# FDR® UPSTREAM®

Unattended
Backup/Restore Software
for PCs and LANs
to MVS Mainframes

# WORKSTATION/SERVER
# Version 2.5.4

## Installation and User's Guide

INNOVATION® DATA PROCESSING

**CORPORATE HEADQUARTERS:** 275 Paterson Ave, Little Falls, NJ 07424 • (973) 890-7300 • Fax: (973) 890-7147
**E-mail: support@fdrinnovation.com • sales@fdrinnovation.com • http://www.innovationdp.fdr.com**

| EUROPEAN OFFICES: | FRANCE | GERMANY | NETHERLANDS | UNITED KINGDOM | NORDIC COUNTRIES |
|---|---|---|---|---|---|
| | 01-49-69-94-02 | 089-489-0210 | 036-534-1660 | 0208-905-1266 | +31-36-534-1660 |

# Table of Contents
# FDR/UPSTREAM Workstation/Server
# Version 2.5.4

**1. INTRODUCTION**
- **1.1.1.** Overview . . . 1-1
- **1.1.2.** UPSTREAM Features . . . 1-2
- **1.1.3.** What is FDR/UPSTREAM Workstation . . . 1-7
  - **1.1.3.1.** FDR/UPSTREAM (US.EXE) . . . 1-7
  - **1.1.3.2.** Configurator (USCFG.EXE) . . . 1-7
  - **1.1.3.3.** Unattended Operations (USSTART.EXE) . . . 1-7
  - **1.1.3.4.** Automated Novell Logins and ULTra Profiles (SETNOV.EXE) . . . 1-8
  - **1.1.3.5.** FDR/UPSTREAM ULTra (ULTra and LANCOPY) . . . 1-8
  - **1.1.3.6.** FDR/UPSTREAM Novell Auto-Recall . . . 1-8
- **1.1.4.** FDR/UPSTREAM's Architecture . . . 1-9
- **1.1.5.** Backup Strategies . . . 1-10
  - **1.1.5.1.** Scenario #1: Full and Incremental Backups to Tape . . . 1-11
  - **1.1.5.2.** Scenario #2: Full Backups on Tape and Incrementals on Disk . . . 1-12
  - **1.1.5.3.** Scenario #3: Full and Incremental Backups on Disk . . . 1-13
  - **1.1.5.4.** Duplicate Files . . . 1-14
- **1.1.6.** Communications Architecture . . . 1-16
  - **1.1.6.1.** Using APPC . . . 1-16
  - **1.1.6.2.** Using TCP/IP . . . 1-16
- **1.1.7.** FDR/UPSTREAM OS/2 . . . 1-17
- **1.1.8.** FDR/UPSTREAM Windows . . . 1-18
- **1.1.9.** FDR/UPSTREAM Windows NT . . . 1-19
- **1.1.10.** FDR/UPSTREAM DOS . . . 1-20
- **1.1.11.** FDR/UPSTREAM AIX . . . 1-21

**2. How to Use FDR/UPSTREAM**
- **2.2.1.** Backing up Servers . . . 2-2
  - **2.2.1.1.** LAN Attached Workstations . . . 2-2
  - **2.2.1.2.** FDR/UPSTREAM on the Server . . . 2-4
- **2.2.2.** Backing up Workstations . . . 2-6
  - **2.2.2.1.** FDR/UPSTREAM on Each Workstation . . . 2-6
  - **2.2.2.2.** FDR/UPSTREAM ULTra . . . 2-6
- **2.2.3.** Scheduling . . . 2-9
  - **2.2.3.1.** Planning . . . 2-9
  - **2.2.3.2.** Implementation . . . 2-9
  - **2.2.3.3.** PC Scheduled (Initiated) . . . 2-10
  - **2.2.3.4.** Host Initiated . . . 2-10
  - **2.2.3.5.** Remote PC Scheduled . . . 2-11
- **2.2.4.** Parameter Files . . . 2-12
- **2.2.5.** Backup Profiles . . . 2-14
- **2.2.6.** Host Storage Management . . . 2-16
  - **2.2.6.1.** Scenario #1: Large Servers/Limited Host Disk . . . 2-19
  - **2.2.6.2.** Scenario #2: Servers and Workstations . . . 2-20

**3. OS/2**
- **3.3.1.** Overview . . . 3-1
  - **3.3.1.1.** Requirements . . . 3-1
- **3.3.2.** Installing FDR/UPSTREAM . . . 3-2
  - **3.3.2.1.** Diskette Installation . . . 3-2
  - **3.3.2.2.** CD-ROM Installation . . . 3-2
- **3.3.3.** Files Included . . . 3-4
- **3.3.4.** Configuration Overview . . . 3-8
  - **3.3.4.1.** Configuring for TCP/IP . . . 3-8
  - **3.3.4.2.** Configuration for APPC - Overview . . . 3-8

**3.3.5.** Pre-PC Configuration Issues . . . 3-9
**3.3.5.1.** Configuring VTAM. . . . 3-9
**3.3.5.2.** Token-Ring Considerations. . . . 3-11
**3.3.5.3.** FDR/UPSTREAM MVS Issues . . . 3-12
**3.3.6.** Configuring the APPC Software. . . . 3-13
**3.3.7.** Configuring Communications Manager/2 . . . 3-14
**3.3.7.1.** Starting the Setup Program . . . 3-14
**3.3.7.2.** Profile List Sheet. . . . 3-15
**3.3.7.3.** Token-Ring Adapter Parameters. . . . 3-16
**3.3.7.4.** Local Node Characteristics . . . 3-17
**3.3.7.5.** Connections List . . . 3-19
**3.3.7.6.** Connection Dialog. . . . 3-20
**3.3.7.7.** Partner LU Dialog . . . 3-21
**3.3.7.8.** Local LU Dialog . . . 3-23
**3.3.7.9.** Mode Definition . . . 3-24
**3.3.7.10.** Transaction Program Definition . . . 3-25
**3.3.7.11.** The Final Steps . . . 3-26
**3.3.8.** Configuring IBM Communications Server. . . . 3-28
**3.3.8.1.** Starting the Setup Program . . . 3-28
**3.3.8.2.** Profile List Sheet. . . . 3-29
**3.3.8.3.** Token-Ring Adapter Parameters. . . . 3-30
**3.3.8.4.** Local Node Characteristics . . . 3-31
**3.3.8.5.** Connections List . . . 3-32
**3.3.8.6.** Connection Dialog. . . . 3-34
**3.3.8.7.** Partner LU Dialog . . . 3-35
**3.3.8.8.** Local LU Dialog . . . 3-36
**3.3.8.9.** Mode Definition . . . 3-38
**3.3.8.10.** Transaction Program Definition . . . 3-39
**3.3.8.11.** The Final Steps . . . 3-41
**3.3.9.** PC FDR/UPSTREAM Configuration. . . . 3-42
**3.3.9.1.** Configuring for an SNA Host Connection . . . 3-43
**3.3.9.2.** Configuring for a TCP/IP Host Connection . . . 3-43
**3.3.9.3.** Completing the Configuration. . . . 3-44

**4. Windows**
**4.4.1.** Overview. . . . 4-1
**4.4.1.1.** Requirements. . . . 4-1
**4.4.2.** Installing FDR/UPSTREAM . . . 4-2
**4.4.3.** Files Included . . . 4-4
**4.4.4.** Configuration Overview . . . 4-8
**4.4.4.1.** Configuring for TCP/IP. . . . 4-8
**4.4.4.2.** APPC Configuration Overview. . . . 4-8
**4.4.5.** Pre-PC Configuration Issues. . . . 4-9
**4.4.5.1.** Configuring VTAM. . . . 4-9
**4.4.5.2.** Token-Ring Considerations. . . . 4-10
**4.4.5.3.** Novell Considerations (Windows 3.1) . . . 4-12
**4.4.5.4.** FDR/UPSTREAM MVS Issues . . . 4-12
**4.4.6.** Configuring the APPC Software. . . . 4-14
**4.4.6.1.** Remotely Attachable Transaction Program Profiles. . . . 4-15
**4.4.7.** Attachmate/DCA Irma for the Mainframe. . . . 4-17
**4.4.7.1.** Token-Ring Configuration . . . 4-17
**4.4.7.2.** Local LU Definition . . . 4-20
**4.4.7.3.** Partner LU Definition . . . 4-21
**4.4.7.4.** Mode Definition . . . 4-23
**4.4.7.5.** Invokable TPs . . . 4-25
**4.4.7.6.** Problems. . . . 4-27
**4.4.8.** Wall Data RUMBA® . . . 4-28
**4.4.8.1.** The RUMBA Configurator . . . 4-28
**4.4.8.2.** Token Ring Connection . . . 4-28
**4.4.8.3.** Mode Configuration . . . 4-30
**4.4.8.4.** Remote LUs. . . . 4-31
**4.4.8.5.** Local LU . . . 4-31
**4.4.8.6.** Transaction Program Definition . . . 4-32

**4.4.8.7.** Running with RUMBA . . . . . 4-34
**4.4.8.8.** Problems . . . . . 4-34
**4.4.9.** IBM Networking Services/DOS® Configuration . . . . . 4-35
**4.4.9.1.** Installing NS/DOS . . . . . 4-35
**4.4.9.2.** Modifying your AUTOEXEC.BAT . . . . . 4-35
**4.4.9.3.** Copying the Sample NS/DOS Configuration Files . . . . . 4-36
**4.4.9.4.** Modifying CONFIG.NSD . . . . . 4-36
**4.4.9.5.** Other .NSD files . . . . . 4-36
**4.4.9.6.** Starting NS/DOS . . . . . 4-37
**4.4.10.** Microsoft SNA Server (Windows Requestors) . . . . . 4-38
**4.4.11.** PC FDR/UPSTREAM Configuration . . . . . 4-39
**4.4.11.1.** Configuring for an SNA Host Connection . . . . . 4-40
**4.4.11.2.** Configuring for a TCP/IP Host Connection . . . . . 4-40
**4.4.11.3.** Completing the Configuration . . . . . 4-41

**5. Windows NT**
**5.5.1.** Overview . . . . . 5-1
**5.5.1.1.** Requirements . . . . . 5-1
**5.5.2.** Installing FDR/UPSTREAM . . . . . 5-2
**5.5.3.** Files Included . . . . . 5-4
**5.5.4.** PC FDR/UPSTREAM Configuration . . . . . 5-8
**5.5.4.1.** Configuring for a SNA Host Connection . . . . . 5-9
**5.5.4.2.** Configuring for a TCP/IP Host Connection . . . . . 5-9
**5.5.4.3.** Completing the Configuration . . . . . 5-10
**5.5.5.** SNA Configuration Overview . . . . . 5-11
**5.5.6.** Pre-PC Configuration Issues . . . . . 5-12
**5.5.6.1.** Configuring VTAM . . . . . 5-12
**5.5.6.2.** Token-Ring Considerations . . . . . 5-13
**5.5.6.3.** FDR/UPSTREAM MVS Issues . . . . . 5-14
**5.5.7.** Configuring SNA Server . . . . . 5-16
**5.5.8.** SNA Server v2.x Connection Configuration . . . . . 5-17
**5.5.8.1.** Service Configuration . . . . . 5-17
**5.5.8.2.** Connection Configuration . . . . . 5-18
**5.5.9.** SNA Server v3.x Connection Configuration . . . . . 5-22
**5.5.9.1.** Server Properties . . . . . 5-22
**5.5.9.2.** Add a Link Service . . . . . 5-23
**5.5.9.3.** Add a Connection . . . . . 5-24
**5.5.10.** MS SNA Server in FDR/UPSTREAM . . . . . 5-29
**5.5.11.** Transaction Program Definition . . . . . 5-32
**5.5.12.** Advanced MS SNA Server . . . . . 5-35
**5.5.12.1.** Problems . . . . . 5-35
**5.5.13.** Manually Configuring SNA Server v2 . . . . . 5-37
**5.5.13.1.** Local LU Configuration . . . . . 5-37
**5.5.13.2.** Mode Configuration . . . . . 5-38
**5.5.13.3.** Partner LU Configuration . . . . . 5-39
**5.5.14.** Manually Configuring SNA Server v3 . . . . . 5-41
**5.5.14.1.** Local LU Configuration . . . . . 5-41
**5.5.14.2.** Mode Configuration . . . . . 5-42
**5.5.14.3.** Partner LU Configuration . . . . . 5-44
**5.5.15.** FDR/UPSTREAM and Windows/NT . . . . . 5-47
**5.5.15.1.** Security . . . . . 5-47
**5.5.15.2.** Add the User to the Administrators group . . . . . 5-48
**5.5.15.3.** Authorizing the Security Hive . . . . . 5-50
**5.5.15.4.** Using UPSTREAM to Back up Another Windows NT PC . . . . . 5-51
**5.5.15.5.** Running as a Service . . . . . 5-51
**5.5.15.6.** Transaction Program Definition for a Service . . . . . 5-52
**5.5.15.7.** Using a Service to Back up Network Drives . . . . . 5-54

**6. DOS**
**6.6.1.** Overview . . . . . 6-1
**6.6.1.1.** Requirements . . . . . 6-1
**6.6.2.** Installing FDR/UPSTREAM . . . . . 6-2
**6.6.2.1.** Installation from Floppies . . . . . 6-2

**6.6.2.2.** Installation from CD-ROM . . . . . 6-3
**6.6.3.** Files Included . . . . . 6-5
**6.6.4.** Configuration Overview . . . . . 6-10
**6.6.4.1.** Configuring for TCP/IP . . . . . 6-10
**6.6.4.2.** Configuration Overview . . . . . 6-10
**6.6.5.** Pre-PC Configuration Issues . . . . . 6-11
**6.6.5.1.** Configuring Host Software . . . . . 6-11
**6.6.5.2.** Token-Ring Considerations . . . . . 6-13
**6.6.5.3.** Novell Considerations . . . . . 6-13
**6.6.5.4.** FDR/UPSTREAM MVS Issues . . . . . 6-14
**6.6.6.** Configuring the APPC Software . . . . . 6-16
**6.6.7.** IBM APPC/PC® Configuration . . . . . 6-17
**6.6.7.1.** APPC/PC Token-Ring Configuration . . . . . 6-18
**6.6.8.** IBM Networking Services/DOS® Configuration . . . . . 6-20
**6.6.8.1.** Installing NS/DOS . . . . . 6-20
**6.6.8.2.** Modifying your AUTOEXEC.BAT . . . . . 6-20
**6.6.8.3.** Copying the Sample NS/DOS Configuration Files . . . . . 6-20
**6.6.8.4.** Modifying CONFIG.NSD . . . . . 6-21
**6.6.8.5.** Other .NSD files . . . . . 6-21
**6.6.9.** AdaptSNA Token-ring (802.2) Configuration . . . . . 6-23
**6.6.9.1.** Performance . . . . . 6-28
**6.6.9.2.** SDLC Connection Issues . . . . . 6-28
**6.6.9.3.** Coax Connection Issues . . . . . 6-29
**6.6.9.4.** AutoSync Connection Issues . . . . . 6-30
**6.6.10.** Eicon Configuration . . . . . 6-31
**6.6.10.1.** Configure the card . . . . . 6-31
**6.6.10.2.** Configure the link (PU) . . . . . 6-32
**6.6.10.3.** Configure APPC . . . . . 6-32
**6.6.11.** PC FDR/UPSTREAM Configuration . . . . . 6-34
**6.6.11.1.** Configuring for a SNA Host Connection . . . . . 6-35
**6.6.11.2.** TCP/IP Configuration . . . . . 6-38
**6.6.11.3.** Completing your Configuration . . . . . 6-39

**7. UNIX**
**7.7.1.** Overview . . . . . 7-1
**7.7.1.1.** System Requirements . . . . . 7-1
**7.7.2.** Installation . . . . . 7-2
**7.7.3.** Configuration . . . . . 7-4
**7.7.3.1.** Configuring for TCP/IP . . . . . 7-4
**7.7.3.2.** Configuring for SNA/APPC . . . . . 7-4
**7.7.4.** Pre-Server/Workstation Configuration Issues . . . . . 7-5
**7.7.4.1.** Configuring Host Software . . . . . 7-5
**7.7.4.2.** Token-Ring Considerations . . . . . 7-7
**7.7.4.3.** FDR/UPSTREAM MVS Issues . . . . . 7-7
**7.7.5.** Configuring SNA Server . . . . . 7-9
**7.7.5.1.** Defining a Local LU . . . . . 7-9
**7.7.5.2.** Defining a Side Information Profile . . . . . 7-10
**7.7.5.3.** Defining a Partner LU Profile . . . . . 7-12
**7.7.5.4.** Defining a Mode Profile . . . . . 7-13
**7.7.5.5.** Defining a Transaction Program Profile . . . . . 7-14
**7.7.5.6.** Defining a Partner LU Location Profile . . . . . 7-16
**7.7.5.7.** Verifying and Testing . . . . . 7-17
**7.7.6.** Configuring FDR/UPSTREAM . . . . . 7-19
**7.7.6.1.** The FDR/UPSTREAM User Interface . . . . . 7-19
**7.7.6.2.** Communications Configuration . . . . . 7-19
**7.7.6.3.** Configuring for a SNA Host Connection . . . . . 7-20
**7.7.6.4.** Configuring for a TCP/IP Host Connection . . . . . 7-21
**7.7.6.5.** Completing the Configuration . . . . . 7-21
**7.7.7.** Backups & Restores . . . . . 7-23
**7.7.7.1.** Backups . . . . . 7-23
**7.7.7.2.** Command Line . . . . . 7-23
**7.7.7.3.** Logical and Physical Volumes . . . . . 7-24
**7.7.7.4.** UNIX Summary . . . . . 7-24

**8. YOUR FIRST BACKUP**
**8.8.1.** Overview . . . . . 8-1
**8.8.2.** Running FDR/UPSTREAM . . . . . 8-2
**8.8.3.** Specifying a Default Parameter File . . . . . 8-3
**8.8.4.** Running a Backup . . . . . 8-11

**9. YOUR FIRST RESTORE**
**9.9.1.** Overview . . . . . 9-1
**9.9.2.** List and Restore . . . . . 9-1
**9.9.3.** List Backups . . . . . 9-4
**9.9.4.** Finalize Restore . . . . . 9-8

**10. Performance**
**10.10.1.** Overview . . . . . 10-1
**10.10.2.** Performance Dialog . . . . . 10-1
**10.10.2.1.** CPU Test . . . . . 10-2
**10.10.2.2.** Screen I/O Test . . . . . 10-2
**10.10.2.3.** File I/O Test . . . . . 10-2
**10.10.2.4.** Backup - No MVS I/O . . . . . 10-3
**10.10.2.5.** VSAM Performance Test . . . . . 10-4
**10.10.2.6.** Raw Communications Test - PC Send . . . . . 10-4
**10.10.2.7.** Raw Communications Test - MVS Send . . . . . 10-4
**10.10.3.** SNA Tuning Parameters . . . . . 10-5
**10.10.3.1.** CM/2 Session Status . . . . . 10-5
**10.10.3.2.** Other APPCs . . . . . 10-5
**10.10.3.3.** Frame Size . . . . . 10-5
**10.10.3.4.** Token-Ring Window Counts . . . . . 10-6
**10.10.4.** Other Performance Improvements . . . . . 10-7
**10.10.4.1.** Duplicate Files . . . . . 10-7
**10.10.4.2.** Local Backups . . . . . 10-7
**10.10.4.3.** Line speed . . . . . 10-7
**10.10.4.4.** APPC . . . . . 10-7
**10.10.4.5.** Multiple PCs . . . . . 10-8
**10.10.4.6.** Bridges and Routers . . . . . 10-8
**10.10.4.7.** Test Times . . . . . 10-8
**10.10.4.8.** Screen Savers . . . . . 10-8
**10.10.4.9.** Server Compression . . . . . 10-8
**10.10.4.10.** Record Size Tuning . . . . . 10-8
**10.10.4.11.** (DOS only) Don’t use USMEM.EXE . . . . . 10-9
**10.10.4.12.** Careful use of Compression . . . . . 10-9

**11. THE FDR/UPSTREAM PROGRAM**
**11.11.1.** Overview . . . . . 11-1
**11.11.2.** When FDR/UPSTREAM Starts . . . . . 11-2
**11.11.2.1.** Read and Verify Files . . . . . 11-2
**11.11.2.2.** *(DOS only)* Verify APPC and Start Communications . . . . . 11-2
**11.11.2.3.** Check for Failed Backups and/or Restores . . . . . 11-3
**11.11.2.4.** Start Unattended Operations . . . . . 11-3
**11.11.2.5.** Check for Remote Initiates . . . . . 11-3
**11.11.2.6.** Registration . . . . . 11-3
**11.11.2.7.** Automatic Update . . . . . 11-3
**11.11.3.** The FDR/UPSTREAM Menus . . . . . 11-4
**11.11.3.1.** File Menu . . . . . 11-4
**11.11.3.2.** Action Menu . . . . . 11-7
**11.11.3.3.** Communications Menu . . . . . 11-8
**11.11.3.4.** Remote Menu . . . . . 11-8
**11.11.3.5.** Management Menu . . . . . 11-9
**11.11.3.6.** Security Menu . . . . . 11-9
**11.11.4.** Backup Specs . . . . . 11-10
**11.11.5.** Migration . . . . . 11-13
**11.11.5.1.** File Migration . . . . . 11-13
**11.11.5.2.** Usage notes . . . . . 11-15

**11.11.5.3.** File Retention vs. Backup Retention . . . . . 11-15
**11.11.5.4.** Last Access Date. . . . . 11-16
**11.11.5.5.** Migration as Part of Backups . . . . . 11-16
**11.11.5.6.** Migration Inquiries and Restores . . . . . 11-17
**11.11.6.** More Backup/Restore Parameters . . . . . 11-18
**11.11.6.1.** Reporting . . . . . 11-21
**11.11.6.2.** Exclude List . . . . . 11-21
**11.11.6.3.** Local Backups. . . . . 11-23
**11.11.7.** More Specification Parameters. . . . . 11-25
**11.11.8.** Restore and Inquiry (old) . . . . . 11-28

**12. Automated Backups and Restores**
**12.12.1.** Overview . . . . . 12-1
**12.12.2.** Concepts . . . . . 12-2
**12.12.3.** Guidelines for Automated Backups and Restores . . . . . 12-4
**12.12.3.1.** Automated Backups . . . . . 12-6
**12.12.3.2.** Automated Restores . . . . . 12-8
**12.12.4.** Specifying Schedules in the Configurator . . . . . 12-11
**12.12.5.** Running USSTART (Auto Start) . . . . . 12-14
**12.12.5.1.** The USSTART Status Display . . . . . 12-15
**12.12.5.2.** Problems with USSTART . . . . . 12-15
**12.12.6.** Unattended Remote Functions . . . . . 12-17

**13. Novell Considerations**
**13.13.1.** Overview . . . . . 13-1
**13.13.2.** Planning . . . . . 13-2
**13.13.2.1.** Planning what and when to backup . . . . . 13-2
**13.13.2.2.** Open files . . . . . 13-2
**13.13.2.3.** How you use Novell Features. . . . . 13-2
**13.13.3.** The Bindery . . . . . 13-4
**13.13.4.** Backing Up Novell Information. . . . . 13-5
**13.13.5.** Logging on as the Supervisor. . . . . 13-7
**13.13.6.** NetWare Directory Services. . . . . 13-11
**13.13.6.1.** Planning . . . . . 13-11
**13.13.6.2.** Security. . . . . 13-11
**13.13.6.3.** Installation . . . . . 13-12
**13.13.6.4.** Configuration . . . . . 13-12
**13.13.6.5.** USNDS Operations. . . . . 13-13
**13.13.6.6.** Backups and Restores of NDS . . . . . 13-14
**13.13.7.** Restoring a Complete Server . . . . . 13-15
**13.13.7.1.** Restoring a NetWare v3.x Server . . . . . 13-15
**13.13.7.2.** Restoring a NetWare v4.x Server . . . . . 13-15
**13.13.8.** Novell Auto-Recall. . . . . 13-16
**13.13.8.1.** Introduction. . . . . 13-16
**13.13.8.2.** Migration . . . . . 13-17
**13.13.8.3.** The Components. . . . . 13-18
**13.13.8.4.** Installation and Configuration of the Server Component. . . . . 13-21
**13.13.8.5.** Installation and Configuration of the Recall Component. . . . . 13-24
**13.13.8.6.** The User Component . . . . . 13-26

**14. IBM LAN Server Considerations**
**14.14.1.** UNC Names for OS/2. . . . . 14-2
**14.14.2.** Planning . . . . . 14-3
**14.14.2.1.** Planning what and when to backup . . . . . 14-3
**14.14.2.2.** Open files . . . . . 14-3
**14.14.3.** Backing up system files . . . . . 14-4
**14.14.3.1.** IBM LAN Server and Microsoft LAN Manager . . . . . 14-4
**14.14.3.2.** HPFS 386 . . . . . 14-4
**14.14.4.** Restoring system files. . . . . 14-6
**14.14.4.1.** Restoring OS/2 system files . . . . . 14-6
**14.14.4.2.** Restoring IBM & Microsoft LAN system files . . . . . 14-6
**14.14.4.3.** Restoring HPFS 386 ACLs. . . . . 14-7

**14.14.4.4.** Disaster Recovery . . . . . 14-7

**15. Windows NT Server Considerations**
**15.15.1.** Planning the Backup/Restore Process . . . . . 15-2
**15.15.1.1.** Planning what and when to backup . . . . . 15-2
**15.15.1.2.** Open files . . . . . 15-3
**15.15.2.** Backing Up a Windows NT Machine. . . . . 15-4
**15.15.3.** Restoring a Windows NT Machine . . . . . 15-6
**15.15.4.** Recovering a Windows NT Machine . . . . . 15-7
**15.15.4.1.** Preparing the Disaster Recovery Package . . . . . 15-7
**15.15.4.2.** Procedure for Recovering a Windows NT machine . . . . . 15-8
**15.15.4.3.** Using TCP/IP to Recover the Windows NT Target System. . . . . 15-8
**15.15.4.4.** Using a SNA Product to Recover the Windows NT Target System . . . . . 15-8
**15.15.4.5.** After restoring a Windows NT Server . . . . . 15-9

**16. Banyan Considerations**
**16.16.1.** Overview . . . . . 16-1
**16.16.2.** Planning . . . . . 16-2
**16.16.2.1.** StreetTalk . . . . . 16-2
**16.16.2.2.** Complete Server Backup . . . . . 16-2
**16.16.2.3.** Security . . . . . 16-3
**16.16.2.4.** Planning what and when to backup . . . . . 16-3
**16.16.2.5.** Open files . . . . . 16-3
**16.16.2.6.** Reducing StreetTalk Information . . . . . 16-3
**16.16.2.7.** Restrictions and Warnings . . . . . 16-4
**16.16.3.** Backups by StreetTalk name . . . . . 16-5
**16.16.4.** Restores by StreetTalk name . . . . . 16-8
**16.16.4.1.** Version Inquiries. . . . . 16-8
**16.16.4.2.** File Inquiries . . . . . 16-9
**16.16.4.3.** StreetTalk name Restores . . . . . 16-11

**17. Disaster Recovery**
**17.17.1.** Introduction . . . . . 17-1
**17.17.2.** When a Disaster Occurs . . . . . 17-2
**17.17.2.1.** Recovery of MVS . . . . . 17-2
**17.17.2.2.** Recovery of FDR/UPSTREAM MVS . . . . . 17-2
**17.17.2.3.** Accessibility of UPSTREAM MVS to your PC Data . . . . . 17-2
**17.17.2.4.** Recovery of your Communications Environment . . . . . 17-3
**17.17.2.5.** Recovering the PC Hardware and Software . . . . . 17-3
**17.17.2.6.** Recovery of your PC or File Server . . . . . 17-4
**17.17.3.** Recovery Issues . . . . . 17-5
**17.17.3.1.** Novell NetWare . . . . . 17-5
**17.17.3.2.** IBM or Microsoft LAN Server or OS/2 Workstations . . . . . 17-5
**17.17.3.3.** Microsoft NT and NT Advanced Server. . . . . 17-5
**17.17.3.4.** Banyan Vines . . . . . 17-6
**17.17.3.5.** Windows 95 . . . . . 17-6
**17.17.4.** Recovery Worksheets . . . . . 17-7

**18. FDR/UPSTREAM ULTra**
**18.18.1.** Overview . . . . . 18-1
**18.18.2.** DOS Workstations . . . . . 18-2
**18.18.2.1.** RESET.EXE . . . . . 18-3
**18.18.3.** OS/2 Workstations . . . . . 18-4
**18.18.4.** Windows Workstations. . . . . 18-6
**18.18.5.** Workstation Messages . . . . . 18-8
**18.18.6.** The FDR/UPSTREAM Requestor Component . . . . . 18-9
**18.18.6.1.** Creating an ULTra Profile . . . . . 18-9
**18.18.6.2.** Using ULTra Profiles . . . . . 18-11
**18.18.7.** The LANCOPY Requestor Component . . . . . 18-12
**18.18.7.1.** Copying files. . . . . 18-12
**18.18.7.2.** Directory Listings . . . . . 18-12
**18.18.8.** Tuning. . . . . 18-14

**18.18.9.** Recovering a Failed OS/2 Workstation . . . . . 18-16
**18.18.9.1.** Performing Regular Backups . . . . . 18-16
**18.18.9.2.** Preparing Recovery Diskettes. . . . . 18-16
**18.18.9.3.** Creating the Recovery Diskettes. . . . . 18-17
**18.18.9.4.** If you don't have BOOTDISK . . . . . 18-17
**18.18.9.5.** Copying NetBIOS Support Files . . . . . 18-18
**18.18.9.6.** Copying IPX Support Files. . . . . 18-19
**18.18.9.7.** Modifying the CONFIG.SYS (NetBIOS). . . . . 18-19
**18.18.9.8.** Modifying the CONFIG.SYS and NET.CFG (IPX). . . . . 18-19
**18.18.9.9.** Copy ULTra . . . . . 18-20
**18.18.9.10.** Testing . . . . . 18-20
**18.18.9.11.** Recovering an OS/2 PC . . . . . 18-21
**18.18.10.** Recovering a Windows 95 Workstation. . . . . 18-22
**18.18.10.1.** Create a Recovery Diskette . . . . . 18-22
**18.18.10.2.** Perform a Recovery Backup. . . . . 18-23
**18.18.10.3.** Perform Regular Backups. . . . . 18-23
**18.18.10.4.** Recovering Windows 95 . . . . . 18-24
**18.18.10.5.** Restoring Long File Names . . . . . 18-24
**18.18.10.6.** Restore your Remaining Data. . . . . 18-24
**18.18.11.** ULTra Workstation Compression . . . . . 18-25
**18.18.12.** Additional ULTra Features . . . . . 18-26

**19. Duplicate Files**
**19.19.1.** In Backups... . . . . 19-2
**19.19.2.** In Restores... . . . . 19-3
**19.19.3.** Maintenance and Notes . . . . . 19-4

**20. Management**
**20.20.1.** Profile Management . . . . . 20-2
**20.20.2.** Profile Configuration . . . . . 20-4
**20.20.3.** Status . . . . . 20-11
**20.20.4.** Reporting . . . . . 20-15
**20.20.4.1.** Running Simple Reports. . . . . 20-15
**20.20.4.2.** Limiting Reports. . . . . 20-16
**20.20.4.3.** How Modifiers Work . . . . . 20-17
**20.20.4.4.** Unattended Reporting. . . . . 20-17
**20.20.5.** Personalizing FDR/UPSTREAM . . . . . 20-21
**20.20.6.** Registration. . . . . 20-26
**20.20.7.** Automatic Updates . . . . . 20-29
**20.20.7.1.** FDR/UPSTREAM Updates . . . . . 20-29
**20.20.7.2.** UNIX notes. . . . . 20-32
**20.20.7.3.** ULTra Updates . . . . . 20-32
**20.20.7.4.** Roll-Back . . . . . 20-34

**21. File Transfer**
**21.21.1.** Using File Transfer. . . . . 21-2
**21.21.1.1.** Host Setup. . . . . 21-2
**21.21.1.2.** File Transfer Dialog . . . . . 21-2
**21.21.1.3.** Other File Transfer Features. . . . . 21-4

**22. FDRSOS Integration**
**22.22.1** Introduction . . . . . 22-1
**22.22.2** FDRSOS Timestamp File . . . . . 22-2
**22.22.3** Highlighted Back to FDRSOS Full . . . . . 22-3

**23. ADVANCED CONFIGURATION**
**23.23.1.** Advanced Configuration Options . . . . . 23-2
**23.23.2.** Setting Configuration Parameters. . . . . 23-5

**24. ADVANCED FDR/UPSTREAM**
**24.24.1.** Overview . . . . . 24-1

**24.24.2.** Program Return Codes . . . . . 24-2
**24.24.2.1.** RETCODE.EXE . . . . . 24-3
**24.24.3.** Job Execution . . . . . 24-4
**24.24.3.1.** Locally Specifying . . . . . 24-4
**24.24.3.2.** Job Return Codes . . . . . 24-6
**24.24.4.** Requesting a Remote UPSTREAM Function . . . . . 24-8
**24.24.5.** User Defined Translation Tables . . . . . 24-11
**24.24.6.** Sequential Disk Size Allocation . . . . . 24-12
**24.24.7.** Fixed Fonts . . . . . 24-14
**24.24.8.** USMODIFY . . . . . 24-15
**24.24.8.1.** Example 1 - Changing Passwords . . . . . 24-15
**24.24.8.2.** Example 2 - Changing several parameters . . . . . 24-15
**24.24.8.3.** Notes . . . . . 24-16
**24.24.9.** FDR/UPSTREAM Tuning . . . . . 24-17
**24.24.9.1.** Program Priority (OS/2 only) . . . . . 24-17
**24.24.9.2.** Backup fine tuning . . . . . 24-18
**24.24.9.3.** Backup file tuning. . . . . 24-18
**24.24.9.4.** Record Packing . . . . . 24-19
**24.24.10.** FDR/UPSTREAM Parameters . . . . . 24-20
**24.24.11.** Environment Variables. . . . . 24-32

**25. SECURITY CONSIDERATIONS**
**25.25.1.** Overview . . . . . 25-1
**25.25.2.** User IDs and Passwords . . . . . 25-2
**25.25.3.** Personalization . . . . . 25-3

**26. Running More Than One Copy**
**26.26.0.1.** VTAM configuration . . . . . 26-1
**26.26.0.2.** Installing the PC software. . . . . 26-1
**26.26.0.3.** Communications configuration. . . . . 26-1
**26.26.0.4.** FDR/UPSTREAM Configuration. . . . . 26-2
**26.26.0.5.** US.EXE Issues . . . . . 26-2

**27. Databases and FDR/UPSTREAM**
**27.27.1.** FDR/UPSTREAM and IBM Database Manager . . . . . 27-2
**27.27.1.1.** How DB2/2 does backups. . . . . 27-2
**27.27.1.2.** Planning . . . . . 27-2
**27.27.1.3.** FDR/UPSTREAM MVS Setup . . . . . 27-4
**27.27.1.4.** DB2/2 setup . . . . . 27-4
**27.27.1.5.** Installation and configuration of SQLUEXIT . . . . . 27-4
**27.27.1.6.** Using FDR/UPSTREAM within DB2/2. . . . . 27-5
**27.27.1.7.** How DB2UEXIT works . . . . . 27-5
**27.27.2.** Lotus Notes. . . . . 27-7
**27.27.3.** FDR/UPSTREAM and Oracle . . . . . 27-8
**27.27.3.1.** **Overview** . . . . . 27-8
**27.27.3.2.** Establishing Your Archive Mode . . . . . 27-8
**27.27.3.3.** Selecting Your ORACLE BACKUP Mode . . . . . 27-9
**27.27.3.4.** **Selecting Your UPSTREAM BACKUP Mode** . . . . . 27-9
**27.27.3.5.** Identifying ORACLE Database Components. . . . . 27-10
**27.27.3.6.** **Backing Up Your ORACLE Database** . . . . . 27-10
**27.27.3.7.** Database Backup**s** - Overview . . . . . 27-11
**27.27.3.8.** OFFLINE, NOARCHIVELOG Mode Backup. . . . . 27-11
**27.27.3.9.** **OFFLINE, ARCHIVELOG Mode, FULL Backup** . . . . . 27-14
**27.27.3.10.** Tablespace Backup**s** . . . . . 27-17
**27.27.3.11.** **Offline Tablespace Backups** . . . . . 27-18
**27.27.3.12.** **Online Tablespace Backups**. . . . . 27-24
**27.27.3.13.** **Recovering Your ORACLE Database** . . . . . 27-30
**27.27.3.14.** **OFFLINE Mode Recovery**. . . . . 27-30
**27.27.3.15.** **Online, Tablespace Mode Recovery** . . . . . 27-33

**28. Errors**
**28.28.1.** Overview . . . . . 28-1

**28.28.2.** Problem Reporting . . . . . 28-2
**28.28.3.** How Messages are Displayed. . . . . 28-3
**28.28.4.** The Message Log . . . . . 28-5
**28.28.5.** USLOGCLR (Clearing the Log) . . . . . 28-6
**28.28.6.** The Message File . . . . . 28-7
**28.28.7.** DOS Memory . . . . . 28-9
**28.28.7.1.** USMEM.EXE . . . . . 28-9
**28.28.8.** APPC Return Codes . . . . . 28-11
**28.28.9.** DOS APPC/PC Log Exit Codes . . . . . 28-21
**28.28.10.** DOS APPC/PC Trace . . . . . 28-25
**28.28.11.** TCP/IP Messages . . . . . 28-26
**28.28.12.** Operating System Messages. . . . . 28-27
**28.28.13.** Novell Errors . . . . . 28-29
**28.28.14.** NetBIOS Errors . . . . . 28-49

**29. FDR/UPSTREAM Messages**

# 1 INTRODUCTION

## 1.1. Overview

Congratulations! You have purchased security for your workstation or server that is second to none. FDR/UPSTREAM will assure that your valuable data is stored where it is safest; on your MVS mainframe. FDR/UPSTREAM's advanced features also make it ideal for software and data distribution, as well as workstation-to-workstation file transfer.

Enterprise computing is a new far-reaching technological phenomenon. Companies are taking a close look at their "total" computing resources. Those that find ways to get the "parts" that comprise this "total" to work together, will emerge with a dramatic competitive edge.

Innovation Data Processing, with its FDR/UPSTREAM Unattended Backup Software, has taken the practical point of view for integrating open architecture, and internetworking within a cooperative processing environment. Now workstations, network file servers, and UNIX systems can backup and restore their respective hard disks to a MVS mainframe. FDR/UPSTREAM makes disaster recovery for workstations, networks and UNIX systems a reality today.

# 1.2. UPSTREAM Features

FDR/UPSTREAM is a state-of-the-art communications application. Its many features include:

- **Multiprotocol**

  FDR/UPSTREAM can use both SNA/APPC (Advanced Program-to-Program Communications) or TCP/IP to transmit data. APPC is IBM's communications component of SAA (System Applications Architecture), their blueprint for the future. And only APPC applications can take advantage of APPN (Advanced Peer-to-Peer Networking), IBM's networking architecture of the future.

  TCP/IP is the communications architecture for the Internet and is the open protocol of the future. FDR/UPSTREAM gives you the choice of both.

- **Unattended Operation**

  You can set up FDR/UPSTREAM to run at any combination of times. Backups and restores can be workstation scheduled to run daily, weekly, monthly, quarterly, and yearly in virtually unlimited numbers of combinations. If you leave your machine running, FDR/UPSTREAM will run, saving the current application and restoring it as if nothing had happened.

  Backups and restores can be started by host batch jobs which can be integrated into your existing scheduling system allowing totally unattended operation. You can even start backups or restores from other workstations or servers!

- **Fast**

  FDR/UPSTREAM uses APPC and TCP/IP, and due to its unique, efficient architecture, FDR/UPSTREAM is the fastest micro-to-mainframe communications facility available today. Selective levels of compression combined with our unique Merge backup and duplicate file suppression facilities assure fast transfers on even slow links.

  The advanced Merge backup facility allows FDR/UPSTREAM MVS to construct a complete full backup without the workstation having to read or send all the files resulting in extraordinary performance. Using a sophisticated technique, the workstation sends a "picture" of the drive(s) to be backed up to the MVS software which uses prior backups plus changed files to construct the fulls. This technique is completely safe as it properly reflects deleted files, changed files, renamed files, and just about anything else.

  To improve restore performance, FDR/UPSTREAM supports local storage of backup data which allows much faster restores while maintaining the advantages of centralized control.

  FDR/UPSTREAM on MVS is a native VTAM or TCP/IP application written entirely in assembler. This provides the fastest possible transfers as well as MVS CPU efficiency.

- **Duplicate Files**

  Merge backups include a duplicate file transmission suppression facility. Often similar files are duplicated on many machines across your enterprise. These include operating system files, word processors, and other software packages. FDR/UPSTREAM can be set up to recognize certain files as duplicates not transmit them saving transmission time, and optionally reducing host storage requirements.

  Determination of duplicate files can be performed manually, by manually backing up the files which are known to be duplicates to our duplicate file database. You can also activate our unique automated method which will identify duplicate files for you automatically.

If you store your duplicate files in our host repository and have duplicate files across your disk or server, FDR/UPSTREAM MVS will send only one copy of the file to the workstation/server and it will be written to all of its locations on the disk or server. This duplicate file restore facility reduces transmission time and is a unique feature of FDR/UPSTREAM.

- **Efficient**

  FDR/UPSTREAM can store your workstation data on the mainframe in compressed format. This conserves mainframe disk space. FDR/UPSTREAM can also write your data directly to tape for long term storage. If your mainframe shop has little free disk space available, your data remains safe.

- **Secure**

  FDR/UPSTREAM interfaces to the most common mainframe security systems including RACF, ACF2 and TOPSECRET. This level of security is unavailable with any pure workstation backup system.

- **LAN Aware**

  A wide variety of PC LAN server file systems are supported including:

  - **Novell NetWare®**: FDR/UPSTREAM provides comprehensive support for NetWare 3.x and 4.x including special NetWare file and directory characteristics, bindery files, NetWare Directory Services, trustee rights, directory restrictions, unattended login and more...
  - **IBM LAN Server®**: FDR/UPSTREAM provides comprehensive support for all versions of IBM LAN Server with backup/restore capabilities of file and directory extended attributes, HPFS386 ACLs and more...
  - **Microsoft Windows NT Advanced Server®**: Support includes backup/restore of long file names, registry hives, system log files, enabling of privileges and more...
  - **Microsoft LAN Manager®**: Support includes backup/restore of long file names, extended attributes and more...
  - **Banyan Vines®**: Banyan support includes backup and restores of StreetTalk®database information as well as file and directory access rights lists support. You can back up StreetTalk names and files within file services with a single specification, using wildcards and StreetTalk names (including entire servers). Restores are simple and user friendly for both StreetTalk names and files. Services, users, profiles, security and more can be backed up and restored easily.

- **PC Workstations**

  FDR/UPSTREAM can back up your data through your Novell or NetBIOS LAN. You only need to install the complete FDR/UPSTREAM product on a single workstation to provide *all* of the workstations in your internetwork with the advantages of FDR/UPSTREAM backup. The FDR/UPSTREAM ULTra (UPSTREAM LAN Transport) facility contacts LAN attached workstations using advanced IPX/SPX or NetBIOS peer-to-peer communications, reducing configuration, installation and training time. Profiles can be set up which allow you to automate backups and restores for groups of workstations with a single workstation or host controlled command. Compression is performed by the workstation to improve performance.

  The FDR/UPSTREAM ULTra version also includes a program to perform workstation-to-workstation copies (LANCOPY) with the ease of XCOPY and the advantages of workstation-to-workstation copies not having to go through the server. LANCOPY will also allow directory listings of remote workstations showing *all* files including system and hidden files.

- **Multi-platform support:**

  FDR/UPSTREAM operates on a variety of operating systems platforms. Each version supports the base UPSTREAM functions of merge backups, single file, directory and full volume restore and more.

- **DOS**:Besides the base functions of UPSTREAM, the DOS version is optimized for low-memory use, supports Novell and Banyan servers, provides a sophisticated scheduler that clears memory before running UPSTREAM, supports FDR/UPSTREAM ULTra and more...
- **OS/2**: FDR/UPSTREAM OS/2 is a 32-bit Presentation Manager product that provides a graphical user interface, backs up and restores system files, includes workstation/server recovery tools, supports virtually every server system that can be connected to OS/2 and more...
- **Windows**: FDR/UPSTREAM Windows supports Windows 3.1, Windows for Workgroups and Windows 95. It includes support for backups/restores of Novell and Banyan file servers, the WINSOCK TCP/IP interface as well as virtually all available SNA/APPCs, ULTra clients and servers and more...
- **Windows NT**: Virtually all of the Windows NT specific features are supported including long file names, HPFS and NTFS file systems, registry hives, system event logs, security ACLs, alternate data streams and more... You can even run FDR/UPSTREAM as a service.
- **AIX**: FDR/UPSTREAM AIX is a full 32-bit UNIX application allowing backups and restores of applications files and character special devices on all three primary AIX hardware platforms (Power-1, Power-2 and PowerPC). It also contains support for symbolic links, preservation of the last access date, support for SNA Server and TCP/IP and more...

### ❑ File Transfer

FDR/UPSTREAM allows you to transfer native files between your workstation/server and your host. Its extensive support includes text and binary files, a choice of host disk or tape, a variety of host file formats including GDGs, PDS members, flat files and more makes FDR/UPSTREAM a powerful tool for interchanging data between your different computer systems.

With its blazing speed and unattended nature, FDR/UPSTREAM allows you to easily integrate data on your different systems into your operational needs.

### ❑ Controllable

FDR/UPSTREAM has 4 ways that file data can be stored on the host:

- Directly to host tape (without having to be staged through a host file)
- SMS controllable disk files
- In a VSAM repository
- Batch archive to tape

Your data, where you want it.

You can also delete backups from a workstation, allowing a workstation administrator total control of his data.

### ❑ Safe

With FDR/UPSTREAM your mission critical data is saved on the most safe and secure repository in your company, your MVS mainframe.

### ❑ Data Sharing and Software Distribution

When your data is stored in a location common to all users, other users can easily retrieve it (subject to security constraints). Since FDR/UPSTREAM is so fast and easy to use, many of your data sharing and distribution requirements are easily solved.

FDR/UPSTREAM's fast, secure and unattended nature makes it ideal for software distribution. Since restores can be automated (with local or remote control), workstation users can backup their critical applications nightly, and at the same time retrieve new software and data updates.

Workstation batch files can be run by remote control, further facilitating distribution and installation of data and software.

An automatic update facility is included within FDR/UPSTREAM so that it's own workstation software can be automatically updated with fall back and sophisticated administrator control.

- **Restart/Recovery**

  FDR/UPSTREAM can restart a failed backup or restore that was terminated due to communications line failure, host unavailability, or just about anything else... at the point it failed. For backups, FDR/UPSTREAM also can remember files that were unavailable due to LAN data sharing issues, and retry those files as well.

- **Easy to Use**

  Because FDR/UPSTREAM is transparent in normal operation, there is nothing for a user to maintain on a day-to-day basis. A system administrator can set up a FDR/UPSTREAM backup system in a matter of minutes, not hours. The CUA screens are familiar and simple to use with point and shoot operation, thereby allowing you to select the backup or restore versions and files quickly and easily.

- **Intelligent**

  FDR/UPSTREAM always remembers where your data is. If you write your data to tape, FDR/UPSTREAM will remember exactly which tape it is stored on, thereby completely eliminating another user record keeping headache.

  FDR/UPSTREAM can *automatically* restore your files back to a specific date, intelligently combining restores of full and incremental backups.

- **Incremental Backups**

  FDR/UPSTREAM checks the archive bit before sending files from the workstation to MVS, thereby allowing you to send only changed files to the mainframe. UPSTREAM allows you to reset archive bits at your discretion allowing differential backups which provides even greater flexibility.

- **Verifiable**

  FDR/UPSTREAM logs backups, restores, communications failures, failed files, statistics, and just about every other significant event on BOTH sides of the operation. This ensures that both the workstation user and the mainframe administrator can monitor, control and verify every aspect of backups and restores.

  Workstation reporting includes all files backed up and restored, files deleted, as well as version and file information requested from the host.

  The FDR/UPSTREAM MVS reporting facility is available from a workstation allowing complex, comprehensive reports showing the status of all operations performed, all backups, sequential disk utilization, and more. Reports are displayed on the PC and written to a text file for later viewing and manipulation.

- **Flexible**

  Because FDR/UPSTREAM operates as an APPC application using SNA or TCP/IP services provided by a large number of different vendors, you can use FDR/UPSTREAM in just about any communications environment. Link types include Token-ring, Ethernet, coax, LAN gateways, SDLC, HDLC and X.25, async, Auto-Sync®, and others.

  FDR/UPSTREAM supports wildcards in backup specifications. To increase flexibility, you can also specify which files NOT to backup. This allows you to be able to specify a generic path name, and then exclude the files in that specification which you do not want included.

- **True Migration**

  FDR/UPSTREAM can be used for true archiving because your data is stored on your company MVS mainframe. As free disk space on workstations and LAN servers become critically low, you can use FDR/UPSTREAM to back up those files which are rarely used and then automatically delete those files which have been successfully backed up. Inquiries and restores of migrated files is easy and trouble-free.

  FDR/UPSTREAM can automatically detect those files which have not been accessed for a given amount of time and automatically include them in a backup. Combining this process with the deletion process, you have true Grooming.

  FDR/UPSTREAM can even automatically recall files from the host when a user accesses them on your Novell file server. This auto-recall facility gives you true mainframe like storage management on your file servers.

- **FDRSOS Integration**

  FDR/UPSTREAM can be used in conjunction with FDRSOS to provide file level restores and restores of incrementals since your last FDRSOS full.

- **Central Control**

  With FDR/UPSTREAM storing workstation data centrally on your MVS mainframe, all the advantages of central storage including security, data sharing, and disaster recovery are realized while continuing to enjoy the performance, ease of use and other benefits of decentralized computing.

  Backups or restores can be initiated by MVS batch jobs or a central workstation, allowing you control of your environment without user intervention.

  You can optionally synchronize your workstation or file server's date and time to the mainframe's date and time assuring that all of your computers stay on track.

- **Jobs Execution**

  FDR/UPSTREAM can run programs and batch jobs on the workstation/server using local or host control. This allows you to integrate your backup and recovery plans with existing databases and other applications.

  Host jobs can also be submitted under workstation/server control. This helps integrate such functions as FDRSOS into FDR/UPSTREAM processing.

- **Complete**

  FDR/UPSTREAM maintains all the information about the file. The file date and time, its original size and attributes are all maintained transparently.

# 1.3. What is FDR/UPSTREAM Workstation

FDR/UPSTREAM Workstation consists of several programs, each with their respective functions. Only the most significant programs are mentioned here. As a whole UPSTREAM allows you to perform backups, restores, software distribution, data sharing, file transfer and a variety of other useful benefits.

### 1.3.1. FDR/UPSTREAM (US.EXE)

This is the main FDR/UPSTREAM program. In Windows, Windows NT and OS/2 it is a graphical facility and in DOS and UNIX a full screen character based program with an interface very similar to Microsoft Windows®. It is fully controllable with parameter files and from the command line, and allows you to easily automate to whatever extent you choose, for backups, restores, data inquiry, profile management, configuration and file transfer.

This is the program that provides the main user interface, performs the communications, logs events, allows inquiries and many other features.

The user interface for backups and restores, besides allowing you to perform “ad hoc” functions, also allows you to save this information to parameter files which can be used for later backups or restores, or for unattended backups or restores. With US.EXE you can save as many of these as you wish, and retrieve or modify them at your will.

FDR/UPSTREAM’s inquiry functions allow you to communicate with the mainframe to see exactly the parameters that you specified with a backup. Once you have chosen a backup to view or restore, you can also see which files are actually available for restore with their dates, times and other DOS directory displays. If you have archived your information to tape, a tape mount will not have to be done for inquiries, thus easing the load on the data center operations staff.

### 1.3.2. Configurator (USCFG.EXE)

The configurator provides a way of specifying SNA or TCP/IP parameters for establishing communications connections and various other FDR/UPSTREAM parameters. It also allows you to specify Schedules and Personalization.

Schedules are specific dates and times that automatic backups occur. You can specify a very large number of schedules, thus allowing you to use FDR/UPSTREAM to perform a variety of functions. You could specify some schedules for automatic backups (incremental daily’s, complete weekly’s), some schedules for automatic restores (for software or other data distribution), and other schedules for data sharing. With FDR/UPSTREAM... the control is yours.

Personalization allows you to restrict access to specific UPSTREAM function (backups, restores, etc.), limit access to specific backup profiles or even specific directories. Personalization profiles can be set up to be multi-user aware and follow a user across workstations on a network.

### 1.3.3. Unattended Operations (USSTART.EXE)

Unattended operations are performed in DOS by a TSR (terminate and stay resident) program and in Windows, Windows NT, OS/2 and UNIX by a small control program. We recommend that you include this program in your system startup files (AUTOEXEC.BAT, STARTUP.CMD, etc.).

When USSTART loads, it reads the configuration file created by the configurator and memorizes the schedules specified. It then calculates the next schedule and waits for it to occur. In DOS, there is a hot-key (ALT-U) which allows you to see the next time UPSTREAM will run automatically.

When it comes time to run FDR/UPSTREAM, USSTART displays a screen which allows you to skip this schedule if you are using your machine. Otherwise (in DOS), your ENTIRE application will be saved (including graphics screens) and FDR/UPSTREAM will be run with the parameter file you specified. When FDR/UPSTREAM returns, it calculates the next schedule to run, and restores your application for use.

### 1.3.4. Automated Novell Logins and ULTra Profiles (SETNOV.EXE)

For the LAN version using Novell NetWare® profiles can be defined, which allow you to automate SUPERVISOR access to file servers in a safe, secure manner. SETNOV.EXE is a program which allows you to define multiple server logins.

SETNOV can also be used to define ULTra profiles. These are groups of workstations which can be identified and backed up using a single UPSTREAM request. SETNOV also displays the ULTra workstations which are currently active on the LAN.

### 1.3.5. FDR/UPSTREAM ULTra (ULTra and LANCOPY)

If you have a Novell or NetBIOS LAN, and have purchased the FDR/UPSTREAM ULTra version, you can direct FDR/UPSTREAM requests to go to workstations which have installed ULTra. ULTRA is a small TSR (about 20K) in DOS and a small control program in Windows, OS/2 and Windows NT which services file access requests across the LAN using IPX/SPX or NetBIOS. Requestors which can use ULTRA's facilities include FDR/UPSTREAM (for backups, restores, as of...restores, clock setting, etc.), and LANCOPY which allows workstation-to-workstation file copies without going through a server.

### 1.3.6. FDR/UPSTREAM Novell Auto-Recall

The FDR/UPSTREAM Auto-Recall facility is a complex set of server programs (USRECALL.NLM), programs on the FDR/UPSTREAM machine (NWRECALL.EXE) and optionally notification programs on the workstation (USNOTIFY.EXE) which provide transparent, unattended automatic recalls of migrated files. See the Novell and Migration chapters for more information.

# 1.4. FDR/UPSTREAM's Architecture

UPSTREAM on MVS maintains a repository for all backups. This repository contains all the backup information that you specified, information about the files (including file dates/times, attributes and the like), and the file data itself.

Backups are separated in several ways, hierarchically:

- Backup Profiles. These are user specified ways of identifying groups of backups. You can have many backup profiles for each machine, or limit it to one.
- Version Dates. Each backup is identified by a version date. This is the date and time (on MVS) that the backup was originally created. Combined with the backup profile, version dates allow you to identify a particular backup.
- File specs. Each backup can have one or more file specs. A file spec is a file specification combined with other information. This allows you to be able to backup whole drives, partial directories, some files, or one file and have them grouped together. File specs can also be used to exclude files or specify migration options.

Backup file data can be stored in four different ways on the host:

- Direct to tape. Each backup is written directly to tape. This allows for the smallest amount of mainframe disk storage at the cost of a limited number of concurrent backups or restores.
- Sequential disk files. Each backup is stored in a separate disk file which can be controlled by SMS or any other migration facility. This provides high backup performance and integration with existing services at the cost of temporary disk space.
- In a VSAM KSDS repository (Keyed/Duplicate). This provides high transfer performance, at the cost of mainframe disk space. This backup type is used with the predefined backup profile name USTDUPFL as the duplicate file database. Except for duplicate file handling, we do not recommend using Keyed backups because it doesn't support the merge facility.
- Archived to tape (Archive). All data is stored in the VSAM repository and then later off-loaded to tape. This provides high backup performance and good tape management at the cost of temporary mainframe disk space. We do not recommend using Archive backups because it doesn't support the merge facility.

Selective or complete inquiries or restore can be retrieved easily by a user from the FDR/UPSTREAM workstation screens.

# 1.5. Backup Strategies

There are virtually an infinite number of ways to integrate FDR/UPSTREAM into your workstation-to-host backup strategy. The merge backup facility is the easiest to use and the most powerful.

Merge backups allow FDR/UPSTREAM workstation to send a fraction of the total data on a disk (only slightly more than an incremental backup) and still end up with a complete full backup. Using a sophisticated technique, the workstation sends a "picture" of the drive(s) to be backed up to the MVS software which uses prior backups plus changed files to construct the fulls.

Advantages:

- A full backup is created with the workstation only having to send a tiny fraction of the total data.
- Easier to use, understand and manage. The beauty of a merge backup is that all the complexity is behind the scenes; it is actually as easy or easier to use than non-merge backups.
- If you are using tapes for incremental backups, you use fewer tapes.

A single backup profile name is used for full and incremental backups. It is recommended that this single profile represent a single, unchanging group of file specs (a single server, a single workstation disk, etc.). The facility is flexible enough for you to be able to add or remove drives, however it is not recommended that you use a profile for more than one entity.

The technique requires that you perform a first-time baseline full backup of the file specifications that you wish to maintain. In this backup you do transmit all the files. Once you have this full backup, you only perform incremental merge and full merge backups.

Incremental merge backups are backups where only the changed files are transmitted to the host. The first incremental merge backup after a full backup begins a new tape or disk file; subsequent incremental merge backups to tape can be appended to previous incremental backups. Subsequent incremental merge backups to disk create new host files.

Full merge backups are appended to the end of the incremental backup file (if the backup is on tape), or a new file is created (if the incremental backups are on disk). The workstation sends all the changed files as well as the directory entries for all files which it does not believe have been changed. FDR/UPSTREAM MVS then examines this list of files, retrieves from old backups (the last full or any of the prior incrementals) files which haven't changed, and requests from the workstation files which it doesn't have.

Before FDR/UPSTREAM will use a file from a previous backup, it will verify a match of the complete, qualified file name, the last modified date and time, and the file size. If any one of these conditions do not match, the host software will request a transmission of the file from the workstation. The result is a complete full backup without the workstation software having to read or send the vast majority of the data, and deleted files are properly reflected.

The following scenarios should help you understand the process.

### 1.5.1. Scenario #1: Full and Incremental Backups to Tape

Figure 1-1 shows a diagram of how a tape only system would work. This scenario's advantages are :

- No intermediate disk requirements. Data goes directly to tape without having to be staged through disk. This saves on host disk space.
- Good for large volumes of data.
- Only one tape is created per backup cycle (usually weekly). This saves on tape management.

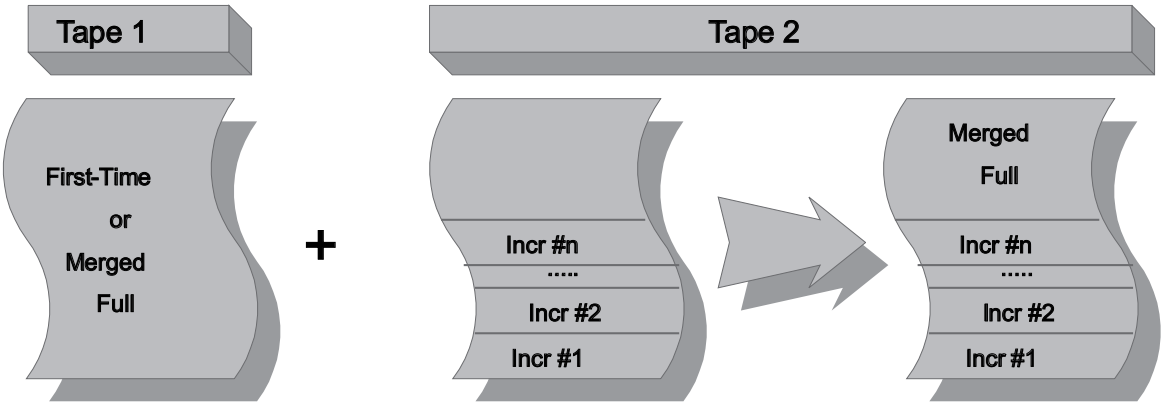


**Figure 1-1**
**Full and Incremental Backups To Tape**

When you run your first-time full backup, a new tape is created which holds all the data on your workstation or server (tape 1 in the figure). The first incremental after a full creates a new tape (tape 2 in the figure). Subsequent incrementals are appended to the end of the tape volume.

After your first-time full backup, subsequent full volume backups are merge full backups. In a merge full backup the workstation sends up all the files changed since the last incremental as well as a directory listing. The tape holding the prior full backup is mounted (tape 1) as well as the tape holding the incremental data (tape 2).

Any files that have not been changed will be copied from tape 1 to tape 2 unless they are in the incremental on tape 2 already. The files which were in the prior incrementals on tape 2 are recorded as being part of both the full and incremental backups. The host software then requests any files which could not be matched.

Note that if you are using retention periods for host tapes, the period begins with the first incremental. You will want to allow for this in your planning.

The result is a new full backup tape which will be used as the source for the next full backup.

### 1.5.2. Scenario #2: Full Backups on Tape and Incrementals on Disk

Figure 1-2 shows a diagram of how a system where full backups are stored on tape and incremental backups are stored on disk would work. You may want to choose this option if you have sufficient host disk space and do not wish to mount the backup tapes each day. In addition, recovery is quicker for incremental data.

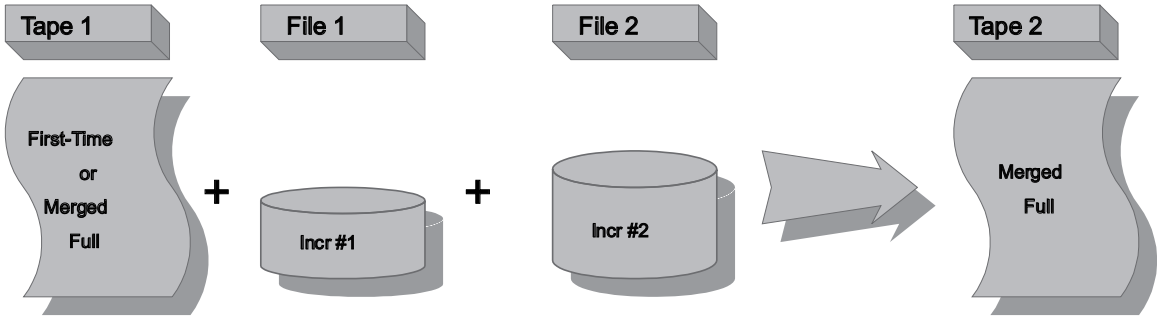


**Figure 1-2**
**Full Backups on Tape, Incrementals on Disk**

When you run your first-time full backup, a new tape is created which holds all the data on your workstation or server (tape 1 in the figure). The first incremental creates a file on disk (file 1). Subsequent incrementals create new files on disk.

When you run a merge full backup, the tape holding the prior full backup is mounted (tape 1) as well as the new tape for output (tape 2). The workstation sends up all the files changed since the last incremental as well as a directory listing.

The host software then copies the workstation files which were requested in the workstation directory listing from the incrementals or its most current backup on the last full (tape 1) to the new full (tape 2). The host software then requests any files which could not be matched.

The result is a new full backup tape which will be used as the source for the next full backup.

### 1.5.3. Scenario #3: Full and Incremental Backups on Disk

Figure 1-3 shows a diagram of how a disk only system would work. You may want to use this scenario for small backups or where restore speed is important.

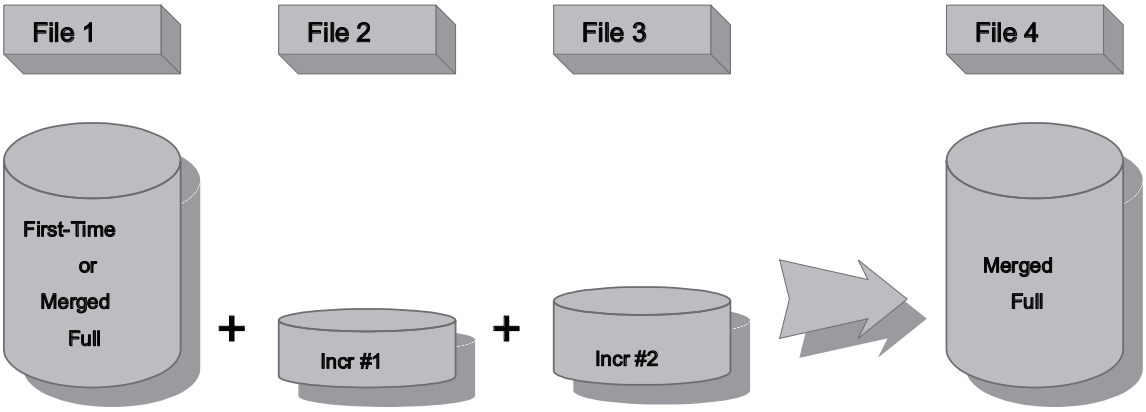


**Figure 1-3**
**Full and Incremental Backups on Disk**

When you run your first-time full backup, a new file is created on the host which holds all the data on your workstation or server (file 1 in the figure). Each incremental afterwards creates a new host file (file 2 and file 3).

When you run a merge full backup, the workstation transmits the changed files and they are written to the new full backup file (file 4). Then the host software takes the directory listing transmitted from the workstation and copies from the incrementals (file 2 and file 3) and the last full (file 1) all of the unchanged files.

The host software then requests any files which could not be matched. The result is a new full backup file which will be used as the source for the next full backup.

### 1.5.4. Duplicate Files

In many cases, software packages such as operating systems, word processors and others must be installed on every workstation or in separate directories. Most of the files associated with this software (executable programs, graphics, screen layouts, etc.) will be identical on each workstation; only configuration and data files are usually unique. Although FDR/UPSTREAM has no problem backing them up from each workstation or directories on the server, the additional overhead to backup many copies of this software when a new version is installed on many workstations or server directories may be considerable.

For example, if you installed Windows 95 on 100 PCs, the next full backup of each of those PCs would have to backup many megabytes of Windows data from each PC, most of which is identical on each PC. The slower the link between the PC and FDR/UPSTREAM MVS, the greater will be the impact of this duplication. This impact could be dramatically reduced if duplicated data can be transmitted to the host just once.

This is what the FDR/UPSTREAM Automatic Duplicate File Support does. Duplicate File Support keeps special backups of files which may be duplicated; during merge backups it will identify files that it already has in that list and include them in the backup without transmitting them. The duplicate backups can be built by UPSTREAM automatically without any effort on your part, or you can manually select duplicate files.

- If you enable the DUPLICATE=AUTO option in the FDR/UPSTREAM MVS configuration (see the FDR/UPSTREAM MVS manual) duplicate files can be identified without doing any special backups. For files with modification date/times over 30 days old, FDR/UPSTREAM MVS will monitor merge backups from all workstation/servers looking for apparent duplicates (same file name, modification date/time and size). When such a file has been backed up twice, a copy of that file will be saved under the USTDUPFL backup profile, just as if a Keyed backup had been done as described below.
- If you wish you can manually identify files which are known to be duplicates and perform Keyed backups using the USTDUPFL backup profile. It is recommended that when you know that files are about to be installed in multiple locations, that you do this thus allowing you to take advantage of duplicate checking immediately.

During a full or incremental merge backup, FDR/UPSTREAM workstation/server will automatically transmit to the host any modified workstation file (based on the archive bit or for UNIX changed since the last backup), unless the modification date/time is greater than 30 days old (or any number of days that you specify). Files not modified or greater than 30 days are not sent; a placeholder record is transmitted. When FDR/UPSTREAM MVS gets to the final step in the backup where it identifies files that must be requested from the workstation since no current copy exists on the host, the duplicate backup support is invoked. Before requesting the unmatched files from the workstation, it will check to see if there is a backup of each such file with a matching name, modification date/time, and file size in the USTDUPFL backup profile. The check does not use the drive/directory qualifier so it will match files which were originally backed up on other drives or directories.

If a match is found under USTDUPFL, the matching file is including in the merge backup using the file as stored in the database. There are two options for processing matched files, controlled by either the **DUPLICATE** option in the host configuration or the **Don't Copy Duplicates to Backup** option in Profile Configuration for the backup profile used in the backup:

- **Copy:** The matching files will be copied from the Keyed backup into the merge backup output file. In subsequent backups, that copy will be carried forward by normal merge backup processing and the file in the Keyed backup will not be used again. This has the advantage that the backup files will be self-contained and the backups under USTDUPFL can be deleted once all workstations that require them has done backups.
- **Don't Copy:** The merge backup output file will be updated with pointers to the duplicated files in the Keyed backup. During any restore that requires those files, the Keyed backups in the FDR/UPSTREAM MVS file data cluster will be read. This has the advantage that the backups will be faster (since there is no data movement required for duplicate files), host storage

requirements are reduced, and you can use duplicate file restores. However it does require that the Keyed backups be retained as long as any workstation backup may point to them; it also requires that the current file data cluster be available during disaster recovery. If you set DUPLICATE=NOCOPY in the USTDUPFL profile definition as well, inadvertent deletion of duplicate files will be prevented. If the duplicates are deleted but are still pointed to by the backups of some workstation, FDR/UPSTREAM MVS will detect this and request the files from the workstation during the next full merge backup.

If you select the Don't Copy option (above), FDR/UPSTREAM MVS will automatically enable duplicate file restores. This facility reduces the amount of data transmitted through the host sending placeholder records to the workstation/server and one copy of a file which is stored on multiple locations in the restore. There can be a significant reduction in the amount of data transmitted if there are a large number of the same files stored on your workstation/server.

You should note:

- Duplicate file support will work only if the duplicate files are installed on the workstation without changing the modification date/time. The installation procedure used for most software will create the files with the same modification date/time on all workstations. This support can be used for files other than those associated with software packages, but the duplicate files must have the same modification date/time on each workstation.
- You may want to do the USTDUPFL backup even for existing software products if you plan to start doing new FDR/UPSTREAM merge backups for existing workstations/servers, so that those duplicate files do not need to be transmitted from each workstation. However, the first time full backup function will transmit all files on the workstation and will not invoke the duplicate file support. FDR/UPSTREAM no longer requires the use of the first time full backup, and we recommend that you perform normal full merge backups even if this is the first time for a workstation/server so that you can take advantage of duplicate file support.
- File names (not including drive or directory qualifiers) must be no longer than 30 characters.
- Files stored in the duplicate file database are stored using high compression if any compression was specified during the backup.

# 1.6. Communications Architecture

FDR/UPSTREAM can use one of two different methods to communicate to the host: SNA/APPC and TCP/IP.

### 1.6.1. Using APPC

When using APPC, FDR/UPSTREAM is a SNA (IBM's Systems Network Architecture) layer 7 APPC (Advanced Program-to-Program Communications) communications application. This means that FDR/UPSTREAM uses the APPC services that are already available on your system.

FDR/UPSTREAM on MVS uses the VTAM APPC services that are available to VTAM programs. This assures that FDR/UPSTREAM MVS will be fast and efficient.

FDR/UPSTREAM workstation operates using the services of virtually every APPC implementation available (and more are being added all the time). In many cases you may have APPC already available, or available for a minimal cost. This allows easy integration of FDR/UPSTREAM into your current SNA communications environment.

### 1.6.2. Using TCP/IP

FDR/UPSTREAM can use most of the commercially available TCP/IP implementations. And there is virtually no vendor specific configuration.

# 1.7. FDR/UPSTREAM OS/2

FDR/UPSTREAM OS/2 is perhaps the most full-featured of the entire workstation/server product line. Its many features include:

- Support for all standard FDR/UPSTREAM functions. These include standard backups/restores, merge backups, point-and-shoot restore of individual files, directories, and drives, host status and reporting, file transfer and more...
- IBM, Novell and Banyan file server support. FDR/UPSTREAM offers to ability to perform complete file server backups for IBM LAN Server (all versions) and Novell servers (v3.x and v4.x) and significant backups of Banyan servers.
- Support for a wide variety of OS/2 versions from OS/2 v1.3 to OS/2 v3.x (Warp), Warp Connect and Warp Server.
- Full 32-bit application.
- Full Novell auto-recall support including notification.
- SNA and TCP/IP. SNA support includes all IBM OS/2 SNA products (EE, ES, CM/2 and Comm. Server) as well as the DCA/Microsoft Comm Server/Workstation. TCP/IP support includes the TCP/IP implementations from both IBM and Novell.
- Presentation Manager interface. Virtually all of the FDR/UPSTREAM programs are Presentation Manager programs. Thus it is easy to use and familiar to most users.
- PC Scheduler. FDR/UPSTREAM includes a powerful scheduler that allows PC users or administrators to schedule any combination of backups or restores. The facility can even be used to schedule non-UPSTREAM programs.
- Powerful Host Control. Virtually every FDR/UPSTREAM OS/2 function can be controlled from the host including backups, restores, reporting, restarting failed backups, execution of local programs and host reporting. If you are using IBM CM/2, it's attach manager will even start FDR/UPSTREAM OS/2 if it is not running.
- Multiple, simultaneous backups. OS/2 is a multitasking operating system, and thus you can run multiple copies of FDR/UPSTREAM which will allow better overall throughput when using a single PC to back up multiple servers.
- Very high performance. Added to the high performance and reliability of the OS/2 operating system, FDR/UPSTREAM OS/2 is multithreaded, pre-opening files in advance of their being needed, and reading large blocks of data.
- Reporting of Negotiated CM/2 SNA Performance Values. When FDR/UPSTREAM starts or as requested from a pull down menu, it reports the negotiated RU sizes and pacing values.
- Modification of execution priority. The priority of the running FDR/UPSTREAM program can be modified and saved for later use.
- External control of FDR/UPSTREAM. A separate program USCNTL.EXE is included with FDR/UPSTREAM to allow the setting of priorities, kill the running program, or toggling of the FDR/UPSTREAM trace.

If you are running OS/2 proceed to chapter 3 for the installation and configuration of FDR/UPSTREAM OS/2 and associated communications facilities.

# 1.8. FDR/UPSTREAM Windows

FDR/UPSTREAM Windows is a powerful member of the FDR/UPSTREAM product line. Its many features include:

- Support for all standard FDR/UPSTREAM functions. These include standard backups/restores, merge backups, point-and-shoot restore of individual files, directories, and drives, host status and reporting, file transfer, and more...
- Support for both Windows 3.1 and Windows 95 including long file names and Windows 95 Registry entries.
- Novell and Banyan file server support. FDR/UPSTREAM offers the ability to perform complete file server backups for Novell servers (v3.x and v4.x) and significant backups of Banyan servers. Attachmate Irma for the Mainframe, Rumba, NT SNA Server client, NetWare for SAA, IBM Networking Services/Windows and more... TCP/IP support uses the powerful WINSOCK interface, allowing FDR/UPSTREAM to use the TCP/IP implementations from virtually any vendor.
- PC Scheduler. FDR/UPSTREAM includes a powerful scheduler that allows PC users or administrators to schedule any combination of backups or restores. The facility can even be used to schedule non-UPSTREAM programs.
- Powerful Host Control. Virtually every FDR/UPSTREAM Windows function can be controlled from the host including backups, restores, reporting, restarting failed backups, execution of local programs and host reporting. If you are using SNA, the SNA vendor supplied attach managers will even start FDR/UPSTREAM Windows if it is not running.
- Single diskette recovery for Windows 95 workstations using ULTra.

If you are running Windows proceed to chapter 4 for the installation and configuration of FDR/UPSTREAM Windows and associated communications facilities.

# 1.9. FDR/UPSTREAM Windows NT

FDR/UPSTREAM Windows NT is a powerful member of the FDR/UPSTREAM product line. Its many features include:

- Support for all standard FDR/UPSTREAM functions. These include standard backups/restores, merge backups, point-and-shoot restore of individual files, directories, and drives, host status and reporting, file transfer, and more...
- Support for virtually every feature of Windows NT and Windows NT Advanced Server including long file names, registry hives, system event logs, security ACLs, extended attributes, alternate data streams, and more...
- Ability to operate as both a Windows NT application and as a service.
- Windows NT Advanced Server, Novell and Banyan file server support. A FDR/UPSTREAM Windows NT machine can perform complete file server backups for all of these server types.
- Full Novell auto-recall support including notification.
- SNA and TCP/IP. FDR/UPSTREAM Windows NT supports the Microsoft SNA Server and SNA Workstation products. TCP/IP support uses the powerful WINSOCK interface, allowing FDR/UPSTREAM to use the TCP/IP implementation included with Windows NT or any other vendor. FDR/UPSTREAM allows simple configuration of SNA Server/Workstation through its own facilities.
- PC Scheduler. FDR/UPSTREAM includes a powerful scheduler that allows PC users or administrators to schedule any combination of backups or restores. The facility can even be used to schedule non-UPSTREAM programs.
- Powerful Host Control. Virtually every FDR/UPSTREAM Windows NT function can be controlled from the host including backups, restores, reporting, restarting failed backups, execution of local programs and host reporting. If you are using SNA, the SNA vendor supplied attach managers will even start FDR/UPSTREAM Windows if it is not running.
- Reporting of Negotiated SNA Server/Workstation Performance Values. When FDR/UPSTREAM starts communications, or as requested from a pull down menu, it reports the negotiated RU sizes and pacing values.

If you are running Windows NT proceed to chapter 5 for the installation and configuration of FDR/UPSTREAM Windows NT and associated communications facilities.

# 1.10. FDR/UPSTREAM DOS

FDR/UPSTREAM DOS is a flexible member of the FDR/UPSTREAM product line. Its many features include:

- Support for all standard FDR/UPSTREAM functions. These include standard backups/restores, merge backups, point-and-shoot restore of individual files, directories, and drives, host status and reporting, file transfer and more...
- A CUA "Windows-like" user interface with dialogs, controls and more allowing FDR/UPSTREAM DOS to be used quickly and with minimal training.
- Support for DOS v3.3 and up.
- Low-memory utilization taking advantage of XMS memory with a special, even lower memory version included.
- Novell and Banyan file server support. FDR/UPSTREAM offers to ability to perform complete file server backups for Novell servers (v3.x and v4.x) and significant backups of Banyan servers.
- SNA and TCP/IP. SNA support includes IBM APPC/PC, NetSoft AdaptAPPC, IBM Networking Services/DOS, Novell NetWare for SAA, and more... TCP/IP support is available for both the IBM and Novell TCP/IP implementations.
- PC Scheduler. FDR/UPSTREAM includes a powerful TSR scheduler that allows PC users or administrators to schedule any combination of backups or restores. The facility can even be used to schedule non-UPSTREAM programs.
- Powerful Host Control. Virtually every FDR/UPSTREAM Windows function can be controlled from the host including backups, restores, reporting, restarting failed backups, execution of local programs and host reporting.

If you are running DOS proceed to chapter 6 for the installation and configuration of FDR/UPSTREAM DOS and associated communications facilities.

# 1.11. FDR/UPSTREAM AIX

FDR/UPSTREAM AIX is a flexible member of the FDR/UPSTREAM product line. Its many features include:

- Support for all standard FDR/UPSTREAM functions. These include standard backups/restores, merge backups, point-and-shoot restore of individual files, directories, and drives, host status and reporting, file transfer and more...
- Support is provided for a number of UNIX specific features including long file names, case sensitivity, symbolic links, and more...
- Character special logical and physical volumes.
- FDR/UPSTREAM AIX will operate on any of the three main AIX hardware platforms (Power/1, Power/2 and Power/PC).
- FDR/UPSTREAM AIX provides a full screen interface which takes advantage of the HFT, LFT or AIXTERM terminal and still operates when using dumb terminals or TELNET terminal emulation.
- Command line version of UPSTREAM allows unattended host control or integration into applications.
- Backups and restores can be initiated locally, from the MVS host, another UNIX system, or a PC.
- SNA and TCP/IP. Both SNA Server and the native TCP/IP facilities are supported.
- Powerful Host Control. Virtually every FDR/UPSTREAM AIX function can be controlled from the host including backups, restores, reporting, restarting failed backups, execution of local programs and host reporting.

If you are running AIX proceed to chapter 7 for the installation and configuration of FDR/UPSTREAM AIX and associated communications facilities.

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# 2 How to Use FDR/UPSTREAM

FDR/UPSTREAM is a powerful and sophisticated backup/restore and software distribution product with tremendous flexibility. This section will help you understand some of the ways that you can use the product.

Some of the important issues in using FDR/UPSTREAM are:

- Methods for backing up file servers
- Methods for backing up user's workstations
- Scheduling backups/restores/software distribution
- FDR/UPSTREAM Parameter Files
- Backup Profiles
- Host storage issues

# 2.1. Backing up Servers

The first decision that you must make when backing up servers is whether FDR/UPSTREAM is to reside on the server or on a LAN attached workstation. In several cases FDR/UPSTREAM works in only one way. You may also choose to mix the two methods.

Issues specific to each server vendor are discussed later in this manual. This section is designed to help you understand the different methods available in FDR/UPSTREAM.

**NOTE: Merge backups are always the recommended method for backing up servers.**

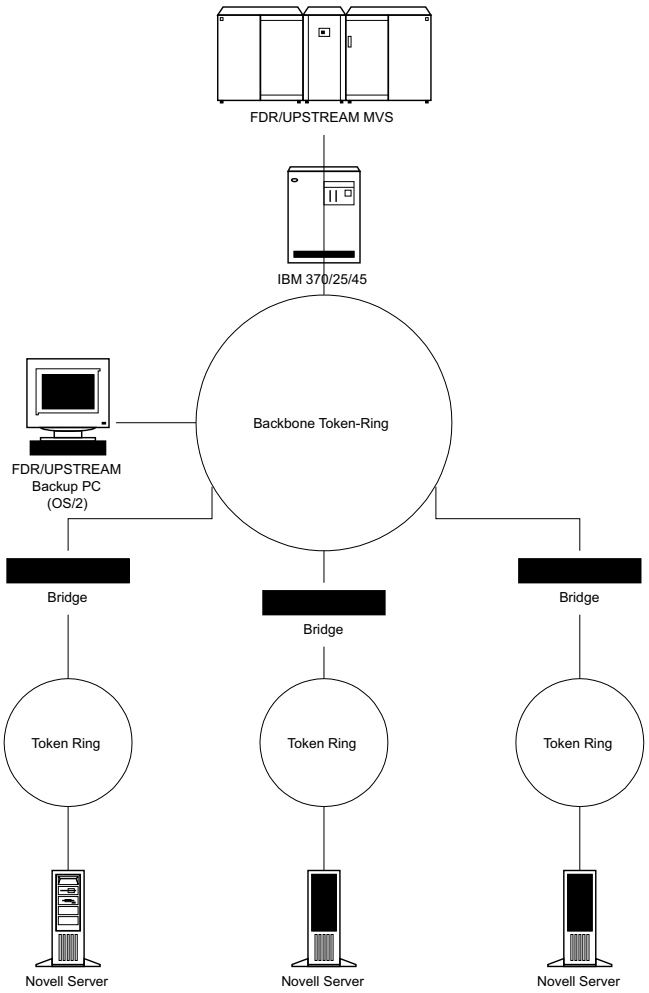
### 2.1.1. LAN Attached Workstations

Using FDR/UPSTREAM on a LAN attached workstation has several advantages:

- **Fault-tolerance:** If the server hardware become inoperable (disk crash, etc.), the system containing FDR/UPSTREAM will still be available and as soon as the server hardware and operating system has been replaced, FDR/UPSTREAM can immediately be available to perform the restore.
- **Server Safety:** Several types of servers (most particularly Novell NLMs) can be crashed by programs running on the server. Backups by LAN attached workstations avoid these problems.
- **Less Server Impact:** By running your backups on another machine, the server's CPU will not be running the backup software, making it more available.
- **Simpler:** Since a single FDR/UPSTREAM LAN attached workstation can back up a number of servers (the Windows, Windows NT and OS/2 versions can even back up more than one server at a time), installation, configuration, and management issues are simplified.
- **Local Backup Storage:** While you can use local backup storage of data if you are running on the server, you must be sure to store your data on another disk to assure recovery in case of disk loss. This is best performed when running UPSTREAM on a workstation other than the server.

If you are using Novell or Banyan file servers, FDR/UPSTREAM **must** reside on a LAN attached workstation. But all FDR/UPSTREAM server backups (except UNIX) can be performed by LAN attached workstations.

The most common way that FDR/UPSTREAM is used on LAN attached workstations to back up servers is by placing the FDR/UPSTREAM machine in a central location (like your computer room) as close to the host device that it is communicating through for performance (few if any bridges or routers). Figure 2-1 shows a sample scenario of a single LAN attached workstation backing up three Novell servers.




In this scenario, a single OS/2 workstation running FDR/UPSTREAM will attach to each of the three Novell file servers in sequence, performing merge backups of each. Note that the bridges are effectively transparent.

There are any number of variants to this scenario. For example:

- Different LAN types are quite common; the FDR/UPSTREAM machine may have a Token-Ring card to attach to the host device Token-Ring and an Ethernet card to attach to the server LAN.
- The FDR/UPSTREAM LAN attached workstations may be close to the servers and further from the host (based on the bridge/router distances imposed). You may do this to optimize server disk speed (often the bottleneck) over host connectivity or to take advantage of compression over slow lines. This also helps reduce backbone LAN traffic.
- Using the FDR/UPSTREAM machine to back up workstations using ULTra.

The number of servers that a LAN attached workstation can back up depends upon several issues. The key to this is the backup “window”: This is the amount of time that you are willing to allow a file server to be backed up. Since you want to perform backups when the fewest number of people are using the server, most backups are performed at night. Thus a typical backup window might be 10 hours: 10 PM to 8 AM. Issues affecting the number of servers that can be backed up within the window are:

- **Performance:** This is the total amount of time to perform a full or incremental backup. Simply, how long it takes to back up each server. Host communications, server access are some of the issues affecting performance. There are a number of performance improving techniques (discussed in the Performance chapter) which can help to improve your server backup performance.
- **How you schedule full vs. incremental merge backups:** Full backups (even full merge backups) take longer than incrementals. If you stagger the fulls so that you don't run all the full backups on the same night, you help to increase the number of servers you can back up within your window.

There are few actual limitations to the number of servers that can be backed up with an FDR/UPSTREAM LAN attached workstation; the only actual one is the number of available drive letters (for IBM and Microsoft file servers). Since Novell and Banyan file servers attach drives dynamically, this is not a limitation.

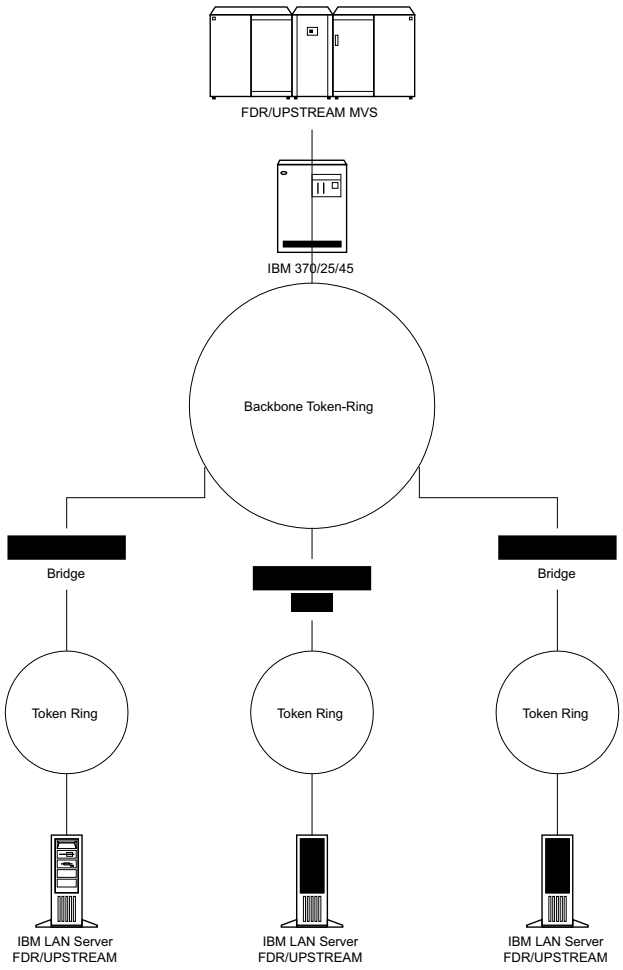
However, the main practical limitation is the number of servers that can be backed up within your backup window. A good rule of thumb is 5 servers per FDR/UPSTREAM PC, but we always recommend testing with your servers in your environment will give you the actual number.

### 2.1.2. FDR/UPSTREAM on the Server

Using FDR/UPSTREAM on the server is the recommended method for backing up IBM, Microsoft and AIX servers. It has several advantages:

- **Performance:** Since performance is so important for both backups and restores, having FDR/UPSTREAM on the server gives you the fastest possible disk read speeds as well as significantly reduced overhead in accessing data. This difference in performance can be up to an order of magnitude.
- **Reducing LAN Traffic:** Since the data does not have to be transmitted over the LAN from the server to the FDR/UPSTREAM machine, the LAN traffic is cut in half.

This method is conceptually quite simple; merely install FDR/UPSTREAM on all the servers you wish to back up; it's virtually identical to backing up a user's workstation (with the added overhead of server specific information). Figure 2-2 shows a sample using FDR/UPSTREAM to back up three IBM LAN Servers.




The most common variants used with this method are using ULTra to backup workstations and also using the FDR/UPSTREAM machines to backup other servers through the LAN (the previous method).

# 2.2. Backing up Workstations

FDR/UPSTREAM offers outstanding features for backing up user's workstations. Its wide array of connectivity options, its unique ULTra feature and more make it the method of choice for backing up user workstations and for distributing software.

The two main methods for backing up workstations are either installing FDR/UPSTREAM on each workstation, or using one or more FDR/UPSTREAM machines with ULTra.

### 2.2.1. FDR/UPSTREAM on Each Workstation

This is the simplest method conceptually, but can be the more complex to implement. Basically, you install the complete FDR/UPSTREAM product on each workstation. The advantages of this method are:

- **Users can perform their own restores:** Since they have the entire product a user can perform their own restores. Since virtually any feature can be restricted using the Personalization facility (including which files can be restored), administrators can still effectively manage the facility.
- **Users can control what they backup:** If a user determines that a directory needs to be backed up immediately, they can just do it, without having to go to an administrator.
- **Users can control when they perform backups:** The PC scheduler becomes available to users allowing control of when backups are most desirable to them.
- **Higher performance:** Since data is only transmitted once, the performance is higher than if ULTra was used.
- **Operates in all FDR/UPSTREAM environments:** ULTra can not be used on TCP/IP LANs (unless NetBIOS is available), or on UNIX workstations.

Note that even with all these advantages, Innovation will most often recommend the ULTra method for backing up workstations.

### 2.2.2. FDR/UPSTREAM ULTra

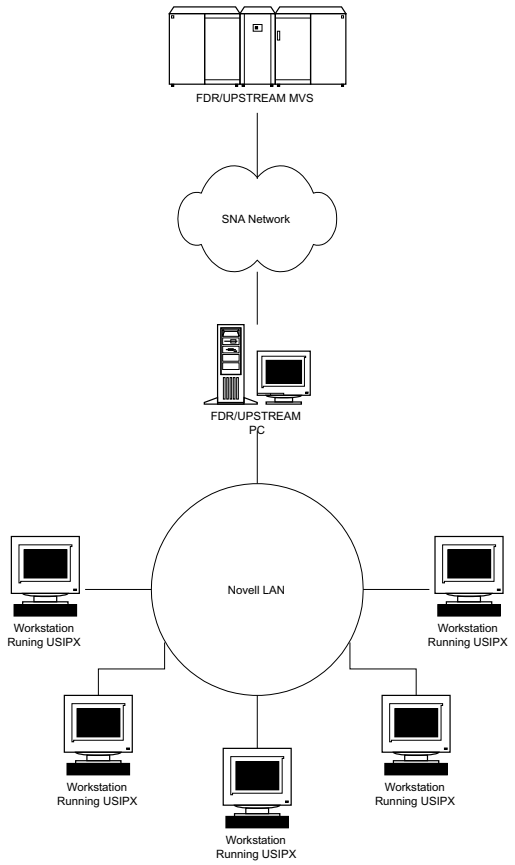
FDR/UPSTREAM ULTra (UPSTREAM LAN Transport) is a powerful facility that allows an FDR/UPSTREAM PC to back up a LAN attached workstation, using LAN protocols. The backup and restore is specified and controlled from the FDR/UPSTREAM PC; the ULTra workstation is basically a slave to the operation.

The process is:

- The FDR/UPSTREAM PC begins the backup (locally or remotely scheduled).
- The specified ULTra LAN Workstation is attached (based on a LAN Workstation Name that is specified when you startup the ULTra software on the workstation).
- The FDR/UPSTREAM PC reads the directory and files as if the disk(s) were directly attached to itself and sends them to the host.

The process is similar for restores.

Figure 2-3 shows how the method works for a Novell LAN with a single FDR/UPSTREAM PC and several IPX/SPX attached workstations. The process is similar for a NetBIOS LAN.




The process is further simplified if you use **ULTra Profiles**. An ULTra Profile is a group of workstations which are similar in configuration (the same number of disk drives, etc.) that you wish to back up or restore to as a group. When you request a backup of several workstations using an ULTra profile, you make a single backup request and FDR/UPSTREAM then performs backups of all the workstations in the profile.

The best part of ULTra Profiles is how easy it is to set up and add a new workstation. The installation of the ULTra software is fast and simple; there are only a few configuration parameters (workstation name, and optional password). And adding a new workstation to the ULTra Profile consists of simple point and shoot commands. ULTra makes backup management of a number of workstations a snap.

Support tools help in ULTra management. The included LANCOPY program allows you to copy files and perform directory listings to and from administrator PCs and ULTra workstations. And the ULTra Profile configuration program can list all active ULTra PCs.

Thus, the advantages of using FDR/UPSTREAM ULTra to backup workstations are:

- **Easy Installation and Configuration:** Adding a new workstation takes only a few minutes; there are no host communications configuration issues.
- **Easy Scheduling:** A single backup or restore request (local or remote) can request any number of workstation backups or restores.
- **Management Tools:** LANCOPY and other ULTra facilities help you to manage workstations, even beyond the scope of backups and restores.

- **Central Control:** Since all backups/restores funnel through a single FDR/UPSTREAM workstation/server, the administration becomes much simpler.
- **Secure:** Since users can't perform backups or restores, there are no security issues.

These advantages make ULTra the backup method of choice for most workstation backups.

# 2.3. Scheduling

Performing ad-hoc backups and restores is the starting point to using FDR/UPSTREAM. But, backups are generally an unattended, scheduled process. They are something that once setup, just work; when you need to perform a restore, you expect to find the files you need.

Software distribution, the act of sending new software or data files to a number of workstations, is also an unattended process.

Scheduling of FDR/UPSTREAM consists of:

- **Planning.** Determining what your repeatable events are, and building a schedule. For backups, this generally means determining what time your backup window starts, how often you want to perform full vs. incremental backups, etc.
- **Implementation:** Implementing your schedule using FDR/UPSTREAM's powerful scheduling and control facilities.

## 2.3.1. Planning

The *UPSTREAM Automated* chapter in this manual helps you plan your backup or software distribution strategies. Some issues to help begin in implementing your plan are:

- When your backup window begins. What time of day for a given day of the week do you want to begin your backup or software distribution and making sure that your machine and files are available during the window.
- How often you wish to perform full vs. incremental backups. We always recommend using the full merge facility. We recommend performing daily incrementals and periodic full merge backups (weekly, bi-monthly, monthly, etc.).
- Access to host resources. Access to tape drives, disk storage space, etc. may affect when you can perform your backups. We recommend consulting with host administrators before finalizing scheduling with FDR/UPSTREAM.
- The performance of the backups. The time it takes to perform a full and incremental backup will affect your scheduling.
- Infrequent events. These may consist of Migration (see later in this chapter), or non-FDR/UPSTREAM functions.

Most users plan incrementals during the week (Monday-Thursday) and full merge backups over the weekend (starting Friday night).

## 2.3.2. Implementation

Once you have decided what you will be backing up, when it will be backed up, and where it will be backed up to, you must decide on the method you will use in requesting this backup. FDR/UPSTREAM offers three ways backups and restores can be started (**initiated**) automatically:

- **Workstation/Server Scheduled:** FDR/UPSTREAM includes a powerful workstation/server scheduler (USSTART). This scheduler allows you to start virtually any function (even non-UPSTREAM functions) unattended in virtually any combination of daily, weekly, monthly and more times.

- **Host Scheduled:** FDR/UPSTREAM workstation/server functions can be requested through batch jobs which can be started using your existing host scheduling system.
- **Remote PC Scheduled:** A workstation/server can request an FDR/UPSTREAM function of another workstation/server. Since FDR/UPSTREAM includes a scheduler, this function can be fully automated.

### 2.3.3. PC Scheduled (Initiated)

The *UPSTREAM Automated* chapter in this manual describes how to set up Workstation Schedules in the Configurator for initiating FDR/UPSTREAM directly or batch or script files which start FDR/UPSTREAM. Worksheets are provided to help you get this straight.

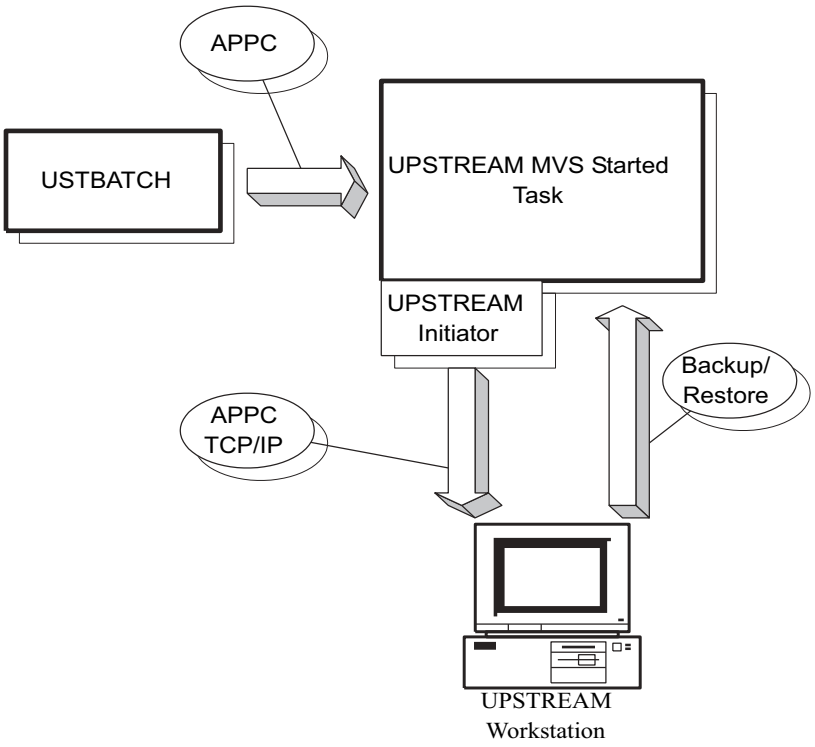
These schedules can be quite sophisticated, consisting of virtually any number of timed daily, weekly, monthly, quarterly or yearly events.

The USSTART program executes these schedules. This program is tailored to your environment. In DOS it is a TSR, in Windows and Windows NT a standard Windows program, in OS/2 a PM program, and in UNIX a command line utility which can be placed in the background. In all cases USSTART is designed to be as unobtrusive as possible, start FDR/UPSTREAM and non-FDR/UPSTREAM functions, and fit nicely into your environment.

### 2.3.4. Host Initiated

Host initiated backups are run through the USTBATCH program; even backup/restore requests generated using the FDR/UPSTREAM MVS ISPF program run through this facility.

Figure 2-4 shows how the USTBATCH process operates. While complex in operation, setup and use are really quite simple - and made even simpler if you use the FDR/UPSTREAM MVS ISPF facility to generate JCL which you then integrate into your existing host scheduling system.




### 2.3.5. Remote PC Scheduled

A workstation/server can request an FDR/UPSTREAM function of another workstation/server either through the mainframe or directly PC-to-PC (see the Advanced Configuration chapter in this manual). Since FDR/UPSTREAM includes a scheduler, this function can be fully automated.

Since this process can be quite complex, we recommend that you use either the host initiated or PC initiated method.

**Figure 2-4**
**USTBATCH Process**

# 2.4. Parameter Files

When you perform many FDR/UPSTREAM functions including backups, restores, unattended functions and the like you are asked if you wish to save your values in an FDR/UPSTREAM parameter file.

Parameter files save all the parameters that you entered: backup profiles, versions, file names, and more. FDR/UPSTREAM's ability to save this information allows you to be able to repeat these functions without having to re-enter the information.

The biggest value of parameter files is in automated, unattended processing. If you wish to run daily incremental and weekly full merge backups, you will create a parameter file for the full backup and a separate parameter file for the incremental.

You can "run" a parameter file in several different ways:

- Select the **Open** option in the **File** menu to read in the values in a parameter file in memory. You can then enter the backup, restore or whatever function dialog was specified and modify the values. You can later either press the <Ok>, or <Save> buttons to leave the dialog and save your parameter changes or pull down the Save option in the File menu to save you parameters after you have left the dialog.
- From the command line when starting FDR/UPSTREAM. This is most commonly used when automating FDR/UPSTREAM for locally initiated functions using the FDR/UPSTREAM local scheduler (USSTART).
- From the host, using the **WSPARM** keyword in USTBATCH processing.

For simplicity sake, most users end up with two parameter files for each entity that they are backing up: a full merge backup and an incremental backup. For example, if you are backing up 3 Novell servers from your FDR/UPSTREAM PC, we would recommend the creation of 6 parameter files as follows:

| Server | Parameter File | Description |
|---|---|---|
| Server1 | SERVER1F.DAT | Full merge backup parameters for Server1. |
| | SERVER1I.DAT | Incremental backup parameters for Server1. |
| Server2 | SERVER2F.DAT | Full merge backup parameters for Server2. |
| | SERVER2I.DAT | Incremental backup parameters for Server2. |
| Server3 | SERVER3F.DAT | Full merge backup parameters for Server3. |
| | SERVER3I.DAT | Incremental backup parameters for Server3. |

| Server | Parameter File | Description |
|---|---|---|
| <none> | RMTPARM.DAT | Supplied parameter file used for handling host initiated backups with SNA in FDR/UPSTREAM Windows, OS/2 and UNIX. |
| <none> | UPSTREAM.DAT | Default UPSTREAM parameter file. Most often used for testing, and ad-hoc backups and restores. |

**Parameter Files on an FDR/UPSTREAM PC**
**Used to Backup up 3 Novell Servers**

Note that the parameter file names include the server name (SERVERn) and have a F or I suffix to indicate that this is either a full or incremental backup parameter file. Most users truncate the server name if it is longer than 6 characters.

Also note **RMTPARM.DAT**. If you are running FDR/UPSTREAM with SNA, the SNA attach manager will start FDR/UPSTREAM for you. RMTPARM.DAT is included to allow FDR/UPSTREAM to wait for host initiates, service them, and terminate after the last one has been serviced.

Most users also have an **UPSTREAM.DAT**. This is the default parameter file and most users will use it only for ad-hoc backups and restores.

**UPSTREAM.DAT will give you a warning if you set it to be unattended. UPSTREAM.DAT should never be used for unattended processing.**

# 2.5. Backup Profiles

Understanding Backup Profiles is fundamental to using FDR/UPSTREAM. A Backup Profile is intended to be used as the key to represent a single, identifiable group of files. Thus you would use a backup profile to represent:

- All the volumes on a server.
- All the disks on a PC.

A backup profile should not be used indiscriminately for more than one PC or more than one server without careful consideration to the implications.

On the workstation/server, the backup profile is specified on one of any number of screens and is stored in the parameter file. In the examples in the previous section (Parameter Files), the backup profile name would be the same as the server name (SERVER1, SERVER2, SERVER3). In each parameter file you would list all the volumes on the server to be backed up (for example, F:*.*, G:*.*, etc.). On a local disk, your backup profile would include file specs for all your drives (for example, C:*.*, D:*.*, etc.).

On the host, backup profiles are used for several purposes:

- As a single identifier to allow workstations/servers to be able to access files on a given PC or server.
- Allowable storage types and backup types.
- File names or prefixes, retention periods, etc.
- Attributes for merge backups.
- ...and more...

Think of the backup profile as the key to the files on your workstation or server. Whenever you specify backups or restores for that PC or server, you should always use the same backup profile.

There are a variety of profile definitions in FDR/UPSTREAM. Each have a specific, but different, purpose:

- **Backup Profiles:** A single identifier which you use to group the files on a given workstation or server.
- **Novell Profiles:** Use to automate the login to a Novell server. These are specified in the SETNOV program and are fully described in the Novell chapter.
- **ULTra Profiles:** Use to group a number of workstations in a single backup or restore request. These are also specified in the SETNOV program and are fully described in the ULTra chapter.

Note that when using ULTra Profiles, each workstation still has a unique Backup Profile.

There are a wide variety of facilities within FDR/UPSTREAM for specifying and modifying Backup Profiles:

- Backup and Restore dialogs. Here you specify the backup profile that you will be using for the backup and restore.
- Profile Management: Here you can view original backup specifications for all backups stored on the host or for a specific profile (with wildcards). You can also delete backups (if you have adequate security).
- Profile Configuration: Here you can view, modify, add or delete profile information as defined on the host. This information includes the types of backups allowed, storage information and more.

The host must have defined to it attributes about the backup. Thus you must either define each backup profile specifically using the host configuration facilities or Profile Configuration, you can use a Profile Prefix, or you can use a **GLOBAL** profile.

The attributes in the profile name **GLOBAL** are used whenever FDR/UPSTREAM MVS does not have the profile name defined explicitly or using a Profile Prefix. Setting up a **GLOBAL** profile allows workstation/server administrators to set up a new FDR/UPSTREAM without changes to FDR/UPSTREAM MVS. Thus, this method is recommended whenever security and storage constraints allow it.

Profile Prefixes are partial Backup Profile names configured within FDR/UPSTREAM MVS. When a profile is received which is not configured, then Profile Prefixes are searched. For example, if you have a group of workstations which will share attributes, you can create a Profile Prefix (for example, WKS) which has these attributes. When you specify backups and restores, you use this name as the prefix for your Backup Profile names (for example, WKSTOM, WKSBOB, etc.).

# 2.6. Host Storage Management

Simplified, host storage consists of disk and tape. Since each installation's storage needs are unique, FDR/UPSTREAM MVS provides a wide variety of ways that you can store your workstation/server data on disk and tape on your MVS host. The workstation/server administrator will need to consult with the host storage administrator to decide the type of storage options to select when specifying backups.

Simplistically, the storage options are:

- A separate flat file on disk or tape for each backup.
- All backups stored on disk or tape GDGs
- Storage in the VSAM repository (Keyed and Archive backups). This method is available, but only recommended for storage of duplicate files.

We recommend for most users that full backups be stored directly to tape, and incrementals be stored on disk (all flat files, managed by tape and DASD management systems when available).

The workstation/server administrator only has to specify whether a specific backup is stored on a disk or tape flat file, or in the VSAM repository in the backup dialog or host or PC parameters. However, the mainframe and workstation/server storage administrators must combine to decide such important issues as:

- Should incrementals be stored on disk or tape? Some factors influencing this decision are the amount of disk space available on the host and the number of tape drives available during the backup window.
- Should disk backups be migrated to tape? You can use the USTMIGRT utility (which is recommended rather than HSM, ABR or a similar host archiving tool) to migrate disk backups to tape or you can use a storage management facility such as ABR or HSM. Some factors include the amount of disk space available and when it is available, and the time and the number of tape mounts necessary for full merge backups.
- How long you need to store your backups for. Auditing, legal requirements and user needs are decision factors. Once you have decided how long to store backups for, you roll off older backups using tape or disk retention periods (with your existing tape or DASD management systems), or GDGs

This is just a partial list. As a workstation/server administrator, we recommend that you fill in the following table of relevant decision factors in determining how to store your backups on the host. The subsequent table should be filled in by the host storage administrator and the last table is the result to be used for FDR/UPSTREAM production implementation.

| Type | Decision Factor | Your Value |
|---|---|---|
| **Servers** | | |
| | How many bytes on the average server? | |
| | How many bytes change daily on the average server? | |
| | How many servers? | |
| | How many bytes in your largest incremental? | |
| | How long do you need to keep backups? | |
| | Will there be a large number of restores (particularly from tape)? | |
| | Duplicate file savings expected (if any)? | |
| **Workstations** | | |
| | How many bytes on the average workstation? | |
| | How many bytes change daily on the average workstation? | |
| | How many workstations? | |
| | How many bytes in your largest incremental? | |
| | How long do you need to keep backups? | |
| | Will there be a large number of restores (particularly from tape)? | |
| | Duplicate file savings expected (if any)? | |

**Workstation/Server**
**Host Storage Decision Factors**

| | Decision Factor | Your Value |
|---|---|---|
| **Disk** | | |
| | Amount of disk space available | |
| | Use USTMIGRT or host storage manager | |
| | GDGs or flat files? | |
| **Tape** | | |
| | Number of tape drives available during the backup window | |
| | Number of tape drives available for restores | |
| | GDGs or flat files? | |

**Host Storage Administrator**
**Host Storage Decision Factors**

| Type | Decision Factor | Your Value |
|---|---|---|
| **Servers** | | |
| | Incrementals on disk or tape? | |
| | Fulls on disk or tape? | |
| | Backup Profile names/prefixes/conventions | |
| | Full and incremental backups scheduled at the same time or staggered | |
| **Workstations** | | |
| | Incrementals on disk or tape? | |
| | Fulls on disk or tape? | |
| | Backup Profile names/prefixes/conventions | |
| | Full and incremental backups scheduled at the same time or staggered | |

**PC Administrator**
**Host Storage Results**

To help you figure out the methods that will work best for you, a number of sample scenarios follow which describe some sample environments.

### 2.6.1. Scenario #1: Large Servers/Limited Host Disk

In this example, the workstation/server administrator has 12 large servers (avg. 4 GB each) for a total of 48 GB. There are few files in the incrementals (avg. less than 1% for a total of 250 MB per day). Workstations are not to be backed up.

The host administrator can allocate up to 2GB for PC server backup on host disk. There are several tape drives available.

Due to the time required to perform a full merge backup and the number of tapes drives required, it is decided to not perform full backups on all the servers at the same time, but to stagger them throughout the week. This also helps to keep the amount of disk space used at a constant value.

It is decided to keep incrementals on disk in flat files, and to use the USTMIGRT facility daily to migrate them to tape after all the backups have completed. Full merge backups will be written to tape in flat files.

### 2.6.2. Scenario #2: Servers and Workstations

In this example, the workstation/server administrator has 5 large servers (avg. 4 GB each) for a total of 20 GB. There are few files in the incrementals (avg. less than 1% for a total of 250 MB per day). There are 40 workstations to be backed up (avg. 500 MB each) for a total of 20 GB.

The host administrator can allocate up to 10GB for PC server backup on host disk. There are several tape drives available.

For server backups, fulls will be performed, staggered, weekly direct to tape using flat files. Incrementals will be stored on disk, again using flat files. No host migration will be performed, but the COPYINCR option will be used to clean up host disk files.

For workstations backups, fulls will be performed, staggered, weekly direct to tape using flat files. Incrementals will be stored on disk, using flat files. No host migration will be performed, but the COPYINCR option will be used to clean up host disk files.

Note that COPYINCR copies the incremental backups onto the full and deletes the original incrementals. This option is only relevant when the incremental backups are stored on disk.

# 3 OS/2

## 3.1. Overview

The installation process consists of four steps:

- Determining your system requirements
- Installing the software
- Configuring the communications software
- Configuring FDR/UPSTREAM

We recommend that you install, configure, and make operational your TCP/IP or APPC software before installing and configuring FDR/UPSTREAM. In particular getting 3270 operational will help in this process.

### 3.1.1. Requirements

FDR/UPSTREAM OS/2 requires the following:

- An IBM AT, PS/2 or compatible
- A diskette or CD-ROM drive.
- 2 megabytes of free hard disk space. If you will be backing up large servers you may need up to 40 MB of free disk space.
- OS/2 v1.x, 2.x or 3.x.
- Communications hardware compatible with your communications software.
- APPC software for an approved vendor, including IBM Communications Server, IBM Communications Manager/2, IBM OS/2 Extended Services, IBM OS/2 Extended Edition, IBM OS/2 Networking Services/2, DCA/Microsoft Select Communications Workstation/Server.

or

- TCP/IP software from an approved vendor including IBM or Novell.

# 3.2. Installing FDR/UPSTREAM

FDR/UPSTREAM includes an installation batch file to help you install it for the first time to your hard disk or network drive. But you don't have to use it if you don't want, as all the batch files do is create a directory for the FDR/UPSTREAM files, copy the diskette to a specified drive and directory and optionally create a folder and items within it. If you have any problems with the installation, just copy the files yourself and manually create the folder. You can end the installation process at any prompt by pressing [ESC], or at any other time by pressing [CTRL][BREAK].

**NOTE: If you specify a drive or directory different than C:\UPSTREAM and you intend to perform PC initiated unattended backups or restores, then you must modify the USLOAD.CMD file to reflect the drive and directory.**

**NOTE: If you do not run the INSTALL batch file for a first time install, you will need to rename USSER to US.SER.**

### 3.2.1. Diskette Installation

If you are installing from CD-ROM, proceed to the next section.

To run the installation program, insert the FDR/UPSTREAM program diskette in your floppy drive. Make that drive the default drive and run the INSTALL batch file. For example:

```
C:\>A:
A:\>INSTALL
```

A banner screen is displayed explaining the installation process. You are then asked:

```
Do you wish to install UPSTREAM now (Y or N) : _
```

Press either 'Y' followed by [ENTER] to install it now, or 'N' to not install FDR/UPSTREAM.

You are then asked for the destination path. Specify the drive and directory you wish UPSTREAM to be installed in. The default is C:\UPSTREAM.

```
Destination : C:\UPSTREAM
```

The installation program now creates the specified directory and copies the files on the Program Diskette to that directory. When the files have been copied, you will asked:

```
Do you wish to create an IDP folder (Y or N) : _
```

Enter Y if you are running OS/2 v2.0 or higher and wish an IDP folder which will allow you to select FDR/UPSTREAM programs from the Presentation Manager Desktop. If you enter N, you can always create the folder and icons manually at a later time.

The supplemental diskette includes samples and files rarely used. You can install these by copying the files manually.

Proceed to page 3-8 to begin the configuration of your communications environment.

### 3.2.2. CD-ROM Installation

To run the installation program, insert the FDR/UPSTREAM CD in your CD-ROM drive. Make that drive the default drive and run the INSTALL program. For example:

```
C:\>D:
D:\>INSTALL
```

An installation screen is displayed:

```
                        FDR/UPSTREAM Installation

UPSTREAM Product (Choose one of the following): U
   U - FDR/UPSTREAM
   W - ULTra (FDR/UPSTREAM for workstations)

Operating System (Choose one of the following): D
   A - AIX        D - DOS
   N - NetWare    O - OS/2
   W - Windows 3.x, Windows 95 and Windows NT

Installation Source Drive (CDROM Drive):        F

Destination Drive:                              C

Destination Directory:                          UPSTREAM_________________

Press the Tab key to move from one field to the next.
Press the Enter key to proceed or the Esc key to exit the installation.
```

**Figure 3-1**
**Installation Screen**

In the installation screen, use the TAB key to move from field to field and the ENTER key when you are satisfied with the screen. For an OS/2 installation enter:

- ☐ **UPSTREAM Product**: Enter **U** for FDR/UPSTREAM
- ☐ **Operating System**: Enter **O** for OS/2
- ☐ **Installation Source Drive**: Enter the drive letter that your CD-ROM is running on.
- ☐ **Destination Drive**: Enter the drive letter of where you wish to install UPSTREAM. Most users will enter **C**.
- ☐ **Destination Directory:** Enter the directory where you wish UPSTREAM installed. Most users will enter **UPSTREAM**.

Press the **ENTER** key to move to the next screen.

You will then be asked if you wish to create an **FDR/UPSTREAM for OS/2 folder** to allow easy access to FDR/UPSTREAM. Only answer 'Y' to this if you do not currently have an UPSTREAM folder.

The installation program now creates the specified directory and copies the files on the Program Diskette to that directory.

The supplemental diskette includes samples and files rarely used. You can install these by copying the files manually.

Proceed to page 3-8 to begin the configuration of your communications environment.

# 3.3. Files Included

FDR/UPSTREAM consists of several files. Each file name and it's purpose is outlined here.

- Table 3-1 describes the files on the FDR/UPSTREAM Program Diskette or the \UPSTREAM\OS2 directory on the CD-ROM.
- Table 3-2 describes the files on the FDR/UPSTREAM Supplemental Diskette (these files are not installed automatically by the INSTALL program when run from diskette). These files are also contained in the \UPSTREAM\OS2 directory on the CD-ROM.
- Table 3-3 describes the files on the FDR/UPSTREAM Supplemental Diskette \SAMPLES directory or the \UPSTREAM\OS2\SAMPLES directory on the CD-ROM.
- Table 3-4 describes the files on the NetWare Program Diskette or the \UPSTREAM\\NETWARE directory on the CD-ROM.
- Table 3-5 describes the contents of the FDR/UPSTREAM ULTra Workstation Diskette (available as a separate option) or the \ULTRA\OS2 directory on the CD-ROM.

| File Name | Description |
|---|---|
| CHARBAT.EXE | Part of the installation system, this executable is designed to be called by a batch file to allow entry of a single character. |
| CRT_IDP.CMD | A REXX program which creates the IDP folder and the FDR/UPSTREAM items (OS/2 v2.x and above only). |
| DESTBAT.EXE | Part of the installation system, this executable is designed to call a batch file and be called by a batch file to allow entry of a path. |
| INST2.CMD | Part of the installation system, this is an internal file. |
| INSTALL.CMD | Part of the installation system, this is the file that a user calls to install FDR/UPSTREAM. |
| RMTPARM.DAT | Sample parameter file, used when the OS/2 attach manager starts FDR/UPSTREAM (when it is not already running). |
| SERIAL.DAT | Required for modification of personalization information of FDR/UPSTREAM. |
| SETNOV.EXE | (Novell only) FDR/UPSTREAM Novell security access specification program. Run this program to specify the user names, servers, etc. you wish to attach to. |
| UPSTREAM.MSG | The FDR/UPSTREAM predefined message file. This file contains many of the messages that are logged and displayed. You can modify this file to change the message text, or to change the way that it is handled (see section 11). |
| US.EXE | FDR/UPSTREAM main program. Provides the main user interface, performs the communications including backups and restores, logs events, allows inquiries and many other features. |

| File Name | Description |
|---|---|
| US.HLP | The FDR/UPSTREAM help file. This file contains the help text that you see when you press the help (F1) button. You can modify this file to customize the text for your installation or translate it into a foreign language (see section 12). |
| USCFG.EXE | FDR/UPSTREAM configurator. Use this program to specify communications parameters, system overall parameters and to set up unattended operations. |
| USCFG.HLP | FDR/UPSTREAM configurator help file. As for the FDR/UPSTREAM help file, this file contains the help information when you press the help (F1) button and is user modifiable. |
| USLOGCLR.EXE | FDR/UPSTREAM log and report maintenance program. The FDR/UPSTREAM logs and reports can grow indefinitely, so a program has been provided which will shrink it down, based on a specified number of days. |
| USSER | The default personalization file. This file must be named US.SER in the UPSTREAM directory or the WORKPATH for UPSTREAM to run. |
| USSTART.EXE | FDR/UPSTREAM unattended operations program. This program operates as a presentation manager program. It waits for a specified time and then starts FDR/UPSTREAM. |
| USTCPIP.EXE | (16-bit version only) Internal IBM TCP/IP access program (do not run directly). This program must be in the same directory as US.EXE. |

**Table 3-1**
**FDR/UPSTREAM Program Diskette Contents**

| File Name | Description |
|---|---|
| RETCODE.EXE | Allows text descriptions of the extended program return code returned by FDR/UPSTREAM and re-sets the limited return code. |
| USCNTL.EXE | Allows operations on the running UPSTREAM program including trace toggling, killing, and more... |
| USFONT.FON | A sample fixed pitch font. |
| USLOAD.CMD | For unattended operations, loads FDR/UPSTREAM and allows you to perform functions that you configure including software installations. |
| USMODIFY.EXE | (Available on the Innovation BBS) Allows command line modification of a number of FDR/UPSTREAM parameter and configuration files. |

**Table 3-2**
**FDR/UPSTREAM Supplemental Diskette Contents**

| File Name | Description |
|---|---|
| AUTOINST.CMD | Sample installation job for the FDR/UPSTREAM auto-update facility. |
| AUTOINST.DAT | Sample installation parameter file for the FDR/UPSTREAM auto-update facility. |
| DATABASE.DAT | Configuration file to be used with SQLUEXIT.CMD |
| EXCLUDE.LST | A sample list of files worth excluding. |
| FULLPWD.CMD | Simple batch file which asks the user to enter their password. |
| FULL1.CMD | Internal batch file called by FULLPWD.CMD |
| READ.ME | Instructions on how to use the IBM Database Manager user exit. |
| REST.CMD | Simple batch file for automating restores. |
| REST.DAT | Parameter file used by REST.CMD |
| SQLUEXIT.CMD | IBM Database Manager backup/restore user exit |
| ULTINST.CMD | Sample installation job for the FDR/UPSTREAM ULTra auto-update facility. |
| ULTDOS.DAT | Sample parameter file for automatically updating FDR/UPSTREAM DOS ULTra machines. |
| ULTNT.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows NT ULTra machines. |
| ULTOS2.DAT | Sample parameter file for automatically updating FDR/UPSTREAM OS/2 ULTra machines. |
| ULTW95.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 95 ULTra machines. |
| ULTWIN.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 3.1 ULTra machines. |
| USATOE.TAB | Sample ASCII-to-EBCDIC conversion table. |
| USETOA.TAB | Sample EBCDIC-to-ASCII conversion table. |

**Table 3-3**
**FDR/UPSTREAM Supplemental Diskette \SAMPLES Directory**

| File Name | Description |
|---|---|
| USLOGCLR.NLM | (NetWare Directory Services) Clears the USNDS.LOG file. See the Novell chapter for more information. |

| | |
|---|---|
| USNDS.NLM | (NetWare Directory Services) Provides access to NDS information for attached FDR/UPSTREAM workstations. See the Novell chapter for more information. |
| USSETUP.NLM | (NetWare Directory Services) Installs the required NLMs on a server. See the Novell chapter for more information. |

**Table 3-4**
**FDR/UPSTREAM NetWare Program Diskette**

| File Name | Description |
|---|---|
| CRT_ULTR.CMD | During installation creates the FDR/UPSTREAM ULTra Icon View. |
| INSTALL.CMD | Simple batch file to install the FDR/UPSTREAM ULTra version on a workstation. |
| LANCOPY.EXE | Allows PC-to-PC file copies and directory listings across the LAN to PCs which have ULTRA.EXE installed. |
| NETBDR.CMD | Sample job for helping you to create NetBIOS disaster recovery diskettes. |
| NOVELLDR.CMD | Sample job for helping you to create Novell IPX/SPX disaster recovery diskettes. |
| ULTRA.EXE | Allows remote file access across a Novell IPX/SPX or NetBIOS LAN. |
| ULTRADR.EXE | Allows remote file access in a disaster recovery mode across LAN connections. |
| USLOGCLR.EXE | USIPX.LOG (or UPSTREAM.LOG) log maintenance (shrinking) program. |

**Table 3-5**
**FDR/UPSTREAM ULTra OS/2 Workstation Diskette Contents**

# 3.4. Configuration Overview

Configuration of FDR/UPSTREAM to communicate to the host is very different depending upon whether you are running SNA/APPC or TCP/IP.

### 3.4.1. Configuring for TCP/IP

Once you have installed the TCP/IP software and tested the connectivity to the host (via a standard application such as FTP), you are immediately ready to proceed to the FDR/UPSTREAM configuration. Go to page 3-42 to perform this configuration.

### 3.4.2. Configuration for APPC - Overview

The process of configuring FDR/UPSTREAM for APPC involves several issues:

- Configuring VTAM
- Configuring FDR/UPSTREAM MVS
- Configuring the APPC software
- Configuring FDR/UPSTREAM PC

Careful planning is essential in configuring SNA software. You should review the entire process before beginning and fill out the worksheets for each section or have information available.

**NOTE: If you have been using a prior version of FDR/UPSTREAM which was full-screen, you will need to change the Communications Manager program type to Presentation Manager.**

# 3.5. Pre-PC Configuration Issues

### 3.5.1. Configuring VTAM

You should have your VTAM system's programmer configure the VTAM environment, or modify the existing environment if it is insufficient for FDR/UPSTREAM (i.e. a mode definition that doesn't support LU 6.2). Worksheet 2-1 should be filled out by this person or the information should be obtained from this person. An NCP regeneration is rarely required.

See the FDR/UPSTREAM MVS manual for suggestions on configuring VTAM.

**NOTE: The host mode entry determines values like RU size and the APPL definition determines the pacing both of which have a significant affect on performance. We recommend that you define a mode entry that initially sets the RU size at 4096 or use USTMODE which is provided as a sample and an APPL definition which sets pacing at 8.**

| Name | Description | Your Value |
|---|---|---|
| SNA Network Name | The name of the SNA network to which you belong. | |
| Partner LU Name | The APPLID of UPSTREAM on the host. Supplied sample: **UPSTREAM**. | |
| LU Number | The LU local address. Most users will use 2. | |
| Mode Name | The mode table entry name. The supplied sample: **USTMODE**. | |
| Receive Pacing Size | A number from 1 to 63 of the number of RUs to be received in succession before a low-level acknowledgment. NEVER use 0. We recommend 8 or 10 initially. | |
| Controller LAA<br>(Token-Ring only) | The locally administered address of the 3174, 3172 or 37xx front end. This is a 12 hex digit number usually starting with 4. | |
| PC LAA<br>(Token-Ring only) | The locally administered address of the PC. This value must be unique on the ring and for 3174 connections, must be defined in the controller. | |
| LU Name | The name of the PC LU to be used. | |
| IDBLK<br>(3172 or 37xx front end only) | Must be 05D for OS/2 EE or ES. | |
| IDNUM<br>(3172 or 37xx front end only) | The 5 hex digit number of the XID. | |

**Worksheet 2-1**
**VTAM definitions for an FDR/UPSTREAM PC**

**NOTE: It is recommended that you use dependent LUs (a non-zero LU number) rather than independent LUs as there are known problems within NCP and VTAM when using independent LUs.**

### 3.5.2. Token-Ring Considerations

If you have a access to a direct Token-Ring connection to the host, it is **strongly** recommended that you use it for FDR/UPSTREAM.

If you are using a 37xx front end or a 3172, the configuration is entirely in VTAM. If you are using a 3174 controller, then you will need a device configuration for the PC if one doesn't already exist. Worksheet 2-2 should be filled out by the host personnel who configures or maintains the 3174 cluster controller

| Name | Description | Your Value |
|---|---|---|
| PC LAA | The locally administered address of the PC as known to the controller. You must modify the LAN Feature Profiles and be sure that the correct configuration file is used in the CONFIG.SYS. | |
| Transmit I-Frame Size | This is 9 bytes greater than the maximum RU size you can support. We recommend that this be 4105. You will need to modify the Transmit buffer size on the PC to support this. | |
| SAP | Service Access Point. Should always be 4. | |

**Worksheet 2-2**
**3174-to-UPSTREAM Configuration**

**NOTE: There are two locally administered addresses used: the address of the controller and the address of the PC. You enter the address of the controller in the Partner LU definition in the Communications Manager. You enter the address of the PC in the LAN feature profiles, LAN Adapter and Protocol Support or NET.CFG file.**

### 3.5.3. FDR/UPSTREAM MVS Issues

You will need to have installed FDR/UPSTREAM MVS before beginning the configuration of an FDR/UPSTREAM OS/2 node. The FDR/UPSTREAM MVS configuration defines storage and security attributes to be used in storing backups.

The configuration for each PC on FDR/UPSTREAM MVS, including backup profiles, security, etc. should be complete before beginning the PC configuration.

Worksheet 2-3 contains the information that you will need for FDR/UPSTREAM OS/2 before you can begin testing. Chapter 7 includes expanded worksheets to help you build your production environment.

| Name | Description | Your Value |
|---|---|---|
| Backup Profile | An 8 character identifier used as a key for the storage of a group of backups. | |
| User ID & Password | The user ID and password required to access the requested backup profile (may not be required) | |
| Sequential Disk | Whether sequential disk backups are enabled. | |
| Sequential Tape | Whether sequential tape backups are enabled. | |

**Worksheet 2-3**
**FDR/UPSTREAM MVS Configuration for Testing**

See the FDR/UPSTREAM MVS manual for assistance on setting up an FDR/UPSTREAM OS/2 user.

# 3.6. Configuring the APPC Software

Select the chapter applicable to your communications environment in the table below for assistance in configuring the APPC software.

| APPC | Page |
|---|---|
| Communications Manager/2 | Page 3-14 |
| IBM Communications Server | Page 3-28 |
| DCA/Microsoft Select Comm. Server or Comm. Workstation | See the Select documentation. It may be worthwhile to skim the OS/2 CM/2 information. |

**Configuring APPCs**

**NOTE: You must configure a transaction program definition in your communications software or you will get FDR/UPSTREAM errors, the remote access of FDR/UPSTREAM functions will not work and FDR/UPSTREAM will report error messages.**

# 3.7. Configuring Communications Manager/2

This section discusses configuration of IBM Communications Manager/2 (CM/2) v1.0 or v1.1 for Token-Ring for use with FDR/UPSTREAM. If you will be using a link type other than Token-Ring, see the CM/2 Configuration Guide (part number SC31-6171-00) for specific information regarding the different link types (though you should read this section for FDR/UPSTREAM specifics, regardless). It is recommended that you have this guide available in any case.

If you are familiar with other APPCs and this is your first experience with CM/2 note that the entire facility is PM based, and while the concepts are the same, the implementation is quite different.

Before beginning configuration for FDR/UPSTREAM, OS/2 and CM/2 should be installed, and 3270 operational. We also recommend that you have all server software (IBM, Novell, Banyan) installed and operational.

### 3.7.1. Starting the Setup Program

The first step in configuring APPC for FDR/UPSTREAM is to start the Communications Manager Setup program. This program (like most other CM/2 programs) is found in the Communications Manager/2 Program Group. Double-click your mouse or press [ENTER] on the **Communications Manager Setup** icon to start the program.

Once the Setup program is started, you will see an IBM logo screen with a single Ok button. Press the **Ok** button to go to the Communications Manager Setup dialog (see figure 3-2).

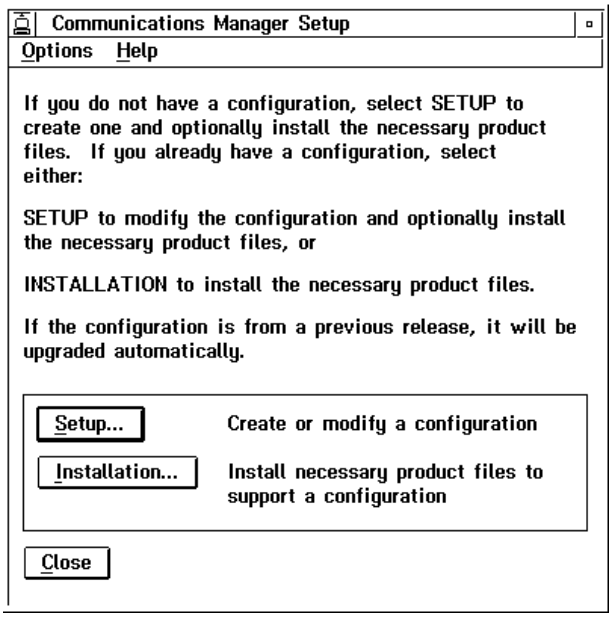



**Figure 3-2**
**CM/2 Setup Dialog**

Press the **Setup** button to begin the configuration. You will then see the Open Configuration dialog. Press the **Ok** button to use the configuration file that you set up for 3270. This will bring you to the Communications Manager Configuration Definition dialog (see figure 3-3).

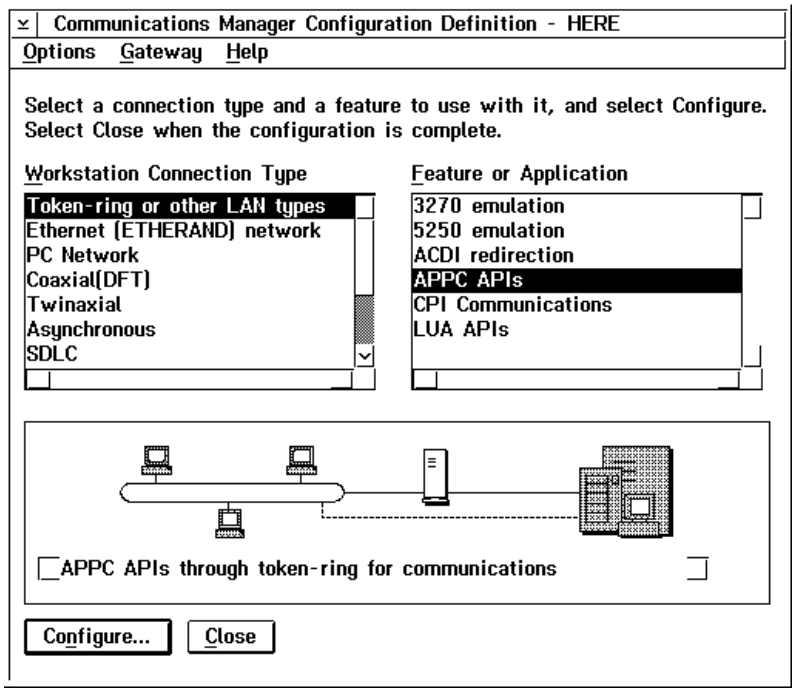



**Figure 3-3**
**CM/2 Configuration Definition dialog**

The configuration definition dialog allows you to select which features over which connection you wish to configure. Highlight the **Token-Ring** workstation connection type and the **APPC APIs** feature type and press the **Configure** button to begin the configuration.

### 3.7.2. Profile List Sheet

This will bring you to the Communications Manager Profile List Sheet dialog (see figure 3-4). Use this dialog to specify the APPC definitions for the Token-Ring link type which are required to run FDR/UPSTREAM.

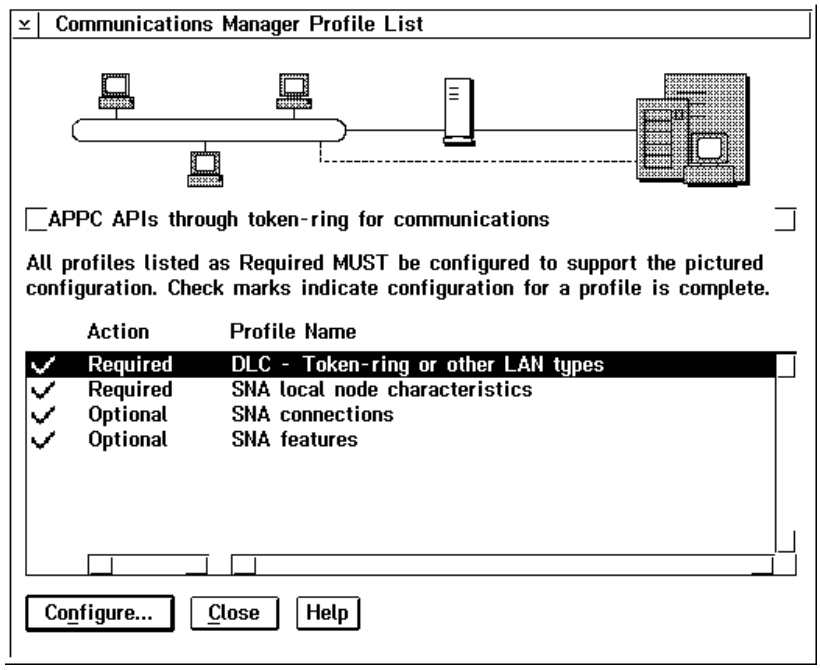



**Figure 3-4**
**CM/2 Profile List Sheet**

Since you have already configured the DLC for 3270, there is an existing configuration. However, for best performance, we recommend that you examine some of its values. Highlight the **DLC - Token-ring or other LAN types** option and press the **Configure** button.

### 3.7.3. Token-Ring Adapter Parameters

This will display the Token Ring other Other LAN types DLC Adapter Parameters dialog (see figure 3-5). This dialog is used to specify SNA access to the LAN adapter, and in some cases may adjust your PROTOCOL.INI file.

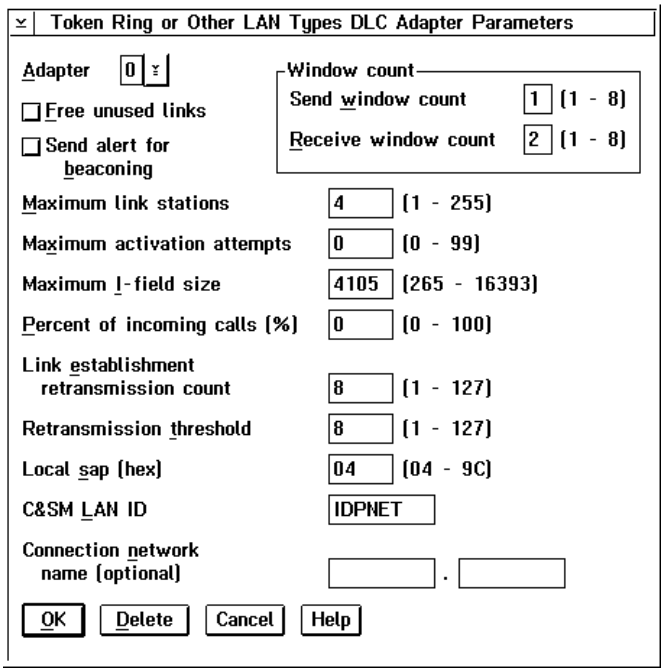



**Figure 3-5**
**CM/2 LAN Adapter Parameters**

The fields of most importance to FDR/UPSTREAM users is:

- **Send window count:** The default of 4 will work in most circumstances since this field will usually be negotiated in an XID3. For maximum portability, we recommend the value of **1**.

- **Receive window count:** This value must match the MAXOUT parameter specified in your VTAM PU definition if you are connecting to a 3172 or 3745 or the value specified in question 941 in the 3174 definition. If you are unsure, do not use the default of 4; use **2**.

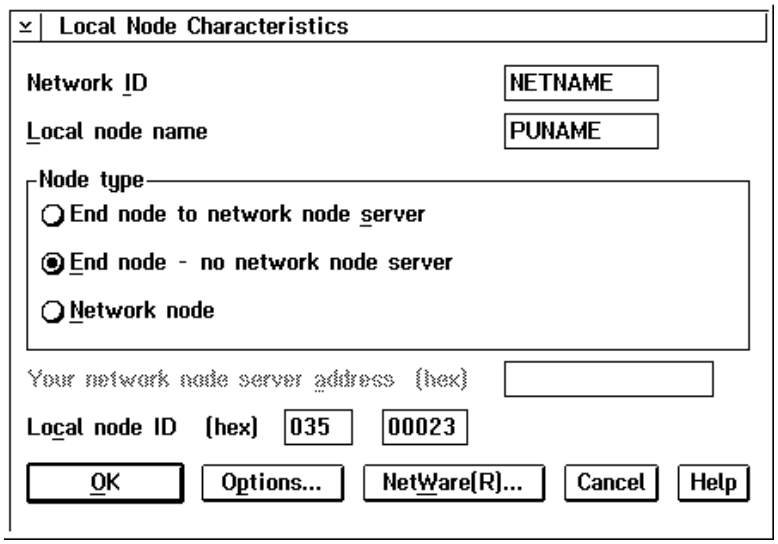
- **Maximum I-field size:** For best performance, we recommend a value of **4105**, which will allow a maximum RU size of 4096.

When you have completed this dialog, press the **Ok** button to return to the Communications Manager Profile List Sheet.

The next step is to specify the Local Node Characteristics. From the Communications Manager Profile List Sheet, highlight **SNA local node characteristics** and press the **Configure** button.

### 3.7.4. Local Node Characteristics

This will display the Local Node Characteristics dialog (see figure 3-6). This dialog is used to specify physical unit (overall) SNA configuration characteristics for your SNA connection. Most of these parameters have been entered when you configured for 3270.




The meaning of the fields are:

- **Network ID:** This is the SNA network name that your PC belongs to. This can be obtained from your network administrator. It may already be entered. Enter up to 8 characters. It is required.

- **Local node name:** The name of your physical unit. This can be obtained from your network administrator. It may already be entered. Enter up to 8 characters. It is required.

- **Node type:** Defines how you are connecting to your adjacent node. Select one radio button.
  - **End Node to Network Node Server:** Select this radio button if you are connecting through an APPN network node (generally this is not an IBM mainframe, but is another OS/2 PC acting as a network node or an AS/400).
  - **End Node - No Network Node Server:** Select this radio button for most connection types.
  - **Network Node:** Select this radio button if this PC is acting as an APPN network node.

- **Local node ID:** If you are connecting to a 37xx front-end processor, you will need to enter your XID. The first field is the IDBLK portion of the XID. In prior OS/2 configurations this was fixed at 05D. Enter a 3 hex digit number.

  The second field is the IDNUM portion. Enter a 5 hex digit number.

  Obtain these values from your network administrator.

When you have completed this dialog, press the **Ok** button to return to the Communications Manager Profile List Sheet.

The next step is to specify the connection that you will use for APPC transactions. Highlight the **SNA connections** entry and press the **Configure** button. This will take you to the Connections List dialog (see figure 3-7).

### 3.7.5. Connections List

This dialog is used to specify the link and type of connection that you will be using.

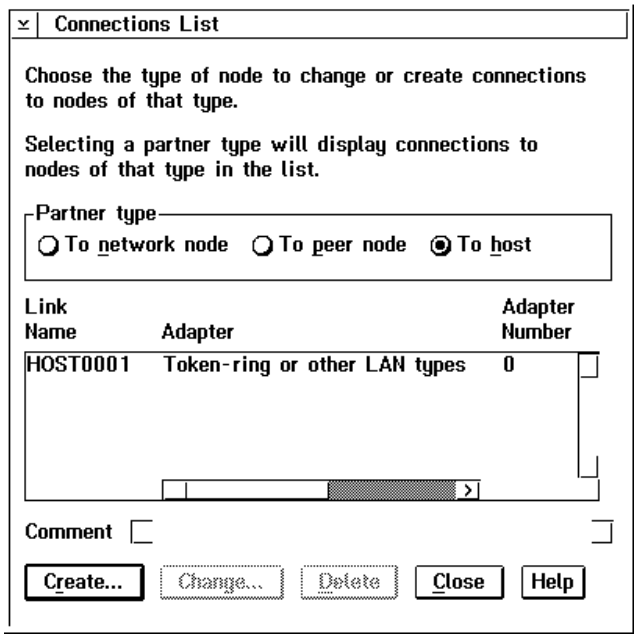



**Figure 3-7**
**CM/2 Connections List**

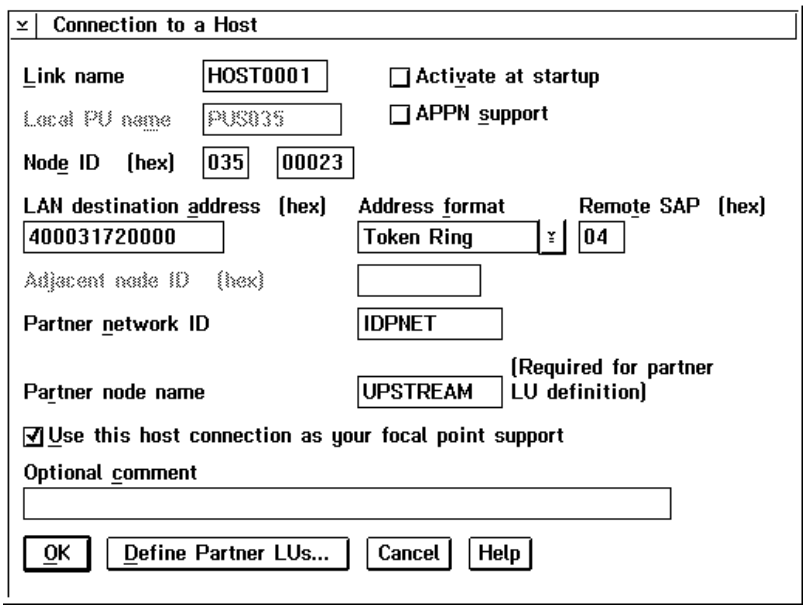
The fields are:

- **Partner type:** This is the Physical Unit type that you will be using to connect to FDR/UPSTREAM MVS. If your connection is to the host through a 3174, 37xx or 3172 select the **To host radio button** (this is most environments). If you will be connecting using Independent LUs you can also select the To peer node option. If you are connecting through an APPN device (AS/400, 3172, etc.) specify To network node. Again, most users will specify To host.

- **Link list box:** This list box allows you to select which link you will be using for your APPC connection. If this box is empty, press the Create button. If this box has the Token-Ring entry that you wish to use, highlight that entry and press the **Change** button.

  You will see the Adapter List selection dialog. Select the Token-Ring adapter entry in the list box and the Adapter number that you will be using (usually 0), and press the **Continue** button.

  This will bring you to the Connection dialog (see figure 3-8).




### 3.7.6. Connection Dialog

This dialog allows you to specify the relevant information for the connection that you will be using for APPC. The fields are:

- **Link name:** This value is generally suggested by the system, as LINK0001, HOST0001, etc. If you are defining your first link or only want one link and the suggested value is LINK0002 or HOST0002, you should press Cancel and reenter the screen in edit mode.

- **Local PU Name:** This field is grayed out in many environments. Enter the Physical Unit name as specified by your network administrator.

- **Node ID:** This is the XID used to connect to the host. Enter the values that you entered in the Local Node Characteristics dialog.

- **Activate at startup:** Check this box if you wish this connection started when Communications Manager starts. FDR/UPSTREAM will operate correctly regardless.

- **APPN support:** Do **not check** this box unless you will be using APPN facilities. Most users will not check this box.

- **LAN destination address:** Enter the LAN address of the 3174, 37xx, or other node that you are connecting to directly for SNA connections. For Token-ring this is generally a 12 digit locally administered address, beginning with 4.

- **Address Format:** Select the format that the LAN destination address (above) is specified in. Most users will select **Token Ring**.

- **Remote SAP:** Enter the Service Access Point defined for your host connection. Most users will specify **04**.

- **Adjacent node ID:** Enter the 8 digit XID used to connect to the host. This field is used in lieu of destination address and is grayed and unavailable to most users.

- **Partner network ID**: This is the SNA network name where FDR/UPSTREAM MVS can be found. This value should be obtained from your network administrator. Enter up to 8 characters. It is required.

- **Partner node name:** This is the physical unit name for your adjacent system. For FDR/UPSTREAM MVS, use the APPLID (usually **UPSTREAM**). Enter up to 8 characters. It is required.

- **Use this host connection as your focal point support:** If you are using this PC to connect to a single host, you should **check** this box (recommended value).

- **Comment:** Enter any text that will help you remember what this definition is for. It is optional.

### 3.7.7. Partner LU Dialog

When you have completed these values, press the Define Partner LUs button to define the systems and applications you are connecting to (see figure 3-9).

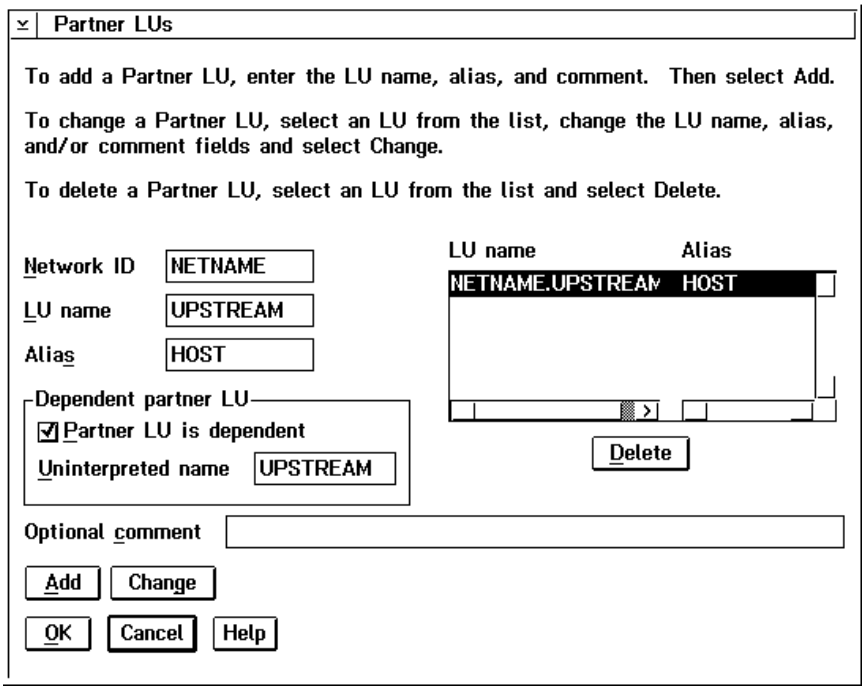



**Figure 3-9**
**CM/2 Partner LUs**

- **Partner network ID:** This is the SNA network name where FDR/UPSTREAM MVS can be found. This value should be obtained from your network administrator. Enter up to 8 characters. It is required.

- **LU name:** This is your partner's LU name. For MVS connections, use the APPLID. For FDR/UPSTREAM MVS, the default is **UPSTREAM**. Enter up to 8 characters. It is required.

- **Alias:** This value is used by FDR/UPSTREAM OS/2 to find this partner definition. It is entered in the FDR/UPSTREAM configurator (described later in this chapter). The suggested value is **HOST**. Enter up to 8 characters. It

is required.

NOTE: This field is case sensitive and must be entered in UPPER case.

- ☐ **Partner LU is dependent:** If you are using dependent LUs, **check** this box. If you are using independent LUs (note independent LUs are required for parallel sessions), do not check this box.

- ☐ **Uninterpreted name:** Use the same entry that you specified for LU Name above. Enter up to 8 characters. For FDR/UPSTREAM MVS, the default is **UPSTREAM**.

- ☐ **Comment**: Enter any text which will help you remember this definition.

Press the **Add** button to add this definition to the LU Name list box which contains all the partner LUs currently defined. When you have completed this screen, press the **Ok** button to return to the Link Definition Dialog.

Press the **Ok** button in the Link Definition Dialog to return to the Connection dialog. Press the **Close** button in the Connection dialog to return to the Profile List Sheet.

On the Profile List Sheet highlight SNA features and press the **Configure** button. This will bring you to the SNA Features List dialog (see figure 3-10).

In the SNA Features dialog you will be configuring a variety of features. When a feature has a configuration entry for it defined, you will see in the Definition list box, that entry. The following procedures will describe the creation of each profile. If you are modifying a configured feature, all you need to do is highlight the feature in the Features list box, highlight the definition you wish to modify in the Definition list box and press the Change button. You can also double-click your mouse on the definition you wish to change.

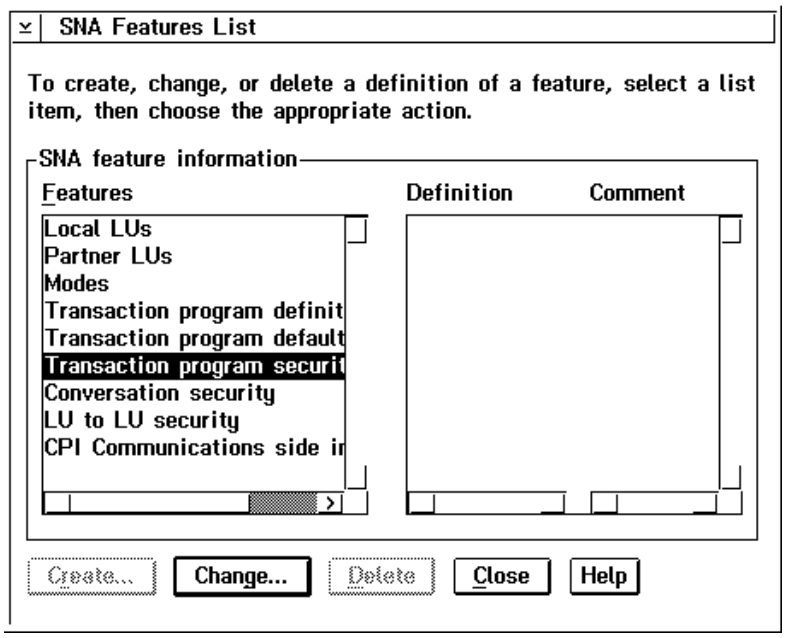



**Figure 3-10**
**CM/2 SNA Features List**

### 3.7.8. Local LU Dialog

From the SNA Features List dialog, highlight the **Local LUs** SNA feature and press the **Create** button. This will display the Local LU dialog (see figure 3-11).

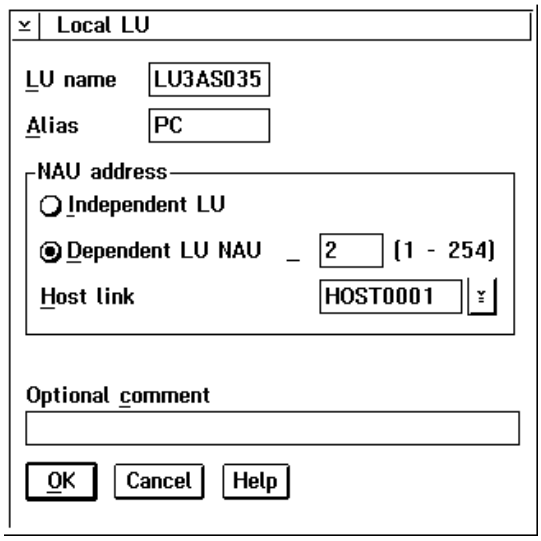



**Figure 3-11**
**CM/2 Local LU**

The Local LU dialog allows you to define the parameters used by the LU (logical unit) defined for FDR/UPSTREAM for APPC access. These parameters must match the VTAM parameters defined on the host for your PC.

- **LU Name:** Enter the local LU name. This name can be obtained from your network administrator. Enter up to 8 characters. It is required.

- **Alias:** This is the name that is used by applications to reference this LU. This value must match the alias configured in the FDR/UPSTREAM configurator (USCFG). The recommended value is **PC**. Enter up to 8 characters. It is required.

  NOTE: This field is case sensitive and must be entered in UPPER case.

- **NAU Address:** Select the independent LU radio button if this is an independent LU (VTAM LU number of 0). Select the dependent LU button if this is a dependent LU (non-zero LU number) and enter the LU Local Address (LU number) in the text box.

  We recommend using dependent LUs unless you require APPN support, to avoid known problems with VTAM and NCP improperly handling adaptive pacing.

- **Host link:** Select the link name of the entry that you defined earlier. Usually, this is LINK0001 or HOST0001.

- **Comment:** Enter any text to help you remember this definition.

When you have completed entering the values in this dialog, press the Ok button to return to the SNA Features dialog.

### 3.7.9. Mode Definition

Since you have already defined partner LUs, the next step is to define the mode that you will be using with FDR/UPSTREAM. Modes define certain characteristics that will be used in the communications.

The default mode for FDR/UPSTREAM is #INTER, which is a sample mode entry always available in VTAM. In CM/2 there is a sample entry for #INTER which needs to be accepted or modified to be used. In the examples, we have assumed that UPSTREAM is a single session application and we recommend whenever possible using it that way. However, that requires modification of the predefined mode entry #INTER. If you can not change #INTER in your environment, you will need to define UPSTREAM for parallel sessions or use the sample provided with UPSTREAM MVS, USTMODE. Most users will be able to modify #INTER and can use the described modifications.

Select **Modes** from the SNA Features dialog, select the definition **#INTER** and press the **Change** button. You will see the Mode Definition dialog (see figure 3-12).

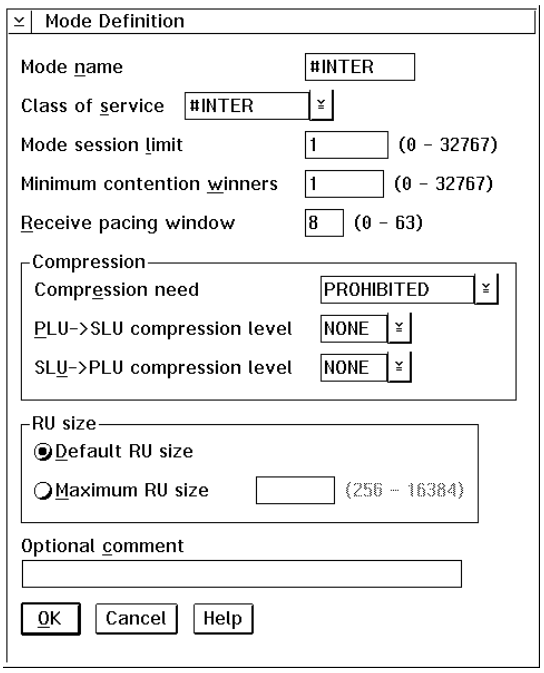



**Figure 3-12**
**CM/2 Mode Definition**

- **Mode Name:** The name of the mode table entry that you will be using. This value must match the value entered in VTAM. We recommend using **#INTER**.

- **Class of service:** Describes characteristics on how the connection will operate. The default of **#INTER** is generally acceptable.

- **Mode session limit:** The maximum number of sessions that can be utilized. We recommend using single sessions, so code the value of **1**.

- **Minimum contention winners:** The number of contention winner sessions that will be activated. FDR/UPSTREAM PC will operate as either a winner or loser, but we recommend a value of **1** (winner).

- **Receive pacing window:** For fixed pacing (non-adaptive), this is the number of RUs received in succession without an acknowledgment. We recommend a value of **8**. NEVER use 0.

- **RU size:** You can select to either use the default RU size or specify a value. We recommend using the **Default RU size** as this will be as large as the adapter can support. Note that the RU size can still be negotiated downwards by the host mode table entry.

- **Comment:** Enter any text that will help you remember this definition.

When you have finished with this dialog, press the **Ok** button to return to the SNA Features dialog.

### 3.7.10. Transaction Program Definition

The final SNA feature to configure is the transaction program definition. This definition is used when you are going to be controlling FDR/UPSTREAM functions from another computer. However, since it doesn't hurt to define a profile, we recommend that you do it even if you are going to be controlling FDR/UPSTREAM from your PC.

Select **Transaction programs definitions** from the SNA Features dialog and press the **Create** button. This will display the first transaction program definition dialog (see figure 3-13).

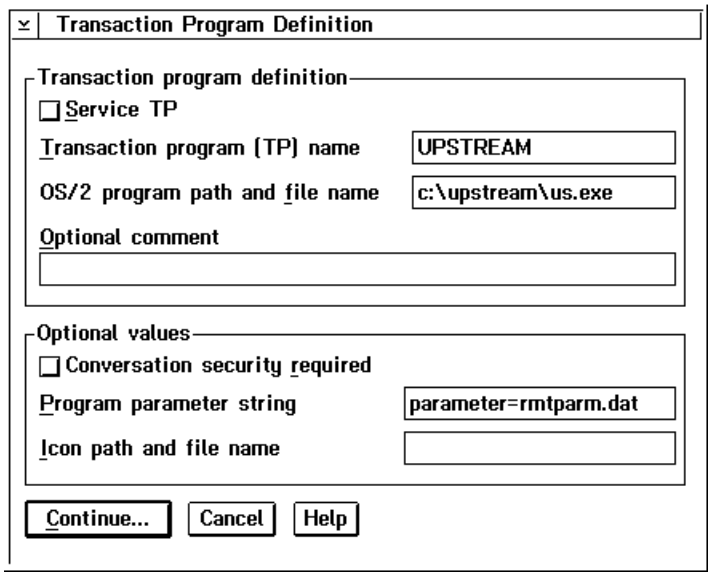



**Figure 3-13**
**CM/2 Transaction Program Definition (1 of 2)**

- **Service TP:** Do **not check** this box for FDR/UPSTREAM.

- **Transaction program (TP) name:** Enter **UPSTREAM**.

NOTE: This field is case sensitive and must be entered in UPPER case.

- **OS/2 program path and file name:** Enter the full drive, path and file name where FDR/UPSTREAM is installed. Most users will enter: **C:\UPSTREAM\US.EXE**.

- **Comment:** Enter whatever text will help you remember this definition.
- **Conversation security required:** Do **not check** this box as FDR/UPSTREAM does its own security management.
- **Program parameter string:** This is the parameters that are passed to FDR/UPSTREAM when it is run. FDR/UPSTREAM comes with a sample remotely initiated parameter file, RMTPARM.DAT. Therefore, the recommended value is:
  **PARAMETER=RMTPARM.DAT**.
- **Icon path and file name:** FDR/UPSTREAM does not use this field; leave it blank.

When you are satisfied with your entries, press the **Continue** button to go to the second transaction program definition dialog (see figure 3-14).

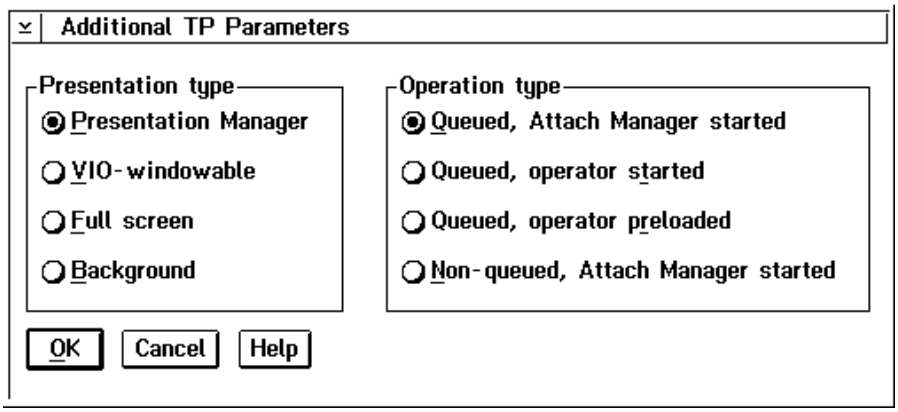



**Figure 3-14**
**CM/2 Transaction Program Definition (2 of 2)**

This dialog allows you to specify how the program is started. The options are:

- **Presentation type:** This is how the started program is displayed. Select **Presentation Manager** as FDR/UPSTREAM is a PM program.
- **Operation Type:** It is recommended that you use **Queued - attach manager started.** In this case, when a remote request is detected by communications manager, if FDR/UPSTREAM is not running, the attach manager starts it. If FDR/UPSTREAM is running, FDR/UPSTREAM will pick up the request. Do not use Queued-operator pre-loaded or non-queued.

When you are satisfied with your selections press the **Ok** button to return to the SNA Features dialog. Press the **Close** button to return to the Profile List Sheet dialog. Press the **Close** button to return to the Configuration Definition dialog. Press the **Close** button to return to the Communications Manager Setup dialog.

### 3.7.11. The Final Steps

Upon returning to the Communications Manager Setup dialog an automatic verification will take place (unless you have disabled this feature).

If there are errors you will be asked if you wish to run the Message Log Formatter to view the errors. This is recommended as it will usually help you in determining where your errors are. Note that the most common error is using the same LU number for both 3270 and LU 6.2. Exit the Message Log Formatter, return to the Communications Manager Setup and repair any problems. If you can not ascertain what the problem is, feel free to call FDR/UPSTREAM technical support.

When the configuration file has verified successfully, you may be asked if you wish these items dynamically modified. There is generally no harm in this. If there are dynamic update errors, merely ignore them and stop and restart Communications Manager.

You may be asked if you wish your CONFIG.SYS and other startup files modified as well. We recommend that you allow the system to automatically modify these files. The Communications Manager may also suggest that you need to reboot to have these features take effect.

When you have completed your Communications Manager modifications (which may include rebooting the system), make sure that the Communications Manager is active and available.

You are now ready to go to the FDR/UPSTREAM configuration (page 3-42).

# 3.8. Configuring IBM Communications Server

This section discusses configuration of IBM Communications Server v2.0 for Token-Ring for use with FDR/UPSTREAM. If you will be using a link type other than Token-Ring, see the Communications Server documentation for specific information regarding the different link types (though you should read this section for FDR/UPSTREAM specifics, regardless). It is recommended that you have this guide available in any case.

If you are familiar with other APPCs and this is your first experience with Communications Server note that the entire facility is PM based, and while the concepts are the same, the implementation is quite different.

Before beginning configuration for FDR/UPSTREAM, OS/2 and Communications Server should be installed, and 3270 operational. We also recommend that you have all server software (IBM, Novell, Banyan) installed and operational.

### 3.8.1. Starting the Setup Program

The first step in configuring APPC for FDR/UPSTREAM is to start the Communications Manager Setup program. This program (like most other Communications Server programs) is found in the Comm Server Icon View. Double-click your mouse or press [ENTER] on the **Communications Manager Setup** icon to start the program.

Once the setup program is started, you will see the Communications Manager Setup dialog (see figure 3-15).

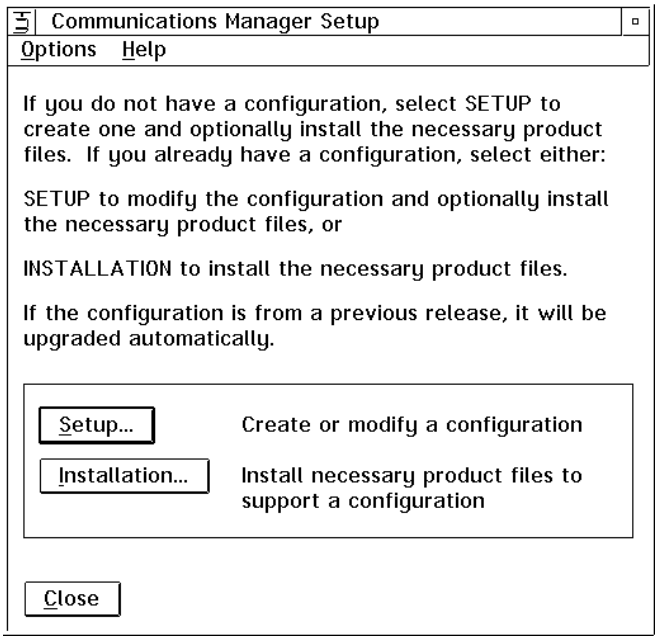



**Figure 3-15**
**Communications Server Setup Dialog**

Press the **Setup** button to begin the configuration. You will then see the Open Configuration dialog. Press the **Ok** button to use the configuration file that you set up for 3270. This will bring you to the Communications Manager Configuration Definition dialog (see figure 3-16).

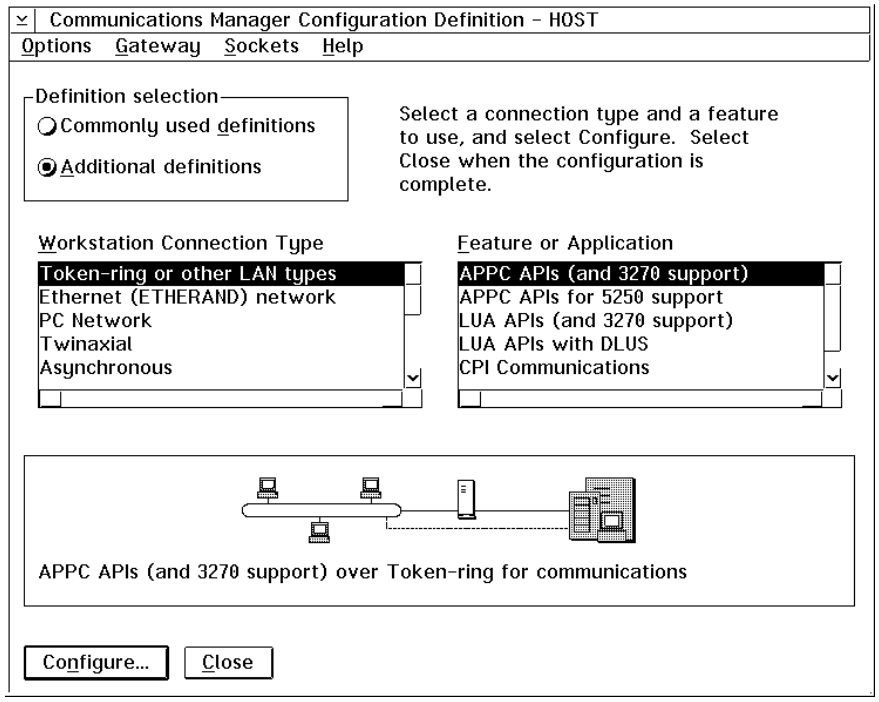



**Figure 3-16**
**Comm. Server Configuration Definitions**

The configuration definition dialog allows you to select which features over which connection you wish to configure. Press the **Additional definitions** radio button, highlight the **Token-Ring or other LAN types** workstation connection type and the **APPC APIs (and 3270 support)** feature or application type and press the **Configure** button to begin the configuration.

### 3.8.2. Profile List Sheet

This will bring you to the Communications Manager Profile List Sheet dialog (see figure 3-17). Use this dialog to specify the APPC definitions for the Token-Ring link type which are required to run FDR/UPSTREAM.

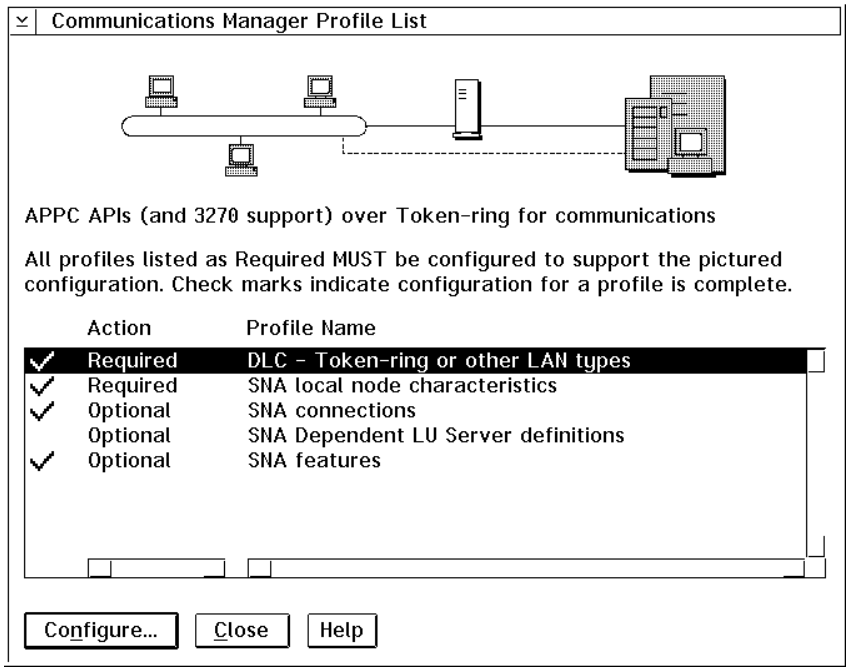



**Figure 3-17**
**Comm. Server Profile List Sheet**

Since you have already configured the DLC for 3270, there is an existing configuration. However, for best performance, we recommend that you examine some of its values. Highlight the **DLC - Token-ring or other LAN types** option and press the **Configure** button.

### 3.8.3. Token-Ring Adapter Parameters

This will display the Token Ring other Other LAN types DLC Adapter Parameters dialog (see figure 3-18). This dialog is used to specify SNA access to the LAN adapter, and in some cases may adjust your PROTOCOL.INI file.

Token Ring or Other LAN Types DLC Adapter Parameters

Adapter 0 (0 - 15)

☐ Free unused links

☐ Send alert for beaconing

☐ Maximum activation attempts (1 - 99)

Window count
Send window count 4 (1 - 8)
Receive window count 4 (1 - 8)

Maximum link stations 4 (1 - 255)

Maximum I-field size 4105 (265 - 16393)

Percent of incoming calls (%) 0 (0 - 100)

Link establishment retransmission count 8 (1 - 127)

Retransmission threshold 8 (1 - 127)

Local SAP (hex) 04 (04 - 9C)

C&SM LAN ID IDPNET

Connection network name (optional) .

OK Delete Cancel Help

**Figure 3-18**
**Comm. Server Token-Ring Adapter Parameters**

The fields of most importance to FDR/UPSTREAM users is:

- **Send window count:** The default of 4 will work in most circumstances since this field will usually be negotiated in an XID3. For maximum portability, we recommend the value of **1**.

- **Receive window count:** This value must match the MAXOUT parameter specified in your VTAM PU definition if you are connecting to a 3172 or 3745 or the value specified in question 941 in the 3174 definition. If you are unsure, do not use the default of 4; use **2**.

- **Maximum I-field size:** For best performance, we recommend a value of **4105**, which will allow a maximum RU size of 4096.

When you have completed this dialog, press the **Ok** button to return to the Communications Manager Profile List Sheet.

The next step is to specify the Local Node Characteristics. From the Communications Manager Profile List Sheet, highlight **SNA local node characteristics** and press the **Configure** button.

### 3.8.4. Local Node Characteristics

This will display the Local Node Characteristics dialog (see figure 3-19). This dialog is used to specify physical unit (overall) SNA configuration characteristics for your SNA connection. Most of these parameters have been entered when you configured for 3270.

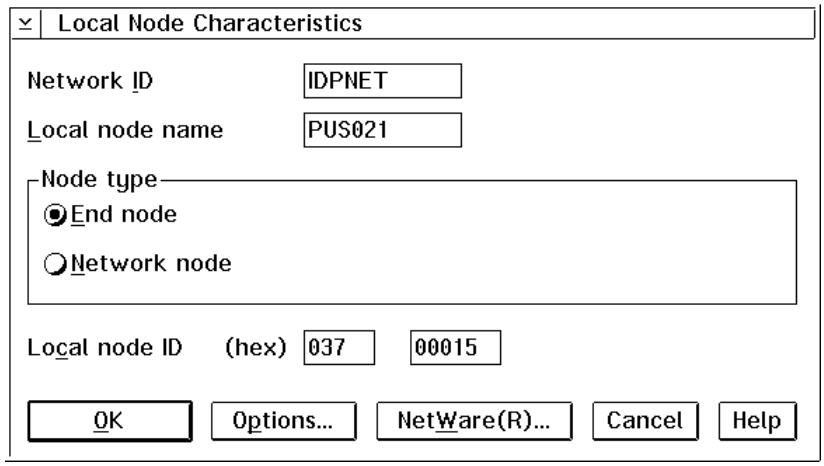



**Figure 3-19**
**Comm. Server Local Node Characteristics**

The meaning of the fields are:

- **Network ID:** This is the SNA network name that your PC belongs to. This can be obtained from your network administrator. It may already be entered. Enter up to 8 characters. It is required.

- **Local node name:** The name of your physical unit. This can be obtained from your network administrator. It may already be entered. Enter up to 8 characters. It is required.

- **Node type:** Defines how you are connecting to your adjacent node. Select one radio button.
  - **End Node:** Select this radio button for most connection types.
  - **Network Node:** Select this radio button if this PC is acting as an APPN network node.

- **Local node ID:** If you are connecting to a 37xx front-end processor or 3172, you will need to enter your XID. The first field is the IDBLK portion of the XID. In prior OS/2 configurations this was fixed at 05D. Enter a 3 hex digit number.

  The second field is the IDNUM portion. Enter a 5 hex digit number.

  Obtain these values from your network administrator.

When you have completed this dialog, press the **Ok** button to return to the Communications Manager Profile List Sheet.

The next step is to specify the connection that you will use for APPC transactions. Highlight the **SNA connections** entry and press the **Configure** button. This will take you to the Connections List dialog (see figure 3-20).

### 3.8.5. Connections List

This dialog is used to specify the link and type of connection that you will be using.

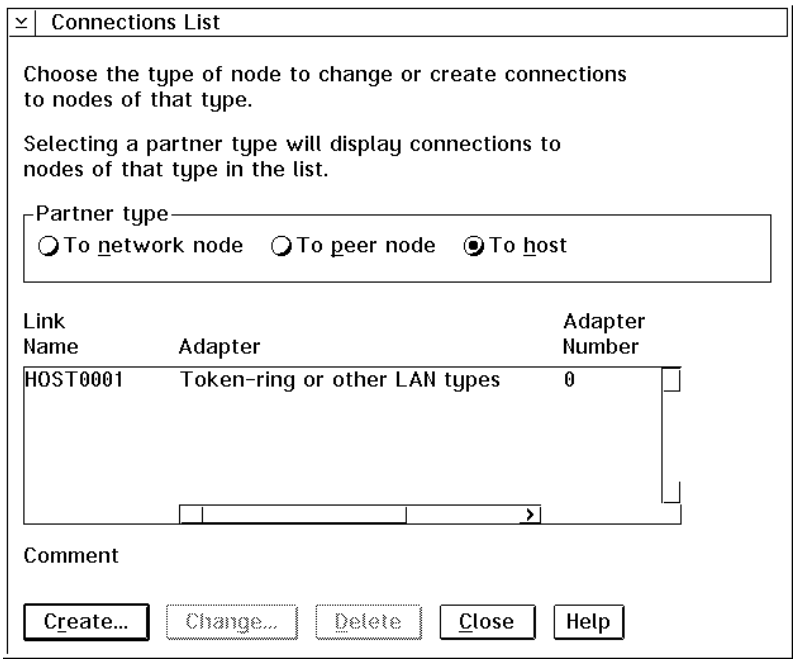



**Figure 3-20**
**Comm. Server Connections List**

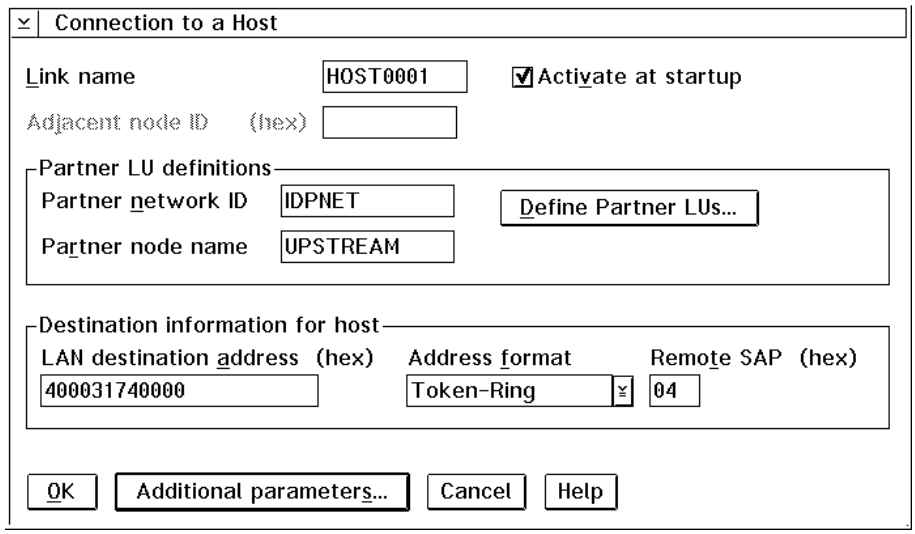
The fields are:

- **Partner type:** This is the Physical Unit type that you will be using to connect to FDR/UPSTREAM MVS. If your connection is to the host through a 3174, 37xx or 3172 select the **To host radio button** (this is most environments). If you will be connecting using Independent LUs you can also select the To peer node option. If you are connecting through an APPN device (AS/400, 3172, etc.) specify To network node. Again, most users will specify To host.

- **Link list box:** This list box allows you to select which link you will be using for your APPC connection. If this box is empty, press the Create button. If this box has the Token-Ring entry that you wish to use, highlight that entry and press the **Change** button.

  You will see the Adapter List selection dialog. Select the Token-Ring adapter entry in the list box and the Adapter number that you will be using (usually 0), and press the **Continue** button.

  This will bring you to the Connection dialog (see figure 3-21).




### 3.8.6. Connection Dialog

This dialog allows you to specify the relevant information for the connection that you will be using for APPC. The fields are:

- **Link name:** This value is generally suggested by the system, as LINK0001, **HOST0001**, etc.
- **Adjacent Node ID:** This is the XID used to connect to the host. Enter the values that you entered in the Local Node Characteristics dialog. This field may be grayed.
- **Activate at startup:** Check this box if you wish this connection started when Communications Manager starts. FDR/UPSTREAM will operate correctly regardless.
- **Partner network ID:** This is the SNA network name that your PC belongs to. This can be obtained from your network administrator. It may already be entered. Enter up to 8 characters. It is required.
- **Partner node name:** This is the physical unit name for your adjacent system. For FDR/UPSTREAM MVS, you can use the APPLID (usually **UPSTREAM**). Enter up to 8 characters. It is required.
- **LAN destination address:** Enter the LAN address of the 3174, 37xx, 3172 or other node that you are connecting to directly for SNA connections. For Token-ring this is generally a 12 digit locally administered address, beginning with 4.
- **Address Format:** Select the format that the LAN destination address (above) is specified in. Most users will select **Token Ring**.
- **Remote SAP:** Enter the Service Access Point defined for your host connection. Most users will specify **04**.



**Figure 3-21**
**Comm. Server Connection to a Host**

### 3.8.7. Partner LU Dialog

When you have completed these values, press the **Define Partner LUs** button to define the systems and applications you are connecting to (see figure 3-22).

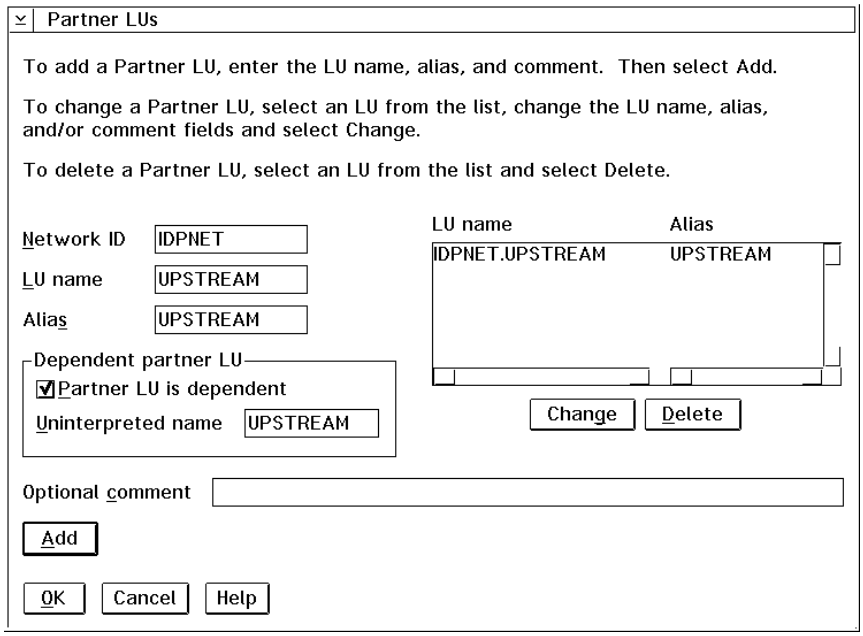



**Figure 3-22**
**Comm. Server Partner LUs**

- **Network ID:** This is the SNA network name where FDR/UPSTREAM MVS can be found. This value should be obtained from your network administrator. Enter up to 8 characters. It is required.

- **LU name:** This is your partner's LU name. For MVS connections, use the APPLID. For FDR/UPSTREAM MVS, the default is **UPSTREAM**. Enter up to 8 characters. It is required.

- **Alias:** This value is used by FDR/UPSTREAM OS/2 to find this partner definition. It is entered in the FDR/UPSTREAM configurator (described later in this chapter). The suggested value is **HOST**. Enter up to 8 characters. It is required.

  NOTE: This field is case sensitive and must be entered in UPPER case.

- **Partner LU is dependent:** If you are using dependent LUs, **check** this box. If you are using independent LUs (note independent LUs are required for parallel sessions), do not check this box.

- **Uninterpreted name:** Use the same entry that you specified for LU Name above. Enter up to 8 characters. For FDR/UPSTREAM MVS, the default is **UPSTREAM**.

- **Optional comment**: Enter any text which will help you remember this definition.

  Press the **Add** button to add this definition to the LU Name list box which contains all the partner LUs currently defined. When you have completed this screen, press the **Ok** button to return to the Link Definition Dialog.

  Press the **Ok** button in the Link Definition Dialog to return to the Connection dialog. Press the **Close** button in the Connection dialog to return to the Profile List Sheet.

On the Profile List Sheet highlight **SNA features** and press the **Configure** button. This will bring you to the SNA Features List dialog (see figure 3-23).

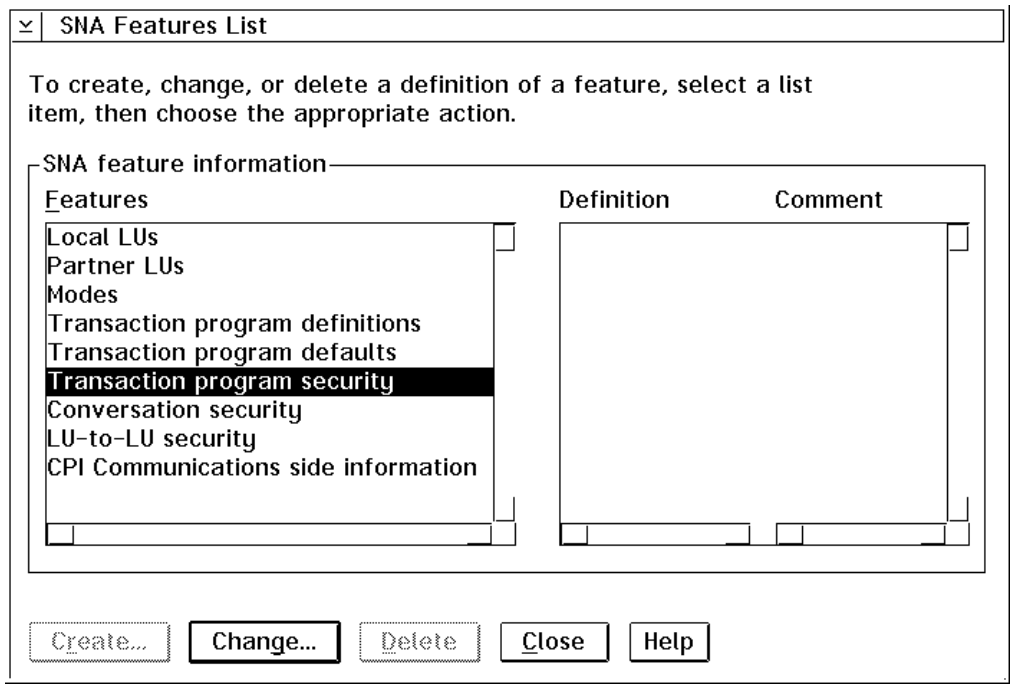
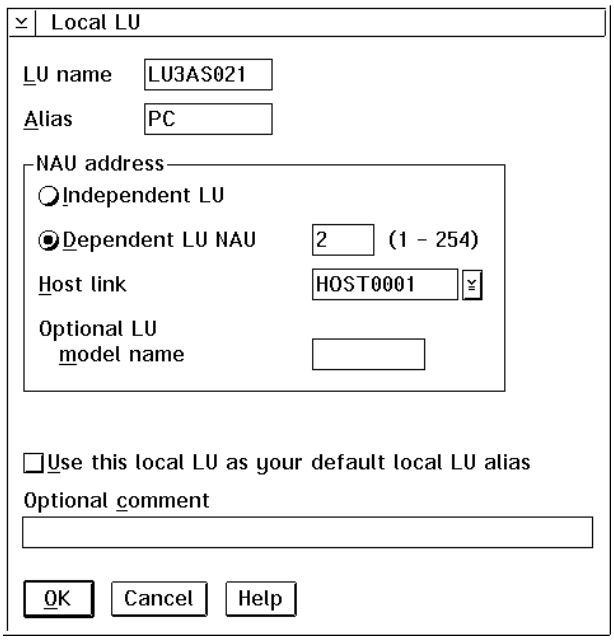



**Figure 3-23**
**Comm. Server SNA Features List**

In the SNA Features dialog you will be configuring a variety of features. When a feature has a configuration entry for it defined, you will see in the Definition list box, that entry. The following procedures will describe the creation of each profile. If you are modifying a configured feature, all you need to do is highlight the feature in the Features list box, highlight the definition you wish to modify in the Definition list box and press the Change button. You can also double-click your mouse on the definition you wish to change.

### 3.8.8. Local LU Dialog

From the SNA Features List dialog, highlight the **Local LUs** SNA feature and press the **Create** button. This will display the Local LU dialog (see figure 3-24).




The Local LU dialog allows you to define the parameters used by the LU (logical unit) defined for FDR/UPSTREAM for APPC access. These parameters must match the VTAM parameters defined on the host for your PC.

- **LU Name:** Enter the local LU name. This name can be obtained from your network administrator. Enter up to 8 characters. It is required.

- **Alias:** This is the name that is used by applications to reference this LU. This value must match the alias configured in the FDR/UPSTREAM configurator (USCFG). The recommended value is **PC**. Enter up to 8 characters. It is required.

  NOTE: This field is case sensitive and must be entered in UPPER case.

- **NAU Address:** Select the independent LU radio button if this is an independent LU (VTAM LU number of 0). Select the dependent LU button if this is a dependent LU (non-zero LU number) and enter the LU Local Address (LU number) in the text box.

  We recommend using dependent LUs unless you require APPN support, to avoid known problems with VTAM and NCP improperly handling adaptive pacing.

- **Host link:** Select the link name of the entry that you defined earlier. Usually, this is LINK0001 or **HOST0001**.

- **Use this local LU as your default local LU alias:** FDR/UPSTREAM does not require that it use the default LU. You can leave it unchecked if you wish.

- **Comment:** Enter any text to help you remember this definition.

When you have completed entering the values in this dialog, press the **Ok** button to return to the SNA Features dialog.

### 3.8.9. Mode Definition

Since you have already defined partner LUs, the next step is to define the mode that you will be using with FDR/UPSTREAM. Modes define certain characteristics that will be used in the communications.

The default mode for FDR/UPSTREAM is #INTER, which is a sample mode entry always available in VTAM. In Comm. Server there is a sample entry for #INTER which needs to be accepted or modified to be used. In the examples, we have assumed that UPSTREAM is a single session application and we recommend whenever possible using it that way. However, that requires modification of the predefined mode entry #INTER. If you can not change #INTER in your environment, you will need to define UPSTREAM for parallel sessions or use the sample provided with UPSTREAM MVS, USTMODE. Most users will be able to modify #INTER and can use the described modifications.

Select **Modes** from the SNA Features dialog, select the definition **#INTER** and press the **Change** button. You will see the Mode Definition dialog (see figure 3-25).

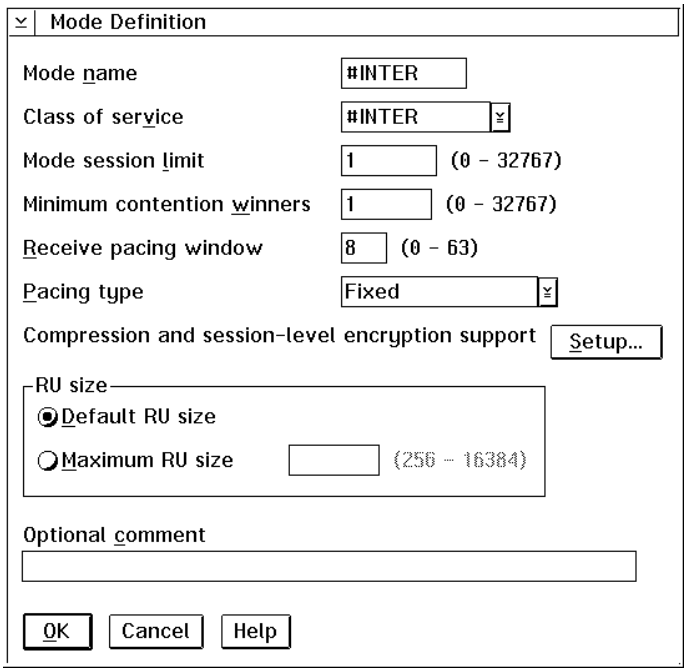



**Figure 3-25**
**Comm. Server Mode Definition**

- **Mode Name:** The name of the mode table entry that you will be using. This value must match the value entered in VTAM. We recommend using **#INTER**.

- **Class of service:** Describes characteristics on how the connection will operate. The default of **#INTER** is generally acceptable.

- **Mode session limit:** The maximum number of sessions that can be utilized. We recommend using single sessions, so code the value of **1**.

- **Minimum contention winners:** The number of contention winner sessions that will be activated. FDR/UPSTREAM PC will operate as either a winner or loser, but we recommend a value of **1** (winner).

- **Receive pacing window:** For fixed pacing (non-adaptive), this is the number of RUs received in succession without an acknowledgment. We recommend a value of **8**. NEVER use 0.

- **Pacing type:** For good performance and high reliability, we recommend using **Fixed** pacing.

- **RU size:** You can select to either use the default RU size or specify a value. We recommend using the **Default RU size** as this will be as large as the adapter can support. Note that the RU size can still be negotiated downwards by the host mode table entry.

- **Comment:** Enter any text that will help you remember this definition.

When you have finished with this dialog, press the **Ok** button to return to the SNA Features dialog.

### 3.8.10. Transaction Program Definition

The final SNA feature to configure is the transaction program definition. This definition is used when you are going to be controlling FDR/UPSTREAM functions from another computer. However, since it doesn't hurt to define a profile, we recommend that you do it even if you are going to be controlling FDR/UPSTREAM from your PC.

Select **Transaction programs definitions** from the SNA Features dialog and press the **Create** button. This will display the first transaction program definition dialog (see figure 3-26).

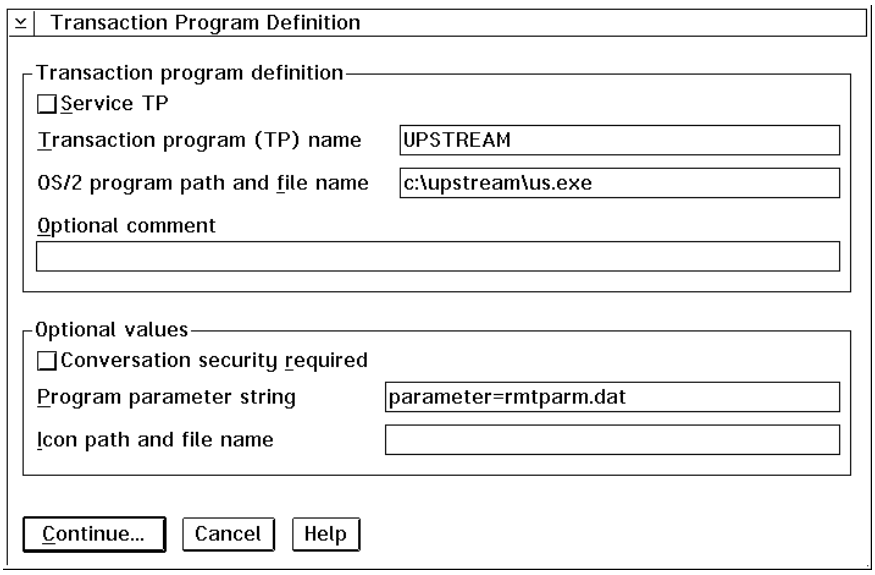



**Figure 3-26**
**Comm. Server Transaction Program Definition (1 of 2)**

- **Service TP:** Do **not check** this box for FDR/UPSTREAM.

- **Transaction program (TP) name:** Enter **UPSTREAM**.

NOTE: This field is case sensitive and must be entered in UPPER case.

- **OS/2 program path and file name:** Enter the full drive, path and file name where FDR/UPSTREAM is installed. Most users will enter: **C:\UPSTREAM\US.EXE**.

- **Comment:** Enter whatever text will help you remember this definition.

- **Conversation security required:** Do **not check** this box as FDR/UPSTREAM does its own security management.

- **Program parameter string:** This is the parameters that are passed to FDR/UPSTREAM when it is run. FDR/UPSTREAM comes with a sample remotely initiated parameter file, RMTPARM.DAT. Therefore, the recommended value is:
  **PARAMETER=RMTPARM.DAT**.

- **Icon path and file name:** FDR/UPSTREAM does not use this field; leave it blank.

When you are satisfied with your entries, press the **Continue** button to go to the second transaction program definition dialog (see figure 3-27).

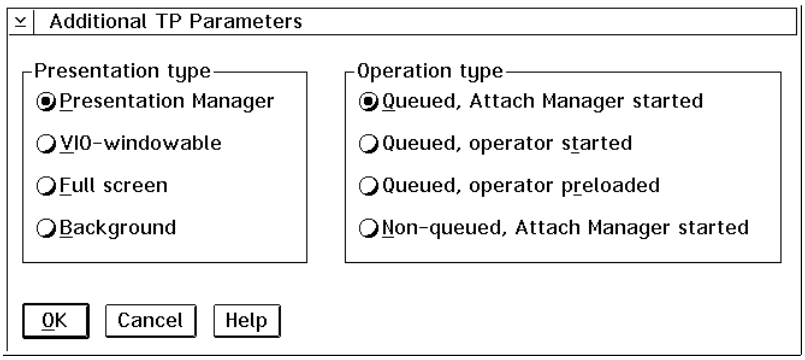



**Figure 3-27**
**Comm. Server Transaction Program Definition (2 of 2)**

This dialog allows you to specify how the program is started. The options are:

- **Presentation type:** This is how the started program is displayed. Select **Presentation Manager** as FDR/UPSTREAM is a PM program.

- **Operation Type:** It is recommended that you use **Queued - attach manager started.** In this case, when a remote request is detected by communications manager, if FDR/UPSTREAM is not running, the attach manager starts it. If FDR/UPSTREAM is running, FDR/UPSTREAM will pick up the request. Do not use Queued-operator pre-loaded or non-queued.

When you are satisfied with your selections press the **Ok** button to return to the SNA Features dialog. Press the **Close** button to return to the Profile List Sheet dialog. Press the **Close** button to return to the Configuration Definition dialog. Press the **Close** button to return to the Communications Manager Setup dialog.

### 3.8.11. The Final Steps

Upon returning to the Communications Manager Setup dialog an automatic verification will take place (unless you have disabled this feature).

If there are errors you will be asked if you wish to run the Message Log Formatter to view the errors. This is recommended as it will usually help you in determining where your errors are. Note that the most common error is using the same LU number for both 3270 and LU 6.2. Exit the Message Log Formatter, return to the Communications Manager Setup and repair any problems. If you can not ascertain what the problem is, feel free to call FDR/UPSTREAM technical support.

When the configuration file has verified successfully, you may be asked if you wish these items dynamically modified. There is generally no harm in this. If dynamic verification fails, ignore the errors and stop and restart Comm. Server.

You may be asked if you wish your CONFIG.SYS and other startup files modified as well. We recommend that you allow the system to automatically modify these files. The Communications Manager may also suggest that you need to reboot to have these features take effect.

When you have completed your Communications Server modifications (which may include rebooting the system), make sure that the Communications Manager is active and available.

You are now ready to go to the FDR/UPSTREAM configuration (page 3-42).

# 3.9. PC FDR/UPSTREAM Configuration

This section guides you in configuring FDR/UPSTREAM for your environment. Before using this section, if you are using APPC you must have completed the SNA configuration (see the previous section).

FDR/UPSTREAM OS/2 uses the Presentation Manager interface. You can access the OS/2 on-line help facility if you have problems using PM programs.

There are several different modes you can be in:

- A dialog: A dialog box is a box inside the main screen where you may be able to enter values, and always contains one or more buttons. Move from field to field with the TAB key or by selecting the field with a mouse. Leave the screen by pressing one of the buttons (by moving the cursor to the button and pressing the space bar, or by double clicking the mouse on the button), or by pressing [ESC] (which is like moving to the CANCEL button and pressing it).
- The full screen: You get access to FDR/UPSTREAM functions by pressing the [ALT] key in conjunction with the first letter of one of the menu items at the top of the screen. This will pull down one of the menus and allow you to move the cursor with the cursor keys to the function you wish to perform; you [ENTER] to perform that function. You can also select a menu item by clicking the mouse on the menu. Finally, there are keyboard “accelerators” for many of the menu items. When you pull down the menu you can see what they are. You can access a function by just pressing the accelerator combination (like [CTRL]B for backup).

In most places in the program, you can get help about a field or a button by pressing the F1 (help) key. This provides context sensitive help about the field or button. If you need additional help, press the INDEX button to get access to helps about other fields or general subjects.

To abort what you are doing in a dialog, press the ESC key. To leave FDR/UPSTREAM from the full screen, pull down the File menu and select Exit, or press the [ALT]X accelerator.

To enter the FDR/UPSTREAM configurator, either double-click the **Configurator** icon in the **FDR/UPSTREAM for OS/2 - Icon View**, or if you haven’t installed the FDR/UPSTREAM icons, go to the FDR/UPSTREAM directory and run:

```
[C:\UPSTREAM] USCFG
```

If this is the first time you’ve run the configurator, you will see an error message saying “No such file or directory”. This means that when FDR/UPSTREAM searched for the default configuration file it could not find it. Press the space bar to continue.

Figure 3-28 shows the Configuration screen. Here you enter the SNA parameters that are required by most SNA’s.

Configuration

SNA...

SNA Parameters

Local LU Alias . . . . . .

Partner LU Alias . . . . . .

Mode Name . . . . . #INTER

TCP/IP...

TCP/IP Parameters

TCP/IP Address . . . . . .

TCP/IP Host Port . . . . . 1972

TCP/IP PC Port . . . . . 1972

Messages Time Out . . . . . 0

Use a Registered Name for Host Initiation

Registered Name . . . . . .

Transmission Interval . . . 0

Ok Cancel

This screen is a dialog. If you are using SNA/APPC to connect to the host press the **SNA...** radio button and see the following section. If you are using TCP/IP press the **TCP/IP...** radio button and go to section 3.9.2.

Note that when you press the SNA... radio button the TCP/IP parameter fields are grayed and become unavailable; when you press the TCP/IP... radio button the SNA parameters fields are grayed and become unavailable.

### 3.9.1. Configuring for an SNA Host Connection

The fields are from your communications configuration.

- **Local LU Alias:** Specify up to 8 characters indicating the logical unit profile name as created in the communications manager. This is always required. The suggested value is **PC**.

- **Partner LU Alias:** Specify up to 8 characters indicating the partner logical unit profile name as created in the communications manager. This is always required. The suggested value is **HOST**.

- **Mode Name:** Specify up to 8 characters indicating the Mode Name as specified in the communications manager. This is always required. The default value is **#INTER**.

If you are satisfied with these parameters go to section 3.9.3. to complete your configuration.

### 3.9.2. Configuring for a TCP/IP Host Connection

The following are the TCP/IP specific parameters:

- **TCP/IP Address:** Enter the IP address of the host adapter that you will be connecting to. Enter the doted decimal notation. For example: 130.50.75.1. This field is required and there is no default.

- **TCP/IP Host Port:** Enter the IP port that FDR/UPSTREAM MVS was installed on. Enter a decimal number. This field is required; in most cases you can accept the default which is **1972**.

- **TCP/IP PC Port:** Enter an IP port that FDR/UPSTREAM on other computers can use to contact your PC. This field is optional; in most cases you can accept the default which is **1972**.

When you have completed entering the TCP/IP specific information proceed to the next section to complete your configuration.

### 3.9.3. Completing the Configuration

There are several fields common to both connectivity types in this dialog:

- **Messages Time Out:** FDR/UPSTREAM informational and error messages will remain displayed until a button is pressed or until they time out. The default of **0** indicates that the message will stay displayed until the button is pressed. A positive number indicates the number of seconds until the message times out if a button is not pressed. -1 indicates that messages should not be displayed. For initial testing, we recommend 0. In production we recommend a small number (such as 3 seconds).

- **Use a Registered Name for Host Initiation:** Check this box if you wish to register a name with FDR/UPSTREAM MVS that host and other workstation/server requests can use to find your workstation. You must register a name if you wish to use the auto-update facility. Note that checking this box may cause occasional errors (which can be ignored) if the workstation/server is updating its registration information when a remote request is received. You must enter a Registered Name if you check this box. The default is checked.

- **Registered Name:** Enter any name, unique within FDR/UPSTREAM MVS, that can be used to allow the host and other PCs to find your workstation. You can enter up to 16 characters which can include embedded spaces. Note that if there are duplicate names no errors are reported; the most recently registered name is used.

- **Transmission Interval:** Enter a number which indicates how often (in minutes) you will re-register your registration name with FDR/UPSTREAM MVS. Most users will use the default of **0**, which causes the registration to happen just once on UPSTREAM startup. The main reason to specify a non-zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change from time to time.

Press the **Ok** button (or press the [ENTER] key) to accept your parameters. You will be asked for the file name to save these parameters to (see figure 3-29).

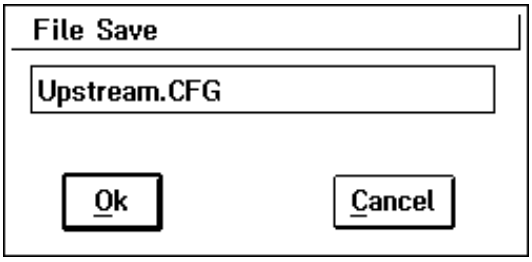



**Figure 3-29**
**Save Configuration Parameters**

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is UPSTREAM.CFG, but you can use any file name and any directory. If the file and path is too large for

the edit field, it will scroll horizontally. Press the **Ok** button to save the parameters to the file you specify, or press Cancel to not save your parameters.

FDR/UPSTREAM is now configured for operation with your communications environment. You can leave the configuration program by typing [ALT]X, or by pulling down the File menu and selecting Exit. Proceed to chapter 8 to perform your first backup.

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# 4 Windows

## 4.1. Overview

The installation process consists of four steps:

- Determining your system requirements
- Installing the software
- Configuring the communications software
- Configuring FDR/UPSTREAM

We recommend that you install, configure, and make operational your APPC or TCP/IP before installing and configuring FDR/UPSTREAM. In particular getting 3270 fully operational will help you in getting FDR/UPSTREAM working quicker.

### 4.1.1. Requirements

FDR/UPSTREAM Windows requires the following:

- An IBM AT, PS/2 or compatible
- A diskette or CD-ROM drive.
- 2 megabytes of free hard disk space. If you will be backing up large servers you may need up to 40 MB of free disk space.
- Microsoft Windows v3.1 or higher (including Windows 95)
- Communications hardware compatible with your communications software.
- APPC software for an approved vendor, including Attachmate (Irma Workstation for Windows, Irma for the Mainframe, or Attachmate Personal Client (v6.0 or higher)), Wall Data (RUMBA), NetSoft (Dynacomm/Elite APPC), Novell (NetWare for SAA), IBM (NS/DOS or NS/Windows) or Microsoft (SNA Server with Windows requestors).

or

- TCP/IP software from an approved vendor which supports the WINSOCK interface.

# 4.2. Installing FDR/UPSTREAM

FDR/UPSTREAM includes an installation program to help you install it for the first time to your hard disk. But you don't have to use it if you don't want, as all the program does is create a directory for the FDR/UPSTREAM files, copy the diskette to a specified drive and directory and optionally create a program group and items within it. If you have any problems with the installation, just copy the files yourself and create a program group (UP-STREAM) on the desktop with the FDR/UPSTREAM programs:

- US.EXE: Named "UPSTREAM"
- USCFG.EXE: Named "Configurator"
- USSTART.EXE: Named "Auto Start"
- SETNOV.EXE: Named "Novell/ULTra"

**NOTE: If you do not run the INSTALL program for a first time install, you will need to rename USSER to US.SER.**

Updates should just be copied over the originals (though the installation program can be run as well).

To run the installation program, insert the FDR/UPSTREAM Program Diskette in your floppy drive or CD in your CD-ROM drive. Go to the Program Manager in Windows, pull down the **File** menu and select **Run** (see figure 4-1). For Windows 95, press the **Start** button and select **Run**.

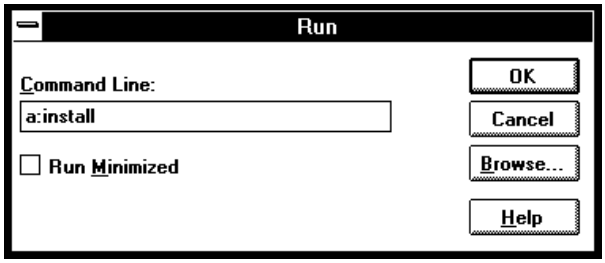
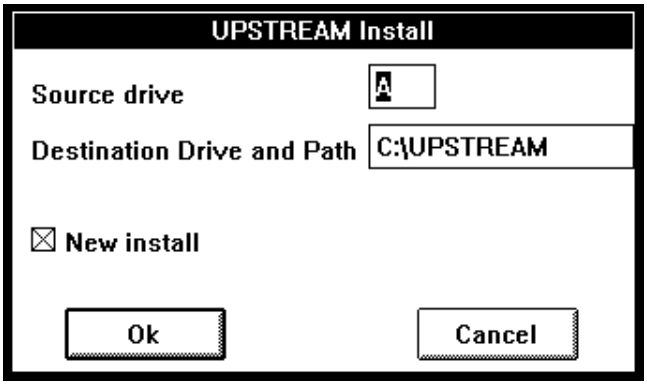



**Figure 4-1**
**Run Install Program**

For a floppy install enter <drive>:INSTALL. Most users will enter **A:INSTALL**.

For a CD install enter <drive>:\UPSTREAM\WINDOWS\INSTALL. Many users will enter: **D:\UPSTREAM\WINDOWS\INSTALL**.

The install program will display a dialog allowing you to specify simple installation parameters (see figure 4-2).




The screen fields are:

- **Source drive:** This is a single letter referring to the drive which contains the FDR/UPSTREAM Windows diskette (or directory if this is a hard disk-to-hard disk install). The default is **A**.
- **Destination Drive and Path:** This is the drive and path where you wish FDR/UPSTREAM installed. Do not add a trailing backslash (\). The default is **C:\UPSTREAM**.
- **New Install:** Check this box if you are installing FDR/UPSTREAM for the first time. This causes the install program to create a new group for FDR/UPSTREAM available from the Program Manager and add the FDR/UPSTREAM programs. If you are updating FDR/UPSTREAM files, do not check this box. The default is checked.
- **Ok:** Press this button to begin the install.
- **Cancel:** Press this button to return to Windows without performing the install.

As the install progresses, you will see FDR/UPSTREAM copy the files to the destination directory. If you checked New Install, you will see the new program group created and the FDR/UPSTREAM programs added.

When you are done, you will see the UPSTREAM program group created. Now proceed to page 4-8 to configure FDR/UPSTREAM.



**Figure 4-2**
**Install Dialog**

# 4.3. Files Included

FDR/UPSTREAM consists of several files. Each file name and it's purpose is outlined here.

- Table 4-1 describes the files on the FDR/UPSTREAM Program Diskette or \UPSTREAM\WINDOWS directory on the CD-ROM.
- Table 4-2 describes the files on the FDR/UPSTREAM Supplemental Diskette and are not automatically installed during a diskette installation. These files are contained in the \UPSTREAM\WINDOWS directory on the CD-ROM.
- Table 4-3 describes the files in the \SAMPLES directory of the FDR/UPSTREAM Supplemental Diskette or \UPSTREAM\WINDOWS\SAMPLES directory on the CD-ROM.
- Table 4-4 describes the files on the NetWare Program Diskette or the \UPSTREAM\NETWARE directory on the CD-ROM.
- Table 4-5 describes the contents of the FDR/UPSTREAM Windows ULTra Workstation Diskette (available as a separate option).

| File Name | Description |
|---|---|
| INSTALL.EXE | FDR/UPSTREAM installation program. |
| RETCODE.EXE | Allows text descriptions of the extended program return code returned by FDR/UPSTREAM and re-sets the limited return code. |
| RMTPARM.DAT | Sample parameter file, used when the attach manager starts FDR/UPSTREAM (when it is not already running). |
| SERIAL.DAT | Required for modification of personalization information of FDR/UPSTREAM. |
| SETNOV.EXE | (Novell & ULTra only) FDR/UPSTREAM Novell security access specification and ULTra Profile specification program. Run this program to specify the Novell user names, servers, etc. you wish to attach to and/or the workstations to be included in an ULTra Profile. |
| UPSTREAM.MSG | The FDR/UPSTREAM predefined message file. This file contains many of the messages that are logged and displayed. You can modify this file to change the message text, or to change the way that it is handled (see section 11). |
| US.EXE | FDR/UPSTREAM main program. Provides the main user interface, performs the communications including backups and restores, logs events, allows inquiries and many other features. |
| US.HLP | The FDR/UPSTREAM help file. This file contains the help text that you see when you press the help (F1) button. You can modify this file to customize the text for your installation or translate it into a foreign language (see section 12). |
| USCFG.EXE | FDR/UPSTREAM configurator. Use this program to specify communications parameters, system overall parameters and to set up unattended operations. |

| File Name | Description |
|---|---|
| USCFG.HLP | FDR/UPSTREAM configurator help file. As for the FDR/UPSTREAM help file, this file contains the help information when you press the help (F1) button and is user modifiable. |
| USLOGCLR.EXE | FDR/UPSTREAM log and report maintenance program. The FDR/UPSTREAM logs and reports can grow indefinitely, so a program has been provided which will shrink it down, based on a specified number of days. |
| USSER | The default personalization file. This file must be named US.SER in the UPSTREAM directory or the WORKPATH for UPSTREAM to run. |
| USSTART.EXE | FDR/UPSTREAM unattended operations program. This program operates as a presentation manager program. It waits for a specified time and then starts FDR/UPSTREAM. |
| USTPCFG.EXE | (Windows NT) Assists in the creation of transaction program definitions for Microsoft SNA Server. |
| USTPSERV.EXE | (Windows NT) An optional facility that allows Microsoft SNA Server to start FDR/UPSTREAM as a service rather than an applications program. |
| USWIN32.DLL | (Windows NT & Windows 95) 32-bit DLL used internally by UPSTREAM for access to specific 32 bit Windows features. |

**Table 4-1**
**FDR/UPSTREAM Windows Program Diskette**

| File Name | Description |
|---|---|
| APPC.BAT | (NS/DOS) Used to load NS/DOS before starting Windows. |
| APPCUNLD.BAT | (NS/DOS) Used to unload NS/DOS |
| CONFIG.NSD | (NS/DOS) Sample CONFIG.NSD to help get NS/DOS working. |
| DEFINETP.NSD | (NS/DOS) Sample DEFINETP.NSD to help get NS/DOS working. |
| MODE.NSD | (NS/DOS) Sample MODE.NSD to help get NS/DOS working. |
| SIDEINFO.NSD | (NS/DOS) Sample SIDEINFO.NSD program to help get NS/DOS working. |
| USMODIFY.EXE | Allows command line modification of a number of FDR/UPSTREAM parameter and configuration files. |

**Table 4-2**
**FDR/UPSTREAM Windows Supplemental Diskette**

| File Name | Description |
|---|---|
| AUTOINST.BAT | Sample installation job for the FDR/UPSTREAM auto-update facility. |
| AUTOINST.DAT | Sample installation parameter file for the FDR/UPSTREAM auto-update facility. |
| EXCLUDE.LST | A sample exclude file list. |
| ULTINST.BAT | Sample installation job for the FDR/UPSTREAM ULTra auto-update facility. |
| ULTDOS.DAT | Sample parameter file for automatically updating FDR/UPSTREAM DOS ULTra workstations. |
| ULTNT.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows NT ULTra workstations. |
| ULTOS2.DAT | Sample parameter file for automatically updating FDR/UPSTREAM OS/2 ULTra workstations. |
| ULTW95.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 95 ULTra workstations. |
| ULTWIN.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 3.1 ULTra workstations. |
| USATOE.TAB | Sample ASCII-to-EBCDIC conversion table. |
| USETOA.TAB | Sample EBCDIC-to-ASCII conversion table. |

**Table 4-3**
**FDR/UPSTREAM Windows Supplemental Diskette \SAMPLES Directory**

| File Name | Description |
|---|---|
| USLOGCLR.NLM | (NetWare Directory Services) Clears the USNDS.LOG file. See the Novell chapter for more information. |
| USNDS.NLM | (NetWare Directory Services) Provides access to NDS information for attached FDR/UPSTREAM workstations. See the Novell chapter for more information. |
| USSETUP.NLM | (NetWare Directory Services) Installs the required NLMs on a server. See the Novell chapter for more information. |

**Table 4-4**
**FDR/UPSTREAM NetWare Program Diskette**

| File Name | Description |
|---|---|
| INSTALL.EXE | Simple program to install the FDR/UPSTREAM ULTra version on a workstation. |
| LANCOPY.EXE | Allows PC-to-PC file copies and directory listings across the LAN to PCs which have ULTRA.EXE installed. |
| ULTRA.EXE | Allows remote file access across a Novell IPX/SPX or NetBIOS LAN. |
| USLOGCLR.EXE | ULTRA.LOG (or UPSTREAM.LOG) log maintenance (shrinking) program. |
| USWIN32.DLL | Access DLL required to run FDR/UPSTREAM ULTra in a Windows 95 or Windows NT environment. |

**Table 4-5**
**FDR/UPSTREAM ULTra Workstation Diskette Contents**

# 4.4. Configuration Overview

Configuration of FDR/UPSTREAM to communicate to the host is very different depending upon whether you are running SNA/APPC or TCP/IP.

### 4.4.1. Configuring for TCP/IP

Once you have installed the TCP/IP software and tested the connectivity to the host (via a standard package such as FTP), you are immediately ready to proceed to the FDR/UPSTREAM configuration. Go to page 4-39 to perform this configuration.

### 4.4.2. APPC Configuration Overview

The process of configuring FDR/UPSTREAM for APPC involves several issues:

- Configuring VTAM
- Configuring FDR/UPSTREAM MVS
- Configuring the APPC software
- Configuring FDR/UPSTREAM Windows

Careful planning is essential in configuring SNA software. You should review the entire process before beginning and fill out the worksheets for each section or have information available.

# 4.5. Pre-PC Configuration Issues

### 4.5.1. Configuring VTAM

You should have your VTAM system's programmer configure the VTAM environment, or modify the existing environment if it is insufficient for FDR/UPSTREAM (i.e. a mode definition that doesn't support LU 6.2). Worksheet 3-1 should be filled out by this person or the information should be obtained from this person. An NCP regeneration is rarely required.

See the FDR/UPSTREAM MVS manual for suggestions on configuring VTAM.

**NOTE: The host mode entry determines values like RU size, and the APPL definition determines the receive pacing which have a significant affect on performance. We recommend that you define a mode entry that initially sets the RU size at 4096 or use USTMODE which is provided as a sample and an APPL definition which sets receive pacing at 8.**

**NOTE: It is recommended that you use dependent LUs (non-zero LU Local Addresses) for FDR/UPSTREAM PCs. Independent LUs tend to be more difficult to continue and offer few benefits.**

| Name | Description | Your Value |
|---|---|---|
| SNA Network Name | The name of the SNA network to which you belong. This is optional in many environments. | |
| Partner LU Name | The APPLID of FDR/UPSTREAM on the host. Supplied sample: **UPSTREAM**. | |
| LU Number | The LU local address. Most users will use 2. NS/DOS MUST be an independent LU. | |
| Mode Name | The mode table entry name. The supplied sample: **USTMODE**. | |
| Receive Pacing Size | A number from 1 to 63 of the number of RUs to be received in succession before a low-level acknowledgment. NEVER use 0. We recommend 8 or 10 initially. | |
| Controller LAA (Token-Ring only) | The locally administered address of the 3174, 3172 or 37xx front end. This is a 12 hex digit number usually starting with 4. | |
| PC LAA (Token-Ring only) | The locally administered address of the PC. This value must be unique on the ring and for 3174 connections, must be defined in the controller. | |
| LU Name | The name of the PC LU to be used. | |
| IDBLK (37xx and 3172 only) | The 3 hex digit IDBLK component of the XID. | |
| IDNUM (37xx and 3172 only) | The 5 hex digit IDNUM component of the XID. | |

**Worksheet 3-1**
**VTAM definitions for an FDR/UPSTREAM PC**

### 4.5.2. Token-Ring Considerations

If you have a access to a direct Token-Ring connection to the host, it is **strongly** recommended that you use it for FDR/UPSTREAM.

If you are using a 37xx front end or a 3172 controller, the configuration is entirely in VTAM. If you are using a 3174 controller, then you will need a device configuration for the PC if one doesn't already exist. Worksheet 3-2 should be filled out by the host personnel who configures or maintains the 3174 cluster controller

| Name | Description | Your Value |
|---|---|---|
| PC LAA | The locally administered address of the PC as known to the controller. You must modify the DXMC0MOD.SYS (or the PROTOCOL.INI file if you are using the DXME0MOD.SYS) device driver used in the CONFIG.SYS | |
| Transmit I-Frame Size | This is 9 bytes greater than the maximum RU size you can support. We recommend that this be 1033 or greater. | |
| SAP | Service Access Point. Should always be 4. | |

**Worksheet 3-2**
**3174-to-UPSTREAM Configuration**

**NOTE: There are two locally administered addresses used: the address of the controller and the address of the PC. You enter the address of the controller in the APPC configuration. You enter the address of the PC in the LAN Support Program device driver program DXMC0MOD.SYS (or the PROTOCOL.INI file if you are using DXME0MOD.SYS).**

**NOTE: If you are using a Novell or Banyan LAN, you must use a LAN driver generated to support the Local Area Network Support Program. Do NOT use the standard Token-Ring driver.**

**NOTE: Novell LAN users should use the ODI or VLM drivers with a NWCALLS.DLL date of 11-02-93 or later.**

**NOTE: NS/DOS requires that a 3174 cluster controller be configured with Config Support C, to allow it access to independent logical units.**

### 4.5.3. Novell Considerations (Windows 3.1)

If you are using FDR/UPSTREAM on a DOS workstation connected to a Novell file server you should plan on using the ODI or VLM drivers (VLM is recommended). You must also have an NWCALLS.DLL in the \WINDOWS or \WINDOWS\SYSTEM directory which is dated 11-02-93 or later. The older IPX/NETX drivers will not operate properly when FDR/UPSTREAM accesses some of the more sophisticated Novell facilities.

If you will be using an APPC which connects directly to a host device (3174, 37xx or 3172), you must use the LANSUP driver, not the TOKEN or OEM LAN vendor driver. APPCs which talk to the host must also have the 802.2 interface available (usually this is the IBM LAN Support Program using the DXM drivers).

You must also modify your NET.CFG. You should have a block similar to the following in it:

```
LINK DRIVER LANSUP
   MAX FRAME SIZE 4208
   LINK STATIONS 6
   SAPS 2
```

The MAX FRAME SIZE parameter allows the best performance available on Token-Ring. Several APPCs require additional Link Stations and SAPs which are determined when the adapter is opened; since Novell is opening the adapter, these values must be defined here.

### 4.5.4. FDR/UPSTREAM MVS Issues

You will need to have installed FDR/UPSTREAM MVS before beginning the configuration of an FDR/UPSTREAM Windows node. The FDR/UPSTREAM MVS configuration defines storage and security attributes to be used in storing backups.

The configuration for each PC on FDR/UPSTREAM MVS, including backup profiles, security, etc. should be complete before beginning the PC configuration.

Worksheet 4-3 contains the information that you will need for FDR/UPSTREAM Windows before you can begin testing.

| Name | Description | Your Value |
|---|---|---|
| Backup Profile | An 8 character identifier used as a key for the storage of a group of backups. | |
| User ID & Password | The user ID and password required to access the requested backup profile (may not be required) | |
| Sequential tape backups allowed | Whether direct-to-tape backups are allowed | |
| Sequential disk backups allowed | Whether sequential disk backups (which can be SMS controlled) are allowed | |

**Worksheet 4-3**
**FDR/UPSTREAM MVS Configuration for Testing**

See the FDR/UPSTREAM MVS manual for assistance on setting up an FDR/UPSTREAM Windows user.

# 4.6. Configuring the APPC Software

You will need to configure the APPC software to operate with FDR/UPSTREAM Windows. See the installation and configuration guides to your APPC software for assistance in configuring your APPC software for FDR/UPSTREAM. Remember to note your LU Alias, Partner LU Alias and Mode Name for entry in FDR/UPSTREAM configuration dialogs.

Table 4 -1 lists the sections in this manual that walk you through configuration of several APPCs. If your APPC is not listed in this table, you still may want to skim it to help you in configuring your APPC. Table 4-2 shows sections that all users should read, as it involves configuration of FDR/UPSTREAM for using the configured APPC and other issues.

| Section | Page | Vendor | Description |
|---|---|---|---|
| 4.7. | 4-17 | Attachmate/DCA<br>Irma for the Mainframe<br>Irma Workstation for Windows<br>Attachmate Personal Client version 6 | PCs using Token-Ring, SDLC and other hardware environments. |
| 4.8. | 4-28 | WallData<br>RUMBA | PCs using Token-Ring, SDLC and other hardware environments. |
| 4.9. | 4-35 | IBM<br>Networking Services/DOS | PCs using IBM Token-Ring, SDLC, coax or Twinax cards, Ethernet or async (through an AS/400). You can not use a 3174 unless you have Config Support C installed. |
| 4.10. | 4-38 | Microsoft<br>SNA Server (Windows requestor) | PCs connecting through a Microsoft SNA Server running on Windows NT. |

**Table 4-1**
**APPC Software Configuration Sections (read one)**

| Section | Page | Name | Description |
|---|---|---|---|
| 4.11. | 4-39 | FDR/UPSTREAM Configuration | Describes how to configure FDR/UPSTREAM for operation with the SNA software. |

**Table 4-2**
**FDR/UPSTREAM Configuration (Required for all APPCs)**

The next section describes the transaction program definition information required of just about every APPC you should read this section if you will not be configuring your APPC using one of the entries in Table 4-1.

### 4.6.1. Remotely Attachable Transaction Program Profiles

The FDR/UPSTREAM program, US.EXE, can not accept remote requests unless you configure for them in your APPC software configuration; it will report errors if this configuration is not performed. Your APPC software can even start FDR/UPSTREAM when a remote request is received.

This configuration is done in the remote transaction program facility of your APPC software. Some of the fields that are common, and whose values are specific to FDR/UPSTREAM include:

- ☐ **Transaction Program (TP) filespec**: Enter the fully qualified path name of the FDR/UPSTREAM program. For most installations this will be: **C:\UPSTREAM\US.EXE**.
- ☐ **Service Transaction Program (TP):** Select **No**.
- ☐ **Sync level:** FDR/UPSTREAM uses Confirm, but we recommend for maximum flexibility, **Either**.
- ☐ **Conversation type:** FDR/UPSTREAM uses Basic conversations, but we recommend for maximum flexibility, **Either**.
- ☐ **Conversation security:** FDR/UPSTREAM does not support the generation of FMH-5 security information, so select **No**.
- ☐ **Transaction Program (TP) operation:** FDR/UPSTREAM can be run in two ways:
  - Queued - attach manager started: In this case, when a remote request is detected by communications manager, if FDR/UPSTREAM is not running, the attach manager starts it. If FDR/UPSTREAM is running, FDR/UPSTREAM will pick up the request. This is the recommended method.
  - Queued - operator started: In this case, when a remote request is detected by your communications software, if FDR/UPSTREAM is not running, the user is requested to start it. If UPSTREAM is running, UPSTREAM will pick up the request. Use when you wish to support remote requests, but only at certain times (controlled by USSTART).
  - Do not select non-queued.
- ☐ **Transaction Program (TP) name:** Enter **UPSTREAM**.
- ☐ **Queued allocates timeout:** This is the amount of time that a remote allocate will be held by the communications manager, without it being serviced, before it rejects it. The default is acceptable in most environments.
- ☐ **Transaction Program (TP) receive timeout:** FDR/UPSTREAM requires an immediate time-out. This is usually denoted with a **0 or 1**.
- ☐ **Maximum queue depth:** Used primarily in parallel session and multiple LU environments, the default of **5** is acceptable in most environments.
- ☐ **Transaction Program (TP) start-up parameters:** These are command line parameters passed to the application. We recommend that you use a sample remote support parameter file provided. Enter: **PARAMETER=RMTPARM.DAT**.
- ☐ **Program type:** Enter: **Windows Application.**

Go to page 4-39 to configure FDR/UPSTREAM for operation with the APPC configuration you have just created.

# 4.7. Attachmate/DCA Irma for the Mainframe

This section discusses configuration of Attachmate/DCA's Irma for the Mainframe, Irma Workstation for Windows or Attachmate Personal Client version 6 using Token-ring as your SNA hardware for FDR/UPSTREAM. For information on configuring other hardware configurations, see the appropriate Configuration Guide. It is recommended that you first read this section and only make the changes necessary for your hardware configuration.

We recommend that you get 3270 emulation working before configuring for APPC; the initial connection is easier to configure and verify for 3270 than for APPC. However for Attachmate Personal Client version 6, note that they do not have an integrated protocol stack, you can not run 3270 and APPC at the same time.

### 4.7.1. Token-Ring Configuration

To configure framing and other important general connection facilities, it is different for the 3 software types:

For Irma for the Mainframe, enter 3270 by selecting the Mainframe Sessions icon in the Irma program group. It is not necessary to actually start your 3270 session, but you can configure these options regardless. Pull down the **Settings** menu and select **Select Connection**. Select the connection you will be using (**LAN Attached (802.2)**) and press the **Configure...** button.

For Irma Workstation for Windows this function is performed in the **3270 Configurator**. Select this icon from the IRMA Workstation program group. Press the **Token-Ring** button.

For Attachmate Personal Client, Select the **Node Operator Facility** from the **Attachmate APPC Client** program group. Pull down the **Configure** menu and select **Connection**. Select the connection you will be using (**LAN Attached (802.2)**) and press the **Configure...** button.

In all cases, you will see the Token-Ring Connection dialog (see figure 4-3).

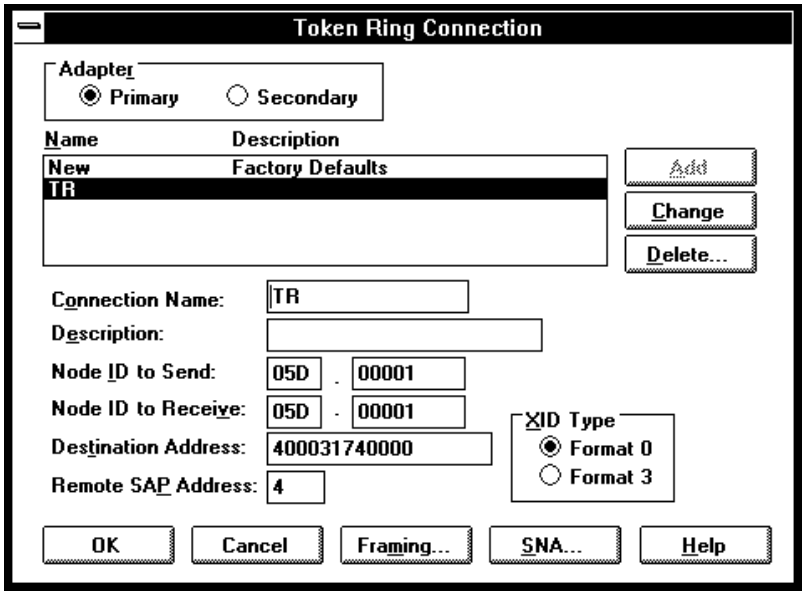
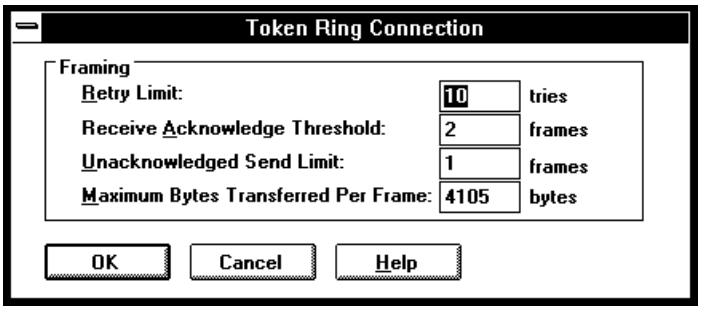



**Figure 4-3**
**Irma Token-Ring Connection**

- **Adapter:** Most users will enter **Primary** as Token-Ring adapters come pre-configured as the Primary adapter.
- **List:** If you already have a Token-Ring entry in the list, highlight it; otherwise highlight the New entry. In most cases it is not necessary to press the <Add> or <Change> buttons.
- **Connection Name:** The default is **TR** and this is the recommended value.
- **Description:** Enter any text which will help you remember this definition.
- **Node ID to Send:** Enter the IDBLK in the first box and the IDNUM in the second box for your PU as defined on the host if you are connecting to a 37xx or 3172; ignored if you are connecting to a 3174. This is a required field and the values can be obtained from your VTAM system administrator.
- **Node ID to Receive:** It is recommended that you specify the same values as for Node ID to Send (above).
- **Destination Address:** Enter the locally administered address of the 3174, 37xx or 3172 LAN adapter. Enter a 12 digit value. This is required and can be obtained from your VTAM system administrator.
- **Remote SAP Address:** Enter the service access point defined for your PU. The default is **4** and is highly recommended.
- **XID Type:** Format **0** is a simpler XID type to get working and is generally recommended. If you have problems connecting 3270 or APPC, you may want to try Format 3.

Once you have completed these parameters, press the **<Framing>** button to modify your framing parameters (see figure 4-5).




- **Retry Limit:** The default of **10** will work in most environments.
- **Receive Acknowledge Threshold:** The default of **2** will work in most environments.
- **Unacknowledged Send Limit:** The default of **1** will work in most environments.
- **Maximum Bytes Transferred Per Frame:** This is an important performance tuning parameter. Most users will want to set it to the maximum value of **4105** for best performance, which allows a maximum RU size of 4096. Some versions of Irma have a maximum frame size of 4095; in this case set this value to 3849 and then set the maximum RU size (defined later) to 3840.

  Note: If you increase your frame size, you may need to modify the LAN adapter open parameters (described for Novell earlier in this chapter) and may need to reboot the PC.

When you have completed this dialog, press the **<Ok>** button to return to the Token-Ring dialog.

In the Token-Ring dialog press the **<SNA...>** button to modify some additional SNA parameters (see figure 4-4).

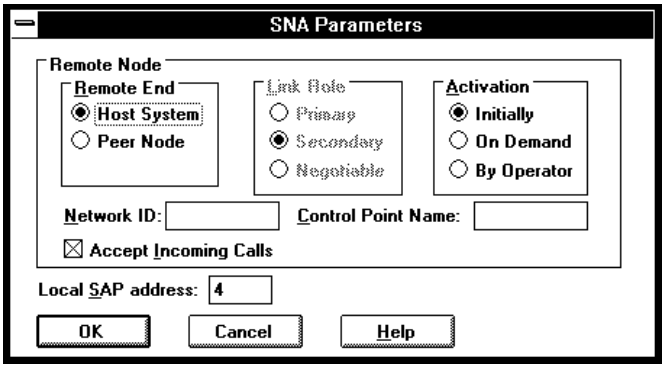



**Figure 4-4**
**Irma Additional SNA Parameters**

- **Remote End:** Most users will specify **Host System**.
- **Link Role:** Most users will find this field grayed and preset to **Secondary**.

- ☐ **Activation: Initially** is recommended for simplicity of operation.
- ☐ **Accept Incoming Calls:** This box should be **checked** for FDR/UPSTREAM to support remote requests.
- ☐ **Control Point Name:** This field allows you to specify your CP Name. This value can be obtained from your VTAM system administrator and is optional.
- ☐ **Local SAP Address**: The default value of **4** is highly recommended.

Press the **<Ok>** button to return to the Token Ring dialog. Press the **<Ok>** button to save your parameters and return to the Select Connection dialog. Press the **<Cancel>** button to return to the Irma main display.

### 4.7.2. Local LU Definition

If you are running Irma for the Mainframe (v3.x) you will need to return to the IRMA Workstation Program Group in the Program Manager, select **API Support** and press the **<APPC>** button to enter the APPC configuration (see figure 4-20).

If you are running Irma v2.x, press the **<APPC>** button.

If you are running Attachmate Personal Client, pull down the **Configure** menu and select **APPC Sessions**.

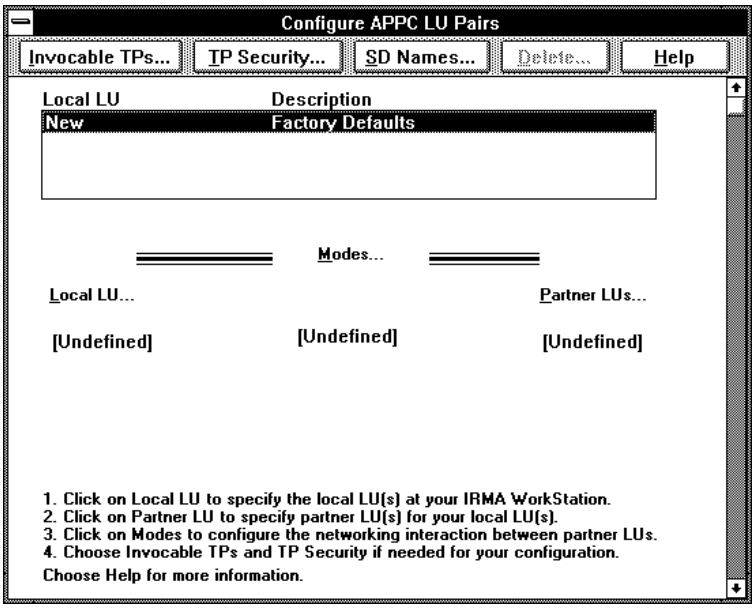



**Figure 4-6**
**Irma APPC Configuration**

The list box contains the list of defined LU/Partner/Mode entries. If you have no entries defined then the list only has New available.

Note that the Local LU, Mode and Partner LU definitions are grayed, but still available. They become color icons when an entry has been defined. Press the **<Local LU...>** button to enter the Local LU dialog (see figure 4-7).

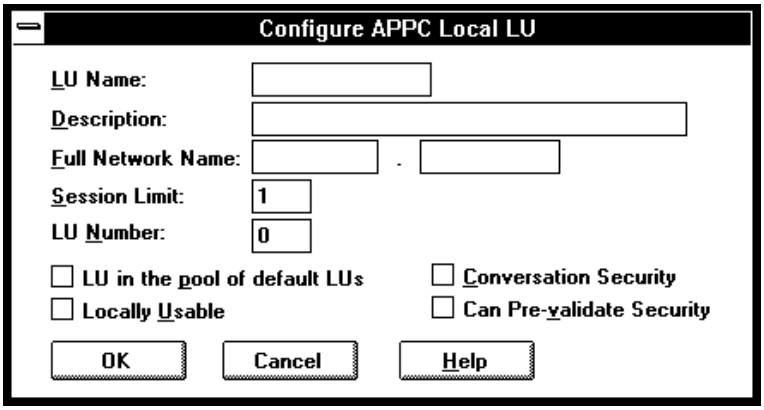



**Figure 4-7**
**Irma LU Dialog**

- **LU Name:** Enter the Logical Unit name as defined in VTAM that you will be using for APPC. This LU must be a different one than used for 3270. This value can be obtained from your VTAM system administrator. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the **Local LU Alias**.

- **Description:** Enter any text that will help you remember this definition.

- **Full Network Name:** Enter your SNA network name in the first box and your LU Name (from above) in the second box. Your SNA network name can be obtained from your VTAM system administrator.

- **Session Limit:** We recommend that you use **1**.

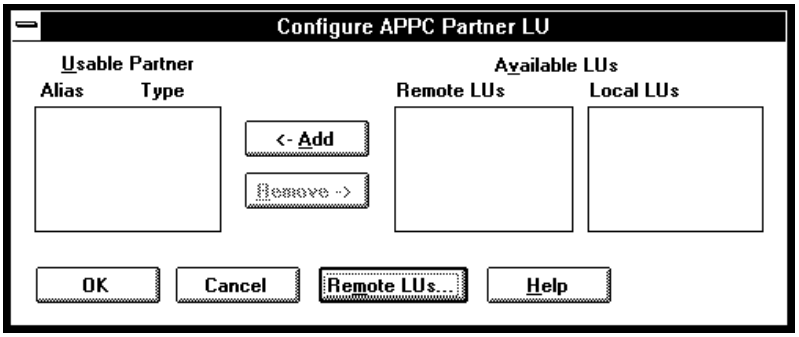
- **LU Number:** This is your LU Local Address; non-zero numbers denote dependent LUs and zero denotes independent LUs. We recommend that you use dependent LUs. This value is directly related to your Local LU name and can be obtained from your system administrator.

Most users will not check any of the check boxes.

Press the **<Ok>** button to save your definition and return to the APPC screen.

### 4.7.3. Partner LU Definition

Press the **<Partner LUs...>** icon to configure a partner LU definition (see figure 4-9).




Press the **<Remote LUs...>** button to specify a partner LU definition (see figure 4-8).

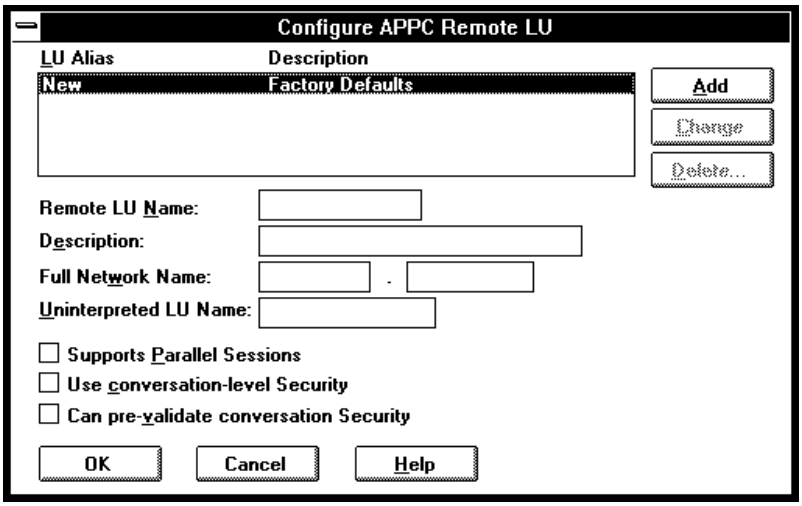



**Figure 4-8**
**Irma Define Partner LU**

The list box contains the list of already defined partner LU definitions. If you are creating a new partner LU, highlight New, otherwise highlight the entry you wish to modify.

- **Remote LU Name:** Enter the partner LU name for FDR/UPSTREAM on the host. Most users will enter **UPSTREAM**. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the **Partner LU Alias**.

- **Description:** Enter any text that will help you remember this definition.

- **Full Network Name:** Enter your SNA Network Name in the first edit field. In the second edit field, again enter the partner LU name for FDR/UPSTREAM on the host (usually **UPSTREAM**).

- **Uninterpreted LU Name:** Again, enter the partner LU name for FDR/UPSTREAM on the host. Most users will enter **UPSTREAM**.

Most users will not need to check any of the check boxes.

**Figure 4-9**
**Irma Select Partner LU**

Press the <Ok> button when you have finished entering values in this dialog. You will return to the Partner LU Selection Dialog.

Highlight the partner LU that you just created in the Remote LUs list and press the < Add> button to move the partner LU definition to the Usable Partner list so that this definition will be available for use.

Press the <Ok> button to return to the APPC main screen. You will now see the Partner LU icon is in color.

### 4.7.4. Mode Definition

From the main APPC screen, press the <Modes...> icon. You will see the mode selection dialog (see figure 4-10).

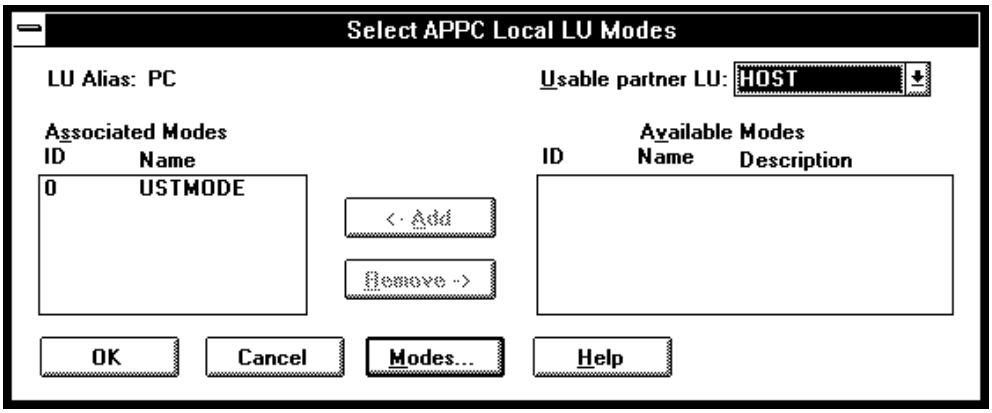
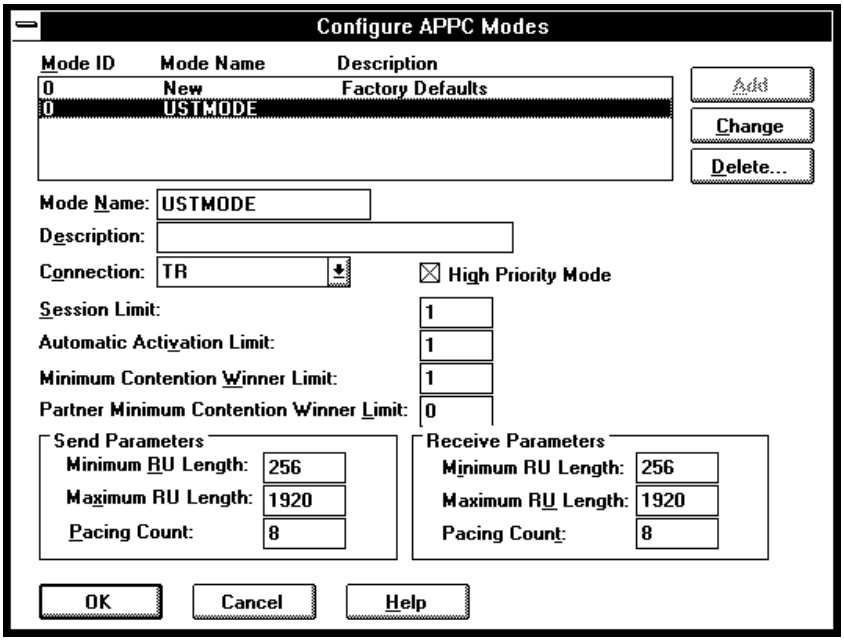



**Figure 4-10**
**Irma Select Mode Dialog**

Press the **<Modes...>** button to specify a mode definition (see figure 4-11).




The list box operates in the same way as the partner LU selection list.

- **Mode Name:** Enter the mode name that you will use for FDR/UPSTREAM. You can either use **#INTER** or **USTMODE**. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the **Mode Name**.

  Note to network administrators: FDR/UPSTREAM is distributed with an example mode table, MODEUST, with a sample mode entry USTMODE. You can code the table name (MODEUST) on the LU, or place the mode entry (USTMODE) in your current default mode table. If you use #INTER, most users will not have to make VTAM changes.

- **Description:** Enter any text that will help you remember this definition.

- **Connection:** Select from this combo box the link definition that you specified from the main configuration screen that you wish to use for FDR/UPSTREAM. Most users will select **TR**.

- **High Priority Mode**: Most users will **check** this box.

- **Session Limit:** The total number of sessions on an LU. Most users will enter **1** for a single session connection.

- **Automatic Activation Limit:** Most users will enter **1** to automatically activate the session.

- **Minimum Contention Winner Limit:** Most users will enter **1** to have the session a PC contention winner.

- **Partner Minimum Contention Winner Limit:** Most users will enter **0** to have the session a PC contention winner.

  Most users will specify the send and receive parameters with the same values for simplicity.

**Figure 4-11**
**Irma Enter Mode Information Dialog**

- **Minimum RU Length:** The default of **256** will allow the RU size to negotiate downwards and still operate in just about all situations.

- **Maximum RU Length:** Most users will specify **4096** which provides the best performance. It is recommended that this value be as large as possible, but no larger than 9 bytes less than the frame size (specified in the Token Ring dialog earlier).

- **Pacing Count:** A good performing value is **8**.

When you have completed this dialog, press the **<Ok>** button to return to the mode selection dialog.

Highlight the mode that you just created in the Available Modes list and press the **< Add>** button to move the mode definition to the Associated Modes list so that this definition will be available for use.

Press the **<Ok>** button to return to the APPC main screen. You will now see the Mode icon is in color.

### 4.7.5. Invokable TPs

FDR/UPSTREAM constantly checks for requests from the host or other computers and you must specify some transaction program parameters to support this. From the Configure APPC LU Pairs screen, press the **<Invokable TPs>** button to display the Configure APPC Invokable TP dialog (see figure 4-12).

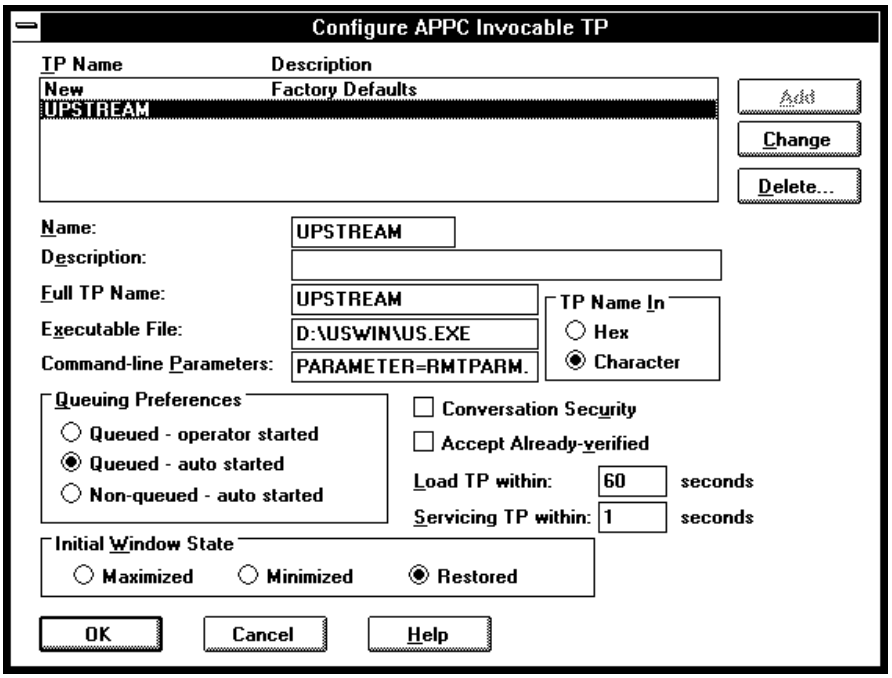



**Figure 4-12**
**Irma Invokable TPs Dialog**

- **Name:** Most users will enter **UPSTREAM** (in upper case). This value must match the INTPN specified in the FDR/UPSTREAM Advanced Configurator.

- **Description:** Enter any text to help you remember this definition.

- ☐ **Full TP Name:** Most users will enter **UPSTREAM** (in upper case). This value must match the transaction program name specified on the remote computer.

- ☐ **Executable File**: The FDR/UPSTREAM main program. Most users will enter: **C:\UPSTREAM\US.EXE**.

- ☐ **Command Line Parameters:** It is recommended that you specify the included parameter file which support remote initiates. Most users will specify: **PARAMETER=RMTPARM.DAT**.

- ☐ **TP Name In:** Most users will press the **Character** radio button.

- ☐ **Queuing Preferences:** Most users will press the **Queued - auto started** radio button to have Irma automatically start FDR/UPSTREAM when a remote request is received and not allow more than one to operate on a given directory at a time.

- ☐ **Conversation Security**: Most users will **not check** this box as FDR/UPSTREAM maintains its own security.

- ☐ **Accept Already verified:** Most users will **not check** this box as FDR/UPSTREAM maintains its own security.

- ☐ **Load TP within:** Most users will use the default of **60 s**econds before a remote request is timed out if not serviced.

- ☐ **Servicing TP within:** You must specify a value of **0** to keep FDR/UPSTREAM from hanging during conversation start, and other places.

**WARNING: You must specify a Servicing TP within value of 0 to keep FDR/UPSTREAM from hanging when checking for remote initiates.**

- ☐ **Initial Window State:** Most users will accept the default of **Restored**.

Press the **<Ok>** button when you have completed this dialog which returns you to the Configure APPC LU Pairs screen.

Pull down the system menu bar and select **Close**. If you are running Irma for the Mainframe you will be returned to the Configure APIs screen. Press the **<Ok>** button to leave the screen. You will be asked if you wish to save your current configuration changes, if your changes are acceptable, press the **<Yes>** button to return to the Program Manager.

If you are running IWW v2.x, in the main IWW screen, pull down the **File** menu and select **Save** to save your parameters. Pull down the **File** menu and select **Exit** to return to the Program Manager.

If you are running Attachmate Personal Client, when you exit Configuring APPC sessions, you will be asked if you wish to save your changes. Exit the Node Operator Facility.

You have completed the Irma definitions for FDR/UPSTREAM. To activate them, we recommend that you shut down Windows and reboot to assure that all internal tables are refreshed before continuing. Verify that 3270 still operates.

### 4.7.6. Problems

If you receive communications error messages from FDR/UPSTREAM, or Irma itself reports errors, Irma maintains a comprehensive error reporting log, maintained in the Diagnostics facility. In IWW, the Diagnostics facility is a separate icon.

In Irma for the Mainframe, you enter the Diagnostics facility enter the Mainframe Display, pull down the **Help** menu and select **Diagnostics**.

For Attachmate Personal Client you enter Diagnostics from the Node Operator Facility by pulling down the **Trace** menu and selecting **APPC Diagnostics**.

In the Diagnostics window, pull down the **File** menu and select **Open**. In most cases you will open the **com.log** file. The most recent messages are placed at the end of the log and the display will be updated even with the program open.

If you have trouble understanding the messages, feel free to call FDR/UPSTREAM technical support.

If you are using Irma Workstation for Windows (v2.x) and you specified a frame size larger than 2042, you may need to modify your SYSTEM.INI file to tell the TR286 program to use a larger frame size.

In the [SNA_CE] section, add the line:

```
xmitbufsize=4105
```

You must use lower case in the name. Other relevant parameters are **xmitbufs** (number of transmission buffers - maximum of 2), **recvbufsize** (receive buffer size - maximum of 1929) and **recvbufs** (number of receive buffers - maximum of 60). In most cases you will not need to change these parameters.

Proceed to page 4-39 to configure FDR/UPSTREAM.

# 4.8. Wall Data RUMBA®

This section discusses configuration of Wall Data's RUMBA using Token-ring as your SNA hardware for FDR/UPSTREAM. Wall Data sells a number of products which can be used, all of which contain the RUMBA engine. If you are a user of RUMBA for the Mainframe, contact your Wall Data distributor to determine if your version has APPC support available.

For information on configuring other hardware configurations, see the RUMBA documentation. It is recommended that you first read this section and only make the changes necessary for your hardware configuration.

If you are using RUMBA for the Mainframe we recommend that you get 3270 emulation working before configuring for APPC; the initial connection is easier to configure and verify for 3270 than for APPC.

### 4.8.1. The RUMBA Configurator

To start the RUMBA configurator select the **Config Utility** or **APPC Setup** from the RUMBA program group. If there is no such option, from the Program Manager pull down the **File** menu and select **Run**. Run the CONFIG program in your RUMBA directory (most users will enter **C:\RUMBA\CONFIG** or **C:\RUMBA\SYSTEM\CONFIG**). This will bring you to the RUMBA Tools for APPC Configuration main screen (see figure 4-13).

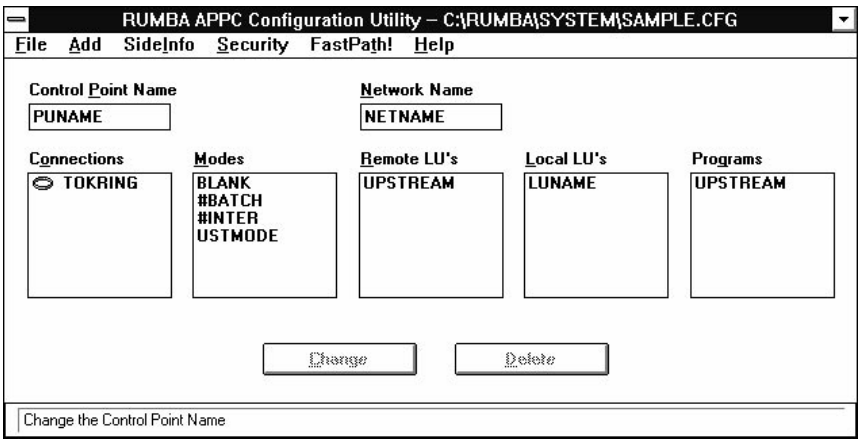


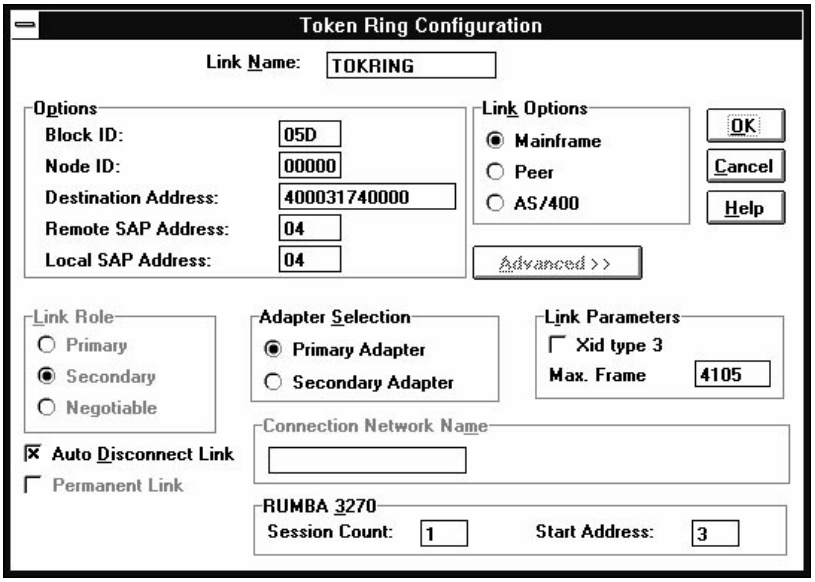

**Figure 4-13**
**RUMBA Configurator**

The first step is to view/modify/create the Token-Ring connection.

### 4.8.2. Token Ring Connection

In the Config utility, if you already have a Token-Ring connection defined, double-click on the existing entry. If you do not, pull down the **Add** menu and select **Connections**. Double-click on the **Token-Ring** connection.

This will bring you to the Token-Ring connection specification dialog (see figure 4-14). Note that whenever you enter a RUMBA Config dialog, we recommend that you always press the **<Advanced>** button as advanced features in most cases need to be configured.




- **Link Name:** We suggest that you use the default which is **TOKRING**.
- **Block ID:** If you are connecting through a 3172 or 37xx, enter the first three digits of the XID (IDBLK as defined on the VTAM PU definition). This parameter is not used for a 3174 connection.
- **Node ID:** If you are connecting through a 3172 or 37xx, enter the last 5 digits of the XID (IDNUM as defined on the VTAM PU definition). This parameter is not used for a 3174 connection.
- **Destination Address:** Enter the 12 digit Token-Ring address of the 3174, 3172 or 37xx you are connecting through.
- **Remote SAP Address:** Most users will enter **4**.
- **Local SAP Address:** Most users will enter **4**.
- **Link Options:** Most FDR/UPSTREAM users will select **Mainframe**.
- **Adapter Selection:** Most users will probably be using the **Primary** (only) Token-Ring adapter.
- XID Type 3: We recommend that you not check this box as XID type 3 is more difficult to get working.
- Max Frame: This is an important performance tuning parameter. Most users will want to set it to the maximum value of 4105 for best performance, which allows a maximum RU size of 4096.

  Note: If you increase your frame size, you may need to modify the LAN adapter open parameters (described for Novell earlier in this chapter) and may need to reboot the PC.

  When you have completed the entries in this dialog, press the<Ok> button to return to the Configuration utility main window.

### 4.8.3. Mode Configuration

The mode defines attributes used in the SNA session. To enter the mode configuration, pull down the **Add** menu and select **Mode...** You will see the Configure Modes dialog (see figure 4-15).

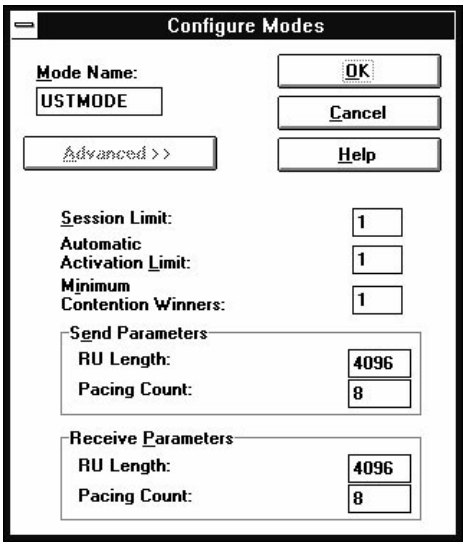



**Figure 4-15**
**RUMBA Mode Configuration**

- **Mode Name:** Enter the mode name that you will use for FDR/UPSTREAM. Most users will use the default of **#INTER** or **USTMODE**. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the Mode Name.

  **Note to network administrators:** FDR/UPSTREAM is distributed with an example mode table, MODEUST, with a sample mode entry USTMODE. You can code the table name (MODEUST) on the LU, or place the mode entry (USTMODE) in your current default mode table. If you use #INTER, most users will not have to make VTAM changes.

- **Session Limit:** The total number of sessions on an LU. Most users will enter **1** for a single session connection.

- **Automatic Activation Limit:** Most users will enter **1** to automatically activate the session.

- **Minimum Contention Winners:** Most users will enter **1** to have the session a PC contention winner.

- **RU Length:** For best performance, we recommend that the RU size be as large as possible, but not so large as to have to be sent in multiple frames. Thus the RU size should be 9 bytes less than the Frame size. If you specified the recommended frame size of 4105, then the RU size would be **4096**. We recommend that the send and receive RU sizes be the same.

- **Pacing Count:** A good performing value is **8**. We recommend that the send and receive pacing counts be the same.

When you have completed the entries in this dialog, press the**<Ok>** button to return to the Configuration utility main window.

### 4.8.4. Remote LUs

The remote LU, or partner LU, is FDR/UPSTREAM MVS. To add a new remote LU, pull down the Add menu and select Remote LU... (see figure 4-16).

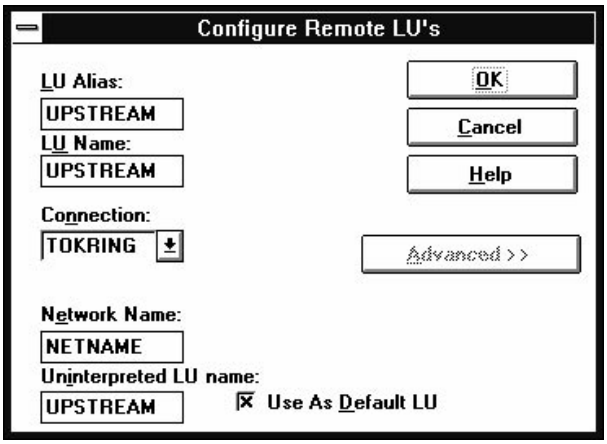



**Figure 4-16**
**RUMBA Partner LU Configuration**

- **LU Alias:** Enter the partner LU name used to denote FDR/UPSTREAM on the host. Most users will enter **UPSTREAM**. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the **Partner LU Alias**.

- **LU Name:** Enter the partner LU name used to denote FDR/UPSTREAM on the host. Most users will enter the same value as above (which is **UPSTREAM**).

- **Connection:** Enter the Token-Ring connection name that you specified earlier, most users will enter **TOKRING**.

- **Network Name:** Enter your SNA Network Name.

- **Uninterpreted LU Name:** Most users will again enter the name of FDR/UPSTREAM MVS (**UPSTREAM** by default).

When you have completed the entries in this dialog, press the<Ok> button to return to the Configuration utility main window.

### 4.8.5. Local LU

The local LU, is the logical unit, defined in VTAM, that FDR/UPSTREAM Windows uses to communicate on. To add a new local LU, pull down the **Add** menu and select **Local LU..**. (see figure 4-).

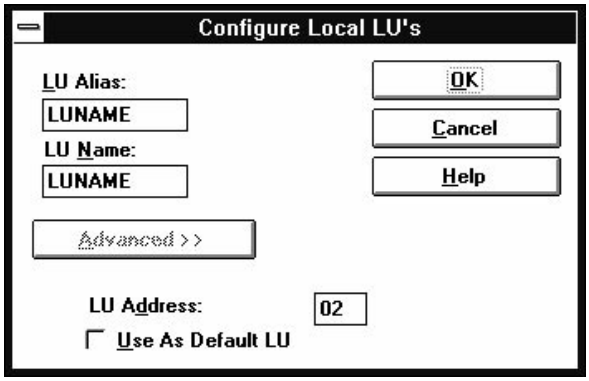



**Figure 4-17**
**RUMBA Local LU**

- **LU Alias:** Enter the Logical Unit name as defined in VTAM that you will be using for APPC. This LU must be a different one than used for 3270. This value can be obtained from your VTAM system administrator. You should remember this later, as it is required in the FDR/UPSTREAM configuration (later in this chapter) as it is the **Local LU Alias**.

- **LU Name:** Enter the same name as you entered for LU Alias.

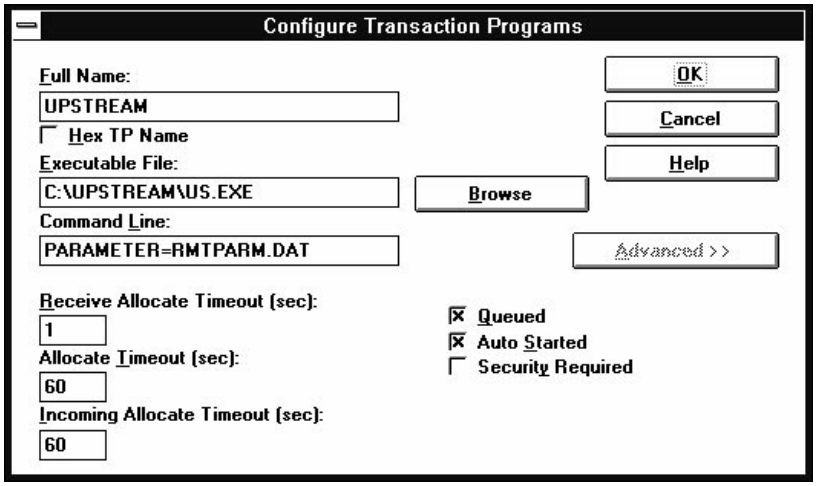
- **Description:** Enter any text that will help you remember this definition.

- **LU Address:** This is your LU Local Address; non-zero numbers denote dependent LUs and zero denotes independent LUs. We recommend that you use dependent LUs. This value is directly related to your Local LU name and can be obtained from your system administrator.

When you have completed the entries in this dialog, press the**<Ok>** button to return to the Configuration utility main window.

### 4.8.6. Transaction Program Definition

The Transaction Program definition is used to tell RUMBA how to process an incoming request from another computer. To specify the FDR/UPSTREAM transaction program definition, pull down the **Add** menu and select **Transaction Program...** You will see the Transaction Program dialog (see figure 4-18).




- **Full Name**: Enter the transaction program name. We recommend the name **UPSTREAM** (in upper case). This value must match the INTPN specified in the FDR/UPSTREAM Advanced Configurator.

- **Executable File:** Enter the fully qualified file name of the FDR/UPSTREAM program, so that RUMBA will be able to find it when a remote initiate is received. For most users this will be **C:\UPSTREAM\US.EXE**

- **Command Line:** The FDR/UPSTREAM distribution includes a parameter file which supports remotely requested functions. To enable it, specify: **PARAMETER=RMTPARM.DAT**.

- **Receive Allocate Timeout (sec):** FDR/UPSTREAM checks periodically for remote initiation requests. To limit the amount of time FDR/UPSTREAM is locked waiting, we recommend specifying the smallest value, which for RUMBA is **1** sec.

  **WARNING: You must specify a Receive Allocate Timeout of 1 to keep FDR/UPSTREAM from hanging when checking for remote initiates.**

- **Allocate Timeout (sec):** This is how long a local initiate will remain pending before RUMBA will time it out. For most users, we recommend **60** secs.

- **Incoming Allocate Timeout (sec):** This is how long a remote initiate will remain pending before RUMBA will time it out. For most users, we recommend **60** secs.

- **Queued:** Checking this box allows RUMBA to queue multiple remote initiates. We recommend that you **check** this box.

- **Auto Started:** Checking this box allows RUMBA to start FDR/UPSTREAM when a remote initiate is received. We recommend that you **check** this box.

- **Security Required:** We recommend that you **not check** this box as FDR/UPSTREAM uses its own security mechanism.

When you have completed the entries in this dialog, press the**<Ok>** button to return to the Configuration utility main window.

This is the last entry in the RUMBA APPC configuration. To save your changes, pull down the **File** menu and select **Save**.

**Figure 4-18**
**RUMBA Transaction Program Definition**

### 4.8.7. Running with RUMBA

To run the RUMBA APPC engine you must either load the WDTOKTSR.EXE TSR driver before entering Windows or load the VWDDLC.386 in your SYSTEM.INI file. See the RUMBA documentation for a complete description of installing and configuring these drivers.

To run the RUMBA APPC engine, either double-click the **APPC Engine** icon in the RUMBA program group, or run the program **WDSNA.EXE** in the RUMBA directory from the Program Manager. When run, this program will display a small dialog as it opens the adapter and then leave an icon on the desktop indicating that it is operating. You may choose to place this icon in your Startup folder to have it running when Windows starts.

Optionally, if the RUMBA engine is not loaded prior to running FDR/UPSTREAM, the first APPC call issued by FDR/UPSTREAM will cause the RUMBA engine to be loaded automatically.

Once the APPC Engine is operational, you can use FDR/UPSTREAM. Proceed to page 4-39 to configure FDR/UPSTREAM.

### 4.8.8. Problems

There are several known problems with the distribution versions of the RUMBA Engine v2.0 which is included in a number of RUMBA products such as RUMBA for the Mainframe and RUMBA Office.

WallData can provide you with several fixes specific to FDR/UPSTREAM. In particular Program Temporary Fix (PTF) #14 is available on the WallData BBS as file ZB0APC.EXE. For more detailed information about the latest PTFs you can reach WallData technical support at (800) 927-8622.

For one of these problems (an FDR/UPSTREAM 1709E error), you can set the environment variable **USNORMT=Y** before entering Windows to disable remote allocate checking within FDR/UPSTREAM. Note that this will prohibit you from receiving host backup/restore requests so we recommend that you get the patches from WallData. To obtain this fix, open a new incident with their technical support group and reference problem #139147.

When calling FDR/UPSTREAM Technical Support with other problems we recommend that you print your RUMBA configuration (a File menu option in the RUMBA APPC Configurator), and have your host PU and LU definitions available. While RUMBA does not maintain a log, it has an excellent trace facility (COMTRACE.EXE) which technical support will ask you to use to help you isolate any problems.

# 4.9. IBM Networking Services/DOS® Configuration

This section discusses configuration of IBM's Networking Services/DOS (NS/DOS) using Token-ring as your SNA hardware for FDR/UPSTREAM. For information on configuring other hardware configurations, see the IBM Networking Services/DOS User's Guide and Reference (included with the product). It is recommended that you first read this section and only make the changes in the enclosed sample files that are required for your hardware configuration.

Be sure that you have all hardware installed and operational before attempting this configuration.

NS/DOS configuration requires use of a text editor (Windows Notepad, EDLIN, EDIT, BRIEF, SPF/PC, etc.) to modify its configuration files. Be sure that if you are using a word processor, that it is running in non-document mode (plain-text).

**Note: If Innovation Data Processing includes corrective service diskettes, be sure that you install them before running NS/DOS. You must have CSD #2 for NS/DOS v1.0 for correct operation.**

**Note: You must configure NS/DOS in either a DOS window or in standard DOS. NS/DOS must be installed before you run Windows.**

### 4.9.1. Installing NS/DOS

NS/DOS includes the IBM Local Area Network Support Program and the IBM 3174 Workstation Communications Support Program as well as the NS/DOS program diskettes.

If you are using Token-Ring (or Ethernet through a 3172) you must have the Local Area Network Support Program installed first. You can determine if you already have it installed by checking your CONFIG.SYS and seeing if the device drivers DXMA0MOD.SYS and DXMC0MOD.SYS (or DXMG0MOD.SYS for Ethernet or DXME0MOD.SYS for IBM Token-Ring Adapter II boards) are loaded. If not, you need to install it. Be sure to regenerate (if necessary) any Novell or Banyan drivers which access the LAN card to support the LAN support program.

If you plan to use NS/DOS with coax, you must be sure to install the 3174 Workstation Peer Communication Support Program.

When you are ready to install NS/DOS, insert Diskette 1 in your floppy drive and run:

```
A:\> INSTALL
```

We recommend the following NS/DOS installation options:

- Program files only. These are all that are required for operation with FDR/UPSTREAM.
- You install NS/DOS on the C:\NSD directory (as suggested by the defaults).

That you NOT have the program modify your AUTOEXEC.BAT. If you boot from a floppy or are short of environment space you may run into problems.

### 4.9.2. Modifying your AUTOEXEC.BAT

You should modify your AUTOEXEC.BAT to include the directory C:\NSD in your path statement (separated from other directories by a semi-colon).

### 4.9.3. Copying the Sample NS/DOS Configuration Files

FDR/UPSTREAM includes sample files to help you through the configuration for Token-Ring. Copy the following files from the FDR/UPSTREAM directory to the NS/DOS directory (C:\UPSTREAM to C:\NSD):

- *.NSD
- APPC.BAT
- APPCUNLD.BAT

Change your default directory to the NS/DOS directory (CD\NSD) to modify the sample configuration files.

### 4.9.4. Modifying CONFIG.NSD

CONFIG.NSD defines and links SNA and physical addresses. The sample CONFIG.NSD is:

```
NSDC LAN                              // IBM Token Ring Adapter
NSDN NETWORK_NAME.LU_NAME             // NetID.LUName of your LU
TRLD UPSTREAM,PARTNER_TR_ADDRESS      // Link to LU and T/R address
```

Assuming the following parameters:

- SNA Network name: SNANET
- LU name: LOCALLU
- Partner LU name: UPSTREAM
- Partner Token-ring address: 400037450001

Your modified CONFIG.NSD would be:

```
NSDC LAN                              // IBM Token Ring Adapter
NSDN SNANET.LOCALLU                   // NetID.LUName of your LU
TRLD UPSTREAM,400037450001            // Link to LU and token ring address
```

### 4.9.5. Other .NSD files

SIDEINFO.NSD is used to relate symbolic destination names to LU names, mode names and transaction programs. It is recommended that you use the same symbolic destination name as the partner LU name to avoid confusion. If you use the default partner LU name of UPSTREAM and the default mode name of USTMODE you do not need to modify this file. The transaction program name must be UPSTREAM (all upper case).

MODE.NSD define performance enhancing parameters. You only have to modify this file is you wish to not use the default mode name (USTMODE), change the RU size, receive pacing, or whether you will be a contention winner or loser session.

It is not recommended that you modify DEFINETP.NSD at this time.

APPC.BAT starts NS/DOS so that FDR/UPSTREAM can run. It activates the link, and connects to the defined partner LU using the defined mode name with a single session. If you are using the default partner LU (UPSTREAM) and the default mode name (USTMODE), you do not need to change this file.

It is not necessary to modify APPCUNLD.BAT.

### 4.9.6. Starting NS/DOS

If Windows is running, you must unload it before starting NS/DOS. When Windows is unloaded, run APPC.BAT (by entering APPC from the command line in the C:\NSD directory) to start NS/DOS. If you have any problems starting NS/DOS, contact Innovation Data Processing technical support.

You may choose to put the APPC.BAT command in your AUTOEXEC.BAT to assure that it is run before you start Windows.

If you intend to control FDR/UPSTREAM from another computer (including the host), you will need to load the NS/DOS Program Launcher (NSDPLW.EXE). This program loads and executes FDR/UPSTREAM when a remote request is received.

To automatically install this program, add the following statement to the Windows section of the WIN.INI file:

```
LOAD=NSDPLW.EXE
```

When Windows is again running, go to page 4-39 to configure FDR/UPSTREAM for operation with the APPC configuration you have just created.

# 4.10. Microsoft SNA Server (Windows Requestors)

You can use FDR/UPSTREAM to run on a Windows 3.1 or Windows 95 PC, using the SNA Services provided by Microsoft SNA Server. To configure this facility, we recommend the following procedure:

- Install the Windows SNA Server client on your Windows 3.1 or 95 workstation. If you are using Windows 95, you must use the Windows 3.1 SNA Server Client. Configure and get operational 3270 through SNA Server. Note that Microsoft recommends not using Named Pipes over IPX/SPX (Named Pipes over NetBIOS is fine). If you are using Windows 95 and IPX/SPX you should use NetBIOS over IPX/SPX and disable the DirectHost feature.
- Add a Local LU, Partner LU and Mode Name within the SNA Server Admin program (see the Windows NT chapter for a complete description of this process). Note the LU Alias, Partner LU Alias and Mode Name values for entry in the UPSTREAM configuration.
- Make the following additions to the end of your WIN.INI file (in the WINDOWS directory) for SNA Server configuration of the transaction program definitions. You will need to use a text editor that doesn't add control characters such as the Notepad application.

```
[SNAServerAutoTPs]
UPSTREAM=UPSTREAM

[UPSTREAM]
Pat hName=C:\UPSTREAM\US.EXE        ; The path name for the UP-
STREAM
                                    ; program
LocalLU=[LU Alias]                  ; Replace [LU Alias] with The
LU
                                    ; Alias for the LU to satisfy

                                    ; an incoming request.
Parameters=PARAMETER=RMTPARM.DAT    ; Parameter for US.EXE
TimeOut=100                         ; RECEIVE_ALLOCATE will time-
out in
                                    ; 1/10 seconds.
Queued=yes                          ; Have SNA Server Client
queue
                                    ; incoming requests.
ConversationSecurity=no              ; No FMH-5 security.
```

**WIN.INI Changes for MS SNA Server**

If you will be host initiating backups, you will also need to add the attach manager program C:\SNA.WIN\SNASRV.EXE to your Startup program group.

Restart your PC. When Windows is again running, go to page 4-39 to configure FDR/UPSTREAM for operation with the APPC configuration you have just created.

# 4.11. PC FDR/UPSTREAM Configuration

This section guides you in configuring FDR/UPSTREAM for your environment. Before using this section, you must have completed the SNA configuration (if you are not using TCP/IP).

FDR/UPSTREAM Windows is a true Windows® application. In these applications there are several different modes you can be in:

- A dialog: A dialog box is a box inside the main screen where you may be able to enter values, and always contains one or more buttons. Move from field to field with the TAB key or by selecting the field with a mouse. Leave the screen by pressing one of the buttons (by moving the cursor to the button and pressing the space bar, or by double clicking the mouse on the button), or by pressing [ESC] (which is like moving to the CANCEL button and pressing it).
- The full screen: You get access to FDR/UPSTREAM functions by pressing the [ALT] key in conjunction with the first letter of one of the menu items at the top of the screen. This will pull down one of the menus and allow you to move the cursor with the cursor keys to the function you wish to perform; you [ENTER] to perform that function. You can also select a menu item by clicking the mouse on the menu. Finally, there are keyboard “accelerators” for many of the menu items. When you pull down the menu you can see what they are. You can access a function by just pressing the accelerator combination (like [ALT]B for backup).

In most places in the program, you can get help about a field or a button by pressing the F1 (help) key. This provides context sensitive help about the field or button. If you need additional help, press the INDEX button to get access to helps about other fields or general subjects.

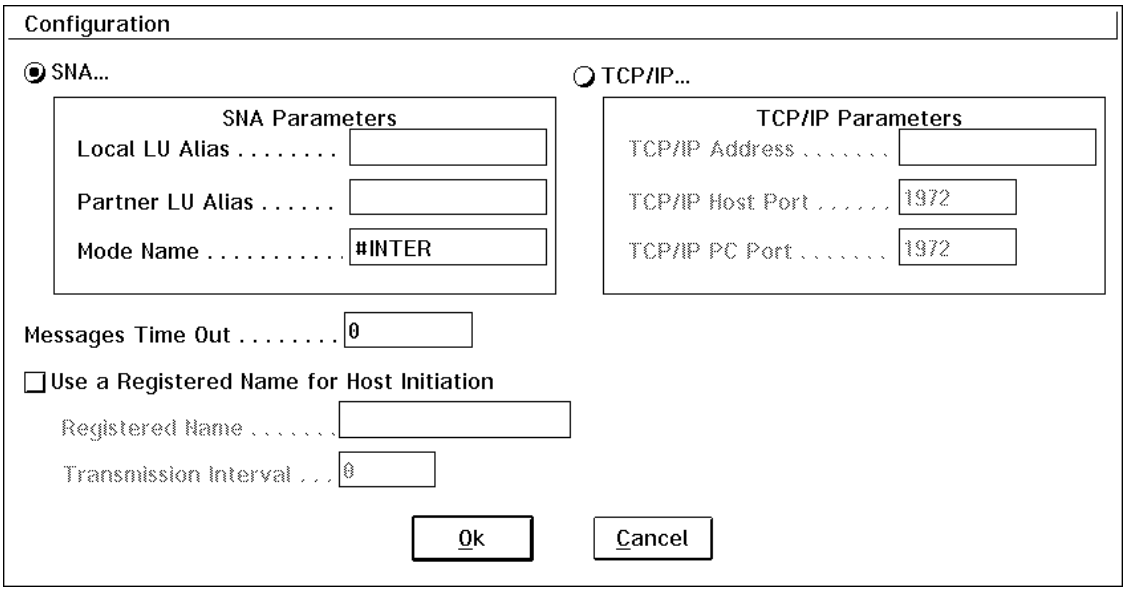
To abort what you are doing in a dialog, press the ESC key. To leave FDR/UPSTREAM from the full screen, pull down the File menu and select Exit, or press the [ALT]X accelerator.

If you feel confused with all these options, don’t worry. It works easier than it sounds. The beginning of this section will walk you slowly through the first screens so that you can get the feel of the interface.

To enter the FDR/UPSTREAM configurator, select it from the FDR/UPSTREAM program group.

If this is the first time you’ve run the configurator, you will see an error message saying “No such file or directory”. This means that when FDR/UPSTREAM searched for the default configuration file it could not find it. Press the space bar or click the mouse on the **<Ok>** button to continue.

Figure 4-19 shows the Configuration screen. Here you enter the host connection parameters.




This screen is a dialog. If you are using SNA/APPC to connect to the host press the **SNA...** radio button and see the following section. If you are using TCP/IP press the **TCP/IP...** radio button and go to section 4.11.2.

Note that when you press the SNA... radio button the TCP/IP parameter fields are grayed and become unavailable; when you press the TCP/IP... radio button the SNA parameter fields are grayed and become unavailable.

### 4.11.1. Configuring for an SNA Host Connection

Most of the fields are from your communications configuration.

- **Local LU Alias:** Specify up to 8 characters indicating the logical unit profile name as created in the communications configuration (in NS/DOS this should be the real LU name). This is always required.

- **Partner LU Alias**: Specify up to 8 characters indicating the partner logical unit profile name as created in the communications configuration (in NS/DOS this should be the real partner LU name). Most often this is **UPSTREAM**. This is always required.

- **Mode Name:** Specify up to 8 characters indicating the Mode Name as specified in the communications configuration. Most often this is **#INTER** or **USTMODE**. The default is #INTER and is always required.

If you are satisfied with these parameters goto section 4.11.3. to complete your configuration.

### 4.11.2. Configuring for a TCP/IP Host Connection

The following are the TCP/IP specific parameters:

- **TCP/IP Address:** Enter the IP address of the host adapter that you will be connecting to. Enter the doted decimal notation. For example: 130.50.75.1. This field is required and there is no default.

- **TCP/IP Host Port:** Enter the IP port that FDR/UPSTREAM MVS was installed on. Enter a decimal number. This field is required; in most cases you can accept the default of **1972**.

- **TCP/IP PC Port:** Enter an IP port that FDR/UPSTREAM on other computers can use to contact your PC. This field is optional; in most cases you can accept the default of **1972**.

When you have completed entering the TCP/IP specific information, proceed to the next section to complete your configuration.

### 4.11.3. Completing the Configuration

There are several fields common to both connectivity types in this dialog:

- **Messages Time Out:** FDR/UPSTREAM error messages should be configured in a production (unattended) mode to go away automatically after a given amount of time, or not be displayed at all. The default of **0** is what you should use at first (messages stay on the screen until you press the space bar). When you are in production or performance testing, specify a number of the number of seconds messages should be displayed. We recommend a value of 3 (seconds). -1 causes message s to not be displayed at all.

- **Use a Registered Name for Host Initiation:** Check this box if you wish to register a name with FDR/UPSTREAM MVS that host and other workstation/server requests can use to find your workstation. You must register a name if you wish to use the auto-update facility. Note that checking this box may cause occasional errors (which can be ignored) if the workstation/server is updating its registration information when a remote request is received. You must enter a Registered Name if you check this box. The default is not checked.

- **Registered Name:** Enter any name, unique within FDR/UPSTREAM MVS, that can be used to allow the host and other PCs to find your workstation. You can enter up to 16 characters which can include embedded spaces. Note that if there are duplicate names no errors are reported; the most recently registered name is used.

- **Transmission Interval:** Enter a number which indicates how often (in minutes) you will re-register your registration name with FDR/UPSTREAM MVS. Most users will use the default of **0**, which causes the registration to happen just once on UPSTREAM startup. The main reason to specify a non-zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change from time to time.

If you are satisfied with these parameters, press the SPACE bar when the **<Ok>** button is highlighted or click on it with the mouse; you will be asked for the file name to save these parameters to.

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is UPSTREAM.CFG, but you can use any file name and any directory. If the file and path is too large for the edit field, it will scroll horizontally. Press the **<Ok>** button to save the parameters to the file you specify.

The configuration parameters are saved in text format. You can modify them with a text editor if you choose. The parameters and their values are discussed in the Advanced Configuration options chapter.

FDR/UPSTREAM is now configured for operation with most host connections. You can leave the configuration program by typing [ALT]X, or by pulling down the **File** menu and selecting **Exit**.

To begin using FDR/UPSTREAM proceed to chapter 8.

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# 5 Windows NT

## 5.1. Overview

The installation process consists of four steps:

- Determining your system requirements
- Installing the software
- Configuring the communications software
- Configuring FDR/UPSTREAM

We recommend that you install, configure, and make operational your APPC or TCP/IP before installing and configuring FDR/UPSTREAM. In particular getting 3270 fully operational will help you in getting FDR/UPSTREAM working quicker.

### 5.1.1. Requirements

FDR/UPSTREAM Windows NT requires the following:

- An IBM AT, PS/2 or compatible
- A diskette or CD-ROM drive.
- 2 megabytes of free hard disk space. If you will be backing up large servers you may need up to 40 MB of free disk space.
- Microsoft Windows NT v3.1 or higher
- Communications hardware compatible with your communications software.
- APPC software for an approved vendor, including Microsoft SNA Server or SNA Workstation.

or

- TCP/IP software from an approved vendor which supports the WINSOCK interface.

# 5.2. Installing FDR/UPSTREAM

FDR/UPSTREAM includes an installation program to help you install it for the first time to your hard disk. But you don't have to use it if you don't want, as all the program does is create a directory for the FDR/UPSTREAM files, copy the diskettes to a specified drive and directory and optionally create a program group and items within it. If you have any problems with the installation, just copy the files yourself and create a program group (UPSTREAM) on the desktop with the FDR/UPSTREAM programs:

- US.EXE: Named "UPSTREAM"
- USCFG.EXE: Named "Configurator"
- USSTART.EXE: Named "Auto Start"
- SETNOV.EXE: Named "Novell/ULTra"

**NOTE: If you do not run the INSTALL program for a first time install, you will need to rename USSER to US.SER.**

**NOTE: FDR/UPSTREAM Windows NT uses the same distributed software as Windows 3.1 and Windows 95. FDR/UPSTREAM dynamically detects the operating system and supports it fully.**

Updates should just be copied over the originals (though the installation program can be run as well).

To run the installation program, insert the FDR/UPSTREAM Program Diskette in your floppy drive or CD in your CD-ROM drive. For Windows NT v3.x go to the Program Manager, pull down the **File** menu and select **Run** (see figure 5-1). For Windows NT v4.x press the **Start** button and select **Run**.

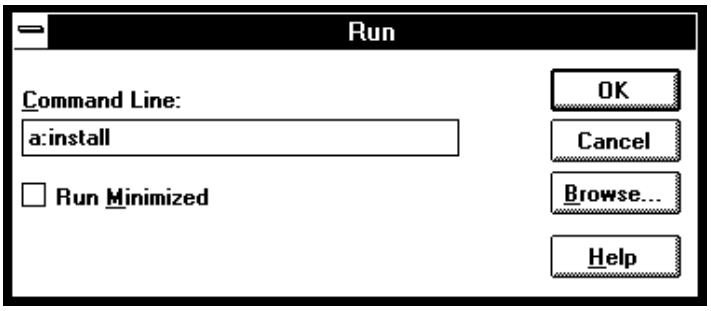
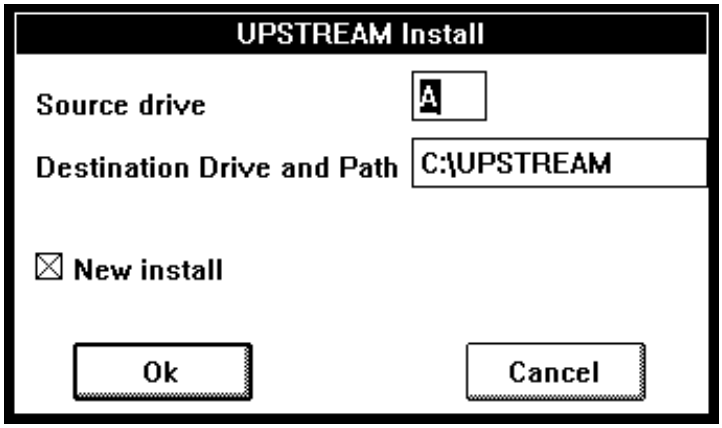



**Figure 5-1**

For a floppy install enter <drive>:INSTALL. Most users will enter **A:INSTALL**.

For a CD-ROM install enter <drive>:\UPSTREAM\WINDOWS\INSTALL. Many users will enter **D:\UPSTREAM\WINDOWS\INSTALL**.

The install program will display a dialog allowing you to specify simple installation parameters (see figure 5-2).




The screen fields are:

- **Source drive:** This is a single letter referring to the drive which contains the FDR/UPSTREAM Windows diskette or CD (or directory if this is a network install). The default is **A**.
- **Destination Drive and Path:** This is the drive and path where you wish FDR/UPSTREAM installed. Do not add a trailing backslash (\). The default is **C:\UPSTREAM**.
- **New Install:** Check this box if you are installing FDR/UPSTREAM for the first time. This causes the install program to create a new group for FDR/UPSTREAM available from the Program Manager and add the FDR/UPSTREAM programs. If you are updating FDR/UPSTREAM files, do not check this box. The default is checked.
- **Ok:** Press this button to begin the install.
- **Cancel:** Press this button to return to Windows without performing the install.

As the install progresses, you will see FDR/UPSTREAM copy the files to the destination directory. If you checked New Install, you will see the new program group created and the FDR/UPSTREAM programs added.

When you are done, you will see the UPSTREAM program group created. Now proceed to page 5-8 to configure for FDR/UPSTREAM.

Note: FDR/UPSTREAM by default will run in the same memory space used by all Windows applications. If you are running Windows NT v3.5 or higher we recommend that you specify in the Properties dialog of the Program Manager (for Windows NT v3.5), or the \WINNT\Profiles\All Users\Start Menu\Programs\Upstream directory of the Windows NT v4.0 explorer, modify the Properties of FDR/UPSTREAM to set **Run in Separate Memory Space**.

# 5.3. Files Included

FDR/UPSTREAM consists of several files. Each file name and it's purpose is outlined here.

- Table 5-1 describes the files on the FDR/UPSTREAM Windows Program Diskette or \UPSTREAM\WINDOWS directory on the CD-ROM.
- Table 5-2 describes the files on the FDR/UPSTREAM Windows Supplemental Diskette. These files are not installed automatically for a diskette install. On the CD-ROM these files are also stored in the \UPSTREAM\WINDOWS directory.
- Table 5-3 describes the files in the \SAMPLES directory of the FDR/UPSTREAM Windows Supplemental Diskette or \UPSTREAM\WINDOWS\SAMPLES directory on the CD-ROM.
- Table 5-4 describes the files on the NetWare Program Diskette or the \UPSTREAM\NETWARE directory on the CD-ROM.
- Table 5-5 describes the contents of the FDR/UPSTREAM ULTra Workstation Diskette (available as a separate option).

| File Name | Description |
|---|---|
| INSTALL.EXE | FDR/UPSTREAM installation program. |
| RMTPARM.DAT | Sample parameter file, used when the attach manager (TPSTART) starts FDR/UPSTREAM (when it is not already running). Also used when running FDR/UPSTREAM as a service. |
| SERIAL.DAT | Required for modification of personalization information of FDR/UPSTREAM. |
| SETNOV.EXE | (Novell & ULTra only) FDR/UPSTREAM Novell security access specification and ULTra Profile specification program. Run this program to specify the Novell user names, servers, etc. you wish to attach to and/or the workstations to be included in an ULTra Profile. |
| UPSTREAM.MSG | The FDR/UPSTREAM predefined message file. This file contains many of the messages that are logged and displayed. You can modify this file to change the message text, or to change the way that it is handled (see section 11). |
| US.EXE | FDR/UPSTREAM main program. Provides the main user interface, performs the communications including backups and restores, logs events, allows inquiries and many other features. |
| US.HLP | The FDR/UPSTREAM help file. This file contains the help text that you see when you press the help (F1) button. You can modify this file to customize the text for your installation or translate it into a foreign language (see section 12). |
| USCFG.EXE | FDR/UPSTREAM configurator. Use this program to specify communications parameters, system overall parameters and to set up unattended operations. |
| USCFG.HLP | FDR/UPSTREAM configurator help file. As for the FDR/UPSTREAM help file, this file contains the help information when you press the help (F1) button and is user modifiable. |

| File Name | Description |
|---|---|
| USLOGCLR.EXE | FDR/UPSTREAM log and report maintenance program. The FDR/UPSTREAM logs and reports can grow indefinitely, so a program has been provided which will shrink it down, based on a specified number of days. |
| USSER | The default personalization file. This file must be named US.SER in the UPSTREAM directory or the WORKPATH for UPSTREAM to run. |
| USSTART.EXE | FDR/UPSTREAM unattended operations program. This program operates as a presentation manager program. It waits for a specified time and then starts FDR/UPSTREAM. |
| USTPCFG.EXE | (Windows NT) Assists in the creation of transaction program definitions for Microsoft SNA Server. |
| USTPSERV.EXE | (Windows NT) An optional executable that allows FDR/UPSTREAM to be run as a service rather than an applications program. |
| USWIN32.DLL | (Windows NT & Windows 95) 32-bit DLL used internally by UPSTREAM for access to specific 32 bit Windows features. |

**Table 5-1**
**FDR/UPSTREAM Program Diskette Contents**

| File Name | Description |
|---|---|
| APPC.BAT | (NS/DOS) Used to load NS/DOS before starting Windows. |
| APPCUNLD.BAT | (NS/DOS) Used to unload NS/DOS |
| CONFIG.NSD | (NS/DOS) Sample CONFIG.NSD to help get NS/DOS working. |
| DEFINETP.NSD | (NS/DOS) Sample DEFINETP.NSD to help get NS/DOS working. |
| MODE.NSD | (NS/DOS) Sample MODE.NSD to help get NS/DOS working. |
| RETCODE.EXE | Allows text descriptions of the extended program return code returned by FDR/UPSTREAM and resets the limited return code. |
| SIDEINFO.NSD | (NS/DOS) Sample SIDEINFO.NSD program to help get NS/DOS working. |
| USMODIFY.EXE | Allows command line modification of a number of FDR/UPSTREAM parameter and configuration files. |

**Table 5-2**
**FDR/UPSTREAM Windows Supplemental Diskette**

| File Name | Description |
|---|---|
| AUTOINST.BAT | Sample installation job for the FDR/UPSTREAM auto-update facility. |
| AUTOINST.DAT | Sample installation parameter file for the FDR/UPSTREAM auto-update facility. |
| EXCLUDE.LST | A sample exclude file list. |
| ULTINST.BAT | Sample installation job for the FDR/UPSTREAM ULTra auto-update facility. |
| ULTDOS.DAT | Sample parameter file for automatically updating FDR/UPSTREAM DOS ULTra workstations. |
| ULTNT.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows NT ULTra workstations. |
| ULTOS2.DAT | Sample parameter file for automatically updating FDR/UPSTREAM OS/2 ULTra workstations. |
| ULTW95.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 95 ULTra workstations. |
| ULTWIN.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 3.1 ULTra workstations. |
| USATOE.TAB | Sample ASCII-to-EBCDIC conversion table. |
| USETOA.TAB | Sample EBCDIC-to-ASCII conversion table. |

**Table 5-3**
**FDR/UPSTREAM Windows Supplemental Diskette \SAMPLES Directory**

| File Name | Description |
|---|---|
| USLOGCLR.NLM | (NetWare Directory Services) Clears the USNDS.LOG file. See the Novell chapter for more information. |
| USNDS.NLM | (NetWare Directory Services) Provides access to NDS information for attached FDR/UPSTREAM workstations. See the Novell chapter for more information. |
| USSETUP.NLM | (NetWare Directory Services) Installs the required NLMs on a server. See the Novell chapter for more information. |

**Table 5-4**
**FDR/UPSTREAM NetWare Program Diskette**

| File Name | Description |
|---|---|
| INSTALL.EXE | Installation program for FDR/UPSTREAM ULTra on a workstation. |

| File Name | Description |
|---|---|
| LANCOPY.EXE | Allows PC-to-PC file copies and directory listings across the LAN to PCs which have ULTRA.EXE installed. |
| ULTRA.EXE | Allows remote file access across a Novell IPX/SPX or NetBIOS LAN. |
| USLOGCLR.EXE | ULTRA.LOG (or UPSTREAM.LOG) log maintenance (shrinking) program. |
| USWIN32.DLL | Access DLL required to run FDR/UPSTREAM ULTra in a Windows 95 or Windows NT environment. |

**Table 5-5**
**FDR/UPSTREAM Windows ULTra Workstation Diskette Contents**

# 5.4. PC FDR/UPSTREAM Configuration

This section guides you in configuring FDR/UPSTREAM for your communications environment.

FDR/UPSTREAM Windows is a standard Windows® application. In these applications there are several different modes you can be in:

- A dialog: A dialog box is a box inside the main screen where you may be able to enter values, and always contains one or more buttons. Move from field to field with the TAB key or by selecting the field with a mouse. Leave the screen by pressing one of the buttons (by moving the cursor to the button and pressing the space bar, or by double clicking the mouse on the button), or by pressing [ESC] (which is like moving to the CANCEL button and pressing it).
- The full screen: You get access to FDR/UPSTREAM functions by pressing the [ALT] key in conjunction with the first letter of one of the menu items at the top of the screen. This will pull down one of the menus and allow you to move the cursor with the cursor keys to the function you wish to perform; you [ENTER] to perform that function. You can also select a menu item by clicking the mouse on the menu. Finally, there are keyboard “accelerators” for many of the menu items. When you pull down the menu you can see what they are. You can access a function by just pressing the accelerator combination (like [ALT]B for backup).

In most places in the program, you can get help about a field or a button by pressing the F1 (help) key. This provides context sensitive help about the field or button. If you need additional help, press the INDEX button to get access to helps about other fields or general subjects.

To abort what you are doing in a dialog, press the ESC key. To leave FDR/UPSTREAM from the full screen, pull down the File menu and select Exit, or press the [ALT]X accelerator.

If you feel confused with all these options, don’t worry. It works easier than it sounds. The beginning of this section will walk you slowly through the first screens so that you can get the feel of the interface.

To enter the FDR/UPSTREAM **Configurator**, select it from the FDR/UPSTREAM program group.

If this is the first time you’ve run the configurator, you will see an error message saying “No such file or directory”. This means that when FDR/UPSTREAM searched for the default configuration file it could not find it. Press the space bar or click the mouse on the **<Ok>** button to continue.

Figure 5-3 shows the Configuration screen. Here you enter the host connection parameters.

Configuration

SNA...

SNA Parameters

Local LU Alias . . . . . .

Partner LU Alias . . . . . .

Mode Name . . . . . #INTER

TCP/IP...

TCP/IP Parameters

TCP/IP Address . . . . . .

TCP/IP Host Port . . . . . 1972

TCP/IP PC Port . . . . . 1972

Messages Time Out . . . . . 0

Use a Registered Name for Host Initiation

Registered Name . . . . . .

Transmission Interval . . . 0

Ok Cancel

This screen is a dialog. If you are using SNA/APPC to connect to the host press the **SNA...** radio button and see the following section. If you are using TCP/IP press the **TCP/IP...** radio button and go to section 5.4.2.

Note that when you press the SNA... radio button the TCP/IP parameter fields are grayed and become unavailable; when you press the TCP/IP... radio button the SNA parameter fields are grayed and become unavailable.

### 5.4.1. Configuring for a SNA Host Connection

Most of the fields are from your communications configuration.

- **Local LU Alias:** Specify up to 8 characters indicating the logical unit profile name as created in the communications configuration. We recommend using the actual local LU name as defined on the host. This is always required.

- **Partner LU Alias:** Specify up to 8 characters indicating the partner logical unit profile name as created in the communications configuration. Most often this is UPSTREAM. This is always required.

- **Mode Name:** Specify up to 8 characters indicating the Mode Name as specified in the communications configuration. Most often this is either USTMODE or #INTER. The default is #INTER. This field is required.

If you are satisfied with these parameters go to 5.4.3.section to complete your configuration.

### 5.4.2. Configuring for a TCP/IP Host Connection

The following are the TCP/IP specific parameters:

- **TCP/IP Address:** Enter the IP address of the host adapter that you will be connecting to. Enter the doted decimal notation. For example: 130.50.75.1. This field is required and there is no default.



Figure 5-3

- **TCP/IP Host Port:** Enter the IP port that FDR/UPSTREAM MVS was installed on. Enter a decimal number. This field is required; in most cases you can accept the default of 1972.

- **TCP/IP PC Port:** Enter an IP port that FDR/UPSTREAM on other computers can use to contact your PC. This field is optional; in most cases you can accept the default of 1972.

When you have completed entering the TCP/IP specific information, proceed to the next section to complete your configuration.

### 5.4.3. Completing the Configuration

There are several fields common to both connectivity types in this dialog:

- **Messages Time Out:** FDR/UPSTREAM error messages should be configured in a production (unattended) mode to go away automatically after a given amount of time, or not be displayed at all. The default of 0 is what you should use at first (messages stay on the screen until you press the space bar). When you are in production or performance testing, specify a number of seconds that messages should be displayed. We recommend a value of 3 (seconds). -1 causes messages to not be displayed at all.

- **Use a Registered Name for Host Initiation:** Check this box if you wish to register a name with FDR/UPSTREAM MVS that host and other workstation/server requests can use to find your workstation. You must register a name if you wish to use the auto-update facility. Note that checking this box may cause occasional errors (which can be ignored) if the workstation/server is updating its registration information when a remote request is received. You must enter a Registered Name if you check this box. The default is not checked.

- **Registered Name:** Enter any name, unique within FDR/UPSTREAM MVS, that can be used to allow the host and other PCs to find your workstation. You can enter up to 16 characters which can include embedded spaces. Note that if there are duplicate names no errors are reported; the most recently used registered name is used.

- **Transmission Interval:** Enter a number which indicates how often (in minutes) you will reregister the registration name with FDR/UPSTREAM MVS. Most users will use the default of 0, which causes the registration to happen just once on FDR/UPSTREAM startup. The main reason to specify a non zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change from time to time.

If you are satisfied with these parameters, press the SPACE bar when the **<Ok>** button is highlighted or click on it with the mouse; you will be asked for the file name to save these parameters to.

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is UPSTREAM.CFG, but you can use any file name and any directory. If the file and path is too large for the edit field, it will scroll horizontally. Press the **<Ok>** button to save the parameters to the file you specify.

The configuration parameters are saved in text format. You can modify them with a text editor if you choose. The parameters and their values are discussed in the Advanced Configuration options chapter.

If you are using TCP/IP, proceed to page 5-45 to complete setting up your machine for FDR/UPSTREAM backups. If you are using SNA with the Microsoft SNA Server or SNA Workstation, the next section will discuss this configuration.

# 5.5. SNA Configuration Overview

The process of configuring FDR/UPSTREAM for APPC involves several issues:

- Configuring VTAM
- Configuring FDR/UPSTREAM MVS
- Configuring the APPC software for Windows NT

Careful planning is essential in configuring SNA software. You should review the entire process before beginning and fill out the worksheets for each section or have information available.

# 5.6. Pre-PC Configuration Issues

### 5.6.1. Configuring VTAM

You should have your VTAM systems programmer configure the VTAM environment, or modify the existing environment if it is insufficient for FDR/UPSTREAM (i.e. a mode definition that doesn't support LU 6.2). Worksheet 5-1 should be filled out by this person or the information should be obtained from this person. An NCP regeneration is rarely required.

Mode names define certain characteristics about the conversation including pacing counts and RU sizes. Innovation provides a sample mode of USTMODE which will always work. Since it can be difficult to install a new mode entry, you can use the VTAM predefined mode #INTER. #INTER can be dangerous to modify, so if it's values are unacceptable, you may choose to define a mode name of your own (or use USTMODE).

See the FDR/UPSTREAM MVS manual for suggestions on configuring VTAM.

**NOTE: The host mode entry determines values like RU size, and the APPL definition determines the receive pacing which have a significant affect on performance. We recommend that you define a mode entry that initially sets the RU size at 4096, or use USTMODE which is provided as a sample, or the VTAM predefined mode #INTER and an APPL definition which sets receive pacing at 8.**

**NOTE: It is recommended that you use dependent LUs (non-zero LU Local Addresses) for FDR/UPSTREAM PCs. Independent LUs tend to be more difficult to configure and offer few benefits.**

| Name | Description | Your Value |
|---|---|---|
| SNA Network Name | The name of the SNA network to which you belong. This is optional in many environments. | |
| Partner LU Name | The APPLID of FDR/UPSTREAM on the host. Supplied sample: UPSTREAM. | |
| LU Number | The LU local address. Many users will use 2. | |
| Mode Name | The mode table entry name. The supplied sample: USTMODE or you can use the VTAM predefined value of #INTER. | |
| Receive Pacing Size | A number from 1 to 63 of the number of RUs to be received in succession before a low-level acknowledgment. NEVER use 0. We recommend 8 or 10 initially. | |
| Controller LAA (Token-Ring only) | The locally administered address of the 3174, 3172 or 37xx front end. This is a 12 hex digit number usually starting with 4. | |
| PC LAA (Token-Ring only) | The locally administered address of the PC. This value must be unique on the ring and for 3174 connections, must be defined in the controller. | |
| LU Name | The name of the PC LU to be used. | |
| IDBLK (37xx or 3172 only) | The 3 hex digit IDBLK component of the XID. | |
| IDNUM (37xx or 3172 only) | The 5 hex digit IDNUM component of the XID. | |

**Worksheet 5-1**
**VTAM definitions for an FDR/UPSTREAM PC**

### 5.6.2. Token-Ring Considerations

If you have a access to a direct Token-Ring connection to the host, it is strongly recommended that you use it for FDR/UPSTREAM.

If you are using a 37xx front end or a 3172 controller, the configuration is entirely in VTAM. If you are using a 3174 controller, then you will need a device configuration for the PC if one doesn't already exist. Worksheet 5-2 should be filled out by the host personnel who configures or maintains the 3174 cluster controller

| Name | Description | Your Value |
|---|---|---|
| PC LAA | The locally administered address of the PC as known to the controller. | |
| Transmit I-Frame Size | This is 9 bytes greater than the maximum RU size you can support. We recommend that this be 1033 or greater. | |
| SAP | Service Access Point. Should always be 4. | |

**Worksheet 5-2**
**3174-to-UPSTREAM Configuration**

**NOTE: There are two locally administered addresses used: the address of the controller and the address of the PC. You enter the address of the controller in the APPC configuration. You enter the address of the PC in the Windows NT Control Panel.**

### 5.6.3. FDR/UPSTREAM MVS Issues

You will need to have installed FDR/UPSTREAM MVS before beginning the configuration of a FDR/UPSTREAM Windows NT node. The FDR/UPSTREAM MVS configuration defines storage and security attributes to be used in storing backups.

The configuration for each PC on FDR/UPSTREAM MVS, including backup profiles, security, etc. should be complete before beginning the PC configuration.

Worksheet 5-3 contains the information that you will need for FDR/UPSTREAM Windows NT before you can begin testing.

| Name | Description | Your Value |
|---|---|---|
| Backup Profile | An 8 character identifier used as a key for the storage of a group of backups. | |
| User ID & Password | The user ID and password required to access the requested backup profile (may not be required). | |
| Sequential tape backups allowed | Whether direct-to-tape backups are allowed. | |
| Sequential disk backups allowed | Whether sequential disk backups (which can be SMS controlled) are allowed. | |

**Worksheet 5-3**
**FDR/UPSTREAM MVS Configuration for Testing**

See the FDR/UPSTREAM MVS manual for assistance on setting up a FDR/UPSTREAM Windows NT user.

# 5.7. Configuring SNA Server

The configuration steps and panels for Microsoft SNA Server/SNA Workstation version 2.x are quite different from those in version 3.x. The following table lists the steps in configuring your version.

| Section | Page | Version/Step | Notes |
|---|---|---|---|
| 5.8. | 5-17 | SNA Server/Workstation v2.x Connection Configuration | Only required if you do not already have a host connection configured. |
| 5.9. | 5-21 | SNA Server v3.x Connection Configuration | Only required if you do not already have a host connection configured. |
| 5.10. | 5-27 | MS SNA Server in FDR/UPSTREAM | Currently only recommended for v2.x due to problems in SNA Server currently being worked on by Microsoft. Allows LU/PLU/Mode definitions with ease. |
| 5.11. | 5-30 | Transaction Program Definition | Required for all versions of SNA Server/Workstation |
| 5.13. | 5-35 | Manually Configuring SNA Server v2.x | Only required if you do not use the MS SNA Server definition facility in FDR/UPSTREAM. |
| 5.14. | 5-39 | Manually Configuring SNA Server v3.x | Required for all users at this time. |
| 5.15. | 5-45 | FDR/UPSTREAM and Windows NT | Required definitions of your Windows NT environment. |
| 5.12. | 5-33 | Advanced SNA Server | Advanced configuration and problem determination issues for SNA Server. |

# 5.8. SNA Server v2.x Connection Configuration

This section describes the configuration for the Microsoft SNA Server/SNA Workstation in the Windows NT operating system using Token-Ring as your SNA connection to the host. It is always recommended that you define a 3270 connection first.

If you have 3270 already running you can skip to page 5-27 to configure APPC definitions in SNA Server/Workstation for FDR/UPSTREAM. However, we do recommend that you review the parameters suggested below as they may help in improving performance.

From the SNA Server (Common) program group run the SNA Admin program (see figure 5-4).

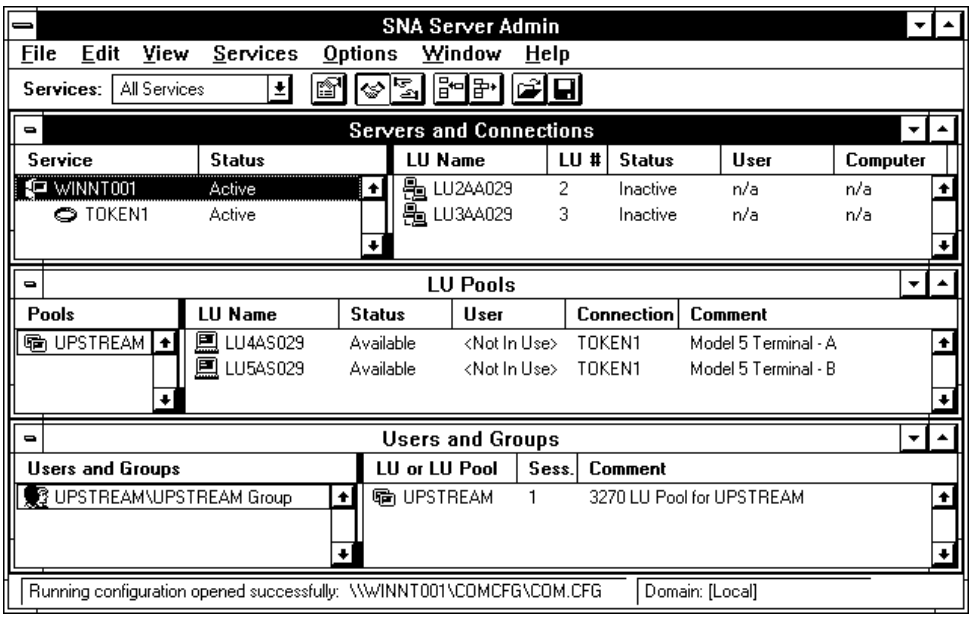



**Figure 5-4**
**SNA Server Admin Window**

It is a good idea to make sure that the Services combo box is set to display all services.

### 5.8.1. Service Configuration

If there is a service defined and operational for 3270, go to the next section.

To modify the service that was required during the install, double-click on the top entry in the service window. You will see the Service dialog (see figure 5-5).

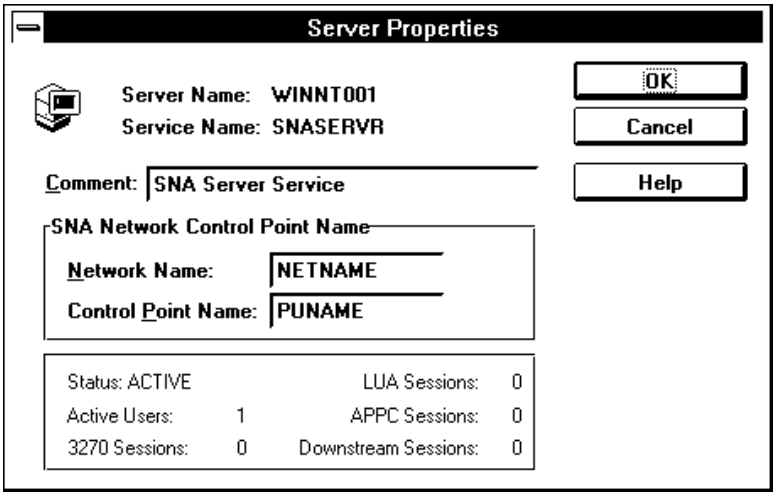



**Figure 5-5**
**Server Properties Dialog**

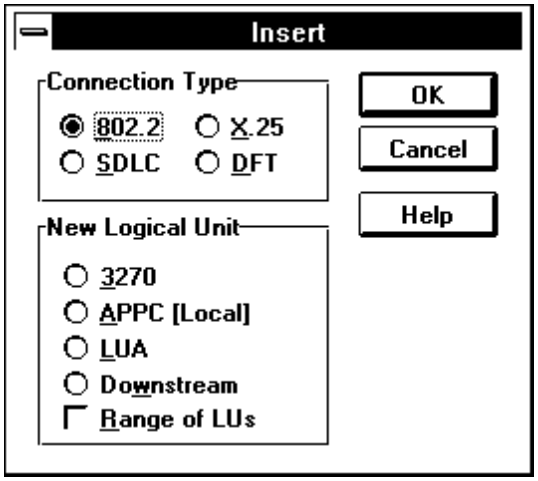
- **Comment:** Enter any descriptive text that will help you remember this entry.
- **Network Name:** Enter your SNA network name. This can be obtained from your SNA Network Administrator.
- **Control Point Name:** Enter your physical unit name. This can be obtained by a VTAM programmer from the PU definition on the host.

Press the **<Ok>** button when you are done to save your changes.

### 5.8.2. Connection Configuration

If there is a connection defined for 3270 you may want to review your configuration to verify that the parameters are correct. Do this by double-clicking the existing connection.

To configure a connection, highlight the service and press the **Insert** key. You will see the Insert dialog (see figure 5-7).




Select the Connection Type (802.2 is Token-Ring). Press the **<Ok>** button. You will see the Connection dialog (see figure 5-6).

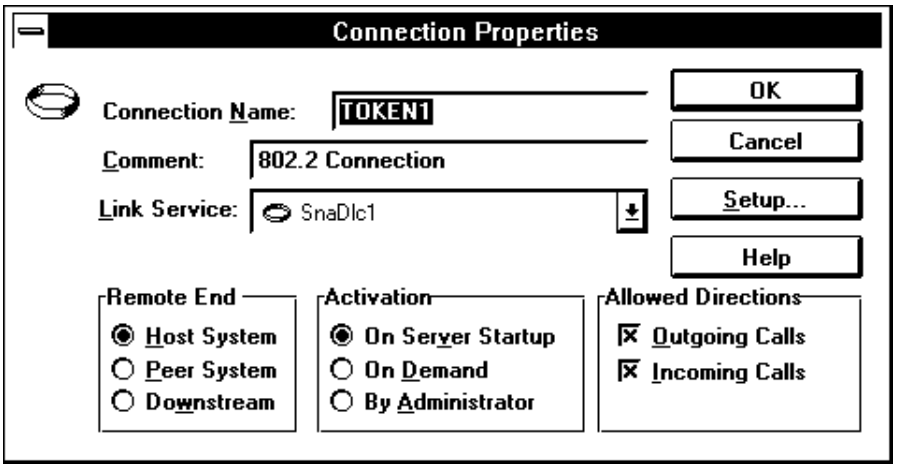



**Figure 5-6**
**Connection Properties**

- **Connection Name:** Enter an identifier that will help you remember this connection. TOKEN1 is suggested.
- **Comment:** Enter any text that will help you remember this definition.
- **Link Service:** Using the options in the Combo box, select the service defined within Windows/NT which you will use to attach to the communications adapter. **SnaDlc1** is the service for Token-Ring adapters.
- **Remote End:** Select **Host System**.
- **Activation: On server startup** is recommended to assure that this facility is available when needed.
- **Allowed Directions:** You should check both **Outgoing calls** and **Incoming calls**.

**Figure 5-7**
**Insert Dialog**

Press the **<Setup>** button to see the 802.2 Setup dialog (see figure 5-8). Press the **Advanced** button to see all the options.

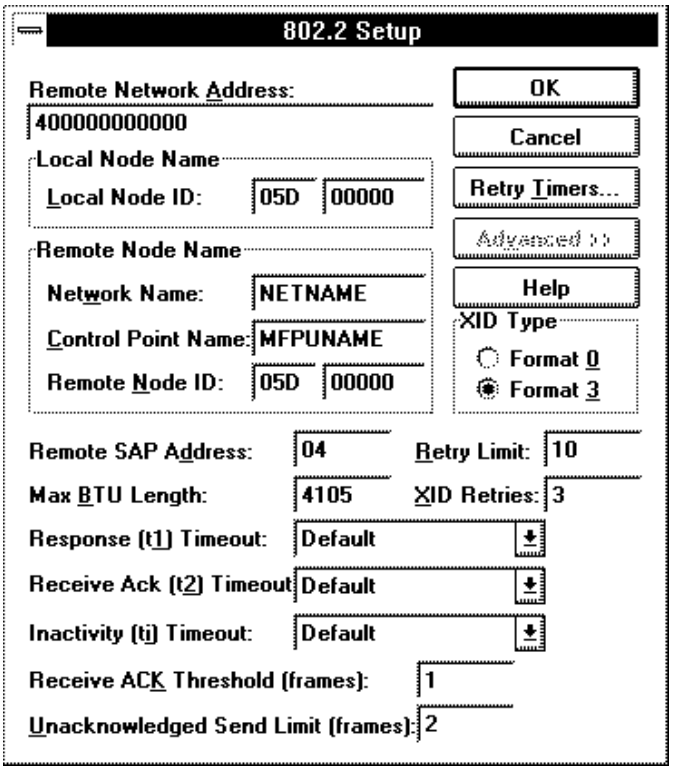



**Figure 5-8**
**Connection Properties Dialog**

Most of the parameters can be left at their defaults. The most commonly changed ones are:

- **Remote Network Address:** Enter the Token-Ring address of your 3174, 37xx, or 3172.
- **Network Name:** Enter the SNA network name used to identify VTAM. Obtain this from your VTAM system administrator.
- **Control Point Name:** Enter your mainframe's control point or PU name. Obtain this from your VTAM system administrator. This is the value specified for the SSCPNAME parameter in the ATCSTR00 member of SYS1.VTAMLST.
- **Remote Node ID:** If you are connecting through a 37xx or 3172 enter your complete XID. The first three digits are the IDBLK and the second 5 digits are the IDNUM definition on VTAM for your PU.
- **XID Type:** In most cases Format 0 is the easiest to get working.
- **Max BTU Length:** This is the maximum frame size that you will be sending to the host. 4105 is the recommended value. This must be at least 9 bytes larger than the largest RU size specified.

Press the **<Ok>** button to save your changes. Proceed to page 5-27 to continue your configuration of SNA Server/SNA Workstation for FDR/UPSTREAM.

# 5.9. SNA Server v3.x Connection Configuration

This section describes the configuration for the Microsoft SNA Server in the Windows NT operating system using Token-Ring as your SNA connection to the host. It is always recommended that you define a 3270 connection first.

If you have 3270 already running you can skip to page 5-30 to your transaction program definition in SNA Server/Workstation for FDR/UPSTREAM. However, we do recommend that you review the parameters suggested below as they may help in improving performance.

Before you begin configuring SNA Server you should install your LAN Adapter using the Windows NT Network Applet in the Control Panel. Note that you will also need the **DLC protocol** as well.

From the **Microsoft SNA Server** menu, select **Manager** (see figure 5-9).

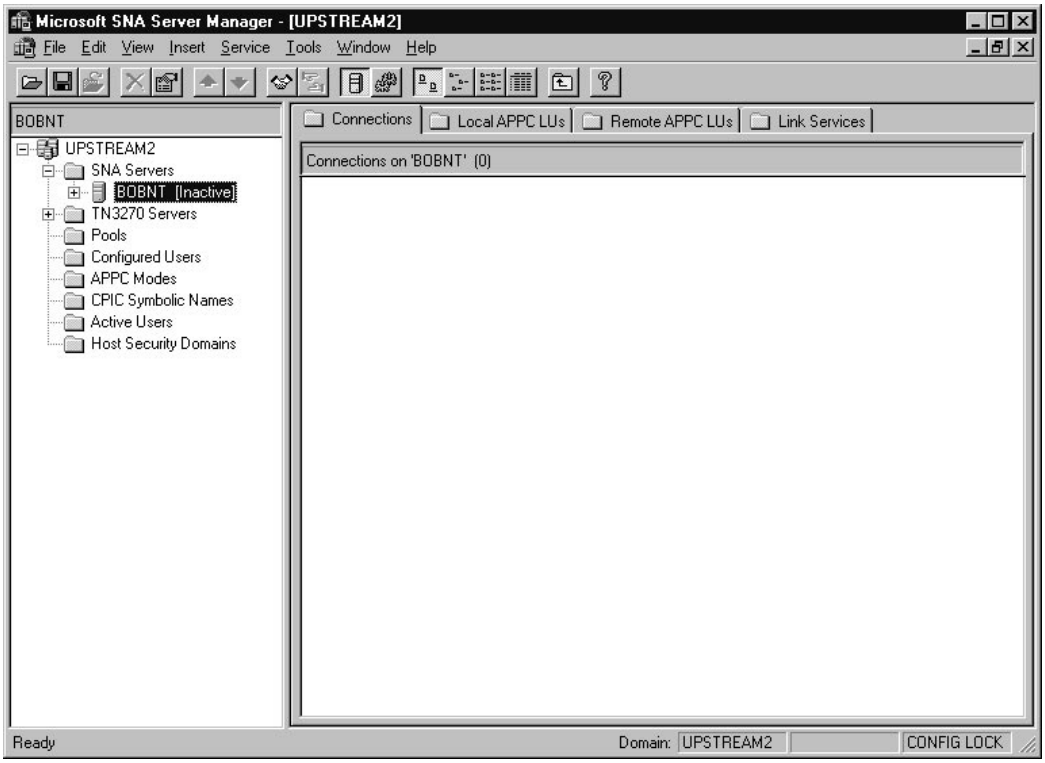



**Figure 5-9**
**SNA Server v3 Server Manager**

### 5.9.1. Server Properties

Highlight the server (BOBNT in the example above), pull down the **View** menu and select **Properties**. This will display the server properties dialog (see figure 5-10).

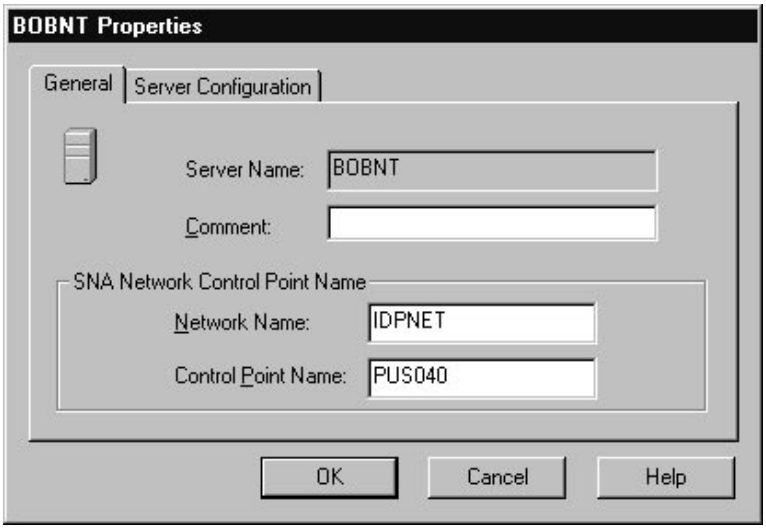



**Figure 5-10**
**Server Properties**

In the **General** property tab enter:

- **Network Name:** Enter your SNA network name. This can be obtained from your SNA Network Administrator. Most users cannot use the default.

- **Control Point Name:** Enter your physical unit name. This can be obtained by a VTAM programmer from the PU definition on the host.

The server configuration properties only need to be changed for workstations not on the SNA Server.

Press the **Ok** button to return to the Server Manager.

### 5.9.2. Add a Link Service

From the SNA Server Manager screen, highlight your server, pull down the **Insert** menu and select **Link Service**. Select **DLC 802.2 Link Service** and press the **Add** button. This will display the DLC properties list (see figure 5-11).

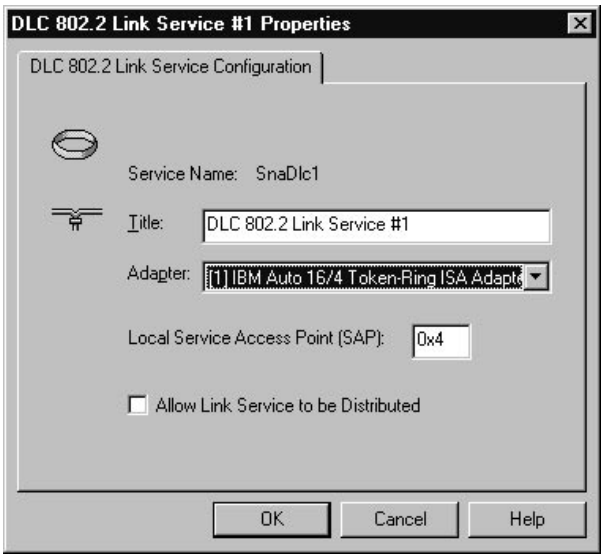



**Figure 5-11**
**DLC Link Service Properties**

Select the adapter that you will use for SNA connectivity and press the **Ok** button to return insert dialog; press the **Finish** button to return to the SNA Server Manager screen. Note that it may take some time during which SNA Server inserts the link service.

### 5.9.3. Add a Connection

From the SNA Server Manager screen, highlight your server, pull down the **Insert** menu and select **Connection** and then **802.2** from the Connection sub-menu.. Select **DLC 802.2 Link Service** and press the **Add** button. This will display the connection properties list - general tab (see figure 5-11).

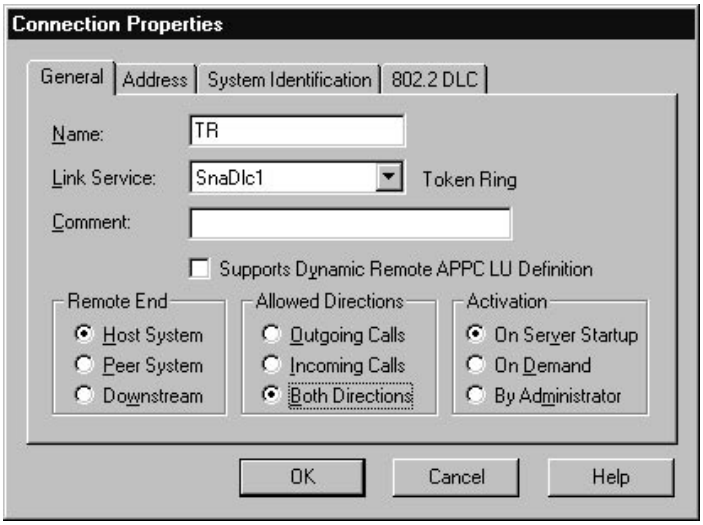
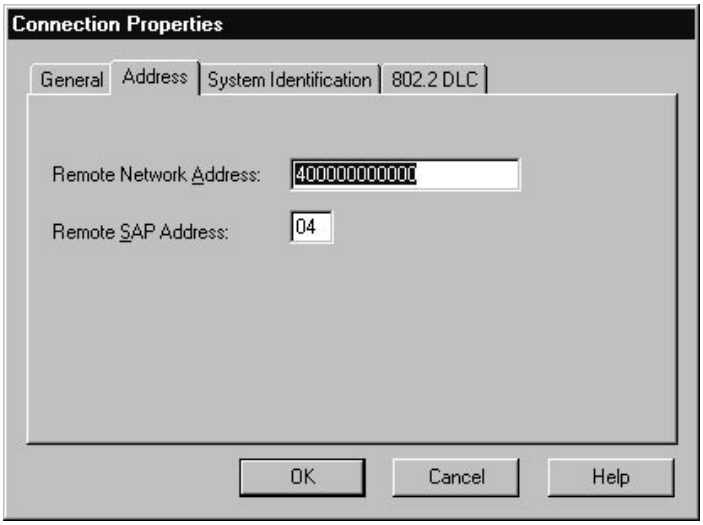



**Figure 5-12**
**Connection Properties - General Tab**

- **Name:** Enter any name you can remember. We recommend **TR** for Token-Ring and **ETH** for Ethernet.
- **Link Service:** Most users will enter **SnaDlc1**.
- **Supports Dynamic Remote APPC LU Definition:** Most users will **not** check this box.
- **Remote End:** Most users will enter **Host System**.
- **Allowed Directions:** Select **Both Directions**.
- **Activation:** Most users will select **On Server Startup**.

Press the **Address** tab in the Property list (see figure 5-13).




- **Remote Network Address:** Enter the 12 digit Token-Ring or Ethernet address of your 3174, 3172 or 37xx.
- **Remote SAP Address:** Most users will use the default of **04.**

Press the System Identification tab (see figure 5-14).

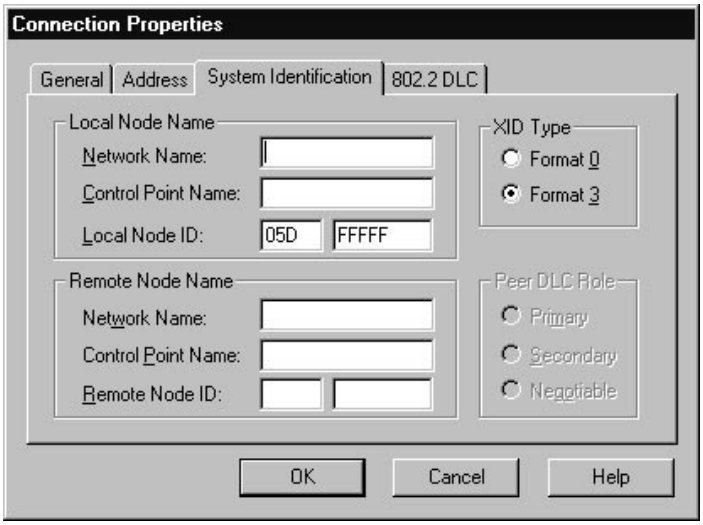



**Figure 5-14**
**Connection Properties - System Identification**

In the Local Node Name frame:

- **Network Name:** Enter the SNA network name used to identify VTAM. Obtain this from your VTAM system administrator.

**Figure 5-13**
**Connection Properties - Address tab**

- **Control Point Name:** Obtain your CPNAME as defined in the local or switched major node definition for your PU from your VTAM administrator.

- **Local Node ID:** Enter the IDBLK in the first box and IDNUM in the second box as defined in the switched major node definition for your PU. This field is not used for 3174 connections.

In the XID Type frame:

- **XID Type:** Most users will select **Format 3** as it allows the most flexibility. However, you must select Format 0 if you are connecting through a 3174 without config support C or any other non-XID negotiable device.

In the Remote Node Name frame:

- **Network Name:** Enter the SNA network name used to identify VTAM. Obtain this from your VTAM system administrator.

- **Control Point Name:** Enter your mainframe's control point or PU name. Obtain this from your VTAM system administrator. This is the value specified for the SSCPNAME parameter in the ATCSTR00 member of SYS1.VTAMLST.

- **Remote Node ID:** Most users will use the default IDNUM of **05D** (in the first box) and IDBLK of **FFFFF** (in the second box).

Press the **802.2 DLC** tab (see figure 5-15).

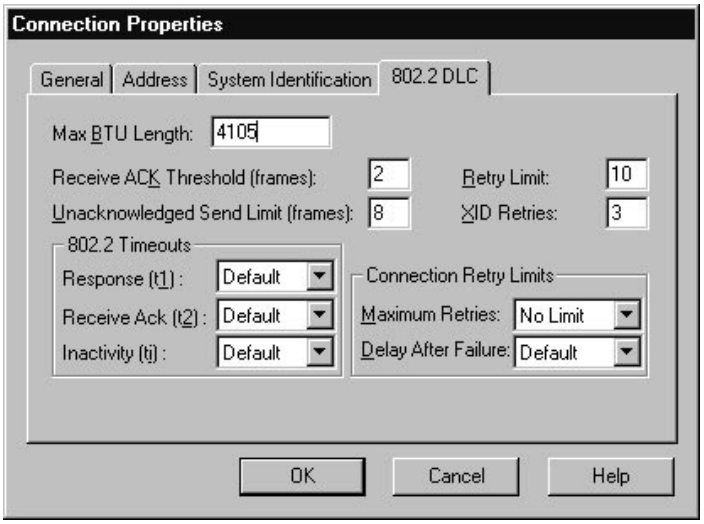



**Figure 5-15**
**Connection Properties - 802.2 DLC**

- **Max BTU Length:** Most users will enter **4105** for Token-Ring for best performance.

The remaining fields can be left at defaults. Press the Ok button to return to the SNA Server Manager screen.

Proceed to page 5-30 to configure a transaction program definition for FDR/UPSTREAM.

# 5.10. MS SNA Server in FDR/UPSTREAM

The FDR/UPSTREAM Configurator provides a simplified method of configuring Microsoft SNA Server/Workstation for use with UPSTREAM. We recommend using it to create or modify SNA Server definitions for UPSTREAM. If you wish to make these definitions manually, see page 5-35 which describes the process.

**This facility cannot be performed for SNA Server v3 due to bugs in SNA Server. When Microsoft has resolved these problems, we will place any fixes on the FDR/UPSTREAM BBS.**

From the UPSTREAM Program Group, select the UPSTREAM Configurator. Verify that the parameter values that you specified are correct. If they are, press the <Cancel> button followed by the <Yes> button to skip the initial configuration dialog. Pull down the Action menu and select MS SNA Configuration.

You will be asked to open your SNA Server configuration file (defaulting to **c:\sna\system\config\com.cfg**); if your configuration file is in a different directory or drive enter it here. After you open this file, you will see the SNA Configuration dialog (see figure 5-16).

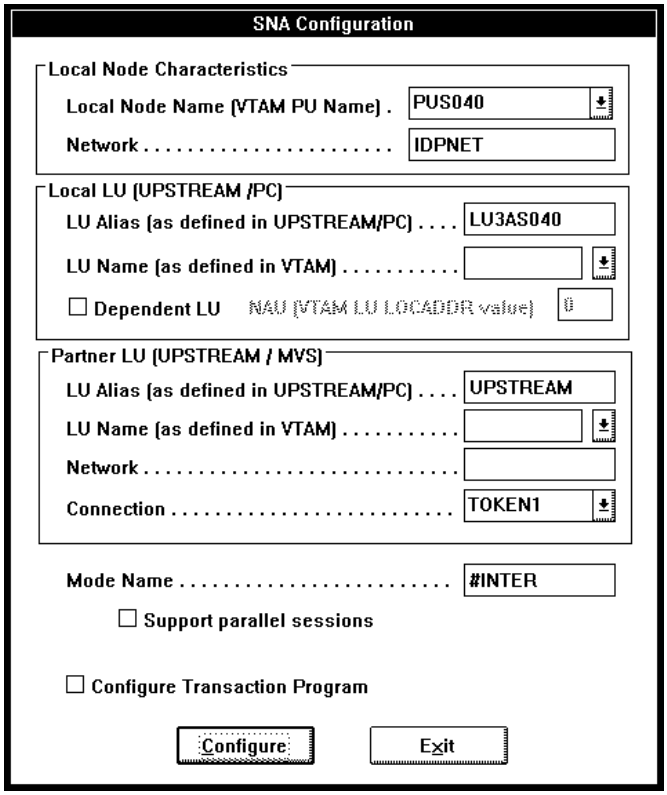



**Figure 5-16**
**MS SNA Configuration with FDR/UPSTREAM**

In the Local Node Characteristics frame:

- **Local Node Name (VTAM PU Name):** Select the local node name (VTAM PU Name) configured in the SNA Server Admin program that you wish to use for UPSTREAM.

- **Network:** Automatically filled in when you select a Local Node. This is a display only field.

In the Local LU (UPSTREAM/PC) frame:

- **LU Alias (as defined in UPSTREAM PC):** This field is filled in automatically with the values from the UPSTREAM Configuration. This is a display only field.

- **LU Name (as defined in VTAM):** Enter your PC's logical unit name as defined by your VTAM system administrator. You can pull down the list box to see a list of currently defined local LUs; if you select one you can modify its values.

- **Dependent LU:** Check this box if your PC's local LU is a dependent LU (has a non-zero LU number). If you check this box you must also enter the NAU (VTAM LU LOCADDR value). It is recommended that you not check this box if you are using the mode #INTER or you want to use parallel sessions and that you check this box if you are using the mode USTMODE.

- **NAU (VTAM LU LOCADDR value):** Enter the VTAM LOCADDR value as defined by your VTAM system administrator, in the range 1-254; do not enter 0.

In the Partner LU (UPSTREAM/MVS) frame:

- **LU Alias (as defined in UPSTREAM PC):** This field is filled in automatically with the value from the UPSTREAM configuration. This is a display only field.

- **LU Name (as defined in VTAM):** Enter the host logical unit name as defined by your VTAM system administrator. The default as installed on UPSTREAM/MVS is UPSTREAM. You can pull down the list box to see a list of currently defined partner LUs; if you select one, you can modify its values.

- **Network:** Enter the SNA network that UPSTREAM/MVS is located in. Most users will enter the Network as defined above in Local Node Characteristics.

- **Connection:** Select the connection, defined in the SNA Server Admin utility that you will be using to connect to the host. Most users will use the displayed (only) connection.

The parameters not in a frame:

- **Mode Name:** This field is filled in automatically with the value from the UPSTREAM configuration. This is a display-only field.

- **Support parallel sessions:** Parallel sessions allow multiple conversations on a single LU. While a single copy of UPSTREAM does not inherently take advantage of this feature, if you run multiple copies of UPSTREAM you can use the same SNA definitions for all of them. Check this box if you wish to support parallel sessions. If you are using the #INTER mode name, this box is checked; if you are using USTMODE you should usually not check this box. You cannot check this box if you are using dependent LUs.

- **Configure Transaction Program**: Check this box if you wish to run the USTPCFG program automatically, which allows the configuration of transaction program definitions. When configuring initially, you must **check** this box.

Press the **<Configure>** button to begin the configuration update process.

As the configuration proceeds, you will see several informative messages, such as a reminder to assign mode tables to LUs in VTAM, notification about existing configuration entries, etc. If there are fatal errors, including security failures and the like, you should note them and correct them. If you checked the <Configure Transaction Program> box, you will be brought into the USTPCFG program to update your transaction program definitions (see section 5.11.).

Note that the configuration process works on the configuration file, not the active configuration itself. You will be asked to make sure that SNA Server Admin is not currently running before the final updates are made. If the SNA Server Admin program is running at the time the update is attempted, you will receive the error message "Insufficient privilege or the configuration file is locked for read/write access."

Once the updates have been made, restart SNA Server Admin and activate your connection. Note that when you highlight the service, you will see your new local LU definition in the LU list, and when you highlight the connection, you will see the new partner LU definition in the LU list.

# 5.11. Transaction Program Definition

To complete your configuration, you will need to configure transaction program support. This is required even if you do not want to support host initiates as FDR/UPSTREAM will hang if this is not specified correctly. If you are running TCP/IP you must still run this program if you are configuring FDR/UPSTREAM to run as a service.

The description here is for defining FDR/UPSTREAM as an application (which is recommended for initial testing) rather than as a service. To configure FDR/UPSTREAM as a service see page 5-45.

You can run this program either from a DOS prompt or from the MS SNA Configuration (by checking the Configure Transaction Program checkbox). If you want to run it from a DOS prompt, run the program: **C:\UPSTREAM\USTPCFG.EXE**. This is an Innovation program designed specifically to modify the registry for APPC Transaction Program definitions (see figure 5-17).

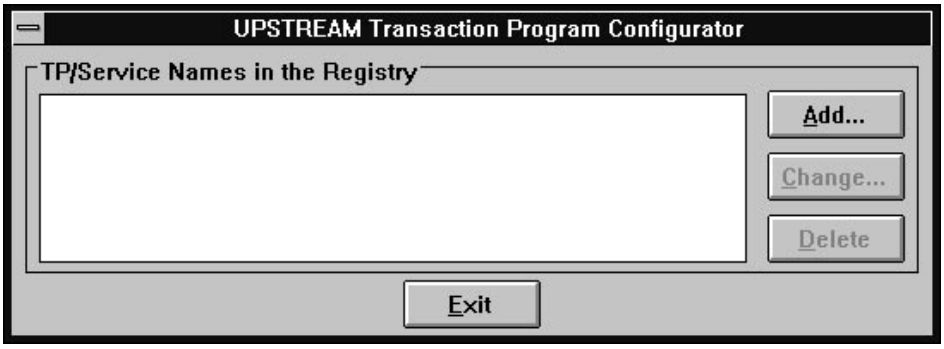
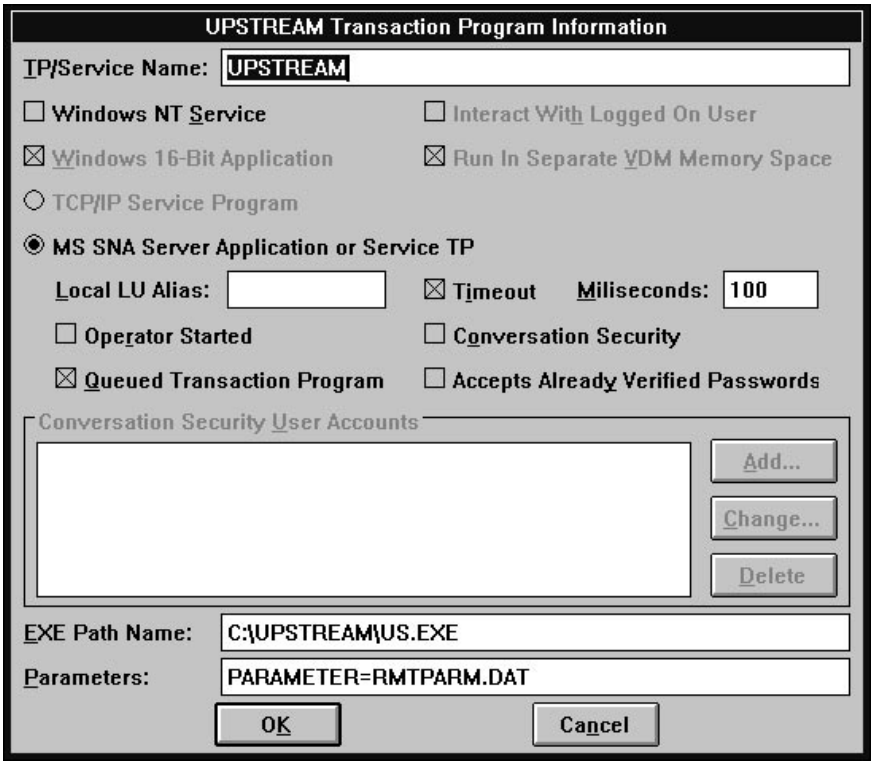



**Figure 5-17**
**MS SNA Server Configuration**

The FDR/UPSTREAM Transaction Program Configurator examines the Registry entries for SNA Server transaction programs and allows you to add, delete, or change these entries. When entering for this first time, press the **<Add>** button. The UPSTREAM Transaction Program Information dialog will be displayed (see figure 5-18).




- **TP Name:** In most cases your transaction program name will be **UPSTREAM**. This must be entered in UPPER case.

- **Windows NT Service:** For early testing, we recommend that you run as an application, so do **not check** this box. See page 5-45 for a complete description of reasons to run as a service and the steps required to do so.

- **MS SNA Service Application or Service TP:** This button is checked automatically; if you are running as an application, you only need to run this program if you are running Microsoft SNA Server or Workstation. This button is pressed by default and cannot be unchecked.

- **Local LU Alias:** Enter the Local LU Alias (specified in the Local LU definition earlier) which will be used for servicing remote requests for the TP Name.

- **Operator Started:** Check this box if you which to be prompted to start FDR/UPSTREAM when a remote initiate is received or if FDR/UPSTREAM will already be running. Do not check this box if you wish SNA Server to start FDR/UPSTREAM. We recommend that you **not check** this box.

- **Queued Transaction Program:** We recommend that you always **check** this box for FDR/UPSTREAM.

- **Timeout:** We recommend that you always **check** this box for FDR/UPSTREAM to avoid hangs.

- **Milliseconds:** We recommend that you use the default of **100**.

- **Conversation Security:** We recommend that you **not check** this box for FDR/UPSTREAM.

- ☐ **Accepts Already Verified Passwords:** We recommend that you **not check** this box for FDR/UPSTREAM.

- ☐ **EXE Path Name:** This is the fully qualified name of the program that you wish started when a remote request is received for the given transaction program name. For the application method, most users will enter: **C:\UPSTREAM\US.EXE**.

- ☐ **Parameters:** Enter the command line parameters to the program name specified above. If you are using the application method, we recommend: **PARAMETER=RMTPARM.DAT** which will process received requests and then terminate automatically.

When you have completed this dialog, press the **<Ok>** button to save your information and return to the Transaction Program Configurator main dialog. Press the **<Exit>** button to exit the program.

The Microsoft SNA Server/Workstation requires that their program **TPSTART.EXE** be running in order to have UPSTREAM automatically started (when running as an application) on a host request. Otherwise, UPSTREAM must already be running. If you will be host initiating backups/restores, you should place the program C:\SNA\SYSTEM\TPSTART.EXE in your Windows NT Startup group. There are known problems with TPSTART.EXE with a file date prior to December 1, 1995, so we recommend that you check your version and if it is old, pick up the newest one from Microsoft, the UPSTREAM BBS or contact your sales representative.

If you used the UPSTREAM Configurator to configure SNA Server this is the last step in the configuration process. If you have reviewed the information on page 5-45 concerning the setup of your Windows NT machine for UPSTREAM, you can now proceed to chapter 8 to begin your first backup.

If you are running SNA Server v2 and wish to configure it manually for FDR/UPSTREAM go to page 5-35. If you are running SNA Server v3 and wish to configure it manually for FDR/UPSTREAM go to page 5-39.

# 5.12. Advanced MS SNA Server

You can use the MS SNA Configuration facility in UPSTREAM to configure:

- UPSTREAM on the SNA Server PC.
- UPSTREAM on a workstation (not the SNA Server PC).
- SNA definitions for workstations using UPSTREAM from the server or any other PC.

There are no specific issues with configuring UPSTREAM to run on the SNA Server.

If you are not running UPSTREAM on the SNA Server and wish to use the UPSTREAM configuration facilities, you must have a drive letter connected to the disk on the PC where SNA Server is running so that the configuration file can be read and written to. You are also going to have to be able to shut down SNA Server so that the configuration file can be updated at the end of the process.

If you are defining SNA definitions for another workstation, you must either run the MS SNA Configuration within UPSTREAM or have a drive letter attached to the drive where SNA Server is running from to update the SNA Server configuration. Note that you cannot update the transaction program definitions for another PC, as these entries must be written to the destination PCs registry.

There are a variety of log and informational files created during the MS SNA Configuration:

- **USSNACFG.ERR**: Recreated in the UPSTREAM work path directory every time you run the MS SNA Configuration, this file shows the error messages displayed.
- **USSNACFG.SRC:** Stored in the directory with the configuration file, the original configuration, before any changes you made.
- **USSNACFG.LOG:** Stored in the directory with the configuration file, the history of all modifications made by the UPSTREAM SNA Configurator.
- **USSNACFG.UPD:** Stored in the directory with the configuration file, the updates to the configuration.

### 5.12.1. Problems

There are three useful tools provided by SNA Server for problem determination: the system event viewer, SNACFG.EXE for displaying configuration files and the trace facility.

The first step in problem determination with SNA Server is to check the Application Event Log. SNA Server uses this log for all its logging. To access the event log, run the Event Viewer program in the Administrative Tools program group. Pull down the Log menu and make sure that Application is checked. Double-clicking an entry shows significant detail.

Often, it can be very helpful in getting SNA communications configured properly, to be able to print out the communications definition so that it can be compared to the host switched major node definition. SNA Server includes a program which allows you to display and printout its definition: SNACFG. It has several options, but we recommend the use of the /DISPLAY option, and the output redirected to a file. For example:

```
C:\SNA\SYSTEM> snacfg /display > c:\com.out
```

SNA Server provides a complex trace facility. It is available in the SNA Server program group as SNA Server Trace. The actual program is C:\SNA\SYSTEM\SNATRACE.

In most cases, technical support will need to see the traces generated from the SnaDlc1 service with Data Link Control messages enabled. Note that traces are stored as two files in the \SNA\TRACES directory: LINKMSG1.TRC and LINKMSG2.TRC.

# 5.13. Manually Configuring SNA Server v2

The following are the steps for manually configuring for FDR/UPSTREAM using the SNA Server Admin Program.

### 5.13.1. Local LU Configuration

You must configure a local LU for use by APPC regardless of existing 3270 definitions.

Highlight the service name and press the **Insert** key. You will see the Insert dialog (see figure 5-7 shown in the previous section). Press the **APPC (local)** radio button. Press the **<Ok>** button to see the APPC LU Properties dialog (see figure 5-19).

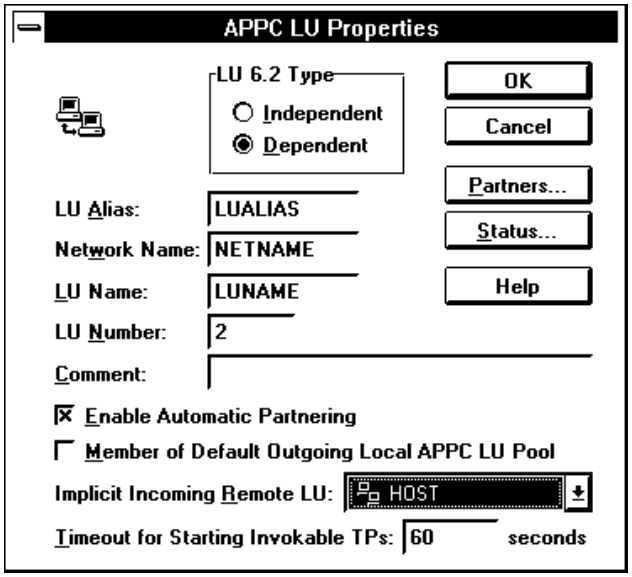



**Figure 5-19**
**APPC LU Properties**

- **LU 6.2 Type:** Press the Dependent radio button if the LU you will be using for FDR/UPSTREAM is configured in VTAM to have a LU Local Address (LU Number) which is non-zero (which is recommended). Press the Independent radio button if the LU Local Address is zero. This value can be obtained from your VTAM programmer

- **LU Alias:** Enter any 8 character value. This value must be in UPPER case. You will need to remember this value as the Local LU Alias for the FDR/UPSTREAM configuration. We suggest using the same value as your Local LU Name (below).

- **Network Name:** Enter your SNA network name. This value can be obtained from your VTAM programmer.

- **LU Name:** Enter the LU name configured for your PC to use with FDR/UPSTREAM. This value is configured in the same place as the LU Local Address on the host (i.e. the label for the LU definition in VTAM).

- **LU Number:** (Dependent LUs only) Enter the LU Local Address configured for your PC to use with FDR/UPSTREAM. This is the LOCADDR parameter for the LU definition in VTAM.

- **Comment:** Enter any text to help you remember this definition.

- **Enable Automatic Partnering:** We recommend that you check this box.

- **Member of Default Outgoing Local APPC LU Pool:** We recommend that you **not check** this box as FDR/UPSTREAM will use a specific LU.

The final two parameters can be left at their defaults.

### 5.13.2. Mode Configuration

In the APPC LU Properties dialog press the **<Partners...>** button to display the Partners list. Press the **<Modes>** button to see the APPC Mode Properties dialog (see figure 5-20).

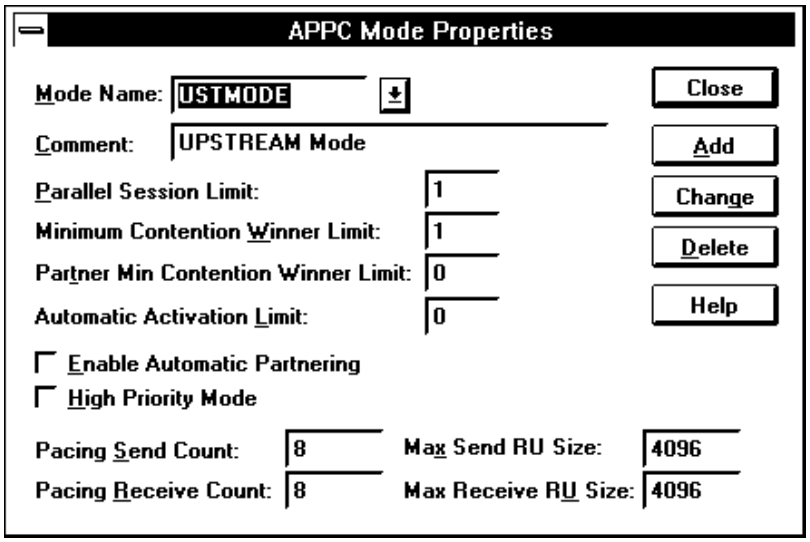



**Figure 5-20**
**APPC Mode Properties**

- **Mode Name:** Enter your SNA mode name. The recommended values are either **USTMODE** or **#INTER**.

- **Comment:** Enter any text that will help you remember this definition.

- **Parallel Session Limit:** We recommend using single sessions for simplicity; most users will enter **1**.

- **Minimum Contention Winner Limit:** For single session users we recommend that the PC be the contention winner so enter **1**.

- **Partner Min Contention Winner Limit:** For single session users, we recommend that the PC be the contention winner, the partner LU cannot be, so enter a value of 0.

- ☐ **Automatic Activation Limit:** A small performance benefit can be gained by automatically activating the session. For single session users, enter **1** to have the session automatically activated.
- ☐ **Enable Automatic Partnering:** We recommend that you **check** this box.
- ☐ **High Priority Mode:** We recommend that you **check** this box.
- ☐ **Pacing Send Count:** Pacing values must never be 0. A good all-around starting value is **8**.
- ☐ **Pacing Receive Count:** You will usually want to use the same value as for the Send Count (we recommend **8**).
- ☐ **Max Send RU Size:** RU size has a significant impact on performance. Use the largest value possible, which is usually **4096**.
- ☐ **Max Receive RU Size**: You will usually want to use the same value as for the Send RU Size (we recommend **4096**).

When you are done press the **<Close>** button, save your changes and exit the mode dialog. Press the **<Close>** button to exit the Partners dialog, and the **<Ok>** button to save the Local LU changes.

### 5.13.3. Partner LU Configuration

Highlight the connection and press the **Insert** key. You will see the Insert dialog. Press the **APPC Remote** radio button and press the **<Ok>** button. You will see the APPC Remote LU Properties dialog (see figure 5-21).

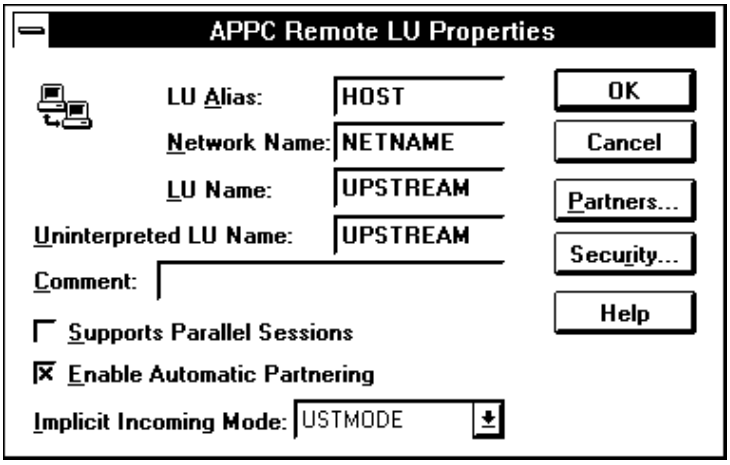



**Figure 5-21**
**Remote LU Properties**

- ☐ **LU Alias:** Enter any 8 character value. This value must be in UPPER case. You will need to remember this value as the Partner LU Alias for the FDR/UPSTREAM configuration (later). We recommend that you use the same value as the partner LU Name (below), which is usually **UPSTREAM**.
- ☐ **Network Name:** Enter your SNA network name.
- ☐ **LU Name:** Enter the name of FDR/UPSTREAM MVS (your partner LU). This is usually **UPSTREAM**.

- ☐ **Uninterpreted LU Name:** This is usually the same name as the partner LU Name. This is usually **UPSTREAM**.
- ☐ **Comment:** Enter any text that will help you remember this definition.
- ☐ **Supports Parallel Session:** Most users will be single session and will **not check** this box.
- ☐ **Enable Automatic Partnering:** We recommend that you **check** this box.

Press the **<Ok>** button to save your changes and exit the dialog.

You have completed the configuration of the SNA services. Pull down the **File** Menu and select **Save Configuration** to save the changes you have made. Exit the SNA Admin program to complete your configuration.

Proceed to section 5.11. to configure your transaction program definition.

# 5.14. Manually Configuring SNA Server v3

The following are the steps for manually configuring for FDR/UPSTREAM using the SNA Server Manager Program.

### 5.14.1. Local LU Configuration

You must configure a local LU for use by APPC regardless of existing 3270 definitions.

Highlight your service name, pull down the **Insert** menu, select the **APPC** menu item and then the **Local LU** submenu. . You will see the General tab in the Local APPC LU properties list (see figure 5-22).

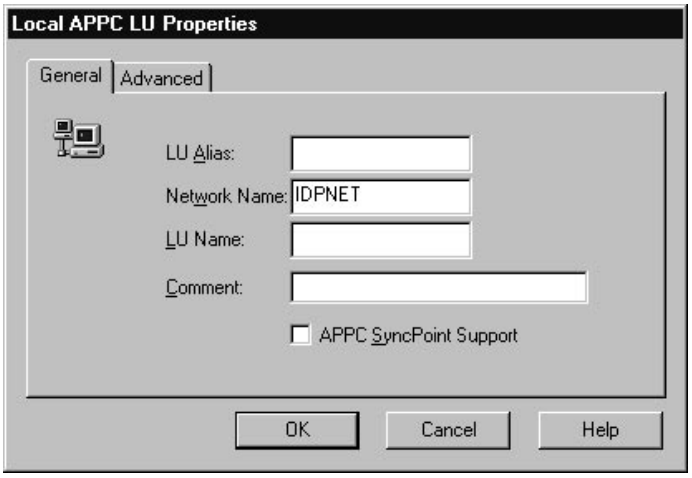



**Figure 5-22**
**Local LU - General**

- **LU Alias:** Enter any 8 character value. This value must be in UPPER case. You will need to remember this value as the Local LU Alias for the FDR/UPSTREAM configuration. We suggest using the same value as your Local LU Name (below).
- **Network Name:** Enter your SNA network name. This value can be obtained from your VTAM programmer.
- **LU Name:** Enter the LU name configured for your PC to use with FDR/UPSTREAM. This value is configured in the same place as the LU Local Address on the host (i.e. the label for the LU definition in VTAM).
- **Comment:** Enter any text to help you remember this definition.
- **APPC SyncPoint Support:** We recommend that you **not** check this box.

Press the **Advanced** tab (see figure 5-23).

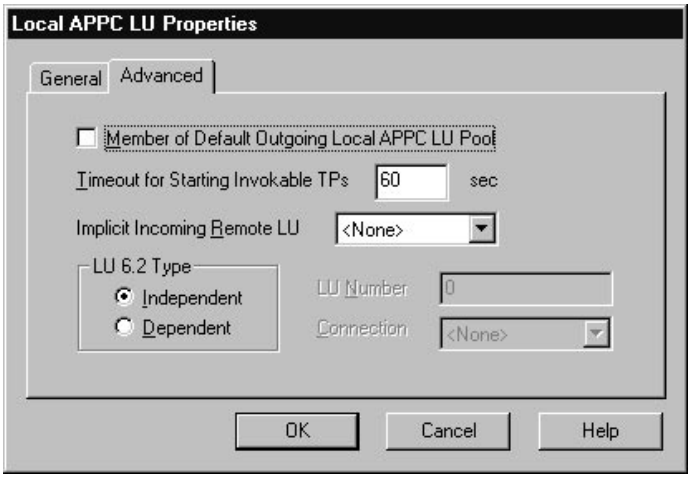



**Figure 5-23**
**Local LU - Advanced**

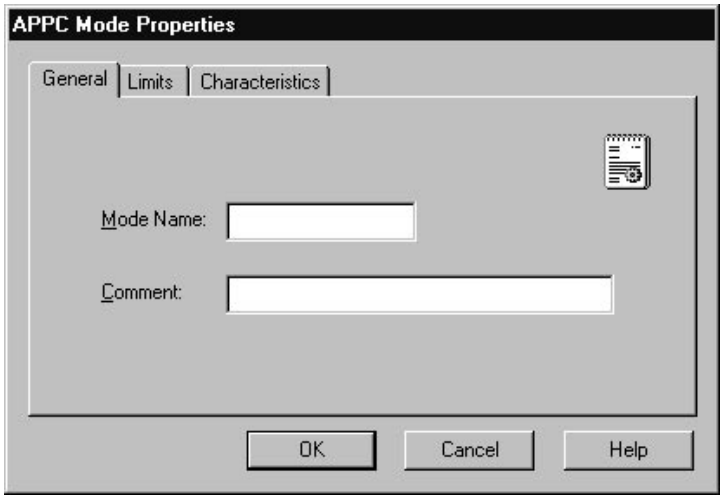
- **Member of Default Outgoing Local APPC LU Pool:** We recommend that you **not** check this box.
- **Timeout for Starting Invokable TPs:** We recommend that you leave the default of **60** seconds.
- **Implicit Incoming Remote LU:** We recommend that you use the default of **<None>**.
- **LU 6.2 Type:** Select Independent if your local LU uses the LU number (LOCADDR) 0. Select dependent if you have a non-zero LU number (LOCADDR).
- **LU Number:** (Dependent Lus only) Enter the LU Number (LOCADDR) of your LU.
- **Connection:** (Dependent Lus only) Pull down and select the connection you entered earlier.

Press **Ok** to save your local LU definition and return to the SNA Server Manager screen.

### 5.14.2. Mode Configuration

This configuration is only necessary if you are not using one of the standard mode definitions (such as #INTER). If you wish to review or modify #INTER, highlight APPC Modes, select #INTER, pull down the View menu and select Properties.

Highlight your service name, pull down the **Insert** menu, select the **APPC** menu item and then the **Mode Definition** submenu. . You will see the General tab in the APPC mode properties list (see figure 5-24).




- **Mode Name:** Enter your SNA mode name. Most users will enter **USTMODE**.

  Press the **Limits** tab (see figure 5-25).

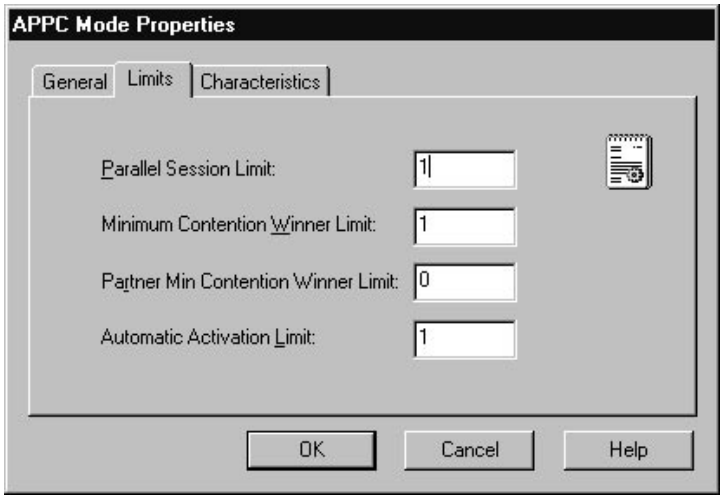



**Figure 5-25**
**APPC Mode - Limits**

- **Parallel Session Limit:** We recommend using single sessions for simplicity; most users will enter **1**.
- **Minimum Contention Winner Limit:** For single session users we recommend that the PC be the contention winner so enter **1**.
- **Partner Min Contention Winner Limit:** For single session users, we recommend that the PC be the contention winner, the partner LU cannot be, so enter a value of 0.

- **Automatic Activation Limit:** A small performance benefit can be gained by automatically activating the session. For single session users, enter **1** to have the session automatically activated.

Press the Characteristics tab (see figure 5-26).

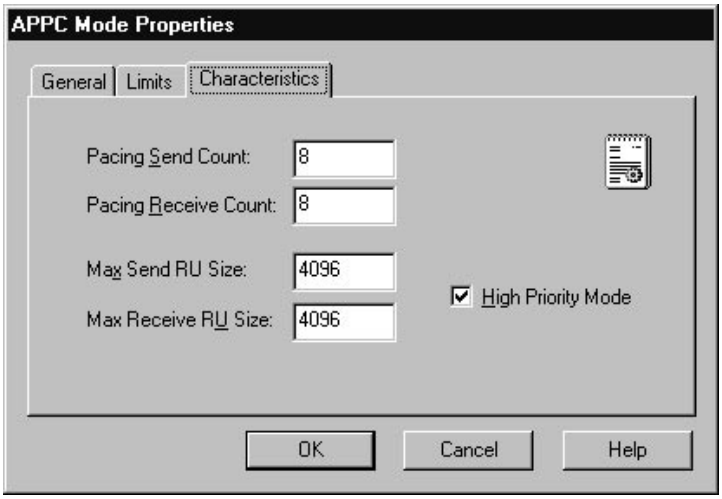



**Figure 5-26**
**APPC Mode - Characteristics**

- **High Priority Mode:** We recommend that you **check** this box.
- **Pacing Send Count:** Pacing values must never be 0. A good all-around starting value is **8**.
- **Pacing Receive Count:** You will usually want to use the same value as for the Send Count (we recommend **8**).
- **Max Send RU Size:** RU size has a significant impact on performance. Use the largest value possible, which is usually **4096**.
- **Max Receive RU Size**: You will usually want to use the same value as for the Send RU Size (we recommend **4096**).

When you are done press the **Ok** button to return to the SNA Server Manager screen.

### 5.14.3. Partner LU Configuration

Highlight the service, pull down the Insert menu and select Remote LU (see figure 5-27).

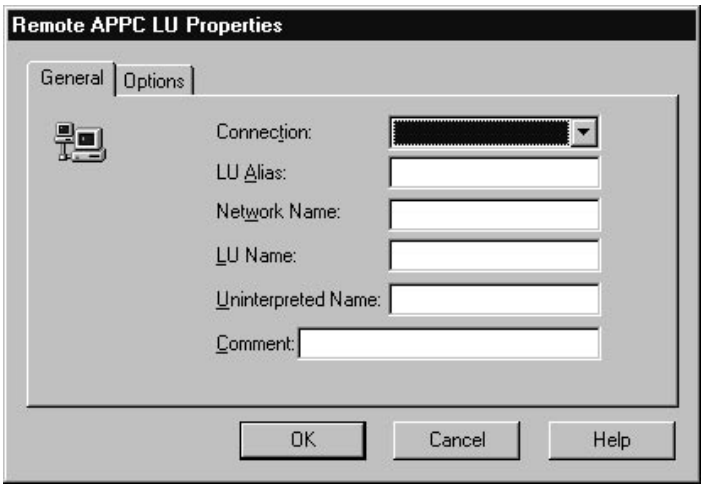
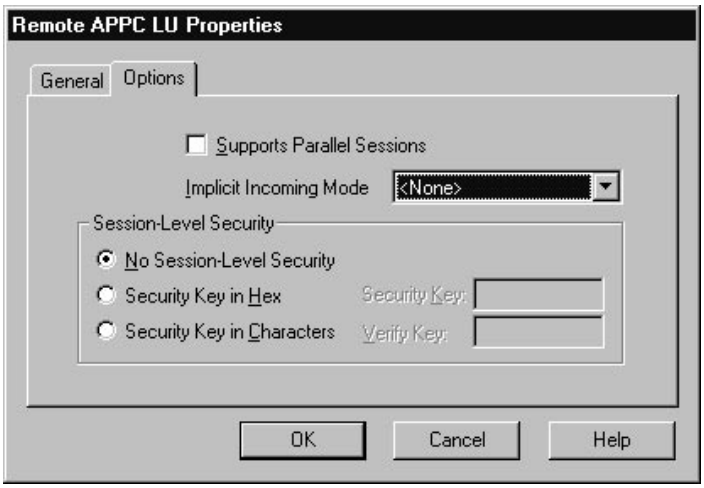



**Figure 5-27**
**Remote LU - General**

- **Connection:** Pull down and select your configured host connection.
- **LU Alias:** Enter any 8 character value. This value must be in UPPER case. You will need to remember this value as the Partner LU Alias for the FDR/UPSTREAM configuration (later). We recommend that you use the same value as the partner LU Name (below), which is usually **UPSTREAM**.
- **Network Name:** Enter your SNA network name.
- **LU Name:** Enter the name of FDR/UPSTREAM MVS (your partner LU). This is usually **UPSTREAM**.
- **Uninterpreted LU Name:** This is usually the same name as the partner LU Name. This is usually **UPSTREAM**.
- **Comment:** Enter any text that will help you remember this definition.

Press the **Options** tab (see figure 5-28).




- **Supports Parallel Session:** Most users will be single session and will **not check** this box.
- **Implicit Incoming Mode**: Most users will leave the default of **<None>**.
- **Session Level Security:** FDR/UPSTREAM does not use session level security. Press the **No Session Level Security** radio button.

Press the **Ok** button to return to the SNA Server Manager screen.

You have completed the configuration of the SNA services. With your service selected, pull down the Service menu and select Start. You may be prompted to save any changes. The host system console may display any errors as well as the Windows NT Application Event log.

Proceed to page 5-45 to complete your configuration for FDR/UPSTREAM.

**Figure 5-28**
**Remote LU - Options**

# 5.15. FDR/UPSTREAM and Windows/NT

FDR/UPSTREAM can run as either a Windows NT program, or as a system service. A service is a special program which runs as an extension of the operating system. An application program is simply a standard Windows NT program. There are significant differences in configuring your Windows NT machine when using the two different methods.

Running FDR/UPSTREAM as an application is the recommended method for testing (and is the method described to this point). This is because FDR/UPSTREAM is an applications program and configuration and use is more natural. When you are ready to implement FDR/UPSTREAM in a production mode, you may choose to run it as a service.

Running FDR/UPSTREAM as a service has some of the following properties:

- **Optional user interface.** You can choose to either have a user interface (which appears when a user logs on) or have no user interface at all. In general, control of a service is performed using the NET command (from the command line) or through the control panel. Ascertaining the status of a service is through the Event Log, through the control panel or by using the NET START command from the command line. FDR/UPSTREAM can also be controlled from the host or another PC.
- **Requires no login.** Services are usually started when the system starts and remain running regardless of whether someone is logged on. This allows FDR/UPSTREAM to perform backups or restores irrespective of whether someone is logged in or not.
- **Have system privileges.** Services have the highest access privileges to files in the system. This means that you can guarantee access to all files in the system (if they are not open by another application and users have not specifically disallowed system privileged access).
- **Can become a specific user.** When a service is started it can be configured to attach as a given user. This allows you to back up any non-local drives automatically attached when a user is logged on, or backup files which require specific user privileges.

In most cases, you will choose to run FDR/UPSTREAM as a service when you are controlling your backups from the host, and have FDR/UPSTREAM operating successfully as an application.

If you have questions about whether to run as an application or as a service, contact FDR/UPSTREAM technical support. See page 5-49 for a description of setting up FDR/UPSTREAM as a service.

The following sections discuss security issues with FDR/UPSTREAM. Since security is extremely important in Windows NT we recommend that all users at least skim this section.

### 5.15.1. Security

The first step in the process of integrating FDR/UPSTREAM into your system for backups is to enable security for backups and restores to be run, and to allow updating of shared configuration files. Windows/NT has some unique requirements which you must set up to allow a complete backup of all your files.

Windows/NT has a security system which prevents users or programs from performing tasks that they are not authorized to perform. Authorization for specific tasks is handled through a set of privileges (also referred to as rights). Privileges are assigned to individual users and user groups. A user can be assigned privileges indirectly

by including the user in a user group to which the privileges have been assigned. Users and groups are managed by a system administrator.

There are three types of user security which are significant for the user performing the backups and restores:

- **User:** If the user performing the backups and restores is a regular user, no security information, extended attributes or alternate data streams will be included in the backup or restore. If you select these options in FDR/UPSTREAM, errors will be logged for those files containing this information.
- **Backup User:** A Backup User can backup and restore security information (without security ACLs), all extended attributes and all alternate data streams. You will not be notified of the failure to obtain security ACLs.
- **Administrator:** An Administrator can backup and restore all types of information.

See the **Windows NT Security Model** chapter in the *Windows NT Resource Guide* for a detailed description of security.

We recommend that the FDR/UPSTREAM user be an Administrator to guarantee that all information requested be properly included in the backups and restores.

The following process will help you create a new Administrator user. The system administrator needs to locate the **Administrative Tools** group and run the **User Manager for Domains** application (see figure 5-29).

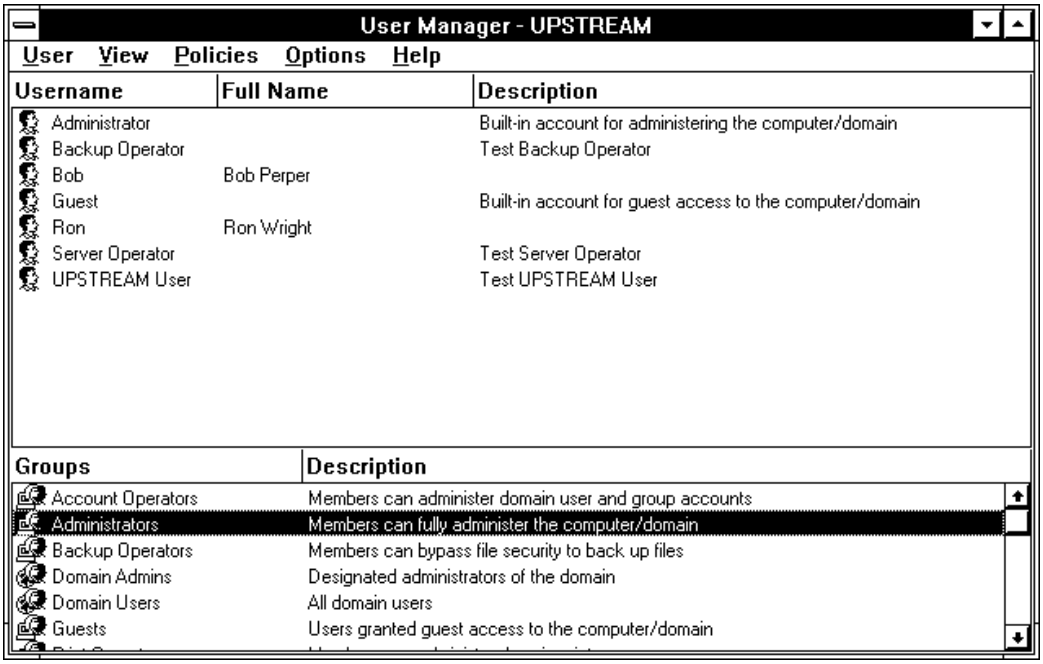
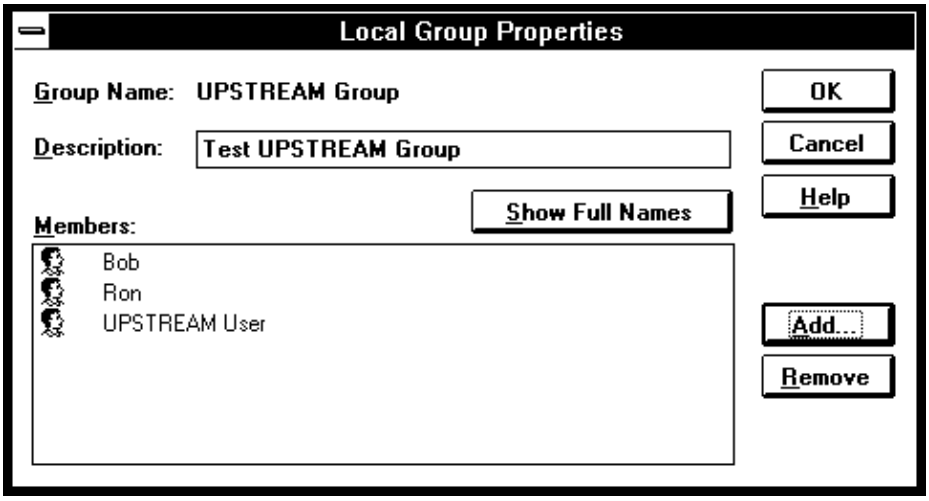



**Figure 5-29**
**User Manager**

### 5.15.2. Add the User to the Administrators group

From the main window of the User Manager , double-click on **Administrators** in the Groups list box to display the Local Group Properties dialog (see figure 5-30).




Press the **<Add>** button to display the Add Users and Groups dialog (see figure 5-31).

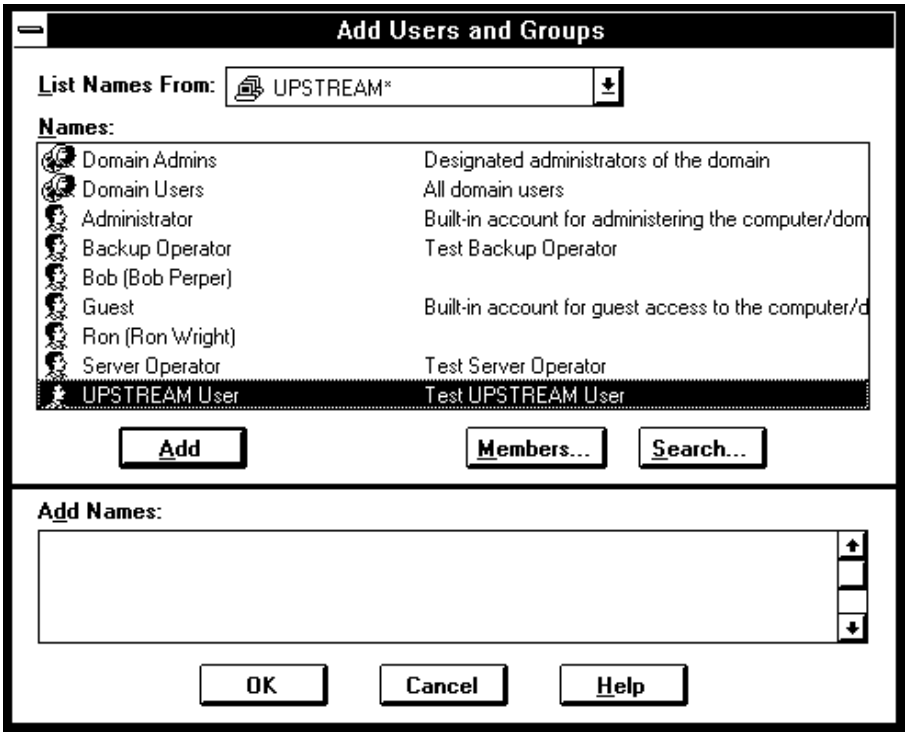



**Figure 5-31**
**Add Users and Groups**

Select the user to be included in the Administrators group in the Names list box.

Press the **<Add>** button to add the user to the group.

Press the **<Ok>** button to save your changes.

Once the users who will be using FDR/UPSTREAM have been included in the Administrators group, the users are now authorized for many of the tasks FDR/UPSTREAM will perform. The following sections are for advanced setup and can be skipped until you are ready to perform full system backups. Proceed to chapter 8 to perform your first backup.

### 5.15.3. Authorizing the Security Hive

Registry information is maintained in hives, which are simply files. Backing them up is important to backing up your system. Version 3.5 of Windows NT allows all but one hive file to be backed up by an administrator. This hive file is the Security hive.

To authorize this hive, select **Command Prompt** from the Windows NT Program Manager Main folder. Run the Registry Editor:

```
C:\users\default> REGEDT32
```

- Click on the title bar for the **HKEY_LOCAL_MACHINE** on Local Machine window to make it the active window.
- Highlight the hive whose Permissions are to be modified (i.e. **SECURITY**).
- Pull down the **Security** menu and select **Permissions...** You will see the Registry Key Permissions dialog (see figure 5-32).

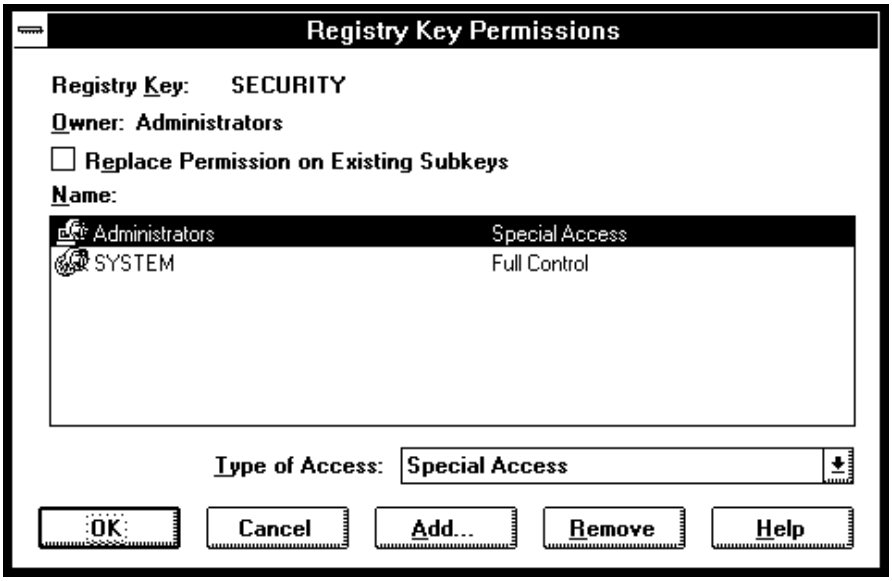



**Figure 5-32**
**Registry Permissions**

You need to change the permissions for Administrators from Special Access to Full Control:

- Check the **Replace Permission on Existing Subkeys** checkbox.
- Select the **Administrators** entry in the list box.
- Select the **Full Control** entry from the Type of Access drop down list box.
- Press the **<Ok>** button.

- You will be asked if you wish to replace the permission on all existing subkeys of the selected registry key. Press the **<Yes>** button.

If you wish to authorize additional registry keys, you can repeat this process. When you are done, close the registry editor.

USWIN32.DLL is provided and installed in the UPSTREAM directory and is required to enable the privileges for the user. As required by Windows/NT, even though the user can be assigned privileges, these privileges cannot be used until they are enabled.

### 5.15.4. Using UPSTREAM to Back up Another Windows NT PC

You can use drive shares to map drives to other Windows NT PC (both within your domain and outside your domain). There are a number of steps that you must perform to assure complete backups.

To backup a PC in your domain, you must:

- Make sure that the user you logged in as has Full Control over the entire drive.
- Each hive in the registry must allow the user Full Control.

If you wish to backup a PC in another domain, you must do the following in the domain which UPSTREAM will be run in:

- You must grant the **Log on locally** right to the Domain Admins group of the domain to be backed up.
- The Domain Admins group of the domain to be backed up must be given **Full Control** over the UPSTREAM directory on the machine on which UPSTREAM will run.
- Grant the Domain Admins group of the domain to be backed up the following rights: **Back up files and directories**, **Change the system time**, and **Restore files and directories**.

You must do the following in the domain that you will be backing up:

- Make sure that the user you logged in as has **Full Control** over the entire drive.
- Each hive in the registry must allow the user **Full Control**.
- The user must be a member of the **Domain Admins** group in addition to being a member of the **Administrators** group.

Proceed to chapter 8 to perform your first backup.

### 5.15.5. Running as a Service

FDR/UPSTREAM itself does not run as a service. Innovation provides a separate program USTPSERV.EXE which runs as a service and runs FDR/UPSTREAM as a child program. Thus, when you have FDR/UPSTREAM properly configured as an application, there are few changes required to run it as a service.

However, it cannot be run as an application at the same time it is running as a service. If you wish to do this, follow the steps outlined in the Running More Than One Copy chapter of this manual to set up a new LU, transaction program, etc. Note that if you do not have the service running, you can run it as an application, even to the extent of proper support for remote initiated functions.

The first step in configuring to run as a service is to configure (or modify) your transaction program definition. This is required even if you are running FDR/UPSTREAM using TCP/IP as the transaction program configurator facility makes registry changes required for services.

### 5.15.6. Transaction Program Definition for a Service

Even if you are running TCP/IP you must configure a transaction program definition using the USTPCFG program, as it not only defines transaction programs for SNA Server, it also adds registry entries required when running as a service.

To run the USTPCFG program go to the UPSTREAM directory and run:

```
C:\UPSTREAM> USTPCFG
```

This will display the UPSTREAM Transaction Program Configurator main dialog. Press the <Add> button if you are creating your first transaction program definition or wish to have a separate transaction program definition for this copy of FDR/UPSTREAM; press the <Change> button if you wish to modify your existing definition.

Note that if you are using SNA and are not using the default transaction program name of UPSTREAM, you must change the INTPN definition in the FDR/UPSTREAM advanced configuration as described in the *Running More than One Copy* chapter of this manual.

This will bring you to the UPSTREAM Transaction Program Information dialog (see figure 5-33).

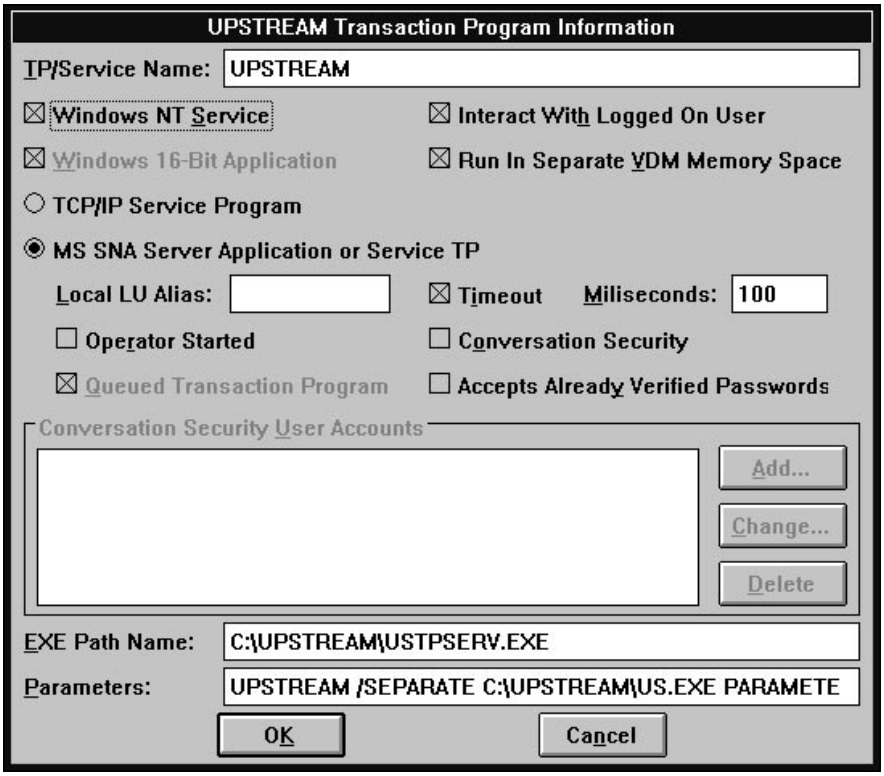



**Figure 5-33**
**Transaction Program Definition**

- **TP Name:** Enter the transaction program name which you wish to use. For your first TP definition most users will enter **UPSTREAM**. It is case sensitive, so enter in upper case.

- ☐ **Windows NT Service: Check** this box to set up FDR/UPSTREAM as a service. Note that several fields are changed when you check this box (their text will change as well as their activation state).

- ☐ **Interact With Logged On User: Check** this box if you wish the FDR/UPSTREAM program's user interface to be available whenever it is running and a user is logged on. We recommend that this box be checked until you are sure that everything is working correctly. Do not check this box if you wish the FDR/UPSTREAM user interface to not be displayed which will guarantee that logged on users will not be able to easily interact (i.e. suspend) an active backup.

- ☐ **Windows 16-Bit Application:** This field is grayed and checked because US.EXE (the UPSTREAM program) is a 16-bit application.

- ☐ **Run in Separate VDM Memory Space:** We recommend that you always **check** this box unless you are short of memory.

The following two radio buttons are dependent upon you communications type:

- ☐ **TCP/IP Service Program:** Press this radio button if your host connectivity uses TCP/IP. If pressed, the SNA specific fields are grayed.

- ☐ **MS SNA Server Application or Service TP:** Press this radio button if your host connectivity uses SNA. If pressed, the SNA specific fields are activated.

The SNA specific fields are:

- ☐ **Local LU Alias:** Enter the Local LU Alias, as specified in the FDR/UPSTREAM Configurator. This field is required.

- ☐ **Operator Started:** Do not check this box if you wish the SNA attach manager to start FDR/UPSTREAM if it is not already running. We recommend that you do **not check** this box.

- ☐ **Queued Transaction Program**: This box is checked and grayed automatically.

- ☐ **Timeout: Check** this box to avoid FDR/UPSTREAM from hanging.

- ☐ **Milliseconds:** We recommend that you use the default of **100**.

- ☐ **Conversation Security:** FDR/UPSTREAM does not use conversation security as it has its own security facilities, so do **not check** this box.

- ☐ **Accepts Already Verified Passwords:** Again, FDR/UPSTREAM does not use conversation security and you should **not check** this box.

The conversation security list box is grayed for FDR/UPSTREAM. The execution parameters below the conversation security list box are:

- ☐ **EXE Path Name:** Enter the fully qualified path name to the FDR/UPSTREAM service transaction program (USTPSERV). Most users will enter:
  **C:\UPSTREAM\USTPSERV.EXE**.
  Note that this field was modified when you checked the Windows NT Service checkbox.

- ☐ **Parameters:** Enter the command line parameters which will be used when USTPSERV.EXE is started. This field was modified when you checked the Windows NT Service checkbox. For your first definition, you may choose to

use:
**UPSTREAM /SEPARATE C:\UPSTREAM\US.EXE PARAMETER=RMTPARM.DAT**

The format for USTPSERV is:

**<Service Name> [/separate] <Program Name> [<Program Parameters>...]**

Where:

- **<Service Name>**: Must be the same as the transaction program name. Usually UPSTREAM.
- **/separate**: An optional parameter which allows you to start the program in a separate VDM. Recommended.
- **<Program Name>**: The fully qualified program name for FDR/UPSTREAM. Usually C:\UPSTREAM\US.EXE.
- **<Program Parameters>**: Enter the parameters which you will send to FDR/UPSTREAM. Most users will enter PARAMETER=RMTPARM.DAT.

Press the **<Ok>** button to save your changes. You will see a message concerning your service definition.

If you are adding the service definition for the first time, you will see the following message:

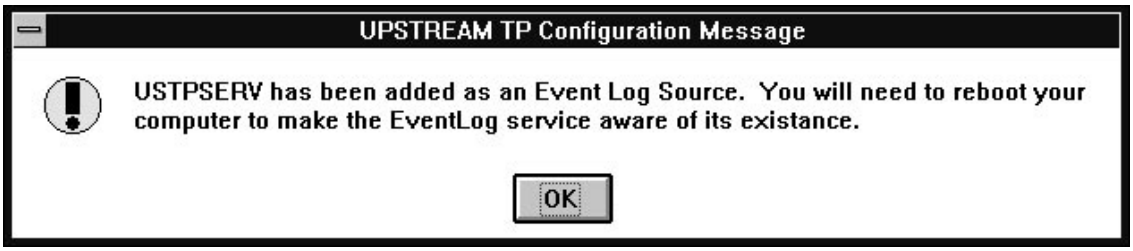



**Figure 5-34**
**Added Event Log Service**

When USTPSERV.EXE has a message to log, it writes it to the Windows NT applications log. If you have unexplained behavior of USTPSERV (for example, not starting UPSTREAM as expected), you can use the **Event Viewer** in the Administrative Tools group to view the **Application** log to view any messages. Note that this is only for USTPSERV messages; FDR/UPSTREAM messages are stored in the UPSTREAM.LOG file.

If you are using TCP/IP and running FDR/UPSTREAM as a service you should specify in RMTPARM.DAT a **REMOTETIMEOUT** of **0**. By default, this parameter has a value of 1 to cause FDR/UPSTREAM to time out if it does not get a remotely initiated request within one minute (which is appropriate for SNA, as its attach manager will redrive the service when a new request comes in). To have FDR/UPSTREAM not timeout while waiting for remotely initiated requests change this value to 0.

### 5.15.7. Using a Service to Back up Network Drives

To use a Windows NT service to back up network drives (drives on another computer) you must:

- Define a user to Windows NT and give it authority to back up the network drive (see section 5.15.4.).
- Log in as that user and map the drive as permanent (using the File Manager, Network Neighborhood or NET USE commands).
- Perform all transaction program definitions using USTPCFG, test and verify their operations.

- Modify the **Startup**, **Service** settings in the **Control Panel** for the service you created in USTPCFG so that when started, it logs in using the account you have set up.

**Note that USTPCFG will reset the Log-On As to System Account each time it is run. Thus you will need to perform these modifications each time you run USTPCFG.**

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# 6 DOS

## 6.1. Overview

The installation process consists of four steps:

- Determining your system requirements
- Installing the software
- Configuring the communications software
- Configuring FDR/UPSTREAM

If you purchased or have available an APPC or TCP/IP already, then we recommend that you install, configure it, and make it operational before installing and configuring FDR/UPSTREAM.

### 6.1.1. Requirements

FDR/UPSTREAM DOS requires the following:

- An IBM AT, PS/2 or compatible
- A diskette or CD-ROM drive.
- 2 megabytes of free hard disk space. If you will be backing up large servers you may need up to 40 MB of free disk space.
- IBM, Microsoft or Novell DOS v3.3 or higher.
- Communications hardware compatible with your communications software.
- APPC software for an approved vendor, including IBM (APPC/PC or NS/DOS), NetSoft (AdaptAPPC), Eicon (Access APPC), or Novell (NetWare for SAA).

or

- TCP/IP software from an approved vendor including IBM and Novell.

# 6.2. Installing FDR/UPSTREAM

FDR/UPSTREAM includes a batch file to help you install it to your hard disk. But you don't have to use it if you don't want, as all the batch file does is create a directory for the FDR/UPSTREAM files, and copy the diskettes to a specified drive and directory. If you have any problems with the installation, just copy the files yourself. You can end the installation process at any prompt by pressing [ESC] or at any other time by pressing [CTRL][BREAK].

**NOTE: If you do not run the INSTALL program for a first time install, you will need to rename USSER to US.SER.**

**NOTE: To install ULTra workstation software, see the ULTra chapter.**

Updates should just be copied over the originals (though the installation program can be run as well).

### 6.2.1. Installation from Floppies

If you are installing from CD-ROM, proceed to the next section.

To run the installation batch file, place the FDR/UPSTREAM Program Diskette 1 in your floppy drive. Make that drive the default drive and run the INSTALL batch file. For example:

```
C:\> A:
A:\> INSTALL
```

A banner screen is displayed explaining the installation process. You are then asked:

```
Do you wish to install UPSTREAM now (Y or N): _
```

Press 'Y' followed by [ENTER] to install it now, or 'N' to now install FDR/UPSTREAM.

You are then asked for the destination path. Specify the drive and directory you wish UPSTREAM to be installed in. The default is C:\UPSTREAM.

```
Destination: C:\UPSTREAM
```

The installation program now creates the specified directory and copies the files on the diskette to that directory. You will then be asked to insert additional diskettes. When the files have been copied, you will be asked:

```
Will you be backing up a Banyan server (Y or N) : _
```

If you answer no then you proceed to the next step. If you answer yes, then FDR/UPSTREAM will perform the following file copies in the destination directory to save the non-Banyan version so that you can recover it at a later time. If you are performing the installation manually then enter:

- copy US.EXE USNOBAN.EXE
- copy USBAN.EXE US.EXE

You are next asked:

```
What is your host connection?
   A(PPC
   I(BM TCP/IP
   N(ovell TCP/IP
Select an option: _
```

If you connection to the host will be:

- Any SNA/APPC connection, enter 'A'.
- TCP/IP using IBM TCP/IP enter 'I'.

- TCP/IP using Novell's LAN Workplace, enter 'N'

The installation program will automatically copy:

- If you select APPC: SNA.BAT to U.BAT
- If you select IBM TCP/IP: IBMTCP.BAT to U.BAT
- If you select Novell TCP/IP: NWTCP.BAT to U.BAT

When the files have been copied the installation is complete. Note that to start UPSTREAM, you will run **U** rather than US; this will activate the communications software (APPC or TCP/IP), the UPSTREAM TCP/IP parent program (if required) and UPSTREAM in a single step.

Section 6.3. lists the files included on the FDR/UPSTREAM diskettes. Proceed to page 6-10 to begin the configuration of your communications environment.

### 6.2.2. Installation from CD-ROM

To run the installation program, insert the FDR/UPSTREAM CD in your CD-ROM drive. Make that drive the default drive and run the INSTALL program. For example:

```
C:\> D:
D:\> INSTALL
```

An installation screen is displayed:

```
                        FDR/UPSTREAM Installation

UPSTREAM Product (Choose one of the following): U
   U - FDR/UPSTREAM
   W - ULTra (FDR/UPSTREAM for workstations)

Operating System (Choose one of the following): D
   A - AIX        D - DOS
   N - NetWare    O - OS/2
   W - Windows 3.x, Windows 95 and Windows NT

Installation Source Drive (CDROM Drive):        F

Destination Drive:                              C

Destination Directory:                          UPSTREAM_________________

Press the Tab key to move from one field to the next.
Press the Enter key to proceed or the Esc key to exit the installation.
```

**Figure 6-1**
**CD-ROM Installation Screen**

In the installation screen, use the **TAB** key to move from field to field and the **ENTER** key when you are satisfied with the screen. For a DOS installation enter:

- ☐ **UPSTREAM Product:** Enter **U** for FDR/UPSTREAM
- ☐ **Operating System:** Enter **D** for DOS
- ☐ **Installation Source Drive:** Enter the drive letter that your CD-ROM is running on.

- ☐ **Destination Drive:** Enter the drive letter of where you wish to install UPSTREAM. Most users will enter **C**.
- ☐ **Destination Directory:** Enter the directory where you wish UPSTREAM installed. Most users will enter **UPSTREAM**.

Press the **ENTER** key to move to the next screen.

You will then be asked to enter your host connection. Select either:

- **A** - IBM Standard APPC. Select this if you are running IBM's APPC/PC, NetWare for SAA or a compatible product (not for NetSoft).
- **D** - NS/DOS CPIC. Select this if you are running IBM's Networking Services/DOS product.
- **I** - IBM TCP/IP. Select this if you are running IBM's TCP/IP for DOS/Windows product.
- **N** - Novell TCP/IP. Select this if you are running Novell LAN Workplace product.
- **S** - AdaptSNA APPC. Select this if you are running NetSoft's Adapt SNA product for DOS. Note that for AdaptSNA you will need a driver diskette available from Innovation or NetSoft.

The installation program will automatically copy:

- If you select APPC: SNA.BAT to U.BAT
- If you select IBM TCP/IP: IBMTCP.BAT to U.BAT
- If you select Novell TCP/IP: NWTCP.BAT to U.BAT

When the files have been copied the installation is complete. Note that to start UPSTREAM, you will run **U** rather than US; this will activate the communications software (APPC or TCP/IP), the UPSTREAM TCP/IP parent program (if required) and UPSTREAM in a single step.

On the CD-ROM, in the \UPSTREAM directory, there are 3 subdirectories relevant for DOS installations. If you are installing manually, copy the appropriate directory:

- **\DOSNSA** Use this directory if you are using NetSoft's AdaptAPPC. You will need a driver diskette from Innovation or NetSoft.
- **\DOSNSD** Use this directory if you are using IBM's Networking Services/DOS product, or any TCP/IP product.
- **\DOSSTD** Use this directory if you are using IBM's APPC/PC or compatible product.

Note that for a manual installation, you will need to rename USSER to US.SER and you will need to rename the appropriate .BAT file (SNA.BAT, IBMTCP.BAT or NWTCP.BAT) to U.BAT.

Section 6.3. lists the files included on the FDR/UPSTREAM diskettes. Proceed to page 6-10 to begin the configuration of your communications environment.

# 6.3. Files Included

FDR/UPSTREAM consists of several files. Each file name and it's purpose is outlined here.

- Table 6-1 describes the files on the FDR/UPSTREAM Install & Program 1 Diskette or is a partial list of files in the DOSNSA, DOSNSD, or DOSSTD directories in the UPSTREAM directory on the CD-ROM.
- Table 6-2 describes the files on the FDR/UPSTREAM Program 2 Diskette or is a partial list of files in the DOSNSA, DOSNSD, or DOSSTD directories in the UPSTREAM directory on the CD-ROM.
- Table 6-3 describes the files on the FDR/UPSTREAM Configuration Diskette is a partial list of files in the DOSNSA, DOSNSD, or DOSSTD directories in the UPSTREAM directory on the CD-ROM.
- Table 6-4 describes the files in the \SAMPLES directory of the FDR/UPSTREAM Configuration Diskette or CD-ROM.
- Table 6-5 describes the files on the NetWare Program Diskette or the \NETWARE directory on the CD-ROM.
- Table 6-6 describes the contents of the FDR/UPSTREAM ULTra DOS Workstation Diskette (available as a separate option).
- Table 6-7 describes the contents of the NetSoft AdaptAPPC Program Diskette (distributed under license from NetSoft).

| File Name | Description |
|---|---|
| APPC.BAT | (NS/DOS) Used to load NS/DOS before starting Windows. |
| APPCUNLD.BAT | (NS/DOS) Used to unload NS/DOS |
| CHARBAT.EXE | Installation batch file helper program. |
| CONFIG.NSD | (NS/DOS) Sample CONFIG.NSD to help get NS/DOS working. |
| DEFINETP.NSD | (NS/DOS) Sample DEFINETP.NSD to help get NS/DOS working. |
| DESTBAT.EXE | Installation batch file helper program. |
| INST2.BAT | Internal batch file used during installation. |
| INST3.BAT | Internal batch file used during installation. |
| INSTALL.BAT | FDR/UPSTREAM installation program. |
| MODE.NSD | (NS/DOS) Sample MODE.NSD to help get NS/DOS working. |
| SIDEINFO.NSD | (NS/DOS) Sample SIDEINFO.NSD program to help get NS/.DOS working. |

| File Name | Description |
|---|---|
| TRACE.EXE | (IBM APPC/PC) Activates/deactivates the install IBM APPC/PC trace. |
| US.EXE | FDR/UPSTREAM main program. Provides the main user interface, performs the communications including backups and restores, logs events, allows inquiries and many other features. Supports Novell LANs and ULTra. |
| US.RES | FDR/UPSTREAM resource file used to hold dialog and string definitions. Required for FDR/UPSTREAM operation. |
| WORKSPC.EXE | (IBM APPC/PC) Helps in calculating the workspace requirements for IBM APPC/PC. |

**Table 6-1**
**FDR/UPSTREAM Install & Program 1 Diskette Contents**

| File Name | Description |
|---|---|
| USMEM.EXE | Very low memory version of FDR/UPSTREAM.. |

**Table 6-2**
**FDR/UPSTREAM Program 2 Diskette Contents**

| File Name | Description |
|---|---|
| EXCLUDE.LST | A sample exclude list file. |
| IBMTCP.BAT | Batch file used to start the FDR/UPSTREAM IBM TCP/IP parent program and UPSTREAM in a single step. During installation, renamed to U.BAT. |
| IBMTCP.EXE | FDR/UPSTREAM TCP/IP parent program for processing IBM TCP/IP requests. Called automatically by U.BAT, which then calls US.EXE. |
| NWTCP.BAT | Batch file used to start the FDR/UPSTREAM Novell TCP/IP parent program and UPSTREAM in a single step. During installation, renamed to U.BAT. |
| NWTCP.EXE | FDR/UPSTREAM TCP/IP parent program for processing Novell TCP/IP requests. Called automatically by U.BAT, which then calls US.EXE. |
| RESET.EXE | NetBIOS adapter reset and open program. Used for NetBIOS ULTra. |
| RETCODE.EXE | Allows text descriptions of the extended program return code returned by FDR/UPSTREAM and resets the limited return code. |
| RMTPARM.DAT | Sample parameter file, used when the OS/2 attach manager starts FDR/UPSTREAM (when it is not already running). |

| File Name | Description |
|---|---|
| SERIAL.DAT | Required for modification of personalization information of FDR/UPSTREAM. |
| SETNOV.EXE | (Novell & ULTra only) FDR/UPSTREAM Novell security access specification and ULTra Profile specification program. Run this program to specify the Novell user names, servers, etc. you wish to attach to and/or the workstations to be included in an ULTra Profile. |
| SETNOV.RES | Resource file required by SETNOV.EXE |
| SNA.BAT | Batch file to load APPC and UPSTREAM in a single step. Renamed to U.BAT during installation. |
| UPSTREAM.MSG | The FDR/UPSTREAM predefined message file. This file contains many of the messages that are logged and displayed. You can modify this file to change the message text, or to change the way that it is handled (see section 11). |
| US.HLP | The FDR/UPSTREAM help file. This file contains the help text that you see when you press the help (F1) button. You can modify this file to customize the text for your installation or translate it into a foreign language (see section 12). |
| USCFG.EXE | FDR/UPSTREAM configurator. Use this program to specify communications parameters, system overall parameters and to set up unattended operations. |
| USCFG.HLP | FDR/UPSTREAM configurator help file. As for the FDR/UPSTREAM help file, this file contains the help information when you press the help (F1) button and is user modifiable. |
| USCFG.RES | Required resource file for USCFG.EXE |
| USLOAD.BAT | Loads communications, runs FDR/UPSTREAM, and unloads communications. Intended for use with USSTART for unattended operations. |
| USLOGCLR.EXE | FDR/UPSTREAM log and report maintenance program. The FDR/UPSTREAM logs and reports can grow indefinitely, so a program has been provided which will shrink it down, based on a specified number of days. |
| USMODIFY.EXE | Allows command line modification of a number of FDR/UPSTREAM parameter and configuration files. |
| USSER | The default personalization file. This file must be named US.SER in the UPSTREAM directory or the WORKPATH for UPSTREAM to run. |
| USSTART.EXE | FDR/UPSTREAM unattended operations program. This program operates as a terminate-and-stay-resident program. It waits for a specified time and then starts FDR/UPSTREAM. |

**Table 6-3**
**FDR/UPSTREAM Configuration Diskette Contents**

| File Name | Description |
|---|---|
| AUTOINST.BAT | Sample installation job for the FDR/UPSTREAM auto-update facility. |
| AUTOINST.DAT | Sample installation parameter file for the FDR/UPSTREAM auto-update facility. |

| File Name | Description |
|---|---|
| ULTINST.BAT | Sample installation job for the FDR/UPSTREAM ULTra auto-update facility. |
| ULTDOS.DAT | Sample parameter file for automatically updating FDR/UPSTREAM DOS ULTra machines. |
| ULTNT.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows NT ULTra machines. |
| ULTOS2.DAT | Sample parameter file for automatically updating FDR/UPSTREAM OS/2 ULTra machines. |
| ULTW95.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 95 machines. |
| ULTWIN.DAT | Sample parameter file for automatically updating FDR/UPSTREAM Windows 3.1 machines. |
| USATOE.TAB | Sample ASCII-to-EBCDIC conversion table. |
| USETOA.TAB | Sample EBCDIC-to-ASCII conversion table. |

**Table 6-4**
**FDR/UPSTREAM Samples Directory**

| File Name | Description |
|---|---|
| USLOGCLR.NLM | (NetWare Directory Services) Clears the USNDS.LOG file. See the Novell chapter for more information. |
| USNDS.NLM | (NetWare Directory Services) Provides access to NDS information for attached FDR/UPSTREAM workstations. See the Novell chapter for more information. |
| USSETUP.NLM | (NetWare Directory Services) Installs the required NLMs on a server. See the Novell chapter for more information. |

**Table 6-5**
**FDR/UPSTREAM NetWare Program Diskette**

| File Name | Description |
|---|---|
| INSTALL.BAT | Simple batch file to install the FDR/UPSTREAM ULTra version on a workstation. |
| LANCOPY.EXE | Allows PC-to-PC file copies and directory listings across the LAN to PCs which have ULTRA.EXE installed. |
| RESET.EXE | NetBIOS adapter reset and open program. Used for NetBIOS ULTra. |
| USIPX.EXE | Allows remote file access across a Novell IPX/SPX LAN. |

| File Name | Description |
|---|---|
| USLOGCLR.EXE | USIPX.LOG (or UPSTREAM.LOG) log maintenance (shrinking) program. |
| USNETB.EXE | Allows remote file access across a NetBIOS LAN. |

**Table 6-6**
**FDR/UPSTREAM ULTra Workstation Diskette Contents**

| File Name | Description |
|---|---|
| <Driver>.EXE | This is a device driver to support a particular device type. The disk you receive may have one or more files. Some examples include 8022.EXE for Token-Ring or Ethernet; SDLCL.EXE for IBM SDLC cards. You may also receive an autodialer program (NSAAT.EXE) for async or AutoSync links or coax microcode for IRMA 2 cards. If you have any questions about these programs call Innovation Data Processing or NetSoft. |
| APPC.BAT | Batch file to start AdaptAPPC. |
| APPCCFG.EXE | APPC configurator. This program allows you to set up SNA parameters to allow AdaptAPPC to operate. See later in this chapter for a description of the use of this program. |
| APPCUNLD.BAT | Batch file to unload AdaptAPPC. |
| MPX4X.EXE | APPC “emulator”. This program provides all the SNA and APPC functions required to allow APPC applications (such as FDR/UPSTREAM to operate). |
| NSACONF6.CFG | The default configuration file for AdaptAPPC for your link type. |
| NSAMGR.EXE | Interrupt arbiter, required to run all AdaptSNA products. |
| NSAUNLD.EXE | Unloads the AdaptAPPC software. You need to add the /p command line parameter to unload APPC. |
| READNAME.EXE | Allows you to inquire the version numbers of the various AdaptAPPC executables. |
| TRACE.EXE | Allows you to generate a link level trace of SNA line traffic. The APPC.BAT file has a call to this REM’ed out so you can see how to use it. It writes to a file called TRACE.LOG. |

**Table 6-7**
**NetSoft AdaptAPPC Diskette (802.2 example)**

# 6.4. Configuration Overview

Configuration of FDR/UPSTREAM to communicate to the host is very different depending upon whether you are running SNA/APPC or TCP/IP.

### 6.4.1. Configuring for TCP/IP

Once you have installed the TCP/IP software and tested the connectivity to the host (via a standard package such as FTP), you are immediately ready to proceed to the FDR/UPSTREAM configuration. Go to page 6-34 to perform this configuration.

**NOTE: The default FDR/UPSTREAM MVS TCP/IP port address is now 1972.**

### 6.4.2. Configuration Overview

The process of configuring FDR/UPSTREAM for APPC involves several issues:

- Configuring VTAM
- Configuring FDR/UPSTREAM MVS
- Configuring the APPC software
- Configuring FDR/UPSTREAM PC

Careful planning is essential in configuring SNA software. You should review the entire process before beginning and fill out the worksheets for each section or have the information available.

**If you are only configuring FDR/UPSTREAM for a workstation using the FDR/UPSTREAM ULTra facility, proceed to the ULTra chapter..**

# 6.5. Pre-PC Configuration Issues

### 6.5.1. Configuring Host Software

IBM Mainframes have three different types of devices which allow SNA communication to PCs: 3174 cluster controllers, 37xx front end processors and 3172s. PCs can also connect to gateways which talk to one of these three types of devices. Innovation Data Processing recommends that due to the performance requirements of FDR/UPSTREAM, you NOT use a gateway. Innovation Data Processing can help you obtain software which will allow you to connect directly to one of these devices. However, if you do not have a choice, FDR/UPSTREAM works with several types of gateways.

You should have your VTAM system's programmer configure the VTAM environment, or modify the existing environment if it is insufficient for FDR/UPSTREAM (i.e. a mode definition that doesn't support LU 6.2). Worksheet 6-1 should be filled out by this person or the information should be obtained from this person. An NCP regeneration is rarely required.

See the FDR/UPSTREAM MVS manual for suggestions on configuring VTAM.

**NOTE: The host mode entry determines values like RU size. The host APPL definition determines the pacing count. These settings have a significant affect on performance. We recommend that you define a mode entry that sets the RU size at 4096 or use USTMODE which is provided as a sample and a FDR/UPSTREAM APPL definition that sets pacing to 8.**

**NOTE: It is recommended that you use dependent LUs (non-zero LU Local Addresses) for UPSTREAM PCs. Independent LUs tend to be more difficult to configure and offer few benefits.**

| Name | Description | Your Value |
|---|---|---|
| SNA Network Name | The name of the SNA network to which you belong. This is optional in many environments. | |
| Partner LU Name | The APPLID of UPSTREAM on the host. Supplied sample: **UPSTREAM**. | |
| LU Number | The LU local address. Most users will use 2. | |
| Mode Name | The mode table entry name. The supplied sample: **USTMODE**. | |
| Receive Pacing Size | A number from 1 to 63 of the number of RUs to be received in succession before a low-level acknowledgment. NEVER use 0. We recommend 8 initially. | |
| Controller LAA (Token-Ring only) | The locally administered address of the 3174, 3172 or the 37xx front end. This is a 12 hex digit number usually starting with 4. | |
| PC LAA (Token-Ring only) | The locally administered address of the PC. This value must be unique on the ring and for 3174 connections, must be defined in the controller. | |
| LU Name (Independent LUs only) | The name of the PC LU to be used. Not required for users using a cluster controller or a dependent LU. | |
| IDBLK (37xx or 3172 only) | The 3 hex digit block number of the XID. Required to be 050 for APPC/PC. | |
| IDNUM (37xx or 3172 only) | The 5 hex digit number of the XID. | |

**Worksheet 6-1**
**VTAM definitions for a FDR/UPSTREAM PC**

### 6.5.2. Token-Ring Considerations

If you have access to a direct Token-Ring connection to the host, it is **strongly** recommended that you use it for FDR/UPSTREAM. You will need IBM's APPC/PC, IBM's Networking Services/DOS or NetSoft's AdaptSNA to do it, and some configuration on the host hardware. Innovation Data Processing can help you in obtaining this software.

If you are using a 37xx front end or a 3172, the configuration is entirely in VTAM. If you are using a 3174 controller, then you will need a device configuration for the PC. Worksheet 6-2 should be filled out by the host personnel who configures or maintains the 3174 cluster controller.

| Name | Description | Your Value |
|---|---|---|
| PC LAA | The locally administered address of the PC as known to the controller. You must modify the PC's CONFIG.SYS entry for DXMC0MOD.SYS to use this value for your PC. | |
| Transmit I-Frame Size | This is 9 bytes greater than the maximum RU size you can support. We recommend that this be 1033 or greater. | |
| SAP | Service Access Point. Should always be 4. | |

**Worksheet 6-2**
**3174-to-FDR/UPSTREAM PC Configuration**

**The IBM Local Area Network Support Program is required for all Token-Ring or direct (non-LAN gateway) Ethernet connections. This program comes with many IBM products including LAN server and NS/DOS or is available directly from IBM. This software includes the DXMA0MOD.SYS and DXMT0MOD.SYS device drivers. DXMT0MOD.SYS (NetBIOS) opens the token-ring card. If you are using DXMT0MOD.SYS (it is not required for UPSTREAM), specify the frame size with the DS= command to be 9 bytes larger than the RU size.**

**NOTE: There are two locally administered addresses used: the address of the controller and the address of the PC. You enter the address of the controller in the FDR/UPSTREAM configurator (or APPCCFG for AdaptSNA users). You enter the address of the PC in the cluster controller definition and in the PC's CONFIG.SYS on the DXMC0MOD.SYS device driver line or the PROTOCOL.INI file if you are using DXME0MOD.SYS.**

**NOTE: If you are using a Novell or Banyan LAN, you must use an LAN workstation driver generated to support the Local Area Network Support Program (TOKREUI). Do NOT use the standard Token-Ring driver.**

### 6.5.3. Novell Considerations

If you are using FDR/UPSTREAM on a DOS workstation connected to a Novell file server you should plan on using the ODI or VLM drivers (VLM is recommended). The older IPX/NETX drivers will not operate properly when FDR/UPSTREAM accesses some of the more sophisticated Novell facilities.

If you will be using an APPC which connects directly to a host device (3174, 37xx or 3172), you must use the LANSUP driver, not the TOKEN or OEM LAN vendor driver. APPCs which talk to the host must have the 802.2 interface available, and the other drivers will interfere with this access.

You must also modify your NET.CFG. You should have a block similar to the following in it:

```
LINK DRIVER LANSUP
   MAX FRAME SIZE 4208
   LINK STATIONS 6
   SAPS 2
```

The MAX FRAME SIZE command allows the best performance available on Token-Ring. Several APPCs require additional Link Stations and SAPs which are determined when the adapter is opened; since Novell is opening the adapter, these values must be defined here.

### 6.5.4. FDR/UPSTREAM MVS Issues

You will need to have installed FDR/UPSTREAM MVS before beginning the configuration of a FDR/UPSTREAM PC node. The FDR/UPSTREAM MVS configuration defines storage and security attributes to be used in storing backups. The configuration for each PC on FDR/UPSTREAM MVS, including backup profiles, security, etc. should be complete before beginning the PC configuration.

Worksheet 6-3 contains the information that you will need for FDR/UPSTREAM PC before you can begin testing. The automation chapter includes expanded worksheets to help you build your production environment.

| Name | Description | Your Value(s) |
|---|---|---|
| Backup Profile | An 8 character identifier used as a key for the storage of a group of backups. | |
| User ID & Password | The user ID and password required to access the requested backup profile (may not be required). | |
| Sequential Tape backups allowed | Whether sequential tape backups are permitted. You may also want to ask about migration procedures. | |
| Sequential Disk backups allowed | Whether sequential disk backups are permitted. You may also want to ask about migration procedures. | |

**Worksheet 6-3**
**FDR/UPSTREAM MVS Configuration for Testing**

See the FDR/UPSTREAM MVS manual for assistance on setting up a FDR/UPSTREAM PC user.

# 6.6. Configuring the APPC Software

This guide will walk you through the steps for configuring the APPC software for almost all FDR/UPSTREAM capable APPC environments. Even if you have configured APPC before, you should at least skim the section appropriate to you.

As most of the rest of this chapter is related to configuring software for other environments than yours, you will need to skip around a bit. Table 6-1 shows which section you should go to for configuring the APPC software, table 6-2 shows you which sections EVERYONE should read, as they involve configuration of FDR/UPSTREAM.

| Section | Page | Device | Vendor | Description |
|---|---|---|---|---|
| 6.7. | 6-17 | IBM SDLC or Token-ring cards | IBM (APPC/PC) | PCs using IBM SDLC or IBM Token-ring cards stand-alone or through an IBM OS/2 gateway who have IBM's APPC/PC. |
| 6.8. | 6-20 | IBM Token-ring, SDLC, Twinax, or coax cards. Ethernet or async. | IBM (NS/DOS) | PC's using IBM Token-ring, SDLC, coax or Twinax cards, Ethernet (through a 3172) or async (through an AS/400. You cannot go through a 3174 unless you have config support C installed and defined independent LUs. |
| 6.9. | 6-23 | Token-ring (and many others) | NetSoft | Use for direct connect 3174 or 37xx stand-alone users who have the AdaptSNA option. |
| 6.10. | 6-31 | Eicon cards | Eicon Technology | PCs using an Eicon card (either stand-alone or gateway). |

**Table 6-1**
**APPC Software Configuration Sections (Read one)**

| Section | Page | Name | Description |
|---|---|---|---|
| 6.11. | 6-34 | PC FDR/UPSTREAM Configuration | Describes how to configure FDR/UPSTREAM for operation with the SNA software. |

**Table 6-2**
**FDR/UPSTREAM Configuration (Required for all APPCs)**

# 6.7. IBM APPC/PC® Configuration

This section discusses configuration of IBM APPC/PC® using Token-Ring or SDLC as your SNA connection for FDR/UPSTREAM.

As for all configurations, you should first configure VTAM, the 3174 (if installed) and FDR/UPSTREAM, and have completed Worksheets 6-1 and 6-2.

You install APPC/PC by copying the diskette(s) to the FDR/UPSTREAM directory.

**APPC/PC requires a corrective service diskette or version 1.12. Innovation Data Processing may include this diskette in the shipment to you. If so, install APPC/PC and copy the contents of the corrective service diskette over the APPC/PC files.**

You will need to calculate a number to be used for the amount of workspace that APPC/PC will need for its operations. As this formula is quite complex, a program is provided to calculate this number. From the directory where you installed FDR/UPSTREAM, run:

```
C:\UPSTREAM> WORKSPC
```

In this program, you will enter your link type (‘S’ for SDLC or ‘T’ for Token-Ring), your largest pacing count (the default is 8), and your RU size (the default is 1024). It will calculate a 5 digit number, round it up and give you a 2 digit number to use as the workspace size in the APPC/PC configuration program. Note this value for later entry.

From the directory where you installed APPC/PC, enter the configuration program:

```
C:\UPSTREAM> APPCONF
```

The IBM banner is displayed on entry. Press [ENTER] to see the CONFIGURATION TASKS menu (see figure 6-2).

```
                    CONFIGURATION TASKS

Select the ID for one of these activities; press ENTER.

ID ACTIVITY

1  Define/Update System Parameters
2  Define/Update IBM Token Ring DLC Parameters
3  Define/Update SDLC DLC Parameters

Select ===>



                    F1=Help   F10=Quit
```

**Figure 6-2**
**APPC/PC Configuration Tasks Menu**

Enter 1 to go to the Define/Update System Parameters screen (see figure 6-3).

```
                    DEFINE/UPDATE SYSTEM PARAMETERS

Type in system parameters; press ENTER to save changes.

ITEM                          CHOICE          POSSIBLE CHOICES

Machine Type................  0000            0 - 9999
Machine Serial Number.......  0000000         7 alphanumeric uppercase char
Node ID.....................  00000           1 - 5 hex digits
Translation Table File Name.                  DOS filename
DOS Control Break...........  1               1 = Yes  2 = No
Workspace Size..............  035             18 - 400 Kbytes

                 F1=Help   F10=Quit   ENTER=Save
```

**Figure 6-3**
**APPC/PC Define/Update System Parameters**

The fields used by FDR/UPSTREAM include:

- **Node ID**: This is the IDNUM portion of the XID. The IDBLK portion is fixed at 050. Enter 5 hex digits. Not used for Token-Ring connections to 3174 cluster controllers.

- **Workspace Size**: Enter the value calculated in the WORKSPC program you ran earlier.

When you have completed modifications to this screen, press [ENTER] to save your changes and [F10] to return to the menu.

### 6.7.1. APPC/PC Token-Ring Configuration

From the Configuration Tasks menu, enter 2 for Token-Ring configuration (see Figure 6-4).

```
                    DEFINE/UPDATE IBM TOKEN RING DLC PARAMETERS

Type in IBM Token Ring DLC parameters; press ENTER to save changes.

ITEM                                CHOICE          POSSIBLE CHOICES

DLC Name......................... ITRN
Load Option...................... 1               1 = Yes  2 = No
% Incoming Calls................ 050             0 - 100
Congestion Tolerance............ 080             0 - 100
Receive Window Count............ 1               1 - 8
Send Window Count............... 2               1 - 8
Maximum Number of Link Stations.. 06              1 - 32
Local Node Address............... 000000000000    12 hex digits all 0's or
                                                  starting with 4,5,6, or 7
Maximum RU Size................. 0256            256 - 1920
Adapter Number.................. 0               0 = Primary  1 = Secondary
Free Unused Link................ 2               1 = Link Take-down
                                                  2 = No Link Take-down



                     F1=Help   F10=Quit   ENTER=Save
```

The parameters used by FDR/UPSTREAM include:

- **Load Option**: Always set to 1 for Yes (load Token-Ring support).
- **Maximum Number of Link Stations**: This number must be 6.
- **Maximum RU Size**: RU size is one of the most important performance tuning parameters for Token-Ring. We recommend an RU size of at least 1024. Remember that if you change this value, then you must change the VTAM and/or controller definitions, the workspace size and the FDR/UPSTREAM configuration minimum and maximum RU sizes to match.

When you have completed your changes, press [ENTER] to save them, [F10] to return to the main menu, and [F10] to save the changes to disk and leave the program.

You have now completed the SNA configuration. Proceed to section 6.11. (page 6-34) to configure FDR/UPSTREAM.

**Figure 6-4**
**APPC/PC Token-Ring Parameters**

# 6.8. IBM Networking Services/DOS® Configuration

This section discusses configuration of IBM's Networking Services/DOS (NS/DOS) using Token-ring as your SNA hardware for FDR/UPSTREAM. For information on configuring other hardware configurations, see the IBM Networking Services/DOS User's Guide and Reference (included with the product). It is recommended that you first read this section and only make the changes in the enclosed sample files that are required for your hardware configuration.

Be sure that you have all hardware installed and operational before attempting this configuration.

NS/DOS configuration requires use of a text editor (EDLIN, EDIT, BRIEF, SPF/PC, etc.) to modify its configuration files. Be sure that if you are using a word processor, that it is running in non-document mode (plain-text).

**Note: For correct operation of FDR/UPSTREAM with NS/DOS v1.0 you must have IBM Corrective Service Diskette #2 installed. Later versions may also require a Corrective Service Diskette. Contact Innovation Data Processing if you have problems getting this disk.**

### 6.8.1. Installing NS/DOS

NS/DOS includes the IBM Local Area Network Support Program and the IBM 3174 Workstation Communications Support Program as well as the NS/DOS program diskettes.

If you are using Token-Ring (or Ethernet through a 3172) you must have the Local Area Network Support Program installed first. You can determine if you already have it installed by checking your CONFIG.SYS and seeing if the device drivers DXMA0MOD.SYS and DXMC0MOD.SYS (or DXMG0MOD.SYS for Ethernet or DXME0MOD.SYS for IBM Adapter II cards) are loaded. If not, you need to install it. Be sure to regenerate (if necessary) any Novell or Banyan drivers which access the LAN card to support the LAN support program.

If you plan to use NS/DOS with coax, you must be sure to install the 3174 Workstation Peer Communication Support Program.

When you are ready to install NS/DOS, insert Diskette 1 in your floppy drive and run:

```
A:\> INSTALL
```

We recommend the following NS/DOS installation options:

- Program files only. These are all that are required for operation with FDR/UPSTREAM.
- You install NS/DOS on the C:\NSD directory (as suggested by the defaults).
- That you NOT have the program modify your AUTOEXEC.BAT. If you boot from a floppy or are short of environment space you may run into problems.

### 6.8.2. Modifying your AUTOEXEC.BAT

You should modify your AUTOEXEC.BAT to include the directory C:\NSD in your path statement (separated from other directories by a semicolon).

### 6.8.3. Copying the Sample NS/DOS Configuration Files

FDR/UPSTREAM includes sample files to help you through the configuration for Token-Ring. Copy the following files from the UPSTREAM directory to the NS/DOS directory (C:\UPSTREAM to C:\NSD):

- *.NSD
- APPC.BAT
- APPCUNLD.BAT

Change your default directory to the NS/DOS directory (CD\NSD) to modify the sample configuration files.

### 6.8.4. Modifying CONFIG.NSD

CONFIG.NSD defines and links SNA and physical addresses. The sample CONFIG.NSD is:

```
NSDC LAN                            // IBM Token Ring Adapter
NSDN NETWORK_NAME.LU_NAME,XID       // NetID.LUName of your LU,
                                    // Your 8 digit XID
TRLD UPSTREAM,PARTNER_TR_ADDRESS    // Link to LU and T/R address
```

Assuming the following parameters:

- SNA Network name: SNANET
- LU name: LOCALLU
- Partner LU name: UPSTREAM
- XID (IDBLK and IDNUM): 05D00001
- Partner Token-ring address: 400037450001

Your modified CONFIG.NSD would be:

```
NSDC LAN                            // IBM Token Ring Adapter
NSDN SNANET.LOCALLU,05D00001        // NetID.LUName of your LU,
                                    // Your 8 digit XID
TRLD UPSTREAM,400037450001          // Link to LU and token ring
                                       address
```

### 6.8.5. Other .NSD files

**SIDEINFO.NSD** is used to relate symbolic destination names to LU names, mode names and transaction programs. It is recommended that you use the same symbolic destination name as the partner LU name to avoid confusion. If you use the default partner LU name of UPSTREAM and the default mode name of USTMODE you do not need to modify this file. The transaction program name must be UPSTREAM (all upper case).

**MODE.NSD** defines performance enhancing parameters. You only have to modify this file if you wish to not use the default mode name (USTMODE), change the RU size, receive pacing, or whether you will be a contention winner or loser session. Note that if you change the RU size to increase performance you will need to add commands to your CONFIG.NSD:

- A TRMF command to increase the frame size (we recommend TRMF 4216 to allow a 4096 byte RU size).

- A NSDS command to increase the internal workspace size (we recommend starting with the maximum which is 64 and working downwards).

It is not recommended that you modify **DEFINETP.NSD** at this time.

APPC.BAT starts NS/DOS so that FDR/UPSTREAM can run. It activates the link, and connects to the defined partner LU using the defined mode name with a single session. If you are using the default partner LU (UPSTREAM) and the default mode name (USTMODE), you do not need to change this file.

It is not necessary to modify APPCUNLD.BAT.

You have now completed the SNA configuration. Change back to the FDR/UPSTREAM directory (CD\UPSTREAM) and proceed to section 6.11. (page 3-34) to configure FDR/UPSTREAM.

# 6.9. AdaptSNA Token-ring (802.2) Configuration

This section discusses configuration of AdaptSNA using Token-ring as your SNA hardware for FDR/UPSTREAM.

NetSoft AdaptSNA supports an almost limitless list of host connectivity options including Token-Ring, SDLC, coax, AutoSync, Async, and more. If you are using AdaptSNA for some other type of connection, read this section and then see page 6-28 for SDLC issues, page 6-29 for coax issues, and page 6-30 for AutoSync issues. Be sure that you have all hardware installed and operational before attempting this configuration.

You must run the AdaptSNA configurator to configure the APPC software for communications. To run this program go to the drive and directory where the AdaptSNA software was loaded (usually C:\UPSTREAM) and run:

```
C:\UPSTREAM>APPCCFG
```

You will see figure 6-. Most users will press **[ENTER]** to use the default file name.

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30
                          READ CONFIGURATION FILE


Use current parameter values from 'NSACONF6.CFG'?          YES   NO









(Make choice with arrow keys - then hit RETURN)

  ESC = Quit without saving changes
```

**Figure 6-5**
**NetSoft - Configuration File Name**

The next screen is acceptance of the link type specified in the file (see figure 6-7). Most users will press **[ENTER]** to proceed to the next screen.

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30

                              PHYSICAL LINK


Current physical link is 802.2
Do you want to change it? YES   NO









(Make choice with arrow keys - then hit RETURN)

  ESC = Quit without saving changes
```

The first entry screen that you enter is the PU (Physical Unit) Main Menu. Here you specify hardware specific fields (see figure 6-6).

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30                 802.2

                              PU MAIN MENU


LOCAL PU ADDRESS (SSAP) :        [04]              (Multiples of 04 only)
DEST ADAPTER NODE ADDR(LOCADD) : 400000000000      (Non zero only)
STATION ID (IDNUM) :             00000             (Range 00000 thru FFFFF)
DEVICE TYPE (IDBLK) :            050               (Range 000 thru FFF)
REMOTE DEVICE (PEER):            NO   YES
                                 NO   YES
                                 NO   YES
                                 
```

This is a 12 digit hex number beginning with a 4 for a LAA, and 1 for a UAA; the default is 400000000000 (many sites code a single cluster controller as 400000003174).

- **STATION ID (IDNUM):** The IDNUM segment of the XID. This is a 5 digit hex number; the default is 00000. Not used for cluster controller connections.

- **DEVICE TYPE (IDBLK):** The IDBLK segment of the XID. This is a 3 digit hex number; the default is 050. Not used for cluster controller connections.

- **REMOTE DEVICE (PEER):** You change this value by using the cursor keys. YES is usually used for independent LUs, NO is usually used for dependent LUs (which include connections through cluster controllers). The default is **NO**.

When you are finished with this screen, press the **F2** key to go to the Logical Unit Assignment Menu (figure 6-8).

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30                  302.2

                        LOGICAL UNIT ASSIGNMENT MENU

LU TYPE:                          6.2
LU ADDRESS (01 thru FF):          [01]
CONTROL INFORMATION CODE SET:     EBCDIC  ASCII
LOCAL LU NAME:
REMOTE (PARTNER) LU NAME:
MODE NAME:
USER DATA:
RECEIVE PACING_SIZE:              1  2  3  4  5  6  7  8  9  10
ACTION:                           INITIATE   ACCEPT

EMULATOR LOADED AS:               TRANSIENT   RESIDENT(TSR)
PROGRAM CONTROL:                  YES



  F1 = PU Main Menu                       F8 = Miscellaneous Configuration
  F2 = Logical Unit Assignment Menu       F9 = Save changes in Config. File
                                          F10= Hardware Configuration
  ESC = Quit without saving changes
```

**Figure 6-8**
**NetSoft - LU Assignment Menu**

Many of the fields in the Logical Unit Assignment Menu are not used. The fields that are used include:

- **LU ADDRESS (01 thru FF):** This is a hex value indicating the LU Local Address. You enter 00 for independent LUs, 01..FF for dependent LUs. The default is 01. Many sites use 02.

- **RECEIVE PACING_SIZE:** The partner's send pacing count. It is usually best for Token-ring to leave this value as large as possible (10) for best performance. The default is **10**.

- **ACTION**: You can specify that either the PC sends the BIND (INITIATE) or waits for the remote system to send the BIND (ACCEPT) by using the cursor keys. Most PC environments work best with INITIATE. The default is **INITIATE**.

- **EMULATOR LOADED AS:** The "as-delivered" batch files assume that the emulator is loaded TSR (RESIDENT). FDR/UPSTREAM can operate in either mode by merely customizing the startup batch files. The default is **RESIDENT (TSR)**.

When you are finished with this screen press **F8** to go to the Miscellaneous Configuration screen (see figure 6-9).

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30                  302.2

                         MISCELLANEOUS CONFIGURATION


ACTIVATE LINK TIMEOUT (in hex. seconds)  3020     (Range is 0 thru E38)

APPC VERB DEAD-MAN TIMER (in hex mins)   3000     (Range is 0 thru 3C)
DUMP KEY :                              NONE  ALT+BACKSPACE  ALT+TAB




  F1 = PU Main Menu                       F8 = Miscellaneous Configuration
  F2 = Logical Unit Assignment Menu       F9 = Save changes in Config. File
                                          F10= Hardware Configuration
  ESC = Quit without saving changes
```

**Figure 6-9**
**NetSoft - Miscellaneous Configuration**

Only the two timers are used in regular operations:

- **ACTIVATE LINK TIMEOUT (in hex seconds):** Specify the number of seconds (in hex), between when the link attempts to start and when it is given up. Note that the user loses control during this interval, so do not specify too large of a value. 0 indicates never time out. The default is **20** (32 seconds). You can specify smaller values (no lower than 10 decimal)with advanced FDR/UPSTREAM features to allow infinite retries while still allowing control to abort.

- **APPC VERB DEAD MAN TIMER (in hex mins):** Specify the number of minutes (in hex), when APPC will assume that the remote system or application is no longer functioning when the remote does not send anything or respond. 0 indicates that this will be ignored. The default is **0**.

When you are completed with this screen press **F10** for the HARDWARE CONFIGURATION screen (figure 6-11).

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30                 802.2

                          HARDWARE CONFIGURATION

IBM TOKEN RING ADAPTER :      Primary   Secondary


  F1 = PU Main Menu                       F8 = Miscellaneous Configuration
  F2 = Logical Unit Assignment Menu       F9 = Save changes in Config. File
                                          F10= Hardware Configuration
  ESC = Quit without saving changes
```

This screen allows you to specify adapter specific information:

- **IBM TOKEN RING ADAPTER:** Use the cursor keys to specify either **PRIMARY** (default) or secondary Token-ring adapter.

This is the last screen for parameters. Press **F9** to save the parameters you have specified (see figure 6-10).

```
                    AdaptSNA LU6.2/APPC CONFIGURATOR 4.30                 SDLC

                     SAVE CHANGES IN CONFIGURATION FILE

Use default file name(s)?     YES   NO

Default file name:  NSACONF6.CFG


(Make choice with arrow keys - then hit RETURN)

  ESC = Quit without saving changes
```

**Figure 6-10**
**NetSoft - Save Changes**

Press **[ENTER]** to save your changed parameters to the default file. Press [ESC] to leave the program without saving your changes.

**Figure 6-11**
**NetSoft - Hardware Configuration**

You have now completed the SNA configuration. Proceed to section 6.11. (page 3-34) to configure FDR/UPSTREAM.

### 6.9.1. Performance

You can dramatically increase the performance of AdaptSNA with 802.2 or coax connections by increasing the RU size. The RU size is determined when the device driver is loaded (8022I.EXE, COAXJ.EXE, etc.).

Increase this size by adding the following parameters to the command line of the device driver:

```
<driver name> tx_maxdata=<RU size + 9> rx_maxdata=<RU size + 9>
```

You must add 9 bytes to allow for the RH and TH in the frame.

Acceptable values are: 265, 521, 1033 and 1929. In most cases you should use 1929 once you have verified the connectivity.

An example APPC.BAT file for an 802.2 connection would be:

```
NSAMGR 80
rem TRACE /c
8022i tx_maxdata=1929 rx_maxdata=1929
APPCTP
MPX4X
```

When increasing the RU size in a Novell Token-Ring environment, verify that you have specified a MAX FRAME SIZE in your NET.CFG which is larger than the RU size specified to AdaptSNA.

### 6.9.2. SDLC Connection Issues

If you are using an SDLC card, the following table lists the adapters supported and the default base I/O addresses and interrupt numbers configured in the hardware configuration screen (F10).

| NetSoft Hardware Code | Board Name/Vendor | Default Base I/O Address | Default Interrupt Level |
|---|---|---|---|
| A | AST CC-432 | 300 | 3 |
| B | ABM PS-UC1A/US2A | 300 | 3 |
| C | NetSoft AdaptModem | 300 | 3 |
| E | Fortelink or IRMACOM II SDLC card | 380 | 3 |
| F | Frontier adCOM 2-M | 300 | 3 |
| H | Pathway pcPATH Adapter | 300 | 3 |
| I | IBM SDLC Adapter | 380 | 3 |
| K | IRMACom | 380 | 3 |

| NetSoft Hardware Code | Board Name/Vendor | Default Base I/O Address | Default Interrupt Level |
|---|---|---|---|
| L | IBM Multiprotocol Adapter (SDLC for PS/2s) and IBM SDLC Adapter (full duplex) | 380 | 3 |
| M | Emulex/Persyst MCP or MPC 2 | 300 | 3 |
| N | Intelligent Technologies 330 Adapter Board | 300 | 3 |
| P | NetSoft AdaptCOM | 300 | 3 |
| Q | Barr/HASP Sync adapter board | 280 | 2 |
| S | SSI PC/5251 Adapter card | 300 | 3 |
| T | TECHLAND BLUELYNX remote circuit board | 300 | 3 |
| W | WANG PC multiport communications controller | 300 | 3 |

**SDLC Cards**

### 6.9.3. Coax Connection Issues

Coax cards allow PCs to connect coaxially to IBM 3174, 3274, or compatible cluster controllers for host connectivity. To use APPC coaxially, your controller must support DFT (distributed function terminal). All 3174s do support DFT inherently, and most 3274s as well. Even if you are using terminal emulation in CUT mode, you can probably use FDR/UPSTREAM in DFT mode.

**NOTE: FDR/UPSTREAM can only operate using SNA controllers. If you have problems getting APPC to run, verify with your system administrator that you are using a SNA controller.**

**NOTE: Several board types (notably IRMA 2 & 3 boards and PCOX boards) require microcode be loaded before use. IBM and several other cards do not require microcode.**

All hardware should be installed and connections tested with a DFT terminal emulator package before beginning FDR/UPSTREAM configuration.

The logical unit configuration screen in APPCCFG displays a port assignment instead of a LU Local Address. DFT coax allows up to 5 “terminals” on each coax connection. Here you specify whether you wish to use the primary definition or one of the secondary definitions. Usually you will use the primary definition. The default is primary.

There is no physical unit configuration screen.

The following table lists the adapters supported and the default base I/O addresses and interrupt numbers configured in the hardware configuration screen (F10).

| NetSoft Hardware Code | Board Name/Vendor | Default Base I/O Address | Default Interrupt Level |
|---|---|---|---|
| J | IBM 3278/79 Adapter<br>IBM 3270 Connection<br>Attachmate 3-N-1<br>IRMA 3 (IBM microcode) | 02D0 | 2 |
| O | Forte PJ coax adapter<br>IRMA 2 coax adapter | 0280 | 2 |
| R | IRMA 1 with IRMAX PROM | 0220 | 2 |
| U | CXI M1B | 0220 | 2 |
| V | AdaptCoax<br>PCOX (CXI) BASE | 0220 | 0 |

**Coax cards**

### 6.9.4. AutoSync Connection Issues

AutoSync® allows you to use a Hayes modem in a synchronous mode using a standard PC async (COM) port. Using a COM port on the PC, you can connect to any synchronous modems on a mainframe which support compatible standards. The following table shows a sample of the different configuration of PC and mainframe modems possible.

| PC Modem | Mainframe Modem |
|---|---|
| Hayes 2400 internal<br>Hayes 2400 (V-series)<br>Hayes 2400 external (serial #not beginning with A) | Hayes modem (2400 baud or greater)<br>Any modem supporting V.22 bis |
| Hayes 9600<br>Hayes 9600 (V-series)<br>Hayes Ultra 9600 | Hayes modem (2400 baud or greater)<br>Any modem supporting V.22 bis<br>Any modem supporting V.32. (except for AT&T 2296) |

**Hayes AutoSync® with FDR/UPSTREAM**

Baud rate between the PC and the modem must be specified. You must also specify a base I/O address and interrupt level. Use a base I/O address of 03f0 and interrupt 4 for COM1, and base I/O address of 04f0 and interrupt 3 for COM2.

# 6.10. Eicon Configuration

Eicon Technology offers very high performance SDLC, X.25 and Token-ring SNA connectivity with 3270 emulation and APPC services. This guide will discuss configuring FDR/UPSTREAM using EICON's APPC services

FDR/UPSTREAM will operate using the new EICON SNA Gateway and the older Access products. In both cases you will need to purchase the APPC option which allows IBM APPC/PC emulation.

EICON software works in both a LAN gateway and stand-alone mode. The configuration is similar for both.

You must have the EICON card installed and operational with SNA or X.25 before beginning configuration of FDR/UPSTREAM.

The EICON configuration for the APPC services that FDR/UPSTREAM requires consists of three steps:

- Configure the card. This part of the EICON configuration defines the parameters which relate to hardware definitions and protocols to load. You perform this configuration for each card only once and only on the gateway machine. See section 6.10.1.
- Configure the link (PU). Here you define the SDLC, X.25 or Token-ring parameters needed to run the communications link. You perform this configuration for each physical unit and only on the gateway machine. See section 6.10.2.
- Configure APPC. Define APPC specific parameters. You perform this configuration on each workstation. See section 6.10.3.

### 6.10.1. Configure the card

Go to the EICON subdirectory on the machine where the EICON card is installed and run:

```
C:> ECCFG
```

Press F4 to go through the screens you have configured until you get to the SW Configuration screen. Here you must be sure that you protocol stack reads (for SDLC):

```
SDLC
SNA
APPC
```

For X.25:

```
HDLC
X.25
SNA
APPC
```

For Token-ring:

```
TIC
SNA
APPC
```

Press F4 until you get to the SNA Configuration screen. Here you should check to be sure that you have allocated enough Logical Units (LUs). Each FDR/UPSTREAM PC needs a Logical Unit for APPC. You may also choose to allocate a separate Physical Unit (PU) for APPC.

Press F4 to go to the APPC Configuration. The number of APPC buffers is determined by the following formula:

```
APPC Buffers = Number of Sessions x ((2 x Maximum Pacing Window)
+ 16)
```

FDR/UPSTREAM uses one session per workstation. Thus for a stand-alone PC with a pacing window of 8, you would allocate 32 buffers (1 x ((2 x 8) + 16).

FDR/UPSTREAM uses one partner LU, one mode, one conversation and one transaction program for each workstation. Thus if you have a LAN gateway with 5 workstations, each of the following fields must be at least 5.

- Maximum Number of Remote (Partner) Logical Units
- Maximum Number of Mode Entries
- Maximum Number of Conversations
- Maximum Number of Transaction Programs

After you have completed the configuration press F1 to save your changed configuration and F10 followed by F1 to quit.

### 6.10.2. Configure the link (PU)

Go to the EICON subdirectory on the machine where the EICON card is installed and run:

```
C:> SNA CONFIG
```

You can use an existing physical unit by using the cursor keys to select the physical unit to modify and pressing F3. You can also create a new physical unit by pressing F2.

On the first screen you enter you need to be sure that you have enough logical units for APPC in the Maximum Number of Logical Units field.

You will also need to define some of the logical units as APPC logical units. If the logical units you wish to assign are numbered from 02 to 33 (decimal), then move the cursor to the logical unit number and use the space bar to select their value as O for Other. If the logical unit you wish to modify is not in the above range, press the F4 key to move to one of the two screens which follow this one allowing you to specify logical units numbers up to 254. Note that 01 is on the SECOND of the three screens.

Press F4 again. If you will be using independent logical units make sure this value is Y. If you are unsure, make this value Y.

When you are finished, press F1 to save your changes and then F10 followed by F1 to quit.

### 6.10.3. Configure APPC

Go to the EICON subdirectory on each workstation and run:

```
C:> IBMAPPCF
```

The meanings of the fields are:

- SDLC Local Address: Enter your LU local address as two hex digits. Specify 01..FE for dependent LUs; specify 00.
- IDBLK,IDNUM values to be used in XID frames: Specify the entire XID as 8 hex digits.
- Line Type: Specify 0 if you are using a leased line; specify 1 if you are using this line as remotely dialed or controlled; specify 2 if your computer or the gateway is dialing or controlling the line.
- Station Role: Determines the type of XID sent, and which side will control the polling. Use 0 for dependent LU host connections; use 2 for independent LU connections. 1 is rarely used for FDR/UPSTREAM.

When you have completed entering these parameters, press F1 to save and then F10 followed by F1 to exit.

Innovation Data Processing does not distribute EICON Technology's software. Therefore, there is not a batch file preconfigured to load EICON's APPC. We recommend that you create one and name it APPC.BAT. For gateway's and stand-alone machines, this file would look like:

```
Echo Start APPC for EICON gateway and stand-alone machines.
NABIOS
ECLOAD
REM The following line is for Token-Ring connections.
REM TICDLC START
SNA START [PUName]
IBMAPPC
```

**Example APPC.BAT for EICON SDLC Gateway and Stand-Alone**

For LAN workstations, the APPC.BAT file would look like:

```
Echo Start APPC for EICON LAN workstations.
NABIOS [SPX] RDR UserName
ECUSE Gateway Password
IBMAPPC
```

**Example APPC.BAT for EICON SDLC Gateway and Stand-Alone**

You have now completed the SNA configuration. Proceed to section 6.11. (page 3-34) to configure FDR/UP-STREAM.

# 6.11. PC FDR/UPSTREAM Configuration

This section guides you in configuring FDR/UPSTREAM for your environment. Before using this section, you must have completed the SNA configuration (see one of the previous sections).

FDR/UPSTREAM PC uses a character based SAA compatible interface. If you have used Microsoft Windows® you will be familiar with this interface. There are several different modes you can be in:

- A dialog: A dialog box is a box inside the main screen where you may be able to enter values, and always contains one or more buttons. Move from field to field with the TAB key or by selecting the field with a mouse. Leave the screen by pressing one of the buttons (by moving the cursor to the button and pressing the space bar, or by double clicking the mouse on the button), or by pressing [ESC] (which is like moving to the CANCEL button and pressing it).
- The full screen: You get access to FDR/UPSTREAM functions by pressing the [ALT] key in conjunction with the first letter of one of the menu items at the top of the screen. This will pull down one of the menus and allow you to move the cursor with the cursor keys to the function you wish to perform; you [ENTER] to perform that function. You can also select a menu item by clicking the mouse on the menu. Finally, there are keyboard “accelerators” for many of the menu items. When you pull down the menu you can see what they are. You can access a function by just pressing the accelerator combination (like [CTRL]B for backup).

In most places in the program, you can get help about a field or a button by pressing the F1 (help) key. This provides context sensitive help about the field or button. If you need additional help, press the INDEX button to get access to helps about other fields or general subjects.

To abort what you are doing in a dialog, press the ESC key. To leave FDR/UPSTREAM from the full screen, pull down the File menu and select Exit, or press the [ALT]X accelerator.

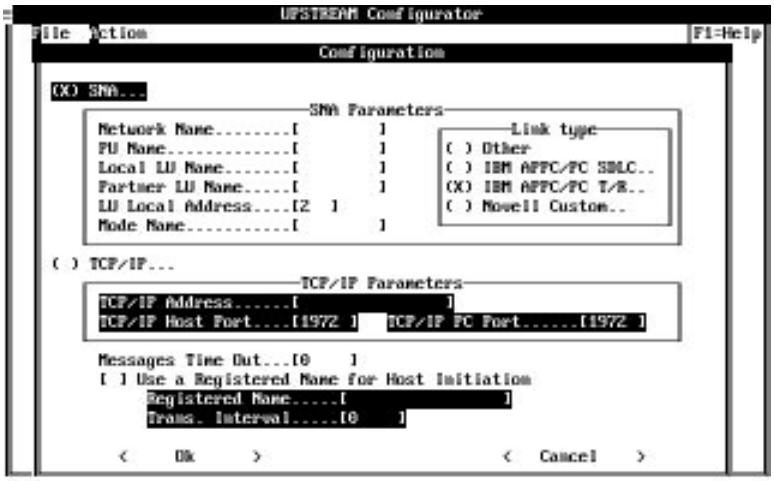
If you feel confused with all these options, don’t worry. It works easier than it sounds - and you’ve probably seen it (or will soon). The beginning of this section will walk you slowly through the first screens so that you can get the feel of the interface.

To enter the FDR/UPSTREAM configurator, go to the UPSTREAM directory and run:

```
C:\UPSTREAM> USCFG
```

If this is the first time you’ve run the configurator, you will see an error message saying “No such file or directory”. This means that when FDR/UPSTREAM searched for the default configuration file it could not find it. Press the space bar to continue.

Figure 6-12 shows the Configuration screen. Here you enter the SNA parameters that are required by most SNA’s.




This screen is a dialog and it contains three types of entry fields:

- Radio buttons: These fields are X's or blanks surrounded by parentheses. You can only select one of these options. You do this by using the up or down arrow keys.
- Text entry: These fields are delimited with square brackets ([text]). You enter the appropriate text in these fields. You can use the TAB key or the up and down arrows to move between these fields. You can use the left or right arrows to edit the characters in the field. The INSERT key toggles between insert and overstrike modes.
- Push buttons: These are options which allow you to leave this dialog. You move between the fields with the TAB key, and select an option by pressing the SPACE bar. You can also directly press the button by pressing the ALT key and the first letter of the option; for example, to press the <Ok> button, press [ALT]O.

If you are using SNA to connect to the host, press the **SNA...** radio button and see the following section. If you are using TCP/IP press the **TCP/IP...** radio button and goto page 6-38.

Note that when you press the SNA... radio button the TCP/IP parameter fields are grayed and become unavailable; when you press the TCP/IP... radio button the SNA parameter fields are grayed and become unavailable.

### 6.11.1. Configuring for a SNA Host Connection

☐ **Network Name:** Specify up to 8 characters indicating the SNA network that this LU belongs to. This is rarely needed and can be left blank. The default is blank.

☐ **PU Name:** Specify up to 8 characters indicating the physical unit name as assigned by your network administrator. For many APPC implementations, this is not a required parameter. The default is blank.

☐ **Local LU Name:** Specify up to 8 characters indicating the logical unit name as assigned by your network administrator. Required for PU 2.1 connections, not used for all others.

- **Partner LU Name:** Specify up to 8 characters indicating the mainframe logical unit name as assigned by your mainframe administrator. This is usually the application name and is always required. The default on the mainframe is UPSTREAM.

- **LU Local Address:** Specify a number from 0 to 255 (decimal) indicating the logical unit local address as assigned by your network administrator. A value of 0 indicates independent logical units. Several APPC vendors use this value to mean different things. In some environments this value is not used (NS/DOS doesn't use it at all and AdaptSNA does not use FDR/UPSTREAM's LU Local Address), and in some environments a value of 255 means to take a LU from a pool. See your APPC manual for more information. The default is 2.

- **Mode Name:** Specify up to 8 characters indicating the Mode Name as assigned by your network administrator. This is always required. The default is **#INTER**; many users may also use **USTMODE**.

  From the Mode Name field you can press the TAB key to move to the link type field. You use the arrow keys to select a radio button (which is indicated by an X in parens).

- **Link Type:** Select Other in all cases except when you are using IBM's APPC/PC® or a Novell gateway. Select Novell Custom only if you are connecting to a non-PC device which is running NetWare for SAA (like a BusTech 3172 controller). Press the TAB key to move to the push buttons.

  If you are satisfied with these parameters, press the SPACE bar when the **<Ok>** button is highlighted (or the ENTER key from any field). If you are not and do not want to save what you have done, press the <Cancel> button or the ESC key in which case you will be asked if you wish to abandon your changes.

  If you pressed the <Ok> button and you selected IBM APPC/PC SDLC you will see the screen in figure 6-13.

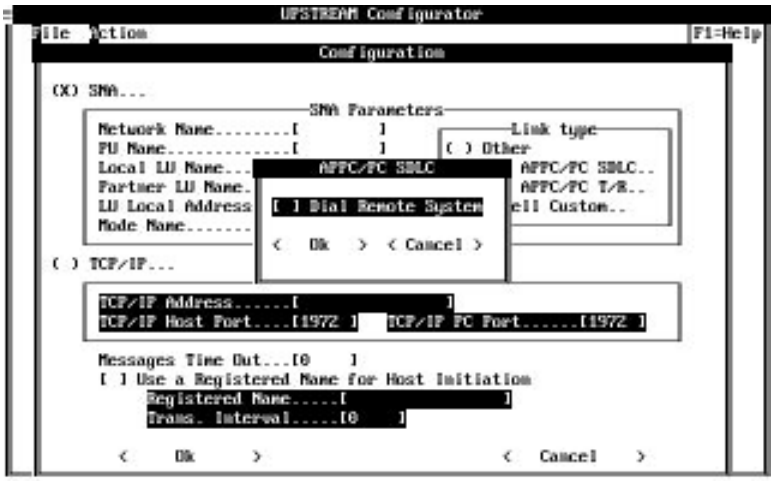
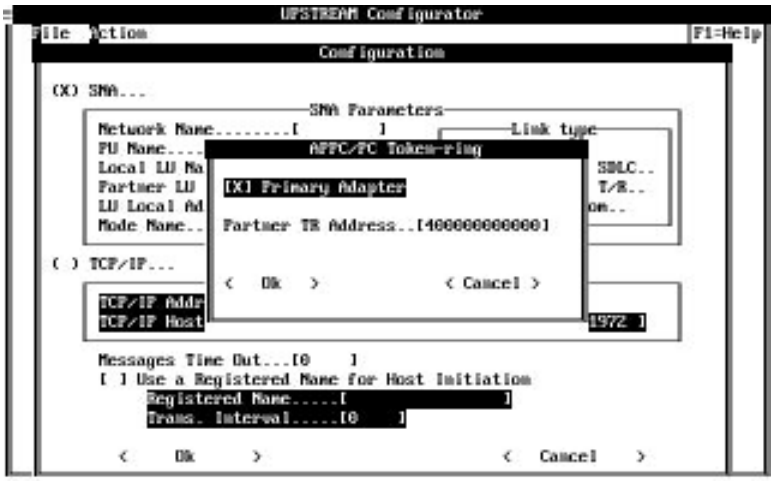



**Figure 6-13**
**DOS SDLC Configuration**

  This screen consists of a single check box. You toggle a check box with the space bar.

- **Dial Remote System:** Check the box if you are using a switched link (dial) where you want to be prompted to dial the telephone. Otherwise, do not check the box. The default is not checked.

  If you selected APPC/PC® Token-ring, you will see figure 6-14.




This dialog consists of a check box and a text edit.

- **Primary Adapter:** This is a check box. You toggle the box with the space bar and it is selected if there is an X between square brackets ([X]). Press this button if you are using the primary Token-ring adapter in your computer or you only have one adapter. Do not press this button if you are using the secondary adapter.

- **Partner TR Address:** Specify the 12 hex digit locally administered address (LAA), usually beginning with a 4, of the 3174 cluster controller, 37xx front-end processor or 3172. Common values are 400031740000 or 400037450000.

  If you selected Novell Custom (again only select this value for non-PC NetWare for SAA devices like a Bus-Tech 3172 controller), then you will see figure 6-15.

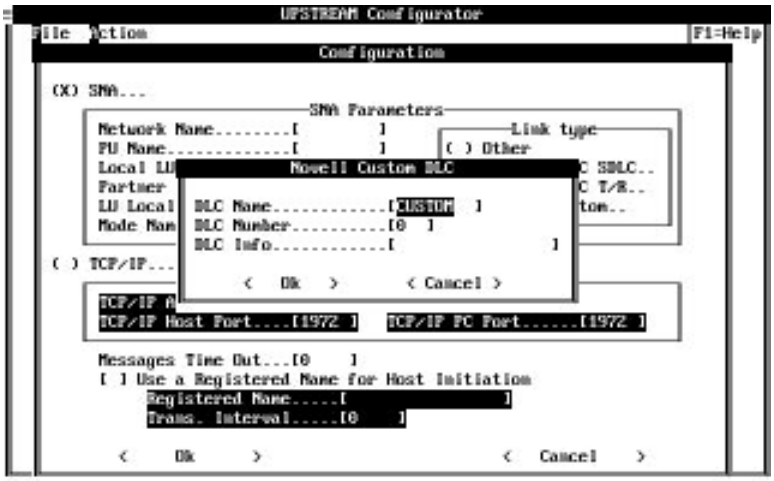



**Figure 6-15**
**DOS Custom Configuration**

The fields are:

- **DLC Name:** This is almost always CUSTOM **indicating** that it is a nonstandard NetWare for SAA configuration.

- **DLC Number:** Enter a number from 0 to 255 indicating which adapter on the NetWare for SAA device you will be using. The default is 0.

- **DLC Info:** Enter any additional information required to address the device. This is typically a channel or other identifier. This is usually required.

When you have completed the configuration dialog and press the **<Ok>** button goto page 6-38 to complete your configuration.

### 6.11.2. TCP/IP Configuration

The following are the TCP/IP specific parameters:

- **TCP/IP Address:** Enter the IP address of the host adapter that you will be connecting to. Enter the doted decimal notation. For example: 130.50.75.1. This field is required and there is no default.

- **TCP/IP Host Port:** Enter the IP port that FDR/UPSTREAM MVS was installed onto. Enter a decimal number. This field is required; in most cases you can accept the default of **1972**.

- **TCP/IP PC Port:** Enter a IP port that FDR/UPSTREAM on other computers can use to contact your PC. This field is optional; in most cases you can accept the default of **1972**.

When you have completed entering the TCP/IP specific parameters proceed to the next section to complete your configuration.

### 6.11.3. Completing your Configuration

There is one field common to both connectivity types on this dialog:

- **Messages Time Out:** FDR/UPSTREAM error messages should be configured in a production (unattended) mode to go away automatically after a given amount of time, or not be displayed at all. The default of 0 is what you should use at first (messages stay on the screen until you press the space bar). When you are in production or performance testing, specify a number for the number of seconds messages should be displayed. We recommend a value of 3 (seconds). -1 causes messages to not be displayed at all.

- **Use a Registered Name for Host Initiation:** Check this box if you wish to register a name with FDR/UPSTREAM MVS that host and other workstation/server requests can use to find your workstation. You must register a unique name to use the FDR/UPSTREAM auto-update facility. Note that checking this box may cause occasional errors (which can be ignored) if the workstation/server is updating its registration information when a remote request is received. You must enter a Registered Name if you check this box. The default is checked.

- **Registered Name:** Enter any name, unique within FDR/UPSTREAM MVS, that can be used to allow the host and other PCs to find your workstation. You can enter up to 16 characters which can include embedded spaces. Note that if there are duplicate names no errors are reported; the most recently registered name is used.

- **Transmission Interval:** Enter a number which indicates how often (in minutes) you will reregister your registration name with FDR/UPSTREAM MVS. Most users will use the default of **0**, which causes the registration to hap-

pen just once on UPSTREAM startup. The main reason to specify a non-zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change.

When you pressed the **<Ok>** button, you will be asked for the file name to save these parameters to (see figure 6-16).

**Figure 6-16**
**DOS Save Configuration Parameters**

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is UPSTREAM.CFG, but you can use any file name and any directory. If the file and path is too large for the edit field, it will scroll horizontally. Press the OK button to save the parameters to the file you specify, or press CANCEL to not save your parameters.

FDR/UPSTREAM is now configured for operation with most host connections. You can leave the configuration program by typing [ALT]X, or by pulling down the File menu and selecting Exit.

To begin using FDR/UPSTREAM proceed to chapter 8.

pen just once on UPSTREAM startup. The main reason to specify a non-zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change.

When you pressed the **<Ok>** button, you will be asked for the file name to save these parameters to (see figure 6-16).

**Figure 6-16**
**DOS Save Configuration Parameters**

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is UPSTREAM.CFG, but you can use any file name and any directory. If the file and path is too large for the edit field, it will scroll horizontally. Press the OK button to save the parameters to the file you specify, or press CANCEL to not save your parameters.

FDR/UPSTREAM is now configured for operation with most host connections. You can leave the configuration program by typing [ALT]X, or by pulling down the File menu and selecting Exit.

To begin using FDR/UPSTREAM proceed to chapter 8.

# 7 UNIX

## 7.1. Overview

The installation process consists of four steps:

- Determining your system requirements
- Installing the software
- Configuring the communications software
- Configuring FDR/UPSTREAM

We recommend that you install, configure, and make operational your APPC or TCP/IP before installing and configuring FDR/UPSTREAM. In particular getting 3270 fully operational will help you in getting FDR/UPSTREAM working quicker.

### 7.1.1. System Requirements

- AIX 3.2.5 and above.
- SNA Server (or its equivalent) for SNA connections.
- The built-in TCP/IP facility for TCP/IP connections.

# 7.2. Installation

FDR/UPSTREAM AIX is distributed on several diskettes or on a CD in the \UPSTREAM\AIX directory in tar format. When transporting the FDR/UPSTREAM software you must use tar to assure that the directories and hard links that it installs are also correctly transported.

To install FDR/UPSTREAM AIX from diskette, create a directory on your system which will hold the software and execute the following:

```
tar -xvf/dev/rfd0
zcat upstream.tar.Z | tar -xvf -
rm upstream.tar.Z
```

Note that you may not wish to remove the FDR/UPSTREAM compressed tar file (upstream.tar.Z) as having it on your system may facilitate automatic updates.

To install FDR/UPSTREAM AIX from CD, create a directory on your system which will hold the software and execute the following:

```
tar -xvf/<CD-ROM mount point>/UPSTREAM AIX
zcat upstream.tar.Z | tar -xvf -
rm upstream.tar.Z
```

Again, you may not wish to remove upstream.tar.Z as it facilitates automatic updates.

The FDR/UPSTREAM software and associated files will be copied into the default directory and the directories and hard links properly installed.

The files created are shown in the following table:

| File Name | Description |
|---|---|
| autoinst.sample.dat | A sample parameter file for use with the FDR/UPSTREAM automatic software update facility. |
| autoinst.sample.script | A sample script file (job) for use with the FDR/UPSTREAM automatic software update facility. |
| rmtparm.dat | Sample remote initiation parameter file intended to be used with the command line version (uscmd). |
| serial.dat | Required to perform personalization of FDR/UPSTREAM. Must be in the original directory you were in when you started UPSTREAM (default directory) or the UPSTREAMPATH. |
| upstream.msg | FDR/UPSTREAM predefined message file. This file contains many of the messages that are logged and displayed. |
| us | FDR/UPSTREAM main program. Provides the main user interface, backups and restores, logs events and more... |
| us.hlp | FDR/UPSTREAM on-line help file. This file contains the help text that you see when you press the help (F1) key. |
| us.res | FDR/UPSTREAM resource file. This file must be in the default directory or in the UPSTREAMPATH. |

| File Name | Description |
|---|---|
| us.ser | FDR/UPSTREAM personalization file, required to run the us program. This file must be in the default directory, the WORKPATH or the UPSTREAMPATH. |
| uscfg | FDR/UPSTREAM configurator. Use this program to configure your communications parameters and quite a few FDR/UPSTREAM run-time parameters (including those necessary to run FDR/UPSTREAM from another directory). |
| uscfg.hlp | FDR/UPSTREAM configurator help file. |
| uscfg.res | FDR/UPSTREAM configurator resource file. This file must be in the default directory or in the UPSTREAMPATH. |
| uscmd | FDR/UPSTREAM main program, command line oriented. All functions are required to be unattended, either through PC parameter file control or host control. The screen display is the same information as written to the log or report. |
| usload | A sample script file which will run uscmd from usstart when a scheduled event occurs. |
| uslogclr | FDR/UPSTREAM log and report maintenance program. The FDR/UPSTREAM logs and reports can grow indefinitely, so this program has been provided which will shrink these files down based by removing entries older than a specified number of days. |
| usstart | FDR/UPSTREAM unattended scheduling program which you can use to schedule us, uscmd or any other program repeatedly. |

A termcap directory is also created which includes a number of files required for terminal emulation support by the full screen programs (us and uscfg).

Note that if you modify the serialization file us.ser, and subsequently wish to reinstall the software, you should rename the file before the reinstallation and copy it back to us.ser.

Note that if you will be running UPSTREAM from a different directory than the one where the files are stored, you should see the notes at the end of this addendum.

# 7.3. Configuration

Configuration of FDR/UPSTREAM AIX to communicate to the host is very different depending upon whether you are running SNA/APPC or TCP/IP.

### 7.3.1. Configuring for TCP/IP

Once you have installed the TCP/IP software and tested connectivity to the host (via a standard application such as FTP), you are immediately ready to proceed to the FDR/UPSTREAM configuration. Go to page 7-19 to perform this configuration.

### 7.3.2. Configuring for SNA/APPC

The process of configuring FDR/UPSTREAM for APPC involves several issues:

- Configuring VTAM
- Configuring FDR/UPSTREAM MVS
- Configuring the APPC software
- Configuring FDR/UPSTREAM PC

Careful planning is essential in configuring SNA software. You should review the entire process before beginning and fill out the worksheets for each section or have the information available.

# 7.4. Pre-Server/Workstation Configuration Issues

### 7.4.1. Configuring Host Software

IBM Mainframes have three different types of devices which allow SNA communication to PCs: 3174 cluster controllers, 37xx front end processors and 3172s. PCs can also connect to gateways which talk to one of these three types of devices. Innovation Data Processing recommends that due to the performance requirements of FDR/UPSTREAM, you NOT use a gateway. Innovation Data Processing can help you obtain software which will allow you to connect directly to one of these devices. However, if you do not have a choice, FDR/UPSTREAM works with several types of gateways.

You should have your VTAM system's programmer configure the VTAM environment, or modify the existing environment if it is insufficient for FDR/UPSTREAM (i.e. a mode definition that doesn't support LU 6.2). Worksheet 7-1 should be filled out by this person or the information should be obtained from this person. An NCP regeneration is rarely required.

See the FDR/UPSTREAM MVS manual for suggestions on configuring VTAM.

**NOTE: The host mode entry determines values like RU size. The host APPL definition determines the pacing count. These settings have a significant affect on performance. We recommend that you define a mode entry that sets the RU size at 4096 or use USTMODE which is provided as a sample and a FDR/UPSTREAM APPL definition that sets pacing to 8.**

**NOTE: It is recommended that you use dependent LUs (non-zero LU Local Addresses) for UPSTREAM PCs. Independent LUs tend to be more difficult to configure and offer few benefits.**

| Name | Description | Your Value |
|---|---|---|
| SNA Network Name | The name of the SNA network to which you belong. This is optional in many environments. | |
| Partner LU Name | The APPLID of UPSTREAM on the host. Supplied sample: **UPSTREAM**. | |
| LU Number | The LU local address. Most users will use 2. | |
| Mode Name | The mode table entry name. The supplied sample: **USTMODE**. | |
| Receive Pacing Size | A number from 1 to 63 of the number of RUs to be received in succession before a low-level acknowledgment. NEVER use 0. We recommend 8 initially. | |
| Controller LAA (Token-Ring only) | The locally administered address of the 3174, 3172 or the 37xx front end. This is a 12 hex digit number usually starting with 4. | |
| PC LAA (Token-Ring only) | The locally administered address of the PC. This value must be unique on the ring and for 3174 connections, must be defined in the controller. | |
| LU Name (Independent LUs only) | The name of the PC LU to be used. Not required for users using a cluster controller or a dependent LU. | |
| IDBLK (37xx or 3172 only) | The 3 hex digit block number of the XID. Required to be 050 for APPC/PC. | |
| IDNUM (37xx or 3172 only) | The 5 hex digit number of the XID. | |

**Worksheet 7-1**
**VTAM definitions for a FDR/UPSTREAM PC**

### 7.4.2. Token-Ring Considerations

If you are using a 37xx front end or a 3172, the configuration is entirely in VTAM. If you are using a 3174 controller, then you will need a device configuration for the PC. Worksheet 7-2 should be filled out by the host personnel who configures or maintains the 3174 cluster controller.

| Name | Description | Your Value |
|---|---|---|
| PC LAA | The locally administered address of the PC as known to the controller. You must modify the PC's CONFIG.SYS entry for DXMC0MOD.SYS to use this value for your PC. | |
| Transmit I-Frame Size | This is 9 bytes greater than the maximum RU size you can support. We recommend that this be 1033 or greater. | |
| SAP | Service Access Point. Should always be 4. | |

**Worksheet 7-2**
**3174-to-FDR/UPSTREAM PC Configuration**

### 7.4.3. FDR/UPSTREAM MVS Issues

You will need to have installed FDR/UPSTREAM MVS before beginning the configuration of a FDR/UPSTREAM UNIX node. The FDR/UPSTREAM MVS configuration defines storage and security attributes to be used in storing backups. The configuration for each PC on FDR/UPSTREAM MVS, including backup profiles, security, etc. should be complete before beginning the PC configuration.

Worksheet 7-3 contains the information that you will need for FDR/UPSTREAM AIX before you can begin testing. The automation chapter includes expanded worksheets to help you build your production environment.

| Name | Description | Your Value(s) |
|---|---|---|
| Backup Profile | An 8 character identifier used as a key for the storage of a group of backups. | |
| User ID & Password | The user ID and password required to access the requested backup profile (may not be required). | |
| Sequential Tape backups allowed | Whether sequential tape backups are permitted. You may also want to ask about migration procedures. | |
| Sequential Disk backups allowed | Whether sequential disk backups are permitted. You may also want to ask about migration procedures. | |

**Worksheet 7-3**
**FDR/UPSTREAM MVS Configuration for Testing**

See the FDR/UPSTREAM MVS manual for assistance on setting up a FDR/UPSTREAM AIX user.

# 7.5. Configuring SNA Server

We recommend that you have a tested connection to the host (using 3270 or another APPC application) before beginning the configuration of APPC for FDR/UPSTREAM.

This section is intended to help you define a new local LU, partner LU and some other definitions required to run FDR/UPSTREAM. It is assumed that you are familiar with the smit utility and have some SNA experience.

Since quite a few smit modifications require that you be the **root** user, login as root and run the **smit** program. The displays and keystrokes listed here are from the character mode version of smit; the Motif version of smit can also be used, but note that the sequence of events and displays are slightly different.

Note that all fields in smit contain useful help (obtained by pressing [F1]) and many fields contain either values which can be selected from a list. We recommend the reading of help messages thoroughly and use of the selection helps.

### 7.5.1. Defining a Local LU

From the smit main menu select (in sequence):

- **Communications Applications and Services**
- **SNA Server/6000**
- **Configure SNA Profiles**
- **Advanced Configuration**. In the Advanced Configuration menu, it is assumed that you already have an operational Link.
- **Sessions**
- **LU 6.2**

Most of the modifications that you will make are in the LU 6.2 menu. To create a new Local LU definition, select:

- **Local LU**
- **Add a Profile**

You will see the **Add LU 6.2 Local LU Profile** screen (see figure 7-1).

```
                         Add LU 6.2 Local LU Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       []
  Local LU name                                      []
  Local LU alias                                     []
  Local LU is dependent?                              no                      +
     If yes,
        Local LU address (1-255)                     []                        #
        System services control point
           (SSCP) ID (*, 0-65535)                    [*]
        Link Station Profile name                    []                      +
  Conversation Security Access List Profile name     []

  Comments                                           []


F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

- **Profile Name:** We recommend that you use the local LU name as defined in VTAM.
- **Local LU Name:** Use the Local LU name as obtained from your VTAM system administrator.
- **Local LU Alias:** For consistency, we recommend that you use your local LU name.
- **Local LU is dependent?**: We recommend the use of dependent LUs whenever possible, so select **yes**.
- **Local LU address:** Enter the decimal LU number as obtained from your VTAM system administrator.
- **System services control point (SSCP) ID:** Enter the SSCP ID for this LU as obtained from your VTAM systems administrator (in the SSCP ID= parameter in the VTAM START statement). If you have verification turned off, you can leave this field with the default of '*'.
- **Link Station Profile name:** You can press the [F4] key to list the defined link station profiles. Select the link station profile that you wish to use for FDR/UPSTREAM (there is usually only one).
- **Conversation Security Access List Profile name:** Leave this field blank.
- **Comments:** Enter any text to help you remember this definition.

When you have completed entering values in this screen, press the **[ENTER]** key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the LU 6.2 menu.

### 7.5.2. Defining a Side Information Profile

A side information profile allows SNA Server to relate conversation start requests to local LU definitions.

If you choose not to use a side information profile, you must do the following:



**Figure 7-1**
**AIX SNA Server Local LU Profile**

- The SNA Server control point name must match the CPNAME in the VTAM definition.
- There must be an independent LU defined whose name is the same as the VTAM CPNAME.
- You must use an independent LU (dependent LUs are not supported without a side information profile).

Because of this complexity we recommend the use of side information profiles.

From the LU 6.2 menu, select:

- **LU 6.2 Side Information**
- **Add a Profile**

You will see the Add LU 6.2 Side Information Profile screen (see figure 7-2).

```
                    Add LU 6.2 Side Information Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       []
  Local LU or Control Point alias                     []                      +
  Provide only one of the following:
     Partner LU alias                                 []                      +
     Fully qualified partner LU name                  []
  Mode name                                           []                      +
  Remote transaction program name (RTPN)              []
  RTPN in hexadecimal?                                 no                     +

  Comments                                            []



F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

**Figure 7-2**
**AIX SNA Server Side Information Profile**

- ☐ **Profile Name:** This must not be the same name as the local LU name. We recommend the partner LU name. For most users this will be **UPSTREAM**.

- ☐ **Local LU or Control Point Alias:** Enter the Local LU name that you specified in the Local LU definition previously.

- ☐ **Provide only one of the following:** We recommend that you specify the **Fully qualified partner LU name**. The fully qualified name is the VTAM network name and the FDR/UPSTREAM partner LU name separated by a dot. For example, if your VTAM network name was MYNET and FDR/UPSTREAM MVS was named UPSTREAM (as is the default), you would specify MYNET.UPSTREAM.

- ☐ **Mode name:** Enter the mode name that you will be using as obtained from your VTAM system administrator. In most cases this will be **USTMODE**.

- ☐ **Remote transaction program name:** Most users will specify **UPSTREAM**.

- ☐ **RTPN in decimal:** Most users will specify **no**.

- ☐ **Comments:** Enter any text that will help you remember this definition.

When you have completed entering values in this screen, press the **[ENTER]** key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the LU 6.2 menu.

### 7.5.3. Defining a Partner LU Profile

A partner LU profile allows SNA Server to properly identify the partner LU when a conversation is started.

From the LU 6.2 menu, select:

- **LU 6.2 Partner LU**
- **Add a Profile**

You will see the Add LU 6.2 Add Partner LU Profile screen (see figure 7-3).

```
                    Add LU 6.2 Partner LU Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                   [Entry Fields]
* Profile name                                    []
  Fully qualified partner LU name                 []
  Partner LU alias                                []
  Parallel sessions supported?                     yes                  +
  Session security supported?                      no                   +
  Conversation security level                      none                 +

  Comments                                        []

F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

**Figure 7-3**

- ☐ **Profile Name:** We recommend the same name as the actual partner LU name. For most users this is **UPSTREAM**.
- ☐ **Fully qualified partner LU name:** The fully qualified name is the VTAM network name and the FDR/UPSTREAM partner LU name separated by a dot. You entered this name in the side profile configuration. For example, if your VTAM network name was MYNET and FDR/UPSTREAM MVS was named UPSTREAM (as is the default), you would specify MYNET.UPSTREAM.
- ☐ **Partner LU Alias:** We recommend that you enter the name of the FDR/UPSTREAM MVS partner LU. For most users this will be **UPSTREAM**.
- ☐ **Parallel sessions supported:** For most users, we recommend that you specify **no**.
- ☐ **Conversation security supported:** FDR/UPSTREAM offers its own security, so you must specify **no**.
- ☐ **Conversation security level:** FDR/UPSTREAM offers its own security, so you must specify **none**.

- **Comments:** Enter any text to help you remember this profile.

When you have completed entering values in this screen, press the [ENTER] key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the LU 6.2 menu.

### 7.5.4. Defining a Mode Profile

A mode is used when starting a session between two logical unit, to determine certain characteristics to be used in the session (RU sizes, pacing counts, etc.).

From the LU 6.2 menu, select:

- **LU 6.2 Mode**
- **Add a Profile**

You will see the Add LU 6.2 Add Mode Profile screen (see figure 7-4).

```
                         Add LU 6.2 Mode Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       []
  Mode name                                           []
  Maximum number of sessions (1-5000)                 [8]                      #
  Minimum contention winners (0-5000)                 [4]                      #
  Minimum contention losers (0-5000)                  [0]                      #
  Auto activate limit (0-500)                         [0]                      #
  Upper bound for adaptive receive pacing window      [16]                     #
  Receive pacing window (0-63)                        [7]                      #
  Maximum RU size (128,...,32768: multiples of 32)    [1024]                   #
  Minimum RU size (128,...,32768: multiples of 32)    [256]                    #
  Class of Service (COS) name                         [#CONNECT]

  Comments                                            []


F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

**Figure 7-4**
**AIX SNA Server Partner LU Profile**

- **Profile Name:** We recommend the same name as the actual mode name. If you are using #INTER as your mode name, you can't have the '#' prefix, so use **INTER**.

- **Mode Name:** Obtain this name from your VTAM system administrator. For most users this is **#INTER** or **UST-MODE**.

- **Maximum number of sessions:** Most users will be using FDR/UPSTREAM in a single session environment so enter **1**.

- **Minimum contention winners:** FDR/UPSTREAM MVS assumes that the workstation will be the contention winner, so enter **1**.

- ☐ **Minimum contention losers:** We recommend **0**, so that the session is likely to be a contention winner session..
- ☐ **Auto activate limit:** We generally recommend **0**, but if you have problems with host initiated requests, you may wish to change this to 1.
- ☐ **Upper bound for adaptive receive pacing window:** A good performing value is **16**.
- ☐ **Receive pacing window:** A good performing value is **16**.
- ☐ **Maximum RU Size:** In many environments, the RU size is the most significant performance parameter. We recommend a value of **4096**.
- ☐ **Minimum RU Size:** Since maintaining a high RU size is important for good performance, we recommend that you initially start with 256, and then after FDR/UPSTREAM is proven, increase to 4096 to guarantee the best possible performance by avoiding negotiation downwards.
- ☐ **Class of Service:** Most users can use the default #BATCH, though in some host environments, better performance can be seen with #CONNECT.
- ☐ **Comments:** Enter any text that will help you remember this profile.

When you have completed entering values in this screen, press the **[ENTER]** key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the LU 6.2 menu.

### 7.5.5. Defining a Transaction Program Profile

A transaction program definition is used to allow SNA Server to locate the program which is to process a request from a remote computer. FDR/UPSTREAM uses this facility to support host initiation through UST-BATCH.

From the LU 6.2 menu, select:

- **LU 6.2 Transaction Program Name (TPN)**
- **Add a Profile**

You will see the Add LU 6.2 TPN Profile screen (see figures 7-6 and 7-5).

```
                              Add LU 6.2 TPN Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                                   [Entry Fields]
* Profile name                                         []
  Transaction program name (TPN)                        []
  Transaction program name (TPN) is in hexadecimal?      no                    +
  PIP data?                                              no                    +
     If yes, Subfields (0-99)                           [0]                     #
  Use Command Line Parameters?                           no                    +
  Command Line Parameters                               []
  Conversation type                                      either               +
  Sync level                                             none/confirm         +
  Resource security level                                none                 +
     If access, Resource Security Access List Prof.    []
  Full path to TP executable                            []
  Multiple instances supported?                          no                    +
[MORE...10]

F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

```
                              Add LU 6.2 TPN Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[MORE...10]                                             [Entry Fields]
     If access, Resource Security Access List Prof.    []
  Full path to TP executable                            []
  Multiple instances supported?                          no                    +
  User ID                                               [100]                   #
  Server synonym name  (0-99)                           []
  Restart action                                         once                 +
  Communication type                                     signals              +
     If IPC, Communication IPC queue key                [0]                     #
  Standard input file/device                            [/dev/console]
  Standard output file/device                           [/dev/console]
  Standard error file/device                            [/dev/console]

  Comments  nstances supported?                         []
[BOTTOM]

F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

**Figure 7-5**
**AIX SNA Server TPN Profile (1 of 2)**

- **Profile name:** We recommend using the same name as specified in the following field. For most users this will be **UPSTREAMP**.
- **Transaction program name (TPN):** This must not be the actual transaction program name as FDR/UPSTREAM will dynamically define it. Thus we recommend using the name **UPSTREAMP**.
- **Transaction program name is in hexadecimal:** Select **no**.
- **PIP data:** FDR/UPSTREAM does not use PIP data, so select **no**.
- **Use command line parameters:** You must enter **no**.



**Figure 7-6**
**AIX SNA Server Mode Profile**

- ☐ **Command line parameters:** Leave this blank.
- ☐ **Conversation type:** FDR/UPSTREAM uses the conversation type of **basic**.
- ☐ **Sync level:** FDR/UPSTREAM uses the sync-level of **confirm**.
- ☐ **Resource security level:** FDR/UPSTREAM uses its own security, so select **none**.
- ☐ **Full path to TP executable:** Enter the directory you installed the FDR/UPSTREAM executable in; the name of the command line version of the FDR/UPSTREAM program is **uscmd** (the recommended value); the name of the full screen version is **us**.
- ☐ **Multiple instances supported:** Configuration of multiple instances requires separate FDR/UPSTREAM configuration files with separate workpaths and log file names. Most users will specify **no**.
- ☐ **User ID:** Most users will use the default of **100**.

The remaining parameters may be left at defaults.

When you have completed entering values in this screen, press the **[ENTER]** key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the LU 6.2 menu.

### 7.5.6. Defining a Partner LU Location Profile

The final FDR/UPSTREAM specific configuration that you must perform is the specification of the partner LU location.

From the LU 6.2 menu, select:

- **Partner LU 6.2 Location**
- **Add a Profile**

You will see the Add Partner LU 6.2 Location Profile screen (see figure 7-7).

```
                    Add Partner LU 6.2 Location Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
* Profile name                                       []
  Fully qualified partner LU name                    [IDPNET.USTPROD1]
  Partner LU location method                          link_station          +
  If owning_cp,
     Fully qualified owning Control Point (CP) name  []
     Local node is network server for LEN node?       no                   +
     Fully qualified network node server name        []
  If link_station,
     Local LU name                                   [LU0AS055]
     Link Station Profile name                       [TRLINK]              +

  Comments                                           []


F1=Help             F2=Refresh          F3=Cancel           F4=List
Esc+5=Reset         F6=Command          F7=Edit             F8=Image
F9=Shell            F10=Exit            Enter=Do
```

- **Profile name:** We recommend that you enter the same name as your partner LU. For most users this is **UPSTREAM**.
- **Fully qualified partner LU name:** Enter the fully qualified partner LU name (SNA network name . partner LU name). The system may suggest the proper name.
- **Partner LU location method:** We recommend **owning cp**.
- **Fully qualified owning control point name:** Enter the fully qualified control point name, obtained from your VTAM administrator.
- **Local node is network server for LEN node:** We recommend selecting **no**.
- **Fully qualified network node server name:** Since we do not recommend routing FDR/UPSTREAM traffic through a network node, leave this field blank.
- **Comments:** Enter any text to help you remember this definition.

When you have completed entering values in this screen, press the **[ENTER]** key to have your parameters checked for validity and saved. If there are errors, carefully read the error description and modify the incorrect values.

Press the **[F3]** key (Cancel button) several times to return to the Advanced Configuration menu.

### 7.5.7. Verifying and Testing

From the Advanced Configuration menu, select Verify Configuration Profiles which will bring you to the Verify Configuration Profiles screen. Select an update action and allow SNA Server to verify your profiles. If there are errors, carefully read the error description and modify the invalid profile definitions.

When your configuration verifies successfully, we recommend stopping and starting all of SNA for the changes to be fully applied.

**Figure 7-7**
**AIX SNA Server TPN Profile (2 of 2)**

You have now completed the SNA configuration necessary for running FDR/UPSTREAM. The following section will describe the configuration of FDR/UPSTREAM to use the SNA Server configuration that you have just created.

# 7.6. Configuring FDR/UPSTREAM

You must configure FDR/UPSTREAM to let the software know the method you will be using to communicate with the host (SNA or TCP/IP) and some of the specific communications parameters.

To specify these configuration parameters, run the FDR/UPSTREAM configurator, uscfg.

### 7.6.1. The FDR/UPSTREAM User Interface

The FDR/UPSTREAM user interface is functionally quite similar to Motif or Microsoft Windows, but is implemented in character mode, so that it can be used from dumb terminals. There are dialogs with push-buttons, check boxes, edit fields and more as well as pull down menus.

The appearance of screens and the user interaction is quite different depending upon your terminal type. The most powerful terminal type with the best appearing screens for FDR/UPSTREAM is the HFT (LFT for AIX v4.1) with the IBM-850 character set loaded, and we recommend its use whenever possible. However, all screens displayed in this manual are the VT220 screens.

As there is no mouse support available in standard curses, certain control and alt key variations have been defined.

- To press a push button, checkbox or radio button, press the [Space] bar.
- To move between fields in a dialog use the [TAB] key.
- To select between radio buttons, use the right and left arrow keys.
- To pull down menus or use accelerators on the HFT, LFT or AIXTERM, use [ALT]+highlighted letter. For example, to pull down the Action menu on the HFT, press [ALT]A.
- To pull down menus or use accelerators on other terminals (including TELNET terminals) press the ESC key immediately followed by the highlighted menu letter or accelerator letter. For example, to pull down the Action menu, press the ESC key immediately followed by the letter A.

Since the HFT or LFT is often the main system console, messages from other facilities (including SNA Server) may be written to the screen on top of FDR/UPSTREAM. You can refresh the screen display by pressing [CTRL]R.

### 7.6.2. Communications Configuration

After you have stared the FDR/UPSTREAM configurator (uscfg), you will see the Configuration dialog (see figure 7-8).

```
UPSTREAM Configurator
File  Action                                                    F1=Help

Configuration
+Connection Type-----------------------------------------------------+
| (X) SNA...                        ( ) TCP/IP...                   |
+---------------------------------------------------------------------+
+SNA Options--------------------++TCP/IP Options-------------------+
| (X) Use Side Info Profile     || Host TCP/IP Address.[            ] |
|     Profile Name....[        ]|| Host TCP/IP Port....[1972 ]      |
| ( ) Use Partner LU Profile    || Your PC Port........[1972 ]      |
|     Partner LU Alias[        ]|+-----------------------------------+
|     Mode Name.......[USTMODE ]|
| TPN Profile...[UPSTREAMP     ]|
+------------------------------+
  Messages Time Out...[0    ]
  [ ] Use a Registered Name for Host Initiation
       Registered Name.....[                ]
       Trans. Interval.....[0    ]

            <    Ok    >                      <  Cancel  >
```

- **Connection Type:** Select either **TCP/IP** if your connection to the host uses TCP/IP or **SNA** if you connection to the host uses SNA Server. Select the option you wish by using the arrow keys to highlight your selection, and pressing the space bar to place an 'X' in the parens. The default is SNA.

  If you are using SNA/APPC to connect to the host press, the SNA radio button and see the following section. If you are using TCP/IP, press the TCP/IP radio button and go to page 7-21).

  Note, if you select SNA, and press [TAB] you will be brought into the SNA options frame and you can not specify TCP/IP options, contrariwise, if you select TCP/IP you will be brought into the TCP/IP options frame and can not select SNA options.

### 7.6.3. Configuring for a SNA Host Connection

The fields are from your communications configuration.

- **Use Side Info Profile:** Check this if you wish to use a side information profile to contact the host or wish to support remote requests. This is the recommended method.

- **Profile Name:** Enter the side information profile specified during your communications configuration. If you were using the suggested values, this will be the partner LU name which for most users is **UPSTREAM**.

- **Use Partner LU Profile:** Check this only if you will not require remote request support. This is not the recommended method.

- **Partner LU Alias:** Enter the partner LU alias defined in the communications configuration. For most users this is **UPSTREAM**.

- **Mode Name:** Enter the mode name defined in your communications configuration. For most users this is **#INTER**.

- **TPN Profile:** Enter the profile name specified in your communications configuration. For most users this is **UPSTREAMP**.

If you are satisfied with these parameters go to page 7-21 to complete your configuration.

### 7.6.4. Configuring for a TCP/IP Host Connection

The following are the TCP/IP specific parameters.

- ☐ **Host TCP/IP Address:** Enter the IP address of the host adapter that you will be connecting to. Enter the doted decimal notation. For example: 130.50.75.1. This field is required.

- ☐ **Host TCP/IP Port:** Enter the IP port that FDR/UPSTREAM MVS was installed on. Enter a decimal number. This field is required; in most cases you can accept the default of **1972**.

- ☐ **Your PC Port:** Enter an IP port that FDR/UPSTREAM on other computers can use to contact your PC. Only one instance of an application on a given computer can use a specific port. This field is optional; in most cases you can accept the default of **1972**.

When you have completed entering the TCP/IP specific information proceed to the next section to complete your configuration.

### 7.6.5. Completing the Configuration

There is one field common to both connectivity types in this dialog:

- ☐ **Messages Time Out:** FDR/UPSTREAM informational and error messages will remain displayed until a button is pressed or until they time out. The default of **0** indicates that the message will stay displayed until the button is pressed. A positive number indicates the number of seconds until the message times out if a button is not pressed. -1 indicates that messages should not be displayed. For initial testing, we recommend 0. In production we recommend a small number (such as 3 seconds).

- ☐ **Use a Registered Name for Host Initiation:** Check this box if you wish to register a name with FDR/UPSTREAM MVS that host and other workstation/server requests can use to find your workstation. A registered name is required if you wish to use the FDR/UPSTREAM automatic update facility. Note that checking this box may cause occasional errors (which can be ignored) if the workstation/server is updating registration information when a remote request is received. You must enter a Registered Name if you check this box. The default is checked.

- ☐ **Registered Name:** Enter any name, unique within FDR/UPSTREAM MVS, that can be used to allow the host and other workstation/servers to find your workstation. You can enter up to 16 characters which can include embedded spaces. Note that if there are duplicate names no errors are reported and the most recently registered name is used.

- ☐ **Transmission Interval:** Enter a number which indicates how often (in minutes) you will reregister your registration name with FDR/UPSTREAM MVS. Most users will use the default of **0**, which causes registration to happen once upon FDR/UPSTREAM startup. The main reason to specify a non-zero value is if you are using TCP/IP with the DHCP facility enabled and your IP address may change.

Press the **<Ok>** button (or press the [ENTER] key) to accept your parameters. You will be asked for the file name to save these parameters to (see figure 7-9).

```
=                          UPSTREAM Configurator
¦  File  Action                                                    ¦F1=Help¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
¦                    +++++++Save Parameter File+++++++                     ¦
¦                    ¦                                ¦                    ¦
¦                    ¦ [upstream.cfg                  ]                    ¦
¦                    ¦                                ¦                    ¦
¦                    ¦                                ¦                    ¦
¦                    ¦ <    Ok    >     <  Cancel   >                     ¦
¦                    ¦                                ¦                    ¦
¦                    +--------------------------------+                    ¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
¦                                                                          ¦
+--------------------------------------------------------------------------
```

In this dialog box, you can type the name of the file you want to save your configuration parameters to. The default is upstream.cfg, but you can use any file name and any directory. If the file and path is too long from the displayed edit field, it will scroll horizontally. Press the <Ok> button to save the parameters to the file you specify, or press <Cancel> to not save your changes.

FDR/UPSTREAM is now configured for operation with your communications environment. You can leave the configuration program by pulling down the File menu and selecting Exit (or by pressing the [F3] key on any terminal, or the [ALT]X key on the HFT).

The following section will discuss specific issues under UNIX.

To begin using FDR/UPSTREAM proceed to chapter 8.

# 7.7. Backups & Restores

The screens and backup/restore concepts used in FDR/UPSTREAM AIX differ somewhat to those in the PC products.

To enter the FDR/UPSTREAM AIX main program, run **us**. As for the DOS product, you will see one or more error messages when entering the program, one of which indicates that the default parameter file is unavailable.

### 7.7.1. Backups

Note that since UNIX does not have an archive bit, FDR/UPSTREAM determines when a file has changed between backups in a different way. Whenever a backup is performed, FDR/UPSTREAM writes a single line file (<Backup Profile>.inc) which contains the date/time of the backup. When you select Incremental, FDR/UPSTREAM uses the date/time in this file and compares it against the last modification date/time of the selected files. Thus you should be careful to not add or modify file specifications when performing an incremental backup, as this will defeat the mechanism.

FDR/UPSTREAM AIX offers a backup feature not available on any of the PC versions (available in the Backup <More> dialog): **Backup files open for Update**: Check this box if you wish FDR/UPSTREAM to back up files which are open for write. Note that the integrity of the data is not assured. This box is not checked by default.

### 7.7.2. Command Line

The command line version of FDR/UPSTREAM (uscmd) gives you several advantages over the full screen version:

- Can be placed in the background.
- For host initiated backups and restores, FDR/UPSTREAM can be system started and left running.
- FDR/UPSTREAM can be run using **cron**.

The command line version writes errors and reporting information (if enabled) to stdout. Since this information is also written to the log and report files, you can redirect its output to the nul file to avoid duplication.

The command line version must be started with enough parameters to perform a function unattended as there are no displays to request parameters and stdin is not supported. Thus, we always recommend that you start uscmd with a command line specified parameter file:

```
uscmd parameter=<parameter file>
```

A sample parameter file (rmtparm.dat) is provided to properly manage the processing of host initiated requests. So, if you wish to have FDR/UPSTREAM started at system start, add the following line to your system start script:

```
uscmd parameter=rmtparm.dat
```

**Note: All parameter files used with uscmd must be unattended (ATTENDED=N) since uscmd has no user interface to allow attended operations.**

The uscmd process can be killed in the normal way and will terminate whenever the requested function has completed. Note that the sample, rmtparm.dat, will never terminate as it continues listening for additional host requests.

### 7.7.3. Logical and Physical Volumes

Logical and physical character volumes as well as files and directories can also be backed up and restored. This is particularly helpful in backing up databases such as Oracle. In AIX v4.1 and later, these backups can even be larger than 2GB.

To specify a backup of a logical or physical character volume, simply specify the UNIX path of the character special device (for example, /dev/rlv01). You cannot specify wildcards and these devices will not appear in the Files Available list box to avoid inadvertently selecting them. You must be the root user to use this feature.

Due to operating system restrictions in AIX v3.2, backups of these volumes cannot exceed 2GB; in AIX v4.1 or greater these volumes can be any size. Note that you should not enable local backups of very large volumes (greater than 4GB).

When logical or physical volumes are displayed on an inquiry, the device is listed as either <CHR-PV> for a character special physical volume or <CHR-LV> for a character special logical volume along with a short size. Restores of these volumes proceed as for restores of files.

Backup and Restore of logical or physical volumes can be very dangerous as the operating system or application may have cached significant amounts of critical data making it unusable when restored. We recommend that file system volumes be taken off-line before any backups or restores and that applications using raw volumes be shut down normally. When in doubt, contact UPSTREAM technical support for help in planning your backup/recovery scheme.

### 7.7.4. UNIX Summary

The following are the main differences between FDR/UPSTREAM AIX and FDR/UPSTREAM PC:

- FDR/UPSTREAM is intended for application and user backup. FDR/UPSTREAM is NOT a replacement for your system backup. FDR/UPSTREAM does not backup special files, named pipes, etc. and requires an operating system with host communications be present. We recommend that you continue to use whatever backup mechanism you are currently using to create bootable backups of the /(root), /usr, /var, /tmp and any other directories that are part of /home required for minimal system recovery.
- Significant FDR/UPSTREAM internal files, used both by us and uscmd, including the help file (us.hlp), the resource file (us.res), the message file (unless fully qualified in the UPSTREAM configuration), the personalization file (us.ser) and the personalization authorization file (serial.dat) are searched for starting with the default directory (the directory you were in when you started UPSTREAM), the WORKPATH (in some cases) then in the directory pointed to in the environment variable UPSTREAMPATH.
- You cannot use the full-screen program us **with** DTTERM and other unsupported terminal types. In these environments, you muse use the command line program **uscmd**.
- Each SNA user must have their own transaction program name if remote initiates are enabled.
- Each TCP/IP user must have defined a unique inbound port number if remote initiates are enabled.
- File and directory names use proper UNIX naming conventions.

- Symbolic links are properly handled for both backups and restores.
- Hard links are not specifically supported. FDR/UPSTREAM will back up multiple copies of a file and restore the file multiple times.
- Sparse files are not specifically supported.
- Incremental backups are performed by checking the file's last modification date.
- There is no user specifiable non-file data. Owner IDs, access dates and more are stored automatically.
- ACLs are not supported.
- There is no Communications menu; communications management options are available through smit.
- If there are errors in starting a remotely requested job (see the *Advanced FDR/UPSTREAM* chapter), these errors are stored in the file **usjob.out** in the WORKPATH directory.
- Unlike DOS, most list boxes are scrollable horizontally.
- Whenever there is a SNA error that causes a FDR/UPSTREAM APPC request to be interrupted, there will usually be a SNA Server message at the console and FDR/UPSTREAM will terminate.
- FDR/UPSTREAM will not back up directories that have been mounted over.

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# 8 YOUR FIRST BACKUP

## 8.1. Overview

This chapter discusses running FDR/UPSTREAM to perform a simple backup. You must have already configured your host connection and run the FDR/UPSTREAM Configurator before you can perform a backup or restore.

You should view this sample backup as just a test. If you are using the Merge Backup facility, you should identify the drives or directories you wish to back up and use a single backup profile name consistently with the same drives or directories.

The steps you follow are:

- Create a default parameter file. FDR/UPSTREAM will report an error until there is a default parameter file. (DOS) FDR/UPSTREAM requires a parameter file before it will automatically start APPC connectivity (TCP/IP is started regardless).
- (DOS) Load your communications software (if it is not loaded already).
- Run FDR/UPSTREAM. FDR/UPSTREAM will start the communications with FDR/UPSTREAM MVS and you can specify and run your backup.
- Exit FDR/UPSTREAM.

**NOTE: Once you enter FDR/UPSTREAM with communications activated, you are eligible to receive and service remote backup or restore requests.**

**NOTE: There will probably be several fields on your screen which are gray and unavailable. When FDR/UPSTREAM starts it detects if your PC is capable of doing the function set in the field. If not, then the field is grayed. If there are LAN fields you need, verify that the server software is correctly installed and activated.**

# 8.2. Running FDR/UPSTREAM

The FDR/UPSTREAM PC main program is named US.EXE. You use it in the same way that you use the configurator as it is also an SAA CUA program.

***(Windows, Windows NT, OS/2 only)*** Start FDR/UPSTREAM by selecting the **FDR/UPSTREAM** icon from the FDR/UPSTREAM Program Group.

***(DOS only)*** Start FDR/UPSTREAM by changing to the directory you loaded FDR/UPSTREAM into and running:

```
C:\UPSTREAM> U
```

This will run the batch file U.BAT which was installed when you installed FDR/UPSTREAM. For APPC, U.BAT will load APPC, start FDR/UPSTREAM and upon termination, unload APPC. For TCP/IP, U.BAT will load the appropriate FDR/UPSTREAM TCP/IP parent program which will execute FDR/UPSTREAM.

***(UNIX only)*** To start the FDR/UPSTREAM character mode program, change to the directory you loaded FDR/UPSTREAM into and run the **us** program.

Note that if you installed FDR/UPSTREAM into another directory, or you have multiple users using it, you should see the notes at the end of the AIX configuration chapter.

# 8.3. Specifying a Default Parameter File

Your first step in running your first backup is to create a default parameter file. This parameter file must be complete in that it specifies acceptable parameters for a backup or restore.

The first time you run FDR/UPSTREAM you will get an error that the default parameter file could not be found (see figure 8-1). You will be creating one here, so press the**<Ok>** button (or the SPACE bar) to continue.

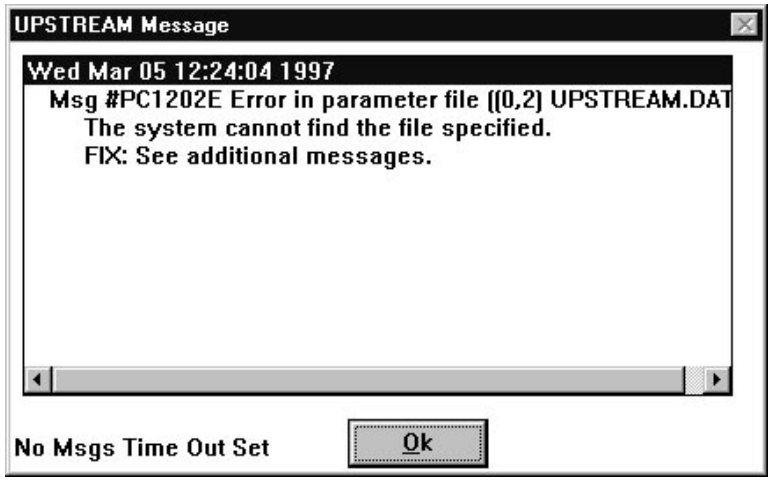



**Figure 8-1**
**Parameter File Not Found**

**No Msgs Time Out Set** in the lower left corner of an error dialog indicates that you have not set a Messages Time Out in the FDR/UPSTREAM configurator (USCFG). Before running FDR/UPSTREAM in production, you will need to set it to a non-zero value. Once you have done this, there will be a counter on all error dialogs indicating the number of seconds before the message will automatically time out and a <Hold> button which allows you to suspend the timer.

If you requested workstation registration in the FDR/UPSTREAM Configurator, you will see a small window which displays the progress of registration to FDR/UPSTREAM MVS (in DOS, you must have active communications for registration to occur). If there are errors, see the Errors chapter for more information on problem determination and resolution.

The first screen you will see after the error is the main FDR/UPSTREAM screen (see figure 8-3). As suggested by the text on the screen you access FDR/UPSTREAM functions with pull down menus. As for the configurator, you can pull down a menu by using the mouse, pressing the [ALT] key followed by the first letter of one of the menu options (like [ALT]A for Action), or by using an accelerator key (like [ALT]B for backup).

The bottom of the screen indicates the selected configuration file name (usually UPSTREAM.CFG) and the type of host connection (SNA or TCP/IP).

The action to be performed is a backup. Pull down the **Action** menu with the mouse or by pressing [ALT]A and press ENTER on **Backup**.

***(UNIX only)*** If you are using TELNET or a dumb terminal, you need to press the [ESC] key followed by the highlighted letter in the menu. To pull down the Action menu, press **[ESC]** then the **A** key.

Whenever you first enter UPSTREAM and request just about any functions, you will be asked to enter your host security parameters (see figure 8-4).

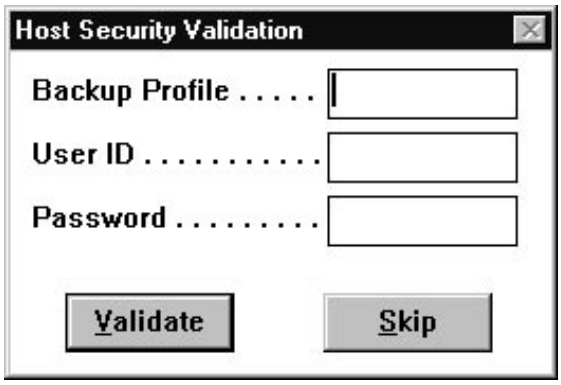



**Figure 8-2**
**Enter Host Security Information**

The entry fields are:

- **Backup Profile:** All of the backups for a backup profile are stored and are accessible together, and each backup profile has certain attributes which are maintained on the mainframe. The mainframe administrator should assign backup profiles. If you are using the merge backup facility (as recommended) you will assign a single backup profile to each workstation or server. This field has a maximum of 8 characters and is required. Note that you can add to the duplicate file database by performing Keyed/Duplicates backups using the backup profile USTDUPFL.

> **WARNING: Backup Profiles should not be shared between servers or workstations. Each server or workstation should have its own Backup Profile when using merge backups.**

- **User ID:** The user ID is your mainframe security ID as assigned by the mainframe security administrator. Usually a password is required if a user ID is required.

- **Password:** The password is your private identifier associated with your user ID for access to the mainframe. This is assigned by the mainframe security administrator. When you enter values in this field, the cursor will move but what you type is not displayed. When you save parameters to disk the password is encrypted. You need to reenter your password at least once when you enter FDR/UPSTREAM in attended mode.

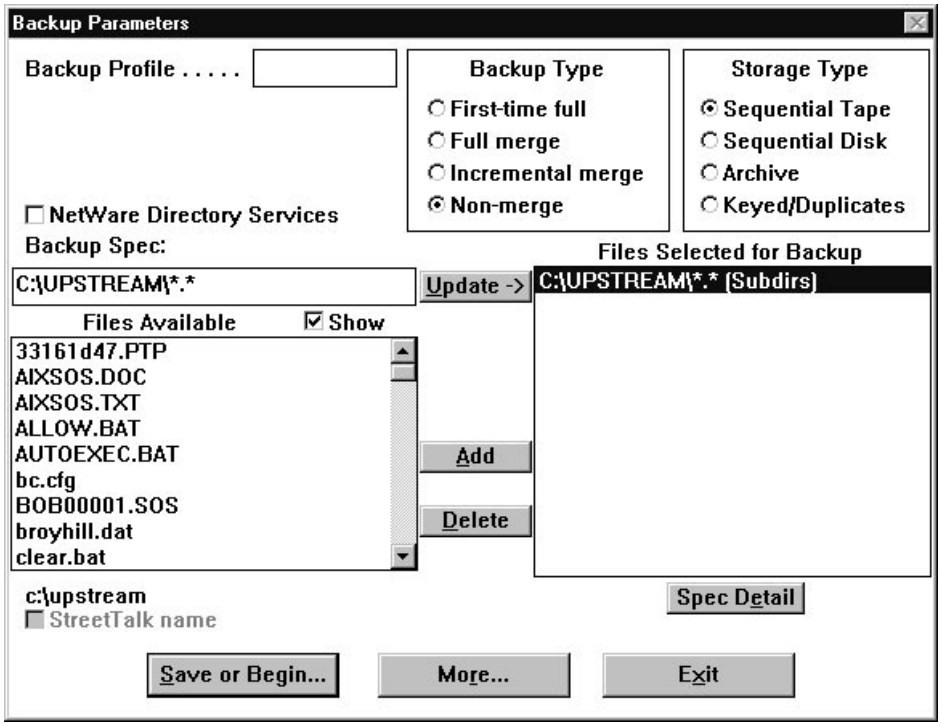
- **Validate:** Press this button to validate your backup profile/user ID/password combination with host security. If you do not validate at this time, validation will be performed at the first host request. Validation can be skipped if you do not have host security enabled or you do not have host communications activated. Note that when you press Validate, communications will be attempted and you may get communications errors (see later in this chapter). Pressing [ENTER] has the same affect as pressing this button.

- **Skip:** Press this button if you wish to skip validation at this time. Pressing [ESC] has the same affect as pressing this button. Note that if you skip validation, your entered parameters are still saved.

Note that you can bring this dialog back up to change any of these values from the main UPSTREAM window by pulling down the **Security** menu and selecting **Host Security Login**.

We recommend that you press **<Skip>** until you have completely entered your backup request.

You will see the backup parameters dialog (see figure 8-4).




Move between fields with the TAB key, the up or down arrow keys or the mouse. There are three types of data entry types on this screen:

- Text entry: These fields are delimited with square brackets ([text]) or rectangular windows. Enter the appropriate text in the fields. You can use the left or right arrow keys to move the cursor throughout the field. The INSERT key toggles between insert and overstrike modes. Some of these fields (like User ID) are larger than they appear. As you enter text, the field will scroll between the square brackets.
- Check boxes: These are either on ([X]) or off ([ ]). You toggle their value by highlighting the fields and pressing the SPACE bar or clicking on them with the mouse.
- Push buttons: These are options which allow you to leave this dialog. Select an option by pressing the SPACE bar or the ALT key followed by the underlined letter of the button name.
- Radio buttons: These are a set of options, only one of which can be selected at a time. Select an option by using the arrow keys to highlight the field you wish to select and pressing the TAB to go to the next field, or clicking on the desired option with the mouse.
- List boxes: These are frames which contain lines of information or selectable values. In many cases with FDR/UPSTREAM there are buttons beneath the list box which work together. The button acts on the choice selected (highlighted in the list box). Generally, double-clicking an entry in a list box is the same as highlighting the entry and pressing the button underneath the list.

The meanings of these fields are available by pressing the help key, [F1] (which is a list box itself). The fields are described below. After the field descriptions is a sample for a definition for a test backup.

The meaning of the text field is:

- ☐ **Backup Profile:** This field will have the value entered in the security validation dialog. You can change its value here.

The Backup Type radio buttons define the type of backup that you wish to perform. The first three options are for merge type backups. The last option is used when you are performing tests or do not wish to use the merge facility. Pressing the merge backup options has effects on other fields in other dialogs.

- ☐ **First-time full:** Press this radio button if you intend to use the merge backup facility and you are performing a baseline full backup. Pressing this button causes the Archived and Keyed storage type buttons to be disabled as well as changes in all the file specs:
  - Incremental is turned off.
  - Reset Archive Bit is turned on.

**Note: First-time full backups are not recommended if you are using the duplicate file suppression facility.**

- ☐ **Full merge:** Press this radio button to create a full backup using the merge facility. Pressing this button causes the same changes in all the file specs as when you press the First-time full as well as disabling the Incremental and Reset Archive Bit options in the file spec dialogs.

- ☐ **Incremental merge:** Press this radio button if you have performed a First-time full in the past and wish to create an incremental backup. Pressing this button causes the Archived and Keyed storage type buttons to be disabled as well as changes in all the file specs:
  - Incremental is turned on and the field is disabled.
  - Reset Archive Bit is turned on and the field is disabled.
- ☐ **Non-merge:** Press this radio button when you do not wish to use the merge facility, are performing tests, or if you are managing Backup Profiles used for Grooming. For backward compatibility, this is the default.

The storage type radio buttons define the host storage type which is how and where your backup information is stored. The option you select must be coordinated with the host administrator who defines the backup profile in the FDR/UPSTREAM MVS configurator and defines which types of backups are allowed. These options affect the file *data*, not the information about each file. Even if your backups are stored on tape, inquires can be done without a tape mount. The Backup Type may disable some of the options.

- ☐ **Sequential Tape:** If you press this radio button, then you will be creating a “direct-to-tape” backup. These backups are written immediately to tape rather than stored (even temporarily) to disk. This storage type may be slow on startup, but is then generally fast on backup (with occasional stoppages while tapes are being changed). Restores may be slow while tapes are being mounted. Remember that coordination with host operational staff is important and that you are limited to the number of concurrent backups or restores you can run by the number of tape drives in the system. This is the default option.

- ☐ **Sequential Disk:** If you press this radio button, then you will be creating a “sequential disk” backup. These backups are stored in a sequential disk (flat) file rather than in the VSAM clusters. This allows the file data to be managed by ABR, SMS or any other host migration system. This storage type allows fast backups but requires temporary disk space to hold the file, coordination with the migration facility, and may be slow on restore due to tape mount delays.

- ☐ **Archived:** If you press this radio button, then you will be creating an “archive” backup. These backups are staged to a disk file on the host and then later, when the mainframe archive utility is run, stored to tape. This storage type allows fast backup and good tape management, but requires temporary MVS disk storage and may be slow for restores due to tape mount delays. This option is disabled if you are using merge backups.

- **Keyed/Duplicates:** If you press this radio button, then you will be creating a "disk" backup or adding to the duplicate file database (you can use the predefined backup profile USTDUPFL to add to the duplicate file database). These backups are stored until rolled off on a host disk file. This storage type allows fast backups and fast restores but requires MVS disk storage for all data. This option is disabled if you are using merge backups.

The check box above the backup spec:

- ***(non-UNIX only)*** **NetWare Directory. Services.:** Check this box if you wish to backup NetWare Directory Services as one of your backup specifications. Checking this box changes the Backup Spec field to (NDS). This box is grayed unless you have an active NetWare drive mapping to a server running the USNDS NLM. See the Novell chapter for more information. The default is not checked.

The Backup Spec allows you to enter the files to be backed up:

- **Backup Spec:** Enter the fully qualified file name, with wildcards, of the file, subdirectory or drive that you wish to back up. When you leave this field the Files Available list box is changed to reflect all the files in the directory which you just selected (if you have pressed the <Show> check box and not specified a StreetTalk name or a UNIX character special device).

  To use this specification, press the <Update> button, which causes the change to be reflected in the Files Selected for Backup list box. Pressing the <Ok> , <Add>, <Spec Detail> or <More...> button will also cause this entry to be saved. This value will change as you highlight different entries in the Files Selected for Backup list.

  **NOTE: You must press the <Update>, <Ok>, <Add>, <Spec Detail> or <More...> button to have the Backup Spec saved for use.**

  **NOTE: To backup more than one file, you MUST specify wildcards.**

- ***(non-UNIX only)*** **Show:** Check this box to have the File Available list updated with the files specified in the Backup Spec (either locally, on a server, or via ULTra). The default is checked.

- **Files Available:** This list box displays a directory listing of the drive and directory specified in the Backup Spec (local files, network drive files, or ULTra attached workstation files). You can use the mouse or keyboard to select entries which causes the Backup Spec to change to reflect the selection, or double click on a file, directory or drive to make that the new entry. To use this specification, press the <Update> button, which causes the change to be reflected in the Files Selected for Backup list.

- ***(non-UNIX only)*** **StreetTalk name:** Check this box if the Backup Spec is a StreetTalk name. This box can be different for each entry in the Files Selected for Backup list. See the Banyan chapter for more information about Banyan server backup. This box is grayed and unavailable unless you have the Banyan drivers loaded and active.

The buttons between the list boxes allow you to modify the values in the Files Selected for Backup list box.

- **Update:** Press this button to change the currently highlighted entry in the Files Selected for Backup list to reflect the entry in the Backup Spec field. This also occurs when you press the <Ok>, <Spec Detail>, or <More...> buttons.

- **Add:** Press this button to create a new entry to be included in the backup using the Backup Spec. The new entry is added to the end of the Files Selected for Backup list box and it becomes the highlighted entry.

- **Delete:** Press this button to delete the highlighted file spec in the Files Selected for Backup list box. The entry before this one becomes the active spec.

- **Files Selected for Backup:** The entries in this list box are the file specifications that will be used in the backup. When you highlight an entry, the Backup Spec and StreetTalk entries will change to reflect the value. Double-clicking the mouse on an entry has the same affect as pressing the <Spec Detail> button.

- **Spec Detail:** Press this button to modify parameters specific to the file specification highlighted in the Files Selected for Backup list box. These parameters include whether subdirectories are included, incremental flags, file server specific information and more. See *The UPSTREAM Program* chapter for more information.

The meaning of the push buttons at the bottom of the dialog are:

- **Ok:** Press this button to be prompted to exit this dialog, save your changed parameters and optionally begin the backup. Pressing ENTER has the same effect as pressing this button.

- **<More...>:** Press this button to update lesser used parameters such as Record size, Novell Profile, Compression, ULTra options, Reporting and the like. See *The UPSTREAM Program* chapter for more information.

- **Cancel:** Press this button when you wish to leave this dialog without saving parameters. Pressing this button is the same as pressing the ESC key.

For this example, use the following parameters:

- Backup Profile as assigned by your system administrator.
- Non-merge Backup Type
- Seq. Disk Storage Type
- C:\UPSTREAM*.* Backup Spec.
- All the remaining parameters left at their defaults.

Press the <Save or Begin> button to save these parameters. You will see the Save parameters dialog (see figure 8-5).

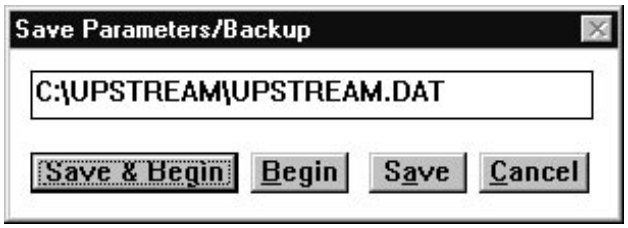



**Figure 8-5**
**Save Parameters Dialog**

In the edit field, enter a name for the file to be used to save the stored parameters in. These parameters are merely text values which can be later viewed in FDR/UPSTREAM, edited with a text editor, overridden from the environment or command line. The recommendation is that all parameter files have the suffix .DAT; the default is UPSTREAM.DAT.

***(DOS only)*** If you do not have communications started (which occurs if you got the Error in Parameter File when you first entered FDR/UPSTREAM), then you must start communications before you can begin a backup. The easiest way to do that is to just press the <Save> button to save your parameters, exit FDR/UPSTREAM and reload the program. Communications will start automatically if there is a default parameter file.

If you press:

- **<Save and Begin>:** Your parameters will be saved to a file (which you can name in the edit field) and the backup will begin. Pressing the ENTER key has the same affect. You must have started communications.
- **<Begin>:** The backup will begin, but your parameters will not be saved to disk. You must have started communications.
- **<Save>:** Your parameters will be saved to a file (which you can name in the edit field). The backup will not be run.
- **<Cancel>:** Your parameters will not be saved and the backup not run.

You have now created the default parameter file. If you wish, you can exit the program by pressing [ALT]X, [F3], or by pulling down the File menu and selecting Exit.

# 8.4. Running a Backup

To run a backup start the FDR/UPSTREAM program as you did above.

***(DOS only)*** If you are using APPC, when FDR/UPSTREAM starts it checks to see if APPC is loaded, and if it is, it then attempts to start a session with FDR/UPSTREAM MVS. If there is an error message box displayed with an error during the APPC session start, see the Messages chapter for FDR/UPSTREAM errors and many of the APPC return codes. APPC return codes are also available in your APPC manual (if you are not an AdaptSNA user). You may have to check with your system administrator for assistance in trouble-shooting problems in establishing a session with the remote. If you have problems you can't seem to easily get around, FDR/UPSTREAM support is available.

After you have started with your host communications available, bring up the backup dialog by pressing [ALT]B or by pulling down the **Action** menu and selecting **Backup**. Press the TAB key until you highlight the **<Save or Begin>** button and press it, or click the <Save or Begin> button with the mouse.

You will be asked if you wish to save your parameters (see figure above). If you choose to begin the backup you will see the backup status screen (see figure 8-6) displays information about the backup that you entered and also shows continually updated running statistics.

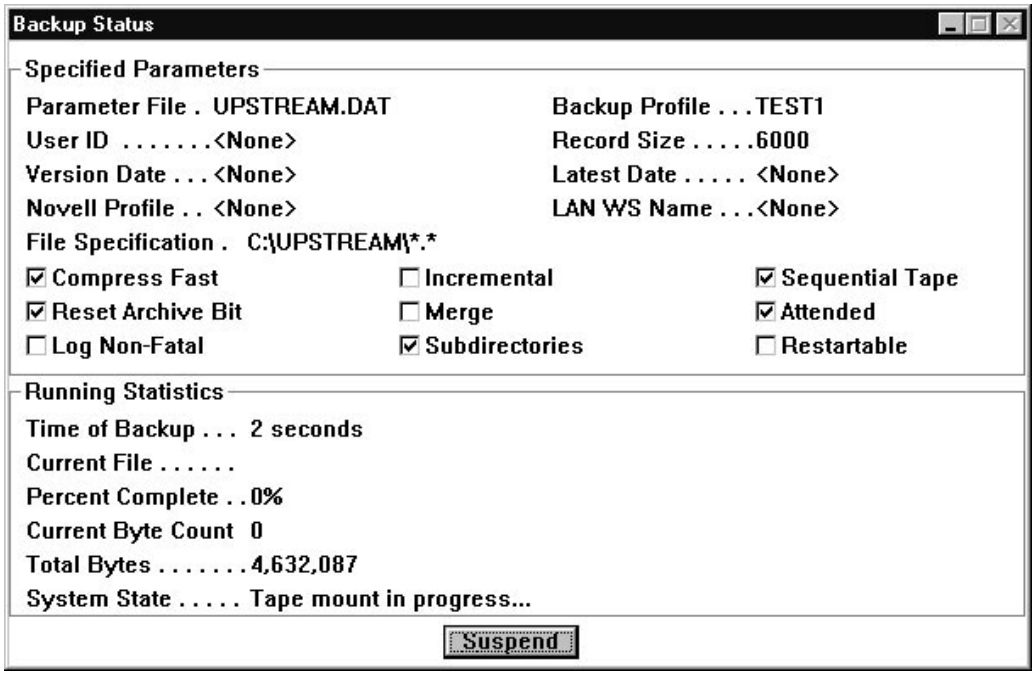
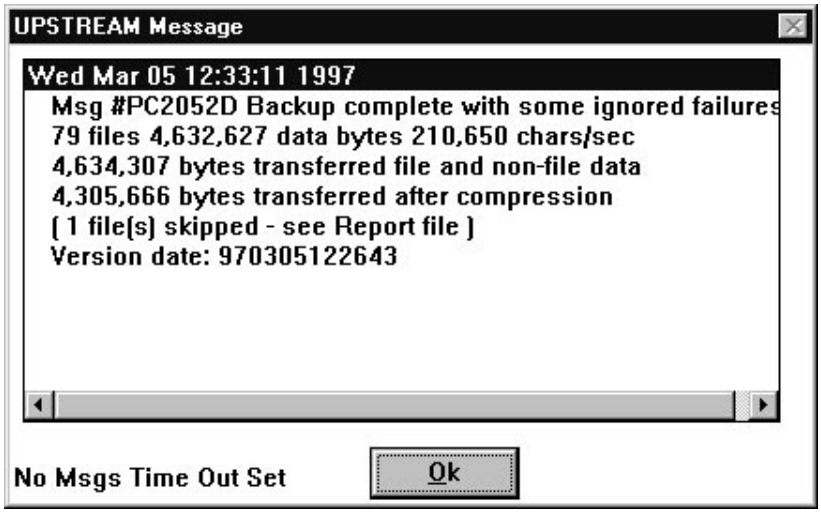



**Figure 8-6**
**Backup Status**

As the backup progresses, you can press the <Suspend> button to stop it. If you specified a restartable backup type, the backup can be restarted later.

When the backup is complete, the status screen is removed and transfer statistics are displayed in an message window (see figure 8-7) and written to the FDR/UPSTREAM log file (**upstream.log**).




If you received an error in the backup, see the *Errors* and *UPSTREAM Errors* chapters to help you in problem resolution. All errors are written to the log file **upstream.log**. Note that in the operating system specific chapters (DOS, OS/2, etc.), there are often suggestions for problem resolution described.

If the backup was not successful, and you specified Restartable in the Specify Backup screen, the information about the backup is retained (in the Backup Description File created at the beginning of the backup). The next time you enter FDR/UPSTREAM, the backup will be retried. If you specify Attended in the Specify screen, then you will be prompted first and have the opportunity to not retry the backup. All files not successfully backed up will be retried.

You have now completed you first backup. The following chapter will walk you through your first restore and inquiry.

# 9 YOUR FIRST RESTORE

## 9.1. Overview

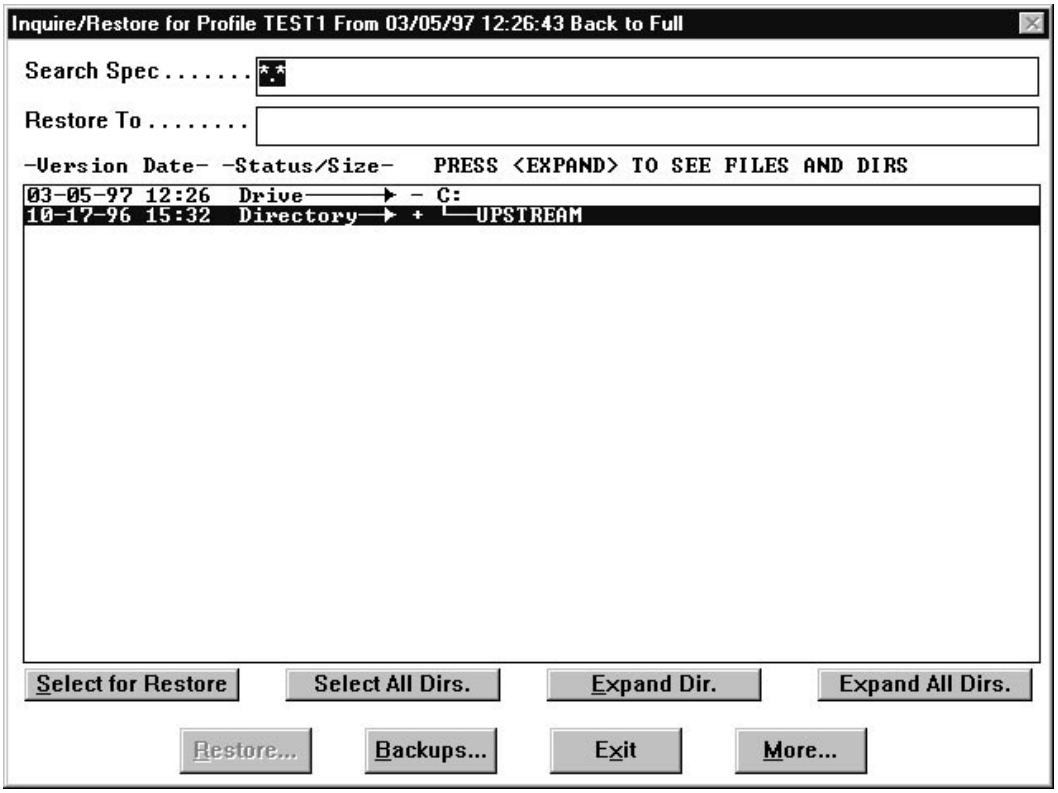
This chapter discusses performing a simple version and file inquiry and restore. A restore assumes that you have first performed a backup, so you should already have installed FDR/UPSTREAM, configured your host connection performed a backup (see the previous chapter).

FDR/UPSTREAM allows you to view, without actually performing a restore, all prior backups (backup versions) stored on the mainframe, as well as all the files in each version, in a format that you are familiar with. This makes it easy for you to restore just the files you need.

## 9.2. List and Restore

To begin a restore you should load your host connectivity software and FDR/UPSTREAM (see the previous chapter). From the FDR/UPSTREAM main screen, either press [ALT]L or pull down the **Action** menu ([ALT]A or use the mouse) and select **List and Restore**. This may cause one or two communications functions to occur (an inquire versions and an inquire files). Either of these may fail. If they do, you will not be able to enter the list and restore facility. See the *Errors* and *UPSTREAM Errors* chapters to help you in problem resolution. If you want to set up restore parameters, see *The UPSTREAM Program* chapter for instructions in using the old restore facilities.

After the communications are complete, you will see the Inquire/Restore dialog (see figure 9-1).




Note that all drives originally specified are automatically displayed (for UNIX the root is automatically displayed), and if you have only a single drive (or for UNIX) the first level has automatically been expanded.

NetWare Directory Services is abbreviated as (NDS) and can not be expanded. Also, this facility can not be used for StreetTalk information - you must use the old restore facilities for the StreetTalk database and files.

While there are few controls in this dialog, each one has many purposes:

- **Search Spec:** Enter the file specification that you wish to use in searching for files. This should not be fully qualified. Thus, for all files use (non-UNIX) *.* (or UNIX *). You can enter any combination of wildcards and non-wildcards. For example, you can enter *.TMP to see all the TMP files. After entering a search spec, press the **<Expand>** button to display all the matching entries in the given directory or the **<Expand All>** button to display all the matching entries from the selected entry downward. Note that if you precede the name with two backslashes (\\), then only directories will be displayed and restored (forces the DIRSONLY PC parameter on).

- **Restore To:** Leave this field blank if you wish to restore to the same drive/directory as the files were originally backed up from. If you wish to restore to a different drive/directory, enter the fully qualified name of the destination (including drive, path and wildcards), before you select the entry for restore.

- **File list:** This list box shows the results of your requested inquiries and selections. Each item in the list box is a file or directory shown in a tree-like format. The Version Date column indicates the file's last modification date, the Status/Size column indicates one of the following:

  - If it is a file, it's size.
  - Whether it is a directory

- Whether is has been migrated.
- Whether it is a symbolic link or a physical or logical volume.
- It's selection status (selected or excluded).

If the item has been selected, it will indicate `Selected` ➔. Note that items can only be deselected at the level they were originally selected at. If an item at a lower level has been selected, it will indicate `Selected` ↓ to help you locate selected items. If an item has been selected implicitly (with wildcards) it will indicate ↑ `Selected`. Items can be excluded only if they are already selected.

Note that the buttons change their text and meanings depending upon the state of the item highlighted in the list box. For example, if the item highlighted is an unselected, unexpanded directory, the 4 buttons will say (in sequence):

- <Select for Restore> (to select the directory),
- <Select All Dirs> (to select all files in all subdirectories below the highlighted one).
- <Expand Dir> (to expand and see the contents of the directory).
- <Expand All Dirs> (to expand and see the contents of all subdirectories below the highlighted one).

☐ **Select:** If the entry in the list box is unselected, this button will say **<Select for Restore>** and will select the highlighted file or (if this is a drive or directory) the items at the highlighted level. Note that when you select an item, it is included in the restore. You must select at least one item for the <Restore> button to be enabled. If the entry in the list box is selected implicitly (through the selection of a drive/directory at a level above), the button will say **<Exclude>** and allow you to exclude the file or files at the given level. If the item is explicitly selected the button will say **<Deselect>**. If the item is explicitly excluded, it will say **<Exclude Off>**.

☐ **Select All:** Allows you to select or exclude from the entry highlighted in the list box, down through all subdirectories. Like the regular select button, the value will change depending upon what is highlighted in the list box.

☐ **Expand:** Press this button to expand (perform and display a file inquiry) the entry highlighted in the list box. If you have a drive or directory highlighted the current drive/directory level will be inquired from the host and displayed on the screen. If you have a file highlighted, then any older versions of the file will be displayed (if any). If the entry has already been expanded (denoted by a minus sign in front of the entry), the button will read **<Collapse>** and you hide displayed files.

☐ **Expand All:** Allows you to expand/collapse from the entry highlighted in the list box, down through all subdirectories.

☐ **Restore...:** Press this button to display the screen allowing you to save your parameters and begin a restore. You must select something for restore for this button to be enabled.

☐ **Backups...:** Press this button to see the backup version information dialog which allows you to select which backup is your starting backup, see details about backups and more...

☐ **Exit:** Press this button to exit this dialog without saving your changes.

☐ **More...:** Press this button to specify non-file data and other information about the files to be included in the restore. Note that when you save values in the More... dialog, the values apply to all the restore specifications.

For this example, highlight the UPSTREAM directory and press the **<Expand Dir.>** button. We will restore just the **us.hlp** file, so highlight us.hlp and press the **<Select for Restore>** button. You will see the Status/Size column change to `Selected` ➔.

# 9.3. List Backups

If you press the **<Backups...>** button you will see the restore parameters dialog (see figure 9-2).

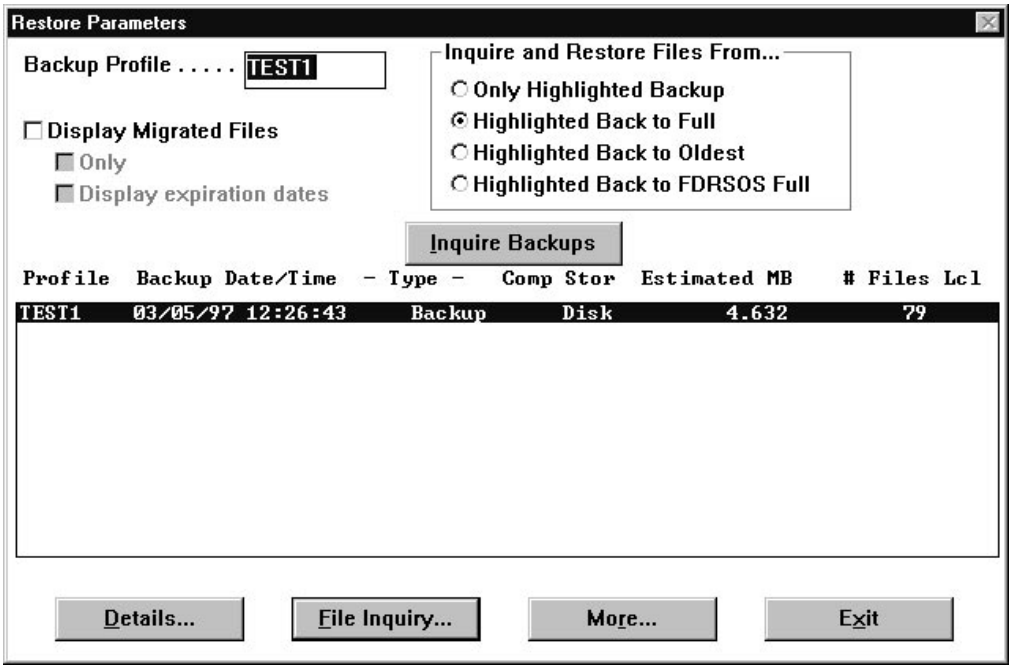



**Figure 9-2**
**Backups List**

This dialog allows you to select information relevant to the backup(s) you are restoring from.

- **Backup Profile:** Available so that you can change the backup profile you will use for your restores. When you change this value, the Backups List clears. You can use a wildcard ('*') in the name to help you select from a group of backups. This field is automatically filled in with the value entered in Host Security Validation and is required.

- **Display Migrated Files:** Check this box if you wish to have migrated files included in the file list. If you check this box, you can optionally also check the **Only** box which, when checked, will display only migrated files and not display normal files in the file list. You can also check the **Display expiration dates** which displays expiration dates for migrated files in the file list. The default for all three check boxes is not checked.

The **Inquire and Restore Files From...** radio buttons allow you to select whether file inquiries and restores will use a single version or multiple versions (which may display multiple files). Note that these options are only used when working with Merge backups.

- **Only Highlighted Backup:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) File Inquiries will show only the files stored in that one backup.

- **Highlighted Back to Full:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) and all versions back to and including the

full. If there are multiple copies of a file, all will be displayed. A restore will include the latest copy of each file (regardless of which backup it is on), or any specifically selected files. This is the default option.

- **Highlighted Back to Oldest:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) and all versions back to the oldest version stored on the host for this profile. If there are multiple copies of a file, all will be displayed. A restore will include the latest version of each file (regardless of which backup it is on) from the selected backup back to the full, or any specifically selected files (which may be before the full backup).

- **Highlighted Back to FDRSOS Full**: If you have FDRSOS® and if selected, the workstation/server software will extract the modification date/time of the FDRSOS Timestamp file and the host software will transmit files in backups which were performed since that date. If selected, the workstation/server software will extract the modification date/time of the FDRSOS Timestamp file and the host software will transmit files in backups which were performed since that date. See the FDRSOS chapter for more information.

The button and the list box are:

- **Inquire Backups:** Press this button if you wish a listing of the backups stored on the host for the specified backup profile. Pressing this button communicates with the host. Note that UPSTREAM does an automatic Inquire Backups when entering the list and restore facility.

- **Backups List:** This list box contains the results of the Inquire Backups. It is a mono-spaced list box, each row showing an individual backup. The columns are: Backup Profile, date and time the backup was started, the type of backup (merge full, merge incremental, or just backup), whether it was completed (an 'I' in the Comp column), the storage type (disk or tape), the original estimated backup size in megabytes and the number of files. Often the list box is automatically filled in on entry. The highlighted backup is important for determining the information displayed and restored (see above).

The push buttons are:

- **Details...:** This button allows you to examine the specific information for the backup version highlighted in the Backups list box above. You must press the <Inquire Backups> button to extract versions before viewing their detail.

- **File Inquiry...:** Press this button to return to the list and restore dialog.

- **More...:** Press this button to select additional restore parameters such as a Novell Profile, Reporting options, etc.

- **Exit:** Press this button to return to the main UPSTREAM window.

To see detailed information about a given backup, press the **<Details...>** button (see figure 9-3).

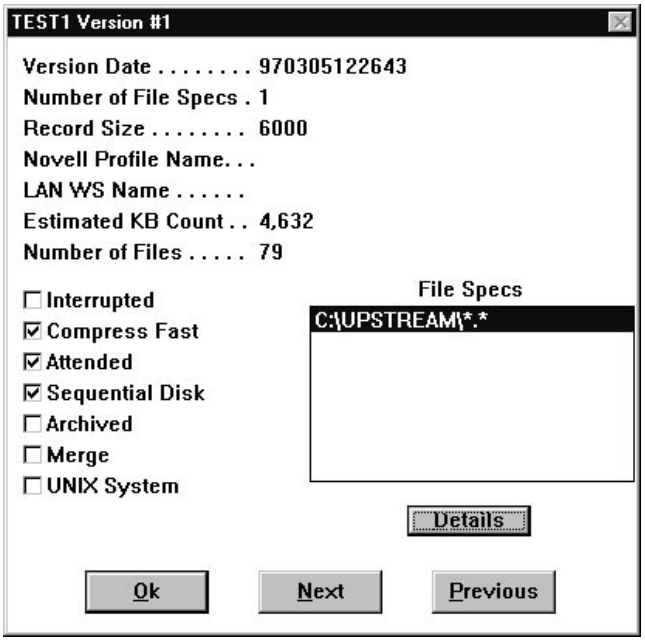
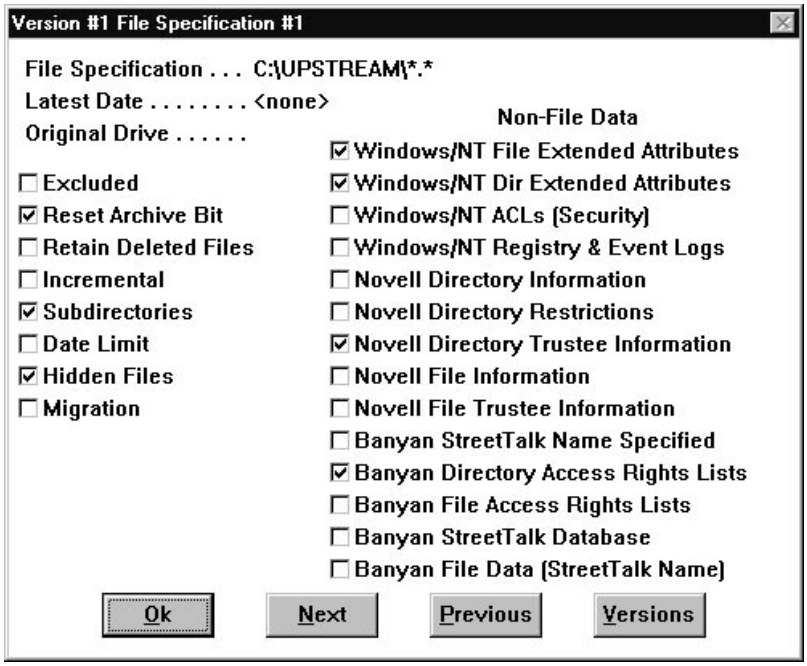



**Figure 9-3**
**Backup Version Detail Display Dialog**

This dialog displays the overall parameters specified when you performed the backup. The controls are:

- **Details:** Highlight a file spec in the File Specs list box (or double-click the file spec) and press this button to see details of the original file specification.
- **Ok:** Press this button to highlight return to the List Backups dialog, highlighting the current backup.
- **Next:** Press this button to see the next backup in the list.
- **Previous:** Press this button to see the previous backup in the list.

If you highlight a File Spec and press the <Details> button you will see the File Specification dialog (see figure 9-4).




Press the **<Ok>** button to return to the Backup Version dialog. Press the **<Ok>** button to return to the Restore Parameters dialog. Press the **<File Inquiry...>** button to return to the Inquire/Restore dialog.



Figure 9-4

# 9.4. Finalize Restore

When you select file(s) to restore and press the **<Restore...>** button, you will see the Save Restore Parameters dialog (see figure 9-5).

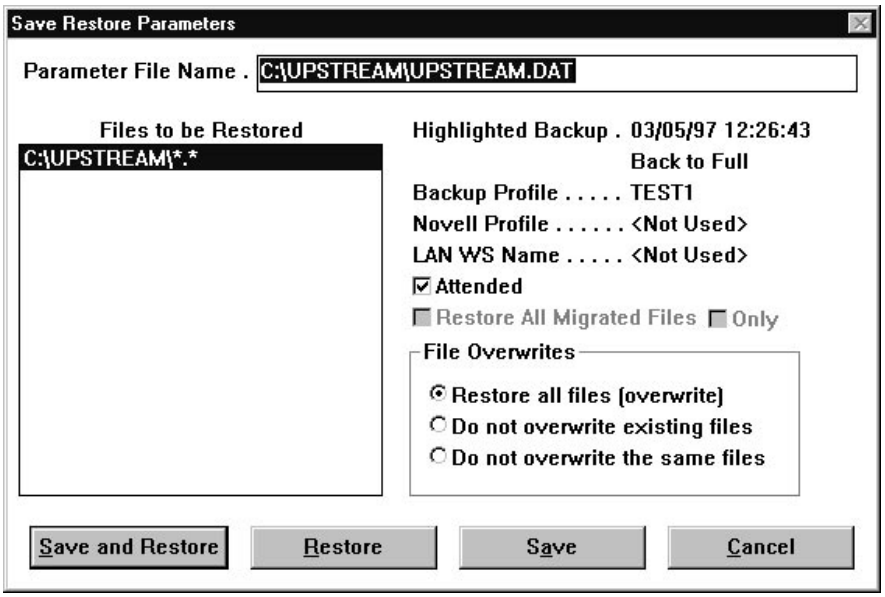



**Figure 9-5**
**Complete Restore Request**

Most of the displayed items on this dialog are to help you to decide if this is the restore that you actually want to perform. There are several modifiable fields including:

- **Parameter File Name:** If you wish to save your restore request, this is the name of the UPSTREAM parameter file that will be used.

- **Attended:** Check this box to have your saved parameter file be attended (recommended). Since restores are generally an attended process (a user specifies the files to be restored), we recommend that you always check this box.

The **Restore All Migrated Files** and **Only** checkboxes are for display purposes only. The radio buttons in the **File Overwrites** frame are:

- **Restore all files (overwrite):** Press this radio button if you wish any existing files to be replaced by files from the backup selected. Thus all received files are written. This is the default.

- **Do not overwrite existing files:** Press this radio button if you wish to preserve the files currently stored on the disk and only write those files which do not already exist.

- **Do not overwrite the same files:** Press this radio button if you wish to have UPSTREAM write all files received except those which have exactly the same modification date and time. This improves performance slightly as extraneous file I/O is avoided.

The push buttons are:

- **Save and Restore:** Saves your restore request information (parameters) to the specified parameter file and begins the restore.
- **Restore:** Begins the restore, the specified parameters being only saved in memory.
- **Save:** Saves your restore request to a parameter file for later retrieval (locally or by the host).
- **Cancel:** Returns you to the List and Restore Dialog.

For this example, press the **<Restore>** button to begin your restore. You will see a status display similar to the one you saw for the backup, with a single button, **<Cancel>** allowing you to cancel the restore. When the restore has completed, a completion message with statistics is logged and displayed.

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# 10 Performance

## 10.1. Overview

High performance is one of the major features of FDR/UPSTREAM. But, as with any communications product, performance requires some tuning to adjust it for your environment.

You must *scientifically* isolate the performance bottlenecks and then take the actions based on where the bottlenecks actually are. Your goal is to avoid wasting time optimizing areas where performance is not actually bottlenecked.

FDR/UPSTREAM provides performance isolation tools based on where performance bottlenecks generally are.

## 10.2. Performance Dialog

Selecting **Performance** from the **Action** menu of the main FDR/UPSTREAM program displays a dialog (see figure 10-1).

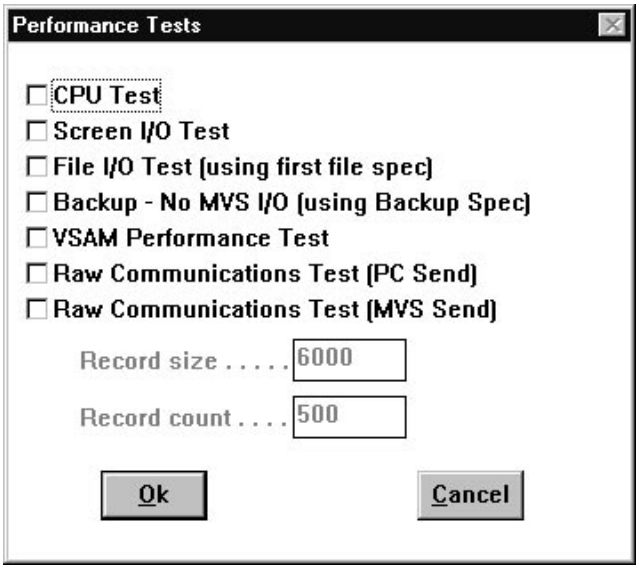



**Figure 10-1**
**Performance Test Dialog**

Use this dialog to help you isolate any issues which are impacting performance. You select an option in this dialog by pressing one or more of the performance testing buttons (with the space bar or the mouse) and then pressing the **<Ok>** button. When all the performance tests are complete, a message box is displayed and logged with all the results.

Each test is described below with possible fixes. When you are first attempting to isolate performance issues it is recommended that you select all the options and then when fixing each option, perform one fix at a time until acceptable results are obtained. Feel free to contact FDR/UPSTREAM technical support at any step in the process to help you get the best from your environment and to help you set your expectations.

Setting your expectations reasonably is an important step. There is a finite point where you cannot appreciably improve performance. Remember that your goal is to get the best *possible* performance.

### 10.2.1. CPU Test

The CPU test returns a number indicating the number of times that a simple compression can be performed on your machine in a given period of time. A result of less than 2500 indicates that fast compression will impact performance on high-speed Token-Ring connections. A number less than 500 indicates that fast compression will impact performance in just about all links.

High compression requires very high CPU performance test numbers when used on high speed links. The general rule of thumb is that the best performance high compression can generate on a high speed link is somewhere around the CPU index * 10 bytes per second. Thus a CPU index of 5000 would have a maximum performance somewhere around 50,000 bytes per second. Thus, we only recommend high compression in lower-speed links.

CPU performance impacts ALL aspects of FDR/UPSTREAM. Slow machines perform slow file I/O, slow communications, slow screen writes and are generally slow everywhere.

### 10.2.2. Screen I/O Test

The screen write test tests to see how many times a string can be written in a dialog box. This is useful in determining if the status display should be enabled during a backup or restore for best performance. A number less than 2500 indicates that performance will be impacted in high-speed Token-Ring connections. A number less than 500 indicates that performance will be impacted in just about all links.

When optimizing performance it is a good idea in just about every case to limit the status display by setting a Status Screen Time (in the Advanced menu in the UPSTREAM Configurator program) to a value or 2000 or 3000 (2 or 3 seconds).

### 10.2.3. File I/O Test

This test reports the performance of reading all the files specified in the first backup file specification screen in characters per second. It does not test subdirectories even if the subdirectory box is checked. The record size is used to determine the blocking of the files read.

PC file read speeds are critical in backup performance. In many file server environments, file I/O performance is the principal bottleneck. But these numbers can be deceiving. Most operating systems are usually very fast in reading an open file but are slow in the actual file opens. And as the number of files in a directory increase, the file opens get slower. In the same environment it is common to see speeds ranging from 400,000 characters

per second to 20,000 characters per second depending on the file sizes and the number of files in the directory. So plan on running this test several times on different directories to get a reasonable estimate of aggregate throughput.

To improve file read performance there are several things to try:

- If you have many large files, increasing the record size may help to improve performance. Try using an exact multiple of 2048. Remember that your mainframe file data cluster size must be large enough to accommodate these larger records.
- In some environments (particularly Novell servers), reducing the record size has shown in some tests to improve performance.
- Reorganize your directories to reduce the number of files in a directory. It is faster to open a small number of files in many directories than a large number of files in a single directory.
- Faster CPUs improve performance. If you can, use a faster workstation and/or a faster server. Increasing memory in servers often helps improve performance as well.

### 10.2.4. Backup - No MVS I/O

This test helps you in determining the performance of your communications link by allowing you to perform a backup, without actually writing the data to MVS disk. A normal backup is done using the backup specifications currently defined.

It is a good idea that before you run this test you perform a file test to determine the file read performance to compare against total throughput reported. Remember that your backup performance can be no better than the performance of the file system.

Communications performance can be improved in several ways:

- RU size
- Pacing count
- Frame size (if adjustable)

On high speed links, increasing these values to their maximum for the SNA hardware and software will yield significant performance improvements.

These values will have to be changed on BOTH sides. The way that you specify the MVS performance parameters is through the mode entry, the LU and PU definitions and the APPL definition. Your MVS systems administrator can help you set up an environment to maximize your FDR/UPSTREAM performance. Performance adjustments should be validated with link traces of the bind to assure that they actually went into affect (see later in this Appendix for more information).

Some recommended values for Token-ring include:

- RU size = 1920 for DOS; 4096 for all other operating systems.
- PC receive pacing count at least 8. Larger values improve performance, but some users will want to save PC memory at the expense of higher performance restores. PC receive pacing count does not affect backups. NEVER set a pacing value of zero as it can crash either SNA.
- MVS receive pacing count at least 8. Larger values require a large amount of NCP or cluster controller memory. NEVER set a pacing count of zero as this can lead to catastrophic mainframe events.

- Frame size = 9 bytes larger than your RU size. This will allow RUs to fit correctly into frames and avoid segmentation. This parameter in many cases is either not adjustable or must adjust with the RU size.

### 10.2.5. VSAM Performance Test

This test reports the number of single File Information and 6000 byte File Data cluster writes that can be performed in a second. The results of this test are reported as an error message during the test.

You would get an indication that VSAM performance may be affecting the overall performance of your backups if you see long pauses (5-10 seconds) during the backups.

VSAM performance varies significantly based on MVS CPU utilization and disk pack utilization. Results often vary by large increments even when run within seconds of each other. For the most useful results, run and average several of these tests at the same time of day you will be running the backups.

The VSAM results give you an indication of the maximum amount of data that can be received by the host. For example, 40 file information records and 35 file data records would indicate that no more than 40 small files in a second or more than 35 records (35 * 6000 bytes = 210,000 characters) in a second can be written to disk.

If you are using IAM files for the file information cluster, you will see a vast difference in performance numbers between file information and file data. This is due to the very high performance of IAM versus VSAM; IAM should be used for both the file information and catalog clusters whenever possible. IAM should not be used for the file data cluster.

### 10.2.6. Raw Communications Test - PC Send

The raw communications tests are the most used performance tests as they indicate in a simple step, the ability of the communications network to transfer large quantities of data. All users are encouraged to run these tests when tuning FDR/UPSTREAM as the initial starting point for isolating performance bottlenecks. We also recommend running these tests whenever setting up a new workstation to verify that communications performs as expected.

This test allows the sending of a specified number of blocks of a specified size to MVS. This can be used to determine the overall throughput which can be accomplished in a backup. When this box or the Raw Communications Test - MVS Send box is checked the record size and record count fields become available for entry.

Note that the total number of bytes transmitted is the product of the record size and record count fields. Do not specify values too large as this test cannot be interrupted once begun.

### 10.2.7. Raw Communications Test - MVS Send

Allows the receiving of a specified number of blocks of a specified size from MVS. This can be used to determine the overall throughput which can be accomplished in a restore. When this box or the Raw Communications Test - PC Send box is checked the record size and record count fields become available for entry.

Note that the total number of bytes transmitted is the product of the record size and record count fields. Do not specify values too large as this test cannot be interrupted once begun.

# 10.3. SNA Tuning Parameters

The SNA parameters of RU size and pacing counts are significant in improving performance; in some cases they can improve performance by orders of magnitude. In SNA the values you enter on the PC for RU size and pacing count may be negotiated to lower values without you being notified. The result may be poor performance which can be remedied.

As noted above, you will generally want to increase your RU size to the maximum supported (usually 1920 or 4096), but not beyond 4096. Pacing should be at least 8.

### 10.3.1. CM/2 Session Status

With most SNA's, you must perform a SNA trace to determine the negotiated values. However, IBM CM/2 or Comm. Server in OS/2 and various Windows and Windows NT SNAs there are tools which indicate the final negotiated values. If you are running the Windows, Windows NT or OS/2 versions of FDR/UPSTREAM, you can pull down the **Communications** menu item and select **Session Status** (it is grayed if your APPC does not support session status). You will see a message box which displays something like the following:

```
Mon Jan 30 16:14:17 1995
   Session ACTIVE
   LU Name:         PC (LU4AS035)
   Partner LU Name: HOST (UPSTREAM)
   Mode name:       USTMODE
   RU size:     send 4096, receive 4096
   Pacing size: send 8, receive 8
```

The same information is also written to the UPSTREAM log when you perform your first host communications after starting the program.

If the message indicates that the session is not active, perform an UPSTREAM function which activates host communications (like a version inquiry) and retry the session status.

### 10.3.2. Other APPCs

To determine your negotiated RU size and pacing counts with other APPCs you will have to perform the SNA trace provided with your APPC. Reading these traces requires quite a bit of expertise. You need to examine the BIND response and check the RU size and pacing counts entries. See the IBM SNA Network Product Formats manual (LY43-0081-1) for a description of the fields in the BIND or call FDR/UPSTREAM technical support.

### 10.3.3. Frame Size

The SNA frame size determines the actual number of bytes that can be transmitted at one time. Many SNA's require that the RU size be at least 9 bytes smaller than the frame size so that RUs fit into frames.

However, some SNA's (Irma for the Mainframe, Rumba, etc.), support segmenting. In this case if the RU size is larger than the frame size, it is segmented to fit into the frame. If you have a small frame size, larger RUs actually degrade performance, as the frame size is the actual transmission value. Thus, you must be sure that the frame size is at least 9 bytes larger than the RU size to guarantee best performance.

### 10.3.4. Token-Ring Window Counts

The send and receive token-ring window counts defines the number of information frames (I-frames) the workstation/server can send/receive before receiving a low-level acknowledgment. These values range from 1 to 8 (or 1 to 127).

These values can impact performance, not just for FDR/UPSTREAM, but for your entire network. Poorly chosen values can cause a significant amount of network thrashing, which when it occurs on multiple workstations, can flood the network.

Since there are a variety of intermediate hardware settings that can affect the optimal values, we recommend that you try various values starting with 1 and moving in powers of 2 (1, 2, 4, 8, etc.) until you see optimal performance.

# 10.4. Other Performance Improvements

Besides the issues you can isolate and help improve in the performance facility, other performance improving items include:

- Duplicate files
- Local backups
- Improving Line Speed
- APPC Software
- Using Multiple PCs
- Eliminating or reducing Bridges and/or Routers
- Choosing appropriate test times
- Screen savers
- Disabling server compression
- Record size tuning
- Don't use USMEM.EXE
- Careful use of compression

### 10.4.1. Duplicate Files

The FDR/UPSTREAM duplicate file facility can be an excellent way to improve performance if you are backing up a number of systems that are logically similar (servers or workstations). See the duplicate file section for a description of the facility and its best usage to improve performance.

### 10.4.2. Local Backups

Local Backups are a technique of FDR/UPSTREAM where some data is stored on the local system as well as being transmitted to the host. In low-communications speed environments this technique can significantly improve restore performance. See the Local Backup section for a more detailed description of this facility.

### 10.4.3. Line speed

Line speed is the most important performance modifier. 2400 baud dial up lines are always slower than 16 megabit Token-ring connections. However, for most users this is the hardest to modify. But, when looking for the largest improvements, this is where you must start.

Line congestion affects line speed. Even Token-ring lines can get congested (though this is rare).

### 10.4.4. APPC

APPC vendors design their products with different goals in mind. For example, gateways are inherently slower than directly connected devices. Experience has shown that the fastest products are IBM APPC/PC® or IBM

Networking Services/DOS for DOS, DCA IRMA Workstation for Windows for Windows, and OS/2 EE® or CM/2 for OS/2.

### 10.4.5. Multiple PCs

Running more than one PC at a time, on the same LAN with the same server will provide better performance than a single machine, due to the advantages of using multiple CPUs and multiple conversations.

The key to doing this is careful planning. For example, if you have two volumes on your file server, you may choose to use two PCs, each backing up one volume. Remember that you must use separate backup profiles.

### 10.4.6. Bridges and Routers

Bridge and/or router hops reduce overall performance. To increase performance, the goal is to place as few intermediate devices as possible between the file server and the backup PC, and the backup PC and the host connected device.

### 10.4.7. Test Times

Test FDR/UPSTREAM when you will actually be performing the backup. File server congestion, host connection congestion, host utilization and other multi-user usage issues will impact performance, and may in fact be less significant at the time the backups will actually be run. If you can, attempt to run your final performance benchmarks at the same time of day and the same day of the week the backups will actually be run.

### 10.4.8. Screen Savers

Screen savers can take an enormous amount of CPU overhead. It is recommended that these always be disabled.

### 10.4.9. Server Compression

Some file server systems (most notably NetWare v4.x) support compression. Since FDR/UPSTREAM uses standard file access methods, the file server system will be constantly working to decompress/recompress files for transmission to the FDR/UPSTREAM machine. It is recommended that file server compression be disabled when optimizing for performance.

### 10.4.10. Record Size Tuning

The FDR/UPSTREAM parameter Record Size is the size of the logical record stored on the host. However, it does not have to be the physical disk read/write record size or the communications send/receive record size.

To change the transmission record size, there is a parameter PACKRECSIZE, whose default is 32700, which defines the TCP/IP or SNA transmission size. In most environments this is the best value, however, you may find that you may be able to improve performance by reducing it.

To change the disk read/write size, specify an appropriate Record Size (usually best done as a power of 2 i.e. 4096, 8192, 16384) and then specify the environment variable parameter BACKUPBUFFERSIZE to be a mul-

tiple of this value (up to 32700). The actual data read size is an even multiple of the Record Size up to the BACKUPBUFFERSIZE. The default is 32000.

### 10.4.11. (DOS only) Don't use USMEM.EXE

USMEM.EXE (the low memory version of FDR/UPSTREAM) should be avoided when attempting to optimize for performance. While there are situations where there are no alternatives, use of memory managers will give you better performance.

### 10.4.12. Careful use of Compression

Compression can help or hurt performance. If the time to process data is more than made up for the fact that you have to send or receive less data, then compression will help. You should try testing all the compression levels on sample data in a realistic environment to determine which one, if any, helps the best.

A good rule of thumb is that high compression is best on slow links (56K bps or slower), fast compression is good with fast machines (486 or faster) on all fast links or on medium links (like coax) with all machines, and that no compression should be used elsewhere. Compression testing should always be done with the MVS storage requirements in mind.

# 11 THE FDR/UPSTREAM PROGRAM

## 11.1. Overview

This chapter describes all the options and functions available in the FDR/UPSTREAM main program US.EXE. It is helpful, but not required, to have looked through the previous chapters to get a feel for using FDR/UPSTREAM.

This chapter explains what FDR/UPSTREAM does when it starts, and it explains the menus and functions available when you run FDR/UPSTREAM.

There are additional parameters that can be specified on a backup that are specific to each specification. This chapter describes these parameters.

Migration (or Grooming) is the ability to automatically delete files which have been backed up. FDR/UPSTREAM has the ability to automatically delete files once the files have been successfully backed up and track them properly. If you are backing up a file system that supports file last access date, FDR/UPSTREAM can also automatically detect which files have not been accessed for some specified period of time. This chapter explains how to do this. FDR/UPSTREAM can also auto-recall Novell files as well. See the Novell chapter for a description of that facility.

There are additional parameters that can be specified for backups and restores. These include:

- Novell specific parameters
- Compression levels
- Reporting features
- ...and more...

Each backup or restore specification can also have metadata parameters (server security options) and other options. This chapter describes these parameters.

There is an alternate restore facility to the one described in the previous chapter. This chapter describes that facility.

# 11.2. When FDR/UPSTREAM Starts

When US.EXE starts it performs many different actions, some of them transparently. These include:

- Read and Verify Files
- Verify APPC and Start Communications
- Check for Failed Backups and/or Restores
- Start Unattended Operations
- Check for Remote Initiates
- Register your Registration information
- Perform automatic updates

This section outlines each of these steps to help you understand them.

### 11.2.1. Read and Verify Files

***(non-DOS and non-UNIX only)*** The first thing US.EXE does is load the communications and file systems drivers. If any of these executables or libraries cannot be found, FDR/UPSTREAM displays an error message.

***(DOS and UNIX only)*** The first thing US.EXE does is open its system file. This file US.RES must exist in the default directory. If it does not, you will receive a message stating that FDR/UPSTREAM could not load its resource file.

US.EXE then displays the main screen and reads in the configuration and transfer parameters. *Advanced Configuration* and *Advanced UPSTREAM* chapters describes how to set parameters in other ways than using the automated parameter files.

If there are missing or no parameter files, a message is displayed and the remainder of the startup functions are skipped. If the parameter files are found, then they are read in and checked for correctness and completeness.

### 11.2.2. *(DOS only)* Verify APPC and Start Communications

If you are using the Standard version with IBM APPC/PC or compatible (NetSoft, Novell, etc.) once the system and parameter files are read and are verified, FDR/UPSTREAM checks to see if APPC has been loaded. If it does not it displays a message and skips the remaining steps. If it is found, unless otherwise specified, it will begin starting the communications with the mainframe.

Starting communications can be time consuming so message boxes showing the progress are displayed. These boxes contain a <Cancel> button allowing you to stop the process. If you cancel the communications start, you can attempt a restart when you are in FDR/UPSTREAM through the pull down menus.

If you get an error message during session start, verify your parameters, check to see that the hardware is functioning, and verify that FDR/UPSTREAM MVS is installed and available. Error messages while you are starting communications frequently display a return code. This return can be looked up in your APPC manual or in the *Messages* chapter of this manual.

APPC is not verified for TCP/IP, IBM NS/DOS or UNIX, Windows or OS/2 users. It is assumed that host communications is running when FDR/UPSTREAM is started. You will receive an error message indicating a remote allocate failure if APPC has not been loaded. As these facilities start communications with the mainframe, FDR/UPSTREAM's first communications attempt will be to check remote allocates.

### 11.2.3. Check for Failed Backups and/or Restores

Once the communications services have been started, FDR/UPSTREAM checks to see if there was a restartable failed backup and/or a failed restore. If you are running attended (you checked the Attended box in the backup or restore <More...> dialog), you will be asked if you wish to continue this backup or restore. If you say no, then the backup or restore can be restarted later. If you say yes, then the backup or restore will restart immediately from the first failed file. Note that if you have both a failed backup and a failed restore pending, both will be restarted if unattended, or if attended, you will be prompted for both..

### 11.2.4. Start Unattended Operations

If you specified an unattended backup or restore (by not checking the Attended check box in the backup or restore <More...> dialog), then the backup or restore will immediately begin. When the requested function has completed, FDR/UPSTREAM will terminate.

If the unattended operation that you selected was to wait for host initiates, UPSTREAM will wait for the specified amount of time after the last received request (for RMTPARM.DAT this is 1 minute) and then terminate.

### 11.2.5. Check for Remote Initiates

FDR/UPSTREAM continually checks for remote backup or restore requests every 15 seconds after it is started with communications activated and you are at the main display (not in a dialog). Remote requests are also checked for when you begin a new backup or restore.

### 11.2.6. Registration

Registration is performed when the first remote check request has returned no remote initiates. It will be performed periodically thereafter depending upon how it is configured in the UPSTREAM configurator.

### 11.2.7. Automatic Update

If you have specified that this workstation is to be automatically upgraded, the version of UPSTREAM for your operating system type is checked at registration time. If it is different than the master version, when UPSTREAM is idle (not performing a local or remotely requested function), the automatic update process will be honored. See the Management chapter for a complete description of the process.

# 11.3. The FDR/UPSTREAM Menus

Once you enter FDR/UPSTREAM, you have many options available via pull down menus. This section describes the functionality available beyond the backup and restore specifications described in prior chapters.

The menus available are:

- File menu. Its functions include parameter file and system options.
- Action Menu: Besides the backup and restore specification functions, it also allows file transfer, the restart of failed backups, performance bottleneck isolation, toggling of the trace for support purposes, and various other functions.
- Communications Menu: (OS/2, Windows and Windows NT) Allows you to see session parameters. (APPC/PC only) Allows you to control the session and to see the current session status.
- Remote Menu: Allows you to set up for unattended remote operation, accept or reject remote requests, perform your own remote request and perform various registration operations.
- Management Menu: Allows an authorized user to perform certain management functions including viewing/deleting of existing backups, modifying host configuration entries, viewing the status of FDR/UPSTREAM MVS, host reporting and duplicate file management.
- Security Menu. Allows you to modify your active security information and invalidate it.

### 11.3.1. File Menu

This menu allows you to perform parameter file options as well as several system functions. The parameter file options include:

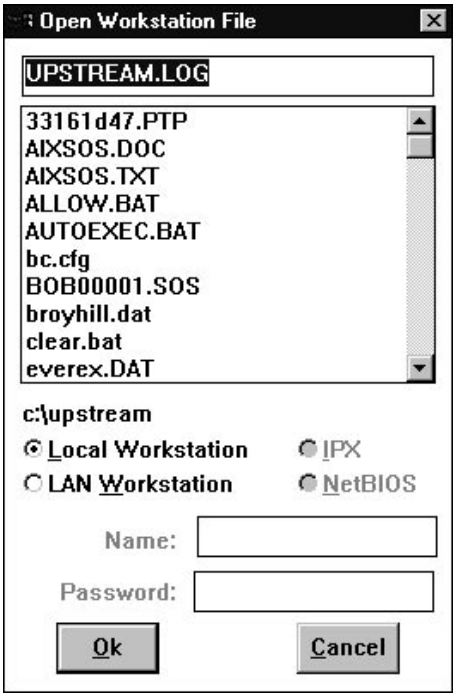
☐ **Open:** This option displays a dialog allowing you to use a previously saved backup or restore parameter file (see figure 11-1).

**Figure 11-1**
**Open Parameter File**

Only those files with the .DAT suffix are displayed in the box (though you can enter any file name). When you open a new parameter file, the backup or restore dialogs are changed to reflect the new parameters. An accelerator for selecting this option is [ALT]O. Note that passwords are not retrieved from parameter files in attended mode for security reasons.

- **Save:** This allows you to save parameters that you changed in the backup or restore dialog, but did not save when you exited it. It displays the same save dialog as when you press the <Ok> or button in the backup or restore dialog to allow you to specify the file name to save. An accelerator for selecting this option is [ALT]S.

- **View:** This option allows you to view a standard text file without starting another program, and is most often used to viewing the UPSTREAM logs and reports. When you select this option, you see the Open Workstation File dialog (see figure 11-2).




If you press the <Local Workstation> radio button, the list and the file you view will be a file on your workstation or server. If you press the <LAN Workstation> radio button then you will be viewing a file on an ULTra workstation and you must enter the connection type and workstation name (and optionally the password).

When you select a file, you will see it displayed in a list box. There are <Top of File> and <End of File> push-buttons to move through the file as well as push buttons to open another file and to close the current file. Note that in many cases, using the scroll bars to scroll through the file will not work as it is paged into memory based on the highlighted item in the list box, so we recommend the use of the cursor keys, control keys (i.e. [PgUp], [PgDn]) or control push buttons.

The system options in the file menu include:

- **Exit:** When you select this option a message box is displayed asking if you wish to exit FDR/UPSTREAM at this time. Press <Ok> to exit, or <Cancel> to remain in FDR/UPSTREAM. An accelerator for selecting this option is [ALT]X or [F3].

- (DOS and UNIX only) DOS/**Shell: When** you select this option a message box is displayed asking you to press <Ok> to go to DOS, or <Cancel> to remain in FDR/UPSTREAM. If you press <Ok> to go to DOS (or the command line in UNIX), then the screen will clear and you will see a standard prompt. FDR/UPSTREAM is suspended, but the session with the mainframe remains active.

  When you are ready to return to FDR/UPSTREAM, type EXIT from the command prompt. An accelerator for selecting this option is [ALT]D.

  (DOS) Note that this option may not work if you have a limited amount of available DOS memory.

- **About:** Selecting this item displays a dialog providing a simple explanation of FDR/UPSTREAM and the current version number. The only option is the <Ok> button. (DOS/UNIX) Note that the version displayed is the version of

**Figure 11-2**
**Select File to View**

the resource file, not necessarily the version of the program. It is thus important that you upgrade these files together.

### 11.3.2. Action Menu

This menu provides the backup and restore functions described as well as a trace option.

- **Backup:** See chapter 8. An accelerator for selecting this option is [ALT]B.
- **List and Restore:** See chapter 9. An accelerator for selecting this option is [ALT]L.
- **Restart Backup:** This option is grayed and unavailable unless there is a failed backup and communications are currently available. If this option is not grayed, you can restart a failed backup (or a backup where certain files were unavailable) by merely selecting this option.
- **Kill Restartable Backup:** This option is grayed and unavailable unless there is a failed backup pending and communications are currently available. If this option is not grayed, you can specify that a backup never be restarted by selecting this option. You will have to confirm that you really don't ever want to restart the backup and then FDR/UPSTREAM will delete it's restart information for that backup.
- **Restart Restore:** This option is grayed and unavailable unless there is a failed restore pending and communications are currently available. If this option is not grayed, you can restart a failed restore by merely selecting this option.
- **Kill Restartable Restore:** This option is grayed and unavailable unless there is a failed restore pending and communications are currently available. If this option is not grayed, you can specify that a restore never be restarted by selecting this option. You will have to confirm that you really don't ever want to restart the restore and then FDR/UPSTREAM will delete it's restart information for that restore.
- **File Transfer:** This option allows you to exchange files with the host. See the File Transfer chapter for a complete description.
- **File Migration:** A facility designed to migrate (identify, and remove) files off the workstation/server. See later in this chapter for a description of the facility.
- **Trace:** Select this option only on the request of FDR/UPSTREAM technical support.
- **Performance**: This option displays a performance test dialog which allows you to isolate performance bottlenecks. See the performance chapter for a complete description of this option and other suggestions on how to improve performance. An accelerator for selecting this option is [ALT]P.
- **Set Environment:** Allows a method of setting lesser used FDR/UPSTREAM parameters that are usually set through environment variables. See the Advanced FDR/UPSTREAM chapter for a complete description.
- ***(OS/2 only)*** **Set Priority:** See the Advanced UPSTREAM chapter for a complete description An accelerator is [ALT]Y.
- **Run a Job:** See the Advanced FDR/UPSTREAM chapter for a complete description. An accelerator is [ALT]J.
- **Restore and Inquiry (old):** See later in this chapter. An accelerator is [ALT]R.
- **As of...Restore**: An obsolete feature. No longer documented.

### 11.3.3. Communications Menu

The communications menu provides services which allow you to view negotiated communications information, and (DOS) control manually your APPC services.

- ☐ ***(DOS only)*** **Activate Session:** This option allows you to activate the APPC if it is not already active. If you select this option, FDR/UPSTREAM goes through the same steps that it goes through when the program starts (see earlier in this chapter).

- ☐ ***(DOS only)*** **Deactivate Session:** This option allows you to deactivate APPC if it is already active. If you select this option, FDR/UPSTREAM disconnects from the APPC services as if the program is terminating.

- ☐ ***(non-UNIX only)*** **Session Status:** This option displays some of the LU 6.2 parameters such as the local LU name, the partner LU name and the mode name. It also displays whether the session is currently active. Even if APPC has been started, the session may still drop. You can activate a lost session by starting a backup or restore, or by deactivating and then reactivating the session.

  **(OS/2, Windows, Windows NT)** This facility will also show you the negotiated session values of RU size and pacing. The values are extremely important for performance optimization. You must have an active session for these value to be displayed - you may have to perform a function such as security validation, list and restore, etc. Some Windows implementations do not support this facility. These values are written to the log as well as the screen.

### 11.3.4. Remote Menu

The remote menu supports functions related to remote initiation of backups and restores.

- ☐ **Unattended Remote Functions:** This option allows you to specify unattended operations where the control of these operations is remote. This is primarily used to have the PC wait a given amount of time for a remote system to request a function. See later in this chapter for more information.

- ☐ **Accept Remote Functions:** This is a single flag which indicates whether you will accept and process remote requests. Remote functions are accepted if there is a check mark next to the option; they are disabled if there is no check mark. You toggle this flag by selecting the option on the menu (with the mouse or by pressing the [ENTER] key when the option is highlighted). Even if remote functions are disabled, FDR/UPSTREAM will continue to look for them, but will send an error message to the remote indicating that they are disabled.

- ☐ **Request Remote Function:** This option allows you to request that a remote function be performed on another PC. These requests can be directed via the FDR/UPSTREAM MVS program or directly (via APPN, LEN or directly). See the Advanced UPSTREAM chapter for more information.

- ☐ **Listen for Remote Functions:** This is a single flag which indicates whether FDR/UPSTREAM will periodically check for remote functions. Since checking for remote functions is very important for avoiding deadlock situations, we recommend unchecking this only when you are sure that your computer will not receive remote requests (either from another workstation/server or from the host).

- ☐ **Registered Names:** Allows an authorized user to modify the host registered name table as well a specify automatic updates. See the Management chapter for more information.

- ☐ **Resend Target Name:** If you have configured to use a target (registered) name, you can resend it at any time by selecting this option.

### 11.3.5. Management Menu

The management menu allows authorized users to perform certain management tasks.

- **Profile Management:** Allows an authorized user to view backups for all profiles or a selected subset of profiles and delete full backups. See the Management chapter for more information.

- **Profile Configuration:** Allows an authorized user to view, add, modify or delete host profile configuration entries. Options such as allowing a given type of backup, host file names generic and global profiles and more can be set here. See the Management chapter for more information.

- **Status of all FDR/UPSTREAM:** Allows an authorized user to view detailed status about the current functions being performed by FDR/UPSTREAM MVS and perform some functions to it. See the Management chapter for more information.

- **Host Reporting:** Allows a workstation/server user access to the facilities and data of the FDR/UPSTREAM MVS reporting facility. See the Management chapter for more information.

- **Duplicate Management:** Allows an authorized user the ability to view and delete the files currently in the duplicate file database. See the Duplicate File Support chapter for more information.

### 11.3.6. Security Menu

The security menu allows a user to modify or invalidate their existing host security logon information.

- **Host Security Login:** Select this option to display the host security entry dialog. See Your First Backup chapter for the use of this facility.

- **Logout (Reset Security):** Invalidates your login. We recommend that you select this option if you are leaving your workstation/server and are not terminating FDR/UPSTREAM.

# 11.4. Backup Specs

A specification used in a backup, specified by pressing the <Add> or <Update> buttons in the backup dialog, can be of three types. All of these types have additional options available.

- Include: This is the default. These are specifications where the file(s) specified are included in the backup.
- Exclude: These are specifications where the file(s) are specified in another file spec and you wish to exclude these from the backup.
- Migrate: These are specifications where the file(s) are specified in another file spec, you are performing a full merge backup and wish to have certain files deleted from your PC or server and maintained on the host for a given period of time. Migration is further described later in this chapter.

To specify the type of file specification and to modify the associated parameters, add or update a file spec on the backup dialog (see Your First Backup chapter), highlight the file spec you wish to modify and press the **<Spec Detail>** button. You will then see the File Specification dialog (see figure 11-3).

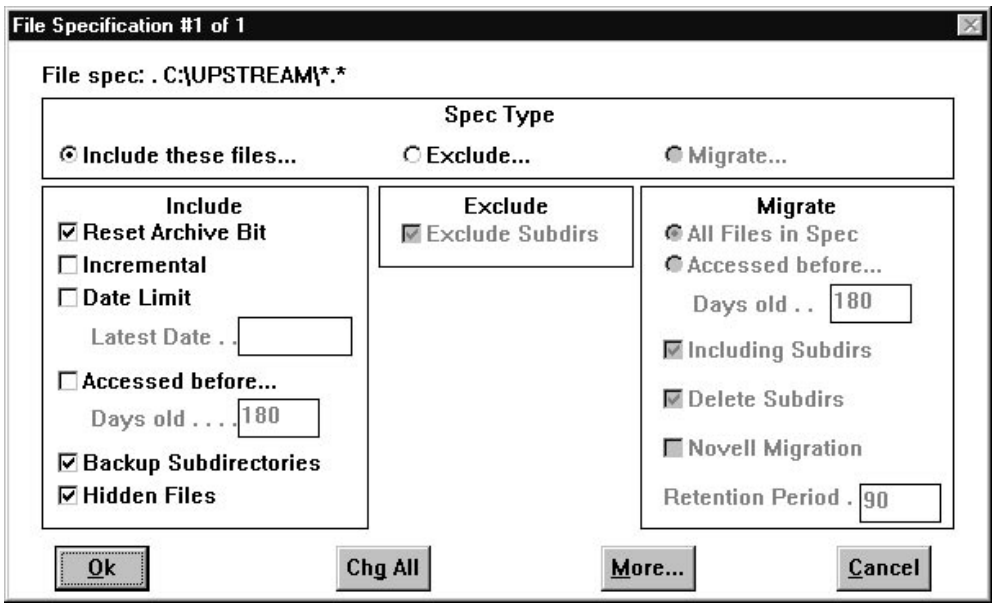



**Figure 11-3**
**File Specification Dialog**

When you select the backup type, the options beneath it are available and the others are grayed and unavailable.

The options under Include these files... are:

☐ **Reset Archive Bit:** (non-UNIX) Check this box if you wish the included files to have the archive bit reset after they have been backed up. The archive bit is set by the operating system when a file has been changed and is used specifically for backups. Use this option for all backups if you wish to perform incremental backups; do not use this option if you wish to perform differential backups except on the full. The default is checked.

- ☐ **Incremental:** Check this box if you wish to perform an incremental backup; i.e.. the files included must have the archive bit set. For UNIX, these are files whose modification date is later than the date of the last backup for this backup profile. This box is grayed if you are performing a full or incremental merge backup.

- ☐ **Date Limit:** Check this box if you wish to include only those files which have been modified later than the date specified . The default is not checked.

- ☐ **Latest Date:** This field is grayed and unavailable unless you have checked the Date Limit box above. Enter a date (in MM-DD-YY format) which will be used to limit the files backed up. For example, September 1, 1994 would be represented as 9-1-94 (leading zeros are optional).

- ☐ ***(UNIX only)*** **Latest Time:** This field is grayed and unavailable unless you have checked the Date Limit box above. Enter a time (in HH:MM:SS 24-hour clock format) which will be used to limit the files backed up. You must also specify a latest date.

- ☐ **Accessed before...:** Check this box if you wish to include only those files which have a last access date before the specified date. Use this option if you wish to migrate files without using the automatic migration facility and is generally not recommended. You can only use this option in file systems which support Last Access Date (such as Novell), and you should use the non file data option to reset the last access date during backups (see later in this chapter). The default is not checked.

- ☐ **Days old:** This field is grayed and unavailable unless you have checked the Accessed before... check box above. Enter the number of days that a file will not be accessed before it will be included in the backup. The default is 180 days.

- ☐ **Backup Subdirectories:** Check this option if you wish the files which match the backup specification to be included in the backup in all subdirectories beneath the given one. Thus, if you wish to backup all the files on the F: drive, use a file specification of F:*.* and check the Backup Subdirectories check box. The default is checked.

- ☐ **Hidden Files:** Check this box if you wish hidden and system files to be included in the backup. Novell v3.x users must check this box to include the binderies. The default is checked.

The options under Exclude... are:

- ☐ **Exclude Subdirs:** Check this box if you wish the exclusion definition to include subdirectories under the specified one. The default is checked.

The options under Migrate... are:

- ☐ **All Files in Spec:** Press this radio button if you wish all the files in this file spec to be migrated to the host regardless of when they were last accessed. This is the default.

- ☐ **Accessed before...:** Press this radio button if you only wish to migrate files in this file spec which have been most recently accessed more than a given number of days ago. You can only use this option in file systems which support Last Access Date (such as Novell), and you should use the non file data option to reset the last access date during backups (see later in this chapter). Pressing this button activates the Days old field below. The default is not pressed.

- ☐ **Days old:** This field is grayed and unavailable unless you have checked the Accessed before... check box above. Enter the number of days that a file will not be accessed before it will be included for migration. The default is 180 days.

- **Including Subdirs:** Check this box if you wish the migration definition to include subdirectories under the specified one. The default is checked.

- **Delete Subdirs:** Check this box if you wish UPSTREAM to delete subdirectories that it empties during the migration. The default is checked.

- **Novell Migration:** Check this box if you wish to leave a "stub" file which will be used by the FDR/UPSTREAM Auto-Recall facility to automatically restore the file when a user accesses it. See the Novell chapter for more information.

- **Retention Period:** Enter the number of days that you wish the migrated files to be merged forward by the host software. Note that the files will remain on the backup tapes or disk files until they expire or are scratched, which may extend past the number of days specified here. The default is 90 days.

The buttons at the bottom of the dialog are:

- **Ok:** Press this button to save your changes and return to the backup dialog.

- **More...:** Press this button to specify additional parameters for this specification. These include metadata parameters (file system specific such as security information), and deletion options.

- **Chg All:** Press this button to have the changes that you have made in this specification copied to all the other specifications and then return to the backup dialog. This is not recommended if you have specified Exclude or Migrate file specifications as the type of specification is changed as well.

- **Cancel:** Press this button to abandon your changes and return to the backup dialog.

# 11.5. Migration

Migration is defined as the action of backing up a file and then automatically deleting it (this is also known as Grooming). FDR/UPSTREAM has the capability to do this and more.

Migration backups can be done in several ways:

- Using the File Migration facility. This is the recommended method.
- As part of a full merge backup. This has the added advantage of having the migrated files easily viewed and recovered through standard inquiry and restore facilities and the host will assure that these files are continuously moved forward until the given retention period has expired. This is the recommended method.
- As part of a separate merge backup, using a separate backup profile. This has the advantage of having the migrated files stored separately from the standard backup (thus saving space), but loses the advantages of easy inquiry and restore.
- As a non-merge backup using a separate profile. This method loses the advantage of real host migration control and it is discussed in the More Specifications section later in this chapter.

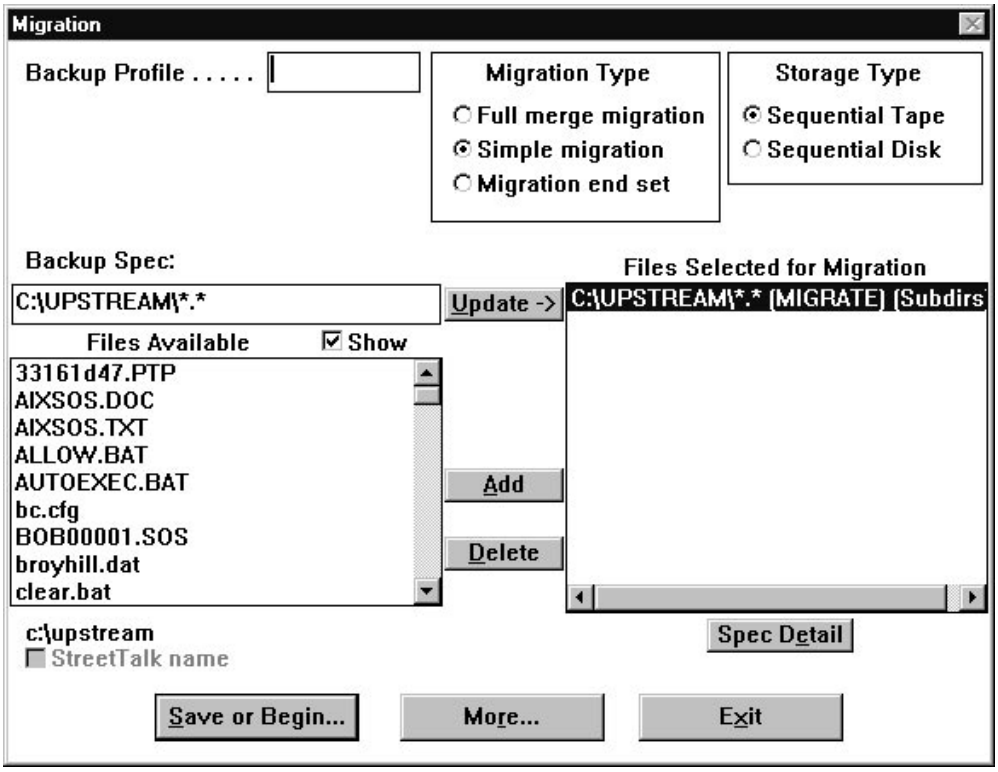
FDR/UPSTREAM can also automatically restore (auto-recall) files on your Novell server whenever a user accesses them. See the Novell chapter for more information.

### 11.5.1. File Migration

If you wish you can integrate your migrated and non-migrated data (see the following section), however, you are encouraged to separate migrated files from your normal production backups by using a **File Migration Only** backup profile.

A File Migration backup profile is a backup profile which is reserved for migrated files only. They cannot be used for regular merge backups and features such as duplicate file checking are specifically disabled. There is a new option in Profile Configuration for setting a profile as **File Migration Profile Only**. The notes at the end of this section denote recommendations for File Migration Profile Only backups.

To perform a migration using the file migration, pull down the **Action** menu and **select File** Migration (see 11f4igure -).




Similar to the standard backup dialog, certain features are disallowed (include file specs, keyed and archived backups, NDS). It also generates a different action type (ACTION=11) which is used to indicate that this is a file migration backup.

While migration has various uses, its most common use will be for Novell auto-recalls.

The most significant change in this dialog is the Migration Type (Backup Type for backups). The values are:

- **Full merge migration:** Similar to a full merge backup, this creates a backup of all newly migrated files, plus it copies any unexpired files from previous full migrations and any files that were migrated with Simple Migration since the last Full Merge Migration. The Simple Migration backups will be uncataloged (if on disk, they will also be scratched). This is usually directed to tape.

- **Simple Migration:** Similar to an incremental MERGE BACKUP, this creates a backup of only the newly migrated files. This is usually directed to disk for faster backup and restore. You should not allow DASD management systems (such as FDR/ABR or DFHSM/DFSMShsm) to migrate these backups.

- **Migration End Set:** Identical to a Full Merge Migration, except that it marks the profile so that the **next** Full Merge Migration will not copy forward any migrated files from this (or previous) full migration backups. As the name "end set" implies, this ends a set of migration backups so that the next migration will create the beginning of a new self-contained set for this profile. See Note 3 below. This is usually directed to tape.

### 11.5.2. Usage notes

**1.** Migrated files are not deleted from the workstation until all of them are backed up. For Full Merge Migration, the deletion does not occur until the merge from previous backups is complete. If the migration fails while the workstation is sending files to MVS and the migration is marked restartable, you may restart the migration. However, if the migration fails while it is merging migrated files from previous backups, the backup will be discarded and must be started over. If the merge fails because some expected previous backup is not available (e.g., no longer cataloged or not on the expected disk), you must manually delete the unavailable backup from FDR/UPSTREAM's records (see removing backups in Profile Management) or recover a vaulted copy of the missing backup before redoing the migration.

**2.** Innovation recommends that you do Simple Migrations on a frequent basis (e.g., daily or weekly) to disk. This allows for fast restores if the data is needed. Full Merge Migrations should be done on an infrequent schedule (perhaps monthly). The data set names used for the Simple Migrations on disk (DASDPREF) and for the Full Merge Migrations on tape (TAPEPREF) should be different. You may want to make the tape backups a GDG, with a limit of at least 3 or 4 generations so that backup copies of the migrated files are retained (but see the notes on backup retention below); the disk backups do not need to be a GDG, but you must insure that they are retained until the next Full Merge Migration (not deleted by a DASD management system).

**3.** "Migration End set" can be used when the amount of unexpired migrated data in the current full migration backup has become so large that merge processing time or the number of tapes required has become too large. The Full Merge Migration backup it creates will be the last one in this "set" of migration backups; subsequent migrations will contain only the files migrated after this point. But this means that this migration end set must be retained until all of the migrated files on it reach their individual expirations; see the notes on backup retention below. Migration End set will probably not be required unless:

- a large amount of data has been migrated under this profile with a long retention.
- the maximum file retention used under this profile exceeds 1 year.
- you do manual migration (not based on date of last usage) of a set of files and need to keep them for an extended period (longer than the usual migration retention).

**4.** Since these migration backups are the only copies of the migrated data sets, Innovation strongly recommends that you create backup copies using the USTVAULT utility (See the FDR/UPSTREAM MVS manual).

### 11.5.3. File Retention vs. Backup Retention

As mentioned earlier, migrated files are given a retention period as part of the file spec used to select them. This retention used to calculate an expiration date associated with each migrated file. When a Full Merge Migration is done, previously migrated files are always copied forward to the new full backup unless they are past their expiration date, so expired files are automatically discarded. If you do not use the Migration End Set option, this means that the latest full migration will contain all unexpired files that have ever been migrated under this profile (we recommend that you retain several previous full migration backups for safety). You can view the expiration dates by checking the **Display expiration dates** checkbox in the Restore parameters dialog from List and Restore.

However, if you do use the Migration End Set option (see Note 3 above), the migrated datasets on the backup created by that option are **not** copied forward to subsequent migration backups. You must insure that this end set backup is retained until every migrated file on it has reached its individual expiration date.

The easiest way to do this is to use the configuration option to include an exclamation mark (!) in the backup dataset prefix in the profile (see DSN Prefix in the description for Profile Configuration); "Migration End set" will replace that with an "E", while it is replaced with a "F" for Full Merge Migration or "N" for Simple Migration. This allows you to create one GDG for the normal Full Merge Migrations (keeping 3 or more generations)

and a separate GDG for the Migration End Set backups, allowing them to be kept much longer. Depending on how often you intend to do a Migration End set, you must define this GDG with sufficient generations so that the backups are retained until the migrated files with the highest retentions reach their expiration dates. For example, if you do Migration End set once a quarter, and the highest retention is 365 days (1 year), the end set GDG should have at least 5 generations (5 quarters).

If you are doing migrations as part of MERGE BACKUPs, note that if you do a "First Time Full" backup, this will not copy any previously migrated files from previous full backups, so the previous full merge backup will need to be retained until all of the migrated files expire. There is no convenient mechanism for automating this, so you may need to manually change the retention of that previous full backup in your tape management system. This is one reason why separate migration is now the recommendation.

### 11.5.4. Last Access Date

Some file systems store and maintain much more information than is stored in the DOS FAT file system. Novell, OS/2 HPFS, Banyan using HPFS, UNIX file systems and NTFS will maintain a Last Access Date which is the last date that the given file was opened for any reason.

FDR/UPSTREAM can optionally respect this date on backups. When performing a backup of a file system which supports Last Access Date, FDR/UPSTREAM can save the directory information before opening the file and replace it after closing the file. As you would expect, this is essential for Migration.

**WARNING: If you are using Last Access Date for Migration, you must have all backup products reset it. For FDR/UPSTREAM backups, see the <Spec Detail>, <More...> dialog.**

### 11.5.5. Migration as Part of Backups

In releases of FDR/UPSTREAM prior to V2.5.4, file migration was done as part of regular backups (either MERGE BACKUPs or non-merge backups). This can still be done, but the separate migration described above is now the recommended way of doing this. In this mode, migration file specs are included with the backup file specs and the migrated files are included in the backups. For MERGE BACKUPs, the migrated files are copied forward to each successive full backup until they reach their expiration date.

For example, if you are regularly performing merge backups on the F: drive (F:*.*) and wish to migrate files in the F:\USERS directory which have not been accessed in more than 180 days create the following file specs when you are running a full merge.

```
Spec #1: F:\*.*
            Include these files:    Pressed
            Reset Archive Bit:      Checked
            Incremental:            Not checked
            Date Limit:             Not checked
            Accessed before:        Not checked
            Backup Subdirectories:  Checked
            Hidden Files:           Checked

Spec #2: F:\USERS\*.*
            Migrate:                Pressed
            Accessed before:        Checked
            Days old:               180
```

```
Including Subdirs:      Checked
Retention Period        90
```

When this backup is run, all the files on the F: drive will be backed up and the files in the F:\USERS directory which are older than 180 days will be deleted. These files will be stored on the host and merged forward onto subsequent full backups until the retention period (180 days) has expired.

### 11.5.6. Migration Inquiries and Restores

Version inquiries will display all backup file specs including Migration file specs as a check box in the version inquiry file spec dialog.

To see migrated files in file inquiries, you need to press the **Display Migrated Files** check box in the Restore Parameters dialog. When a File Inquiry is performed for a migrated file there will be the text [MIGRATED] in the column used to indicate file size.

Next to the Display Migrated Files checkbox are two checkboxes:

- ☐ **Only**. If checked, then only migrated files are displayed; standard (non-migrated) files are not displayed. This can be useful in determining specific migrated files to restore.

- ☐ **Display Expiration Dates:** (List and Restore only) If checked, the file list includes the expiration date for migrated files. Note that this is the last date that files will be merged forward - they will remain on the host until the disk or tape file expires.

There are two ways to restore migrated files:

- Specifically add or update a migrated file in the Inquire Files list box (using the mouse or keyboard)
- Specify wildcards in the Specification field and check the Restore migrated files checkbox in the <More...> dialog.

**NOTE: Files which have been migrated, restored and then backed up again will no longer be marked as Migrated and will no longer be carried forward by the host automatically.**

# 11.6. More Backup/Restore Parameters

You can specify several significant parameters for either backups or restores by pressing the <More...> button from the backup,or restore dialogs. Note that several of these fields may be grayed either because server support is not loaded or these functions are not appropriate to your context (for example, backup only parameters will be grayed when you are in a restore dialog).

Figure 11-5 shows the <More...> dialog:

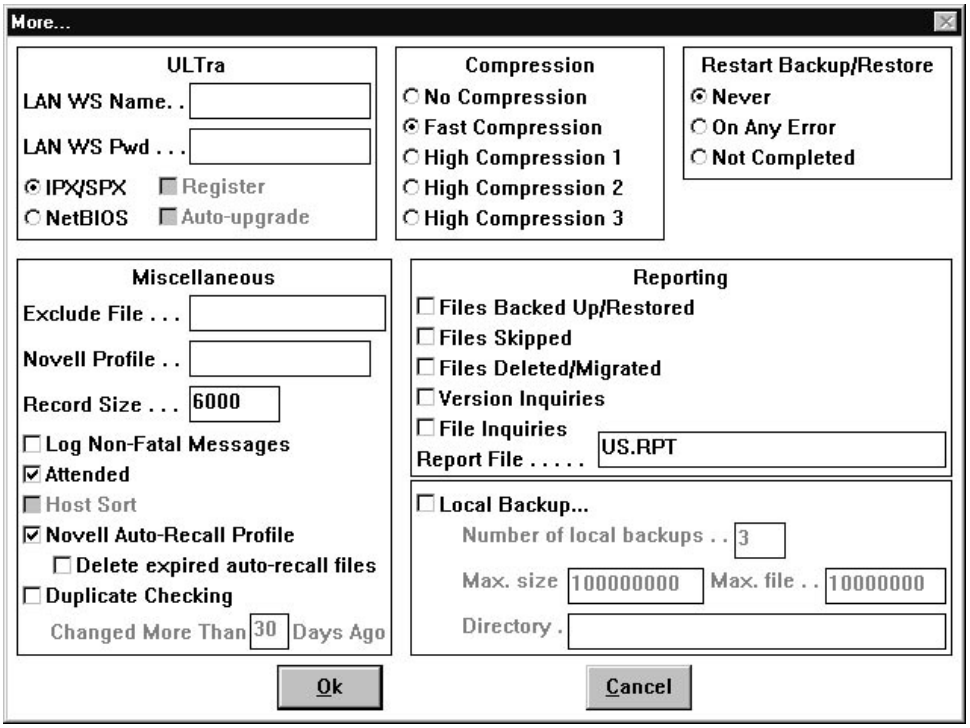



**Figure 11-5**
**More Backup/Restore Parameters**

***(non-UNIX only)*** The options in the ULTra frame are further described in the ULTra chapter.

- **LAN WS Name:** (FDR/UPSTREAM ULTra) The LAN Workstation Name is used when you are using this PC to back up or restore the files on another PC on the LAN. This field is grayed unless you have Novell drivers loaded and active. LAN WS Name references a name specified on a workstation where the ULTRA workstation program is run or an ULTra profile (if preceded by an '@').. See the ULTra chapter for more information. The default is blank (not using this feature - you will be backing up files on a local or server disk).

- **LAN WS Pwd:** (FDR/UPSTREAM ULTra) The LAN Workstation Password is used when you define a LAN WS Name and the workstation that you are backing up or restoring has defined a password. This field is grayed unless you have LAN drivers loaded and active. The default is blank (no password).

- **IPX/SPX or NetBIOS:** You must check one of these radio buttons if you have entered a LAN WS Name to indicate the method you wish to use to contact the ULTra workstation. The default is IPX/SPX.

- ☐ **Register:** Check this box if you wish to register the ULTra workstation with the host. You must check this box to use the auto-upgrade facility. The default is not checked.

- ☐ **Auto-upgrade:** Check this box if you wish to automatically upgrade the FDR/UPSTREAM ULTra software on the ULTra workstation. This facility requires sophisticated setup; see the Management chapter for more information.

The compression radio buttons allow you to specify the type of compression used during the backup. These fields are grayed for restores. Each level or compression has advantages and disadvantages. The default is fast compression.

- ☐ **No Compression**: If you press this radio button, then the data will not be compressed. Select no compression for the highest performance in local Token-Ring environments with medium to slow PCs where reducing data storage is less important than throughput.

- ☐ **Fast Compression:** If you press this radio button, then a high performance compression method will be used. This method if not particularly effective with many types of files in reducing the amount of data transferred. Select this option for high performance in most high speed communications environments.

- ☐ **High Compression:** If you press one of the high compression buttons, then the maximum compression will be used. These methods are very effective on all types of files. However, they significantly impact the performance of the backup and require additional memory. High compression is recommended in low speed environments (56K bps or less), in high speed environments where MVS storage is at a premium and for small backups. The three levels of high compression run at about the same speed, but take increasing amounts of memory and are slightly more effective (1-3% per level).

  The additional memory requirements are:

  - High Compression 1: 26K
  - High Compression 2: 46K
  - High Compression 3: 91K

The Restart Backup/Restore frame lists radio buttons which allow you to select the situations in which a failed backup or restore will be restarted.

- ☐ **Never:** If you press this radio button, and a backups or restores failed for any reason, it will not be restarted.

- ☐ **On any error:** If you press this radio button, and a backups fails for any reason or a file is skipped for any reason the backup will restart at the point of failure (if the backup did not complete) and/or skipped files will be retried. This field is grayed for restores.

- ☐ **Not completed:** If you press this radio button, and a backup or restore does not complete, the backup or restore will restart at the point of failure. Failed files during a backup will also be retried. If the backup or restore runs to completion (regardless of whether files were skipped), then it will not be restarted.

The Miscellaneous frame consists of a variety of options:

- ☐ **Exclude File:** Enter an exclude list file, formatted as described later in this chapter.

- ☐ ***(non-UNIX only)*** **Novell Profile:** (Novell Unattended Login) The Novell Profile references a profile name created using the SETNOV (Novell icon) program. This field is grayed unless you have Novell drivers loaded and active. Novell NetWare users who wish to automate their attachment to a particular server with a given user name and drive mappings should enter the predefined profile name value in this field. All other users should leave this field blank. See the Novell chapter for more information. The default is blank.

- ☐ **Record Size:** The record size determines how the file is blocked during the transfer to the mainframe and is usually considered a tuning parameter. This field is grayed unless you are defining backup parameters. Smaller records require less memory but can be slower in transfer speed. Larger records require more memory and may be inefficient in remote storage utilization. We recommend that you use the default value of 6000.

The meaning of the check boxes are:

- ☐ **Log Non-Fatal Messages:** If you check this box, FDR/UPSTREAM messages that do not terminate a backup or restore will be displayed and written to the log. These messages include detail on why a file was skipped, failure to obtain non-file data and the like. It is recommended that this button be checked during testing and the initial phases of production and be unchecked when the log or reports are regularly checked for backup or restore completeness. The default is unchecked.

**NOTE: Significant warning messages may be missed in backups, restores and inquiries if the Log Non-Fatal Messages button is not checked.**

- ☐ **Attended:** If you check Attended it is assumed that this is an attended backup or restore. Do not check this box if you are building a parameter file for unattended backups or restores. The default is checked.

**NOTE: Unchecking the Attended button and saving it as the default parameter file will cause FDR/UPSTREAM to automatically perform a backup or restore when it is started. Do not save an unattended parameter file to UPSTREAM.DAT**

- ☐ **Host Sort:** Check this box if you wish the host sort utility utilized on restores. There is a certain amount of overhead in using the sort, so the default is not checked though you may want to enable it if there are problems in using the standard method. This field is grayed for backups.

- ☐ **Novell Auto-Recall Profile:** You must check this box if you are backing up a Novell server and are using the FDR/UPSTREAM Auto-Recall facility otherwise all backups will cause FDR/UPSTREAM to automatically recall all files. For this reason, the default is checked.

**WARNING: You must check the Novell Auto-Recall Profile box if you are using Novell Auto-Recall to prevent all files from being recalled on backups.**

- ☐ **Delete expired auto-recall files:** This field is grayed unless you have checked Novell Auto-Recall Profile above. If checked, FDR/UPSTREAM will check all stubs left by FDR/UPSTREAM Auto-Recall during standard backups to determine if they have expired. If they have expired, the stubs will be deleted. The default is not checked.

- ☐ **Duplicate Checking:** If you check this box then placeholder records are send instead of the actual file data for files with last modification dates greater than the value specified. See the Duplicate Files chapter for more information. The default is not checked.

The following section describes the reporting options. Section 11.6.3. describes the local backup facility.

### 11.6.1. Reporting

FDR/UPSTREAM PC can be configured to write detailed information to a report file including:

- Files backed up or restored. Every file backed up or restored is included.
- Files skipped. Files skipped during the backup are written to the report file as well as written to both the PC and MVS logs.
- Files deleted. If you are using the automatic deletion feature (see later in this chapter), every file deleted is written to the report.
- Version inquiries: The results of the version inquiries (all version and files specs within the versions) are written to the report.
- File inquiries: The results of each file inquiry (in directory format) is written to the report.

The report file is simply a text file on the PC which contains the date and time of each event followed by the specific information for that event. Report files can be displayed with the viewing facility, your favorite text editor, printed, and, like UPSTREAM.LOG, maintained by USLOGCLR (see chapter 11).

A simple backup report entry might look like:

```
Tue Apr 12 16:05:10 1994
   Backup starting
   Backed up: c:\AUTOEXEC.BAT
   SKIPPED: c:\GO.BAT
   Backed up: c:\CONFIG.SYS
```

A simple inquire files entry might look like:

```
Mon Apr 11 15:21:27 1994
   Inquire files starting:
   Inquire files: g:\test\*.*
                        <DIR>        ..
      01/18/94 17:06:28          3 US.RET
      02/17/93 16:19:15        512 BACK$LOG.000
```

To specify reporting options, press the <More...> button on the Backup, Restore or "As of...Restore" main dialogs and select any of the options in the Reporting frame. Each of the check boxes enables one of the reporting features. The report file name allows you to specify the name of the file that report information will be written to.

Report options are written to parameter files. Thus, if you wish you can change reporting options with each backup or restore, or control them from the host.

### 11.6.2. Exclude List

UPSTREAM supports an exclude list file which can allow you to specify any number of files to be excluded from a backup or restore.

The exclude list is a text file, each line indicating the file(s) to be excluded:

```
"<File name>" <subdirectory flag> <comments>
```

Where:

- "<File name>": The fully qualified file name, surrounded by quotes, of file(s) you wish to exclude from the backup or restore. You may use wildcards in the file name. Non-UNIX systems may use the generic '#' drive letter indicating any drive.

- <subdirectory flag>: Y indicates that all files in subdirectories beneath the one selected will be excluded. N indicates to only exclude these files in the specified subdirectory.
- <comments>: Any text, to the end of the line, that will help you remember the entry.

You specify the exclude list file name in the <More...> backup or restore dialog. You can also specify it from the command line, environment or the host with the UPSTREAM parameter EXCLUDELISTNAME.

Note that exclude definitions can slow down the process of building the backup file or the restore, in some cases significantly. You should experiment with adding entries and determining the performance impact before actually implementing a long exclude list in your environment.

If you do not specify a drive or directory for a file, the '#' (universal) drive and subdirectories flag will be assumed.

(Non-UNIX) A sample EXCLUDE.LST file is provided (see below) which will work with most environments. We recommend deleting lines inappropriate to your environment.

```
"#:\BACKOUT.TTS"  Y   Netware     Transaction Tracking File
"#:\EA DATA. SF"  Y   OS/2        Extended Attribute File
"#:\SWAPPER.DAT"  Y   OS/2        Virtual Storage Paging File
"#:\386SPART.PAR" Y   Windows 3.1 Virtual Storage Paging File
"#:\SPART.PAR"    Y   Windows 3.1 Virtual Storage Paging File
"#:\WIN386.SWP"   Y   Windows 95  Virtual Storage Paging File
"#:\PAGEFILE.SYS" Y   Windows NT  Virtual Storage Paging File
"#:\US1.TRC"      Y   UPSTREAM    Trace File
"#:\US2.TRC"      Y   UPSTREAM    Trace File
"#:\UPSTREAM.BKP" Y   UPSTREAM    Temporary Backup File
```

### 11.6.3. Local Backups

Local backups are yet another way to improve restore performance. In a local backup, the files are stored on the workstation/server, in compressed format, in a directory of your choosing, with certain restrictions you can specify as well as being transmitted to the host.

Inquires and restores appear as if the data is stored only on the host, but if enabled, the data is recovered from t he local workstation's repository rather than being transmitted from the host. This results in much faster restore performance, particularly in low-speed communications environments. Management tasks such as merges, profile management, etc. are local backup aware.

Note that if the local workstation's backup information is lost, the files will automatically be transmitted by the host. Furthermore, if you perform a restore where some files are locally stored and some are stored only on the host, FDR/UPSTREAM will recognize this and use local storage whenever possible, and transmit the remainder from the host.

The local backup fields in the backup or restore **<More...>** dialog are:

- ☐ **Local Backup:** Check this box if you wish to enable storage of your data locally on backups or to restore from local storage on restores. For backups, the remainder of the fields are available for entry if this box is checked. On backups, all local backup files are automatically excluded from the backup. The default is not checked.

- ☐ **Number of local backups:** Specify the total number of local backup files to be stored on the workstation/server (each complete backup becomes one backup file). When this number is exceeded the oldest is automatically deleted and the host is notified. You can specify from 1 to 255; the default is 3.

- ☐ **Max size:** The maximum number of bytes stored locally in the local backup file. When this number is exceeded FDR/UPSTREAM stops writing to the local backup file. The default is 100,000,000 bytes.

- ☐ **Max files:** The maximum file size that a file can be and be stored in the local backup file. This is based on the size in the directory entry, not the final compressed size. If a file is larger than this size, this file is not placed in the local backup file. The default is 10,000,000 bytes.

- ☐ **Directory:** The directory where the local backup files will be stored. The default is the WORKPATH directory. If you change the directory and leave this field, and there are local backup files in the original directory, you will be asked if you wish to move your current local backups to that directory. If you answer **Yes**, then the files are moved. If you answer **No**, you will be asked if you wish to delete the local backup files in the original directory.

Local backup files are stored in the specified directory with the name:

```
<Backup Profile>.<number>
```

Where <number> is from 1..255. The number 0 is reserved as a control file. For example, backups using the backup profile SERVER1 will have backup files named SERVER1.000, SERVER1.001, etc.

The host is notified of all local backups stored on the workstation whenever a merge backup, a restore or profile management is performed. Thus, it is very important that if local backups are enabled, that the local backup directory be correct. If you move files to a new directory, all parameter files (workstation/server or host stored) must be modified to show the new directory.

There is a column in the Profile Management and Restore Parameters dialogs: **Lcl**. This column displays the local backup file number if the local backup is currently known to the host (the host must know about local backups for them to be utilized for restores). If you delete a backup in Profile Management the local backup file is also deleted. See the Management chapter for a more detailed description of Profile Management.

Local backup support can be Personalized so that only authorized users can use it. See the Advanced Configuration chapter for a detailed description of this facility.

There is a program, READLCLB.EXE (available on the UPSTREAM BBS) which allows directory listings and file-data only extractions of files from a local backup file.

# 11.7. More Specification Parameters

There are additional parameters that can be specified with each backup and restore file specification. These parameters relate to metadata (file system specific features such as security) and rarely used parameters. If you wish additional information about the file system parameters see the appendix associated with your server vendor.

You can access these options by pressing the <More...> button in the backup file specification dialog, the restore file inquiry dialog or the As of...Restore specification dialog (see figure 11-6).

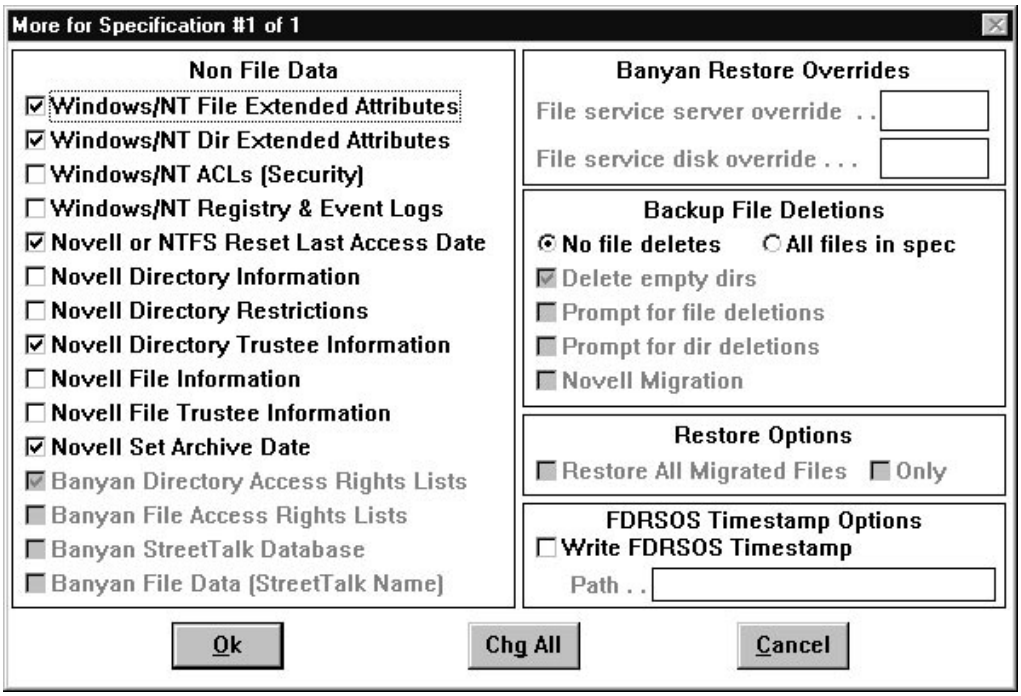



**Figure 11-6**
**More Specifications**

Note that this dialog varies significantly depending upon your operating system type, the one displayed is the OS/2 variety.

Some fields will be grayed and unavailable in the dialog depending upon whether you are performing a backup or restore, whether certain file systems are available, etc.

Many of the parameters are specific to a file system type. See the chapter relating to your specific file system for more information.

The non-server specific non-file data options are:

- ☐ ***(OS/2 and Windows NT only)*** **[OS/2][Windows NT] File Extended Attributes:** Check this box if you wish extended attributes for files to be included in the backup or restore. There is a certain amount of overhead in detecting

and reading extended attributes, and you may see errors if the files are locked (the extended attributes may not be available even though the file is, and will be backed up). The default is checked.

- ☐ ***(OS/2 and Windows NT only)*** **[OS/2][Windows NT] Dir. Extended Attributes:** Check this box if you wish extended attributes for directories. The default is checked.

- ☐ ***(OS/2, Windows NT and UNIX only)*** **Reset Last Access Date:** Check this box if you wish a file's last access date to be reset to its original value after it has been backed up. This is usually required when using migration, but should not be used otherwise as there is significant overhead. The default is not checked.

- ☐ ***(UNIX only)*** **Backup files opened for Update:** Check this box if you wish to perform a "dirty" backup - one which the files are not guaranteed to have internal integrity due to application/system buffering. The default is not checked.

The Backup File Deletions frame consists of parameters which are used in specifying automatic deletions. You would only use these options if you are performing migration and do not wish to use the automatic migration facilities described earlier in this chapter because you are not using merge backups or wish to store these files in a different backup profile. It is strongly recommended that you use the merge backup migration facility rather than these features.

- ☐ **No file deletes:** If this radio button is pressed, when the backup has completed, files are not automatically deleted. This radio button is pressed by default.

- ☐ **All files in spec:** If this radio button is pressed, all the files in the backup will be automatically deleted (subject to prompting specifications below). The default is not pressed.

The following three checkboxes are enabled only with the All files in spec button pressed.

- ☐ **Delete empty dirs:** If you check this box, directories which are emptied through automatic deletions are removed automatically. The default is checked.

- ☐ **Prompt for file deletions:** If you check this box, you are prompted with a message box asking if you wish to delete each and every file. These messages boxes do not time out and there can be a large number of them so check this box with care. The default is not checked.

- ☐ **Prompt for dir deletions:** If you check this box, you are prompted with a message box requesting if you wish to delete the files in the displayed directory. Note that this is also a message box which does not time out. The default is checked.

  In a backup in which deletions are specified, you are given a chance to abort the deletion process when the backup has completed and before the deletions begin, regardless of whether you have prompting enabled or not. A dialog is displayed with message 2080D which does time out.

  If you press the <Ok> button before the time-out, the deletion process will be skipped. The time-out can be configured separately from the Messages Time Out by specifying the environment variable Environment Variable USDELETETIME. The default is 10 seconds.

The Restore Options frame consists of a single parameter which is available when performing restores on merge type backups.

- ☐ **Restore migrated files:** Check this box if you wish migrated files included in the restore. Migrated files are automatically included if you select them individually from the Inquire Files list. This check box is only valid if this file spec includes wildcards. You can press the **Only** checkbox if you wish to not restore standard files (only migrated files).

The FDRSOS Timestamp Options frame consists of options if you have the FDRSOS product. See the FDRSOS chapter for more information.

# 11.8. Restore and Inquiry (old)

The old Restore and Inquiry facility has several advantages over the List and Restore facility and is thus still included in the product, including:

- Support for Banyan StreetTalk. The new facility does not support StreetTalk database entries or the extended StreetTalk definitions (see the Banyan chapter for more information).
- Available when host connectivity is not functioning. The List and Restore facility requires host connectivity to be used. Thus if you wish to build parameter files or perform other off-line restore preparation functions, you can do this.
- Allows access to drives which are not included in the highlighted file spec.
- Allows users familiar with older versions of UPSTREAM a familiar user interface.

When you pull down the Action menu and select Restore and Inquiry (old) you see the Restore Specification dialog (see figure 11-7).

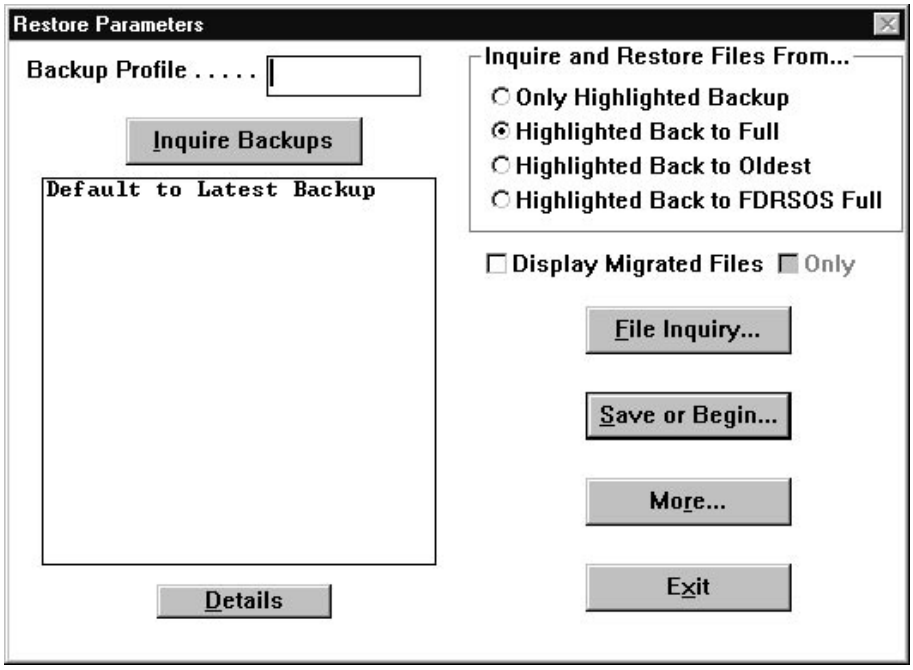



**Figure 11-7**
**Restore Parameters (old)**

The meanings of the first edit field is:

☐ **Backup Profile:** Specify the same Backup Profile that you specified for the backup. This field has a maximum of 8 characters and is required.

The push button under the edit fields is:

- **Inquire Backups:** This button performs an Inquire Versions. The PC establishes a conversation with the mainframe and receives the information for all backups for the Backup Profile. If you do not press this button, the information you will view and restore will be from the last backup stored for the profile.

- **Backups List:** This list box contains the formatted version dates once you have performed an inquire versions (with the <Inquire Backups> button). If you double click on an entry with the mouse, then details about that backup is available. The entry highlighted is used if you press the <Details> button.

- **Details:** This button allows you to examine the specific information for the backup version highlighted in the Backups list box above. You must press the <Inquire Backups> button to extract versions before viewing their detail.

The Inquire and Restore Files From... radio buttons allow you to select whether file inquiries and restores will use a single version or multiple versions (which may display multiple files). Note that these options are only used when working with Merge backups.

- **Only Highlighted Backup:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) File Inquiries will show only the files stored in that one backup.

- **Highlighted Back to Full:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) and all versions back to and including the full. If there are multiple copies of a file, all will be displayed. A restore will include the latest copy of each file (regardless of which backup it is on), or any specifically selected files. This is the default option.

- **Highlighted Back to Oldest:** File inquiries and restores will use the backup version which is currently highlighted, or the latest version (if you have not pressed the <Inquire Backups> button) and all versions back to the oldest version stored on the host for this profile. If there are multiple copies of a file, all will be displayed. A restore will include the latest version of each file (regardless of which backup it is on) from the selected backup back to the full, or any specifically selected files (which may be before the full backup).

- **Highlighted Back to FDRSOS Full**: If you have FDRSOS® and if selected, the workstation/server software will extract the modification date/time of the FDRSOS Timestamp file and the host software will transmit files in backups which were performed since that date. If selected, the workstation/server software will extract the modification date/time of the FDRSOS Timestamp file and the host software will transmit files in backups which were performed since that date. See the FDRSOS chapter for more information.

The check boxes are:

- **Display Migrated Files:** Check this box if you are using Merge type backups and you have migrated files stored on the host. Checking this box does not necessarily include the files selected in a restore. See the Migration section in The UPSTREAM Program chapter for more information on migration/grooming. The Only checkbox is available if you check this box. The default is not checked.

- **Only**: Check this box if you wish to display only migrated files; i.e. no regular files. You must check the Display Migrated Files checkbox to check this box. The default is not checked.

The push buttons at the bottom of the dialog allow you to continue.

- **File Inquiry...:** Press this button to specify which files are to be included in the restore and to perform file inquiries (listings of files stored on the host for each version).

- **Save or Begin:** Press this button to indicate that you are finished with this dialog and may wish to begin the restore now, and/or may wish to save your changes. Pressing ENTER has the same effect as pressing this button.

- **More...:** Press this button to specify Novell options, ULTra options, reporting options and more (see earlier in this chapter).

- **Cancel:** Press this button when you wish to leave this screen without saving parameters. Pressing this button is the same as pressing the ESC key.

When you press the File Inquiry button, you will see the Restore Specification dialog (see figure 11-8).

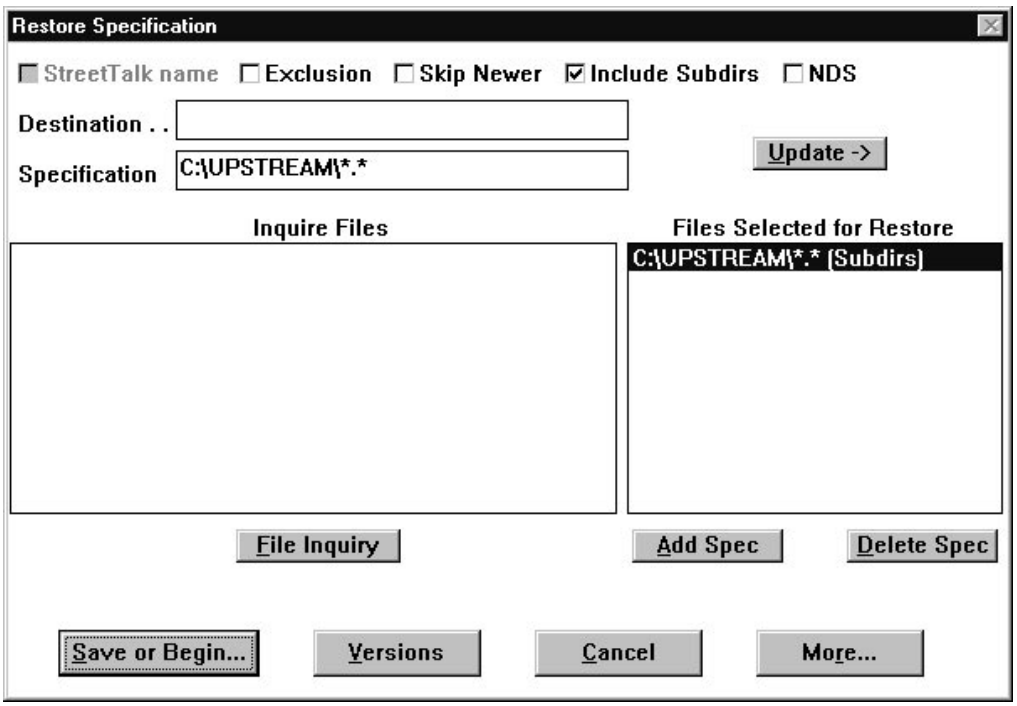



**Figure 11-8**
**Restore Specification Dialog (old)**

- ***(non-UNIX only)*** **StreetTalk name:** Press this button if the value in the Specification field is a Banyan StreetTalk name. See the Banyan chapter for more information. This value will be grayed if the Banyan drivers are not loaded. The default is not checked.

- **Exclude:** If you have specified in another file spec, a file specification which includes files which you do not want restored, then by checking this box, you can use this file spec to specify files which are excluded. If you check this box, some of the other fields on this screen will become inaccessible because they are not used. The default is not checked. A '#' character can be used in place of the drive letter to exclude files on any drive.

- **Skip Newer:** If you check this box, and FDR/UPSTREAM attempts to restore a file which already exists on disk, it will check the file dates and only overwrite files which FDR/UPSTREAM has stored which carry a later date. Otherwise, all files are restored regardless of date (you would use this if you suspect corrupted files on your disk). The default is checked.

- **Include Subdirs:** If you check this box, all files matching the file specification in directories underneath the one specified will be restored. If you checked Exclude these files, then this field will change to say Exclude Subdirs. The default is checked.

- ***(non-UNIX only)*** **NDS:** Check this box if you wish to restore NetWare Directory Services. Checking this box cause the Specification field to change to (NDS). See the Novell chapter for more information. This field is grayed and unavailable unless you have a server mapping defined to a server running the USNDS NLM. The default is not checked.

The following two edit fields work together in allowing you to specify the source and destination file names:

- **Destination:** Allows you to specify a different drive, directory or file name than the one originally used for the backup. If you leave this field blank, the original drive, directory and path will be used. This is a scrollable field and you can enter up to 256 characters. The default is blank (files restored to their original names). Specify the same number of wildcards in this field as you specify in the Restore Specification, use a path and the generic wildcard *.*, or just a path ending in a backslash ('\').

  For example, if the Restore Specification is C:\Test*.txt and you want to rename all the txt files to doc files, you could enter in the Destination field:

  - C:\Test*.doc or
  - C:\Test*.* or
  - C:\Test\

- **Specification:** Allows you to specify the drive, directory and file name that was used originally to back up the files. This is a scrollable field and you can enter up to 256 characters. This field is required.

The first button is:

- **Update:** Press this button to update the highlighted Selected for Restore entry with the values entered in the Specification, Destination, Subdirs, Skip Newer, Exclusion and StreetTalk fields. Pressing the <Save or Begin> button also updates the Selected for Restore entry.

The first list box is:

- **Inquire Files:** The list box is filled by performing an Inquire Files, which is done by pressing the <File Inquiry> button. Like other list boxes in FDR/UPSTREAM, when you move the cursor into the box (by using the up or down arrow keys), the Restore Specification gets the value currently highlighted in the list.

  If you change drives or directories in the list box, the list will only be updated the next time you press the <File Inquiry> button or double-click the mouse on a directory entry. Double-clicking the mouse on a file the first time will cause the Selected for Restore box to clear and the selected entry added as the only entry. Subsequent double-clicked files will cause the files to be added. Double-clicking on a directory entry has the same effect as selecting the directory entry and pressing the <File Inquiry> button.

  You can tell which directory is currently displayed in the list box by the path specification directly beneath the box.

The buttons are:

- **File Inquiry:** Press this button to perform an inquire files of the file information specified in the restore specification currently stored on the mainframe for this backup profile/version date combination. You must provide the following parameters: backup profile, user ID and password (if required on the mainframe), and a restore specification. It is recommended that you perform an inquire backups before you perform the inquire files. This will fill in the originally specified backup specifications in the Files Selected for Restore list.

- **Add Spec**: Press this button if you wish to have the values entered in the top of the dialog (specification, destination, subdirectories, etc.) to be added as a new Selected for Restore specification and added to the end of the list box.

- **Delete Spec:** Press this button if you wish to delete the highlighted specification in the Selected for Restore list box. The prior entry is highlighted afterwards. You must leave at least one entry in the Selected for Restore list box.

The Selected for Restore list box controls the context of many fields in this dialog.

- **Files Selected for Restore:** Selecting different values in this box will cause the Specification, Destination, subdirs, skip newer, exclusion and StreetTalk name fields to reflect the updated values. If you have performed an inquire files, the list box will either clear (if your most recent file inquiry was not for this specification) or be filled (if your most recent file inquiry was for this specification).

The push buttons at the bottom allow you to leave the dialog:

- **Save or Begin:** Press this button to indicate that you are finished with this dialog and may wish to either save your changes and/or begin a restore. Pressing ENTER has the same effect as pressing this button.

- **Versions:** Press this button to return to the Restore Parameters dialog.

- **Cancel:** Press this button when you wish to leave this screen without saving parameters. Pressing this button is the same as pressing the ESC key.

- **More:** Press this button to determine which non-file data types that were backed up will be restored, as well as some Banyan overrides for the spec highlighted in the Files Selected for Restore list box. See server specific information chapter for more information.

# 12 Automated Backups and Restores

## 12.1. Overview

Automated backups and restores are one of the most powerful features of UPSTREAM. What they allow you to do include:

- Guarantee that PCs get backed up without the user having to worry about it.
- Support Software Distribution and other Data Distribution
- Support Data Sharing

Automated backups and restores require careful planning. When you create your plan we recommend that you coordinate this with your mainframe UPSTREAM administrator to assure that it meets your PC needs.

This chapter includes worksheets to help you plan your automated backup or restore scheme. We recommend that you use them to assure that all issues have been addressed.

Even if your automated plan is to have all actions controlled from the mainframe, you should read this chapter to understand the concepts and to set up your workstation correctly.

# 12.2. Concepts

In FDR/UPSTREAM, an automated backup or restore can either be run by starting a batch or script file, or by starting UPSTREAM directly. We generally recommend starting a batch or script file as this provides maximum control.

The sample below shows USLOAD.BAT which is provided with the DOS version of UPSTREAM, used to start backups on a schedule.

```
@Echo off
REM ******************************************************************
REM * USLOAD.BAT - Automatic load of UPSTREAM.                        *
REM * Copyright 1991 (c) Innovation Data Processing                   *
REM *                                                                 *
REM * This batch file is started by USSTART when it detects that a    *
REM * predefined event (schedule) has occured.  USSTART calls this    *
REM * batch file with two parameters:                                 *
REM *    1 = Specified parameter file name                            *
REM *    2 = Specified USSTART configuration file name                *
REM *                                                                 *
REM * NOTE: This batch file assumes that the APPC services are already *
REM * available.  REM'ed statements below can be removed to load and   *
REM * unload APPC (assuming batch files by those names are available). *
REM *                                                                 *
REM * NOTE: This batch file assumes that you loaded UPSTREAM on the C: *
REM * drive on the UPSTREAM directory.  If you did not, modify        *
REM * this file.                                                      *
REM ******************************************************************
REM
c:
cd\upstream
call U PARAMETER=%1 CONFIGFILE=%2
```

**Figure 7.2.1**
**Start APPC and UPSTREAM for AdaptSNA**

A **Schedule** is a timed event. UPSTREAM supports 6 types of schedules: daily, weekly, weekdays, monthly, quarterly and yearly. Each of these events can start an automated UPSTREAM function. There can be up to 255 schedules per configuration file. To allow you maximum flexibility, each schedule can be defined to start a different shell or batch file and a different parameter file, allowing you to mix backups, with software distribution or other functions.

There are a variety of unattended UPSTREAM functions. To build a unattended UPSTREAM function, merely fill out the dialog of the function you wish to perform, and uncheck the attended box. There are several functions for which there are no dialogs for. In those cases, you have to set up the parameters by hand. The primary parameter used to determine the function to be performed is the parameter ACTION (except for requesting a function on a remote workstation/server). See the Advanced UPSTREAM chapter for a more thorough description of these functions and a list of parameter file values.

The unattended functions that can be performed through scheduled or host control are:

- Backups (ACTION = 1)

- Restores (ACTION = 0)
- As of...Restores (ACTION = 2)
- Restart a failed backup only (ACTION = 4)
- Run a program or batch file, optionally on a workstation (ACTION = 5)
- Kill a pending failed backup restart (ACTION = 6)
- Run a host report (ACTION = 7)
- Request a remote function be run on another workstation/server (REMOTEREQUEST = Y)

USSTART.EXE (the UPSTREAM Automated Start icon) is the schedule execution program. It is a separate program and is intended to be as unobtrusive as possible, fit into your environment, and run UPSTREAM (and other) functions on a scheduled basis. In DOS it is a TSR which saves whatever is in memory, runs UPSTREAM and restores memory. In OS/2, Windows, Windows NT and UNIX it is merely a standard program which will run the requested function.

# 12.3. Guidelines for Automated Backups and Restores

Worksheet 12.1 is a blank form for you to fill out to help you plan for your automated backups and restores for the mainframe and PC configurations. Worksheet 12.2 helps you plan your parameter files used for the backups and restores. It allows room for only one file set, but you can copy the worksheet for additional file sets. Later in this section we will fill out several to give you the idea of how it works.

| Sch. # | Count or Ret. Period | Backup or Restore | Batch/Script File | Parameter File | Sched. Type | Date/Time |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |

**Worksheet 12.1**
**Automated Backup or Restore Plan**

| Parameter | File #1 | File #2 | File #3 |
|---|---|---|---|
| Parameter File Name | | | |
| Storage Type (backups) | | | |
| Restart Type (backups) | | | |
| Novell Profile | | | |
| LAN WS Name | | | |
| Compression | | | |
| Latest Version or Version Date (restores) | | | |
| Number of File Specs | | | |
| **File Spec #1** | | | |
| File name | | | |
| Destination (restores) | | | |
| Exclusion | | | |
| Incremental (backups) | | | |
| Subdirectories | | | |
| Hidden Files (backups) | | | |
| Latest Version or Version Date (restores) | | | |
| Skip Newer/Existing Files (restores) | | | |
| Grooming | | | |

**Worksheet 12.2**
**Planning Parameter Files for Automated Backups and Restores**

### 12.3.1. Automated Backups

Automated backups require different planning from automated restores because they are generally used for different purposes. Automated backups meet the primary needs of preserving your PC disk data for later recovery, either as a disaster recovery tool, or for archiving purposes.

Planning for automated backups requires that you consider some of the following issues:

- Avoiding conflicting with users whom need to use the machine.
- Determining how long you want to preserve data.
- Determining at what point you wish the intervals between data saved to increase (if any).
- Assuring that the important files really get backed up.
- Conserving mainframe disk space.
- Making sure that the more important event is scheduled first.

Figures 12.3 and 12.4 show worksheets completely filled out and are examples of an automated backup scheme.

The assumptions are:

- The PC is available for use for automated facilities at night only.
- Data must be preserved for a maximum of one year.
- All files on the C: drive must be preserved.
- Logarithmic increase in the age of backups is acceptable.
- Long term backups must be archived to tape.

The scheme works as follows:

- ☐ Monday through Thursday we wish to perform incremental backups. These backups are keyed allowing fast retrieval. Each day (Monday, Tuesday, etc.) is managed as one weekday schedule.
- ☐ Each Friday a complete disk backup is done. This assures that ALL data files are saved. These backups are archived and are rolled off on a 5 week schedule.
- ☐ Each month, on the first day, a complete backup is done. These backups are archived and the roll off interval is 12, thus maintaining backups for a year.

| Sched. # | Count or Ret. Period | Backup or Restore | Batch/Script File | Parameter File | Sched. Type | Date/Time |
|---|---|---|---|---|---|---|
| 1 | 5 (GDG) | B | USLOAD.CMD | WEEKLY.DAT | Week | Fri. 00:00:00 |
| 2 | 7 days | B | USLOAD.CMD | DAILY.DAT | Weekday | 00:00:00 |

**Figure 12.3**
**Sample Worksheet for Schedules**

| Parameter | File #1 | File #2 | File #3 |
|---|---|---|---|
| Parameter File Name | DAILY.DAT | WEEKLY.DAT | |
| Storage Type (backups) | Seq. Disk | Seq. Tape | |
| Restart Type (backups) | None | Not Complete | |
| Novell Profile | SERVER1 | SERVER1 | |
| LAN WS Name | | | |
| Compression | Fast | Fast | |
| Latest Version or Version Date (restores) | | | |
| Number of File Specs | 1 | 1 | |
| **File Spec #1** | | | |
| File name | F:*.* | F:*.* | |
| Destination (restores) | | | |
| Exclusion | N | N | |
| Incremental (backups) | Y | N | |
| Subdirectories | Y | Y | |
| Hidden Files (backups) | Y | Y | |
| Latest Version or Version Date (restores) | | | |
| Skip Newer/Existing Files (restores) | | | |
| Grooming | N | N | |

**Worksheet 12.4**
**Sample Worksheet for Parameter Files**

### 12.3.2. Automated Restores

Automated restores are primarily used for software and other data distribution and most users need to use it in a significantly different way than automated backups.

Some of the significant issues to be considered in planning for automated restores are:

- Is there both global (all workstations) and private data (one workstation) to be distributed?
- Do the files need to be staged through a temporary directory?
- Are there special installation issues to be considered?
- How often does data need to be distributed?

The scheme we recommend for distribution of files involves the setting up of a public backup profile and a private backup profile. All PCs should plan to extract data from the public backup profile on a regular basis. The private backup profile is used to allow users or administrators to send files destined for a particular workstation.

For safety, we recommend that for a public backup profile files be carefully prepared by an administrator, and built to be staged through a temporary directory and be compiled with a batch file for installation. The name of this batch file should be put by all workstations into their unattended options batch file started by USSTART.

For example, for a global distribution, a backup profile is defined (GLOBAL). The administrator wishing to distribute files will copy these files to a temporary directory on his disk (C:\TEMP), build a batch file to install these (C:\INSTALL.BAT), and back up the entire distribution directory and the installation batch job.

The workstations will periodically perform an automated restore. They will restore all the files in the latest version (which can be compacted or ZIPed, but don't have to be). When the administrator is confident that the data has been transmitted to the correct locations, the batch job can be run remotely to install the data.

Worksheets 12.5 and 12.6 describe the configuration for this process.

| Sched # | Backup Profile | Roll-off Count | Back/ Rest | Batch File | Parameter File | Sched. Type | Date/Time |
|---|---|---|---|---|---|---|---|
| 1 | GLOBAL | 1 | R | GLOBAL.CMD | GLOBAL.DAT | Week | Sun. 00:00:00 |
| 2 | PC1 | 1 | R | GLOBAL.CMD | PRIVATE.DAT | Daily | 00:00:00 |

**Worksheet 12.5**
**Schedules for Automated Restores**

| Parameter | File #1 | File #2 | File #3 |
|---|---|---|---|
| Parameter File Name | GLOBAL | PRIVATE | |
| Backup Profile | GLOBAL | PC1 | |
| Compression | Y | Y | |
| Storage Type (backups) | | | |
| Restartable (backups) | | | |
| Latest Version or Version Date (restores) | Latest | Latest | |
| Number of File Specs | 1 | 1 | |
| **File Set #1** | | | |
| Reset Archive Bit (backups) | | | |
| Incremental (backups) | | | |
| Date Limit (backups) | | | |
| Subdirectories | Y | Y | |
| Hidden Files (backups) | | | |
| Latest Version or Version Date (restores) | Latest | Latest | |
| Skip Newer/Existing Files (restores) | N | N | |
| File name | C:*.* | C:*.* | |
| Destination (restores) | | | |

**Worksheet 12.6**
**Parameter Files for Automated Restores**

# 12.4. Specifying Schedules in the Configurator

Schedules for unattended backups and restores are specified in the configurator. This section will walk you through the process of building an unattended backup or restore. Remember that it is better to pre-plan, so fill out a worksheet.

You start the configurator by entering:

```
[C:\UPSTREAM] USCFG
```

or by selecting the **Configurator** icon from the UPSTREAM program group.

This will display the main configuration dialog. Press [ESC] or the <Cancel> button to go to the configuration main screen. Pull down the **Action** menu and select **PC Schedule** (you can also use the [ALT]P accelerator). You will then see the main schedules dialog (see figure 12-1).

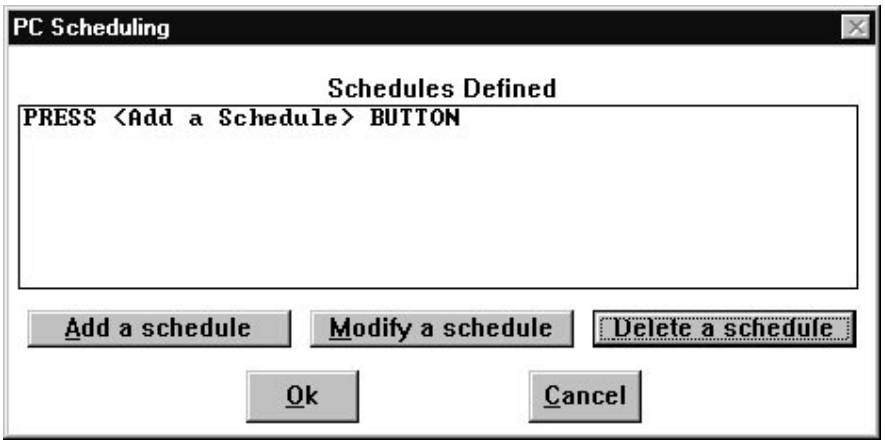



**Figure 12-1**
**Main Schedule Dialog**

There is a list box and 5 push buttons in this dialog:

- **Schedules Defined:** This list box contains all the schedules that you define. When you use a new configuration file, the box prompts you to add the first schedule. When you have schedules defined, you can edit a specific schedule by highlighting it in the list box and pressing the <Modify a schedule> button, or double-click the schedule with the mouse.
- **Add a schedule:** This push button allows you to add and define a new schedule.
- **Modify a schedule:** This push button allows you to edit the schedule currently highlighted in this list box. You can perform the same function by double-clicking the entry in the list box you wish to modify with the mouse.
- **Delete a schedule:** Press this button to delete the schedule currently highlighted in the list box.
- **Ok:** Press this button when you have completed editing the schedules and wish to save them to a configuration file.
- **Cancel:** Press this button if you wish to abandon the changes that you have made.

If you press the <Add a schedule> or <Modify a schedule> button, then you will see the Schedules dialog (see figure 12-2). In this dialog you specify parameters relevant to all types of schedules.

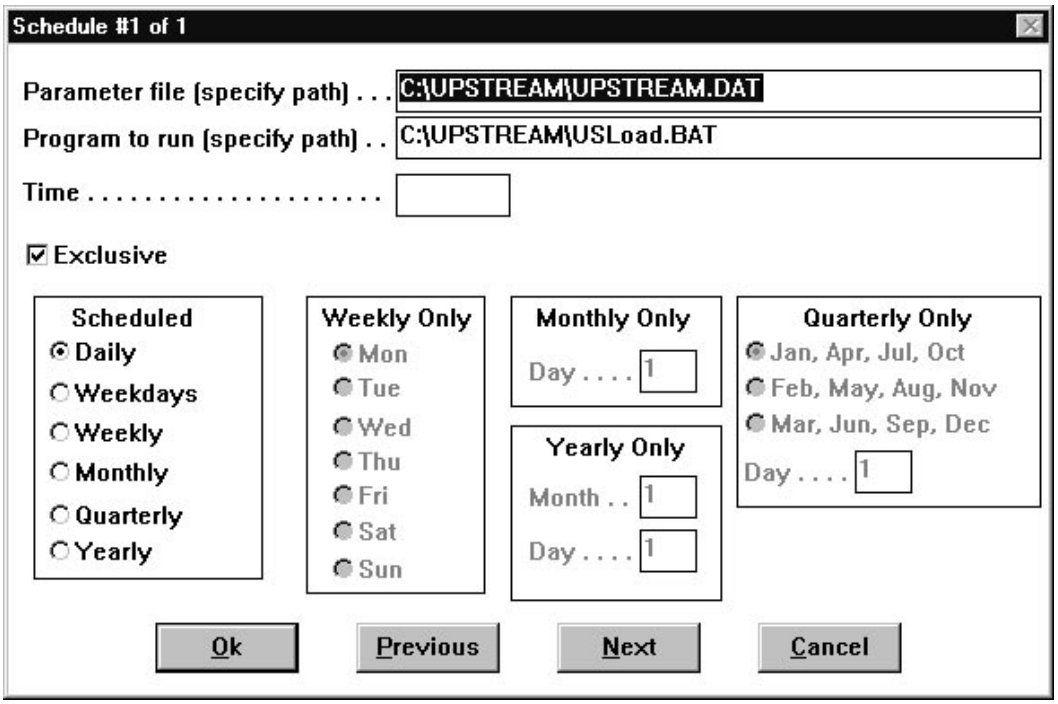



**Figure 12-2**
**Specify a Schedule**

The parameters on this dialog include:

- **Parameter File:** This is the name of the parameter file to be used in the automated backup or restore if you use the standard conventions. However, what this field really identifies is the first parameter to the program automatically started. So you can use it as you choose. We recommend that you enter the complete file specification (including drive and directory). It has a maximum of 128 characters, the default is Upstream.DAT and it is a required field.

- **Program to Run:** This is the name of the program or batch file to be started automatically by USSTART. The .CMD, .BAT, or .EXE extension is suggested but not required. We recommend that you enter the complete file specification (including drive and path). It has a maximum of 128 characters, the default is USLOAD and it is required.

- **Time:** This is the time you wish the event to occur. The format is HH:MM:SS using a 24 hour clock. Thus 7:00 PM would be 19:00:00. This is an 8 character field with no default and it is required.

- **Exclusive:** This is a check box. If you specify two schedules which are to occur within 1 hour of each other, this flag determines if the second one should be done. For example, if you specify one schedule for 2:00 AM weekly, and a second for 2:01 AM, and you check this box only the first will be done. This is why you should specify the more important or less frequent schedules before the less important or less frequent ones. If you do not check the box, then ALL schedules scheduled will be performed.

- **Scheduled:** This is a set of radio buttons. Select Daily for a timed schedule that will occur every day. Daily schedules are not often used as they will occur on weekends as well. Weekday schedules only run Monday through Friday (excluding Saturday and Sunday). Weekly schedules occur on a given day of the week. Monthly schedules occur

on one day each month. Quarterly schedules occur one day each quarter. Yearly schedules occur one day each year. There is no default and one button must be pressed.

The frames consist of options that are specific for certain schedule types. Daily and Weekday schedules require no additional parameters. Each frame is grayed unless you have pressed the schedule radio button applicable for those parameters.

Weekly options:

- **Day of the week:** This is a series of 7 radio buttons representing the day of the week you wish the unattended operation to occur. The default is Monday and this field is required.

Monthly options:

- **Day:** This is the day of the month that you wish the unattended operation to occur. Legal values are from 1 to 31. This field is required.

Quarterly options:

- **Month:** Select one of the three radio buttons representing which set of months you wish the event to occur: January, April, July, October, or February, May, August, November, or March, June, September, December. One option must be selected.

- **Day:** This is the day of the month that you wish the unattended operation to occur. Legal values are from 1 to 31. This field is required.

Yearly options:

- **Month:** Enter the month (1=January, 2 = February, etc.) of the year you wish the unattended operation to occur. This field is required.

- **Day:** This is the day of the month that you wish the unattended operation to occur. Legal values are from 1 to 31. This field is required.

Push buttons:

- **Ok:** This button acknowledges that you have completed the configuration and you will be asked if you wish to save the configuration. Pressing this button has the same effect as pressing the ENTER key.

- **Previous:** This button allows you to go to the previously specified schedule.

- **Next:** This button allows you to go to the next specified schedule.

- **Cancel:** This button allows you to abandon the changes you have made. Pressing this button has the same effect as pressing the ESC key.

# 12.5. Running USSTART (Auto Start)

USSTART is a presentation manager application (OS/2), Windows program (Windows and Windows NT), a Terminate and Stay Resident application (DOS) or a standard command line utility (UNIX). It is used to start unattended workstation initiated unattended UPSTREAM functions. You do not need to use USSTART if you intend to control FDR/UPSTREAM from the mainframe or another workstation.

USSTART performs the following functions:

- When it is loaded it reads the configuration file that you specified and remembers the schedules, parameter files and batch files that were specified.
- Calculates the exact date and time for the next schedule to run.
- Continually checks the clock for the next schedule to run.
- When the date and time is matched, it maximizes itself, beeps, displays a window in the screen informing you that an unattended event is about to occur, and gives you an opportunity to not perform it (by displaying a CANCEL button).
- (DOS) It saves your current environment (program, data, etc.) and frees as much memory as possible.
- It runs the specified batch or executable file passing the parameter file as the first parameter and the configuration file as the second parameter.
- When the program returns, it reads the return code file and displays whether FDR/UPSTREAM was run, and whether the any FDR/UPSTREAM functions were performed.
- (DOS) Restores your previously executing program.
- Calculates the next schedule and continues.
- While it is waiting for the next schedule, a status window is available to let you see that USSTART is loaded and when the next schedule is about to occur.

***(OS/2 only)*** When USSTART begins, it starts minimized. You can display the status by double-clicking the icon, or by selecting the Maximize menu option.

USSTART can be run at any time, however, we recommend that once you have tested your environment, that you run USSTART in your AUTOEXEC.BAT, STARTUP.CMD, or Startup program group.

There are command line parameters to USSTART. Specify them on the command line when you run USSTART. These parameters are separated by spaces and are not positional. They include:

- ☐ **CONFIGFILE=<file name>** Specifying a configuration file allows you to use a different one than the default. Most environments will not need more than one configuration file. The default is UPSTREAM.CFG.

- ☐ **/T** This switch toggles tracing on and should be used only under the guidance of FDR/UPSTREAM technical support.

- ☐ **/D<number>** This switch allows you to specify the delay used to allow you to skip an event before it is actually run. The default is 10 seconds. For example, to specify a 60 second delay, run USSTART as follows:

```
USSTART /D60
```

### 12.5.1. The USSTART Status Display

When USSTART is running, a status display is continually updated (see figure 12-3). In DOS use [ALT]U to display status.

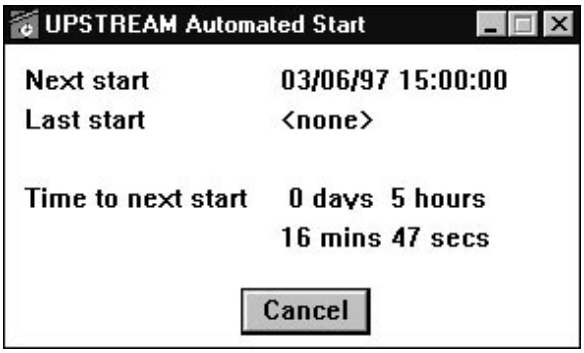



**Figure 12-3**
**Auto-Start Status**

- **Next Start**. This is the date and time of the next automatic start.
- **Last Start**. This is the date and time of the last automatic start.
- **Time to next start**. This is a continuously updated display of the number of days, hours, minutes and seconds until the next automatic start.
- **Any events in the last automatic start**. In the line below the time to next start, you will see a display of whether FDR/UPSTREAM was successful or not in the last operation or if there was an error in starting FDR/UPSTREAM.
- **Cancel**. This button is only available when it is about ready to begin an operation. If you press this button, the operation that was to begin will be skipped. In DOS or UNIX, press the [ESC] key to skip an operation.

When USSTART has calculated that the automatic start should be performed, the display is cleared and a ten second countdown is displayed. If you press the CANCEL button (or [ESC] key) during this time, the automatic start is aborted and the normal display replaces it. Otherwise, after 10 seconds the program requested is automatically started.

While the program requested is running, the USSTART display will show the program running. The program requested to be run will run in a newly created screen group, visible in the Task List display.

When the program that you requested is complete, USSTART will return to its normal monitoring function.

### 12.5.2. Problems with USSTART

Since USSTART runs in its own screen group it can be difficult isolating problems running the batch file when it is time for an automatic operation. We recommend that you test USSTART by setting up your schedules and then modifying the system clock to be the time for each automatic start, and then running USSTART.

USSTART maintains a log, **USSTART.LOG** which contains a list of attempts to start programs, when the next event is scheduled to run, any auto-start errors, etc. Any problem determination should begin by checking USSTART.LOG

If the screen just flashes and USSTART begins its timer for the next automatic operation, check the following:

- Verify that you have specified the COMPLETE path name of the batch file to run (like C:\UPSTREAM\USLOAD.CMD, not just USLOAD.CMD.
- Check to make sure that the batch file is correct by placing PAUSE statements at strategic locations in the file.
- Verify that Attended is NOT checked.
- Verify that the communications manager is running at the time of the automatic operations.

If USSTART just hangs, you may have a pending message waiting for user intervention. Verify that you have specified a Messages Time Out in the configurator with a value other than 0 (a positive number for a message timeout, or -1 if you do not wish messages displayed at all).

# 12.6. Unattended Remote Functions

If all your unattended functions will be controlled by MVS batch jobs or a central PC, you must have your PC listening for these remote requests. If you specified in your APPC that FDR/UPSTREAM is Attach Manager started, then the APPC will start FDR/UPSTREAM. In that case, you must have a parameter file specified which supports remotely initiated requests, specified on the command line. The Unattended Remote Functions option described below creates parameter files that meet this need. The sample RMTPARM.DAT provided was created with the facility described below.

If you specified in your APPC configuration that FDR/UPSTREAM would be operator started, then you must have USSTART or a user start FDR/UPSTREAM and define a parameter file which will wait for a longer period of time.

To define a parameter file to only wait for remote initiates, run FDR/UPSTREAM:

```
[C:\UPSTREAM] US
```

Pull down the Remote menu and select Unattended Remote Functions. You will see the Unattended Remote dialog (see figure 12-4).

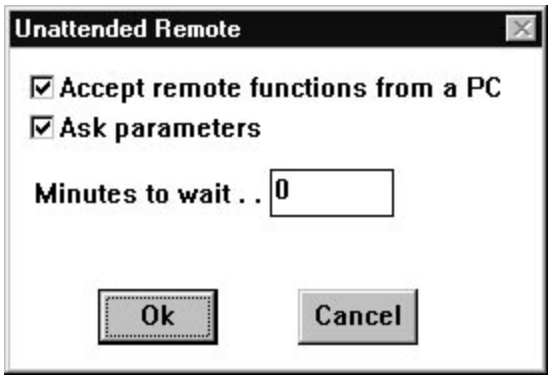



**Figure 12-4**
**Unattended Remote Functions Dialog**

This dialog allows you to set parameters which are used to create a parameter file that can be used to process remote requests in an unattended fashion. The parameters are:

- **Accept remote functions from a PC:** Check this box is you are willing to have your PC accept remote backup or restore requests from a PC. Do not check this box if you only are willing to accept remote requests from a mainframe batch job. The state of this box affects whether remote requests are serviced even if FDR/UPSTREAM is attended. (it can be used with the "Accept Remote Functions" check). The default is checked. In RMTPARM.DAT it is checked.

- **Ask parameters:** Do not check this box if you are building a parameter file for unattended operation. The default is checked. In RMTPARM.DAT it is not checked.

- **Minutes to wait:** Enter the number of minutes that FDR/UPSTREAM will wait in unattended mode for a remote request. You can specify up to 65536 minutes. 0 indicates to wait until a key is pressed. The default is 0. RMTPARM.DAT waits for 1 minute as it is intended to be started from the attach manager, and 1 minute is enough time to begin to service the request.

Press the <Ok> button or the [ENTER] key to be prompted to save your changes to a parameter file, or the <Cancel> button or the [ESC] key to abandon your changes.

When FDR/UPSTREAM is started in unattended mode waiting for a remote initiate you will see the screen below (see figure 12-5).

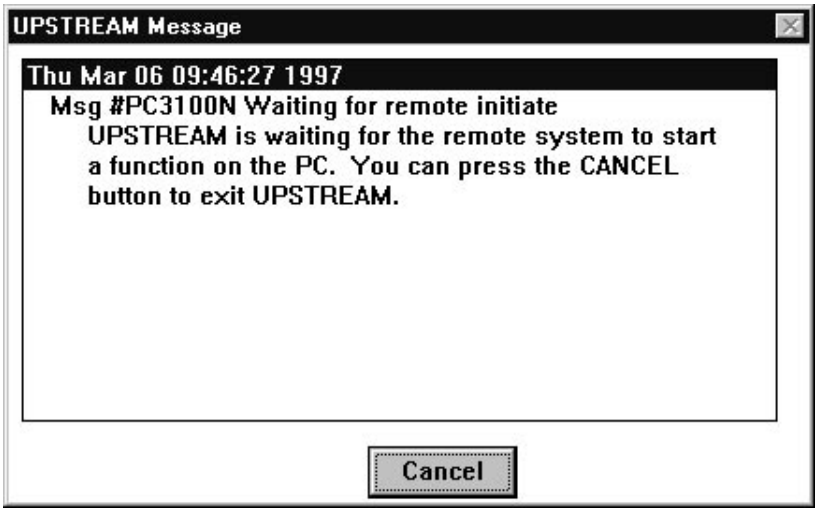



**Figure 12-5**
**Waiting for Remote Initiate**

You can press the <Cancel> button to exit FDR/UPSTREAM; otherwise FDR/UPSTREAM will terminate automatically after the given number of minutes has expired.

# 13 Novell Considerations

## 13.1. Overview

FDR/UPSTREAM addresses Novell extensively. To use these facilities you must purchase the LAN version of FDR/UPSTREAM for Novell and use UPSTREAM on a workstation which has full Novell client support including OS/2, Windows, Windows 95 and DOS.

To back up a Novell NetWare file server there are several issues which you must address:

- Planning.
- Backing up the bindery.
- Backing up Novell information.
- Only the supervisor can back up ALL non-opened files.
- Backing up NetWare Directory Services.

This chapter discusses these issues.

FDR/UPSTREAM can automatically recall migrated files whenever a user accesses them. This chapter also discusses this facility.

**NOTE: This chapter discusses the backing up of a file server. If you wish to use your Novell network to back up workstations, see the FDR/UPSTREAM ULTra chapter.**

# 13.2. Planning

Novell servers allow PCs to share disks, printers and other resources. FDR/UPSTREAM supports Novell NetWare® 286, 386, and v4.x completely.

Backing up or restoring the data files on a Novell server merely requires mapping a drive (with the MAP command) to the file server you wish to back up or restore and running FDR/UPSTREAM. You can backup or restore more than one file server at a time with FDR/UPSTREAM, but we recommend that due to the extreme size of many Novell servers, that each server be a separate backup with a separate backup profile.

To assure that *all* the Novell specific information that you need is backed up as well as managing issues caused by the large size of many Novell server networks, backing up Novell file servers require special considerations not found when backing up single workstations. These issues are discussed below.

### 13.2.1. Planning what and when to backup

Novell file servers tend to be very large. This may require a complex plan. You should consider:

- The real performance of FDR/UPSTREAM. You may need to optimize FDR/UPSTREAM to handle this large amount of data. The performance appendix can help you get the best from your environment.
- What your "window" is. This is the number of hours during which you can do backups. For many users, complete backups are done only on weekends. Effective utilization of your time window helps you get the most from FDR/UPSTREAM.
- How often you *need* to perform complete backups. You may want to perform complete backups daily, but an analysis of your requirements may show that weekly or even monthly complete backups are adequate based on a realistic appraisal of your needs and the use of incrementals. Or you may find that complete backups should be performed over a period of several days (by backing up individual directories).
- How many machines to use in the backup. Multiple servers are often best backed up by multiple PCs.

### 13.2.2. Open files

The second aspect of planning should be to assure that all required files are closed when the backup is performed. This is best done manually be requiring that all users detach from their applications before leaving each night.

### 13.2.3. How you use Novell Features

Novell file servers provide a rich selection of information and security features not available in a base DOS environment. These include:

- File and directory specific information
- Directory restrictions
- Trustee rights

- The bindery files
- NetWare Directory Services

These issues are discussed in the following sections.

# 13.3. The Bindery

The bindery consists of hidden system files on the SYS: drive of your file server in the \SYSTEM directory. The bindery holds security information for each user, file and print server information and other overall system properties. These files are NET$BIND.SYS and NET$BVAL.SYS for NetWare 286 and NET$OBJ.SYS, NET$PROP.SYS and NET$VAL.SYS for NetWare 386.

FDR/UPSTREAM consists of code which can back up the bindery if you request backing up these files, and if you are logged in as the supervisor or a supervisor equivalent. FDR/UPSTREAM lets you see these files in the file specifications dialog. The bindery files have their archive bits set if they have been changed, so they can be included in an incremental backup. See later in this appendix for information about being logged in as the supervisor.

Bindery restores should be done carefully. You should only restore the bindery if there has been a complete system failure and you wish to recover completely. Security and other information can be lost if you restore the bindery and there have been changes made to the system. Call FDR/UPSTREAM technical support if you have any questions on bindery restores.

**NOTE: To back up the bindery, you must include the specification for the \SYSTEM directory on the SYS: drive (usually F:\SYSTEM) and you must press the HIDDEN FILES check box.**

# 13.4. Backing Up Novell Information

FDR/UPSTREAM includes comprehensive support for selectively backing up and restoring Novell specific information. The selection criteria can be accessed by pressing the <More> button from the backup or restore file specifications dialog (see figure 13-1).

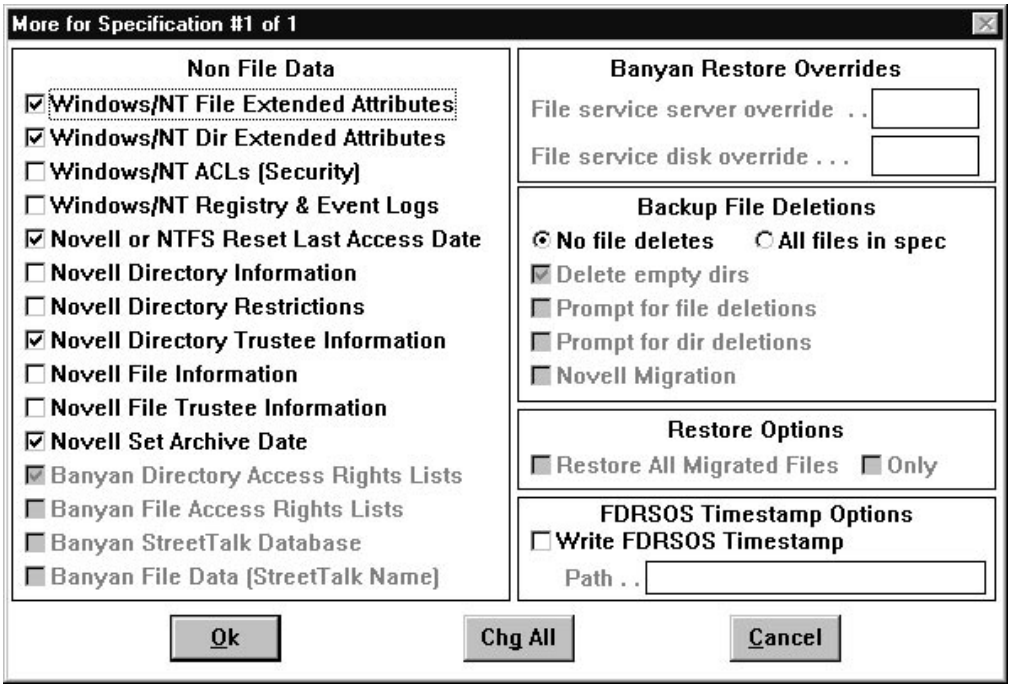



**Figure 13-1**
**More Specification Dialog**

Non-file data is transferred with the data on the backup, and received with the data on the restore. When you select a non-file data option on a backup, FDR/UPSTREAM will attempt to find that attribute and send it with the data. If there is no attribute of that nature (for example, no trustees), then FDR/UPSTREAM will not send any extra bytes. If there is an error accessing an attribute that should be there, then the error is logged and the data part of the file is sent. You may choose to not send many of the non-file data options due to the overhead in retrieving them and the extra transfer and storage overhead.

When you select a non-file data option on a restore, FDR/UPSTREAM will attempt to write that attribute to the file system if it was originally backed up. If there is an error, FDR/UPSTREAM will log the error and still restore the data file, skipping all remaining non-file data options for that file. You may choose not to restore non-file data options if you are restoring to a different file system than the one backed up (like a non-Novell disk), or another file server.

The options on the screen that are not applicable to you can be ignored, as FDR/UPSTREAM will ignore them, even if set, if non-file data of that type cannot be found.

File and directory extended attributes can be combined with Novell information.

The non-file data options for Novell are:

- ☐ **Novell or HPFS Reset Last Access:** Selecting this button will cause FDR/UPSTREAM to save the file's information (including last access date and time) before each file accessed during a backup and restore it after the file has been transmitted. If you select Novell Set Archive Date, this facility will be enabled even if not checked. There is additional overhead in using this facility. This is particularly useful if you intend to use Migration (see the *FDR/UPSTREAM Program* chapter) at any time. The default is not checked.

- ☐ **Novell Directory Information:** Novell maintains additional information above and beyond what DOS supports about each directory including creation and last modification dates, owner IDs and the like. These are viewable and settable in the FILER program. Since this information is rarely crucial for most users and since it takes some overhead in maintenance, the default is not checked.

- ☐ **Novell Directory Restriction:** Novell NetWare 386 and above allows space restrictions based on directory. These are maintained in the DSPACE program. Since directory restrictions are rarely used, the default is not checked.

- ☐ **Novell Directory Trustee Information:** Security in most Novell environments is maintained based on trustee rights. These are maintained in the FILER program in concert with SYSCON. Since most Novell LANs use directory level trustee rights for security, the default is checked.

- ☐ **Novell File Information:** Novell maintains additional information above and beyond what DOS supports about each file including creation and last modification dates, owner IDs and the like. These are viewable and settable in the FILER program. Since this information is rarely crucial for most users and since it takes some overhead in maintenance, the default is not checked.

- ☐ **Novell File Trustee Information:** NetWare 386 and above supports trustee rights for files as well as directories. Since most Novell LANs use directory level trustee rights rather than file level trustee rights, the default is not checked.

- ☐ **Novell Set Archive Date:** Selecting this button will cause FDR/UPSTREAM to save the file or directory information before each file or directory is accessed during a backup, and setting the last archived date, time and ID of the current user after the information has been transmitted. There is additional overhead in using this facility. The default is not checked.

# 13.5. Logging on as the Supervisor

The Novell version of FDR/UPSTREAM includes a facility to manage unattended, secure login as the supervisor (or equivalent), the **Novell Profile**. This is a field, available on the backup, restore, and "as of...restore" screens and references a profile name defined using the SETNOV.EXE (Novell and ULTra) program.

When you specify a valid profile name, FDR/UPSTREAM will perform the following steps before performing the function requested:

- Attaches the specified server (if you are not already attached).
- Logs on as the user name you specify using the specified password.
- Maps the drives on that server as you have specified.

When the FDR/UPSTREAM function (backup, restore, etc.) has completed, it will perform the following steps:

- Either logs off from the file server, or logs a different user on (depending on what you specified).
- If a server or drive was attached to, then that server or drive is detached.

To specify server login information, run the SETNOV.EXE program, or select the **Novell and ULTra** program in the UPSTREAM program group. When you run the program, you are presented with several buttons (see figure 13-2).

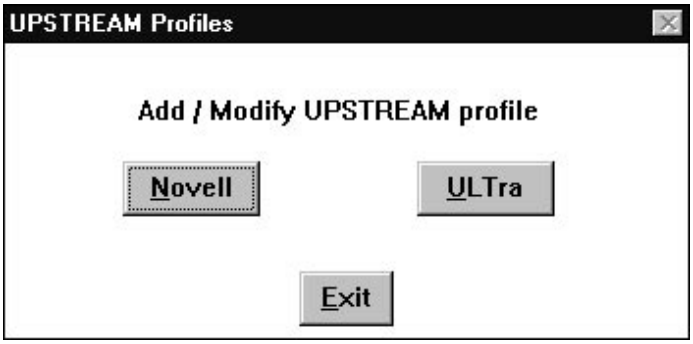



**Figure 13-2**
**UPSTREAM Profile Dialog**

Press the **<Novell>** button to configure Novell profiles. You will then see the Server Profile dialog (see figure 13-3).

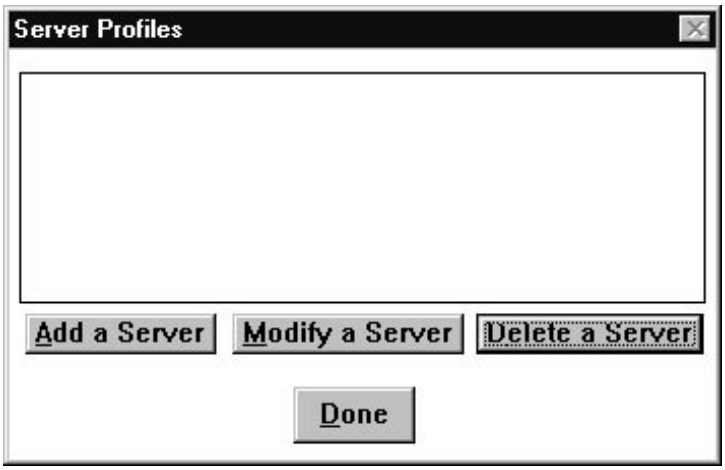
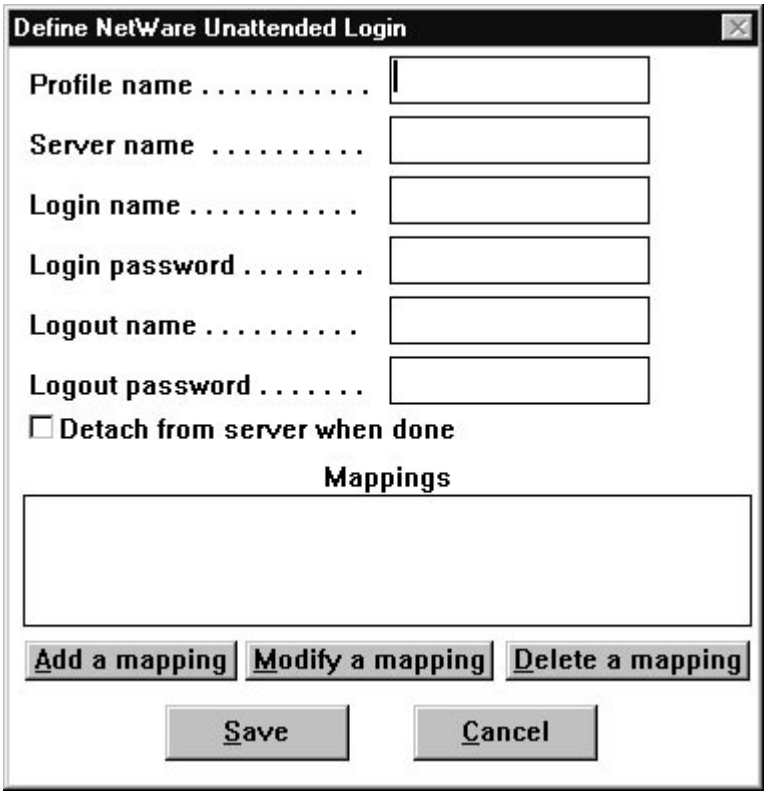



**Figure 13-3**
**Server Profile List**

This screen lists the defined Novell Profiles and allows you options to add, modify or delete profiles.

- **Server Profiles:** This list box displays all the profiles currently defined. If you double-click your mouse on an entry, it is the same as pressing the <Modify a server> button. The highlighted entry is the one the Add, Modify or Delete buttons will act upon.
- **Add a server:** Press this button to add a new profile. Press this button when running this program for the first time.
- **Modify a server:** Press this button to edit the profile currently highlighted in the list box.
- **Delete a server:** Press this button to delete the profile currently highlighted in the list box.
- **Done:** Press this button when you wish to exit the program. Pressing the [ESC] key has the same effect.

If you press the <Add a server> or <Modify a server> button, you will see the profile entry screen (see figure 13-4). All the information maintained by SETNOV is hidden and encrypted.




- **Profile name:** This is any random name which identifies the unattended information you are defining here, generally a server name. Required field. This field is grayed and inaccessible if you are modifying an existing mapping.

- **Server name:** Enter the NetWare name of the server that you are defining.

- **Login name:** The user name used to log in to the server you wish to attach to. Required field. If you are logging into a NetWare v4.x server you must use the complete, dotted, fully qualified name. For example: .CN=ADMIN.O=INNOVATION

- **Login password:** The password for the user name defined above. Optional field.

- **Logout name**: The user name to log into after FDR/UPSTREAM has completed. You would enter a logout name if you normally are attached to a server. If this is left blank, FDR/UPSTREAM will log off from the server. Again, for NetWare v4.x servers you must use the complete, dotted, fully qualified name. Optional field.

- **Logout password:** The password for the logout name (if any). Optional field.

- **Detach from server when done:** Check this box if you wish UPSTREAM to forcibly detach (release its connection) from the server at the end of the backup or restore. Otherwise UPSTREAM will only detach from the server when it had to perform an attach (there was no existing connection).

- **Mappings:** This list box displays all the mappings currently defined for this profile. The highlighted entry is used when you press the <Modify a mapping> or <Delete a mapping button>. Double-clicking on an entry is the same as pressing the <Modify a mapping button>.

- **Add a mapping:** Press this button to add a drive mapping. You must have at least one drive mapping defined for the profile to operate correctly. This will display the mapping dialog box.

- **Modify a mapping:** Press this button to edit the drive letter or volume name of the drive mapping currently highlighted in the Mappings list box. This will display the mapping dialog box.

- **Delete a mapping:** Press this button to delete the mapping currently highlighted in the Mappings list box.

- **Save:** Saves the profile information defined.

- **Cancel:** Abandons whatever profile changes you have made.

When you press the <Add a mapping> or <Modify a mapping> button, you will see the mapping dialog box (see Figure 13-5).

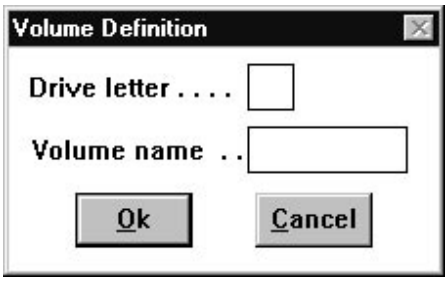



**Figure 13-5**
**Add/Modify a Novell Profile**

- **Drive Letter:** Enter a letter from A..Z designating which drive you wish the server volume to be mapped to. Required field.

- **Volume Name:** Enter the NetWare volume name of the volume on the server that you wish to map to. Required field.

- **Ok:** Press this button if you are satisfied with your mapping.

- **Cancel:** Press this button if you wish to abandon your changes.

When you have defined profiles with mappings you enter the profile name in the <More..> dialog Novell Profile field.

# 13.6. NetWare Directory Services

Novell's NetWare Directory Services (NDS) is an object oriented database which is used to store server related information including security, printer information, application specific information and much more. It is at the core of your server network. In most environments, there is a single directory for all servers; NetWare propagates changes to all servers, but no single server has responsibility for the directory.

The backup/restore implications of this kind of system are:

- A backup of the directory from any server gets the entire directory. Backups from other servers would produce the same information and would thus be unnecessarily repetitive.
- A restore of the directory impacts all servers.
- In the event of a server crash, since you don't know what pieces of the directory were stored on that server, you should restore all the directory.
- Any authorized user can, from any location in the internetwork, accidentally delete or otherwise imprudently modify directory entries.

FDR/UPSTREAM includes comprehensive support for the backup and restore of NetWare Directory Services. Using Novell's architected Storage Management Services (SMS) and transporting the data in System Independent Data Format (SIDF), FDR/UPSTREAM offers complete backup and restore of NetWare Directory Services which will work today and into the future.

### 13.6.1. Planning

Before beginning backups of NetWare Directory Services you should have FDR/UPSTREAM operational on a NetWare attached workstation.

When planning backups of your NetWare servers, if you have even one NetWare v4.x server you should plan on backing up the entire directory.

FDR/UPSTREAM uses a separate component which resides on a server to back up the directory. This component (USNDS.NLM) performs interprocess communications to send or receive directory information to and from a FDR/UPSTREAM workstation which actually performs the backup. Thus you must set up a workstation with FDR/UPSTREAM with host communications and you must also install and configure USNDS on a server.

Regular backups of the directory can and should be performed from a single FDR/UPSTREAM PC.

You should plan on restoring the entire directory in the event of a server crash. This will assure that any non-replicated directory information is properly restored.

If you have any questions concerning planning or operations of backups or restores of NetWare Directory Services, feel free to call FDR/UPSTREAM technical support.

### 13.6.2. Security

The USNDS NLM itself must have supervisor equivalent access (ADMIN access to the entire directory) to be able to backup or restore the directory. This access can be obtained in two ways:

- The security information can be saved by USNDS during the setup. All FDR/UPSTREAM workstations can then backup or restore NDS information. This has the advantage that backups and restores are simpler and require no separate security attachment, but any workstation that is running FDR/UPSTREAM can backup or restore any component of NDS. Note that while workstations can backup or restore NDS information, they cannot examine or modify it.
- Workstations must use a Novell Profile which represents an authorized user to backup or restore the NDS. This is more secure, but makes backups and restores (particularly ad-hoc restores) of NDS information more difficult.

Choose the method which fits best the security considerations of your organization.

### 13.6.3. Installation

Support for NetWare Directory Services is provided on the first FDR/UPSTREAM Program diskette. This diskette contains the following NetWare Loadable Modules:

- USSETUP.NLM: Run this program to install the following NLMs to the SYS:SYSTEM directory.
- USNDS.NLM: This program allows FDR/UPSTREAM workstations NDS access.
- USLOGCLR.NLM: Clears the USNDS.LOG file which is automatically generated by USNDS. Most users will either want to run this program from time to time from the server (usually by installing it in the AUTOEXEC.NCF file) or run USLOGCLR.EXE from any UPSTREAM workstation.
- TSANDS.NLM: A Novell SMS TSA (Target Service Agent). Required for SMS access of Directory Services.

To install the NDS NLMs go to a server where you wish the directory to be backed up from. Note that this can be any NetWare v4.x server that you will be including in your backup plan.

The installation process merely copies the files USNDS.NLM, TSANDS.NLM and USLOGCLR.NLM to the SYS:SYSTEM directory. If you wish you can copy these files from any workstation that has access to that directory and proceed to the configuration step.

To begin the install, put the first Program Diskette in the diskette drive on the server. From the System Console enter:

```
LOAD A:USSETUP
```

You will be asked if you wish to run the install. If you enter ‘Y’, the files will be copied.

The installation program will inform you that you will probably want to modify the AUTOEXEC.NCF to load the USLOGCLR and USNDS NLMs (described below).

### 13.6.4. Configuration

The FDR/UPSTREAM NDS support NLM (USNDS) requires configuration so that it can properly service NDS backup and restore requests. The configuration consists of Novell SMS options that must be defined, security considerations and reporting.

To configure USNDS, load it from the system console at the server it was installed on:

```
LOAD USNDS
```

The first time you run USNDS you are automatically brought into the configuration. USNDS is a NLM which runs in a separate screen. You can toggle through the loaded NLMs by using the [CTRL][ESC] combination.

The first configuration item is the selection of the Target Service Agent (TSA) you wish to use. A TSA entry is displayed and you must choose whether you wish to use the listed one by entering 'Y' or 'N'. As the screen heading suggests, you will probably wish to use a TSA which begins with your server name, and it will usually be the first entry. For example, if you are on server PAYROLL you may see:

```
PAYROLL:NetWare 4.0 Directory.  Use this one (Y or N) ->
```

Most users will enter 'Y' for the first entry.

Next, you must select a Target Service. If your directory is named ORG_NETWARE_SERVERS, you may see:

```
1. ORG_NETWARE_SERVERS
   Service type   :  NetwareDirectoryServices
   Service version: 1.0
Use this service (Y or N) ->
```

Again, most users will select 'Y' for the first entry.

The next step is the entry of security information to continue the configuration. When NDS is backed up or restored, you must be an authorized user (usually this means supervisor equivalent). To determine which SMS facilities are used in the backup, you must now log in. For example, if you are still using the Novell default, enter for User Name: .CN=ADMIN.O=ORG, and the password of ADMIN. We always recommend the use of the dotted, fully qualified name for all NDS entries. Note that when you enter the password, it is not displayed.

If you enter the security information incorrectly, you will see a message written in the messages section on the screen and you will have the opportunity to reenter the values correctly.

After you have successfully entered your security information, you will be asked:

```
Can UPSTREAM workstations use this login (Y or N) ->
```

If you enter 'Y', UPSTREAM workstations will not be required to have used a Novell Profile for the attach. If you wish to restrict the access enter 'N'. See the security section above.

The next step is the select the Resource to use for backups and restores. Again almost all users will select the first resource which is: Full Directory Backup.

The final step is the amount of reporting information that you wish to write to the USNDS.LOG file:

```
Detailed object backed-up and restored reporting (Y or N) ->
```

If you enter 'Y' all objects included or skipped in a backup or restore will be written to the report. In most cases you will want to turn this on for testing and off in production as this can be extensive depending on the size of your directory resulting in very large USNDS.LOG files.

When you have completed the configuration, the screen will clear, "Configuration successfully updated" will be entered in the messages section of the screen and USNDS will be operational.

### 13.6.5. USNDS Operations

There are two sections to the USNDS status screen: the information/update section where you entered configuration information at the top of the screen, and the messages section at the bottom which shows the last three or so messages written to the USNDS.LOG file. The information section of the screen shows the number of workstations currently connected and the status which is the last request serviced. This NLM takes few system resources and can be left running at all times.

Since USNDS must be operational for FDR/UPSTREAM to be able to backup/restore the NDS, you should run the INSTALL utility and update AUTOEXEC.NCF to assure that USNDS is automatically loaded at server start. Add the following lines to the end:

```
LOAD USLOGCLR 30
LOAD USNDS
```

Note that the 30 at the end of USLOGCLR is the number of days worth of information to maintain in the USNDS.LOG file (stored in the SYS:SYSTEM directory).

To exit the USNDS program, press the [ESC] key. You will be asked:

```
End program (Y or N) ->
```

If you enter 'Y', you will then be asked:

```
Modify configuration (Y or N) ->
```

If you enter 'Y', you will reenter the configuration process.

When the program terminates, you will be asked :

```
<Press any key to close screen>
```

This will return you to the system console.

### 13.6.6. Backups and Restores of NDS

There is a checkbox on the FDR/UPSTREAM main backup dialog: NetWare Directory Services. If you check this box, the Backup Spec field will change to (NDS). This check box will be grayed if you do not have USNDS running on a server which you are currently attached to. If it is grayed, verify that you have a drive mapping assigned to the server which is running USNDS.

**This specification is for the entire directory. If you wish to include files on a file server you must specify them in separate file specs.**

If you wish, you can specify any component or groups of components of the directory to include or exclude if you do not wish to back up the entire directory. To do this, add to the end of backup spec a backslash and the component you wish to include or exclude with wildcards. For example, if you only wish to back up the organizational unit TEST in the organization ORG, use a single include spec as follows:

```
(NDS)\*.OU=TEST.O=ORG.[ROOT]
```

You should then check the Include Subdirectories checkbox in the Spec Detail dialog. The trailing .[ROOT] is required. Note that you can use exclude specifications as well to limit the data transferred.

Note that if your backups are to mainframe DASD, FDR/UPSTREAM PCs calculation of the size of the backup will be incorrect and may cause FDR/UPSTREAM MVS to be unable to store the data. If you find this is true, modify your backup parameter file to use a DASDOVERRIDE or CALCDASDSIZE (see the *Advanced FDR/UPSTREAM* chapter).

FDR/UPSTREAM stores the entire directory, regardless of your specification in a single entry (NDS). File inquiries will show the date and time that the NDS information was backed up. Restores can be filtered in the same ways as backups.

# 13.7. Restoring a Complete Server

Restoring a complete server with FDR/UPSTREAM is quite simple. Since FDR/UPSTREAM runs on attached workstations, the efforts required to install and configure host communications have already been completed. The following lists the process for restoring a complete NetWare server in the event of a server failure.

### 13.7.1. Restoring a NetWare v3.x Server

If you are recreating a completely new PC server (NetWare v3.11 or v3.12) the steps are:

- Go through the normal Novell server installation process, including installing LAN and disk drivers, until it requests you insert the SYSTEM-3 diskette. Abort the process.
- From the FDR/UPSTREAM PC, log in as the SUPERVISOR (there will be no password).
- Restore the most recent 3 bindery files (restoring F:\SYSTEM\NET$*.SYS is adequate).
- Restore the rest of the server.

Note that on a complete system restore you must restore the bindery files first, before any non-file data will be restored properly. Trustee information must have bindery pointers to restore correctly.

**Note: You must NEVER have two servers on the same network with the same server name. Two servers have the same name if you restore a bindery from one onto another. The entire Novell internetwork will become unstable.**

### 13.7.2. Restoring a NetWare v4.x Server

If you are recreating a completely new PC server (NetWare v4.x) the steps are:

- Go through the normal Novell server installation process, including installing LAN and disk drivers.
- If USNDS was running on this server, reinstall and configure it (see above).
- From the FDR/UPSTREAM PC, log in. If you lost a some or all of the directory, you may have to use the default login of ADMIN.
- Restore all NDS.
- Restore the rest of the server.

Note that on a complete system restore you must restore NDS first, before any non-file data will be restored properly. Trustee information must have bindery pointers to restore correctly.

# 13.8. Novell Auto-Recall

Auto-Recall is a facility where when a file has been migrated (moved to other storage), a stub of the file is left behind. If a user accesses the file, then the file is restored to its original media in its original form.

FDR/UPSTREAM now supports auto-recall for Novell servers. This comprehensive facility features:

- Auto-detection of files to migrate based on last access date. When specifying files to migrate you can either specify specifically the files to migrate or specify a wildcarded range of files and ask UPSTREAM to only migrate those files which hadn't been accessed for a given number of days. This allows you to use FDR/UPSTREAM as a tool to keep your disks free of unused data.
- Transparent recall. When a file is accessed by any user in any operating system, FDR/UPSTREAM will automatically recall the file.
- User notification. A user on a Windows 95, Windows NT or OS/2 based system can be notified of the recall event and decide whether to allow the recall to proceed or fail.
- Recalls by FDR/UPSTREAM on Windows 95, Windows NT or OS/2 systems.
- Specification of recall retention periods and automatic cleanup of expired migration stubs.

### 13.8.1. Introduction

Before beginning on migration/auto-recall planning you should have a basic understanding of FDR/UPSTREAM and how it functions in a Novell environment.

There are several steps to a migration/recall:

- ☐ Migrating the files. Determining the files to migrate and performing the migration. This is performed by FDR/UPSTREAM on a separate workstation (DOS, OS/2, Windows, Windows NT). The **File Migration** facility is recommended for performing these migrations, and it is further recommended that you specify a File Migration only profile.

- ☐ Detecting a recall request. FDR/UPSTREAM includes a NLM (NetWare Loadable Module) which runs on the server: USRECALL.NLM. When installed, this NLM will determine if a file must be recalled when it is opened by a workstation application or user for read or read/write by examining it's last access date (Jan. 2, 1981 which is set by UPSTREAM during a Novell migration). This NLM has many configuration options for the processing of auto-recall requests including:
  - Whether the user should be held until the recall completes or the file open should fail and the recall proceed in the background.
  - Whether the user can be notified of recall requests and accept or deny them.
  - How long a recall request should be held for (its timeout).

- ☐ (Optionally) Notifying the user. If the user's workstation is Windows 95, Windows NT or OS/2 and has loaded the FDR/UPSTREAM Auto-Recall notification program (USRECALL.EXE) on his workstation the user will be notified of the recall request and have the opportunity to either accept the recall or reject it.

- ☐ Recall the file. If the recall can proceed, then USRECALL.NLM will send the request to NWRECALL.EXE, the FDR/UPSTREAM Auto-Recaller which will start FDR/UPSTREAM to perform the recall. Once the recall has

completed, the user, if blocked waiting for the recall to complete, will be freed. If the recall fails for any reason, the user will be returned a NetWare file open error.

- ☐ Clean up expired files. This is performed during the migration.

Communications between the server NLM and the recaller or notification workstation uses the Novell TLI facility which runs over IPX/SPX. Communications configuration is performed on the server.

### 13.8.2. Migration

When planning for the migration, some issues to consider related to host storage are:

- Files to be migrated should be stored in a separate backup profile from your regular backups. If you choose to use the same backup profile you need to realize that there will be excessive overhead in host FILE_INFO storage as a record for a migrated file is created for each new full backup.
- Migration should be performed somewhat infrequently. Again, the overhead in the FILE_INFO cluster is quite high.
- You may choose to use deferred merges to keep data stored on disk in case of early user recall.

Some Novell server notes and warnings include:

**NOTE: If you intend to migrate using the last access date, you must check the Novell or HPFS Reset Last Access Date checkbox in the Backup/Spec Detail/More... dialog for ALL backups. Otherwise the last access date will always be the last backup date.**

**WARNING: For ALL UPSTREAM backups of a server containing migrated files, you MUST check the Novell Auto-Recall Profile checkbox in the Backup/More... dialog. If you do not, an UPSTREAM backup will cause a recall of all migrated files.**

**NOTE: When checking the Novell Auto-Recall Profile, you can also check Delete expired auto-recall files. When performing a migration for auto-recall you specify a retention period. FDR/UPSTREAM sets the file's creation date to today's date plus the retention period. If you check this box the next backup will cause the stub to be deleted.**

**NOTE: Auto-recall of migrated files must come from a single backup profile for each server. You cannot use more than one backup profile to hold migrated files for a given server.**

**WARNING: You may get hangs if you allow the FDR/UPSTREAM machine to perform auto-recalls. This machine should only be used to restore recalled files.**

There are three different ways to migrate files for auto-recall using FDR/UPSTREAM:

- File Migration: This is a separate option for specifying files to migrate. This is the recommended method (see later in these notes for a description of this new facility). Note that you must check the **Novell Migration** checkbox in the spec detail dialog.

- Migration. When performing Full Merge backups, the Migrate... option is enabled in the Backup, Spec Detail dialog. When you press this radio button you can specify that all migrated files be Novell Migrated (a stub left and auto-recallable) rather than deleted by checking the **Novell Migration** checkbox. The other migration options are discussed in the Migration section of the FDR/UPSTREAM Program chapter in the manual.
- Specify files be included in any non-merge backup and then (in the Backup/Spec Detail/More... dialog) in the Backup File Deletions frame, press the All Files in Spec radio button and check the Novell Migration checkbox. This will cause the files to be marked for auto-recall rather than explicitly deleted. Note that the expiration of the files is specified using the RETAIN parameter not available on this screen. You should set it by editing the parameter file manually or in the Migration Spec Detail frame. If using this method you must still check the **Novell Auto-Recall Profile** checkbox in the Backup/More... dialog.

For most users we recommend:

- Use a separate backup profile for migration than for your regular backups.
- Use Migration rather than file deletion.
- Migrate those files which have not been accessed for more than 180 days.
- Perform migrations monthly or less often.
- Retain migrated files for 90 days.
- Use deferred merge and do not run the merge utility for several days to allow users to recall files.

### 13.8.3. The Components

The NetWare Auto-Recall diskette (or \NWRECALL directory) on the CD contains the following files:

| File Name | Description |
|---|---|
| \NOTIFY\OS2\UPSTREAM.MSG | UPSTREAM message file for OS/2 user notification. |
| \NOTIFY\OS2\USNOTIFY.EXE | User notification program for OS/2 users accessing migrated files on Novell servers. |
| \NOTIFY\WINDOWS\UPSTREAM.MSG | UPSTREAM message file for Windows 95 and Windows NT user notification. |
| \NOTIFY\WINDOWS\USNOTIFY.EXE | Users notification program for Windows 95 and Windows NT users accessing migrated files on Novell servers. |
| \RECALL\OS2\NWRECALL.EXE | The UPSTREAM auto-recaller program that runs on the UPSTREAM OS/2 machine. This is a full-screen (non-PM) program. |
| \RECALL\WINDOWS\NWRECALL.EXE | The UPSTREAM auto-recaller program that runs on the UPSTREAM Windows 95 or UPSTREAM Windows NT machine. |
| \SERVER\USLOGCLR.NLM | Log clearing program (NLM version) |
| \SERVER\USRECALL.NLM | UPSTREAM auto-recaller server module. |
| \SERVER\USSETUP.NLM | UPSTREAM auto-recaller server setup program. |

**Auto-Recall Components**

The figure below shows you the components in FDR/UPSTREAM auto-recall:

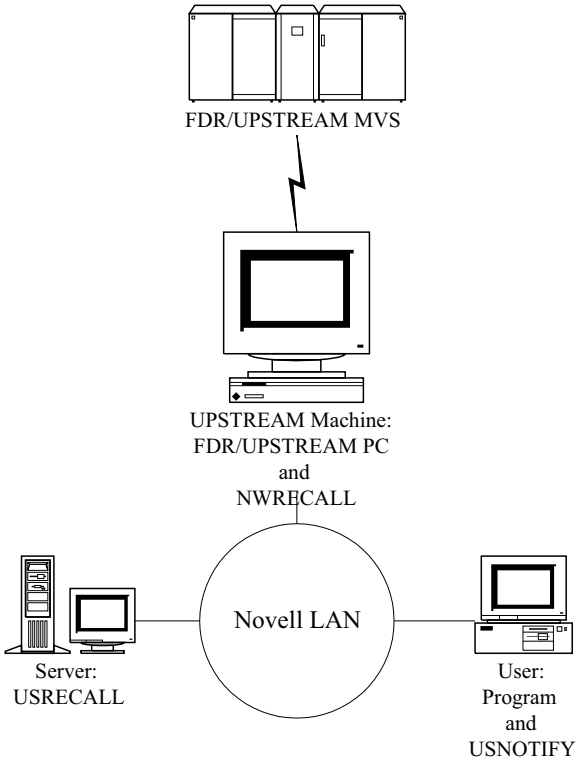



**Figure 13-6**
**Auto-Recall Components**

On the user's machine the components are:

- **The user's program**. Any program or method that the user uses to access a file on the server. This can include such simple facilities as the TYPE command.

- **USNOTIFY**. This is an OS/2 or Windows 95 or NT program which notifies the user when the recall request has occurred on this machine and allows the user to select whether the recall will occur. We recommend its use when possible so that when a recall is in progress, the user does not think that the application has hung.

On the Novell file server the components are:

- **USRECALL**. A server NLM which monitors file system open calls, notifies users (through communications to USNOTIFY on user's machines) and requests recalls to NWRECALL (on the FDR/UPSTREAM PC).

On the FDR/UPSTREAM PC, the components are:

- **NWRECALL**. An OS/2 or Windows 95 or NT program which allows must be always running and receives the auto-recall requests from USRECALL on the server and starts FDR/UPSTREAM PC to perform the recall.

- **FDR/UPSTREAM**. Performs the restore (recall).

Communications between USNOTIFY on the user's machine and USRECALL on the server and between USRECALL on the server and NWRECALL on the FDR/UPSTREAM machine uses the Novell standard TLI interface. This interface can utilize the SPX, SPX-2, or TCP/IP protocols, though most users will use SPX-2 for performance reasons.

The process of auto-recall is shown in the following figure:

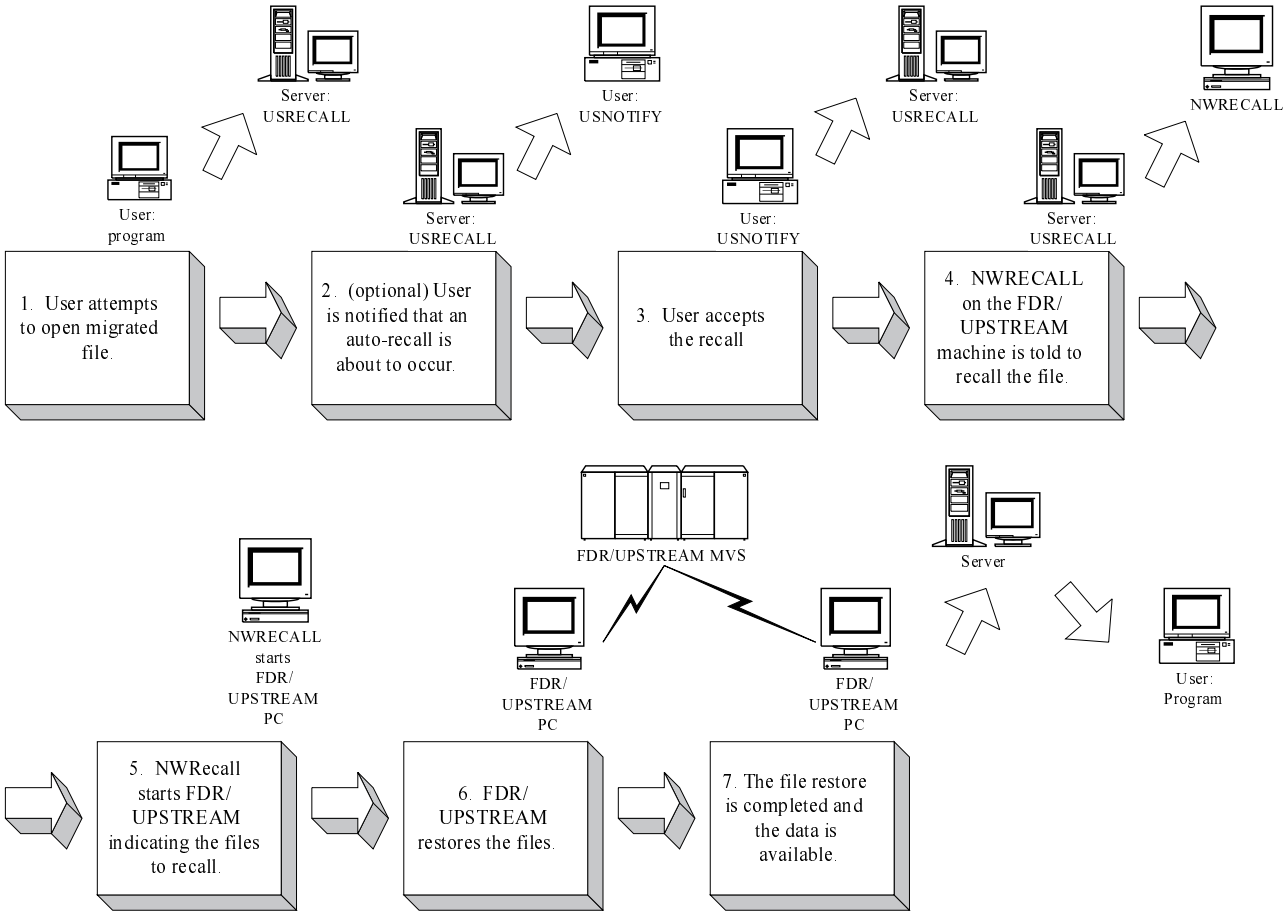



**Figure 13-7**
**Auto-Recall Process**

The auto-recall process is:

- ☐ 1. The user attempts to open a migrated file. When the migration was performed a stub was left for the file. When the user attempts to open this file, USRECALL on the server intercepts the open request and holds it until the recall is completed or fails.

- ☐ 2. (Optional) User is notified that an auto-recall is about to occur. If USNOTIFY is running on the user's machine, USRECALL will send a message to it. USNOTIFY will beep, and ask the user if the recall should be performed.

- ☐ 3. User accepts the recall. If the user says NO (in USNOTIFY) or the notification request times out, the file open request fails. If the user says YES or USNOTIFY is not running, then the recall is performed.

- ☐ 4. NWRECALL on the FDR/UPSTREAM machine is told to recall the file. USRECALL on the server sends a message to NWRECALL on the FDR/UPSTREAM machine to perform the recall. If a number of recalls occur simultaneously, then they will be serviced at the same time.

- ☐ 5. NWRECALL starts FDR/UPSTREAM. NWRECALL, using parameters defined in NWRECALL.DAT, starts FDR/UPSTREAM requesting a restore for the user requested file.

- ☐ 6. FDR/UPSTREAM restores the files. FDR/UPSTREAM performs a normal file restore directly to the server.

- ☐ 7. The file restore is completed and the data is available. The user's file open request will be satisfied and the program can proceed normally.

### 13.8.4. Installation and Configuration of the Server Component

Auto-recall can be performed on NetWare v3.12 or v4.1x servers. Due to the nature of NetWare (with its fragility with NLMs and operating system hooks), we recommend that you isolate a server for testing before you place it in production, upgrade to the latest levels of Novell software, and install and test auto-recall before placing the server back in production. Note that server upgrades and PTFs are available on CompuServe NetWire and on their FTP site at ftp.novell.com/pub/updates. We recommend the following updates be applied before installing the auto-recall server component:

- For NetWare 3.12 servers: 312PTA.EXE, CDUP4.EXE, LANDR9.EXE, LIBUPB.EXE, MON176.EXE, NAM312.EXE, SMSUP6.EXE, STRTL5.EXE and VRPUP1.EXE.
- For NetWare 4.10 servers: 410PT6.EXE, 41NDS9.EXE, CDUP4.EXE, INS224.EXE, LANDR9.EXE, LIBUPB.EXE, NAM41A.EXE, SMSUP6.EXE, SRVMN1.EXE and STRTL5.EXE.
- For NetWare 4.11 servers: 411SP1B.EXE, LIBUPB.EXE.

**WARNING: You must upgrade your server to assure reliable operation of your server and auto-recall**

To install the server component you can copy the files from the \NWRECALL\SERVER directory on the CD or the \SERVER directory on the NetWare Auto-Recall Diskette to the SYS:SYSTEM directory of your server from a workstation, or from the server you can run the USSETUP program.

To run the USSETUP program from diskette, insert the NetWare Auto-Recall diskette in the A: drive and enter from the System Console:

```
load a:server\ussetup
```

To run the USSETUP program from the CD, insert the CD in your CD drive and enter from the System Console (assuming that the CD drive is drive D:):

```
load d:\nwrecall\server\ussetup
```

You will be asked if you wish to run the program (Enter 'Y'). If installing from CD, you will be asked for the CD directory. Enter **D:\NWRECALL\SERVER**. The program will copy the contents of the directory to the SYS:SYSTEM directory, refer you to this manual and ask you to press a key to return to the System Console.

To configure USRECALL, you must load the program:

```
load usrecall
```

This will display the Auto-Recall console (see figure 13-8).

```
                    FDR/UPSTREAM Auto Recall System
Process #1                          Process #2
Status  : Idle                      Status  : Idle

Process #3                          Process #4
Status  : Idle                      Status  : Idle

Process #5                          Process #6
Status  : Idle                      Status  : Idle

                          Messages
```

It is divided into 3 seconds:

- Connected recallers. The top boxes named Process indicate the recallers that are currently connected and their status.
- A user entry line (in the middle).
- A messages display. All messages are written to the file USRECALL.LOG; the most recent few messages are displayed in this window. Note that this window is used to display help information while you are entering configuration values.

When you enter for the first time, you will be prompted in the user entry line:

```
Configuration file not found.  Create (Y or N) ->
```

Press **Y** and enter to begin configuring.

The user entry line will now prompt you:

```
SPX (Y or N) ->
```

The messages field will now indicate that you have entered configuration. It will also display help for the question. **SPX: SPX is only recommended in an environment where you know that SPX-2 will not work. The default is NO. Most users will press** N **and enter.**

The following table describes the options requested during configuration, their defaults and some descriptive help. You can press ENTER to accept the default or prior value. Note that some options only have to be entered if they are relevant; for example you don't have to enter IP parameters if you are only using SPX.

| Item | Default | Description |
|---|---|---|
| SPX | N | SPX: SPX is only recommended in an environment where you know that SPX-2 will not work. The default is NO. |

| Item | Default | Description |
|---|---|---|
| (SPX only) SPX Socket Number | 4226 | SPX Socket Number: The SPX socket number must be a unique socket number on the server. We recommend using the default value unless you know it is incorrect. The default is 4226. |
| (SPX only) Use SAP (SPX) | Y | Use SAP: SAP (Service Advertising Protocol) allows this program to be found easily by workstations but has the disadvantage of increased network overhead. We recommend using it whenever possible. The default is YES. |
| (SPX only) SPX SAP Service Type | bf74 | SAP Service Type: When USRECALL is using SAP to advertise its services, a service type is required to identify the call of service. Most users will leave it at the default value. |
| SPX-2 | Y | SPX-2: The recommended communications protocol for most Novell networks. Disable only if you must use SPX or TCP/IP. The default is YES. |
| (SPX-2 only) SPX-2 Socket Number | 4225 | SPX-2 Socket Number: The SPX socket number must be a unique socket number on the server. We recommend using the default value unless you know it is incorrect. The default is 4225. |
| (SPX-2 only) Use SAP (SPX-2) | Y | Use SAP: SAP (Service Advertising Protocol) allows this program to be found easily by workstations but has the disadvantage of increased network overhead. We recommend using it whenever possible. The default is YES. |
| (SPX-2 only) SPX SAP Service Type | bf75 | SAP Service Type: When USRECALL is using SAP to advertise its services, a service type is required to identify the call of service. Most users will leave it at the default value. |
| TCP/IP (TLI) | N | TCP/IP (TLI): TCP/IP (using the TLI interface) requires Novell TCP/IP on the recall or notify workstation. The default is NO. |
| (TCP/IP only) TCP/IP Socket Number | 1973 | TCP/IP Socket Number: The TCP/IP socket number must be a unique socket number on the server. We recommend using the default value unless you know it is incorrect. The default is 1973. |
| (TCP/IP only) Use SAP (TCP/IP) | Y | Use SAP: SAP (Service Advertising Protocol) allows this program to be found easily by workstations but has the disadvantage of increased network overhead. We recommend using it whenever possible. The default is YES. |
| (TCP/IP only) TCP/IP SAP Service Type | bf76 | SAP Service Type: When USRECALL is using SAP to advertise its services, a service type is required to identify the call of service. Most users will leave it at the default value. |
| Process Timeout (in minutes) | 30 | Process Timeout: The number of minutes that a process will persists without communications from the recall or notify PC. The default is 30. |
| Support auto-recall | Y | Auto-recall: A facility where a FDR/UPSTREAM machine must be registered and ready to recall migrated files from the host on user demand. The default is YES. |
| Wait for recall | Y | Wait for recall: Select 'Y' if you wish to have the user wait for the file to be recalled. Select 'N' to have the file open fail, and the recall occur later. Selecting 'N' is always safer, but less responsive. The default is YES. |

| Item | Default | Description |
|---|---|---|
| Support user notification | Y | Support user notification. This facility has some overhead, but if enabled, users (when running USNOTIFY) can deny recalls. Select 'Y' to enabled, 'N' to disable. |
| (Notify only) User must accept | N | User must accept. This requires that the user be attached and must approve all recalls before they will be performed. The default is 'N'. |
| Auto-recall time-out | 300 | Auto-recall time-out. Specify the maximum number of seconds before a recall request is denied if it is not satisfied. The default is 300 (5 minutes). |
| Number of auto-recall volumes | 1 | Number of auto-recall volumes. Specify the number of volumes that you wish to support auto-recall for. For each volume there will be certain information that you will be required to enter. The default is 1. |
| (For each volume) Volume name | (none) | Volume name. Enter the NetWare volume name that FDR/UPSTREAM will perform the auto-recall for. For example, SYS. |
| (For each volume) FDR/UPSTREAM Drive Letter | F | FDR/UPSTREAM Drive Letter. Enter the drive letter that FDR/UPSTREAM uses when it backs up this volume. For example, O. |

If the required NLMs are loaded, the program will be ready to accept recall requests. If you receive a TLI errors, you may need to load one of the following NLMs before loading USRECALL. Note that these NLMs should be loaded in your AUTOEXEC.NCF file before you load USRECALL.

- TLI.NLM for all interfaces.
- SPXS.NLM for SPX or SPX-2.
- TCPIP for TCP/IP.

To terminate USRECALL (if it is terminating normally), press the [ESC] key. You will be asked:

```
End program (Y or N) ->
```

After a few seconds hesitation, you will be asked:

```
Modify config file (Y or N) ->
```

If you wish to modify your configuration, you can do it whenever you terminate USRECALL.

### 13.8.5. Installation and Configuration of the Recall Component

NWRECALL is a Windows (16-bit program that will only work in Windows 95 or Windows NT) or an OS/2 full-screen program that sits as a front end to FDR/UPSTREAM.

NWRECALL for Windows has the same restrictions as FDR/UPSTREAM; it requires the requestor from Novell, dated Oct 96 or later.

NWRECALL for OS/2 requires the 32-bit Novell requestor supplied with NetWare v4.11 or CLOS2N.EXE on Novell's web site.

To install NWRECALL, merely copy NWRECALL.EXE from:

- \RECALL\OS2 for an OS/2 installation from diskette.
- \NWRECALL\RECALL\OS2 for an OS/2 installation from CD.

- \RECALL\WINDOWS for a Windows 95 or NT installation from diskette.
- \NWRECALL\RECALL\WINDOWS for a Windows 95 or NT installation from CD.

Most of the configuration of NWRECALL is actually performed in FDR/UPSTREAM.

NWRECALL requires a predefined parameter file NWRECALL.DAT which contains parameters for performing requested restores from the host. To define NWRECALL.DAT you should enter FDR/UPSTREAM, perform a single file restore using the same backup profile as you will use for the recalls and save the parameter file as NWRECALL.DAT. In particular you should be careful to define:

- The correct backup profile used for the migration.
- A Novell Profile if needed.
- Any reporting options you wish.
- Local backup if you used it for the migration.
- The non-file data types you wish restored.

Since NWRECALL will specify the files to restore, the actual file saved to NWRECALL.DAT is not important.

NWRECALL.EXE has the following command line syntax:

```
NWRECALL.EXE [switches...] [parameters...]
```

The switches are:

- /List: Lists all the recall servers on the network.
- /Trace: Activates command line tracing. Use this only when requested by FDR/UPSTREAM tech support.

The parameters are:

- RECALLSERVER=<server name> This is a required parameter specifying the name of the Novell server which is running USRECALL that you will be performing recalls for.
- WHOLEDIR=<Y or N> If you specify N, only those files requested will be recalled; if you specify Y all migrated files in the directory will be restored. The default is N.
- RECALLCOMMTYPE=<0 for SPX, 1 for SPX-2, and 2 for TCP/IP> Use the type specified on the server in USRECALL. The default is 1.
- RECALLCHECKINTERVAL=<interval> Specify the number of seconds between recall checks. The default is 15 seconds.
- CONFIGFILE=<config file name> Specify the name of the UPSTREAM configuration file. The default is UPSTREAM.CFG.
- PARAMETER=<parameter file name> Specify the name of the template UPSTREAM parameter file with parameters for recalls. The default is NWRECALL.DAT.

Most users will specify:

```
NWRECALL RECALLSERVER=<server name>
```

You must have NWRECALL running at all times that you have USRECALL running on the server. We recommend that is be placed in your STARTUP.CMD file for OS/2 or STARTUP group for Windows 95 or NT.

NWRECALL writes to the FDR/UPSTREAM log (UPSTREAM.LOG) all informative messages and this is where you should look for problem determination.

### 13.8.6. The User Component

If you wish to notify users recalls when they occur and allow them to not perform the process, you will need to install and configure the USNOTIFY program on all workstations. Note that this process is mandatory if you specified the "User must accept" option when configuring USRECALL on the server.

USNOTIFY for Windows has the same restrictions as FDR/UPSTREAM; it requires the requestor from Novell, dated Oct 96 or later.

USNOTIFY for OS/2 requires the 32-bit Novell requestor supplied with NetWare v4.11 or CLOS2N.EXE on Novell's web site.

We recommend that USNOTIFY be installed on a common directory on the server where the auto-recalls are performed. A good place might be SYS:PUBLIC/USNOTIFY. Merely copy the files with all subdirectories from the diskette or CD. For a diskette install, you might specify:

```
XCOPY A:\NOTIFY\*.* F:\PUBLIC\USNOTIFY\*.* /s
```

or a CD install you might specify:

```
XCOPY D:\NWRECALL\NOTIFY\*.* F:\PUBLIC\USNOTIFY\*.* /s
```

This will create the following directory structure:

```
\USNOTIFY
   \WINDOWS
   \OS2
```

The \WINDOWS directory contains the Windows 95 and NT version of USNOTIFY, the \OS2 directory contains the OS/2 version of USNOTIFY.

USNOTIFY is a PM or Windows program with the following command line syntax:

```
USNOTIFY [switches...] [parameters...]
```

The switches are:

- /List: Lists all the recall servers on the network.
- /Trace: Activates command line tracing. Use this only when requested by FDR/UPSTREAM tech support.

The parameters are:

- RECALLSERVER=<server name> This is a required parameter specifying the name of the Novell server which is running USRECALL that you will be performing recalls for.
- RECALLCOMMTYPE=<0 for SPX, 1 for SPX-2, and 2 for TCP/IP> Use the type specified on the server in USRECALL. The default is 1.
- CONFIGFILE=<config file name> A file name where you can specify parameters for this program (an alternate to the command line).
- LOGFILE=<log file name> Specify the name of the log file where USNOTIFY writes messages to. The default is UPSTREAM.LOG.
- MESSAGEFILE=<message file name> Specify the name of the UPSTREAM message file. The default is UPSTREAM.MSG.

**WARNING: During a recall, you may not be able to read or write to the server drive. Do not run USNOTIFY from a server drive as it may hang your machine when it attempts to read from the executable, write to the log, and read from the message file**

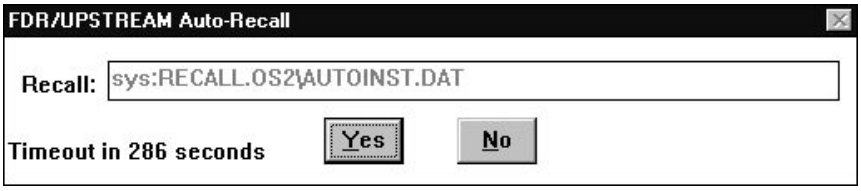
Since you must run USNOTIFY from a user's local drive, we recommend that you add statements to user's login profile to copy the files from the common directory to user's local directories. For example:

```
copy f:\public\usnotify\windows\*.* c:\usnotify\*.*
```

At the user's workstation, you will need to add USNOTIFY to the user's STARTUP.CMD (for OS/2) or Startup group (Windows 95 or NT). For the command line, most users will specify:

```
USNOTIFY RECALLSERVER=<server name>
```

When an auto-recall request is attempted, the notified user will see:




If the user selects Yes, the auto-recall will be performed. If the user selects No or waits until the time out has expired, then the recall will not be performed and the file open will fail.

If the user requests that the file not be recalled, the question (notification) may occur more than once as multiple name spaces are attempting to open the file.

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# 14 IBM LAN Server Considerations

FDR/UPSTREAM addresses IBM LAN Server extensively. Due to the well integrated nature of IBM LAN Server in OS/2, much of what is required is to back up and restore the file system itself. However, being a file server implies that both planning and specific server considerations must be performed. Some of these include:

- General server backup planning. Which files to back up, dealing with other files and databases, etc.
- Backing up system files.
- Backing up HPFS 386 (ACLs)
- Disaster Recovery

Note that due to the way that IBM supports LAN Server, you must use the OS/2 version of FDR/UPSTREAM to completely back up and restore an IBM LAN Server. Note that the old Microsoft LAN Manager (v1.x) is almost identical in requirements and support to IBM LAN Server.

You can use UNC (Universal Naming Convention) names to back up network attached systems. This chapter explains how to use UNC names with FDR/UPSTREAM.

# 14.1. UNC Names for OS/2

Universal Naming Convention (UNC) names are used within OS/2 to name network resources. For files, this naming convention has the advantages of:

- A single name to represent a file, regardless of where it is in the network.
- It is not drive letter oriented.

UNC names can be used for in virtually any OS/2 command (TYPE, DEL, COPY, etc.), as well as the network oriented (NET) commands. A UNC name has the form:

```
\\<Machine name>\<Share name>\<directory specification>
```

FDR/UPSTREAM has modified this syntax (so that it will work with its drive-centric orientation) as follows:

```
!:\<Machine name>\<Share name>\<directory specification>
```

The exclamation point (!) drive letter indicates to FDR/UPSTREAM that it is a UNC name.

Thus, you can specify in a backup, restore, view or just about any FDR/UPSTREAM function the UNC name of the resource, freeing you from any drive dependencies.

For example, to back up all the files on machine RON in the share name CDRIVE, you would specify:

```
!:\RON\CDRIVE\*.*
```

The use of UNC names still requires that you be logged on to the machine with adequate security.

You cannot use UNC names within FDR/UPSTREAM for files on a Novell server.

# 14.2. Planning

IBM LAN Servers allow PCs to share disks, printers and other resources. FDR/UPSTREAM supports all versions of IBM LAN Server up to and including v4.x.

You can run UPSTREAM either on the server itself, or on a LAN attached workstation. If you are running UPSTREAM on the server, all you have to do is merely back up/restore the local drives (C:, D:, etc.). This is the recommended method for backing up/restoring a server as it has the maximum performance (the data does not require transmission across the LAN).

If you are running UPSTREAM on a LAN attached workstation, you must attach a drive to the server (using the NET USE command). While this is not the recommended method (due to performance considerations), this method offers some benefits in manageability. Note that if you use this method you should not generally attempt to back up more than one server in a backup profile.

### 14.2.1. Planning what and when to backup

IBM LAN Servers tend to be very large. This may require a complex plan. You should consider:

- The real performance of FDR/UPSTREAM. You may need to optimize FDR/UPSTREAM to handle this large amount of data. The performance chapter can help you get the best from your environment.
- What your “window” is. This is the number of hours during which you can do backups. For many users, complete backups are done only on weekends. Effective utilization of your time window helps you get the most from FDR/UPSTREAM.
- How often you *need* to perform complete backups. You may want to perform complete backups daily, but an analysis of your requirements may show that weekly or even monthly complete backups are adequate based on a realistic appraisal of your needs and the use of incrementals. Or you may find that complete backups should be performed over a period of several days (by backing up individual directories).
- How many machines to use in the backup. Multiple servers are often best backed up by multiple PCs.

### 14.2.2. Open files

The second aspect of planning should be to assure that all required files are closed when the backup is performed. This is best done manually be requiring that all users detach from their applications before leaving each night.

# 14.3. Backing up system files

### 14.3.1. IBM LAN Server and Microsoft LAN Manager

If you will be backing up OS/2 system files which include OS2.INI, OS2SYS.INI or LAN system files which include NET.ACC you should know the following:

- The size of these files is dynamic. It may appear that you are not backing them up correctly because the sizes change, but this is normal and you should not generally be concerned.
- Restoring system files can be tricky. See the next section for specific information on how to restore these files.

### 14.3.2. HPFS 386

One of the distinguishing characteristics of HPFS 386 is that security information is stored in the file system, as well as in the NET.ACC file. The information is stored in the form of Access Control Lists (ACLs). You specify that you wish they be included in a backup, by entering the files to be backed up, pressing the <Spec Detail> button and then the <More...> button to display the More Specification dialog (see figure 14-1).

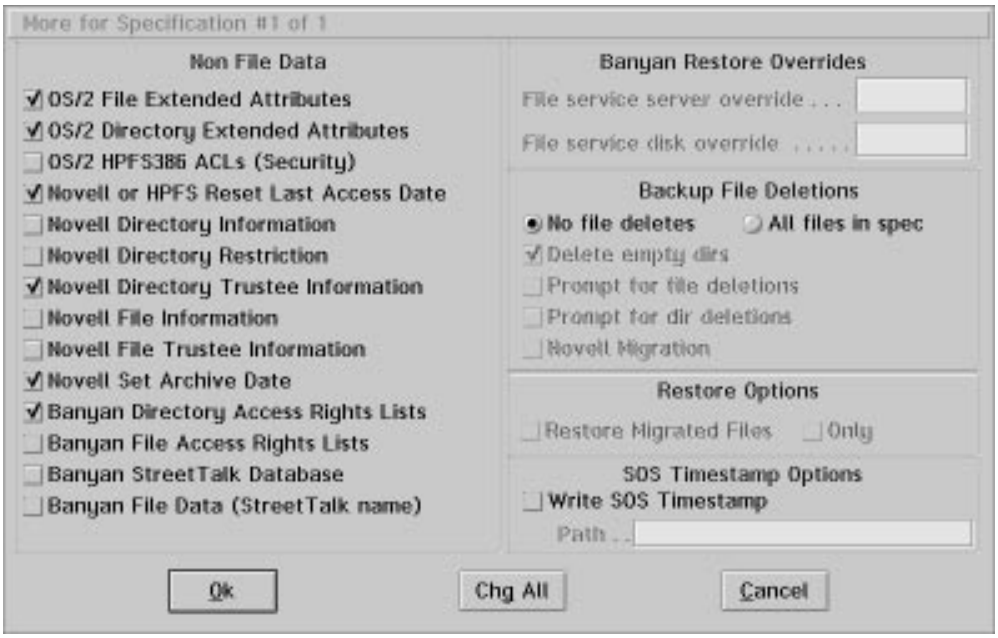


**Figure 14-1**
**More Specification Dialog**

There are several options specific to OS/2 server backup:

☐ **OS/2 File Extended Attributes:** For a complete server backup you should include extended attributes.

☐ **OS/2 Directory Extended Attributes**: For a complete server backup you should include extended attributes.

- ☐ **OS/2 HPFS 386 ACLs (Security):** Check this button if you wish OS/2 ACLs (Access Control Lists) included in the backup or restore. The default is not checked. Checking this option reduces performance significantly, so only use it if you are using HPFS 386 and ACLs (through the NET ACCESS command).

- ☐ **Novell or HPFS Reset Last Access Date:** Check this button if you are using FDR/UPSTREAM migration or some other facility which examines the last access date and you are also using HPFS or HPFS 386. The default is note checked. Checking this option has a performance impact.

# 14.4. Restoring system files

The OS/2 system files OS2.INI and OS2SYS.INI and the LAN system files such as NET.ACC can be difficult to restore due to the fact that the operating system keeps these files open and locked at all times.

If you have any questions or problems restoring system files, call FDR/UPSTREAM technical support.

### 14.4.1. Restoring OS/2 system files

To restore the OS/2 system files OS2.INI and OS2SYS.INI you will need to do the following:

- ☐ Restore them to a different path by using the destination option (C:\OS2*.INI to C:\OS2INI*.INI).
- ☐ Edit your CONFIG.SYS to change the PROTSHELL= line to reflect the new directory.
- ☐ For these changes to take effect, you will need to shutdown the system and restart it.

### 14.4.2. Restoring IBM & Microsoft LAN system files

To restore the LAN Server and LAN Manager system files (like NET.ACC) you will need to do the following:

- ☐ Restore it to a different path by using the destination option (C:\IBMLAN\ACCOUNTS\NET.ACC to C:\IBM-LAN\ACCOUNTS\NET.TMP).
- ☐ If you are using LAN Manager:
  - Run NET STOP WORKSTATION
  - If you are running Local Security, use the LAN Manager Installer to Detach your server.
- ☐ If you are running LAN Server:
  - Modify your CONFIG.SYS to REM out the line DEVICE=C:\IBMLAN\NETPROG\RDRHELP.SYS which will disable the LAN Server program.
  - Reboot your machine to disable the program completely.
- ☐ Copy the restored files (COPY NET.TMP to NET.ACC).
- ☐ If you are using LAN Manager:
  - If you were running Local Security, use the LAN Manager Installer to reattach your server.
  - Restart the server using NET START SERVER.
- ☐ If you are using LAN Server:
  - Edit your CONFIG.SYS to remove the REM from the RDRHELP.SYS device driver line.
  - Shutdown and restart the system

### 14.4.3. Restoring HPFS 386 ACLs

Check the OS/2 LAN Server ACLs box in the <More> dialog from the restore file spec dialog to enable restores of ACLs. Note that ACLs are maintained for both files and directories.

In most cases you will restore data and ACLs simultaneously.

However, if you are only maintaining ACLs for directories, you can use the DIRSONLY parameter (which you specify by entering a double backslash in the List and Restore facility) to restore directories only and thus restore ACLs without restoring the files associated with them.

### 14.4.4. Disaster Recovery

FDR/UPSTREAM offers a way to completely recover an OS/2 workstation/server. See the FDR/UPSTREAM ULTra chapter for a complete description of this facility.

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# 15 Windows NT Server Considerations

FDR/UPSTREAM provides a complete backup, restore and disaster recover solution for Windows NT Servers and Workstations. Adequate planning is required to ensure that the specific requirements of your installation are addressed. This planning starts by addressing the following considerations:

- Planning the Backup/Restore Process
- Backing Up a Windows NT Machine
- Restoring a Windows NT Machine
- Recovering a Windows NT Machine

Only the Windows NT version of FDR/UPSTREAM has the capability of backing up the critical system information in a Windows NT system. This critical system information consists of:

- Long file and directory names
- File and directory Access Control Lists (ACLs)
- Extended Attributes (EAs) and alternate data streams for files
- The Windows NT Registry
- The Windows NT Event Logs

# 15.1. Planning the Backup/Restore Process

Unlike some other operating systems, the ability to share disks, printers and other resources is built into Windows NT. No additional system software is required. To share a disk (or a specific directory on a disk) with another machine, a **Share** can be set up that will allow other Windows NT machines and machines running either the Microsoft LAN Manager or the IBM LAN Server to attach to the drive (or directory).

The backup, restore and disaster recovery tasks for each Windows NT computer in your installation is the same regardless of whether the computer is running Windows NT Server or Windows NT Workstation. In order to ensure that a Windows NT computer is completely backed up/restored, the Windows NT version of FDR/UPSTREAM must be run either on that computer or from another Windows NT computer that is attached via a share to the computer that is being backed up/restored.

When you run FDR/UPSTREAM on the computer that is being backed up/restored, all you have to do is merely back up/restore the local drives (C:, D:, etc.). This is the recommended method for backing up/restoring a server as it has the maximum performance (the data does not require transmission across the LAN).

When you run FDR/UPSTREAM on another computer (other than the one being backed up/restored) you must attach a drive to a share of the target computer (using the NET USE command). While this is not the recommended method (due to performance considerations), this method offers some benefits in manageability. Note that if you use this method you should not generally attempt to back up/restore more than one computer at a time (using a single backup profile).

### 15.1.1. Planning what and when to backup

Your primary concern will most likely be backing up/restoring Windows NT Servers, however your Windows NT Workstations will need some consideration as well. Windows NT Servers tend to be very large. This may require a complex plan. You should consider:

- The real performance of FDR/UPSTREAM. You may need to optimize FDR/UPSTREAM to handle this large amount of data. The performance chapter can help you get the best from you environment.
- What your “window” is. This is the number of hours during which you can do backups. For many users, complete backups are done only on weekends. Effective utilization of your time window helps you get the most from FDR/UPSTREAM.
- How often you *need* to perform complete backups. You may want to perform complete backups daily, but an analysis of your requirements may show that weekly or even monthly complete backups are adequate based on a realistic appraisal of your needs and the use of incrementals. Or you may find that complete backups should be performed over a period of several days (by backing up individual directories).
- How many machines to use in the backup. Multiple servers are often best backed up by multiple PCs.

### 15.1.2. Open files

The second aspect of planning should be to assure that all required files are closed when the backup is performed. This is best done manually by requiring that all users detach from their applications before leaving each night.

# 15.2. Backing Up a Windows NT Machine

FDR/UPSTREAM allows you to specify the types of information that are to be backed up on an individual file specification (disk) basis. The Windows NT file systems manage a number of types of information that are referred to as Non-File Data within FDR/UPSTREAM. You specify which types of Non-File Data you want included in a back up with the following procedure:

- On the Backup Parameters dialog enter a file specification for the disk to be backed up
- Press the **<Spec Detail>** button to display the File Specification #n of m dialog
- Press the **<More..>**. button to display the following dialog:

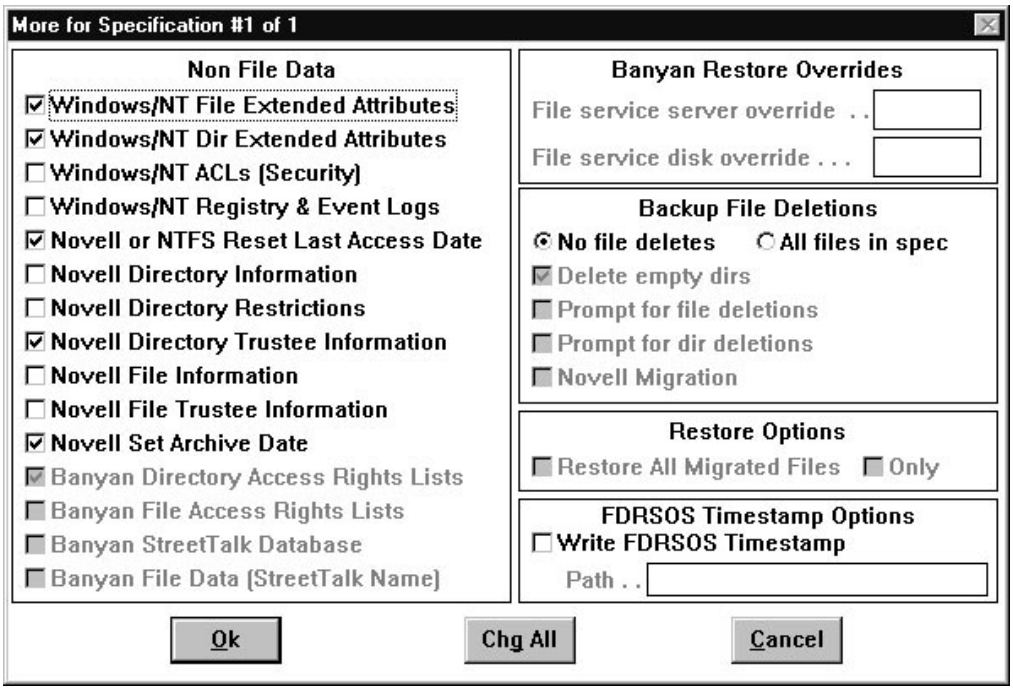


**Figure 15-1**
**More Specification Dialog**

The types of Windows NT Non-File Data that can be selected are:

- ☐ **Windows/NT File Extended Attributes:** The Windows NT File System (NTFS) has the ability of storing extra data along with the normal file data. This additional data can be Extended Attributes (EAs), alternate data streams or Access Control Lists (ACLs). By selecting this option FDR/UPSTREAM will back up the EAs and alternate data streams for the files included in the file specification. ACLs are handled separately.

- ☐ **Windows/NT Dir Extended Attributes:** Directories do not contain data or alternate data streams, but they may have EAs. By selecting this option FDR/UPSTREAM will back up the EAs for the directories included in the file specification.

- **Windows/NT ACLs (Security):** NTFS can store Access Control Lists for each file and directory. By selecting this option FDR/UPSTREAM will back up the ACLs for every file and directory included in the file specification.

- **Windows/NT Registry & Event logs:** Every Windows NT system has a registry and event log. By selecting this option FDR/UPSTREAM will back up the registry and event logs whose files are included in the file specification. WARNING: If one or more registry or event log files are not included in the file specification they will not be backed up. This could lead to an inconsistent system state if only a subset of the registry files are restored. For this reason it is strongly suggested that registry files be backed up only for file specifications that include the entire Windows NT system drive (C:*.*).

- **Novell or NTFS Reset Last Access Date:** FDR/UPSTREAM has the ability to back up files based on when they were last accessed. For this to be done correctly FDR/UPSTREAM itself must not be allowed to modify the last access date of the files it backs up. By selecting this option FDR/UPSTREAM will reset the last access date for each file after it is done backing it up.

All of these Non-File Data options (with the possible exception of **Novell or NTFS Reset Last Access Date**) should be selected for a complete backup.

# 15.3. Restoring a Windows NT Machine

FDR/UPSTREAM also allows you to specify the types of Non-File Data you want included in a restore with the following procedure:

- On the Inquire/Restore for Profile ... Using Backup MM/DD/YY HH:MM:SS dialog select the directories and/or files you want restored
- Press the More... button to display the More for Specification #n of m dialog

The Non-File Data that can be selected is the same as with a backup:

- Windows/NT File Extended Attributes·
- Windows/NT Dir Extended Attributes·
- Windows/NT ACLs (Security)·
- Windows/NT Registry & Event logs·
- Novell or NTFS Reset Last Access Date

**WARNING: When restoring registry files, it is strongly suggested that the full set of registry files be restored to prevent an inconsistent system state to occur. Whenever one or more registry files are restored, FDR/UPSTREAM will advise you to reboot the Windows NT machine for the restored registry files to take effect.**

# 15.4. Recovering a Windows NT Machine

A disaster is something that we all want to avoid, but when a disaster occurs it helps to be prepared. Windows NT and FDR/UPSTREAM were both created with the idea of disaster recovery in mind.

### 15.4.1. Preparing the Disaster Recovery Package

When you first install a Windows NT system (both Server and Workstation) the installation procedure creates, by default (when the /b parameter is not used when starting the NT installation program; WINNT.EXE for non-NT systems and WINNT32.EXE for NT systems), three NT boot diskettes for you. Also during the installation procedure, you are asked if you want to create an Emergency Repair Disk (ERD). It is strongly suggested that you do so. The ERD contains your current system configuration. The three boot diskettes, the ERD and your Windows NT Server/Workstation CD are your tools for recovering from a disaster.

As your system configuration is modified it is important to periodically create a new ERD and store it with the rest of your disaster recovery package. To create a new ERD you can use the RDISK.EXE program found in the SYSTEM32 subdirectory of you main Windows NT system directory (in most cases C:\WINNT). For example:

```
C:\WINNT\SYSTEM32\RDISK.EXE
```

RDISK.EXE is easy to run and takes only a few minutes.

Microsoft periodically releases services packs to apply fixes and minor enhancements to Windows NT. If you decide to apply one of these service packs to your Windows NT system we recommend that you perform a backup in case there are problems applying it. You will have to also include the service pack in your disaster recovery plans. After applying a service pack:

- Note that the contents of the service pack will be included in your next UPSTREAM backup (as the archive bits are on).
- Create another Emergency Repair Disk and save it with your disaster recovery package.
- Copy the files that make up the service pack to diskettes (the recommended method). You can also place the service pack on one or more other machines on the network (if you have network access on recovered machines), or back up the contents of the service pack using UPSTREAM (if you have UPSTREAM access on recovered machines). Which ever method you use, the service pack must be available with your disaster recovery package.

FDR/UPSTREAM requires a communications package through which it can communicate with the mainframe. This communications package is either TCP/IP which is built into Windows NT or one of the separately installed SNA products. If your installation uses one of these SNA products in conjunction with FDR/UPSTREAM to do its back ups and restores then the SNA product installation disk(s) or CD should also be included in you disaster recover package. You should also include a copy of the current configuration for the SNA product.

The last item to include in your disaster recovery package is a copy of FDR/UPSTREAM itself.

This disaster recovery package should be stored in a safe place and be readily available in the event of a disaster.

### 15.4.2. Procedure for Recovering a Windows NT machine

During this discussion of the disaster recovery procedure the term **Target System** will be used to refer to the machine that is to be recovered and the term **Source System** will be used to refer to the machine on which FDR/UPSTREAM is run.

The very first step in any disaster recovery procedure is restoring the basic Windows NT system on the target system. This is accomplished by booting the target system using the three Windows NT boot diskettes and then supplying the ERD when prompted by the Windows NT boot process. If a Windows NT service pack was applied to the system you will have to reapply it **after** applying the ERD.

The rest of the disaster recovery procedure depends on whether TCP/IP is the communication protocol that FDR/UPSTREAM uses to communicate with the mainframe. If TCP/IP is used by FDR/UPSTREAM (TCP/IP must be installed on the mainframe) then continue with section 15.4.3., otherwise continue with section 5.7., 5.4.1.15.4.4..

### 15.4.3. Using TCP/IP to Recover the Windows NT Target System

This is the easiest of the disaster recovery scenarios. Since TCP/IP is built into Windows NT it is immediately available to perform the rest of your disaster recover process. Proceed as follows:

- 1. Install FDR/UPSTREAM on the target system.
- 2. Use FDR/UPSTREAM on the target system to restore all of its disks.

To complete your recovery, proceed to section 15.4.5..

### 15.4.4. Using a SNA Product to Recover the Windows NT Target System

If FDR/UPSTREAM uses a SNA connection to communicate with the mainframe then you must either install a SNA product that FDR/UPSTREAM can use on the target system or use a second Windows NT machine that has a SNA product that FDR/UPSTREAM can use already installed on it. If the SNA product installed on the second Windows NT machine is the SNA Server Client and the target system is the SNA Server gateway, the second machine cannot be used for SNA communications until the target system is recovered.

Is a second Windows NT machine available on the same LAN as the target system and has a SNA package that FDR/UPSTREAM can use installed on it (not SNA Server Client)? If yes, this machine will be referred to as the Source System, then use the following procedure:

- 1. If the source system does not have FDR/UPSTREAM installed on it, install it.
- 2. Create a share on the target system for each disk that is to be recovered. By default Windows NT creates a share named C$ for the C: drive.
- 3. Make sure that the source system has authority to access the share on the target system.
- 4. On the source system attach to the share of the target system. This can be done using the NET USE command.
- 5. Use FDR/UPSTREAM on the source system to recover each of the disks (via shares) of the target system.

If a second Windows NT machine is either not available or does not have a SNA product that FDR/UPSTREAM can use installed on it, then use the following procedure:

- 1. Install the SNA product on the target system.
- 2. Install FDR/UPSTREAM on the target system.

- 3. Use FDR/UPSTREAM on the target system to restore all of its disks.

To complete your recovery, proceed to section 15.4.5..

### 15.4.5. After restoring a Windows NT Server

If the Windows NT system just recovered is a Windows NT Primary Domain Controller or a Backup Domain Controller the system may be out of sync with the other Domain Controllers in the domain. This situation occurs when the NETLOGON service writes one of the following entries to the System Event Log on any of the Domain Controllers in the domain:

- Event ID 3210: Failed to authenticate with <primary domain controller>, a Windows NT domain controller for domain <domain>
- Event ID 5722: The session setup from the computer <backup domain controller> failed to authenticate. The name of the account referenced in the security database is <account name>. The following error occurred: <error>.

The System Event Log entries will be written the first time the recovered server is rebooted.

To rectify this situation you will need to follow the instructions in the Windows NT Server documentation for resynchronizing the domain controllers.

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# 16 Banyan Considerations

## 16.1. Overview

FDR/UPSTREAM supports a wide variety of Banyan VINES® features. In particular, FDR/UPSTREAM allows the backup and restore of StreetTalk® names .

Banyan StreetTalk names included are:

- Backup and restore of files within a file service, by specifying the StreetTalk service name (with or without wildcards).
- Both file and directory Access Rights Lists.
- Services. All server based services are backed up with certain startup information, descriptions and the like. On restore, services are transparently recreated and started.
- Groups.
- Users and their profiles and security settings (including locational and time restrictions).
- Banyan extended attributes.
- Nicknames.

A complete server can be backed up with a single specification.

Server date and time can also be optionally synchronized to the host date and time when performing backups (see the Advanced Configurator section).

To use these facilities you must purchase the LAN version of FDR/UPSTREAM for Banyan.

To back up a Banyan VINES file server there are several issues which you must address:

- Planning.
- Backups by StreetTalk name
- Restores by StreetTalk name.

This chapter discusses these issues.

# 16.2. Planning

Banyan servers allow PCs to share disks, printers and other resources. FDR/UPSTREAM allows the backup and restore of most Banyan server features through the specification of StreetTalk names or server names.

Planning to backup a Banyan server requires:

- Understanding StreetTalk and FDR/UPSTREAM's extended StreetTalk naming convention.
- Security considerations.
- Planning what and when to back up.
- Open files
- Restrictions

It is assumed that you understand Banyan features and facilities and that you know the organization and naming conventions of the servers that you wish to back up.

### 16.2.1. StreetTalk

StreetTalk is Banyan's internal method of specifying all entities stored on a server. The format of a StreetTalk name is:

```
<Item>@<Group>@<Organization>
```

FDR/UPSTREAM has extended this naming convention further by adding file names after the StreetTalk name to allow specification of files within file services.

```
<Item>@<Group>@<Organization>\<file specification>
```

If there are no file services defined, then the <file specification> is ignored.

Any one of the four entities above can have wildcards. For example, if you wished to back up all the files and services in the "Test Group" group in the "Test Org" organization, you would specify:

```
*@Test Group@Test Org\*.*
```

The first step in planning a backup strategy is to determine which items, groups, organizations and files you wish to back up.

FDR/UPSTREAM runs on a workstation, not on a server. Since StreetTalk allows you to identify objects regardless of their location (through the use of wildcards), you can use a single workstation to back up several servers.

### 16.2.2. Complete Server Backup

The extended naming convention can also be used to back up a complete server. The format for specifying a complete server is:

```
&<server name>\<file specification>
```

For example, if you wished to backup the PAYROLL server (including all files within all file services), you would specify:

```
&PAYROLL\*.*
```

FDR/UPSTREAM will find all the groups on the server and back up all the StreetTalk information for those groups. FDR/UPSTREAM will then search for all services that are maintained on that server.

The data is stored on the mainframe using the standard Banyan StreetTalk names. Thus you must perform restores using the StreetTalk name, not the server name.

### 16.2.3. Security

Membership in the AdminList of a group allows you access to the items in the group. The MLIST program allows you to manipulate lists, including the AdminList. You must define a user which is in the AdminList of all the groups you wish to back up. It is recommended that you not put lists in the AdminList of a group.

Access Rights Lists determine security within a file service (which is itself a group item). The SETARL program lets you allows access to files or directories in a file service. If you have defined limited security to files or directories in a file service, you will have to set up a user who has write access (which may require an entry in the Extended List) to all the files you wish to backup.

You must be logged on as a user which is both a member of the AdminList of any group that you wish to back up and has write access, as determined by the Access Rights List of a file or directory for files within a service.

To assure that *all* the Banyan specific information that you need is backed up as well as managing issues caused by the large size of many Banyan server networks, backing up Banyan file servers require special considerations not found when backing up single workstations. These issues are discussed below.

### 16.2.4. Planning what and when to backup

Banyan file servers tend to be very large. This may require a complex plan. You should consider:

- The real performance of FDR/UPSTREAM. You may need to optimize FDR/UPSTREAM to handle this large amount of data. The performance appendix can help you get the best from your environment.
- What your “window” is. This is the number of hours during which you can do backups. For many users, complete backups are done only on weekends. Effective utilization of your time window helps you get the most from FDR/UPSTREAM.
- How often you *need* to perform complete backups. You may want to perform complete backups daily, but an analysis of your requirements may show that weekly or even monthly complete backups are adequate based on a realistic appraisal of your needs and the use of incrementals. Or you may find that complete backups should be performed over a period of several days (by backing up individual directories).
- How many machines to use in the backup. Multiple servers are often best backed up by multiple PCs.

### 16.2.5. Open files

The next aspect of planning should be to assure that all required files are closed when the backup is performed. This is best done manually be requiring that all users detach from their applications before leaving each night.

### 16.2.6. Reducing StreetTalk Information

If you wish, you can reduce the amount of StreetTalk information that FDR/UPSTREAM includes in a backup in the following ways:

- User location and time restrictions are not included.
- StreetTalk attributes are not included.

You may want to do this to save on MVS space, improve backup performance, or eliminate problems if you are getting errors accessing any of the above features.

Enable this feature by setting the environment variable **STLITE** to any value. For example, on the command line before running FDR/UPSTREAM enter:

```
SET STLITE=Y
```

OS/2 users can put this in the CONFIG.SYS if you are starting FDR/UPSTREAM from the host or remote PC.

### 16.2.7. Restrictions and Warnings

FDR/UPSTREAM will back up the vast majority of Banyan server features. However, there are a small minority of features that FDR/UPSTREAM can not back up. These include:

- Mail entries. The mail service will be backed up, but the actual mail itself will not.
- Service information. Several types of services require that you make certain specifications specific to that service. For example, SNA services requires PU and LU definitions. FDR/UPSTREAM does not back these up. For most of these features, the amount of configuration information is actually quite small and can usually be written down.
- You can not use the List and Restore facility to restore StreetTalk information. You must use the old Restore facility.

Some warnings:

- If you are recreating a file service, you may see FDR/UPSTREAM message number 2632 indicating that the service is not responding. In most cases the restore will continue and work.

  In some cases you may see an FDR/UPSTREAM message number 2645 indicating that the file service was unavailable when FDR/UPSTREAM attempted to dynamically map the drive. This occurs because the server has not completed creating the file service when FDR/UPSTREAM asks for the drive to be mapped. This will be followed by an FDR/UPSTREAM Message number 2140 indicating that the restore can not continue. You should rerun the restore as specified to restore the files within the file services.
- If you are using FDR/UPSTREAM and the Banyan services extensively in OS/2 you may run our of RPC ports. This is an internal Banyan error and requires a reboot.
- If you are backing up StreetTalk only (no file services included) to sequential disk, the size will be allocated incorrectly and most likely the backup will fail. The Advanced FDR/UPSTREAM section discusses ways to avoid problems with sequential disk backup under and over allocations.

# 16.3. Backups by StreetTalk name

Banyan server backups proceed as standard backups (see Your First Backup chapter). You select the Backup dialog and you specify overall backup parameters which include options specific to Banyan server backups (see figure 16-1).

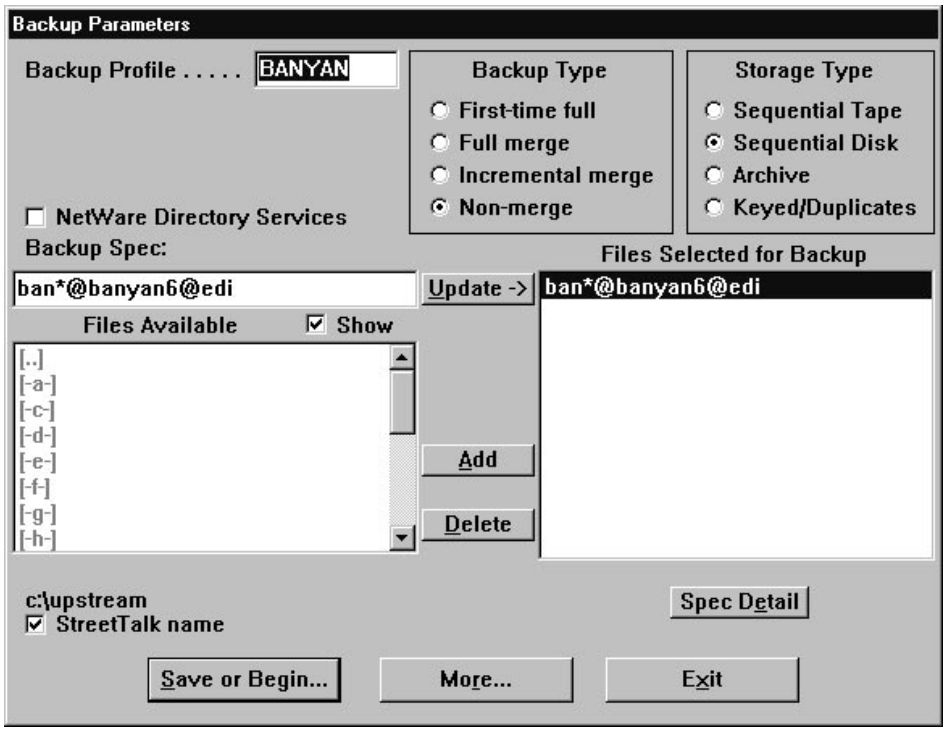



**Figure 16-1**
**Request Backup using a StreetTalk Name**

In the **Backup Spec** field, enter a StreetTalk name and check the **StreetTalk name** check box. By checking this box, you have told FDR/UPSTREAM that you are entering a modified StreetTalk name. When you check the StreetTalk name check box the list box of file names becomes grayed and unavailable.

This name can have wildcards in the StreetTalk portion and in the file name portion. In the example above, all the StreetTalk items in the "Test Group" group in the "EDI" organization will be included as well as all the files in the root directory of each of the file services.

For backups, you can also specify a complete server by prefixing the server name with an ampersand ('&'). For example, to back up the PAYROLL server, enter &PAYROLL*.* in the Backup Spec field.

The remaining parameters in the dialog refer to the files in all the file services that match the specified StreetTalk name. In the example above, the archive bit will not be reset, the files will be backed up regardless of the initial state of the archive bit (incremental), there will be no date limit, no subdirectories will be checked off of the root and no hidden files will be included.

If you press the Exclude radio button, and you specify a StreetTalk name (with wildcards), the StreetTalk names which match your specification will be excluded from the backup. If you wish to exclude files in file services, you should use the generic drive letter ('#') to specify files on any drive.

You selectively specify Banyan features in the <More...> dialog, available from the <Spec Detail> dialog (see figure 16-2 which shows default values).

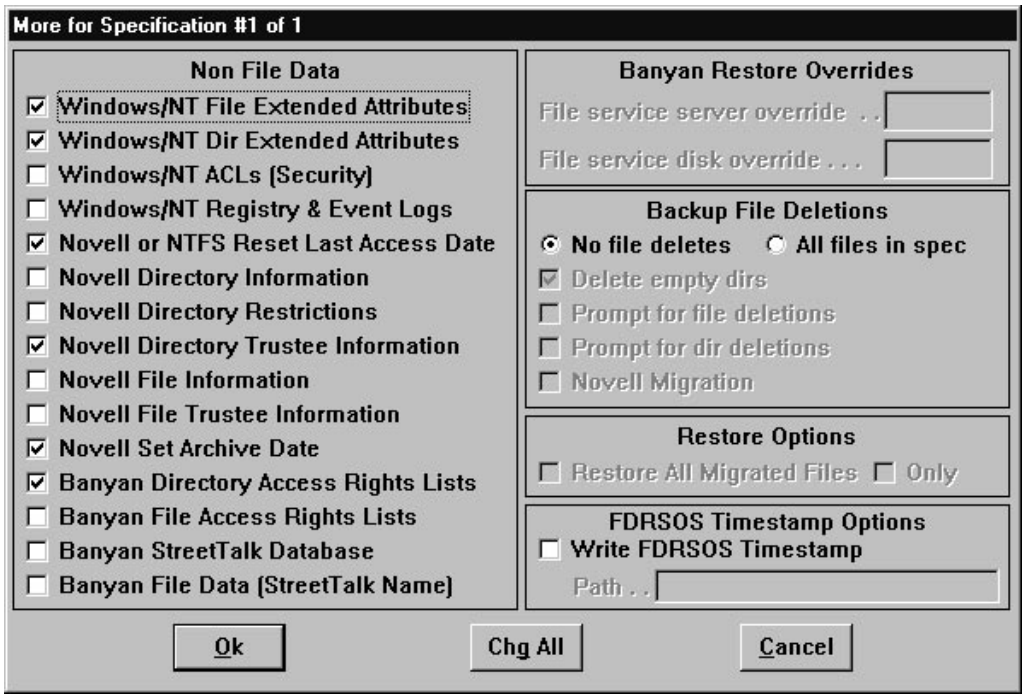



**Figure 16-2**
**Non-File Data Dialog**

Each of the Banyan check boxes are significant (the values in the figure above are the default values, not necessarily the recommended values):

- **Banyan Directory Access Rights Lists:** When you check this box, FDR/UPSTREAM will include the Access Rights Lists for all directories encountered in the backup or restore. The default is checked and most Banyan users will want to check it.

- **Banyan File Access Rights Lists:** When you check this box, FDR/UPSTREAM will include the Access Rights Lists for all files encountered in the backup or restore. As this has quite a bit of transfer and storage overhead associated with it, unless you use file Access Rights Lists specifically, you should not check it. The default is not checked and most Banyan users will not want to check it.

- **Banyan StreetTalk Database:** Even if you check the StreetTalk check box, you will need to check this box as well if you wish to include the StreetTalk information (users, groups, etc.) in the backup or restore. If you do not check this box, only the files in the file services will be backed up or restored. The default is checked and most Banyan users will want to check it.

- **Banyan File Data (StreetTalk name):** If you check this box the files in the file services will be included in the backup or restore. Otherwise, only the StreetTalk database will be included in the backup or restore. The default is checked and most Banyan users will want to check it.

- **File service server:** Only used for restores, if entered, specifies that a file service should be created on a different server than the one that it was originally backed up from. The default is blank, which indicates that the service should be restored to the original server. The field is grayed in a backup dialog.

- **File service disk:** Only used for restores, if entered, specifies that a file service should be created on a different disk than the one that it was originally backed up from. This field is case sensitive and should be entered with the leading slash (for example: "/disk1"). The default is blank, which indicates that the service should be restored to the original disk. The field is grayed in a backup dialog.

A StreetTalk backup that includes files services will cause FDR/UPSTREAM to dynamically mount drives (see figure 16-3). In most cases you will not need to be concerned with this; it is merely informational. However, it is interesting to note that you can restore files by using this drive letter.

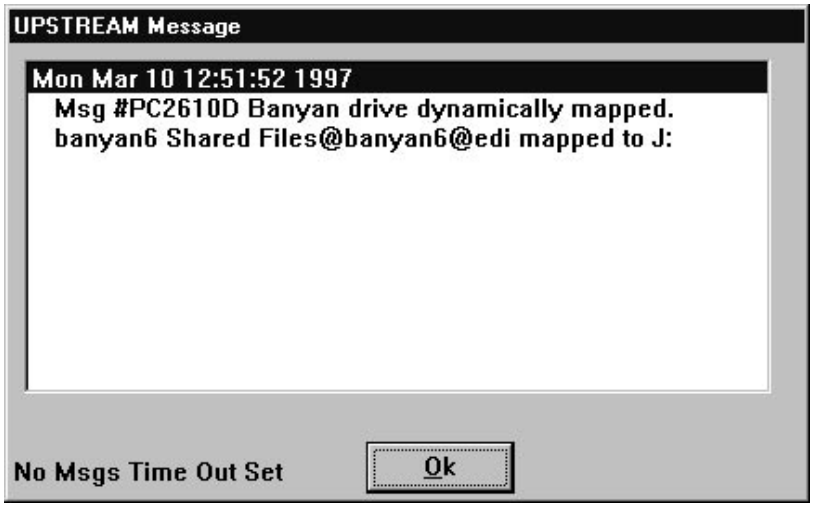



**Figure 16-3**
**Banyan Dynamic Drive Mapping**

# 16.4. Restores by StreetTalk name

FDR/UPSTREAM restores and inquiries of Banyan StreetTalk information is easy and transparent. This section will show you the differences between a standard inquiry and restore and a Banyan inquiry and restore. It will be helpful to review the UPSTREAM Program chapter's discussion of the Restore and Inquiry (old) function so as to help you understand the non-Banyan operation.

## 16.4.1. Version Inquiries

Version inquiries of Banyan backups that include StreetTalk file services are slightly different than standard inquiries. To perform a version inquiry, follow the Restore and Inquiry (old) procedures (**not** the List and Restore procedures) for entering the first restore screen. Press the **<Inquire Backups>** button when you have entered the relevant parameters. Then select the version to view in the list box and press the **<Details>** button to see the version information, then highlight the first file spec and press the **<Details>** button (see figure 16-4).

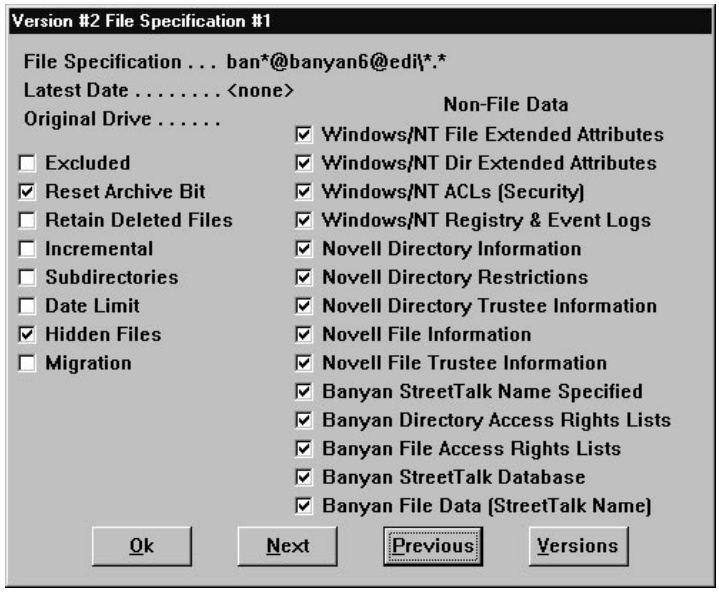



**Figure 16-4**
**Example Banyan Inquire Versions Display**

Note that the file specification is your original Backup Spec and that the Banyan StreetTalk Name box is checked. For every file service that is included in your original specification, you will have additional File Specs which were automatically created by FDR/UPSTREAM. You can see these by pressing the **<Next>** button (see figure 16-5).

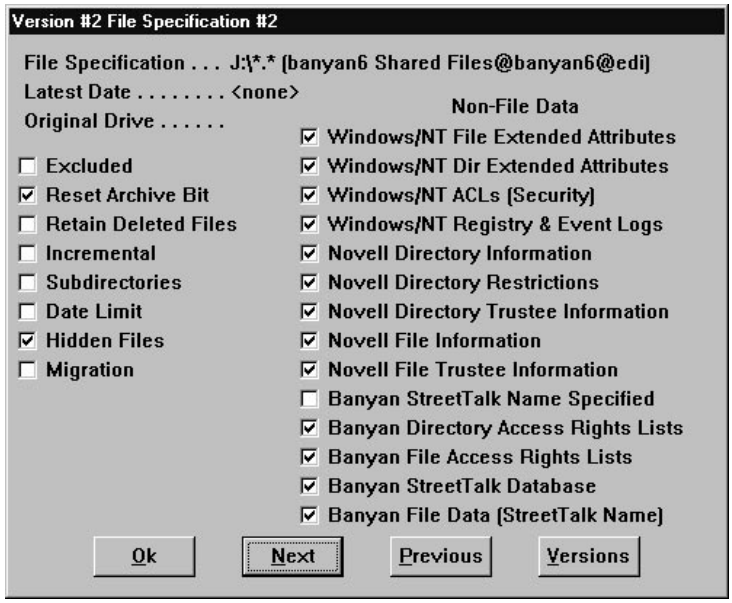



**Figure 16-5**
**Dynamically Created File Spec**

Note that the dynamically created drive letter is followed by the file specification portion of the original StreetTalk name. Also, the file service name is specified in parens, in inverted name order.

### 16.4.2. File Inquiries

File inquiries are performed in the restore file specs dialog. Enter the restore dialog, perform a version inquiry and select a version. Then press the **<File Inquiry**> button to enter the file specs dialog.

As for the backup, if you check the StreetTalk name(s) check box, you can enter a modified StreetTalk name. If you enter a modified StreetTalk name with one or more wildcards in the StreetTalk portion of the name, you will see the StreetTalk names of the names that match that specification. Figure 16-6 shows an example StreetTalk name inquiry.

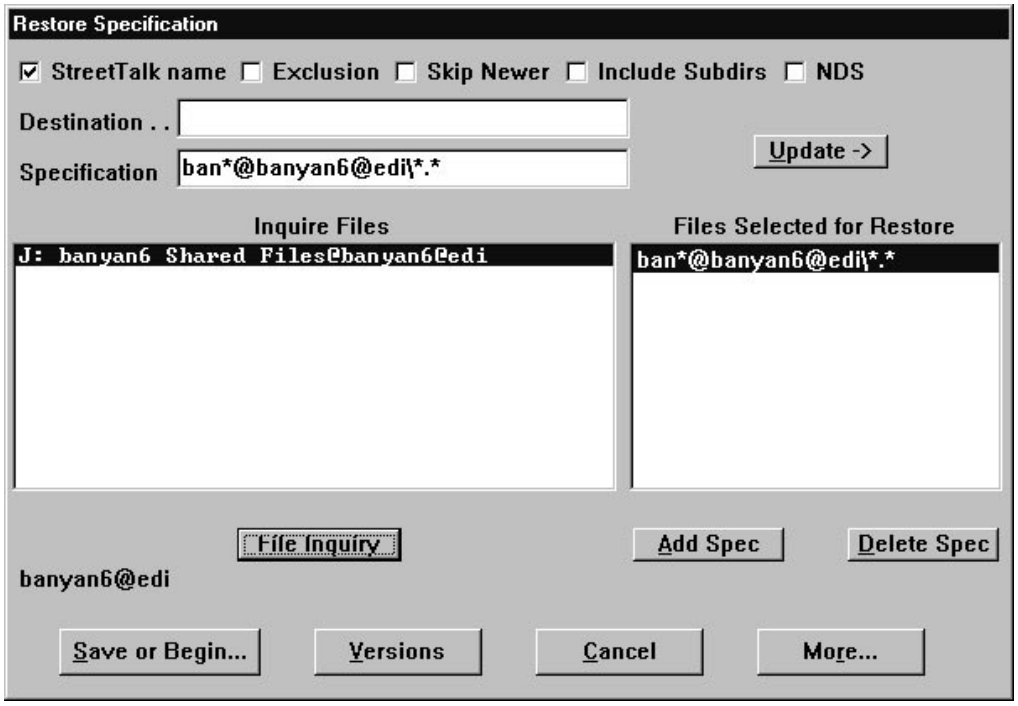
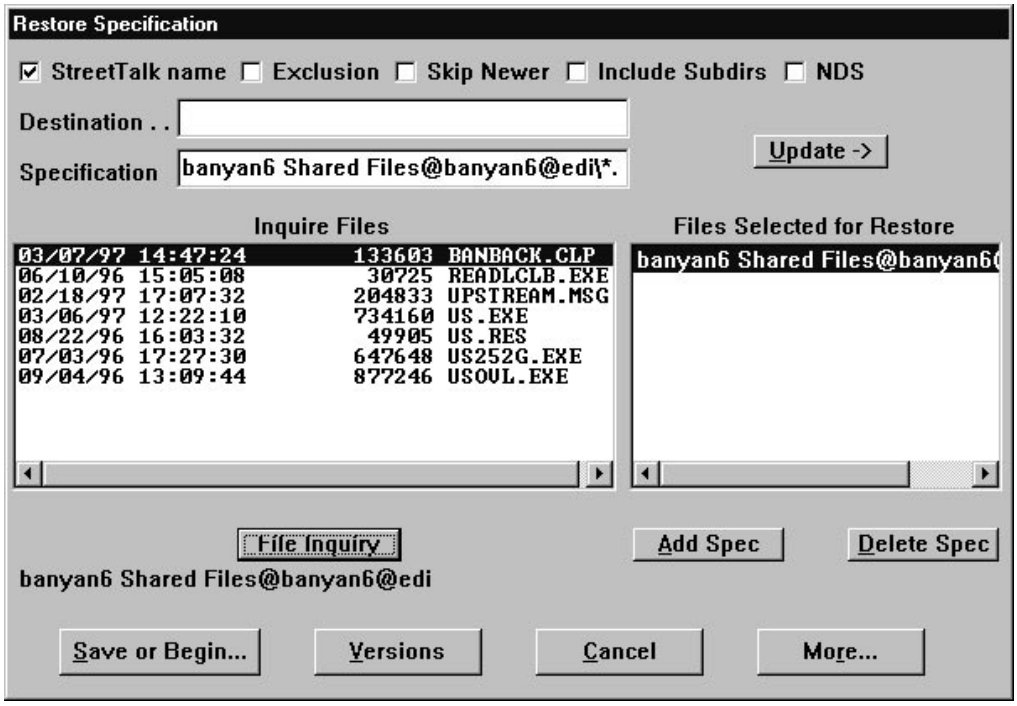



**Figure 16-6**
**StreetTalk Name File Inquiry**

Note that there are drive letters next to the file service entries. You can use the mouse or the arrow keys to select specific StreetTalk names listed in the Inquire Files list box.

If you specify a complete StreetTalk file service name then the wildcards (if any) that are specified in the file name are used for the inquire. Figure 16-7 shows an example of a file inquiry within a file service.




As with standard file inquiries, you can use the mouse or arrow keys to select further entries (such a subdirectories or parent directories) to inquire upon.

### 16.4.3. StreetTalk name Restores

As for backups, the **<More>** button allows you the ability to select whether you wish to restore file service data, StreetTalk database information and Access Rights Lists. If you are restoring file services you can also indicate a different server or disk for the service(s) to be restored to.

The **Restore Destination** field can be used in various ways to control how and where StreetTalk information and files are restored.

- If you do not specify a Restore Destination, the StreetTalk names and file services will be restored to their original locations.
- If you specify a Restore Destination which is a local drive (not a modified StreetTalk name) and you do specify a modified StreetTalk name for the Restore Specification, then the files within the file services will be redirected and the StreetTalk database information will not be restored. Note that the number of wildcards in the file portion of the StreetTalk name have to match the number of wildcards in the local drive specification.
- If you specify a different StreetTalk name in the Restore Destination than is in the Restore Specification then FDR/UPSTREAM will dynamically mount the specified file service. You can not use wildcards to specify the StreetTalk name in either the Restore Specification or Destination, only in the file portion of the name. StreetTalk database information will not be restored.
- If you specify the same StreetTalk name in the Restore Destination as in the Restore Specification, you can optionally rename the file portion of the modified StreetTalk name.

**Figure 16-7**

A StreetTalk restore which includes file services will perform an automatic file inq;inquiry and may also perform an automatic version inquiry as well if you check the Latest Version flag. Then the StreetTalk information will be restored followed by the file information.“

# 17 Disaster Recovery

## 17.1. Introduction

FDR/UPSTREAM flexibility is demonstrated as its use not only as a backup/restore utility, but it also integrates very nicely into an organization's disaster recovery plans.

This chapter addresses some of the relevant issues of FDR/UPSTREAM and disaster recovery planning and implementation. At the end of this chapter is a worksheet to help get you set up.

This chapter discusses all phases of disaster recovery, assuming the loss of both the mainframe and the PC or file server. If your organization has plans which cover one or more of these issues already, you should still read these sections to be sure that all of the significant issues are covered.

# 17.2. When a Disaster Occurs

A disaster is defined as an event which causes the physical destruction or loss of access to your normal working environment. FDR/UPSTREAM is a superior product for the recovery of a PC or file server which is lost in the event of a disaster.

At the time when a disaster occurs, recovery of a PC or LAN file server consists of the following:

- Recovery of the MVS hardware and system software.
- Recovery of FDR/UPSTREAM MVS.
- Accessibility to FDR/UPSTREAM MVS of your PC data.
- Recovery of the communications environment.
- Recovery of the PC and/or LAN file server hardware and system software.
- Recovery of your PC or LAN File Server.

### 17.2.1. Recovery of MVS

This is usually covered in your standard disaster recovery plan and is outside the scope of this chapter.

### 17.2.2. Recovery of FDR/UPSTREAM MVS

FDR/UPSTREAM MVS software can be recovered using a standard host dump/restore facility (FDR, etc.) or can be reloaded from the original tapes. If you will be recovering FDR/UPSTREAM from the original tapes, you will need the authorization ZAP and all update ZAPs at the disaster location.

The issues involved with the initial FDR/UPSTREAM installation should be resolved in advance including sufficient space for the control files and PC file data, authorized libraries, etc.

### 17.2.3. Accessibility of UPSTREAM MVS to your PC Data

There are two (or three in some cases) control clusters and a set of disk and tape files which need to be available for disaster recovery.

For the control files, you can choose to either save and restore them in their entirety if you have the original tapes. If you choose to use copies of the original tapes, reinitialize the control files from scratch and use the RE-GEN utility to re-enter the control information from the backup tapes and disk files.

We strongly recommend that you use the **Vaulting** facility described in the FDR/UPSTREAM MVS manual as a method of generating off-site tapes. This facility not only makes the copies of the sequential disk and tape datasets for transport to the off-site disaster recovery site, but also saves the control information in such a format that the REGEN of the data is very fast.

The PC data which is saved on sequential disk may be recovered using a standard dump/restore utility (such as FDR) or may be individually copied to tape and recopied to disk at the disaster site individually.

For PC data which is saved on sequential tape or ARCHIVE backups which have been archived to tape, you may take the original tapes or if you have copies of your tapes use the REGEN utility to modify (or reenter) the control information to reflect changed VOLSERs and tape boundaries; again the vaulting facility is the recommended method.

Your decisions must be influenced by the following concerns:

- The REGEN process can take some time, particularly when used against un-vaulted datasets. While it has been optimized for high performance, the need to perform potentially millions of insertions through a large number of disk or tape files may take an unacceptably long time.
- When using vaulting, it is recommended that you take the original control clusters to the disaster site as a large number of modifications of clusters is much faster than a large number of insertions.
- REGEN (including vaulting) does not work with KEYED or ARCHIVE backups which are resident in the FILE DATA cluster.
- You can take your original tapes to the disaster site or copies of the tapes (made with IEBGENER or some similar utility. Tapes which were copied using IEBGENER, must be re-entered into FDR/UPSTREAM MVS through the REGEN utility as FDR/UPSTREAM MVS maintains exact tape information (VOLSER) which is lost in a copy.
- Sequential disk files (GDG or non-GDG) only require a REGEN if they go to a different device type or have a different file name.
- If you send the original tapes to the disaster site, you will only have copies at the standard site. This makes local recoveries difficult as you will have to REGEN them whenever you wish to perform a restore.

Basically the issues you must decide are:

- Take the original control files or rebuild them from scratch.
- Take copies of tapes or the originals.

We recommend:

- Take vaulted copies of disk and tape datasets containing PC data to the disaster site. Originals are required for restores and for merge backup processing and while the REGEN may take some time, improved performance in normal operation is generally preferable.
- Take full dump copies of control files and PC data files to the disaster site. This saves time in disaster recovery and has no impact on normal operations.

### 17.2.4. Recovery of your Communications Environment

FDR/UPSTREAM PC and MVS systems must be able to communicate. But the method of communications does not have to be the same as you use in your standard production environment.

You will need the connectivity hardware and the software configured properly in all nodes. This means VTAM, 3174 (if any), and PC configurations must be in place and tested in advance.

### 17.2.5. Recovering the PC Hardware and Software

At your disaster site you must have access to hardware which you can install FDR/UPSTREAM on (which supports your communications environment) and hardware for the LAN file server.

Recovery of the FDR/UPSTREAM PC requires the availability and installation of the operating system (DOS, OS/2, Windows or Windows/NT). In all cases this must be performed using the operating system vendor's installation tools.

Installation of FDR/UPSTREAM will usually be performed from diskette. Communications software will usually be installed using the software vendor's standard methodologies. Configuration files can be set up in advance and taken on diskette to the disaster site.

Specific information for LAN server recovery by vendor is provided later in this chapter.

### 17.2.6. Recovery of your PC or File Server

Once you have the FDR/UPSTREAM PC installed and configured you can restore your PC disk or server files. Again, server control information is discussed later in this chapter.

When recovering a PC or file server you can run multiple simultaneous restores if you run multiple copies of FDR/UPSTREAM and your data is stored on the host in either the FILE DATA clusters (KEYED or ARCHIVE backups which haven't been archived to tape) or sequential disk. This may help in faster recovery.

**NOTE: You may want to isolate the most critical data and selectively restore it first to allow users to begin work as soon as possible.**

# 17.3. Recovery Issues

Each operating system has certain issues which are specific to it relating to disaster recovery.

### 17.3.1. Novell NetWare

Since FDR/UPSTREAM does not run on the server, you recover a workstation which will run FDR/UPSTREAM first. This workstation must have the Novell requestor as well as host communications.

The operating systems for NetWare v3.x servers do not have to be completely recovered before FDR/UPSTREAM restores can begin. FDR/UPSTREAM can recover the entire server once the first two disks have been installed and the LAN and disk systems have been configured. See the Novell chapter for more information.

Also, you must restore the bindery files for a NetWare v3.x server or the NetWare Directory Services for a NetWare v4.x server before you begin restoring data to assure that trustees and like information are properly restored. Again, see the Novell chapter for more information.

Note that for a NetWare v4.x server you must install the USNDS NLM before you can restore Directory Services.

### 17.3.2. IBM or Microsoft LAN Server or OS/2 Workstations

You can either run the ULTra OS/2 recovery methodology (see the ULTra chapter) or if you are running FDR/UPSTREAM on a single PC or for some other reason can not use the ULTra recovery methodology, you must manually recovery the OS/2 operating system and host communications be running before beginning the UPSTREAM restore. We also recommend the standard IBM LAN Server install as it makes modifications in numerous configuration files which manual modification would be dangerous.

To restore the security system, restore NET.ACC in the \IBMLAN\ACCOUNTS directory. See the IBM LAN Server chapter for instructions on activating this file.

At this point you can restore the user's files and HPFS386 access rights.

### 17.3.3. Microsoft NT and NT Advanced Server

FDR/UPSTREAM requires that NT and host communications be running before beginning the restore. We recommend that you use the standard NT recovery procedures which include the use of an Emergency Repair Disk and a copy of the latest service pack installed on your system. This will insure that your LAN, disk and other drivers are properly configured. Note that you must reinstall the service pack which matches your latest backup **after** applying the Emergency Repair Disk.

At this point reinstall, configure and test your host connectivity software (SNA Server or TCP/IP) and reinstall and configure FDR/UPSTREAM. Recover your registry hives first and then your user files. This process is discussed fully in the *Windows NT Server Considerations* chapter.

If you wish, you can use a single NT PC to recover the files for multiple servers.

### 17.3.4. Banyan Vines

Since FDR/UPSTREAM does not run on the server, you recover a workstation which will run FDR/UPSTREAM first. This workstation must have the Banyan requestor as well as host communications.

Each server to be recovered must be operational. Load the operating system for the server using the standard Banyan facilities, giving each server its original name. Once the server is up and running, log in from the FDR/UPSTREAM PC (as the default administrator). You can now restore the server data. Restores must be performed by StreetTalk name to assure that the StreetTalk database is properly rebuilt.

Some services such as SNA services must be reconfigured (though they will be recreated). Users will be properly defined with all security, but they will have no password. As they login they should be encouraged to create a new password

### 17.3.5. Windows 95

You can either run the ULTra Windows 95 recovery methodology (see the ULTra chapter) or if you are running FDR/UPSTREAM on a single PC or for some other reason can not use the ULTra recovery methodology,we recommend that you manually recover the Windows 95 operating system including the use of the recovery diskette created during the install to properly recover device support.

You must then install and configure your host connectivity and install and configure FDR/UPSTREAM. Once you have FDR/UPSTREAM operational, you can use it to recover your applications

# 17.4. Recovery Worksheets

The following table lists MVS issues which should be dealt with for proper disaster recovery using FDR/UPSTREAM.

| Description | Value |
|---|---|
| FDR/UPSTREAM MVS software to be recovered using original tapes or standard backups. | |
| VTAM APPL definition for FDR/UPSTREAM MVS available. | |
| Authorized library available. | |
| FDR/UPSTREAM MVS configuration table available. | |
| Control files to be recovered using standard backups. | |
| Tapes containing PC data copied using IEBGENER or the Vaulting facility (requiring REGEN) or originals at disaster site. | |
| Sequential datasets containing PC data retain original names and device types, or some change (requiring REGEN). | |
| Communications definitions for PC connections defined and known (including 3174 and other hardware specific definitions). | |

**Table 1**
**FDR/UPSTREAM MVS DR Considerations**

The following table checklists PC side considerations for disaster recovery.

| Description | Value |
|---|---|
| PC hardware available. | |
| Operating system diskettes or CDs available. | |
| Operating system corrective service packs (if needed) | |
| Server hardware available (if separate). | |
| Server operating system diskettes or CDs available. | |
| Server operating system corrective service packs (if needed) | |

| Description | Value |
|---|---|
| Host connectivity hardware and software available. | |
| Host connectivity parameters available. | |
| Critical data determined for quickest recovery. | |

**Table 2**
**FDR/UPSTREAM PC DR Considerations**

# 18 FDR/UPSTREAM ULTra

## 18.1. Overview

The FDR/UPSTREAM ULTra (UPSTREAM LAN Transport) feature allows you to use a single FDR/UPSTREAM PC to back up and restore to the disks of workstations which are attached to the LAN and do not have FDR/UPSTREAM or any kind of host communications on them. Workstations can be grouped into profiles so that through a single PC or host request any number of workstations can be backed up or restored.

This is a sophisticated facility using LAN protocols (you can use either IPX/SPX or NetBIOS) to communicate between the FDR/UPSTREAM PC and the workstation. The workstations can be any combination of DOS, Windows, Windows NT or OS/2 PCs.

The FDR/UPSTREAM ULTra feature of FDR/UPSTREAM allows you to install a small TSR on DOS workstations (about 20K), a PM program on OS/2 workstations or a Windows program on Windows and Windows NT workstations and have an FDR/UPSTREAM machine on the LAN backup and restore data to the workstation.

There are two components to the LAN Workstation feature of FDR/UPSTREAM:

- Workstation component (ULTRA). Install ULTRA (USIPX and USNETB for DOS) on the workstation to allow it to be accessed by FDR/UPSTREAM. You must give ULTRA a workstation name so that it can be found by the requestor PC. You can optionally also give it a password so that you can restrict unauthorized users from accessing your PC.
- Requestor component (FDR/UPSTREAM or LANCOPY). The requestor specifies the name of the workstation and optionally the password. FDR/UPSTREAM accesses the workstation in the same way that it accesses a local disk. LANCOPY is a program provided to allow you to copy files to and from the workstation and perform directory listings.

As well as backups, restores and file transfers, ULTra can also be used to start programs on remote workstations either locally or host requested. This can be very helpful in such functions as software distribution.

FDR/UPSTREAM ULTra works by using IPX/SPX or NetBIOS communications across the LAN. Thus, the FDR/UPSTREAM PC can attach to a workstation through the LAN regardless of whether the LAN supports SNA or not. You can use the FDR/UPSTREAM ULTra through Ethernet, Arcnet, across NetWare internal bridges and just about any other way that LANs get access to their own features.

FDR/UPSTREAM ULTra comes on a separate diskette and is priced separately from the base FDR/UPSTREAM product. The current version supports generic NetBIOS and Novell IPX/SPX networks. Contact your sales representative for pricing information.

# 18.2. DOS Workstations

To install the workstation component, you can either run the INSTALL.BAT file included on the workstation diskette, or create a directory and copy the files from the diskette to it.

The DOS workstation software comes supplied with two versions of ULTra, USIPX.EXE for IPX/SPX access and USNETB.EXE for NetBIOS access.

The DOS the workstation component (USIPX.EXE), is loaded in the following way:

```
USIPX <Workstation Name> [/p[password]]
```

or

```
USNETB <Workstation Name> [/p[password]]
```

- **Workstation Name:** Up to 31 characters uniquely naming the workstation on the LAN.

- **/P[password]:** You can optionally enter a password, or enter /P to have USIPX prompt you for the password (to avoid having it displayed).

For example, if you wish to load USIPX with the workstation name of TOM_SMITH and a password of PIE, enter:

```
USIPX TOM_SMITH /pPIE
```

or

```
USIPX TOM_SMITH /p
```

and then you'll be prompted for the password.

To unload USIPX or USNETB, enter:

```
USIPX /U
```

or

```
USNETB /U
```

After USIPX or USNETB is loaded, you can see the workstation name by pressing the hot key [ALT]U (see figure 18-1).

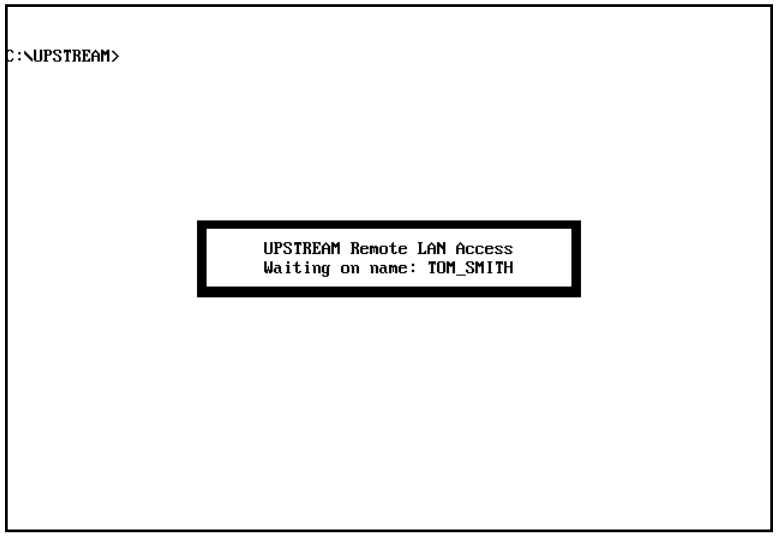



**Figure 18-1**
**DOS ULTra Status Display**

When a remote access is in progress, the hot key screen is displayed with the current file or function displayed on the screen.

We recommend that you add USIPX or USNETB to your AUTOEXEC.BAT to complete the installation of the workstation component.

### 18.2.1. RESET.EXE

If you are using the NetBIOS interface for workstations or on the UPSTREAM PC and the adapter has not yet been reset for NetBIOS (the IBM LAN Support Program will often reset it, but many other NetBIOS implementations will not), you may need to use the included RESET.EXE program.

This program should be used with care as it resets the NetBIOS interface. If you have open LAN Server or other LAN connections which use NetBIOS, they will be broken. This program should only be used if you are not using other NetBIOS applications (including server/drive support).

For FDR/UPSTREAM, RESET.EXE should be placed in your U.BAT file, to be run even before APPC is loaded. If you are using ULTra, you should create a batch file to run RESET.EXE before starting ULTra (or use AUTOEXEC.BAT).

The format for RESET is:

```
RESET <adapter number> <session count> <command count>
```

Where:

- <adapter number>: The communications adapter number, either 0 for the primary adapter or 1 for the secondary adapter. A parameter is required.
- <session count>: The maximum number of simultaneously running sessions. The range is 0..254. The default is 5.
- <command count>: The maximum number of outstanding commands. The range is 0.254. The default is 15.

# 18.3. OS/2 Workstations

In OS/2 there is a single program for both IPX/SPX and NetBIOS, ULTRA.EXE.

To install the workstation component, insert the ULTra LAN Workstation diskette in your A: drive and run the INSTALL program as follows:

```
INSTALL <Destination> <LAN WS Name>
```

Where:

- **<Destination>:** Is the fully qualified drive/path to where the ULTra software will be copied (the directory will be created if necessary). We recommend **C:\ULTRA**.

- **<LAN WS Name>:** The ULTra workstation name to be used, by UPSTREAM, to represent this user. We recommend using the user's first name.

If you wish, you can create a directory and copy the files to it. The install program just performs the copy and creates an UPSTREAM folder and ULTra icon (which you can do yourself).

The OS/2 workstation component (also named ULTRA.EXE) is loaded from an OS/2 full screen, a batch file (including STARTUP.CMD) or can be placed in the **Startup** folder. When it starts you will be switched to the presentation manager. The command line parameters are:

```
ULTRA <Workstation Name> [/p[password]]
```

- **Workstation Name**: Up to 31 characters uniquely naming the workstation on the LAN.

- **/P[password]:** You can optionally enter a password, or enter /P to have ULTRA prompt you for the password (to avoid having it displayed).

For example, if you wish to load ULTRA with the workstation name of TOM_SMITH and a password of PIE, enter:

```
USIPX TOM_SMITH /pPIE
```

or

```
ULTRA TOM_SMITH /p
```

and then you'll be prompted for the password.

All ULTra activity is displayed in the main ULTra program window (see figure 18-2). The ULTra program window can be minimized to save desktop space. To terminate ULTra, close it by pulling down the system menu in the upper left hand corner of the window and selecting **Close**.

**Figure 18-2**
**OS/2 ULTra Status Display**

We recommend that you add ULTRA to your STARTUP.CMD or Startup group to complete the installation.

Note that there is a character mode version of the ULTRA program, ULTRADR.EXE, which is described in OS/2 recovery later in this chapter.

Note that you can disable either the NetBIOS or IPX/SPX connectivity types, by specifying environment variables USNOIPXSPX=Y to disable IPX/SPX and USNONETBIOS=Y to disabled NetBIOS.

There are two NetBIOS interfaces available in OS/2: the LAN Server interface and the LAPS interface. Both FDR/UPSTREAM and ULTra attempt to use the LAN Server interface first as it is the faster one. You can force FDR/UPSTREAM or ULTra to use the LAPS interface by specifying the environment variable USLAPS=Y.

# 18.4. Windows Workstations

The installation and later configuration of the ULTra workstation component for Windows is performed from the INSTALL program.

Note that you use this same facility regardless of whether you are running Windows 3.1, Windows 95 or Windows NT and regardless of whether you are using IPX/SPX or NetBIOS. FDR/UPSTREAM will detect the environment and properly compensate.

To install the ULTra component, select Run... from the File Menu in the Program Manager and run A:INSTALL (see figure 18-3).

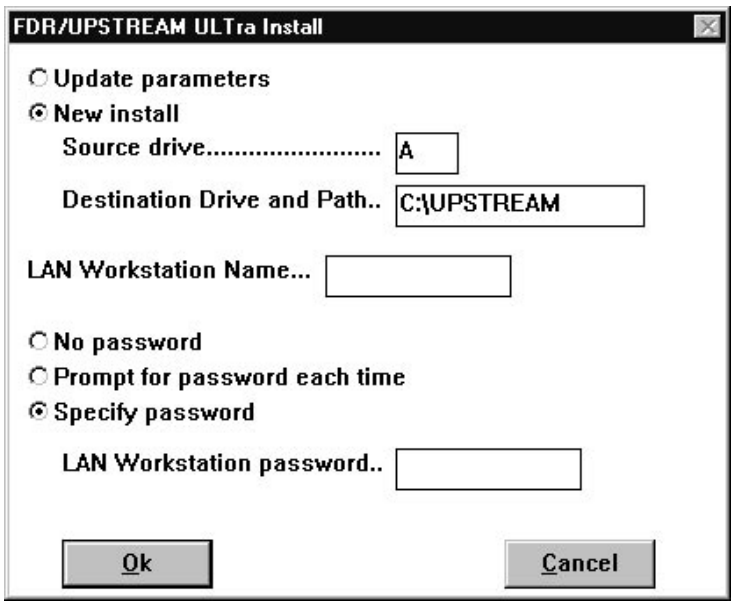



**Figure 18-3**
**Windows ULTra Install Dialog**

The first radio buttons indicate:

- **Update parameters:** If you press this radio button, the files will not be copied from diskette, or the program group created. Only the command line to the ULTRA program will be modified.

- **New install:** If you press this button the files will be copied from the diskette, the program group created and the command line to the ULTRA program will be created. Pressing this radio button enables the following two fields. This is the default radio button.

If you press the New install radio button, the following two fields are enabled:

- **Source drive:** Enter the drive letter of where the FDR/UPSTREAM ULTra files can be found. The default is A

- **Destination Drive and Path:** Enter the drive and path of where you want the files placed. The default is C:\UPSTREAM.

The following parameters are used to generate the command line which is stored in the program definition in the Program Manager:

- **LAN Workstation Name:** Enter up to 31 characters uniquely naming the Workstation on the LAN. This field is required.

The following three radio buttons indicate local workstation passwords:

- **No password:** Press this radio button if you do not want password protection for your workstation.

- **Prompt for password each time:** Press this radio button if you do not want your password stored, but want to enter it each time ULTra is started.

- **Specify password:** Press this radio button if you wish to enter a password that will be stored in the Program Manager definition for ULTra.

If you press the Specify password button, the following field is enabled and required:

- **LAN Workstation password:** Enter up to 31 characters of the password that will be stored in the Program Manager definition for starting ULTRA.

If you selected prompting for the password you will see the password dialog when you start ULTra. Enter the password you wish to use. The FDR/UPSTREAM PC administrator must know this password to be able to backup or restore to your PC.

All ULTra activity is displayed in the main ULTra program window (see figure 18-4). The ULTra program window can be minimized to save desktop space. To terminate ULTra, close it by pulling down the system menu in the upper left hand corner of the window and selecting **Close**.

**Figure 18-4**
**Windows ULTra Status Display**

Note that you can disable either the NetBIOS or IPX/SPX connectivity types, by specifying environment variables USNOIPXSPX=Y to disable IPX/SPX and USNONETBIOS=Y to disabled NetBIOS.

In Windows 3.1, if you are using the default NetBIOS parameters you will need to increase the size of the NetBIOS heap. You will need to increase these values further if you will be increasing either your LANBUFFER size or NUMECBS. In the SYSTEM.INI file, add or modify the NetHeapSize in the 386Enh section:

```
...
[386Enh]
...
NetHeapSize = 100
```

# 18.5. Workstation Messages

ULTra maintains a log, ULTRA.LOG in the directory that ULTra was started from. The messages in the log are time-stamped and indicate a primary error code, sometimes a secondary error code and a return code. The error codes can be looked up in the UPSTREAM Messages chapter of this manual or the UPSTREAM.MSG file. The return codes are either Novell return codes or operating system return codes (depending upon their context).

Some of the error codes are merely notifications of activity. Error code 4000 indicates the time the TSR was loaded. 4001 indicates the time it was unloaded. 3005 is a normal connect. 3675 is a normal disconnect. Many other messages are merely notifications as well. All serious failures are logged on the requestor side as well as the workstation side.

The size of the workstation log can be reduced without deleting the entire file by running USLOGCLR. Since this is not the default log file name you must specify the name on the command line. For example, to remove all but the last 5 days worth of messages, enter:

```
USLOGCLR 5 ULTRA.LOG
```

# 18.6. The FDR/UPSTREAM Requestor Component

FDR/UPSTREAM has two new parameters for FDR/UPSTREAM ULTra access: LAN WS Name and LAN WS Password and a choice of either IPX/SPX or NetBIOS connectivity radio buttons. The LAN WS Name is the workstation name parameter entered on the ULTRA command line on the workstation. The LAN WS Password is the optional password entered on the workstation.

These two parameters are found on the <More...> dialog in the backup, restore or As of...Restore processes.

When you perform a backup or restore using FDR/UPSTREAM ULTra, the FDR/UPSTREAM PC contacts the workstation through the LAN. This brings up the status display on the workstation. Then as file I/O requests need to be processed they are routed to the workstation. The FDR/UPSTREAM PC just appears to be performing a normal backup or restore (though the LAN Workstation Name is on the status display). When the backup or restore is complete, the workstation's status display disappears and both PCs are ready for the next action.

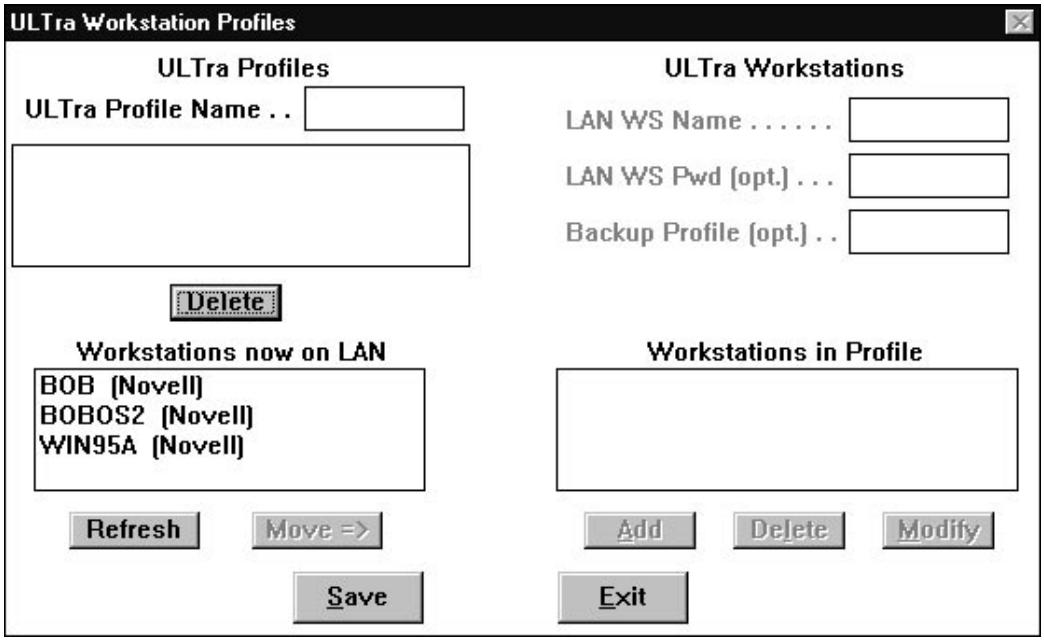
In most cases you will want to back up a number of workstations the same way: i.e. the same file specifications, fulls on the same day, etc. To make this simple, FDR/UPSTREAM ULTra allows you to be able to group workstations together and specify a similar operation for each using an ULTra profile.

When you specify a backup or restore using an ULTra profile, the backup or restore operation is repeated multiple times, one backup or restore operation for each LAN Workstation name specified.

Note: The DOS version of FDR/UPSTREAM ULTra can not access OS/2 or Windows 95 and NT specific features including extended attributes, nor can it properly access long file names. Thus we recommend using an advanced operating system (OS/2, Windows NT or Windows 95) if you will be backing up workstations using an advanced operating system.

### 18.6.1. Creating an ULTra Profile

ULTra profiles are created in the SETNOV program (it is the **Novell and ULTra** icon if you are running OS/2 or Windows). In the entry dialog (titled *Server Profiles*), you will see a button: **<ULTra>**. When you press this button, a message box stating: *It will take about 5 sec. to get information about active ULTra stations*. Press this button, and after a short wait the ULTra Workstation Profiles dialog will be displayed(see figure 18-5).




- **ULTra Profile Name:** Enter the name of an existing ULTra profile or a new profile. If you enter a name of an existing ULTra profile, the profiles in the Workstations in Profile list will change to reflect the workstations defined for that profile. If you enter a new profile name, you will be asked if you wish to create it. The list box underneath this field consists of the existing profiles; if you an highlight entry in the list box the ULTra Profile Name will change as well as the list of profiles in the Workstations in Profile list. Many of the fields in this dialog are grayed and unavailable if you do not have a value in this field. You can enter from 1 to 8 characters for the profile name.

  The <Delete> and <Save> buttons allow you to respectively delete an existing profile or save the profile which is specified in the ULTra Profile Name field.

- **Workstations now on LAN:** If your PC is currently attached to the LAN, this list box displays the ULTra workstations which are active at this time. This can be useful in helping you define the entries in your ULTra profile.

  Pressing the <Refresh> button will have the list refreshed with the currently active ULTra workstations. Pressing the < Move=> > button causes the highlighted entry to be moved to the LAN WS Name field.

  Note that workstations may be in the list twice, with a different connectivity type. The connectivity type is for display only and is ignored when specifying the ULTra profile. The connectivity type used will be the type specified in UPSTREAM.

- **LAN WS Name:** Enter the LAN Workstation Name which you wish to add to the ULTra profile currently specified. The LAN Workstation Name is a command line parameter to ULTra. This value can be entered automatically by pressing the <Move> button. This is a required field.

- **LAN WS Pwd:** Enter the password specified by the user on the ULTra workstation. This value is encrypted before being stored. This is an optional field. If left blank it is assumed that the workstation has no password.



Figure 18-5

- **Backup Profile:** In most cases you will leave this field blank which will cause FDR/UPSTREAM to use the same Backup Profile name as LAN Workstation Name. If you wish though, you can specify a different Backup Profile name .

- **Workstations in Profile:** This list box contains all the workstations defined for this profile. Changing the highlighted entry will change the values in the edit fields above.

- **Add:** Press this button to add the specified LAN Workstation Name to the profile. Remember that you must press the <Save> button to save the entry to disk.

- **Delete:** Press this button to delete the specified LAN Workstation Name from the current profile. Remember that you must press the <Save> button to save the entry to disk.

- **Modify:** Press this button to update the LAN Workstation entry (to reflect a changed password or backup profile). Remember that you must press the <Save> button to save the entry to disk.

- **Ok:** Press this button to leave the dialog. Remember that you must press the <Save> button to save any profile changes to disk.

### 18.6.2. Using ULTra Profiles

To use an ULTra profile, specify a backup as you normally would. Since this backup reflects a group of workstations with slightly different configurations, you will want to make the backup specifications encompass the largest workstation.

For example: if you are backup up three workstations and two of them have a C: drive and the third has a C: and D: drive, your backup specifications should include both a C: and D: drive.

In the backup profile field you can enter any value as it will be overridden (but it remains required). In the LAN WS Name field (in the <More...> dialog), enter an “at” sign (@) and then the ULTra profile. For example, if you have an ULTra profile named USERS enter in the LAN WS Name field:

```
@USERS
```

When the backup begins, FDR/UPSTREAM will display message number 5003N which says that an ULTra profile backup is starting and indicates the LAN Workstation Name which will be used. The dialog will be displayed for 10 seconds (regardless of your Message Time Limit). Pressing the <Ok> button during this period allows you to abort all remaining backups or restores in the profile. Otherwise, when it times out, backups or restores will be started for each LAN Workstation Name in the profile.

Note that all the workstations in an ULTra profile must be attached via the same connectivity type (IPX/SPX or NetBIOS), as specified in the <More...> dialog.

# 18.7. The LANCOPY Requestor Component

LANCOPY is a utility program provided with FDR/UPSTREAM ULTra to allow you to copy files to and from a workstation which has USIPX loaded on it or perform directory listings of files on a workstation.

### 18.7.1. Copying files

The LANCOPY file copy facility of FDR/UPSTREAM ULTra allows a requesting PC to copy files to and from a workstation through the LAN without going through a file server. There are two formats for LANCOPY, one for copying files from the remote workstation and one for coping files from the local PC. To copy files from the remote workstation, the format of LANCOPY is:

```
LANCOPY <Workstation Name>  R<Drive>:<file spec>
        L<Drive>:<file spec> [/p<password>] [/s]
        [/i[NE | NO]]
```

- **Workstation Name:** The name of the workstation, specified when USIPX was loaded.
- **R<Drive>:<file spec>:** 'R' stands for remote. The remainder is the file specification on the remote computer.
- **L<Drive>:<file spec>:** 'L' stands for local. The remainder is the file specification on your computer.
- **/p<password>:** The optional password specified on the workstation.
- **/s:** Optionally specifies that subdirectories be included in the copy.
- **/iNE or /iNO:** The connectivity type: Use /iNE for NetBIOS and /iNO for Novell IPX/SPX. The default is /iNO.

Note that wildcards, if used, are required in both the local and remote file specifications.

For example, to copy all the files from the c:\temp directory on a workstation named TOM_SMITH to the d:\new directory on your machine, including subdirectories and a password of PIE enter:

```
LANCOPY TOM_SMITH rc:\temp\*.* ld:\new\*.* /pPIE /s
```

The form for a copy in the other directory (from your PC to the workstation) is:

```
LANCOPY <Workstation Name>  R<Drive>:<file spec>
        L<Drive>:<file spec> [/p<password>] [/s]
        [/i[NE | NO]]
```

For example, if you wished to reverse the movement of files from the previous example, specify:

```
LANCOPY TOM_SMITH ld:\new\*.* rc:\temp\*.* /pPIE /s
```

Note: The DOS version of LANCOPY will not copy the extended attributes or the long file names of an OS/2, Windows 95 or Windows NT workstation.

### 18.7.2. Directory Listings

If you wish to perform a directory listing of a workstation, the format is:

```
LANCOPY <Workstation Name> <file spec> /d [/p]
        [/i[NE | NO]]
```

- **Workstation Name:** The name of the workstation, specified when USIPX was loaded.

- **<file spec>:** The file specification on the remote computer that you wish to see a directory listing of (including wildcards).
- **/d:** Required to denote a directory listing.
- **/p<password>:** The optional password specified on the workstation.
- **/iNE or /iNO:** The connectivity type: Use /iNE for NetBIOS and /iNO for Novell IPX/SPX. The default is /iNO.

The DOS version of LANCOPY shows directory listings in standard DOS form. The OS/2 version shows directory listings in OS/2 HPFS form including extended attributes and long file names.

Note that all files are displayed including system and hidden files.

# 18.8. Tuning

There are a number of parameters to help you tune the LAN Workstation version and most work on both the requestor and the workstation. These parameters are set through environment variables (SET <variable>=<value>) which are set on the command line before you run the program. You may choose to add these to your AUTOEXEC.BAT file.

For example, in DOS, to reduce the amount of memory required on the workstation, enter the following on the command line before running USIPX:

```
SET LANBUFFER=1024
SET NUMECBS=5
```

| Name | Default | Description |
|---|---|---|
| ADAPTER | 0 | The NetBIOS adapter number to use. 0 is the primary adapter, 1 is the secondary adapter. |
| LANBALANCE | 2 | How the internal buffers are optimized. While this parameter can be specified on the requestor, it is only useful on the workstation.<br>0 = Mostly receive<br>1 = Mostly send<br>2 = Balance send and receive |
| LANBUFFER | 2048 | The size of the I/O buffer. A larger size will increase I/O performance at the expense of memory. Do not set this value lower than 512 or greater than 32767. |
| LANTIMEOUT | 0 | How long in seconds a communications request will be held for before timing out. The default of 0 means to never time out. |
| NOSAP | (not specified) | The default is to use the NetWare Service Advertising Protocol, where each workstation registers itself once a minute with every file server on the internetwork. You can disable this feature to reduce the amount of overhead on the internetwork by specifying a value for NOSAP. However, you will also lose the ability to cross bridges and routers. |
| NUMECBS | 10 | The number of event control blocks used in the data transfer. A larger number increases LAN performance at the expense of memory. Do not set this value lower than 5 or greater than 254. |
| SERVERTYPE | 29631 | When using the Service Advertising Protocol, this is the TYPE advertised by the workstation. It is specified in inverted byte format. |
| SOCKET | 9026 | The IPX socket used for communications. If you have a socket conflict, specify a different value. This value is in inverted byte order. |
| TIMEOUT | 20 | The number of seconds that a node will wait for a connection packet from the remote. You should always specify the same value on the requestor and workstation. |
| USDATAGRAMTO | 3 | The number of seconds before a datagram (broadcast) used in session establishment will time out. |

| Name | Default | Description |
|---|---|---|
| USLAPS | (not specified) | (OS/2 only) If specified, force the use of the LAPS interface instead of the LAN Server interface. |
| USNOIPXSPX | (not specified) | If specified, then the IPX/SPX interface will not be used for ULTra servers or requestors. |
| USNONETBIOS | (not specified) | If specified, then the NetBIOS interface will not be used for ULTra servers or requestors. |
| USUSE32BITNETBIOS | (not specified) | (OS/2) Causes FDR/UPSTREAM to use the 32-bit interface rather than the 16-bit interface. |
| USUSEWIN32ALTERNATEFILENAMES | (not specified) | If specified, then ULTra on a Windows 95 or Windows NT machine will use the mangled name (8.3) instead of the long file name. |

# 18.9. Recovering a Failed OS/2 Workstation

When an OS/2 PC or server fails, the process to recover the operating system, communications facilities, LAN services and more can require many hours and is extremely time consuming. FDR/UPSTREAM offers a way to recover an OS/2 workstation or server, quickly and in an unattended fashion with the ULTra product. This process can also be used to quickly and easily install OS/2 with complete operating system and applications to a new workstation.

This process works by utilizing an FDR/UPSTREAM OS/2 PC which has the full version of the software installed including host connectivity. The FDR/UPSTREAM PC performs a restore to the new PC using the ULTra facility using LAN protocols (NetBIOS or IPX/SPX).

The following discusses the recovery of an OS/2 workstation or server using ULTra with NetBIOS or IPX as the transport mechanism.

You can also use a similar method to recover a DOS or Windows workstation as well. The process is not described in detail as a single disk recovery of the operating system is quite simple.

You must prepare for an OS/2 recovery in the following ways:

- Perform regular FDR/UPSTREAM backups of your PC or server.
- Prepare customized utility (recovery) diskettes

Note that the following process assumes that your original PC and new PC will be using NetBIOS or IPX through an IBM Token-Ring card. Various notes are placed indicating changes you must make if you are using different card types, or if your original PC and new PC have different hardware configurations.

When you need to recover an OS/2 PC, perform the following:

- Boot with the Utility diskettes
- Run FDR/UPSTREAM ULTra on the new PC.
- On another PC on the LAN, run the full version of FDR/UPSTREAM, restoring the server.
- If this is an IBM LAN Server and you are running HPFS386, boot the server and rerun the restore with the full version of FDR/UPSTREAM.

### 18.9.1. Performing Regular Backups

To use the FDR/UPSTREAM OS/2 recovery facility you must regularly back up your PC or server. You can use either the full FDR/UPSTREAM product or the ULTra product. However, if this is an IBM LAN Server file server with HPFS386, you will want to use the full version of FDR/UPSTREAM as the ULTra product does not back up HPFS386 ACLs.

### 18.9.2. Preparing Recovery Diskettes

There are several steps to preparing your recovery diskettes:

- Create the diskettes
- Copying the NetBIOS or IPX support files.

- Modifying the CONFIG.SYS (for NetBIOS or IPX).
- Copy the ULTra recovery facilities
- Test.

### 18.9.3. Creating the Recovery Diskettes

From the OS/2 System folder, select the System Setup folder and start the Create Utility Diskettes program. You can also start this program from an OS/2 full-screen or Window by running C:\OS2\INSTALL\BOOT-DISK or if you have OS/2 pre-installed by IBM run C:\OS2\INSTALL\PRELOAD\BOOTDISK. Note that if you have an early version of OS/2 v2.1, you may not have this program. See the following section if you do not have this option.

This program has a help button on entry to help you understand the process which we recommend you read. The following description is based on the use of 3 1.44MB diskettes which is recommended rather than one 2.88MB diskette.

Have 3 diskettes available. Follow the instructions for creating these diskettes. The resulting diskettes are:

- Diskette #1 is the first bootable diskette. In a disaster you will begin your boot process with this diskette.
- Diskette #2 is the second bootable diskette. Use this diskette to continue your booting process.
- Diskette #3 is the utility diskette. It contains FORMAT and FDISK and is where you will copy the ULTra software to.

It is a good practice at this time to test these diskettes by booting with the first two of them. You should expect to see an OS/2 prompt after the second diskette boots. Try to access files and directories on your hard drive, and try to start some programs (ULTra for example) from the hard drive. If there is a problem, reboot from the hard disk, recreate the diskettes and retry.

### 18.9.4. If you don't have BOOTDISK

Some early editions of OS/2 v2.1 do not have the BOOTDISK utility. In this case you will need to prepare the recovery diskettes manually. The steps are:

- ☐ Make copies of the Installation Diskette and Diskette 1 from your OS/2 Installation package by repeating the following process for each of the two diskettes. From an OS/2 full-screen or window, insert the disk to copy in drive A: and enter the following:

```
DISKCOPY A: A:
```

- ☐ Follow the instructions to insert a blank diskette. Label the copy of the Installation Diskette as Recovery Diskette #1 and the copy of Diskette 1 as Recovery Diskette #2.

- ☐ Edit the CONFIG.SYS file on Diskette #2: Change:

```
PROTSHELL=SYSINST1.EXE
SET OS/2_SHELL=SYSINST1.EXE
```

- ☐ To:

```
PROTSHELL=CMD.EXE
SET OS/2_SHELL=CMD.EXE
```

- Note that the CONFIG.SYS file ma have the read-only attribute which could prevent you from editing it. You can remove the read-only attribute from the CONFIG.SYS file by entering the following from an OS/2 full screen or window:

```
ATTRIB A:\CONFIG.SYS -R
```

- Increase the free space on Diskette #2 by entering the following from an OS/2 full screen or window:

```
DEL A:\BUNDLE
DEL A:\SYSINST1.EXE
DEL A:\SYSINST2.EXE
```

  You should have about 300K free on this diskette to proceed with the steps to complete the creation of the recovery diskettes.

### 18.9.5. Copying NetBIOS Support Files

Go to the following section if you are using ULTra with IPX.

To modify these diskettes to support NetBIOS, copy the following files from the C:\IBMCOM directory on your PC to Diskette #2:

```
copy c:\IBMCOM\LANMSGEX.EXE a:\
copy c:\IBMCOM\LANMSGDD.OS2 a:\
copy c:\IBMCOM\PROTMAN.OS2 a:\
copy c:\IBMCOM\PROTOCOL.INI a:\
```

Copy the following files from the C:\IBMCOM\DLL directory on your PC to Diskette #2:

```
copy c:\IBMCOM\DLL\ACSLAN.DLL a:\
copy c:\IBMCOM\DLL\ACSNETB.DLL a:\
copy c:\IBMCOM\DLL\LANMSGDL.DLL a:\
```

Copy the following files from the C:\IBMCOM\PROTOCOL directory on your PC to Diskette #2:

```
copy c:\IBMCOM\PROTOCOL\NETBIND.EXE a:\
copy c:\IBMCOM\PROTOCOL\NETBEUI.NIF a:\
copy c:\IBMCOM\PROTOCOL\NETBEUI.OS2 a:\
copy c:\IBMCOM\PROTOCOL\NETBIOS.OS2 a:\
```

Copy your LAN adapter driver and its NIF file to Diskette #2. These files are found on the diskette which came with your adapter card. Note that you will want to use the NDIS drivers rather than the Novell ODI drivers. For most IBM Token-Ring cards (except the Adapter II):

```
copy c:\IBMCOM\MACS\IBMTOK.OS2 a:\
copy c:\IBMCOM\MACS\IBMTOK.NIF a:\
```

Copy the following DLL from the C:\OS2\DLL directory for job support to Diskette #2:

```
copy c:\OS2\DLL\QUECALLS.DLL a:\
```

Copy the following message files in the C:\IBMCOM directory to Diskette #2 to provide readable bootup messages. If you run out of space creating the diskettes, you can remove any or all of these files.

```
copy c:\IBMCOM\BRZ.MSG a:\
copy c:\IBMCOM\ETHH.MSG a:\
copy c:\IBMCOM\LT0.MSG a:\
copy c:\IBMCOM\LT2.MSG a:\
copy c:\IBMCOM\LT0H.MSG a:\
copy c:\IBMCOM\LT1H.MSG a:\
copy c:\IBMCOM\LT2H.MSG a:\
copy c:\IBMCOM\LT3H.MSG a:\
copy c:\IBMCOM\LT4H.MSG a:\
copy c:\IBMCOM\MACH.MSG a:\
copy c:\IBMCOM\PRO.MSG a:\
copy c:\IBMCOM\UBIH.MSG a:\
```

Copy the following message file from the c:\OS2\SYSTEM directory to Diskette #2. Again, if you run out of space you can remove this file.

```
copy c:\OS2\SYSTEM\OSO001.MSG a:\
```

### 18.9.6. Copying IPX Support Files

Go to the following section if you are using ULTra with NetBIOS.

To modify these diskettes to support IPX, copy the following files from the C:\NETWARE directory on your PC to Diskette #2:

```
copy c:\NETWARE\IPXCALLS.DLL a:\
copy c:\NETWARE\NETAPI.DLL a:\
copy c:\NETWARE\NETSUB.DLL a:\
copy c:\NETWARE\NPCALLS.DLL a:\
copy c:\NETWARE\NWCALLS.DLL a:\
copy c:\NETWARE\NWCONFIG.DLL a:\
copy c:\NETWARE\SPXCALLS.DLL a:\
copy c:\NETWARE\NWREQOS2.MSG a:\
copy c:\NETWARE\LSL.SYS a:\
copy c:\NETWARE\IPX.SYS a:\
copy c:\NETWARE\SPX.SYS a:\
```

Copy the following device drivers from the c:\OS2\DLL directory:

```
copy c:\OS2\DLL\NLS.DLL a:\
copy c:\OS2\DLL\QUECALLS.DLL a:\
```

Copy the ODI driver for your LAN adapter card. For the IBM Token-Ring adapter (except the adapter II):

```
copy c:\NETWARE\TOKEN.SYS a:\
```

Copy your NET.CFG file:

```
copy c:\NET.CFG a:\
```

### 18.9.7. Modifying the CONFIG.SYS (NetBIOS)

If you are using IPX, proceed to the next section.

Once you have copied all the files, you must modify the CONFIG.SYS on Diskette #2 to load the adapter support and NetBIOS.

Using a text editor (such as E), edit your CONFIG.SYS to add the following lines to the end of the file:

```
DEVICE=LANMSGDD.OS2 /I:a:\
DEVICE=PROTMAN.OS2 /I:a:\
DEVICE=NETBEUI.OS2
DEVICE=NETBIOS.OS2
RUN=NETBIND.EXE
RUN=LANMSGEX.EXE
```

At the very end of the file, add a line to load your LAN adapter driver (copied above). For most IBM Token-Ring cards, add:

```
DEVICE=IBMTOK.OS2
```

### 18.9.8. Modifying the CONFIG.SYS and NET.CFG (IPX)

If you are using NetBIOS, proceed to the next section.

Edit the CONFIG.SYS on Diskette #2 to load the adapter and IPX support.

Using a text editor (such as E), edit your CONFIG.SYS to add the following lines to the end of the file:

```
DEVICE=A:\LSL.SYS
REM Replace the following line with your adapter
REM specific ODI driver
DEVICE=A:\IBMTOK.SYS
DEVICE=A:\IPX.SYS
DEVICE=A:\SPX.SYS
```

Again, using a text editor, edit the NET.CFG file on Diskette #2 in the following ways:

- ☐ If you are not using the ODI driver for your PC normally (most likely then you would be using an NDIS driver), you will need to properly configure the NET.CFG to use the ODI driver.
- ☐ Remove all block header statements and their subsequent modifiers, retaining the following:
  - Link Driver
  - Protocol
  - Link Support

  An example NET.CFG would be:

```
LINK DRIVER TOKEN
   NODE ADDRESS 400000000001
   FRAME TOKEN-RING
   FRAME TOKEN-RING_SNAP
LINK SUPPORT
   BUFFERS 14 4202
PROTOCOL STACK SPX
   RETRY COUNT 200
```

### 18.9.9. Copy ULTra

Copy the full screen version of FDR/UPSTREAM ULTra to Diskette #3:

```
copy c:\UPSTREAM\ULTRADR.EXE a:\
```

### 18.9.10. Testing

Once you have the recovery diskettes built, you should test the diskettes to verify that they are correct.

Perform a normal shutdown of OS/2 from the desktop. Once the system has shut down, insert Diskette #1 into the A: drive and reboot the PC. After a short time, you will be asked to insert Diskette #2 to complete the boot process.

When the system reaches the command line (note that there is no presentation manager in the recovery system), you must wait for all disk activity to cease. There should be no errors during the boot process. For NetBIOS, if there are errors, they will be logged to the file LANTRAN.LOG on Diskette #2; there is no similar log for IPX.

After disk activity has ceased, make a new directory on the hard disk (we recommend C:\ULTRA), insert Diskette #3 and copy ULTRADR.EXE to this directory. You must then reinsert Diskette #2. Diskette #2 must be inserted during ULTra operations as it contains required libraries.

Make the A: drive the default drive. Run the ULTRADR program with a workstation name (by entering C:\ULTRA\ULTRADR <workstation name>). All status messages are written to the screen with a prompt suggesting that if you press any key, ULTRADR will terminate.

Go to an OS/2 PC with the full version of FDR/UPSTREAM. Restore the OS/2 directory, on the PC being tested (specifying the LAN Workstation name and a NetBIOS connection type in the <More...> dialog). If this process is successful, you are ready to recover this PC, otherwise contact FDR/UPSTREAM Technical Support. We recommend that you delete the C:\ULTRA directory so that it does not get included in regular backups.

**NOTE: If for some reason you are using recovery diskettes prepared on some other PC or the hard disk was reformatted, be sure that the file system type in which the diskettes were prepared and the new one are the same (i.e. all FAT or all HPFS).**

### 18.9.11. Recovering an OS/2 PC

The process for recovering an OS/2 PC is very much like the testing process:

- Boot the new PC with the 2 recovery diskettes.
- (If necessary) After disk activity has ceased, insert Diskette #3, run the FDISK and FORMAT programs. You will need to reboot after running FDISK.
- Create a C:\ULTRA directory, insert Diskette #3, and copy ULTRADR.EXE to the new directory. Reinsert Diskette #2.
- Make the A: drive the default.
- Run C:\ULTRA\ULTRADR with a workstation name on the command line.
- On the FDR/UPSTREAM PC, restore the PC.
- Reboot the PC.
- (IBM LAN Server and HPFS386) Re-run the full version of FDR/UPSTREAM to recover ACLs.

# 18.10. Recovering a Windows 95 Workstation

FDR/UPSTREAM ULTra can be used to provide a single diskette disaster recovery solution for Windows 95 workstations. Using the DOS version of FDR/UPSTREAM ULTra on the workstation to be recovered in combination with the complete FDR/UPSTREAM product on the LAN, the operating system, long file names, and everything necessary for complete system recovery can be achieved.

The process consists of the following:

- Create a recovery diskette.
- Save the long file name information and perform, using the DOS version of FDR/UPSTREAM ULTra, a recovery backup.
- Perform regular backups.
- When a disaster occurs, boot the recovery diskette and recover the base operating system.
- Recover long file names.
- Restore your remaining data.

The following completely describes the process.

### 18.10.1. Create a Recovery Diskette

A recovery diskette is a Windows 95 (DOS v7) bootable diskette containing device and LAN support, as well as FDR/UPSTREAM ULTra software.

The first step, is to format the recovery diskette using the /s option which transfers the operating system. From a Windows 95 MS-DOS prompt, enter:

```
C:\WINDOWS> format a: /s
```

You do not need to specify a particular volume label, so press the [ENTER] key to skip that step.

Copy the contents of the DOS version of ULTra to your recovery diskette. If you need to save space you only need USIPX.EXE for IPX/SPX or USNETB.EXE and in some cases RESET.EXE for NetBIOS. We also recommend that you copy the Windows 95 FORMAT and HIMEM programs to your recovery diskette:

```
C:\WINDOWS> copy c:\windows\command\format.com a:
C:\WINDOWS> copy c:\windows\himem.sys
```

If your new hard disks will not come properly partitioned, you will also have to copy the FDISK program.

At this point the process of creating the recovery diskette varies significantly depending upon your device support, LAN drivers, etc. The following steps were used to create a NetBIOS recovery diskette for an IBM Token-Ring environment.

- Copy the IBM LAN Support Program drivers to the diskette (this consisted of DXM.MSG, DXMA0MOD.SYS, DXMC0MOD.SYS, DXMMSG.001, DXMT0MOD.SYS).
- Create a CONFIG.SYS as follows. As described in the DOS ULTra installation section, you may need to use the RESET program and you may need DXMT0MOD parameter modifiers.

```
files=99
buffers=20
dos=high
device=a:\himem.sys
```

```
device=a:\dxma0mod.sys
device=a:\dxmc0mod.sys
device=a:\dxmt0mod.sys
```

The following steps were used to create an IPX/SPX recovery diskette for an IBM Token-Ring environment:

- Copy the IBM LAN Support Program drivers to the diskette, excluding the NetBIOS driver. This consisted of: DXM.MSG, DXMA0MOD.SYS, DXMC0MOD.SYS, and DXMMSG.001.
- Create a CONFIG.SYS as follows:

```
files=99
buffers=20
dos=high
device=a:\himem.sys
device=a:\dxma0mod.sys
device=a:\dxmc0mod.sys
```

- Install the DOS version of the NetWare drivers for your hardware environment to a PC with the same LAN hardware as your target PC. Copy the contents of the \NWCLIENT directory to an \NWCLIENT directory on your PC. Modify the STARTNET.BAT file so that it uses the A: drive instead of the drive that you installed your software to.
- Create an AUTOEXEC.BAT that runs the STARTNET.BAT file.

### 18.10.2. Perform a Recovery Backup

There is a program, LFNBK, in the Windows 95 distribution, which allows long file names on your disk to be converted to short file names, and the long file name information to be stored in a file for later recovery.

Copy this file to your Windows directory. From a MS-DOS prompt enter (assuming that the D: drive is your CD):

```
C:\WINDOWS> copy d:\admin\apptools\lfnback\lfnbk.exe
```

Run the LFNBK program, using the /b to back up the long file name information:

```
C:\WINDOWS> lfnbk /b
```

At this point, your system no longer has long file name information available. Note that before your PC will behave normally, you will need to rerun the LFNBK program with the /r option. To perform your recovery backup, insert your recovery diskette and reboot your PC.

Once the PC is rebooted in DOS and you have installed LAN support, run the ULTra program (USIPX or USNETB) with the workstation name you wish to use.

At this point, go to the FDR/UPSTREAM Workstation/Server that will be used to backup/restore your Windows 95 PC. Perform a complete backup of the C: drive. Note that we recommend that you perform a first time full and use a separate backup profile for each Windows 95 PC that you are preparing a recovery plan.

After the backup has completed, reboot the Windows 95 PC, and run the long file name backup program from an MS-DOS prompt with the recovery option to restore your PC to normal:

```
C:\WINDOWS> lfnbk /r
```

### 18.10.3. Perform Regular Backups

You should perform regular backups either using the ULTra or complete version of FDR/UPSTREAM for Windows 95. This will assure that your applications and minor system changes are recorded and can be restored. If you perform major system changes or change your LAN hardware we recommend that you rebuild your recovery diskette and perform a new recovery backup.

### 18.10.4. Recovering Windows 95

At the time you install a replacement hard disk or procure a new computer, boot up the machine using your recovery diskette. You may need to partition the hard disk using FDISK or a similar utility. See the disk/computer manufacturers documentation for more information.

Before performing the following verify that there is no important data to be lost on your new disk. Then format the hard disk of your new hard disk using the system transfer option:

```
A:\> format c: /s
```

Load ULTra on your workstation and proceed to the FDR/UPSTREAM machine. Restore the entire contents of the C: drive.

Once the drive has been restored, reboot the computer.

### 18.10.5. Restoring Long File Names

When you reboot your PC your environment is not completely restored. Your folders will be incomplete and have truncated names. If you can not get to an MS-DOS prompt, use the **Run** command from the **Start** menu to run **C:\WINDOWS\LFNBK /r**

After the program has completed, your environment (including host connectivity if any) is restored.

### 18.10.6. Restore your Remaining Data

Perform a complete restore of your entire system to recover all of your application data as well as minor changes to your environment (registry and other system changes).

# 18.11. ULTra Workstation Compression

FDR/UPSTREAM ULTra now supports workstation level compression. This offers better performance on slow LAN links as well as better network resource utilization.

When you upgrade to FDR/UPSTREAM ULTra v2.4.6 (on both the workstation and UPSTREAM PC) you will automatically have the benefits of workstation compression. In particular when using IPX/SPX most users will immediately see better performance.

With workstation compression, the compression that you specify on the UPSTREAM PC is actually performed on the workstation; in prior versions the workstation would ship the data and the UPSTREAM PC would compress the data for transmission to the host.

There are a few cases where ULTra compression will not or should not be used:

- ULTra compression will not be used on DOS workstations. DOS workstations have insufficient memory for compression. Workstation compression is disabled automatically.
- When using high compression, the LAN link is fast and the workstation is particularly slow. Workstation compression would result in overall performance degradation.

To limit workstation compression on the workstation, specify the environment variable ULTRACOMPR.

| Name | Default | Description |
|---|---|---|
| ULTRACOMPR | 4 | The maximum compression level to perform on the workstation.<br>0 = No compression<br>1 = Fast Compression<br>2 = High Compression 1<br>3 = High Compression 2<br>4 = High Compression 3 |

To limit workstation compression on the UPSTREAM PC, use the standard UPSTREAM parameter ULTRACOMP:

| Name | Default | Req. | Description |
|---|---|---|---|
| ULTRACOMP | 4 | No | The maximum compression level that the workstations are to perform. Higher levels of compression specified will be performed on the UPSTREAM PC.<br>0 = No compression<br>1 = Fast Compression<br>2 = High Compression 1<br>3 = High Compression 2<br>4 = High Compression 3 |

# 18.12. Additional ULTra Features

The ULTra facility and its capabilities are pervasive throughout the entire FDR/UPSTREAM product. Discussed in other sections of this manual are other features of FDR/UPSTREAM where ULTra is one of the components, but not the primary one. See the referenced chapters:

- **Registration:** FDR/UPSTREAM ULTra workstations can be configured to automatically register their LAN Workstation name with the host allowing an administrator to determine it's last access, FDR/UPSTREAM workstation connectivity information and more... See the *FDR/UPSTREAM Program* and *Management* chapters for more information.
- **Auto-Updates:** The FDR/UPSTREAM ULTra workstation software can be automatically updated through administrator control. There is some setup, but once defined, you can easily update the FDR/UPSTREAM software for a large number of workstations. See the *Management* chapter for more information.
- **File Transfer:** FDR/UPSTREAM offers a unique facility where it's powerful, high performance file transfer facility is available to ULTra workstations. See the *File Transfer* chapter for more information.
- **Job Execution:** Batch jobs and programs can be executed both on the FDR/UPSTREAM workstation and on ULTra workstations as well as remote ULTra termination. See the *Advanced FDR/UPSTREAM* chapter for more information.
- **File Viewing:** Text files residing on the local hard disk, LAN attached drives or ULTra systems can be viewed from an FDR/UPSTREAM machine. See the *FDR/UPSTREAM Program* chapter for more information.

# 19 Duplicate Files

Many workstations and servers have files which are duplicates of files on other workstations/servers. These include operating system files, applications, etc. Transmission and storage of these files can be quite costly.

FDR/UPSTREAM v2.4.5 and later (combined with FDR/UPSTREAM MVS v2.4.5) provides a way to avoid transmitting and storing these duplicate files. FDR/UPSTREAM supports a duplicate file repository of files (stored on host disk) which will be checked whenever a file is most likely a duplicate (based on when the file was last modified).

Files can be identified as duplicates either:

- Automatically: If you enable the automatic duplicate file identification feature in FDR/UPSTREAM MVS, the determination of whether a file should be stored in the duplicate file database is performed by the host software. This is a very powerful feature; you don't have to have any prior knowledge of files that may be stored in duplicate, but it has some additional overhead and takes a few backups for these files to be identified.
- Manually: You can explicitly back up files to the duplicate database. This has the advantage of minimizing overhead and allowing you to be able to take advantage of duplicate file handling on your first full server backup.

Identified duplicate files can be copied to the host backup disk file or tape if you wish, which provides a backup disk file or tape that completely represents the workstation/server. This method eases disaster site recovery concerns, as the duplicate file database does not have to be present and current. Or, identified duplicate files can remain in the repository, easing host storage requirements.

The duplicate database are those files which are stored as Keyed/Duplicate backups in the FILE_DATA cluster, using the backup profile USTDUPFL. To manually add files to the duplicate database, all you do is perform keyed backups using the USTDUPFL backup profile. Since these files are stored on DASD, we recommend the use of high compression for Windows and OS/2 environments (DOS memory requirements may limit is usefulness). When FDR/UPSTREAM adds these files automatically to the duplicate file database, high compression will be used (except in DOS).

FDR/UPSTREAM is the first product in its class which allows the reduction of transmitted data in restores. Duplicated files stored in the host duplicate file repository are transmitted to the workstation/server once and then written to the locations on the disk or server where the file is stored. This significantly reduces the amount of data transmitted and thus reduces time to a complete system recovery.

# 19.1. In Backups...

Once there are duplicates stored on the host, use of the duplicate facility requires almost no user intervention.

There is a new option in the FDR/UPSTREAM Backup <More...> panel: **Duplicate Checking**. If this box is checked, a following field is activated: **Changed more than xxx days ago**. The default is 30. Thus if a file was modified more than 30 days ago, and the archive bit is on, the file will be considered eligible for duplicate checking.

After you have set this up, you perform full or incremental merge backups normally (do not perform first-time full merge backups even on new workstations/servers). Files will be taken from the duplicate file database if they are not found in prior backups and they have been modified longer ago than you have configured for (30 days by default). The results are backups that can be significantly faster.

Note that when files are placed in the duplicate file repository, their non-file data is included along with them. Since in some cases this may include security information (which may not be duplicate), Innovation does not recommend using automatic duplicate file detection if you believe that non-file data (or even regular file data) may cause a false duplicate. In these cases you should use the manual method and only copy those files which you know to be real duplicate candidates.

# 19.2. In Restores...

FDR/UPSTREAM has a variety of features designed to reduce the amount of data read, transmitted and stored on backups including merge backups, duplicate file checking, etc. FDR/UPSTREAM (when running workstation/server and host versions 2.5.2 or greater) also allows the ability to reduce the amount of data transmitted to the workstation/server on a restore.

The way that it works is that when FDR/UPSTREAM MVS detects a request to restore multiple copies of a file stored in the duplicate repository, it will send multiple placeholder records to the workstation/server followed by the actual data. FDR/UPSTREAM Workstation/Server will then write the data to each of the locations for the file.

To take advantage of this facility, you must use the duplicate file facility for backups and store the files in the repository (select the **Don't Copy Duplicates to Backup** option in Profile Configuration or DUPLICATE=NOCOPY in the backup profile host configuration). The process is then automatic when using FDR/UPSTREAM MVS and Workstation/Server v2.5.2 or later. This process is automatically disabled for FDR/UPSTREAM ULTra as ULTra only support a single file write.

The FDR/UPSTREAM Workstation/Server parameter MAXDUPS allows you to specify the maximum number of duplicated files which the workstation/server will attempt to write at one time. The default is 10 (except for DOS which is 1). You can disable this facility by specifying a MAXDUPS of 1.

# 19.3. Maintenance and Notes

When performing inquiries and restores using USTDUPFL, the radio buttons have different meanings:

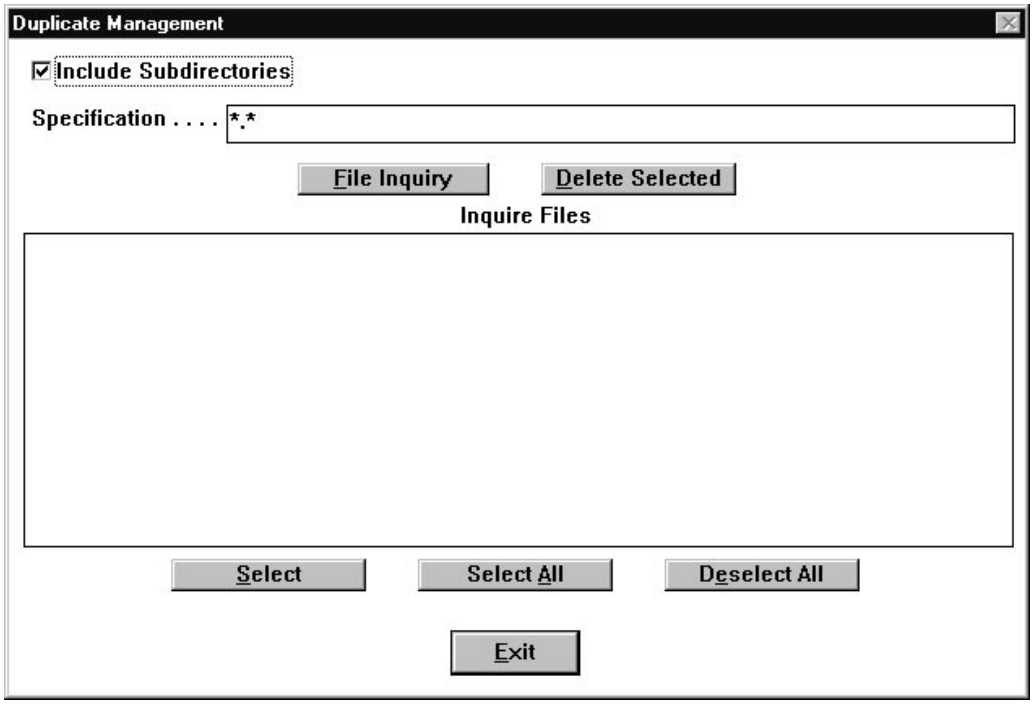
- **Only Highlighted Backup:** Only the backup version highlighted will be used for inquiries and restores. This is the method we recommend using when performing software distribution from the duplicate file database and when you wish to select backup versions for deletion.
- **Highlighted Back to Full:** For USTDUPFL, this means to look at the backup versions back from the highlighted backup to the very first backup stored.
- **Highlighted Back to Oldest:** For USTDUPFL, this means to examine all the backup versions from the highlighted backup, for files which are available specifically for duplicate management (i.e. have not exceeded 30 characters, were not deleted and re-added, etc.).

Note that if you will be using FDR/UPSTREAM for software distribution, we highly recommend using the USTDUPFL backup profile. Since these files will become duplicates through normal backups, placing them in the duplicate file database in advance allows you to take advantage of duplicate file support as soon as possible.

Under certain circumstances, files will be stored in USTDUPFL and are still unavailable for duplicate use. These include files which have file names (not including the directory path) greater than 30 characters, and files in backup versions which were deleted and then re-added.

You can remove manually performed duplicate backups in the standard way using profile management. Also, when you delete a backup, the files can not be made re-eligible for duplicate support.

To view and delete individual files in the duplicate database, there is an option in the **Remote** menu, **Duplicate Management** (see figure 19-1).




- **Include Subdirectories:** Check this box if you wish subdirectories searched when performing the file inquiry.

- **Specification:** Enter the specification to search. Like standard file inquiries, you can enter the drive/directory/file name with or without wildcards. In addition to this method, you can also enter a file name without the drive/directory prefix, allowing searches which are irrelevant to the original location of the file. Note that if you do not use the drive/directory prefix, the Include Subdirectories flag is automatically checked. The default is *.* and this field is required.

- **File Inquiry:** Press this button to perform the inquiry from the host using the Specification above.

- **Delete Selected:** Press this button to send the list of selected files and directories to the host for deletion. Pressing this button will prompt you for verification of the delete. When files/directories have been deleted, the file size field is replaced with the text [DEL] and a short size; the files are then deselected.

- **Inquire Files:** This list box contains the result of the search. If you double-click a file or directory or highlight it and press the <Select> button, a check mark (DOS or OS/2) or asterisk (Windows, UNIX) will appear in the first column. This indicates that the file or directory has been selected for delete. Double-clicking or highlighting and pressing the <Select> button on a file or directory already selected causes it to be deselected.

- **Select:** Press this button to select/deselect the file or directory highlighted in the list box for delete.

- **Select All:** Press this button to select **all** the files in the duplicate file repository for delete.

- **Deselect All:** Press this button to deselect all files that have been selected (but not yet deleted).

- **Exit:** Press this button to exit the dialog.

**Figure 19-1**
**Duplicate File Management**

Note that if you check **Don't Copy Duplicates to Backup**, and you delete the backups using Profile Management or the files using Duplicate Management which contain files referenced, they are permanently deleted. Thus this method is recommended for use only with care.

# 20 Management

FDR/UPSTREAM offers a wide variety of management facilities both on the host and on the workstation/server. This chapter discusses some of the management features including:

- Profile Management. This facility allows a manager to view and delete single backups or all backups for a backup profile.
- Profile Configuration. Allows the display, creation, modification and deletion of backup profile definitions on the host.
- Status of FDR/UPSTREAM MVS. Allows the viewing of active processes within FDR/UPSTREAM MVS and several features including the termination of an active process.
- Host Reporting. FDR/UPSTREAM MVS supports a powerful reporting system. This facility is also available on the workstation/server.
- Personalization. This is a configuration feature of FDR/UPSTREAM where an administrator can determine ("personalize") a copy of FDR/UPSTREAM on a workstation for specific functions.
- Registration Management. Allows an administrator to view, create, modify and delete host registration entries.
- FDR/UPSTREAM Software Auto-Updates. FDR/UPSTREAM can be configured to automatically update its own software (including FDR/UPSTREAM ULTra workstations). This facility uses registration and is described in this chapter.

# 20.1. Profile Management

Profile Management is a facility of the FDR/UPSTREAM program US.EXE that allows authorized users to view and delete complete backups (versions), and delete all backups within a profile.

Care must be taken in using this facility, as the deletion of active data without the knowledge of the owner of that data is often a problem.

To assure that this facility is only used by those who are authorized two checks are performed. Standard FDR/UPSTREAM security is validated (see the Security chapter and the FDR/UPSTREAM MVS manual), and there is also a Personalization option for Profile Management. Note that the old method using the file **PROFMGT.NUL** is no longer used.

To access Profile Management, pull down the Management menu and select Profile Management. You will see the Profile Management dialog (see figure 20-1).

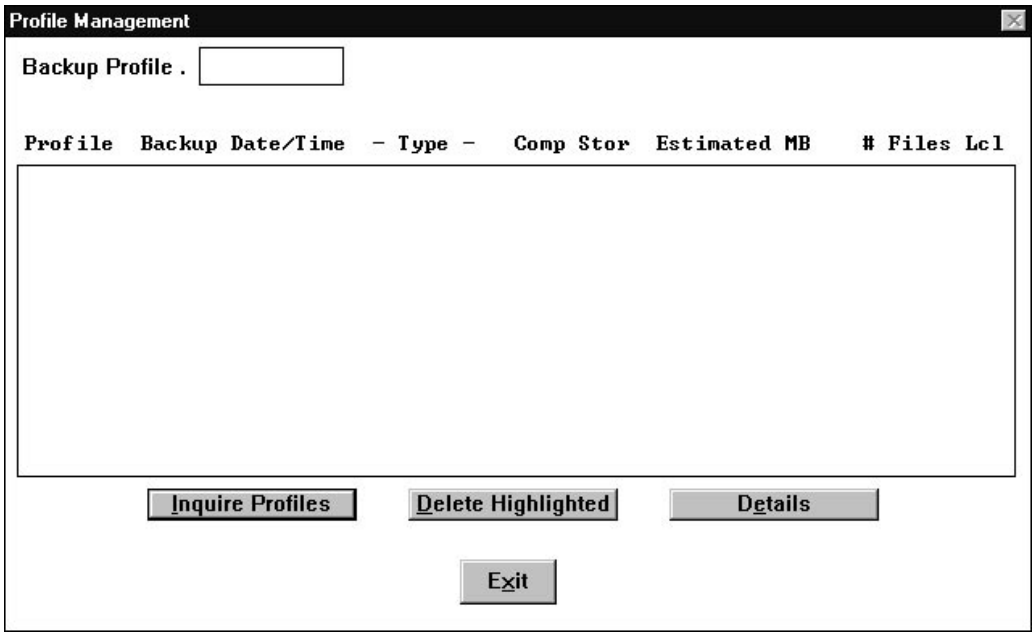



**Figure 20-1**
**Profile Management**

The parameters in this dialog are:

- **Backup Profile:** Enter the backup profile name you wish to see the backups for. The default is the backup profile specified in security validation.

  If you wish to see the versions for a group of profiles with a common prefix, enter the prefix name followed by an asterisk. For example, to see all the versions for the profiles SERVER1, SERVER2 and SERVER3, enter SERVER*. Leave the field blank or enter a single asterisk ('*') to view all backups.

- **Profiles List:** This list box contains the profiles and versions maintained by FDR/UPSTREAM MVS. This box is filled when you press the <Inquire Profiles> button. Highlighted entries are used by the <Delete Highlighted> and <Details> buttons. Displayed information includes (in a mono-space font, displayed in columns):
    - The profile name (Profile). The name is displayed a single time for all backups for a profile, on its own line.
    - The date/time the backup was begun (Backup Date/Time)
    - The backup type (Type). Values displayed are Merge Full, Merge Inc., Keyed, Archive.
    - Whether the backup was completed (Comp). The column has Intr if it was interrupted.
    - The storage type (Stor), either Disk or Tape
    - Estimated Megabytes (Estimated MB). The value is calculated by the workstation/server when the backup is begun and may not be exact.
    - Number of files (# Files).
    - A local backup file number if a local backup was specified.
- **Inquire Profiles:** Press this button to see the profiles and the versions contained in each profile currently maintained by FDR/UPSTREAM MVS. You must perform this inquiry to delete or view the profile information.
- **Delete Highlighted:** Press this button to delete the profile or version currently highlighted in the list box. You will be asked for confirmation before the function is done. During the deletes, a status dialog is displayed.

  When the delete has finished, the entries are replaced with the word DELETED. These entries can no longer be viewed or otherwise modified. Later inquiries will no longer show the versions deleted.
- **Details**: Press this button to view the version currently highlighted in the list box. You must highlight a version, not a complete profile. The information displayed is the same as for an inquire versions done in the restore dialog.
- **Exit:** Press this button when you have finished.

# 20.2. Profile Configuration

Each backup profile must be configured to FDR/UPSTREAM MVS either explicitly (where the configuration specifies the exact name) or implicitly( where the configuration specifies a global or prefix name). This configuration specifies such options as limitations, file prefixes and the like.

Backup Profile configurations can be modified on the host by modifying the configuration member and either using the FDR/UPSTREAM MVS configurator (USTCONFG) or through console commands. You can also modify them from your PC.

Care must be taken in using this facility, as improper modifications may cause working backup profiles to no longer operate correctly.

To assure that this facility is only used by those who are authorized two checks are performed. Standard FDR/UPSTREAM security is validated (see the Security chapter and the FDR/UPSTREAM MVS manual), and there is also a Personalization option for Profile Management. Note that the old method using the file **PROFMGT.NUL** is no longer used.

To access Profile Configuration, pull down the Management menu and select Profile Configuration. You will see the Profile Configuration dialog (see figure 20-2).

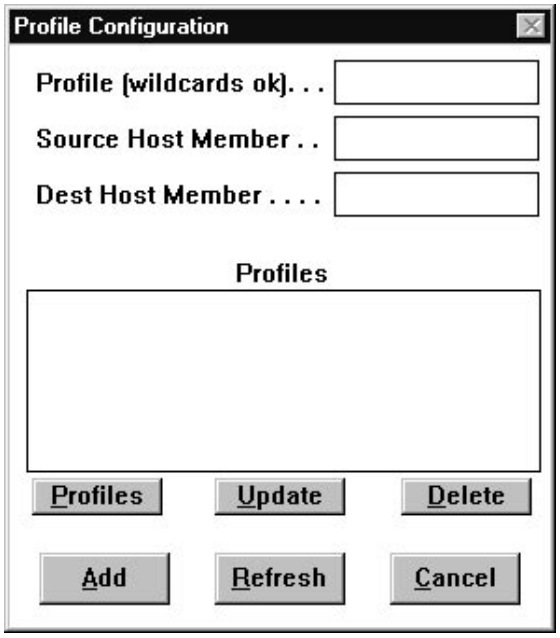



**Figure 20-2**
**List Profiles**

This is primarily a selection dialog where you select profiles or configuration members to modify, add or delete.

- **Profile:** If you wish to view or update an existing profile, enter a backup profile name or a part of a name and an asterisk wildcard and press the <Profiles> button. If you wish to add a new profile, enter a complete (non wildcarded) profile name in this field and press the <Add> button.

- **Source Host Member:** If you wish to add/update/delete backup profiles in the default host configuration member you can leave this field blank. This field is filled in with the default name when you press the <Profiles> button. If you wish to perform an action on another host member enter that member name.

- **Dest Host Member:** Leave this field blank (or accept the automatically entered value) unless you wish to create a new host configuration member, using the Host Member value (entered above) as the source and this value as the destination. Most users will rarely do this. During this process, if you add, update or delete a member the change will be reflected in the new member. Note that by specifying the same Host Member and Destination Host Member multiple times will continually erase the contents of the Destination Host Member. FDR/UPSTREAM will automatically change the Host Member to be the value of the Destination Host Member when you actually perform a add or update.

- **Profiles List:** This list, which is filled in after you press the <Profiles> button, contains the profiles which matched the value entered in the Profile field. If you double-click an entry it is the same as pressing the <Update> button. The highlighted entry is used when you press the <Update> or <Delete> buttons.

- **Profiles:** Press this button to retrieve from the host the profiles entered in the Profile field.

- **Update:** Press this button to view and/or update the profile information which is currently highlighted in the Profiles List.

- **Delete:** Press this button to delete the profile currently highlighted in the Profiles List.

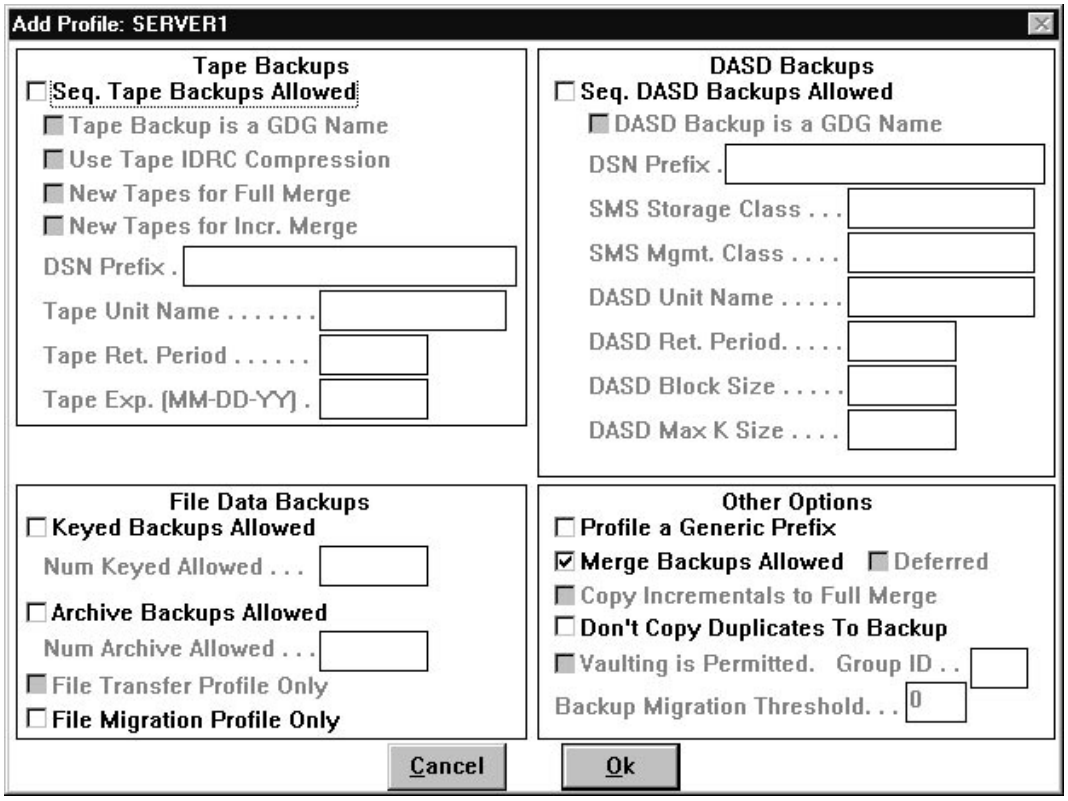
- **Add:** Press this button to add a new profile which will have the name specified in the Profile edit field. If you have an existing profile highlighted in the Profiles List, the values in that profile will be used as defaults for the new profile.

- **Refresh:** Press this button to have the active configuration in FDR/UPSTREAM MVS refreshed with the values changed in this facility. Additionally, if you change the Destination Host Member, that will become the active member.

- **Cancel:** Press this button to leave this dialog.

FDR/UPSTREAM will begin a conversation with the host when you press the <Profiles>, <Delete> or <Refresh> buttons. If you press the <Add> or <Update> buttons you will see the Profile Modification dialog (see figure 20-3).

Many of the fields in the Profile Modification dialog are unfamiliar to PC users. Pressing the [F1] button will provide help specific to the field you have highlighted.




The fields in the Tape Backups frame are:

- **Seq. Tape Backups Allowed:** Check this box if you wish to allow this profile to perform backups directly to tape. You must enter a tape DSN Prefix and a Tape Unit. Checking this box will activate the other parameters in the Tape Backups frame.

- **Tape Backup is a GDG Name:** Check this box if you wish tape backup datasets to be allocated as new generations of a GDG. This is not recommended, since FDR/UPSTREAM MVS will automatically uncatalog unneeded tapes and tape management systems will scratch expired backups. If used, the GDG base name specified in "Tape DSN Prefix" must be predefined in your MVS system catalogs before it can be used by FDR/UPSTREAM MVS; be sure you define sufficient generations in the GDG base to retain all required backups.

- **Use Tape IDRC Compression:** Check this box if you are using 3480/3490 cartridge drives and wish to have FDR/UPSTREAM MVS specify the TRTCH=COMP parameter when dynamically allocating the tape backup to request hardware (IDRC) compaction of the tape dataset. IDRC compaction may be used even you don't check this box if compaction is your system default.

- **New Tapes for Full Merge:** Check this box if you will be using MERGE BACKUP, both full and incremental backups are stored on tape and you do NOT wish the full backups appended to the tape used for incremental backups. Otherwise the full backup will be appended to the tape used for incremental backups. It is more efficient to NOT check this box.

- **New Tapes for Incr. Merge:** Check this box if you will be using MERGE BACKUP, both full and incremental backups are stored on tape and you do NOT wish incremental backups after the first backup stored on the same tape.

Otherwise the first incremental backup will use a new tape and subsequent incremental backups will be appended to that tape. It is more efficient to NOT check this box.

- **Tape DSN Prefix:** This is a required field if you check the Seq. Tape Backups Allowed check box above. Specify a 1 to 35 character dataset name prefix that will be used to dynamically allocate the tape dataset for the backup. The prefix may include periods (".") to separate index levels and must meet MVS standards for dataset names.

  If you do not enable the tape GDG option in this profile, FDR/UPSTREAM will allocate the backup file as a non-GDG. The length of this value must not exceed 19 characters and FDR/UPSTREAM will add 3 additional index levels at the end of the name to create a unique dataset name: profile name, the date as "Dyymmdd", and the time as "Thhmmss".

  If the tape GDG option is enabled in the profile, the backup datasets will be allocated as new generations of a GDG; this field must specify the GDG base name and may be up to 35 characters long. The GDG base must be predefined in the appropriate MVS catalog along with the number of generations to keep. If the tape GDG option is enabled in a profile which is a prefix or has a profile name as GLOBAL and the LAST index level of this field matches the profile prefix name (or GLOBAL), then FDR/UPSTREAM will substitute the actual profile name used by the workstation. For example, if the profile has a prefix of ABC, is a GDG Name, and this field is BACKUP.ABC but the workstation uses profile name ABC123, the actual GDG name will be BACKUP.ABC123. This allows unique dataset names to be generated based on the actual profile name. The GDG bases for these modified names must be predefined, and the total length of the name with a maximum 8 character profile name cannot exceed 35 characters. If the last index does not match, the unmodified GDG name will be used for all actual profile names (in this case, GDG is not recommended).

- **Tape Unit Name:** Applies only to profiles where Seq. Tape Backups Allowed has been checked and specifies a MVS tape unit name (any value that will allocate a tape device when specified in a UNIT= parameter in JCL). This unit name will be used when dynamically allocating the backup dataset. This field is required when the Seq. tape backups are enabled.

- **Tape Ret. Period:** Applies only to profiles where the Seq. Tape Backups Allowed check box has been checked. The meaning is identical to the JCL parameter RETPD=; the number of days that a tape will be maintained before it is expired. This is optional; by default no expiration date or retention period is specified when the dataset is allocated. Either this field or "Tape. Exp." can be specified, not both. FDR/UPSTREAM MVS does not explicitly enforce these dates, but if you have a tape management system which does, FDR/UPSTREAM MVS will recognize that the dataset has been scratched or uncataloged during USTMAINT execution.

  WARNING: Be sure that the expiration date you specify causes the backups to be retained for a sufficient period. Once the backups are scratched by tape management systems, they are no longer available to FDR/UPSTREAM MVS and the next execution of USTMAINT will cause them to be deleted from UPSTREAM's records.

- **Tape Exp. (MM-DD-YY):** Applies only to profiles where the Seq. Tape Backups Allowed check box has been checked. The meaning is identical to the JCL parameter EXPDT=. This value must be specified in MM-DD-YY format; special expirations such as 99000 would be entered as 00-00-99. Either this field or "Tape Ret. Period" can be specified, not both. This field is optional; by default no expiration date or retention period is specified when the dataset is allocated. FDR/UPSTREAM MVS does not explicitly enforce these dates, but if you have a tape management system which does FDR/UPSTREAM MVS will recognize that the dataset has been scratched or uncataloged during USTMAINT execution. Most users will use tape Ret. Period rather than this field.

  WARNING: Be sure that the expiration date you specify causes the backups to be retained for a sufficient period. Once the backups are scratched by tape management systems, they are no longer available to FDR/UPSTREAM MVS and the next execution of USTMAINT will cause them to be deleted from UPSTREAM's records.

The fields in the DASD Backups frame are:

- ☐ **Seq. DASD Backups Allowed:** Check this box if you wish to allow this profile to perform backups to sequential host disk files (DASD). You must enter a DASD DSN Prefix, a DASD Unit or SMS Storage Class.

- ☐ **DASD Backup is a GDG Name:** Check this box if you wish the DASD backup datasets to be allocated as new generations of a GDG. This is recommended for backups on sequential disk, since GDG processing will automatically delete old generations. The GDG base name specified in "DASD DSN Prefix" must be predefined in your MVS system catalogs before it can be used by FDR/UPSTREAM MVS; be sure you define sufficient generations in the GDG base to retain all required backups.

- ☐ **DASD DSN Prefix:** This is a required field if you check the Seq. DASD Backups Allowed check box above. Specify a 1 to 35 character dataset name prefix that will be used to dynamically allocate the tape dataset for the backup. The prefix may include periods (".") to separate index levels and must meet MVS standards for dataset names.

  If you do not enable the DASD GDG option in this profile, FDR/UPSTREAM will allocate the backup file as a non-GDG. The length of this value must not exceed 19 characters and FDR/UPSTREAM will add 3 additional index levels at the end of the name to create a unique dataset name: profile name, the date as "Dyymmdd", and the time as "Thhmmss".

  If the DASD GDG option is enabled in the profile, the backup datasets will be allocated as new generations of a GDG; this field must specify the GDG base name and may be up to 35 characters long. The GDG base must be predefined in the appropriate MVS catalog along with the number of generations to keep. If the DASD GDG option is enabled in a profile which is a prefix or has a profile name as GLOBAL and the LAST level of this field matches the profile prefix name (or GLOBAL), then FDR/UPSTREAM will substitute the actual profile name used by the workstation. For example, if the profile has a prefix of ABC, a GDG Name, and this field is BACKUP.ABC but the workstation uses profile name ABC123, the actual GDG name will be BACKUP.ABC123. This allows unique dataset names to be generated based on the actual profile name. The GDG bases for these modified names must be predefined, and the total length of the name with a maximum 8 character profile name cannot exceed 35 characters. If the last index does not match, the unmodified GDG name will be used for all actual profile names (in this case, GDG is not recommended).

- ☐ **SMS Storage Class:** Applies only to profiles where the Seq. DASD Backups Allowed check box has been checked if your MVS system has SMS (System Managed Storage) enabled. It specifies a 1-8 character storage class name that will be passed to SMS during the dynamic allocation of the backup dataset; it will be used by SMS if the dataset becomes SMS managed (see SMS Storage Class). Consult your storage administrator or MVS system programmer for valid storage class names. Note that SMS may override or ignore your storage class even if you do not specify one in the profile. The operand is optional and defaults to no storage class name.

- ☐ **SMS Mgmt. Class:** Applies only to profiles where the Seq. DASD Backups Allowed check box has been checked if your MVS system has SMS (System Managed Storage) enabled. It specifies a 1-8 character management class name that will be passed to SMS during the dynamic allocation of the backup dataset; it will be used by SMS if the dataset becomes SMS managed (see SMS Storage Class). Consult your storage administrator or MVS system programmer for valid management class names. Note that SMS may override or ignore your management class even if you do not specify one in the profile. The operand is optional and defaults to no management class name.

- ☐ **DASD Unit Name:** Applies only to profiles where Seq. DASD Backups Allowed has been checked and specifies a MVS disk unit name (any value that will allocate a disk device when specified in a UNIT= parameter in JCL). This unit name will be used then dynamically allocating the backup dataset; there must be one or more volumes with a mount attribute of STORAGE included in that unit. Either this field, or SMS Storage Class is required when the Seq. DASD backups are enabled.

- ☐ **DASD Block Size:** Applies only to profiles where the Seq. DASD Backups Allowed check box has been checked and specifies the blocksize to be used when allocating those backups; it is no longer used as the actual blocksize so

you generally do not need to specify it. Values from 1024 to 32760 are accepted. The parameter is optional and has a default of the value of DASDBLK= on the MAIN statement in this configuration (10752 if not specified there).

- **DASD Ret. Period:** Applies only to profiles where the Seq. DASD Backups Allowed check box has been checked. The meaning is identical to the JCL parameter RETPD=; the number of days that a file will be maintained before it is expired. This is optional; by default no retention period is specified when the dataset is allocated. FDR/UPSTREAM MVS does not explicitly enforce these dates, but if you have a DASD management system which does FDR/UPSTREAM MVS will recognize that the dataset has been scratched or uncataloged during USTMAINT execution.

  WARNING: Be sure that the expiration date you specify causes the backups to be retained for a sufficient period. Once the backups are scratched by DASD or disk management systems, they are no longer available to FDR/UPSTREAM MVS and the next execution of USTMAINT will cause them to be deleted from UPSTREAM's records.

The fields in the File Data Backups frame are:

- **Keyed Allowed:** Check this box if you wish to allow this profile to perform keyed (online) backups. These are backups in which the data is stored in the FILE_DATA cluster and rolled-off by FDR/UPSTREAM MVS when the maximum number entered is exceeded. You must enter a maximum number of backups to be stored.

- **Num Keyed:** Specify the number of Online (keyed) backups which will be retained for this workstation by FDR/UPSTREAM MVS. It can have a value from 0 to 4096; 0 prohibits the workstation from performing keyed backups. During the backup, if this count is exceeded, the oldest backup version associated with this profile is deleted. The operand is optional, with a default of 0. The host title is ONLINE=. This field is grayed unless you check the Keyed Backups Allowed check box above.

- **Archive Allowed:** Check this box if you wish to allow this profile to perform archived backups. These are backups in which the data is staged in the FILE_DATA cluster and then migrated to tape when you run the archive utility. The backups are rolled-off by FDR/UPSTREAM MVS when the maximum number entered is exceeded. You must enter a maximum number of backups to be stored.

- **Num Archive:** Specify the number of Archive (non-keyed) backups which will be retained for this workstation by FDR/UPSTREAM MVS. It can have a value from 0 to 4096; 0 prohibits the workstation from performing archive backups. During the backup, if this count is exceeded, the oldest archive version associated with this profile is flagged for deletion during the next execution of USTARCH, the archive utility. The operand is optional, with a default of 0. The host title is ARCHIVE=. This field is grayed unless you check the Archive Backups Allowed check box above.

- **File Transfer Profile Only:** Check this box if you wish to use this backup profile ONLY for file transfers. If you check this box, you can not use this profile for backups. If checked the tape/DASD information specified above is used as the default values, thus you may choose to have multiple file transfer profiles, each with different attributes. This box is grayed unless you have checked either DASD or tape (above) and have not checked the Merge Backups Allowed checkbox.

- **File Migration Profile Only:** Check this box if you wish to use this backup profile ONLY for file migration. If you check this box you can not use this profile for standard backups or file transfers. The default is not checked.

The fields in the Other Options frame are:

- **Generic Prefix:** Check this box if you wish the profile you are adding or updating to be used as a prefix profile name. Your profile name can be from 1 to 7 characters. Similar to the GLOBAL profile, the parameters in this profile will be used when the profile name entered at the workstation does not exist in the configuration, as long as the profile name starts with the characters specified. Checking this box allows you to define a number of profiles with a

single entry. This may be used to define a set of profiles for the use of a single workstation, for various purposes, or may be used to define profiles for a set of workstations. In any case, be sure that a given profile name will be used only for a single purpose.

- ☐ **Merge Backups Allowed:** Check this box if you wish this profile to be used for MERGE BACKUP processing; the profile must also be enabled for DASD (sequential disk) or Tape backups. Profiles enabled for Merge can also be used to do non-merge backups. When you check this box, the Deferred and File Transfer boxes become ungreyed and available

  MERGE BACKUP is the recommended backup technique. It is more efficient than non-merge full and incremental backups and allows for simpler restores.

- ☐ **Deferred:** Check this box if you wish the merge backups to be deferred. This process causes FDR/UPSTREAM to defer the merging of prior tape information until the merge defer utility is run at a later time, thus reducing the number of tape mounts at the time the merge backup is performed. Unless you must reduce tape mounts during the merge backup process, it is recommended that you NOT check this option. Note that the merge defer utility must be run to assure that the tape is complete. The default is not checked.

- ☐ **Copy Incrementals to Full Merge:** Check this box if you will be using MERGE BACKUP with incremental backups stored on disk and full backups stored on tape and you wish the incrementals to be copied to the full backup tape.

- ☐ **Don't Copy Duplicates to Backup:** Check this box if you wish duplicate files to not be copied to the backup disk or tape file. That means that when a restore is requested, the file data will be restored from the duplicate file database. Checking this box will reduce the amount of storage required on the backup files, but will make maintenance of the duplicate file database more difficult, and reduce the performance of the restores. The default is not checked.

- ☐ **Vaulting is Permitted:** Check this box if you wish the backups stored in this profile to be eligible for vaulting. Vaulting is the process where copies of the backups are created to be sent to a disaster site for disaster recovery. Vaulting is described in full in the FDR/UPSTREAM MVS manual. The default is not checked.

- ☐ **Group ID:** You can specify a two character field to cause this profile to be eligible for vaulting when a USTVLTXX (where XX matches this suffix) is processed. If the suffix is not specified, then if vaulting is enabled, these backups can be included in any vault run.

- ☐ **Backup Migration Threshold.**: Specify the number of sequential DASD backups that you wish to keep on disk before they are migrated to tape using the USTMIGRT utility. Specify 0 if you wish to either not use the USTMIGRT utility or you wish these backups to not be migrated. The default is 0. The migration process is for the backups once they are on the mainframe. This process is particularly useful if you will be backing up a number of workstations and wish to efficiently use your tape drives while minimizing the amount of host DASD space you are using. You can use this process by specifying a non-zero number in this field and specifying a Sequential Disk backup in the backup screens. This process can result in slightly slower merges if you are using it for incrementals and can result in long delays if you run a number of fulls which require the same tapes.

The buttons are:

- ☐ **Ok:** Press this button to perform the add or update. You will be asked again if you are sure and if you respond YES, then the profile information is transmitted to the host and validated.

- ☐ **Cancel:** Press this button to abandon any changes you have entered and to return to the preceding profile configuration dialog.

# 20.3. Status

FDR/UPSTREAM MVS process status information (activity) can be obtained from a workstation/server. Through this facility you can view the running FDR/UPSTREAM functions, check detailed information, cancel them and see general information concerning FDR/UPSTREAM MVS.

Note that this feature requires FDR/UPSTREAM MVS v2.4.5 and is disabled using personalization in the workstation/server distribution and must be enabled to be used.

To enter the status facility, from the Management menu, pull down the **Status of all FDR/UPSTREAM** option.

You will see the Status Information request dialog (see figure 20-4).

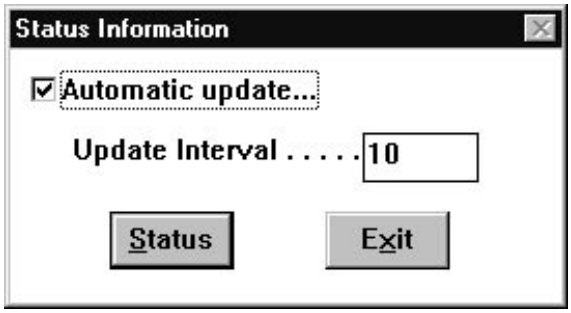


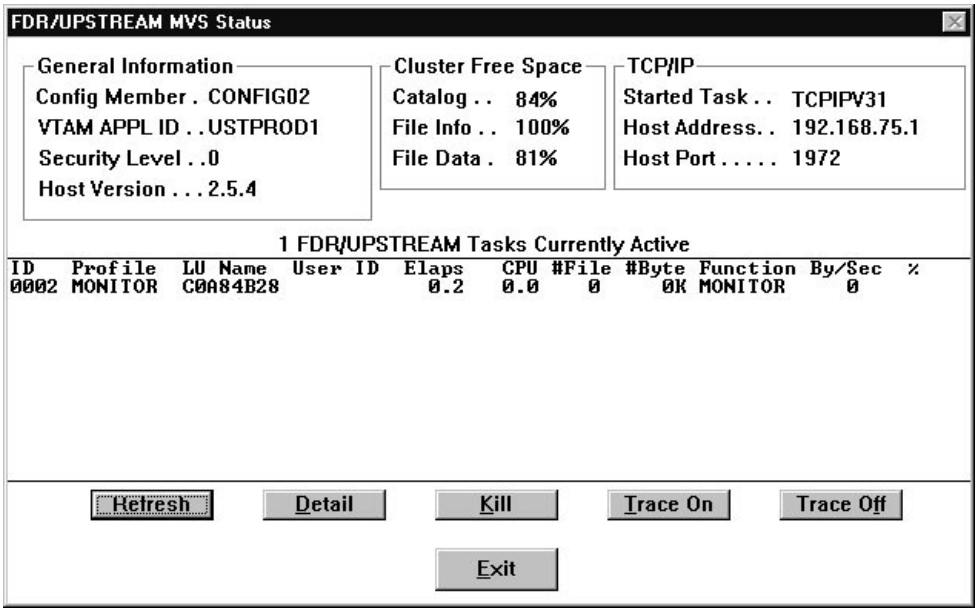

**Figure 20-4**
**Status Request Dialog**

The fields are:

- **Automatic Update:** Check this box if you wish the status information refreshed automatically. This can be convenient, and the default is checked.

- **Update Interval:** How often (in seconds) automatic updates are performed. This field is required if Automatic Update is checked and grayed if Automatic Update is not checked. The default is 10 seconds.

Press the **<Ok>** button to perform the (initial) status inquiry (see figure 20-5).




Note that if you have automatic update on you will see a flashing communications display underneath the top set of frames.

There are 4 display frames:

- **General Information:** Displays the configuration member utilized by the host in the FDR/UPSTREAM MVS configuration, the VTAM APPL ID (which is the SNA partner LU name), the security level specified and the version of FDR/UPSTREAM MVS.

- **Cluster Free Space:** The percentages of available free space in the 3 primary clusters. Note the free space has a special meaning in both IAM and VSAM and that many users will not define a File Data cluster.

- **TCP/IP:** The name of the TCP/IP facility FDR/UPSTREAM MVS uses and the addresses workstations will use to connect to it. This frame can be ignored if you do not use TCP/IP in your environment.

- **Tasks:** Above the list box, is a count of the number of FDR/UPSTREAM tasks currently active. (or the text Communications Error if there was a problem accessing the host). In the list box is a single line description of the task (ID, Profile, LU Name, etc.). If you selected Automatic Update, this text above the list box and the contents of the list box are automatically, periodically refreshed. If you double-click on a task in the list box, you will see the detail display for that task (see below). Note that there is always at least one task active: a status task which is this display.

The buttons below the list box are:

- **Refresh:** Press this button to cause a manual refresh of the task information. If you have Automatic Update selected, the next automatic update will be the Update Interval number of seconds after you press this button.

- **Detail:** Pressing this button displays detail information for the highlighted task in the task list (see below).

- **Kill:** Pressing this button will cause the task to be canceled by FDR/UPSTREAM MVS. You will be prompted for acknowledgment before the kill is performed. The remote PC will receive a message indicating that the process was canceled by request.

- **Trace On and Trace Off:** Press these buttons only on request of FDR/UPSTREAM technical support.

- **Exit:** Press this button to terminate the active status conversation with the host and return to the preceding dialog.

If you press the Detail button or double-click the mouse on a task you will see the task detail dialog (figure 20-6).

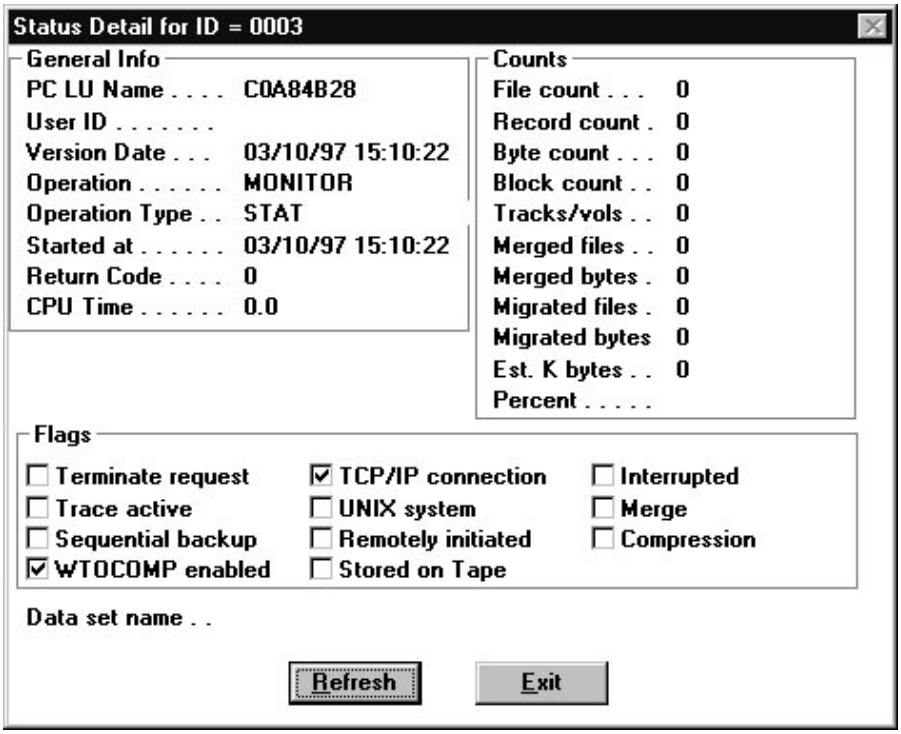



**Figure 20-6**
**Status Detail**

Note that if you have automatic update on you will see a flashing communications display underneath the top set of frames.

There are three frames and a text field:

- **General Info:** Contains information such as the LU name, user name, version date (or time the task started if this is not backup/restore related), operation name and type, task start time, current return code and CPU time in seconds.

- **Counts:** Reports the status through a backup or restore. Of particular interest is fact that these counts will constantly increment (if you have automatic update on) during a backup or restore. The percent complete will be somewhat inaccurate as it does not take into account compression.

- **Flags:** Displays activated/not activated information such as whether the request is in termination, trace is active, sequential backup, WTOCOMP (console notify), TCP/IP type connection (vs. SNA), UNIX system (vs. PC), remotely initiated (vs. PC initiated), Stored on Tape (vs. disk), Interrupted, Merge (and whether this is a full or incremental merge), and the compression level.

- **Data set name:** The host data set name related to this task.

The buttons are:

- **Refresh:** Operates as for the previous dialog, causes the fields to be refreshed.
- **Exit:** Return to the previous dialog.

Note that if the task terminates and either a manual or automatic refresh takes place, an error is displayed and you are returned to the previous dialog.

# 20.4. Reporting

FDR/UPSTREAM's comprehensive reporting facilities are now available from an FDR/UPSTREAM PC. Comprehensive filtering options allow you to tailor reports to your specific needs and these tailored reports can be saved and recalled for later use. You can even command line execute (or host request) specific reports.

Also, note that even with all of its power, these reporting facilities are a subset of the even more extensive reporting available through the batch report function of FDR/UPSTREAM MVS.

### 20.4.1. Running Simple Reports

To request a report, from the FDR/UPSTREAM main screen, pull down the Management Menu and select Host Reporting. You will see the FDR/UPSTREAM MVS Reports dialog (see figure 7).

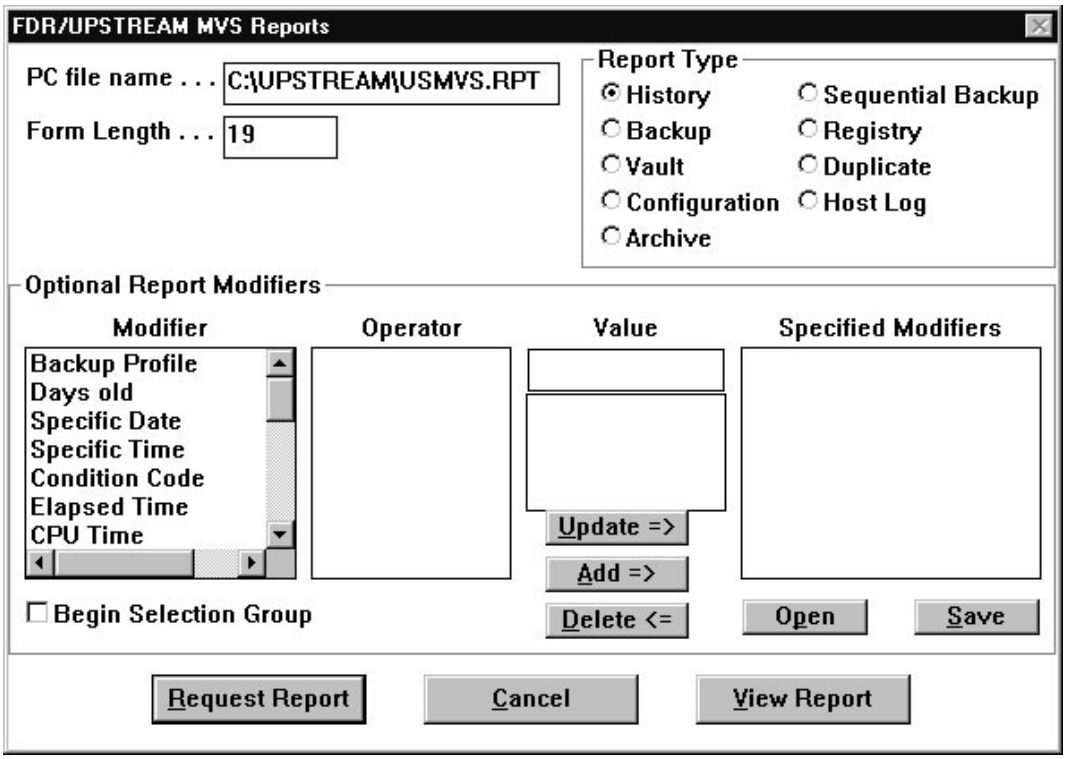



**Figure 20-7**
**Request Host Report**

The fields which are required are:

- **PC file name:** When the report is generated, the output is placed in the specified PC file and a file browser is automatically brought up so that you can view the results immediately. The default file name is USMVS.RPT in your work path.

- **Form Length:** After the specified number of lines a set of title lines are automatically drawn. The default is set so that a title is always displayed on your screen. Changing this to 0 causes the title to be written only once.

☐ **Report Type:** Press a radio button for the type of report you wish to generate. The options are:

- **History**: Generates a report from history records stored in the FDR/UPSTREAM MVS Catalog file. This is virtually all activity noted by FDR/UPSTREAM. The report notes (by Backup Profile when known), the date/time of the request, the resulting condition code, elapsed and CPU times, the LU name, the operation and various statistics.
- **Backup:** Generates a report of requested backups. This report also is from history records, but includes information on backup data set names and values in place of other fields in the History report. It reports on backups recorded by FDR/UPSTREAM which have no matching history records.
- **Vault:** Generates a report identical to the Backup report, but it will only select backup records which are flagged as having a vault (secondary) copy created by USTVAULT, and the backup data sets shown will be the vault (copy 2) backups.
- **Configuration:** Generates a report listing information from the FDR/UPSTREAM MVS configuration file. A USTCONFG DD statement pointing to the configuration file or member must be present when FDR/UPSTREAM MVS was started. The same information can be viewed (and modified) using the Profile Configuration facility.
- **Archive:** Generates a report on archive backup storage from information in the FDR/UPSTREAM MVS Catalog and File Information data files. It is similar to the previous utility program USTDLOC2.
- **Sequential Backup:** Generates a report of storage utilized for sequential backups.
- **Registry:** Lists the known registered names.
- **Duplicate:** Reports on the files stored in the duplicate file database.
- **Host Log:** FDR/UPSTREAM MVS maintains in memory a large number of its latest log entries (the exact amount is configurable in FDR/UPSTREAM MVS). This report can be very helpful in problem determination. Unlike viewing the running started task log, the log does not have to be flushed to see the latest entries.

When you have entered the required fields, press:

☐ **Request Report:** Pressing this button causes FDR/UPSTREAM to request and receive the report specified. When the report has been received, the file view facility is used to display the resulting report.

☐ **View Report:** Pressing this button causes FDR/UPSTREAM to use the file view facility to display the report previously requested (using the report name specified in the PC file name field).

☐ **Cancel:** Press this button to leave this dialog and return to the main FDR/UPSTREAM display.

The file view facility is tailored for low-memory utilization; lines outside a given range are not displayed until they are highlighted. Thus we recommend that you use the [PageUp], [PageDown] keys rather than the scroll-bar to page through reports. If you are using DOS, you will not be able to scroll horizontally; you must use a text editor outside of FDR/UPSTREAM to see the results to the right of the text displayed.

### 20.4.2. Limiting Reports

In an environment where FDR/UPSTREAM is quite active, the reports displayed may be too long for your needs. FDR/UPSTREAM allows you to specify report modifiers which allow you a virtually unlimited number of combinations of how reports are generated.

The method to limit your reports is:

- Specify the required report information (described above).

- Select a Modifier from the Modifier list. The Operator list will show the allowable operators and (depending on the Modifier selected), the Value list may show some suggested values.
- Select an Operator from the Operator list (equal, not equal, etc.).
- Enter a Value or select a Value from the Value list.
- Press the <Add> button to add the completed modifier to the Specified Modifiers list.

You can use the <Update> button to highlight an existing complete modifier in the Specified Modifiers list and then change its values. You can use the <Delete> button to remove a highlighted Specified Modifier.

The <Save> button allows you to save your report specifiers (User ID, Password, PC file name, Form Length, Report type and all modifiers) to a report selection file. You can save report specifiers for unattended operations (see below).

The <Open> button allows you to retrieve previously specified report information from a report selection file.

For example, if you wished a backup report specifying only those backups for the profile SERVER* that were performed in the last day, request a backup report with the following modifiers:

| Modifier | Operator | Value | Specified Modifiers |
|---|---|---|---|
| Backup Profile | Equal | SERVER* | Backup Profile.EQ.SERVER* |
| Days old | Less than | 1 | Days old.LT.1 |

### 20.4.3. How Modifiers Work

All modifiers in FDR/UPSTREAM MVS Reporting are used as exclusion statements; it is as if the modifiers are ANDed together. In the example above, you are requesting a backup report of all backups where the backup profile is equal to SERVER* and the days old is less than 1.

The exception to this rule is if you use the same modifier twice with the equal operator. For example, a backup report for backup profiles of SERVER* including (or) backup profiles of USER*.

If you wish to use the inclusion operator (OR) between modifiers, you can check the Begin Selection Group checkbox. Modifiers within a selection group are ANDed together, but the modifier immediately preceding the group is ORed with the modifiers in the group.

For example, if there are backups for SERVER* done within the last 2 days, but none previous to that, a backup report of using the modifiers Backup Profile.EQ.SERVER*, Days old.GT.2 would result in no entries. But if you check Begin Selection Group on Days old.GT.2, then you would see a report of all backups for SERVER*.

### 20.4.4. Unattended Reporting

You can run the reporting function unattended if you wish to repeat one or more reports on a regular basis. As this uses standard FDR/UPSTREAM parameter overrides, you can request that this be host initiated.

The ACTION parameter value of 7 specifies that a report is to be run and the report selection file should be specified in the REPORTNAME parameter. Note that if performed locally, you must also specify ATTENDED=N.

For example, if you wish to run a report from the command line (or a batch file), with a report selection file of RPTPARMS.MRT, enter:

```
US ACTION=7 REPORTNAME=RPTPARMS.MRT ATTENDED=N
```

Note that if you wish to run multiple reports unattended, you must run FDR/UPSTREAM multiple times.

The report modifiers are listed in the following table:

| Modifier | Report Type | Operators | Values | Description |
|---|---|---|---|---|
| Backup Profile | All | Equal<br>Not Equal | <= 8 characters | The backup profile (with wildcards) that you wish to include/exclude from the report. |
| Days old | History<br>Backup<br>Vault | All | A number | The number of days old that the event occurred. |
| Specific Date | History<br>Backup<br>Vault | All | A date in the form YY/MM/DD | A specified date. |
| Specific Time | History<br>Backup<br>Vault | All | A time in the form HH:MM:SS | A specified time. |
| Condition Code | History<br>Backup<br>Vault | Equal<br>Not Equal | A number: 0,4,8,12,16 or ABEND, SUSPEND, CANCEL, SYSTEM, USER, ZERO. | The result of the specified operation. |
| Elapsed Time | History<br>Backup<br>Vault | All | A number | The elapsed time, in tenths of minutes, recorded for the operation to complete. For example, 2 1/2 minutes would be 25. |
| CPU Time | History<br>Backup<br>Vault | All | A number | Specifies MVS CPU time used, in thousands of a second (milliseconds) to complete the operation. For example, 1 second is 1000. |
| LU Name | History<br>Backup<br>Vault | Equal<br>Not Equal | <= 8 characters | A [wildcarded] SNA LU name or for TCP/IP, the network address coded as an 8-digit hexadecimal value (each pair of digits corresponds to one of the 4 values in the address, converted to hex). |
| User ID | History<br>Backup<br>Vault | Equal<br>Not Equal | <= 8 characters | A [wildcarded] host user ID. |

| Modifier | Report Type | Operators | Values | Description |
|---|---|---|---|---|
| Operation Name | History<br>Backup<br>Vault | Equal<br>Not Equal | <= 8 characters | The type of operation.<br>Utility operations: ARCHIVE, DELETE, MAINT, MAINTF, REGEN, REORG.<br>Termination: SHUTDOWN. Workstation operations: BACKUP, BACKUP M, RESTORE, RESTARTB, INQUIREV, INQUIREF, REMOVE F, REMOVE B, COMM MVS, COMM PC, VSAM TST, NON I/O, REPORT<br>Mainframe initiated: HOSTINIT. |
| Operation Type | History<br>Backup<br>Vault | Equal<br>Not Equal | <= 8 characters | Used with operation names to qualify the type of operations.<br>for backup: INCR, FULL, MERG, ARCH, KEYD.<br>for restore: TAPE, DASD<br>for mainframe initiated: MVS, PC<br>for utility: RPT |
| Backup Type | History<br>Backup<br>Vault | Equal<br>Not Equal | <= 8 characters | For backups, the type of backup. Some values are: KEYD, ARCH, DASD, TAPE. |
| Number of Blocks | History<br>Backup<br>Vault | All | A number | The number of blocks transmitted to/from the workstation. |
| Number of Files | History<br>Backup<br>Vault | All | A number | The number of files transmitted to/from the workstation. |
| Number of Bytes | History<br>Backup<br>Vault | All | A number | The number of bytes transmitted to/from the workstation. |
| Number of Merged Files | History<br>Backup<br>Vault | All | A number | The number of files which were merged forward from previous backups during a full merge backup. |
| Number of Merged Bytes | History<br>Backup<br>Vault | All | A number | The number of bytes which were merged forward from previous backups during a full merge backup. |
| Number of Merged Blocks | History<br>Backup<br>Vault | All | A number | The number of blocks which were merged forward from previous backups during a full merge backup. |
| Number of Migrated Files | History<br>Backup<br>Vault | All | A number | The number of migrated files which were merged forward from previous backups during a full merge backup. |
| Number of Tracks | History<br>Backup<br>Vault | All | A number | The number of DASD tracks that were used for a sequential DASD backup. |
| Number of Tapes | History<br>Backup<br>Vault | All | A number | The number of tape volumes that were used for a sequential tape backup. |

| Modifier | Report Type | Operators | Values | Description |
|---|---|---|---|---|
| File Name Mask | History<br>Backup<br>Vault | Equal<br>Not Equal | *.* | *.* indicates that files should be listed. |
| Host Config Member | Configuration | Equal<br>Not Equal | <= 8 characters | A specific configuration member name. |
| Task Modifier | Host Log | Equal<br>Not Equal | A number. | The four digit numeric FDR/UPSTREAM MVS assigned task identifier. |
| Include Subdirs | Backup | Equal | INCLUDE,EXCLUDE, ONLY | INCLUDE = Include subdirectories<br>EXCLUDE = Exclude subdirectories<br>ONLY = Only subdirectories |

# 20.5. Personalizing FDR/UPSTREAM

FDR/UPSTREAM PC can be personalized to allow an administrator to be able to suppress access to a wide variety of FDR/UPSTREAM functions. Some of these include: access to a specified directory, a hard-coded backup profile name, and more...

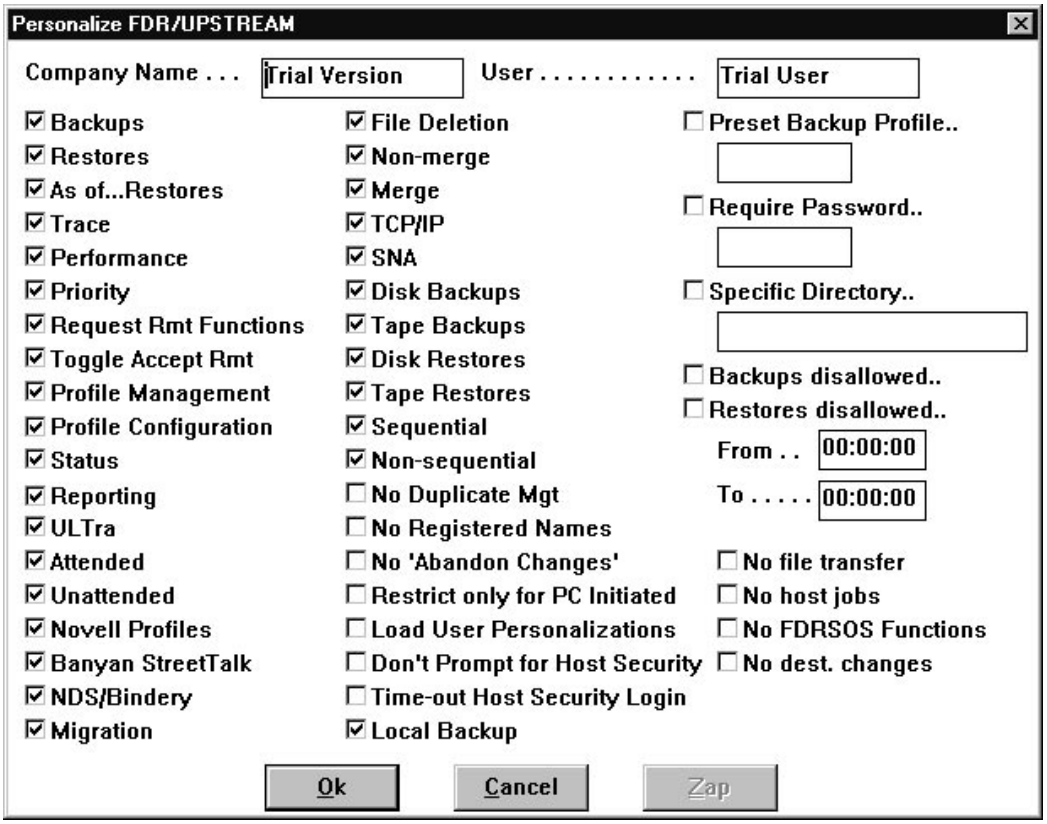
Personalization information is written to a file (US.SER) which must either be in the work path (as specified in the FDR/UPSTREAM Configurator Advanced Configuration) or in the same directory as the FDR/UPSTREAM program. This process is performed using the FDR/UPSTREAM Configurator.

To utilize this facility, the user must have both the configurator and a specially coded file SERIAL.DAT. If this user does not, then the specified customization is permanent. When upgrading to new versions of FDR/UPSTREAM, the personalization information will remain in effect.

To access the facility, enter the FDR/UPSTREAM Configurator (USCFG.EXE), press the <Cancel> button to exit the specification dialog, pull down the Action menu and select Personalize UPSTREAM.

You will then see a file open dialog. In most cases you will select the personalization file (US.SER) in the default directory which will allow you to edit personalization information.

If you have the SERIAL.DAT file in the directory, you will then see the Personalization dialog (see figure 20-8).




The Company Name and User are displayed in the About box in the File menu of FDR/UPSTREAM.

Most of the check boxes represent features and are self-explanatory. For example, if the Backups check box is unchecked then the Backups menu item in FDR/UPSTREAM is grayed, and an error will be displayed if the user attempts to perform a backup.

Specific use of the Security specific features are described in the Security chapter.

The two columns of check boxes are:

- **Backups:** Check this box if you wish to allow users to perform backups. If this box is not checked then the backup option in FDR/UPSTREAM is grayed and unattended backups will be denied.

- **Restores:** Check this box if you wish to allow users to perform restores. If this box is not checked then the restore option in FDR/UPSTREAM is grayed and unattended restores will be denied.

- **As of...Restores**: Check this box if you wish to allow users to perform as of...restores. If this box is not checked then the as of...restore option in FDR/UPSTREAM is grayed and unattended as of...restores will be denied.

- **Trace:** Check this box if you wish to allow this user to activate the internal FDR/UPSTREAM trace.

- **Performance**: Check this box if you wish to allow this user to run the FDR/UPSTREAM performance tests.

**Figure 20-8**
**Personalization**

- ☐ **Priority:** Check this box if you wish to allow this user to modify the execution priority of FDR/UPSTREAM. This option is only valid in OS/2.

- ☐ **Request Rmt Functions:** Check this box if you wish to allow this user to request an FDR/UPSTREAM function of another PC.

- ☐ **Toggle Accept Rmt:** Check this box if you wish to allow this user to enable/disable accepting remote initiates. FDR/UPSTREAM will listen for remote initiates either way, but the user will be disabled from changing whether remote initiates will be accepted (they will always be accepted).

- ☐ **Profile Management**: Check this box if you wish to allow this user to run Profile Management which allows viewing and deleting of backups stored on the host.

- ☐ **Profile Configuration**: Check this box if you wish to allow this user to run Profile Configuration which allows viewing, modifying, and deleting host defined backup profile configuration information.

- ☐ **Status:** Check this box if you wish to allow this user to run the FDR/UPSTREAM MVS status facility which allows users to view currently active UPSTREAM functions, cancel them and toggle tracing.

- ☐ **Reporting:** Check this box if you wish to allow this user to perform FDR/UPSTREAM MVS reporting functions from the PC.

- ☐ **ULTra:** Check this box if you wish to allow this user to be able to activate the FDR/UPSTREAM ULTra facility which allows backups/restores of LAN attached workstations.

- ☐ **Attended**: Check this box if you wish to allow this user to perform attended FDR/UPSTREAM functions. If this box is not checked all FDR/UPSTREAM functions must be unattended.

- ☐ **Unattended**: Check this box if you wish to allow this user to perform unattended FDR/UPSTREAM functions. If this box is not checked all FDR/UPSTREAM functions must be attended.

- ☐ **Novell Profiles:** Check this box if you wish to allow this user to specify a Novell Profile which allows unattended login to a Novell file server based on login information specified in the SETNOV program.

- ☐ **Banyan StreetTalk:** Check this box if you wish to allow this user to specify a Banyan StreetTalk name for backup/restore purposes.

- ☐ **NDS/Bindery:** Check this box if you wish to allow this user to backup/restore the Novell bindery (if v3.x) or the Novell NetWare Directory Services (if v4.x).

- ☐ **Migration:** Check this box if you wish to allow this user to perform migration: the backup of unmodified files to the host and the subsequent deletion of those files.

- ☐ **Deletion:** Check this box if you wish to allow this user to allow FDR/UPSTREAM to perform file deletes.

- ☐ **Non-Merge:** Check this box if you wish to allow this user to perform non-merge backups.

- ☐ **Merge**: Check this box if you wish to allow this user to perform merge backups.

- ☐ **TCP/IP:** Check this box if you wish to allow this user to use TCP/IP to connect to the host.

- ☐ **SNA:** Check this box if you wish to allow this user to use SNA to connect to the host.

- ☐ **Disk Backups:** Check this box if you wish to allow this user to perform backups to disk (vs. tape).
- ☐ **Tape Backups:** Check this box if you wish to allow this user to perform backups to tape (vs. disk).
- ☐ **Disk Restores:** Check this box if you wish to allow this user to perform restores from disk.
- ☐ **Tape Restores :** Check this box if you wish to allow this user to perform restores from tape.
- ☐ **Sequential:** Check this box if you wish to allow this user to perform sequential (disk or tape) backups/restores. If you do not check this box, all backups are Keyed or Archive.
- ☐ **Non-sequential:** Check this box if you wish to allow this user to perform non-sequential (keyed or archive) backups/restores. If you do not check this box, all backups are sequential disk or tape.
- ☐ **No Duplicate Mgt:** Check this box if you wish to not allow this user to use the duplicate management facility which allows the viewing/deleting of files in the duplicate database (keyed backups in USTDUPFL).
- ☐ **No Registered Names:** Check this box if you wish to not allow this user to use the registered name facility which allows the viewing/updating of target names which logically identify the LU Name or IP Address/Port Number of a workstation/server.
- ☐ **No 'Abandon Changes':** Check this box if you don't want the user to see the *Abandon Changes* box when the <Cancel> button is pressed.
- ☐ **Restrict only for PC Initiated:** Check this box if you want ALL the personalization options to only apply to PC initiate functions; host initiated functions have no personalization defined restrictions.
- ☐ **Load User Personalizations:** Check this box if you want to have separate personalization files for each user, activated when they log in. The personalization file name is the user's host login name with the .ser extension in the work path directory. For example, for a user with the host login name of "TOM", you must have a TOM.ser in the work path directory for that user to use UPSTREAM. This box should be checked for us.ser and all user personalization files if you will be using this option.
- ☐ **No Host Security:** Check this box if you wish to skip the initial host login dialog on UPSTREAM entry. If you do not have host security enabled, you should check this box.
- ☐ **Time-out Host Security Login:** Check this box if you wish a user's login to time out after 30 minutes of disuse. Note that the timer is only effective when at the main UPSTREAM screen, so your users should be encouraged to return to the main screen when they are done.
- ☐ **Local Backup:** Check this box if you wish to allow users to be able to specify and utilize local backup storage.
- ☐ **No File Transfer:** Check this box if you wish to disallow users from using the file transfer facility.
- ☐ **No Host Jobs:** Check this box if you wish to disallow the submission of host jobs from the workstation/server.
- ☐ **No FDRSOS Functions:** Check this box if you wish to disallow the use of FDRSOS Timestamp functions.
- ☐ **No Dest Changes:** Check this box if you wish to disallow restores to a different location than where the backup was performed from. This is particuarly useful if you wish to have the local workstation/server security system validate access to files. When possible, the UNC name is validated.

The right hand column consists of several more complex features:

- ☐ **Preset Backup Profile:** If you wish to customize FDR/UPSTREAM so that users can only perform backups and restores using a particular backup profile, check this box and enter the backup profile beneath it. In FDR/UPSTREAM, all backup profile edit fields are grayed and the specified entry is always used.

- ☐ **Require Password:** If you wish to secure access to FDR/UPSTREAM, check this box and enter a password in the edit field beneath it. When you enter FDR/UPSTREAM, you must enter this password to use the software.

- ☐ **Specific Directory:** If you wish to only allow access to a given directory, (and those files and directories underneath it), enter this directory entry here. This is a powerful feature as it allows the security within FDR/UPSTREAM MVS to be augmented. An example would be if you will be performing backups centrally and wish users to be able to perform their own restores, you would enter the primary directory that they have access to. Enter the directory with a terminating backslash; for example, F:\USERS\TOM\.

- ☐ **Backups Disallowed/Restores Disallowed:** If you check either of these boxes, enter a From and To time in the edit fields below. This allows you to be able to specify a range of times where backups and/or restores can not be performed. You specify times using a 24 hour clock. For example, if you wish to restrict restores during the day (to limit tape mounts or excess line traffic), check the Restores Disallowed check box and enter a From time of 09:00:00 and a To time of 17:00:00.

Press the **Ok** button to write your changes to an FDR/UPSTREAM personalization file. The default is the same file as was opened when you entered this facility. You can also save to a different file, but note that FDR/UPSTREAM will require a file named US.SER in either the work path or the FDR/UPSTREAM directory of the workstation that is being personalized.

If you press the <Cancel> button you will leave the dialog without making any changes. The <Zap> button is for use only by FDR/UPSTREAM technical support.

Some additional notes on this facility:

- The special purpose file PROFMGT.NUL is no longer used to restrict access to profile management and profile configuration; this facility supersedes the need for this file.
- SERIAL.DAT can be generated to disallow access in USCFG to disabling certain facilities. Contact FDR/UPSTREAM technical support for more information.

# 20.6. Registration

Requesting an FDR/UPSTREAM function (backup, restore, etc.) of a workstation/server from the host or another workstation/server has required that you know the LU Name or the IP Address/Port Number of that workstation/server. LU Names/IP Addresses can be difficult to remember and there is no support for dynamic LUs or the TCP/IP DHCP facility.

This facility allows you to be able to register a target name that you can use to identify the workstation. This can be any name that easily identifies the workstation/server allowing host or other workstation requests to be easily located. Using this facility now allows you to locate workstations/servers even if they are using dynamic LUs or DHCP.

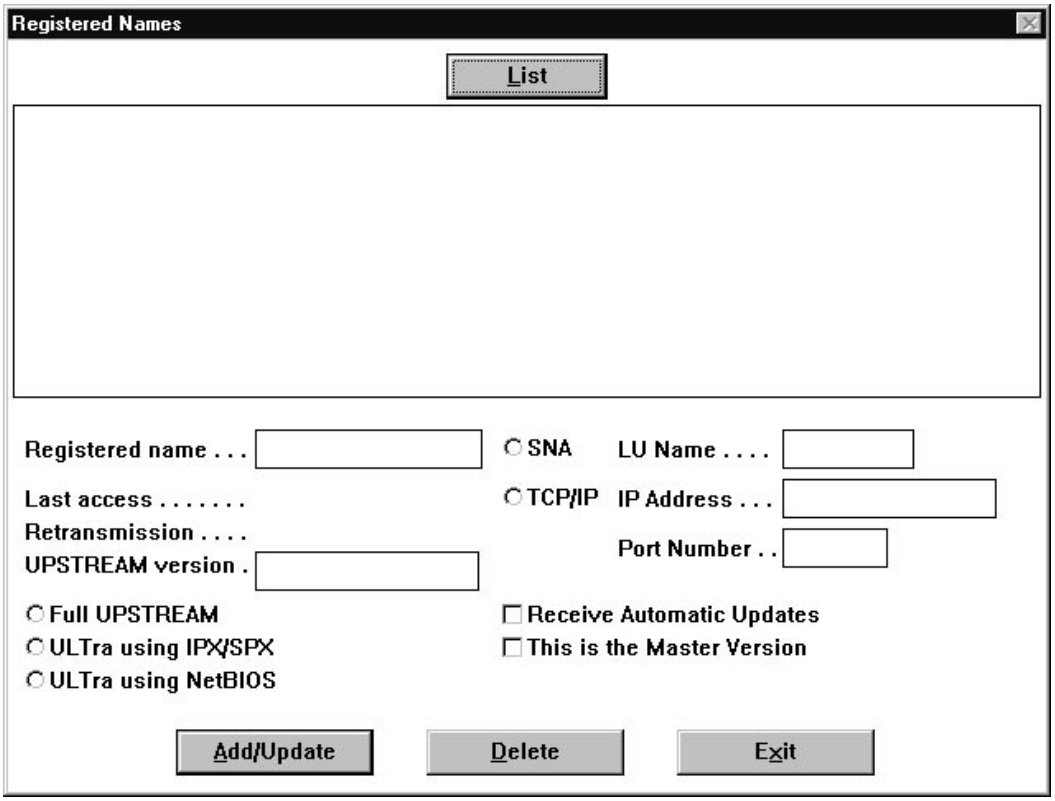
To register a target name you can:

- Have the workstation/server self-register. There is a new configuration option which allows you to define the target name during configuration.
- Register from the host. There is a new option in the FDR/UPSTREAM MVS ISPF panels REGISTRY which allows you to maintain target names.
- Register from a PC. There is a new option in the Remote Menu on the Workstation/Server (Registered Names) which allows you to maintain target names.

Registration is also the basis for the FDR/UPSTREAM Auto-Update facility described in the next section.

The workstation/server self-registration is defined in the Configurator. This process is described in the configuration chapters, depending upon the operating system type.

To modify FDR/UPSTREAM MVS registration from a workstation/server, pull down the **Remote** menu and select the **Registered Names** option (see figure 20-9).




- **List:** Press this button to request the list of registered workstations/servers. After pressing this button the list box is filled with a list of the names currently registered, their LU Name or TCP/IP address/port number, the last access (use), how often they retransmit if they use self-registration, whether this workstation is set up for auto-updates, whether it is the auto-update "master", whether it is an ULTra workstation and the ULTra connectivity type. See the following section for a description of the auto-update fields.

- **Registered Names List:** When you highlight an entry in this list, the fields under the list box are filled in with the registration information defined for this workstation/server. The fields under the list box are used to add, modify or delete registration.

- **Registered Name:** The name assigned to a given workstation/server. This field is filled in automatically when you highlight registration information in the Registered Names list box above. You can enter up to 16 characters and embedded spaces are allowed. This field is required.

- **SNA:** Press this radio button if the workstation/server is connected via SNA. You must enter a LU Name if you press this button.

- **LU Name:** Enter the SNA LU Name (not alias) used by the workstation/server. This field is required.

- **TCP/IP:** Press this radio button if the workstation/server is connected via TCP/IP. You must enter an IP Address and Port Number if you press this button.

- **IP Address:** Enter the IP Address used by the workstation server. This field is required. Note that if workstations/servers use DHCP, self-registration is the recommended mechanism.



Figure 20-9
Registered Names

- **Port Number:** Enter the port number used by the workstation/server for servicing FDR/UPSTREAM requests. The default used by most FDR/UPSTREAM users is 1972.

The remaining screen fields are used for auto-updates. See the next section for more information.

- **Add/Update:** Press this button if you wish to add or update the registration information entered below the list box.
- **Delete:** Press this button if you wish to delete the registered name specified in the Registered name field.
- **Exit:** Press this button to leave the dialog.

Note that there is another option in the **Remote** menu: **Resend Target Nam**e. This option is only enabled if you are using self-registration and it allows you to retransmit the registration information defined in the FDR/UPSTREAM configuration.

# 20.7. Automatic Updates

An automatic workstation/server update of FDR/UPSTREAM software is available which upgrades your software (including ULTra workstations) to an administrator specified version. After a one-time setup of the workstation/server, an administrator can request automatic updates of specified operating system versions of FDR/UPSTREAM.

Some features of this facility include:

- Automatic workstation detection of old versions.
- Administrator control of the production version, the workstations to receive the updates and when it is activated.
- Administrator verification of software updates.
- Support for multiple versions of FDR/UPSTREAM and multiple operating systems.
- Preservation of prior versions and fall-back.
- Updates of active programs.
- ULTra workstation support.
- Automatic operating system type recognition for ULTra workstations.
- Support for ULTra profiles.

To use this facility for FDR/UPSTREAM workstation/servers, see the next section; for ULTra workstations, see the following section.

### 20.7.1. FDR/UPSTREAM Updates

The process of automatic updates of FDR/UPSTREAM Workstation/Server is:

- An administrator certifies a version of software for automatic update. This version is placed in a predefined directory (based on operating system type) and is backed up to the host using a predefined backup profile (again, based on operating system type).
- An administrator, using the Registered Names facility, specifies a user as the Master Version for a specific version and operating system type of FDR/UPSTREAM.
- An administrator, using the Registered Names facility, specifies the workstation/servers by registered name to be automatically updated.
- When the workstation/server registers, the host indicates to it that it's version is out of sync (it can be either older or newer to qualify to automatic updates).
- When the workstation/server is idle (has performed all local and remote requests), it performs an automatic restore to a separate directory (using the pre-setup parameter file AUTOINST.DAT).
- After the successful restore, a job is run (AUTOINST.BAT, AUTOINST.CMD or autoinst) to save the old software to a separate directory, and the new software is copied in. FDR/UPSTREAM terminates to allow the copy of the new software to complete. The batch file can optionally restart FDR/UPSTREAM on completion.
- The next time FDR/UPSTREAM runs, it will register it's version to the host for administrator verification.

To set up an FDR/UPSTREAM workstation for automatic updates you must perform the following steps on each workstation.

- ☐ Install FDR/UPSTREAM v2.5.3 or later.
- ☐ Make sure that the workstation uses FDR/UPSTREAM registration and that you note the registered name.
- ☐ Create an **autoinst.dat** file in the WORKPATH directory which restores:
  - From a predefined source directory (for example:FILES= C:\UPSTREAM\WINDIST*.* for Windows 3.1)
  - To a new software directory (DESTINATION=C:\UPSTREAM\NEW*.*).
  - Using the latest version.
  - In the backup profile USTooo, where ooo is the operating system type (USTWIN for Windows 3.1).

A sample autoinst.dat is included in the \SAMPLES directory.

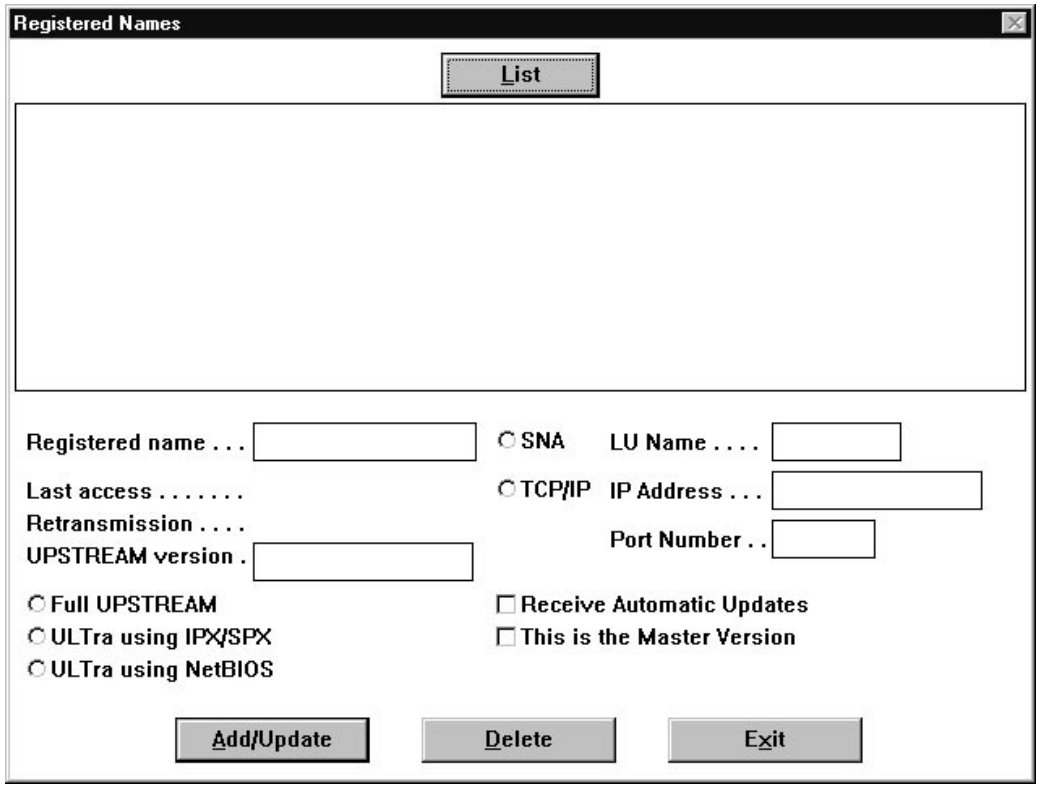
Operating system types are listed below. Note that even though currently the Windows version of FDR/UPSTREAM is also used for Windows 95 and Windows NT, these versions should be maintained separately as future plans call for separate versions of these products.

- **DOS** for all versions of DOS
- **OS2** for all versions of OS/2
- **Win** for Windows 3.x
- **W95** for Windows 95
- **NT** for Windows NT
- **AIX** for AIX UNIX.

- ☐ Create an installation job (**AUTOINST.BAT** for DOS, Windows and Windows NT, **AUTOINST.CMD** for OS/2 and **autoinst** for UNIX). This job should copy the current software to an "old" directory, copy the new software from the "new" directory and (optionally) restart FDR/UPSTREAM if it must be running or you wish it to automatically register immediately. A sample AUTOINST is included in the \SAMPLES directory. You may want to modify this sample to use the correct directory (if not C:\UPSTREAM) or restart FDR/UPSTREAM if the communications facilities do not start it.

When an administrator wishes to automatically distribute software the software, it should be locally installed, tested and certified for your local environment. When ready to distribute, follow these steps:

- ☐ Copy the distribution diskette or CD to a subdirectory named for the operating system type (for Windows 3.1, C:\UPSTREAM\WINDIST*.*).
- ☐ Perform a non-merge, disk backup of this directory using the backup profile configured on the workstations (for example, USTWIN).
- ☐ In the FDR/UPSTREAM program (we recommend that you use the version that you are automatically distributing), select **Registered Names** from the **Remote** menu.




- Press the <List> button to list the FDR/UPSTREAM machines registered to the system.
- Highlight your name and the UPSTREAM version field which should match the version and operating system that you are distributing. If it does not, you can change it.
- Check the **Receive Automatic Updates** and **This is the Master Version** checkboxes.
- Review the list of workstations which have the **Full UPSTREAM** radio button pressed. Check the **Receive Automatic Updates** checkbox for workstations that you wish to receive the updates and uncheck it for those you don't wish to see receive the updates. From this point onwards the workstations will be eligible to receive updates when they register.
- You can later verify that the workstations have received the software by checking that the UPSTREAM version field has been properly updated.

When an FDR/UPSTREAM workstation has been selected to receive automatic updates, and it registers the host software will notify the workstation that it's version number is not the same as the master version and it has been selected for automatic updates.

The workstation software then completes any locally requested processing and remote requests. When it is idle, it puts up a message dialog allowing the user 10 seconds to cancel the first step of the automatic update, which is the restore. If the user does not cancel the automatic update restore, the restore will run, using auto-inst.dat.

When the restore has completed successfully, the user is given a final opportunity to cancel the automatic update process for the second step which is running the installation job. If the user does not perform this cancel, the installation job (autoinst) is run and FDR/UPSTREAM immediately terminates so that active programs can be overwritten. If you wish, you can have autoinst re-run FDR/UPSTREAM or perform any other function.

### 20.7.2. UNIX notes

To make UNIX automatic updates smooth, we provide samples:

- **autoinst.sample.dat** A sample parameter file (which you will need to rename to be **autoinst.dat**) for the automated restore step.
- **autoinst.sample.script** A sample script file (which you will need to rename to be **autoinst**) for the installation job step.

We further recommend the following:

- That UPSTREAM on all systems be installed in the **/usr/lpp/upstream** directory to be consistent with other products. The samples assume that UPSTREAM is installed in this directory.
- When you perform the backup for distribution, that you use the compressed tar file (**upstream.tar.Z**) as distributed and that it come from the directory **/usr/lpp/upstream.dist**

### 20.7.3. ULTra Updates

The automatic update of ULTra workstations is somewhat different that for full FDR/UPSTREAM workstations. You should understand the procedure for FDR/UPSTREAM machines before setting up for ULTra workstations.

The ULTra update facility uses the ULTra workstation name as the registered name, and performs the registration during a backup. This allows ULTra workstations to be included in automatic updates even if they use ULTra Profiles.

On each ULTra workstation that will be using automatic updates, you must perform the following steps:

☐ Install FDR/UPSTREAM ULTra v2.5.3 or later.

☐ Create an installation job (ULTINST.BAT for Windows and Windows NT, or ULTINST.CMD for OS/2). This job should copy the current software to an “old” directory, copy the new software from the “new” directory and (optionally) restart ULTra if it must be running. A sample ULTINST is included in the \SAMPLES directory. You may want to modify this sample to use the correct directory (if not C:\UPSTREAM).

Note that since ULTra for DOS does not support jobs, this step is not necessary; the restore must be performed directly to the ULTra directory.

On the FDR/UPSTREAM machine:

☐ Create a parameter file in the **WORKPATH** directory which restores:

- From a predefined source directory (for example:FILES= C:\UPSTREAM\ULTWIN*.* for Windows 3.1)
- To a new software directory (DESTINATION=C:\UPSTREAM\NEW*.*).
- Using the latest version.

- In the backup profile USTUooo, where ooo is the operating system type (USTUWIN for Windows 3.1).

The name of the DAT file, its backup profile and directories must be customized for each version of FDR/UPSTREAM ULTra that you will be updating. The format for the DAT file is **ULTooo.DAT** where ooo is the operating system type (see above); the format for the backup profiles is **USTUooo**.

Thus, if you support DOS, Windows and Windows 95 workstations, you must have, in the WORKPATH directory, 3 DAT files (ULTDOS.DAT, ULTWIN.DAT and ULTW95.DAT) each of which restores from a separate backup profile (USTUDOS, USTUWIN and USTUW95 respectively) and separate specification directories (C:\UPSTREAM\ULTDOS*.*, C:\UPSTREAM\ULTWIN*.* and C:\UPSTREAM\ULTW95*.* respectively). Sample DAT files are included in the \SAMPLES directory.

- ☐ In the backup <More...> dialog, there are two new checkboxes in the ULTra frame: **Register** and **Auto-upgrade**. If you press the Register checkbox, the LAN Workstation Name is used as the registered name and the version number and ULTra connection type is registered on the host. If you press the Auto-upgrade button (which is grayed unless you have pressed the Register checkbox) the workstation is automatically upgraded. This function is only performed during backups (not restores) and you can use ULTra profiles.

  When the administrator is ready to perform an automatic update, the process is similar to FDR/UPSTREAM automatic updates:

- ☐ Copy the distribution diskette or CD to a subdirectory for the operating system type to be distributed (for example, C:\UPSTREAM\ULTWIN*.*).

- ☐ Perform a non-merge, disk backup of this directory using the backup profile configured on the workstations (for example, USTUWIN).

- ☐ In the FDR/UPSTREAM program, select **Registered Names** from the **Remote** menu.

- ☐ Press the <List> button to list the FDR/UPSTREAM machines registered to the system.

- ☐ Add or Update a dummy workstation name (for example ULTWIN), entering the operating system and version number in the **UPSTREAM version** field and pressing the ULTra connection type (**ULTra using IPX/SPX** or **ULTra using NetBIOS**). Enter your connection type (SNA or TCP/IP) and your LU Name or IP Address/Port Number.

- ☐ Check the **Receive Automatic Updates** and **This is the Master Version** checkboxes.

- ☐ Review the list of workstations which have one of the ULTra radio buttons pressed. Check the **Receive Automatic Updates** checkbox for workstations that you wish to receive the updates and uncheck it for those you don't wish to see receive the updates. From this point onwards the workstations will be eligible to receive updates when they register.

- ☐ You can later verify that the workstations have received the software by checking that the **UPSTREAM version** field has been properly updated.

  When an ULTra workstation has been selected to receive automatic updates and it completes a backup, it will then register itself with the host. The host software will notify the workstation that it's version number is not the same as the master version and it has been selected for automatic updates.

  The FDR/UPSTREAM machine then puts up a message dialog allowing the user 10 seconds to cancel the first step of the automatic update, which is the restore. If the user does not cancel the automatic update restore, the restore will run, using ULTooo.DAT (ULTWIN.DAT) and automatically replacing the LAN Workstation Name, Password and ULTra connection type with that used in the backup.

When the restore has completed successfully, the user is given a final opportunity to cancel the automatic update process for the second step which is running the installation job. If the user does not perform this cancel, the installation job (ultinst) is run and the ULTra software immediately terminates so that active programs can be overwritten. If you wish, you can have ultinst re-run FDR/UPSTREAM or perform any other function.

Note that since DOS ULTra does not allow the execution of jobs, a job is not run; the software will be updated the next time that it it loaded.

### 20.7.4. Roll-Back

If for some reason you wish to roll-back to a prior version of FDR/UPSTREAM the process is:

- The administrator should revert to the prior version.
- Uncheck Receive Automatic Updates.
- Delete the flawed version.
- Re-back up the version you wish to revert to (if it is not already the latest version).
- Check Receive Automatic Updates.
- ...or you can just copy the files from the OLD directory.

# 21.1. Using File Transfer

### 21.1.1. Host Setup

To use file transfer, you must define a backup profile on the host which defines defaults for file transfer. File transfer profiles can not be used for backups and backup profiles can't be used for file transfer. There is a new parameter in Profile Configuration, File Transfer Profile Only which should be checked for backup profiles designated for file transfer (this field is grayed until you check Disk or Tape and uncheck Merge backups); a similar parameter is available on the ISPF panel: TRANSFER=YES.

The backup profile definition allows you to determine whether you wish to enable file transfers for disk and/or tape as well as default creation options (for workstation/server sends) such as whether created files are GDGs, the prefix names, storage classes, retention periods, etc. Once the backup profile has been defined and activated you can specify a file transfer.

### 21.1.2. File Transfer Dialog

There is a new option in the **Action** menu, **File Transfer** which can be used for workstation specification of file transfers (see figure 21-1), and a similar ISPF panel available through the USTBATCH facility.

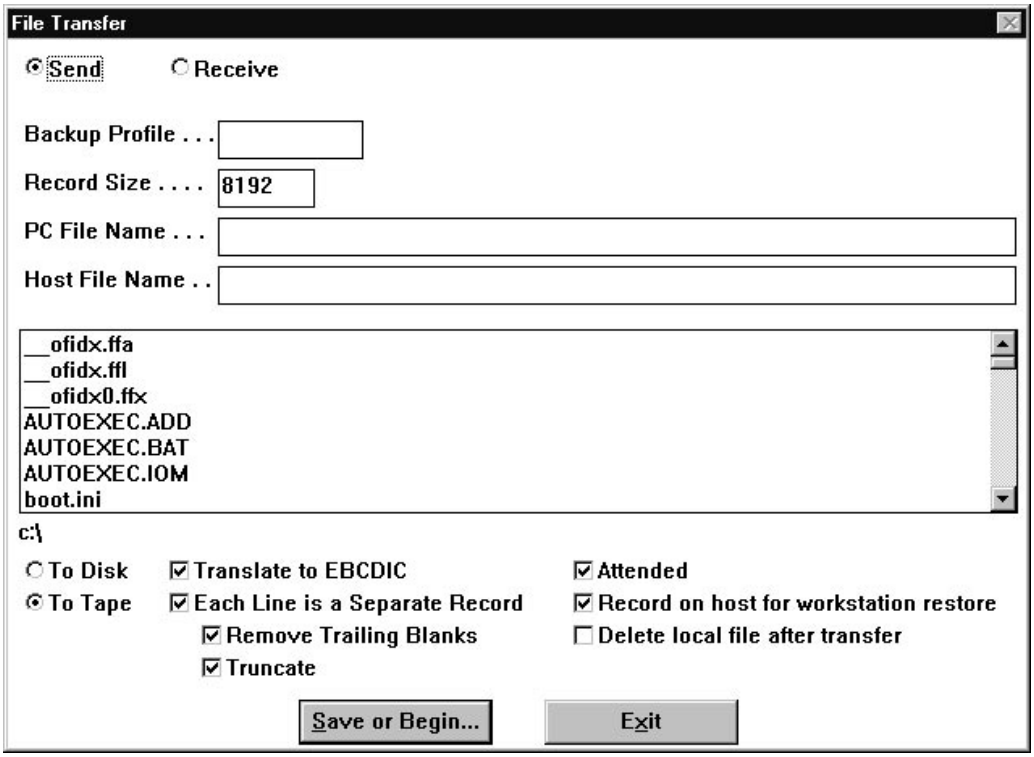



**Figure 21-1**
**File Transfer**

- **Send/Receive:** Press the **Send** radio button if you wish to send a workstation/server file to the host; press the **Receive** radio button if you wish to receive a host file. The default is Send.

- **Backup Profile:** Specify the backup profile name which contains the defaults you wish to use for this file transfer. For receives, this can be any name not used for backups. This field is required and there is no default.

- **Record Size:** Record sizes can be very important in workstation/server sends as all host files are blocked into logical records. If you check Each Line is a Separate Record (below), then this is the longest line that is transmitted; otherwise the record size is the exact number of bytes for each record on the host. The default is 8192, but record sizes of 80 bytes (for text files) are also common.

- **PC File Name:** Enter the name of the source file for Sends and the destination file for Receives. For sends, the file list below is used to help fill in this field. Wildcards are not allowed. The default is blank and is required.

- **Host File Name:** Enter the name of the destination file for Sends and the source file for Receives. You can leave this field blank if you wish to have the host assign a name using the FDR/UPSTREAM convention which is the profile defined prefix and a random suffix for non-GDGs.

  Host file names are a maximum of 44 characters, are multi-level and have dot separators (for example BOB.TEST). Sequential files use these names. If you leave this field blank, the host will create the file name for sends, or will use the most recent recorded file transfer for receives.

  GDGs (generation data groups) are host file names with a generation suffix number in parens. For sends, the suffix must be +1 (for example, BOB.GDG(+1)). For receives the suffix must be 0 or negative (for example, BOB.GDG(-1)).

  PDSs (partitioned data sets) are a single large entity which holds a number of entries within it (somewhat similar to a directory) and are specified as host names with an 8 or less character entry in parens (for example, BOB.PDS(ENTRY)). FDR/UPSTREAM requires that the PDS be preallocated for sends, but the entry can either pre-exist or be created.

  The default for host file name is blank and is required only for receives.

- **File List:** You can use the mouse or keyboard to help you select files to send in the same manner as selecting files for backup. The list is grayed for receives.

- **To Disk/Tape:** Select Disk if you wish to write your file on host disk; select Tape if you wish to write your file on host tape. This field is grayed for receives.

- **Translate to EBCDIC (ASCII):** Check this box if you wish to translate workstation/server readable ASCII to host readable EBCDIC for sends or vice-versa for receives. In most cases, check this box for text files and uncheck for binary files. The text of this message changes for sends and receives (Translate to EBCDIC for sends and Translate to ASCII for receives).

  Note that ASCII-to-EBCDIC translation may not be congruent (files transmitted and then receive may not be identical).

  FDR/UPSTREAM supports user loaded translation tables and we recommend their use in situations where data is not translated as expected. The default is checked.

- **Each Line is a Separate Record:** For sends, check this box if you wish to block workstation/server files into separate records based on lines (carriage return/line feed for PCs and line feed for UNIX systems); do not check this box if you wish to block the workstation/server file into records based on a fixed size (the record size). For receives, check this box if you wish to have FDR/UPSTREAM add a carriage return/line feed (line feed only for UNIX) after each received line; do not check this box if you don't want line delimiters added. Most users will check this box for

text files and uncheck it for binary files. If this box is not checked, the two checkboxes below are grayed. The default is checked.

- ☐ **Remove Trailing Blanks:** Check this box if you wish trailing blanks on each line to be removed for both sends and receives. The default is checked.

- ☐ **Truncate:** Check this box if you wish records which are longer than the record size to be truncated (data which is too long is removed); do not check if you wish remaining characters in a line transmitted as the next record (data which is too long is transmitted, increasing the number of lines). This field is unavailable for receives. The default is checked.

- ☐ **Attended:** If you check Attended, it is assumed that this is an attended file transfer. Do not check this box if you are building a parameter file for unattended file transfers. The default is checked.

- ☐ **Record on host for workstation restore:** Check this box if you wish to have FDR/UPSTREAM MVS record this information for easy workstation recovery in which the workstation does not have to know the host file name. This field is grayed for receives. The default is checked.

- ☐ **Delete local file after transfer:** Check this box if you wish to delete the file after a successful file send. Note that this parameter is automatically unchecked after a send. The default is not checked.

A file transfer visually appears as a standard backup or restore with a status screen, logging and reporting.

### 21.1.3. Other File Transfer Features

File transfers can be automated in the same way as any other FDR/UPSTREAM function: from the command line, utilizing the workstation scheduler, from the host, etc.

Reporting is available in file transfer and is specified in a backup or restore <More...> dialog.

To send or receive files to and from ULTra connected workstations, you must set the ULTra workstation name, password and connection type in a backup or restore <More...> dialog. You can use ULTra profiles if you wish.

# 22 FDRSOS Integration

## 22.1 Introduction

FDRSOS is a separate product licensed by Innovation Data Processing which allows high speed physical backups and restores of EMC Symmetrix SCSI disk arrays to and from an IBM mainframe. The attraction of the EMC Symmetrix is the ability to store and administer both open systems and IBM mainframe data on the same large device. The EMC disk array must have the ESP feature installed.

FDRSOS allows the open systems (UNIX, PC operating systems, etc.) disk to be backed up and restored to mainframe disk or tape. Since it only allows physical disk backups and restores it is not suited for single file or directory backups and restores. That is where FDR/UPSTREAM with its intelligent full merge processing is best utilized for single file granularity.

FDR/UPSTREAM can now be used in concert with FDRSOS to utilize FDRSOS' ability to provide high speed backups and restores of complete EMC attached disk drives with FDR/UPSTREAM's ability to provide incremental backups and restores.

In the recommended scenario, FDRSOS is used regularly (generally weekly) to provide a backup of your EMC drives. FDR/UPSTREAM incrementals are run daily to provide recovery to a given point.

Whenever possible, we recommend the regular use of FDR/UPSTREAM full merge backups so that selective file restores as well as FDRSOS high speed disaster recovery restores can be performed. However, if tape drive or time issues force it, you can use FDR/UPSTREAM incremental merges exclusively.

When a disaster occurs, you restore, using FDRSOS, the entire drive. Using FDR/UPSTREAM, you then restore the files modified since the FDRSOS backup.

Two options in FDR/UPSTREAM have been added to facilitate this feature:

- A new backup option in the File Spec More dialog allows you to create a "FDRSOS Timestamp File".
- A new restore option allows you to specify a restore back to this timestamp file.

# 22.2 FDRSOS Timestamp File

There is an option in the Backup, File Spec, More dialog: **Write FDRSOS Timestamp**. If checked, FDR/UPSTREAM will place a FDRSOS Timestamp file in the directory specified for the backup spec, or in any user specified directory.

A FDRSOS Timestamp file is zero length, has standard system attributes, and is of the form:

```
<Backup Profile>.SOS
```

Where <Backup Profile> is the specified backup profile name.

If you do not specify a FDRSOS Timestamp directory the file will be placed in the directory specified for the backup. For example, if you specify C:*.*, the FDRSOS Timestamp file will be placed in C:\.

For restores, FDR/UPSTREAM searches for the FDRSOS Timestamp file in the directory specified for the restore, and works it's way upwards until it reaches the root. For example, if you wish to restore C:\Dir1\Dir2\Dir3\File.DAT, FDR/UPSTREAM will search for the FDRSOS Timestamp file in C:\Dir1\Dir2\Dir3, then C:\Dir1\Dir2, then C:\Dir1, and finally C:\ until the file is found. If you specify a particular directory, that directory will be used exclusively.

The important information stored in a FDRSOS Timestamp file is its modification date/time. The date of the file is the host defined version date of the backup and it is used during a restore as the date/time of the last UPSTREAM backup before the disaster recovery FDRSOS restore.

You should check this box for all disks which are included in both FDR/UPSTREAM and FDRSOS backups. The user specified path can be left blank in most cases except those where security or other reasons make it difficult to store files in the directory specified for the backup. In this case you will need to verify that this directory is properly specified for both the backup and the restore.

# 22.3 Highlighted Back to FDRSOS Full

There is a radio button option in the restore parameters dialog, **Highlighted Back to FDRSOS Full**. If selected, the workstation/server software will extract the modification date/time of the FDRSOS Timestamp file and the host software will transmit files in backups which were performed since that date.

Thus, the FDRSOS Timestamp file is a signature on the disk of the last FDR/UPSTREAM backup. When FDRSOS is run, it will place this signature back as part of its normal processing and FDR/UPSTREAM will use it to determine the date/time of it's last backup.

Note that the FDRSOS Timestamp file should not be removed. FDR/UPSTREAM will not include these files in normal backups. If you perform a non-UPSTREAM restore of files which would include the FDRSOS Timestamp file, you should either specifically exclude it or recognize that you are placing the FDRSOS state of the disk for FDR/UPSTREAM at an earlier date.

There is a personalization option to disallow FDRSOS features.

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# 23 ADVANCED CONFIGURATION

There are several FDR/UPSTREAM options available in the advanced menu in the FDR/UPSTREAM configurator (USCFG.EXE). The first section of this chapter will describe these options.

All configuration options are changeable from the command line, the environment (using the SET command), from a file and from a dialog. What has been described up to this chapter has been setting parameters from a dialog. The second section of this chapter describes how to use the other ways.

# 23.1. Advanced Configuration Options

You specify advanced options in the configurator by pulling down the Action menu from the full screen and selecting Advanced. The accelerator for this is [ALT]V. This displays the Advanced Configuration Options dialog (see figure 22- for the OS/2 version). Some of these parameters are not used for some APPC's or TCP/IP or in various operating systems. See your APPC manual and the notes below for more information.

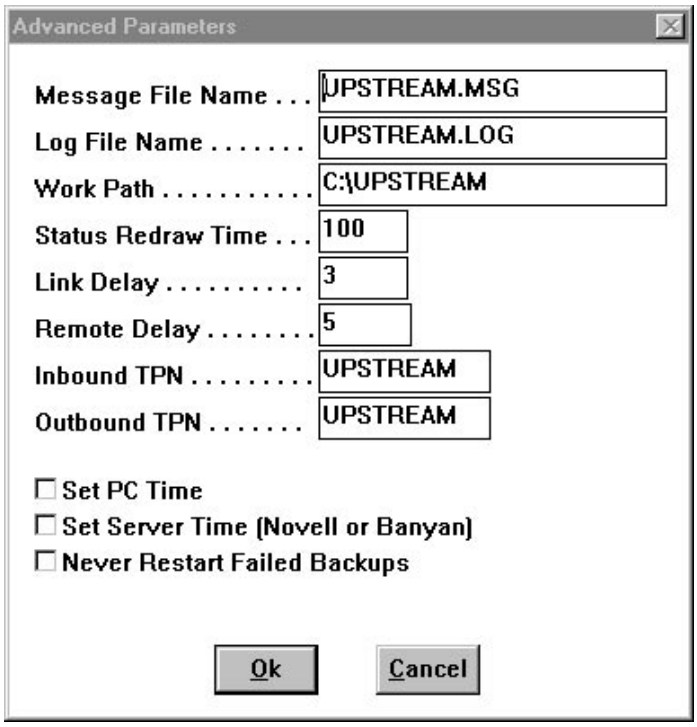



**Figure 23-1**
**Advanced Configurator**

The meaning of the edit field parameters are:

- **Message File Name:** This is the name of the file which FDR/UPSTREAM predefined messages are read from. A reason for changing this name might be to have messages specific to your environment or to change the path from which it is obtained. This is a 80 character field, the default is UPSTREAM.MSG, and it is required.

- **Log File Name:** This is the name of the file which FDR/UPSTREAM writes significant system events to. A reason for changing this name might be to change the path. This is a 80 character field, the default is UPSTREAM.LOG, and it is required.

- **Work Path:** This is the drive and directory where temporary files are written. These files include the Backup Description File, which describes the files being backed up, and the data saved from the foreground environment by USSTART.EXE. Since this data could potentially be quite large, it is recommended that this path indicate a path not part of the backup. This is a 80 character field, the default is blank which uses the default directory, and it is optional.

- **Status Redraw Time:** This is a performance enhancing parameter. Specify a number which represents the number of milliseconds between backup or restore status screen display updates (if status screen displays are enabled). 0 in-

dicates that status messages are updated continuously. For totally unattended environments, it is recommended that you specify no displays at all. For partially attended or performance test environments, it is recommended that this value be 2 or 3 seconds (2000 or 3000). 0 is the default and should be used when initially testing or where screen update performance is not impacting total system performance.

- ☐ **Link Delay:** The number of seconds between the activation of the link and the activation of the session on startup. This is also used as the maximum amount of time that an allocation failure - retry (primary return code = 3, secondary return code = 5) is retried. APPC/PC may require this on some Token-Ring connections and it may be useful on SDLC (in lieu of the "Dial remote now" message). Not recommended for AdaptSNA connections as it has its own link time out. Not used for TCP/IP. This is an integer from 0 to 255 and the default is 3.

- ☐ **Remote Delay:** The number of seconds that FDR/UPSTREAM waits after receiving a remotely initiated request before performing any other functions. Specify a higher number if you are using a slow line and you get rejected or timed out host requests. This is an integer from 0 to 65535 and the default is 5.

- ☐ **Inbound TPN:** The transaction program name that FDR/UPSTREAM uses when checking for and verifying remotely requested functions. This value must match the host parameter TPNAME. Not used for TCP/IP. Specify up to 8 characters and the default is UPSTREAM.

- ☐ **Outbound TPN:** The transaction program name that FDR/UPSTREAM uses when starting a conversation with the remote system. FDR/UPSTREAM MVS does not check this value, but other PCs do and it must match the Inbound TPN specified on those PCs if performing a PC-to-PC request (not through the host). There are almost no situations that require changing this value. Not used for TCP/IP. Specify up to 8 characters and the default is UPSTREAM.

- ☐ ***(DOS only)*** **Maximum RU Size:** An RU is a request/response unit and is an atomic SNA transport value. This is an important performance tuning parameter. Larger values increase speed exponentially on high-speed links. We recommend the largest value possible after initial testing has verified connection. This can be an integer value from 256 to 32767. The default is 1024 and it is required. This field is not used by TCP/IP, AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors. AdaptSNA sets this parameter on the command line to 8022I.EXE.

- ☐ ***(DOS only)*** **Minimum RU Size:** This is the minimum value the APPC will negotiate down to. We generally recommend that the minimum be the same as the maximum for best performance. This can be an integer from 256 to 32767. The default is 1024 and it is required. This field is not used by TCP/IP, AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors. AdaptSNA sets this parameter on the command line to 8022I.EXE.

- ☐ ***(DOS only)*** **Receive Pacing:** This is another tuning parameter. We recommend as large a value as possible considering the capabilities of the APPC and memory after initial testing. This can be an integer value from 1 to 63. The default is 8 and it is required (for some APPC's). This field is not used by TCP/IP, AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors.

There are two communications check boxes. They are not used by TCP/IP, AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors.

- ☐ ***(DOS only)*** **Contention Winner:** Check this box is you wish your LU to request to be the contention winner. This is generally required for auto-activating the session. The default is checked.

- ☐ ***(DOS only)*** **Auto-activate Session:** Check this box if you wish your contention winner session to be automatically bound to the mainframe LU. This is generally recommended. The default is checked.

- ☐ ***(DOS only)*** **Test Connection:** Check this box if you wish to have FDR/UPSTREAM perform a test conversation as soon as the session establishment process has completed. This is particularly useful for APPC/PC connections when you wish to perform host initiation as session establishment is not automatic, and this process will force it. Not used for TCP/IP. The default is not checked.

There are two clock setting check boxes. They are:

- ☐ **Set PC Time:** Check this box if you wish the PC's clock to be synchronized to the mainframe's clock when a backup is run. The clock is set using standard DOS calls; some PCs may reset their clock when they are rebooted or powered off. See your hardware users manual for more information. The default is not checked.

- ☐ **Set Server Time (Novell or Banyan):** Check this box if you wish your Novell NetWare or Banyan Vines server's clock to be synchronized to the mainframe's clock. The default is not checked.

The last check box is a general one:

- ☐ **Never Restart Failed Backups:** Check this box to keep FDR/UPSTREAM from restarting a failed backup. You would normally only check this box if you wish to specify an alternate configuration file; not for normal automated backups. The default is not checked.

There are two buttons. They are:

- ☐ **Ok:** Press this button to indicate that you are satisfied with your parameters. This will bring up the save parameters dialog. Pressing the ENTER key has the same effect.

- ☐ **Cancel:** Press this button to abandon your changes. Pressing the ESC key has the same effect.

# 23.2. Setting Configuration Parameters

You can set configuration parameters in several prioritized ways. Each priority level higher will override the value of a lower value. If two parameters are set the same way, then the newer will overwrite the older. The ways from lowest to highest are:

- **Default:** Used if a default is known and it is acceptable.
- **Parameter File:** This is a value obtained from the default parameter file (UPSTREAM.CFG) or a parameter file specified from a higher priority. For example, in UPSTREAM.CFG you will see a line like:

```
MESSAGEFILE Upstream.CFG
```

- **Environment:** These are values set using the DOS SET=<name> command. You can set these values from the command line or from a batch file. For example, you could add a line to your AUTOEXEC.BAT that would say:

```
SET CONFIGFILE=C:\UPSTREAM\US1.CFG
```

- **Command Line:** When you run USCFG or US, add the parameter on the same line, parameters separated by spaces. For example, you could start FDR/UPSTREAM:

```
US CONFIGFILE=C:\UPSTREAM\US1.CFG
```

- **User (dialog):** When you enter parameters from a dialog, these values are ALWAYS used.

You set a parameter using a keyword (upper and lower case can be mixed), followed by a separator (a blank or an equal sign) followed by the value. Parameters from the DOS environment and the command line must use an equal sign as the separator. Parameters are listed in the order they appear in the file.

There are two types of parameters: configuration and frequency. Table 1 describes the configuration parameters. These parameters do not repeat.

Table 2 describes the frequency parameters. These parameters repeat for each frequency defined.

If you use the configurator, you can print out the results to see how configuration parameters can be specified.

| Name | Default | Req. | Description |
|---|---|---|---|
| ADAPTERADDRESS<br>(DOS APPC only) | 40000000000 | No | For IBM APPC/PC® Token-ring, the Token-ring address of the immediate node you are connected to. |
| AUTOACTIVATE<br>(DOS APPC only) | Y | No | Whether the session should be automatically activated. |
| CONFIGFILE | Upstream.CFG | Yes | The name (and optionally the path) of the configuration file to read parameters from. |
| DIALREMOTE<br>(DOS APPC only) | N | No | For IBM APPC/PC® SDLC, if 'Y' you will be prompted with a message window to dial the modem. |
| DLCINFO<br>(DOS APPC only) | NONE | No | For NetWare for SAA Custom configurations, any controller adapter configuration information (such as a channel address). |
| DLCNAME<br>(DOS APPC only) | ITRN | No | The DLCNAME used for Custom configurations. FDR/UPSTREAM will automatically insert ITRN or SDLC for IBM APPC/PC or Other definitions. For Custom NetWare for SAA definitions, you must enter CUSTOM. |
| DLCNUMBER<br>(DOS APPC only) | 0 | No | For NetWare for SAA Custom configurations, the DLC number. Use a value from 0 to 255. |
| DLCTYPE | 0 (Other) | Yes | The DLC type for this PC:<br>0 = Non-IBM APPC/PC®<br>1 = IBM APPC/PC® SDLC<br>2 = IBM APPC/PC® Token-ring<br>3 = NetWare for SAA Custom<br>4 = TCP/IP (any vendor). |
| INPORT<br>(TCP/IP only) | 1972 | No | The IP port used to allow other computers to request functions (including host initiates). |
| INTPN<br>(APPC only) | UPSTREAM | No | The transaction program name used for remote initiated functions. Specified on MVS using TPNAME= |
| INTPNPROF<br>(UNIX APPC only) | UPSTREAMP | No | The transaction program profile name defined in the SNA server configuration. |
| LINKDELAY<br>(APPC only) | 3 | No | The number of seconds between an activate link and an activate session and the number of seconds that an ALLOCATION_FAILURE - RETRY will be retried. *Very* useful for APPC/PC® Token-Ring connections. |
| LOGFILE | Upstream.LOG | Yes | The name (and optionally the path) of the log file to write the error and other messages to. |
| LULOCALADDRESS<br>(DOS APPC only) | 1 | Yes | The LU local address of this PC in decimal. 0 is used for independent LUs. Dependent LUs are defined from 1 to 255. Not used by AdaptSNA or NS/DOS. |

| Name | Default | Req. | Description |
|---|---|---|---|
| LUNAME<br>(APPC only) | NONE | Yes | Your logical unit name. For OS/2, Windows, Windows NT and UNIX this is the local alias name. |
| MAXRUSIZE<br>(DOS APPC only) | 1024 | No | The maximum RU size. For APPC/PC® this must be the same as the minimum RU size. The range depends on your APPC. Not used for AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors. |
| MESSAGEFILE | Upstream.MSG | Yes | The name (and optionally the path) of the message file to read the predefined messages from. |
| MESSAGETIMELIMIT | 0 | No | A number indicating the number of seconds that predefined messages should be displayed for:<br>-1 = Do NOT display any messages.<br>0 = Display messages until released.<br>*number* = Number of seconds. |
| MINRUSIZE<br>(DOS APPC only) | 1024 | No | The minimum RU size (after negotiation). For APPC/PC® this must be the same as the maximum RU size. The range depends on your APPC. Not used for AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors. |
| MODENAME<br>(APPC only) | #INTER | Yes | The mode name you wish to use. |
| NETNAME<br>(DOS APPC only) | NONE | No | The SNA network name this PC is defined within. Usually not required. |
| NORESTART | N | No | If specified as 'Y', restarts will not be attempted on UPSTREAM program entry. |
| OUTPORT<br>(TCP/IP only) | 1972 | Yes | The IP port used to contact the host. |
| OUTTPN<br>(APPC only) | UPSTREAM | No | The remote computer's transaction program name. |
| PACING<br>(DOS APPC only) | 8 | No | The receive pacing count. The range depends on your APPC. Not used for AdaptSNA, NS/DOS or DCA/Microsoft Comm Server DOS requestors. NEVER set pacing to zero with IBM APPC/PC. |
| PARTNERLUNAME<br>(APPC only) | NONE | Yes | The LU name of FDR/UPSTREAM MVS. For OS/2, Windows, Windows NT and UNIX this is the partner alias name. |
| PRIMARYADAPTER<br>(DOS APPC only) | Y | No | For IBM APPC/PC® Token-ring, 'Y' indicates that you will be using the primary Token-ring adapter, 'N' indicates that you will be using the secondary adapter. |
| PUNAME<br>(DOS APPC only) | NONE | No | The SNA physical unit name of this PC. Usually not required. |

| Name | Default | Req. | Description |
|---|---|---|---|
| REMOTEDELAY | 5 | No | The number of seconds that FDR/UPSTREAM will wait after receiving a remotely initiated request before performing other functions. |
| SETPCTIME | N | No | Whether the PC clock should be synchronized to the mainframe clock when backups are run. |
| SETSERVERTIME | N | No | Whether the Novell NetWare or Banyan Vines server clock should be synchronized to the mainframe clock when backups are run. |
| STATUSREDRAWINTERVAL | 0 | No | The number of milliseconds between backup or restore status screen refreshes. |
| TARGETNAME | None | No | The target (registered) name to transmit to the host. |
| TARGETNAMEINTERVAL | 0 | No | How often (in minutes) the registered name will be retransmitted to the host. 0 means to only transmit the name on UPSTREAM program entry. |
| TCPADDRESS<br>(TCP/IP only) | None | Yes | The IP address of the host. |
| TCPOPTIONLEVEL<br>(TCP/IP only) | 0 | No | All TCP/IP advanced options use 65535 except for TCP_NODELAY which uses 6. |
| TCPOPTIONNUMBER<br>(TCP/IP only) | 0 | No | If specified, the advanced TCP/IP option:<br>1: (TCP_NODELAY). Disables the Nagle algorithm for send coalescing. Use a BOOL OptionValue and an OptionLevel of 6.<br>1: (SO_DEBUG). Record debugging information. Use a BOOL OptionValue.<br>8: (SO_KEEPALIVE). Send keep alives. Use a BOOL OptionValue.<br>16: (SO_DONTROUTE). Don't route; send directly to interface. Use a BOOL OptionValue.<br>4097: (SO_SNDBUF). Specify buffer size for sends. Use an INT OptionValue.<br>4098: (SO_RCVBUF). Specify buffer size for receives. Use an INT OptionValue. |
| TCPOPTIONVALUE<br>(TCP/IP only) | 0 | No | Specify the new value for the option. For BOOL values, specify 1 to enable, 0 to disable; for INT values, specify the value you wish to set. |
| TCPOPTIONVALUELENGTH<br>(TCP/IP only) | 0 | No | The number of bytes used by OptionValue, which is processor dependent. For most implementations use 2 for both BOOL and INT. |
| TESTCONNECT<br>(DOS APPC only) | N | No | If specified as 'Y', a test conversation will be initiated to the host. |
| USETARGETNAME | N | No | Whether a target (registered) name is to be transmitted on program entry. |

| Name | Default | Req. | Description |
|---|---|---|---|
| WINNER<br>(DOS APPC only) | Y | No | Whether you wish this to be a contention winner session. Required for auto-activation. Not used by AdaptSNA, NS/DOS requestors. |
| WORKPATH | (UPSTREAM directory) | No | The name of a drive and directory where temporary and trace files will be written. It is recommended that this path NOT be part of any file spec to be backed up. |

**Table 1**
**Configuration Parameters**

| Name | Default | Req. | Description |
|---|---|---|---|
| DAY | NONE | Yes (monthly, quarterly, yearly) | The day of the month to run the monthly, quarterly or yearly frequency. A number from 1..31. |
| EXCLUSIVE | Yes | No | If you have two or more frequencies scheduled within an hour of each other, this determines if the subsequent one will be run. |
| FREQPARAM | Upstream.DAT | No | The first parameter passed on the command line to the program automatically activated. Generally this is the parameter file to be used. |
| FREQTYPE | 1 | Yes | The frequency interval:<br>1 = Daily<br>2 = Weekly<br>3 = Monthly<br>4 = Quarterly<br>5 = Yearly<br>6 = Weekdays |
| MONTH | 1 | Yes (quarterly, yearly) | For yearly frequencies, this is the month (1-12). For quarterly frequencies, this is the month in the quarter (1-3). |
| NUMFREQ | 1 | Yes | The header to this frequency. Each frequency begins with a NUMFREQ definition with an ascending number starting at 1. |
| STARTBATCH | USLoad.BAT | Yes | The name of the program or batch file to be automatically started. |
| TIME | NONE | Yes | The time when the frequency will be scheduled. The format must be HH:MM:SS. |
| WEEKDAY | NONE | Yes (weekly) | The day of the week to run the weekly frequency. 0 = Monday, 1 = Tuesday, ..., 6 = Sunday. |

**Table 2**
**Frequency Parameters (Repeating)**

# 24 ADVANCED FDR/UPSTREAM

## 24.1. Overview

This chapter discusses some of the miscellaneous advanced features of the FDR/UPSTREAM program US.EXE that have not been covered in previous chapters.

- FDR/UPSTREAM returns program return codes which can be used to determine the success or failure of FDR/UPSTREAM functions.
- Remote FDR/UPSTREAM systems can run programs, and batch jobs on your workstation and you can request that programs and batch jobs be run on an ULTra workstation as well as the host.
- FDR/UPSTREAM functions can be specified remotely either from mainframe batch jobs or from a PC. This section describes how to initiate these functions from a PC.
- FDR/UPSTREAM has its own internal ASCII-to-EBCDIC translation table which it uses for communications parameters and file name specifications. Non-U.S. users can modify this table to support other single-byte character sets.
- Sequential disk backups require that the size of the MVS dataset be known in advance. Normally FDR/UPSTREAM will calculate the value close enough to work. There are additional tuning parameters which allow you to ensure that the dataset is allocated to the correct size.
- FDR/UPSTREAM uses fixed (mono-spaced) fonts for various displays. You can specify a specific font to be used if you wish.
- If you have a number of FDR/UPSTREAM parameter files, and you wish to change one or more parameters at a time in a number of files, a program, USMODIFY is provided to allow you to do this easily.
- FDR/UPSTREAM allows you to set its parameters in other ways than through the dialog panels. Use of these parameters allows you to tailor your environment to best suit your needs. This section describes how to do this and lists these parameters. It then goes on to describe how to make it easy for untrained users to take advantage of FDR/UPSTREAM.

# 24.2. Program Return Codes

FDR/UPSTREAM returns program return codes to indicate success or failure of particular FDR/UPSTREAM functions. Program return codes can be read from batch files using the ERRORLEVEL command or as return codes from calling programs.

FDR/UPSTREAM program return codes are coded as a bit map. The values are added together to produce the total returned value.

Note that when using ERRORLEVEL to check the program return code in a batch file that ERRORLEVEL returns success if the return code is the requested value or higher. Thus, a check for ERRORLEVEL 1, will return true if the program return code is greater than 0.

Table 1 shows the return code values.

| Meaning | Value |
|---|---|
| No errors | 0 |
| Backup failed | 1 |
| Restore failed | 2 |
| As of...Restore failed | 4 |
| Remote requested received failed | 8 |
| Remote requested failed | 16 |
| Running the requested job failed | 32 |
| Running the requested host report failed | 64 |

**Table 1**
**Program Return Codes**

For example, if a remote request and a backup both failed, you would get a return code of 9 (1 + 8).

A file is created in the WORKPATH or default directory, US.RET which holds a more comprehensive return code which adds in the values above, plus values indicating which functions were performed. Table 2 shows the added values.

| Meaning | Value |
|---|---|
| No functions performed | 0 |

| Meaning | Value |
|---|---|
| Backup completed | 256 |
| Restore completed | 512 |
| As of…Restore completed | 1024 |
| Remote request received | 2048 |
| Remote request performed | 4096 |
| Requested job started successfully | 8192 |
| Requested host report run successfully | 16384 |

**Table 2**
**Program Return Codes**

### 24.2.1. RETCODE.EXE

The program, RETCODE.EXE allows you to read the US.RET file and recover the original program return code to a fresh program return code (if it was lost due to running another program).

It also reads interprets the value of US.RET and displays the meanings on the screen. It can be quicker to use this program to determine if FDR/UPSTREAM ran successfully than checking the FDR/UPSTREAM log.

# 24.3. Job Execution

FDR/UPSTREAM includes a feature which allows remote computers (MVS and other workstation/servers) to run a batch file or program on your workstation/server or for you to submit existing host jobs. The workstation/server aspect of this facility is particularly useful, and is used, in the FDR/UPSTREAM Auto-Update facility (see the *Management* chapter for a detailed description of that facility).

You can also run batch jobs or programs on an ULTra attached workstation. These can be specified from the host, from the run job dialog, or automated from the FDR/UPSTREAM machine.

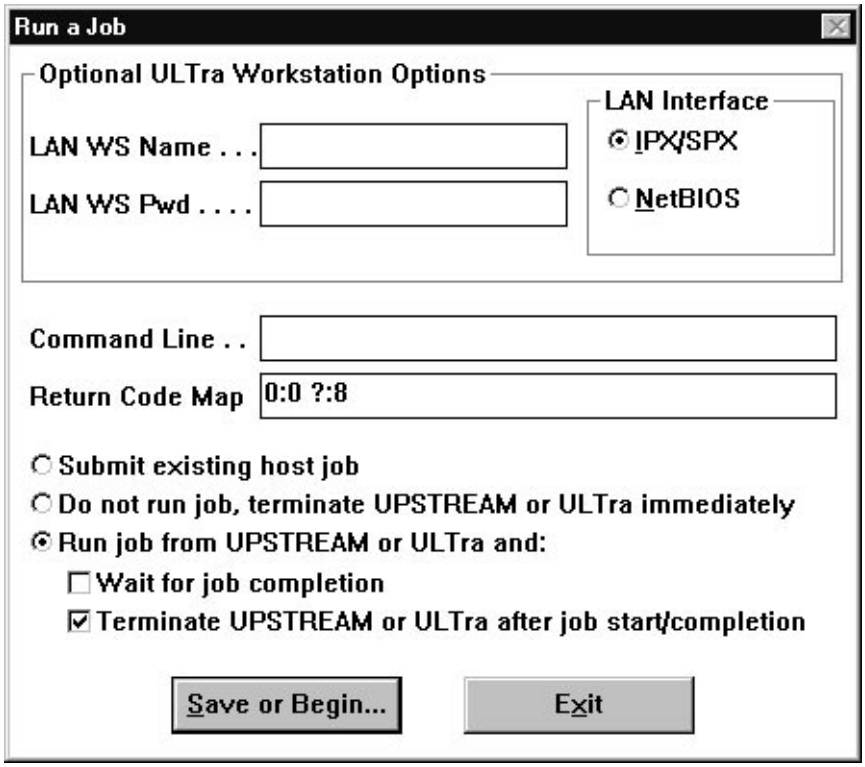
Finally, the job execution facility can be used to remotely terminate the FDR/UPSTREAM or ULTra software.

### 24.3.1. Locally Specifying

FDR/UPSTREAM includes a dialog which allows you to specify the parameters necessary to run a job. Use this dialog:

- To submit a job stored on the host.
- To build a parameter file for workstation or host job automated execution.
- Run a job on an ULTra attached workstation.

To access this dialog, pull down the Action menu and select Run a Job. The accelerator for this is [ALT]J. See figure below.




The first frame consists of parameters which are specific to ULTra. For local job execution you can leave these blank.

- **LAN WS Name:** Specify the LAN Workstation Name of the workstation where you wish the job to be executed. If preceded by an '@', this is an ULTra profile name (see the ULTra chapter for a description of how to setup ULTra profiles). If blank, this job will be run on this machine. The default is blank.

- **LAN WS Pwd:** Specify the LAN Workstation Password, associated with the LAN Workstation Name. This is only required if the user specified a password when loading FDR/UPSTREAM ULTra on their workstation. The default is blank.

- **LAN Interface:** Check either IPX/SPX or NetBIOS depending upon the connection type you wish to use to contact the workstation. The default is IPX/SPX.

The non-ULTra parameters are:

- **Command line:** Enter the command line of the program or batch file you wish to run. We recommend using the fully qualified path to the program or batch file to run, followed by any command line parameters that you wish to use. This is usually required and the default is blank. This is the only required parameter for submitting host jobs.

- **Return Code Map:** This is used only for CONV=WAIT or CONV=KEEP host jobs running on a workstation/server, this parameter allows you to map the job return code to a return code consistent with the way that host return codes work. The syntax is described below. The default is 0:0 ?:8 which will map a workstation 0 return code to a host 0 return code and all other workstation return codes to a host return code of 8. This field is not used for host jobs.

**Figure 24-1**
**Run a Job**

The following two radio buttons determine whether a job is run at all:

- ☐ **Do not run job, terminate UPSTREAM or ULTra immediately:** If you press this radio button, not job is run. This is merely an indication that UPSTREAM or ULTra should be terminated. This is not the default radio button and is rarely used.

- ☐ **Run job from UPSTREAM or ULTra and:** Pressing this radio button causes the job on the command line to be run and it is the default. If you press this radio button, the two check boxes beneath it are active.

The run job checkboxes are:

- ☐ **Wait for job completion:** If checked this causes FDR/UPSTREAM to wait in a suspended state until the job has completed. Otherwise, FDR/UPSTREAM will start the job and continue. The default is not checked.

- ☐ **Terminate UPSTREAM or ULTra after job start/completion:** If checked this causes FDR/UPSTREAM to terminate after the job has been started (if Wait for job completion has not been checked above) or terminate after the job has completed (if Wait for job completion has been checked above). If not checked, FDR/UPSTREAM will not terminate as a result of running the job (it may terminate for other reasons including a remote time limit expiration). The default is checked.

The push buttons are:

- ☐ **Save or Begin....:** Press this button to save your selections to a parameter file for later execution and/or execute them now.

- ☐ **Exit:** Press to leave this dialog without saving any of you selections.

### 24.3.2. Job Return Codes

FDR/UPSTREAM MVS CONV=WAIT batch jobs return a return code indicating whether the requested function has successfully completed. For backups or restores, this return code indicates whether the backup or restore worked successfully (return code 0), had some warnings (return code 4) and so on. These return codes are used for host reporting and are often used with a scheduling system to determine whether to perform additional functions or notify an administrator.

This process becomes more complex when you are running a workstation job. Is the job successful if it merely runs? What constitutes working?

This problem is exacerbated by the differences in PC and UNIX system return codes and mainframe return codes. On the mainframe, there is a convention of how return codes work (0 = success, 4 = minor problems, 8 = failure, ...). If a workstation program returns a return code at all, it often is simply 0 for successes and non-zero for failure.

To help map workstation return codes to host return codes, a mapping facility is provided (Return Code Map on the workstation dialog or the parameter JOBRETURNCODEMAP). It's syntax is:

```
<workstation return code>:<host return code> ...
```

Where:

- ☐ **<workstation return code>** is the ERRORLEVEL or program return code from the application or batch file. You can specify:

  - A single numeric value: 0, 1, etc.

- A range of values: 1-4, 8-12, etc.
- A question mark (?): This indicates any value which is not directly specified as a single numeric value a value in a range.

☐ **<host return code>** is the value which the host job will return.

The combination of <workstation return code>:<host return code> can be repeated multiple times, separated by spaces or tabs.

For example, the default of 0:0 ?:8 will cause the host batch job to return:

- 0 if the workstation program returns a program return code of 0.
- 8 if the workstation program returns a program return code which is non-zero.
- 12 or 16 depending upon the type of failure if the workstation does not run the job at all (due to some type of communications or other failure).

# 24.4. Requesting a Remote UPSTREAM Function

FDR/UPSTREAM allows you to specify backups or restores from MVS batch jobs or from other workstations/servers. Remote PC specified functions can be done through FDR/UPSTREAM MVS or directly PC-to-PC (through TCP/IP, APPN or low-entry networking).

Remote PC specified functions can be saved and executed from parameter files. You can even use this facility to control all of your PCs from a central PC.

Remote FDR/UPSTREAM functions are accomplished by sending FDR/UPSTREAM parameters to the remote PC (specified in a dialog or using one of the other ways of entering FDR/UPSTREAM parameters), or using parameters (in a parameter file) on the remote PC.

To specify remotely initiated functions, pull down the Remote menu from the main FDR/UPSTREAM screen and select Request Remote Function. You can also use the accelerator, [ALT]Q. You will see the Request a Remote Function dialog (see figure 24-2).

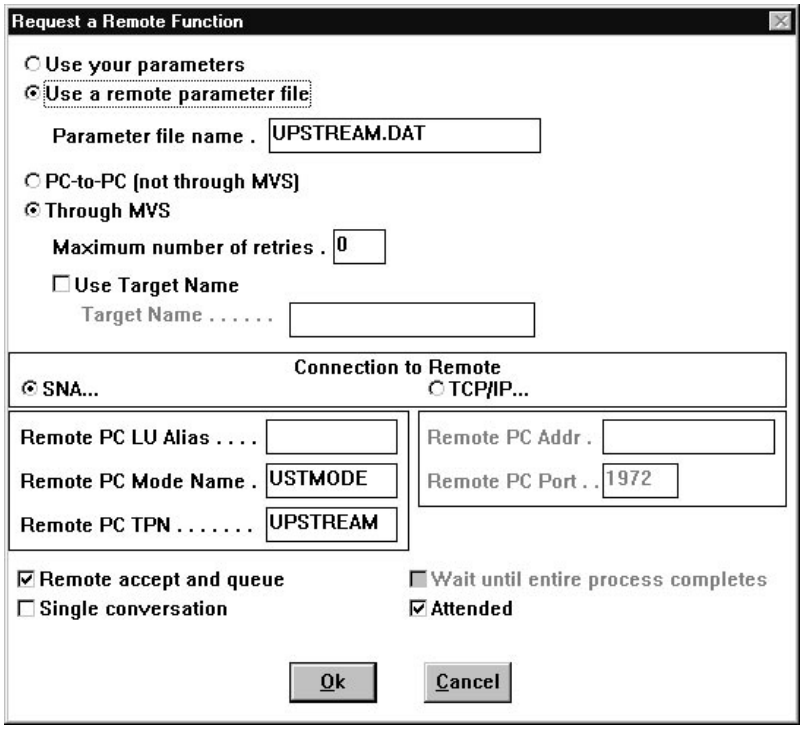



**Figure 24-2**
**Request a Remote Function**

The parameters are:

- **Use your parameters:** If you select this radio button, then the remote function will use the parameters that you specified in a backup, restore or as of...restore dialog, as if you were at that PC. Do not check this button if you wish to use a parameter file stored on the remote PC. If you wish to use a parameter file on your PC, use the Open command from the File Menu and enter a password in the appropriate dialog before executing this function. The default is not checked.

- ☐ **Use a remote parameter file:** If you select this radio button you are requesting the execution of a parameter file that currently exists on the remote system. This parameter file must be complete. If you select this option, you must also enter a parameter file name. The default is checked.

- ☐ **Parameter file name:** This field is grayed and unavailable unless you checked Use a remote parameter file (above). Enter the fully qualified file name of a FDR/UPSTREAM parameter file. The default is UPSTREAM.DAT.

- ☐ **PC-to-PC (not through MVS):** It is not recommended that this radio button be checked in most DOS APPC environments (IBM APPC/PC, NSA AdaptAPPC, NetWare APPCs, Eicon AccessAPPC, or CSI Maxess). This option allows you to request a remote PC function without going through FDR/UPSTREAM MVS (using point-to-point independent LUs, low-entry networking, or APPN). The default is not checked.

- ☐ **Through MVS:** Check this radio button for most remote initiates. Your PC connects to FDR/UPSTREAM MVS, which in tern connects to the remote PC. All requests are directly forwarded by FDR/UPSTREAM MVS. The PC connection is held open until the remote PC receives and accepts the request. If you check this option, you can also specify a Maximum number of retries. The default is checked.

- ☐ **Maximum number of retries:** This option is only available when Through MVS (above) is checked. You can set the number of times that FDR/UPSTREAM MVS will retry the connection to the remote PC before abandoning the attach. The retry interval is set on the mainframe. The PC is held (locked) until the number of retries have been exceeded. Specify a number from 0 to 255. The default is 0.

- ☐ **Use Target Name:** Check this box if you wish to specify how to find the workstation/server by registered (target) name rather than by LU name or IP address. The default is not checked.

- ☐ **Target Name:** If you check Use Target Name above, you must enter a registered name.

The check boxes beneath the connection type are:

- ☐ **Remote accept and queue:** If this button is checked and the remote PC is beginning a process it can't easily interrupt (a backup or restore), then the remote PC will queue it until the PC becomes free and will process the request then. If this button is not checked, the remote will reject the request if it can't service it immediately. The default is checked.

- ☐ **Single conversation:** If this button is checked then the conversation between FDR/UPSTREAM MVS and the target PC that requested the function will be used for the conversation for the backup and restore. Otherwise the request will be a separate conversation from the backup or restore. Checking the box is preferred as the host software can keep better track of the complete request for host reporting. This option requires FDR/UPSTREAM PC v2.4.0a or later and FDR/UPSTREAM MVS v2.4.0 or later and cannot be used directly PC-to-PC. The default is not checked.

- ☐ **Wait until process finishes:** If this button is checked then the PC will wait until the entire process that was requested has completed if single conversation (above) is checked; otherwise it has no affect. This option can hang the PC for a long time is the process requested is time consuming and is thus not normally recommended. This option requires FDR/UPSTREAM PC v2.4.0a or later and FDR/UPSTREAM MVS v2.4.0 or later and cannot be used directly PC-to-PC. The default is not checked.

- ☐ **Attended:** If this button is checked this process (the remote request), even if saved to a parameter file, will be attended. If this button is not checked and you save these parameters to a parameter file, this process can be unattended. The default is checked. **NOTE:** The remote action will be attended or unattended based on the parameters that are used, NOT this value. This value only affects the process of requesting the remote function.

Select one of the two radio buttons:

- **SNA...:** If you press this radio button, the remote computer is connected via SNA/APPC and you must also enter the Remote LU Name and Remote Mode Name parameters.

- **Remote PC LU Name:** Enter the LU Name of the PC you are attaching to. For direct PC-to-PC requests through DCA/Microsoft Select this is the alias of the remote PC. This field is required. The default is blank.

- **Remote PC Mode Name:** Enter the Mode Name for the connection to the remote PC. For requests through FDR/UPSTREAM MVS, this mode name is only used for the connection from FDR/UPSTREAM MVS to the remote PC, and can be different than the mode name for the connection between your PC and FDR/UPSTREAM MVS. This field is required. The default is USTMODE.

- **Remote PC TPN:** Enter the transaction program name posted on the remote PC. The default is UPSTREAM. This field is particularly important in APPCs where multiple copies of UPSTREAM are running and you wish to direct your request to a particular copy.

or

- **TCP/IP..:** If you press this radio button, the remote computer is connected via TCP/IP and you must also enter the TCP/IP Address and Port parameters.

- **TCP/IP Address:** Enter the IP address of the remote PC. Use the dotted decimal notation. This field is required.

- **TCP/IP Port:** Enter the IP port that FDR/UPSTREAM uses on the remote PC, in decimal. This field is required.

- **Ok:** Press this button (or the [ENTER] key) to save the values entered above to a parameter file and/or begin the remote request..

- **Cancel:** Press this button (or the [ESC] key) to exit this dialog without saving or executing the request.

If you press the <Save and Begin> or <Begin> buttons after pressing <Ok>, you will be asked for the name of the parameter file to save this request to, and then you will see the status of the request. Do not be alarmed if the state continues to remain at “Confirm request” for some time, particularly if you specified a retry count. This is normal.

When the remote request has been submitted (but not serviced), you are returned to the FDR/UPSTREAM main window. In unattended mode, FDR/UPSTREAM will terminate.

# 24.5. User Defined Translation Tables

FDR/UPSTREAM has its own internal ASCII-to-EBCDIC and EBCDIC-to-ASCII translation table which it uses for communications parameters and file name specifications. For users of FDR/UPSTREAM in the United States, this will work correctly for all situations. However, if you have a non-U.S. codepage loaded on your PC, characters which use values not defined in the ASCII-7 character set (which includes characters with accents and umlauts)may find that file names will be truncated at the first non-ASCII 7 character.

To remedy this situation, FDR/UPSTREAM supports user loadable ASCII-to-EBCDIC and EBCDIC-to-ASCII translation tables.

To build your own translation table, follow these guidelines:

- Each file should have 256 lines, one line per character to translate.
- Each line represents a position. Line 32 (decimal) of the ASCII-to-EBCDIC file will represent the number what you wish the space character translated to.
- Specify the value to translate to in decimal or hexadecimal. If you are using hex, then precede each value with a 0x. For example to specify 2a hex, enter 0x2a (the hex letter digits can be upper or lower case).
- You may enter comments on each line if you separate the value and the comment with at least one space.
- Remember that conversions should be symmetric. If you define a value in the ASCII-to-EBCDIC table, don't forget to define the converse value in the EBCDIC-to-ASCII table.
- The default ASCII-to-EBCDIC translation file is named USATOE.TAB.
- The default EBCDIC-to-ASCII translation file is named USETOA.TAB.

The parameter file entries **ASCTOEBC** (ASCII-to-EBCDIC, default USATOE.TAB) and **EBCTOASC** (EBCDIC-to-ASCII, default USETOA.TAB) specify user loadable translation tables. Whenever a parameter file is opened or one of these values is received from a remote system (and a new table is specified), the tables are loaded immediately. Thus you can use different tables for backups than for file transfers.

When FDR/UPSTREAM loads a translation table it logs message #1225I with the table name in the message log.

Sample USATOE.TAB and USETOA.TAB files can be found in the \SAMPLES directory of the configuration disk for DOS users or the supplemental diskette for OS/2 or Windows users. These samples translate many of the non-U.S. characters correctly.

Note that characters in file names that are translated to non-printable EBCDIC characters will display incorrectly in the FDR/UPSTREAM MVS log if there is an error. There are no adverse affects in PC inquiries or restores.

# 24.6. Sequential Disk Size Allocation

If you are using the Sequential Disk backup type, you may occasionally have problems in that FDR/UPSTREAM will allocate the size of the MVS dataset either too large, which can have negative impacts on your system as a whole (though any excess space is freed when the backup is complete), or too small which will keep the backup from working correctly.

Note that if you are using Sequential Tape, Archive or Keyed backups you do not have to be concerned about this issue and can ignore this section.

FDR/UPSTREAM goes to great lengths in calculating the size of the MVS file where the data backed up is stored. Most users will have no problems and can ignore this section. However if you are having problems, this section can help you.

FDR/UPSTREAM PC transmits the number of bytes which it found in file data while building the backup file to FDR/UPSTREAM MVS which then converts this to the correct allocation in blocks. This value can be wrong for several reasons:

- FDR/UPSTREAM PC does not by default include the number of bytes of non-file data (NetWare Directory Services, other Novell information, Banyan StreetTalk information or extended attributes), as this can potentially add significantly to the amount of time that it takes to build the backup file. In extreme cases this can be all or almost all of the data in the backup. In these cases the MVS file allocation may go into extents or may even fail.
- FDR/UPSTREAM PC does not include the savings of compression. If you are using high compression or your data compresses well this can cause FDR/UPSTREAM to over-allocate the size of the file.
- FDR/UPSTREAM MVS takes the value received from the PC, adds a certain amount for overhead and converts it into blocks. In most cases this is going to be very close to the amount of space required. Even so, it is not exact and there may be a small variation causing a slight over or underestimation of the size.

If you are finding that the file created by FDR/UPSTREAM to hold the sequential backup is either over or under allocated, you can control this from FDR/UPSTREAM PC. We do not recommend solving this problem by modifying the DASD block size on FDR/UPSTREAM MVS.

There are two parameter file parameters designed to help you solve this problem. These parameters are not shown on the screens but can be modified in the parameter file, from the command line or from the environment (they are also documented later in this chapter):

- ☐ CALCDASDSIZE: The default is ‘N’. If ‘Y’, then FDR/UPSTREAM PC will calculate, during the backup file build, the total number of bytes of non-file data and add this to the size of the file data in its calculation that it sends to FDR/UPSTREAM MVS. Specify ‘Y’ if you are performing a backup with a large percentage of non-file data compared to file data and are willing to accept a longer amount of time to build the backup file.

- ☐ DASDOVERRIDE: The default is 100%. Allows you to specifically tailor the calculation of the size of the backup. The calculated total referenced below either indicates the size of the file data only (if CALCDASDSIZE=N) or the size of the file data plus the non-file data. There are 4 forms of this parameter:
  - +<number>: Add the given number of bytes to the total calculated.
  - -<number>: Subtract the given number of bytes from the total calculated.

- <number>%: Use the given percentage against the total calculated.
- <number>: Use this number to override any calculated value.

For example, if you are performing a backup of a Novell file server with only Directory Trustee Rights checked, and high compression, you may find that FDR/UPSTREAM consistently overallocates the file twice as large as it needs to be. Therefore, you would want to specify a DASDOVERRIDE of 50% (or 55% to allow some variation in the format of the data) to have it allocated correctly.

Another example would be if you are backing up StreetTalk only (with no file services included). FDR/UPSTREAM would normally calculate the size of the file data as 0 causing the backup to fail. You can correct this problem by specifying CALCDASDSIZE as Y.

# 24.7. Fixed Fonts

A fixed pitch font is vital for the tree-like display in the new restore facility as well as columnar displays in Profile Management, Registered Named and more.

UPSTREAM will choose a reasonable fixed font in Windows and OS/2 that will work well in most circumstances. However, there is a new environment variable which allows you the ability to select the font pitch and name: USMONOFONT.

Note that UPSTREAM can only used installed fonts and they must be non-proportional (mono-space).

| Name | Default | Description |
|---|---|---|
| USMONOFONT | OEM_FIXED_FONT (Windows)<br>8.Courier (OS/2) | The fixed pitch font that will be used when UPSTREAM needs a fixed font. The format is: <size>.<name>. You can specify a size without specifying a name. |

Depending upon your display adapter driver, you may find that the none of the OS/2 fonts will display an adequate number of lines in the new restore panel. So we have included a font USFONT.FON in the UPSTREAM OS/2 distribution. To install a font in OS/2, use the Font Palette in the OS/2 System Setup icon view. Select Edit font... and press the Add button. Specify the drive/directory where USFONT exists and the file will be copied. Use the environment variable override (above) to use the new font.

# 24.8. USMODIFY

A new program USMODIFY is included with FDR/UPSTREAM to allow command line or batch file tailoring of any overall parameter within a parameter or configuration file or group of files. It is particularly useful for regular changes to passwords for all of your parameter files.

USMODIFY is a bound program: the same executable will work in both DOS and OS/2. The command line syntax is:

```
USMODIFY [/?] DATSPEC=<FileList> [@<Override File>]
              [parm[=[value]]...]CFGSPEC=<FileList>
```

Where:

- **/?** (or /h, -?, -h or no parameters at all) displays help text.
- **DATSPEC= <FileList>:** Designates a list of one or more FDR/UPSTREAM parameter file specifications (*.DAT) which may contain wildcards. The prefix of DATSPEC is the default if you do not specify a prefix. In the FileList, you can specify multiple files, each separated by a semicolon (';').
- **CFGSPEC= <FileList>:** Designates a list of one or more FDR/UPSTREAM configuration file specifications (*.CFG) which may contain wildcards. In the FileList, you can specify multiple files, each separated by a semicolon (';').
- **@<Override File>:** If you have a number of parameters that you wish to change (too many for the command line), then you can enter them in an override file, and specify it alone on the command line with the '@' prefix.
- **parm[=value]:** One or more override parameters. If you specify just the parameter title with no equal sign and no value, you will be prompted for the value. If you specify a parameter title with an equal sign but no value, a blank value will be used. Override parameters specified on the command line take precedence over parameters specified in an override file.

### 24.8.1. Example 1 - Changing Passwords

For example, if you wished to change the password in all of your parameter files and wish to be prompted for the new password, enter:

```
USMODIFY DATSPEC=*.DAT PASSWORD
```

You will then be prompted for the new password (which will not be displayed) and all of the parameter files will be updated. The list of files updated can be found in the UPSTREAM.LOG file.

### 24.8.2. Example 2 - Changing several parameters

If you wish to change your User ID, password, and backup profile name in two parameter files (DAY.DAT and WEEK.DAT), you could create an override file (OVERRIDE.MOD) as follows:

```
USERID NEWUSER
BACKUPPROFILE SERVER1
```

Then, from the command line, specify the following:

```
USMODIFY DATSPEC=DAY.DAT;WEEK.DAT @OVERRIDE.MOD PASSWORD
```

You will be prompted for the password and then the two parameter files will be updated with the results placed in UPSTREAM.LOG.

### 24.8.3. Notes

Some notes on this facility:

- The name of the log file is determined from the configuration file (UPSTREAM.CFG) and cannot be overridden. You should also have the UPSTREAM.MSG file available as it is used for logging.
- File specification level parameters (file name, archive bit, etc.) and frequency definition configuration parameters are likely to cause problems with this facility as there is no way to separate each specification or frequency. Thus, we do not recommend that you use USMODIFY to modify these parameters.

# 24.9. FDR/UPSTREAM Tuning

There are several ways to fine-tune FDR/UPSTREAM. These issues include:

- Setting the priority of the FDR/UPSTREAM program.
- FDR/UPSTREAM opens up to 3 files in advance in a backup, and reads up to 64K of data at a time. You can specify the number of files in advance and the size of this data buffer.
- FDR/UPSTREAM creates a temporary file during the backup. The maximum file size (including drive and path) impacts the size of the backup file. You can set this value.
- When idle, FDR/UPSTREAM uses a certain amount of CPU time. You can tune this amount of time.
- FDR/UPSTREAM supports a facility known a record packing where a number of logical records are combined into a very large single transmission record. You can vary the transmission record size.

Many of these fine-tuning options are controlled through environment variables. Environment variables can be set in the OS/2 session that you are running in or in the CONFIG.SYS, in which case it will be propagated to all OS/2 sessions. Environment variables are set using the SET <variable>=value.

More information about the environment variables defined in FDR/UPSTREAM can be found on page -.

### 24.9.1. Program Priority (OS/2 only)

In OS/2, each process (complete program) is given a priority by the operating system. This priority is used to determine how much of the CPU's processor time is dedicated for each task.

Extensive testing has shown that increasing the program priority level can have a significant performance improvement impact if the PC is not bottlenecked in disk or communications I/O. OS/2 automatically increases the priority of the foreground process (the program with the focus), so you can get some priority improvement by just making FDR/UPSTREAM the active window.

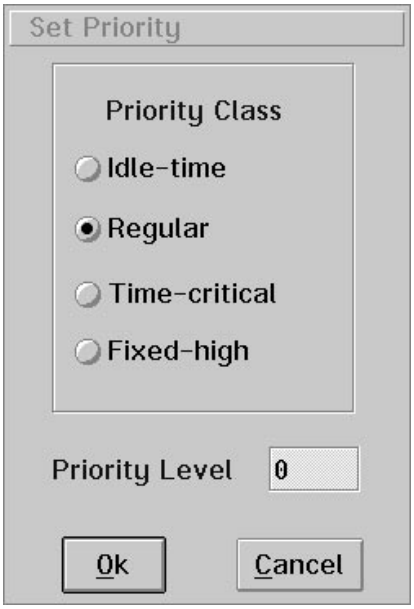
On the other hand, an increased priority for FDR/UPSTREAM means that other tasks have less CPU time to execute producing unacceptable performance in other tasks. The ability to change your priority addresses both issues.

This priority is represented by two separate values: a priority class and a modifier priority level. The priority classes are Idle-time, Regular (which is the default), Time-critical and Fixed-high. The priority level is a modifier from 0-31 which indicates how your process will be dispatched within the given level; the default is 0.

FDR/UPSTREAM allows two separate ways to modify the program priority:

- For this execution of FDR/UPSTREAM. To do this, pull down the Action menu and select Priority. Adjusting your priority does not affect future executions of FDR/UPSTREAM.
- For a given request. You can save the priority settings to a parameter file which will then be used whenever you open a parameter file or specify a file from the host.

Either method displays the priority dialog (see figure 24-3).




**Warning: Indiscriminate priority modifications can cause PCs to hang. Perform testing during off-hours or on PCs which can be rebooted.**

### 24.9.2. Backup fine tuning

When performing a backup, FDR/UPSTREAM will pre-open a certain number of files before it begins to back them up. In many environments this improves performance. FDR/UPSTREAM will also read data is very large blocks, up to 64K bytes at a time. You can set these values through environment variables:

- **NUMBACKUPTHREADS:** ***(OS/2 only)*** The file pre-opens are performed in a backup thread. Through this environment variable you set the number of files that the separate thread will pre-open The default is 3. Valid range is from 1-50. If you set this value to 1, there will be no file pre-opens.

- **BACKUPBUFFERSIZE:** ***(non DOS only)*** FDR/UPSTREAM takes 64000 and even divides it by the record size to determine the data read size. Thus if you specify a record size of 6000, FDR/UPSTREAM will always read data in 60000 byte pieces (it will still send them to the host in 6000 byte records). The default is 10000. Valid range is the record size up to 64000.

### 24.9.3. Backup file tuning

The FDR/UPSTREAM backup file (UPSTREAM.BKP) can grow extremely large when backing up a server with a large number of files. The size of this file is the product of the maximum possible file size (including drive and path) multiplied by the number of files, with some additional overhead.

If this file is becoming too large for your PC, or the default size is too small for the possible files size on your PC or server, you may need to change this value.

- **MAXFILENAMESIZE:** The maximum number of bytes that a file can be (including drive and path) to be included in the backup. The default is 128 bytes (80 bytes for DOS). The valid range is 20-230 bytes.

### 24.9.4. Record Packing

FDR/UPSTREAM Workstation/Server and MVS v2.5.2 supports a facility known a record packing where multiple logical records are combined into a single, very large record. Testing has shown that there are significant performance improvements and a reduction in CPU utilization in TCP/IP and to a lesser extent SNA.

Record packing is enabled by default for both backups and restores when using a high enough version of FDR/UPSTREAM on both the host and workstation/server sides (except for DOS where it must be explicitly enabled).

This size can be varied using the parameter PACKRECSIZE. The default record packing size is 32700. We do not recommend using a larger block size due to various system unknowns about memory and record management.

You can somewhat limit record packing by setting the PACKFLUSHAFTERFILE parameter to Y which causes UPSTREAM to send a packed record after each file. This may help somewhat in a high host CPU load environment.

# 24.10. FDR/UPSTREAM Parameters

As for the configurator, US.EXE allows you to set parameters in several prioritized ways. Each priority level higher will override the value of a lower value. If two parameters are set the same way, then the newer will overwrite the older. The ways from lowest to highest are:

- Default: Used if a default is known and it is acceptable.
- Parameter File: This is a value obtained from the default parameter file (UPSTREAM.DAT) or a parameter file specified from a higher priority. For example, in UPSTREAM.DAT you will see a line like:

```
DISPLAY Y
```

- Environment: These are values set using the DOS SET=<name> command. You can set these values from the command line or from a batch file. For example, you could add a line to your AUTOEXEC.BAT that would say:

```
SET PARAMETER=C:\UPSTREAM\US1.DAT
```

- Command Line: When you run US.EXE, you add the parameter on the same line, parameters separated by spaces. For example, you could start FDR/UPSTREAM:

```
US PARAMETER=C:\UPSTREAM\US1.CFG
```

- User (dialog): When you enter parameters from a dialog, these values are ALWAYS used.

You set a parameter using a keyword (upper and lower case can be mixed), followed by a separator (a blank or an equal sign) followed by the value. Parameters from the DOS environment and the command line must use an equal sign as the separator.

There are two types of parameters: overall and file spec. The following table describes the overall parameters. These parameters do not repeat.

The succeeding table describes the file spec parameters. These parameters repeat for each file spec defined.

If you use the dialogs in US.EXE and you save your parameters to a parameter file, you can print out the results to see how parameters can be specified.

| Name | Default | Required | Description |
|---|---|---|---|
| ACCEPTPCREMOTE | Y | No | Y = Accept and process remote requests originating from a PC (not a MVS batch job).<br>N = Reject remote requests from PCs. |
| ACCEPTREMOTE | Y | No | Y = Accept and process remote requests.<br>N = Reject (but look for) remote requests. |
| ACTION | 1 | Yes | The function to be performed:<br>0 = Restore (or workstation receive file transfer)<br>1 = Backup (or workstation send file transfer)<br>2 = As of...Restore<br>3 = Wait for remote initiate<br>4 = Restart only<br>5 = Run a job<br>6 = Kill last restartable backup<br>7 = Run host report<br>8 = Restart restores only<br>9 = Kill restartable restore<br>10 = Submit a host job<br>11 = Migration |
| ACTIVATEONENTRY<br>(DOS only) | Y | No | Y = Activate the session on startup.<br>N = Do not start APPC on US.EXE start. |
| ASCTOEBC | USATOE.TAB | No | When specified, the user loadable ASCII-to-EBCDIC translation table gets loaded. |
| ASOFDATE | NONE | No | Used for “As of...Restores” this is the date that you wish the files restored to. The format is MM-DD-YY. |
| ASOFTIME | NONE | No | Only used when ASOFDATE is specified, the time that you wish the files restored to. If this is not defined then 00:00:00 is used. The format is HH:MM:SS using a 24 hour clock. |
| ATTENDED | Y | No | Y = It is assumed that there is a user present to make prompted decisions.<br>N = Unattended mode. It is recommended that you also specify a MESSAGETIMELIMIT as well. |
| BACKUPPROFILE | NONE | Yes | The profile name used for backups, restores and as of...restores. You can specify up to 8 characters. |
| BACKUPPROFILE2 | NONE | No | Used for “As of...Restores” this is the incremental Backup Profile. |
| BLANKTRUNC<br>(File Transfer only) | Y | No | (Only used if LINEBLOCK=Y)<br>Y = Trailing blanks at the end of each record are removed.<br>N = Trailing blanks are retained. |

| Name | Default | Required | Description |
|---|---|---|---|
| CALCDASDSIZE | N | No | N = If you are performing a sequential disk backup the amount of space allocate on MVS for the backup depends on the amount of file data found.<br>Y = If you are performing a sequential disk backup the amount of space allocated on MVS depends on the amount of file and non-file data found. |
| COMPRESSLEVEL<br>(Backups only) | 1 | No | Specifies the compression level:<br>0 = No compression<br>1 = Fast compression<br>2 = High compression 1<br>3 = High compression 2<br>4 = High compression 3 |
| DASDOVERRIDE<br>(Backups only) | 100% | No | Allows you to override the amount of space (bytes) requested on a sequential disk backup. 4 forms:<br>+<number>: Add the given number of bytes to the total calculated.<br>-<number>: Subtract the given number of bytes from the total calculated.<br><number>%: Use the given percentage to calculate the total.<br><number>: Use the given number to override any calculated value. |
| DISPLAY | Y | No | Y = Backup or restore status information continually updated.<br>N = No status display during the backup or restore. |
| DUALCOPY | N | No | Not used. |
| DUPDAYS<br>(Backups only) | 30 | No | If duplicate checking is enabled, the number of days since the file was modified and has the archive bit on before it can be considered eligible for duplicate handling. |
| DUPLICATE<br>(Backups only) | N | No | Whether you wish to use duplicate file checking.<br>N = No special duplicate file handling.<br>Y = UPSTREAM on the workstation will send up placeholder records for many files with the archive bit on for both fulls and incrementals (see DUPDAYS). |
| EBCTOASC | USETOA.TAB | No | When specified, the user loadable EBCDIC-to-ASCII translation table gets loaded. |
| EXCLUDELISTNAME | None | No | Enter an exclude list file name, formatted as described in the Exclude List section. |
| FILETRANSFER | N | No | Y = This is a file transfer (the ACTION parameter controls whether it is a send or a receive).<br>N = This is a backup or restore. |
| GETREMOTEFILES<br>(Backups only) | Y | No | Whether the “Show” checkbox is checked in the backup dialog. |

| Name | Default | Required | Description |
|---|---|---|---|
| HOSTFILENAME<br>(File Transfer only) | None | No | If specified the name of the host file. If not specified, the FDR/UPSTREAM MVS will generate a name for workstation sends, or will use the latest recorded file transfer for workstation receives. |
| HOSTRECORD<br>(File Transfer workstation sends only) | Y | No | Y = Transferred files are recorded in the FDR/UPSTREAM MVS database for easy retrieval.<br>N = Transferred files are not recorded in the FDR/UPSTREAM MVS database. |
| HOSTSORT<br>(Restores only) | N | No | Y = You wish the host sort utility used for restores.<br>N = You do not wish the host sort utility used for restores. |
| INQOPTIONS<br>(Merge Inquiries and Restores) | 2 | No | (New value) A bit map of options used during an inquiry and restore:<br>0 = Inquiries and restores only show normal files and the highlighted backup.<br>1 = Inquires show migrated files as well as normal files.<br>2 = Inquires and restores use “Highlighted back to full”. This option must be on for “Highlighted back to FDRSOS” (32).<br>4 = Inquires operate from the currently highlighted backup to the first version “Highlighted back to oldest”<br>8 = (not used)<br>16 = Only display migrated files in an inquiry.<br>32 = Restore “Highlighted back to FDRSOS”. You must also have value 2 on as well “Highlighted back to full”. |
| JOBOPTIONS<br>(Request job) | 0 | No | A bit map of options used when a job is requested and started:<br>1 = Start job and do not terminate.<br>2 = Wait for job to be terminated.<br>4 = Not used<br>8 = No job, terminate the current UPSTREAM or ULTra program. |
| JOBRETURNCODEMAP<br>(Request job) | 0:0 ?:8 | No | For CONV=WAIT jobs, a mapping between the workstation return code and the host job return code. You can specify multiple mappings (including workstation return code ranges), the ‘?’ used for all unassigned workstation return codes. |
| LANINTERFACE<br>(ULTra) | 0 | No | The communications protocol used to access the ULTra workstation:<br>0 = IPX/SPX<br>1 = NetBIOS |
| LANWSNAME<br>(ULTra) | NONE | No | (FDR/UPSTREAM ULTra) If you are using the LAN Workstation facility this is the name of the workstation that you are operating on behalf of, or if it is preceded with an ‘@’ sign, it is the profile name which was set to a list of workstations to be used. |

| Name | Default | Required | Description |
|---|---|---|---|
| LANWSPASSWORD (ULTra) | NONE | No | (FDR/UPSTREAM ULTra) If you are specifying a LANWSNAME and the workstation is password protected, then this is the password to enter. If parameter file stored, it is stored encrypted. |
| LATESTVERSION (Restores only) | Y | No | Y = You wish to restore the latest version available for the backup profile.<br>N = You wish to use a specific version date. |
| LINEBLOCK (File Transfer only) | Y | No | Y = Records are separated by CR/LF (LF only for UNIX) for workstation sends; CR/LF (LF for UNIX) is added at the end of each record for workstation receives.<br>N = All records are separated by the record size (workstation sends). |
| LINETRUNC (File Transfer only) | Y | No | (Only used if LINEBLOCK=Y for workstation sends)<br>Y = Data exceeding the record size is truncated.<br>N = Data exceeding the record size is sent as a separate record. |
| LISTENFORREMOTE | Y | No | Y = Your PC will listen for remote requests.<br>N = Your PC will not listen for remote requests (should only be 'N' if you will NEVER receive a host or remote PC request). |
| LOCALBACKUP | N | No | Y = Whether during a backup files should be stored locally as well as the host; during a restore whether files should be taken from local storage whenever possible.<br>N = Host storage is used exclusively for backups and restores. |
| LOCALBACKUPDIR | None (uses WORKPATH ) | No | The directory where local backup files are stored. |
| LOCALBACKUPMAX (Backups only) | 3 | No | The maximum number of local backup files (each backup is one file) stored on a workstation. |
| LOCALBACKUPMAXFILESIZE (Backups only) | 10000000 | No | The largest file that will be stored locally if local backups are enabled. |
| LOCALBACKUPMAXSIZE (Backups only) | 100000000 | No | The largest that a local backup file will grow to. |
| LOGNONFATAL | No | No | Y = Non-fatal errors during a backup or restores are logged and displayed.<br>N = Non-fatal errors during a backup or restore are not logged or displayed. |
| MAXDUPS | 10 (1 for DOS) | No | The maximum number of duplicate files that can be simultaneously written in a duplicate file restore. 0 or 1 disables duplicate file restores. |

| Name | Default | Required | Description |
|---|---|---|---|
| MERGE<br>(Backups only) | 0 | No | The backup type<br>0 = No merge used<br>1 = Full merge<br>2 = Incremental merge<br>3 = First-time merge backup |
| MODIFYFILE | Y (UNIX)<br>N (all others) | No | Y = Incrementals are determined by the last date/time FDR/UPSTREAM was run (stored in the modification file).<br>N = Incrementals are determined by the archive bit. |
| NOVELLPROFILE | NONE | No | The profile name, set in SETNOV.EXE, referencing the server, user name and drive mappings to be mapped to your Novell file server. |
| NOVELLRECALL | Y | No | Y = This backup profile could be used to back up a Novell server which uses the FDR/UPSTREAM auto-recall facility.<br>N = This backup profile will never be used to backup a Novell server which uses the FDR/UPSTREAM auto-recall facility. |
| PACKFLUSHAFTERFILE | N | No | Y = Forces a packed record in a backup to be transmitted after each file.<br>N = Records are fully packed. |
| PACKRECSIZE | 32700<br>(0 for DOS) | No | The maximum number of bytes transmitted or received from the host. Specify 0 to disable record packing. |
| PARAMETER | upstream.dat | Yes | The name (and optionally the path) of the parameter file to read parameters from. |
| PASSWORD | NONE | No | Your password. This is usually required if the user ID is required. You can specify up to 32 characters. If FDR/UPSTREAM generates this field in a parameter file, then it is encrypted. In attended mode the password is not read from a parameter file (but can be accepted from the command line or environment). |
| PRTYCLASS<br>(OS/2 only) | 2 | No | The priority class for the requested action:<br>1 = Idle-time<br>2 = Regular<br>3 = Time-critical<br>4 = Fixed-high |
| PRTYLEVEL<br>(OS/2 only) | 0 | No | A number from 0 to 31 modifying the priority class. |
| RECALLCLEANUP | N | No | Y = FDR/UPSTREAM will examine Novell auto-recall stub files to determine if any have expired, and if any have, they will be deleted.<br>N = Auto-recall stub files will not be deleted. |
| RECORDSIZE<br>(Backups only) | 6000 | No | The data blocking size. This is a memory/performance tool. |

| Name | Default | Required | Description |
|---|---|---|---|
| REMOTEADDR<br>(Remote requests only) | None | No | If the remote PC is connected via TCP/IP, this is its IP address. |
| REMOTECONNECTTYPE<br>(Remote requests only) | 0 | No | The method use to send the request to the remote PC.<br>0 = The remote request is via FDR/UPSTREAM MVS and the LUName or TCP/IP address/port number are specified.<br>1 = The remote request is directly PC-to-PC.<br>2 = The remote request is via FDR/UPSTREAM MVS and a registered name is specified. |
| REMOTEFLAGS<br>(Remote requests only) | 0 | No | A bit map indicating how a PC-to-host-to-PC request will be handled.<br>1 = The request is queued on the remote PC.<br>2 = There is a single conversation between the host and the remote PC; the PC does not deallocate when the request is received.<br>4 = The requesting PC will wait until the process has completed on the remote PC. |
| REMOTELOCALPARAMETERS<br>(Remote requests only) | N | No | Y = Use parameters defined on your PC.<br>N = Use a remote parameter file (and you must specify a REMOTEPARAMETERFILE). |
| REMOTELUNAME<br>(Remote requests only) | NONE | Yes | The LU name (or alias if DCA/Microsoft select PC-to-PC) of the remote system. |
| REMOTEMAXRETRIES<br>(Remote requests only) | 0 | No | If REMOTEPCTOPC=N, this is the number of times FDR/UPSTREAM MVS will attempt to connect to the remote PC. |
| REMOTEMODENAME<br>(Remote requests only) | USTMODE | No | The mode name used to contact the remote system. |
| REMOTEPARAMETERFILE<br>(Remote requests only) | upstream.dat | Yes (see above) | The parameter file on the remote PC to execute (if REMOTELOCALPARAMETERS=N). |
| REMOTEPORT<br>(Remote requests only) | None | No | If the remote PC is connected via TCP/IP, this is its IP port. |
| REMOTEQUEUE<br>(Remote requests only) | Y | No | Y = The remote PC should accept and queue the request if it can't process it immediately.<br>N = The remote PC should reject the request if it can't process it immediately. |
| REMOTEREQUEST | N | No | Y = You are requesting a function be performed on another PC.<br>N = You are requesting a local function.<br>Unless you are requesting another PC to perform a remote function specify 'N'. |
| REMOTETARGETNAME<br>(Remote requests only) | None | No | Fill in a value if you wish to find the remote computer by registered name rather than LU name or IP address. |
| REMOTETCP<br>(Remote requests only) | N | No | Y = The remote PC is connected via TCP/IP.<br>N = The remote PC is connected via SNA. |

| Name | Default | Required | Description |
|---|---|---|---|
| REMOTETIMEOUT<br>(Unattended wait for remote) | 0 | No | The number of minutes that the PC will wait in unattended mode for a remote initiated function. 0 indicates wait until a user aborts the wait. |
| REMOTETPN<br>(Remote requests only) | UPSTREAM | No | The transaction program name to be used in initiating contact with the remote system. |
| REPORTNAME | US.RPT | Yes (if reporting) | The name of the file to write reporting information to. |
| REPORTOPTIONS | 0 | No | A bit map describing any of the report features you wish to enable:<br>1 = Files backed up/restored<br>2 = Files skipped during the backup<br>4 = Files automatically deleted<br>8 = Inquire versions<br>16 = Inquire files |
| RESTARTTYPE<br>(Backups only) | 0 | No | Specifies the action to be performed, at a restart point (usually the next time FDR/UPSTREAM is run), if there is a restartable error:<br>0 = Never restart.<br>1 = Restart failed files and incomplete backups<br>2 = Restart only incomplete backups. |
| RESTORECHECKPOINT | 120 | No | The number of seconds between automatic checkpoints when performing a restartable restore. |
| SKIP<br>(Restores only) | 0 | No | For restores using “List and Restore”, a set of options of how to process existing files:<br>0 = Restore all files regardless of whether there are existing files.<br>1 = Restore only files where there is no existing file of the same name.<br>2 = Restore only files where the existing file’s modification date/time and size are not the same. |
| SKIPEXISTING<br>(Restores only) | N | No | Obsolete parameter, use SKIP |
| STORAGETYPE<br>(Backups only) | 3 | No | How the data is stored on the mainframe.<br>0 = Archive backup. Will be merged to tape when the next archive is performed on the mainframe.<br>1 = Keyed backup. Stored on mainframe disk until rolled off.<br>2 = Sequential disk. Stored on mainframe flat files.<br>3 = Sequential tape. Stored directly to mainframe tape. |
| TRACE | N | No | Use only when instructed by FDR/UPSTREAM technical support. |
| TRANSLATE<br>(File Transfers only) | Y | No | Y = ASCII/EBCDIC translation is performed on all data (assumes text).<br>N = No translation of the data (assumes binary). |

| Name | Default | Required | Description |
|---|---|---|---|
| ULTRACOMP<br>(ULTra) | 4 | No | The maximum level of compression supported by ULTra:<br>0 = No compression<br>1 = Fast compression<br>2 = High compression 1<br>3 = High compression 2<br>4 = High compression 3 |
| ULTREG<br>(ULTra Backups only) | N | No | Whether the LAN Workstation Name will be registered to the host. |
| ULTUPD<br>(ULTra Backups only) | N | No | Whether the ULTra workstation can participate in automatic updates. |
| USERID | NONE | No | Your security identifier. This may be required by some MVS systems (see your system administrator). You can specify up to 32 characters. |
| VERSIONDATE<br>(Restores only) | NONE | No | For a restore, if you specified LATESTVERSION=N, then you are required to specify a complete version date. This is usually used with an inquire versions command. The version date is exactly 12 numeric characters. |
| XFERRECORDSIZE<br>(File Transfers only) | 8192 | No | The record blocking size for file transfers. Users will often use 80 for text files as well. |

**Table 1**
**FDR/UPSTREAM Overall Parameters**

| Name | Default | Required | Description |
|---|---|---|---|
| ARCHIVEBIT<br>(Backups only) | Y | No | Y = The archive bit is reset for all files successfully backed up.<br>N = The archive bit is not reset. |
| BANYANDISK<br>(Banyan Restores only) | NONE | No | The disk name to be used when a file service is being created. If you specify nothing, then the service will be created on the disk which it originally came from. This field is case sensitive and should be the UNIX disk spec. For example “/disk1". |
| BANYANSERVER<br>(Banyan Restores only) | NONE | No | The server name to be used when a file service is being created. If you specify nothing, then the service will be created on the server which it originally came from. |
| DATELIMIT<br>(Backups only) | N | No | Y = Only those files carrying a date the same or later than the specified LATESTDATE will be backed up.<br>N = All files specified will be backed up.. |
| DAYSOLD<br>(Backups only) | 180 | No | The number of days that a file has not been accessed before inclusion in the backup or migration. |
| DELETED | N | No | Not used at this time. |
| DELETEPROMPTS<br>(Backups only) | 2 | No | 0 = No prompts; delete the files without waiting (unattended).<br>1 = Prompt for each file before deleting<br>2 = Prompt for the files in each directory before deleting. |
| DESTINATION<br>(Restores only) | NONE | No | This parameter allows you to specify that files be restored to a different file or path name from which they were originally backed up. The wildcard specifications must match the wildcard specifications in the FILES parameter. You can specify up to 128 characters. |
| DIRDELETE<br>(Backups only) | Y | No | Y = If automatically deleting files, remove directories which ad all the files deleted.<br>N = Leave the directories which were just emptied. |
| DIRSONLY<br>(Restores only) | N | No | Whether ONLY directories and no files should be restored:<br>Y = Restore only directories (no files)<br>N = Restore files and directories. |
| DRIVEALIAS<br>(Backups only) | None | No | If specified, the drive letter transmitted to the host in lieu of the specified one. Allows you to move drive mappings without affecting merge backups. |
| FILEDATE | NONE | No | The last modified date of a specific file to be restored. For internal use only. |
| FILEDELETE<br>(Backups only) | N | No | Y = Delete the files which were successfully backed up.<br>N = Do not delete the files which were successfully backed up. |
| FILES | NONE | Yes | The file specification to be backed up or restored or the name of the job to run. This can include wildcards. |

| Name | Default | Required | Description |
|---|---|---|---|
| FILESOPENFORUPDAT<br>(UNIX Backups only) | N | No | Whether files open for update should be included in the backup. |
| HIDDENFILES<br>(Backups only) | N | No | Whether hidden and system files should be backed up as well as normal files. |
| INCREMENTAL<br>(Backups only) | Y | No | Y = Only those files with the archive bit set (files which have changed) will be backed up.<br>N = All files specified will be backed up. |
| LASTACCESS<br>(Backups only) | N | No | Y = Only include files which have not been accessed for the number of days (or more) specified in the DAYSOLD parameter.<br>N = Don't restrict by last access date. |
| LATESTDATE<br>(Backups only) | NONE | No | This parameter is only used if you specify DATELIMIT=Y. This field must be 8 characters and specify the date in the format MM-DD-YY. |
| LATESTTIME<br>(UNIX Backups only) | NONE | No | The time, within the LATESTDATE to back up the files. In HH:MM:SS form. |
| MIGRATED<br>(Merge restores only) | N | No | Y = Include migrated files in the restore.<br>N = Include only specified files in the restore. |
| MIGRBITS<br>(Restores only) | 0 | No | How migrated files should be treated in a restore:<br>1 = Include migrated files in the restore.<br>2 = Include only migrated files (no regular files). |
| NDS | N | No | Y = This is a NetWare Directory Services backup specification.<br>N = This is a non-NDS spec. |
| NONFILEDATABITMAP | 147 | No | An integer which defines the types of non-file data FDR/UPSTREAM will attempt to backup or restore. The separate values are coded as powers of 2 and are then added to reach the total value:<br>1 = OS/2 or NT extended attributes (files)<br>2 = OS/2 or NT extended attributes (dirs)<br>4 = Novell directory info<br>8 = Novell directory restrictions<br>16 = Novell directory trustees<br>32 = Novell file info<br>64 = Novell file trustees<br>128 = Banyan access rights lists or NT Registry and Event logs.<br>256 = Novell, HPFS or NTFS reset last access date<br>512 = Novell set archive date<br>1024 = The name specified in the FILES parameter is a StreetTalk name.<br>2048 = Banyan StreetTalk included.<br>4096 = Banyan file service files.<br>8192 = Banyan file Access Rights Lists<br>16384 = HPFS or NTFS ACLs<br>32768 = Windows NT registry files. |

| Name | Default | Required | Description |
|---|---|---|---|
| NOVELLMIGRATE<br>(Migration specs only) | N | No | Y = Leave a Novell migration stub instead of deleting the file after the file has been successfully backed up.<br>N = Delete the file after it has been successfully backed up. |
| RETAIN<br>(Migration specs only) | 90 | No | In a migration spec, the number of days that the file should be merged forward onto new full backups. |
| SKIPOLD<br>(Restores only) | Y | No | Y = Only those files which are newer on the mainframe will be restored.<br>N = All files will be restored. |
| SOSTIMESTAMP | N | No | Y = Create a FDRSOS Timestamp file during the backup which is used at restore time to determine if a FDRSOS restore has been done if the Highlighted Back to FDRSOS restore option is selected.<br>N = Do not create a FDRSOS Timestamp file. |
| SOSTIMESTAMPPATH | None | No | If SOSTIMESTAMP=Y, if specified, this is the path where the FDRSOS timestamp file is written (for backups) or read from (for restores). If not specified the file is written/read at the specified backup directory. |
| SPECNUMBER | 1 | Yes | The header to this file set. Each file set begins with a SPECNUMBER definition with an ascending number starting at 1. |
| SPECTYPE | 0 | No | 0 = File specification is files to be included in the backup or restore.<br>1 = File specification is files to be excluded from the backup or restore.<br>2 = File specification is files to be migrated during the backup. |
| SUBDIRECTORIES | Y | No | Y = All subdirectories under the specified one will be checked for files which match the file specification.<br>N = Only those files in the specified or default directory which match the file specification will be transferred. |

**Table 2**
**FDR/UPSTREAM File Spec Parameters**

# 24.11. Environment Variables

FDR/UPSTREAM can be controlled in a variety of ways through environment variables. Environment variables are values which are set using the SET <variable>=<value> command from the command line.

You can also specify these values interactively within FDR/UPSTREAM, from a FDR/UPSTREAM parameter file, from the host, or from a new environment file (USENV.DAT) as well as the environment.

To specify these values interactively or to save these values to a configuration or parameter file, pull down the Action menu and select **Set Environment** from within FDR/UPSTREAM. You can also use the [ALT]N accelerator. This will display the environment parameters dialog.

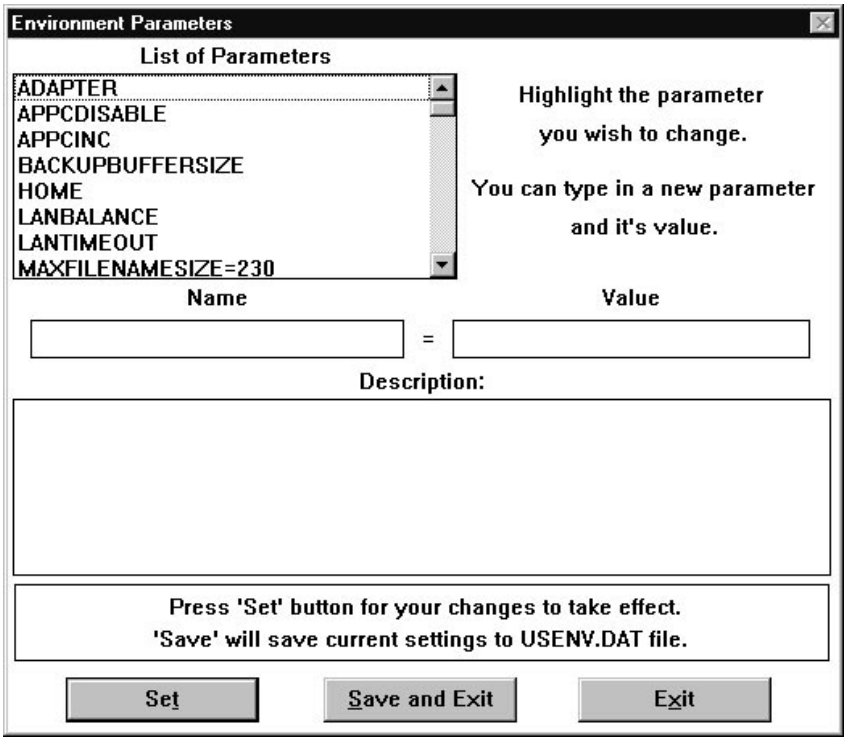



**Figure 24-4**
**Set Environment Variables**

- **List of Parameters:** When you select a given environment parameter, the Name field is changed to display the selected name, the value has it's current value (blank indicates that it's not currently set) and the description contains a description of the environment parameter. Note that parameters do not have to be in this list to be active, this list only contains those values with descriptions in the FDR/UPSTREAM help file (us.hlp).

- **Name:** The environment variable title.

- **Value:** This is the environment variable's value. If this value is blank, it reverts to its default.

- **Description:** Describes the environment variable. This list box is scrollable both horizontally and vertically (if necessary).

- **Set:** Press this button to use the specify name/value pair. When set, the value may be active immediately or may require a shutdown of FDR/UPSTREAM to become active, depending upon the variable. If the value needs to be retained between executions of FDR/UPSTREAM you should save it to a file.

- **Save and Exit:** Press this button to optionally save these settings. We recommend that you always use the default file name USENV.DAT.

- **Exit:** Press this button to leave the dialog without saving your settings to a file. Note that setting changes may already be in affect for this execution of UPSTREAM.

Environment variable settings most often are not in affect until UPSTREAM is restarted. Note that changes must be saved in parameter or configuration files to be placed in affect.

If you use USENV.DAT, it must be in the UPSTREAM directory as it is loaded immediately on UPSTREAM start (before configuration or parameter files).

These parameters can be inserted into host jobs as well as defined locally and will now be recognized. At this time they must be manually inserted into the job stream but they are not positional and can be inserted anywhere. If they are inserted in host jobs, you should specify the USTBATCH parameter VERIFY=NO (above the workstation/server parameters) to keep USTBATCH from verifying these values against standard UPSTREAM parameters.

Many of these values are listed in other sections. This table is given as a convenience to allow a single point of reference for these values.

| Name | Default | Description |
|---|---|---|
| ADAPTER<br>(ULTra NetBIOS) | 0 | The NetBIOS adapter number to use. 0 is the primary adapter; 1 is the secondary adapter. |
| APPCINC | disabled | (DOS) If this variable exists, FDR/UPSTREAM will use incomplete calls to APPC/PC which reduces the amount of time that FDR/UPSTREAM spends within each call. |
| APPCDISABLE | disabled | (DOS) If this variable exists, FDR/UPSTREAM will disable APPC/PC between calls. This may allow better session establishment. |
| BACKUPBUFFERSIZE | 32000 | (OS/2, Windows and Windows NT) The number of bytes requested in each file block read and write. The record size is thus only used for blocking to the host, not in reading/writing data off the disk. Very large numbers may significantly degrade performance on Novell LANs. |
| HOME<br>(UNIX only) | None | The default UPSTREAM work path. |
| LANBALANCE | 0 (US)<br>1 (ULTra) | (ULTra) How the send/receive buffers are allocated by default:<br>0 = Mostly receive<br>1 = Mostly send<br>2 = Evenly |

| Name | Default | Description |
|---|---|---|
| LANBUFFER | 4096 (OS/2 or Windows)<br>2048 (DOS) | (ULTra) The buffer size used for file I/O in LAN communications. |
| LANTIMEOUT | 0 | (ULTra) The receive/send timeout (in seconds) for both NetBIOS and IPX/SPX as well as both the UPSTREAM PC and the workstation. 0 indicates no timeout. |
| MAXFILENAMESIZE | 128 (OS/2)<br>80 (other) | The maximum number of bytes that can be accepted in a file name. Range is 20...230. Smaller values reduce the backup file size, but may cause long names to be skipped. |
| NOMVSWILDCARDS | disabled | Use for successful inquiries and restores when using FDR/UPSTREAM PC v2.3.3 or later and FDR/UPSTREAM MVS v2.3.1 or earlier. |
| NOSAP | disabled | (ULTra) The default is to use the NetWare Service Advertising Protocol, where each workstation registers itself once a minute with every file server on the internetwork. You can disable this feature to reduce the amount of overhead on the internetwork by specifying a value for NOSAP. However, you will lose the ability to cross bridges and routers. |
| NUMBACKUPTHREADS | 3 | (OS/2) The maximum number of file open threads that will be started and running. Specify 1 to disable the multithreaded facility. Max value is 50. |
| NUMECBS | 10 | The number of event control blocks used in the data transfer. A larger number increases LAN performance at the expense of memory. Do not set this value lower than 5 or greater than 254. |
| RMTWAIT | disabled | (OS/2) If this variable exists, multithreading will be disabled. Used for checking for remote allocates. |
| SERVERTYPE | 29631 | (ULTra) When using the Service Advertising Protocol, this is the TYPE advertised by the workstation. It is specified in inverted byte format. |
| SOCKET | 9026 | (ULTra) The IPX socket used for communications. If you have a socket conflict, specify a different value. This value is in inverted byte order. |
| STLITE | disabled | (Banyan) If this variable exists, FDR/UPSTREAM will not include Banyan security information or Banyan extended attributes (OS/2 EAs are managed separately) in the backup. |
| TRCBUF | 1024 | The number of bytes used for trace buffering (trace buffering is disabled when TRCFLUSH is enabled). |
| TRCFAST | disabled | If this variable exists, buffer data will not be traced. |
| TRCFLUSH | disabled | If this variable exists, the trace information is flushed to disk after each message. Slows the trace significantly but should be used if there is a chance that FDR/UPSTREAM will crash. |

| Name | Default | Description |
|---|---|---|
| TRCMEM | disabled | If this variable exists, memory tracing will begin immediately upon FDR/UPSTREAM start. This tracing is extensive. The trace file(s) may be placed in different directories than if the trace is activated later. |
| TRCPRN | disabled | If this variable exists, trace information is written to LPT1:. |
| TRCSCR | disabled | (DOS) If this variable exists trace information is written to the screen rather than the trace files. |
| TRCSIZE | 100000 | The number of bytes that will be written to a trace file before it wraps to the alternate file. |
| TRCTYPE | 0xffff (all tracing) | The tracing level. Allows you to selectively enable tracing. Specified as a bit map, this value can be specified in decimal or hex (if hex, there must be a leading 0x). Values are:<br>0x0001 : Novell<br>0x0002 : Banyan<br>0x0004 : ULTra<br>0x0008 : File<br>0x0010 : Host communications<br>0x0020 : Backup/restore/file transfer/submit job<br>0x0040 : Memory allocations<br>0x0080 : Block tracing (regardless of package)<br>0x0100 : Error logging<br>0x0200 : Parameter management<br>0x0400 : Win 32s |
| ULTRACOMPR<br>(ULTra workstations only) | 4 | The maximum compression level to perform on the workstation.<br>0 = No compression<br>1 = Fast compression<br>2 = High compression 1<br>3 = High compression 2<br>4 = High compression 3 |
| UPSTREAMPATH<br>(UNIX only) | none | The path used to find the UPSTREAM resource and help files. |
| USAPPC | auto detect | (Windows) Which APPC will be used.<br>DCA = Use DCA IWW<br>NSA = Use NetSoft's DynaComm APPC<br>NSDOS = Use IBM's NS/DOS or NS/Windows<br>NWSAA = Use Novell's Netware for SAA<br>RUMBA = Use Rumba APPC Tools<br>WINNT = Use Microsoft SNA Server (NT OS)<br>ATTACHMATE = Use Attachmate APPC. |
| USCLOSEREMOTECHECKINTERVAL | 250 | How often UPSTREAM checks for remote initiates (in milliseconds) during shutdown. |
| USDATAGRAMTO | 5 | (SetNov.EXE) The number of seconds that SetNov will wait to detect NetBIOS connected active ULTra workstations. Increase this value if you do not see all your workstations when entering the ULTra profile facility. |
| USDELETETIME | 10 | The number of seconds between when the backup completes and file deletes begin that you can abort the entire deletion process. |

| Name | Default | Description |
|---|---|---|
| USFILEOPENRETRY | 1 | Specifies the maximum number of times that FDR/UPSTREAM will attempt to open a file if the file open fails. Specify if you believe that file opens may succeed if retried. Retries are separated by 1 second intervals. The default is 0 (no retries). This parameter must come from the environment (can not come from the environment file) |
| USFORCEDCA<br>(Windows Attachmate only) | disabled | If specified, ignores the return code from WinAPPCStartup and assumes proper install of the APPC software. |
| USLAPS<br>(OS/2 NetBIOS ULTra) | disabled | If specified, force the use of the LAPS interface rather than the LAN Server interface. |
| USLISTINCR | 250<br>(25 for DOS) | The number of additional lines before/after the line which caused a List and Restore or Restore file list to be refreshed. |
| USLISTTHRESH | 10 | The number of lines between the highlighted item and the top or bottom of a List and Restore or Restore file list when the list is refreshed with previous or subsequent lines. |
| USLISTWINDOW | 500<br>(50 for DOS) | The maximum number of lines that will be displayed in a List and Restore or Restore file list. Note that there is a bug in OS/2 v2.1 where 1000 or more entries in any list box will make OS/2 unstable. |
| USMAPFILEREGIONSIZEMB<br>(32-bit windows only) | 8 | The number of megabytes FDR/UPSTREAM will use for a file mapping buffer when it uses file mapping to improve backup performance. |
| USMEMSUBALLOCBLOCKSIZE<br>(OS/2 32-bit only) | 16384 | The size that UPSTREAM uses for internal memory suballocation. |
| USMEMSUBALLOCLOWTHRESHOLD<br>(OS/2 32-bit only) | 24 | The smallest memory block that UPSTREAM 32-bit memory allocation will allow. |
| USMEMSUBALLOCHIGHTHRESHOLD<br>(OS/2 32-bit only) | 2040 | The largest memory block that UPSTREAM 32-bit memory allocation will internally manage. |
| USMONOFONT<br>(OS/2 and Windows only) | System mono-space font | The mono space font to use. Format:<br><font name>.<size><br>Windows uses Terminal.12. |
| USMSGQDEPTH | 8 | (Windows) The application message queue depth. The default is 8; the range is 8..255. |
| USNO32<br>(Windows and Windows NT only) | None | If specified, disables all 32-bit file access. It is recommended that if you wish to disable Win 32s that you use USNO32FILE. |
| USNO32FILE<br>(Windows and Windows NT only) | None | If specified, disables 32-bit file access. |
| USNOACL | disabled | (OS/2) If specified, disables the loading of OS/2 ACL access. |
| USNOBAN | disabled | If specified, disables the loading of Banyan drivers. |

| Name | Default | Description |
|---|---|---|
| USNODLLCLEANUP | disabled | (Windows) Use when using a Windows APPC which does not properly handle its DLL being freed. |
| USNOFILEMAPPING<br>(32-bit Windows only) | disabled | If enabled, FDR/UPSTREAM will not use file mapping to improve backup performance. |
| USNOIPXSPX<br>(ULTra only) | disabled | If specified, then the IPX/SPX interface will not be used for ULTra servers/requestors. |
| USNONETBIOS<br>(ULTra only) | disabled | If specified, then the NetBIOS interface will not be used for ULTra servers/requestors. |
| USNONEWNWDLLS | disabled | (Novell OS/2 and Windows) Forces UPSTREAM to load only the old NetWare DLLs (NWCALLS, NWLOCALE, NWNET). |
| USNOOLDNWDLLS | disabled | (Novell OS/2 and Windows) Forces UPSTREAM to load only the new NetWare DLLs (CALoooss, LOCoooss, NEToooss, and CLXoooss where ooo is OS2 or WIN and ss is either 16 or 32). |
| USNONOV | disabled | If specified, disables the loading of Novell drivers. |
| USNORMT | disabled | Disables check for remote initiates. |
| USNOVFORCECOMPRESS<br>(Novell only) | disabled | When set to any value, UPSTREAM will set the COMPRESS_IMMEDIATE attribute (forcing the file to be compressed) if the file is already compressed. This will assure that after a backup or a restore no additional disk space will be required. |
| USNOVWAITTOSET | 0 | (Novell) Specify a number of seconds UPSTREAM will delay before resetting file date information to get around a NetWare v4 bug where last access dates can't be reset for compressed files. |
| USOLDDESCFLAG | disabled | If specified causes FDR/UPSTREAM to send a 1 byte flag in the backup description rather than a 4 byte flag. This is only necessary if the host is reporting backup description flag length errors. |
| USPIPEOPENRETRY<br>(32-bit Windows only) | 1 | Specifies the maximum number of times that FDR/UPSTREAM will attempt to open a pipe if the pipe open fails. Specify if you believe that pipe opens may succeed if retried. Retries are separated by 1 second intervals. The default is 0 (no retries). This parameter must come from the environment (can not come from the environment file) |
| USPGM | US.EXE | (DOS only) Name and path of the FDR/UPSTREAM child program to be run by the TCP/IP parent program. |
| USREMOTECHECKINTERVAL | 15000 | How often UPSTREAM checks for remote initiates (in milliseconds). |
| USREMOTECHECKNODISPLAY | disabled | If enabled, the "Doing remote check" message is disabled. |
| USREMOTENTEVENTLOGS | disabled | If enabled, NT event logs on non-local systems will be included in the backup. |

| Name | Default | Description |
|---|---|---|
| USSIRECORD | None | Allows you to specify a side info table entry name for CPIC. |
| USTCP | Automatic | (OS/2 only) Allows you to specify the TCP/IP vendor. If not specified, UPSTREAM will automatically determine the vendor:<br>IBM : IBM TCP/IP v2.0 or greater.<br>NOVELL: Novell LAN Workplace for OS/2. |
| USTCPINT | 102 | (DOS only) TCP/IP parent program to UPSTREAM communications interrupt. |
| USTCPIPTRC | disabled | (OS/2 only) Enables low-level (USTCPIP.EXE) tracing. Trace file is USTCPIP.TRC. TRCFLUSH environment variable is used. |
| USTCPTRC | disabled | Enables mid-level UPSTREAM TCP/IP tracing. |
| USTRACE | disabled | Activates tracing before configuration/parameter processing. |
| USTRACELOADNETWARE | disabled | (Novell) Use only on instruction of UPSTREAM technical support. |
| USTRACEWIN32 | disabled | (Windows/NT) Use to enable Win32 Thunk tracing. |
| USUSE16BITACCESS<br>(OS/2 32-bit only) | disabled | Forces use of the 16-bit OS/2 system access routines. |
| USUSE32BITNETBIOS<br>(OS/2 32-bit ULTra only) | disabled | If enabled, forces the use of the 32-bit NetBIOS interface. |
| USUSEINODEIMEFORINCR<br>(UNIX only) | disabled | If enabled, the I-Node time is used as well as the last modified time to indicate whether a file has changed (in incremental backups). NOTE: If you use this method and then perform restores, all restored files will be backed up on the next backup. If you restore a large number of files you should immediately after the restore perform a small non-relevant backup using the same backup profile to have the incremental date/time file updated. |
| USUSEWIN32ALTERNATEFILENAMES | disabled | (Windows NT and Windows 95 ULTra only) UPSTREAM will use the mangled file name rather than the long file name. |

# 25 SECURITY CONSIDERATIONS

## 25.1. Overview

FDR/UPSTREAM offers unique security features for a product of its type. All FDR/UPSTREAM functions require a security clearance. FDR/UPSTREAM security is controlled centrally on MVS and integrates into your in-house security package which can include ACF-2, RACF and TOPSECRET and locally through the personalization facility.

Using central security, there are two different levels of security. The lowest security level (level 1) is comparable to a TSO logon. It allows you access to FDR/UPSTREAM data storage. Level 1 security is recommended for environments where minimal security checks are sufficient.

Level 2 security allows you to perform comprehensive security checks. You can allow or not allow individual users access to data stored in particular backup profiles.

See the FDR/UPSTREAM MVS User’s Guide for more information concerning setting and maintaining data set security.

# 25.2. User IDs and Passwords

The most common form of security protection for computer systems is a combined user ID and password. For FDR/UPSTREAM workstation/server, there are user ID and password fields on all screens which communicate with FDR/UPSTREAM MVS.

Both the user ID and the password are 8 characters. When you enter the user ID, the text is displayed; when you enter the password, the cursor moves but the characters you enter are not displayed.

When you save a parameter file which contains a password, it is stored to disk encrypted with a special algorithm which assures that none of the characters end up as control characters which avoids issues like errant line feeds and end of file markers.

The unattended nature of FDR/UPSTREAM requires that passwords be stored. If you wish to not store your password, we recommend that you enter blanks into the password field and save the parameter file before you leave the FDR/UPSTREAM program.

Passwords must always be entered once when running in attended mode. This assures maximum security in attended mode and that changed passwords are reflected in unattended mode.

If you wish, you can specify a password unencrypted using the parameter entry schemes which can include parameter file, command line, and environment. FDR/UPSTREAM codes a flag with encrypted passwords so that it can tell when a password is unencrypted.

Thus, if you wish to integrate FDR/UPSTREAM with a security package of your own, or you wish to enter a different password when you run the FDR/UPSTREAM program, you can do this. For example, to start FDR/UPSTREAM with a different password than in the default data file (say TEST1), you could enter:

```
US PASSWORD=TEST1
```

# 25.3. Personalization

The personalization facility is an UPSTREAM configurator function which allows an administrator to limit access to specific UPSTREAM functions. It is described in detail in the Management chapter.

Some of its very powerful features include:

- Checkboxes to limit the access to virtually every UPSTREAM function.
- **Restrict only for PC Initiated:** If you specify this, all the personalization check boxes will apply only to workstation/server initiated functions; all host initiated functions will be accepted.
- **Load User Personalizations:** If you check this box, you must have separate personalization files for each user, activated when they log in. The personalization file name is the user's host login name with .ser extension in the work path directory. This is particularly useful for enforcing security on a multi-user system when running a single copy of FDR/UPSTREAM.
- **Time-out Host Security Login:** If you check this box, a user's login will time out after 30 minutes of inactivity.
- **No dest. Changes:** If you check this box, a user cannot redirect a restore to a different drive or directory. This allows your system's existing security system to enforce access to files. When possible, the UNC name (universal naming convention) name for the device is used to keep users from redirecting drives under the covers.
- **Preset Backup Profile:** Allows you to specify a specific backup profile, thus keeping the user from viewing or restoring data that they do not have permission to access.
- **Password:** Each copy of UPSTREAM can be locally password protected.
- **Specific Directory:** You can limit backups/restores to a specific directory (and below). This assures that your users are restricted to access to their home directories.

Since the personalization facility can be a powerful way to limit access to specific functions, we highly recommend it's use.

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# 26 Running More Than One Copy

One of the ways to improve performance with FDR/UPSTREAM is to run multiple copies at one time. This takes advantage of the operating system's multi-tasking abilities. While one copy of FDR/UPSTREAM is reading a file, another can be sending data. This technique can be used to ease administration as well: each LU can be dedicated for a particular file server. Note that there is rarely any performance benefit to running more than 3 copies at one time.

The technique is fundamentally to run multiple copies of FDR/UPSTREAM. While there are ways (in some operating systems) to get a single copy of FDR/UPSTREAM running the issues of host connectivity, temporary files,etc. just make it simpler to have separate FDR/UPSTREAM directories.

Before beginning this setup, get a single copy of FDR/UPSTREAM fully operational in the way that you want to use it. Note that this chapter only applies to non-DOS environments.

### 26.0.1. VTAM configuration

This step is only necessary for SNA. In VTAM configure enough LUs for your PC for every copy of FDR/UPSTREAM that you wish to run. Note that in most cases you can not share 3270 LUs with APPC LUs so that you will need to configure enough. Note the LU names and numbers (LU Local Addresses) for use later.

### 26.0.2. Installing the PC software

Create a new directory for each copy of FDR/UPSTREAM. For best performance, they should be on separate disk drives (though this is rarely possible). For example, if you wish to run a total of 3 copies of FDR/UPSTREAM and the first copy is on C:\UPSTREAM, copy the diskettes to new directories C:\US2 and C:\US3.

In Windows, Windows 95 and Windows NT, each copy of UPSTREAM must have a separate name as Windows will try to assume that you wish to load another instance of the same program rather than a completely separate copy of the program. We recommend that the name be the same name as the directory. For example, in C:\US2, rename US.EXE to US2.EXE, in C:\US3 rename US.EXE to US3.EXE. You must be sure that any icons pointing to these copies of UPSTREAM are also renamed.

### 26.0.3. Communications configuration

This step is only necessary for SNA. In the communications configuration, configure a separate LU for each copy of FDR/UPSTREAM that you intend to run. For example, if you have defined a Local LU named LU5 for FDR/UPSTREAM and wish to run a total of 3 copies, add definitions for LU6 and LU7. Note the Local LU Alias' for use later.

Also, in the communications configuration, configure a separate Transaction Program definition for each copy. If you are using the transaction program name of UPSTREAM for the first copy, configure definitions UPSTREA2 and UPSTREA3 for 2 more copies. Note the Transaction Program Names (and don't forget to use upper case) for use later. It is particularly important to remember which Transaction Program Name associates with which directory.

When configuring Transaction Program definitions, you need the executable file name. Using this example, define them as C:\US2\US.EXE and C:\US3\US.EXE. It is all right to use the definition PARAMETER=RMTPARM.DAT for all copies.

Verify and save your communications configuration (in most cases you will need to stop and restart communications to have it truly activate successfully).

### 26.0.4. FDR/UPSTREAM Configuration

***(SNA only)*** In each of the FDR/UPSTREAM directories, run the Configurator (USCFG). Enter the new Local LU Alias (defined earlier in the communications configuration) in the configuration dialog and save to the configuration file. Remember that each copy of FDR/UPSTREAM must use a separate Local LU Alias.

From the main configuration screen, pull down the Action menu and select Advanced. Enter the transaction program name that you specified earlier in the Communications Configuration in the Inbound TPN field. Save to the configuration file.

***(TCP/IP only)*** In each of the FDR/UPSTREAM directories, run the Configurator (USCFG). Specify a separate TCP/IP PC Port for each copy. When you request a host function, you will use this port number to reference a given copy of FDR/UPSTREAM on the workstation (which must be up and running to be serviced).

### 26.0.5. US.EXE Issues

Each copy of FDR/UPSTREAM is now ready to run. You should test a small backup to verify that you have set up the communications environment correctly. You may also wish to test them all running simultaneously to verify that all is working as expected.

Some issues of note when running FDR/UPSTREAM in production are:

- **Backup Profiles:** You MUST use separate backup profiles when running multiple backups at one time, regardless of whether it comes from one or more than one PCs.
- **Host initiation:** You must consistently use a combination of LU/Transaction Program Name (TPN) when host initiating or IP address/port number. For example, if you have 3 LUs (LU1, LU2 and LU3) you should have three TPNs (UPSTREAM, UPSTREA2, UPSTREA3). They should then be always used together; i.e.: LU1 and UPSTREAM, LU2 and UPSTREA2, and LU3 and UPSTREA3.
- **Novell Profiles:** FDR/UPSTREAM will mount Novell volumes on local drives. You will need to be sure that each copy of FDR/UPSTREAM is working with a separate set of drive mappings.

  Novell Profiles defined in SETNOV are visible only to the copy of FDR/UPSTREAM that is in the same directory as the SETNOV program. Plan on either running SETNOV in every directory and duplicating definitions, or only backing up particular servers from particular directories.
- **Local scheduler:** If you will be locally initiating backups, then you may choose to run multiple copies of the USSTART program. While a single copy will work, there will be fewer frequencies and things will be a little earlier to manage.

# 27 Databases and FDR/UPSTREAM

FDR/UPSTREAM, due to its command line control and program return code facilities, can be integrated into the facilities provided by most database vendors.

A sample REXX program is included to help you integrate FDR/UPSTREAM into IBM OS/2 Database Manager® and DB2/2. However, a similar facility can be used for integration into just about any database that you are using on your database server.

FDR/UPSTREAM has been certified by Innovation for backup of Lotus Notes server. This chapter includes a brief description of including Lotus Notes in your FDR/UPSTREAM backup/restore environment.

FDR/UPSTREAM includes extensive documentation for integrating backups of Oracle databases on PC operating systems. This chapter describes these procedures.

# 27.1. FDR/UPSTREAM and IBM Database Manager

This facility is designed to be used in OS/2 only and has been updated to use the merge backup facility. A sample REXX program (DB2UEXIT.CMD or SQLUEXIT.CMD), a sample configuration file for it (DATABASE.DAT) and a READ.ME file is included in the \SAMPLES directory on the FDR/UPSTREAM distribution diskette. There are some configuration issues involved.

Most users will find the REXX program included sufficient for their needs. However, since this is a REXX program, the source code is available for modification. Feel free to customize this facility to meet your needs.

If you have DB2/2 v2.0 or higher you will need to use the REXX program DB2UEXIT.CMD; if you have IBM Database Manager or DB2/2 v1.x you will need to use SQLUEXIT.CMD. For convenience, all references below to the exit program are to DB2UEXIT.CMD; substitute SQLUEXIT.CMD if you are not running DB2/2 v2.x or higher.

### 27.1.1. How DB2/2 does backups

DB2/2 can do full backups by operator command (BACKUP DATABASE...) or program control. It will backup log files (which consist of incremental database changes) whenever it determines they need to be backed up automatically.

Full restores are performed by operator command (RESTORE DATABASE...) or program control.

The process of restoring log files is called *Roll Forward*. Roll Forwards can be performed manually by operator command (ROLLFORWARD DATABASE...).

Database backups and restores by default will go to the drive specified in the backup or restore command. Since this is often not helpful, as most users will probably want to back up to tape or use other methods, a user exit (DB2UEXIT) is provided.

FDR/UPSTREAM's sample exit DB2UEXIT.CMD is a full function DB2/2 user exit that implements the BACKUP, RESTORE, ARCHIVE and RETRIEVE functions.

### 27.1.2. Planning

The following worksheet should be filled in to help you plan for database backups. The first column is filled in as a sample:

| | Database 1 | Database 2 | Database 3 | Database 4 |
|---|---|---|---|---|
| Database Name: | SAMPLE | | | |

| | Database 1 | Database 2 | Database 3 | Database 4 |
|---|---|---|---|---|
| Backup Profile: | SAMPLE | | | |
| **Database Parms** | | | | |
| Compression Level: | 0 | | | |
| Storage Type: | 3 | | | |
| Record Size: | 6000 | | | |
| Non-file Data Bits: | 3 | | | |
| **Log file Parms** | | | | |
| Compression Level: | 0 | | | |
| Storage Type: | 2 | | | |
| Record Size: | 6000 | | | |
| Non-file Data Bits: | 3 | | | |

☐ **Database Name:** The Database Manager name of the database that you will be using FDR/UPSTREAM to back up.

☐ **Backup Profile:** The backup profile name that you wish to use to backup this database.

The remaining parameters are repeated twice: once for the complete database BACKUP and RESTORE and again for the log file ARCHIVE and RETRIEVE. The parameters are described fully in the Advanced UP-STREAM chapter of this manual.

The sample configuration has the following parameters specified:

- Database Name: SAMPLE
- Backup Profile: SAMPLE
- Database Compression: None
- Database Storage Type: Sequential Tape
- Database Record Size: 6000 bytes

- Database Non-file Data Bits: OS/2 Extended Attributes for files and OS/2 Extended Attributes for directories.
- Log file Compression: None
- Log file Storage Type: Sequential Disk
- Log file Record Size: 6000
- Log file Non-file Data Bits: OS/2 Extended Attributes for files and OS/2 Extended Attributes for directories.

### 27.1.3. FDR/UPSTREAM MVS Setup

You must define in FDR/UPSTREAM MVS in the configurator a Backup Profile for each database that you will be backing up. In the Worksheet example, for the database SAMPLE, the backup profile is also SAMPLE.

### 27.1.4. DB2/2 setup

To setup DB2/2 to use the FDR/UPSTREAM DB2UEXIT user exit for Archive and Retrieve functions enable the *user exit* parameter in the database configuration file.

To use the user exit for the Backup and Restore functions, merely specify the character '0' (zero not O) as the target drive parameter on the BACKUP DATABASE... command or the source drive parameter on the RESTORE DATABASE... command.

### 27.1.5. Installation and configuration of SQLUEXIT

To install the FDR/UPSTREAM Database Manager exit, copy the DB2UEXIT.CMD and DATABASE.DAT files from the \SAMPLES directory of FDR/UPSTREAM or the distribution diskettes to your FDR/UPSTREAM execution directory. The DB2UEXIT.CMD and DATABASE.DAT files must be in the same directory as US.EXE, and this directory must be in the PATH statement. Furthermore, there must not be another DB2UEXIT file in a directory before the FDR/UPSTREAM directory in the PATH.

To configure DB2UEXIT the main task is the modification of DATABASE.DAT to fit your environment. Using a text editor (the OS/2 editor E will work fine), edit DATABASE.DAT (see figure 1).

There must be one line in the DATABASE.DAT file for every database. The parameters in the file are positional and separated by spaces. The parameters should be taken from the Worksheet which you filled out above.

```
/*************************************************************************/
/* Parameter Definitions:                                                */
/*   Database Name  - A 1-8 character database name as defined to the IBM  */
/*                    Database Manager product.                          */
/*                                                                       */
/*   Backup Profile - A 1-8 backup profile name defined in the FDR/UPSTREAM*/
/*                    MVS configuration file.                            */
/*                                                                       */
/*   Comp           - A number between 0 and 4 to specify the type of     */
/*                    compression as follows:  0-None, 1-Fast, 2-HIGH1,   */
/*                    3 - HIGH2 and 4 - High3.                           */
/*                                                                       */
/*   STyp           - A number between 0 - 3 to specify the type of storage*/
/*                    as follows:  0-ARCH, 1-KEYD, 2-DASD and 3-TAPE.     */
/*                                                                       */
/*   RecSz          - Record size.                                       */
/*                                                                       */
/*   NFDat          - Nonfile data bitmap value.                         */
/*                                                                       */
/* The Comp, STyp, RecSz and NFDat parameters must be specified for both  */
/* database backups and log file backups.The database parameters may differ*/
/* from the log file parameters.For more information about the Comp, Styp, */
/* RecSz and NFDat parameters, refer to the FDR/UPSTREAM manual,parameters */
/* COMPRESSLEVEL,STORAGETYPE,RECORDSIZE & NONFILEDATABITMAP respectively  */
/*************************************************************************/
/*  Database      Backup       Database parameters      Log File parameters*/
/*    Name       Profile      Comp STyp RecSz NFDat  Comp STyp RecSz NFDat */
/*    ____       _______      ____ ____ ____- ____-  ____ ____ ____- ____- */
    SAMPLE       SAMPLE          0    3  6000 16387     0    2  6000 16387
```

**Figure 1**
**Sample DATABASE.DAT**

### 27.1.6. Using FDR/UPSTREAM within DB2/2

When Database Manager starts DB2UEXIT.CMD, is starts it as a separate process (in a different screen group which can be found in the OS/2 Task List). Thus, a user may not even know when DB2/2 has requested an ARCHIVE of log files.

If DB2UEXIT.CMD needs to report an error (either one of its own, or to indicate that FDR/UPSTREAM had reported an error), then it will display a message, append it to the FDR/UPSTREAM database log, beep, and wait for the user to press a key. The beeping will continue every 5 seconds until the user presses a key. If the user has not responded to error messages, DB2/2 may hang. There are instructions in the DB2UEXIT.CMD which describe how to disable the pause.

### 27.1.7. How DB2UEXIT works

When you request a BACKUP DATABASE, the backup profile name to be used will be read from the DATABASE.DAT file. The other parameters that you specify, combined with the parameters passed to the exit by Database Manager are used to create an FDR/UPSTREAM parameter file which is named <database name>.DAT and passed on the command line to US.EXE with the log file name (named <database name>.LOG), a 3 second Messages Time Out, a NORESTART parameter to disable automatic restarts, and a

SETPCTIME to guarantee that the PC time is set correctly. DB2UEXIT can be driven multiple times, usually at least twice, once for the database configuration and a second time for the database data.

DB2UEXIT knows when it is the first time that it is called and performs a merge full backup. On subsequent executions, DB2UEXIT will perform merge incremental backups.

When you specify a RESTORE DATABASE and DB2/2 generates a RESTORE, a standard restore is performed using the Latest Version. DB2UEXIT is driven multiple times (usually twice), and so is FDR/UPSTREAM. After the first RESTORE call, DB2/2 will pause and ask the user if he wants to continue.

When DB2UEXIT is driven with a RETRIEVE (a roll-forward), FDR/UPSTREAM will be driven to do a Restore using files back to full facility.

Note that since a database backup consists of multiple backups of items that may actually be on separate devices, you may not be able to use the **List and Restore** facility for manual inquiries and restores. Since you will normally be using the DB2/2 facilities for restore this is not normally a problem. However if you wish to perform manual inquires and restores we recommend that you always use the **Restore and Inquiry (old)** facility

# 27.2. Lotus Notes

Lotus Notes servers, regardless of whether they are on OS/2, Windows NT, Novell NetWare, etc., are designed to always be in a state where a backup of its files will work. A backup of the directories where Notes has stored its files will always be successful and all data will be retrieved. There are no problems with locked files or records. So all you have to do is include the Notes data directory in your backups.

When performing restores, the Notes server must be down. You may also have to restore Notes modified system files (CONFIG.SYS, NT Registry entries, etc.) in disaster recovery situations.

All backups are fulls. There is no capability with Notes for an incremental backup so you should expect large backups daily.

# 27.3. FDR/UPSTREAM and Oracle

### 27.3.1. Overview

Oracle Server is a fully-functioning Relational Database Management System (RDBMS) which operates in essentially the same manner on all supported operating system platforms. FDR/UPSTREAM also operates in a platform independent manner and this makes it possible to describe fairly straightforward and detailed procedures for using FDR/UPSTREAM for backup and recovery of Oracle databases regardless of particular operating system they are running on. Within this section, samples are provided for fully tested FDR/UPSTREAM backup and recovery scenarios running on Windows NT and OS/2 ORACLE client systems with ORACLE database servers running under NetWare.

When you create an Oracle database, you should decide how you plan to protect the database against potential equipment failures or other data losses. If such planning is not considered before database creation, database recovery may not be possible.

In order to utilize FDR/UPSTREAM for the backup and recovery of ORACLE databases the following configuration planning decisions must be made.

- Establish Your ORACLE Archive Mode
- Select Your ORACLE Backup Mode
- Select Your UPSTREAM Backup Mode
- Identify Your ORACLE Database Components

These steps are outlined in the following sections. These decisions must be made prior to beginning your backups. If the are not, significant problems may arise at a later time when attempting to recover specific data.

If you have any questions about these planning items, feel free to contact UPSTREAM technical support for assistance.

### 27.3.2. Establishing Your Archive Mode

When establishing your ORACLE databases, your backup and recovery methodologies should be an integral part of your database design. Oracle supports two modes of logging for committed database transactions. They are:

- ARCHIVELOG mode
- NOARCHIVELOG mode

In **ARCHIVELOG** mode ORACLE makes use of it’s REDO LOG files to allow for the continuing operation of the ORACLE server while backups are being performed. Every Oracle database has a set of two or more REDO log files. This set of REDO log files is collectively known as the database's REDO log. All changes made to the database are recorded in the REDO log files.

If a database is operating in ARCHIVELOG mode, previously taken backups of the REDO logs and database files coupled with the current online REDO log can recover the database right up to the time of any non-catastrophic failure.

When **ARCHIVELOG** mode is enabled, there are several important database recovery factors to consider:

- Full recovery is available in case of media failure

- Recovery to a past “point-in-time” is available
- You can take backups of the ORACLE DBMS while it is up or down

In **NOARCHIVELOG** mode, ORACLE does NOT make use of it’s REDO LOG file facility to allow for the continuing operation of the ORACLE server while backups are being performed. When **NOARCHIVELOG** mode is enabled, there are several important database recovery factors to consider:

- You will lose any changes since the last full backup
- You can return only to a previous full backup
- You can take backups only when the Oracle DBMS is down

If your database has already been constructed, you can determine which ARCHIVELOG mode your database is operating in with one of two ways:

- Open the Oracle Database Manager and click on the Parameters button. If the check box 'Support Recovery' option is ON and the Edit Database Parameters screen is checked, the database is running in ARCHIVELOG mode.
- Issue the following Oracle SQL command:

  ```
  ARCHIVE LOG LIST
  ```

For more information on ARCHIVELOG mode and it’s implications, please refer to the ORACLE “Server Administrator's Guide”.

### 27.3.3. Selecting Your ORACLE BACKUP Mode

ORACLE supports two modes of operation for the backing up of it’s database files. They are:

- **OFFLINE** mode
- **ONLINE** mode

**Offline** mode can be utilized when your ORACLE database is operating in either **ARCHIVELOG** mode previously described. **Offline** mode requires that the ORACLE Database Server is brought down for the duration of the backup process.

**Online** mode is only available when the ORACLE **ARCHIVELOG** mode is enabled. This mode makes use of ORACLE system RDEO LOG files to allow for the continuing operation of the ORACLE server while backups are being performed. These REDO LOG files will also be used to apply against your database in selected recovery scenarios.

### 27.3.4. Selecting Your UPSTREAM BACKUP Mode

UPSTREAM supports two modes of performing backups of the ORACLE database and REDO LOG files. They are:

- **FULL** mode
- **INCREMENTAL** mode

**FULL** mode can be utilized with either of the ORACLE ARCHIVELOG modes described above. **FULL** mode causes all ORACLE database files to be backed up regardless of whether they have changed or not.

When **FULL** mode is enabled, there are several important factors to consider:

- All files will be backed up

- Data is backed up whether it has changed or not
- The output of this process will contain all the user data you will need to recover in the event of a failure.

**INCREMENTAL** mode can be utilized with either of the ORACLE ARCHIVELOG modes described above. **INCREMENTAL** mode causes only the ORACLE database files that have been changed to be backed up. This eliminates the backing up of files that do not change from day to day (i.e. old REDO Log files, unchanged system related files, etc.).

When **INCREMENTAL** mode is enabled, there are several important factors to consider:

- The INCREMENTAL backup will be used in concert with a previous FULL backup in order to recreate your ORACLE database(s)
- Backup times can be significantly reduced
- The output of this process must be combined with previously created FULL backups to recover the latest versions of your data

Following a clean shutdown, all of the files that constitute a database are closed. An **OFFLINE FULL** backup taken after an ORACLE shutdown can be used to recover to that particular point in time. The recovery process is straightforward and requires only that the **FULL** backup be restored. Note that a full backup taken while the database is open, after an ORACLE DBMS crash, or shutdown abort is suspect due to the fact that the database files could have been in the process of being updated.

### 27.3.5. Identifying ORACLE Database Components

In order for the datafiles that represent an entire ORACLE database or individual database tablespace to be backed up, the file system components that contain these database components must be identified. An ORACLE database consists of the following types of components:

- Database Files
- REDO LOG Files
- Control Files

The **Database** files contain the actual user data that is stored in the database by your company's application systems. These are contained in **Tablespaces** within the database files. Within the **Tablespaces** are the **Tables** which hold the actual user data.

The **REDO LOG** files contain the application database update **Transactions**. The transactions, often referred to as **Units of Work,** are **atomic** actions performed against the database by application programs. An atomic action is one which is committed to the database as a single entity or not. This grouping of units of work is critical to maintaining database integrity and recoverability.

The **Control** files contain the description of the physical aspects of the databases. Information such as file system entities, files and directories, that contain the actual database data and REDO Log files.

### 27.3.6. Backing Up Your ORACLE Database

For illustrative purposes, the following sections outline the available UPSTREAM/ORACLE backup scenarios:

☐ Database Backups:

- OFFLINE, NOARCHIVELOG Mode, FULL Backup
- OFFLINE, ARCHIVELOG Mode FULL Backup

☐ Tablespace Backups:

- OFFLINE, ARCHIVELOG Mode Backup
- ONLINE, ARCHIVELOG Mode Backup

These scenarios represent the only backup options for ORACLE database users that will insure full database integrity. Any other scenarios should be carefully reviewed in order to limit your exposure to the loss of data.

The examples in the following sections have been extensively tested with an ORACLE database running as a NLM under NetWare 4.1 and with FDR/UPSTREAM running under OS/2 WARP version 3. The samples are constructed to operate via MVS mainframe initiation. This represents how the majority of customers generally chose to perform these types of backups. Other operating environments may require slight modifications to the configurations and JOBs provided to perform properly. If you have difficulty, feel free to contact Innovation Technical Support for further assistance.

### 27.3.7. Database Backups - Overview

If your ORACLE database is operating in either **NOARCHIVELOG** or **ARCHIVELOG** mode, one of the available choices for backing it up is to take the entire database OFFLINE and back it up via the UPSTREAM FULL backup process. This process makes a complete copy of the associated ORACLE database files and backs them up to the UPSTREAM HOST system. The only recovery scenario available for this type of backup involves the restoration of the most recent full backup of the database.

Keep the following important factors in mind when constructing this type of backup configuration:

- Plan to take full Offline backups regularly, according to the amount of work that you can afford to lose.
- Schedule backups only for the time of day when you are sure that the Oracle database is shutdown for systemwide use
- Whenever you alter the physical structure of the database, immediately take a full database backup. An immediate backup protects the new structure of the database which will NOT be reflected in the previous full backup.

Note that if a full backup is taken while the database is still open, after a DBMS crash, or a shutdown abort, the results should be considered highly suspect due to the fact that database integrity can NOT be guaranteed.

### 27.3.8. OFFLINE, NOARCHIVELOG Mode Backup

The following list outlines the steps necessary to perform this type of backup:

**1) Determine which data and control files comprise your ORACLE Database**

**2) Shutdown the ORACLE Database Server**

**3) Perform the UPSTREAM FULL backup**

**4) Restart the ORACLE Database Server**

As has been the case throughout this manual, these steps are outlined for mainframe initiation. If you wish to initiate from the FDR/UPSTREAM workstation side, use the parameter files embedded in the JCL to construct PC parameter files. These examples are intended to represent simple approaches for performing the minimal of backups. You will need to review the platform, specific sections of the FDR/UPSTREAM documentation in order to be sure that these parameter files meet your requirements.

**Step 1) Identify the ORACLE Database and Control Files**

To determine which data files constitute your ORACLE database issue the following SQL command using an ORACLE SQL interface:

```
SELECT  TABLESPACE_NAME,  FILE_NAME  FROM  SYS.DBA_DATA_FILES;
```

You can also obtain this information directly using the Oracle Server Manager GUI.

The location of the control files is defined in the start up parameter file (CONTROL_FILES parameter) if it differs from the default location of subdirectory DATABASE of the default Oracle directory.

To determine which control files your ORACLE database is using, issue the following SQL command using an ORACLE SQL interface:

```
SHOW  PARAMETER  CONTROL_FILE
```

You may need to resolve any embedded Oracle parameters (like '%ORACLE_HOME%', which stands for the directory where Oracle was originally installed), in order to get the real path and file names of these control files.

**Step 2) Shutdown the ORACLE Database**

Before taking a **full Offline backup,** it will be necessary to shutdown the ORACLE database and to be sure that it was cleanly shutdown. You have two options for controlling this operation, you can use either the Oracle Database Manager GUI application to manually shut down the database or a mainframe initiated, predefined SQL procedure.

We will be outlining the second approach. This approach will allow for the automatic scheduling of the backup operation and not require manual intervention. The following example outlines minimal ORACLE database shutdown host and workstation components.

**Workstation Command File (STOPORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STOPORC.SQL
```

**Workstation SQL File (STOPORC.SQL) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
SHUTDOWN NORMAL;
EXIT;
```

**Host JCL:**

```
//*
//*        HALT ORACLE DATABASE OPERATION
//*
|//STOP     EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=YOUR.UPSTREAM.LOAD.LIBRARY
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
```

```
//USTPARM  DD   *
APPLPREF=UPSTR
USAPPL=UPSTREAM
MAXRETRY=1
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\UPSTREAM\ORACLE\STOPORC.CMD
ENDPARM
/*
//
```

Use your operating system specific “Oracle Database Tools” guide for the exact command line interface parameters required to support your environment. The samples above were configured for an OS/2 client workstation and ORACLE running as a NetWare NLM.

**Step 3) Perform the FDR/UPSTREAM FULL backup**

Once the ORACLE database has been shut down, you can perform the FDR/UPSTREAM backup operation. The sample below backs up a series of files that are contained in the ORACLE\DATABASE subdirectory of a Novell NetWare file server accessible via logical drive O:. These samples once again assume that the process will be mainframe initiated.

**Host JCL:**

```
//*
//*        BACKUP ORACLE DATABASE FILES
//*
//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=YOUR.UPSTREAM.LOAD.LIBRARY
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=UPSTR
USAPPL=UPSTREAM
MAXRETRY=1
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1                          * Backup
STORAGETYPE 3                     * SEQUENTIAL TAPE
MERGE 3                           * First Time Full
BACKUPPROFILE ORACLE1             * Host Backup Profile Name
NOVELLPROFILE NET41SYS            * Novell Profile Name
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\*.*      * ORACLE Database Files
NONFILEDATABITMAP 147
ENDPARM
/*
//
```

The intent of this example is to illustrate the minimum number of necessary FDR/UPSTREAM control statements to perform a backup. The usage of any additional features will require added customization to be performed on the above sample.

**Step 4) Startup the ORACLE Database Server**

Once the backup, step 4, has completed successfully, the ORACLE database needs to be restarted. The following JCL will invoke an ORACLE SQL command to restart the database.

**Workstation Command File (STARTORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STARTORC.SQL
```

**Workstation SQL File (STARTORC.SQL) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
STARTUP EXCLUSIVE PFILE=C:\TESTS\INITORCL.ORA;
EXIT;
```

**Host JCL:**

```
//STARTORC EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD SYSOUT=*
//USTLOG   DD SYSOUT=*
//USTPARM  DD *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
TRACE N
JOBOPTIONS 3
SPECNUMBER 1
FILES C:\TESTS\STARTORC.CMD
ENDPARM
/*
//
```

### 27.3.9. OFFLINE, ARCHIVELOG Mode, FULL Backup

If your database is operating in **ARCHIVELOG** mode and the activity level and usage pattern of the database will allow you to take it down from time to time long enough to take a **Full, Offline** backup, you can utilize the following approach.

You should take a **Full, Offline** backup on a regular basis (once a week or month), and in between these full backups you take a number of incremental backups (more frequently, like every day). These incremental backups should backup your ORACLE REDO log files, which are to be used in case of database failure to roll forward from the full backup to the latest REDO log file available.

The following list outlines the steps necessary to perform this type of backup:

**1) Determine which data, control, and REDO Log files comprise your ORACLE Database**

**2) Shutdown the ORACLE Database Server**

**3) Perform the UPSTREAM FULL backup**

**4) Restart the ORACLE Database Server**

As has been the case throughout this manual, these steps are outlined for mainframe initiation. If you wish to initiate from the FDR/UPSTREAM workstation side, use the parameter files embedded in the JCL to construct PC parameter files. These examples are intended to represent simple approaches for performing the minimal of backups. You will need to review the platform, specific sections of the FDR/UPSTREAM documentation in order to be sure that these parameter files meet your requirements.

**Step 1) Identify the ORACLE Database and Control Files**

To determine which data files constitute your ORACLE database issue the following SQL command using an ORACLE SQL interface:

```
SELECT  TABLESPACE_NAME,  FILE_NAME  FROM  SYS.DBA_DATA_FILES;
```

You can also obtain this information directly using the Oracle Server Manager GUI.

The location of the control files is defined in the start up parameter file (CONTROL_FILES parameter) if it differs from the default location of subdirectory DATABASE of the default Oracle directory.

To determine which control files your ORACLE database is using, issue the following SQL command using an ORACLE SQL interface:

```
SHOW  PARAMETER  CONTROL_FILE
```

You may need to resolve any embedded Oracle parameters (like '%ORACLE_HOME%', which stands for the directory where Oracle was originally installed), in order to get the real path and file names of these control files.

**Step 2) Shutdown the ORACLE Database**

Before taking an **INCREMENTAL Offline backup,** it will be necessary to shutdown the ORACLE database. You have two options for controlling this operation, you can use either the Oracle Database Manager GUI application to manually shut down the database or a mainframe initiated, predefined SQL procedure.

As with the FULL process outlined earlier, we will be outlining the second approach. This approach will allow for the automatic scheduling of the INCREMENTAL backup operation and not require manual intervention. The following example outlines minimal ORACLE database shutdown host and workstation components.

**Workstation Command File (STOPORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STOPORC.SQL
```

**Workstation SQL File (STOPORC.CMD) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
SHUTDOWN NORMAL;
EXIT;
```

**Host JCL:**

```
//*
//*        HALT ORACLE DATABASE OPERATION
//*
//STOPORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=YOUR.UPSTREAM.LOAD.LIBRARY
//SYSPRINT DD   SYSOUT=*
```

```
//SYSUDUMP DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=UPSTR
USAPPL=UPSTREAM
MAXRETRY=1
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\UPSTREAM\ORACLE\STOPORC.CMD
ENDPARM
/*
//
```

Use your operating system specific “Oracle Database Tools” guide for the exact command line interface parameters required to support your environment. The samples above were configured for an OS/2 client workstation and ORACLE running as a NetWare NLM.

**Step 3) Perform the FDR/UPSTREAM Backup**

Once the ORACLE database has been shut down, you can perform the FDR/UPSTREAM backup operation. The sample below backs up a series of files that are contained in the ORACLE\DATABASE, ORACLE\CONTROL, and ORACLE\LOGFILES subdirectories of a Novell NetWare file server accessible via logical drive O:. These samples once again assume that the process will be mainframe initiated.

**Host JCL:**

```
//*
//*        BACKUP ORACLE DATABASE FILES
//*
//BACKORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=YOUR.UPSTREAM.LOAD.LIBRARY
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=UPSTR
USAPPL=UPSTREAM
MAXRETRY=1
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1                          * Backup
STORAGETYPE 3                     * Sequential Tape
MERGE 3                           * First Time Full
BACKUPPROFILE ORACLE1             * Host Backup Profile Name
NOVELLPROFILE NET41SYS            * Novell Profile Name
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\*.*      * ORACLE Database Files
NONFILEDATABITMAP 147
*
SPECNUMBER 2
```

```
FILES O:\ORACLE\CONTROL\*.*      * ORACLE Control Files
NONFILEDATABITMAP 147
*
SPECNUMBER 3
FILES O:\ORACLE\LOGFILES\*.*     * ORACLE REDO Log Files
NONFILEDATABITMAP 147

ENDPARM
/*
//
```

The intent of this example is to illustrate the minimum number of necessary FDR/UPSTREAM control statements to perform a backup. The usage of any additional features will require added customization to be performed on the above sample.

**Step 4) Startup the ORACLE Database Server**

Once the backup has completed successfully, the ORACLE database needs to be restarted. The following JCL will invoke an ORACLE SQL command to restart the database.

**Workstation Command File (STARTORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STARTORC.SQL
```

**Workstation SQL File (STARTORC.SQL) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
STARTUP EXCLUSIVE PFILE=C:\TESTS\INITORCL.ORA;
EXIT;
```

**Host JCL:**

```
//STARTORC EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD SYSOUT=*
//USTLOG   DD SYSOUT=*
//USTPARM  DD *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
TRACE N
JOBOPTIONS 3
SPECNUMBER 1
FILES C:\TESTS\STARTORC.CMD
ENDPARM
```

### 27.3.10. Tablespace Backups

If your requirements are such that your database must stay online 24 hours a day, seven days a week and you do are unable to take **Full, Offline backups** regularly, the best backup strategy will be to utilize **Tablespace** backups. These types of backups only backup specific portions of your database.

Depending on the availability of the datafiles at the time of the backup, you must decide what type of tablespace backup to perform:

- **Offline Tablespace Backups** are the best approach if you are able to disconnect the tables from the database for the duration of backup. This type of backup is then processed just like the Full, Offline backup previously described. By definition this type of backup disables user access to the affected tablespace(s) while the backup is in progress, however database activity for other components of the database remain unaffected.
- **Online Tablespace Backups** are the best approach if the tables must remain available for use while the backup is in progress. With this type of backup the affected Tablespaces are placed in a special "BACKUP" mode while the backup takes place. During this time any changes to the Tablespaces in question will be redirected to the ORACLE REDO log files. These files will contain the database transaction information to be reapplied to the database should a recovery be necessary. The use of this type of backup should be avoided when the tablespaces to be backed up are being heavily utilized. While the backup is in progress, all the changes will be accumulated in the REDO log files only, so it is possible that you may experience performance degradation and an overflow of the REDO log files. If you wish to perform Online Tablespace backups your ORACLE database must be operating in ARCHIVELOG mode.

### 27.3.11. Offline Tablespace Backups

When backing up in Offline Tablespace mode there are several database components that you will need to provide in order to perform a successful recovery. These components are:

- **Database Datafile Files**
- **ORACLE Control Files**

In order to perform Offline Tablespace type backups, the following criteria should be reviewed carefully:

- When the database is initially created or when you have decided to start backing it up, you need to perform a full Offline backup. This is the foundation for your backups, which provides copies of all datafiles and the control file of the database.
- Take partial backups of your database to update backed up information in the full Offline backup. The datafiles of extensively used tablespaces should be backed up frequently to reduce database recovery time, should recovery ever be required. The closer the last **FULL** backup is to the time of the failure, the fewer REDO log files that will need to be applied to recover the database.
- Every time you make a structural change to the database, take a control file backup.
- Take backups of archived REDO log files on a regular basis and after periods of high activity or important changes.

The following describes how to take **Offline Tablespace** backups of your ORACLE Database using FDR/UPSTREAM.

As has been the case throughout this manual, these steps are outlined for mainframe initiation. If you wish to initiate from the FDR/UPSTREAM workstation side, use the parameter files embedded in the JCL to construct PC parameter files. These examples are intended to represent simple approaches for performing the minimal of backups. You will need to review the platform, specific sections of the FDR/UPSTREAM documentation in order to be sure that these parameter files meet your requirements.

**Step #1) Determine Required Tablespaces**

The first step will be to determine the tablespaces that you are going to back up and obtain the list of datafiles for those tablespaces. You can do this either using the Oracle Server Manager or by issuing the following SQL command:

```
SELECT  TABLESPACE_NAME,  FILE_NAME,  FROM  SYS.DBA_DATA_FILES;
```

**Step #2) Place Database Tablespaces in OFFLINE Mode**

Use the following sample JOB to construct a platform specific command file that will place your selected ORACLE Tablespaces into OFFLINE mode. While in this mode the Tablespaces in question will be unavailable to the applications that normally access them.

**Host JCL:**

```
//BACKORC  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****         ISSUE ORACLE BACKUP COMMAND         *****
//* ******************************************************
//*
//*
//CMDBORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDBORC.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDBORC.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDBORC.SQL
```

**SQL Command File (CMDBORC.SQL):**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
—
—      Place ORACLE Database Tablespaces in BACKUP Mode
—
ALTER  TABLESPACE  USER_DATA        BEGIN BACKUP;
ALTER  TABLESPACE  ROLLBACK_DATA    BEGIN BACKUP;
ALTER  TABLESPACE  TEMPORARY_DATA   BEGIN BACKUP;
```

**Step #3) Backup Tablespaces**

The following sample JOB will backup the tablespaces whose names were obtained in step #1 of this procedure.

**Host JCL:**

```
//BACKORC  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1
BACKUPPROFILE TEST001
NOVELLPROFILE EVEREX
USERID XYZ
MERGE 3
STORAGETYPE 2
ATTENDED Y
REPORTOPTIONS 6
REPORTNAME USORACLE.RPT
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\*.ORA       * ORACLE DATABASE FILES
SUBDIRECTORIES Y
SPECTYPE 0
ARCHIVEBIT N
*
ENDPARM
/*
//
```

**Step #4) Place Database in NORMAL Mode**

Use the following sample to construct a platform specific command file that will place your selected ORACLE Tablespaces back into NORMAL operating mode. This causes ORACLE to begin making Tablespace changes to the Database datafiles and no longer into the REDO logfiles.

**Host JCL:**

```
//BACKEND  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****       ISSUE ORACLE END BACKUP COMMAND        *****
//* ******************************************************
//*
//*
//CMDBORC  EXEC PGM=USTBATCH
```

```
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDRORC.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDRORC.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDRORC.SQL
```

**SQL Command File (CMDRORC.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–      Take ORACLE Database Tablespaces Out of BACKUP Mode
–
ALTER  TABLESPACE  USER_DATA        END BACKUP;
ALTER  TABLESPACE  ROLLBACK_DATA    END BACKUP;
ALTER  TABLESPACE  TEMPORARY_DATA   END BACKUP;
```

**Step # 5) Create a Backup Database Control File**

Use the following sample JOB to construct a platform specific command file that will backup your selected ORACLE Database Control File. This step is important in order to insure that the database just backed up matches the ORACLE Control File in case of a restore.

The following **SQL commands** will correctly backup the control file to the specified location.

```
ALTER SYSTEM SWITCH LOGFILE;
ALTER DATABASE BACKUP CONTROLFILE TO 'full- file-name' RESE;
```

**Host JCL:**

```
//BACKCTL  JOB (ACCOUNTING INFO),’BACKUP ORACLE’, CLASS=A
//* ******************************************************
//* *****     BACKUP ORACLE DATABASE CONTROL FILE      *****
//* ******************************************************
//*
//*
//CONTROL  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
```

```
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\BACKCTL.CMD
ENDPARM
/*
//
```

**Operating System Command File (BACKCTL.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @BACKCTL.SQL
```

**SQL Command File (BACKCTL.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
—
—     Copy ORACLE Database Control File
—
ALTER SYSTEM SWITCH LOGFILE;
ALTER  DATABASE  BACKUP  CONTROLFILE
       TO  'SYS:\ORACLE\CONTROL\IDPCTL1.BKP'  REUSE;
```

**Step #6) Switch REDO Log Files**

Use the following sample JOB to construct a platform specific command file that will switch your selected ORACLE Database REDO Log files. This step is important in order to insure that the Log files for the database just backed up contain any database changes that would need to be applied in case of a restore.

**Host JCL:**

```
//SWREDO  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****    SWITCH ORACLE DATABASE REDO LOG FILES     *****
//* ******************************************************
//*
//*
//REDOLOG  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
```

```
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\SWREDO.CMD
ENDPARM
/*
//
```

**Operating System Command File (SWREDO.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @SWREDO.SQL
```

**SQL Command File (SWREDO.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–     Switch ORACLE Database REDO Log Files
–
ALTER SYSTEM SWITCH LOGFILE;
```

**Step #7) Backup the REDO Log and Control Files**

Use the following sample JOB to construct a platform specific command file that will backup your selected ORACLE Database REDO Log files. This step is important in order to insure that the Log files for the database just backed up contain any database changes that would need to be applied in case of a restore.

In order to guarantee that all committed transactions can be recovered, you have to have a full set of archived REDO log files available at the time of the recovery. You must save all the REDO log files from the time the last tablespace backup was taken and up to the recovery point-in-time. This is necessary in order to be able to provide the Oracle recovery tools with all the necessary REDO log files.

**Host JCL:**

```
//BACKREDO JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1
BACKUPPROFILE ORCREDO
NOVELLPROFILE EVEREX
USERID XYZ
MERGE 3
STORAGETYPE 2
RECORDSIZE 6000
ATTENDED Y
REPORTOPTIONS 6
```

```
REPORTNAME USORACLE.RPT
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\LOGFILE\*.LOG       * REDO LOG FILES
SPECTYPE 0
ARCHIVEBIT N
*
SPECNUMBER 2
FILES O:\ORACLE\CONTROL\*.BKP       * BACKUP CONTROL FILE
SPECTYPE 0
ARCHIVEBIT N
*
ENDPARM
/*
//
```

### 27.3.12. Online Tablespace Backups

When backing up in Online Tablespace mode, there are several database components that you will need to provide in order to perform a successful recovery. These components are:

- **Database Datafile backups**
- **ORACLE Control Files**
- **REDO log files (for Online type backups)**

In order to perform tablespace type backups, the following criteria should be reviewed carefully:

- When the database is initially created or when you have decided to start backing it up, you need to perform a full Offline backup. This is the foundation for your backups, which provides copies of all datafiles and the control file of the database.
- Take partial backups of your database to update backed up information in the full Offline backup. The datafiles of extensively used tablespaces should be backed up frequently to reduce database recovery time, should recovery ever be required. The closer the last **FULL** backup is to the time of the failure, the fewer REDO log files that will need to be applied to recover the database.
- Every time you make a structural change to the database, take a control file backup.
- Take backups of archived REDO log files on a regular basis and after periods of high activity or important changes.

The following section describes how to take **Online Tablespace** backups of your ORACLE Database using FDR/UPSTREAM.

As has been the case throughout this manual, these steps are outlined for mainframe initiation. If you wish to initiate from the FDR/UPSTREAM workstation side, use the parameter files embedded in the JCL to construct PC parameter files. These examples are intended to represent simple approaches for performing the minimal of backups. You will need to review the platform, specific sections of the FDR/UPSTREAM documentation in order to be sure that these parameter files meet your requirements.

**Step #1) Determine Required Tablespaces**

The first step will be to determine the tablespaces that you are going to back up and obtain the list of datafiles for those tablespaces. You can do this either using the Oracle Server Manager or by issuing the following SQL command:

```
SELECT  TABLESPACE_NAME,  FILE_NAME,  FROM  SYS.DBA_DATA_FILES;
```

**Step #2) Place Database Tablespaces in BACKUP Mode**

Use the following sample JOB to construct a platform specific command file that will place your selected ORACLE Tablespaces into Backup mode. While in this mode any changes to the affected Tablespaces will go into the REDO LOG files, not into the Tablespace datafiles themselves.

**Host JCL:**

```
//BACKORC  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****         ISSUE ORACLE BACKUP COMMAND          *****
//* ******************************************************
//*
//*
//CMDBORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDBORC.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDBORC.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDBORC.SQL
```

**SQL Command File (CMDBORC.SQL):**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–      Place ORACLE Database Tablespaces in BACKUP Mode
–
ALTER  TABLESPACE  USER_DATA        BEGIN BACKUP;
ALTER  TABLESPACE  ROLLBACK_DATA    BEGIN BACKUP;
ALTER  TABLESPACE  TEMPORARY_DATA   BEGIN BACKUP;
```

**Step #3) Backup the Tablespaces**

The following sample JOB will backup the tablespaces whose names were obtained in step #1 of this procedure.

**Host JCL:**

```
//BACKORC  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1
BACKUPPROFILE TEST001
NOVELLPROFILE EVEREX
USERID XYZ
MERGE 3
STORAGETYPE 2
RECORDSIZE 6000
ATTENDED Y
REPORTOPTIONS 6
REPORTNAME USORACLE.RPT
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\*.ORA       * ORACLE DATABASE FILES
SUBDIRECTORIES Y
SPECTYPE 0
ARCHIVEBIT N
*
ENDPARM
/*
//
```

**Step #4) Place Database in NORMAL Mode**

Use the following sample JOB to construct a platform specific command file that will place your selected ORACLE Tablespaces back into NORMAL operating mode. This causes ORACLE to begin making Tablespace changes to the Database datafiles and no longer into the REDO logfiles.

**Host JCL:**

```
//BACKEND  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****       ISSUE ORACLE END BACKUP COMMAND        *****
//* ******************************************************
//*
//*
//CMDBORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
```

```
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDRORC.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDRORC.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDRORC.SQL
```

**SQL Command File (CMDRORC.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
—
—      Take ORACLE Database Tablespaces Out of BACKUP Mode
—
ALTER  TABLESPACE  USER_DATA        END BACKUP;
ALTER  TABLESPACE  ROLLBACK_DATA    END BACKUP;
ALTER  TABLESPACE  TEMPORARY_DATA   END BACKUP;
```

**Step #5) Create a Backup Database Control File**

Use the following sample to construct a platform specific set of files that will backup your selected ORACLE Database Control File. This step is important in order to insure that the database just backed up matches the ORACLE Control File in case of a restore.

The following **SQL command** will backup the control file to the specified location.

```
ALTER DATABASE BACKUP CONTROLFILE TO 'full- file-name' REUSE;
```

**Host JCL:**

```
//BACKCTL  JOB (ACCOUNTING INFO),’BACKUP ORACLE’, CLASS=A
//* ******************************************************
//* *****     BACKUP ORACLE DATABASE CONTROL FILE      *****
//* ******************************************************
//*
//*
//CONTROL  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
```

```
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\BACKCTL.CMD
ENDPARM
/*
//
```

**Operating System Command File (BACKCTL.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @BACKCTL.SQL
```

**SQL Command File (BACKCTL.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–     Copy ORACLE Database Control File
–
ALTER  DATABASE  BACKUP  CONTROLFILE
       TO  'SYS:\ORACLE\CONTROL\IDPCTL1.BKP'  REUSE;
```

**Step # 6) Switch REDO Log Files**

Use the following sample JOB to construct a platform specific command file that will switch your selected ORACLE Database REDO Log files. This step is important in order to insure that the Log files for the database just backed up contain any database changes that would need to be applied in case of a restore.

**Host JCL:**

```
//SWREDO  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****    SWITCH ORACLE DATABASE REDO LOG FILES     *****
//* ******************************************************
//*
//*
//REDOLOG  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
```

```
SPECNUMBER 1
FILES C:\TESTS\T16020\SWREDO.CMD
ENDPARM
/*
//
```

**Operating System Command File (SWREDO.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @SWREDO.SQL
```

**SQL Command File (SWREDO.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–     Switch ORACLE Database REDO Log Files
–
ALTER SYSTEM SWITCH LOGFILE;
```

**Step # 7) Backup the REDO Log and Control Files**

Use the following sample JOB to construct a platform specific command file that will backup your selected ORACLE Database REDO Log files. This step is important in order to insure that the Log files for the database just backed up contain any database changes that would need to be applied in case of a restore.

In order to guarantee that all committed transactions can be recovered, you have to have a full set of archived REDO log files available at the time of the recovery. You must save all the REDO log files from the time the last tablespace backup was taken and up to the recovery point-in-time. This is necessary in order to be able to provide the Oracle recovery tools with all the necessary REDO log files.

**Host JCL:**

```
//BACKREDO JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//BACKUP   EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
TPNAME=UPSTREAM
ACTION 1
BACKUPPROFILE ORCREDO
NOVELLPROFILE EVEREX
USERID XYZ
MERGE 3
STORAGETYPE 2
RECORDSIZE 6000
COMPRESSLEVEL 0
RESTARTTYPE 0
ATTENDED Y
REPORTOPTIONS 6
REPORTNAME USORACLE.RPT
```

```
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\LOGFILE\*.LOG       * REDO LOG FILES
SPECTYPE 0
ARCHIVEBIT N
*
SPECNUMBER 2
FILES O:\ORACLE\CONTROL\*.BKP       * BACKUP CONTROL FILE
SPECTYPE 0
ARCHIVEBIT N
*
ENDPARM
/*
//
```

### 27.3.13. Recovering Your ORACLE Database

In every database system, the possibility of a system or media failure is always present. In some cases you may also need to recover to a point in time in the past in order to undo erroneous operational or programmatic changes to a database. Before recovering a database, you must choose an appropriate recovery method. Regular database backups taken using UPSTREAM and the previously outlined backup procedures will provide you with all the necessary components to perform a successful recovery.

For illustrative purposes, this section outlines the following UPSTREAM/ORACLE database recovery scenarios:

- **OFFLINE Mode Recovery**
- **ONLINE, Tablespace Mode Recovery**

These scenarios represent the sample database recovery options for ORACLE database users that performed backups, based upon the previously supplied backup scenarios, that will insure full database integrity. Any other scenarios should be carefully reviewed in order to limit your exposure to the loss of data.

### 27.3.14. OFFLINE Mode Recovery

This recovery scenario assumes that you used any of the OFFLINE mode backup procedures previously outlined. During the backup, you took the ORACLE operating environment down and performed FULL backups of the database and its additional components (control files, REDO logs, etc.).

To perform this type of recovery the following steps must be taken:

- 1) Shutdown the ORACLE Database
- 2) Restore the ORACLE Database components
- 3) Restart the ORACLE Database

**Step # 1) Shutdown the ORACLE Database**

Before performing an ORACLE OFFLINE Database recovery it will be necessary to shutdown the ORACLE database, if it is currently operating. You have two options for controlling this operation, you can use either the Oracle Database Manager GUI application to manually shut down the database or a predefined SQL procedure.

As with the processes outlined earlier, we will be outlining the second approach utilizing mainframe initiation. This approach will allow for the automatic scheduling of the recovery operation and not require manual intervention. The following example outlines a minimal ORACLE database shutdown of host and workstation components.

**Workstation Command File (STOPORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STOPORC.SQL
```

**Workstation SQL File (STOPORC.CMD) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
SHUTDOWN NORMAL;
EXIT;
```

**Host JCL:**

```
//STOPORC  JOB (ACCOUNTING INFO),'STOP ORACLE', CLASS=A
//*
//*        HALT ORACLE DATABASE OPERATION
//*
//STOP     EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=YOUR.UPSTREAM.LOAD.LIBRARY
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=UPSTR
USAPPL=UPSTREAM
MAXRETRY=1
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\UPSTREAM\ORACLE\STOPORC.CMD
ENDPARM
/*
//
```

Use your operating system specific “Oracle Database Tools” guide for the exact command line interface parameters required to support your environment. The samples above were configured for an OS/2 client workstation and with ORACLE running as a NetWare NLM.

**Step # 2) Restore the ORACLE Database Components**

**Host JCL:**

```
//RESTORE  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
```

```
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 0
BACKUPPROFILE TEST001
NOVELLPROFILE EVEREX
RECORDSIZE 6000
ATTENDED Y
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\*.*     * ORACLE DATABASE FILES
SUBDIRECTORIES Y
SPECTYPE 0
*
SPECNUMBER 2
FILES O:\ORACLE\CONTROL\*.*      * ORACLE CONTROL FILES
SUBDIRECTORIES Y
SPECTYPE 0
*
SPECNUMBER 3
FILES O:\ORACLE\LOGFILES\*.*     * ORACLE REDO LOG FILES
SUBDIRECTORIES Y
SPECTYPE 0
*
ENDPARM
/*
//
```

**Step 4) Startup the ORACLE Database Server**

Once the database recovery has completed successfully, the ORACLE database needs to be restarted. The following JCL will invoke an ORACLE SQL command to restart the database.

**Host JCL:**

```
//STARTORC EXEC PGM=USTBATCH
//STEPLIB  DD DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD SYSOUT=*
//USTLOG   DD SYSOUT=*
//USTPARM  DD *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
TRACE N
JOBOPTIONS 3
SPECNUMBER 1
```

```
FILES C:\TESTS\STARTORC.CMD
ENDPARM
/*
//
```

**Workstation Command File (STARTORC.CMD) :**

```
CD \UPSTREAM
SQLDBA @STARTORC.SQL
```

**Workstation SQL File (STARTORC.SQL) :**

```
CONNECT INTERNAL/ORACLE@EVEREX;
STARTUP EXCLUSIVE PFILE=C:\TESTS\INITORCL.ORA;
EXIT;
```

### 27.3.15. Online, Tablespace Mode Recovery

When backing up in Online Tablespace mode, there are several database components that you will need to provide in order to perform a successful recovery. These components are:

- **Database Tablespace backups**
- **ORACLE Control Files**
- **REDO log files**

In order to perform an Online, Tablespace type restore the following criteria should be reviewed carefully:

- When the database is initially created or when you have decided to start backing it up, you need to perform a full Offline backup. This is the foundation for your backups, which provides copies of all datafiles and the control file of the database.
- Take partial backups of your database to update backed up information in the full Offline backup. The datafiles of extensively used tablespaces should be backed up frequently to reduce database recovery time, should recovery ever be required. The closer the last **FULL** backup is to the time of the failure, the fewer REDO log files that will need to be applied to recover the database.
- Every time you make a structural change to the database, take a control file backup.
- Take backups of archived REDO log files on a regular basis and after periods of high activity or important changes.

**Procedures**

The following section describes how to perform an **Online Tablespace** restore of your ORACLE Database using FDR/UPSTREAM. The assumption is that the database is currently started. If it is up, remove the STARTUP MOUNT command in step # 2.

As has been the case throughout this manual, these steps are outlined for mainframe initiation. If you wish to initiate from the FDR/UPSTREAM workstation side, use the parameter files embedded in the JCL to construct PC parameter files. These examples are intended to represent simple approaches for performing the most minimal of restores. You will need to review the platform specific sections of the FDR/UPSTREAM documentation in order to be sure that these parameter files meet your requirements.

**Step #1) Determine Required Tablespaces**

The first step will be to determine the tablespaces that you are going to restore and obtain the list of datafiles for those tablespaces. You can do this either using the Oracle Server Manager or by issuing the following SQL command:

```
SELECT  TABLESPACE_NAME,  FILE_NAME,  FROM  SYS.DBA_DATA_FILES;
```

**Step #2) Place Database Files Containing Tablespaces into OFFLINE Mode**

Use the following sample JOB to construct a platform specific command file that will place your selected ORACLE Tablespaces into Offline mode. While in this mode, any request to update the affected tablespace(s) will be denied.

**Host JCL:**

```
//ALTRORC  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****         ISSUE ORACLE ALTER COMMANDS          *****
//* ******************************************************
//*
//*
//CMDALTR  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDALTR.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDALTR.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDALTR.SQL
```

**SQL Command File (CMDBALTR.SQL):**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–    Place ORACLE Datafiles Tablespace(s) into OFFLINE Mode
–
STARTUP MOUNT;
ALTER    DATABASE    DATAFILE  'xxxxxxxx.xxx'   OFFLINE;
ALTER    DATABASE    OPEN;
ALTER    TABLESPACE  xxxxxxxx  OFFLINE;
```

**Step #3) Restore the Datafile(s)**

The following sample JOB will restore the datafiles containing tablespaces whose names were obtained in step #1 of this procedure. If the REDO logfiles have been destroyed also (media failure, accidental erasure, etc.) you should recover then in this step as well.

**Host JCL:**

```
//RESTORC  JOB (ACCOUNTING INFO),'RESTORE ORACLE', CLASS=A
//RESTORE  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 1
BACKUPPROFILE TEST001
NOVELLPROFILE EVEREX
USERID XYZ
MERGE 3
STORAGETYPE 2
RECORDSIZE 6000
COMPRESSLEVEL 0
RESTARTTYPE 0
ATTENDED Y
REPORTOPTIONS 6
REPORTNAME USORACLE.RPT
LOGNONFATAL Y
*
SPECNUMBER 1
FILES O:\ORACLE\DATABASE\xxxxxx.ORA    Oracle Database Files
SUBDIRECTORIES N
SPECTYPE 0
ARCHIVEBIT N
*
ENDPARM
/*
//
```

**Step #4) Recover the Tablespace(s)**

Use the following sample JOB to construct a platform specific command file that will recover your selected ORACLE Tablespaces from any subsequent REDO Logfiles that were created after the backup was taken.

**Host JCL:**

```
//BACKEND  JOB (ACCOUNTING INFO),'BACKUP ORACLE', CLASS=A
//* ******************************************************
//* *****       ISSUE ORACLE END BACKUP COMMAND        *****
//* ******************************************************
```

```
//*
//*
//CMDBORC  EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
LOGMODE=USTMODEMAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\CMDRCVR.CMD
ENDPARM
/*
//
```

**Operating System Command File (CMDRCVR.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @CMDRCVR.SQL
```

**SQL Command File (CMDRCVR.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–      Recover the applicable Oracle Tablespace(s)
–
RECOVER  TABLESPACE  xxxxxxxx;
```

**Step #5) Place OFFLINE Tablespace(s) Online**

Use the following sample JOB to construct a platform specific command file that will place the selected tablespace(s) into ONLINE mode. Following the completion of this step, your ORACLE users will be able to access the database normally.

**Host JCL:**

```
//ONLINE  JOB (ACCOUNTING INFO),'ORACLE', CLASS=A
//* ******************************************************
//* *****     Place ORACLE Tablespace(s) Online       *****
//* ******************************************************
//*
//*
//ALTER    EXEC PGM=USTBATCH
//STEPLIB  DD   DISP=SHR,DSN=USTEST.UPSTREAM.LOAD
//SYSUDUMP DD   SYSOUT=*
//USTLOG   DD   SYSOUT=*
//USTPARM  DD   *
APPLPREF=USTST
USAPPL=USTSAPPL
```

```
LOGMODE=USTMODE
MAXRETRY=0
CONV=WAIT
*
TARGLU=luname    or    TCPTARG=nn.nn.nn.nn
ACTION 5
ATTENDED Y
JOBOPTIONS 3
*
SPECNUMBER 1
FILES C:\TESTS\T16020\ALTRONLN.CMD
ENDPARM
/*
//
```

**Operating System Command File (ALTRONLN.CMD):**

```
SQLPLUS UPSTREAM/UPSTREAM@EVEREX  @ALTRONLN.SQL
```

**SQL Command File (ALTRONLN.SQL) :**

```
CONNECT UPSTREAM/UPSTREAM@EVEREX;
–
–     Place Tablespace(s) Online
–
ALTER  TABLESPACE XXXXXXXX  ONLINE;
```

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# 28 Errors

## 28.1. Overview

Communications packages, by their very nature, generate a large number of text messages, return codes, and the like. FDR/UPSTREAM provides superior message handling allowing you to understand and solve whatever problems occur.

Many of the FDR/UPSTREAM messages that are reported are accompanied by APPC primary and secondary return codes, TCP/IP return codes, operating system messages an more. If you have purchased a communications product from a vendor other than Innovation Data Processing, you should have their manual available to the system administrator for problem determination.

This section discusses how messages are displayed, how they are stored, and what they mean.

Note that the FDR/UPSTREAM messages are in the next chapter.

# 28.2. Problem Reporting

Our customers are very important to us. Our goal is always to provide prompt and courteous service.

Should you have any questions regarding the installation, implementation, or use of the FDR/UPSTREAM program product, please feel free to contact Innovation Data Processing Technical Support group listed below.

In the event you are having difficulty with FDR/UPSTREAM, please retain all the error information you can gather and contact the Innovation Data Processing Technical Support group listed below as soon as possible. We will make every effort to resolve the difficulty in the shortest possible time.

**Innovation Data Processing, Technical Support**
**275 Paterson Ave.**
**Little Falls, NJ 07424**

**Phone: (201) 812-7773**
**Fax: (201) 812-7384**
**Bulletin Board: (201) 812-7385**

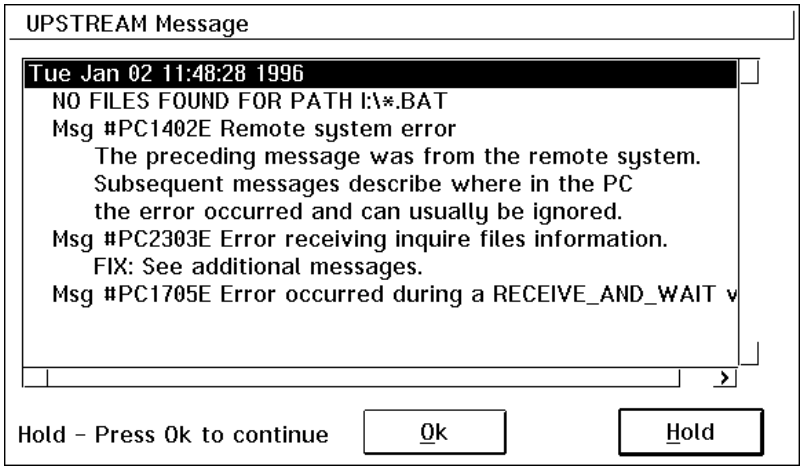
# 28.3. How Messages are Displayed

Messages generated in the FDR/UPSTREAM program (US.EXE) and the configurator (USCFG.EXE) are displayed as message dialogs with two buttons, <Ok> and <Hold>. When you press the <Ok> button, the message window goes away, when you press the <Hold> button any messages time-out is ignored and the message remains on the window until you press the <Ok> button.

The message dialog can also go away after a given amount of time if you specified a Messages Time Out in the FDR/UPSTREAM configurator. The amount of time remaining is displayed in the lower left corner of the message dialog; if you do not specify a Messages Time Out then *No Msgs Time Out Set* is displayed. You can also disable messages entirely (though this is not recommended - it can be confusing when using in an attended mode) with a Messages Time Out value of -1.

Messages may come from two different sources: FDR/UPSTREAM locally and FDR/UPSTREAM MVS. Figure 28-1 shows a message from FDR/UPSTREAM workstation/server and figure 27- shows a message generated by FDR/UPSTREAM MVS and displayed by FDR/UPSTREAM locally. Note that the host message is in upper in case and that it is always accompanied by workstation/server message #1402.

**Figure 28-1**
**Local FDR/UPSTREAM Message**




Both of the figures above show FDR/UPSTREAM displaying more than one message at a time in a single message window. This allows you to know as much as possible about the environment to assist you in your problem determination.

**Figure 28-2**
**Remote (Host) Reported Message**

# 28.4. The Message Log

The message log is a file where significant system messages are written. These messages may or may not have been written to the screen.

The message log file is a standard text file, and you can display it, print it, edit it or read it with standard text file programs (TYPE, PRINT, EDIT, etc.). The name of the log is configurable in the configurator. The default name and directory is:

```
C:\UPSTREAM\UPSTREAM.LOG
```

The figure below shows an example of messages in the message log.

```
Mon Jun 17 15:25:41 1991
   Msg #PC2050I Backup started
Mon Jun 17 15:26:10 1991
   Msg #PC2051D Backup successful
   5 files 7988 bytes 469 chars/sec
Wed Jun 19 12:08:07 1991
   Msg #PC2150I Restore started
Wed Jun 19 12:08:12 1991
   WORKSTATION NAME FAILED CONFIGURATION VERIFICATION
   Msg #PC1402E Remote system error
        The preceding message was from the remote system.
        Subsequent messages describe where in the PC
        the error occurred and can usually be ignored.
   Msg #PC2102E Error occurred during a restore receive descript
   Msg #PC1705E Error occurred during a RECEIVE_AND_WAIT verb
Wed Jun 19 12:08:42 1991
   Msg #PC2153I Restore failed
```

**Sample Message Log (UPSTREAM.LOG)**

# 28.5. USLOGCLR (Clearing the Log)

USLOGCLR.EXE is a program distributed with FDR/UPSTREAM which helps you maintain the message log (UPSTREAM.LOG, USSTART.LOG and USNDS.LOG) and the report files. Since the message log and the report files are standard text files, it will grow forever as messages continue to be added. Therefore, Innovation Data Processing distributes a program which shrinks the log and keeps it to a manageable size.

USLOGCLR.EXE allows you to reduce the size of the log by the number of days worth of log information that you wish to maintain. You run USLOGCLR from the command line with command line parameters. We recommend that you add USLOGCLR to your AUTOEXEC.BAT before the call the USSTART.

The syntax for USLOGCLR.EXE is:

```
USLOGCLR <Number of days old> <Log file name>
```

Where:

- **<Number of days old>** is a number from 0 to 32767 which indicates that entries which have been in the log longer than these number of days will be purged.
- **<Log file name>** is an optional parameter which is the name of the log or report file to clean. If you do not specify anything, the default of UPSTREAM.LOG is used.

If you run USLOGCLR.EXE without any parameters it displays a brief description of its calling conventions.

For example, if you wish to clean out all but the last 14 days of information from the default log, you would run USLOGCLR as follows:

```
USLOGCLR 14
```

As USLOGCLR.EXE runs, it writes the log entries it wishes to save to a temporary file, and then deletes the original log and renames the temporary file. Therefore, it is required that you have a certain amount of free disk space.

USLOGCLR.EXE writes to the screen the number of lines removed and the number of lines remaining. This information can be redirected with standard DOS redirection if you do not wish any display.

There is a version of USLOGCLR which is an NLM, designed to run on a file server to clear the USNDS.LOG or USRECALL.LOG. It operates the same as USLOGCLR.EXE, except that the default log file name is USNDS.LOG.

# 28.6. The Message File

Almost all FDR/UPSTREAM messages for both the configurator (USCFG.EXE) and the FDR/UPSTREAM program (US.EXE) are stored in the message file. The default name for the message file is UPSTREAM.MSG and you can change the name in the advanced configurator.

The message file is a standard DOS text file which can be viewed, printed or edited with standard DOS facilities (TYPE, PRINT, EDLIN, etc.). The format for messages in the log is:

```
[NUMBER][SEVERITY] [TEXT]
   [ADDITIONAL TEXT]
   ...
   [ADDITIONAL TEXT]
{ NEXT MESSAGE }
```

Where:

- **NUMBER:** The message number is a 4 digit number that the programs will look for when they have a particular message to log.
- **SEVERITY:** The severity is a single letter indicating what to do with the message. If the severity is a lower case letter and the message is displayed, then the message will not time out regardless of the Message Time Limit setting. There are several severities which include:
  - I: Informational message. These messages are only written to the log. They are not displayed or sent to the remote system. An example is a message indicating that there was an error during the restore and the message was already displayed.
  - N: Display but don't log. These messages are only displayed on the screen. They are not written to the log or sent to the remote system. Examples are configurator messages which do not need to be written to the log.
  - D: Display and log. These messages are displayed and written to the log but not sent to the remote system. Examples include statistics messages after transfers are complete.
  - W: Warning. These messages indicate that a significant, but not necessarily fatal event, has occurred. These messages are logged, displayed and sent to the remote system. An example would be during a restarted backup, when the backup must restart from the beginning. This is significant, but the operation can continue.
  - E: Error. These messages indicate that an error has occurred. These are usually (but not always) fatal. These messages are logged, displayed and sent to the remote system. Examples would be file errors during a backup.
- **TEXT:** This is text describing the message.
- **ADDITIONAL TEXT:** Any additional lines of text you wish logged or displayed (up to a total for the window of 10 lines). Each line of text must have a character in column 1.

There are several advantages with this scheme:

- You can change the message text. If you wish to customize the messages for your installation you can. This also simplifies foreign language issues.
- You can change the message severity. For example, if you wished that statistics not be displayed to users, you could change the severity from 'D' to 'I'.
- You can find messages in your message file. If you are performing problem determination for a user, you can use your text editor to find the message associated with a message number in your copy of the message file.
- Program size is decreased. FDR/UPSTREAM does not contain the text for these messages in its code.

If the message file is not found, or there is an error reading the message file, the message is handled as if it had severity 'E', and you will see a message logged in place of the normal text which can include:

- ☐ Error reading msg file: <error text>

  This means that there was a file error reading through the message file. The file error text describes the DOS error.

- ☐ Message not found.

  The message requested by FDR/UPSTREAM was not found in the message file.

- ☐ Error opening msg file: <error text>

  There was an error when FDR/UPSTREAM attempted to open the file to log a message. The file error text describes the error encountered.

- ☐ Message file not defined

  This means that the message file name was not defined or removed from the advanced configurator.

If you choose to modify the message file, remember the following guidelines:

- Each message can be no more than 56 characters long.
- There can be no more than 10 lines of message text in a message window. The safest route is to not add any more additional message text than exists currently.
- New messages begin with a number in column 1.
- The end of each message's additional text is denoted with a non-blank in column 1.

# 28.7. DOS Memory

DOS, with its 640K limitation, is inherently always short of memory. FDR/UPSTREAM with its complex functionality is also a large memory consumer, so you may run into memory errors.

The FDR/UPSTREAM program, US.EXE (it was known as USOVL.EXE in prior versions) takes advantage of extended memory if an extended memory manager is loaded (such as HIMEM.SYS). You should run FDR/UPSTREAM in an environment with at least 1MB of extended memory on a 286 PC or higher to take advantage of this facility. If you need to run FDR/UPSTREAM on a 8088 PC or have no extended memory on your PC, contact Innovation Data Processing for a special version of FDR/UPSTREAM or use USMEM (below).

FDR/UPSTREAM's unattended operations program USSTART unloads other applications currently running which will help in freeing memory. Remember that when testing with FDR/UPSTREAM that you should have as much memory as possible free as USSTART will unload other applications in unattended mode.

Memory errors come in two types: FDR/UPSTREAM message boxes explaining that there was a problem performing a function due to a memory shortage, or a window system message beeping and indicating "Out of memory". For the latter, it is recommended that you reboot your machine and work on how to reduce FDR/UPSTREAM's consumption of memory.

FDR/UPSTREAM can take less memory by any of the following methods:

- Use the low-memory version of FDR/UPSTREAM (see below).
- Reduce the record size. There must be a buffer in memory to hold the record.
- Turn off compression. When compression is requested, FDR/UPSTREAM allocates TWO buffers, of the size of the record size.
- Reduce the number of file specs. Each file spec takes a certain amount of memory.
- In your APPC, reduce the pacing counts and RU sizes. For APPC/PC this will allow you to reduce the workspace size.

DOS version 5 (and above) and memory managers will help you increase the amount of memory available within the DOS memory space.

### 28.7.1. USMEM.EXE

USMEM.EXE is a separate version of FDR/UPSTREAM designed for the sole purpose of reducing the memory required for FDR/UPSTREAM.

This version uses less memory by utilizing a sophisticated virtual memory scheme. Parts of the FDR/UPSTREAM program are continually swapped out to EMS or XMS memory or disk.

This version is not recommended unless you have memory problems, as it is usually slower than the standard version of FDR/UPSTREAM. However, when you begin to have DOS memory problems, this is a good starting point.

USMEM.EXE is used just like the standard version of FDR/UPSTREAM. You may even choose to rename it to US.EXE for simplicity. TCP/IP users will want to rename it to US.EXE (as the parent program will start US.EXE).

It is recommended that if you are using this version that you have EMS or XMS memory, as it is significantly faster when paging to memory versus disk. Many users have XMS memory defined, as the device driver HI-MEM.SYS is installed automatically with many applications including DOS 5.0 (and above).

If you do not have EMS or XMS memory, be sure to have at least 250K free on disk for swapping.

# 28.8. APPC Return Codes

Most of the APPC vendors support a set of primary and secondary return codes defined in the IBM APPC/PC® product. However, some of the vendors have added new return codes and some return codes have additional meanings. In general, the final source for APPC return code information is the APPC return code guide provided by your APPC vendor.

Note that if your APPC provides logging (for example, Irma for the Mainframe provides an excellent diagnostics facility), that log should be checked for text descriptions of problems before checking this guide.

***(OS/2 only)*** These return codes can be found on-line in the *Problem Determination Guide* in the CM/2 Icon view (may require the specific installation of this Guide). In some cases a sense code may also be returned. These sense codes are also available in the Problem Determination Guide.

The following is a list of the standard APPC primary and secondary return codes.

- ☐ 0000: Ok
  **Description:** APPC executed the verb as specified.
  **Action:** No action is required.

- ☐ 0001: Parameter Check
  **Description:** There was an error due to an incorrect parameter.
  **Action:** See the secondary return code for more information.

  - 00000001: Bad TP_ID
    **Description:** APPC does not recognize the specified transaction program ID (TP ID).
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000002: Bad Conversation ID
    **Description:** APPC does not recognize the specified conversation ID.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000003: Bad LU ID
    **Description:** APPC does not recognize the specified LU ID.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000006: Data Area Across Segment
    **Description:** APPC does not permit PIP data to cross a segment boundary.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000010: Bad TPN Length
    **Description:** The value that TPN_LENGTH (transaction program name length) specifies is too short (less than 1) or too long (greater than 64).
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000011: Bad Conversation Type
    **Description:** APPC does not recognize the specified conversation type.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000012: Bad Synchronization Level
    **Description:** APPC does not recognize the specified SYNC_LEVEL type.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000013: Bad Security Selected
    **Description:** APPC does not recognize the specified SECURITY type.
    Action: Call FDR/UPSTREAM technical support.
  - 00000014: Bad Return Control
    **Description:** APPC does not recognize the specified RETURN_CONTROL value.
    Action: Call FDR/UPSTREAM technical support.

- 00000015: Security Information Too Long
  **Description:** APPC doe not accept a password or a user ID that is greater than 10 bytes.
  **Action:** Verify that you specified a correct user ID and password.
- 00000016: PIP Length Incorrect
  **Description:** APPC does not accept PIP data that is longer than 32767 bytes.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000017: SNASVCMG Mode Name
  **Description:** APPC does not permit the EBCDIC mode name SNASVCMG.
  **Action:** Use a different mode name.
- 00000018: Unknown Partner Mode
  **Description:** APPC does not recognize the specified partner LU or mode name.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000031: Confirm on Sync Mode
  **Description:** APPC does not permit the program to use this verb if it allocated the conversation with SYNC_LEVEL(NONE).
  **Action:** Call FDR/UPSTREAM technical support.
- 00000051: Deallocate Bad Type
  **Description:** APPC does not recognize the specified TYPE.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000057: Log LL Wrong
  **Description:** The LOG_DATA_LENGTH does not match the value on the LL field of the LOG_DATA.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000091: Invalid Length
  **Description:** The program specified an illegal value for the MAX_LENGTH parameter.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000093: Post on Receipt Bad Fill
  **Description:** The program specified an illegal value for the FILL parameter.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000A1: Prepare to Receive Invalid Type
  **Description**: APPC does not recognize the specified TYPE.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000B5: Receive and Wait Bad Fill
  **Description:** The program specified an illegal value for the FILL parameter.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000C4: Receive Immediate Bad Fill
  **Description:** The program specified an illegal value for the FILL parameter.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000F1: Bad LL
  **Description:** DATA contains an invalid logical record length (LL) value of hex 0000, 0001, 8000, or 8001.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000102: Log LL Wrong
  **Description:** The LL field of the log data does not match the specified length.
  **Action**: Call FDR/UPSTREAM technical support.
- 00000103: Bad Type
  **Description:** APPC does not recognize the specified error TYPE.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000153: All Modes Must Reset
  **Description:** APPC does not permit the specification of a non-zero session limit when the MODE_NAME_SELECT parameter indicates ALL.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000154: Bad SNASVCMG Limits
  **Description:** The application subsystem has specified invalid settings for the PARTNER_LU_MODE_SESSION_LIMIT, MIN_CONWINNERS_SOURCE, or MIN_CONWINNERS_TARGET parameters when MODE_NAME(SNASVCMG) is indicated.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000155: Minimum Greater-than Total
  **Description:** The sum of MIN_CONWINNERS_SOURCE and MIN_CONWINNERS_TARGET is greater than the value specified for the PARTNER_LU_MODE_SESSION_LIMIT.
  **Action:** Call FDR/UPSTREAM technical support.

- 00000156: Mode Closed
  **Description:** CNOS cannot set a non-zero limit because the local maximum negotiable session limit is currently zero for the specified mode.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000157: Bad Mode Name
  **Description:** The specified partner LU does not support the specified Mode Name.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000159: Reset SNA Drains
  **Description:** The SNASVCMG mode does not support the DRAIN settings (CNOS).
  **Action:** Call FDR/UPSTREAM technical support.
- 0000015A: Single Not Source Responsible
  **Description:** For a single session mode (for which PARTNER_LU_SESSION_LIMIT = 1) for the SNASVCMG mode, APPC permits only the local LU to be responsible for deactivating sessions.
  **Action:** Call FDR/UPSTREAM technical support.
- 0000015B: Bad Partner LU
  **Description:** APPC does not recognize the specified partner LU name.
  **Action:** Call FDR/UPSTREAM technical support.
- 0000015C: Exceeds Maximum Allowed
  **Description:** The local maximum negotiable session limit is less than the session limit specified with the CNOS verb.
  **Action:** Call FDR/UPSTREAM technical support.
- 0000015D: Change Source Drains
  **Description:** APPC does not permit a program to specify MODE_NAME_SELECT(ONE) and DRAIN_SOURCE(YES) when DRAIN_SOURCE(NO) is currently in effect for the specified mode.
  **Action:** Call FDR/UPSTREAM technical support.

☐ 0000001: Bad TP ID
**Description:** APPC does not recognize the specified TP ID.
**Action:** Call FDR/UPSTREAM technical support.

☐ 0002: State Check
**Description:** The action requested was out of context.
**Action:** See the secondary return code.

- 00000032: Confirm Bad State
  **Description:** The conversation is not in send state.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000033: Confirm Not LL Body
  **Description:** The conversation is in send state, and the program started, but did not finish, sending a logical record.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000041: Confirmed Bad State
  **Description:** The conversation is not in confirm state.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000052: Deallocate Flush Bad State
  **Description:** The program specified the TYPE(SYNC_LEVEL) parameter on a conversation specified with SYNC_LEVEL = NONE when the conversation was not in the send state. Alternatively, the program can cause this error by specifying TYPE(FLUSH) when the conversation is not in send state.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000053: Deallocate Confirm Bad State
  **Description:** The program specified the TYPE(SYNC_LEVEL) parameter on a conversation specified with SYNC_LEVEL = CONFIRM when the conversation was not in send state.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000055: Deallocate Not LL Body
  **Description:** The program specified the TYPE(FLUSH) or the TYPE(SYNC_LEVEL) parameter, the conversation is in send state, and the program started but did not finish sending a logical record.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000061: Flush Not Send State
  **Description:** The conversation must be in send state to flush the local LU's send buffer.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000092: Post on Receipt Not Receive State
  **Description:** The conversation is not receive state.
  **Action:** Call FDR/UPSTREAM technical support.

- 000000A2: Unfinished LL.
  **Description:** The conversation is in send state, and the program started, but did not finish sending a logical record.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000A3: Prepare to Receive Not In Send State
  **Description:** The conversation is not in send state.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000B1: Receive and Wait Bad State
  **Description:** The conversation is not in send or receive state.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000B2: Receive and Wait Not LL Body
  **Description:** The conversation is in send state, and the program started, but did not finish sending a logical record.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000C1: Receive Immediate Not In Receive State
  **Description:** The conversation is not in receive state.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000E1: Request To Send Not In Receive State
  **Description:** The conversation is not in receive or confirm state.
  **Action:** Call FDR/UPSTREAM technical support.
- 000000F2: Send Data Not In Send State
  **Description:** The conversation is not in send state.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000122: Not Receive State
  **Description:** The conversation is not in receive state and the program specified the POSTED option for the TYPE parameter.
  **Action:** Call FDR/UPSTREAM technical support.
- 00000151: CNOS Session Limit Not Zero
  **Description:** APPC does not permit a program to change the session limit to a non-zero value unless the limit is already zero.
  **Action:** Call FDR/UPSTREAM technical support.

☐ 0003: Allocation Error
Description: APPC could not properly allocate a conversation.
Action: Check your session parameters.

- 00000000:
  **Description:** Most often returned by AdaptSNA, same as Allocation Failure No Retry.
- 00000004: Allocation Failure No Retry
  **Description:** APPC cannot allocate the conversation on a session because of a permanent condition. For example, the current mode session limit for the specified partner LU is 0; or because of a system definition error or a session-activation protocol error before it could allocate the conversation.
  The program should not try the conversation again until the condition is corrected.
  **Action:** Verify that FDR/UPSTREAM is running on the mainframe. Verify that the mode entry is in the host VTAM mode table (MODETAB) specified. Run a trace to see if the link is being properly activated. If it is, then check the sense codes and other data for suggestions. If there is nothing in the trace, for the IBM Token-ring adapter, check that the adapter number setting in the Token-ring configuration menu matches the switch setting on the adapter card and the partner LU address specified. For SDLC, check that any modems are properly connected. Check that the station role in the SDLC configuration menu is properly set at primary, secondary or negotiable, and that this corresponds to the settings at the partner node. Check that the NRZI setting in the SDLC configuration menu matches the NRZI setting of the partner node. Restart APPC.
- 00000005: Allocation Failure Retry
  **Description:** APPC cannot allocate the conversation because of a temporary condition. For example, APPC cannot activate the session to be used for the conversation because of a temporary lack of resources at the local LU or because APPC deactivated the session in response to a line or modem failure before it could allocate the conversation. The program can try the conversation again. APPC/PC will report this error if it has partially completed activating the session. FDR/UPSTREAM will retry this up to 10 times before reporting this error.
  **Action:** Re-verify your communications parameters. Retry - some conditions are immediately retryable. For the Token-ring adapter, check that the adapter number setting in the Token-ring configuration menu matches the switch setting on the adapter card and the partner LU address specified. For SDLC, check that any modems are properly connected. Check that the station role in the SDLC configuration menu is properly set at primary, secondary or negotiable, and that this corresponds to the settings at the partner mode. Check that the NRZI setting in the SDLC configuration menu matches the NRZI setting of the partner node.
- 10086034: Conversation Type Mismatch
  **Description:** The remote LU rejected the allocation request because it or the remote transaction program does not support the specified conversation type.
  **Action:** Call FDR/UPSTREAM technical support.
- 10086031: PIP Not Allowed
  **Description:** The remote LU rejected the allocation request because the local transaction program specified program initialization

parameters and either the remote LU does not support PIP data or the remote transaction program has no PIP variables defined.
**Action:** Call FDR/UPSTREAM technical support.

- 10086032: PIP Not Specified Correctly
  **Description:** The remote LU rejected the allocation request because the remote transaction program has one or more PIP variables defined and the local transaction program has specified that no PIP variables are to be used. This secondary return code can also indicate that the number of PIP variables defined by the local transaction program is different than the number specified by the remote transaction program.
  **Action:** Call FDR/UPSTREAM technical support.
- 080F6051: Security Not Valid
  **Description:** The remote LU rejected the user ID or password supplied.
  **Action:** FMH-5 security is not used by FDR/UPSTREAM. Call technical support.
- 10086041: Sync Level Not Supported
  **Description:** The remote program rejected the allocation request because the local transaction program specified an unrecognized or unacceptable SYNC_LEVEL type.
  **Action:** Call FDR/UPSTREAM technical support.
- 10086021: TPN Not Recognized
  **Description:** The remote LU rejected the allocation request because the local transaction program specified a remote transaction program name that the remote LU does not recognize. This return code can also indicate that the remote LU recognized the TPN but could not initiate the TPN using the designated partner LU or mode name.
  **Action:** Check the validity of your partner and mode parameters. Verify that FDR/UPSTREAM MVS was correctly installed and is available.
- 084C0000: Transaction Program Not Available - No Retry
  **Description:** The remote LU rejected the allocation request because it cannot start the specified transaction program.
  **Action:** Check the validity of your partner and mode parameters. Verify that FDR/UPSTREAM MVS was correctly installed and is available.
- 084B6031: Transaction Program Not Available - Retry
  **Description:** The remote LU rejected the allocation request because it cannot start the specified transaction program immediately.

  **Action:** Retry the transfer. Verify that FDR/UPSTREAM MVS was correctly installed and is available.

☐ 00000003: Bad LU ID
**Description:** APPC does not recognize the specified LU ID.
**Action:** Call FDR/UPSTREAM technical support.

☐ 0005: Deallocate Abend
**Description:** The source of the error notification is either the remote transaction program or the remote LU. The remote transaction program causes this error notification by issuing a DEALLOCATE verb specifying the TYPE(ABEND) parameter. Alternatively, the remote LU can issue a DEALLOCATE because of a remote transaction program ABEND condition.
**Action:** Check the remote system log.

☐ 0006: Deallocate Abend Program
**Description:** The remote transaction program or the remote LU causes this error notification by issuing a DEALLOCATE verb specifying the TYPE(ABEND_PROG) parameter. If the conversation for the remote transaction program is in receive state when the DEALLOCATE occurs, information sent by the local transaction program, and not yet received by the remote transaction program, is purged. APPC reports this return code on a verb the program issues in send or receive state when the remote transaction program is purged. APPC reports this return code on a verb the program issues in send or receive state when the remote transaction program or remote LU deallocates the conversation.
**Action:** Check the remote system log.

☐ 0007: Deallocate Abend SVC
**Description:** The remote transaction program or the remote LU causes this error notification by issuing a DEALLOCATE verb specifying the TYPE(ABEND_SVC) parameter. If the conversation for the remote transaction program is in receive state when the DEALLOCATE occurs, information sent by the local program, and not yet received by the remote program, is purged. APPC reports this return code on a verb the program issues in send or receive state when the remote program or remote LU deallocates the conversation.
**Action:** Call FDR/UPSTREAM technical support.

☐ 0008: Deallocate Abend Timer
**Description:** The remote transaction program causes this error notification by issuing a DEALLOCATE verb specifying the TYPE (ABEND_TIMER) parameter. If the conversation for the remote transaction program is in receive state when the DEALLOCATE occurs, information sent by the local transaction program, and not yet received by the remote transaction programs, is purged. APPC reports this return code on a verb the transaction program issues in send or receive state when the remote transaction program or remote LU deallocates the conversation.
**Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000008: No PU Attached
  **Description:** Reported on an ACTIVATE_DLC verb, APPC has not yet received a valid ATTACH_PU verb.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0009: Deallocate Normal
  **Description:** The remote transaction program issued a DEALLOCATE specifying the TYPE(SYNC_LEVEL) or TYPE(FLUSH) parameter. APPC reports this return code on a verb the local transaction program issues in receive state.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000A: Data Posting Blocked
  **Description:** APPC cannot post one of the active conversations because the APPC internal workspace storage is in use and the program is unable to send a pacing response. The condition is temporary.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000B: Posting Not Active
  **Description:** Posting is not active for the specified conversations
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000C: Program Error - No Truncation
  **Description:** The remote transaction program issued a SEND_ERROR specifying the TYPE(PROG) parameter, the conversation for the remote transaction program was in send state, and the SEND_ERROR did not truncate a logical record. No truncation occurs when a program issues a SEND_ERROR before sending any logical records or after sending a complete logical record. APPC reports this return code on a receive verb and the conversation remains in receive state.
  **Action:** This is an indication that the remote system wishes to notify you of some type of event. It is usually followed by a text message. If this message does not appear, check the log on the remote system.

- ☐ 000D: Program Error - Truncation
  **Description:** The remote transaction program issued a SEND_ERROR specifying the TYPE(PROG) parameter, the conversation for the remote transaction program was in send state, and the SEND_ERROR truncated a logical record. Truncation occurs when a program begins sending a logical record and then issues SEND_ERROR before sending the complete logical record. APPC reports this return code on a RECEIVE_AND_WAIT or RECEIVE_IMMEDIATE verb the local transaction program issues after receiving the truncated logical record.
  **Action**: This is an indication that the remote system wishes to notify you of some type of event. It is usually followed by a text message. If this message does not appear, check the log on the remote system.

- ☐ 000E: Program Error Purging
  **Description:** The remote transaction program issued a SEND_ERROR verb specifying the TYPE(PROG) parameter in receive or confirm state. If the remote transaction program issues a SEND_ERROR verb when it is in receive state, information sent to, but not yet received by, the remote transaction program is purged. APPC normally reports this return code on a verb the local transaction program issues after sending information to the remote transaction program. However, APPC can also report this return code on a verb the program issues before sending any information, depending on the verb and when the program issues it. The conversation remains in receive state.
  **Action:** This is an indication that the remote system wishes to notify you of some type of event. It is usually followed by a text message. If this message does not appear, check the log on the remote system.

- ☐ 000F: Conversation Failure - Retry
  **Description:** A temporary failure prematurely terminated the conversation.
  **Action:** Retry. Check the remote system log.

- ☐ 0010: Conversation Failure - No Retry
  **Description:** A permanent failure prematurely terminated the conversation.
  **Action:** The condition is not temporary; operator intervention is necessary to correct the problem. Check the remote system log.

- ☐ 0011: SVC Error - No Truncation
  **Description:** The remote transaction program or remote LU issued a SEND_ERROR specifying the TYPE(SVC) parameter, the conversation for the remote transaction program was in send state, and the SEND_ERROR did not truncate a logical record. No truncation occurs when a program issues SEND_ERROR before sending any logical records or after sending a complete logical record. APPC reports this return code on a receive verb and the conversation remains in receive state.
  **Action:** The condition is not temporary; operator intervention is necessary to correct the problem.

- ☐ 0012: SVC Error - Purging
  **Description:** The remote transaction program or remote LU issued a SEND_ERROR specifying the TYPE(SVC) parameter, the conversation for the remote transaction program was in send state, and the SEND_ERROR truncated a logical record. Truncation occurs when a program begins sending a logical record and then the program or LU issues a SEND_ERROR before sending a complete logical record. APPC reports this return code on a RECEIVE_AND_WAIT or RECEIVE_IMMEDIATE verb the local transaction program issues after receiving the truncated logical record.
  **Action:** The condition is not temporary; operator intervention is necessary to correct the problem.

- ☐ 0013: SVC Error - Purging
  **Description:** The remote transaction program or remote LU issued a SEND_ERROR specifying the TYPE(SVC) parameter in receive or confirm state. If the remote transaction program issues a SEND_ERROR verb when it is in receive state, information sent to, but not yet received by, the remote transaction program is purged. APPC reports this return code on a verb the local transaction program issues after sending information to the remote transaction program. However, APPC can also report this return code on a verb the program issues before sending any information, depending on the verb and when the program issues it. The conversation remains in receive state.
  **Action:** The condition is not temporary; operator intervention is necessary to correct the problem.

- ☐ 0014: Unsuccessful
  **Description:** The program specified RETURN_CONTROL(IMMEDIATE) on the allocation request and APPC could not allocate the conversation because no contention winner sessions were available.
  **Action:** Unload APPC, and verify that you have check the Contention Winner box in the advanced configurator (USCFG.EXE), and retry.

- ☐ 0018: CNOS Partner Reject
  **Description:** The partner LU rejected a CNOS request from the local LU because of a condition specified in one of the secondary return codes.
  **Action:** Take the action described for the indicated secondary return code.
  - 00000156: CNOS Mode Closed
    **Description:** The local LU cannot negotiate a non-zero session because the local maximum session limit of the partner LU is zero.
    **Action:** Check the session limit for the specified mode name on the remote LU.
  - 00000157: CNOS Bad Mode Name
    **Description:** The partner LU does not recognize the specified Mode Name.
    **Action:** Check the partner LU Mode Name on the remote system.
  - 0000015F: CNOS Command Race Reject
    **Description:** APPC is currently processing a CNOS verb issued by the partner LU.
    **Action:** This is not an error condition. This secondary return code simply indicates that a race condition occurred during CNOS negotiation between two LUs.

- ☐ 0019: Conversation Type Mixed
  **Description:** FDR/UPSTREAM issued both basic and mapped conversation verbs on the same conversation.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000110: Bad State
  **Description:** TP_VALID does not follow a GET_ALLOCATE.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000001B1: Bad Partner LU Name
  **Description:** APPC does not recognize the supplied partner LU name parameter value.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000001B2: Bad Mode Name
  **Description:** APPC does not recognize the Mode Name parameter value.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000201: Already Active PU
  **Description:** The PU is already active and cannot be redefined at this time. This error can result if a previous DETACH_PU has not been completed.
  **Action:** Verify that you do not have two copies of FDR/UPSTREAM running (enter EXIT from the DOS command line).

- ☐ 00000211: Already Active LU
  **Description:** The LU is already defined.
  **Action:** Verify that you do not have two copies of FDR/UPSTREAM running (enter EXIT from the DOS command line).

- ☐ 00000212: Bad Partner Session
  **Description:** The session limit for an individual partner LU (PARTNER_LU_SESSION_LIMIT) is greater than the session limit permitted for all partner LUs (LU_SESSION_LIMIT).
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000213: Bad RU Sizes
  **Description:** The maximum RU size value of the MAX_RU_SIZE parameter is smaller than the minimum RU size value.
  **Action:** Verify the RU sizes. NOTE: For APPC/PC® you must use the same value for both the maximum and minimum RU sizes in FDR/UPSTREAM, and this value must be smaller than the value specified in the APPCONF program.

- ☐ 000000214: Bad Mode Session
  **Description:** The session limit for an individual mode name (MODE_MAX_NEGOTIABLE_SESSION_LIMIT) is greater than the session limit (PARTNER_LU_SESSION_LIMIT) permitted for all mode names used for sessions with the specific partner LU.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000216: Bad Pacing Count
  **Description:** The PACING_SIZE is not in the range of 0 to 63.
  **Action:** Verify that you have specified a valid pacing count in the advanced configuration menu (USCFG.EXE).

- ☐ 00000219: Extreme RUs
  **Description:** The upper bound for the MAX_RU_SIZE is too large or the lower bound is too small.
  **Action:** The low value must be at least 16 and the high value must not be more than allowed by the link station that is to carry the session traffic (specified as the MAX_RU_SIZE in the APPC configuration). NOTE: For APPC/PC® you must use the same value for both the maximum and minimum RU sizes in FDR/UPSTREAM, and this value must be smaller than the value specified in the APPCONF program.

- ☐ 0000021A: SNASVCMG 1
  **Description:** APPC does not accept the EBCDIC name SNASVCMG as the mode name for a single session connection to communicate data between transaction programs.
  **Action:** Using the mode name SNASVCMG implies parallel sessions are being used. Therefore, a single session connection cannot use the SNASVCMG mode name.

- ☐ 00000223: SSCP Connected LU
  **Description:** The program can issue DETACH_LU only for independent LUs that do not have active sessions with the SSCP.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000230: Invalid Change
  **Description:** The application subsystem has made an invalid change in the management of incoming ALLOCATEs.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000243: Too Many TPs
  **Description:** APPC is already running the maximum number of transaction programs that this LU can run concurrently (as defined with the MAX_TPS parameter in the ATTACH_LU verb). This return code indicates that the application subsystem cannot initiate the transaction program locally. The condition may be temporary if an incoming ALLOCATE was in the process of being rejected.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000272: Adapter Close Failure
  **Description:** APPC has experienced a failure while trying to close an adapter.
  **Action:** Check your adapter physical connections.

- ☐ 00000281: Get Allocate Bad Type
  **Description:** APPC does not recognize the parameter specified in the TYPE field.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000282: Unsuccessful
  **Description:** The LU is not currently holding any incoming ALLOCATEs in the queue.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00000283: DLC Failure
  **Description:** Reported on an ACTIVATE_DLC verb, This return code indicates on of many possible error conditions. For example, the adapter number may been incorrectly specified on the APPC configuration menus or on the ATTACH_LU verb. This return code can also indicate that the adapter address for the Token-ring network exists elsewhere on the token ring.
  **Action:** If the adapter is for the IBM Token-ring network, check switch 2 (the primary/secondary adapter switch) and verify that it match the adapter number parameter specified on the ACTIVATE_DLC and ATTACH_LU verbs, and the adapter number entry on the APPC configuration menus. If another program which uses the IBM Token-ring network adapter (such as the IBM NetBIOS program) was loaded before APPC, you may have to reload the other program again, specifying an adequate number of service access points and links for APPC operation. For more information of Service Access Point (SAP) operation, see the IBM Token-Ring Network NETBIOS Program User's Guide. For information on loading APPC refer to your APPC manual. If you unloaded APPC and moved to another IBM PC in the same token ring after your program issued ACTIVATE_DLC you must use a new soft address on the new IBM PC. Alternatively, you can free the original soft address by turning off the first IBM PC or by re-initializing the first IBM PC with the adapter diagnostic program after unloading APPC. This program is supplied with the IBM Token-ring network adapter.

- ☐ 00000284: Unrecognized DLC
  **Description:** APPC could not find the specified DLC name and adapter number in the configuration file.
  **Action:** Check the DLC name and adapter number supplied in the configuration file.

- ☐ 00000286: Duplicate DLC
  **Description**: Reported on an ACTIVATE_DLC verb, the specified DLC is already open.
  **Action:** Check the DLC name and adapter number on the ACTIVATE_DLC verb to see if they are correct. Verify that you don't already have a version of FDR/UPSTREAM already active (enter EXIT from DOS).

- ☐ 00000301: SSCP-PU Session Not Active
  **Description:** APPC could not send the NMVT because the SSCP-PU session was not active.
  **Action:** Contact the host operator to activate an SSCP-PU session.

- ☐ 00000302: Data Exceeds RU Size
  **Description:** The data exceeded the allowable RU size.
  **Action:** Reduce the size of data sent or check that the RU size is adequate.

- ☐ F001 or F0010000: APPC Disabled
  **Description:** APPC did not execute the verb because it was disabled.
  **Action:** Check for any other APPC programs operating. Call FDR/UPSTREAM technical support.

- ☐ F002 or F0020000: APPC Busy
  **Description:** APPC did not execute the verb because APPC was processing another verb. APPC can process only one verb at a time.
  **Action:** Wait unit APPC is not busy and then reissue the verb.

- ☐ F003 or F0030000: APPC Abended
  **Description:** APPC did not execute the verb because APPC has abnormally terminated.
  **Action:** Restart APPC. For APPC/PC® increase your workspace size. For Novell, check to be sure the gateway is still active.

- ☐ F004 or F0040000: Incomplete (DOS)
  **Description:** The issued verb has suspended without completing its defined function.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ F004: Communications Subsytem not loaded (non-DOS)
  **Description:** The communications manager is not loaded or has been brought down by manual control.
  **Action:** Stop FDR/UPSTREAM, restart communications manager and restart FDR/UPSTREAM.

- ☐ F005 or F0050000: Incomplete Altered Verb
  **Description:** A verb that has previously returned as INCOMPLETE was altered when it was re-issued.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ FEFF or FEFFxxxx: No CPIC mapping
  **Description:** CPIC was in use and the return code could not be mapped to an APPC/PC return code value. The secondary return code or the second half of the return code indicates the actual CPIC return code.
  **Action:** Call FDR/UPSTREAM technical support for an interpretation of the CPIC return code.

- ☐ FDFF or FDFFxxxx: Using internal location
  **Description:** CPIC was in use and the location of where the error occurred is reported. The secondary return code or the second half of the return code indicates the internal FDR/UPSTREAM location of where the error occurred.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ FFFF or FFFFFFFF: Invalid Verb
  **Description:** APPC did not recognize the supplied verb operation code and did not execute the verb. An incorrect AH value can also cause this return code.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 00010000: Parameter check
  **Description:** This is a 8 digit representation of a 4 digit return code (Parameter check) and an 8 digit secondary return code (0000 are the first 4 digits). In this case it is most likely a mismatch between the local LU alias defined in communications manager and the local LU alias defined in FDR/UPSTREAM.
  **Action:** Modify the local LU alias in the FDR/UPSTREAM configuration or your communications configuration.

# 28.9. DOS APPC/PC Log Exit Codes

This section describes the TYPE and SUBTYPE codes displayed when an FDR/UPSTREAM LU or PU log exit is reported (FDR/UPSTREAM error numbers 1310 and 1311).

Some of the terminology below is not defined in this manual. See the SNA Format and Protocol Reference Manual, for unfamiliar terms.

The boxed headings below describe the TYPE; the bullets underneath each type describe the SUBTYPE.

- ☐ 0001: Conversation error
  **Description:** Conversation error generated from a SEND_ERROR or a DEALLOCATE (TYPE=ABEND). The SUBTYPE describes the SNA sense code.
  **Action:** See any previous FDR/UPSTREAM error messages.

- ☐ 0002: Duplicate OAF-DAF address
  **Description:** Received an OAF-DAF address which duplicates one already active.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0003: Cannot route request to LU
  **Description:** Cannot reroute request to LU (the LU may not be ATTACHed or the LU name or NAU address may be incorrect).
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0004: OAF-DAF address space filled
  **Description:** OAF-DAF address space filled (Too many sessions may be active). This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0005: Begin bracket bit not set in RH
  **Description:** Begin bracket bit not set in RH. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0006: Received an unexpected RTR.
  **Description:** Received an unexpected RTR. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0007: Received an unexpected BIS reply.
  **Description:** Received an unexpected BIS reply. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0008: Basic conversation protocol error.
  **Description:** Conversation-level protocol error detected at the basic conversation level. The session is deactivated with an UNBIND indicating a type 'FE' protocol error. The SUBTYPE is the SNA sense code.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0009: Mapped conversation protocol error.
  **Description:** Conversation level protocol error detected for a mapped conversation. APPC/PC issues a DEALLOCATE TYPE(ABEND) for the conversation.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000A: BIND response with no outstanding request.
  **Description:** Received a BIND response with no outstanding request. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000B: NS header not recognized.
  **Description:** NS header not recognized on an SSCP-LU or SSCP-PU session. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000C: UNBIND syntax error.
  **Description:** Received an UNBIND request with syntax error. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000D: Session control request format error.
  **Description:** Received session control request with format error. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000E: UNBIND response with no outstanding request.
  **Description:** Received UNBIND response with no outstanding request. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 000F: INITSELF response with no outstanding request.
  **Description:** Received INITSELF response with no outstanding request. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0010: BIND error.
  **Description:** Received BIND request with syntax, state or semantic error. The SUBTYPE is a SNA sense code.
  **Action:** This usually indicates an error in the LU, partner LU or mode name definitions in the FDR/UPSTREAM configurator.

- ☐ 0011: Unexpected BIS.
  **Description:** Received unexpected BIS request. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0012: Invalid NS record.
  **Description:** Received invalid NS record. This is a protocol error.
  **Action:** If you see an LU log exit in the FDR/UPSTREAM log with a TYPE=0012 and a SUBTYPE=10030000, then this is merely an indication that the banner screen has been rejected by the APPC with no adverse effects. If you turn off the banner screen to this LU, the message will not re-appear. Otherwise, call FDR/UPSTREAM technical support.

- ☐ 0013: Session level protocol error.
  **Description:** Session level protocol error detected.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0014: Received bad frame.
  **Description:** Received fame from DLC in error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0015: Bracket error.
  **Description:** Bracket error. This is a protocol error.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0016: Line down.
  **Description:** Received route inop - line has gone down.
  **Action:** Restart the line. If the problem continues, call FDR/UPSTREAM technical support.

- ☐ 0017: NMVT message.
  **Description:** Network Management NMVT message.
  **Action:** Call FDR/UPSTREAM technical support.

  - 00000000: User defined data. For Token-Ring this generally means that the internal adapter counters have overflowed, and this can be ignored.
  - 00000001: A complete NMVT.
  - 00000002: TRANSFER_ALERT. This often indicates that the link level connection can not be established. Verify that the Node ID matches the IDNUM on the host definition (if you are using a 3172 or 3745), that the Token-Ring addresses match (particularly for a 3174 - the question 941 address must be configured in the PC), and that there is an adequate workspace size defined.
  - 00000003: TRANSFER_PDSTATS

- ☐ 0018: Error data GDS.
  **Description:** Received Error Data GDS variable from a partner on a mapped conversation. APPC/PC issues a DEALLOCATE(ABEND) for the conversation.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 0019: Security Error.
  **Description:** Session level security error (FMH-12).
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 001A: Conversation Level Security Error.
  **Description:** Conversation level security error (FMH-5).
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 001B: Link level error.
  **Description:** Token-ring link error.

  - 00000101: Invalid adapter.
    **Action:** Validate that you specified the correct adapter in the FDR/UPSTREAM configurator.
  - 00000102: Command not recognized.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000103: Invalid link ID.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000105: Invalid parameter table.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000106: Required parameter missing.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000107: Invalid parameter table field.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000108: Invalid number of connections.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000200: Adapter not open.
    **Action:** Verify that you have the Local Area Network Program installed.
  - 00000300: Duplicate command.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000400: Remote station not responding.
    **Action:** Verify that the remote connection (controller or front end) is currently active.
  - 00000500: DLC unsuccessful.
    **Action:** Retry the connection.
  - 00000600: DLC unsuccessful.
    **Action:** Call FDR/UPSTREAM technical support.
  - 00000700: XID protocol error.
    **Action:** Call FDR/UPSTREAM technical support. A line trace may be required.
  - 00000800: Connection failure.
    **Action:** Verify the link level parameters, as well as an adequate workspace size in APPCONF. Also validate the Token-Ring addresses for both computers.
  - 8xxxxxxx: DLC specific link level error.
    **Action:** Call FDR/UPSTREAM technical support.

- ☐ 001C: NMVT too large.
  **Description:** NMVT message too large for the RU size.
  **Action:** Call FDR/UPSTREAM technical support.

- ☐ 001D: Non-normal UNBIND.
  **Description:** Received non-normal UNBIND (Due to a protocol error or a DETACH_PU(HARD) verb).
  **Action:** Call FDR/UPSTREAM technical support. The SUBTYPES below refer to the UNBIND type.

  - 00000003: Session outage.
  - 00000006: Invalid parameters.
  - 00000007: Virtual route map.
  - 00000008: Route extension INOP.
  - 00000009: Hierarchical reset.
  - 0000000A: SSCP gone.

- 0000000B: Virtual route deactivated.
- 0000000C: Unrecoverable LU failure.
- 0000000E: Recoverable LU failure.
- 0000000F: Cleanup.
- 00000011: Gateway node cleanup.
- 000000FE: Protocol violation.

☐ FFFF: Abnormal termination of APPC/PC.
**Description:** The abnormal termination subtypes below indicate either an invalid configuration file or an APPC/PC program error.
**Action:** Verify that the local and remote pacing counts are not 0, that the workspace size is large enough and then restore or reconstruct the configuration file from the APPC/PC menus, if possible, to correct these problems. (For information on the APPC/PC menus refer to the APPC/PC Installation and Configuration Guide).

- 00000000: No available storage. APPC/PC will try to close adapters.
- 00000001: No available storage. APPC/PC cannot continue. If the IBM Token-ring network is left in an unstable state, the keyboard may be locked.
- 00000002: Process being created is unknown.
- 00000003: Process fell through to its end.
- 00000004: Sending to a nonexistent queue.
- 00000005: Receiving from a nonexistent queue.
- 00000006: Invalid variant variable in configuration file.

# 28.10. DOS APPC/PC Trace

If you are using IBM's APPC/PC and you are attempting to perform problem determination, the APPC/PC trace may help. FDR/UPSTREAM includes in its standard distribution a program, TRACE.EXE which enables and disables this trace.

To use the trace, you must have a printer attached and active on the default LPT1 parallel printer port, or a network printer redirecting LPT1 printer output. If you run out of paper or there is any other kind of printer problem, APPC/PC may hang.

To activate the trace, load APPC/PC normally. Then you run the program TRACE as follows:

```
TRACE <Parameter1> <Parameter2> ...
```

The parameters are:

- ON: Activates the trace.
- OFF: Deactivates the trace.
- API: When used with ON, will also activate the API trace.

To turn off the trace, run TRACE with the OFF parameter. You can turn off the trace while in FDR/UPSTREAM by selecting the DOS option from the File menu and running the trace program.

You can also turn off the trace by pressing the [SCROLL LOCK] key.

# 28.11. TCP/IP Messages

TCP/IP Messages are displayed as FDR/UPSTREAM messages #4800-4899 - see the next chapter for a listing of these and all other FDR/UPSTREAM messages.

Since each TCP/IP implementation uses different message numbers, FDR/UPSTREAM maps these messages into the UNIX ‘E’ messages and then to FDR/UPSTREAM messages in the above range.

For details about remedies for a specific message you will need to see your TCP/IP documentation.

# 28.12. Operating System Messages

Operating system messages are those messages which the operating system reports when an action is attempted that fails, usually file access. These messages can be reported in two ways.

- US.EXE and USCFG.EXE will attempt to find the error text associated with the message and display the text as an additional message. If the text is unknown, then the error number itself is displayed.
- USSTART.EXE and ULTRA.EXE report ALL operating system errors with the number alone.

OS/2 operating system numbers can be interpreted by entering from an OS/2 Window or Full screen:

```
HELP SYS<number>
```

Windows NT operating system numbers can be interpreted by entering from a DOS window:

```
NET HELPMSG <number>
```

Windows NT messages can also be interpreted using the LASTERR program available on the FDR/UPSTREAM BBS.

If the message number or text you get is not listed below, call FDR/UPSTREAM technical support for assistance.

☐ 0: Error 0
**Action:** This is a normal return code. Report this to FDR/UPSTREAM technical support.

☐ 1: Function number invalid
**Action:** This usually indicates that file sharing must be loaded or that there is a file sharing error.

☐ 2: No such file or directory
**Action:** The file that you attempted to open was not found or the directory did not exist. Respecify the file name.

☐ 3: Path not found or file doesn't exist.
**Action:** The file that you attempted to open was not found or the directory did not exist. Respecify the file name.

☐ 4: No handle available.
**Action:** The FILES= command in CONFIG.SYS specifies an inadequate number of files for FDR/UPSTREAM. Edit CONFIG.SYS to specify a higher number (we recommend at least 20), reboot your computer and retry.

☐ 5: Access denied
**Action:** This typically indicates an attempt to open a read-only or system file for write or that the file is in use. Either specify another file, close all other programs accessing the file, or run the ATTRIB.EXE program supplied with DOS to modify the read-only or system attribute.

☐ 7: Arg list too long
**Action:** Internal FDR/UPSTREAM error. Call FDR/UPSTREAM technical support.

☐ 8: Exec format error
**Action:** This may indicate that a file has been corrupted. Reinstall FDR/UPSTREAM and retry.

☐ 9: Bad file number
**Action:** May indicate file in use or other file sharing error. Close all other applications which may be accessing the file and retry.

☐ 12: Not enough core
**Action:** There is insufficient memory to perform the indicated function. Free memory by unloading TSRs or device drivers.

☐ 13: Permission denied
**Action:** Another program or computer has the requested file open. Have the other program or computer close the file and retry.

- ☐ 17: File exists
  **Action:** There was an attempt to create a file that was not supposed to exist. Delete the file and retry.

- ☐ 18: Cross-device link
  **Action:** This error most commonly occurs when you attempt to access a file on a LAN that another program or computer already has open. Have the other program or computer close the file and retry.

- ☐ 22: Invalid argument
  **Action:** Internal FDR/UPSTREAM error. Call FDR/UPSTREAM technical support.

- ☐ 24: Too many open files
  **Action:** The FILES= command in CONFIG.SYS specifies an inadequate number of files for FDR/UPSTREAM. Edit CONFIG.SYS to specify a higher number (we recommend at least 20), reboot your computer and retry.

- ☐ 28: No space left on device
  **Action:** The drive that you specified has inadequate free space for the operation requested. Either specify another drive or free disk space on the specified drive.

- ☐ 33: Math argument
  **Action:** Internal FDR/UPSTREAM error. Call FDR/UPSTREAM technical support.

- ☐ 34: Result too large
  **Action:** Internal FDR/UPSTREAM error. Call FDR/UPSTREAM technical support.

- ☐ 36: Resource deadlock would occur
  **Action:** Internal FDR/UPSTREAM error. Call FDR/UPSTREAM technical support.

# 28.13. Novell Errors

Novell return codes are reported when FDR/UPSTREAM attempts to perform some specific Novell function (retrieve or set non-file data, login to a server etc.). FDR/UPSTREAM will specifically denote the return code as a Novell return code.

Novell return codes are reported as hexadecimal values whose meanings are described below (the decimal value is in parens next to the hexadecimal values). In some cases there are more than one meanings for a particular return code. Often the context (the function being performed) will point you to the meaning. Contact Innovation Technical Support for any questions you may have concerning these return codes.

Requester/Shell Errors

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| 0x8800 | 0 | SHELL_ERROR | |
| | | VLM_ERROR | |
| | | ALREADY_ATTACHED | Attach attempted to server with valid, existing connection |
| 0x8801 | 1 | INVALID_CONNECTION | Request attempted with invalid or nonattached connection handle |
| 0x8802 | 2 | DRIVE_IN_USE | OS/2 only (NOT USED) |
| 0x8803 | 3 | CANT_ADD_CDS | Map drive attempted but unable to add new current directory structure |
| 0x8804 | 4 | BAD_DRIVE_BASE | Map drive attempted with invalid path specification |
| 0x8805 | 5 | NET_READ_ERROR | Attempt to receive from the selected transport failed |
| | | NET_RECV_ERROR | Attempt to receive from the selected transport failed |
| 0x8806 | 6 | UNKNOWN_NET_ERROR | Network send attempted with a nonspecific network error |
| 0x8807 | 7 | SERVER_INVALID_SLOT | Server request attempted with invalid server connection slot |
| | | BAD_SERVER_SLOT | Server request attempted with invalid server connection slot |
| 0x8808 | 8 | NO_SERVER_SLOTS | Attach attempted to server with no connection slots available |
| 0x8809 | 9 | NET_WRITE_ERROR | Attempt to send on the selected transport failed |
| | | NET_SEND_ERROR | Attempt to send on the selected transport failed |
| 0x880A | 10 | SERVER_NO_ROUTE | Attempted to find route to server where no route exists |
| 0x880B | 11 | BAD_LOCAL_TARGET | OS/2 only |
| 0x880C | 12 | TOO_MANY_REQ_FRAGS | Attempted request with too many request fragments specified |
| 0x880D | 13 | CONNECT_LIST_OVERFLOW | Too many connections to fit in the list size specified |

| | | | |
|---|---|---|---|
| 0x880E | 14 | BUFFER_OVERFLOW | Attempt to receive more data than the reply buffer had room for |
| 0x880F | 15 | NO_CONN_TO_SERVER | Attempt to get connection for a server not connected |
| | | NO_CONNECTION_TO_SERVER | Attempt to get connection for a server not connected |
| 0x8810 | 16 | NO_ROUTER_FOUND | OS/2 only |
| 0x8811 | 17 | BAD_FUNC_ERROR | Attempted function to non-existent or illegal function |
| | | INVALID_SHELL_CALL | Attempted function to non-existent or illegal function |
| 0x8830 | 48 | NOT_SAME_CONNECTION | Internal server request attempted across different server connections |
| 0x8831 | 49 | PRIMARY_CONNECTION_NOT_ SET | Attempt to retrieve default connection with no primary connection set |
| | | NO_PRIMARY_SET | Attempt to retrieve default connection with no primary connection set |
| 0x8832 | 50 | NO_CAPTURE_SET | Capture information requested on port with no capture in progress |
| | | NO_CAPTURE_IN_PROGRESS | Capture information requested on port with no capture in progress |
| 0x8833 | 51 | BAD_BUFFER_LENGTH | len requested on a GetDNC or SetDNC was too large. |
| | | INVALID_BUFFER_LENGTH | len requested on a GetDNC or SetDNC was too large. |
| 0x8834 | 52 | NO_USER_NAME | |
| 0x8835 | 53 | NO_NETWARE_PRINT_SPOOLER | Capture requested without local print spooler installed. |
| 0x8836 | 54 | INVALID_PARAMETER | Attempted function with invalid function parameter specified. |
| 0x8837 | 55 | CONFIG_FILE_OPEN_FAILED | OS/2 only. |
| 0x8838 | 56 | NO_CONFIG_FILE | OS/2 only. |
| 0x8839 | 57 | CONFIG_FILE_READ_FAILED | OS/2 only. |
| 0x883A | 58 | CONFIG_LINE_TOO_LONG | OS/2 only. |
| 0x883B | 59 | CONFIG_LINES_IGNORED | OS/2 only. |
| 0x883C | 60 | NOT_MY_RESOURCE | Attempted request made with a parameter using foreign resource. |
| 0x883D | 61 | DAEMON_INSTALLED | OS/2 only. |
| 0x883E | 62 | SPOOLER_INSTALLED | Attempted load of print spooler with print spooler already installed. |
| 0x883F | 63 | CONN_TABLE_FULL | Tried to alloc a connection handle with no more local connection table entries. |
| | | CONNECTION_TABLE_FULL | Tried to alloc a connection handle with no more local connection table entries. |
| 0x8840 | 64 | CONFIG_SECTION_NOT_FOUND | OS/2 only. |
| 0x8841 | 65 | BAD_TRAN_TYPE | Attempted function on a connection with an invalid transport selected. |
| 0x8841 | 65 | INVALID_TRANSPORT_TYPE | Attempted function on a connection with an invalid transport selected. |
| 0x8842 | 66 | TDS_TAG_IN_USE | OS/2 only. |
| 0x8843 | 67 | TDS_OUT_OF_MEMORY | OS/2 only. |
| 0x8844 | 68 | TDS_INVALID_TAG | Attempted TDS function with invalid tag. |

| | | | |
|---|---|---|---|
| 0x8845 | 69 | TDS_WRITE_TRUNCATED | Attempted TDS write with buffer that exceeded buffer. |
| 0x8846 | 70 | NO_DIRECTORY_SERVICE_ CONNECTION | |
| | | SERVICE_BUSY | Attempted request to a busy, partially asynchronous function. |
| 0x8847 | 71 | NO_SERVER_ERROR | Attempted connect failed to find any servers responding. |
| 0x8848 | 72 | BAD_VLM_ERROR | Attempted function to nonexistent or not-loaded overlay. |
| 0x8849 | 73 | NETWORK_DRIVE_IN_USE | Attempted map to network drive already mapped. |
| 0x884A | 74 | LOCAL_DRIVE_IN_USE | Attempted map to local drive already in use. |
| 0x884B | 75 | NO_DRIVES_AVAILABLE | Attempted map to next available drive when none available. |
| 0x884C | 76 | DEVICE_NOT_REDIRECTED | The device is not redirected. |
| 0x884D | 77 | NO_MORE_SFT_ENTRIES | Maximum number of files was reached. |
| 0x884E | 78 | UNLOAD_ERROR | Attempted unload failed. |
| 0x884F | 79 | IN_USE_ERROR | Attempted re-use of already in use connection entry. |
| 0x8850 | 80 | TOO_MANY_REP_FRAGS | Attempted request with too many reply fragments specified. |
| 0x8851 | 81 | TABLE_FULL | Attempted to add a name into the name table after it was full. |
| 0x8852 | 82 | SOCKET_NOT_OPEN | Listen was posted on unopened socket. |
| 0x8853 | 83 | MEM_MGR_ERROR | Attempted enhanced memory operation failed. |
| 0x8854 | 84 | SFT3_ERROR | An SFT III switch occurred mid-transfer. |
| 0x8855 | 85 | PREFERRED_NOT_FOUND | Preferred directory server not established, but another directory server was returned. |
| 0x8856 | 86 | DEVICE_NOT_RECOGNIZED | Determine if the device is not used by VLM application; pass to next redirector, if any. |
| 0x8857 | 87 | BAD_NET_TYPE | The network type (Bindery or Directory Services) does not match the server version. |
| 0x8858 | 88 | ERROR_OPENING_FILE | Generic open failure error, invalid path, access denied, etc. |
| 0x8859 | 89 | NO_PREFERRED_SPECIFIED | No preferred name specified. |
| 0x885A | 90 | ERROR_OPENING_SOCKET | Error opening a socket. |
| 0x88FF | 127 | SHELL_FAILURE | Either an unknown error, or the shell is not present. |
| | | VLM_FAILURE | Either an unknown error, or the VLM is not present. |

## Server Errors

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| 0x8901 | 001 | ERR_INSUFFICIENT_SPACE | |
| 0x8977 | 119 | ERR_BUFFER_TOO_SMALL | |
| 0x8978 | 120 | ERR_VOLUME_FLAG_NOT_SET | The service requested is not available on the selected volume. |
| 0x8979 | 121 | ERR_NO_ITEMS_FOUND | |
| 0x897A | 122 | ERR_CONN_ALREADY_TEMP | |

| | | | |
|---|---|---|---|
| 0x897B | 123 | ERR_CONN_ALREADY_LOGGED_IN | |
| 0x897C | 124 | ERR_CONN_NOT_AUTHENTICATED | |
| 0x897D | 125 | ERR_CONN_NOT_LOGGED_IN | |
| 0x897E | 126 | NCP_BOUNDARY_CHECK_FAILED | |
| 0x897E | 127 | ERR_LOCK_WAITING | |
| 0x8980 | 128 | ERR_LOCK_FAIL | |
| | | FILE_IN_USE_ERROR | Attempt to open or create a file already open. |
| 0x8981 | 129 | NO_MORE_FILE_HANDLES | No more file handles available; the network file handle table is full. |
| 0x8982 | 130 | NO_OPEN_PRIVILEGES | Attempt to open a file without the open privilege. |
| 0x8983 | 131 | IO_ERROR_NETWORK_DISK | Hard disk input/output error on a NetWare volume; a bad sector has been encountered and could be fatal. |
| 0x8984 | 132 | NO_CREATE_PRIVILEGES | Attempt to create a file without the create privilege. |
| 0x8985 | 133 | NO_CREATE_DELETE_PRIVILEGES | Attempt to create an already existing file without the create/delete privileges. |
| 0x8986 | 134 | CREATE_FILE_EXISTS_READ_ONLY | Attempt to create a file with the same name as an already existing file with read-only status. |
| 0x8987 | 135 | WILD_CARDS_IN_CREATE_FILE_NAME | Attempt to create a file using an ambiguous filename. |
| 0x8988 | 136 | INVALID_FILE_HANDLE | Attempt to close or perform I/O on a file with an invalid file handle (i.e. trying to read from a file that has been closed). |
| 0x8989 | 137 | NO_SEARCH_PRIVILEGES | Attempt to search a directory without search privileges in that directory. |
| 0x898A | 138 | NO_DELETE_PRIVILEGES | Attempt to delete a file without file deletion privileges in that file's directory. |
| 0x898B | 139 | NO_RENAME_PRIVILEGES | Attempt to rename a file without renaming privileges in that file's directory. |
| 0x898C | 140 | NO_MODIFY_PRIVILEGES | Attempt to modify a file without attribute modification privileges in that file's directory. |
| 0x898D | 141 | SOME_FILES_AFFECTED_IN_USE | Attempt to delete, rename, or set file attributes using an ambiguous filename while some of the files specified by the filename are in use by another workstation. |
| 0x898E | 142 | NO_FILES_AFFECTED_IN_USE | Attempt to delete, rename, or set file attributes using an ambiguous filename while some of the files specified by the filename are in use by another workstation. |
| 0x898F | 143 | SOME_FILES_AFFECTED_READ_ONLY | Attempt to delete, rename, or set file attributes using a filename when some of the files specified have read-only status. |
| 0x8990 | 144 | NO_FILES_AFFECTED_READ_ONLY | Attempt to delete, rename, or set file attributes using a filename when all of the files specified have read-only status. |
| 0x8991 | 145 | SOME_FILES_RENAMED_NAME_EXISTS | Attempt to rename files using an ambiguous filename, when one or more files matching the new filename specification already exist. |
| 0x8992 | 146 | NO_FILES_RENAMED_NAME_EXISTS | Attempt to rename a file using a filename, when all of the files matching the new filename specification already exist. |
| 0x8993 | 147 | NO_READ_PRIVILEGES | Attempt to read a file without read privileges to that file. |

| | | | |
|---|---|---|---|
| 0x8994 | 148 | NO_WRITE_PRIVILEGES_OR_ READONLY | Attempt to write to a file without write privileges to that file, or if the specified file has read-only status. |
| 0x8995 | 149 | FILE_DETACHED | Attempt to read or write to a detached file. |
| 0x8996 | 150 | SERVER_OUT_OF_MEMORY | Attempt to write to file server which does not currently have enough free dynamic memory to process this request. |
| | | ERR_TARGET_NOT_A_SUBDIRECTORY | |
| 0x8997 | 151 | NO_DISK_SPACE_FOR_SPOOL_FILE | The network operating system has determined that the network disk doesn't have enough space left for spool files. |
| 0x8998 | 152 | VOLUME_DOES_NOT_EXIST | The network operating system has tried to access a volume but cannot find the volume in the system definition files. |
| 0x8999 | 153 | DIRECTORY_FULL | |
| 0x899A | 154 | RENAMING_ACROSS_VOLUMES | Attempt to rename across volumes; attempt to rename a file and move the renamed file from its current volume into another volume. The rename command may move the file between directories on the same volume; however, using rename to move a file between volumes is not allowed. |
| 0x899B | 155 | BAD_DIRECTORY_HANDLE | Attempt to use an invalid directory handle. This occurs if the network has been brought down and brought back up without rebooting the workstation. |
| 0x899C | 156 | INVALID_PATH | |
| | | NO_MORE_TRUSTEES | No more trustees are listed in the directory. |
| 0x899D | 157 | NO_MORE_DIRECTORY_HANDLES | No more directory handles available; the directory handle table is full. Each user may have up to 255 directory handles. |
| 0x899E | 158 | INVALID_FILENAME | Attempt to create a file using invalid characters within the name of the file. |
| 0x899F | 159 | DIRECTORY_ACTIVE | Attempt to delete a directory that is being used by another workstation. |
| 0x89A0 | 160 | DIRECTORY_NOT_EMPTY | |
| 0x89A1 | 161 | DIRECTORY_IO_ERROR | A nonrecoverable I/O error has occurred on the disk in the directory area. This error has occurred in both copies of the directory and is fatal. |
| 0x89A2 | 162 | READ_FILE_WITH_RECORD_LOCKED | Attempt to read a file where data is physically locked. |
| 0x89A3 | 163 | ERR_TRANSACTION_RESTARTED | |
| 0x89A4 | 164 | ERR_RENAME_DIR_INVALID | |
| 0x89A5 | 165 | ERR_INVALID_OPENCREATE_MODE | |
| 0x89A6 | 166 | ERR_ALREADY_IN_USE | |
| 0x89A7 | 167 | ERR_INVALID_RESOURCE_TAG | |
| 0x89A8 | 168 | ERR_ACCESS_DENIED | |
| 0x89BE | 190 | INVALID_DATA_STREAM | |
| 0x89BF | 191 | INVALID_NAME_SPACE | |
| 0x89C0 | 192 | NO_ACCOUNTING_PRIVILEGES | |
| 0x89C1 | 193 | LOGIN_DENIED_NO_ACCOUNT_ BALANCE | Attempt to log in by a bindery object without an accounting balance, and accounting is enabled. |
| 0x89C2 | 194 | LOGIN_DENIED_NO_CREDIT | Attempt to log in to account with no credit available. |

| | | | |
|---|---|---|---|
| 0x89C3 | 195 | ERR_TOO_MANY_HOLDS | |
| 0x89C4 | 196 | ACCOUNTING_DISABLED | |
| 0x89C5 | 197 | INTRUDER_DETECTION_LOCK | Attempt to log in after the system had locked the account because of intruder detection. |
| 0x89C6 | 198 | NO_CONSOLE_OPERATOR | Attempt to use console without operator privileges. |
| | | NO_CONSOLE_PRIVILEGES | |
| 0x89D0 | 208 | ERR_Q_IO_FAILURE | |
| 0x89D1 | 209 | ERR_NO_QUEUE | |
| 0x89D2 | 210 | ERR_NO_Q_SERVER | |
| 0x89D3 | 211 | ERR_NO_Q_RIGHTS | |
| 0x89D4 | 212 | ERR_Q_FULL | |
| 0x89D5 | 213 | ERR_NO_Q_JOB | |
| 0x89D6 | 214 | ERR_NO_Q_JOB_RIGHTS | |
| 0x89D7 | 215 | ERR_Q_IN_SERVICE | |
| | | PASSWORD_NOT_UNIQUE | Attempt to change password to a previously used password when the unique requirement is specified for the account. |
| 0x89D8 | 216 | ERR_Q_NOT_ACTIVE | |
| | | PASSWORD_TOO_SHORT | Attempt to change password to a password with fewer characters than the required minimum specified for the account. |
| 0x89D9 | 217 | ERR_Q_STN_NOT_SERVER | |
| | | LOGIN_DENIED_NO_CONNECTION | Attempt to log in using an account which has limits on the number of concurrent connections and that number has been reached. |
| | | ERR_MAXIMUM_LOGINS_EXCEEDED | |
| 0x89DA | 218 | ERR_Q_HALTED | |
| | | UNAUTHORIZED_LOGIN_TIME | |
| 0x89DB | 219 | UNAUTHORIZED_LOGIN_STATION | Attempt to log in from an unauthorized station using an account with limits to a specific network and/or station. |
| | | ERR_Q_MAX_SERVERS | |
| 0x89DC | 220 | ACCOUNT_DISABLED | Attempt to log in using an account which has expired or has been disabled by the Supervisor. |
| 0x89DD | 221 | TALLY_CORRUPT | |
| 0x89DE | 222 | PASSWORD_HAS_EXPIRED_NO_GRACE | Attempt to log in using an account password which has expired and all grace logins have also expired. |
| 0x89DF | 223 | PASSWORD_HAS_EXPIRED | Attempt to log in using an expired account password but the login was allowed because the account had a grace login. |
| 0x89E7 | 231 | E_NO_MORE_USERS | |
| 0x89E8 | 232 | NOT_ITEM_PROPERTY | Attempt to use an item not associated with this property group or an item which has been deleted from this group. |
| | | WRITE_PROPERTY_TO_GROUP | Attempt to write a data segment to a group property using the call to write a property value. |
| 0x89E9 | 233 | MEMBER_ALREADY_EXISTS | Attempt to redundantly add an object to a group property. |

| | | | |
|---|---|---|---|
| 0x89EA | 234 | NO_SUCH_MEMBER | |
| 0x89EB | 235 | NOT_GROUP_PROPERTY | Attempt to use a non-group property. |
| 0x89EC | 236 | NO_SUCH_SEGMENT | Attempt to use a nonexistent segment. Note that segments must be written sequentially when a property is first created, but may be read and written in any order after they already exist. |
| 0x89ED | 237 | PROPERTY_ALREADY_EXISTS | |
| 0x89EE | 238 | OBJECT_ALREADY_EXISTS | |
| 0x89EF | 239 | INVALID_NAME | Request made with an object or property name containing illegal characters. Illegal characters in names are control characters, the comma, colon, semicolon, slash, backslash, question mark, asterisk, and tilde. |
| 0x89F0 | 240 | WILD_CARD_NOT_ALLOWED | Attempt to use a wildcard character or wild object type in a call where wildcards are not allowed. |
| 0x89F1 | 241 | INVALID_BINDERY_SECURITY | Attempt to assign a security level of a bindery object or property to be higher than the user's security level. This would make the object or property inaccessible to the user. |
| 0x89F2 | 242 | NO_OBJECT_READ_PRIVILEGE | Attempt to access object information or scan the object's properties by a station without the necessary security to access this information. |
| 0x89F3 | 243 | NO_OBJECT_RENAME_PRIVILEGE | Attempt to rename an object without the necessary security. Only the Supervisor can rename objects. Note that if the station does not have the proper security to see that the object exists, then NCP_NO_SUCH_OBJECT is returned. |
| 0x89F4 | 244 | NO_OBJECT_DELETE_PRIVILEGE | Attempt to delete an object by a station without the necessary security to delete the object. Only the Supervisor can delete objects. Note that if the station does not even have the proper security to see that the object exists, then NCP_NO_SUCH_OBJECT is returned. |
| 0x89F5 | 245 | NO_OBJECT_CREATE_PRIVILEGE | Attempt to create an object by a station without the necessary security to create or change an object. Only Supervisors are allowed to create objects. |
| 0x89F6 | 246 | NO_PROPERTY_DELETE_PRIVILEGE | Attempt to delete a property by a station without the necessary security privilege to delete a property from the give object. Note that if the station does not have the proper security to see that the property exists, then NCP_NO_SUCH_PROPERTY is returned. |
| | | NOT_SAME_LOCAL_DRIVE | |
| 0x89F7 | 247 | NO_PROPERTY_CREATE_PRIVILEGE | Attempt to create a property by a station without the necessary security to create or change a property for the object. |
| | | TARGET_DRIVE_NOT_LOCAL | |
| 0x89F8 | 248 | NO_PROPERTY_WRITE_PRIVILEGE | Attempt to write by a station without the necessary write security to change the property data. |
| | | ALREADY_ATTACHED_TO_SERVER | |
| | | NOT_ATTACHED_TO_SERVER | |
| 0x89F9 | 249 | NO_FREE_CONNECTION_SLOTS | |
| | | NO_PROPERTY_READ_PRIVILEGE | Attempt to read by a station without the necessary read security to access the property data. |
| 0x89FA | 250 | NO_MORE_SERVER_SLOTS | |

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|---|---|---|---|
| | | TEMP_REMAP_ERROR | Attempt to use an unknown path. |
| 0x89FB | 251 | INVALID_PARAMETERS | Attempt to use an invalid parameter (drive number, path, or flag value) during a set drive path call. |
| | | NO_SUCH_PROPERTY | |
| 0x89FC | 252 | INTERNET_PACKET_REQT_CANCELED | |
| | | UNKNOWN_FILE_SERVER | Attempt to attach to a server using an invalid server name. |
| | | MESSAGE_QUEUE_FULL | |
| | | NO_SUCH_OBJECT | Attempt to use an object which doesn't exist, or the calling station doesn't have the proper security to access the object. Note that the object name and type must both match for the object to be found. |
| 0x89FD | 253 | LOCK_COLLISION | |
| | | BAD_STATION_NUMBER | Attempt to use a bad (undefined, unavailable, etc.) station number. |
| | | INVALID_PACKET_LENGTH | The requesting packet did not have a 30 byte packet header as the first fragment, or its total length exceeded 576 characters. |
| | | UNKNOWN_REQUEST | |
| 0x89FE | 254 | BINDERY_LOCKED | Attempt to use a bindery which is temporarily locked by the Supervisor. |
| | | TRUSTEE_NOT_FOUND | |
| | | DIRECTORY_LOCKED | |
| | | INVALID_SEMAPHORE_NAME_LENGTH | Attempt to open a semaphore with an invalid semaphore name length. Semaphores use strings that are from 1 to 127 bytes long. |
| | | PACKET_NOT_DELIVERABLE | Currently unable to deliver packet for any of the following possible reasons: (1) The destination node is on another network, and no router could be found with a path to the destination network, or (2) the destination node address is on the local network, and hardware detects that the destination node address is nonexistent or inactive, or (3) the destination node is the same machine as the source node, and there is no pending list |
| | | SERVER_BINDERY_LOCKED | |
| | | SOCKET_TABLE_FULL | Attempt to open a socket when the socket table already has 50 entries marked as open. |
| | | SPOOL_DIRECTORY_ERROR | |
| | | SUPERVISOR_HAS_DISABLED_LOGIN | Attempt to log in when the Supervisor has disabled logins from the console or the bindery was locked. |
| | | TIMEOUT_FAILURE | Failure caused by the timeout limit expiring before the request was fulfilled. |
| 0x89FF | 255 | BAD_PRINTER_ERROR | Attempt to use a bad (undefined, unavailable, etc.) printer. |
| | | BAD_RECORD_OFFSET | Attempt to use an invalid offset value during physical locking calls. |
| | | CLOSE_FCB_ERROR | Error closing file. |
| | | FILE_EXTENSION_ERROR | Attempt to use file with a bad (undefined, unavailable, etc.) extension. |

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|---|---|
| FILE_NAME_ERROR | Attempt to use file with a bad (undefined, unavailable, etc.) name. |
| HARDWARE_FAILURE | |
| INVALID_DRIVE_NUMBER | |
| DOS_INVALID_DRIVE | Attempt to use an invalid (undefined, unavailable, etc.) drive. |
| INVALID_INITIAL_SEMAPHORE_VALUE | Attempt to open a semaphore with an invalid semaphore value. The semaphore value must be positive, and must be initialized to a value from 0 to 127. |
| INVALID_SEMAPHORE_HANDLE | Attempt to examine, wait, or signal a semaphore with an invalid semaphore handle. The semaphore handle is obtained through the open a semaphore call. |
| IO_BOUND_ERROR | Attempt to write beyond the end of file or disk. |
| NO_FILES_FOUND_ERROR | No files were found that matched the search specification. |
| NO_RESPONSE_FROM_SERVER | |
| NO_SUCH_OBJECT_OR_BAD_ PASSWORD | Attempt to use an unfound object, or attempt to use a bad (undefined, unavailable, etc.) password. On a login call, this indicates the password was correct, but it has expired and all grace logins have been used up. On a change password call, it indicates that the old password given was correct, but the account is not allowed to change the password (typical of the GUEST account). |
| PATH_NOT_LOCATABLE | Attempt to find an unknown path during a get full path call. |
| QUEUE_FULL_ERROR | Attempt to use a queue with 99 entries in it (99 is the maximum number of entries that can be placed in each print queue). |
| REQUEST_NOT_OUTSTANDING | |
| SOCKET_ALREADY_OPEN | Attempt to redundantly open a socket whose specified socket number is already open. |
| LOCK_ERROR | Attempt to use a locked file. |

## Directory Services OS Errors

| Hex | Dec. | Constant | Desc. |
|---|---|---|---|
| 0xFFFFF | -001 | DSERR_INSUFFICIENT_SPACE | |
| 0xFFF89 | -119 | DSERR_BUFFER_TOO_SMALL | The data to be passed back is too large for the buffer you have declared. |
| 0xFFF88 | -120 | DSERR_VOLUME_FLAG_NOT_SET | |
| 0xFFF87 | -121 | DSERR_NO_ITEMS_FOUND | You made a bindery request for items not found. |
| 0xFFF86 | -122 | DSERR_CONN_ALREADY_TEMPORARY | Attempted to convert a temporary connection into a temporary connection. |
| 0xFFF85 | -123 | DSERR_CONN_ALREADY_LOGGED_IN | Attempted to log in to a server you were already logged into. |
| 0xFFF84 | -124 | DSERR_CONN_NOT_AUTHENTICATED | Attempted connection for call without being authenticated. |

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|---|---|---|---|
| 0xFFF83 | -125 | DSERR_CONN_NOT_LOGGED_IN | Attempted to log out of a connection you are not logged into. |
| 0xFFF82 | -126 | DSERR_NCP_BOUNDARY_CHECK_ FAILED | NCP subfunction size does not match the actual size of data sent. |
| 0xFFF81 | -127 | DSERR_LOCK_WAITING | Time-out occurred before file was locked. |
| 0xFFF80 | -128 | DSERR_LOCK_FAIL | Attempted to open or create a file that is already open. |
| 0xFFF7F | -129 | DSERR_OUT_OF_HANDLES | No more file handles available; the network file handle table is full. |
| 0xFFF7E | -130 | DSERR_NO_OPEN_PRIVILEGE | Attempted to open a file without the open privilege. |
| 0xFFF7D | -131 | DSERR_HARD_IO_ERROR | Hard disk input/output error on a NetWare volume; a bad sector has been encountered and could be fatal. |
| 0xFFF7C | -132 | DSERR_NO_CREATE_PRIVILEGE | Attempted to create a file without the create privilege. |
| 0xFFF7B | -133 | DSERR_NO_CREATE_DELETE_PRIV | Attempted to create an already existing file without the create/delete privileges. |
| 0xFFF7A | -134 | DSERR_R_O_CREATE_FILE | Attempted to create a file with the same name as an already existing file with read-only status. |
| 0xFFF79 | -135 | DSERR_CREATE_FILE_INVALID_NAME | A file name contains invalid characters. |
| 0xFFF78 | -136 | DSERR_INVALID_FILE_HANDLE | Attempted to close or perform I/O on a file with an invalid file handle (i.e. trying to read from a file that has been closed). |
| 0xFFF77 | -137 | DSERR_NO_SEARCH_PRIVILEGE | Attempted to search a directory without search privileges in that directory. |
| 0xFFF76 | -138 | DSERR_NO_DELETE_PRIVILEGE | Attempted to delete a file without file deletion privileges in that file’s directory. |
| 0xFFF75 | -139 | DSERR_NO_RENAME_PRIVILEGE | Attempted to rename a file without renaming privileges in that file’s directory. |
| 0xFFF74 | -140 | DSERR_NO_SET_PRIVILEGE | Attempted to modify a file without attribute modification privileges in that file’s directory. |
| 0xFFF73 | -141 | DSERR_SOME_FILES_IN_USE | Attempted to delete, rename, or set file attributes using an ambiguous filename while some of the files are in use by another workstation. |
| 0xFFF72 | -142 | DSERR_ALL_FILES_IN_USE | Attempted to delete, rename, or set file attributes using a filename when the file or files are in use by another workstation. |
| 0xFFF71 | -143 | DSERR_SOME_READ_ONLY | Attempted to open read-only files. |
| 0xFFF70 | -144 | DSERR_ALL_READ_ONLY | Attempted to delete, rename, or set file attributes using a filename when all of the files specified have read-only status. |
| 0xFFF6F | -145 | DSERR_SOME_NAMES_EXIST | Attempted to rename files using an ambiguous filename, when one or more files matching the new filename specification already exist. |
| 0xFFF6E | -146 | DSERR_ALL_NAMES_EXIST | Attempted to rename a file using a filename, when all of the files matching the new filename specification already exist. |
| 0xFFF6D | -147 | DSERR_NO_READ_PRIVILEGE | Attempted to read a file without read privileges for that file. |
| 0xFFF6C | -148 | DSERR_NO_WRITE_PRIVILEGE | Attempt to write to a file without write privileges to that file, or if the specified file has read-only status. |
| 0xFFF6B | -149 | DSERR_FILE_DETACHED | Attempt to read or write to a detached file. |

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| 0xFFF6A | -150 | DSERR_NO_ALLOC_SPACE | Attempt to write to a file server that does not currently have enough free DRAM to process this request. |
| | | DSERR_TARGET_NOT_A_SUBDIR | |
| 0xFFF69 | -151 | DSERR_NO_SPOOL_SPACE | The network OS has determined that the network disk doesn't have enough space left for spool files. |
| 0xFFF68 | -152 | DSERR_INVALID_VOLUME | The network OS cannot find the requested volume in the system definition files. |
| 0xFFF67 | -153 | DSERR_DIRECTORY_FULL | Attempted to write to a volume without available directory space. |
| 0xFFF66 | -154 | DSERR_RENAME_ACROSS_VOLUME | Attempted to rename a file and move it from its current volume into another volume. The rename command may move the file between directories on the same volume; however, using rename to move a file between volumes is not allowed. |
| 0xFFF65 | -155 | DSERR_BAD_DIR_HANDLE | Attempted to use an invalid directory handle. This occurs if the network has been brought down and back up without rebooting the workstation. |
| 0xFFF64 | -156 | DSERR_INVALID_PATH | |
| 0xFFF64 | -156 | DSERR_NO_SUCH_EXTENSION | No more trustees are listed in the directory. |
| 0xFFF63 | -157 | DSERR_NO_DIR_HANDLES | No more directory handles available; the directory handle table is full. Each user may have up to 255 directory handles. |
| 0xFFF62 | -158 | DSERR_BAD_FILE_NAME | Attempted to create a file using invalid file name characters. |
| 0xFFF61 | -159 | DSERR_DIRECTORY_ACTIVE | Attempted to delete a directory that is being used by another workstation. |
| 0xFFF60 | -160 | DSERR_DIRECTORY_NOT_EMPTY | Attempted to delete a directory that contains files or other directories. |
| 0xFFF5F | -161 | DSERR_DIRECTORY_IO_ERROR | A non-recoverable I/O error has occurred on the disk in the directory area. This error has occurred in both copies of the directory and is fatal. |
| 0xFFF5E | -162 | DSERR_IO_LOCKED | Attempt to read a file where data is physically locked. |
| 0xFFF5D | -163 | DSERR_TRANSACTION_RESTARTED | |
| 0xFFF5C | -164 | DSERR_RENAME_DIR_INVALID | |
| 0xFFF5B | -165 | DSERR_INVALID_OPENCREATE_MODE | |
| 0xFFF5A | -166 | DSERR_ALREADY_IN_USE | |
| 0xFFF59 | -167 | DSERR_INVALID_RESOURCE_TAG | |
| 0xFFF58 | -168 | DSERR_ACCESS_DENIED | |
| 0xFFF42 | -190 | DSERR_INVALID_DATA_STREAM | |
| 0xFFF41 | -191 | DSERR_INVALID_NAME_SPACE | |
| 0xFFF40 | -192 | DSERR_NO_ACCOUNTING_PRIVILEGES | |
| 0xFFF3F | -193 | DSERR_NO_ACCOUNT_BALANCE | Attempt to log in by a bindery object without an accounting balance, and accounting is enabled. |
| 0xFFF3E | -194 | DSERR_CREDIT_LIMIT_EXCEEDED | Attempt to log in to account with no credit available. |
| 0xFFF3D | -195 | DSERR_TOO_MANY_HOLDS | |
| 0xFFF3C | -196 | DSERR_ACCOUNTING_DISABLED | |
| 0xFFF3B | -197 | DSERR_LOGIN_LOCKOUT | Attempt to log in after the system had locked the account because of intruder detection. |

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| 0xFFF3A | -198 | DSERR_NO_CONSOLE_RIGHTS | Attempt to use console privileges without operator privileges. |
| 0xFFF30 | -208 | DSERR_Q_IO_FAILURE | |
| 0xFFF2F | -209 | DSERR_NO_QUEUE | |
| 0xFFF2E | -210 | DSERR_NO_Q_SERVER | |
| 0xFFF2D | -211 | DSERR_NO_Q_RIGHTS | |
| 0xFFF2C | -212 | DSERR_Q_FULL | |
| 0xFFF2B | -213 | DSERR_NO_Q_JOB | |
| 0xFFF2A | -214 | DSERR_NO_Q_JOB_RIGHTS | |
| | | DSERR_UNENCRYPTED_NOT_ALLOWED | |
| 0xFFF29 | -215 | DSERR_Q_IN_SERVICE | |
| | | DSERR_DUPLICATE_PASSWORD | Attempt to change password to a previously used password when the unique requirement is specified for the account. |
| 0xFFF28 | -216 | DSERR_Q_NOT_ACTIVE | |
| | | DSERR_PASSWORD_TOO_SHORT | Attempt to change password to a password with less characters than the required minimum specified for the account. |
| 0xFFF27 | -217 | DSERR_Q_STN_NOT_SERVER | |
| | | DSERR_MAXIMUM_LOGINS_EXCEEDED | Attempt to log in using an account which has limits on the number of concurrent connections and that number has been reached. |
| 0xFFF26 | -218 | DSERR_Q_HALTED | |
| | | DSERR_BAD_LOGIN_TIME | Attempt to log in during an unauthorized time of day specified for the account. |
| 0xFFF25 | -219 | DSERR_Q_MAX_SERVERS | |
| | | DSERR_NODE_ADDRESS_VIOLATION | Attempt to log in from an unauthorized station using an account with limits to a specific network and/or station. |
| 0xFFF24 | -220 | DSERR_LOG_ACCOUNT_EXPIRED | Attempt to log in using an account which has expired or has been disabled by the Supervisor. |
| 0xFFF22 | -222 | DSERR_BAD_PASSWORD | Attempt to log in using an account password which has expired and all grace logins have also expired. |
| 0xFFF21 | -223 | DSERR_PASSWORD_EXPIRED | Attempt to log in using an expired account password but the login was allowed because the account had a grace login. |
| 0xFFF20 | -224 | DSERR_NO_LOGIN_CONN_AVAILABLE | |
| 0xFFF18 | -232 | DSERR_WRITE_TO_GROUP_PROPERTY | Attempt to write a data segment to a group property using the call to write a property value. |
| 0xFFF17 | -233 | DSERR_MEMBER_ALREADY_EXISTS | Attempt to redundantly add an object to a group property. |
| 0xFFF16 | -234 | DSERR_NO_SUCH_MEMBER | Attempt to use an object which is not a member of the defined group property. |
| 0xFFF15 | -235 | DSERR_PROPERTY_NOT_GROUP | Attempt to use a non-group property. |
| 0xFFF14 | -236 | DSERR_NO_SUCH_VALUE_SET | Attempt to use a nonexistent segment. Note that segments must be written sequentially when a property is first created, but may be read and written in any order after they already exist. |

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|---|---|---|---|
| 0xFFF13 | -237 | DSERR_PROPERTY_ALREADY_EXISTS | |
| 0xFFF12 | -238 | DSERR_OBJECT_ALREADY_EXISTS | |
| 0xFFF11 | -239 | DSERR_ILLEGAL_NAME | Request made with an object or property name containing illegal characters. Illegal characters in names are control characters, the comma, colon, semicolon, slash, backslash, question mark, asterisk, and tilde. |
| 0xFFF10 | -240 | DSERR_ILLEGAL_WILDCARD | Attempt to use a wildcard character or wild object type in a call where wildcards are not allowed. |
| 0xFFF0F | -241 | DSERR_BINDERY_SECURITY | Attempt to assign a security level of a bindery object or property to be higher than the user's security level. This would make the object or property inaccessible to the user. |
| 0xFFF0E | -242 | DSERR_NO_OBJECT_READ_RIGHTS | Attempt to access object information or scan the object's properties by a station without the necessary security to access this information. |
| 0xFFF0D | -243 | DSERR_NO_OBJECT_RENAME_RIGHTS | Attempt to rename an object without the necessary security. Only the Supervisor can rename objects. Note that if the station does not have the proper security to see that the object exists, then NCP_NO_SUCH_OBJECT is returned. |
| 0xFFF0C | -244 | DSERR_NO_OBJECT_DELETE_RIGHTS | Attempt to delete an object by a station without the necessary security to delete the object. Only the Supervisor can delete objects. Note that if the station does not even have the proper security to see that the object exists, then NCP_NO_SUCH_OBJECT is returned. |
| 0xFFF0B | -245 | DSERR_NO_OBJECT_CREATE_RIGHTS | Attempt to create an object by a station without the necessary security to create or change an object. Only Supervisors are allowed to create objects. |
| 0xFFF0A | -246 | DSERR_NO_PROPERTY_DELETE_ RIGHTS | Attempt to delete a property by a station without the necessary security privilege to delete a property from the give object. Note that if the station does not have the proper security to see that the property exists, then NCP_NO_SUCH_PROPERTY is returned. |
| 0xFFF09 | -247 | DSERR_NO_PROPERTY_CREATE_ RIGHTS | Attempt to create a property by a station without the necessary security to create or change a property for the object. |
| 0xFFF08 | -248 | DSERR_NO_PROPERTY_WRITE_RIGHTS | |
| 0xFFF07 | -249 | DSERR_NO_PROPERTY_READ_RIGHTS | Attempt to read by a station without the necessary read security to access the property data. |
| 0xFFF06 | -250 | DSERR_TEMP_REMAP | Attempt to use an unknown path. |
| 0xFFF05 | -251 | DSERR_UNKNOWN_REQUEST | Attempt to use an invalid parameter (drive number, path, or flag value) during a set drive path call. |
| | | DSERR_NO_SUCH_PROPERTY | Attempt to use a property which doesn't exist for the specified object. |
| 0xFFF04 | -252 | DSERR_MESSAGE_QUEUE_FULL | |
| | | DSERR_TARGET_ALREADY_HAS_MSG | |
| | | DSERR_NO_SUCH_OBJECT | Attempt to use an object which doesn't exist, or the calling station doesn't have the proper security to access the object. Note that the object name and type must both match for the object to be found. |
| 0xFFF03 | -253 | DSERR_BAD_STATION_NUMBER | Attempt to use a bad (undefined, unavailable, etc.) station number. |
| 0xFFF02 | -254 | DSERR_BINDERY_LOCKED | Attempt to use a bindery which is temporarily locked by the Supervisor. |
| | | DSERR_DIR_LOCKED | |

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| | | DSERR_SPOOL_DELETE | |
| | | DSERR_TRUSTEE_NOT_FOUND | |
| 0xFFF01 | -255 | DSERR_HARD_FAILURE | |
| | | DSERR_FILE_NAME | |
| | | DSERR_FILE_EXISTS | |
| | | DSERR_CLOSE_FCB | |
| | | DSERR_IO_BOUND | Attempt to write beyond the end of file or disk. |
| | | DSERR_NO_SPOOL_FILE | |
| | | DSERR_BAD_SPOOL_PRINTER | Attempt to use a bad (undefined, unavailable, etc.) printer. |
| | | DSERR_BAD_PARAMETER | |
| | | DSERR_NO_FILES_FOUND | No files were found matching the search specification. |
| | | DSERR_NO_TRUSTEE_CHANGE_PRIV | |
| | | DSERR_TARGET_NOT_LOGGED_IN | |
| | | DSERR_TARGET_NOT_ACCEPTING_ MSGS | |
| | | DSERR_MUST_FORCE_DOWN | |

## Directory Services Client Errors

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| 0xFFFFFED3 | -301 | ERR_NOT_ENOUGH_MEMORY | Client workstation does not have memory to allocate. |
| 0xFFFFFED2 | -302 | ERR_BAD_KEY | Trying to pass a bad key parameter for a context call. See NWDSDC.H for the correct parameter. |
| 0xFFFFFED1 | -303 | ERR_BAD_CONTEXT | Trying to pass a bad context parameter to a Directory Services function. Call NWDSCreateContext first and use its return value as the context parameter. |
| 0xFFFFFED0 | -304 | ERR_BUFFER_FULL | Ran out of room trying to add data to an input buffer. |
| 0xFFFFFECF | -305 | ERR_LIST_EMPTY | Passed an empty list (a null pointer) to NWDSPutAttrVal for one of the following syntax types: SYN_CI_LIST SYN_OCTET_LIST. |
| 0xFFFFFECE | -306 | ERR_BAD_SYNTAX | Tried to pass a bad syntax ID. |
| 0xFFFFFECD | -307 | ERR_BUFFER_EMPTY | Tried to get data from an empty buffer. |
| 0xFFFFFECC | -308 | ERR_BAD_VERB | Initialized the buffer with a verb not associated with the API call. |
| 0xFFFFFECB | -309 | ERR_EXPECTED_IDENTIFIER | The name being parsed is not typed. |
| 0xFFFFFECA | -310 | ERR_EXPECTED_EQUALS | An equal sign is expected in the name. |
| 0xFFFFFEC9 | -311 | ERR_ATTR_TYPE_EXPECTED | The name being parsed is a multi-AVA and must be typed (All AVAs must be either typed or not typed). |
| 0xFFFFFEC8 | -312 | ERR_ATTR_TYPE_NOT_EXPECTED | The name being parsed is a multi-AVA and must not be typed (All AVAs must be either typed or not typed). |
| 0xFFFFFEC7 | -313 | ERR_FILTER_TREE_EMPTY | Tried to delete an empty filter. |
| 0xFFFFFEC6 | -314 | ERR_INVALID_OBJECT_NAME | (1) Tried to pass a NULL string for object name to the API call or (2) Tried to pass a name containing both leading and trailing dots. |

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| 0xFFFFFEC5 | -315 | ERR_EXPECTED_RDN_DELIMITER | An RDN delimiter (.) was expected and not found during the name parse. |
| 0xFFFFFEC4 | -316 | ERR_TOO_MANY_TOKENS | Too many trailing delimiter dots in name; only three context levels and four trailing dots in name are permitted. |
| 0xFFFFFEC3 | -317 | ERR_INCONSISTENT_MULTIAVA | AVA type passed in is wrong. |
| 0xFFFFFEC2 | -318 | ERR_COUNTRY_NAME_TOO_LONG | Country name identifiers are only allowed one character. |
| 0xFFFFFEC1 | -319 | ERR_SYSTEM_ERROR | Internal error. |
| 0xFFFFFEC0 | -320 | ERR_CANT_ADD_ROOT | Tried to restore an object at the root. |
| 0xFFFFFEBF | -321 | ERR_UNABLE_TO_ATTACH | Could not connect to the specified server. |
| 0xFFFFFEBE | -322 | ERR_INVALID_HANDLE | Invalid iteration handle. |
| 0xFFFFFEBD | -323 | ERR_BUFFER_ZERO_LENGTH | Tried to call NWDSAllocBuf with a zero-length size. |
| 0xFFFFFEBC | -324 | ERR_INVALID_REPLICA_TYPE | Attempted to pass in a replica type that was not a MASTER, SECONDARY, or READONLY |
| 0xFFFFFEBB | -325 | ERR_INVALID_ATTR_SYNTAX | Attempted to pass in an invalid attribute syntax ID. |
| 0xFFFFFEBA | -326 | ERR_INVALID_FILTER_SYNTAX | Attempted to pass in an invalid filter syntax ID. |
| 0xFFFFFEB8 | -328 | ERR_CONTEXT_CREATION | Failed to create a context--usually because unicode tables were not loaded. |
| 0xFFFFFEB7 | -329 | ERR_INVALID_UNION_TAG | The server returned an infotype parameter that did not agree with the infotype you passed in. |
| 0xFFFFFEB6 | -330 | ERR_INVALID_SERVER_RESPONSE | Returned from NWDSGetSyntaxID. |
| 0xFFFFFEB5 | -331 | ERR_NULL_POINTER | Entered a NULL pointer, a real pointer was expected. |
| 0xFFFFFEB4 | -332 | ERR_NO_SERVER_FOUND | |
| 0xFFFFFEB3 | -333 | ERR_NO_CONNECTION | Internal error--contact Novell Customer Support. |
| 0xFFFFFEB2 | -334 | ERR_RDN_TOO_LONG | The RDN exceeded 128 characters. |
| 0xFFFFFEB1 | -335 | ERR_DUPLICATE_TYPE | Multi-AVAs--AVAs cannot contain same type. |
| 0xFFFFFEB0 | -336 | ERR_DATA_STORE_FAILURE | |
| 0xFFFFFEAF | -337 | ERR_NOT_LOGGED_IN | |
| 0xFFFFFEAE | -338 | ERR_INVALID_PASSWORD_CHARS | Entered password characters that are invalid. |
| 0xFFFFFEAD | -339 | ERR_FAILED_SERVER_AUTHENT | Attempted server authentication failed. |
| 0xFFFFFEAC | -340 | ERR_TRANSPORT | Transport failed. |
| 0xFFFFFEAB | -341 | ERR_NO_SUCH_SYNTAX | Attempted to use an invalid syntax. |
| 0xFFFFFEAA | -342 | ERR_INVALID_DS_NAME | (1) An empty string passed in for a name or (2) a NULL pointer. |
| 0xFFFFFEA9 | -343 | ERR_ATTR_NAME_TOO_LONG | Attribute name exceeded 32 characters. |
| 0xFFFFFEA8 | -344 | ERR_INVALID_TDS | Tagged Data Store is either uninitialized or corrupted. Usually, NWDSLogin was not first called. |
| 0xFFFFFEA7 | -345 | ERR_INVALID_DS_VERSION | |
| 0xFFFFFEA6 | -346 | ERR_UNICODE_TRANSLATION | A unicode translation error returned from one of three functions: NWDSListPartitions, NWDSSyncPartition, and NWDSSyncSchema. |
| 0xFFFFFEA5 | -347 | ERR_SCHEMA_NAME_TOO_LONG | Schema name exceeded 32 characters. |

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| 0xFFFFFEA4 | -348 | ERR_UNICODE_FILE_NOT_FOUND | Unicode file could not be found in the defined search algorithm defined in NWInitUnicodeTables. |
| 0xFFFFFEA3 | -349 | ERR_UNICODE_ALREADY_LOADED | (DOS-only) NWInitUnicodeTables attempted to call unicode tables more than once. |
| 0xFFFFFEA2 | -350 | ERR_NOT_CONTEXT_OWNER011 | |
| 0xFFFFFEA1 | -351 | ERR_ATTEMPT_TO_AUTHENTICATE_0 | |
| 0xFFFFFEA0 | -352 | ERR_NO_WRITABLE_REPLICAS | Returned by NWDSLogout: On logout, the server logs out of the monitor connection. Subsequently the API call tries to find a writable replica of that monitor connection's partition, but can't. |
| 0xFFFFFE9F | -353 | ERR_DN_TOO_LONG | The name passed in exceeded 256 characters. |
| 0xFFFFFE9E | -354 | ERR_RENAME_NOT_ALLOWED | Attempt to move an object to the same place in the tree that it was in. See NWDSMoveObject. |

## Directory Services Agent Errors

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| 0xFFFFFDA7 | -601 | ERR_NO_SUCH_ENTRY | Object passed in could not be found. Check context relative to the passed-in name. |
| 0xFFFFFDA6 | -602 | ERR_NO_SUCH_VALUE | The requested attribute value could not be found. |
| 0xFFFFFDA5 | -603 | ERR_NO_SUCH_ATTRIBUTE | The requested attribute could not be found. |
| 0xFFFFFDA4 | -604 | ERR_NO_SUCH_CLASS | The class does not exist. |
| 0xFFFFFDA3 | -605 | ERR_NO_SUCH_PARTITION | The name of the passed-in partition could not be found. |
| 0xFFFFFDA2 | -606 | ERR_ENTRY_ALREADY_EXISTS | Attempted to add object at the same level in the tree as a pre-existing object of the same name. |
| 0xFFFFFDA1 | -607 | ERR_NOT_EFFECTIVE_CLASS | Attempted to create an object of a base class that is not an effective class. |
| 0xFFFFFDA0 | -608 | ERR_ILLEGAL_ATTRIBUTE | Attempted to add an attribute illegal for that object class. |
| 0xFFFFFD9F | -609 | ERR_MISSING_MANDATORY | Attempted to add an object missing a mandatory attribute. |
| 0xFFFFFD9E | -610 | ERR_ILLEGAL_DS_NAME | Server found a problem with a name passed in by the client. |
| 0xFFFFFD9D | -611 | ERR_ILLEGAL_CONTAINMENT | Attempted to add an object violating the schema's containment roles for that type of object. |
| 0xFFFFFD9C | -612 | ERR_CANT_HAVE_MULTIPLE_ VALUES | Attempted to add more than one value to a single-value attribute. |
| 0xFFFFFD9B | -613 | ERR_SYNTAX_VIOLATION | |
| 0xFFFFFD9A | -614 | ERR_DUPLICATE_VALUE | Attempted to add the same attribute-value combination to an object. |
| 0xFFFFFD99 | -615 | ERR_ATTRIBUTE_ALREADY_EXISTS | Attempted to add an attribute that already exists. |
| 0xFFFFFD98 | -616 | ERR_MAXIMUM_ENTRIES_EXIST | The server has reached the maximum entries in its data base. |
| 0xFFFFFD97 | -617 | ERR_DATABASE_FORMAT | |

| | | | |
|---|---|---|---|
| 0xFFFFFD96 | -618 | ERR_INCONSISTENT_DATABASE | The server has detected an inconsistent database—-usually the number of entries in a container does not match the number stored in the containers entry. |
| 0xFFFFFD95 | -619 | ERR_INVALID_COMPARISON | Attempted to (1) compare two attributes that are not comparable or (2) use an invalid compare syntax. |
| 0xFFFFFD94 | -620 | ERR_COMPARISON_FAILED | |
| 0xFFFFFD93 | -621 | ERR_TRANSACTIONS_DISABLED | |
| 0xFFFFFD92 | -622 | ERR_INVALID_TRANSPORT | The type of transport passed in to the server is not supported by the server. |
| 0xFFFFFD91 | -623 | ERR_SYNTAX_INVALID_IN_NAME | |
| 0xFFFFFD90 | -624 | ERR_REPLICA_ALREADY_EXISTS | Name passed in for replica already exists. |
| 0xFFFFFD8F | -625 | ERR_TRANSPORT_FAILURE | |
| 0xFFFFFD8E | -626 | ERR_ALL_REFERRALS_FAILED | Server has no objects matching request and has attempted to contact x other servers to find the object. None of those servers respond. |
| 0xFFFFFD8D | -627 | ERR_CANT_REMOVE_NAMING_ VALUE | Attempted to delete the naming attribute. Rename the object, then delete the attribute. |
| 0xFFFFFD8C | -628 | ERR_OBJECT_CLASS_VIOLATION | |
| 0xFFFFFD8B | -629 | ERR_ENTRY_IS_NOT_LEAF | Attempted to delete an entry containing subordinates, which the API call cannot do. First delete the subordinates. |
| 0xFFFFFD8A | -630 | ERR_DIFFERENT_TREE | |
| 0xFFFFFD89 | -631 | ERR_ILLEGAL_REPLICA_TYPE | |
| 0xFFFFFD88 | -632 | ERR_SYSTEM_FAILURE | |
| 0xFFFFFD87 | -633 | ERR_INVALID_ENTRY_FOR_ROOT | |
| 0xFFFFFD86 | -634 | ERR_NO_REFERRALS | Server has no objects that match request and has no referrals on which to search for the object. |
| 0xFFFFFD85 | -635 | ERR_REMOTE_FAILURE | Attempt to connect to remote server failed. |
| )xFFFFFD84 | -636 | ERR_UNREACHABLE_SERVER | |
| 0xFFFFFD83 | -637 | ERR_PREVIOUS_MOVE_IN_PROGRESS | |
| 0xFFFFFD82 | -638 | ERR_NO_CHARACTER_MAPPING | |
| 0xFFFFFD81 | -639 | ERR_INCOMPLETE_AUTHENTICATION | |
| 0xFFFFFD80 | -640 | ERR_INVALID_CERTIFICATE | |
| 0xFFFFFD7F | -641 | ERR_INVALID_REQUEST | Server did not understand request—-for example, verb sent by client could be wrong. |
| 0xFFFFFD7E | -642 | ERR_INVALID_ITERATION | Iteration handle passed in by client is wrong. |
| 0xFFFFFD7D | -643 | ERR_SCHEMA_IS_NONREMOVABLE | Attempted to delete Novell base schema. |
| 0xFFFFFD7C | -644 | ERR_SCHEMA_IS_IN_USE | Attempted to delete a schema entry that still contains an object using that schema entry. Delete that object or attribute, then delete the schema. |
| 0xFFFFFD7B | -645 | ERR_CLASS_ALREADY_EXISTS | Attempted to add a class already existing in the schema. |
| 0xFFFFFD7A | -646 | ERR_BAD_NAMING_ATTRIBUTES | |
| 0xFFFFFD79 | -647 | ERR_NOT_ROOT_PARTITION | Attempted a function required on the root partition and (1) client did not pass in the root partition name or (2) client has attempted to do the function somewhere besides the root partition. |

| | | | |
|---|---|---|---|
| 0xFFFFFD78 | -648 | ERR_INSUFFICIENT_STACK | Server ran out of stack. |
| 0xFFFFFD77 | -649 | ERR_INSUFFICIENT_BUFFER | Server ran out of memory. |
| 0xFFFFFD76 | -650 | ERR_AMBIGUOUS_CONTAINMENT | Attempted to create a schema definition for a class containing an ambiguous containment rule. |
| 0xFFFFFD75 | -651 | ERR_AMBIGUOUS_NAMING | Attempted to create a schema definition for a class containing an ambiguous containment name. |
| 0xFFFFFD74 | -652 | ERR_DUPLICATE_MANDATORY | Attempted to create a schema definition for a class containing a duplicate mandatory name. |
| 0xFFFFFD73 | -653 | ERR_DUPLICATE_OPTIONAL | Attempted to create a schema definition for a class containing a duplicate optional name. |
| 0xFFFFD72 | -654 | ERR_PARTITION_BUSY | |
| 0xFFFFFD71 | -655 | ERR_MULTIPLE_REPLICAS | |
| 0xFFFFFD70 | -656 | ERR_CRUCIAL_REPLICA | |
| 0xFFFFFD6F | -657 | ERR_SCHEMA_SYNC_IN_PROGRESS | Function could not be completed because schema sync was in progress. |
| 0xFFFFFD6E | -658 | ERR_SKULK_IN_PROGRESS | Function could not be completed because skulk was in progress. |
| 0xFFFFFD6D | -659 | ERR_TIME_NOT_SYNCHRONIZED | Servers are not synchronized. |
| 0xFFFFFD6C | -660 | ERR_RECORD_IN_USE | |
| 0xFFFFFD6B | -661 | ERR_DS_VOLUME_NOT_MOUNTED | |
| 0xFFFFFD6A | -662 | ERR_DS_VOLUME_IO_FAILURE | |
| 0xFFFFFD69 | -663 | ERR_DS_LOCKED | DS Database is locked; analogous to bindery being locked. |
| 0xFFFFFD68 | -664 | ERR_OLD_EPOCH | |
| 0xFFFFFD67 | -665 | ERR_NEW_EPOCH | |
| 0xFFFFFD66 | -666 | ERR_INCOMPATIBLE_DS_VERSION | |
| 0xFFFFFD65 | -667 | ERR_PARTITION_ROOT | Attempted a function that cannot be done on the root partition. |
| 0xFFFFFD64 | -668 | ERR_ENTRY_NOT_CONTAINER | Attempted to do an illegal function on a leaf object. |
| 0xFFFFFD63 | -669 | ERR_FAILED_AUTHENTICATION | Passed in a bad password. |
| 0xFFFFFD62 | -669 | ERR_INVALID_CONTEXT | |
| 0xFFFFFD61 | -671 | ERR_NO_SUCH_PARENT | |
| 0xFFFFFD60 | -672 | ERR_NO_ACCESS | Client has no rights to do the function returning the error. |
| 0xFFFFFD5F | -673 | ERR_REPLICA_NOT_ON | |
| 0xFFFFFD5E | -674 | ERR_INVALID_NAME_SERVICE | |
| 0xFFFFFD5D | -675 | ERR_INVALID_TASK | |
| 0xFFFFFD5C | -676 | ERR_INVALID_CONN_HANDLE | |
| 0xFFFFFD5B | -677 | ERR_INVALID_IDENTITY | |
| 0xFFFFFD5A | -678 | ERR_DUPLICATE_ACL | |
| 0xFFFFFD59 | -679 | ERR_PARTITION_ALREADY_EXISTS | |
| 0xFFFFFD58 | -680 | ERR_TRANSPORT_MODIFIED | |
| 0xFFFFFD57 | -681 | ERR_ALIAS_OF_AN_ALIAS | Attempted to alias an alias. |

| | | | |
|---|---|---|---|
| 0xFFFFFD56 | -682 | ERR_AUDITING_FAILED | |
| 0xFFFFFD55 | -683 | ERR_INVALID_API_VERSION | Library passed an invalid API version; for example, client may be using an old library. |
| 0xFFFFFD54 | -684 | ERR_SECURE_NCP_VIOLATION | |
| 0xFFFFFD53 | -685 | ERR_MOVE_IN_PROGRESS | |
| 0xFFFFFD52 | -686 | ERR_NOT_LEAF_PARTITION | |
| 0xFFFFFD51 | -687 | ERR_CANNOT_ABORT | |
| 0xFFFFFD50 | -688 | ERR_CACHE_OVERFLOW | |
| 0xFFFFFD4F | -689 | ERR_INVALID_SUBORDINATE_COUNT | |
| 0xFFFFFD4E | -690 | ERR_INVALID_RDN | |
| 0xFFFFFD4D | -691 | ERR_MOD_TIME_NOT_CURRENT | |
| 0xFFFFFD4C | -692 | ERR_INCORRECT_BASE_CLASS | |
| 0xFFFFFD4B | -693 | ERR_MISSING_REFERENCE | |
| 0xFFFFFD4A | -694 | ERR_LOST_ENTRY | |
| 0xFFFFFD49 | -695 | ERR_AGENT_ALREADY_REGISTERED | |
| 0xFFFFFD48 | -696 | ERR_DS_LOADER_BUSY | |
| 0xFFFFFD47 | -697 | ERR_DS_CANNOT_RELOAD | |
| 0xFFFFFD46 | -698 | ERR_REPLICA_IN_SKULK | |
| 0xFFFFFD45 | -699 | ERR_FATAL | |
| 0xFFFFFD44 | -700 | ERR_OBSOLETE_API | |
| 0xFFFFFD43 | -701 | ERR_SYNCHRONIZATION_DISABLED | |
| 0xFFFFFD42 | -702 | ERR_INVALID_PARAMETER | |

## DOS/Windows IPX/SPX errors

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| EC | 236 | | Connection terminated.<br>(Windows) SPX terminated poorly. |
| ED | 237 | | Connection failed.<br>SPX terminated poorly.<br>(Windows) SPX connection terminated. |
| EE | 238 | | Invalid connection. |
| EF | 239 | | Connection table full. |
| F0 | 240 | | IPX not installed. |
| F1 | 241 | | (Windows) IPX/SPX not initialized. |
| F2 | 242 | | (Windows) No DOS memory. |
| F3 | 243 | | (Windows) No free ECB. |
| F4 | 244 | | (Windows) Lock failed. |
| F5 | 245 | | (Windows) Over the maximum limit. |
| F6 | 246 | | (Windows) IPX/SPX previously initialized. |

| | | |
|---|---|---|
| F9 | 249 | ECB Cannot be canceled |
| FA | 250 | No local target identified. |
| FC | 252 | Request canceled.<br>SPX connection closed. |
| FD | 253 | Bad packet. Given packet did not have a 30-byte packet header as the first fragment or its total length exceeded 567 bytes.<br>Packet overflow. |
| FE | 254 | Socket table full.<br>Packet not deliverable. |
| FF | 255 | ECB not in use<br>Socket not open.<br>Socket already open.<br>Hardware failure.<br>(Windows) SPX not installed.<br>(Windows) SPX socket not opened. |

## IPX/SPX for OS/2

| Hex. | Dec. | Constant | Desc. |
|---|---|---|---|
| 8001 | 32769 | (-32767) | Socket table full. |
| 8002 | 32770 | (-32766) | Bad packet. |
| 8004 | 32772 | (-32764) | Packet not found. |
| 8006 | 32774 | (-32762) | Receive overflow. |
| 8007 | 32775 | (-32761) | Canceled |
| 9001 | 36865 | (-28671) | IPX timeout |
| 9002 | 36866 | (-28670) | No route |
| 9003 | 36867 | (-28669) | Socket in use. |
| 9004 | 36868 | (-28668) | Socket not open. |
| A002 | 40962 | (-24574) | Socket table full.<br>Out of resource. |
| A0FF | 41215 | (-24321) | SPX ECB in use. |
| A1F9 | 41465 | (-24071) | Cancel failed. |
| A1FF | 41471 | (-24065) | ECB not found. |
| A2ED | 41709 | (-23827) | Connection failed. |
| A2EE | 41710 | (-23826) | SPX connection not found. |
| A2FD | 41725 | (-23811) | Connection failed.<br>Bad packet. |
| A3EF | 41967 | (-23569) | Connection table full. |
| A402 | 41986 | (-23550) | Bad connection status. |
| A601 | 42497 | (-23039) | Invalid fragment list. |

# 28.14. NetBIOS Errors

NetBIOS return codes are reported when FDR/UPSTREAM attempts to perform an ULTra function over NetBIOS and it fails. FDR/UPSTREAM will specifically denote the return code as a NetBIOS return code.

NetBIOS return codes are reported as hexadecimal values whose meanings are described below. Contact Innovation Technical Support for any questions you may have concerning these return codes.

- **01:** Invalid buffer length for SEND DATAGRAM, SEND BROADCAST DATAGRAM, ADAPTER STATUS, or SESSION STATUS.
  **Cause:** A Send Broadcast or Send Datagram command cannot send more than 512 bytes. For ADAPTER STATUS and SESSION STATUS, the buffer length specified was less than the minimum required.
  **Action:** Specify the correct size for the buffer and try again.

- **03:** Invalid command
  **Cause:** The command code used was incorrect.
  **Action:** Reissue the correct command code.

- **05:** Command timed out
  **Cause:** One of the following
  1. ADAPTER STATUS: The system time-out period has elapsed.
  2. SEND: The time-out period specified for the Call or Listen command has elapsed.
  3. RECEIVE: The time-out period specified for the Call or Listen command has elapsed.
  4. HANG UP: The time-out period has expired for any outstanding Send commands to complete.

  **Action:** Associate the action number below to the Cause above:
  1. ADAPTER STATUS: Make sure you are using the correct name.
  2. SEND: The session ended abnormally. Establish another session and reissue a Send command.
  3. RECEIVE: Reissue the command.
  4. HANG UP: The session ended abnormally.

- **06:** Message Incomplete
  **Cause:** Part of a message was not received because the specified buffer length is not large enough to receive the full message.
  **Action:** Reissue another Receive or Receive Any command to get the rest of the message before the remote node times out under session support. For Adapter Status, Session Status, Receive Datagram, and Receive Broadcast Datagram commands, the remaining data is lost.

- **08:** Invalid local session number
  **Cause:** The session number specified is not one of the active sessions.
  **Action:** Specify an active session and reissue the command.

- **09:** No resource available
  **Cause:** Not enough space available on the node.
  **Action:** Reissue the command at a later time. This is a temporary condition.

- **0A:** Session closed
  **Cause:** The session has been closed by either the local or remote node.
  **Action:** No action is required. For a pending SEND, RECEIVE, or RECEIVE ANY, this is the notification that the session has been closed. For HANG UP, the session was closed by the remote computer.

- **0B:** Command canceled
  **Cause:** Notification that the command was canceled. If the canceled command is SEND or CHAIN SEND the session is abnormally ended.
  **Action:** No action is required.

- **0D:** Duplicate name in local name table
  **Cause**: A name was specified that is already in the local name table.
  **Action**: Specify another name. For FDR/UPSTREAM ULTra, you can not use the IBM or Microsoft server workstation name as the ULTra name; you must select a different (or slightly modified) name.

- **0E:** Name table full
  **Cause:** The maximum number of names is in the name table. The maximum number of names depends on the specific NetBIOS implementation you are using.
  **Action:** Wait until a delete name occurs or deregistration is complete.

- ☐ **0F:** Command completed (name has active sessions and is now deregistered)
  **Cause:** The name to be deleted is active in a session now, but is deregistered. When the name is marked deregistered and has active sessions, it still occupies a slot in the name table. The name is unusable.
  **Action:** Close all sessions using that name so the Delete command can complete.

- ☐ **11**: Local session table full
  **Cause:** No entries are available in the session table. (The number of sessions for a local session table is user-specifiable and has maximum values depending on the specific NetBIOS implementation you are using).
  **Action:** One of the following
  - Wait until a session has closed.
  - Refer to the Reset command to alter values.

- ☐ **12**: Session open rejected
  **Cause**: No Listen command is outstanding on the remote node.
  **Action:** Wait until a Listen command is issued by the remote node.

- ☐ **13:** Invalid name number
  **Cause:** The name number is invalid
  **Action**: Use the original name number that was assigned to the name

- ☐ **14:** No answer (cannot find name called)
  **Cause:** The call name specified cannot be found or did not answer.
  **Action:** One of the following:
  1. Verify that the call name used is correct.
  2. Retry with the correct or a different call name.
  3. Reissue if the remote node is busy.

- ☐ **15**: Name not found
  **Cause:** One of the following has occurred:
  - The name specified was not in the name table.
  - An asterisk was specified in the first character position of the name field.
  - Hex 00 was specified in the first character position.
  - The name is deregistered.

  **Action:** Specify another name.

- ☐ **16**: Name in use on remote node.
  **Cause:** Unique names may be used only once on the network.
  **Action:** Specify another name.

- ☐ **17:** Name deleted
  **Cause**: The name that issued a Receive Datagram, Receive Broadcast Datagram, Listen or Receive Any command has been deleted.
  **Action:** No action required.

- ☐ **18:** Session ended abnormally
  **Cause**: One of the following has occurred:
  - The remote node is powered off.
  - The session SEND or CHAIN SEND has timed out.
  - SEND or CHAIN SEND was canceled.
  - HANG UP timed out while waiting for SEND or CHAIN SEND to complete.

  **Action:**
  - Check the remote node for status.
  - Reestablish the session for a Send, Chain Send, Receive, or Receive Any command.

- ☐ **19:** Name conflict detected
  **Cause**: Network protocol has detected two or more identical names on the network.
  **Action**: Every node on the network should delete that name immediately.

- ☐ **21**: Interface busy
  **Cause**: BIOS was called while executing an uninterruptible process.
  **Action:** Return from the interrupt level and try again later.

- ☐ **22**: Too many commands outstanding
  **Cause:** The number of outstanding commands is maximum.
  **Action**:

- If not at the maximum number, refer to RESET.
- If at the maximum number, try again later.

☐ **23:** Invalid number in NCB_LANA_NUM field
**Cause**: A number other than hex 00 or hex 01 was specified.
**Action:** Correct the number and try again. Specify hex 00 for the first adapter or hex 01 for the second adapter.

☐ **24**: Command completes while cancel is occurring
**Cause**: An attempt was made to cancel a command that already completed.
**Action**: No action required

☐ **26**: Command not valid to cancel
**Cause**: An attempt was made to cancel a command tat is invalid to cancel.
**Action**: The commands that are not valid to cancel are: ADD NAME, ADD GROUP NAME, DELETE NAME, SEND DATAGRAM, SEND BROADCAST DATAGRAM, SESSION STATUS, RESET, and CANCEL.

☐ **40:** Adapter malfunction
**Cause**: A hardware problem was detected on the adapter.
**Action:** Retry or reset the command. If you receive the return code again, perform the node diagnostic tests.

☐ **50 to F6:** Adapter malfunction
**Cause**: A hardware problem was detected on the adapter.
**Action**: Retry or reset the command. If you receive the return code again, perform the node diagnostic tests.

**FF**: Command pending status
**Cause**: The command is still pending
**Action**: No action is required. See NCP_POST@ and NCB_RETCODE for a description of this return code.

- If not at the maximum number, refer to RESET.
- If at the maximum number, try again later.

☐ **23:** Invalid number in NCB_LANA_NUM field
**Cause**: A number other than hex 00 or hex 01 was specified.
**Action:** Correct the number and try again. Specify hex 00 for the first adapter or hex 01 for the second adapter.

☐ **24**: Command completes while cancel is occurring
**Cause**: An attempt was made to cancel a command that already completed.
**Action**: No action required

☐ **26**: Command not valid to cancel
**Cause**: An attempt was made to cancel a command tat is invalid to cancel.
**Action**: The commands that are not valid to cancel are: ADD NAME, ADD GROUP NAME, DELETE NAME, SEND DATAGRAM, SEND BROADCAST DATAGRAM, SESSION STATUS, RESET, and CANCEL.

☐ **40:** Adapter malfunction
**Cause**: A hardware problem was detected on the adapter.
**Action:** Retry or reset the command. If you receive the return code again, perform the node diagnostic tests.

☐ **50 to F6:** Adapter malfunction
**Cause**: A hardware problem was detected on the adapter.
**Action**: Retry or reset the command. If you receive the return code again, perform the node diagnostic tests.

**FF**: Command pending status
**Cause**: The command is still pending
**Action**: No action is required. See NCP_POST@ and NCB_RETCODE for a description of this return code.

# 29 FDR/UPSTREAM Messages

This section lists the messages that are contained in the FDR/UPSTREAM message file (UPSTREAM.MSG). Note that FDR/UPSTREAM usually logs several messages simultaneously.

FDR/UPSTREAM messages usually contain:

- A number, starting at 1001.
- A severity letter, described in the prior chapter
- A single line title
- Additional lines of text describing the message
- A FIX, which describes the action that you may take to help resolve the problem.

Many FDR/UPSTREAM messages have a fix which says to “See additional messages”. Often these additional messages will refer you to return codes from the APPC software (listed in the prior chapter), the operating system (again listed earlier in the prior chapter), or some other source (Banyan, etc.). When encountering messages of this type, please contact technical support for an interpretation and recommended action in these cases.

**PC1001E Error creating window data**
**Reason:** There was an error allocating data to display the error window.
**Action:** Free memory and try again.

**PC1003E Error setting window time-out timer**
**Reason:** There was an error setting the timer to allow an error message to time-out. Further messages will not time-out.
**Action:** Call technical support.

**PC1004E Error loading the error window dialog**
**Reason:** When attempting to display a message, the message display dialog was not found.
**Action:** Make sure that US.RES is in the same directory as UPSTREAM.

## Log file errors (Error errors) These are messages which occur when attempting to display a message.

**PC1010E Error writing to the log file**
**Reason:** There was an error writing to the log file.
**Action:** See additional messages.

**PC1011E Error opening the log file**
**Reason:** There was an error opening the log file.
**Action:** See additional messages.

**PC1020E Error allocating data to send error (OS/2)**
**Reason:** There was an error allocating data space to send the given error to the remote system.
**Action:** Close other programs or free disk space.

## Error messages cannot be displayed when unattended

**PC1030D Cannot display messages while unattended**
**Reason:** UPSTREAM could not display the following message title and message while running in an unattended mode.

## Informational messages. These are messages that are displayed in message boxes, and are often not fatal.

**PC1101D Communications not loaded.**
**Reason:** APPC or TCP/IP is not loaded. Unattended operations will not be performed.

**PC1102N Dial remote now.**
**Reason:** Dial the remote system now. Press the OK button when you are polling

## Errors during initialization.

**PC1201E Error in configuration file**
**Action:** See additional messages.

**PC1202E Error in parameter file (%s)**
**Reason:** %s
**Action:** See additional messages.

**PC1203E Required configuration parameter missing.**
**Reason:** A required configuration parameter that was expected is missing.
**Action:** See additional messages.

**PC1204E Required parameter missing.**
**Action:** See additional messages.

**PC1205E Unrecognized action command**
**Reason:** UPSTREAM detected a command that it could not recognize. Internal error.
**Action:** Call UPSTREAM technical support.

**PC1206W Restart only requested and nothing to restart**
**Reason:** The restart only action command was specified and there was not an outstanding backup to restart.

**PC1207E Run Job not supported in Windows**
**Reason:** Since Microsoft Windows does not have the concept of a batch or command file, the job function has no meaning.

**PC1208D Restart only action command specified**

**PC1209E Kill last restart and there wasn't one pending**

## Return code file errors.

**PC1210E Error creating return code file**
**Reason:** There was a file error creating the US.RET file.
**Action:** Look up the return code in the operating system messages section of the UPSTREAM manual.

**PC1211E Error writing return code file**
**Reason:** There was a file error writing the return code in the US.RET file.
**Action:** Look up the return code in the operating system messages section of the UPSTREAM manual.

**PC1220W Error opening translation table**
**Reason:** There was an error opening the translation table listed below.
**Action:** See additional messages

**PC1221W Error reading translation table**
**Reason:** There was an error reading an entry from the translation table listed below.
**Action:** Verify that you have one line per entry. You must have a total of 256 lines. See additional messages.

**PC1225I Using translation table.**
**Reason:** The following translation table is now in use:

**PC1230W Restart restore requested and nothing to restart**
**Reason:** The restart only action command was specified and there was not an outstanding restore to restart.

**PC1231D Restart restore action command specified**

**PC1232E Kill restart restore and there wasn't one pending**

**PC1233W Restartable backup has been killed.**

**PC1234W Restartable restore has been killed.**

## Errors during normal operation.

**PC1250E Error creating internal message list**
**Reason:** There was an error creating the internal message list. This may cause the flow of screens to operate incorrectly.
**Action:** Free memory and try again.

**PC1251E Stack overflow**
**Reason:** There is a shortage of stack space for temporary memory. Internal error.
**Action:** Call Tech Support.

**PC1252I Windows message queue depth changed**
**Reason:** The environment variable was specified to change the UPSTREAM message queue depth. The value specified may be reduced due to Windows memory considerations

## Enter/exit UPSTREAM normal messages

**PC1275I Entering UPSTREAM**

**PC1276I Exiting UPSTREAM**

**PC1277E Error setting termination timer**
**Reason:** UPSTREAM can't set the termination timer. It will terminate anyway but may be unstable in Windows.

**PC1278E Error resetting termination timer**
**Reason:** UPSTREAM can't reset the termination timer. It will terminate anyway but may be unstable in Windows.

**PC1279E Termination process took too long.**
**Reason:** UPSTREAM waited 60 seconds for pending remote allocate requests to terminate. UPSTREAM will terminate anyway but may be unstable in Windows.

## Errors in USModify

**PC1280I Entering USModify**

**PC1281I Exiting USModify**

**PC1282E USModify parameter error**
**Reason:** Multiple file spec parameters were specified.

**PC1283E USModify parameter error**
**Reason:** Multiple override file parameters were specified.

**PC1284N Please enter a value for the following parameter(s)**
**Reason:** Press the Esc key to enter a blank value.

**PC1285E USModify parameter error**
**Reason:** No configuration or parameter file specifications were specified.

**PC1286W USModify found no files**
**Reason:** No files matching the following file specification were found.

**PC1287E USModify error modifying configuration file**
**Action:** See additional messages.

**PC1288E USModify error modifying parameter file**
**Action:** See additional messages.

**PC1289I USModify successfully modified file**
**Reason:** The following file was successfully modified.

## Session management errors

**PC1301E Unknown session state**
**Reason:** Unexpected session state. Internal failure.
**Action:** Call technical support.

**PC1302E Session state did not change.**
**Reason:** The session state must always change. Internal failure.
**Action:** Call technical support.

**PC1303E Error displaying session status.**
**Reason:** There was an error in obtaining session status information from APPC.
**Action:** See additional messages and lookup return codes.

**PC1304D Activate DLC failure.**
**Reason:** If you are using AdaptSNA, this indicates that the link timer has timed out. The link will be continually retried until you press CANCEL or the link becomes active.

## Log exits

**PC1310I LU Log Exit**
**Reason:** The following type and subtype describe some error reported by APPC/PC concerning the LU.
**Action:** Can usually be ignored. See UPSTREAM manual for the meaning of the type and subtype.

**PC1311D PU Log Exit**
**Reason:** The following type and subtype describe some error reported by APPC/PC concerning the PU.
**Action:** A TYPE of 17 with a SUBTYPE of 0 is normal Other TYPEs and SUBTYPEs should be looked up in the Log Exits codes in the UPSTREAM User's Guide.

## Session state locations.

**PC1325E Error occurred at the session start point**

**PC1326E Error occurred during ATTACH_PU verb**

**PC1327E Error occurred during ATTACH_LU verb**

**PC1328E Error occurred during ACTIVATE_DLC verb**

**PC1329E Error occurred during “dial remote” prompt**

**PC1330E Error occurred during session activation**

**PC1331E Error occurred while waiting for session start**

**PC1332E Error occurred at session active location**

**PC1333E Error occurred during session deactivation**

**PC1334E Error occurred during DETACH_LU verb**

**PC1335E Error occurred during DETACH_PU verb**

**PC1336E Error occurred after session was stopped** General APPC errors

**PC1401E Unknown APPC function**
**Reason:** A request was made for an APPC function that was unknown. This is an internal error.
**Action:** Call technical support.

**PC1402E Remote system error**
**Reason:** The preceding message was from the remote system. Subsequent messages describe where in the PC the error occurred and can usually be ignored.
**Action:** See the host log (available through Host Reporting) for more details.

**PC1403I Allocation failure - retry...**
**Reason:** There was a retryable allocation error. UPSTREAM will retry this verb up to 10 times before reporting this as a fatal error.

**PC1404E Illegal force to send**
**Reason:** The remote requested a force to send state illegally. Internal error.
**Action:** Call tech support.

## Windows APPC errors

**PC1431E An APPC Startup error occurred**
**Reason:** An attempt to initialize an APPC interface failed. The name of the APPC interface and the error code follow.
**Action:** Ensure that your APPC software is properly configured.

## Abort messages. These are informational messages that are displayed in message boxes and allow the user to press ABORT.

**PC1501N Starting session**
**Reason:** You can press CANCEL to abort the session start function. This message will go away if there is an error or the session has started successfully.

**PC1502N Waiting for session to activate.**
**Reason:** You can press CANCEL to abort waiting for the session to start automatically. This message will go away if there is an error or the session has started successfully.

General file errors.

**PC1601E Error creating file structure**
**Reason:** There was an error creating the internal file storage structure.
**Action:** Free memory and try again.

**PC1602E Error setting drive for directory create**
**Reason:** There was an error during a file open when the directory was attempting to be created, setting the default drive to the requested value.
**Action:** Be sure that the drive is ready then try again.

**PC1603E Error getting directory for directory create**
**Reason:** There was an error during a file open when the directory was attempting to be created, getting the current default directory for the specified drive.
**Action:** Be sure that the drive is ready then try again.

**PC1604E Error creating directory**
**Reason:** There was an error during a file open when the directory was attempting to be created.
**Action:** See additional messages.

**PC1605E Error setting directory after directory create**
**Reason:** There was an error during a file open when the directory was created setting the default directory to the directory successfully created.
**Action:** See additional messages.

**PC1606E Error opening file**
**Action:** See additional messages.

**PC1607E Error removing old EOF marker in a text file**
**Reason:** There was an error removing an old end-of-file marker in a text file when a file was opened for append.
**Action:** See additional messages.

**PC1608E Error reading old EOF marker in a text file**
**Reason:** There was an error reading the last byte of a text file opened for append.
**Action:** See additional messages.

**PC1609E Error seeking old EOF marker in a text file**
**Reason:** There was an error seeking to the last byte of a text file opened for append.
**Action:** See additional messages.

**PC1610E Error seeking for block read**
**Reason:** There was an error seeking for a location in a file for a block read.
**Action:** See additional messages.

**PC1611E Error reading a block**
**Reason:** There was an error reading a block of a file randomly.
**Action:** See additional messages.

**PC1612E Not enough data (unexpected EOF)**
**Reason:** During a block read, a block of a specific size was expected and the file did not contain enough data.
**Action:** The file has been corrupted. Delete the file and retry (if possible).

**PC1613E Error writing a string**
**Reason:** There was an error writing a string sequentially.
**Action:** See additional messages.

**PC1614E Error writing a string EOL**
**Reason:** There was an error writing the CR/LF combination after writing a string successfully.
**Action:** See additional messages.

**PC1615E Error seeking for block write**
**Reason:** There was an error setting the location for a block write.
**Action:** See additional messages.

**PC1616E Error writing a block of data**
**Action:** See additional messages.

**PC1617E Error deleting a file**
**Action:** See additional messages.

**PC1618E Error seeking to the end of a file**
**Action:** See additional messages.

**PC1619E Access of a LAN file.**
**Reason:** The file to be opened is a LAN file.
**Action:** Purchase the LAN version of UPSTREAM.

**PC1620E Error searching a directory (FindFirst OS2)**
**Reason:** There was an error searching the directory.
**Action:** See additional messages.

**PC1621E Error searching a directory (FindNext OS2)**
**Reason:** There was an error searching the directory.
**Action:** See additional messages.

**PC1622E Error searching a directory (FindFirstFile WinNT)**
**Reason:** There was an error searching the directory.
**Action:** Contact Tech Support.

**PC1623W Ignoring file with size over 4G (WinNT)**
**Reason:** File found while searching the directory.
**Action:** Exclude this file.

**PC1624W Invalid date and time for file (WinNT)**
**Reason:** File found while searching the directory. Assuming date and time of 01/01/1980 12:00:00a.

**PC1625E Error removing a directory**
**Action:** See additional messages.

**PC1626E (NT) Error getting file time**
**Action:** See additional messages.

**PC1627E (NT) Error setting file time**
**Action:** See additional messages.

**PC1628E (NT) Error reading Extended Attribute or ACL**
**Reason:** Stream ID header
**Action:** See additional messages.

**PC1629E (NT) Error reading Extended Attribute or ACL**
**Reason:** Stream data
**Action:** See additional messages.

**PC1630E (NT) Error writing Extended Attribute or ACL**
**Reason:** Stream ID header
**Action:** See additional messages.

**PC1631E (NT) Error writing Extended Attribute or ACL**
**Reason:** Stream data
**Action:** See additional messages.

**PC1632E (NT) Error skipping Extended Attribute or ACL**
**Reason:** Stream data
**Action:** See additional messages.

**PC1633W (NT) Error Extended Attribute stream too long**
**Reason:** An extended attribute stream for a file has a size greater than 4G and cannot be backed up.
**Action:** Exclude this file.

**PC1634E (NT) Error restoring non-file data**
**Reason:** The non-file data for a file or directory could not be restored because the “Restore files and directories” privilege could not be enabled.
**Action:** Ensure your account has the appropriate rights.

**PC1635E (NT) Error backing up directory non-file data**
**Reason:** The non-file data for a directory could not be backed up because the directory could not be opened.
**Action:** See additional messages.

**PC1636E (NT) Error restoring directory non-file data**
**Reason:** The non-file data for a directory could not be restored because the directory could not be opened.
**Action:** See additional messages.

**PC1637E Error allocating extra data buffer**
**Reason:** There was an error allocating the buffer to hold multi-file extra data.
**Action:** Reduce the number of duplicate files or free memory.

**PC1638E Extra data position too large**

**Reason:** Internal error. Call tech support.

**PC1639E (NT) Error restoring invalid non-file data**
**Reason:** The non-file data for a file or directory could not be restored because it is not formatted properly.
**Action:** Call technical support.

**PC1640E Non-file data for one or more file not restored**
**Reason:** The non-file data for one or more files was not restored, probably because it was backed up from a different operating system than the one it is being restored for.
**Action:** Call technical support.

**PC1641E Error allocating file find buffer**
**Reason:** There was an error allocating a buffer needed to perform a file search operation.
**Action:** Free memory and try again.

**PC1642E An attempt was made to read past the end of file**
**Reason:** There was an attempt to read past the end of a file during a backup.
**Action:** Call technical support.

**PC1643E Error remapping file view**
**Reason:** There was an error remapping a view for a memory mapped file.
**Action:** Call technical support.

**PC1644E Cannot determine pipe file size**
**Reason:** A UNC pipe file spec was provided for a DASD backup without a DASDOVERRIDE parameter. The only way for UPSTREAM to determine the amount of data that might be read from a pipe is for the user to inform UPSTREAM via a DASDOVERRIDE parameter. The DASDOVERRIDE parameter was either not provided or did not specify an absolute number. UPSTREAM cannot backup the data from the pipe to DASD.
**Action:** Supply a DASDOVERRIDE parameter with an absolute number of bytes as a value.

## Mid-level conversation errors.

**PC1701E Error occurred during a TP_STARTED verb**
**Reason:** If you are running OS/2 or Windows, a return code of 00010000 usually means a mismatch between the local LU alias and the communications manager local LU alias.

**PC1702E Error occurred during a TP_ENDED verb**

**PC1703E Error occurred during an ALLOCATE verb**

**PC1704E Error occurred during a SEND_DATA verb**

**PC1705E Error occurred during a RECEIVE_AND_WAIT verb**

**PC1706E Error occurred during a CONFIRM verb**

**PC1707E Error occurred during a CONFIRMED verb**

**PC1708E Error occurred during a DEALLOCATE verb**

**PC1709E Error occurred during a GET ALLOCATE verb**
**Reason:** There was an error checking for a remote request of UPSTREAM functions.
**Action:** (OS/2 or Windows) Verify that you have configured for remotely attachable programs correctly.

**PC1710E Error occurred during a TP_VALID verb**

**PC1711E Conversation type mismatch**
**Reason:** UPSTREAM received a remote allocate that was invalid.
**Action:** Allocate probably not destined for this node.

**PC1712E Bad sync level**
**Reason:** UPSTREAM received a remote allocate that was invalid.
**Action:** Allocate probably not destined for this node.

**PC1713E TPN not recognized**
**Reason:** UPSTREAM received a remote allocate that was invalid.
**Action:** Allocate probably not destined for this node.

**PC1714E Error testing remote allocate**
**Reason:** There was an error testing for remote allocates before beginning a local allocate.
**Action:** See additional messages

**PC1715E Expected data**
**Reason:** UPSTREAM received a state change when data was expected. Internal error.
**Action:** Contact Tech Support.

**PC1716E Error allocating test conversation**
**Action:** See additional messages.

**PC1717E Error deallocating test conversation**
**Action:** See additional messages.

**PC1718I Remote allocate support disabled**
**Reason:** You specified the environment variable USNORMT which intentionally disabled support for host initiates.

**PC1719E Remote allocate checks are taking too long**
**Reason:** The internal UPSTREAM timer checks for remote requests of UPSTREAM functions every 5 seconds. The last check took more than 5 seconds so UPSTREAM is disabling this check.
**Action:** You should adjust your APPC software so that Remote Allocate checks return as quickly as possible (usually a value of 1).

**PC1720E Remote allocate checks seem locked**
**Reason:** UPSTREAM has has waited more than 1 minute for a remote allocate check to return. This indicates that your communications software has locked.
**Action:** A reboot would be suggested.

**PC1721E Remote allocate support was disabled**
**Reason:** UPSTREAM has disabled the support for host initiates due to a previous condition.
**Action:** Check the log to determine why host initiates were disabled.

**PC1725E Bad send state**
**Reason:** The conversation can not support the send request made. Internal error.
**Action:** Call technical support.

**PC1726E Bad receive state**
**Reason:** The conversation can not support the receive request made. Internal error.
**Action:** Call technical support.

**PC1727E Bad confirm state**
**Reason:** The conversation can not support the confirm request made. Internal error.
**Action:** Call technical support.

**PC1728E Bad confirmed state**
**Reason:** The conversation can not support the confirmed request made. Internal error.
**Action:** Call technical support.

**PC1729E Bad flush state**
**Reason:** The conversation can not support the flush request made. Internal error.
**Action:** Call technical support.

**PC1730E Bad send error state**
**Reason:** The conversation can not support the send error request made. Internal error.
**Action:** Call technical support.

**PC1731E Incomplete received.**
**Reason:** A receive and wait buffer was too small. Internal error.
**Action:** Call technical support.

**PC1732E Bad flush send state**
**Reason:** The conversation can not support the flush request made. Internal error.
**Action:** Call technical support.

**PC1733E NULL receive buffer**
**Reason:** Internal error.
**Action:** Call technical support.

**PC1740E Cannot start a conversation**
**Reason:** A communications conversation cannot be started because neither APPC or TCP/IP is installed.

**PC1750E Can't allocate data to flush receives (OS/2).**
**Reason:** There was an error allocating data space to flush received data.
**Action:** Close other programs or free disk space.

**PC1751E Can't allocate data to flush receives (OS/2).**
**Reason:** There was an error allocating data space to flush received data to perform a confirmed.
**Action:** Close other programs or free disk space.

**PC1752E Can't allocate data to flush receives (OS/2).**
**Reason:** There was an error allocating data space to flush received data to completely end a conversation.
**Action:** Close other programs or free disk space.

**PC1753E Can't allocate record packing record.**
**Action:** Disable record packing or free memory.

**PC1754E Record packing error**
**Reason:** A data record was larger than the entire buffer received. Internal error.
**Action:** Call tech support.

**PC1755E Invalid packing type**
**Reason:** The remote specified a packing type not allowed.
**Action:** Call tech support.

**PC1756E Invalid packing type (standard)**
**Reason:** The remote specified a packing type not allowed.
**Action:** Call tech support.

**PC1757E Invalid packing type (fixed)**
**Reason:** The remote specified a packing type not allowed.
**Action:** Call tech support.

**PC1758E Invalid packing type (variable)**
**Reason:** The remote specified a packing type not allowed.
**Action:** Call tech support.

## Backup file access errors.

**PC1801E Error writing description to the backup file**
**Reason:** There was an error writing the backup description record (record #1) to the internal backup file.
**Action:** See additional messages.

**PC1802E Error writing the specs to the backup file**
**Reason:** There was an error writing a file specification to the internal backup file.
**Action:** See additional messages.

**PC1803E Error writing file info to the backup file**
**Reason:** There was an error writing a file information record to the internal backup file.
**Action:** See additional messages.

**PC1804E Error writing description to the backup file**
**Reason:** There was an error writing the backup description record (record #1) to the internal backup file when the file information was completely written.
**Action:** See additional messages.

**PC1805E Error deleting backup file.**
**Reason:** There was an error deleting the internal backup file.
**Action:** See additional messages.

**PC1806E Error creating the backup file**
**Reason:** There was an error creating the internal backup file.
**Action:** See additional messages.

**PC1807E Error writing parameters to the backup file**
**Reason:** There was an error writing the non-repeating parameters to the internal backup file during its creation.
**Action:** See additional messages.

**PC1808D File spec specifies no files.**
**Reason:** The following backup file spec specifies a drive or mount point where no files could be found to be backed up. This usually occurs when a drive or mount point has been lost or is unavailable.
**Action:** Validate the drive or mount point connection.

**PC1809E No valid files to back up.**
**Reason:** There are no valid files in any of your file specs to backup. The backup will not be performed. Usually this occurs when one or more connections to drives or mount points have been lost.
**Action:** Validate the drive or mount point connection.

**PC1810W Backup specification not found.**
**Reason:** The backup specification directory was not found on the specified drive.
**Action:** Check your file set specification.

**PC1811I Error getting extended attribute size (OS/2)**
**Reason:** There was an error getting the size of the extended attributes. Extended attributes (if any) will not be backed up (but an attempt will be made to backup the data).
**Action:** The file may be in use - try later, or this may be a system file which can not be backed up.

**PC1812E File name too long**
**Reason:** UPSTREAM can only process file names which are less than or equal to the environment variable MAXFILENAMESIZE or 80 bytes for DOS and Windows, or 128 bytes for OS/2.
**Action:** Specify shorter file names or increase MAXFILENAMESIZE.

**PC1813E Error creating backup parameter file**
**Reason:** There was an error creating the parameter file which is associated with a backup file.
**Action:** See additional messages

**PC1814E Error reading backup file to delete**
**Reason:** There was an error reading the backup file for the purpose of deleting the parameter file attached to it. There will be a file left on disk.
**Action:** See additional messages

**PC1815E Error deleting param file attached to backup**
**Reason:** There was an error deleting the parameter file attached to the backup file. There will be a file left on disk.
**Action:** See additional messages

**PC1816E Error searching for file spec (OS/2 dirs above)**
**Reason:** There was an error searching the file spec requested
**Action:** See return code.

**PC1817E Error searching for file spec (OS/2 files)**
**Reason:** There was an error searching the file spec requested
**Action:** See return code.

**PC1818E Error searching for file spec (OS/2 dir)**
**Reason:** There was an error searching the file spec requested
**Action:** See return code.

**PC1819I Directory too long**
**Reason:** The directory below is too long for reliable DOS access. The files in it will be skipped.
**Action:** Reduce the directory path length.

**PC1820E Error saving backup parameters**
**Reason:** There was an error saving the original backup parameters temporarily so that modified parameters can be used.
**Action:** See additional messages.

**PC1821E Error recovering backup parameters**
**Reason:** There was an error retrieving the parameters that you originally specified. The parameters (as displayed) are now incorrect.
**Action:** See additional messages.

**PC1822E Error adding a file spec**
**Reason:** There was an error setting the current file spec after adding an existing one.
**Action:** See additional messages.

**PC1823E Error copying to new file spec**
**Reason:** When creating a new file spec, there was an error copying parameters from an existing file spec.

**Action:** See additional messages.

**PC1824E StreetTalk specified but no definition found**
**Reason:** While you checked the StreetTalk check box, there were no file specs which were StreetTalk names.
**Action:** Respecify.

**PC1830E Record size too small**
**Reason:** To backup StreetTalk information, you must specify at least a 2048 byte record size (4096 with high compression).
**Action:** Respecify.

**PC1831E Error opening a file to calculate DASD size**
**Reason:** There was an error opening a file to calculate the size of the sequential disk file to be created for this back up on MVS.
**Action:** See additional messages.

**PC1832E Error accessing non-file data for DASD calc**
**Reason:** There was an error accessing non-file data so as to be able to calculate the total number of bytes that will be used to create the Sequential Disk file on MVS for this backup. In most cases this won't be a problem but if you have alot of these errors the file may be too small or go into secondary extents.
**Action:** See additional messages.

**PC1833E Error accessing non-file data for DASD calc**
**Reason:** There was an error accessing non-file data so as to be able to calculate the total number of bytes that will be used to create the Sequential Disk file on MVS for this backup. In most cases this won't be a problem but if you have alot of these errors the file may be too small or go into secondary extents.
**Action:** See additional messages.

**PC1834E Error creating new file spec.**
**Reason:** There was an error allocating memory for a file specification during the backup file build.
**Action:** Free memory and retry or specify fewer file specifications.

**PC1835E Error creating a directory level**
**Reason:** There was an error allocating memory for a directory level during the backup file build.
**Action:** Free memory and retry or specify the subdirectories explicitly.

**PC1836E Error creating a subdirectory**
**Reason:** There was an error allocating memory for a subdirectory during the backup file build.
**Action:** Free memory and retry or specify the subdirectories explicitly.

**PC1837E (Banyan) No data to back up.**
**Reason:** You specified that a server be backed up and the result was no data at all.
**Action:** Respecify.

**PC1838W (Banyan) Server specified has no data**
**Reason:** The server that you specified contains no groups to be backed up.
**Action:** Respecify.

**PC1839D (Banyan) Dynamic group detection:**

**PC1840E Volume doesn't support last access date**
**Reason:** You requested a restricted backup based on last access date. The volume you are backing up does not support this field. You must use an HPFS volume, Novell volume or Banyan volume formatted and accessed with OS/2 to use this facility.
**Action:** Respecify.

**PC1841E Only valid for full merge backups**
**Reason:** You can only specify a migration or retention of deleted files when performing a full merge backup.
**Action:** Respecify.

**PC1842W Can't migrate changed file.**
**Reason:** The following file has changed, yet it was specified for migration. This file will not be deleted.

**PC1843E Error opening incremental file**
**Reason:** There was an error opening to read the required last backup file used for incrementals.
**Action:** See additional messages.

**PC1844E Error opening incremental file**
**Reason:** There was an error opening to write the required last backup file used for incrementals.
**Action:** See additional messages.

**PC1845E Error reading incremental file.**
**Reason:** There was an error reading the required incremental file.
**Action:** See additional messages.

**PC1846E Error writing incremental file.**
**Reason:** There was an error writing the required incremental file.
**Action:** See additional messages.

**PC1847E Parameter inconsistancy**
**Reason:** You specified DATELIMIT but did not specify both a LATESTDATE and a LATESTTIME.
**Action:** Respecify.

**PC1848E Latest date incorrect**
**Reason:** The format must be YY:MM:DD.
**Action:** Respecify.

**PC1849E Latest time incorrect**
**Reason:** The format must be HH:MM:SS.
**Action:** Respecify.

**PC1850E Not AIX journaled file system**
**Reason:** The file specification (below) is not part of the normal AIX journaled file system. Only JFS files may be backed up with UPSTREAM.
**Action:** Respecify.

**PC1851D Skipping non journaled file system**
**Reason:** The following directory was included in the file specification, but is not a journaled file system and thus will not be included in the backup.

**PC1852W Skipping files not owned by the effective User**
**Reason:** You must be running with root user authority to backup files you do not own.

**PC1853D Error opening incremental file**
**Reason:** There was an error opening to read the required last backup file used for incrementals. It will be assumed that a full backup has not been done before. All files will thus be marked has having NOT been changed and the host will request all files not matching previous backups or in USTDUPFL.

**PC1854E Error allocating memory**
**Reason:** There was an error allocating memory for the backup restore file.
**Action:** Free memory or disk and retry.

**PC1855E Unexpected EOF**
**Reason:** Unexpected end of file reading the backup/restore file.
**Action:** Internal error. Call tech support.

**PC1856I Backup not completely started.**
**Reason:** This backup can not be restarted.

**PC1857I Restore not completely started.**
**Reason:** This backup can not be restarted.

**PC1858W Path name too long.**
**Reason:** The following path name is too long and its subdirectories will not be traversed.
**Action:** The MAXFILENAMESIZE environment variable can be increased up to 230 bytes.

**PC1859E ioctl failed for raw device.**
**Reason:** Could not get IOCINFO for raw device.

**PC1860E Open failed for raw device.**
**Reason:** Could not get IOCINFO for raw device.

**PC1861E Raw device too large.**
**Reason:** Can not back up devices over 2gig on AIX 3.2.

**PC1862E Banyan migration include not found.**
**Reason:** The specification below was not found in the include specs. Internal error.
**Action:** Call tech support.

## Backup file validity errors.

**PC1825W Old backup file**
**Reason:** The backup file detected on disk is not usable because it hold a version which does not match the version of the software. The backup will begin from the beginning.

**PC1826W Backup file not completed**
**Reason:** The backup file detected on disk is not usable because it did not complete. The backup file will be regenerated and the backup will start from the beginning.

**PC1827E File specification is not valid for LAN WS**
**Reason:** The file specification has a Universal Naming Convention (UNC) prefix which is not allowed when a ULTra LAN Workstation is also specified.
**Action:** Correct the file specification and try again.

**PC1828E File specification has invalid network name**
**Reason:** The file specification has a Universal Naming Convention (UNC) prefix which contains an invalid network name.
**Action:** Correct the file specification and try again.

## Exclude errors.

**PC1890E Unable to allocate exclude file spec storage**
**Action:** Close some other applications and try the UPSTREAM function again.

## Intercomputer structure build/parse errors.

**PC1900E Build structure overflow**
**Reason:** When building a record for transmission, the data overflowed the structure passed in.
**Action:** Specify a larger record size.

**PC1901E Unexpected received data type**
**Reason:** A data record was received which contained data which was unexpected. Internal error.
**Action:** Call technical support.

**PC1902E Parse structure overflow**
**Reason:** When extracting received data, the data overflowed the buffer available.
**Action:** Specify a larger record size.

**PC1903E Field size overflow**
**Reason:** When extracting received data, the data overflowed the field available.
**Action:** Specify a larger record size.

**PC1904E Field not exact size**
**Reason:** When parsing received data, a data record was not the size expected. Internal error.
**Action:** Call technical support.

**PC1905E Received length too large**
**Reason:** When parsing received data, a data field was larger than the buffer to hold it.
**Action:** Specify a larger record size.

**PC1906E Received data area not created**
**Reason:** The received data buffer was not created before a request to parse data was received. Internal error.
**Action:** Call technical support.

**PC1907E Build structure overflow during fold**
**Reason:** When building a record for transmission, when attempting to fold lower case to upper case, the data overflowed the structure passed in.
**Action:** Specify a larger record size.

**PC1908E Invalid date format**
**Reason:** When converting a date from normal to Julian format, the date was not in the correct format (MM-DD-YY).
**Action:** Internal error. Call tech support.

**PC1909E (UNIX) Received invalid flag length field**
**Action:** Internal error. Call tech support.

**PC1910E (UNIX) Received invalid flag length field**
**Action:** Internal error. Call tech support.

**PC1911E (UNIX) Received invalid flag length field**
**Action:** Internal error. Call tech support.

**PC1912E (UNIX) Internal invalid flag length field**
**Action:** Internal error. Call tech support.

**PC1913E (Status) Received bad opcode**
**Action:** Internal error. Call tech support.

**PC1914E (Backup Build) Position out of range**
**Action:** Internal error. Call tech support.

## Backup state errors.

**PC2000E Error occurred during a backup build file**

**PC2001E Error occurred during a backup start conv**

**PC2002E Error occurred during a backup send description**

**PC2003E Error occurred during a backup received started**

**PC2004E Error occurred during a backup send file info**

**PC2005E Error occurred during a backup send file data**

**PC2006E Error occurred during a backup confirm**

**PC2007E Error occurred during a backup end conversation**

**PC2008E Error occurred at the end of a backup**

**PC2010E Error occurred during a restart read file**

**PC2011E Error occurred during a restart start conv**

**PC2012E Error occurred during a restart send restart**

**PC2013E Error occurred during a restart receive desc.**

**PC2014E Error occurred while deleting files.**

**PC2015E Error occurred during the host merge.**

**PC2025E Unknown backup state**
**Reason:** Internal error.
**Action:** Call technical support.

**PC2026E Error allocating record data**
**Reason:** Memory was not available to allocate the record for the backup.
**Action:** Either specify a smaller record size or turn off compression.

**PC2027E Compression error**
**Reason:** Internal error.
**Action:** Call technical support.

**PC2028E Error reading file attributes**
**Action:** See additional messages.

**PC2029W Error setting file attributes**
**Action:** See additional messages.

**PC2030E Backup file unusable for restarted backup**
**Reason:** The backup never started. It must be rerun.

**PC2032E Restarted backup mismatch**
**Reason:** The remote version date does not match the version date in the version file. The backup is not restartable.

**PC2033E Error recovering parameters during restart**
**Reason:** There was an error recovering the original parameters specified at backup time.
**Action:** See additional messages

**PC2034E Error using backup file specifications**
**Reason:** There was an error using the file specifications stored in the backup file. The backup is not restartable.

**PC2035E Error saving parameters during restart**
**Reason:** There was an error saving the current parameters to restore the parameters at the backup time.
**Action:** See additional messages

**PC2036E Error creating the specification hold area**
**Reason:** Memory ran short while attempting to create a structure to hold file specifications.
**Action:** Free memory, specify a smaller record size or turn off compression.

**PC2037D Error retrieving original transfer specs**
**Reason:** There was an error retrieving the transfer specifications that were in place before the restarted backup was attempted. This should not affect the success or failure of the transfer.

**PC2038E Error retrieving original transfer parms**
**Reason:** There was an error retrieving the transfer parameters that were in place before the restarted backup was attempted. This should not affect the success or failure of the transfer.

**PC2039E Remote saw transfer as completed**
**Reason:** The remote did not recognize that the backup had failed even though the PC thinks that it did. The backup is thus not restartable.

**PC2041E File open error aborted the backup**
**Reason:** The backup aborted because a file to be backed up was not available for open.

**PC2043E File read error aborted the backup**
**Reason:** The backup aborted because a file to be backed up was not available for read.

**PC2044W Error creating backup timer**
**Reason:** There was an error creating the backup timer. The backup should continue normally, however you will not be able to suspend the backup.

**PC2045E Extended attribute sizes not equal (OS/2)**
**Reason:** The extended attributes of the file has changed since the backup file information was created.
**Action:** Retry the backup.

**PC2046E Can't allocate extended attribute buffer (OS/2)**
**Reason:** There was an error allocating the data space for the extended attribute buffer.
**Action:** Free memory by unloading other programs or by freeing additional disk space.

**PC2047E Error getting extended attributes length (OS/2)**
**Reason:** There was an error getting the length of the extended attributes for the file.
**Action:** Verify that the file still exists.

**PC2048E Error getting extended attribute name (OS/2)**
**Reason:** There was an error extracting the name of the extended attribute.
**Action:** Verify that the file has not been opened by another application.

**PC2049E Error getting extended attributes (OS/2)**
**Reason:** There was an error extracting the extended attributes.
**Action:** Verify that the file has not been opened by another application.

**PC2050I Backup started**

**PC2051D Backup successful**

**PC2052D Backup complete with some ignored failures**

**PC2053I Backup failed**

**PC2054I Restarted backup started**

**PC2055W Backup suspended**

**PC2056I File transfer send started**

**PC2057D File transfer successful**

**PC2058D File transfer complete with some ignored failures**

**PC2059I File transfer failed**

**PC2060W File transfer suspended**

**PC2075E Original backup not completely started**
**Reason:** None of the files from the original backup ever reached the host.
**Action:** Restart the backup.

**PC2076D PC and/or Server time adjusted to MVS time**

**PC2077E Error creating the delta file.**
**Reason:** There was an error creating the file containing the time change. This will affect the USSTART program if it is currently running.
**Action:** See additional messages. If USSTART is running, stop and restart.

**PC2078E Restart not specified.**
**Reason:** There was a backup file, but the original backup was not specified as restartable.

**PC2079E Past restart point**
**Reason:** The backup has passed the point that a restart can be attempted.
**Action:** The backup has been committed “as is”. Future backups will pick up any data that was not included in this one.

**PC2080D Automatic delete to begin**
**Reason:** Press the OK button to skip the delete process.

**PC2081D Automatic file deletion complete**

**PC2082E Error starting backup open file thread**
**Reason:** There was an error starting the backup open file thread.
**Action:** Contact tech support.

**PC2083E Timeout waiting for file open thread**
**Reason:** There was a timeout waiting for the file open thread to open the file.
**Action:** Contact tech support.

**PC2084E (OS/2) Error allocating memory**
**Reason:** There was an error allocating memory to hold information for file open threads.
**Action:** Specify a smaller number (NUMBACKUPTHREADS) or free memory or disk space.

**PC2085D A previous backup dataset was unavailable**
**Reason:** When performing the merge, the host attempted to dynamically allocate a dataset from a previous backup and it failed. Files which were on this backup will be requested from the PC.
**Action:** See the host log.

**PC2086E One of your file specs is empty.**
**Action:** Enter a file specification in every file spec.

**PC2087E Backup profile name invalid**
**Reason:** The backup profile name you specified can not be used to create a file name on the host and is thus invalid.
**Action:** Make sure the length is less than or equal to 8 and that the first character is an alphabetic character or a '$', '#' or '@'.

**PC2088E NDS file specs must be first**
**Reason:** You must specify all NetWare Directory Services file specs before non-NDS specs.
**Action:** Respecify

**PC2089D Dummy profile specified**
**Reason:** FDR/UPSTREAM will back up the file information only; no file data will be backed up and restores are prohibited. These profiles are only for testing.

**PC2090E Unknown duplicate flags**

**Reason:** FDR/UPSTREAM MVS sent duplicate flags to your machine which were unrecognized.
**Action:** Upgrade FDR/UPSTREAM on your machine.

**PC2091W Skipped %ld files**

**PC2092E Error saving parameters to add migration specs.**
**Action:** See additional messages.

**PC2093E Received bad position number.**
**Action:** Internal error. Call tech support.

**PC2094E Error creating backup open file event**
**Reason:** There was an error creating one of the synchronization events for the backup open file thread.
**Action:** Contact tech support.

**PC2095E A migration only backup was specified**
**Reason:** You specified a migration only backup and there were no migrated files.
**Action:** Respecify.

**PC2096E Storage type not allowed**
**Reason:** You may not specify a keyed or archived type backup for a migration backup.
**Action:** Specify a sequential disk or tape storage type.

## Restore state errors.

**PC2100E Error occurred during a restore start conv.**

**PC2101E Error occurred during a restore send description**

**PC2102E Error occurred during a restore receive descript.**

**PC2103E Error occurred during a restore receive file**

**PC2105E Error occurred during a restore confirmed data**

**PC2106E Error occurred during a restore end conversation**

**PC2107E Error occurred during the completion of the rest.**

**PC2108E Error occurred during a restore restart.**

**PC2120E Dest specification is not valid for LAN WS**
**Reason:** The destination file specification has a Universal Naming Convention (UNC) prefix which is not allowed when a ULTra LAN Workstation is also specified.
**Action:** Correct the destination file specification and try again.

**PC2121E Dest specification has invalid network name**
**Reason:** The destination file specification has a Universal Naming Convention (UNC) prefix which contains an invalid network name.
**Action:** Correct the destination file specification and try again.

**PC2124E PC text files disallowed with ULTra**
**Action:** Do not specify an ULTra restore with PC text files.

**PC2125E Unknown state during restore**
**Reason:** Internal error.
**Action:** Call technical support.

**PC2126W Error creating restore timer**
**Reason:** There was an error creating the restore timer. The restore should continue normally, however you will not be able to cancel the restore.

**PC2127E Error allocating data space**
**Reason:** There was insufficient memory to allocate the received data area.
**Action:** Free memory, or specify a smaller record size.

**PC2128E Error matching file info with specification**
**Reason:** Internal error matching the received file information with the user file specification.
**Action:** Call technical support.

**PC2129W Error opening existing file**
**Reason:** There was an error opening the existing file before the restore could be tried.
**Action:** Retry later.

**PC2130E Received data without information**
**Reason:** Restore data was received without an open file to write to. Internal error.
**Action:** Call technical support.

**PC2131E Unexpected received data type**
**Reason:** During a restore a record type other than data or information was received. Internal error.
**Action:** Call technical support.

**PC2132E Error creating directory**
**Action:** See additional messages.

**PC2133E Error allocating ext. attr. buffer (OS/2)**
**Reason:** There was an error allocating a buffer to hold the received extended attributes.
**Action:** Close other programs or free disk

**PC2134E Extended attribute overflow (OS/2)**
**Reason:** An extended attribute was larger than UPSTREAM can manage (32767 bytes for version 1.1).
**Action:** Reduce the size of the extended attributes

**PC2135E Error setting file extended attribute (OS/2)**
**Reason:** There was an error setting an extended attribute for a file.
**Action:** Verify that the file has not been opened by another application.

**PC2136W File restore errors logged on PC.**
**Reason:** Earlier file restore errors were logged by the PC. This message is to inform the mainframe that the restore was not completely successful.
**Action:** See PC log entries above.

**PC2137E Communications failed.**
**Reason:** The communications failed during the restore of the following file. This file may be corrupt.
**Action:** See PC log entries above.

**PC2138E Error saving parameters**
**Reason:** There was an error saving the original, user- specified parameters.
**Action:** See additional messages.

**PC2139E StreetTalk name specified not backed up**
**Reason:** The StreetTalk name that you specified as the original backup spec was not found.
**Action:** Respecify

**PC2140W StreetTalk destination should be mapped**
**Reason:** A drive which should have been mapped during the restore was not.
**Action:** This may happen when UPSTREAM creates a service and earlier reports the service not completely started or the backup had an error. Retry the restore.

**PC2141E Error reallocating data for merge**
**Reason:** A file was received which uses a larger record size than the previous file and the data space can't be allocated.
**Action:** Free memory and retry.

**PC2142E Error in fast de-compression**
**Reason:** There was a internal error in decompressing data that was compressed using fast compression.
**Action:** Contact Tech Support

**PC2143E Dummy profile disallowed**
**Reason:** Dummy profiles are for testing backups only; data generated can not be used for a restore.

**PC2144E Error writing EA.**
**Reason:** You are trying to restore file with OS/2 EA to a non-OS/2 ULTra workstation.
**Action:** If you really want to restore files/directories to a non-OS/2 workstation and loose there extended attributes, uncheck all of the OS/2 EA checkboxes in the 'More...' dialog.

**PC2145E Exceeded maximum duplicate files.**
**Reason:** Internal error.

**Action:** Call tech support.

**PC2146E Duplicate file transferred and integrity failure**
**Reason:** The file information for a duplicate file received had internal errors (it really should never have been a duplicate).
**Action:** Exclude this file from the restore.

**PC2147E Error saving restart parameters**
**Reason:** There was a file error saving the restart parameters.
**Action:** See additional messages.

**PC2148E Error saving restart description**
**Reason:** There was a file error saving the restart parameters.
**Action:** See additional messages.

**PC2149E Error recovering restore parameters**
**Reason:** During a restarted restore, there was an error recovering the original UPSTREAM parameters.
**Action:** See additional messages.

**PC2150I Restore started**

**PC2151D Restore successful**

**PC2152D Restore completed with some failures**

**PC2153D Restore failed**

**PC2154E Restore suspended by user**

**PC2155I Restore restarted**

**PC2156I Restore failed but restartable**

**PC2157I File transfer receive started**

**PC2158D File transfer receive successful**

**PC2159D File transfer completed with failures**

**PC2160D File transfer failed**

**PC2161E File transfer canceled by user**

**PC2175E Restore wildcard mismatch.**
**Reason:** You specified a source and destination with incompatible wildcards.
**Action:** Respecify; if there's a wildcard in the source, then there must be a wildcard in the destination.

**PC2176E Restore StreetTalk specification error.**
**Reason:** There is an error in the StreetTalk file spec or a wildcard mismatch.
**Action:** Respecify the given file spec.

**PC2177E StreetTalk destination changed**
**Reason:** You are not allowed to specify a different destination StreetTalk name - only a different file or path name.
**Action:** Respecify.

**PC2178E StreetTalk wildcard illegal**
**Reason:** You specified a wildcard in the original StreetTalk name definition and a local drive letter. This does not allow a one-to-one mapping of a StreetTalk name and the destination drive.
**Action:** Respecify.

**PC2180E Raw device too large.**
**Reason:** Can not restore to devices over 2gig on AIX 3.2.

**PC2181E Destination is not a raw disk or partition.**
**Reason:** A character special device other than a raw disk or partition was specified for the destination.

**PC2182E ioctl failed for raw device.**
**Reason:** Could not get IOCINFO for raw device.

**PC2183E Open failed for raw device.**
**Reason:** Could not get IOCINFO for raw device.

**PC2184E Backup is not a raw disk or partition.**
**Reason:** Can not restore a regular file to a raw disk or partition.

**PC2185E Destination and backup are not the same type.**
**Reason:** The destination for the restore is a raw disk and the backup is from a raw partition, or the destination is a raw partition and the backup is from a raw disk.

**PC2186E Destination not same size as backup.**
**Reason:** Can not restore a backup of a raw device to a raw device of a different size.

**PC2187E Destination and backup blocksizes different.**
**Reason:** Can not restore a backup of a raw device to a raw device with a different blocksize.

**PC2188E Not root user.**
**Reason:** You must be the root user to restore to a raw disk or partition.

**PC2189E Raw device does not exist.**
**Reason:** A raw device must exist prior to restore.

**PC2190E Restore can't restart.**
**Reason:** You attempted to restart a non-restartable restore.
**Action:** Restart the restore manually.

**PC2191E Version not found**
**Reason:** During personalization destination checking the requested version date was not found.
**Action:** Specify a valid version date.

**PC2192E Drive not found**
**Reason:** During personalization destination checking the requested drive was not found or had been remapped.
**Action:** Specify a valid, non-remapped drive.

## Inquire version errors.

**PC2200E Error opening version information temporary file**
**Action:** See additional messages

**PC2201E Error allocating inquire version memory**
**Reason:** There was not enough memory to allocate space to inquire versions.
**Action:** Free memory

**PC2202E Error building start conversation record**
**Reason:** There was an error building the start conversation record to send to the remote.
**Action:** See additional messages.

**PC2203E Error sending start conversation for inq ver**
**Reason:** There was an error sending the start conversation record for an inquire versions request.
**Action:** See additional messages.

**PC2204E Error sending inquire versions record**
**Action:** See additional messages.

**PC2205E Error receiving inquire versions information**
**Reason:** There was an error receiving the non-repeating backup description from the remote.
**Action:** See additional messages.

**PC2206E Error sending inquire versions confirmed**
**Reason:** There was an error acknowledging receipt of all the version information.
**Action:** See additional messages.

**PC2207E Error ending the inquire versions conversation**
**Action:** See additional messages.

**PC2208E Error deleting inquire versions temp file**
**Action:** See additional messages.

**PC2209E Error ending the inquire versions conversation**
**Action:** See additional messages.

**PC2210E Error writing to inquire versions temp file**

**Reason:** There was an error writing to the inquire versions temporary file.
**Action:** See additional messages.

**PC2211E Error receiving inquire versions repeated info**
**Reason:** There was an error receiving the repeated backup description information.
**Action:** See additional messages.

**PC2212E Error writing inquire version repeated info**
**Reason:** There was an error writing the repeated backup description information to the temporary file.
**Action:** See additional messages.

**PC2213E Error reading temporary inquire versions file**
**Reason:** There was an error reading the inquire versions temporary file for non-repeated backup description information.
**Action:** See additional messages.

**PC2214E Error reading temporary inquire versions file**
**Reason:** There was an error reading the inquire versions temporary file non-repeated information when searching for repeated information.
**Action:** See additional messages.

**PC2215E Error reading temporary inquire versions file**
**Reason:** There was an error reading the inquire versions temporary file repeated information.
**Action:** See additional messages.

**PC2216D Expected more file descriptions.**
**Reason:** There was an unexpected end of data or non- repeated structure when receiving version information.
**Action:** Call technical support.

**PC2217E Can't delete inquire versions file.**
**Reason:** There was an error deleting the inquire versions information file (USVER.BKP).
**Action:** See additional messages.

**PC2218E Error receiving inquire versions profile name**
**Reason:** There was an error receiving the profile name for the profile management information request.
**Action:** See additional messages.

**PC2219D No versions stored for this profile**
**Reason:** Specify a different backup profile.

**PC2220E Unexpected EOF reading version file**
**Reason:** Internal error reading non-repeated section.
**Action:** Contact tech support.

**PC2221E Unexpected EOF reading version file**
**Reason:** Internal error reading repeated section.
**Action:** Contact tech support.

**PC2222E Unexpected EOF reading version file**
**Reason:** Internal error reading non-repeated section to read repeated section.
**Action:** Contact tech support.

## Inquire files errors.

**PC2300E Error starting inquire files conversation**
**Action:** See additional messages.

**PC2301E Error sending start conversation for inquire file**
**Action:** See additional messages.

**PC2302E Error sending inquire files request.**
**Action:** See additional messages.

**PC2303E Error receiving inquire files information.**
**Action:** See additional messages.

**PC2304N Receiving backed-up file information**
**Reason:** A remote inquire files process is in progress. You can press CANCEL to abort process. This message will go away if there is an error or the information has been completely received.

**PC2305E Can't create inquire files temp file**
**Reason:** There was an error creating the inquire files temporary file. Inquire files will not function until this is fixed.
**Action:** See additional messages.

**PC2306E Can't write to inquire files temp file**
**Reason:** There was an error writing to the inquire files temporary file. Inquire files will not function until this is fixed.
**Action:** See additional messages.

**PC2307E Can't reopen inquire files temp file**
**Reason:** There was an error reopening the inquire files temporary file to fill the list box. Inquire files will not function until this is fixed.
**Action:** See additional messages.

**PC2308E Can't read inquire files temp file**
**Reason:** There was an error reading the file information from the inquire files temporary file. Inquire files will not function until this is fixed.
**Action:** See additional messages.

**PC2309E Unexpected end of file - inquire files temp**
**Reason:** End of file was reached on the inquire files temporary file. This is a system error and inquire files will not function until this is fixed.
**Action:** Call UPSTREAM technical support.

**PC2310E Can't allocate data to inquire files (OS/2).**
**Reason:** There was an error allocating data space to perform the inquire files function.
**Action:** Close other programs or free disk space.

**PC2311E File spec not found.**
**Reason:** The StreetTalk part of the name could not be found in the version inquiry section.
**Action:** Respecify the StreetTalk part of the name, specify the drive letter directly or perform a version inquiry to verify that the StreetTalk name exists.

**PC2312E Version inquiry required**
**Reason:** To perform a file inquiry of a given version using a StreetTalk name, you must in the same execution of UPSTREAM, perform a version inquiry and select the version to use.
**Action:** Perform a version inquiry.

**PC2313E User requested cancel of inquire files.**

**PC2314E Error sending delete file request.**
**Action:** See communications return codes.

**PC2315E Error confirming delete file request.**
**Action:** Additional messages.

**PC2316E Internal date format error.**
**Action:** Call tech support.

## Help system errors.

**PC2400E Error opening help file**
**Action:** See additional messages.

**PC2401E Error reading help file**
**Action:** See additional messages.

## Novell errors.

**PC2491E (Novell) Error setting file/dir info**
**Reason:** There was a Novell error setting the file or directory information.
**Action:** Look up the following return code in the UPSTREAM manual.

**PC2492E (Novell) Error allocating a dir handle**
**Reason:** There was a Novell error allocating a temporary name space directory handle.
**Action:** See additional messages.

**PC2493E (Novell) Bad file name**

**Reason:** A file name was expected to have a '/','\' or ':'.
**Action:** Internal error. Call tech support.

**PC2494E (Novell) Not a Novell drive**
**Reason:** You requested Novell migration of a non-Novell drive. The files will not be deleted. You will not see any more error messages.
**Action:** Set NOVELLMIGRATE to N

**PC2495I (Novell) USNOVWAITTOSET defined and set to:**

**PC2496E (Novell) Error unhiding directory**
**Reason:** There was an error unhiding a directory that was hidden so that Novell directory information can be set.
**Action:** See additional messages.

**PC2497E (Novell) Error unhiding directory**
**Reason:** There was an error unhiding a directory that was hidden so that Novell directory information can be extracted.
**Action:** See additional messages.

**PC2498E (Novell NT) Error setting bindery attributes**
**Reason:** Error setting the bindery attributes immediately after a bindery close.
**Action:** See additional messages.

**PC2499E (Novell NT) Error setting bindery attributes**
**Reason:** Error setting the bindery attributes immediately before a bindery open.
**Action:** See additional messages.

**PC2500E Error closing the bindery.**
**Reason:** There was an error closing the Novell bindery.
**Action:** Verify that the server is still up and that there are no other programs accessing the bindery.

**PC2501E Error retrieving directory restrictions.**
**Reason:** There was an error retrieving the directory size restrictions value.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2502E Error allocating a temporary directory handle**
**Reason:** Certain Novell access calls require the existence of a temporary directory handle. You must have a free, NetWare accessible drive letter.
**Action:** Free a drive letter with the map command.

**PC2503E Error accessing trustee information.**
**Reason:** There was an error accessing trustee information for a file or directory.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2504E Error retrieving directory information.**
**Reason:** There was an error retrieving the directory information values.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2505E Error retrieving file information.**
**Reason:** There was an error retrieving the file information values.
**Action:** The additional messages reference the Novell return code and the file affected. Call UPSTREAM tech support for more info.

**PC2506E Error retrieving file information for a write.**
**Reason:** There was an error retrieving the file information to write the received file information.
**Action:** The additional messages reference the Novell return code and the file affected. Call UPSTREAM tech support for more info.

**PC2507E Error writing file or directory information**
**Reason:** There was an error writing the file or directory values.
**Action:** The additional messages reference the Novell return code and the file or directory affected. Call UPSTREAM tech support for more info.

**PC2508E Error setting the directory restrictions.**
**Reason:** There was an error setting the directory size restrictions value.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2509E Error setting trustees.**
**Reason:** There was an error setting file or directory trustee rights.
**Action:** The additional messages reference the Novell return code and the file or directory affected. Call UPSTREAM tech support for more info.

**PC2510E Error converting to a Novell name.**
**Reason:** There was an error converting the specified name to a NetWare specific name.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2511E Error setting directory information.**
**Reason:** There was an error setting directory information values.
**Action:** The additional messages reference the Novell return code and the directory affected. Call UPSTREAM tech support for more info.

**PC2512E Error reopening the bindery**
**Reason:** There was an error reopening the bindery. This is a serious error, as no bindery activities can happen (logins, print access, etc).
**Action:** From the system console, using monitor, clear the connection for the UPSTREAM PC. Restore the bindery.

**PC2513E Error setting file attributes**
**Reason:** There was an error setting a file's attributes.
**Action:** Call UPSTREAM technical support.

**PC2514E Error creating save info buffer**
**Reason:** There was an error creating the buffer to save the novell file or directory attributes in.
**Action:** Free memory

**PC2515E Error (re)setting Novell information**
**Reason:** There was an internal error setting the archive date or resetting the last access date.
**Action:** Call UPSTREAM technical support.

**PC2516E Error getting your object ID**
**Reason:** There was an error getting the object ID to reset the archiver ID for the file or directory.
**Action:** Call UPSTREAM technical support.

**PC2517E Error setting the server date/time**
**Action:** See additional messages.

**PC2518E Error building NetWare name**
**Reason:** There was an internal error with one of the following names.
**Action:** Contact Tech Support.

**PC2519E Write directory entry size error**
**Reason:** Unexpected size received during write directory entry. Internal error.
**Action:** Contact Tech Support.

**PC2520E Write file entry size error**
**Reason:** Unexpected size received during write file entry. Internal error.
**Action:** Contact Tech Support.

**PC2521E Error scanning files**
**Reason:** There was a Novell error scanning the drive.
**Action:** See additional messages.

**PC2522E Novell information not saved previously**
**Reason:** UPSTREAM attempted to write Novell information out and it was not saved previously. Internal error.
**Action:** Contact Tech Support.

**PC2523E Error reopening the bindery**
**Reason:** There was an error reopening the bindery during set of archive bit and/or archive date. This is a serious error, as no bindery activities can happen (logins, print access, etc).
**Action:** From the system console, using monitor, clear the connection for the UPSTREAM PC. Restore the bindery.

**PC2524E Error allocating memory**
**Reason:** There was an error allocating memory for the LRU retrieval of object IDs
**Action:** Free memory and retry.

**PC2525E (Novell) Error loading NetWare API**
**Reason:** There was an error loading the API module
**Action:** See additional messages.

**PC2526E (Novell) Error loading function**

**Reason:** There was an error loading a particular NetWare function.
**Action:** See additional messages.

**PC2527E (Novell) Error loading NetWare DLLs**
**Reason:** A complete set of NetWare DLLs could not be found and loaded. The NetWare DLLs are required to provide the neccessary NetWare API functions used by UPSTREAM.
**Action:** Reinstall the NetWare client software for the environment in which UPSTREAM is to run.

**PC2530E (Novell NDS) NDS not loaded**
**Reason:** The USNDS NLM is not running on any server.
**Action:** Load USNDS.NLM and retry.

**PC2531E (Novell NDS) Error accessing NLM**
**Reason:** There was a Novell error accessing the USNDS.NLM.
**Action:** See additional messages.

**PC2532E (Novell NDS) USNDS reported an error**
**Reason:** The following text came from USNDS.NLM:

**PC2533E (Novell NDS) Error accessing NLM**
**Reason:** There was a Novell error accessing the USNDS.NLM during a Read NDS request.
**Action:** See additional messages.

**PC2534E (Novell NDS) USNDS reported an error**
**Reason:** The following text came from USNDS.NLM:

**PC2535E (Novell NDS) Error accessing NLM**
**Reason:** There was a Novell error accessing the USNDS.NLM during a Write NDS request.
**Action:** See additional messages.

**PC2536E (Novell NDS) USNDS reported an error**
**Reason:** The following text came from USNDS.NLM:

**PC2537E (Novell NDS) USNDS reported an error**
**Reason:** The following text came from USNDS.NLM:

**PC2538E (Novell NDS) Error accessing NLM**
**Reason:** There was a Novell error accessing the USNDS.NLM during a Start request.
**Action:** See additional messages.

**PC2540I (Novell) Error getting object ID (DS)**
**Reason:** When attempting to set Novell values, there was an error getting the object ID. Operations will continue.
**Action:** See additional messages.

**PC2541I (Novell) Error getting object ID**
**Reason:** When attempting to set Novell values, there was an error getting the object ID. Operations will continue.
**Action:** See additional messages.

**PC2542I (Novell) Error getting object name (DS)**
**Reason:** When attempting to set Novell values, there was an error getting the object name. Operations will continue.
**Action:** See additional messages.

**PC2543I (Novell) Error getting object name**
**Reason:** When attempting to set Novell values, there was an error getting the object name. Operations will continue.
**Action:** See additional messages.

**PC2544I (Novell) Error canonicalizing name**
**Reason:** When attempting to set Novell values, there was an error converting the retrieved name to the standard format. Operations will continue.
**Action:** See additional messages.

**PC2545E (Novell) Expected buffer.**
**Action:** Internal error. Call Tech Support.

**PC2546I (Novell) Error abbreviating name**
**Reason:** When attempting to set Novell values, there was an error converting the standard name to abbreviated format. Operations will continue.
**Action:** See additional messages.

**PC2547W (Novell) [Supervisor] not predefined**
**Reason:** The predefined number for the [Supervisor] object does not match what was found on the server. There will be additional messages.
**Action:** Contact tech support.

**PC2548W (Novell) [Public] not predefined**
**Reason:** The predefined number for the [Public] object does not match what was found on the server. There will be additional messages.
**Action:** Contact tech support.

**PC2549E (Novell and LAN WS) LAN WS Name and**
**Reason:** Novell Profile specify mutually exclusive sources/destinations of data.
**Action:** Delete undesired specification.

**PC2550E (Novell Login) No profiles found**
**Action:** Run SETNOV to create a NetWare profile.

**PC2551E (Novell Login) Profile version mismatch**
**Action:** Run SETNOV to re-create your profile.

**PC2552E (Novell Login) Memory shortage**
**Reason:** There was a memory shortage while trying to read the profile file.
**Action:** Free memory and retry.

**PC2553E (Novell Login) Profile read error**
**Reason:** There was an error reading the NetWare profile.
**Action:** Run SETNOV and regenerate the profiles.

**PC2554E (Novell Login) Old version volume error**
**Reason:** There was an error converting the old profile information to the new format.
**Action:** Run SETNOV and upgrade.

**PC2555E (Novell Login) Memory shortage**
**Reason:** There was a memory shortage reading the data from the old profile.
**Action:** Run SETNOV and upgrade.

**PC2556E (Novell Login) Definition error**
**Reason:** There was a definition error in the old profile information.
**Action:** Run SETNOV and upgrade.

**PC2557E (Novell Login) Profile not found**
**Reason:** The profile that you specified is not one defined in SETNOV.
**Action:** Respecify in UPSTREAM or SETNOV.

**PC2558E (Novell Login) Error attaching to server**
**Reason:** There was a Novell error attaching to the specified server.
**Action:** Verify (in SETNOV) that the server name is correct. If so, call tech support with the error number that follows.

**PC2559E (Novell Login) Error getting UPSTREAM path**
**Reason:** There was a Novell error retrieving the current UPSTREAM path defintion.
**Action:** Call tech support with the error number that follows.

**PC2560E (Novell Login) Memory shortage**
**Reason:** There was an error allocating the memory required to hold the NetWare status information
**Action:** Free memory and retry.

**PC2561E (Novell Login) NetWare not loaded**
**Reason:** A request to load a NetWare profile was made but NetWare is not loaded.
**Action:** Load NetWare or don't request a profile.

**PC2562E (Novell Login) NetWare not loaded**
**Reason:** There are no defined NetWare connection IDs. This usually means that NetWare is not loaded.
**Action:** Load NetWare

**PC2563E (Novell Login) Error retrieving path**
**Reason:** There was a Novell error determining the original path on a drive to be mapped.
**Action:** Call tech support with the error number that follows.

**PC2564E (Novell Login) Path conflicts**
**Reason:** The path that you specified and the UPSTREAM path on the same drive conflict.

**Action:** Either change the SETNOV definition for the drive, run UPSTREAM on a local drive, or remap the UPSTREAM directory.

**PC2565E (Novell Login) NetWare error logging in.**
**Reason:** There was an error logging into the selected server.
**Action:** Verify that the password is correct. Call tech support with the error number that follows.

**PC2566E (Novell Login) Can't establish UPSTREAM path**
**Reason:** There was a Novell error reestablishing that path definition for the drive UPSTREAM is running from.
**Action:** Call tech support with the error number that follows.

**PC2567E (Novell Login) Can't map target drive**
**Reason:** There was a NetWare error mapping the target drive path.
**Action:** Call tech support with the error number that follows.

**PC2568E (Novell Login) Can't login logout user name**
**Reason:** There was a NetWare error logging into the server with the logout name (defined in SETNOV).
**Action:** Call tech support with the error number that follows.

**PC2569E (Novell Login) Can't establish UPSTREAM path**
**Reason:** There was a Novell error reestablishing that path definition for the drive UPSTREAM is running from during a logout operation.
**Action:** Call tech support with the error number that follows.

**PC2570E (Novell Login) Can't logout UPSTREAM drive**
**Reason:** You can't detach from the drive that you were running UPSTREAM from.
**Action:** Remap the UPSTREAM drive or change your SETNOV mappings for this profile.

**PC2571E (Novell Login) Can't run from server**
**Reason:** In OS/2 you cannot run UPSTREAM from a server that you're backing up.
**Action:** Run UPSTREAM from the local drive.

**PC2572E (Novell Login) Can't save drive mappings**
**Reason:** There was an error allocating the memory to save the drive mappings. UPSTREAM will continue, but when the backup is done the drive mappings for the server may be lost.
**Action:** Free memory.

**PC2573E (Novell Login) Can't save drive mappings**
**Reason:** There was a NetWare error retrieving the existing drive mappings for a given server.
**Action:** Call tech support with the error number that follows.

**PC2574E (Novell Login) Can't restore drive mappings**
**Reason:** There was a NetWare error restoring the preexisting drive mappings for a given server.
**Action:** Call tech support with the error number that follows.

**PC2575E (Novell Login) Can't get connection status**
**Reason:** There was a NetWare error getting the connection status used to determine if we should login using bindery or directory services.
**Action:** Call tech support with the error number that follows.

**PC2576E (Novell Login) Can't get locale**
**Reason:** There was a NetWare error getting the locale information necessary to login using directory services.
**Action:** Verify that the directory with the Unicode tables is in the search path.

**PC2577E (Novell Login) Can't initialize unicode tables**
**Reason:** There was a NetWare error initializing the unicode tables necessary to login using directory services.
**Action:** Verify that the directory with the Unicode tables is in the search path.

**PC2578E (Novell Login) Can't create context**
**Reason:** There was a NetWare error creating the context necessary to login using directory services.
**Action:** Verify that directory service support is enabled in your requestor.

**PC2579E (Novell Login) Can't login**
**Reason:** There was a NetWare error logging in using directory services.
**Action:** Verify that the user name and password for this profile are correct.

**PC2580E (Novell Login) Can't authenticate login**
**Reason:** There was a NetWare error authenticating the login using directory services.
**Action:** Verify that the user name and password for this profile are correct.

**PC2581E (Novell Login) Can't login logout user name**
**Reason:** There was a NetWare error logging into the server with the logout name (defined in SETNOV) using directory services.
**Action:** Verify that the user name and password for this profile are correct.

**PC2582E (Novell Login) Can't authenticate logout user name**
**Reason:** There was a NetWare error authenticating the logout user name (defined in SETNOV) using directory services.
**Action:** Verify that the user name and password for this profile are correct.

**PC2583E (Novell Login) Directory services required**
**Reason:** Novell directory services support is not loaded but is required to login to this server.
**Action:** Install directory services support on this PC.

**PC2584E (Novell Login) Error allocating dir handle**
**Reason:** There was an error allocating a new directory handle preparitory to mapping the new drive.
**Action:** See additional messages.

**PC2585E (Novell Login) Can't set locale**
**Reason:** There was a NetWare error setting the locale information necessary to login using directory services.
**Action:** Verify that the directory with the Unicode tables is in the search path.

**PC2586E (Novell Login) Can't get connection name**
**Reason:** There was a NetWare error getting the server's connection type.
**Action:** Report the following return code to tech support.

**PC2587E (Novell Login) Can't set tree**
**Reason:** There was a NetWare error setting the preferred directory services tree.
**Action:** Report the following return code to tech support.

**PC2588E (Novell Login) Server not NDS**
**Reason:** The server you specified does not use NetWare Directory Services.
**Action:** Specify a different server or use a bindery login name.

**PC2589D (Novell Login) Error logging out (DS).**
**Reason:** There was an error logging out from the server. Ususally this message can be ignored.

**PC2590D (Novell Login) Error logging out**
**Reason:** There was an error logging out from the server. Ususally this message can be ignored.

**PC2591I (Novell Login) Detaching from server:**

**PC2592W (Novell Login) Error detaching from server.**
**Reason:** There was a Novell error detaching from a server that UPSTREAM attached to.
**Action:** Look up the Novell error number in the UPSTREAM manual.

**PC2593I (Novell Login DS) Detaching from server:**

**PC2594W (Novell Login DS) Error detaching from server.**
**Reason:** There was a Novell error detaching from a server that UPSTREAM attached to.
**Action:** Look up the Novell error number in the UPSTREAM manual.

## OS/2 specific file access errors.

**PC2600E (OS/2) Extended Attribute Record Overflow**
**Reason:** The extended attribute for the given file is larger than 65280 bytes.
**Action:** Reduce the size of the extended attribute.

**PC2601E (OS/2) Error accessing extended attributes**

**Reason:** There was an error accessing extended attributes for the given file.
**Action:** See additional messages.

**PC2602E (OS/2) Error setting extended attributes**
**Reason:** There was an error setting extended attributes for the given file.
**Action:** See additional messages.

**PC2603E (OS/2) Error saving file information**
**Reason:** There was an error retrieving information which should be available.
**Action:** See additional messages.

**PC2604E (OS/2) Saved file info doesn't match**
**Reason:** The information saved in the internal buffer for later updating doesn't match file or directory name to update. Internal error.
**Action:** Contact tech support.

**PC2605E (OS/2) Error setting file information**
**Reason:** There was an error setting information.
**Action:** See additional messages.

**PC2606E (OS/2) Error loading network function**
**Reason:** There was an error loading a required function to access the ACLs.
**Action:** See additional messages.

**PC2607E (OS/2) Error finding network library**
**Reason:** There was an error finding the network facilities.
**Action:** See additional messages.

**PC2608E (OS/2) Error listing all the drives**
**Reason:** There was an error listing the known mapped drives on this PC.
**Action:** See additional messages.

**PC2609E (OS/2) Error checking for ACLs**
**Action:** See additional messages.

**PC2615E (OS/2) Error allocating put memory.**
**Reason:** There was a memory shortage allocating memory required for OS/2 duplicate file handling.
**Action:** Either reduce the maximum number of duplicate files or free memory.

**PC2620E (OS/2) Error deleting existing ACLs**
**Action:** See additional messages.

**PC2621E (OS/2) Error creating ACLs.**
**Action:** See additional messages

**PC2622E (OS/2) Error allocating data area to save info**
**Action:** Free memory.

**PC2623E (OS/2) Error setting file attribute**
**Reason:** There was an error setting a file's attribute.
**Action:** See additional messages.

**PC2624W (OS/2) ACLs disabled**
**Reason:** You specified ACLs be backed up but you also specified that ACLs be disabled using the USNOACL environment variable. The process will continue.

**PC2625E (OS/2) Error allocating EA buffer memory.**
**Reason:** There was a memory shortage allocating memory required for OS/2 extended attribute handling.
**Action:** See additional messages and free memory.

## Banyan specific file access errors.

**PC2610D Banyan drive dynamically mapped.**

**PC2611D Banyan version 4 detected**
**Reason:** There are limited capabilities in backing up a Banyan version 4 system. See the UPSTREAM manual for a description of what these are.

**PC2612D Banyan “StreetTalk Lite” enabled**
**Reason:** You enabled the environment variable STLITE which causes UPSTREAM to not back up the StreetTalk security information or the StreetTalk attributes. This will result in faster backups as data that is rarely used will be excluded.

**PC2625E (Banyan) Error getting the access rights list**
**Reason:** There was an error retrieving the access rights list for the given directory.
**Action:** See additional messages.

**PC2626E (Banyan) Error setting the access rights list**
**Reason:** There was an error setting the access rights list for the given directory.
**Action:** See additional messages.

**PC2627E (Banyan) Record size buffer too small**
**Reason:** The record size specified does not leave enough space for the access rights list.
**Action:** Make the buffer size larger than 335.

**PC2628E (Banyan) Access rights list bad**
**Reason:** The received access rights list is incorrect.
**Action:** Internal error. Call UPSTREAM tech support.

**PC2630E (Banyan) Memory shortage**
**Reason:** There was an error allocating memory to hold temporary information.
**Action:** Free memory and retry. You may also want to try setting the LOCALMEM parameter to a high value (SET LOCALMEM=10000).

**PC2631E (Banyan) Error getting RPC port.**
**Reason:** Error getting the remote procedure call port for the given service.
**Action:** See additional messages. UPSTREAM will continue.

**PC2632E (Banyan) Error getting the server version.**
**Reason:** There was an error retrieving the server version. UPSTREAM will continue, assuming that the server mapped to the drive is v5.
**Action:** See additional messages.

**PC2633E (Banyan) Error setting an ARL.**
**Reason:** There was the following error setting the access rights list for the following name.
**Action:** See additional messages.

**PC2634E (Banyan) Error getting an ARL.**
**Reason:** There was the following error getting the access rights list for the following name.
**Action:** See additional messages.

**PC2635E (Banyan) Memory shortage.**
**Reason:** There was a memory shortage allocating enough memory to hold the Banyan session information.
**Action:** Free memory and retry. You may also want to try setting the LOCALMEM parameter to a high value (SET LOCALMEM=10000).

**PC2637E (Banyan) Error starting the Banyan session**
**Reason:** There was the following error starting the Banyan session.
**Action:** An 1801 error means that you have to log on to the server (run BAN).

**PC2638E (Banyan) Error getting the server port**
**Reason:** There was an error getting the RPC port information for a given server.
**Action:** See additional messages.

**PC2641E (Banyan) Error listing StreetTalk names**
**Action:** See additional messages.

**PC2642E (Banyan) Memory shortage.**
**Reason:** There was a memory shortage allocating enough memory to hold the service list.
**Action:** Free memory and retry. You may also want to try setting the LOCALMEM parameter to a high value (SET LOCALMEM=10000).

**PC2643E (Banyan) Error getting associate record 0.**
**Reason:** There was an error getting the main associated record (record #0) for the given name.
**Action:** See additional messages.

**PC2644E (Banyan) No free drive**

**Reason:** When UPSTREAM attempted to dyamically associate a drive letter with a StreetTalk file service, there wasn't a free (unused) drive letter available.
**Action:** Reduce the number of user mapped drives or specify a StreetTalk name that has fewer file services.

**PC2645E (Banyan) Error dyamically mapping a drive**
**Action:** See additional messages.

**PC2646E (Banyan) Error getting associate record 0.**
**Reason:** There was an error getting the main associated record (record #0) for the given name.
**Action:** See additional messages.

**PC2647E (Banyan) Error getting the server name**
**Reason:** There was an error getting the server name for a given AdminList entry.
**Action:** See additional messages.

**PC2648E (Banyan) Error getting user profile.**
**Action:** See additional messages.

**PC2649E (Banyan) Error getting base security info.**
**Action:** See additional messages.

**PC2650E (Banyan) Error getting login time limits.**
**Action:** See additional messages.

**PC2651E (Banyan) Error getting login location count.**
**Action:** See additional messages.

**PC2652E (Banyan) Error getting login locations**
**Action:** See additional messages.

**PC2653E (Banyan) Error getting login location limits.**
**Action:** See additional messages.

**PC2654E (Banyan) Error listing attributes**
**Action:** See additional messages.

**PC2655E (Banyan) Error getting attribute information.**
**Action:** See additional messages.

**PC2656E (Banyan) Error getting an attribute.**
**Action:** See additional messages.

**PC2657E (Banyan) Error getting the members of a list.**
**Action:** See additional messages.

**PC2658E (Banyan) Received structure too large.**
**Reason:** Internal error.
**Action:** Call Tech Support.

**PC2659E (Banyan) Error adding a nickname.**
**Action:** See additional messages.

**PC2660E (Banyan) Memory shortage.**
**Reason:** There was a memory shortage allocating enough memory to hold data used later...
**Action:** Free memory and retry. You may also want to try setting the LOCALMEM parameter to a high value (SET LOCALMEM=10000).

**PC2661E (Banyan) Error finding saved data**
**Reason:** There was an error locating a structure which was saved in memory. Internal error.
**Action:** Call Tech Support.

**PC2662E (Banyan) Error adding a list.**
**Action:** See additional messages.

**PC2663E (Banyan) Received unknown structure type.**
**Reason:** Internal error.
**Action:** Call Tech Support.

**PC2664E (Banyan) Error adding a group.**
**Action:** See additional messages.

**PC2665E (Banyan) Error getting the current user**
**Reason:** There was an error retrieving the current user's StreetTalk name, used as the first entry in the AdminList of the newly created group.
**Action:** See additional messages.

**PC2666E (Banyan) Error adding current user**
**Reason:** There was an error adding the current user to the AdminList of a newly created group.
**Action:** See additional messages.

**PC2667E (Banyan) Error creating a service.**
**Action:** See additional messages.

**PC2668E (Banyan) Error setting an attribute.**
**Action:** See additional messages.

**PC2669E (Banyan) Error adding a list member.**
**Action:** See additional messages.

**PC2670E (Banyan) Error adding a user.**
**Action:** See additional messages.

**PC2671E (Banyan) Error setting base security.**
**Action:** See additional messages.

**PC2672E (Banyan) Error setting login times**
**Action:** See additional messages.

**PC2673E (Banyan) Error setting locational limits**
**Action:** See additional messages.

**PC2674E (Banyan) Error starting the service.**
**Reason:** There was an error starting a newly created Banyan service.
**Action:** See additional messages.

**PC2675E (Banyan) Banyan not loaded.**
**Reason:** You specified a StreetTalk name but the Banyan services are not available.
**Action:** Install or start Banyan and retry.

**PC2676E (Banyan) Error loading function**
**Reason:** There was an error loading a required function. UPSTREAM will not be able to use any Banyan specific facilities.
**Action:** For OS/2, verify that VNSAPI.DLL is in the LIBPATH and that you are logged in. For Windows 3.x, verify that VNSAPI.DLL is in the PATH and that your are logged in. For Windows 95 & NT, verify that VNSAPI32.DLL is in the PATH and that you are logged in.

**PC2677E (Banyan) Error loading module.**
**Reason:** There was an error loading a required module. UPSTREAM will not be able to use any Banyan specific facilities.
**Action:** For OS/2, verify that VNSAPI.DLL is in the LIBPATH and that you are logged in. For Windows 3.x, verify that VNSAPI.DLL is in the PATH and that your are logged in. For Windows 95 & NT, verify that VNSAPI32.DLL is in the PATH and that you are logged in.

**PC2678E (Banyan) Map drive not free**
**Reason:** When dynamically mapping a drive, the drive which was free, is no longer available.
**Action:** Verify that you don't have other applications on your PC dynamically mapping drives.

**PC2679E (Banyan) Unknown structure**
**Reason:** When receiving StreetTalk information, an unknown structure type was received. Internal error.
**Action:** Contact Tech Support.

**PC2680E (Banyan) Memory shortage.**
**Reason:** There was a memory shortage allocating enough memory to hold data used later...
**Action:** Free memory and retry. You may also want to try setting the LOCALMEM parameter to a high value (SET LOCALMEM=10000).

**PC2681E (Banyan) Too many service fields**
**Reason:** No more than 14 service fields were expected and more were received. Internal error.
**Action:** Contact Tech Support.

**PC2682E (Banyan) Error listing to add a group**
**Reason:** A template group must be found when adding a new group. There was an error listing groups in your organization.
**Action:** See additional messages.

**PC2683E (Banyan) Error reading list members**

**Reason:** List members are stored in a temporary file. There was an error reading the file. Lists will not be complete.
**Action:** See additional messages.

**PC2684E (Banyan) Error delete list file**
**Reason:** List members are stored in a temporary file. There was an error deleting this file.
**Action:** See additional messages. You should delete the file manually (BANLIST.*).

**PC2685E (Banyan) Error creating list file.**
**Reason:** List members are stored in a temporary file. There was an error creating this file.
**Action:** See additional messages. Verify that the WORKPATH is available.

**PC2686E (Banyan) Error writing list file.**
**Reason:** List members are stored in a temporary file. There was an error writing to this file.
**Action:** See additional messages.

**PC2687E (Banyan) Error formatting name**
**Reason:** The following name could not be formatted for use as a StreetTalk name (used to start it as a service).
**Action:** See additional messages.

**PC2688W (Banyan) Old version ARL**
**Reason:** The given directory was backed up using a version of UPSTREAM before v2.3.0. The ARL will be ignored.
**Action:** If you require the ARL information, either use an older version of UPSTREAM or contact Tech Support.

**PC2690E (Banyan) Invalid StreetTalk name**
**Reason:** A StreetTalk name must be in a “Item@Group@Organization” form.
**Action:** Respecify

**PC2691E (Banyan) Invalid StreetTalk name**
**Reason:** A part of a StreetTalk name is too large.
**Action:** Respecify

**PC2692E (Banyan) Error getting group name**
**Reason:** Error formatting the group name to create the service.
**Action:** See additional messages.

**PC2693E (Banyan) Error getting server service**
**Reason:** There was an error retrieving the name of a server service for the specified server.
**Action:** See additional messages.

**PC2695E (Banyan) Error setting the server time**
**Action:** See additional messages

**PC2696E (Banyan) Error getting server time**
**Reason:** Error getting the server time so that it could be set.
**Action:** See additional messages

**PC2697E (Banyan) Error listing groups**
**Reason:** There was an error listing the groups on the given server.
**Action:** See additional messages.

**PC2698E (Banyan) Error getting the server name**
**Reason:** For the group found, there was an error finding the server name to compare against the requested server.
**Action:** See additional messages.

**PC2699E (Banyan) Service list destroyed**
**Reason:** During a group search the internal service list was destroyed. Internal error.
**Action:** Call technical support.

**PC2700E (Banyan) Memory shortage**
**Reason:** While allocating memory to list the groups on a server, there was insufficient memory.
**Action:** Free memory.

## Performance test errors.

**PC2800E VSAM I/O test error**
**Reason:** There was an error starting or receiving the results of a VSAM I/O test.
**Action:** See additional messages.

**PC2801D Performance Tests Results:**

**PC2802E File I/O test error**
**Reason:** There was a file I/O test error and the results shown in the statistics will be wrong.
**Action:** See additional messages.

**PC2803E Communications volume test error**
**Reason:** There was an error in the communications test and the results shown in the statistics will be wrong.
**Action:** See additional messages.

## As of date restore errors.

**PC2900W Nothing to restore.**
**Reason:** You requested an “As of...Restore” and there were not versions matching your specified criteria.
**Action:** Respecify.

**PC2901E Duplicate backup profile names**
**Reason:** You specified the same profile name in the full and incremental profile fields.
**Action:** Specify different names or leave the incremental profile field blank (required for merge backups).

## High compression errors.

**PC3000E High compression reinitialization error**
**Reason:** There was an error initializing for high compression. This is an unexpected error.
**Action:** Call UPSTREAM technical support.

**PC3001E High compression error**
**Reason:** There was an error attempting to compress a record using high compression.
**Action:** See additional message.

**PC3002E High compression initialization error**
**Reason:** There was an error initializing for high compression. You probably do not have enough memory.
**Action:** See additional message.

**PC3003E Error during high decompression**
**Reason:** There was an error decompressing a record which was compressed using high compression.
**Action:** Call UPSTREAM technical support.

**PC3004E Error reinitializing high decompression**
**Reason:** There was an error reinitializing during a restore for high compression. This is an unexpected error.
**Action:** Call UPSTREAM technical support.

**PC3005E Error initializing for high decompression**
**Reason:** There was an error initializing a restore for high compression. You probably do not have enough memory.
**Action:** See additional message.

**PC3006E High compression, non-file overage**
**Reason:** After compressing a block of non-file data, the data was too large to fit into a single record.
**Action:** Call UPSTREAM technical support.

**PC3007E High decompression, non-file overage**
**Reason:** After decompressing a block of non-file data, the data was too large to fit into a single record. This is an unexpected error.
**Action:** Call UPSTREAM technical support.

**PC3008E High decompression, non-file input exhausted**
**Reason:** While decompressing a block of non-file data, the data was exhausted without being completed. This is an unexpected error.
**Action:** Call UPSTREAM technical support.

## Remote initiate errors.

**PC3100N Waiting for remote initiate**
**Reason:** UPSTREAM is waiting for the remote system to start a function on the PC. You can press the CANCEL button to exit UPSTREAM.

**PC3101I Remote initiate received**
**Reason:** A remote initiated function will now be processed.

**PC3102D Remote initiate queued.**
**Reason:** A remote initiated function was received. It will queued for processing when the current process is complete.

**PC3103E Error allocating data for remote initiate**
**Reason:** There was insufficient data space for processing the remote initiate request. Further remote initiates will be rejected.
**Action:** Exit UPSTREAM and free memory.

**PC3104E Remote initiated request rejected**
**Reason:** The remote initiate request is rejected due to a problem reported earlier.

**PC3105E Remote requested non-queued and PC busy**
**Reason:** The remote system requested immediate execution of a function and this machine is currently busy processing another function that can not be interrupted at this point.
**Action:** The remote will retry.

**PC3106E Error saving current parameters during remote**
**Reason:** There was an error saving the current parameters so that remotely initiated parameters could be processed.
**Action:** See additional messages.

**PC3107E Invalid parameter received (%s)**
**Reason:** A parameter received from a remotely initiated request was in error. %s

**PC3108E Error recalling parameters for execution**
**Reason:** There was an error retrieving saved remotely specified parameters for execution now.
**Action:** See additional messages.

**PC3109E Error saving parameters for remote execution**
**Reason:** There was an error saving the received parameters.
**Action:** See additional messages.

**PC3110E Error restoring original parameters**
**Reason:** After saving parameters for remote execution, there was an error restoring the original parameters.
**Action:** See additional messages.

**PC3111E Missing parameter**
**Reason:** The parameters that were remotely received are incomplete.
**Action:** See additional messages.

**PC3112E Error saving current parameters**
**Reason:** There was an error saving the current parameters so that a remote execution request can be processed.
**Action:** See additional messages.

**PC3113E Error restoring current parameters**
**Reason:** There was an error restoring the current parameters after a remote execution request was processed.
**Action:** See additional messages.

**PC3114E User requested reject of remote functions**
**Reason:** To reactivate remote functions, select the “Unattended Remote Functions” option from the Action menu.

**PC3115E Error saving remote parameter file name**
**Reason:** There was an error saving the remotely specified parameter file name.
**Action:** See additional messages.

**PC3116E Error reading remotely specified param file**
**Reason:** There was an error reading the parameter file specified by the remote system.
**Action:** Verify that the name is correct.

**PC3117E User requested reject of PC requests**
**Reason:** The user requested that PC initiation requests be rejected.

**PC3118E PC is busy**
**Reason:** The PC is busy processing another request and is not available to process a request where the calling facility (USTBATCH or another PC) will wait for completion.

**PC3119W Remote initiate queued.**
**Reason:** A remote initiated function was received. It will be queued for processing when the current process is complete.

**PC3120E Wrong PC**
**Reason:** This request was sent to a PC whose logical name does not match the logical name of this PC. The logical name received is:

**PC3125E Error occurred during receipt of remote request**

**PC3126E Error occurred during receipt of parameters**

**PC3127E Error occurred during a CONFIRMED of remote**

**PC3128E Error occurred during the end of a conversation**

**PC3129E Error occurred while test for remote initiate**

**PC3130N Waiting for remote initiate**
**Reason:** UPSTREAM is waiting for the remote system to start a function. Use CTRL-C or the kill command if running in the background to terminate UPSTREAM.

## Parameter file queuing errors.

**PC3200E Error allocating memory for parameter queuing**
**Reason:** There was an error allocating enough memory to enqueue a new parameter structure. The process requested will fail.
**Action:** Free a small amount of additional memory.

**PC3201E Error setting specs for parm save**
**Reason:** There was an error setting the current parameter information during a parameter save. The process requested will fail.
**Action:** See additional messages.

**PC3202E Error setting writing parameters for parm save**
**Reason:** There was an error writing the parameters during a parameter save. The process requested will fail.
**Action:** See additional messages.

## Remote request errors. Locational errors

**PC3300E Remote request start conversation error**
**Reason:** There was an error starting the conversation with the remote system.
**Action:** See the return codes.

**PC3301E Remote request send request error**
**Reason:** There was an error sending the remote request record.
**Action:** See the return codes.

**PC3302E Remote request send parameter error**
**Reason:** There was an error sending a remote request parameter.
**Action:** See the return codes.

**PC3303E Remote request confirm error**
**Reason:** The remote system did not accept the remote request.
**Action:** See additional messages

**PC3304E Remote request end conversation error**
**Reason:** There was an error terminating the remote request conversation.
**Action:** See additional messages

## Other remote request errors

**PC3350E Error saving parameters**
**Reason:** There was an error saving your current parameters so that they could be sent to the remote system.
**Action:** See additional messages.

**PC3351E Error opening parameter file**
**Reason:** There was an error opening the file that is used to hold the parameters that are sent for remote execution.
**Action:** See additional messages.

**PC3352E Error reading parameter file**
**Reason:** There was an error reading the parameter file that is used to hold the parameters for remote execution.
**Action:** See additional messages.

**PC3353E Error removing saved parameters**
**Reason:** There was an error removing the saved parameters that were sent to the remote.
**Action:** See additional messages.

**PC3354E Required parameter missing**
**Reason:** When attempting a remote request either the partner LU, mode name or remote TPN was missing.
**Action:** Enter all the required parameters

**PC3355E TCP/IP requested but not activated**
**Reason:** If you wish to connect using TCP/IP to a remote PC directly, you must use TCP/IP to connect to the host.
**Action:** Respecify.

## Profile management errors.

**PC3400E Error allocating deletion buffer**
**Reason:** There was an error getting memory for the communications buffer for deleting profile info.
**Action:** Free memory

**PC3401E Error starting conversation**
**Reason:** There was an error starting the conversation to delete a version.
**Action:** See return codes

**PC3402E Error sending start conversation**
**Reason:** There was an error sending the request to begin a conversation to delete a version.
**Action:** See return codes

**PC3403E Error sending remove backup**
**Reason:** There was an error sending the remove backup command.
**Action:** See return codes

**PC3404E Error confirming remove backup**
**Reason:** There was an error validating the remove backup
**Action:** See return codes or remote message

**PC3405E Error ending the conversation**
**Reason:** There was an error ending the conversation when removing a backup.
**Action:** See return codes

## Host configuration errors.

**PC3450E Error allocating memory**
**Reason:** There was an error allocating memory for host configuration management.
**Action:** Free memory or restart program.

**PC3451E Error during start conversation error**
**Reason:** There was an error during host config access.
**Action:** See additional messages.

**PC3452E Error sending start conversation**
**Action:** See additional messages.

**PC3453E Error receiving profile.**
**Action:** See additional messages.

**PC3454E Error sending profile**
**Action:** See additional messages.

**PC3455E Error confirming send of profile**
**Action:** See additional messages.

**PC3456E Error ending conversation**
**Reason:** There was an error during host config access.
**Action:** See additional messages.

**PC3457E Error opening host config file**
**Reason:** There was an error opening the temporary file used to hold the host configuration entries requested.
**Action:** See additional messages.

**PC3458E Error writing host config file**
**Reason:** There was an error writing to the temporary file used to hold the host configuration entries requested.
**Action:** See additional messages.

**PC3459E NULL Structure**
**Action:** Internal error. Call Tech Support.

**PC3460E Error reading host config file**
**Reason:** There was an error reading an entry from the temporary file used to hold the host configuration entries requested.
**Action:** See additional messages.

**PC3461E Unexpected end of file.**
**Reason:** There was an unexpected end of file reading entries from the temporary file used to hold the host configuration entries requested.
**Action:** Call Tech Support.

**PC3462E Error deleting file.**
**Reason:** There was an error deleting the temporary file used to hold the host configuration entries requested.
**Action:** See additional messages.

**PC3463E Error finding entry in file**
**Reason:** There was an error finding a profile entry in the internal profile file to reflect the update requested.
**Action:** Call Tech Support.

**PC3464E Expected confirm or data**
**Reason:** While receiving profiles, neither a confirm or data was received.
**Action:** Call Tech Support.

## LAN Workstation access errors. Mid-level LAN access errors).

**PC3500E (LAN WS) Error allocating I/O buffer**
**Reason:** There was an error dymaically allocating the I/O buffer. Insufficient memory.
**Action:** Set LANBUFFER to a smaller value or free memory.

**PC3502E (LAN WS) Error in negotiation.**
**Reason:** The record size specified in UPSTREAM is too small (should be larger than 1024 bytes).
**Action:** Increase the 'Record Size' value in 'MORE' screen.

**PC3505I (LAN WS) A connection has been established**
**Reason:** (WS Msg)

**PC3510E (LAN WS) Expected an acknowledgment**
**Reason:** An acknowledgment was expected and something else was received.
**Action:** Contact Tech Support.

**PC3511E (LAN WS) Bad data received**
**Reason:** While expecting an acknowledgment from the parter, other data was received.
**Action:** Contact Tech Support.

**PC3515E (LAN WS) Out of files**
**Reason:** (Requestor Msg) There are no more internal files for file access.
**Action:** Contact Tech Support.

**PC3516E (LAN WS) Error during a send open file**
**Reason:** (Requestor Msg) There was an error during a send open file request to the workstation.
**Action:** See additional messages.

**PC3517E (LAN WS) Error during a receive open file**
**Reason:** (Requestor Msg) There was an error during the receive of the open file request.
**Action:** See additional messages.

**PC3520E (LAN WS) Error sending a read file**
**Reason:** (Requestor Msg) There was an error during the send of a read file request.
**Action:** See additional messages.

**PC3521E (LAN WS) Error receiving data**
**Reason:** (Requestor Msg) There was an error receiving data from a read file request.
**Action:** See additional messages.

**PC3522E (LAN WS) Time out receiving data**
**Reason:** (Requestor Msg) There was a time out receiving data from the workstation.
**Action:** Verify that the workstation is still running. Increase the TIMEOUT on both sides.

**PC3523E (LAN WS) Received bad data**
**Reason:** (Requestor Msg) While receiving file data from the workstation, an unexpected data type was received.
**Action:** Contact Tech Support.

**PC3525E (LAN WS) Error sending a write file request**
**Reason:** (Requestor Msg) There was an error sending a write file request to the workstation.
**Action:** See additional messages

**PC3526E (LAN WS) Error sending data.**
**Reason:** (Requestor Msg) There was an error sending data to the workstation.
**Action:** See additional messages.

**PC3530E (LAN WS) Error sending a close file request**
**Reason:** (Requestor Msg) There was an error sending a close file request to the workstation.
**Action:** See additional messages.

**PC3531E (LAN WS) Error receiving the close file ack**
**Reason:** (Requestor Msg) There was an error receiving the acknowledgment to the close file request.
**Action:** See additional messages.

**PC3535E (LAN WS) Error sending directory search**
**Reason:** (Requestor Msg) There was an error sending the directory search request.
**Action:** See additional messages.

**PC3536E (LAN WS) Error receiving directory information**
**Reason:** (Requestor Msg) There was an error receiving dir- ectory information from the workstation.
**Action:** See additional messages.

**PC3537E (LAN WS) Error receiving directory information**
**Reason:** (Requestor Msg) There was a time-out or remote disconnect receiving directory information from the workstation.
**Action:** Verify that the workstation is still running

**PC3538E (LAN WS) Error in searching directory**
**Reason:** (Requestor Msg) The workstation reported an error in performing a directory search.
**Action:** The return code should be looked up in the operating system messages in the UPSTREAM manual.

**PC3539E (LAN WS) Unexpected data**
**Reason:** (Requestor Msg) A directory search response contained unexpected data.
**Action:** Contact Tech Support.

**PC3545E (LAN WS) Error sending a create dir request**
**Reason:** (Requestor Msg) There was an error sending a create directory request.
**Action:** See additional messages.

**PC3546E (LAN WS) Error receiving create dir ack**
**Reason:** (Requestor Msg) There was an error receiving a create directory acknowledgment.
**Action:** See additional messages.

**PC3547E (LAN WS) Error creating directory.**
**Reason:** (Requestor Msg) The workstation reported an error creating directory.
**Action:** Check the error code. Most likely the existing directory structure is incompatable with that you are restoring.

**PC3550E (LAN WS) Error sending set dir info**
**Reason:** (Requestor Msg) There was an error sending a set directory info request (to set attributes).
**Action:** See additional messages.

**PC3551E (LAN WS) Error receiving dir info ack**
**Reason:** (Requestor Msg) There was an error receiving the acknowledgment to the directory info request.
**Action:** See additional messages.

**PC3555E (LAN WS) Error sending set date command**
**Reason:** (Requestor Msg) There was an error sending the command to set a file or system date.
**Action:** See additional messages.

**PC3556E (LAN WS) Error receiving set date ack**
**Reason:** (Requestor Msg) There was an error receiving the acknowledgment to the set date command.
**Action:** See additional messages.

**PC3557E (LAN WS) Error in delete file request**
**Reason:** (Requestor Msg) There was an error in processing the command to delete a file.
**Action:** Check if the file was opened by some other application; check the file attributes.

**PC3558E (LAN WS) Error receiving delete file ack**
**Reason:** (Requestor Msg) There was an error receiving the acknowledgment to the delete file command.
**Action:** See additional messages.

**PC3559E (LAN WS) Not EA block.**
**Reason:** (Requestor Msg) Expected EA block, but neither EA, nor error received. Protocol error.
**Action:** Call Tech Support.

**PC3560E (LAN WS) Error sending read EA request**
**Reason:** (Requestor Msg) There was an error sending the request to read an OS/2 extended attribute.
**Action:** See additional messages.

**PC3561E (LAN WS) Error receiving EA**
**Reason:** (Requestor Msg) There was an error receiving the OS/2 extended attribute for a file.
**Action:** See additional messages.

**PC3562E (LAN WS) Error receiving EA**
**Reason:** (Requestor Msg) There was a timeout or a disconnect during the receipt of an OS/2 extended attribute.
**Action:** See additional messages.

**PC3563E (LAN WS) Error in remove directory request**
**Reason:** (Requestor Msg) There was an error in processing the command to remove a directory.
**Action:** Check if the directory is not empty or is opened by some other application.

**PC3564E (LAN WS) Error receiving remove directory ack**
**Reason:** (Requestor Msg) There was an error receiving the acknowledgment to the remove directory command.
**Action:** See additional messages.

**PC3565E (LAN WS) Error sending write EA**
**Reason:** (Requestor Msg) There was an error sending a request to write an extended attribute.
**Action:** See additional messages.

**PC3566E (LAN WS) Error sending EA**

**Reason:** (Requestor Msg) There was an error sending an extended attribute.
**Action:** See additional messages.

**PC3567E (LAN WS) Error sending EA ack**
**Reason:** (Requestor Msg) There was an error sending the acknowledgment which ends the extended attribute.
**Action:** See additional messages.

**PC3568E LAN interface to be used to get to the**
**Reason:** workstation is not active or available.
**Action:** Check if you specified the right LAN interface ('More' screen), check your PC configuration.

## Mid-level workstation errors

**PC3600E (LAN WS) Error sending a close file ack**
**Reason:** (WS Msg) There was an error sending the acknowledgment to a close file command.
**Action:** See additional messages.

**PC3605E (LAN WS) File requested not found**
**Reason:** The requested file operation referenced an unknown file handle. Internal error.
**Action:** Contact Tech Support.

**PC3610E (LAN WS) Parse open file request error**
**Reason:** (WS Msg) There was an error parsing an open file request. Internal error.
**Action:** Contact Tech Support.

**PC3611E (LAN WS) Out of files**
**Reason:** (WS Msg) The maximum number of files open was exceeded. Internal error.
**Action:** Contact Tech Support.

**PC3612E (LAN WS) Error opening the file.**
**Reason:** (WS Msg) There was an error opening the requested file.
**Action:** See additional messages.

**PC3615E (LAN WS) Error parsing read file request**
**Reason:** (WS Msg) Invalid data was found parsing a read file request. Internal error.
**Action:** Contact Tech Support.

**PC3616E (LAN WS) Error seeking in an open file**
**Reason:** (WS Msg) There was an operating system error seeking to a location in an open file.
**Action:** Look up the return code in the operating system messages section of the UPSTREAM manual.

**PC3617E (LAN WS) Error reading a file**
**Reason:** (WS Msg) There was an operating system error reading data from an open file.
**Action:** Look the return code up in the operating system messages section of the UPSTREAM manual.

**PC3618E (LAN WS) Error sending file data**
**Reason:** (WS Msg) There was an error sending file data.
**Action:** Call Tech Support.

**PC3619E (LAN WS) Error sending end of data ack**
**Reason:** (WS Msg) There was an error sending the end of data acknowledgment.
**Action:** Call Tech Support.

**PC3620E (LAN WS) Range check during read file.**
**Reason:** Internal error.
**Action:** Call Tech Support.

**PC3625E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) While parsing a write file request, unexpected data was received. Internal error.
**Action:** Call Tech Support.

**PC3626E (LAN WS) Error seeking for file write**
**Reason:** (WS Msg) There was a file error seeking to write data in an open file.
**Action:** Look the return code up in the operating system messages section of the UPSTREAM manual.

**PC3627E (LAN WS) Error writing file data.**
**Reason:** (WS Msg) There was a file error writing data to an open file.
**Action:** Look the return code up in the operating system messages section of the UPSTREAM manual.

**PC3630E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) While parsing a directory information request, unexpected data was detected.
**Action:** Call Tech Support.

**PC3631E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) While parsing a directory search request, unexpected data was detected.
**Action:** Call Tech Support.

**PC3632E (LAN WS) Error sending directory info**
**Reason:** (WS Msg) There was an error sending directory information.
**Action:** Call Tech Support.

**PC3633E (LAN WS) Error sending dir info ack**
**Reason:** (WS Msg) There was an error sending a directory information acknowledgment.
**Action:** Call Tech Support.

**PC3634E (LAN WS) Error restarting directory search**
**Reason:** (WS Msg) There was an error restarting a directory search.
**Action:** Call Tech Support.

**PC3635E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) While parsing a create directory request, unexpected data was detected.
**Action:** Call Tech Support.

**PC3636E (LAN WS) Error during a directory create.**
**Reason:** (WS Msg) The error occurred servicing a directory create request.
**Action:** See additional messages.

**PC3640E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) When parsing a set information (attributes) command unexpected data was detected.
**Action:** Call Tech Support.

**PC3641E (LAN WS) Error during a set info ack**
**Reason:** (WS Msg) The error occurred when sending an acknowledgment to a set info (attributes).
**Action:** See additional messages.

**PC3645E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) When parsing a set date request, unexpected data was detected.
**Action:** Call Tech Support.

**PC3646E (LAN WS) Error during a set date ack**
**Reason:** (WS Msg) The error occurred when sending an acknowledgment to a set date.
**Action:** See additional messages.

**PC3647E (LAN WS) Error setting the file date.**
**Reason:** (WS Msg) There was a file error setting the file's date.
**Action:** Look the return code up in the operating system messages section of the UPSTREAM manual.

**PC3650E (LAN WS) Error during receive of service**
**Reason:** (WS Msg) There was an error receiving the service request from the remote.
**Action:** See additional messages.

**PC3651E (LAN WS) Unknown service**
**Reason:** (WS Msg) When waiting for a service request from the requestor, an unknown request was received.
**Action:** Make sure that the workstation and the requestor are at the same version levels.

**PC3652E (LAN WS) Timeout waiting for a request**
**Reason:** (WS Msg) A timeout was detected while waiting for a service request.

**Action:** Verify that the requestor is still running. Increase the TIMEOUT on both sides.

**PC3675I (LAN WS) Normal disconnect**
**Reason:** (WS Msg)

**PC3676E (LAN WS) Error during a file deletion**
**Reason:** (WS Msg) The error occurred servicing a file delete request.
**Action:** See additional messages.

**PC3677E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) When parsing a delete file information command unexpected data was detected.
**Action:** Call Tech Support.

**PC3678E (LAN WS) Error during a directory removing**
**Reason:** (WS Msg) The error occurred servicing a remove directory request.
**Action:** See additional messages.

**PC3679E (LAN WS) Unexpected data during parse**
**Reason:** (WS Msg) When parsing a remove directory information command unexpected data was detected.
**Action:** Call Tech Support.

**PC3680E (LAN WS) Error parsing read EA**
**Reason:** (WS Msg) There was an error parsing the data fields for a read OS/2 extended attribute request.
**Action:** Call Tech Support.

**PC3681E (LAN WS) Error searching EAs.**
**Reason:** (WS Msg) There was an error listing the extended attributes for a given file or directory.
**Action:** See additional messages.

**PC3682E (LAN WS) Error reading EA**
**Reason:** (WS Msg) There was an error reading a given extended attribute.
**Action:** See additional messages.

**PC3683E (LAN WS) Error sending EA**
**Reason:** (WS Msg) There was an error sending an extended attribute.
**Action:** See additional messages.

**PC3685E (LAN WS) Error parsing write EA**
**Reason:** (WS Msg) There was an error parsing the data fields for a write extended attribute request.
**Action:** Call Tech Support.

**PC3686E (LAN WS) Error receiving EA**
**Reason:** (WS Msg) There was an error receiving an extended attribute.
**Action:** See additional messages.

**PC3687E (LAN WS) Error receiving EA**
**Reason:** (WS Msg) There was a timeout or a disconnect while receiving an extended attribute.
**Action:** Verify the remote was operating. Increase the TIMEOUT on both sides.

**PC3688E (LAN WS) Error writing EA**
**Reason:** (WS Msg) There was an error writing an extended attribute.
**Action:** See additional messages.

**PC3689E (LAN WS) Error during a delete file ack**
**Reason:** (WS Msg) The error occurred when sending an acknowledgment to a delete file command.
**Action:** See additional messages.

**PC3690E (LAN WS) Error during a remove directory ack**
**Reason:** (WS Msg) The error occurred when sending an acknowledgment to a remove directory command.
**Action:** See additional messages.

## Mid level construction/parsing routines

**PC3691E (LAN WS) Data received too large**
**Reason:** The data element received is too large for the given space. Internal error.
**Action:** Contact Tech Support.

**PC3692E (LAN WS) Data length larger than the data**
**Reason:** The length specified for a data element is larger than the remaining entire block. Internal error.
**Action:** Contact Tech Support.

**PC3693E (LAN WS) Other than EA data recieved.**
**Reason:** Internal error.
**Action:** Contact Tech Support.

## Run job errors.

**PC3701I Running a remotely requested job.**
**Reason:** The following is the specification for a remotely requested job to be run immediately.

**PC3702E Remotely requested job file not found.**
**Reason:** The file for the job to be run was not found.
**Action:** Respecify

**PC3703I Remotely requested job execution status.**
**Reason:** A step in the execution of a remotely requested job finished. The job specification, step and return code follow.

**PC3704E The COMSPEC environment variable not found.**
**Reason:** The COMSPEC environment variable needed to run a remotely requested job was not specified in the configuration.
**Action:** For Windows NT add a “ComSpec=” line to the System Environment Variables list in the System applet of the Control Panel. For all other operating systems add a “SET COMSPEC=” statement to your CONFIG.SYS file (OS/2) or your AUTOEXEC.BAT file (all others).

**PC3705E Error parsing a remote job request.**
**Reason:** Invalid data was parsed to ULTra. Internal error.
**Action:** Check if the versions of UPSTREAM and ULTra are compatable. Call Tech Support.

**PC3706N Running a remotely requested job on ULTra WS.**
**Reason:** The following ULTra workstation name was obtained from the LAN WS Profile specified. You can abort the execution of the job by pressing the OK button now.

**PC3707E Could not acknowledge ULTra WS job request.**
**Reason:** An error occurred while attempting to receive an acknowledgement message from an ULTra workstation that was to run a remotely requested job.
**Action:** Make sure the ULTra workstation is up and running, and make sure you can access LAN.

**PC3708E Could not send a job request to an ULTra WS.**
**Reason:** An error occurred while attempting to send a remote job request to an ULTra workstation.
**Action:** Make sure the ULTra workstation is up and running, and make sure you can access LAN.

**PC3709E ULTra WS remote job request processing error.**
**Reason:** An unknown error occurred in an ULTra workstation while attempting to process a remotely requested job.
**Action:** Check the following messages.

**PC3710I Running a remotely requested job on ULTra WS.**
**Reason:** The following is the specification for a remotely requested job to be run on an ULTra workstation.

**PC3711E A DOS WS cannot run remotely requested job.**
**Reason:** Remotely requested jobs can not be run on an ULTra workstation that is running DOS.

**PC3712I Job Status: ??**
**Reason:** The status for a remotely requested job is ??.

**PC3713E Could not connect to ULTra WS to run a job.**
**Reason:** An error occurred while attempting to connect to an ULTra workstation in order to run a remotely requested job.

**PC3714E Could not get a buffer to run ULTra WS job.**

**Reason:** An error occurred while attempting to allocate a communications buffer in order to run a remotely requested job on an ULTra workstation.

**PC3715E User aborted ULTra WS remotely requested job.**
**Reason:** A remotely requested job to be run on an ULTra workstation was aborted by the user before it was started.

**PC3716D The JOBRETURNCODEMAP parameter is invalid.**
**Reason:** The format of the JOBRETURNCODEMAP parameter is invalid. The return code returned to the host may not be what was expected.
**Action:** See the following JOBRETURNCODEMAP parameter and the program and host return codes, and then respecify the JOBRETURNCODEMAP parameter.

**PC3717I An error occured starting a job.**
**Reason:** The OS/2 version of UPSTREAM encountered an error on a DosCreateQueue call to create a queue to be used for waiting for a job to finish execution.
**Action:** See the following 3724E message for the return code.

**PC3718I An error occured starting a job.**
**Reason:** The OS/2 version of UPSTREAM encountered an error on a DosStartSession call to start the execution of a job.
**Action:** See the following 3724E message for the return code.

**PC3719I An error occured waiting for a job.**
**Reason:** The OS/2 version of UPSTREAM encountered an error creating a job execution event on which to wait.
**Action:** See the following 3724E message for the return code.

**PC3720I An error occured waiting for a job.**
**Reason:** The OS/2 version of UPSTREAM encountered an error on a DosReadQueue call to get the return code from the job execution.
**Action:** See the following 3724E message for the return code.

**PC3721I An error occured starting a job.**
**Reason:** The Windows 95 or NT version of UPSTREAM encountered an error on a CreateProcess call to start the execution of a job.
**Action:** See the following 3724E message for the return code.

**PC3722I An error occured waiting for a job.**
**Reason:** The Windows 95 or NT version of UPSTREAM encountered an error on a WaitForSingleObject call to get the return code from the job execution.
**Action:** See the following 3724E message for the return code.

**PC3723I An error occured starting a job.**
**Reason:** The Windows 3.1 version of UPSTREAM encountered an error on a WinExec call to start the execution of a job.
**Action:** See the following 3724E message for the return code.

**PC3724E A Remotely requested job did not execute.**
**Reason:** A remotely requested job did not execute because of an error in one of the preexecution steps. The job specification, preexecution step and step error code follow.

## ULTra compression errors.

**PC3750E (LAN WS) Record size is too big.**
**Reason:** The record size used by UPSTREAM is larger than the buffer allocated by ULTra.
**Action:** Set environmental variable LANBUFFER to the size of 'Record Size' parameter. Restart ULTra.

**PC3752E (LAN WS) ULTra compression initialization error.**
**Action:** You probably do not have enough memory.

**PC3753E (LAN WS) ULTra Compression initialization error,**
**Action:** You probably do not have enough memory.

**PC3754E (LAN WS) ULTra does not support the specified**
**Reason:** compression level.
**Action:** Set ULTRACOMP parameter in the current para- meter file to the value not greater than you specified for ULTra. For DOS ULTra it is 0.

**PC3755E (LAN WS) Error allocating compression buffer.**
**Action:** Stop some application on ULTra side to free memory.

**PC3756E (LAN WS) ULTra compression initialization error.**
**Action:** You probably do not have enough memory.

**PC3757E (LAN WS) Error in high compression routine**
**Reason:** in ULTra(EA). Internal error.
**Action:** Call Tech support.

**PC3758E (LAN WS) Error in high compression routine**
**Reason:** in ULTra. Internal error.
**Action:** Call Tech support.

**PC3760E (LAN WS) Error in fast decompression routine**
**Reason:** in ULTra. Internal error or corrupted data.
**Action:** Call Tech support.

**PC3761E (LAN WS) Error in high decompression routine**
**Reason:** in ULTra. Internal error or corrupted data.
**Action:** Call Tech support.

**PC3762E (LAM WS) Range check in decompression buffer.**
**Reason:** Internal error or corrupted data.
**Action:** Call Tech support.

## DOS low level IPX/SPX initialization routines

**PC3800E (LAN WS) Error allocating memory**
**Reason:** There was a shortage of memory dynamically allocating the ECBs used in IPX/SPX communications.
**Action:** Reduce the number of ECBs (using SET NUMECBS=5) or otherwise free memory.

## LANIPX.C errors (DOS low level IPX/SPX routines).

**PC3900E (LAN WS) SPX not installed.**
**Action:** Verify that IPX or the ODI drivers have been installed or that you are using a version of IPX new enough to support SPX.

**PC3901E (LAN WS) Error opening IPX socket**
**Reason:** There was a Novell error opening the IPX socket.
**Action:** Change the socket number (using the SOCKET environment variable) or note the return code and call Tech Support.

**PC3902E (LAN WS) Error opening SPX socket**
**Reason:** There was a Novell error opening the SPX socket.
**Action:** Change the socket number (using the SOCKET environment variable) or note the return code and call Tech Support.

**PC3903E (LAN WS) IPX not installed.**
**Action:** Verify that IPX or the ODI drivers have been installed.

**PC3904E (LAN WS) Error initializing IPX**
**Action:** Verify that IPX has been installed. Note the return code and call Tech Support.

**PC3905E (LAN WS) Error opening SAP socket**
**Reason:** There was a Novell error opening the SAP (Service Advertizing Protocol) socket.
**Action:** Either disable SAP use (through the NOSAP environment variable) or remove other SAP advertizers from this PC.

**PC3906E (LAN WS) Error loading function**
**Reason:** There was a Windows error opening a Novell function required.
**Action:** Verify that the Novell software is correctly installed.

**PC3907E (LAN WS) Error loading NetWare**
**Reason:** There was a Windows error loading the required library.
**Action:** Verify that the NWIPXSPX.DLL library is in the path.

**PC3908E (LAN WS) Error loading NWCALLS**
**Reason:** There was a Windows error loading the required library NWCALLS.DLL.
**Action:** Verify that the NWCALLS.DLL library is in the path.

**PC3910E (LAN WS) No free buffers**
**Reason:** All ECBs are currently in use. Internal error.
**Action:** Contact Tech Support.

**PC3911E (LAN WS) Error sending broadcast**
**Reason:** (WS Msg) Error sending the SAP broadcast.
**Action:** Reboot and retry. If the problem continues contact Tech Support.

**PC3912E (LAN WS) Timeout waiting for connection**
**Reason:** There was an time out during the connection process.
**Action:** Verify the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3915E (LAN WS) Error sending FIND_WORKSTATION**
**Reason:** There was an error sending the request for the partner to identify itself.
**Action:** Verify the other computer is still operating.

**PC3920E (LAN WS) Workstation not found**
**Reason:** (Requestor Msg) The specified workstation name was not found in the server's bindery.
**Action:** Respecify the workstation name.

**PC3921E (LAN WS) Error finding workstation**
**Reason:** (Requestor Msg) The attempt to find the work- station resulted in an error.
**Action:** Note the return code and call Tech Support.

**PC3922E (LAN WS) Error finding workstation**
**Reason:** (Requestor Msg) The attempt to get the default connection ID to find the workstation resulted in an error.
**Action:** The connection to your server has been lost. Reestablish and retry.

**PC3925E (LAN WS) SPX connect error**
**Reason:** (Requestor Msg) There was an error attempting to establish the SPX connection.
**Action:** Note the return code and call Tech Support.

**PC3926E (LAN WS) Error receiving initial connect**
**Reason:** (WS Msg) There was an error receiving the initial IPX connect message.
**Action:** Note the return code and call Tech Support.

**PC3927E (LAN WS) Error listening for the broadcast**
**Reason:** (WS Msg) There was an error receiving the broadcast from the requestor.
**Action:** Note the return code and call Tech Support.

**PC3928E (LAN WS) Timeout listening for SPX connection**
**Reason:** (WS Msg) There was a timeout waiting for the SPX establishment message after the initial connect sequence was complete.
**Action:** Verify the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3930E (LAN WS) Error sending negotiation record**
**Reason:** There was an error sending the negotiation record to the other computer.
**Action:** Note the return code and call Tech Support.

**PC3935E (LAN WS) Error receiving negotiation record**
**Reason:** There was an error receiving the negotiation record from the other computer.
**Action:** Note the return code and call Tech Support.

**PC3936E (LAN WS) Timeout waiting for negotiation**
**Reason:** Timed out waiting for the other computer to send the negotiation message
**Action:** Verify the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3937E (LAN WS) Negotation failed**
**Reason:** There was a problem with the parameters specified which caused the other computer to reject the communications.
**Action:** Check the log on your other computer.

**PC3938E (LAN WS) Password mismatch**
**Reason:** (WS Msg) The password specified on the requestor does not match.
**Action:** Enter the correct password.

**PC3945E (LAN WS) Error listening for IPX connect**
**Reason:** (Requestor Msg) While listening to the response from the workstation there was an error.
**Action:** See additional messages.

**PC3946E (LAN WS) No response to IPX broadcast**
**Reason:** (Requestor Msg) The workstation was not found.
**Action:** Verify that the other computer is still operating.

**PC3950E (LAN WS) Error during SPX connect**
**Reason:** (Requestor Msg) There was a Novell error during The SPX connection sequence.
**Action:** Note the return code and call Tech Support.

**PC3951E (LAN WS) Error listening for SPX connect**
**Reason:** (WS Msg) There was an error waiting for the connection from the requestor.
**Action:** See additional messages.

**PC3952E (LAN WS) Time out during SPX connect**
**Reason:** (Requestor Msg) The workstation did not respond to the SPX connection message.
**Action:** Verify that the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3955E (LAN WS) The IN-USE flag changed.**
**Reason:** The internal “in-use” flag was turned off and then got turned on again before action could be taken. Internal error.
**Action:** Contact Tech Support.

**PC3956E (LAN WS) Unexpected ECB complete**
**Reason:** When a receive ECB was expected a send was detected or vice-versa. Internal error.
**Action:** Contact Tech Support.

**PC3957E (LAN WS) Corrupted flow**
**Reason:** The data flow was corrupted due to the failure of the communications layer to observe interrupt disabling.
**Action:** Contact Tech Support.

**PC3960E (LAN WS) Error terminating SPX connection**
**Reason:** When the SPX connection was terminated a return code was received.
**Action:** Usually this message can be ignored if subsequent connections operate. However if you have problems, note the return code and contact Tech Support.

**PC3961E (LAN WS) Error canceling posted ECB**
**Reason:** There was an error canceling a posted ECB during the shutdown process.
**Action:** Usually this message can be ignored if subsequent connections operate. However if you have problems, note the return code and contact Tech Support.

**PC3970E (LAN WS) Error sending flow control**
**Reason:** There was an error sending a flow control message to the other PC.
**Action:** Note the return code and call Tech Support.

**PC3975E (LAN WS) Error flushing received data**
**Reason:** There was an error flushing received data in order to perform a send.
**Action:** Note the return code and call Tech Support.

**PC3976E (LAN WS) Time out waiting for a send to complete**
**Reason:** A time-out occurred waiting for a send to finish.
**Action:** Verify that the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3980E (LAN WS) Time out flushing receives**
**Reason:** When flushing received preparatory to sending there was a time-out.
**Action:** Verify that the other computer is still operating. Increase the TIMEOUT on both sides.

**PC3981E (LAN WS) Send buffer lost**
**Reason:** A send ECB that was posted is no longer there. Internal error.
**Action:** Contact Tech Support.

**PC3982E (LAN WS) Time-out sending**

**Reason:** There was a time-out waiting for a send to complete before a new send could be posted.
**Action:** Verify that the other computer is still operating.

**PC3983E (LAN WS) Error receiving flow control**
**Reason:** There was an error receiving a flow control message from the remote system.
**Action:** Note the return code and contact Tech Support.

**PC3984E (LAN WS) Expected flow control message**
**Reason:** Received data from the remote computer instead of a flow control message. Internal error.
**Action:** Contact Tech Support.

**PC3985E (LAN WS) Expected flow control message**
**Reason:** A time-out or remote disconnect message was received instead of a flow control message.
**Action:** Verify that the other computer is still operating.

## DOS TSR Messages

**PC4000I (LAN WS) TSR loaded**

**PC4001I (LAN WS) TSR unloaded**

**PC4095F Remote Disconnect request.** OS/2 IPX/SPX low-level functions

**PC4100E (LAN WS) Error loading function**
**Reason:** There was an error loading a function from a dynamically loaded DLL module.
**Action:** See additional messages.

**PC4103E (LAN WS) DOSCALL1.DLL not found**
**Reason:** The required DOSCALL1.DLL module was not found when UPSTREAM attempted to dynamically load it.
**Action:** See additional messages.

**PC4104E (LAN WS) Error loading DOSCALL1.DLL**
**Reason:** There was an error attempting to dynamically load the DOSCALL1.DLL module.
**Action:** See additional messages.

**PC4105E (LAN WS) IPXCALLS.DLL not found**
**Reason:** The required IPXCALLS.DLL module was not found when UPSTREAM attempted to dynamically load it.
**Action:** See additional messages.

**PC4106E (LAN WS) Error loading IPXCALLS.DLL**
**Reason:** There was an error attempting to dynamically load the IPXCALLS.DLL module.
**Action:** See additional messages.

**PC4107E (LAN WS) SPXCALLS.DLL not found**
**Reason:** The required SPXCALLS.DLL module was not found when UPSTREAM attempted to dynamically load it.
**Action:** See additional messages.

**PC4108E (LAN WS) Error loading SPXCALLS.DLL**
**Reason:** There was an error attempting to dynamically load the SPXCALLS.DLL module.
**Action:** See additional messages.

**PC4109E (LAN WS) NWCALLS.DLL not found**
**Reason:** The required NWCALLS.DLL module was not found when UPSTREAM attempted to dynamically load it.
**Action:** See additional messages.

**PC4110E (LAN WS) Error loading NWCALLS.DLL**
**Reason:** There was an error attempting to dynamically load the NWCALLS.DLL module.
**Action:** See additional messages.

**PC4115E (LAN WS) Error dynamically allocating memory**
**Reason:** There was an error dynamically allocating required memory.
**Action:** Unload programs or free disk.

**PC4120E (LAN WS) Error opening SAP socket**
**Reason:** There was a Novell error opening the IPX socket using for SAP (Service Advertising Protocol) broadcasts.
**Action:** See additional messages.

**PC4121E (LAN WS) Error opening SPX socket**
**Reason:** There was a Novell error opening the SPX socket.
**Action:** Verify that UPSTREAM is not running on your PC in another screen group. Specify another socket.

**PC4122E (LAN WS) Error opening IPX socket**
**Reason:** There was a Novell error opening the IPX socket.
**Action:** Verify that UPSTREAM is not running on your PC in another screen group. Specify another socket.

**PC4123E (LAN WS) Error setting the SPX error check level.**
**Reason:** There was a Novell error setting the level where SPX errors are reported.
**Action:** Call Tech Support.

**PC4125E (LAN WS) Error getting a free buffer.**
**Reason:** Internal error.
**Action:** Call Tech Support.

**PC4130E (LAN WS) Error receiving connect request**
**Reason:** There was an IPX error receiving the connection request.
**Action:** See additional messages.

**PC4135E (LAN WS) Error sending SAP broadcast**
**Reason:** (WS Msg) There was an IPX error sending the Service Advertising Protocol (SAP) message to all server.
**Action:** See additional messages.

**PC4140E (LAN WS) Error getting local target**
**Reason:** (Requestor Msg) There was an error getting the immediate address of the target PC.
**Action:** See additional messages.

**PC4141E (LAN WS) Error sending FIND_WORKSTATION**
**Reason:** There was an error sending the request to find the other PC.
**Action:** See additional messages.

**PC4145E (LAN WS) Error during receive SPX connection**
**Reason:** (WS Msg) There was an error listening for the inbound SPX connection request.
**Action:** See additional messages.

**PC4146E (LAN WS) Error during receive SPX connection**
**Reason:** (WS Msg) There was an error after the system attempted to listen for the inbound SPX connection request.
**Action:** See additional messages.

**PC4147E (LAN WS) Time out during connection**
**Reason:** (WS Msg) There was a timeout or a disconnect request while attempting to receive an inbound SPX connection request.
**Action:** Verify that the remote is functioning. Increase the TIMEOUT on both sides.

**PC4150E (LAN WS) Error getting default connection ID**
**Reason:** (Requestor Msg) There was a Novell error getting the default connection ID.
**Action:** See additional messages.

**PC4151E (LAN WS) Workstation not found**
**Reason:** (Requestor Msg) The specified workstation was not found.
**Action:** Verify that ULTra is running on the requested workstation.

**PC4152E (LAN WS) Error finding requested workstation**
**Reason:** (Requestor Msg) There was a Novell server error searching for the address of the specified workstation.
**Action:** See additional messages.

**PC4153E (LAN WS) Error getting local target**
**Reason:** (Requestor Msg) Error finding the address of the nearest connection to the workstation.
**Action:** See additional messages.

**PC4155E (LAN WS) Error posting SPX listens**
**Reason:** There was an error posting SPX listen(s) (for data).
**Action:** See additional messages.

**PC4160E (LAN WS) Workstation not responding**

**Reason:** (Requestor Msg) The remote workstation is not responding to the connection request.
**Action:** Verify that the remote workstation is not on the other side of a bridge or use the SAP facility.

**PC4165E (LAN WS) Connection failed**
**Reason:** (Requestor Msg) The connection failed to the workstation immediately.
**Action:** See additional messages.

**PC4166E (LAN WS) Connection failed**
**Reason:** (Requestor Msg) The connection failed to the workstation.
**Action:** See additional messages.

**PC4167E (LAN WS) Connection timed out**
**Reason:** (Requestor Msg) The connection failed to the workstation either through a time-out or a disconnect.
**Action:** Verify that the workstation did not unload ULTra.

**PC4168E (LAN WS) Disconnect during connection**
**Reason:** (Requestor Msg) The connection failed to the remote workstation due to a disconnect request.
**Action:** Verify that the workstation did not unload ULTra.

**PC4170E (LAN WS) Error sending negotiation**
**Reason:** There was an error sending the negotiation message.
**Action:** See additional messages.

**PC4175E (LAN WS) Error receiving negotiation**
**Reason:** There was an error receiving the negotiation message.
**Action:** See additional messages.

**PC4176E (LAN WS) Time out during negotiation**
**Reason:** There was a time-out during the negotiation
**Action:** Verify that the remote is operating. Increase the TIMEOUT on both sides.

**PC4177E (LAN WS) Negotation failed.**
**Reason:** The negotiation message did not parse correctly. Internal error.
**Action:** Call Tech Support.

**PC4178E (LAN WS) Disconnect during negotation**
**Reason:** The remote disconnected during the negotiation phase.
**Action:** Restart the remote and retry.

**PC4179E (LAN WS) Password mismatch**
**Reason:** (WS Msg) The specified password did not match.
**Action:** Respecify the password and retry.

**PC4180E (LAN WS) Error receiving**
**Reason:** There was an error receiving data from the remote (immediately).
**Action:** See additional messages.

**PC4185E (LAN WS) Error setting SPX semaphore**
**Reason:** There was an OS/2 error setting the SPX wait for completion semaphore.
**Action:** Note the error and contact tech support.

**PC4190E (LAN WS) Error checking SPX semaphore**
**Reason:** There was an OS/2 error checking the SPX was for completion semaphore.
**Action:** Note the error and contact tech support.

**PC4191E (LAN WS) Semaphore not found.**
**Reason:** The semaphore does not match one of the internal data blocks. Internal error.
**Action:** Call Tech Support.

**PC4195E (LAN WS) Error terminating SPX connection**
**Reason:** There was a Novell error terminating the SPX connection.
**Action:** See additional messages.

**PC4200E (LAN WS) Error sending flow control**
**Reason:** There was an error sending a flow control message.
**Action:** See additional messages.

**PC4205E (LAN WS) Error finishing sending**
**Reason:** There was an error while waiting for all the send packets to complete.
**Action:** See additional messages.

**PC4206E (LAN WS) Timeout finishing sending**
**Reason:** There was a timeout during the process of waiting for send messages to complete.
**Action:** Increase the TIMEOUT on both sides.

**PC4210E (LAN WS) Timeout flushing receives**
**Reason:** While flushing receives there was a timeout.
**Action:** Verify that the remote is operating. Increase the TIMEOUT on both sides.

**PC4211E (LAN WS) Send buffer lost.**
**Reason:** A buffer in use could not be found. Internal error.
**Action:** Call Tech Support.

**PC4212E (LAN WS) Error sending packet.**
**Reason:** There was an immediate Novell error sending a packet to the remote.
**Action:** See additional messages.

**PC4213E (LAN WS) Time out sending a packet.**
**Reason:** There was a timeout waiting for a packet to be sent.
**Action:** Verify that the remote is operating. Increase the TIMEOUT on both sides.

**PC4214E (LAN WS) Error listing for flow control**
**Reason:** There was a Novell error listening for a flow control message.
**Action:** See additional messages.

**PC4215E (LAN WS) Expected a flow control message**
**Reason:** A flow control message was expected and something else was received. Internal error.
**Action:** Call Tech Support.

**PC4216E (LAN WS) No flow control**
**Reason:** A timeout or disconnect was received instead of a flow control message.
**Action:** Verify the remote is still operating.

## OS/2 USIPX.c errors

**PC4300E Error starting required timer**
**Reason:** There was an OS/2 system error starting an interval timer.
**Action:** Call Tech Support.

**PC4301E ULTra Normal load**
**Reason:** ULTra is now operational.

**PC4302E ULTra Normal unload**
**Reason:** ULTra is now shut down.

**PC4305E Error starting processing thread**
**Reason:** There was an OS/2 system error starting the remote processing thread.
**Action:** Call Tech Support.

## NetBIOS errors

**PC4400E (ULTra only) Error issuing a NetBIOS LISTEN command.**
**Reason:** Usually this is the result of a previous error.
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4401E (ULTra only) Error accepting a NetBIOS connection**
**Reason:** from UPSTREAM.
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4402E Error terminating the NetBIOS session.**

**PC4403E Error deleteing a NetBIOS session name.**

**PC4404E Error adding a session name to a local NetBIOS table.**
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4405E NetBIOS error sending data.**
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4406E NetBIOS error receiving data.**
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4407E Error canceling a wait on a NetBIOS session.**

**PC4408E Error in NetBIOS connection to the remote station.**

**PC4409E Error registering UPSTREAM to NetBIOS.**

**PC4410E NetBIOS communication error - TimeOut in Send.**
**Action:** If your peer is still up and running, increase the LANTIMEOUT value on your side.

**PC4411E Communication error - no errors(dummy entry).**

**PC4412E Communication error - TimeOut.**

**PC4413E Communication error - Disconnected.**

**PC4414E Communication error - Send/Receive incomplete.**

**PC4415E Communication error - Status error.**

**PC4416I (LAN WS) A NetBIOS connection has been established.**

**PC4417E (LAN WS) Error allocating a NetBIOS receive buffer.**
**Reason:** There was an error dymaically allocating the NetBIOS receive buffer. Insufficient memory.
**Action:** Set LANBUFFER and/or NUNECBS to a smaller value or free memory.

**PC4418E (LAN WS) Error allocating a NetBIOS send buffer.**
**Reason:** There was an error dymaically allocating the NetBIOS send buffer. Insufficient memory.
**Action:** Set LANBUFFER and/or NUMECBS to a smaller value or free memory.

**PC4420E The specified NetBIOS DLL was not found.**
**Reason:** (it could be not an error if you are using another one or IPX/SPX interface):

**PC4421E Error loading NetBIOS interface functions.**
**Reason:** NetBIOS interface disabled.
**Action:** Use OS/2 HELP command to obtain the description of the error: HELP SYSxxx , where xxx is the error code provided.

**PC4422E NetBIOS SUBMIT function was not loaded.**
**Reason:** NetBIOS interface disabled. Error code 127 means that the function wasn't found in NETAPI.DLL.
**Action:** Check version and installation errors for Comm. Manager. Call Tech Support.

**PC4423E NetBIOS interrupt vector not found.**

**PC4424E NetBIOS not present (int 5C not initialized or not**
**Reason:** a valid NetBIOS interrupt).
**Action:** See the explanation of the error code in the UPSTREAM manual.

**PC4425E The specified NetBIOS interface is not active.**
**Reason:** This may not be an error if you are using another NetBIOS interface or an IPX/SPX interface.

**PC4426E LAN support program.**
**Action:** Check if you have NETAPI.DLL in the \MUGLIB\DLL directory and that this directory is in the LIBPATH statement in your CONFIG.SYS. Also check if you have the LAN Requestor running.

**PC4427E LAPs NetBIOS.**
**Action:** Check if you have ACSNETB.DLL in the \MUGLIB\DLL directory and that this directory is in the LIBPATH statement in your CONFIG.SYS. Also check if you are loading NETBIOS.OS2 in CONFIG.SYS.

**PC4428 WIN32 NetBIOS. Error enumerating virtual adapters.**
**Action:** Check if NetBIOS is install and properly configured. Check the return code in UPSTREAM manual. If you are not intend to use NetBIOS set environment variable USNONETBIOS=Y. Call Tech Support.

## Reporting Errors.

**PC4500E Error opening report file.**
**Action:** See additional messages.

**PC4501E Error writing time to report file.**
**Action:** See additional messages.

**PC4502E Error writing beginning message to report.**
**Action:** See additional messages.

**PC4503E Error getting text from message file**
**Action:** See additional messages.

**PC4504E Error writing a message to the report**
**Action:** See additional messages.

## Win32 system errors.

**PC4601W Win32 initialization error.**
**Reason:** The initialization of the Win32 WOW thunk layer could not be performed. UPSTREAM can still function as a 16 bit application, but all functionality dependent on the Win32 WOW thunk layer is not available.

**PC4602W File system initialization error.**
**Reason:** One or more of the Win32 file system functions are not available. UPSTREAM can still function, but long file name support, extended attribute support and possibly other support is not available.

**PC4603W The SeBackupPrivilege is disabled.**
**Reason:** UPSTREAM will not be able to backup Security information, Extended Attributes and alternate data streams for files and directories.
FIX: Ensure your account has the Back up files and directories right granted to it.

**PC4604W The SeRestorePrivilege is disabled.**
**Reason:** UPSTREAM will not be able to restore Security information, Extended Attributes and alternate data streams for files and directories.
**Action:** Ensure your account has the Restore files and directories right granted to it.

**PC4605W The SeSecurityPrivilege is disabled.**
**Reason:** UPSTREAM may be able to backup and restore Security information, Extended Attributes and alternate data streams for files and directories, but not Security ACL information used for auditing access.
**Action:** Ensure your account is a member of the Administrators group.

**PC4606W The SeSystemtimePrivilege is disabled.**
**Reason:** UPSTREAM will not be able to synchronize the Windows NT system clock with the mainframe.
**Action:** Ensure your account has the Change the system time right granted to it.

**PC4607E Unable to allocate registry information**
**Reason:** storage for the following file.
**Action:** Close some other applications and try the UPSTREAM function again.

**PC4608E Unable to open the key for a hive file.**
**Action:** See additional messages

**PC4609E Unable to save the key for a hive file.**
**Action:** See additional messages

**PC4610E Unable to replace the key for a hive file.**
**Action:** See additional messages

**PC4611E Unable to enumerate a value of the registry's**
**Reason:** hive list on a local or remote computer.
**Action:** See additional messages

**PC4612E Unable to open the registry's profile list on a**
**Reason:** local or remote computer.
**Action:** See additional messages

**PC4613E Unable to enumerate a subkey of the registry's**
**Reason:** profile list on a local or remote computer.
**Action:** See additional messages

**PC4614E Unable to open a subkey of the registry's**
**Reason:** profile list on a local or remote computer.
**Action:** See additional messages

**PC4615E Unable to query the "ProfileImagePath" value of**
**Reason:** a subkey of the registry's profile list on a local or remote computer.
**Action:** See additional messages

**PC4616D Reboot the computer.**
**Reason:** All or part of the registry on a local or remote computer has been restored. The restored configuration will not take effect until the computer is restarted.

**PC4617D One or more Registry and/or Event Log files**
**Reason:** will be backed up, but they will not be migrated or deleted and they will have their ACL and Extended Attribute information backed up regardless of the Non-File Data settings.

**PC4618E Unable to open the registry's event log list on**
**Reason:** a local or remote computer.
**Action:** See additional messages

**PC4619E Unable to enumerate a subkey of the registry's**
**Reason:** event log list on a local or remote computer.
**Action:** See additional messages

**PC4620E Unable to open a subkey of the registry's event**
**Reason:** log list on a local or remote computer.
**Action:** See additional messages

**PC4621E Unable to query the "File" value of a subkey of**
**Reason:** the registry's event log list on a local or remote computer.
**Action:** See additional messages

**PC4622E Unable to open an event log file.**
**Action:** See additional messages

**PC4623E Unable to backup an event log file.**
**Action:** See additional messages

**PC4624D An event log file has been restored to a file**
**Reason:** with a different name. See the following messages for the event log file's original name and the name of the file to which it was restored.

**PC4625E (NT) Error allocating put memory.**
**Reason:** There was a memory shortage allocating memory required for NT duplicate file handling.
**Action:** Either reduce the maximum number of duplicate files or free memory.

**PC4626E The registry for the destination drive could**
**Reason:** not be opened.
**Action:** Ensure that the share name for the drive on the remote computer is not one of the NT predefined share names such as C$, D$, etc. You must define a share name ("CDRIVE" for example) that provides access to the remote computer's NT system drive with the Full Control permission given either directly to the your user account or to a group that your user account is a member of.

**PC4627E Event log file excluded**
**Reason:** An attempt to open an event log file on a remote computer for either backup or restore is disallowed by default.
**Action:** Set the USREMOTENTEVENTLOGS environment variable to Y and try the operation again.

## Win32 system errors from USTPSERV.EXE.

**PC4680E Invalid parameters passed to USTPSERV**
**Reason:** The service name and program specification are required as the first two paramters to USTPSERV.EXE. FIX: Run the USTPCFG.EXE program, select the TP service for which this execution applies, change the EXE Path Name field to "d:\path\USTPSERV.EXE" and change the Parameters field to "servicename programfilespec [param1 ... paramN]"

**PC4681E USTPSERV could not start the service**
**Reason:** The service provided to USTPSERV.EXE could not be started by the Service Control Dispatcher. The name of the service and the error code follow:

**PC4682E The service started by USTPSERV did not complete**
**Reason:** The service provided to USTPSERV.EXE did not complete successfully. The name of the service and the error code follow:

**PC4683E USTPSERV could not register the SC Handler**
**Reason:** The Service Control Handler for the service provided to USTPSERV.EXE could not be registered. The name of the service and the error code follow:

**PC4684E USTPSERV could not set the service status**
**Reason:** The status for the service provided to USTPSERV.EXE could not be set. The name of the service and the error code follow:

**PC4685I USTPSERV started the program for the service**
**Reason:** The program for the service provided to USTPSERV.EXE was started successfully. The name of the service and the program specification follow:

**PC4686E USTPSERV could not start the program for the service**
**Reason:** The program for the service provided to USTPSERV.EXE could not be started. The name of the service and the program specification follow:

**PC4687I The service program started by USTPSERV terminated**
**Reason:** The program for the service provided to USTPSERV.EXE terminated normally. The name of the service and the program specification follow:

**PC4688W The service program started by USTPSERV was stopped**
**Reason:** The program for the service provided to USTPSERV.EXE was stopped prematurely. The name of the service and the program specification follow:

**PC4689E The service program started by USTPSERV did not terminate**
**Reason:** The program for the service provided to USTPSERV.EXE did not terminate. It may still be running. The name of the service and the program specification follow:

**PC4690E The service program started by USTPSERV ABENDED**
**Reason:** The program for the service provided to USTPSERV.EXE terminated abnormally. The name of the service and the program specification follow:

**PC4691I The service started by USTPSERV received an SC request**
**Reason:** The service provided to USTPSERV.EXE received a request from the Service Control Manager. The name of the service and the type of request received follow:

## OS/2 specific TCP/IP errors.

**PC4700E Error creating named pipe.**
**Reason:** There was an OS/2 error creating the named pipe necessary to communicate with the subprogram USTCPIP.
**Action:** The return code is the OS/2 error. Run HELP SYSxxxx with the return code for a full description.

**PC4701E Error allocating status named data area.**
**Reason:** There was an error allocating the data area necessary to communicate with the subprogram USTCPIP.
**Action:** The return code is the OS/2 error. Run HELP SYSxxxx with the return code for a full description.

**PC4702E Error starting USTCPIP.EXE**
**Reason:** There was an error starting the program USTCPIP.EXE.
**Action:** The return code is the error returned from the spawn call. See the Errors chapter in the UPSTREAM manual for a list of these return codes. Also try running the program USTCPIP manually - if it can't load the DLL SO32DLL make sure you have TCP/IP installed and started.

**PC4703E Error connecting to USTCPIP**
**Reason:** There was an error connecting the named pipe to the subprogram USTCPIP.

**Action:** The return code is the OS/2 error. Run HELP SYSxxxx with the return code for a full description.

**PC4704E Error reading named pipe.**
**Reason:** There was an error reading the named pipe used to communicate with USTCPIP.
**Action:** The return code is the OS/2 error. Run HELP SYSxxxx with the return code for a full description.

**PC4705E Error writing named pipe.**
**Reason:** There was an error writing to the named pipe used to communicate with USTCPIP.
**Action:** The return code is the OS/2 error. Run HELP SYSxxxx with the return code for a full description.

**PC4706E Internal TCP/IP error**
**Reason:** USTCPIP reported an internal error.
**Action:** The error text and return codes should help you diagnose the problem.

**PC4707E Error loading required TCP/IP function**
**Reason:** The function listed below could not be loaded.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4708E Error loading required TCP/IP module**
**Reason:** The module listed below could not be loaded.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4709E Novell TCP/IP not loaded**
**Reason:** The "loaded" call returned that Novell TCP/IP services are not available.
**Action:** Verify the LWP install is correct.

**PC4710E Error starting TCP/IP thread**
**Reason:** OS/2 would not allow the TCP/IP thread to begin.
**Action:** Shut down some other processes and retry.

**PC4711E Error setting semaphore**
**Reason:** There was an error setting a required semaphore before thread start.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4712E Error setting semaphore**
**Reason:** There was an error setting a required semaphore used for the main thread.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4713E Error clearing semaphore**
**Reason:** There was an error clearing a required semaphore used for the TCP/IP thread.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4714E Error waiting on thread semaphore**
**Reason:** There was an error waiting on the TCP/IP thread semaphore.
**Action:** The return code lists the OS/2 error. Look up OS/2 errors by entering (from a command line) HELP SYSxxxx where xxxx is the return code.

**PC4715E Unknown TCP/IP request**
**Reason:** There was an internal error communicating between the main thread and the TCP/IP thread.
**Action:** Contact tech support.

## General TCP/IP errors.

**PC4750E TCP/IP communications error**
**Reason:** The following messages describes the error and the location within UPSTREAM where it happened.

**PC4751E (TCP/IP) sock_init failed.**
**Reason:** The sock_init call (which is used to init- ialize structures and detect the existance of TCP/IP) failed.
**Action:** Verify that TCP/IP is installed and operational.

**PC4752E (TCP/IP) socket failed.**
**Reason:** The socket call (which is used to begin communications) failed.

**PC4753E (TCP/IP) connect failed**
**Reason:** The connect call which is used to connect to the mainframe failed.

**PC4754E (TCP/IP) Error allocating internal memory**
**Reason:** There was an error allocating memory which is used for TCP/IP traffic.
**Action:** Free memory.

**PC4755E (TCP/IP) Receive buffer too small**
**Reason:** Internal error.
**Action:** Call Tech Support

**PC4757E (TCP/IP) Data size mismatch**
**Reason:** Expected to receive a block of a given size (based on the length prefix) and the data received was a different size.
**Action:** Call Tech Support.

**PC4758E (TCP/IP) Error during confirm**
**Reason:** Error having the host verify that the data was received correctly.
**Action:** See additional messages.

**PC4759E (TCP/IP) Error during confirmed**
**Reason:** Error notifying the host that the data has been correctly received.
**Action:** See additional messages.

**PC4760E (TCP/IP) Send sizes wrong**
**Reason:** There was an internal error matching the requested transmit size to the size encoded in the data. Internal error.
**Action:** Call Tech Support.

**PC4761E (TCP/IP) soclose failed**
**Reason:** The soclose call which is used to disconnect from the remote failed.

**PC4762E (TCP/IP) Exceeded max sockets**
**Reason:** FDR/UPSTREAM has no more room for the more sockets. Internal error.
**Action:** Call Tech Support.

**PC4763E (TCP/IP) Sending receive request**
**Reason:** Error occurred when sending a request to the host to receive.

**PC4764E (TCP/IP) socket failed.**
**Reason:** The socket call (which is used to begin communications for remote initiates) failed.

**PC4765E (TCP/IP) bind failed.**
**Reason:** The bind call (which is used to begin communications for remote initiates) failed.

**PC4766E (TCP/IP) ioctl failed.**
**Reason:** The ioctl call (which is used to begin communications for remote initiates) failed.

**PC4767E (TCP/IP) accept failed.**
**Reason:** The accept call (which is used to begin communications for remote initiates) failed.

**PC4768E (TCP/IP) Insufficient memory**
**Reason:** There was not sufficient memory to allocate the CreateTP structure which is necessary to properly process the received request.
**Action:** Free memory.

**PC4769E (TCP/IP) recv failed.**
**Reason:** The recv call (which is used to receive data from the remote) failed.

**PC4770E (TCP/IP) send failed.**
**Reason:** The send call (which is used to send data to the remote) failed.

**PC4771E (TCP/IP) Received no data.**

**Reason:** The data length received is too small to contain any data. Internal error.
**Action:** Call Tech Support.

**PC4772E (TCP/IP) Unknown APPC request**
**Reason:** The APPC request was unrecognized. Internal error.
**Action:** Call Tech Support.

**PC4773E (TCP/IP) listen failed.**
**Reason:** The listen call (which is used to listen for a remote request) failed.

**PC4774E (TCP/IP) Deallocate failed.**
**Reason:** The request to the remote to deallocate failed.

**PC4775E (TCP/IP) Receive of CONFIRMED failed**
**Reason:** The CONFIRM response was not properly received.

**PC4776E (TCP/IP) Expected a CONFIRMED**
**Reason:** The other data than an error or a CONFIRMED was received after a CONFIRM. Internal error.

**PC4777E (TCP/IP) linger failed.**
**Reason:** The linger call to request unsent data flushed failed.

**PC4778W (TCP/IP) Error occurred while flushing data.**
**Reason:** The error occurred while flushing data prior to closing the connnection.

**PC4779E (TCP/IP) Error occurred while setting blocking**
**Reason:** The error occurred when attempting to set the remotely received conversation as blocking.

**PC4780E (TCP/IP) Incomplete received**
**Reason:** The data record received is larger than the data buffer. Internal error.
**Action:** Call tech support.

**PC4781E (TCP/IP) Socket in use**
**Reason:** A socket call returned a socket number in use. There is a bug in your TCP/IP implementation.
**Action:** Call tech support.

**PC4782E (TCP/IP) Error in specified TCP/IP Option**
**Reason:** You specified in the UPSTREAM configuration to use a TCP/IP option and your TCP/IP reported the following error.

## TCP/IP return codes.

**PC4800E Unknown return code.**
**Reason:** The following return code could not be interpreted.
**Action:** Call Tech Support.

**PC4801E (TCP/IP) Not owner (SOCEPERM)**

**PC4802E (TCP/IP) No such process (SOCESRCH)**

**PC4803E (TCP/IP) Interrupted system call (SOCEINTR)**

**PC4804E (TCP/IP) No such device or address (SOCENXIO)**

**PC4805E (TCP/IP) Bad file number (SOCEBADF)**

**PC4806E (TCP/IP) Permission denied (SOCEACCES)**

**PC4807E (TCP/IP) Bad address (SOCEFAULT)**

**PC4808E (TCP/IP) Invalid argument (SOCEINVAL)**

**PC4809E (TCP/IP) Too many open files (SOCEMFILE)**

**PC4810E (TCP/IP) Broken pipe (SOCEPIPE)**

**PC4811E (TCP/IP) OS/2 Error (SOCEOS2ERR)**

**PC4812E (TCP/IP) Operation would block (SOCEWOULDBLOCK)**

**PC4813E (TCP/IP) Operation now in progress (SOCEINPROGRESS)**

**PC4814E (TCP/IP) Operation already in progress (SOCEALREADY)**

**PC4815E (TCP/IP) Socket operation on non-socket (SOCENOTSOCK)**

**PC4816E (TCP/IP) Destination address required (SOCEDESTADDRREQ)**

**PC4817E (TCP/IP) Message too long (SOCEMSGSIZE)**

**PC4818E (TCP/IP) Protocol wrong type for socket (SOCEPROTOTYPE)**

**PC4819E (TCP/IP) Protocol not available (SOCENOPROTOOPT)**

**PC4820E (TCP/IP) Protocol not supported (SOCEPROTONOSUPPORT)**

**PC4821E (TCP/IP) Socket type not supported (SOCESOCKTNOSUPPORT)**

**PC4822E (TCP/IP) Operation not supported on socket (SOCEOPNOTSUPP)**

**PC4823E (TCP/IP) Protocol family not supported (SOCEPFNOSUPPORT)**

**PC4824E (TCP/IP) Address family not supported by protocol family (SOCEAFNOSUPPORT)**

**PC4825E (TCP/IP) Address already in use (SOCEADDRINUSE)**

**PC4826E (TCP/IP) Can't assign requested address (SOCEADDRNOTAVAIL)**

**PC4827E (TCP/IP) Network is down (SOCENETDOWN)**

**PC4828E (TCP/IP) Network is unreachable (SOCENETUNREACH)**

**PC4829E (TCP/IP) Network dropped connection on reset (SOCENETRESET)**

**PC4830E (TCP/IP) Software caused connection abort (SOCECONNABORTED)**

**PC4831E (TCP/IP) Connection reset by peer (SOCECONNRESET)**

**PC4832E (TCP/IP) No buffer space available (SOCENOBUFS)**

**PC4833E (TCP/IP) Socket is already connected (SOCEISCONN)**

**PC4834E (TCP/IP) Socket is not connected (SOCENOTCONN)**

**PC4835E (TCP/IP) Can't send after socket shutdown (SOCESHUTDOWN)**

**PC4836E (TCP/IP) Too many references: can't splice (SOCETOOMANYREFS)**

**PC4837E (TCP/IP) Connection timed out (SOCETIMEDOUT)**

**PC4838E (TCP/IP) Connection refused (SOCECONNREFUSED)**

**PC4839E (TCP/IP) Too many levels of symbolic links (SOCELOOP)**

**PC4840E (TCP/IP) File name too long (SOCENAMETOOLONG)**

**PC4841E (TCP/IP) Host is down (SOCEHOSTDOWN)**

**PC4842E (TCP/IP) No route to host (SOCEHOSTUNREACH)**

**PC4843E (TCP/IP) Directory not empty (SOCENOTEMPTY)**

## DOS specific TCP/IP errors.

**PC4900E (DOS TCP/IP) Error allocating memory**
**Reason:** There wasn't enough memory to allocate the shared data buffer.
**Action:** Free memory.

**PC4901E (DOS TCP/IP) Invalid interrupt**
**Reason:** The interrupt number specified with the environment variable USTCPINT is outside the valid range.
**Action:** Specify an interrupt greater than 60.

**PC4902E (DOS TCP/IP) TCP/IP TSR not found**
**Reason:** The required UPSTREAM TCP/IP processing TSR program was not found at the specified interrupt.
**Action:** Load UPSTREAM TCP/IP TSR.

**PC4903E (DOS TCP/IP) Internal TCP/IP error**
**Reason:** The TSR reported an internal error.
**Action:** The error text and return codes should help you diagnose the problem.

## Windows specific TCP/IP errors.

**PC4950E (Win TCP/IP) Error loading function**
**Reason:** The function below is required but not found.
**Action:** Verify that WINSOCK.DLL or WSOCK32.DLL is in your PATH and is a high enough version.

**PC4951E (Win TCP/IP) WINSOCK.DLL not found**
**Reason:** WINSOCK.DLL or WSOCK32.DLL is required for TCP/IP access.
**Action:** Verify that it is in your path.

**PC4952E (Win TCP/IP) Error loading WINSOCK.DLL**
**Reason:** The following error occurred when loading WINSOCK.DLL or WSOCK32.DLL.
**Action:** Call Tech Support.

**PC4953E (Win TCP/IP) Sockets initialization error**
**Reason:** WSAStartup returned the following return code.
**Action:** See your TCP/IP documentation.

**PC4954E (Win TCP/IP) Error creating test socket**
**Reason:** UPSTREAM creates a test socket to test the functionality of the WinSock environment and the test creation failed.
**Action:** See return code.

## LAN Workstation profile errors.

**PC5000E (LAN WS Prf) Novell not installed**
**Reason:** Novell access is not available and required for the LAN Workstation profile facility.
**Action:** Install Novell

**PC5001E (LAN Ws Prf) Error opening profile**
**Reason:** There was a file system error opening the specified profile.
**Action:** Specify an existing profile.

**PC5002E (LAN WS Prf) Error reading profile**
**Reason:** There was an error reading the profile.
**Action:** See additional messages.

**PC5003N (LAN WS Prf) Beginning LAN WS Backup/Restore**
**Reason:** The following profile was obtained from the LAN WS Profile specified. You can abort the entire process by pressing the CANCEL button now.

**PC5004E (LAN WS Prf) User abort of LAN WS**
**Reason:** Backup/Restore.

**PC5005W (LAN WS) Files with long file names ignored**
**Reason:** One or more files or directories with long file names were found on the workstation. These files cannot be handled by the DOS or Windows 3.1 versions of UPSTREAM.
**Action:** If it is not an OS/2 workstation set the environment variable USUSEWIN32ALTERNATEFILENAMES=Y so that the alternate file names can be used.

## Status errors.

**PC5100E (Status) Error during start conversation**
**Action:** See additional messages

**PC5101E (Status) Error sending start conversation**
**Action:** See additional messages

**PC5102E (Status) Error sending status request**
**Action:** See additional messages

**PC5103E (Status) Error receiving response**
**Action:** See additional messages

**PC5104E (Status) Unexpected conversation state**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5105E (Status) Error during Confirm**
**Action:** See additional messages.

**PC5106E (Status) Error during Confirmed**
**Action:** See additional messages.

**PC5107E (Status) Error during end of conversation**
**Action:** See additional messages.

## UNIX system errors.

**PC5200E (UNIX) Error occurred reading symbolic link**
**Action:** Internal error. Call tech support.

**PC5201E (UNIX) Error occurred creating symbolic link**
**Action:** Internal error. Call tech support.

**PC5202E (UNIX) Error occurred removing symbolic link**
**Action:** Internal error. Call tech support.

**PC5203E (UNIX) Statx error occurred while restoring**
**Reason:** a symbolic link
**Action:** Internal error. Call tech support.

**PC5204E (UNIX) Can not restore symbolic link**
**Reason:** An existing entry in the file system is not a symbolic link.
**Action:** Remove the existing file or directory IF AND ONLY IF you want the symbolic link to replace the existing file or directory and rerun the restore.

**PC5205E (UNIX) Error reseting last access date.**
**Action:** Internal error. Call tech support.

## Host reporting errors

**PC5300E (Host Rpt) Error allocating memory**
**Action:** Free memory.

**PC5301E (Host Rpt) Error opening file**
**Reason:** There was an error opening the specified host reporting parameter file.
**Action:** See additional messages.

**PC5302E (Host Rpt) Error reading parameter**
**Action:** See additional messages.

**PC5303E (Host Rpt) Error opening file**
**Reason:** There was an error opening the specified host reporting parameter file for write.
**Action:** See additional messages.

**PC5304E (Host Rpt) Error writing parameter**
**Action:** See additional messages.

**PC5305E (Host Rpt) User canceled host report**

**PC5306E (Host Rpt) Error occurred during a start conv.**
**Action:** See additional messages.

**PC5307E (Host Rpt) Error occurred during send of start**

**PC5308E (Host Rpt) Error occurred during send of req.**

**PC5309E (Host Rpt) Error getting result count.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5310E (Host Rpt) Error getting result string.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5311E (Host Rpt) Error occurred during send of selection.**

**PC5312E (Host Rpt) Error occurred during receive.**

**PC5313E (Host Rpt) Unexpected conversation state.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5314E (Host Rpt) Error occurred during a confirmed**

**PC5315E (Host Rpt) Error opening report file**
**Action:** See additional messages.

**PC5316E (Host Rpt) Error writing to report file.**
**Action:** See additional messages.

**PC5317E (Host Rpt) Error occurred during end conversation**

**PC5318W (Host Rpt) No information matched criteria**
**Action:** Respecify.

## Personalization errors.

**PC5400E (Per.) Personaliziation file not found.**
**Reason:** For UPSTREAM, the personalization file is US.SER and must be found either in the Work Path or in the UPSTREAM directory; in USCFG, the specified file was not found.
**Action:** You may be able to copy USSER to US.SER.

**PC5401E (Per.) Error reading the personalization file.**
**Action:** See additional messages.

**PC5402E (Per.) Personalization illegally modified**
**Action:** Reload UPSTREAM from the original diskettes.

**PC5403E (Per.) Error in access**
**Action:** Reload UPSTREAM from the original diskettes.

**PC5404E (Per.) Error in access**
**Action:** Reload UPSTREAM from the original diskettes.

**PC5405E (Per.) Error in access**
**Action:** Reload UPSTREAM from the original diskettes.

**PC5406E (Per.) Error in access**
**Action:** Reload UPSTREAM from the original diskettes.

**PC5407E (Per.) Error writing to the personalization file.**
**Action:** See additional messages.

**PC5408E (Per.) Error opening ZAP file.**
**Action:** See additional messages.

**PC5409E (Per.) Error reading ZAP file.**
**Action:** See additional messages.

**PC5410E (Per.) Error opening personalization file.**
**Reason:** The personalization file could not be opened. For UPSTREAM this is fatal - for USCFG, specify a different file.
**Action:** See additional messages.

**PC5450E (Per.) Invalid personalization**
**Action:** Call tech support.

**PC5451E (Per.) Backups disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5452E (Per.) Restores disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5453E (Per.) As of...Restores disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5454E (Per.) Performance tests disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5455E (Per.) Remote requests disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5456E (Per.) Profile management disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5457E (Per.) Profile configuration disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5458E (Per.) Host status disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5459E (Per.) Host reporting disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5460E (Per.) ULTra disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5461E (Per.) Novell Profiles disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5462E (Per.) Banyan StreetTalk Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5463E (Per.) Bindery/NDS Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5464E (Per.) Migration Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5465E (Per.) Deletion Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5466E (Per.) Non-merge backups Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5467E (Per.) Merge backups Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5468E (Per.) TCP/IP Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5469E (Per.) SNA Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5470E (Per.) Sequential disk backups Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5471E (Per.) Sequential tape backups Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5472E (Per.) Sequential disk restores Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5473E (Per.) Sequential tape restores Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5474E (Per.) Backups Disallowed at this time**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5475E (Per.) Restores Disallowed at this time**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5476E (Per.) Password failed.**
**Reason:** The user entered an incorrect password and/or chose not to run UPSTREAM at this time.

**PC5477E (Per.) The specification is not allowed**
**Reason:** The file specification (which follows) is not allowed for your copy of UPSTREAM.
**Action:** Call your administrator.

**PC5478E (Per.) Attended operations Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5479E (Per.) Unattended operations Disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5480E (Per.) Sequential backups disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5481E (Per.) Non-sequential backups disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5482E (Per.) File transfers disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5483E (Per.) Host jobs disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5484E (Per.) FDRSOS functions disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

**PC5485E (Per.) Destinations disallowed**
**Reason:** Your copy of UPSTREAM has specifically disallowed this function.
**Action:** Call your administrator.

## Target name errors

**PC5501E Error starting conversation**
**Reason:** There was an error starting a conversation to inform the host of your target name.
**Action:** See communications return codes.

**PC5502E Error allocating memory.**
**Reason:** There was an error allocating memory to inform the host of your target name.
**Action:** Free memory or disk.

**PC5503E Error sending target name info.**
**Reason:** There was an error sending the target name information to the host.
**Action:** See communications return codes.

**PC5504E Error in confirm of target name.**
**Reason:** There was an error confirming the transmission of the target name information to the host.
**Action:** See communications return codes.

**PC5505E Error ending conversion of target name.**
**Reason:** There was an error ending the conversation of the transmission of the target name to the host.
**Action:** See communications return codes.

**PC5506I Registered the following name to the host:**

**PC5507E Error sending target name start conversation**
**Reason:** There was a communications error sending the start conversation record to the host.
**Action:** See communications return codes.

**PC5508E Error receiving workstation information**
**Reason:** There was a communications error receiving the requested workstation information from the host.
**Action:** See communications return codes.

**PC5509D Automatic update.**
**Reason:** The local machine received an automatic update indication from the host. When terminating or idle, the automatic update will proceed.

**PC5510D Running Automatic Update.**
**Reason:** The following UPSTREAM control file (.dat) is being executed (usually a restore) as part of the automatic update process. If you press the CANCEL button, the auto-update will be skipped.

**PC5511D Running Automatic Update.**
**Reason:** The following UPSTREAM job (batch file or script) is being executed (usually a restore) as part of the automatic update process. If you press the CANCEL button, the auto-update process will be skipped.

**PC5512D ULTra automatic update.**
**Reason:** The ULTra version is not at the level of the master version. The automatic update will begin.

**PC5513D Running ULTra Automatic Update.**
**Reason:** The following UPSTREAM control file (.dat) is being executed (usually a restore) as part of the automatic update process. If you press the CANCEL button, the auto-update process will be skipped.

**PC5514D Running ULTra Automatic Update.**

**Reason:** The following UPSTREAM job (batch file or script) is being executed (usually a restore) as part of the automatic update process.

**PC5515E Auto-update parameter file error**
**Action:** See additional messages.

**PC5516E Error saving parameters**
**Reason:** When attempting to automatically update an ULTra workstation, there was an error saving the existing parameters.
**Action:** See additional messages.

**PC5517E ULTra auto-update parameter file error**
**Action:** See additional messages.

**PC5518E Error restoring parameters**
**Reason:** When attempting to restore parameters after an ULTra automatic update there was an error.
**Action:** See additional messages.

**PC5519E Error saving parameters**
**Reason:** When attempting to automatically update, there was an error saving the existing parameters.
**Action:** See additional messages.

**PC5520E Error restoring parameters**
**Reason:** When attempting to restore parameters after an automatic update.
**Action:** See additional messages.

**PC5521D User requested skip of auto-update**

## Inquiry/Restore errors

**PC5600W Error deleting file inquiry file.**
**Reason:** There was a file system error deleting the file used to store inquired files information.
**Action:** See additional messages.

**PC5601E Error opening inquiry file**
**Action:** See additional messages.

**PC5602E Error reading inquiry file**
**Action:** See additional messages.

**PC5603E Unexpected EOF in inquiry file**
**Action:** Internal error - contact tech support

**PC5604E Error deleting inquiry file.**
**Action:** See additional messages.

**PC5605E Error writing inquiry file.**
**Action:** See additional messages.

## Security validation errors.

**PC5650E Error allocating required memory.**
**Reason:** When performing security validation, there was a memory shortage.
**Action:** Free memory or disk and retry.

**PC5651E Error starting conversation**
**Reason:** When performing security validation, there was an error starting the conversation with the host.
**Action:** See the comm. return codes.

**PC5652E Error sending request**
**Reason:** When performing security validation, there was an error sending the security information.
**Action:** See the comm. return codes.

**PC5653E Security information confirm error**
**Reason:** If there is not a comm error, most likely there was an error with your security information.
**Action:** Reenter your security information.

**PC5654E Error ending conversation.**
**Reason:** There was an error ending the security validation conversation.
**Action:** See the comm. return codes.

**PC5660E Remote password invalid**
**Reason:** The password entered on the remote system is not the password personalized on the PC.
**Action:** Resubmit with the correct password.

## SMS errors.

**PC5701E (SMS) Error gettign default connection ID**
**Reason:** There was a Novell error getting the default connection ID.
**Action:** Look up the return code in the Novell messages section of the UPSTREAM manual.

**PC5702E (SMS) Error scanning object**
**Reason:** There was a Novell error scanning for the SMS Server.
**Action:** Look up the return code in the Novell messages section of the UPSTREAM manual.

**PC5703E (SMS) Badly formatted IP address**
**Reason:** The IP address of the USSMS PC was incorrectly formatted. Internal error.
**Action:** Call UPSTREAM technical support.

**PC5704E (SMS) SPX address location error**
**Reason:** There was an error extracting from the bindery the SPX address of the given workstation.
**Action:** Look up the return code in the Novell messages section of the UPSTREAM manual.

**PC5705E (SMS) Can't allocate comm buffer area.**
**Reason:** Memory shortage.
**Action:** Free memory or disk and retry.

**PC5706E (SMS) TLI error in open.**
**Reason:** There was a TLI error in a t_open.
**Action:** See additional messages.

**PC5707E (SMS) TLI error in bind.**
**Reason:** There was a TLI error in a t_bind.
**Action:** See additional messages.

**PC5708E (SMS) TLI error in connect.**
**Reason:** There was a TLI error in a t_connect.
**Action:** See additional messages.

**PC5709E (SMS) Exceeded buffer for field**
**Reason:** While adding a field to a transmission buffer, we attempted to go past the end of the buffer. Internal error.
**Action:** Contact tech support.

**PC5710E (SMS) TLI error in receive.**
**Reason:** There was a TLI error in a t_rcv of data length.
**Action:** See additional messages.

**PC5711E (SMS) TLI error in receive.**
**Reason:** There was a TLI error in a t_rcv.
**Action:** See additional messages.

**PC5712E (SMS) TLI error in send**
**Reason:** There was a TLI error in a t_snd.
**Action:** See additional messages.

**PC5713E (SMS) Received buffer too small**
**Reason:** The buffer received from the server was too small. Internal error.
**Action:** Call tech support.

**PC5714E (SMS) Unexpected received data type**
**Reason:** Your workstation received an unknown data type from the server. Internal error.
**Action:** Call tech support.

**PC5715E (SMS) Unexpected end of data**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5716E (SMS) Field length exceeds received buffer**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5717E (SMS) Received length exceeds field.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5718E (SMS) Received file server message:**

**PC5719E (SMS) Insufficient memory**
**Reason:** Error allocating the buffer required for server transport.
**Action:** Specify a USSMSXMITSIZE environment variable or free memory.

**PC5720E (SMS) Server not found.**
**Reason:** The requested server was not found in the bindery.
**Action:** Verify the USSMS.NLM program is running and configured for the specified connection type.

**PC5721E (SMS) Error in disconnect**
**Reason:** There was a TLI error in t_sndrel.
**Action:** See additional messages.

**PC5722E (SMS) Insufficient memory**
**Reason:** Error allocating the buffer required to begin server transport.
**Action:** Free memory or disk.

**PC5723E (SMS) Not connected**
**Reason:** The SMS function you're attempting doesn't work unless you have connected to a server first.
**Action:** Select a server and connect.

**PC5724E (SMS) Invalid field length.**
**Action:** Call tech support.

**PC5725E (SMS) Error checking for received data**
**Reason:** When attempting to transmit data, there was a TLI error checking to see if there was any data to receive.
**Action:** See additional messages.

**PC5726E (SMS) Unexpected receive type**
**Reason:** The NLM send unexpected data.
**Action:** Internal error. Call tech support.

**PC5727E (SMS) Unexpected t_look data state.**
**Action:** Retry the operation.

**PC5728E (SMS) Error getting connection for server**
**Reason:** There was an error getting the connection handle for the specified server.
**Action:** See Novell return code

**PC5729E (SMS) Error getting connection reference**
**Reason:** There was an error getting the connection reference (default).
**Action:** See Novell return code

**PC5730E (SMS) Receive into buffer too small**
**Reason:** The specified buffer is too small.
**Action:** Internal error. Call tech support.

**PC5731E (SMS) Receive into buffer too small**
**Reason:** The specified buffer is too small.
**Action:** Internal error. Call tech support.

## Auto-recall specific errors

**PC5750W (Auto Recall) Can't open server conn.**
**Reason:** Unable to open connection to file server.
**Action:** See Novell return code

**PC5751W (Auto Recall) Can't get file name**
**Reason:** For the requested name space, the file name could not be obtained.
**Action:** See Novell return code

**PC5752W (Auto Recall) The file name received is bad**
**Reason:** The received file name does not have a colon separator used to denote the volume name.
**Action:** Call tech support.

**PC5753W (Auto Recall) Unable to start UPSTREAM**
**Reason:** UPSTREAM could not be started to perform the auto-recall.
**Action:** See return code.

**PC5754W (Auto Recall) UPSTREAM restore failed**
**Reason:** The UPSTREAM restore failed.
**Action:** See UPSTREAM log.

**PC5755D (Auto Recall) Received recall request**

**PC5756D (Auto Recall) Recall successful**

**PC5757I (Auto Recall) Enter NWRecall**

**PC5758I (Auto Recall) Exit NWRecall**

**PC5759E (Auto Recall) Error opening input parameter file.**
**Reason:** The input parameter file could not be opened.
**Action:** See additional messages.

**PC5760E (Auto Recall) Error opening output parameter file.**
**Reason:** The output parameter file could not be opened.
**Action:** See additional messages.

**PC5761E (Auto Recall) Error reading input parameter file.**
**Action:** See additional messages.

**PC5762E (Auto Recall) Error writing output parameter file.**
**Action:** See additional messages.

**PC5763E (Auto Recall) Error reading input parameter file.**
**Reason:** Error occurred while skipping to the file spec info.
**Action:** See additional messages.

**PC5764E (Auto Recall) Error writing output parameter file.**
**Reason:** Error occurred while writing file spec info.
**Action:** See additional messages.

**PC5765E (Auto Recall) Error writing output parameter file.**
**Reason:** Error occurred while writing file spec data.
**Action:** See additional messages.

**PC5766I (Auto Recall) Deleted expired file:**

**PC5767W (Auto Recall) Error deleting expired file.**

## SMS normal messages.

**PC5800I SMS Backup starting**

**PC5810E (SMS Backup) Error allocating memory**
**Reason:** There was a memory shortage allocating the required memory to begin an SMS backup.
**Action:** Free memory or disk.

## Local backup errors.

**PC5901E (Lcl Bkp) Error deleting backup file.**
**Reason:** There was a file system error deleting the following backup file.
**Action:** See additional messages.

**PC5902E (Lcl Bkp) Error allocating memory**
**Reason:** There was a memory shortage allocating the internal local backup memory area.
**Action:** Free memory or disk.

**PC5903E (Lcl Bkp) Error opening local backup file.**
**Action:** See additional messages.

**PC5904E (Lcl Bkp) Error writing backup description.**
**Action:** See additional messages.

**PC5905E (Lcl Bkp) Write header out of order.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5906E (Lcl Bkp) Read record out of order.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5907E (Lcl Bkp) Record read exceeds buffer.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5908E (Lcl Bkp) Error reading header**
**Action:** See additional messages.

**PC5909E (Lcl Bkp) Write record out of order.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5910W (Lcl Bkp) Error writing a local backup record.**
**Reason:** UPSTREAM will save the local backup "as is".

**PC5911E (Lcl Bkp) Find file out of order.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5912E (Lcl Bkp) Error reading record**
**Reason:** There was an error doing a sequential search for a given record. Internal error.
**Action:** Call tech support.

**PC5913E (Lcl Bkp) Unexpected end of file**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5914E (Lcl Bkp) Error reading record**
**Reason:** There was an error doing a direct search for a given record. Internal error.
**Action:** Call tech support.

**PC5915E (Lcl Bkp) Expected file not found.**
**Reason:** The following file was not found at the given location. Internal error.
**Action:** Call tech support.

**PC5916E (Lcl Bkp) Corrupted data.**
**Reason:** A record read was not a file info record (as required). Internal error.
**Action:** Call tech support.

**PC5917E (Lcl Bkp) Exceeded record**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5918E (Lcl Bkp) Local backup isn't restartable**
**Reason:** A consistancy error was detected in the local backup file. This file will be deleted.

**PC5919E (Lcl Bkp) Restore out of order.**
**Reason:** Internal error.
**Action:** Call tech support.

**PC5920E (Lcl Bkp) Error updating the file header**
**Action:** See additional messages.

**PC5921E (Lcl Bkp) Error reading counter file.**
**Reason:** There was an error reading the local backup counter file (profile name.000).
**Action:** See additional messages.

**PC5922E (Lcl Bkp) Error opening local backup source**
**Reason:** During a local backup copy, there was an error opening the source file.
**Action:** See additional messages.

**PC5923E (Lcl Bkp) Error opening local backup dest**
**Reason:** During a local backup copy, there was an error opening the destination file.
**Action:** See additional messages.

**PC5924E (Lcl Bkp) Error reading local backup source**
**Reason:** During a local backup copy, there was an error reading the source file.
**Action:** See additional messages.

**PC5925E (Lcl Bkp) Error writing local backup dest**
**Reason:** During a local backup copy, there was an error writing the destination file.
**Action:** See additional messages.

**PC5926E (Lcl Bkp) Error deleting the local backup file**
**Reason:** There was an error deleting the local backup file when the local backup directory was changed.
**Action:** See additional messages.

## File transfer errors.

**PC6001E (File Xfer) Wildcards not allowed.**
**Reason:** You can not specify more than one file in a file transfer request.
**Action:** Respecify.

**PC6002E (File Xfer) Record packing required.**
**Reason:** You must enable record packing to use file transfer.
**Action:** Set the parameter PACKRECSIZE to a non- zero value.

## Host job submission errors.

**PC6100E Error allocating memory**
**Reason:** There was an error allocating memory for host job submission.
**Action:** Free memory or restart program.

**PC6101E Error during start conversation error**
**Reason:** There was an error during host job submission
**Action:** See additional messages.

**PC6102E Error sending start conversation**
**Action:** See additional messages.

**PC6103E Error sending non-repeated description**
**Action:** See additional messages.

**PC6104E Error sending repeated description**
**Action:** See additional messages.

**PC6105E Error receiving job submission info.**
**Action:** See additional messages.

**PC6106E Error in confirmed of host job.**
**Action:** See additional messages.

**PC6107E Error ending conversation.**
**Action:** See additional messages.

**PC6108I Submitting existing host job**

**PC6109D Host job submitted**

**PC6110I Host job submission failed**

## UPSTREAM/SOS integration errors.

**PC6200D Error creating SOS file**
**Reason:** Could not create the SOS timestamp file. SOS restores will have to be performed manually.
**Action:** See additional messages.

**PC6201D Could not find the SOS file.**
**Reason:** Expected the SOS file and it was not found.
**Action:** Verify the SOS Timestamp Path. If you removed the file, you will have to restore it.

**PC6202E Expected SOS timestamp file spec**
**Reason:** There were no SOS capable file specifications.
**Action:** Respecify the restore.

UPSTREAM/Auto-Recall notification errors.

**PC6300E Expected connection not found**
**Reason:** When searching through the list of connected servers, your configured server was not found.
**Action:** Internal error; call tech support.

**PC6301E Connection number not found.**
**Reason:** When looking at the connected server an unexpected error was returned.
**Action:** Internal error; call tech support.

**PC6302E No longer connected**
**Action:** Restart the USRECALL NLM and USNOTIFY.

**PC6303I Enter USNotify**

**PC6304I Exit USNotify**

# INDEX

## A


Abort 3-42, 4-39, 5-8, 6-34
Access Control Lists 14-4
Accessed Before 11-11
Action Menu 11-4, 11-7
  As of...Restore 11-7
  Backup 11-7
  List and Restore 11-7
  Performance 11-7
  Restore and Inquiry (old) 11-7
  Run a Job 11-7
  Set Priority 11-7
  Trace 11-7
AdaptSNA
  APPCCFG.EXE 6-23
  AutoSync Issues 6-30
  Coax Boards 6-30
  Coax issues 6-29
  SDLC Boards 6-28
  SDLC Issues 6-28
  Token-ring 6-16
Add Button 8-8
Add Spec Button 11-31
AIX 1-4
  Logical and Physical Volumes 7-24
All Files in Spec 11-11
All Files in Spec Radio Button 11-26
APPC 1-2, 1-16, 3-8, 3-13, 4-8, 4-14, 5-11, 6-1, 6-10, 6-16, 7-4
  FDR/UPSTREAM Configuration 3-43
APPC.BAT 4-5, 4-36, 5-5, 6-5, 6-9, 6-22
  Eicon Technologies 6-33
APPC/PC 6-17
APPCCFG.EXE 6-9
APPCUNLD.BAT 4-5, 4-36, 5-5, 6-5, 6-9, 6-22
APPN 3-18, 24-8
Architecture 1-9
As of...Restore 11-32
Async 1-5, 6-16
Attachmate Personal Client 4-17
Attended 11-20 - 24-21
Automatic Updates 11-3, 20-29
  FDR/UPSTREAM 20-29
  Roll-Back 20-34
  ULTra Workstations 20-32
  UNIX Notes 20-32
Auto-Recall 1-6, 1-8
AutoSync 1-5
Auto-updates 1-5


## B


Backing up Servers 2-2
  On LAN Attached Workstations 2-2
  On the Server 2-4
Backing up Workstations 2-6
  FDR/UPSTREAM on Each Workstation 2-6
  FDR/UPSTREAM ULTra 2-6
Backup 8-1 - 8-12
  Backup Parameters Dialog 8-5
  Details 9-5
  Restart 8-12
  Restart Failed 11-7
  Restart only option 24-21
  Status Screen 8-11
  StreetTalk 16-5
  Transfer Statistics 8-11
Backup Migration Threshold 20-10
Backup Profile 1-9, 3-12, 6-15, 7-8, 8-5, 8-7, 9-4, 11-28, 20-4
  Delete 20-2
Backup Profiles 2-14
Backup Restart 11-19
Backup Spec 8-8
Backup Strategies 1-10
Backup Subdirectories 11-11
Backup Type 8-7
BACKUPBUFFERSIZE
  Environment tuning variable 24-18
Backups Button 9-4
Backups List 9-5, 11-29
Banyan 1-3, 16-1 - 16-12, 24-30
  Access Rights Lists 16-3
  Complete Server Backup 16-2
  Disaster Recovery 17-6
  Extended StreetTalk Name 16-2
  File Inquiries 16-9
  File Services 16-7
  Open Files 16-3
  Planning 16-3
  Restores 16-11
  Restrictions and Warnings 16-4
  Security 16-3
  Set Server Time 23-4
  Version Inquries 16-8
Banyan Restores 11-28
Bindery 13-4
BOOTDISK.EXE 18-17
Bulletin Board 28-2


## C

Cancel Button 8-9, 11-30, 11-32
Character special devices 7-24
CHARBAT.EXE 6-5
Chg All Button 11-12
Class of Service 3-24, 3-38
CM/2
  Connection Dialog 3-20
  Connections List 3-19
  Local LU Dialog 3-23
  Local Node Characteristics 3-17
  Mode dialog 3-24
  Partner LU Dialog 3-21
  Profile List Sheet 3-15
  Token-Ring Adapter Parameters 3-16
  Transaction Program definition 3-25
CM/2 Session Status 10-5
Coax 1-5
Command Line 23-5, 24-20
Communications Architecture 1-16
Communications Manager/2 3-14
Communications Menu 11-4, 11-8
  Activate Session 11-8
  Deactivate Session 11-8
  Session Status 11-8
Compression 1-3, 11-19, 24-22
CONFIG.NSD 4-5, 4-36, 5-5, 6-5, 6-21
Configuration 23-1 - 23-10
  Advanced 23-2
  APPC 4-40
  Completing 4-41
  Configuration File 23-5
  DCA/Microsoft Select 3-13
  Frequency Table 23-10
  OS/2 3-8
  Parameter Table 23-6
  TCP/IP 4-40
  UPSTREAM 3-42
Configurator 1-7, 3-5, 3-42, 4-4, 4-39, 5-4, 5-8, 6-7, 6-16, 6-34, 12-11, 20-21
  APPC/PC SDLC 6-36
  APPC/PC Token-ring 6-36
  Save 6-39
Contention Winner 23-3
COPYINCR 2-20
CRT_IDP.CMD 3-4
CUA 1-5

## D

DASD
  Size Allocation 24-12
DATABASE.DAT 27-2
Databases
  Integration with FDR/UPSTREAM 27-1
Date Limit 11-11
Days Old 11-11
DB2/2 27-2
DB-2/2 27-1
DB2UEXIT.CMD 27-2
DCA 4-17
DEFINETP.NSD 4-5, 5-5, 6-5, 6-22
Delete Button 8-8
Delete Empty Dirs Checkbox 11-26
Delete Expired Auto-Recall Files 11-20
Delete Spec Button 11-32
Delete Subdirs 11-12
DESTBAT.EXE 6-5
Details Button 11-29
DHCP 20-26
Dialogs 3-42, 4-39, 5-8, 6-34
  Check Boxes 8-6
  List Boxes 8-6
  Push Buttons 6-35
  Radio buttons 8-6
  Radio Buttons 6-35
  Text Entry 6-35
Differential 11-10
Disaster Recovery 17-1 - 17-8
Display Migrated Files 11-29
Distribution 1-4
DOS 1-4, 6-1 - 6-39
  Memory 28-9
Drive Alias 24-29
Duplicate Checking 11-20
Duplicate Files 1-2, 1-14, 8-5, 8-8, 19-1 - 19-6
  Restores 1-3
Duplicate Management 11-9
DXMC0MOD.SYS 6-13
Dynamic LUs 20-26

## E

ECCFG.EXE 6-31
Efficiency 1-3
Eicon Technologies 6-16, 6-31
Environment 23-5, 24-20
Environment Variables 24-32
ERRORLEVEL 24-2
Errors 28-1 - 28-56
Ethernet 1-5, 6-16
Event Log 5-33
Event Viewer 5-33
Exclude File 11-19
Exclude files 1-5, 11-30
Exclude Files from Backup 11-10
Exclude List 11-21

Exclude Subdirs 11-11
EXCLUDE.LST 3-6, 4-6, 5-6, 6-6
Exclusive 12-12
Exit 11-6
Exit UPSTREAM 8-10
Expand 9-3
Extended Attributes 11-25

## F

Fast Compression 11-19
FDR/UPSTREAM 11-1 - 11-32
  Menus 11-4
  When FDR/UPSTREAM Starts 11-2
FDRSOS 1-6, 20-24, 22-1 - 22-4
  Timestamp File 22-2
File Attributes 13-5
File Inquiry Button 11-29
File List 9-2
File Menu 11-4
  About 11-6
  DOS 11-6
  Exit 11-6
  Open 11-4
  Save 11-5
File Migration 11-7
File Overwrites 9-8
File Set 1-9
  Table 24-29
File Specs Button 11-30
File Transfer 1-4, 11-7, 21-1 - 21-4
  Backup Profiles 20-9
  Reporting 21-4
  ULTra 21-4
Files
  Restore 11-31
  Viewing Saved 11-31
Files Available 8-8
First-time full 8-7
Frame Size 10-3, 10-5
Full merge 8-7
Full Screen 3-42, 4-39, 5-8, 6-34
FULL1.BAT 3-6
FULLPWD.BAT 3-6

## G

GLOBAL Backup Profile 2-15
Grooming 1-6, 11-13

## H

Hayes Modems 6-30
HDLC 1-5
Help 3-42, 4-39, 5-8, 6-34
  US.HLP 3-5
  USCFG.HLP 3-5
Hidden Files 11-11
High Compression 11-19
Highlighted Back to FDRSOS Full 9-5, 11-29, 22-3
Highlighted Back to Full 9-4, 11-29
Highlighted Back to Oldest 9-5, 11-29
Host Control
  See: Remote initiated 24-8
Host Jobs 20-24
Host Reporting 11-9
Host Security Login 8-5, 11-9
Host Sort 11-20
Host Storage Management 2-16
Host TCP/IP Address 3-43
Hot-key 1-8
How to Use FDR/UPSTREAM 2-1 - 2-20
HPFS 386 14-4, 14-7

## I

IBM
  APPC/PC 6-17
  SDLC 6-16
  Token-ring 6-16
IBM Communications Server 3-28
  Connection Dialog 3-34
  Connections List 3-32
  Finishing Configuration 3-40
  Local LU Dialog 3-36
  Local Node Characterisitics 3-31
  Mode Definition 3-38
  Partner LU Dialog 3-35
  Profile List Sheet 3-29
  Setup Program 3-28
  Token-Ring Adapter 3-30
  Transaction Program Definition 3-39
IBM Database Manager 27-2
IBM LAN Server 1-3, 14-1 - 14-8
  Disaster Recovery 17-5
IBMAPPCF.EXE 6-32
IBMTCP.BAT 6-6
IBMTCP.EXE 6-6
I-Frame Size 3-17, 3-31
Include Files in Backup 11-10
Including Subdirs 11-12
Incremental 11-10 - 11-11
Incremental Backups 1-5
Incremental merge 8-7
Independent LU 3-23, 3-37

Inquire and Restore Files From 9-4, 11-29
Inquire Backups 9-5, 11-29
Inquire Files 1-7, 11-31
StreetTalk 16-9
Inquire Versions 1-7, 11-29
StreetTalk 16-8
INST2.BAT 6-5
INST3.BAT 6-5
INSTALL.BAT 6-5
INSTALL.CMD 3-4
INSTALL.EXE 4-4, 5-4
Installation 3-2, 3-4, 4-2, 4-4, 5-2, 5-4, 6-2, 6-5
IPX/SPX 11-18
Irma
Invokable TPs 4-25
Local LU Alias 4-21
Mode Name 4-24
Partner LU Alias 4-22
Problems 4-27
IRMA for the Mainframe 4-17
IRMA Workstation for Windows (IWW) 4-17
IWW
Local LU Definition 4-20
Mode Definition 4-23
Partner LU Definition 4-21
Token-Ring Configuration 4-17

## J

Job Execution 24-4
Locally Specifying 24-4
Return Codes 24-6
Jobs 1-6
Host 1-6
PC 1-6
Submit Host 24-4

## K

Kill Restartable Backup 11-7
Kill Restartable Restore 11-7

## L

LAN 1-5
LAN Manager 14-6
LAN Server 14-1 - 14-8
LAN WS Name 11-18, 24-23
LAN WS Password 11-18, 24-24
LANCOPY.EXE 1-3, 1-8, 3-7, 4-7, 5-7 - 6-8
Last 11-11
Latest Date 11-11
LFNBK.EXE 18-23
Link Delay 23-3
Link Name 3-20, 3-34
Listen for Remote Functions 11-8
Local Backup 1-2
Local Backups 11-23
Locally Administered Address 3-10, 3-20, 3-34, 4-10, 5-13
Log File Name 23-2
Logging 1-5
Logout 11-9
Lotus Notes 27-7
LU alias 3-43, 4-40, 5-9
LU Alias 3-21, 3-23, 3-35, 3-37
LU Local Address 3-10, 3-23, 3-37, 4-10, 5-13, 6-12, 7-6
LU Name 3-10, 3-21, 3-23, 3-35, 3-37, 4-10, 5-13, 6-12, 7-6, 24-10

## M

Management 20-1 - 20-34
Management Menu 11-4, 11-9
MAXFILENAMESIZE
Environment tuning parameter 24-19
Maximum RU Size 23-3
Member 20-5
Merge
Deferred 20-10
Merge Backups 1-2, 1-10, 8-1, 8-5
Message File Access Errors 28-8
Message File Name 23-2
Messages
APPC Return Codes 28-11
Automatically continuing after 6-38
Clearing the Log 28-6
Controlling Display 28-7
Display 28-3
FDR/UPSTREAM 29-1
File 28-7
Log 28-5
Modifying 28-8
Number 28-7
Operating System 28-27
Severity 28-7
Suppressing Non-Fatal 11-20
TCP/IP 28-26
Text 28-7
UPSTREAM.MSG 3-4
Messages Time Out 3-44, 4-41, 5-10, 6-38 - 6-39
Methods 2-1
Microsoft
LAN Manager 14-1

Microsoft LAN Manager 1-3
Disaster Recovery 17-5
Microsoft NT Advanced Server
Disaster Recovery 17-5
Microsoft SNA Server 5-16
Microsoft SNA Server v2.x
Connection 5-17
Migrated Files
Display 9-4
Display Expiration Dates 9-4
Display Only 9-4
Migration 1-6, 11-10, 11-13, 13-16, 24-21
Backup Profile Definition 20-9
Minimum RU Size 23-3
Mode name 3-43, 4-40, 5-9
Mode Name 3-10, 3-24, 4-10, 5-13, 6-12, 6-21, 7-6, 24-10
MODE.NSD 4-36, 6-21
More Backup/Restore Parameters 11-18
More button 13-5
More Button 11-32
More Specification Parameters 11-25
More... 9-3
More... Button 8-9, 11-30
MPX4X.EXE 6-9
MS SNA Configuration 5-27
MS SNA Server
Windows Requestors 4-38
Multiple Copies 26-1 - 26-2
MVS
Cluster Free Space 20-12
Kill Tasks 20-13
Reporting 20-15
Tasks 20-12
TCP/IP 20-12
Trace 20-13

## N

NAU Address 3-23, 3-37
NET USE 14-3
NET.ACC 14-4, 14-6
NetBIOS 1-3, 1-8, 11-18, 18-1
Return Codes 28-54
NetSoft 6-16
NetWare 1-3
NetWare Directory Services 1-3, 8-8, 11-31, 13-11 - 24-12
Network Name 3-10, 3-18, 3-21, 3-32, 3-35, 4-10, 5-13
Networking Services/DOS 4-35, 6-13, 6-20, 11-3, 23-3
No File Deletes Radio Button 11-26
Node ID 3-18, 3-32
Non merge 8-7
Novell 1-3, 1-8, 3-4, 4-4, 4-12, 5-4, 6-7, 13-1 - 13-28
Auto-Recall 13-16
Bindery 13-4
Disaster Recovery 17-5
IPX Driver Conflicts 6-13
PC Setup 6-13
Return Codes 28-29
Set Server Time 23-4
SETNOV.EXE 1-8
USNOVELL.EXE 13-7
Novell Auto-Recall Profile 11-20
Novell Migration 11-12
Novell Profile 11-19, 13-7, 24-25
NSACONF6.CFG 6-9
NSAMGR.EXE 6-9
NSAUNLD.EXE 6-9
NUMBACKUPTHREADS
Environment tuning variable 24-18
NWRECALL 13-19
NWTCP.BAT 6-6
NWTCP.EXE 6-6

## O

Ok Button 8-9
Only Highlighted Backup 9-4, 11-29
Only Migrated Files 11-29
Oracle 7-24, 27-8
OS/2 1-4, 3-1 - 3-46
FDR/UPSTREAM Specific Features 1-17
Workstation Recovery 18-16
OS2.INI 14-4, 14-6
OS2SYS.INI 14-4, 14-6
Overview 1-1

## P

Pacing 3-9 - 3-10, 3-25, 3-39, 6-11 - 6-12, 6-21, 7-5 - 7-6
Parameter File 12-12, 24-9, 24-20
First Time You Run 8-3
Parameter Files 1-7, 2-12, 8-1, 8-3
Parameters
Table 24-21
Partner LU alias 3-43, 4-40, 5-9
Partner LU Name 3-10, 4-10, 5-13, 6-12, 7-6
Password 8-5, 25-2
Performance 1-2, 10-1 - 10-9, 23-3
AdaptSNA 6-28
Personalization 1-7, 20-21, 25-3
Physical Unit Name 3-18, 3-32
Presentation Manager 1-4, 12-14
Priority 24-17

Problem Reporting 28-2
Profile Configuration 11-9, 20-4
Profile management 1-4
Profile Management 11-9, 20-2
Profile Prefixes 2-15
PROFMGT.NUL 20-2, 20-4
Program Return Code 3-5, 4-4 - 6-6
Program Return Codes 24-2
Program to Run 12-12
Prompt for Dir Deletions Checkbox 11-26
Prompt for File Deletions Checkbox 11-26
PROTOCOL.INI 6-13

## R

Read and Verify Files 11-2
READ.ME 27-2
READLCLB.EXE 11-24
READNAME.EXE 6-9
Receive Pacing 10-3, 23-3
Record Packing 24-19
Record Size 11-20
Registered Names 20-26
Registration 3-44, 4-41, 8-3, 11-3, 20-26
Remote 11-8
Remote Delay 23-3
Remote initiated 1-2, 1-6, 8-1 - 11-2
    Checking 11-3
    PC Controlled 24-8
    Rejecting 11-8
    Request from another PC 11-8
    Unattended 11-8
Remote Initiated
    Accept from 12-17
    Sample Parameter File 3-4
    Unattended 12-17
Remote Menu 11-4, 11-8, 12-17
    Listen for Remote Functions 11-8
    Registered Names 11-8
    Request Remtoe Function 11-8
    Resend Target Name 11-8
Reporting
    Host 1-5
    Workstation 1-5
Resend Target Name 20-28
Reset Archive Bit 11-10
RESET.EXE 6-6, 6-8, 18-3
REST.BAT 3-6
REST.DAT 3-6
Restart 1-5, 23-7, 24-27
    Unattended 24-21
Restart Backup 11-19
Restart Restore 11-19
Restarted Backups 11-3
    Avoiding 23-4
Restarted Restores 11-3
Restore 9-1 - 9-10
    Destination 11-31
    Finalize 9-8
    List and Restore 9-1
    List Backups 9-4
    Restart Failed 11-7
    Specification 11-31
    Specifying File Specs 11-30
    StreetTalk 16-8
    Subdirectories 11-30
Restore All Migrated Files 9-8
Restore and Inquiry (old) 11-28
Restore Migrated Files 11-17, 11-26
Restore Restart 11-19
Restore To 9-2
RETCODE.EXE 3-5, 4-4 - 6-6, 24-3
Retention Period 11-12
Return Codes
    See Messages 28-11
RMTPARM.DAT 3-4, 4-4, 5-4, 6-6, 11-3
RU Size 3-9, 3-25, 3-39, 6-11, 6-21, 7-5, 10-3, 10-5, 23-3
RUMBA 4-28
    Configurator 4-28
    Local LU 4-31
    Local LU Alias 4-32
    Mode 4-30
    Partner LU Alias 4-31
    Problems 4-34
    Remote LUs 4-31
    Running With 4-34
    Token Ring Connection 4-28
    Transaction Program 4-32
Run in Separate Memory Space 5-3
Running FDR/UPSTREAM PC 8-2

## S

SAA 1-2
SAP 6-24
Save or Begin Button 11-29, 11-32
Schedules 1-7, 12-11
    Daily 12-13
    Monthly 12-13
    Multiple 12-12
    Quarter 12-13
    Quarterly 12-13
    Specifying 12-11
    Time 12-12
    Weekday 12-13
    Weekly 12-13

Yearly 12-13
Scheduling 2-9
Host Scheduled 2-10
PC Scheduled 2-10
Remote PC Scheduled 2-11
SDLC 1-5, 6-16
Search Spec 9-2
Security 6-15, 7-8, 25-1 - 25-4
ACF-2 1-3
Level 1 25-1
Level 2 25-1
RACF 1-3
TOPSECRET 1-3
Security Menu 8-5, 11-4, 11-9
Select 9-3
Selected for Restore 11-32
Sequential Disk
Size Allocation 24-12
SERIAL.DAT 3-4, 4-4, 5-4, 6-7, 20-21
Session 8-11, 11-2, 11-8, 23-3
Session Limit 3-24, 3-38
Set Environment 24-32
Set PC Time 23-4, 23-8
SETNOV.EXE 3-4, 4-4, 5-4, 6-7, 13-7
SETNOV.RES 6-7
Show 8-8
SIDEINFO.NSD 4-5, 4-36, 5-5, 6-5, 6-21
SIDF 13-11
Skip Button 8-5
Skip Old Files 11-30
SMS 13-11
SNA 1-16
SNA Server
Advanced Issues 5-33
SNA.BAT 6-7
SNA.EXE 6-32
SNACFG.EXE 5-33
Spec Detail 8-9
Specify Button 11-32
Speed
See: Performance 10-1
SPX 1-3, 1-8
SQLUEXIT.CMD 27-2
Status
FDR/UPSTREAM MVS 20-11
Status of all FDR/UPSTREAM 11-9
Status Screen
Delaying updates 23-2
STLITE Environment Variable 16-4
Storage Type 8-7, 24-27
Archived 8-7
Keyed/Duplicates 8-8
Sequential Disk 8-7
Sequential Tape 8-7
StreetTalk 1-3
StreetTalk name
Check box 16-5


## T


Tape 1-5, 1-7
Target Name 24-9
TCP/IP 1-2, 23-6
Advanced Options 23-8
Configuration 3-8
FDR/UPSTREAM Architecture 1-16
FDR/UPSTREAM Configuration 3-43
IP Address 3-43
IP Port 3-44
Remote PC Access 24-8
Technical Support 28-2
Temporary Files 23-2
Test Connection 23-3
Time 12-13
Time, Setting 1-6
Token-ring 1-5, 3-10 - 3-11, 3-20, 3-34, 4-10, 5-13, 6-16, 6-18, 6-23, 10-7
DXMC0MOD.SYS 6-13
I-Frame Size 6-13
LAN Support Program 6-13
Locally Administered Address (LAA) 6-12
RU Size 6-13
SAP 6-13
TPSTART.EXE 5-32
Trace
FDR/UPSTREAM 11-7
TRACE.EXE 6-6, 28-25
TRACE.LOG 6-9
Transaction Program Name 3-25, 3-39, 23-3, 23-6
Translation Tables
User-defined 24-11
TSR (Terminate-and-stay-resident) 1-7
Tuning 24-17
Twinax 6-16


## U


ULTra 1-3, 1-8, 11-18
Auto-Update 11-19
DOS Workstations 18-2
Listing Active Workstations 18-11
OS/2 Workstations 18-4
Profiles 1-8
Registration 11-19
Using ULTra Profiles 18-11

Windows Workstations 18-6
Workstation Compression 18-25
ULTra Profiles 2-7
Configuring in SETNOV 18-9
ULTRA.EXE 1-8, 3-7, 4-7, 5-7
ULTRADR.EXE 3-7
Unattended 1-2, 1-7, 11-3, 11-20
Problems 12-15
Remote Initiated 12-17
Restart only 24-21
Status 12-15
UNC Names 14-2
UNIX 7-1 - 7-26
Update Button 8-8, 11-31
UPSTREAM
Advanced Options 24-1
Setting Parameters 24-20
UPSTREAM.CFG 3-44
UPSTREAM/ULTra 3-7, 4-7, 5-7, 6-9, 18-1 - 18-26
US.EXE 1-7, 3-4, 4-4, 5-4, 6-6, 8-2, 11-1, 24-1
US.RES 6-6
US.RET 24-2
US.SER 4-5, 5-5, 6-7, 20-21
USATOE.DAT 3-6, 4-6, 5-6, 6-8
USATOE.TAB 24-11
USCFG.EXE 1-7, 3-42, 6-34, 12-11, 20-21, 23-1
USCFG.RES 6-7
USCNTL.EXE 3-5
USDELETETIME 11-26
User ID 8-5, 25-2
USETOA.DAT 3-6, 4-6, 5-6, 6-6, 6-8
USETOA.TAB 24-11
USFONT.FON 3-5
USIPX.EXE 6-8, 18-2
USLOAD.BAT 6-7
USLOAD.CMD 3-2, 3-5
USLOGCLR.EXE 3-5, 4-5, 5-5, 6-7, 28-6
USLOGCLR.NLM 3-6, 4-6, 5-6, 6-8
USMEM.EXE 6-6, 10-9, 28-9
USMODIFY.EXE 3-5, 4-5, 5-5, 6-7
USNDS.NLM 3-7, 4-6, 5-6, 6-8
USNETB.EXE 6-9, 18-2
USNOTIFY 13-19
USOVL.EXE 28-9
USRECALL 13-19
USSETUP.NLM 3-7, 4-6, 5-6, 6-8
USSNACFG.ERR 5-33
USSNACFG.LOG 5-33
USSNACFG.SRC 5-33
USSNACFG.UPD 5-33
USSTART.EXE 1-7, 3-5, 4-5, 5-5, 6-7, 12-14, 23-2
Configuring abort 12-14
Problems 12-15
Status 12-15
USSTART.LOG 12-15
USTBATCH 2-11
USTCPIP.EXE 3-5
USTDUPFL
Backup Profile 19-4
USTPCFG.EXE 4-5, 5-5, 5-30
USTPSERV.EXE 4-5, 5-5, 5-49
USWIN32.DLL4-5, 5-5, 5-49


## V


EXCLUDE.LST 8-5
Validate Button 8-5
Vaulting 17-2, 20-10
Groups 20-10
Version Date 1-9
Version Details 9-5
View a File 20-16
View File 11-5
Vines 1-3, 16-1
VTAM 1-2, 1-16, 3-8, 4-8, 5-11, 6-10, 7-4


## W


Window Counts3-17, 3-31, 10-6
Windows 1-4, 1-7, 4-1 - 4-42, 6-34
Windows 95
Disaster Recovery 17-6
Windows 95 Recovery
Creating a Recovery Diskettte 18-22
Perform a Recovery Backup 18-23
Recovering Windows 95 18-24
Restoring Long File Names 18-24
Windows NT 1-4, 5-1 - 5-54
Backing up another PC 5-49
Domain Controller 15-9
Hives 5-48
Registry 5-48
Registry Editor 5-48
Security 5-45
Service 5-49
Service Backup of Network Drives 5-52
Service Packs 15-7
Windows NT Advanced Server 1-3
Windows NT Server 15-1 - 15-10
Backing up 15-4
Disaster Recovery 15-7
Planning 15-2
Restoring 15-6
Windows Session Status 10-5
Windows/NT

Privileges 5-45
WINSOCK 1-4, 1-18 - 1-19
Work Path 23-2
Workspace Size 6-17 - 6-19
WORKSPC.EXE 6-6, 6-17

## X

X.25 1-5
XID 3-18, 3-32, 6-12, 6-25, 7-6
IDBLK 6-12
IDNUM 6-12

## READER'S COMMENT FORM

## FDR/UPSTREAM-PC USERS MANUAL V2.5

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