ASG-PreAlert® MVS
User's Guide

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Preface

This *ASG-PreAlert MVS User's Guide* describes the functions and operations of ASG-PreAlert MVS (herein called PreAlert MVS) as a monitor and control system in the MVS environment. PreAlert MVS is a realtime MVS control system that targets and corrects problems across single or multiple address spaces, thus enhancing management and control of your MVS processing environment.

PreAlert MVS concurrently monitors all of your address spaces (jobs), readying your data center to meet service-level objectives at any time.

Allen Systems Group, Inc. (ASG) provides professional support to resolve any questions or concerns regarding the installation or use of any ASG product. Telephone technical support is available around the world, 24 hours a day, 7 days a week.

ASG welcomes your comments, as a preferred or prospective customer, on this publication or on any ASG product.

About This Publication

This publication consists of these chapters:

- Chapter 1, "Introduction," acquaints you with the PreAlert MVS features, including screen layouts, control and line commands, help and tutorial, and miscellaneous features.
- Chapter 2, "Menu Reference," explains the use and content of the Master Menu facility within PreAlert MVS.
- Chapter 3, "Address Space Analysis," discusses the functions and uses of PreAlert MVS for MVS address space analysis.
- Chapter 4, "Device Analysis," explains the usage of disk device information for statistical, control, and monitoring purposes.
- Chapter 5, "Dataset Information," explains how PreAlert MVS provides the functions to investigate the control and allocation of datasets.

- Chapter 6, "System Analysis," discusses how PreAlert MVS displays critical MVS system statistical information regarding the utilization of system resources.
- Chapter 7, "MVS System Services," discusses various line commands providing MVS system services.
- Chapter 8, "Address Space Wait Analysis," discusses the functions and uses of MVS Address Space Wait Analysis.
- Chapter 9, "MVS Exception Analysis," explains how to activate and use Exception Analysis.

Related Publications

The complete documentation library for ASG-PreAlert MVS consists of these publications (where *nn* represents the product version number):

- *ASG-PreAlert MVS IDMS/MVS System Guide* (PAC1400-*nn*) provides information regarding PreAlert MVS realtime operating system.
- *ASG-PreAlert MVS IDMS User's Guide* (PAI0200-*nn*) provides complete instructions on how to use PreAlert MVS for performing realtime IDMS system monitoring.
- *ASG-PreAlert MVS MVS User's Guide* (PAM0200-*nn*) describes the functions and operations of PreAlert MVS as a monitor and control system in the MVS environment.
- *ASG-PreAlert MVS MSP System Guide* (PAF1400-*nn*-MSP) describes the codes and abends useful to operating ASG-PreAlert MVS MSP.
- *ASG-PreAlert MVS MSP User's Guide* (PAF0200-*nn*-MSP) provides complete instructions on how to use ASG-PreAlert MVS MSP for performing realtime MSP system monitoring.

Note:

To obtain a specific version of a publication, contact the ASG Service Desk.

Publication Conventions

ASG uses these conventions in technical publications:

Convention	Represents
ALL CAPITALS	Directory, path, file, dataset, member, database, program, command, and parameter names.
Initial Capitals on Each Word	Window, field, field group, check box, button, panel (or screen), option names, and names of keys. A plus sign (+) is inserted for key combinations (e.g., Alt+Tab).
`lowercase italic monospace`	Information that you provide according to your particular situation. For example, you would replace *`filename`* with the actual name of the file.
`Monospace`	Characters you must type exactly as they are shown. Code, JCL, file listings, or command/statement syntax. Also used for denoting brief examples in a paragraph.
Vertical Separator Bar (|) with underline	Options available with the default value underlined (e.g., Y|N).

1 Introduction

This chapter acquaints you with the main features and functions of PreAlert MVS and explains its screen displays. This chapter includes these sections:

Functions 2

PreAlert MVS Interface 3
Screen Definitions 6
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Background Session 7

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Functions

PreAlert MVS has three interdependent functions:

Monitoring. PreAlert MVS executes in its own address space and traces an extensive number of MVS-related events.

Alerting. PreAlert MVS Exception Analysis for MVS compares actual data to problem thresholds, targets the problem incident, and issues an audible alarm. PreAlert MVS also sends a message to your TSO session and/or the operator console and writes the incident to a log file.

Controlling. PreAlert MVS lets you execute any MVS or VTAM command to correct or forestall a diagnosed problem condition.

PreAlert MVS Interface

The MVS operating system allows several tasks to execute at the same time. Some of these tasks are batch jobs, others are TSO users, and a few are started tasks (e.g., JES2, VTAM, CICS, IDMS, etc.). Each of these tasks is referred to as an *address space*. The term address space is derived from the ability of each task to reference the full range of storage locations allowed by the hardware architecture: 16 megabytes for 370 architecture, 2 gigabytes for XA and ESA.

Each address space executing within a system is competing with all the other address spaces for a limited amount of resources. These include such physical resources as the CPU, real storage (memory), channels, disk drives, tape drives, etc., or may represent logical resources such as datasets, programs, or system services.

PreAlert MVS monitors MVS system activity from two perspectives: the resources used by each address space and the overall usage of a resource. Additionally, PreAlert MVS allows you to select the specific information you want to monitor. This allows you to concentrate your analysis on only those items of interest to you. Thus, in a typical system, you could monitor the overall CPU utilization, CPU usage, real storage usage, input and output rates and paging rates for batch jobs and active TSO users, tape drives and their current user, and the current response time for the TSO performance groups.

All of this information displayed easily on a single screen by using these line commands:

Command	Description
SYSP	Plots overall system CPU utilization.
JSEL SEL=JT	Specifies selection parms (batch jobs and active TSO).
JOBN	Selects address spaces and display their jobnames.
CPUR	Displays CPU usage rate for selected address spaces.
FMCT	Displays working storage set size (real storage usage) for selected address spaces.
IOCR	Displays input and output rate for selected address spaces.
PINR	Displays page-in rate for selected address spaces.
TAPE	Selects and displays online tape drives.
TUSR	Display current users for selected tape drives.
PGPT 2	Displays performance group data for the TSO PGN (2).

Figure 1 was created from these line commands:

Figure 1 • PreAlert MVS screen

```
COMMAND: ________    SAMPLES    16:27:00.9  93.060  62.15% .TUT for Tutorial
SYSP CPU   1   62.07% ********************************... .... .... ....
+    CPU   2   62.24% ********************************... .... .... ....
+    SYSTEM    62.15% ********************************... .... .... ....
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 SLKXPARR LXOGSYDI LWRGEAIX EXGXSTR3 PAJGSYAG LXOGSYDD PPAY595R
CPUR     .00%     .00%     .00%    5.48%     .12%     .13%     .15%     .10%
FMCT     524K     372K     196K    1704K     140K     296K     488K     312K
IOCR       .0       .0       .0     32.5       .0      4.4       .0      4.4
PINR                                 3.0       .0       .0       .0       .5
TAPE      480      481      482      483      F90      F91      F92      F93
TUSR IDMSJNL1                                      IDMSJNL1
PGPT  2,1           RESP DMN OBJ  TRAN  SWAP   CPU   I/O   MSO   SRB  TOTL
+    PGN   2/  1      .2   3   1 169.0 170.0 4.90K 687.0 29.0K 859.0 35.5K
+    PGN   2/  2      .9   3   1 14.00 14.00 1.11K 582.0 5.99K 139.0 7.83K
+    PGN   2/  3     5.4   4   4 10.00 11.00 8.18K 5.02K 79.7K 775.0 93.7K
+    PGN   2/  4      .0   5   5  .000  .000  .000  .000  .000  .000  .000
+    PGN   2/ALL      .5 ALL ALL 193.0 195.0 14.2K 6.29K 114.K 1.77K 137.K
```

The first line of all PreAlert MVS screens shows the name of the screen currently being displayed, the current time, Julian date, and system CPU utilization. The date/time stamp and CPU utilization are always current and are not affected by the Freeze Frame option.

On the COMMAND line, enter the name of the screen you want to display, or enter the command SCREENS to display all defined screens and then select a screen name. Use subsequent lines to construct the display by entering line commands. These line commands control, select, and display the data.

Enter a four-character line command in the first four columns. The remaining 76 columns on each line are used either to display the requested information or to allow entry of additional input.

Figure 2 shows how line commands are used to construct a PreAlert MVS display:

Figure 2 • PreAlert MVS display

```
1.   COMMAND: ________   SAMPLES    16:27:00.9  93.060  62.15% .TUT for Tutorial
2.   SYSP CPU    1   62.07% ********************************... .... .... ....
3.   +    CPU    2   62.24% ********************************... .... .... ....
4.   +    SYSTEM     62.15% ********************************... .... .... ....
5.   JSEL SEL=JT,TRN=Y
6.   JOBN DSSGSYD1 SLKXPARR LXOGSYDI LWRGEAIX EXGXSTR3
7.   JSTA  WAT*RES  WAT*RES  WAT*RES  I/O*RES  CPU*RES
8.   CPUR     .00%     .00%     .00%    5.48%     .12%
9.   FMCT     524K     372K     196K    1704K     140K
10.  IOCR       .0       .0       .0     32.5       .0
11.  PINR                                 3.0       .0
12.  TAPE      480      481      482      483      F90     F91     F92     F93+
13.  TUSR IDMSJNL1                                      IDMSJNL1
```

In lines 2 through 4, the SYSP line command was used to plot the percentage utilization of each CPU and the average for the system (e.g., 62.15%). Whenever a line command requires two or more display lines, the first column of each additional line contains a plus sign (+) to indicate that the line is a continuation of the previous line command (e.g., lines 3 and 4 are a continuation of line 2).

Lines 5 though 11 demonstrate the relationships among the three classes of line commands. Line 5 contains the JSEL control line command to allow entry of parameters for selecting address spaces for display. Line 6 contains the JOBN selection line command, which selects the address spaces to be displayed and shows their jobnames. Lines 7 through 11 contain line commands to display specific information for the selected address spaces.

The TAPE line command on line 12 selects all online tape drives and displays their device addresses. Line 13 contains the TUSR line command to display the current user of the tape drive (e.g., IDMSJNL1 for tape drive 480 and F91). The overflow indicator (+) at the end of the display shows that additional elements are selected.

Screen Definitions

Screen definitions are maintained in either the PreAlert MVS HELPFILE PDS or in your personal screens file PDS. Each definition consists of 1 to 64 eighty-byte records containing the actual line command and any input to the line command. The line command must begin in the first column of the record, and the input in column 6.

If specified, all 64 line commands are processed even when the display overflows the screen display limit. Additional scrolling is provided to view additional display lines through the .SCROLL, .UP, and .DOWN control commands.

Note:

The actual number of lines displayed depends upon the screen size of the terminal and the number of continuation lines generated by the line commands. Use PF keys and control commands to scroll through the display.

Predefined Screens

Enter SCREENS in the COMMAND input area to display the names of all defined screens, as shown in Figure 3 on page 7. Any of these screens may display by entering the screen name in the COMMAND input area or by moving the cursor to the desired screen name and pressing Enter.

The predefined screen names display starting with the screen names from your personal screens file, if allocated, followed by a <<====>> separator. Next, the screen names from the installation alternate helpfile, if allocated, display followed by another <<====>> separator. Finally, the screens in the PreAlert system helpfile display.

Figure 3 • Predefined screens

```
COMMAND:________  SCREENS    16:27:00.9  93.060  41.72%
SCRN  TREYA    TREYB    TREYC    TREYP   TREYT    TREYW    <<====>> ACTVPGMS
+     ACTVTASK ALLJOB   ATPR     ATRU    ATTK     ATTR     ATTW     BLANK
+     CONSOLE  CSA      DBAREAS  DISK    DISKBUSY DISK1    DT       DTRACE
+     DUMP     FIELDS   FIXED    FRAMES  IDMSACTV IDMSSTAT IDMSSTA1 IDMSSTAT2
+     JOBCPU   JOBENQ   JSPLOT   NEWJOB  PAGEABLE PAGESWAP PAGING   PFKEYSCN
+     PLOTS    PLOTSP   PRDWAIT1 PRODDB  PRODDUMP PRODPOOL PRODSTG  PRODWAIT
+     PRR      SCREENS  SRM      SRMTSO  SRM2     TAPE     TESTTASK TSO
+     TSOWAIT  TSOWAIT1 WAIT     WAIT1
```

Background Session

PreAlert MVS is capable of operating in a background mode. This is accomplished by activating a PreAlert MVS session and pressing the Clear key, or using the .BG*nnn* control command. This releases your terminal back to TSO or VTAM. The PreAlert MVS session continues to execute in the PreAlert MVS address space exactly as if the terminal were still being used. The MIS terminal is now free to be used for other functions (e.g., TSO or ISPF).

After activating the MVS Exception Analysis functions, PreAlert MVS notifies the user of any impending problems with the operating environment by means of the TSO User Message Option. For proper syntax, refer to "MVS Exception Analysis Message Options" on page 362.

To re-establish your PreAlert MVS session, execute the CLIST for TSO or follow the VTAM logon procedure for VTAM started tasks. Refer to "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS System Guide* for expanded information on PreAlert MVS background sessions.

Note:

Background sessions are available only through the PreAlert MVS Multiple User Session Manager. Background sessions are not available through the PreAlert/Local TSO Option. Refer to "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS System Guide* for a discussion of the different PreAlert sessions.

Functional Facilities

The commands used to control the PreAlert MVS functional facilities can be entered in two ways:

- As control commands, entered through the COMMAND input area on the top line of the screen. Control commands allow for quick entry of commands, but may not be saved along with the screen.
- As line commands, entered on the body of the display screen. Line commands may be saved along with the screen definition.

The functional facilities are described in the following subsections.

Building and Saving Screens

Save screen definitions by entering the .= control command. Enter a single character with the control command to be used as a suffix to your TSO user ID to form the screen name. For example, entering .=C results in the screen definition being saved as user ID C. Retrieve the screen by entering either the full name (user ID C) or the suffix (C) and pressing Enter.

Build screen definitions by entering the Build Screen mode. Build Screen mode displays the line commands and line command input; all line command processing is bypassed. PF keys or Edit line commands may be used to insert, change, and delete line commands while in Build Screen mode. Build Screen mode is entered by the .BLDS control command and exited by the .BLDSOFF control command.

The MEMREP keyword in the UDPARMS macro (See "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS System Guide*) prevents a user from accidently overlaying an existing screen. If MEMREP=Y has been specified, the replace option .=x,R must be added to the save command in order to replace a screen.

For example, entering .=C,R replaces the user ID C screen. Entering .=C would *not* replace the user ID C screen and PreAlert MVS will display an error message.

Screen Editing Commands

Screen editing commands have been provided and are similar to those utilized by ISPF. All edit line commands must be followed by a space or they are not recognized by PreAlert MVS. These edit line commands are used:

Line Command	Function
I*n*	Insert *n* lines (default = 1)
IB*n*	Insert before *n* lines
M*n*	Move *n* lines
C*n*	Copy *n* lines
A*n*	After target for move/copy (repeated *n* times)
D*n*	Delete *n* lines
R*n*	Repeat this line *n* times
DD	Block delete
CC	Block copy
MM	Block move
RR*n*	Block repeat *n* times

Screen Print Facility

The Screen Print Facility controls the ability to automatically print the contents of the current screen with each update.

Command	Description
.PRT	The .PRT control/line command specifies the number of times the screen is to print and the SYSOUT class, for example, .PRT 5,X This command results in the contents of the screen being printed to SYSOUT class X for the next five updates.
.SPN	The .SPN line command or control command closes and deallocates the current print file. This allows immediate printing of the file without terminating the PreAlert MVS session.
.HOLD	The .HOLD control command allows you to specify HOLD=YES for the print file. Use .HOLDOFF to remove the HOLD=YES attribute.
.DST	The .DST line command allows a remote SYSOUT destination to be specified, for example, .DST R0 This command specifies that the SYSOUT file is to be routed to the main system printer.

Note:

The current SYSOUT class, HOLD attribute, and DEST output destination remains in effect until the print file has been spunoff. After that, they may be changed.

Screen Print Line Command

The PRNT line command specifies the SYSOUT class, HOLD attribute, destination, and print count and closes (spinoff) the print file. These keywords are used:

Keyword	Function
CLS=*x*	Specifies SYSOUT class
SPN=Y	Closes (spin-off) the file
HLD=Y/N	Specifies HOLD attribute
DST=*destination*	Specifies SYSOUT destination
CNT=*n*	Specifies print count
DDN=*ddname*	Specifies DDname for the file. If the DDname is already in use, dynamic allocation generates a unique DDname.

Figure 4 shows an example of the PRNT line command:

Figure 4 • PRNT line command

```
PRNT CLS=X,HLD=Y,DST=RMT24,CNT=5,DDN=PRINTDD
+   OPEN   CLASS:X  HOLD:Y  DEST:RMT24   COUNT:5   DDNAME:PRINTDD
```

In Figure 4, the PRINTDD file was allocated to SYSOUT CLASS:X with HOLD=Yes and DEST=RMT24. The screen content automatically prints through the next five updates (COUNT:5) of PreAlert MVS.

Note:

The PRNT line command must appear on each screen to be printed.

Automatic Screen Options

The automatic screen options provide the ability to process a series of one or more screens either sequentially or as a called subroutine. Sequential processing implies linking screens together to pass control from one screen to another in a fashion similar to the flow of a GOTO or branch instruction. Processing screens as a subroutine involves calling the screens, then returning control to the original screen.

Screens may be linked together in a series using the .ASL line command, which specifies the number of times the current screen is to be displayed and the screen to be displayed afterwards.

Command	Description
.ASL 5,NEXTONE	After the current screen has been displayed 5 times, the NEXTONE screen is displayed.
.ASL *	Cancels the automatic screen option. The .CAGO control command also cancels the automatic screen option.

The ability to call a screen or a series of screens is provided by the ASC line command. When a call is requested, PreAlert MVS remembers the contents of the current screen and then displays the called screen. The .RET line command should be used to return to the original screen.

Command	Display
.ASC 5,CALLED	After the current screen has been displayed 5 times, the CALLED screen is displayed.
.ASC *	Cancels automatic screen calling. The .CAGO control command also cancels automatic screen calling.

The .< screen control command also provides screen calling. This allows the user to call a screen to display some specific data, and then return to the original screen.

Note:

Screen calling may also be invoked through Timed Screen Services (see "Timed Screen Services" on page 14) and through the Screen Chaining option (see "Screen Chaining Option" on page 358).

While a called screen is active, one of these messages displays on the command line to indicate the source of the called screen:

Message	Source
`CMD SCREEN ACTIVE`	.< Screen Command
`ASC SCREEN ACTIVE`	Automatic Screen Calling
`TSC SCREEN ACTIVE`	Timed Screen Calling
`EXA SCREEN ACTIVE`	MVS Exception Analysis

PreAlert MVS supports only one level of screen calling; that is, PreAlert MVS does not allow screen calling requests while a called screen displays. The MVS Screen Chaining option is suppressed while a called screen is active. Requests from Automatic Screen Calling and Timed Screen Calling are delayed until the called screen returns to the calling screen.

If multiple requests occur simultaneously from either MVS or IDMS Exception Analysis, then each request is serviced in order of priority. Other requests for screen calling from Automatic and Timed Screen Calling are delayed while the called screen is active.

Automatic Update

When PreAlert MVS is placed in Automatic Update mode, PreAlert MVS automatically updates the display without any user interaction. Additionally, the updates may be synchronized to occur on the minute.

Command	Description
.INT*nnn* [,X]	The display updates every *nnn* seconds.
.INT *nnn*,X	The display updates every *nnn* seconds and is synchronized to occur on the minute. Valid values for *nnn* are 1, 2, 3, 4, 5, 10, 13, 15, 20, 30, and 60. Other values will suppress the synchronize option.
Example:	
.INT 30,X	PreAlert is placed in automatic update mode. All subsequent updates occur either on the minute or 30 seconds after the minute.

Note:

If any input is entered while in Automatic Update mode, the PreAlert MVS session returns to Manual mode.

The PreAlert MVS automatic update feature is supported under ISPF. When automatic update is active, the terminal keyboard is locked, preventing any other activities on the terminal. To stop the automatic update, press either the PA1 key for local terminals or the ATTN key for remote terminals. PreAlert MVS will wait for the automatic update interval to complete, and then will refresh the display and unlock the keyboard.

Caution! Users working on 3270 emulators must determine the correct key to stop PreAlert's Automatic Update feature. End the PreAlert session if you do not know the correct key to stop PreAlert's Automatic Update feature. The MVS modify command (F PREALERT, STOP, *userid*) may be used to terminate PreAlert sessions.

The automatic update may be secured. Refer to "Security Considerations" in the *ASG-PreAlert IDMS/MVS System Guide*.

Timed Screen Services

The PreAlert MVS Timed Screen Services provide the ability to automatically link or call another screen at a specified time. Timed screen linking passes control to a screen at a specific time. Timed Screen Services call a screen at a specific time. Refer to "Automatic Screen Options" on page 11 to distinguish between linking and calling a screen.

Both timed screen linking and calling provide a primary and three alternate time and screen sets. Each time and screen set is maintained independently of the other.

The primary and alternate designations are used only when multiple requests occur simultaneously. The primary set would then be processed initially, followed by the first, second, and third alternates.

Timed Screen Services are provided by these control/line commands:

Command	Function
.TSL *time,screen*	Primary timed screen linking
.TL1 *time,screen*	First alternate timed screen linking
.TL2 *time,screen*	Second alternate timed screen linking
.TL3 *time,screen*	Third alternate timed screen linking
.TSC *time,screen*	Primary timed screen calling
.TC1 *time,screen*	First alternate timed screen calling
.TC2 *time,screen*	Second alternate timed screen calling
.TC3 *time,screen*	Third alternate timed screen calling

The *time* parameter may be specified as follows:

Parameter	Description
hhmm	Time of day, 0000 through 2359
+*nnn*	Current time of day plus *nnn* minutes
*	Cancel timed screen service

The line command is only needed to request the timed screen service. After the service has been established, the line command is no longer needed. PreAlert MVS remembers the request until the time is reached or the request is canceled.

For example, a series of screens are to be called at 10:00 P.M. and 1:00 A.M. The first screen displays for 2 minutes, the second screen displays for another 2 minutes, and the third screen displays only once to return control to the original screen.

These are the screens built:

Screen/command	Function
Screen INIT:	
.TSC 2200,SCREEN1	Call SCREEN1 at 10:00 PM.
.TC1 0100,SCREEN1	Call SCREEN1 at 1:00 AM.
.RET 1	Return to calling screen.
Screen SCREEN1:	
.TSL +2,SCREEN2	After 2 minutes, link SCREEN2.
.PRT 10,X	Print the screen to Class X.
.INT 10	Auto Update at 10 seconds.
--	MVS or IDMS line commands.
Screen SCREEN2:	
.TSL +2,SCREEN3	After 2 minutes, link SCREEN3.
.PRT 10,X	Print the screen to Class X.
--	MVS or IDMS line commands.
Screen SCREEN3:	
.RET 1	Return to calling screen.

Sometime during the day, the user enters the .<INIT control command to initialize the timed screen services. These screens are activated at these times:

Time	Activated Screen
10:00:00 P.M.	SCREEN1 is called and updated every 10 seconds for 2 minutes.
10:02:00 P.M.	Link to SCREEN2, which is updated every 10 seconds for another 2 minutes.
10:04:00 P.M.	Link to SCREEN3, which returns control to the screen that was active at 10:00 P.M.
10:04:10 P.M.	Continue with the original screen.
01:00:00 A.M.	SCREEN1 is called and the entire scenario is repeated.

Screen Fields Help

Enter `.HELP` and press Enter to display a short description of each line command field on the screen (Figure 5). Press Enter to redisplay the original screen.

Figure 5 • Help for Field screens

```
JSEL JOB SELECTION COMMAND
JOBN JOB NAME
PROC PROCEDURE NAME
STEP STEP NAME
JSTA JOB STATUS
DPRT DISPATCHING PRIORITY  HEX (DEC)
TMTR TIME IN TRANSACTION
==== LINE SEPARATOR
JOBN JOB NAME
PROC PROCEDURE NAME
STEP STEP NAME
JSTA JOB STATUS
DPRT DISPATCHING PRIORITY  HEX (DEC)
TMTR TIME IN TRANSACTION
==== LINE SEPARATOR
JOBN JOB NAME
PROC PROCEDURE NAME
STEO STEP NAME
JSTA JOB STATUS
     LINE COMMAND INPUT AREA
     LINE COMMAND INPUT AREA
     LINE COMMAND INPUT AREA
     LINE COMMAND INPUT AREA
```

Enter Tutorial Facility

The online interactive tutorials can be viewed in two ways. To start at the beginning of the tutorials, position the cursor at the home or header command area, type `.TUT1`, and press Enter.

Type in the number that corresponds to your area of interest from the menu, and press Enter. The tutorial display resembles Figure 6.

Figure 6 • Tutorial screen

```
COMMAND:            MAINMENU   16:07:34.6  93.060  90.31%  Tutorial    1 +
.
.    SUBJECT                            TUTORIAL SCREEN
.
.    Screen Definitions   . . . . . . . . . . . .    2
.    PreAlert Functional Facilities . . . . . .   50
.    PF Key Support   . . . . . . . . . . . . . .  100
.    Restricted Functions . . . . . . . . . . . . 1000
.
.    PreAlert.MVS . . . . . . . . . . . . . . . .  150
.
.    PreAlert.IDMS  . . . . . . . . . . . . . . . 2000
.
.
.    Enter Tutorial Screen number to display tutorials.
.    Enter .END to exit tutorials.
.
.    The current tutorial screen number is displayed in the upper right
.    corner of the display. When the tutorial screen number is followed
.    by a plus sign "+", press enter to display the next tutorial screen.
.
```

The second way to view the online tutorials is to type `.TUT` in the Command area, position the cursor on the desired line command, and press Enter. The major section for that line command displays.

Scroll

To scroll forward or backward to a specific line, type `.SCROLL`*nnn* (where *nnn* is the line number to display) and press Enter. When the .SCROLL*nnn* control command is used, no refresh of the PreAlert MVS screen display occurs. You may specify + *nnn* to scroll forward and - *nnn* to scroll backward through the display. You may also scroll to the cursor location by entering `.SCROLL`, positioning the cursor on the desired line, and pressing Enter.

Use the .UP and .DOWN control commands to scroll up or down through the display screen. By default the commands scroll the entire screen. You may scroll up or down to the cursor location by entering either .UP or .DOWN, positioning the cursor on the desired line, and pressing Enter. For .UP, the desired line is placed at the bottom of the screen. For .DOWN, the desired line is placed at the top of the screen. To scroll any number of lines, specify these commands:

Command	Function
.SCROLL 6	Scroll to display line number 6
.UP	Scroll up
.UP10	Scroll up 10 lines
.DOWN	Scroll down
.DOWN19	Scroll down 19 lines

Shift Left

To shift the display to the left, enter `.LEFT`*nn* (where *nn* is the number of display fields to shift) and press Enter. The leading display elements shift to the left and the screen is updated. For example, `.LEFT 3` shifts the display elements three columns to the left.

When one or more elements shift left, the line separator line command, = = = =, displays the shift count indicating the number of elements shifted to the left.

Shift Right

To shift the display to the right, enter `.RIGHT`*nn* (where *nn* is the number of display elements to shift) and press Enter. The leading display elements are removed from the display and the screen is updated. For example, `.RIGHT 3` shifts the display elements three columns to the right.

Copy Screen

To copy a screen into the current screen, enter `./screen` (where `screen` is the name of the screen to be copied) in the COMMAND input area, enter `A` on the line command where the copied screen is to follow, and press Enter. The screen is copied into the current screen at the indicated position and the screen is updated, as shown in Figure 7.

Figure 7 • Copy screen

```
COMMAND: ./TAPE  SCREENS    16:27:00.9  93.060  41.72%
JSEL SEL=JT,REP=N
JOBN PRODIDMS TESTIDMS TREY     MKW050D  TKCS     OPD100D  TESTLOC  MFGTEST  +
PROC PRODIDMS TESTIDMS $TSUSER1 MKW050D  $TSUSER  OPD100D  TESTLOC  MFGTEST
STEP IDMS     IDMS              STEP1             STEP3    STEP2    STEP1
DPRT  AE(174)  9A(154)  FF(255)  80(128)  FF(255)  87(135)  FF(255)  AE(174)
TMTR    7:21H    7:17H    1:22H    1:24H    2.20M    4:22M    7:39M     .73S

A== ==========================================================================
SYSP CPU   1   62.07% ********************************... .... .... ....
+    CPU   2   62.24% ********************************... .... .... ....
+    SYSTEM    62.15% ********************************... .... .... ....
```

The contents of the TAPE screen are copied into the current screen following the ==== line separator. Only the line commands are copied; blank lines are not copied into the current screen.

Switch to Background Session

The .BG*nnn* control command switches your session to a background session with the Auto-update interval (.INT) set to *nnn* seconds. This is an alternative to using the Clear key. The .BG*nnn* control command must be used when PreAlert MVS is run as an ISPF application, since ISPF does not pass the Clear key to PreAlert MVS. Refer to "Background Session" on page 7.

Color Support

PreAlert supports extended attributes for color and highlighting on 3270 terminals. The color and highlighting attributes are useful in adding extra impact for statistics, exception messages, comments, and menu items.

For PreAlert sessions running under ISPF, color support is automatically activated when the session is started. For other PreAlert sessions, VTAM and native TSO, color support may be activated using the .COLR control command.

Command	Function
.COLRON	Full color support
.COLRXON	Color support for exception messages only.

Also, the .CLR line command may be used to activate color support.

Command	Function
.CLR ON	Full color support
.CLR XON	Color support for exception messages only.

PreAlert has five basic display types, based on the type of data being displayed or the type of input that may be entered.

Display Types	Input and Output	Monochrome Attributes	Color Attributes
Normal data displays	Output	Normal	Blue normal
Messages, exception data	Output	Bright	White normal
Line commands	Input	Normal	Green normal
Line commands Input areas	Input	Bright	Red underscore
Command, blank lines	Input	Bright	Red normal

The default color attributes may be changed using the UDPARMS macro. The *ASG-PreAlert IDMS/MVS System Guide* contains a description of the UDPARMS macro and the default color assignments.

The color attributes for each user are saved in their PreAlert profile, saving the colors across PreAlert sessions. These color attributes may be altered through line commands.

The COLOR1 screen contains the line commands used to alter color attributes.

Line Command	Display Type
COPN	Normal data displays
COPH	Messages, exception data
COUN	Line commands
COIN	Line command input areas
COUH	Command, blank lines

Each of these line commands allows you to assign a color and highlighting attribute to the display type.

Attribute	Description
Valid Intensities	LOW, HIGH
Valid Colors	RED, BLUE, TURQ, YELLOW, WHITE, GREEN, PINK
Valid Highlights	NORMAL, USCORE, REVERSE, BLINK

Example:

COPH WHITE,USCORE	Assigns white color and underscore attributes to the display type for messages and exception data displays.

The user may customize the color and highlighting attributes for comments and menu items.

Within the comment the user may include special characters that represent a specific set of extended attributes. By using these characters, the user can add color attributes to the menus and comments.

The default special characters are defined in the UDCHATT macro. The *ASG-PreAlert IDMS/MVS System Guide* contains a description of the UDCHATT macro and the default special characters.

The user may alter their special character assignments. The special characters for each user are saved in their PreAlert profile, saving the colors across PreAlert sessions.

The PreAlert screens, menus, and tutorials use the @ and # special characters. Additional special characters may be included by the user.

The COLOR2 screen contains these line commands used to alter special character color attributes:

Line Command	Description
CHAT	Assign special character attributes for menus and comments.
Keywords:	
CHA=*character*	Special character (i.e., # or @)
INT=*intensity*	For monochrome displays
COL=*color*,*highlight*	Color displays
CAN=Y	Remove special character

Attribute	Description
Valid Intensities	LOW, HIGH
Valid Colors	RED, BLUE, TURQ, YELLOW, WHITE, GREEN, PINK
Valid Highlights	NORMAL, USCORE, REVERSE, BLINK

Example:

CHAT CHA=$,COL=GREEN,USCORE

+ CHA=$,INT=HIGH,COL=GREEN,USCORE

+ CHA=#,INT=HIGH,COL=WHITE,NORMAL

+ CHA=@,INT=LOW,COL=YELLOW,NORMAL

When PreAlert locates a dollar sign ($) in a comment, the green and reverse attributes are started. The text following the $ sign displays in green and underscored, for example:

#White text@yellow text and $green underscored text.

Auto-repeat Option

The PreAlert MVS Auto-repeat Option is available on most of the major selection commands found throughout this publication. This option automatically repeats the line commands specified when the line separator ==== control command is detected. The result is a display of all jobs, tasks, etc., that are currently in the system. Consequently, the user has an overall view of system activity. The default for the Auto-repeat Option is taken from the userdata member and can be toggled ON or OFF using the .REP control command.

Toggle Freeze Frame

Entering either the .Z or .FREEZE control commands in the COMMAND input area suspends updating of the displayed screen. This option is intended to allow in-depth analysis of data.

When the Freeze Frame feature is active, the message `FREEZE FRAME ACTIVE` displays on the top line in the upper right corner of the display screen. See "Freezing Displays" on page 36 for PreAlert MVS line commands that can be frozen.

Exit Tutorial Facility and Exit PreAlert MVS

Enter the .END control command in the COMMAND input area to go back one level in PreAlert MVS menus, end a PreAlert MVS session, or return to an original screen when viewing the online tutorials.

Stop All Sessions and Shutdown PreAlert MVS

Enter the .STOPV control command in the COMMAND input area to stop the current user session(s) and shutdown PreAlert MVS.

Immediate Termination of PreAlert MVS

Enter the .STOP control command in the COMMAND input area to immediately terminate the current PreAlert MVS session.

MENU Support

The PreAlert MVS Menu facilities are managed through use of the MENU line command. This command is used to specify a screen name and brief comment about the screen.

When a MENU item is displayed, the user can place the cursor anywhere on the MENU line and press Enter. PreAlert then displays the selected screen.

The MENU line command has the format:

`MENU` *`screen:comments`*

where:

`screen` is the member name of the screen.

`:` is a colon, required to separate the screen name from any comments.

`comments` is a brief description of the screen.

This description may include extended color and highlighting attributes. For further information on extended color, see "Color Support" on page 19.

Figure 8 shows the use of the MENU command:

Figure 8 • MENU command

```
.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
COMMAND:            MAINMENU   09:13:34.5  98.317   7.31% .TUT for Tutorial
.                     PreAlert Primary MENU
.
.
MENU MVSMENU  :      PreAlert/MVS INTERFACE
.
MENU IDMSMENU :      PreAlert/IDMS INTERFACE
.
MENU PAMENU   :      PreAlert FUNCTIONAL FACILITIES
.
MENU SCREENS  :      DISPLAY THE SCREENS LIST
.
.
.
.
.
.    Position the cursor on the desired MENU name, and press ENTER.
.
.
.
SID  SYSID=CPAC  CPU=2003/027025  MVS=SP6.0.4   PREALERT=V4.R1.0
```

As a screen is selected from Menu panels, the Menu name is added to the top of a stack. When the .END (PF3) command is entered the Menu name at the top of the stack is removed.

When the Menu stack is active (containing one or more entries), it may display at the top of the screen on the Menus Active line (Figure 9).

Figure 9 • Active Menu stack

```
COMMAND:            USERD1      9:04:44.3  95.018  60.00% .TUT for Tutorial
Menus Active:   MAINMENU  PAMENU

.    This screen displays the PreAlert USERDATA values being used for this
.    session.  Use the scroll down key (PF8) to display additional values.

UDPB UDPARMS --- USERDATA ASSEMBLED 11/02/94 09.41
+    USER AUTHORIZATION AND SECURITY
+          SECINT=Y  SECWAIT=Y  SECSAVE=Y  AUTHXIT=N  AUTOATH=Y
+          AMVS=(NONE)
+    MISCELLANEOUS OPTIONS
+          AREP=Y  PRTCLS=X  PRTDEST=R0  PRTHOLD=Y
+          HELPDSN=*.PREALERT.HELP
+          NOSAVE=N  MEMREP=N  UNIT=SYSDA  INT=(5,3,600)  SPFLPA=Y
+          COMDWTO=N  WTORTC=(11)  WTODSC=(7)
+          SCRNLIM=512  PLOTYEL=45  PLOTRED=75  MSRBTO=10  MENUHDR=Y
+          COPN=(BLUE,NORMAL)  COPH=(WHITE,NORMAL)
+          COUN=(GREEN,NORMAL)  COUH=(RED,NORMAL)
+          COIN=(RED,USCORE)
+          ASFID=  ASFFUN=EVENT.NOTIFICATION.MANAGER
+    STATISTICS LOGGING OPTIONS
+          MLOGSMF=0  MLOGDSP=***  MLOGBUF=204800  MLOGMEM=#MLOGOFF
+          MLOGDSN=*.SHOPMON.MLOG
+    IDMS INTERFACE OPTIONS
```

The user can skip back through several Menu screens simply by placing the cursor on the name of the desired Menu on the Menus Active line and pressing Enter. All menus lower on the stack than the one selected are removed from the stack. The selected menu is displayed.

To escape from the Menu control, the .ESC control command displays the highest menu and removes all other entries from the Menu stack. The same function may be performed by placing the cursor on the first Menus Active entry and pressing Enter.

Command	Description
.ESC	Escape from Menu control and return to the highest level menu.

Use the .MENU control command to remove the Menus Active display line. The .MENU control command toggles the display of the Menus Active line. If it is displayed, then .MENU removes it. Entering .MENU again restores the Menus Active line.

Command	Description
.MENU	Toggles the display of the Menus Active line at the top of the PreAlert display area.

Trace Control

PreAlert MVS traces the activity of an address space or a disk drive by taking periodic samples. The time interval between samples is specified in the .TRAC control command or the .TRC line command.

The .TRAC control command displays 50 address space samples, and the DTRC line command displays 20 disk activity samples.

Control Command	Line Command	Function
.TRAC*nnn*	.TRC *nnn*	*nnn* specifies trace interval in .01 secs. (Max=1.00 secs).
.ASID*nnn*	.ASD *nnn*	*nnn* specifies ASID of the address space to be traced.
.VTR*volser*	.VTR *volser*	*volser* specifies volume serial number of the disk to be traced.
.DTR*nnn*	.DTR *nnn*	*nnn* specifies unit address of the disk to be traced.

Miscellaneous Features

The following text explains miscellaneous PreAlert MVS line commands and PF key assignments.

Comment Lines

The .... line command adds comments to your screens. Special characters may be included to add color and highlighting attributes to the comments. See "Color Support" on page 19.

System ID Line Command

The SID line command displays the system ID, CPU model, CPU serial number, MVS release level, and release level and date of PreAlert MVS. For example:

```
SID  SYSID=MVS1  CPU=3090/012344  MVS=SP4.2.2   PREALERT=V3.R6.0
```

PF Key Default Assignments

PreAlert MVS has standard PF key assignments to assist the user with various support functions. These assignments can be modified to meet each user's or the site's installation requirements. PreAlert MVS loads the user-specified defaults at execution time.

PF Key	Action	Description
1	.HELP	Screen fields help
13	.TUT	Enter tutorial
2/14	.DEL	Delete line command
3/15	.END	End PreAlert MVS session
4/16	.PRT	Print current screen
5/17	.CHG	Change line commands
6/18	.SCROLL	Scroll to line # or cursor position
7/19	.UP	Scroll up
8/20	.DOWN	Scroll down
9/21	.INS	Insert line command
10/22	.LEFT	Shift left
11/23	.RIGHT	Shift right
12	.ESC	Menu escape
24	.STOP	Stop PreAlert MVS session

Note:

PreAlert/TSO ISPF users: The PreAlert MVS PF key definitions are not used since the ISPF Dialog Manager passes all PF key activity as commands to the application. The ISPF KEYS command may be used to define PF keys for PreAlert MVS commands. By using the ISPF Menu Panels or the PASPF CLIST, ISPF maintains a separate set of PF key definitions for PreAlert MVS. Refer to "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS System Guide* for more details on the PreAlert TSO/ISPF interface.

Define or Reset PF Key Definitions

Entering the .KEYS control command displays the PF key assignments within PreAlert MVS. This command is also used to modify the function of a PF key.

PreAlert MVS commands can be stacked for a given PF key. When stacking commands, separate them with a semi-colon (;). For example, entering `PF13 ACTVTASK;.INT10;.PRT` specifies the screen name ACTVTASK, sets the automatic update to 10 seconds, and activates the screen print option for the PF13 key.

Note:

These are some of the PreAlert MVS control commands that are mutually exclusive and cannot be stacked together:.

HELP	.TUT	.UP	.DOWN
.SCROLL	.STOP	.STOPV	.ESC

Online Quick Reference

The QREF line command provides an online Quick Reference help facility similar to that found in the *ASG-PreAlert Quick Reference* booklet. The line commands displayed are either selected by an area of PreAlert MVS or related to a specified line command.

The display also indicates the type of line command:

Command Type	Function
CONTROL	Use to enter positional or keyword parameters for functional control of PreAlert MVS, or to specify selection parameters.
SELECTION	Use to select specific elements for display. Typically these line commands also display the name or ID of the element.
DISPLAY	Use to display specific information for the selected elements.

Keyword	Description
REF=MVS	PreAlert MVS line commands.
REF=IDMS	PreAlert IDMS line commands.
REF=CONTROL	Functional Control line commands.
REF=AUTH	Restricted Functions line commands.
REF=Line Command	Line commands related to the specified line command.
DSC=Y|N	Request descriptions to be displayed in addition to the line commands.

Figure 10 is an example of a QREF display:

Figure 10 • QREF display

```
QREF
+   ENTER REF=CONTROL | MVS | IDMS | AUTH | Line Command
==== ========================================================================
QREF REF=IDMS
+  SELECT: ATID  BFFR  DBNM  JRNL  LINE  PRNM  RUID  TKCD  TRPT
+ DISPLAY: HSPL  IXAS  MMAP  PRPL  RCES  SSTK  STPL
=== ============================================================================
QREF REF=BFFR
+ CONTROL: BFSL
+  SELECT: BFFR
+ DISPLAY: BFBW  BFIO  BFIR  BFPG  BFRD  BFRF  BFRP  BFRQ  BFRR  BFSZ  BFUT
+          BFWR  BFXX
=== ============================================================================
QREF REF=BFFR,DSC=Y
+ CONTROL: BFSL  IDMS BUFFER - SELECTION PARMS
+  SELECT: BFFR  IDMS BUFFER - NAME
+ DISPLAY: BFBW  IDMS BUFFER - BUFFER WAITS
+          BFIO  IDMS BUFFER - TOTAL I/O COUNT
+          BFIR  IDMS BUFFER - CURRENT I/O RATE
+          BFPG  IDMS BUFFER - NUMBER OF PAGES MAX/IN-USE
+          BFRD  IDMS BUFFER - PHYSICAL READS
+          BFRF  IDMS BUFFER - READS FOUND IN BUFFER
+          BFRP  IDMS BUFFER - PERCENT READS FOUND IN BUFFER
+          BFRQ  IDMS BUFFER - TOTAL REQUESTS
+          BFRR  IDMS BUFFER - CURRENT REQUEST RATE
+          BFSZ  IDMS BUFFER - SIZE
```

USERDATA Values

The USERDATA member in the PreAlert Control file specifies operational settings for PreAlert In the USERDATA member, several macros are coded to specify the settings. These line commands display each macro and its keyword settings.

Line Command	Macro	Function
UDPA	UDPARMS	Expanded control settings
UDPB	UDPARMS	Compressed control settings
UDAU	UDAUSER	Authorized user IDs
UDLC	UDLCX	Line command exclude list
UDPG	UDPGN	MVS performance group names
UDDM	UDDOM	MVS domain names
UDEX	UDEXAL	Default MVS exception level sets

Line Command	Macro	Function
UDCV	UDCVNUM	IDMS CV numbers and jobnames
UDIX	UDIDXL	Default IDMS exception level sets
UDCH	UDCHATT	Default special character attributes

The UDCV and UDIX line commands are described in the *ASG-Prealert IDMS User's Guide*.

USERDATA UDPARMS Macro

The USERDATA UDPARMS macro specifies the operational characteristics of PreAlert. These include user authorization and security, miscellaneous defaults, statistics logging options, PreAlert IDMS interface, PreAlert MVS interface, VTAM, and TSO interfaces. Refer to the *ASG-PreAlert IDMS/MVS System Guide* for a description of the UDPARMS macro and its keyword.

The UDPA line command displays the list of keyword settings in an expanded format, as shown in Figure 11. The expanded format includes a brief comment for each keyword setting. The display may extend past the physical size of the screen. Use the scrolling commands, .UP (PF7) or .DOWN (PF8), to view the entire display.

Figure 11 • UDPA line command

```
UDPA UDPARMS --- USERDATA ASSEMBLED 06/01/93 14.11
+    USER AUTHORIZATION AND SECURITY
+           SECINT=Y             UPDATE INTERVAL SECURED
+           SECWAIT=Y            MVS WAIT ANALYSIS SECURED
+           SECSAVE=Y            SCREEN SAVE SECURED
+           AUTHXIT=N            ALL AUTH USERS IN UDAUSER
+           AUTOATH=Y            AUTO .AUTHON FOR AUTH USERS
+           AMVS=(NONE)          PREALERT.MVS NOT SECURED
+    MISCELLANEOUS OPTIONS
+           AREP=Y               AUTO-REPEAT DEFAULT
+           PRTCLS=X             PRINT SYSOUT CLASS DEFAULT
+           PRTDEST=R0           PRINT DESTINATION DEFAULT
+           PRTHOLD=Y            PRINT HOLD ATTRIBUTE DEFAULT
+           HELPDSN=*.PREALERT.HELP
+           NOSAVE=N             SAVE OPTION SUPPRESSED
+           MEMREP=N             .=X,R REQUIRED TO REPLACE MEMBER
+           UNIT=SYSDA           DEFAULT UNIT FOR DYNAMIC ALLOCATION
+           INT=(5,3,600)        AUTO-UPDATE INTERVAL DEFAULTS
+           SPFLPA=N             ISPF MODULES NOT IN LPA
+           COMDWTO=N            NO WTO MESSAGE FOR COMD COMMANDS
+           WTORTC=(11)          WTO MESSAGE ROUTE CODES
+           WTODSC=(7)           WTO MESSAGE DESCRIPTOR CODES
+           SCRNLIM=512          MAX SCREEN NAMES FOR SCRN
```

The UDPB line command displays the list of UDPARMS keyword settings in a compressed format (Figure 12). The compressed format lists the keyword settings only. The display may extend beyond the physical size of the screen. Use the scrolling commands, .UP (PF7) and .DOWN (PF8) to view the entire display.

Figure 12 • UDPB line command

```
UDPB UDPARMS --- USERDATA ASSEMBLED 11/02/94 09.41
+    USER AUTHORIZATION AND SECURITY
+          SECINT=Y  SECWAIT=Y  SECSAVE=Y  AUTHXIT=N  AUTOATH=Y
+          AMVS=(NONE)
+    MISCELLANEOUS OPTIONS
+          AREP=Y  PRTCLS=X  PRTDEST=R0  PRTHOLD=Y
+          HELPDSN=*.PREALERT.HELP
+          NOSAVE=N  MEMREP=N  UNIT=SYSDA  INT=(5,3,600)  SPFLPA=Y
+          COMDWTO=N  WTORTC=(11)  WTODSC=(7)
+          SCRNLIM=512  PLOTYEL=45  PLOTRED=75  MSRBTO=10  MENUHDR=Y
+          COPN=(BLUE,NORMAL)  COPH=(WHITE,NORMAL)
+          COUN=(GREEN,NORMAL)  COUH=(RED,NORMAL)
+          COIN=(RED,USCORE)
+          ASFID=  ASFFUN=EVENT.NOTIFICATION.MANAGER
+          CENDATE=N
+    STATISTICS LOGGING OPTIONS
+          MLOGSMF=0  MLOGDSP=***  MLOGBUF=204800  MLOGMEM=#MLOGOFF
+          MLOGDSN=*.SHOPMON.MLOG
+    IDMS INTERFACE OPTIONS
+          PIDMS=IDMS12G  IDMSMAX=4  IDMSRCE=S  ITIME=20
+          IJRNL=60  IJRNLF=N  DCLOG=N  IDMSSRB=Y  ITASKST=Y
+          IDXPFX=PAIDX  IDXDATE=Y  IADS2=ADS2  IUSMAX=128  IDMSJCT=64
+          ILOGINT=15  ILOGSYN=N  ILOGSTA=N  IABXBY=N  IERRSND=Y
+          SPYIAT=SPYIAT  SPYIRU=SPYIRU  SPYIDB=SPYIDB  SPYIBF=SPYIBF
+    SIRF-IDMS LOCAL MODE OPTIONS
+          SIRFLME=16  SPYSLM=SPYSLM
+    MVS INTERFACE OPTIONS
```

The IDMS Interface Options and the SIRF-IDMS Local Mode Options are displayed only if your PreAlert license includes the PreAlert IDMS interface.

USERDATA UDAUSER Macro

The USERDATA UDAUSER macro specifies the user ID(s) allowed to use the authorized features of PreAlert. With the UDPARMS AUTHXIT=N keyword, the user ID must be specified in UDAUSER to be authorized. With AUTHXIT=Y, if the user ID has not been included in the UDAUSER macros, PreAlert calls the security exit to determine if the user ID is authorized.

The UDLCX LCX=keyword specifies the names of any line command exclude lists associated with the user ID. The UDLCX macro builds the line command exclude lists.

For each UDAUSER coded in USERDATA, the UDAU line command displays the user ID and any associated LCX line command exclude lists, as shown in Figure 13.

Figure 13 • UDAU line command

```
UDAU UDAUSER --- USERDATA ASSEMBLED 06/01/93 14.11
+   USERID1
+   USERID2
+   USERID3   LCX=(LCXMZAP)
+   USERID4   LCX=(LCXCOMD,LCXMZAP)
UDLC UDLCX --- USERDATA ASSEMBLED 06/01/93 14.11
+   LCXMZAP   LCX=(MZAP,KEY0)
+   LCXCOMD   LCX=(COMD,IVRY,ICMD)
```

Refer to "Security Considerations" in the *ASG-PreAlert IDMS/MVS System Guide* for additional information on the Line Command Exclude feature.

USERDATA UDLCX Macro

The USERDATA UDLCX macro specifies the line exclude lists referenced by the UDAUSER macros. The LCX= keyword specifies one or more secured line commands or functions. The user is denied access to the specified line commands or functions.

For each UDLCX macro coded in USERDATA, the UDLC line command displays the name of the list and the secured items, as shown in Figure 14.

Figure 14 • UDLC line command

```
UDAU UDAUSER --- USERDATA ASSEMBLED 06/01/93 14.11
+   USERID1
+   USERID2
+   USERID3   LCX=(LCXMZAP)
+   USERID4   LCX=(LCXCOMD,LCXMZAP)
UDLC UDLCX --- USERDATA ASSEMBLED 06/01/93 14.11
+   LCXMZAP   LCX=(MZAP,KEY0)
+   LCXCOMD   LCX=(COMD,IVRY,ICMD)
```

Refer to "Security Considerations" in the *ASG-PreAlert IDMS/MVS System Guide* for additional information on the Line Command Exclude feature.

USERDATA UDPGN and UDDOM Macros

The USERDATA UDPGN and UDDOM macros specify the names associated with MVS performance groups and domains (see Figure 15 on page 34). These names are used to provide meaningful names when displaying performance group or domain numbers.

The performance group and domain names for an address space are displayed by the PGNA and DOMA line commands. The PGRU and CPUU line commands also summarize paging activity and CPU usage by performance group or domain name. Refer to "Address Space Information" on page 140, and "System Analysis" on page 219 for more information on these line commands.

Figure 15 • UDPGN and UDDOM macros

```
UDPG UDPGN --- USERDATA ASSEMBLED 06/01/93 14.11
+        0,SYSTEM     1,BATCH       2.TSO              3,HOTBATCH
+        4,DATABASE   5,VTAM        6,JES2             7,HOT-TSO
+        8,MONITORS   9,SMPE-BAT    99,DELAY           7,HOT-TSO

UDDOM --- USERDATA ASSEMBLED 06/01/93 14.11
+        0,SYSTEM     1,TSO-1       2,TSO-1            3,BAT-TSO3
+        4,BATCH-HI   5,BATCH-2     6,SYS-TASK         7,DATABASE
+        8,MONITORS   9,HOT-TSO1    10,HOT-TSO2
```

USERDATA UDEXAL Macro

The USERDATA UDEXAL macro specifies the default exception analysis level sets for one or more MVS systems. When PreAlert MVS begins to monitor MVS, the default exception analysis level set is loaded and used for exception analysis. If a default has not been specified, the level set must be loaded through the EXAS line command. Exception Analysis remains inactive until a level set has been loaded.

A user ID is specified with each UDEXAL macro. This allows separate level sets to be specified for each user. Also, a default user ID may be included for the user IDs not specifically coded.

For each UDEXAL macro coded in USERDATA, the UDEX line command displays the user ID and the list of MVS system names and their default level sets. The SID line command may be used to display the name of the MVS system being monitored, as shown in Figure 16.

Figure 16 • UDEX line command

```
UDEX UDEXAL --- USERDATA ASSEMBLED 06/01/93 14.11
+         *       SYS1,01        SYS2,02
+         USERID1 SYS1,91
+         USERID2 SYS2,92

SYSID=SYS1  CPU=3090/012345  MVS=SP4.2.2  PREALERT=V3.R6.0
```

Refer to "MVS Exception Analysis" on page 289 for more information on exception analysis level sets.

USERDATA UDCHATT Macro

The USERDATA UDCHATT macro defines the default special character attributes used in comment displays. These special characters allow the user to add color and highlighting to the comments.

For each UDCHATT macro coded in USERDATA, the UDCH line command displays the special character, and the attributes associated with it, as shown in Figure 17:

Figure 17 • UDCHATT macro

```
UDCH UDCHATT --- USERDATA ASSEMBLED 11/02/94 09.41
+ UDCHATT CHAR=#,INTENS=HIGH,COLOR=WHITE,USCORE
+ UDCHATT CHAR=@,INTENS=LOW,COLOR=YELLOW,NORMAL
```

Freezing Displays

PreAlert MVS provides the ability to stop data retrieval to enable further analysis of system activity. The .FREEZE and .Z control commands are used for this purpose. The sections and associated line commands that can be specified for the Freeze Frame feature are noted throughout this publication. The following sections can be reviewed individually for applicability of the Freeze Frame feature.

Sections Where Freeze Frame Is Applicable

The Freeze Frame feature of PreAlert MVS applies to these sections:

CPU Utilization
Dispatching
Swapping
Swap Control
Paging
Paging Rates
Real Storage Usage
input and output Counts

Enqueue Contention Analysis
Address Space Exceptions
Disk Statistics for SP3 and XA
All Tape Statistics
CPU Utilization Plots
Real Storage Map
Page and Swap Datasets
CSA and SQA Subpool Usage
System CPU, input and output, and Paging
System Resources Manager (SRM)
Entire MVS Exception Analysis

Sections Where Freeze Frame not Applicable

The Freeze Frame feature of PreAlert MVS does not apply to these sections:

Address Space Trace
Disk Device Trace
All Dataset Information Sections
Entire MVS System Services Section
Entire Address Space Wait Analysis Section

SPY Feature

The SPY feature provides a beneficial method of obtaining detailed information about an address space or disk device. To invoke the SPY feature, type the .SPY command, move the cursor to the desired item, and press Enter. PreAlert then calls a screen tailored to provide the detailed information for the selected address space or disk device.

Usually, the .SPY command is defined to a PF key. This definition allows a user to invoke the SPY feature by moving the cursor to the appropriate item and pressing the PF key.

To identify an item for SPY, the cursor may be placed on:

- A data item displayed through a display line command, such as ASID, JIB, PROC, etc. for address space information
- A line of data from a horizontal display line command, ASH for address space information
- A line of data from a horizontal display line command, DHOLE for disk device information
- An address space or disk device exception message

For example, begin with this sample screen shown in Figure 18:

Figure 18 • SPY feature

```
COMMAND:  .SPY                14:47:03.8  94.056  85.12% .TUT for Tutorial
JSEL SEL=S,SRT=CPUR,CPU=4

JOBN DB2TEST  LSCMSTR  JES2     HCF      RMF      NET      DB3PMSTR CICS212
ASID       71       19       24       37       16       28       39       40
PROC DB2TEST  LSCMSTR  IEFPROC  HCFEC    IEFPROC  NET      IEFPROC  CICS
CPUR   35.69%    8.24%    7.70%    7.43%    5.81%    5.54%    5.27%    5.27%
IOCR      1.0       .0      3.5       .0       .0       .0       .0       .0
TPIR       .0       .0       .0       .0       .0       .0       .0       .0
EXAD *** STC PACTEST POSSIBLE CPU LOOP, CPU=35.69, I/O=1.0   (T1) ***
JEXX    1/*..    1/...    1/...    1/...    1/...    1/...    1/...    1/...
ASH 1 1/4 CPU PctP  CPUT    Dprty   Wss     IOrte   Jobstat  Swap Reason Pgrte
+ DB2TEST    35.69%   1:20M  6C(108)  836K     1.0    CPU*NSW                .0
+ LSCMSTR     8.24%  26:06M  FA(250)  984K      .0   *WAT*NSW                .0
+ JES2        7.70%  28:14M  5C( 92) 1680K     3.5    WAT*NSW                .0
+ HCF         7.43%  20.97S  6D(109)  172K      .0    WAT*RES                .0
+ RMF         5.81%  19:38M  6D(109)  252K      .0    WAT*NSW                .0
+ NET         5.54%   5:08M  6D(109) 1576K      .0    WAT*NSW                .0
+ DB3PMSTR    5.27%   2:18M  6D(109)  256K      .0   *WAT*NSW                .0
+ CICS212     5.27%   6:04M  5B( 91)  260K      .0    WAT*NSW                .0
```

In Figure 18, the SPY feature may be invoked for address space ID 71 (DB2TEST) by performing these steps:

1. Entering `.SPY` in the command input area. (You may skip this step if you are using a PF key previously defined for the .SPY command.)

2. Placing the cursor on one of these items:
   - The exception message for the address space
   - Any data item displayed for the address space by the ASID, PROC, CPUR, etc. line commands
   - Anywhere on the line built by the ASH line command for the address space

3. Press Enter or the PF key defined for the .SPY command.

PreAlert then displays the SPYMAS screen for MVS address spaces as shown in Figure 19.

Figure 19 • SPYMAS screen

```
 COMMAND:____________SPYMAS     14:49:24.1  94.056  63.00% SPY SCREEN ACTIVE
.   Address Space detailed display for .SPY
ASZZ    Jobname:PACTEST          Job Proc:PACTEST            Userid:
+      Job Asid:      71         Job Step:                 Job Type:STC
+      Job Stat: CPU*NSW     Job wait tme:               Asid Dprty: 6C(108)
+      TCB Rate:  34.85%     Perf Grp/Per:   8   1     Perf Grp Nme:MONITORS
+      SRB Rate:    .84%        Domain No:       8       Domain Nme:MONITORS
+      CPU Time:   1:21M         Sys CPU%:  35.69%     Procesr CPU%:  35.69%
+    Real Alloc:    836K       Fixed Real:      0K     Pageabl Stor:    836K
+         Estor:    124K     Lcl Pgin Rte:      .0     Tot Pgin Rte:      .0
+  NonVio Slots:     110        Vio Slots:              Total Slots:     110
+     Swap Rval:     .00         Swap Cnt:              Swap Reason:
+      I/O Rate:      .0          I/O Cnt:     743     Dev Conn Tme:    1.11
+      Srv Unts:  116319        Trans Cnt:       1         Trns Tme:  23:13H
+       EXATASK:   1/*..    2/...

.  To select another task for ASZZ, enter .SPY after COMMAND:
.  place the cursor on the desired task, and press enter.

JSEL SEL=J
ASH   1/4 CPU PctP  CPUT    Dprty   Wss     IOrte   Jobstat  Swap Reason Pgrte
+ OPRRSMTC    4.16%   5.86S  26( 38)  332K    13.7    WAT*RES
```

Enter `.RET` to return to the original screen. The original screen is then redisplayed.

SPY Commands

Request the SPY feature with or without the Freeze Frame feature. With the Freeze Frame feature, the data collected by PreAlert for the address space is frozen. That data will not be updated as long as the Freeze Frame feature is active. Refer to "Toggle Freeze Frame" on page 23 for additional details on the freeze frame feature.

Command	Description
.SPY Request	SPY feature without Freeze Frame.
.SPYZ Request	SPY feature with Freeze Frame, which will be deactivated when the .RET command returns control to the original screen.

SPY Screens

This table provides the names of the default SPY screen definitions, line commands issued to display SPY data, and descriptions of the type of data displayed by each command:

Screen Name	Line Command	Spy Data Type
SPYMAS	ASZZ	MVS address space data
SPYMDD	DDZZMVS	disk device data

The name of each screen is specified in the Userdata UDPARMS macro. The user may override the default screens by specifying the names of other screens. For further information on the UDPARMS macro, refer to "UDPARMS - PreAlert User Installation Data" in the *ASG-PreAlert IDMS/MVS System Guide*.

Statistics Logging Feature

The Statistics Logging Feature allows the user to record selected statistics from PreAlert MVS. This section discusses where statistics are logged.

Logging may be directed to the SMF datasets, a user specified dataset, or the PreAlert MVS MLOG datasets. The actual destination depends on these factors:

MLOG line command
MLOGnn DDs in the PreAlert MVS startup JCL
MLOGFILE DD in the PreAlert MVS startup JCL
MLOGFILE allocated in the PreAlert MVS CLIST
Defaults specified in the UDPARMS macro

For problems encountered during the logging, see "PreAlert MVS Messages" on page 389.

MLOG Line Command

The MLOG line command directs logging to either an SMF or a specified dataset name. When using the MLOG line command, it overrides the log files allocated in the JCL or CLIST and the defaults from the UDPARMS macro.

The MLOG line commands direct logging only for the user who enters the command. Any other user who may be logged onto PreAlert MVS is unaffected.

The MLOG line command dynamically specifies the SMF record ID or the MLOG dataset name and attributes for statistics logging.

Keyword	Specifies
SMF = *nnn*	SMF record ID (must be > 127 and < 256).
DSN = *data.set.name*	MLOG Dataset name. An * in any position replaces the user's user ID.
DSP = MOD|OLD|SHR	Specifies the dataset status for existing datasets only. New datasets are allocated with DISP=MOD.
VOL = *VOLSER*	Use only if a specific VOLSER is required.
UNT = *unit*	Defaults to unit specifications in userdata.
BLK = *nnn*	Block size. Must be 4096 or larger. Default is 4096.
SPC = B|T|C	Space allocation type: B block T track C cylinder
PSQ = *nnn*	Primary space quantity.
SSQ = *nnn*	Secondary space quantity.
RES = Y	Reset to default attributes.
SWT = Y	Switch MLOG*nn* datasets.

The SMF=*nnn* keyword directs logging to the SMF datasets and specifies the SMF record ID. Your systems programmer should have the necessary jobs to extract data from the SMF datasets. The statistics may then be printed using the MLOGPRT2 job described later in this section.

The DSN=*data.set.name* keyword directs logging to the specified dataset. If the dataset does not exist, PreAlert MVS dynamically allocates the file using these attributes:

Dataset Attribute	Description
DSN=	data.set.name
DISP=	(NEW,CATLG,CATLG)
DCB=	(RECFM=VB,LRECL=4092,BLKSIZE=4096)
DSORG=	PS
UNIT=	SYSDA
SPACE=	(4096,(500,200))

Use keywords with the MLOG line command to override the defaults for the block size, unit, and SPACE parameters. Specify the default unit in the UDPARMS macro.

When DSN=*data.set.name* specifies an existing dataset, PreAlert MVS allocates the file using the attributes:

Command	Description
DISP=	MOD,KEEP,KEEP

Use keywords with the MLOG line command to override the default disposition. Specify the default in the UDPARMS macro.

If the dataset becomes full, all logging activity is saved in buffers until the user selects a new log dataset through the MLOG line command. When the buffers become full, all logging activity is suspended. When the new dataset is allocated, the old dataset is freed to allow for printing or archiving.

Print the dataset using the JCL in the MLOGPRT2 member of the PreAlert MVS control file, or archive the dataset to another file using the IEBGENER utility program.

Figure 20 displays the MLOG line command:

Figure 20 • MLOG line command

```
MLOG DSN=DEVBER.PREALERT.MLOG1207
+    OPEN   DSN=DEVBER.PREALERT.MLOG1207

DSN=DEVBER.PREALERT.MLOG1207
+  VOLSER CUA  RECFM LRECL BLKSZ  DSORG  CREDT  REFDT  EXT  TRKS  USED  2ND-ALC
+  TSO001 C1A   VB    4092  4096   PS    93341  93341    1    50     0    200BLK
```

In the example, the MLOG line command was used to allocate the specified dataset for logging. "PreAlert MVS Messages" on page 389 contains the messages that may be displayed when PreAlert MVS encounters problems with the MLOG dataset.

MLOGnn DDs in the Startup JCL

Note:

For PreAlert MVS Multiple Session Users only

If neither SMF nor a dataset was specified through the MLOG line command, PreAlert MVS logs statistics to the MLOG*nn* datasets specified in the startup JCL. The log datasets may be used to record statistics for any user signed onto PreAlert MVS, but the datasets should not be shared across multiple PreAlert MVS users.

Log datasets are specified in DD statements with ddnames MLOG1, MLOG2, through MLOG15. If these are used, at least two datasets should be used. Use of additional datasets is at the discretion of the user. Before PreAlert MVS is started, the datasets must be initialized by the MLOGINIT job described in the "Initialize Statistics Logging" step of the "Installation of PreAlert" chapter in the *ASG-PreAlert IDMS/MVS System Guide*.

PreAlert MVS maintains a status code in the first record of each of the MLOG*nn* datasets. The Available status indicates that the dataset is available for use. The Open status indicates that PreAlert MVS is currently logging to this dataset. The Closed status indicates that the file is closed and contains data that should be offloaded.

The MLOG*nn* datasets provide the easiest means of continuous statistics logging. When a log dataset fills, PreAlert MVS automatically closes the dataset, submits the MLOGOFFL, log offload job, and switches logging to the next available log dataset. The job offloads all closed datasets and resets their status to Available. When more than one closed dataset is detected, the offload program offload each dataset in the sequence it was opened. The offload job is also submitted during PreAlert MVS startup processing when one or more closed log datasets is detected.

The log offload and log print jobs are also described in the "Initialize Statistics Logging" step of the "Installation of PreAlert" chapter in the *ASG-PreAlert IDMS/MVS System Guide*.

If a user wants to access data in the open log dataset before it fills, the user may request that PreAlert MVS switch log datasets. To switch log datasets, PreAlert MVS closes the current log dataset, submits the offload job, and opens the next log dataset.

The user may request a switch by entering the MLOG line command with the SWT=Y keyword. Also, the computer operator may request a switch by entering the modify PreAlert MVS switch command:

```
F PREALERT,SWITCH
```

Although PreAlert MVS attempts to offload the closed log datasets as soon as possible, it is possible for all log datasets to be closed when PreAlert MVS attempts to switch log datasets. When this occurs, PreAlert MVS retains the statistics to be logged in internal buffers until a log dataset becomes available.

The size of the buffers is specified in the userdata UDPARMS macro. When these buffers are filled, PreAlert MVS ignores any additional requests for statistics logging.

MLOGFILE DD in the Startup JCL

Note:

For PreAlert MVS Multiple Session Users only.

The MLOGFILE DD specifies a single log dataset in place of the MLOG*nn* log datasets. The MLOGFILE DD should only be used when PreAlert MVS is brought up for a short duration to record a limited number of statistics. The MLOGFILE dataset does not require initialization (as do the MLOG*nn* datasets), nor is the MLOGFILE dataset offloaded.

Before PreAlert MVS is started, the MLOGFILE dataset must be allocated. Use the JCL shown in Figure 21:

Figure 21 • JCL used to allocate the MLOGFILE dataset

```
//MLOGALLC   JOB   99,'ALLOCATE MLOG'
//STEP1EXEC  PGM=IEFBR14
//MLOGFILE  DD  DSN=data.set.name,
//        DISP=(NEW,CATLG,DELETE),
//        DCB=(RECFM=VB,LRECL=4092,BLKSIZE=4096),
//        UNIT=sysda,SPACE=(4096,(500,200))
```

The *data.set.name*, *sysda*, and SPACE parameters should be specified as needed.

The PreAlert MVS startup JCL should include this statement:

```
//MLOGFILE  DD  DSN=data.set.name,DISP=OLD
```

The MLOGFILE dataset logs statistics from all users signed onto PreAlert MVS unless otherwise directed by the MLOG line command.

If the MLOGFILE dataset fills, all logging activity is saved in buffers until the user selects a new log dataset through the MLOG line command. When the buffers fill, all logging activity is suspended until a new log dataset is allocated. PreAlert MVS should be stopped as soon as possible to allow printing or archiving of the log dataset(s).

When PreAlert MVS is stopped, the MLOGFILE dataset should either be printed by using the JCL in the MLOGPRT2 member of the PreAlert MVS control file or archived to another file by using the IEBGENER utility program.

MLOGFILE Allocated in the PreAlert MVS CLIST

Note:

For PreAlert MVS Local TSO users only

The PreAlert MVS Local TSO user may add an ALLOC command to the PreAlert MVS CLIST. If logging has not been directed elsewhere by the MLOG line command, PreAlert MVS logs to the dataset specified in the ALLOC command.

Before the PreAlert MVS CLIST is executed, the MLOGFILE dataset must be allocated. Use the JCL shown in Figure 22.

Figure 22 • JCL used to allocate the MLOGFILE dataset

```
//MLOGALLC   JOB   99,ALLOCATE MLOG
//STEP1EXEC  PGM=IEFBR14
//MLOGFILE  DD  DSN=data.set.name,
//        DCB=(RECFM=VB,LRECL=4092,BLKSIZE=4096),
//        UNIT=sysda,SPACE=(4096,(500,200))
```

The *data.set.name*, *sysda*, and SPACE parameters should be specified as needed.

The PreAlert MVS CLIST should include this command:

```
ALLOC FI(MLOGFILE) DA('data.set.name') OLD
```

The MLOGFILE dataset logs statistics for only this PreAlert MVS LOCAL TSO user.

If the MLOGFILE dataset fills, the logging activity is saved in buffers until the user selects a new log dataset through the MLOG line command. When the buffers fill, all logging activity is suspended until a new log dataset is allocated.

When the new dataset is allocated, the old dataset is freed to allow for printing or archiving. The dataset may be printed by using the JCL in the MLOGPRT2 member of the PreAlert MVS control file.

Defaults in UDPARMS Macro

The defaults specified in the userdata UDPARMS macro provide the last resort. If none of the prior options have been satisfied, PreAlert MVS simulates an MLOG line command by using the UDPARMS defaults. The same procedures are followed as in the MLOG line command option.

If the MLOGSMF keyword has been specified as zero (0) and the MLOGDSN keyword has not been specified, then PreAlert MVS saves all logging activity in buffers until a log dataset is allocated through the MLOG line command. When the buffers fill, PreAlert MVS suspends logging.

Print MLOG Statistics

Use The PRNTMLOG job (PreAlert MVS control dataset) to extract and print records from the MLOG dataset. The first step executes the SHOPMXLG program to extract statistics records and the second step executes SHOPMPLG to print the statistics. Record extract is controlled through user-supplied parameters.

The SHOPMXLG program recognizes these extract parameters:

DATE= {*date*|(*date1,date2*)} [, ...]

where:

date is the extract for a single date (YYDDD)

(date1,date2) is the extract for a date range, inclusive.

Example: `DATE=(92002,92006),(92009,92013)`
Selects records from 1/2/92 through 1/6/92 and from 1/9/92 through 1/13/92.

TIME= (*time1,time2*) [, ...]

where *(time1,time2)* is the extract for a time range, inclusive (HHMM).

Example: `TIME=(2200,2359),(0000,0359)`
Selects records from a 6 hour period beginning at 10:00P.M.

DTTM= (*date.time1,date.time2*) [, ...]

where:

(date.time1,date.time2) is the extract for a date-time range, inclusive (YYDDD.HHMM).

Example: `DTTM=(92009.0600,92010.0559)`
Selects records from a 24 hour period beginning at 6:00A.M. on 1/9/89.

SYST= *`System ID`* [, ...]

where *`System ID`* is the extract for a SMF System ID. See the SID line command for the SMF System ID.

Example: `SYST=SYS1,SYS1`
Selects records for systems SYS1 and SYS2.

USER= *`Userid`* [, ...]

where *`Userid`* is the extract for a PreAlert MVS user ID for the PreAlert MVS session that created the MLOG statistics records.

Example: `USER=USER1`
Selects records from the PreAlert MVS session for USER1.

TYPE= {*`type`*|(*`type1,type2`*)} [, ...]

where:

`type` is the extract for a specific MLOG record type.

(*`type1,type2`*) is the extract for a range of MLOG record types.

Example: `TYPE=1,(100,103)`
Selects record types 1 and 100 through 103.

CVID= *`IDMS CV number`* [, ...]

where *`IDMS CV number`* is the extract for a specific IDMS CV number. Extracts only IDMS record types (greater than 100).

Example: `CVID=1000`
Selects records for CV number 1000.

IDMS= *`IDMS Jobname`* [, ...]

where *IDMS Jobname* is the extract for a specific IDMS jobname. Extracts only IDMS record types (greater than 100).

Example: `IDMS=IDMSDC1`
Selects records for jobname IDMSDC1.

Note:

The extract parameter must begin in column one of the parameter record. Only one extract parameter may be specified on each parameter record.

Each parameter may use one or more records to specify up to eight occurrences of each parameter.

When a parameter has multiple values, OR logic is used. (For example, for TYPE=1,100, the record selects if it is type 1 or 100).

When multiple parameters are specified, AND logic is used. (For example, for DATE=92006 ... TIME=(0800,1759), the statistics record is selected if it was written on 1/6/92 and between 8:00A.M. and 5:59P.M.).

Print MLOG Statistics Using SAS

Three SAS programs plus sample JCL have been included in the PreAlert MVS control file. These programs extract and print data from the PreAlert MVS MLOG files as follows:

- SASMLOG prints the MLOG statistics records similar to those produced by the PRNTMLOG job, described previously in this section.
- SASEXAM prints summary reports for PreAlert MVS Exception Analysis.
- MLOGSAS contains sample JCL to execute these programs.

These SAS programs are intended only to demonstrate the potential uses of the MLOG statistics. Any further customization of the reports or archival of the data is left to the user.

The SASMLOG member is used to print the MLOG statistics records. It contains both the SAS statements required to read the header section of the MLOG statistics records, and the statements for other members containing additional SAS statements. Each of these members print a specific MLOG record type, as listed:

Member	Function
SASMLOG	Read MLOG record header.
SASML1	Read and print MLOG record type 1, PreAlert MVS screen images.
SASML3	Read and print MLOG record type 3, PreAlert MVS Exception Analysis messages.
SASML4	Read and print MLOG record type 4, PreAlert MVS System Statistics records.

The SASEXAM member is used to print a summary of the MVS exception message records. It contains the SAS statements needed to read the MVS exception message records and to write them to a SAS dataset. These are followed by include statements for additional members to print the specific summary report:

Member	Function
SASEXAM	Read MLOG record type 3, and write to SAS datasets based on the exception analysis area (system, address space, or DASD device). Only records with the same PreAlert MVS user ID and MVS system ID in the PAUSER file is used.
SASEXAM1	Summarize exception messages by date and exception area, and print the Daily MVS Exception Summary report.
SASEXAM2	Summarize exception messages by exception object (jobname or VOLSER), and print the Exception Object Summary report.
SASEXAM3	Summarize exception messages by the exception definition number, and print the Exception Definition Summary report.

The MLOGSAS member in the PreAlert MVS control file contains sample JCL used to execute SAS to print the MLOG Statistics. The JCL is provided as a sample only. Consult your systems programming staff for the correct JCL.

Assuming the basic JCL is correct, these items may require attention:

- The PROG='SASLPA' symbolic assignment specifies the name of the SAS load module to be executed. Consult your systems programmers.
- The SASLIB='SYS1.SAS.LIBRARY' symbolic assignment specifies the name of the SAS load module library. Consult your systems programmers.
- The SASHELP='SYS1.SAS.SASHELP' symbolic assignment specifies the name of the SAS Help dataset. Consult your systems programmers.
- The PREFIX='ASG.PREALERT' symbolic assignment specifies the dataset name prefix used to identify the PreAlert MVS control dataset. This is the same prefix as used in the PreAlert MVS installation.
- The PAMEMB='SASMLOG' symbolic assignment specifies the member name in the PreAlert MVS control file containing the SAS program to be executed.
- The MLOGDSN='ASG.PREALERT.OFFLOAD' symbolic assignment specifies the dataset name for the MLOG Statistics file. When the MLOG statistics have been written to the MLOGnn DDs in the PreAlert MVS startup JCL, the MLOG Offload job must be run to offload the statistics prior to using the SASJCL.
- The PAUSER DD statement specifies the PreAlert MVS user ID and MVS system ID for the SASIDXM program.

Restricted Functions

Many of PreAlert MVS's functions are restricted for use by authorized users only. Refer to "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS System Guide* for authorizing PreAlert MVS users.

Some functions, such as Wait Analysis and Auto-update mode, require only that the user be allowed authorization. The functions described on the following pages require PreAlert MVS to be running in supervisor state Key Zero. This allows PreAlert MVS to access data stored in protected areas and in other address spaces.

Authorization for PreAlert MVS to enter supervisor state Key Zero is performed by entering either the .AUTHON control command or the .ATH line command. Authorization may be removed through either the .AUTHOFF control command or the .ATH line command. Authorization remains in effect for the duration of the session or until the user removes it.

Control Command	Line Command	Function
.AUTHON	.ATH ON	Allow Authorization
.AUTHOFF	.ATH OFF	Remove Authorization

Displaying Virtual Storage

With the PreAlert MVS DUMP line command, you can view all virtual storage addressable within your address space. This includes the NUCLEUS, COMMON areas (SQA & CSA), and your local private area.

Command	Function
DUMH	DUMP Header Line.
DUML	Display current DUMP address space ID/jobname and address.
DUMP	Display 16 bytes virtual storage in HEX and EBCDIC.

The ADDR line command specifies the virtual storage address to be displayed. All addresses are specified in HEX.

Command	Function
ADDR *hhhhhh*	Display virtual storage beginning at address *hhhhhh*.
ADDR +*hhhhh*	Page forward *hhhhh* bytes.
ADDR -*hhhhh*	Page backward *hhhhh* bytes.
ADDR @	Display storage beginning at the location specified in the current address (indirect addressing).
ADDR /*mod-name*	Display LPA module.
ADDR *(mod-name)*	Display LPDE entry for LPA module.

PreAlert MVS's ADDR line command, followed by the control block name, enables the user to view many of the standard MVS control blocks.

Command	Function
ADDR	
`*control-block-name`	Display the specified control block.

These are the displayable control blocks:

ASCB*nnn*	ASMV	ASVT	ASX	B*nnn*	CAT
CCT	CS	CSTE	CVT	DMDT	GDA
ICT	LCCA	LCH	MCT	OUCB*nnn*	OUXB*nnn*

PART	PCCA	PCT	PGDT	PGVT	PVT
RCT	MCA	RMCT	RMPT	RSMH*nnn*	SART
SDCT	UCB *cuu*	WMST			

where:

nnn is the ASID of the desired address space.

cuu is the device address.

Figure 23 shows a sample display of virtual storage.

Figure 23 • Virtual storage

```
ADDR *ASCB19    <<==--  Locate the ASCB for address space 19.
DUMH  ADDRESS        +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMP  00F5C280 +000  C1E2C3C2 00F8AC00 00F54780 00000000   *ASCB 8   5   *
DUMP  00F5C290 +010  008FD310 0000142E 00000000 008F90E8   *  L            Y*
DUMP  00F5C2A0 +020  00000001 0013000D 000001DB 00000000   *               *
DUMP  00F5C2B0 +030  7FF154E8 00000000 00F4C710 00A66650   *"1 Y     4G  W &*
DUMP  00F5C2C0 +040  00000001 71FC8200 9B573FEA 05EF2601   *      B         *
DUMP  00F5C2D0 +050  00000D69 808FDAD8 9B573F2C 00000000   *       Q        *
```

Cross Memory Storage Display

To display the private area storage of another address space, the CMDA line command specifies the ASID of that address space. The CMDA command retrieves the storage from the specified address space using Cross Memory Services features. The DUMP line command is then used to display the storage.

When the CMDA command is first entered for an address space, the ASXB is displayed. The ADDR line command can then be used to display different storage locations in the specified address space.

The CMDA command can only be used to display storage of an address space that is swapped-in. Cross Memory Services does not support access to a swapped-out address space. An error message is displayed if the address space is swapped-out.

Figure 24 illustrates use of the CMDA line command:

Figure 24 • CMDA line command

```
.ATH ON
JSEL SEL=U
JOBN *MASTER* PCAUTH   GRS      DUMPSRV  CONSOLE  ALLOCAS
ASID       1        2        3        4        5        6
CMDA 1                 *MASTER* SELECTED
DUMP 0000CA50 +000  C1E2E7C2 0000CB58 008E0AA8 000B0000   *ASXB            *
DUMP 0000CA60 +010  00000000 00000000 00000000 00000000   *                *
```

Scanning Virtual Storage

The MSCN line command (Figure 25) is used to scan virtual storage. Both the private area and system areas of any swapped in address space may be scanned. The search string may be specified either as a character string or as hex data.

Figure 25 • Scanning virtual storage

```
COMMAND:            DUMPSCAN   11:06:35.9  01.106  15.06% .TUT for Tutorial
.  Memory Scan - Enter:
.
.    Address Space:  JOB=jobname or ASI=asid
.      Search Data:  STR=character string or HEX=hex data
.         Location:  LOC=PRIVATE/LSQA/CSA/SQA/NUCLEUS/LPA
.        Alignment:  ALN=D/F/H/B

MSCN JOB=PACTEST,STR=SHOPMXMB,ALN=B
+               DATA: STR=SHOPMXMB
+      ADDRESS SPACE: JOB=PACTEST
+           LOCATION: LOC=PRIVATE
+          ALIGNMENT: ALN=B
+           FOUND AT: 0000FD4D

CMDA          ENTER ASID
ADDR
DUML DUMP ASID   127/PACTEST    ADDRESS:0000FD4D
DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMP  0000FD4D +000                                E2C8D6   *            SHO*
DUMP  0000FD50 +003  D7D4E7D4 C26DF0F4 61F1F361 F0F16DF1   *PMXMB_04/13/01_1*
DUMP  0000FD60 +013  F84BF0F2 90ECD00C 18CF41B0 CFFF41B0   *8.02           *
DUMP  0000FD70 +023  B00158A0 100058F0 A898BF1F F4904770   *       0yq  4   *
DUMP  0000FD80 +033  C0744100 08000700 47F0C048 00000900   *         0      *
```

These keywords are used with MSCN:

Keyword	Description
STR=character string	Specify the search string.
HEX=hex data	Specify the search string in hex.
STR=string and HEX=hex keywords are mutually exclusive, only one may be specified.	
JOB=jobname	Specify the jobname of the address space to be searched.
ASI=asid	Specify the ASID of the address space to be searched.
JOB=jobname and ASI=asid keywords are mutually exclusive, only one may be specified. Either keyword is required when the private area or LSQA are being searched.	

The address space being searched must be swapped in. MSCN cannot scan a swapped out address space.

Keyword	Description
LOC=location	Specify the storage location(s) to be searched, default is LOC=PRIVATE • PRIVATE—Private areas • LSQA—Local System Queue areas • NUCLEUS—Nucleus storage • CSA—Common System areas • SQA—System Queue areas • LPA—Link Pack areas

LOC=PRIVATE or LOC=LSQA require the JOB=jobname or ASI=asid keywords to identify the address space being searched.

ALN=alignment	Specify the alignment for the search string, default is ALN=F (fullword) • D—Doubleword • F—Fullword • H—Halfword • B—Byte

Alignment is used to specify the storage boundary where MSCN will look for the search string.

- ALN=D, MSCN will only check storage on doubleword boundaries, storage addresses ending in 0 and 8.
- ALN=F, only fullword boundaries, storage addresses ending in 0, 4, 8, or C.
- ALN=H, halfword boundaries, storage addresses ending in 0, 2, 4, 6, 8, A, C, E.
- ALN=B, all storage addresses are checked.

Modifying Memory

The MZAP line command uses Cross Memory Services to modify memory in any address space that is swapped-in. (Cross Memory Services does not allow access to swapped-out address spaces.) Keywords specify the verify and/or replace values. Both the verify and replace functions are optional; a replace may be performed without a verify. If both verify and replace are requested, the replace function is suppressed if the verify function fails.

Keyword	Function
VER=*hhhhhhhh*	Specifies verify value. 1 to 4 HEX bytes.
REP=*hhhhhhhh*	Specifies replace value. 1 to 4 HEX bytes. Length must not be greater than the VER= length.

Figure 26 illustrates use of the MZAP line command:

Figure 26 • MZAP line command

```
JSEL JNM=WERXSHPT
JOBN WERXSHPT
ASID      164
CMDA 164            WERXSHPT SELECTED
ADDR 6FF6
DUML DUMP ASID   164/WERXSHPT   ADDRESS:00006FF6
MZAR VER=0101,REP=0111
+   VER:  ASID   164   ADDR 00006FF6   DATA 0101
+   REP:  ASID   164   ADDR 00006FF6   DATA 0111
DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMH 00006FF6 +000                0111 00000064 00000000   *                *
```

Master Console Support

PreAlert MVS allows authorized users to display an image of the Master Console, issue MVS commands, display retained messages, and delete retained messages.

Command	Function
MCON	Displays a line of the Master Console.
RPLY	Displays any outstanding Operator Reply Elements.
COMD	Provides a line for entry of MVS commands.
MDRM	Display retained messages.
MDOM	Delete retained messages.

In Figure 27 on page 57, the last line on the CONSOLE screen display is for command input. Position the cursor at the COMMAND input line, type `D T`, and press Enter. After waiting 2 to 3 seconds, press Enter.

The audit trail message displays, showing your user ID and the command you just entered. (Indicated by the underlined text in Figure 27.)

Figure 27 • Master Console support

```
COMMAND:________   CONSOLE    22:47:00.8  93.060  45.68%
.ATH  ON
MCON  - JOB 9799  $HASP395 MFD040D  ENDED
MCON              $HASP309    INIT  2 INACTIVE ******** C=AI
MCON    JOB 9907  IEC502E RK 582,OS0026,SL,PMCHA,S030S,PNT1.CUSTSAVE.S030S.SOR
MCON    JOB 9907 *IEC501A M MCON582,PRIVAT,SL,6250 BPI,PMCHA,S030S,
MCON    PNT1.CUSTSAVE.S030S.SORTOUT
MCON  - JOB 9910 +IDMS DC201006 V1 T1 CV-STATUS PROGNAME SUBSCHEM -RU-TASK-
MCON  - --LOCAL-IDENT-- PRI
MCON  - JOB 9910  +IDMS DC201006 V1 T1  I ABORT  MFB0018D PMF3SS07         61
MCON  -  BATC 207960582K
MCON 00  TSU 9921  IEE136I LOCAL: TIME=22.46.55 DATE=90.305  GMT: TIME=22.46.55
MCON      DATE=90.305
MCON  -  TSU 9921  PREALERT USER: TREY    ISSUED: D T
MCON     JOB 9907  IEC705I TAPE ON 582,OS0029,SL,6250 BPI,PMCHA,S030S,
MCON     PNT1.CUSTSAVE.S030S.SORTOUT
MCON IEE152I      ENTER      CANCEL      D C,K
MCON IEE163I MODE= RD
==============================================================================RPL
Y FFFB 20.51.27 JOB 9910 @56 REPLY WITH REQUEST TO IDMS V1FFFB 01.55.58 JOB RPLY
9494 @74 REPLY WITH REQUEST TO IDMS V90
RPLY
==============================================================================
COMD
```

Figure 28 on page 58, shows the CONSRMQ screen used to display and delete retained messages.

The MDRM line command displays the message ID, message type, and time stamp followed by the message text. Message type displays as I for Information messages, E for Eventual action messages, and C for Critical eventual action messages. Refer to IBM manual *OS/390 V2R5 MVS Routing and Descriptor Codes* for more information on message types.

Use the MDOM line command to delete a retained message. Specify the message ID with the MSG=*nnn* keyword.

Figure 28 • MDOM line command

```
COMMAND:            CONSRMQ    17:04:05.9  99.321  82.37% .TUT for Tutorial
.  MVS Master Console Retained Message Queue
MDRM      269  C  15.16.17 JOB02867 *PREALERT RETAINED MESSAGE TEST
+         264  C  15.12.09 JOB02856 @PDSALTER07-W ERROR: MEMBER TSTALTER AT:
+                           TCR.R43.DIST.ALL.COBOLII.LOADLIB DLIB<
+         250  C  08.19.39          *ILR006E COMMON PAGE DATA SET FULL, OVERF
+                           LOWING TO PLPA DATA SET
+         249  I  05.20.14 STC02146 *DSNT405E -DB2M DSNTLIDE DISPATCH PRIORIT
+                           IES NOT IN SYNC: IRLM    : 0071 COMPARED TO DB2
+                             : 0071
.
.  Enter MSG=nnnnn (message id) to delete message
MDOM MSG=269
+    MESSAGE ID      269 DELETED
```

2 Menu Reference

This chapter describes the utilization of the Master Menu facility within PreAlert MVS. These topics are covered:

MVSMENU 61
MVSMENU, MVSM1 62
MVSMENU, MVSM2 79
MVSMENU, MVSM3 91
MVSMENU, MVSM4 111
MVSMENU, MVSM5 119
PAMENU 126

General information about the use of the Master Menu facility includes:

- Select menus by placing the cursor on the menu name and pressing Enter.
- To exit the current menu screen, use the .END control command (usually PF3 key), or type `.END` in the COMMAND area and press Enter. Repeat this procedure for each level of screen menu being viewed. To return to the Main or first level menu, type the `.ESC` in the header area and press Enter.
- Comments have been added to each menu to describe the contents, define an equation, or clarify a statistic. These comments can be removed as you become proficient with the PreAlert MVS product.
- Should you want to modify the menus or the line commands contained in them, you can edit the member in the PreAlert MVS Help file. Not all menus satisfy every data center; thus, flexibility has been provided for maintaining your own screen definitions.

Figure 29 shows the Primary Menu screen for all PreAlert MVS users.

Figure 29 • PreAlert Primary MENU

```
.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
COMMAND:            MAINMENU   09:13:34.5  98.317   7.31% .TUT for Tutorial
.                     PreAlert Primary MENU
.
.
MENU MVSMENU  :     PreAlert/MVS INTERFACE
.
MENU IDMSMENU :     PreAlert/IDMS INTERFACE
.
MENU PAMENU   :     PreAlert FUNCTIONAL FACILITIES
.
MENU SCREENS  :     DISPLAY THE SCREENS LIST
.
.
.
.
.
.    Position the cursor on the desired MENU name, and press ENTER.
.
.
.
SID  SYSID=CPAC  CPU=2003/027025  MVS=SP6.0.4   PREALERT=V4.R1.0
```

All PreAlert MVS menus and screens are contained as members in the PreAlert MVS help file, using the menu name or screen name as the member name. ISPF edit may be used to edit the menu screens to add additional menu references or to delete any unwanted references.

Note:

The second menu on the PreAlert MVS Primary Menu is MENU IDMSMENU, PreAlert IDMS INTERFACE. This is for PreAlert IDMS installations only.

MVSMENU

The PreAlert MVS Interface Primary Menu, MVSMENU (Figure 30), is selected from the PreAlert MVS Primary Menu.

Figure 30 • MVSMENU

```
.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
COMMAND:            MVSMENU    09:15:36.6  98.317   6.62% .TUT for Tutorial
Menus Active:   MAINMENU
.                 PreAlert / MVS Interface
.                        Primary MENU
.
.
MENU MVSM1    :     ADDRESS SPACE (JOB) ANALYSIS
.
MENU MVSM2    :     DEVICE (DISK AND TAPE) ANALYSIS
.
MENU MVSM3    :     MVS SYSTEM ANALYSIS
.
MENU MVSM4    :     MVS EXCEPTION ANALYSIS
.
MENU MVSM5    :     MVS SYSTEM SERVICES
.
.
MENU PAMENU   :     PREALERT FUNCTIONAL FACILITIES
.
.
.    Position the cursor on the desired MENU name, and press Enter.
.
SID  SYSID=CPAC  CPU=2003/027025  MVS=SP6.0.4   PREALERT=V4.R1.0
```

From this menu, you can access Address Space Analysis, Device Analysis, MVS System Analysis, MVS Exception Analysis, and MVS System Services. These options of the PreAlert MVS MVSMENU are described and illustrated in the subsections that follow.

MVSMENU, MVSM1

The PreAlert MVS Address Space (Job) Analysis menu (Figure 31) is selected from the PreAlert MVS Interface Primary Menu.

Figure 31 • PreAlert MVS Address Space Analysis menu

```
 COMMAND: __________ MVSM1      14:20:53.5  94.060  19.62% .TUT for Tutorial
.                  PreAlert / MVS Interface
.                   Address Space Analysis
.
MENU ALLJOB   :    ACTIVE JOBS, STC AND TSO
.
MENU JOBCPU   :    JOB, STC AND TSO; CPU USAGE, SORTED ON CPU RATE
MENU JOBRATE  :    JOB, STC AND TSO; CPU, I/O, PAGING RATES
MENU JOBSRM   :    JOB, STC AND TSO; SRM STATISTICS
MENU JOBSTOR  :    JOB, STC AND TSO; STORAGE USAGE
.
MENU ASHL     :    ADDRESS SPACE HORIZONTAL DISPLAY
MENU JOBPLOT  :    CPU PLOTS FOR THE TOP CPU USERS
MENU JOBENQ   :    JOBS AND STC WAITING ON AN ENQUEUE
.
MENU TRACE    :    ADDRESS SPACE TRACE
.
MENU TSO      :    DISPLAY ACTIVE TSO USERS
.
MENU WAIT     :    WAIT ANALYSIS BY JOB NAME
MENU TSOWAIT  :    WAIT ANALYSIS FOR A TSO PERFORMANCE GROUP
.
.    Position the cursor on the desired MENU name, then press Enter.
```

Menu references may be added or deleted by editing the MVSM1 member of the PreAlert MVS help file. The text that follows describes and illustrates the screen options available through the PreAlert MVS Interface Address Space Analysis menu.

ALLJOB

The ALLJOB screen (Figure 32) is selected from the Address Space Analysis menu. It describes the basic status of all active batch jobs, started tasks, and TSO users.

Figure 32 • ALLJOB screen

```
COMMAND:____________ALLJOB     14:51:22.7  93.060  98.92% .TUT for Tutorial
JSEL SEL=JST,TRN=Y
JOBN LLA      VLF      ACF2     RMF      LOGROUTE SLS0     JES2     JGMGSYA1 +
PROC LLA      VLF      IEFPROC  IEFPROC  LOGROUTE IEFPROC  IEFPROC  STEP010
STEP
JSTA *WAT*NSW *WAT*NSW *WAT*NSW  WAT*NSW  WAT*NSW *WAT*NSW  WAT*NSW  CPU*RES
CPUR     .00%     .00%     .00%     .09%     .00%     .04%     .06%   13.94%
TMTR    3:14D    3:14D    3:14D    3:14D    3:14D    3:14D   10:46H    1:10M
====  ======================================================================
JOBN AUTOMATE IDMSDC7  LXA7200Y TTNGSYA  IDMSDC6  PGA3999E PPAY303R CDBGSYAF +
PROC ATM30    IEFPROC  STEP1    $TSUSRDP IEFPROC  GA3E999  PAYR303  SEXT010E
STEP                                               S999010 SEXT020T
JSTA *WAT*NSW  WAT*NSW  I/O*RES  WAT*LSW  WAT*NSW  I/O*RES  I/O*RES  I/O*RES
CPUR     .04%     .01%    4.45%     .00%     .01%     .22%     .72%     .46%
TMTR    1:17D    7:21H   26:45M   17.32S    5:22H    1:02H   26:10M   10:18M
==== ==========================   7 LINE(S) REPEATED ==========================
JOBN APSWPROB NET      TSO      FOCPRD   TEGVB013 ADMPRINT ATP      DPM      +
PROC STEP01   VTMRMT   STEP1    HLISNK   IMSPROD  ADMPRINT AT10     DPM
STEP                                    G
JSTA *WAT*NSW  WAT*NSW  WAT*LSW  WAT*LSW  WAT*RES  WAT*LSW  WAT*NSW *WAT*NSW
CPUR     .00%     .50%     .00%     .00%     .56%     .00%     .00%     .18%
TMTR    3:08D   23:29H    3:14D   11:21H    3:33M    3:14D    3:14D    3:14D
==== ==========================   7 LINE(S) REPEATED ==========================
JOBN ELD      ESP1     AOI      ESP1     HCF      HSM      MULTSESS NETTARS  +
```

These line commands are used with the ALLJOB screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
JSTA	Job Status
CPUR	CPU Utilization, by System
TMTR	Time in Transaction
====	Line Separator / Auto-repeat

Additional keywords may be used with the JSEL line command to select only the desired address spaces. Refer to "Address Space Selection" on page 174.

JOBCPU

The JOBCPU screen (Figure 33) is selected from the Address Space Analysis menu. It displays CPU utilization (by system) for all active address spaces, sorted on their CPU rate.

Figure 33 • JOBCPU screen

```
COMMAND:_____________JOBCPU     14:51:50.0  93.060  97.49% .TUT for Tutorial
JSEL SEL=JST,TRN=Y,SRT=CPUR
JOBN JGMGSYA1 VRSGSYD  IDMSDC1  LXA7200Y CAS3331  JPGGSYA  HSM      PPTS130E +
TMTR    1:10M   34.88S   46:23M   26:45M    1:10M    5.56S    6:16H   36:59M
DPRT  80(128)  80(128)  DC(220)  60( 96)  80(128)  A6(166)  AB(171)  97(151)
CPUR   13.94%   13.54%    4.84%    4.45%    2.22%    1.65%    1.64%    1.61%
CPU    23.65S    1:57M    2:52H    1:02M    8.53S   15.86S    3:28H    3:54M
==== ==========================================================================
JOBN DSN2DBM1 DLG5113R PXD4500  AOI      PVIP022R PVIP027R ASAT     PAAR220R +
TMTR    6:07H    3:19M    7:02M    3:14D   54:56M   54:48M   50:06M    2:36H
DPRT  DB(219)  87(135)  81(129)  AB(171)  BE(190)  BE(190)  FF(255)  94(148)
CPUR   1.57%    1.32%    1.24%    1.20%    1.11%    1.11%    1.00%     .88%
CPU   18.04S   15.25S    1:08M    3:45H    3:21M    2:57M    2:24M    9:15M
==== ========================   6 LINE(S) REPEATED ========================
JOBN IDMSDC2  PPAY303R TCGVB013 PSLR300U MRJGERIA PMGV049U TEGVB013 PAAR106R +
TMTR   7:12H    26:10M    4:15M    2:47H    4:07M    6:10M    3:33M   14:55M
DPRT CF(207)   96(150)  95(149)  93(147)  76(118)  90(144)  93(147)  94(148)
CPUR    .85%      .72%     .72%     .66%     .65%     .62%     .56%     .53%
CPU    10:57M    1:15M   13.85S    1:05M    7.51S    7.91S    4.14S   27.28S
==== ========================   6 LINE(S) REPEATED========================
JOBN NET      NETVIEW  CDBGSYAF OCCI     PVIP031R MULTSESS PVIP118R THGVB013 +
TMTR   23:29H   14:09H   10:18M    3:13D   29:50M    3:13D    3:13H    1:51M
DPRT  EF(239)  EC(236)  86(134)  DD(221)  BE(190)  EC(236)  BE(190)  97(151)
CPUR     .50%     .48%     .46%     .38%     .34%     .32%     .26%     .23%
```

These line commands are used with the JOBCPU screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
TMTR	Time in Transaction
DPRT	Dispatching Priority
CPUR	CPU Utilization, by System
CPU	Total Job Step CPU Time
====	Line Separator / Auto-repeat

The JSEL line command includes the SRT=CPUR keyword to sort the display based on the CPU rate for each address space. The address spaces using the most CPU are displayed first.

JOBRATE

The JOBRATE screen (Figure 34) is selected from the Address Space Analysis menu. It displays CPU, I/O, and paging rates for all active address spaces, sorted on CPU rate.

Figure 34 • JOBRATE screen

```
COMMAND:____________JOBRATE    14:52:07.2  93.060  97.71% .TUT for Tutorial
JSEL SEL=JST,TRN=Y,SRT=CPUR
JOBN JGMGSYA1 VRSGSYD  IDMSDC1  LXA7200Y CAS3331  JPGGSYA  HSM      PPTS130E +
CPUR   13.94%   13.54%    4.84%    4.45%    2.22%    1.65%    1.64%    1.61%
IOCR       .0      5.4     81.5     24.2     35.9    139.4    119.1    162.2
PINR       .0       .0       .0       .0       .0       .0       .0       .0
TPIR       .0       .0       .0       .0       .0       .0       .0       .0
SWAP
==== ========================================================================
JOBN DSN2DBM1 DLG5113R PXD4500  AOI      PVIP022R PVIP027R ASAT     PAAR220R +
CPUR   1.57%    1.32%    1.24%    1.20%    1.11%    1.11%    1.00%     .88%
IOCR      .9    163.1    458.8       .0     41.3     22.5       .2     47.6
PINR      .0       .0       .0       .0       .0       .0       .0       .0
TPIR      .0       .0       .0       .0       .0       .0       .0       .0
SWAP
==== ==========================   7 LINE(S) REPEATED ========================
JOBN IDMSDC2  PPAY303R TCGVB013 PSLR300U MRJGERIA PMGV049U TEGVB013 PAAR106R +
CPUR    .85%     .72%     .72%     .66%     .65%     .62%     .56%     .53%
IOCR    45.4     55.8     25.1     47.1     43.0      6.5     28.6     37.5
PINR      .0       .0       .0       .0       .0       .0       .0       .0
TPIR      .0       .0       .0       .0       .0       .0       .0       .0
SWAP
==== ==========================   7 LINE(S) REPEATED ========================
JOBN NET      NETVIEW  CDBGSYAF OCCI     PVIP031R MULTSESS PVIP118R THGVB013 +
```

These line commands are used with the JOBRATE screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
CPUR	CPU Utilization, by System
IOCR	Current I/O rate
PINR	Local Page-in rate
TPIR	Total Page-in rate
SWAP	Swap Reason
====	Line Separator / Auto-repeat

The SRT=CPUR keyword may be changed to SRT=IOCR or SRT=PINR to sort the address spaces on either the I/O rate or local page-in rate.

JOBSRM

The JOBSRM screen (Figure 35) is selected from the Address Space Analysis menu. It displays SRM related information for all active address spaces.

Figure 35 • JOBSRM screen

```
COMMAND:____________JOBSRM     14:52:18.8  93.060  96.18% .TUT for Tutorial
JSEL SEL=JST,TRN=Y
JOBN LLA      VLF      ACF2     RMF      LOGROUTE SLS0     JES2     JGMGSYA1 +
PROC LLA      VLF      IEFPROC  IEFPROC  LOGROUTE IEFPROC  IEFPROC  STEP010
TMTR    3:14D    3:14D    3:14D    3:14D    3:14D    3:14D   10:46H    1:10M
PGN     9   1    9   1   18   1   15   1    9   1    9   1   18   1    5   4
DOMN        6        6        7        7        6        6        7        2
OBJ         2        2        3        3        2        2        3        4
SUAL 34.5704M 32.5229M 3.82742M 33.6220M      871 70.6571M 143.431M 2.64316M
==== ========================================================================
JOBN AUTOMATE IDMSDC7  LXA7200Y TTNGSYA  IDMSDC6  PGA3999E PPAY303R CDBGSYAF +
PROC ATM30    IEFPROC  STEP1    $TSUSRDP IEFPROC  GA3E999  PAYR303  SEXT010E
TMTR    1:17D    7:21H   26:45M   17.32S    5:22H    1:02H   26:10M   10:18M
PGN     9   1   13   1   37   1   25   2   31   1    6   1    6   1    5   4
DOMN        6        8       13        3        8       12       12        2
OBJ         2        1        5        2        1        2        2        4
SUAL 991.071M 25.9338M 11.3969M          11.9868M 39.6110M 3.31872M   713665
==== ========================   8 LINE(S) REPEATED========================
JOBN APSWPROB NET      TSO      FOCPRD   TEGVB013 ADMPRINT ATP      DPM      +
PROC STEP01   VTMRMT   STEP1    HLISNK   IMSPROD  ADMPRINT AT10     DPM
TMTR    3:08D   23:29H    3:14D   11:21H    3:33M    3:14D    3:14D    3:14D
PGN     9   1   17   1        1    9   1    6   1    9   1    9   1    9   1
DOMN        6        7                 6       12        6        6        6
OBJ         2        3                 2        2        2        2        2
```

These line commands are used with the JOBSRM screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
TMTR	Time in Transaction
PGN	Performance Group Number and Period
DOMN	Domain Number
OBJ	Objective Number
SUAL	Total service units since last swap
====	Line Separator / Auto-repeat

To monitor SRM values for a particular domain, add the DMN=*nnn* keyword to the JSEL selection keywords. Also, the SWRV line command may be added to display the swap recommendation value for each address space.

JOBSTOR

The JOBSTOR screen (Figure 36) is selected from the Address Space Analysis menu. It displays central storage usage and common storage usage statistics for all active batch jobs, started tasks, and TSO users; sorted on the central storage usage of each address space.

Figure 36 • JOBSTOR screen

```
COMMAND:_____________JOBSTOR    13:19:44.7  98.051  5.43% .TUT FOR Tutorial
JSEL SEL=JST,TRN=Y,SRT=FMCT
JOBN DB3PDBM1 DB3TDBM1 VLF     NET    TCPIP    TUBES    ASFCORPC JES2      +
PROC IEFPROC  IEFPROC  VLF     NET    TCPIP             ASFMAIN  IEFPROC
STEP
FMCT   15972K    4880K    2468K    1896K    1872K    1772K    1448K    1028K
ESCT     564K    1204K    1204K     260K     516K      72K     148K     596K
CSTT     195K     187K      928    1765K      18K     3994      24K     235K
CSAT     186K     186K      352    1764K      18K     3688      20K     234K
CSAB     6400     6400               27K      168      128     1872      19K
SQAT       48       48      256                                3520       48
SQAB       48       48      256                                3250       48
ASPL FLD=FMCT,PLT=10000
+    JOB NAME  REAL STG   ...1K...2K...3K...4K...5K...6K...7K...8K...9K..10K
+    DB3PDBM1    15972K   ***************************************************
+    DB3TDBM1     4880K   *************************|....|....|....|....|....|
+    VLF          2468K   ************..|....|....|....|....|....|....|....|
+    NET          1896K   *********|....|....|....|....|....|....|....|....|
+    TCPIP        1872K   *********|....|....|....|....|....|....|....|....|
+    TUBES        1772K   *********|....|....|....|....|....|....|....|....|
+    ASFCORPC     1448K   *******..|....|....|....|....|....|....|....|....|
+    JES2         1028K   *****....|....|....|....|....|....|....|....|....|
```

These line commands are used with the JOBSTOR screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
FMCT	Central Storage Size
ESCT	Extended Storage Size
CSTT	Total Common Storage Size

Line Command	Description
CSAT	Total Common System Area (CSA) Size
CSAB	Low CSA Size (below 16 MB line)
SQAT	Total System Queue Area (SQA) Size
SQAB	Low SQA Size (below 16 MB Line)
ASPL	Address Space Plots
====	Line Separator/Auto-repeat

The ASPL line command displays the central storage size for each address space specified by the JOBN line command. The FLD=*xxxx* keyword may be used to plot the other storage usage statistics. Refer to "Address Space Plots" on page 168.

ASHL

The ASHL screen (Figure 37) is selected from the Address Space Analysis Menu. Address Spaces are displayed in a horizontal format using the ASHL line command.

Figure 37 • ASHL screen

```
COMMAND: __________ ASHL       11:38:53.1  94.060  15.50% .TUT for Tutorial
.  MVS Address Space Data, horizontal display

JSEL SEL=JTS,CPU=1,SRT>CPUR

.  Specify 1, 2, 3, 4, or 5 for the ASHL display format number.
ASHL 1 1/5 CPU Pct   CPUT    Dprty   Wssze     IOrte   Jobstat  Swap Reasn Pgrte
+ DEVSAJ      2.24%   1:18M  FF(255) 1192K      .6    WAT LSW TERM-IN        .0
+ DEVSME      2.22%   2:14M  FF(255)  304K      .2    WAT LSW TERM-IN        .0
+ LSCMSTR     1.95%  43:54M  FA(250)  968K      .0   *WAT*NSW                .0
+ JES2        1.78%  38:24M  5D( 93) 1484K     1.4    WAT*NSW                 .0
+ DEVWBJ      1.38%  26.58S  FF(255) 1620K      .8    WAT LSW TERM-IN        .0
+ SPTDJM      1.38%   1:40M  FF(255)  968K      .7    WAT LSW TERM-IN        .0
+ RMF         1.18%  32:59M  6D(109)  256K      .0    WAT*NSW                 .0
+ DEVNRW      1.12%   2:26M  FF(255) 1428K      .6    WAT LSW TERM-IN        .0

ASPL
+  JOB NAME   CPU RATE  ...10...20...30...40...50...60...70...80...90..100
+  DEVSAJ        2.24%  *...|....|....|....|....|....|....|....|....|....|
+  DEVSME        2.22%  *...|....|....|....|....|....|....|....|....|....|
+  LSCMSTR       1.95%  *...|....|....|....|....|....|....|....|....|....|
+  JES2          1.78%  *...|....|....|....|....|....|....|....|....|....|
```

These line commands are used with the ASHL screen:

Line Command	Description
JSEL	Address Space Data selection keywords
ASHL	Address Space Data display, horizontal format
ASPL	Address Space data plots

The ASHL line command displays four different formats. Refer to "Address Space Horizontal Display" on page 157 for a description of these formats.

JOBPLOT

The JOBPLOT screen (Figure 38) is selected from the Address Space Analysis menu. This screen displays CPU utilization plots for all active address spaces; sorted on their CPU rate.

Figure 38 • JOBPLOT screen

```
COMMAND:_____________JOBPLOT    14:52:31.1  93.060  95.82% .TUT for Tutorial
JSEL SEL=JST,TRN=Y,SRT=CPUR
JOBN JGMGSYA1 VRSGSYD  IDMSDC1  LXA7200Y CAS3331  JPGGSYA  HSM      PPTS130E +
PROC   STEP010  $TSUSR04 IEFPROC  STEP1    $TSUSR01 $TSUSRDP HSMIVP   S130010J
STEP                                                                  S110010
FMCT   2292K     568K   31828K    4260K    1368K    1212K    2824K     588K
IOCR      .0      5.4     81.5     24.2     35.9    139.4    119.1    162.2
CPUX  83.69%   81.27%   29.05%   26.71%   13.39%   10.00%    9.91%    9.68%
ASPL
+  JOB NAME   CPU RATE  ...10...20...30...40...50...60...70...80...90..100
+  JGMGSYA1     83.69%  ******************************************..|....|
+  VRSGSYD      81.27%  *****************************************...|....|
+  IDMSDC1      29.05%  ***************....|....|....|....|....|....|....|
+  LXA7200Y     26.71%  *************.|....|....|....|....|....|....|....|
+  CAS3331      13.39%  *******..|....|....|....|....|....|....|....|....|
+  JPGGSYA      10.00%  *****....|....|....|....|....|....|....|....|....|
+  HSM           9.91%  *****....|....|....|....|....|....|....|....|....|
+  PPTS130E      9.68%  *****....|....|....|....|....|....|....|....|....|
==== ==================================================================
JOBN DSN2DBM1 DLG5113R PXD4500  AOI      PVIP022R PVIP027R ASAT     PAAR220R +
PROC IEFPROC  S200030  $TSUSR01 AOI      VIPR023  VIPR028  IEFPROC  AARR220
STEP                                    S023040  S028110           SEXT010R
FMCT  26296K    4184K    4544K    1420K    3308K    3124K    1276K    2776K
IOCR      .9    163.1    458.8       .0     41.3     22.5       .2     47.6
```

These line commands are used with the JOBPLOT screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname

Line Command	Description
PROC	Procedure Name
STEP	Step Name
FMCT	Central Storage Size
IOCR	Current input and output rate
CPUX	CPU Utilization, by Processor
ASPL	Address Space Plots
====	Line Separator / Auto-repeat

The ASPL line command plots the CPU utilization (by processor) for each address space specified by the JOBN line command. The FLD=IOCR or FLD=FMCT keywords may be used with the ASPL line command to plot the input and output rate or central storage sizes for the selected address spaces.

JOBENQ

The JOBENQ screen (Figure 39) is selected from the Address Space Analysis menu. This screen displays enqueue contention in batch jobs and started tasks.

Figure 39 • JOBENQ screen

```
COMMAND:____________JOBENQ     14:52:59.3  93.060 101.42% .TUT for Tutorial
.    The following display shows only jobs and started tasks waiting on one
.    or more enqueues. JENQ shows all enqueue contention for those jobs.
JSEL SEL=JS,ENQ=Y,REP=N
JOBN IDMSDC2  FOCTEST  WERXSHPQ
SWAP          DET-WAIT DET-WAIT
WAIT             1:01M   17.32S
QMAJ IDMSCV   FOCHLISU SYSDSN
QMIN BATC     WJV0438  WERXSHP.
QASI 220 EXC  258 EXC  137 EXC
QJNM TGMB100U WJV0438  WERXSHP
QCNT        1        2        1
JENQ IDMSDC2  EXC WAIT SYS  IDMSCV     8 BATC
+      C2C1E3C3 2B2D3776
+    FOCTEST  EXC WAIT SYS  FOCHLISU  12 MAC8842  O
+      D4C1C3F8 F8F4F240 3E960E58
+    FOCTEST  EXC WAIT SYS  FOCHLISU  12 WJV0438
+      E6D1E5F0 F4F3F840 3E1C37C0
+    WERXSHPQ EXC WAIT SYS  SYSDSN    19 WERXSHP.PREALERT.CNTL
==== ========================================================================
.    Dataset enqueue contention.
ENQU
+   SYSDSN   SYS   19 WERXSHP.PREALERT.CNTL
+     WERXSHP  SHR OWNS               WERXSHPQ EXC WAIT
```

These line commands are used with the JOBENQ screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
SWAP	Swap Reason
WAIT	Wait Time
QMAJ	Enqueue Major Name
QMIN	Enqueue Minor Name, first 8 bytes
QASI	Enqueue Owner address space ID and status
QJNM	Enqueue Owner Jobname
QCNT	Enqueue Count
JENQ	Enqueue data for selected Address Spaces
====	Line Separator / Auto-repeat
ENQU	System Enqueues Display

The JENQ line command displays the enqueues that the address spaces are waiting on. Additionally, the ENQU line command displays any dataset enqueue contention.

TRACE

The TRACE screen (Figure 40) is selected from the Address Space Analysis menu. It displays a trace of an address space's activity over 50 PreAlert MVS samples.

Figure 40 • TRACE screen

```
COMMAND:____________TRACE      14:54:24.4  93.060 102.18% .TUT for Tutorial
.    To trace a job:
.       Use the JSEL selection keywords to display the desired job, then
.       enter its ASID to the right of the .ASD line command.
.
JSEL SEL=JS,SWP=I,REP=N
JOBN LLA      VLF      ACF2     RMF      LOGROUTE SLS0     JES2     JGMGSYA1 +
ASID       10       12       13       14       16       17       18       21
==== ========================================================================
.ASD 237
.TRC 002
TRAC TCB ACTIVE     ********* * ** ***********************************
TRAC TCB COUNT       11 11          111      1111     1 111   11  1111
TRAC TCB CPU WAIT
TRAC SRB ACTIVE      ******** * ** ************************ ***********
TRAC SRB  COUNT
TRAC SHORT WAIT     1122 1322 2 11 11 1121211113123223 1   11211311 13
TRAC SWAP COUNT
TRAC SWAP REASON
TRAC PAGE COUNT
TRAC I/O COUNT       42121332 2 11 1233 212111333 31242122 12223236336
TRAC    ASID = 237  IDMSDC1    INTERVAL =  .02
```

These line commands are used with the TRACE screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
ASID	Address Space ID
====	Line Separator/Auto-repeat
.ASD	Specifies Trace ASID
.TRC	Specifies Trace Interval (1/100ths second)
TRAC	Address Space Trace

The address space ID (ASID) of the job to be traced is entered in the .ASD line command. The address space traces over 50 samples taken at the interval specified in the .TRC line command. Each TRAC line command displays a separate item traced. Refer to "Address Space Trace" on page 173.

TSO

The TSO screen (Figure 41) is selected from the Address Space Analysis menu. This screen displays information on all active TSO users. The information is sorted by transaction time.

Figure 41 • TSO screen

```
COMMAND:_____________TSO        14:54:36.1  93.060  98.96% .TUT for Tutorial
JSEL SEL=T,TRN=Y,SRT=TMTR
JOBN PXD4500  CAS3331  VRSGSYD  TTNGSYA  GXWGSYC  JPGGSYA  WERXSHP
PROC $TSUSR01 $TSUSR01 $TSUSR04 $TSUSRDP $TSUSR05 $TSUSRDP $TSUSR02
PGN     2   4    2   4   24   4   25   2   23   1   25   3   22   1
DOMN        5        5        5        3        3        4        3
TMTR    7:02M    1:10M   34.88S   17.32S    7.50S    5.56S     .18S
CPUR    1.24%    2.22%   13.54%     .00%     .06%    1.65%     .15%
DPIR       .0       .0       .0       .0       .0       .0       .0
==== ==========================================================================
```

These line commands are used with the TSO screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname (TSO User ID)
PROC	Procedure Name
PGN	Performance Group number and period
DOMN	Domain Number
TMTR	Time in Transaction
CPUR	CPU Utilization, by system
DPIR	Demand Paging rate
====	Line Separator/Auto-repeat

The JSEL line command includes the TRN=Y keyword to select only active TSO users currently executing a transaction, not users waiting on terminal input.

WAIT

The WAIT screen (Figure 42) is selected from the Address Space Analysis menu. Invoking this screen initiates the Wait Analysis data collector sub-task, and then chains to the WAIT1 screen.

Figure 42 • WAIT screen

```
COMMAND:____________WAIT       14:54:45.7  93.060 103.32% .TUT for Tutorial
.    This screen starts the Wait Analysis data collector sub-task;
.    then Screen Chains to the WAIT1 Screen.
JSEL SEL=J,REP=N
JOBN JGMGSYA1 LXA7200Y PGA3999E PPAY303R CDBGSYAF TEGVB013 PAAR106R PVIP022R +
PROC STEP010  STEP1    GA3E999  PAYR303  SEXT010E IMSPROD  AARR106  VIPR023
STEP                   S999010  SEXT020T          G        SEXT010R S023040
PGN  5   4   37   1    6   1    6   1    5   4    6   1    6   1   99   1
JSTA CPU*RES  I/O*RES  I/O*RES  I/O*RES  I/O*RES  WAT*RES  WAT*RES  I/O*RES
CPUR  13.94%    4.45%     .22%     .72%     .46%     .56%     .53%    1.11%
TMTR   1:10M   26:45M    1:02H   26:10M   10:18M    3:33M   14:55M   54:56M
==== ======================================================================
WBGN WAIT ANALYSIS STARTED
WTIM               WAIT ANALYSIS SAMPLE PERIOD =   .5 SECONDS
WLIM               WAIT ANALYSIS SAMPLE LIMIT =   7200 LEFT =  7200
WPCT               PLOT THRESHOLD SET TO   5%
.ASL 001,WAIT1
```

These line commands are used with the WAIT screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
PGN	Performance Group number and period
JSTA	Job Status
CPUR	CPU Utilization, by system
TMTR	Transaction Time
====	Line Separator/Auto-repeat

Line Command	Description
WBGN	Start Wait Analysis Sub-task
WTIM	Specifies Wait Analysis Sample Interval
WLIM	Specifies Wait Analysis Sample Limit
WPCT	Specifies Wait Analysis Plot Threshold
.ASL	Screen Chaining Count and Screen Name

PreAlert MVS Wait Analysis detects the reasons causing an address space to wait. Such reasons may be I/O or paging. Refer to "Address Space Information" on page 140 for more information.

WAIT1

The WAIT1 screen (Figure 43) chains from the WAIT screen. WAIT1 performs wait analysis for a specified address space.

Figure 43 • WAIT1 screen

```
COMMAND:____________WAIT1      14:56:05.4  93.060 104.32% .TUT for Tutorial
JSEL SEL=J,REP=N
JOBN JGMGSYA1 LXA7200Y PGA3999E PPAY303R CDBGSYAF TEGVB013 PAAR106R PVIP022R +
PGN    5   4   37   1    6   1    6   1    5   4    6   1    6   1   99   1
JSTA  CPU*RES  I/O*RES  I/O*RES  I/O*RES  I/O*RES  WAT*RES  WAT*RES  I/O*RES
CPUR   13.94%    4.45%     .22%     .72%     .46%     .56%     .53%    1.11%
TMTR    1:10M   26:45M    1:02H   26:10M   10:18M    3:33M   14:55M   54:56M
==== ======================================================================
.    To select a job for Wait Analysis; enter the Jobname below.
WSJB               ENTER JOB NAME
.    To display the results of Wait Analysis; enter the Jobname to the
.    right of the following line commands.
WCTJ IDMSDC1       SAMPLES  210    ELAPS  11:06MIN
+    CPU  STIM Q3D1  3D1  231  232  4AA  214  18B  21D  4B8  201  3C9 Q214 Q4B8
+     7.1  196   35   29   29   21   19   15   14   11   10    9    7    7    6
WPCJ IDMSDC1       SAMPLES  210    ELAPS  11:06MIN
+    CPU  STIM Q3D1  3D1  231  232  4AA  214  18B  21D  4B8  201  3C9 Q214 Q4B8
+     7.1 36.9  6.6  5.4  5.4  3.9  3.5  2.8  2.6  2.0  1.8  1.6  1.3  1.3  1.1
WPLJ IDMSDC1       SAMPLES  210    ELAPS  11:06MIN
+   CPU            7.1%  ****|....|....|....|....|....|....|....|....|....|
+   STIM   196    36.9%  ******************.|....|....|....|....|....|....|
+   Q3D1    35     6.6%  ***.|....|....|....|....|....|....|....|....|....|
+    3D1    29     5.4%  ***.|....|....|....|....|....|....|....|....|....|
+    231    29     5.4%  ***.|....|....|....|....|....|....|....|....|....|
```

These line commands are used with the WAIT1 screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PGN	Performance Group number and period
JSTA	Job Status
CPUR	CPU Utilization, by system
TMTR	Transaction Time
====	Line Separator/Auto-repeat
WSJB	Select Jobname for Wait Analysis
WCTJ	Display Wait Counts
WPCJ	Display Wait Percents
WPLJ	Plot Wait Percents

Specify the jobname with the WSJB line command. Results are displayed by the WCTJ, WPCJ, and WPLJ line commands. Refer to "Address Space Information" on page 140 for a description of the wait analysis codes.

TSOWAIT

The TSOWAIT screen (Figure 44) is selected from the Address Space Analysis menu. It initiates the wait analysis data collector sub-task, then chains to screen TSOWAIT1.

Figure 44 • TSOWAIT screen

```
COMMAND:            TSOWAIT    10:55:55.7  98.296  11.12% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   MVSM1
.    This screen starts Wait Analysis data collector sub-task;
.    then screen chains to screen - TSOWAIT1.
JSEL SEL=T,TRN=Y,REP=N
JOBN SPTPJB
PROC DEVPROC
STEP
PGN
JSTA  WAT*RES
CPUR     .00%
TMTR    1.28S
====
==========================================================================
WBGN WAIT ANALYSIS STARTED
WTIM               WAIT ANALYSIS SAMPLE PERIOD =   .5 SECONDS
WLIM               WAIT ANALYSIS SAMPLE LIMIT =    600 LEFT =   600
WPCT               PLOT THRESHOLD SET TO   5%
.ASL 001,TSOWAIT1
```

These line commands are used with the TSOWAIT screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
PGN	Performance Group number and period
JSTA	Job Status
CPUR	CPU Utilization, by system
TMTR	Transaction Time
====	Line Separator/Auto-repeat
WBGN	Start Wait Analysis Sub-task
WTIM	Specifies Wait Analysis Sample Interval

Line Command	Description
WLIM	Specifies Wait Analysis Sample Limit
WPCT	Specifies Wait Analysis Plot Threshold
.ASL	Screen Chaining Count and Screen Name

PreAlert MVS Wait Analysis monitors TSO performance groups for response time problems. Refer to "Address Space Information" on page 140 for additional information.

TSOWAIT1

TSOWAIT1 (Figure 45) chains from TSOWAIT. This screen allows you to perform wait analysis for a TSO performance group.

Figure 45 • TSOWAIT1 screen

```
COMMAND:____________TSOWAIT1   15:00:21.9  93.060  95.85% .TUT for Tutorial
JSEL SEL=T,TRN=Y,REP=N
JOBN CAS3331  SDCPNOI  WERXSHP  GXWGSYC  CDHPACI  PAHGSYA  SRTPCSI
PGN    2   4   22   3   22   3   23   1    2   3   25   3    2   4
JSTA CPU*RES  WAT*RES  CPU*RES  WAT*LSW  I/O*RES  CPU*RES  WAT*RES
CPUR   1.87%     .38%     .92%     .08%     .36%    1.77%     .96%
TMTR  10:24M    5.89S    6.12S    3.35S    2.82S   20.17S   44.25S
==== ==========================================================================
.    To select a TSO performance group for Wait Analysis; enter the
.    performance group number (PGN) below.
WSPG              ENTER PERFORMANCE GROUP NUMBER
.    To display the results of Wait Analysis; enter the PGN to the
.    right of the following line commands.
WCTP 002           SAMPLES  102    ELAPS  56.32SEC
+    CPU  SWTI LGSW ECBW CPUW  627  195  3CF QA2C  A2C Q3CF  606 SWDW STIM  A00
+     5.5 2324 1011   73   59   57   24   17   11   11    8    7    7    6    4
WPCP 002           SAMPLES  102    ELAPS  56.32SEC
+    CPU  SWTI LGSW ECBW CPUW  627  195  3CF QA2C  A2C Q3CF  606 SWDW STIM  A00
+     5.5 60.3 26.2  1.8  1.5  1.4   .6   .4   .2   .2   .2   .1   .1   .1   .1
WPLP 002           SAMPLES  102    ELAPS  56.32SEC
+   CPU            5.5%  ***.|....|....|....|....|....|....|....|....|....|
+   SWTI  2324    60.3%  ******************************....|....|....|....|
+   LGSW  1011    26.2%  *************.|....|....|....|....|....|....|....|
```

These line commands are used with the TSOWAIT1 screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PGN	Performance Group number and period
JSTA	Job Status

Line Command	Description
CPUR	CPU Utilization, by system
TMTR	Transaction Time
====	Line Separator/Auto-repeat
WSPG	Select PGN for Wait Analysis
WCTP	Display Wait Counts
WPCP	Display Wait Percents
WPLP	Plot Wait Percents

Specify the performance group number with the WSPG line command. Results are displayed through the WCTP, WPCP, and WPLP line commands. Refer to "Address Space Information" on page 140 for a description of the wait analysis codes.

MVSMENU, MVSM2

The PreAlert MVS Device (Disk and Tape) Analysis menu (Figure 46), MVSM2 is selected from the PreAlert MVS Interface Primary Menu.

Figure 46 • PreAlert MVS Device Analysis menu

```
 COMMAND:__________ MVSM2      14:28:13.6  94.060  17.00% .TUT for Tutorial
.                 PreAlert / MVS Interface
.              Device (Disk and Tape) Analysis
.
MENU DISKIO   :    DISK DEVICE I/O ACTIVITY
MENU DISKXA   :    DISK STATISTICS
MENU DISKBUSY :    DISK STATISTICS, SORTED ON PCT BUSY
MENU DDHL     :    DISK DEVICE HORIZONTAL DISPLAY
.
MENU DTRACE   :    DISK DEVICE TRACE
.
MENU TAPE     :    ALL ONLINE TAPE DEVICES
.
MENU LCUQUEUE :    LCU I/O QUEUEING REPORT
MENU LCURATE  :    LCU I/O ACTIVITY PLOT
.
MENU CHPBUSY  :    CHANNEL PATH ACTIVITY
.
MENU DATASET  :    DATASET INFORMATION
.
.    Position the cursor on the desired MENU name, then press Enter.
.
```

Menu references may be added or deleted by editing the MVSM2 member of the PreAlert MVS help file. The following text describes the screen options available via the PreAlert MVS Interface Device (Disk and Tape) Analysis menu.

DISKIO

The DISKIO screen (Figure 47) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. The DISKIO screen displays the user (jobname) and seek address (cylinder and head) for all active DASD I/Os.

Figure 47 • DISKIO screen

```
COMMAND:____________DISKIO     15:02:03.2  93.060 104.13% .TUT for Tutorial
.    Use the DSEL line command to specify selection parms to select the
.    desired disks. See tutorials 300 thru 309 for additional information.
DSEL
DISK     180      181      182      183      184      185      186      187 +
DVOL   DLB182   PRDX87   DBAX88   PRDX8P   LOC18X   PRDX88   LOC18F   LOC18G
DUSR                                                                *MASTER*
DCYL                                                                   30  9
==== ========================================================================
DISK      188      189      18A      18B      18C      18D      18E      18F +
DVOL   DB1X84   PRDX8O   PRDX8A   DBAX80   SLB183   TMPX84   PRDX83   PRDX8V
DUSR
DCYL
==== ==========================   5 LINE(S) REPEATED ==========================
DISK      190      191      192      193      194      195      196      197 +
DVOL   SLB181   SSWX80   CICX84   PRDX8N   DB4X83   PUB180   STGX88   LOC18B
DUSR                                                TCGV1350          *MASTER*
DCYL                                                  451  0            289  4
==== ==========================   5 LINE(S) REPEATED ==========================
DISK     198      199      19A      19B      19C      19D      19E      19F +
DVOL   PRDX8K   STGX8K   LOC18A   STGX8H   DB4X85   DB2X89   SLB18E   LOC183
DUSR                   *MASTER*                                      *MASTER*
DCYL                     143  2                                        785  3
==== ==========================   5 LINE(S) REPEATED ==========================
```

These line commands are used with the DISKIO screen:

Line Command	Description
DSEL	Disk Selection Keywords
DISK	Disk Device Address (CUA)
DVOL	Disk VOLSER
DUSR	Active input and output, Jobname
DCYL	Active input and output, Cylinder and Head
====	Line Separator/Auto-repeat

For any disk device with an active I/O, the DUSR and DCYL line commands show the jobname and seek address for the I/O. Disk selection keywords may be specified with the DSEL line command. Refer to "Disk Selection Parameters" on page 198.

DISKXA

The DISKXA screen (Figure 48) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen displays device statistics for all online disk devices.

Figure 48 • DISKXA screen

```
COMMAND:____________DISKXA     15:02:22.0  93.060 104.04% .TUT for Tutorial
.    Use the DSEL line command to specify selection parms to select the
.    desired disks. See tutorials 300 thru 309 for additional information.
DSEL
DISK      180      181      182      183      184      185      186      187 +
DVOL   DLB182   PRDX87   DBAX88   PRDX8P   LOC18X   PRDX88   LOC18F   LOC18G
DALC               103       53        9              134        1        1
DOPN                45       29        2               94
DBSY    .00%     .20%    1.48%     .10%     .00%     .43%     .00%     .00%
DDST   .003S    .010S    .003S    .033S    .000S    .014S    .000S    .000S
DIOQ   .000S    .000S    .000S    .000S    .000S    .000S    .000S    .000S
DCUT   .000S    .001S    .000S    .011S    .000S    .003S    .000S    .000S
DDVT   .000S    .000S    .000S    .000S    .000S    .000S    .000S    .000S
DPND   .000S    .001S    .000S    .011S    .000S    .003S    .000S    .000S
DDIS   .000S    .006S    .001S    .019S    .000S    .009S    .000S    .000S
DCON   .003S    .003S    .002S    .003S    .000S    .002S    .000S    .000S
DIOR    .008     .225    4.508     .050     .000     .366     .000     .000
=== ==========================================================================
DISK      188      189      18A      18B      18C      18D      18E      18F +
DVOL   DB1X84   PRDX8O   PRDX8A   DBAX80   SLB183   TMPX84   PRDX83   PRDX8V
DALC       34        7        6       31      199        3       11        9
DOPN        4        1        2       27       87        3        2        3
DBSY    .00%     .16%    1.00%   19.23%    9.08%    1.09%     .07%     .53%
DDST   .000S    .023S    .006S    .015S    .019S    .019S    .017S    .017S
```

These line commands are used with the DISKXA screen:

Line Command	Description
DSEL	Disk Selection Keywords
DISK	Disk Device Address (CUA)
DVOL	Disk VOLSER
DALC	Datasets Allocated on the disk
DOPN	Datasets Open on the disk
DBSY	Device Percent Busy
DDST	Device Response (Service) Time
DIOQ	Average IOQ delay time
DCUT	Average Control Unit Busy delay time
DDVT	Average Device Busy delay time
DPND	Average Pending in channel time

Line Command	Description
DDIS	Average Device Disconnect time
DCON	Average Device Connect time
DIOR	Average input and output rate
= = = =	Line Separator/Auto-repeat

The device busy percent, response time, delay times, and input and output rate statistics are obtained from RMF for the current RMF reporting interval. If RMF is not active or not recording DASD statistics, the line commands displays: `RMF DATA NOT AVAILABLE`.

DISKBUSY

The DISKBUSY screen (Figure 49) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen displays and plots disk percent busy information, sorted by percent busy.

Figure 49 • DISKBUSY screen

```
COMMAND:____________DISKBUSY   15:02:33.8  93.060 105.64% .TUT for Tutorial
.  Disk Device Display - Sorted by Percent Busy
DSEL SRT=DBSY
DISK      A37      A2C      23B      3CD      A34      348      4AD      3D1 +
DVOL   CDPX84   PUB185   CDPX82   DB4X88   CDPX83   DB2X87   DB1X8L   DB1X8E
DBSY   89.76%   88.54%   83.91%   83.03%   76.99%   76.80%   72.41%   72.24%
DDST   .025S    .043S    .007S    .023S    .008S    .015S    .068S    .059S
DPLT
+ CUA VOLSER  PCT BUSY  ...10...20...30...40...50...60...70...80...90..100
+ A37 CDPX84    89.76   ********************************************....|
+ A2C PUB185    88.54   *******************************************|....|
+ 23B CDPX82    83.91   ******************************************..|....|
+ 3CD DB4X88    83.03   ******************************************..|....|
+ A34 CDPX83    76.99   ***************************************.|....|....|
+ 348 DB2X87    76.80   ***************************************.|....|....|
+ 4AD DB1X8L    72.41   ************************************...|....|....|
+ 3D1 DB1X8E    72.24   ************************************...|....|....|
==== ==========================================================================
DISK      627      4B8      A22      3CB      A13      214      A03      20A +
DVOL  STGX8J   DBAX81   SLB18G   DB1X85   CICX86   DB1X83   SLR18A   DB1X8M
DBSY  69.35%   66.92%   65.19%   56.93%   56.33%   53.11%   52.79%   49.18%
DDST   .020S    .021S    .076S    .012S    .059S    .022S    .028S    .015S
DPLT
+ CUA VOLSER  PCT BUSY  ...10...20...30...40...50...60...70...80...90..100
```

These line commands are used with the DISKBUSY screen:

Line Command	Description
DSEL	Disk Selection Keywords
DISK	Disk Device Address (CUA)
DVOL	Disk VOLSER
DBSY	Device Percent Busy
DDST	Device Response (Service) Time
DPLT	Disk Statistics Plots
====	Line Separator/Auto-repeat

The FLD=DIOR or FLD=DDST keywords may be specified with the DPLT line command to plot either the input and output rate or device service time. Refer to "Disk Statistics Plots" on page 193.

DDHL

The DDHL screen (Figure 50) is selected from MVSM2, the Device (Disk and Tape) Analysis Menu. On this screen, disk device statistics are displayed in a horizontal format through use of the DDHL line command.

Figure 50 • DDHL screen

```
 COMMAND: __________ DDHL       11:06:12.7  94.060  99.81% .TUT for Tutorial
.  MVS Disk Device Data, horizontal display

.  Use DSEL to customize the Disk Device display

DSEL ONL=Y,SRT>DBSY,BSY=2

.  Specify 1, 2, 3, or 4 for the DDHL display format number
DDHL 1 1/4     Dev BUSY  SSCH/ sec  Serv Time    CYL/ HD  Curr User     Log CU
+  PROD01  C1F   23.26%      2.471      .012S                               005
+  WORK01  C16   14.18%      8.796      .007S                               005
+  SCR001  C11    2.76%      1.790      .014S                               005
+  TSO001  C1A    2.43%      6.050      .003S                               005
+  SPOOL0  C18    2.25%      3.096      .007S                               005

DPLT
+ CUA VOLSER  PCT BUSY  ...10...20...30...40...50...60...70...80...90..100
+ C1F PROD01    23.26   ************..|....|....|....|....|....|....|....|
+ C16 WORK01    14.18   *******..|....|....|....|....|....|....|....|....|
+ C11 SCR001     2.76   *...|....|....|....|....|....|....|....|....|....|
+ C1A TSO001     2.43   *...|....|....|....|....|....|....|....|....|....|
+ C18 SPOOL0     2.25   *...|....|....|....|....|....|....|....|....|....|
```

These line commands are used with the DDHL screen:

Line Command	Description
DSEL	Disk Device Data selection keywords
DDHL	Disk Device Data display, horizontal format
DPLT	Disk Device data plots

The DDHL line command displays four different formats. Refer to "Disk Device Horizontal Display" on page 203.

DTRACE

The DTRACE screen (Figure 51) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen allows you to trace input and output activity on a disk device.

Figure 51 • DTRACE screen

```
COMMAND:____________DTRACE     15:03:48.8  93.060  98.07% .TUT for Tutorial
.    To request a trace on a disk device:
.         Specify the VOLSER in .VTR,
.                ** or **
.         Specify the device address (CUA) in .DTR
.VTR DBAX80
.DTR
.TRC 002
DTRC USER ASID     157157            157   157            397397         157
DTRC CYLINDER      0D60DF            0B7   061            661661         007
DTRC HEAD           11                12     6              7  7
DTRC SIO COUNT          2  1              1     1                 1           1
DTRC USER COUNT
DTRC DCB COUNT      27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27 27
DTRC     CUU = 18B  VOLSER = DBAX80    INTERVAL =  .02
=== ========================================================================
DSEL VOL=DBA*
DISK     182      18B      21D      35C      3C5      4AB      4B3      4B8 +
DVOL  DBAX88   DBAX80   DBAX8K   DBAX85   DBAX8A   DBAX82   DBAX8B   DBAX81
==== =======================================================================
DISK     4BD      4BE
DVOL  DBAX8U   DBAX8V
==== =========================   3 LINE(S) REPEATED ==========================
```

These line commands are used with the DTRACE screen:

Line Command	Description
.VTR	Specifies Disk Trace VOLSER
.DTR	Specifies Disk Trace Device Address
.TRC	Specifies Trace Interval

Line Command	Description
DTRC	Displays Disk Trace
====	Line Separator/Auto-repeat
DSEL	Disk Selection Keywords
DISK	Disk Device Address (CUA)
DVOL	Disk VOLSER

A device VOLSER or device address may be specified with either the .VTR or .DTR line command. The device is traced over 20 samples taken at the interval specified in the .TRC line command. Each DTRC line command displays a separate traced item. Refer to "Disk Device Trace" on page 202.

TAPE

The TAPE screen (Figure 52) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen presents tape statistics for all allocated tapes.

Figure 52 • TAPE screen

```
COMMAND:____________TAPE       15:04:47.5  93.060 103.22% .TUT for Tutorial
.    Use the TSEL line command to specify selection parms to select the
.    desired tapes.
TSEL ALC=Y
TAPE     FB2      FB7      FB8      FBA      FBC      FC1      FD3      FD6
TVOL  741887   713475   H03661   H03172   733818   *MOUNT   *MOUNT   757191
TLBL    1 SL       SL    82 SL   784 SL     1 SL       SL       SL     1 SL
TUSR PMGV049U PAAP737R HSM      HSM      PMGV049U PGTE835U PPTS900R PMGV049U
TSIO      22     1307     3110    14687       22        3        3       22
TERT
TERP
TDST    .276S    .010S    .129S    .486S    .236S    .006S    .000S    .124S
TMNT                                                 6.08S    5:38M
==== ==========================================================================
```

.These line commands are used with the TAPE screen:

Line Command	Description
TSEL	Tape Selection Keywords
TAPE	Tape Device Address (CUA)
TVOL	Tape VOLSER
TLBL	Tape File number, Label type
TUSR	Tape User Jobname
TSIO	Start I/O Count
TERT	Temporary error count
TERP	Permanent error count
TDST	Device Service Time
TMNT	Tape Mount Wait Time
====	Line Separator/Auto-repeat

The ALC=Y selection keyword is used to select allocated tape devices only. Refer to "Tape Selection Parameters" on page 210.

LCUQUEUE

The LCUQUEUE screen (Figure 53) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. It displays the Logical Control Unit (LCU) Queueing report.

Figure 53 • LCUQUEUE screen

```
COMMAND:____________LCUQUEUE   15:05:31.0  93.060  95.04% .TUT for Tutorial
.     Use the LCU=xxx keyword to select LCUs for display.
LCUQ
+ LCU D  CONT RT  DLY Q  ALL %  CONTROL UNITS   CHP   I/O RT   CU %   CH %
+ 00F D    0.075   0.25   0.27  020              06   17.347   7.48   5.94
+                               021              1C   17.438   7.31   4.47
+ 010 D    0.000   0.00   0.62  022              07   14.454   0.47   7.41
+                               023              1E   14.794   0.40   8.32
+ 011 D    0.000   0.00   0.16  AA0              1A    8.766   0.00   4.68
+                               1A0              01    8.744   0.00   3.49
+ 014 D    1.302   0.47   7.68  014              14  162.892  16.06  53.35
+                                                59  177.829  15.24  49.86
+                               015              10  161.927  16.15  56.71
+                                                4A  176.839  15.46  50.90
+ 018 D    0.000   0.00   3.49  FFF              01    0.000   0.00   3.49
+ 01D D    1.258   0.11   2.34  012              48  102.410   8.88  43.28
+                                                49  118.069   9.07  34.40
+                               013              52  101.769   9.21  45.38
+                                                54  117.776   8.79  34.68
+ 020 D    0.025   0.00   5.69  010              02   56.264   6.86  43.77
+                                                03   46.810   7.72  53.56
+                               011              19   53.652   7.10  46.71
+                                                5B   50.432   7.27  51.95
```

LCUQ displays the LCU Queueing Report.Refer to "Logical Control Unit Queuing" on page 248 for an explanation of the LCU queueing report and for the keywords available with the LCUQ line command.

LCURATE

The LCURATE screen (Figure 54) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen displays Logical Control Unit input and output activity plots.

Figure 54 • LCURATE screen

```
COMMAND:____________LCURATE    15:06:07.1  93.060  93.75% .TUT for Tutorial
.     Use the LCU=xxx keyword to select specific LCUs for display.
LCUR PLT=1000
+ LCU   ALL %  I/O RT  ..100..200..300..400..500..600..700..800..900...1K
+ 00F    0.27      34  **..|....|....|....|....|....|....|....|....|....|
+ 010    0.62      29  *...|....|....|....|....|....|....|....|....|....|
+ 011    0.16      17  *...|....|....|....|....|....|....|....|....|....|
+ 014    7.68     679  ***********************************|....|....|....|
+ 016    0.00       0  ....|....|....|....|....|....|....|....|....|....|
+ 017    0.00       0  ....|....|....|....|....|....|....|....|....|....|
+ 018    3.49       0  ....|....|....|....|....|....|....|....|....|....|
+ 01D    2.34     440  **********************..|....|....|....|....|....|
+ 020    5.69     207  **********....|....|....|....|....|....|....|....|
+ 023    9.98      89  ****|....|....|....|....|....|....|....|....|....|
+ 024    2.53      97  *****....|....|....|....|....|....|....|....|....|
+ 02A    0.24      24  *...|....|....|....|....|....|....|....|....|....|
+ 02B    0.07      37  **..|....|....|....|....|....|....|....|....|....|
+ 035    6.34     492  *************************....|....|....|....|....|
+ 062    0.00       0  ....|....|....|....|....|....|....|....|....|....|
```

LCUR displays the LCU input and output activity plots. Refer to "Logical Control Unit Activity" on page 246 for an explanation of the input and output activity plots and a description of the keywords available to the LCUR line command.

CHPBUSY

The CHPBUSY screen (Figure 55) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen displays channel path input and output rate and percent busy plots.

Figure 55 • CHPBUSY screen

```
COMMAND:_____________CHPBUSY    15:07:19.2  93.060  97.92% .TUT for Tutorial
.
.     Use the LCU=xxx keyword to select by LCUID.
.     Use the CHP=xx keyword to select by CPHID.
.
.                      Channel path I/O rate.
CHPR IOR=50,LCU=014,01D
+ CHP LCU    BUSY  I/O RT    ...20...40...60...80..100..120..140..160..180..200
+  10 014   32.22      60    ***************....|....|....|....|....|....|....|
+  14 014   31.62      59    ***************....|....|....|....|....|....|....|
+  48 01D   31.92      91    ************************.|....|....|....|....|....|
+  49 01D   23.34     100    *************************....|....|....|....|....|
+  4A 014   20.12      67    *****************..|....|....|....|....|....|....|
+  52 01D   31.62      91    ************************.|....|....|....|....|....|
+  54 01D   23.99     100    *************************....|....|....|....|....|
+  59 014   18.16      68    *****************..|....|....|....|....|....|....|
.
.                      Channel path percentage busy.
CHPB CHB=25,CHP=014,01D
+ CHP LCU    BUSY  I/O RT    ...10...20...30...40...50...60...70...80...90..100
+  10 014   32.22      60    ****************...|....|....|....|....|....|....|
+  14 014   31.62      59    ****************...|....|....|....|....|....|....|
+  48 01D   31.92      91    ****************...|....|....|....|....|....|....|
+  52 01D   31.62      91    ****************...|....|....|....|....|....|....|
```

These line commands are used with the CHPBUSY screen:

Line Command	Description
CHPR	Channel path input and output rate plot
CHPB	Channel path percentage busy plot

Refer to "Channel Path Activity" on page 250 for more information on the CHPB and CHPR line commands.

DATASET

The DATASET screen (Figure 56) is selected from MVSM2, the Device (Disk and Tape) Analysis menu. This screen explores the dataset display options of PreAlert MVS.

Figure 56 • DATASET screen

```
COMMAND:____________DATASET    15:07:25.2  93.060  97.92% .TUT for Tutorial
.
.    The DSN line command displays the dataset label information maintained
.    in the VTOC for a dataset. Specify DSN=data.set.name (and VOL=volser
.    if uncataloged).
.
DSN  DSN=WERXSHP.V3R31.LINKLIB
+  VOLSER CUA  RECFM LRECL BLKSZ  DSORG  CREDT REFDT  EXT  TRKS  USED  2ND-ALC
+  STGX8B 1A6   U           6144   PO    92024 92051    4   173    91
.
.    The DSNW line command displays who has allocation to a dataset. Enter
.    the data.set.name only.
.
DSNW WERXSHP.V3R31.LINKLIB                        WAIT=   0 OWNER=   1
+   WERXSHP   ASID= 285  OWN/SHR
.
.    The DSNJ line command displays the dataset names allocated to an
.    address space. Specify JNM=jobname or ASI=asid.
.
DSNJ JNM=WERXSHP
+   1. WERXSHP     OWN/SHR   SP1GSYS.ISP.ISPMLIB
+   2. WERXSHP     OWN/SHR   SP1GSYS.ISP.ISPPLIB.NEWISPF.MODS
+   3. WERXSHP     OWN/SHR   DCPGSYZ.PDC.PERM.ISPMLIB
+   4. WERXSHP     OWN/SHR   SYS1.ISPMLIB
```

These line commands are used with the DATASET screen:

Line Command	Description
DSN	Dataset Label Information
DSNW	Dataset Allocations
DSNJ	Datasets Allocated to a Job

Refer to "Dataset Information" on page 211 for more information on the dataset functions available in PreAlert MVS.

MVSMENU, MVSM3

The PreAlert MVS System Analysis menu (Figure 57), MVSM3, is selected from the PreAlert MVS Interface Primary Menu.

Figure 57 • PreAlert MVS System Analysis menu

```
COMMAND:____________MVSM3      11:57:55.1  98.077  92.06% .TUT for Tutorial
.                 PreAlert / MVS System Analysis
.
MENU PLOTS    :    CPU USAGE PLOTS
.
MENU REALSTG  :    REAL STORAGE PLOT
MENU REALSTOR :    REAL STORAGE USAGE
MENU FIXED    :    FIXED REAL STORAGE USAGE
MENU PAGEABLE :    PAGEABLE REAL STORAGE USAGE
MENU ESTOR    :    EXTENDED STORAGE USAGE
.
MENU PAGING   :    PAGING ACTIVITY
MENU PAGEPLOT :    PAGING ACTIVITY PLOTS
.
MENU CSA      :    CSA & SQA USAGE
MENU CSASTG   :    CSA & SQA ALLOCATION CHANGES
MENU CSAU     :    UNOWNED COMMON STORAGE MANAGEMENT
.
MENU SRM      :    SRM MULTIPROGRAMMING LEVEL ADJUSTMENT
MENU SRMLOAD  :    SRM LOAD BALANCING
MENU SRMTSO   :    TSO SWAP ACTIVITY
MENU SRMTSOR  :    TSO PERFORMANCE GROUP RESPONSE TIME
MENU SRMSWAP  :    MPL SWAP ACTIVITY
.    Position the cursor on the desired MENU name, then press ENTER.
```

Menu references may be added or deleted by editing the MVSM3 member of the PreAlert MVS help file. The text that follows describes and illustrates the screen options available through the PreAlert MVS System Analysis menu.

PLOTS

The PLOTS screen (Figure 58) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays CPU utilization plots and the address spaces with the highest CPU usage.

Figure 58 • PLOTS screen

```
COMMAND:____________PLOTS      10:28:55.1  93.060  88.92% .TUT for Tutorial
.    Distribution of CPU usage
SYSP CPU   0    89.26%  ***********************************************....|
+    CPU   1    88.38%  ***********************************************|....|
+    CPU   2    86.44%  **********************************************.|....|
+    CPU   3    82.74%  *********************************************...|....|
+    CPU   4    79.92%  ********************************************....|....|
+    CPU   5    74.47%  *************************************..|....|....|
+    SYSTEM     83.53%  ********************************************..|....|
MPLT *MVS 346   18.83%  *********|....|....|....|....|....|....|....|....|
APLT *ALL 346   64.70%  *********************************..|....|....|....|
==== ======================================================================
JPLT *JOB  28    9.51%  *****....|....|....|....|....|....|....|....|....|
SPLT *STC 116   38.22%  *******************|....|....|....|....|....|....|
TPLT *TSO 189   15.08%  ********.|....|....|....|....|....|....|....|....|
UPLT *UND  13    1.89%  *...|....|....|....|....|....|....|....|....|....|
==== ======================================================================
.    Top users of CPU.
JSEL SEL=JTS,TRN=Y,REP=N,SRT=CPUR
JOBN NNVTAM   IDMSDC1  IDMSDC7  IDMSDC4  RFBGSYA  DWA3483  ASAT1    IDMSDC2  +
PROC NNVTAM   IEFPROC  IEFPROC  IEFPROC  $TSUSRDP $TSUSR02 IEFPROC  IEFPROC
STEP
CPUR   14.25%    4.79%    3.05%    2.34%    2.14%    1.70%    1.50%    1.34%
PINR      .0       .0       .0       .7       .0       .0       .0       .0
IOCT    3441 3.79157M   105448   708050     4172     3498     4073   815566
=== ===========================================================================
```

These line commands are used with the PLOTS screen:

Line Command	Description
SYSP	System CPU Utilization, for each processor
MPLT	MVS CPU overhead and unreported CPU time
APLT	Total CPU Usage for all address spaces
====	Line Separator/Auto-repeat
JPLT	Total CPU Usage for all Batch jobs
SPLT	Total CPU Usage for all Started Tasks
TPLT	Total CPU Usage for all TSO users
UPLT	Total CPU Usage for System Address spaces
JSEL	Address Space Selection Keywords

Line Command	Description
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
CPUR	CPU Utilization, by system
PINR	Page-in Rate (per second)
IOCT	Input and Output Count

The SYSP line command shows the CPU Utilization of each processor in the system, plus an overall average for the entire system. The APLT line command shows the total CPU utilization by all address spaces currently executing. The MPLT line command reflects the difference between the overall system CPU utilization and the total of all active address spaces.

This value represents unreported CPU time consisting of MVS overhead and CPU time from address spaces that have completed a step since the last PreAlert MVS cycle. Refer to "CPU Utilization by Performance Group or Domain" on page 221 for additional information.

REALSTG

The REALSTG screen (Figure 59) is selected from MVSM3, the PreAlert MVS System Analysis menu. Figure 59 displays real storage utilization plots for MVS.

Figure 59 • REALSTG screen

```
COMMAND:____________REALSTG    10:29:24.9  93.060  99.17% .TUT for Tutorial
.    Distribution of Real Storage
RSHD         EACH PLOT POINT EQUALS  8192K    EACH BAR EQUALS 65536K
RSOS  441260K .......|.......|.......|.......|.......|.......|......
RSNU    6144K .
RSPO  435116K .......|.......|.......|.......|.......|.......|.....
.    Total pageable, fixed, and available (free) Real storage
RSTP  382496K .......|.......|.......|.......|.......|.......
RSTF   49988K ......
RSAS    2632K
.    Total SQA, LPA, CSA, LSQA, and Private Area storage
RSSS   12464K ..
RSLS    7164K .
RSCS    9732K .
RSQS   31648K ....
RSRS  366544K .......|.......|.......|.......|.......|.....
.    Top users of Real storage
JSEL SEL=JST,SRT=FMCT,REP=N
JOBN IDMSDC1  DSN1DBM1 DSN2DBM1 IDMSDC2  IDMSDC4  IDMSDC7  IDMSDC6  CICS001  +
FXFR     140K      68K      68K     104K     104K     140K      88K     120K
FMCT   33172K   30808K   29876K   13108K   12852K   12684K   11620K   10452K
==== ========================================================================
```

These line commands are used with the REALSTG screen:

Line Command	Description
RSHD	Real Storage plot header
RSOS	Online Real Storage size plot
RSNU	Nucleus Real Storage size plot
RSPO	Real Storage Paging Pool size plot
RSTP	Total pageable allocated storage size plot
RSTF	Total fixed allocated storage size plot
RSAS	Total available storage size plot
RSSS	SQA storage size plot
RSLS	LPA storage size plot
RSCS	CSA storage size plot
RSQS	LSQA storage size plot

Line Command	Description
RSRS	Regions and SWA storage size plot
JSEL	Address Space Selection Keywords
JOBN	Jobname
FXFR	Fixed Storage size
FMCT	Working Storage set size
====	Line Separator/Auto-repeat

The RS*xx* line commands indicate the amount of central (real) storage that is being used by the various areas of MVS. Additional RS*xx* line commands are available to separate this into fixed and pageable storage sizes. Refer to "Real Storage Utilization" on page 223 for additional information.

REALSTOR

The REALSTOR screen (Figure 60) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays real storage utilization and frame counts for MVS.

Figure 60 • REALSTOR screen

```
COMMAND:____________REALSTOR   10:29:33.1  93.060  94.09% .TUT for Tutorial
.  Distribution of Real (Central) storage frames
RSTG CENTRAL STORAGE   FRAMES       FIXED    PAGEABLE      EXPANDED
+    TOTAL            110,336                                129,024
+    ON-LINE          110,315                                129,024
+    NUCLEUS            1,536
+    IN-USE           108,779      12,497      95,624       125,734
+    AVAILABLE            658                                  3,290
+
+    SQA                3,116       3,066          50             0
+    LPA                1,791         108       1,683             8
+    CSA                2,433          67       2,366             0
+    LSQA               7,912       7,609         303         1,831
+    REGIONS+SWA       91,636       1,647      89,989       125,726
.  Top users of Real Storage
JSEL SEL=JST,SRT=FMCT
JOBN IDMSDC1  DSN1DBM1 DSN2DBM1 IDMSDC2  IDMSDC4  IDMSDC7  IDMSDC6  CICS001  +
PROC IEFPROC  IEFPROC  IEFPROC  IEFPROC  IEFPROC  IEFPROC  IEFPROC  CICS001
STEP
FMCT   33172K   30808K   29876K   13108K   12852K   12684K   11620K   10452K
FXFR     140K      68K      68K     104K     104K     140K      88K     120K
```

These line commands are used with the REALSTOR screen:

Line Command	Description
RSTG	Real and Expanded storage usage summary
JSEL	Address Space Selection Keywords
JOBN	Jobname
PROC	Procedure Name
STEP	Step Name
FMCT	Working Storage Set size
FXFR	Fixed Storage size

The RSTG line command displays a summary of real and expanded storage usage for the various areas of MVS. The counts displayed indicate the number of real storage frames (4K bytes per frame) used.

FIXED

The FIXED screen (Figure 61) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays fixed storage utilization for MVS.

Figure 61 • FIXED screen

```
COMMAND:____________FIXED      10:33:57.6  93.060  97.23% .TUT for Tutorial
.    Distribution of Fixed storage
RSHD          EACH PLOT POINT EQUALS  8192K    EACH BAR EQUALS 65536K
RSOS   441260K .......|.......|.......|.......|.......|.......|......
RSTF    49988K ......
.    SQA, LPA, CSA, LSQA, and Regions+SWA Fixed storage
RSSF   12264K .
RSLF     432K
RSCF     268K
RSQF    30436K ....
RSRF     6588K .
==== ======================================================================
.    Top users of Fixed storage
JSEL SEL=STJ,SRT=FXFR,REP=N
JOBN POIC148R NETVIEW  LFD87057 JINGSYA  ADC2SS   PPTS967R PHDGSYA  ALOGSYA  +
FXFR    3472K     404K     380K     308K     304K     268K     256K     228K
FMCT    5568K    7512K     868K    1648K    1088K     868K    1300K    3092K
==== ======================================================================
```

These line commands are used with the FIXED screen:

Line Command	Description
RSHD	Real Storage plot header
RSOS	Online Real Storage size plot
RSTF	Total allocated fixed storage size plot
RSSF	SQA fixed storage size plot
RSLF	LPA fixed storage size plot
RSCF	CSA fixed storage size plot
RSQF	LSQA fixed storage size plot
RSRF	Regions and SWA fixed storage size plot
====	Line Separator/Auto-repeat
JSEL	Address Space Selection Keywords
JOBN	Jobname
FXFR	Fixed storage size
FMCT	Working Storage set size

PAGEABLE

The PAGEABLE screen (Figure 62) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays pageable storage utilization for MVS.

Figure 62 • PAGEABLE screen

```
COMMAND:____________PAGEABLE   10:34:12.4  93.060  96.75% .TUT for Tutorial
.    Distribution of Pageable storage
RSHD          EACH PLOT POINT EQUALS  8192K    EACH BAR EQUALS 65536K
RSOS   441260K .......|.......|.......|.......|.......|.......|......
RSTP   382496K .......|.......|.......|.......|.......|.......
.    SQA, LPA, CSA, LSQA, and Regions+SWA Pageable storage
RSSP     200K
RSLP    6732K .
RSCP    9464K .
RSQP    1212K
RSRP  359956K .......|.......|.......|.......|.......|....
==== ========================================================================
.    Top users of Real storage
JSEL SEL=STJ,SRT=FMCT,REP=N
JOBN IDMSDC1  DSN1DBM1 DSN2DBM1 IDMSDC2  IDMSDC4  IDMSDC7  IDMSDC6  CICS001  +
FMCT  33172K   30808K   29876K   13108K   12852K   12684K   11620K   10452K
FXFR    140K      68K      68K     104K     104K     140K      88K     120K
==== ==========================================================================
```

These line commands are used with the PAGEABLE screen:

Line Command	Description
RSHD	Real Storage plot header
RSOS	Online Real Storage size plot
RSTP	Total pageable allocated storage size plot
RSSP	SQA pageable storage size plot
RSLP	LPA pageable storage size plot
RSCP	CSA pageable storage size plot
RSQP	LSQA pageable storage size plot
RSRP	Regions and SWA pageable storage size plot
====	Line Separator/Auto-repeat
JSEL	Address Space Selection Keywords
JOBN	Jobname

Line Command	Description
FMCT	Working Storage set size
FXFR	Fixed Storage size

ESTOR

The ESTOR screen (Figure 63) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays Extended Storage Utilization for MVS.

Figure 63 • ESTOR screen

```
COMMAND:____________ESTOR      10:34:21.4  93.060  91.63% .TUT for Tutorial
.     E-Storage activity
ESTG     MIGRATION AGE:   80577   WRITE:  457.9  READ:  318.4  MIGR:     .0
.     Extended (Expanded) Storage Utilization
ESHD          EACH PLOT POINT EQUALS  8192K    EACH BAR EQUALS 65536K
ESSZ  516096K .......|.......|.......|.......|.......|.......|.......|.......
ESOS  516096K .......|.......|.......|.......|.......|.......|.......|.......
ESIN  502936K .......|.......|.......|.......|.......|.......|.......|.....
ESAV   13160K ..
.     E-Storage allocated to SQA, LPA, CSA, LSQA, and Regions
ESSQ         K
ESLP       32K
ESCS         K
ESLS     7324K .
ESRG   502904K .......|.......|.......|.......|.......|.......|.......|.....
.     Top users of E-storage
JSEL SEL=JST,SRT=ESCT
JOBN GPC0222  IDMSDC7  IDMSDC1  DSN3DBM1 VLF      IDMSDC3  RSM3241  CPTGSYAI +
ESCT   17272K   16100K   13804K   13196K   12176K    8888K    6596K    5440K
```

These line commands are used with the ESTOR screen:

Line Command	Description
ESTG	Extended Storage Activity
ESHD	Extended Storage plot header
ESSZ	Extended Storage size plot
ESOS	Online Extended Storage size plot
ESIN	In-use Extended Storage size plot
ESAV	Available Extended Storage size plot
ESSQ	SQA Extended Storage size plot

Line Command	Description
ESLP	LPA Extended Storage size plot
ESCS	CSA Extended Storage size plot
ESLS	LSQA Extended Storage size plot
ESRG	Regions Extended Storage size plot
JSEL	Address Space Selection Keywords
JOBN	Jobname
ESCT	Extended storage usage (KB)

The ESTG line command displays the migration age for extended storage along with the read, write, and migration rates for extend storage. The remaining ES*xx* line commands plot the amount (KB) of extended storage being used by the various areas of MVS. Refer to "Extended Storage Utilization" on page 226 for additional information.

PAGING

The PAGING screen (Figure 64) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays the address spaces with the highest paging activity, plus the status of page datasets and swap datasets.

Figure 64 • PAGING screen

```
 COMMAND:            PAGING     15:08:49.7  98.296   8.12% .TUT for Tutorial
 Menus Active:   MAINMENU  MVSMENU   MVSM3
 .    Top users with paging rate > 1.0 pages per second.
 JSEL SEL=JST,TRN=Y,PGR=1,SRT=PINR,REP=N
 JOBN VTMLCL
 PINR      1.9
 TPIR      1.9
 DPIR      1.9
 ====
==========================================================================
 SYSR CPU:  12.59  I/O:   30.7     PPR:    1.9   CPR:     .0   TPR:    1.9
 .    Page dataset activity
 PDSH TYPE   DSNAME                CUA VOLSER SLOTS-AVAIL---USED%   RATE    RESP
 PDSN PLPA   PAGE.CPAC.PLPA        F10 MISCAT 16200  3434  78.80%    .00
 PDSN COMMON PAGE.CPAC.COMMON      F10 MISCAT  1980   603  69.54%    .09   .000S
 PDSN LOCAL *PAGE.VMISUT2.LOCAL    F0B MISUT2 63000 50143  20.40%   1.08
 PDSN LOCAL *PAGE.VMISUT3.LOCAL    F13 MISUT3 54000 45769  15.24%   1.17   .000S
 PDSN LOCAL *PAGE.CPAC.LOCAL1      F10 MISCAT 32220 24521  23.89%    .18   .000S
 PDSN
 .    Swap dataset activity
 SDSN SWAP   PAGE.VLOC184.SWAP1    600 LOC184   900   899    .11%    .00
 SDSN SWAP   PAGE.VLOC18E.SWAP1    1A7 LOC18E   900   899    .11%    .00
```

These line commands are used with the PAGING screen:

Line Command	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
PINR	Private area Page-in rate
TPIR	Private + Common Page-in rate
DPIR	Page-in + reclaims rate
====	Line Separator/Auto-repeat
SYSR	System CPU, input and output, and paging rates
PDSH	Page dataset and Swap dataset display header
PDSN	Page dataset information
SDSN	Swap dataset information

Each PDSN or SDSN line command displays one page or swap dataset only. Either line command may need to be repeated until all page and swap datasets are shown.

PAGEPLOT

The PAGEPLOT screen (Figure 65) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen plots the paging activity by system area, displaying the address spaces with the highest paging activity.

Figure 65 • PAGEPLOT screen

```
COMMAND:____________PAGEPLOT   10:35:53.8  93.060  78.24% .TUT for Tutorial
.      Paging Activity (in pages per second)
.      Use PLT=nnn to specify plot measurement scale
PGRP PLT=200
+ PAGING RATES          ...20...40...60...80..100..120..140..160..180..200
+ CSA+LPA          .2   ....|....|....|....|....|....|....|....|....|....|
+ HIPERSPACE       .0   ....|....|....|....|....|....|....|....|....|....|
+ VIO            27.8   *******..|....|....|....|....|....|....|....|....|
+ SWAP           68.2   *****************..|....|....|....|....|....|....|
+ ADDR SPACE     42.7   ***********...|....|....|....|....|....|....|....|
+ ---TOTAL---   139.0   ************************************....|....|....|

.      Paging Activity Summary Table
PGRT     PAGE RECLAIMS          PAGE IN                     PAGE OUT
+  COMMON  N-SWAP  PCT    SWAP N-SWAP  TOTAL  PCT     SWAP N-SWAP  TOTAL  PCT
+   LPA       .0    0              .2     .2    0
+   CSA       .0    0              .0     .0    0              .0     .0    0
+   ===       .0    0              .2     .2    0              .0     .0    0
+ ADDRESS SPACE
+   HSP                            .0     .0    0              .0     .0    0
+   VIO     75.5   86            27.8   27.8   20            11.5   11.5   19
+  N-VIO    11.8   14     68.2   42.7  110.9   80     41.8    6.3   48.2   81
+   ===     87.3  100     68.2   70.5  138.8  100     41.8   17.9   59.8  100
+ TOTAL SYSTEM
+   HSP                            .0     .0    0              .0     .0    0
+   VIO     75.5   86            27.8   27.8   20            11.5   11.5   19
```

These line commands are used with the PAGEPLOT screen:

Line Command	Description
PGRP	Paging Activity Plot
PGRT	Paging Activity Table

Refer to "Paging Activity" on page 236 for more information on the PGRP and PGRT line commands.

CSA

The CSA screen (Figure 66) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays CSA and SQA storage allocation by subpool and key.

Figure 66 • CSA screen

```
COMMAND:____________CSA        10:36:31.2  93.060  93.52% .TUT for Tutorial
.    Total CSA allocation
CSAM   CSA SIZE = 23188K   ALLOC = 13432K   57.92%
.    Distribution of CSA by subpool/key
CSAH   SUBPOOL/KEY  ALLOCATED     AVAIL      USED    PCT   FIX PROT  USE
CSAM    227/  0 B       16384      7248      9136  55.76%   Y    Y   SYSTEM
CSAM    227/  0 A       90112      7184     82928  92.02%   Y    Y   SYSTEM
CSAM    227/  6 B       49152      4016     45136  91.82%   Y    Y   VTAM
CSAM    227/  6 A      876544      7144    869400  99.18%   Y    Y   VTAM
CSAM    227/  7 A       73728         0     73728 100.00%   Y    Y   IMS
CSAM    228/  0 B       36864     10456     26408  71.63%   Y    N   SYSTEM
CSAM    228/  0 A      253952     13944    240008  94.50%   Y    N   SYSTEM
.    Distribution of SQA by subpool/key
SQAM   SQA SIZE = 16192K   ALLOC = 16280K  100.54%
SQAM   226/  0 B      221184      3840    217344  98.26%   Y    N   SYSTEM
SQAM   239/  0 B      167936      1000    166936  99.40%   N    Y   SYSTEM
SQAM   239/  0 A     1294336     11384   1282952  99.12%   N    Y   SYSTEM
SQAM   245/  0 B      618496     78928    539568  87.23%   Y    N   SYSTEM
SQAM   245/  0 A    13656064   7243640   6412424  46.95%   Y    N   SYSTEM
SQAM   247/  0 A      638976      3048    635928  99.52%   D    Y   SYSTEM
SQAM   248/  0 A       73728      4368     69360  94.07%   D    Y   SYSTEM
SQAM   ALL/  0 B     1007616     83768    923848  91.68%
SQAM   ALL/  0 A    15663104   7262440   8400664  53.63%
SQAM   ALL/  0 *    16670720   7346208   9324512  55.93%
```

These line commands are used with the CSA screen:

Line Command	Description
CSAH	CSA & SQA subpool allocation header
CSAM	CSA allocation by subpool and key
SQAM	SQA allocation by subpool and key

Each CSAM or SQAM line command displays the total storage allocated to a single subpool, key, and location (above or below the 16 MB line). The line commands may need to be repeated several times to allow all possible combinations to be displayed. The .UP (PF7 key) and .DOWN (PF8 key) commands may be used to scroll to any line commands that may have rolled off the screen.

CSASTG

The CSASTG screen (Figure 67) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen identifies and displays recently allocated CSA storage.

Figure 67 • CSASTG screen

```
COMMAND:            CSASTG     15:20:30.3  98.296   8.75% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   MVSM3
CSUM  Area    Total    Alloc-PCT     CSA-PCT     SQA-PCT    Free-PCT
+     CSA      1190       94   7      94   7                1096  92
+     SQA       532      532 100                 532 100
+     ECSA     4002     3335  83    3335  83                 667  16
+     ESQA     2844     2844 100                2844 100
CSTG NO CHANGES TO CSA OR SQA ALLOCATIONS
.    Enter the storage address below.
ADDR
DUML DUMP ASID    53/PREALERT   ADDRESS:00000000
DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMP  00000000 +000  040C0000 813D7CE0 00000000 00000000   *    a @         *
DUMP  00000010 +010  00FD9D80 00000000 078C3000 8005EA02   *                *
DUMP  00000020 +020  078C0000 00031E06 040CE000 80FFDF66   *                *
DUMP  00000030 +030  00000000 00000000 070C1000 861188B6   *            f h *
DUMP  00000040 +040  00000000 00000000 00000000 00FD9D80   *                *
DUMP  00000050 +050  00000000 00000000 040C0000 813C3C60   *            a  -*
DUMP  00000060 +060  040C0000 80FE3280 00080000 843A4560   *            d  -*
DUMP  00000070 +070  00080000 843A5408 040C0000 813C6100   *    d       a / *
DUMP  00000080 +080  00000000 00001004 0002006B 00040016   *           ,    *
```

These line commands are used with the CSASTG screen:

Line Command	Description
CSUM	CSA and SQA page allocation summary
CSTG	CSA or SQA allocation changes
ADDR	Specifies storage address for display
DUML	Storage ASID/Jobname and Address
DUMH	Storage Display Header
DUMP	Storage Display, 16 bytes per line command

To display recently allocated CSA or SQA storage, enter the storage address in the ADDR line command. The DUMP line commands display the storage. Refer to "Displaying Virtual Storage" on page 51 for more information on displaying storage.

CSAU

The CSAU screen (Figure 68) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays the unowned areas of common storage and allows the user to release (FREEMAIN) the storage.

Figure 68 • CSAU screen

```
COMMAND: __________ CSAU       12:38:34.9  98.077  71.56% .TUT for Tutorial
 .          Unowned Common Storage Management

 CSTU          Size      Used-PCT      Avail-PCT    Unowned-PCT
 +     CSA    3956K      743K  18%     3212K  81%      147K   3%
 +     SQA     896K      242K  27%      653K  72%         K   0%
 +    ECSA   24896K    15070K  60%     9825K  39%      771K   3%
 +    ESQA    9864K     4060K  41%     5803K  58%        1K   0%
 + ALL CSA   28852K    15814K  54%    13037K  45%      918K   3%
 + ALL SQA   10760K     4303K  39%     6456K  60%        2K   0%

 .  Use CNT=n, SKP=n, JNM=jobname, or JID=jobid keywords
 UCSL CNT=5
 +  CSA 241  00C19B68  9368   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 241  00C1C000  8192   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 241  00C1F1B8  2632   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 231  00C5BE88   152   ASFCORPC  STC01965  98.075  08:53:18
 +  CSA 241  00C89030   104   ASFTEST3  STC02395  98.075  08:32:36
 +  MORE UNOWNED COMMON STORAGE AREAS, USE CNT= OR SKP= TO DISPLAY

 .  Specify ADR=address to free Unowned Common Storage
 UCSF
```

These line commands are used with the CSAU screen:

Line Command	Description
CSTU	CSA/SQA storage usage summary
UCSL	List unowned common storage
UCSF	Free unowned commons storage

The line commands on this screen require the MVS Common Storage Tracking Facility to be active. Without common storage tracking, PreAlert cannot monitor unowned common storage.

SRM

The SRM screen (Figure 69) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays SRM multi programming level adjustment controls and domain multi programming levels.

Figure 69 • SRM screen

```
 COMMAND:            SRM        16:02:39.1  98.302  79.12% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   MVSM3
SRM  CPU=  79  UIC= 100  PFR=   4  PDT=   0  IPS=00 OPT=00 ICS=00
+    CPU= 1.0  IOC= 0.1  MSO= 0.0  SRB= 1.0
RCT      FIELD                 CURRENT       LOW      HIGH
+    UNREF INTVL COUNT             100         2         4
+    PAGING RATE                     4         5        50
+    CPU UTILIZATION                79       101       103
+    PCT ALL STORAGE FIXED          30        86        92
+    PCT STG BELOW 16M FIXED        24        92        98
DMDT                MIN MAX TGT CUR    RUA INC NSW GOO OUT   CIDX
+    DOMAIN   0 MPL 999 999 999        6.9       6          99.99
+    DOMAIN   1 MPL 999 999 999        2.0   1   1         105.26
+    DOMAIN   2 MPL   1 999   1         .0                  655.35
+    DOMAIN   3 MPL   3   5   3         .0                     .00
+    DOMAIN   5 MPL   1   5   1         .8   1              99.99
+    DOMAIN   6 MPL   1   1   1         .9       1          99.99
+    DOMAIN   7 MPL   9  13  13       16.0      15            .00
+    DOMAIN   8 MPL 255 255 255        5.0   1   4          99.99
+    DOMAIN   9 MPL   1 999   1         .0                  655.35
+    DOMAIN  10 MPL   1 999   1         .0                  655.35
```

These line commands are used with the SRM screen:

Line Command	Description
SRM	SRM summary
RCT	SRM MPL control variables
DMDT	Domain multi programming levels

The RCT line command displays the SRM variables used in adjusting the multi programming levels. The DMDT line command displays the domain MPLs and may be used to identify the domains affected by MPL adjustments. Refer to "System Resources Manager" on page 254 for additional information.

SRMLOAD

The SRMLOAD screen (Figure 70) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen displays SRM load balancing controls.

Figure 70 • SRMLOAD screen

```
COMMAND:____________SRMLOAD    10:37:05.6  93.060  91.32% .TUT for Tutorial
SRM  CPU=  91  UIC= 255  PFR=  20  PDT=   0  IPS=00 OPT=00 ICS=00
+    CPU= 5.0  IOC= 3.0  MSO=10.0  SRB= 5.0
CCT      FIELD                 CURRENT       LOW      HIGH
+    PROCESSOR UTILIZATION       91.32     85.00    100.00
MCTP     PAGEABLE STG CNTL     CURRENT      HIGH       PCT
+    UTIL PAGING FIXED STG       12705     87023        80
+    UTIL AVAIL FIXED STG        12705      3926        92
MCTS     STG LOAD BAL          CURRENT       LOW      HIGH
+    AVAIL FRAME COUNT             728       100       200
+    UNREF INTVL COUNT             254         1        30
+    UTIL AVAIL FIXED STG           22                  76
ICT  LOGICAL PATH ID          CLASS    CURRENT       LOW      HIGH
+    04                       TAPE            0        50        80
+    20,26                    TAPE           15        50        80
+    27,51                    TAPE            6        50        80
+    58                       TAPE            0        50        80
+    06,1C                    DASD-DPR        7        20        35
+    07,1E                    DASD-DPR        4        20        35
+    01,1A                    DASD-DPR        0        20        35
+    10,14,4A,59              DASD-DPR        0        20        35
+    62,66                    DASD-DPR        0        20        35
+    67                       DASD-DPR        0        20        35
+    01                       DASD-DPR        1        20        35
```

These line commands are used with the SRMLOAD screen:

Line Command	Description
SRM	SRM summary
CCT	SRM CPU Load Balancing controls
MCTP	SRM Pageable Storage controls
MCTS	SRM storage load balancing controls
ICT	SRM input and output load balancing controls

Refer to "System Resources Manager" on page 254 for more information on SRM controls.

SRMTSO

The SRMTSO screen (Figure 71) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen provides information to allow monitoring of SRM swap control for TSO address spaces.

Figure 71 • SRMTSO screen

```
COMMAND:____________SRMTSO     10:37:20.2  93.060  90.42% .TUT for Tutorial
.    Logical Swap Control
LSCT     FIELD                 CURRENT       LOW      HIGH
+    LOGICAL SWAP THINK TIME      30.0        .0      30.0
+    UNREF INTVL COUNT             255        20        30
+    AVAIL FRAME COUNT             514         0       300
+    UTIL PAGING FIXED STG          11        56        66
+    UTIL AVAIL FIXED STG           22        76        82
.    Active TSO users
JSEL SEL=T,TRN=Y,REP=N
JOBN PHDGSYA  GXWGSYC  DWPGRVI  WERXSHP  JATPPFI  JBPGSYA  AKLGSYA
JSTA WAT*LSW  I/O*RES  I/O*RES  CPU*RES  I/O*RES  CPU*RES  WAT*RES
SWAP DET-WAIT
DOMN        4        4        5        3        3        4        3
SRAL       .0    13677    17895     4103     1198     4895     3048
SWRV    15.00    15.00    15.00    15.00    15.00    15.00    15.00
SUAL       11     2101 2.25592M      891      571     4943      662
==== ========================================================================
.    Enter the TSO Domain number below
DMDT 3,3            MIN MAX TGT CUR    RUA INC NSW GOO OUT   CIDX
+    DOMAIN   3 MPL  50  99  50   2    1.5   2                 0A
+    DOMAIN   4 MPL  50  99  50   2    2.6   2                 0A
+    DOMAIN   5 MPL  15  99  15   1    1.0   1                 0D
```

These line commands are used with the SRMTSO screen:

Line Command	Description
LSCT	SRM Logical Swap controls
JSEL	Address Space Selection Keywords
JOBN	Jobname
JSTA	Job Status
SWAP	Swap reason
DOMN	Domain number
SRAL	Service Units absorption rate
SWRV	Swap recommendation value
SUAL	Total Service Units used

Line Command	Description
====	Line Separator/Auto-repeat
DMDT	SRM domain descriptor table

SRMTSOR

The SRMTSOR screen (Figure 72) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen monitors response time for TSO performance groups.

Figure 72 • SRMTSOR screen

```
COMMAND:____________SRMTSOR    10:38:43.6  93.060  90.03% .TUT for Tutorial
SRM  CPU=  90  UIC= 255  PFR=  20  PDT=   0  IPS=00 OPT=00 ICS=00
+    CPU= 5.0  IOC= 3.0  MSO=10.0  SRB= 5.0
.    Active TSO users; scroll right for more data.
JSEL SEL=T,TRN=Y,REP=N
JOBN PHDGSYA  GXWGSYC  DWPGRVI  WERXSHP  JATPPFI  JBPGSYA  AKLGSYA
PGN    25   3   22   3    2   4   22   2    2   2   25   3   25   2
TMTR    3:28M   10.15S    2:06M     .35S     .56S    1.12S     .34S
==== ========================================================================
.    Enter the TSO Performance Group Number below.
PGPT 2              RESP DMN OBJ  TRAN  SWAP   CPU   I/O   MSO   SRB  TOTL
+    PGN   2/  1      .2   3   1 671.0 674.0 33.0K 4.76K 302.K 8.19K 348.K
+    PGN   2/  2      .5   3   2 69.00 69.00 22.2K 4.99K 212.K 1.46K 240.K
+    PGN   2/  3     2.5   4   4 118.0 118.0 224.K 59.3K 3.72M 11.0K 4.02M
+    PGN   2/  4    35.6   5   5 6.000 6.000 61.0K 9.92K 1.06M 1.62K 1.14M
+    PGN   2/ALL      .8 ALL ALL 864.0 867.0 341.K 79.0K 5.31M 22.3K 5.75M
```

These line commands are used with the SRMTSOR screen:

Line Command	Description
SRM	SRM summary
JSEL	Address Space Selection Keywords
JOBN	Jobname, TSO user ID
PGN	Performance Group Number/Period
TMTR	Transaction Time
====	Line Separator/Auto-repeat
PGPT	SRM Performance Group Table

The PGPT line command displays the average response times for each period within a performance group. Refer to "Performance Group Table" on page 254 for an explanation of the PGPT display.

SRMSWAP

The SRMSWAP screen (Figure 73) is selected from MVSM3, the PreAlert MVS System Analysis menu. This screen monitors SRM control of swapped out address spaces.

Figure 73 • SRMSWAP screen

```
COMMAND:____________SRMSWAP    10:42:27.0  93.060  89.64% .TUT for Tutorial
SRM  CPU=  89  UIC= 255  PFR=  20  PDT=   0  IPS=00 OPT=00 ICS=00
+    CPU= 5.0  IOC= 3.0  MSO=10.0  SRB= 5.0
.    Swapped-out address spaces, use the PGN= or DMN= keywords to
.    select specific performance groups or domains.
JSEL SEL=JST,SWP=O,TRN=Y,REP=N,DMN=2
JOBN JGMGSYAC JARGSYAE MVIP614E
JSTA WAT*SWP  WAT*SWP  WAT*LSW
SWAP DET-WAIT UNILATRL UNILATRL
PGN     5   4    3   4    4   4
DOMN        2        2        2
SWRV     1.00     2.29     7.41
SUAL    93175 1.02299M   107958
==== ==========================================================================
.    Enter the Domain number below
DMDT 2              MIN MAX TGT CUR    RUA INC NSW GOO OUT   CIDX
+    DOMAIN   2 MPL   9  99  17  16   15.9  16           3     1D
```

These line commands are used with the SRMSWAP screen:

Line Command	Description
SRM	SRM summary
JSEL	Address Space Selection Keywords
JOBN	Jobname
JSTA	Job Status
SWAP	Swap Reason
PGN	Performance Group Number/Period
DOMN	Domain number
SWRV	Swap recommendation value

Line Command	Description
SUAL	Total service units used
====	Line separator/Auto-repeat
DMDT	Domain descriptor table

A domain number was included in the JSEL line command to display address spaces in domain 2 only. Also, the domain number was specified in the DMDT line command to display the status of domain 2.

MVSMENU, MVSM4

The PreAlert MVS Exception Analysis Menu (Figure 74), MVSM4, is selected from the PreAlert MVS Interface Primary Menu.

Figure 74 • PreAlert MVS Exception Analysis Menu

```
COMMAND:            MVSM4      16:08:09.0  98.302  14.43% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU
.                 PreAlert / MVS Interface
.               MVS Exception Analysis Menu
.
.
MENU EXALOAD  :     LOAD MVS EXCEPTION ANALYSIS LEVEL SET
MENU EXALIST  :     LIST MVS EXCEPTION DEFINITION NAMES
.
MENU EXASYS   :     SET/DISPLAY SYSTEM EXCEPTION DEFINITIONS
MENU EXATASK  :     SET/DISPLAY TASK EXCEPTION DEFINITIONS
MENU EXADASD  :     SET/DISPLAY DASD EXCEPTION DEFINITIONS
.
MENU EXARUN   :     MONITOR MVS EXCEPTION ANALYSIS
.
MENU EXA1     :     SAMPLE MVS EXCEPTION ANALYSIS
.
.
.    NOTE: Review the "PreAlert MVS Exception Analysis" manual before
.          using these screens.
.
```

Menu references may be added or deleted by editing the MVSM4 member of the PreAlert MVS help file. The screen options available through the PreAlert MVS Exception Analysis menu are described and illustrated in the text that follows.

EXALOAD

The EXALOAD screen (Figure 75) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen allows the MVS Exception Analysis level set to be loaded.

Figure 75 • EXALOAD screen

```
COMMAND:            EXALOAD    16:09:37.0  98.302  12.00% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   MVSM4
.
.    The EXAS line command is used to load the MVS Exception Analysis level
.    set. The level sets contains the initial settings for the exception
.    thresholds. Level 99 has been included with the PreAlert installation.
.
.    Keyword          Function
.    LVL=xx         - Specify exception threshold module level
.    LOG=xxx        - Specify Exception Logging default options
.
.    SYS=ON/OFF Activate/Terminate MVS System Exception Analysis
.    TSK=ON/OFF Activate/Terminate Address Space Exception Analysis
.    DSK=ON/OFF Activate/Terminate DASD Exception Analysis
.
.    Following EXAS type LVL=99 and press enter; this will load the level
.    set. Level set 99 has been defined with all exception areas activated.
.
EXAS
+      LVL=99           SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                       MIN=   0 MAX= 255 LOG=
```

The EXAS line command is used to load the MVS Exception Analysis level set. The level set contains the predefined exception definitions built using the MVS Exception Analysis Macros.

A default level set, LVL=99, has been included with PreAlert MVS. This level set contains 20 spare system exception definitions, 20 spare address space exception definitions, and 10 spare DASD exception definitions.

EXALIST

The EXALIST screen (Figure 76) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen displays all non-spare exception definitions for PreAlert MVS Exception Analysis.

Figure 76 • EXALIST screen

```
COMMAND:___________ EXALIST    13:23:43.0  93.060  99.73% FREEZE FRAME ACTIVE
.
.    The EXAL line command lists all non-spare exception definitions.
.
.    The exceptions are listed by "area",
.            SYS for MVS System Exception Analysis
.            TSK for Address Space Exception Analysis
.            DSK for DASD Exception Analysis
.
EXAL LVL=99 SYS=ON  CNT=20  TSK=ON  CNT=20  DSK=ON  CNT=10
+ SYS: EXA=1  SET=ON  CPU>99
+      EXA=2  SET=ON  TPM>1800
+ TSK: EXA=1  JNM=IDMS*     SET=ON  IOR<1  CPX>75
+      EXA=2  JNM=IDMSJRN*  SET=OFF
+ DSK: EXA=1  VOL=DBAX*   SET=ON  IOR>20  RTM>.100
+      EXA=2  VOL=*       SET=ON  RDY=Y
```

The EXAL line command displays a condensed listing of the loaded MVS Exception level set. The threshold keywords for all nonspare exception definitions are listed. Spare definitions are not listed.

EXASYS

The EXASYS screen (Figure 77) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen allows you to alter and display PreAlert MVS System Exception Definitions.

Figure 77 • EXASYS screen

```
COMMAND:____________EXASYS     13:24:44.6  93.060  98.32% FREEZE FRAME ACTIVE
.
.    The XVSY line command is used to activate or terminate system exception
.    definitions, alter the threshold values, and screen print and chaining
.    options. Keywords are used to select the exception definition and
.    specify the thresholds and options.
.
.    Keyword          Function
.    EXA=nnn        - Specify exception definition number
.    SET=ON/OFF     - Activate/terminate the exception definition
.
.    Refer to Tutorial 600 for more information.
.
XVSY EXA=3,SET=ON,SQA>100,PRI=100,MSG='SQA OVERFLOWING INTO CSA',LMX=2
+   EXA=3  SET=ON  PRI=100  LMX=2  MSG=SQA OVERFLOWING INTO CSA  SQA>100
XDSY
+   EXA=1  SET=ON  PRI=51  TDL=15  CPU>99
+   EXA=2  SET=ON  PRI=50  TPM>1800
+   EXA=3  SET=ON  PRI=100  LMX=2  MSG=SQA OVERFLOWING INTO CSA  SQA>100
```

Refer to "MVS System Exception Analysis" on page 298 and "MVS System Exception Thresholds" on page 305 for a description of the XVSY and XDSY line commands and their keywords.

EXATASK

The EXATASK screen (Figure 78) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen allows you to alter and display PreAlert MVS Address Space Exception Definitions.

Figure 78 • EXATASK screen

```
COMMAND:____________EXATASK    13:26:11.0  93.060 101.83% FREEZE FRAME ACTIVE
.
.    The XVTK line command is used to activate or terminate address space
.    exception definitions and to alter thresholds and screen print and
.    chaining options. Keywords are used to select exception definitions
.    and to specify job name mask or performance group and period, and to
.    specify exception thresholds and options.
.
.    Keyword                     Function
.    EXA=nnn                   - Specify exception definition number
.    JNM=job name masks        - Specify job name masks
.    PGN=perf. group number    - Specify PGN
.    PRD=perf. group period    - Specify period
.    SET=ON/OFF                - Activate/terminate exception definition
.
.    Refer to Tutorial 700 for more information.
.
XVTK EXA=3,JNM=IDMS*,SET=ON,NSW=Y,USR=DBA1,LIM=2,PRI=20,TDL=60
+   EXA=3  JNM=IDMS*     SET=ON  PRI=20  LIM=2  TDL=60  USR=DBA1  NSW=Y
XDTK
+   EXA=1  JNM=IDMS*     SET=ON  AND=Y  PRI=150  TDL=10
+       MSG=POSSIBLE CPU LOOP, CPU=&CPUX, I/O=&IOCR  IOR<1  CPX>75
+   EXA=2  JNM=IDMSJRN*  SET=OFF  PRI=1
+   EXA=3  JNM=IDMS*     SET=ON  PRI=20  LIM=2  TDL=60  USR=DBA1  NSW=Y
+   EXA=4  CLS=B  SET=ON  AND=Y  PRI=1  MSG=JOB IN CPU LOOP  IOR<1  CPX>50
```

Refer to "MVS Address Space Exception Analysis" on page 325 and "MVS Address Space Exception Thresholds" on page 333 for a description of the XVTK and XDTK line commands and their keywords.

EXADASD

The EXADASD screen (Figure 79) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen allows you to alter and display PreAlert MVS DASD Exception Definitions.

Figure 79 • EXADASD screen

```
COMMAND:____________EXADASD    13:26:37.2  93.060 100.65% FREEZE FRAME ACTIVE
.
.    The XVDK line command is used to activate or terminate DASD exception
.    definitions, alter the threshold values, and screen print and chaining
.    options. Keywords are used to select the exception definition and
.    specify the thresholds and options.
.
.    Keyword          Function
.    EXA=nnn        - Specify exception definition number
.    SET=ON/OFF     - Activate/terminate the exception definition
.    VOL=volser     - Specify VOLSER mask
.    CUA=xxx        - Specify channel address (CUA) mask
.
.    Refer to Tutorial 800 for more information.
.
XVDK EXA=3,VOL=DBAX80,SET=OFF
+   EXA=3  VOL=DBAX80  SET=OFF  PRI=1
XDDK
+   EXA=1  VOL=DBAX*   SET=ON  PRI=1  TDL=60  IOR>20  RTM>.100
+   EXA=2  VOL=*       SET=ON  PRI=1  RDY=Y
+   EXA=3  VOL=DBAX80  SET=OFF  PRI=1
```

Refer to "MVS DASD Exception Analysis" on page 342 and "MVS DASD Exception Thresholds" on page 348 for a description of the XVDK and XDDK line commands and their keywords.

EXARUN

The EXARUN screen is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen monitors PreAlert MVS Exception Analysis.

Figure 80 provides a sample of a screen that may be used to monitor PreAlert MVS Exception Analysis.

Figure 80 • EXARUN screen

```
COMMAND:____________EXARUN     13:32:00.5  93.060  79.93% FREEZE FRAME ACTIVE
.    The EXAD line command is used to display all MVS exception messages.
.    Exception Analysis remains active even when the EXAD line command
.    is not used on the current screen. This allows the screen print and
.    screen chaining options to remain active, and allows highlighting of
.    exceptional values in address space data displays.
.
EXAD *** JOB TDAR146R JOB IN CPU LOOP (T4) ***
+    *** 35C DBAX85 I/O RATE = 32.558 PER SECOND (D1) ***
SYSR CPU:  93.20  I/O: 1669.2     PPR:     .0   CPR:     .0   TPR:    .0
JSEL SEL=JTS,TRN=Y,SRT=CPUR,REP=N
JOBN TDAR146R CSF9954Q IDMSDC1  ADC2SS   JES2     PAGGTRI  NETVIEW  OCCI     +
JSTA CPU*RES  CPU*RES  I/O*NSW  WAT*RES  I/O*NSW  I/O*RES  WAT*RES *WAT*NSW
PGN    4   4   37   1   14   1   20   1   18   1    2   3   16   1    9   1
SWAP
CPUX  63.47%   51.96%   35.41%   16.94%   14.52%    9.98%    9.28%    7.86%
FMCT    308K    4776K   29844K    1492K    3624K     724K    8504K    4004K
IOCR      .0     31.9     88.4     63.0     49.9     28.2      2.1       .0
PINR      .0       .0       .0       .0       .0       .0       .0       .0
JEXX   4/*..             1/...
+                         3/...
TSEL MNT=Y
TAPE      FB3      FD3      FD4
TVOL   *MOUNT   *MOUNT   *MOUNT
TUSR MXSXEEAA MWEGSYAB MWEGSYAB
TMNT    9.92S    9.92S    9.92S
```

EXA1

The EXA1 screen (Figure 81) is selected from MVSM4, the PreAlert MVS Exception Analysis menu. This screen is a sample PreAlert MVS Exception Analysis screen.

Figure 81 • EXA1 screen

```
COMMAND:____________EXA1       13:32:14.4  93.060  91.92% FREEZE FRAME ACTIVE
EXAS
+   LVL=99           SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                    MIN=   0 MAX= 255 LOG=
XVSY
XDSY
+   EXA=1  SET=ON  PRI=51  TDL=15  CPU>99
+   EXA=2  SET=ON  PRI=50  TPM>1800
+   EXA=3  SET=ON  PRI=100  LMX=2(2)  MSG=SQA OVERFLOWING INTO CSA  SQA>100
EXAD *** JOB TDAR146R JOB IN CPU LOOP (T4) ***
+    *** 35C DBAX85 I/O RATE = 32.558 PER SECOND (D1) ***
SRM  CPU=  88  UIC= 255  PFR=   0  PDT=   0  IPS=00 OPT=00 ICS=00
+    CPU= 5.0  IOC= 3.0  MSO=10.0  SRB= 5.0
```

This screen combines several functions of PreAlert MVS Exception Analysis: loading the level set; altering and displaying system exception definitions; and displaying exception messages.

MVSMENU, MVSM5

The PreAlert MVS System Services Menu, MVSM5 (Figure 82), is selected from the PreAlert MVS Interface Primary Menu.

Figure 82 • PreAlert MVS System Services Menu

```
COMMAND:___________ MVSM5      15:41:30.0  93.060  99.96% .TUT for Tutorial
.                 PreAlert / MVS Interface
.                 MVS System Services Menu
.
.
.   The following functions require PreAlert authorization.
.
MENU MVSSAPFL :    ADD APF ENTRIES
.
MENU MVSSKILL :    TERMINATE AN ADDRESS SPACE
.
MENU MVSSLPAM :    ADD/REPLACE LPA MODULES
.
MENU MVSSMZAP :    CROSS MEMORY ZAP
.
MENU MVSSSWAP :    MARK AN ADDRESS SPACE NON-SWAPPABLE
.
.
.    NOTE: Review the MVS System Services in the "PreAlert MVS Users Guide"
.          before using these screens.
.
.    Position the cursor on the desired MENU name, then press Enter.
.
```

Menu references may be added or deleted by editing the MVSM5 member of the PreAlert MVS help file. The text that follows describes and illustrates the screen options available through the PreAlert MVS Exception Analysis menu.

All of the MVS System Services functions are described in "MVS System Services" on page 265. Additionally, the user must be authorized by PreAlert MVS to use the MVS System Services functions. Refer to "Security Considerations" in the *ASG-PreAlert IDMS/MVS Systems Guide* for information on authorized user IDs.

MVSSAPFL

The MVSSAPFL screen (Figure 83) is selected from MVSM5, the PreAlert MVS System Services menu. From this screen, the user can dynamically manage the MVS Authorized Program Facility (APF) List.

Figure 83 • MVSSAPFL screen

```
COMMAND:____________MVSSAPFL   16:11:27.3  98.302  13.37% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   MVSM5
.
.    The APFL line command allows an authorized user to add entries to the
.    Authorized Program Facility list (APF list) dynamically, without
.    using an IPL. Entries added to the APF list through the APFL command
.    exist only for the life of the IPL. Sometime before the next IPL, the
.    entry should be added to the IEAAPFxx member of SYS1.PARMLIB.
.
.    Keyword         Function
.    DSN=dsname    - Specifies the library to be added to the APF list.
.                    (Fully qualified, no blanks or quotes)
.    VOL=volser    - Specifies the VOLSER on which the library resides.
.
.    LST=dsname*   - Specify up to the first 8 characters of the dsnames
.                    to be listed. (LST=* for all).
.    SRT=DSN|VOL   - Requests that the list be sorted by dsname or volser.
.                    Also, SRT< for ascending or SRT> for descending.
.    DEL=dsname    - Specifies the library to be deleted from the APF list.
.                    (VOL= keyword must be specified as well)
.ATH ON
APFL
```

The APFL line command and its keywords are described in "APF List Management" on page 265.

MVSSKILL

The MVSSKILL screen (Figure 84) is selected from MVSM5, the PreAlert MVS System Services menu. This screen allows you to terminate an address space.

Figure 84 • MVSSKILL screen

```
COMMAND:____________MVSSKILL   15:42:17.7  93.060  96.80% .TUT for Tutorial
.
.    The KILL command issues the CALLRTM TYPE=MEMTERM macro to terminate an
.    address space with a System 722 abend. MVS circumvents task recovery
.    and task resource manager processing when the MEMTERM option is used.
.    This includes all system and user established recovery routines, dump
.    processing, and dataset disposition processing.
.
.    Keyword        Function
.    JNM=jobname  - Specifies the job name of the address space.
.    ASD=nnnn     - Specifies the asid of the address space.
.
.    Additional information on Tutorials 1403-1404.
.
KILL
```

The KILL line command and its keywords are described in "Terminate an Address Space" on page 266.

MVSSLPAM

The MVSSLPAM screen (Figure 85) is selected from MVSM5, the PreAlert MVS System Services menu. This screen allows you to add or replace LPA modules.

Figure 85 • MVSSLPAM screen

```
COMMAND:_____________MVSSLPAM   15:42:39.2  93.060  71.87% .TUT for Tutorial
.
.    The LPAM command allows an authorized user to dynamically load new or
.    reload existing modules in the Link Pack Area (LPA). Modules may be
.    loaded from any authorized load library, and also may be loaded into
.    either fixed (subpool 228) storage or pageable (subpool 241) storage.
.
.    Keyword             Function
.    MOD=module name   - Specify either the load module or alias name.
.    DSN=library name  - Specify the name of the load library which contains
.                        the specified module. Default is SYS1.LPALIB.
.    FIX=Y/N           - Specify whether the module should be loaded into
.                        fixed (Y) or pageable (N) storage. Default is N.
.    VOL=volser        - Specify the volser if the library is not cataloged.
.    UNT=unit name     - Specify the unit name if the library is not
.                        cataloged. Default is SYSDA.
.
.    Additional information on Tutorials 1405-1412.
.
LPAM
```

The LPAM command and its keywords are described in "Add/Replace LPA Modules" on page 267.

MVSSMZAP

The MVSSMZAP screen (Figure 86) is selected from MVSM5, the PreAlert MVS System Services menu. This screen allows you to modify the memory of other address spaces.

Figure 86 • MVSSMZAP screen

```
 COMMAND:            MVSSMZAP   16:15:49.5  98.302   7.18% .TUT for Tutorial
 Menus Active:   MAINMENU  MVSMENU   MVSM5
 .ATH ON
 JSEL SEL=J,REP=N
 JOBN
 ASID
 ====
==========================================================================
 TCBM      ENTER ASID
 ====
==========================================================================
 CMDA          ENTER ASID
 ADDR
 DUML DUMP ASID    53/PREALERT   ADDRESS:00000000
 MZAP
 DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
 DUMP  00000000 +000  040C0000 813D7CE0 00000000 00000000   *    a @         *
 DUMP  00000010 +010  00FD9D80 00000000 078C1000 0005BB2A   *                *
 DUMP  00000020 +020  078C0000 00031E06 040C0000 813DD574   *            a N *
 DUMP  00000030 +030  00000000 00000000 070E0000 00000000   *                *
 DUMP  00000040 +040  00000000 00000000 00000000 00FD9D80   *                *
 DUMP  00000050 +050  00000000 00000000 040C0000 813C3C60   *            a  -*
 DUMP  00000060 +060  040C0000 80FE3280 00080000 843A4560   *            d  -*
```

These line commands are used with the MVSSMZAP screen:

Line Commands	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
ASID	Address Space ID
====	Line Separator/Auto-repeat
TCBM	Address Space TCB Map
CMDA	Cross Memory Display ASID
ADDR	Memory Display Address
DUML	Memory Display ASID/Jobname and Address
MZAP	Modify Memory

Line Commands	Description
DUMH	Memory Display Header
DUMP	Memory Display, 16 bytes per line command

Use the JSEL JNM keyword to select the target address space for display. Its address space ID is shown in the ASID line command.

Specify the target address space ID in the TCBM line command. This command displays a TCB map for the address space. The TCBs locate the desired programs or data areas.

Specify the target address space ID in the CMDA line command. This command shifts the memory display to the desired address space. The DUML line command displays the ASID, Jobname, and address of the memory displayed.

Use the ADDR line command to adjust the memory address to the desired location.

Use the MZAP line command to modify the memory.

The JSEL, JOBN, and ASID line commands are described in "Address Space Analysis" on page 139.

The TCBM line command is described in "Address Space Restricted Functions" on page 178.

The CMDA, ADDR, MZAP, DUML, and DUMP line commands are described in "Displaying Virtual Storage" on page 51 and "Modifying Memory" on page 56.

MVSSSWAP

The MVSSSWAP screen (Figure 87) is selected from MVSM5, the PreAlert MVS System Services menu. This screen allows you to mark an address space as nonswappable.

Figure 87 • MVSSSWAP screen

```
COMMAND:____________MVSSSWAP   15:43:53.0  93.060  99.90% .TUT for Tutorial
.     This screen is used to mark an address space non-swappable.
.     Use the JNM= keyword with the JSEL line command to select the
.     desired address space. Then enter the address space ID (ASID)
.     in the SWPI line command using the ASI=nnn keyword.

JSEL REP=N,JNM=*
JOBN *MASTER* PCAUTH   RASP    TRACE    GRS     DUMPSRV  CONSOLE  ALLOCAS  +
ASID       1        2        3        4        5        6        8        9
JSTA  I/O*NSW *WAT*NSW *WAT*NSW *WAT*NSW *WAT*NSW  WAT*NSW *WAT*NSW *WAT*NSW
SWAP
SWCT                 1        1        1        1                 1        1
==== ==========================================================================

SWPI

.     The SWPN line command should be used to mark an address space
.     non-swappable for extended periods of time, more than a minute.

.     The SWPO line command may be used to remove the non-swappable
.     attribute from an address space.
```

These line commands are used with the MVSSWAP screen:

Line Commands	Description
JSEL	Address Space Selection Keywords
JOBN	Jobname
ASID	Address Space ID
JSTA	Job Status
SWAP	Swap Reason
SWCT	Swap Count
====	Line Separator/Auto-repeat
SWPI	Mark an Address Space Non-swappable

The line commands used to mark an address space nonswappable are described in "Address Space Non-swappable Status" on page 269.

PAMENU

The PreAlert Miscellaneous Facilities Primary Menu, PAMENU (Figure 88), is selected from the PreAlert MVS Interface Primary Menu.

Figure 88 • PreAlert Miscellaneous Facilities Primary Menu

```
COMMAND:             PAMENU     10:55:37.1  01.106  12.18% .TUT for Tutorial
.               PreAlert Miscellaneous Facilities
.                        Primary MENU
.
MENU BLANK    :     BLANK SCREEN
MENU SCREENS  :     DISPLAY ALL SCREEN NAMES
MENU PRINT    :     SCREEN PRINT FEATURES
.
MENU COLOR1   :     SCREEN COLORS
MENU COLOR2   :     MENU AND COMMENT COLORS
.
MENU USERD1   :     USERDATA KEYWORDS, COMPRESSED
MENU USERD2   :     USERDATA KEYWORDS, EXPANDED
.
.        The following facilities require PreAlert authorization.
.
MENU CONSOLE  :     MVS MASTER CONSOLE INTERFACE
MENU CONSRMQ  :     MVS MASTER CONSOLE RETAINED MESSAGE QUEUE
.
MENU DUMP     :     DISPLAY VIRTUAL MEMORY
MENU DUMPSCAN :     DISPLAY/SCAN VIRTUAL MEMORY
.
.    Position the cursor on the desired MENU name, and press ENTER.
```

The PAMENU contains screen references to facilities within PreAlert MVS.

The last 4 menu items, CONSOLE, CONSRMQ, DUMP, and DUMPSCAN screens, require an authorized PreAlert user. Refer to "Security Considerations" in the *ASG-PreAlert IDMS/MVS System Guide* for more information on authorized user IDs.

BLANK

The BLANK screen (Figure 89) is selected from PAMENU, the PreAlert MVS Miscellaneous Facilities Primary Menu. This screen is presented blank and is used for building your own screens.

Figure 89 • BLANK screen

```
COMMAND:_____________BLANK      14:25:31.1  93.060  106.71% .TUT for Tutorial
```

PreAlert MVS line commands are entered in the first column of each line. A screen may contain up to 64 line commands. The .UP (PF7 key) and .DOWN (PF8 key) commands may be used to scroll up and down in the screen.

The screen may be saved for later use by using the .=x header command. Refer to "Introduction" on page 1 for more information on saving screens.

SCREENS

The SCREENS screen (Figure 90) is selected from PAMENU, the PreAlert MVS Miscellaneous Facilities Primary Menu. This screen displays the names of all screens available to the user.

Figure 90 • SCREENS screen

```
COMMAND:____________SCREENS    14:25:22.7  93.060 110.08% .TUT for Tutorial
SCRN START1   WERXSHP$ WERXSHPA WERXSHPB WERXSHPC WERXSHPD WERXSHPE WERXSHPG
+    WERXSHPH WERXSHPI WERXSHPJ WERXSHPK WERXSHPL WERXSHPM WERXSHPO WERXSHPP
+    WERXSHPQ WERXSHPR WERXSHPS WERXSHPT WERXSHPV WERXSHPW WERXSHPX WERXSHPY
+    WERXSHPZ WERXSHP1 WERXSHP3 XJOB     <<====>> ACTVPGMS ACTVTASK AJ2
+    AJ3      AJ4      ALLJOB   ATLK     ATPLOTS  ATPR     ATRU     ATSTAT1
+    ATSTAT2  ATSTAT3  ATTK     ATTR     ATTW     BFFRDEFN BFFRPLOT BLANK
+    CHPBUSY  CONSOLE  CPUPLOT  CSA      CSSTAT   DATASET  DBAREAS  DBPLOTS
+    DBSTATS  DISK     DISKBUSY DISKIO   DISKSP3  DISKXA   DISK1    DT
+    DTRACE   DUMP     ESTOR    EXALIST  EXALOAD  EXARUN   EXASYS   EXATASK
+    EXA1     FIELDS   FIXED    FRAMES   HISTOGRM IDMSABND IDMSABNZ IDMSACTV
+    IDMSCOMD IDMSDUMP IDMSLINE IDMSMENU IDMSMLOG IDMSMMAP IDMSM1   IDMSM2
+    IDMSM3   IDMSM4   IDMSM5   IDMSM6   IDMSM7   IDMSRCES IDMSSTAT IDMSSTA1
+    IDMSSTA2 IDMSTTRC IDMSVARY IDXLIST  IDXLOAD  IDXRUN   IDXSYS   IDXT
+    IDXTASK  IDX1     IDX2     JOBCPU   JOBENQ   JOBPLOT  JOBRATE  JOBSRM
+    JRNLDEFN JSPLOT   LCUQUEUE LCURATE  LINEDEFN LOCKSTAT MAINMENU MPSTATS
+    MVSIDMS  MVSMENU  MVSM1    MVSM2    MVSM3    MVSM4    MVSM5    MVSSAPFL
+    MVSSKILL MVSSLPAM MVSSMZAP MVSSSWAP NEWJOB   PAGEABLE PAGEPLOT PAGERATE
+    PAGESWAP PAGING   PAMENU   PFKEYS   PFKEYSCN PLOTS    PLOTSP   POPSAREA
+    PRDWAIT1 PRGPOOL  PRINT    PRODDB   PRODDUMP PRODPOOL PRODSTG  PRODWAIT
+    PROGDEFN PROGDEF1 PROGDEF2 RCASTAT  REALSTG  REALSTOR RUSTAT1  RUSTAT2
+    RUSTAT3  SCREENS  SCRQSTAT SRM      SRMLOAD  SRMSWAP  SRMTSO   SRMTSOR
+    SRM2     STGPOOL  TAPE     TASKDEFN TERMDEFN TERMUSE  TEST     TESTTASK
+    TRACE    TSKSTATS TSO      TSOWAIT  TSOWAIT1 WAIT     WAIT1
.
.  To select a screen; (1) position the cursor to the desired screen
```

The SCRN line command lists the screen names in the user's help file and the PreAlert MVS help file. On the SCRN line command output display, the screen names in the user's help file precede the <<====>> symbol. The screen names in the PreAlert MVS help file follow that symbol. ISPF may be used to edit, rename, or delete any member in either Help file.

Member names that begin with the user's user ID may be retrieved by entering the single character that follows the user ID (i.e., for member WERXSHP$, type $ in the COMMAND input area and press Enter). To return to PAMENU, press the End key.

PRINT

The PRINT screen (Figure 91) is selected from PAMENU, the PreAlert MVS Miscellaneous Facilities Primary Menu. This is the Screen Print facility setup screen.

Figure 91 • PRINT screen

```
COMMAND:____________PRINT      14:25:40.7  93.060 104.93% .TUT for Tutorial
.
.    The PRNT line command can be used to specify the SYSOUT class, HOLD
.    attribute, destination, and print count, and to close (spin-off) the
.    print file.
.
.    KEYWORD            FUNCTION
.    CLS=x            - Specify SYSOUT class
.    SPN=Y            - Close (spin-off) the file
.    HLD=Y/N          - Specify HOLD attribute
.    DST=destination  - Specify SYSOUT destination
.    CNT=n            - Specify print count
.    DDN=ddname       - Specify DD name
.
.    The PRNT line command (with print count > 0) is required on all screens
.    to be printed. The screens will no longer be automatically printed
.    when the print count has been decremented to zero.
.
PRNT
+   OPEN    CLASS:X  HOLD:Y  DEST:R0        COUNT:   0  DDN:SYS00002
```

To return to PAMENU, press Enter. Refer to "Screen Print Facility" on page 10 for a complete list of screen printing options.

COLOR1

The COLOR1 screen (Figure 92) is selected from the PreAlert Miscellaneous Facilities Primary Menu, PAMENU. The COLOR1 screen contains the line commands used to alter color attributes.

Figure 92 • COLOR1 screen

```
COMMAND:_____________COLOR1      9:02:47.5  95.018 100.00% .TUT for Tutorial
Menus Active:   MAINMENU  PAMENU
.  The .CLR line command may be used to activate COLOR support.
.  Specify ON full color support;
.          XON exception messages color support.

.CLR ON

.  The following line commands can be used to tailor color and
.  extended hilighting for PreAlert.  For each item, specify
.  a color, followed by a hilight option.

.  Valid Colors: RED, BLUE, TURQ, YELLOW, WHITE, GREEN, PINK
.  Valid Hilights: NORMAL, USCORE, REVERSE, BLINK

COIN RED,USCORE        LINE COMMAND INPUT AREAS
COPN BLUE,NORMAL       NORMAL DISPLAY AREAS
COPH WHITE,USCORE      HILIGHTED DISPLAY AREAS
COUN GREEN,NORMAL      NORMAL INPUT AREAS
COUH PINK,NORMAL       HILIGHTED INPUT AREAS
```

Refer to "Color Support" on page 19 for additional information.

COLOR2

The COLOR2 screen (Figure 93) is selected from the PreAlert Miscellaneous Facilities Primary Menu, PAMENU. The COLOR2 screen contains the line commands used to alter special character color attributes.

Figure 93 • COLOR2 screen

```
COMMAND:_____________COLOR2      9:03:48.2  95.018  82.75% .TUT for Tutorial
Menus Active:   MAINMENU  PAMENU
.  The CHAT line command assign display attributes to special
.  characters for Menus and Comments.
.  Specify:  CHA=character
.            INT=intensity        (monochrome displays)
.            COL=color,hilight    (color displays)
.            CAN=Y                (remove special character)

.  Valid Intensities: LOW, HIGH
.  Valid Colors: RED, BLUE, TURQ, YELLOW, WHITE, GREEN, PINK
.  Valid Hilights: NORMAL, USCORE, REVERSE, BLINK

CHAT
+ CHA=%,INT=LOW,COL=GREEN,NORMAL
+ CHA=#,INT=HIGH,COL=WHITE,USCORE
+ CHA=@,INT=LOW,COL=YELLOW,NORMAL
```

Refer to "Color Support" on page 19 for additional information.

USERD1

The USERD1 screen (Figure 94) is selected from PAMENU, the PreAlert Miscellaneous Facilities Primary Menu. This screen displays the PreAlert USERDATA settings in a compressed format.

Figure 94 • USERD1 screen

```
COMMAND:            USERD1     16:17:57.7  98.302  12.81% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   PAMENU

.    This screen displays the PreAlert USERDATA values being used for this
.    session.  Use the scroll down key (PF8) to display additional values.

UDPB UDPARMS --- USERDATA ASSEMBLED 10/23/98 11.24
+    USER AUTHORIZATION AND SECURITY
+          SECINT=Y  SECWAIT=Y  SECSAVE=Y  AUTHXIT=N  AUTOATH=Y
+          AMVS=(NONE)
+    MISCELLANEOUS OPTIONS
+          AREP=Y  PRTCLS=A  PRTDEST=R0  PRTHOLD=N
+          HELPDSN=*.PREALERT.HELP
+          NOSAVE=N  MEMREP=Y  UNIT=3390  INT=(5,3,600)  SPFLPA=Y
+          COMDWTO=N  WTORTC=(11)  WTODSC=(7)
+          SCRNLIM=512  PLOTYEL=30  PLOTRED=70  MSRBTO=10  MENUHDR=Y
+          COPN=(BLUE,NORMAL)  COPH=(WHITE,NORMAL)
+          COUN=(GREEN,NORMAL)  COUH=(RED,NORMAL)
+          COIN=(RED,USCORE)
+          ASFID=  ASFFUN=EVENT.NOTIFICATION.FACILITY
+          CENDATE=Y
```

Use the .DOWN (PF8) scroll command to view additional data. The authorized user IDs, line command exclude lists, IDMS CV numbers, IDMS exception level sets, MVS performance group and domain names, and MVS exception level sets are also displayed.

USERD2

The USERD2 screen (Figure 95) is selected from PAMENU, the PreAlert Miscellaneous Facilities Primary Menu. This screen displays the PreAlert USERDATA settings for the UDPARMS macro.

Figure 95 • USERD2 screen

```
COMMAND:            USERD2     16:19:42.9  98.302  24.00% .TUT for Tutorial
Menus Active:   MAINMENU  MVSMENU   PAMENU

.    This screen displays the expanded list of the USERDATA UDPARMS
.    keywords.  Scroll down key (PF8) to display additional values.

UDPA UDPARMS --- USERDATA ASSEMBLED 10/23/98 11.24
+    USER AUTHORIZATION AND SECURITY
+          SECINT=Y             UPDATE INTERVAL SECURED
+          SECWAIT=Y            MVS WAIT ANALYSIS SECURED
+          SECSAVE=Y            SCREEN SAVE SECURED
+          AUTHXIT=N            ALL AUTH USERS IN UDAUSER
+          AUTOATH=Y            AUTO .AUTHON FOR AUTH USERS
+          AMVS=(NONE)          PREALERT.MVS NOT SECURED
+    MISCELLANEOUS OPTIONS
+          AREP=Y               AUTO-REPEAT DEFAULT
+          PRTCLS=A             PRINT SYSOUT CLASS DEFAULT
+          PRTDEST=R0           PRINT DESTINATION DEFAULT
+          PRTHOLD=N            PRINT HOLD ATTRIBUTE DEFAULT
+          HELPDSN=*.PREALERT.HELP
+          NOSAVE=N             SAVE OPTION SUPPRESSED
```

Use the .DOWN (PF8) scroll command to view additional data. The entire list of UDPARMS keywords displays.

CONSOLE

The CONSOLE screen (Figure 96) is selected from PAMENU, the PreAlert MVS Miscellaneous Facilities Primary Menu. This is the PreAlert MVS Master Console display screen.

Figure 96 • CONSOLE screen

```
COMMAND:____________CONSOLE    14:27:27.0  93.060 105.75% .TUT for Tutorial
MCON    * TGLPACZ.PTGL951R.STEP060.SORTOUT
MCON  - 14.27.09 JOB00653  $HASP375 PTGL721R ESTIMATE EXCEEDED BY     310,000
MCON  -  LINES
MCON  - 14.27.13 JOB00653  $HASP375 PTGL721R ESTIMATE EXCEEDED BY     320,000
MCON  -  LINES
MCON    *14.27.15 JOB02662 *TMS001  IEF233A M FB0,SCRTCH,SL,POIC016R,STEP070
MCON 00 *14.27.15 JOB02544 *IEF233A M FD0,732303,,PETV956E,S956290,
MCON    * ETVPRDZ.PETVP902.ERROR
MCON    *14.27.15 JOB02544 *TMS001  IEF233A M FB3,PRIVAT,SL,PETV956E,S956290,
MCON    * ETVPRDZ.PETVR948.SRTDERR
MCON    *14.27.21 JOB02196 *TMS001  IEF233A M FC2,PRIVAT,SL,PTGL941R,STEP060,
MCON    * TGLPACZ.PTGL941R.STEP060.SORTOUT
MCON
MCON
MCON IEE152I     ENTER     CANCEL     D C,K
MCON IEE163I MODE= RD
=== ==========================================================================
RPLY 02.41.09 STC05328 *17 REPLY WITH REQUEST TO IDMS V6
RPLY 02.24.07 STC05215 *08 REPLY WITH REQUEST TO IDMS V8
RPLY 01.11.27 STC04328 *83 REPLY WITH REQUEST TO IDMS V2
==== ========================================================================
COMD
```

These line commands are used with the CONSOLE screen:

Line Command	Description
MCON	Master Console Display line
====	Line Separator/Auto-repeat
RPLY	Outstanding Operator Reply Element
COMD	Issue MVS Operator Command

To return to PAMENU, press the End key. Refer to "Master Console Support" on page 57 for more information.

CONSRMQ

The CONSRMQ screen (Figure 97) is selected from the PreAlert Miscellaneous Facilities Primary Menu. This screen is the PreAlert MVS Master Console Retained Message Queue management screen.

Figure 97 • CONSRMQ screen

```
COMMAND:            CONSRMQ    17:04:05.9  99.321  82.37% .TUT for Tutorial
.  MVS Master Console Retained Message Queue
MDRM      269  C  15.16.17 JOB02867 *PREALERT RETAINED MESSAGE TEST
+         264  C  15.12.09 JOB02856 @PDSALTER07-W ERROR: MEMBER TSTALTER AT:
+                           TCR.R43.DIST.ALL.COBOLII.LOADLIB DLIB<
+         250  C  08.19.39          *ILR006E COMMON PAGE DATA SET FULL, OVERF
+                           LOWING TO PLPA DATA SET
+         249  I  05.20.14 STC02146 *DSNT405E -DB2M DSNTLIDE DISPATCH PRIORIT
+                           IES NOT IN SYNC: IRLM    : 0071 COMPARED TO DB2
+                             : 0071
.
.  Enter MSG=nnnnn (message id) to delete message
MDOM
```

These line commands are used with the CONSRMQ screen:

Line Command	Description
MDRM	Display retained messages.
MDOM	Delete retained messages

Refer to "Master Console Support" on page 57 for more information on the PreAlert retained message queue features.

DUMP

The DUMP screen (Figure 98) is selected from PAMENU, the PreAlert MVS Miscellaneous Facilities Primary Menu. This screen is used to display central storage.

Figure 98 • DUMP screen

```
COMMAND:____________DUMP       14:28:10.5  93.060 105.66% .TUT for Tutorial
ADDR *ASCB69
DUML DUMP ASID    69/WERXSHP    ADDRESS:00F2A180
DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMP  00F2A180 +000  C1E2C3C2 00B0D600 00F24280 00000000   *ASCB  O  2      *
DUMP  00F2A190 +010  009FD4A0 000016E5 00000000 009C32C0   *  M    V        *
DUMP  00F2A1A0 +020  00000001 00450000 000100DB 80B0B301   *                *
DUMP  00F2A1B0 +030  7FF16EB0 00000040 00B0CE40 00A93938   *"1>          Z  *
DUMP  00F2A1C0 +040  00000001 1A11D125 A545ABEB 731A7134   *      J V       *
DUMP  00F2A1D0 +050  00000D69 809FDD60 A545ABC1 00000000   *       -V  A    *
DUMP  00F2A1E0 +060  009FFD18 FFFF0000 00000000 009FDF00   *                *
DUMP  00F2A1F0 +070  03EF0000 00000000 00000000 009FE178   *                *
DUMP  00F2A200 +080  00000000 00000000 00000000 40000000   *                *
DUMP  00F2A210 +090  01D49240 01DADD18 00000280 00000000   * MK             *
DUMP  00F2A220 +0A0  00000000 00000000 00000000 00000000   *                *
DUMP  00F2A230 +0B0  00B0CE48 00000000 00000000 00000000   *                *
DUMP  00F2A240 +0C0  00000007 000006B4 00000000 2B8CD400   *              M *
DUMP  00F2A250 +0D0  00000000 00000000 00000001 00000000   *                *
DUMP  00F2A260 +0E0  009FEA58 FFFFFFDB 00000000 00000000   *                *
DUMP  00F2A270 +0F0  00000000 00000000 01DD1140 7FFEC000   *            "   *
```

These line commands are used with the DUMP screen:

Line Command	Description
ADDR	Specifies storage address for display
DUML	Storage ASID/Jobname and Address
DUMH	Storage Display Header
DUMP	Storage Display, 16 bytes per line command

To return to PAMENU, press the End key. To return to the PreAlert MVS Primary Menu, press the End key again. Refer to "Displaying Virtual Storage" on page 51 for more information on displaying storage.

DUMPSCAN

Select the DUMPSCAN screen (Figure 99) from the PreAlert Miscellaneous Facilities Primary Menu (on the PAMENU screen). Use the DUMPSCAN screen to search either private or common areas for a character string or hex data.

Figure 99 • DUMPSCAN screen

```
COMMAND:            DUMPSCAN   11:06:35.9  01.106  15.06% .TUT for Tutorial
.  Memory Scan - Enter:
.
.    Address Space:  JOB=jobname or ASI=asid
.      Search Data:  STR=character string or HEX=hex data
.         Location:  LOC=PRIVATE/LSQA/CSA/SQA/NUCLEUS/LPA
.        Alignment:  ALN=D/F/H/B

MSCN JOB=PACTEST,STR=SHOPMXMB,ALN=B
+               DATA: STR=SHOPMXMB
+      ADDRESS SPACE: JOB=PACTEST
+           LOCATION: LOC=PRIVATE
+          ALIGNMENT: ALN=B
+           FOUND AT: 0000FD4D

CMDA          ENTER ASID
ADDR
DUML DUMP ASID   127/PACTEST    ADDRESS:0000FD4D
DUMH   ADDRESS       +0.....3 +4.....7 +8.....B +C.....F   *---E B C D I C--*
DUMP  0000FD4D +000                                E2C8D6   *             SHO*
DUMP  0000FD50 +003  D7D4E7D4 C26DF0F4 61F1F361 F0F16DF1   *PMXMB_04/13/01_1*
DUMP  0000FD60 +013  F84BF0F2 90ECD00C 18CF41B0 CFFF41B0   *8.02            *
DUMP  0000FD70 +023  B00158A0 100058F0 A898BF1F F4904770   *       0yq  4   *
DUMP  0000FD80 +033  C0744100 08000700 47F0C048 00000900   *         0      *
```

These line commands are used with the DUMPSCAN screen:

Line Command	Description
MSCN	Memory scan
CMDA	Specify cross memory dump ASID
ADDR	Specify storage address for display
DUML	Storage ASID/Jobname and Address
DUMH	Storage display header
DUMP	Storage display, 16 bytes per line command

3 Address Space Analysis

This chapter discusses the Address Space Analysis functionality of PreAlert MVS. These topics are covered:

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CPU Utilization **142**

Dispatching **143**

Swapping **145**

Swap Control **147**

Paging **149**

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Address Space Information

Throughout this PreAlert MVS documentation, the term *job* has been used to represent an address space when it may be a batch job, TSO user, or a started task. The following line commands are commonly used to identify the address space, some of which display in Figure 100 on page 141.

Command	Description		
JOBN	Jobname, TSO user ID, or started task PROC name. Overflow Indicator (+) available.		
PROC	Procedure Name.		
STEP	Step Name.		
JID	JOB type: JOB, TSU, STC, or blank. It also shows job class for batch jobs.		
JNUM	JES job number. Available only if MVS Common Storage Tracking is active.		
ASID	Address Space ID, unique number assigned to each address space.		
JUSR	User ID from jobcard (may be supplied by a security package).		
JSTA	Job Status for cross memory address spaces (LLA, VLF, ACF2, etc.). The status display is formatted into four fields:		
	A	*	Address Space Available for CROSS MEMORY use
	BBB	CPU	Address Space is CPU dispatchable
		WAT	Address Space is waiting
		DLY	Address Space is Delayed for RTO
		I/O	Address Space is Waiting for input and output
	C	*	Address Space is in a transaction
		blank	Address Space is not in a transaction
	DDD	RES	Address Space is resident
		NSW	Address Space is resident and nonswappable
		LSW	Address Space is logically swapped out
		SWP	Address Space is swapped out
TRCT	Count of transactions for this job. For TSO users, the number of Terminal Inputs for batch jobs and started tasks is usually 1.		

Command	Description
TMTR	Amount of transaction time; amount of time since the start of the current transaction. For TSO, time since last terminal input. For batch jobs and started tasks, time since the performance group was set (job start time).
WAIT	Waiting time; amount of time the job has been waiting (e.g., for a resource, input, or end of a time interval).
TMSW	Time since last swap action (in or out).
TMSL	Time since job selection (not valid for initiators).

Note:

Time fields are displayed in DIGITAL CLOCK format, for example:

1:13D=1 DAY 13 HOURS
6:34M= 6 MINUTES 34 SECONDS
43.21S=43.21 SECONDS

The JSEL line command specifies address space selection parameters, as shown in Figure 100. For additional information on this command, refer to "Address Space Selection" on page 174.

Figure 100 • JSEL line command

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F SLKXPARR LXOGSYDI LWRGEAIX EXGXSTR3 PAJGSYAG LXOGSYDD
PROC AMUPH11  OICF502  ADSORPTS CFMAREAS MODEL    STEP1    ADSORPTS CFMCE064
STEP          STRIP01                    GO                          DMLC
JSUR DSSGSYD  ADC255   SLKXPAR  LXOGSYD  LWRGEAI  EXGXSTR  PAJGSYA  LXOGSYD JID
JOB A    JOB P    JOB B    JOB B    JOB Q    JOB A    JOB A    JOB C
ASID      14       15       17       19       21       22       26       29
```

CPU Utilization

In MVS, units of work are represented by two control blocks:

- Task Control Blocks (TCB) represent tasks executing within an address space. These tasks are usually user programs.
- System Request Blocks (SRB) represent requests to execute service routines for that address space.

Figure 101 displays CPU utilization when the system is processing TCBs and SRMs.

Figure 101 • Processing TCBs and SRMs

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F WTJGSYA1 SLKXPARR WKLXSTRD LXOGSYDI TIMP030F LWRGEAIX
TCB     5.45S     .05S     .43S    4.07S     .10S     .30S     .01S    1:14M
TCBR     .00%     .05%     .43%     .00%     .00%     .00%     .01%    3.58%
SRB      .45S     .00S     .08S    1.13S     .02S     .13S     .00S    9.63S
SRBR     .00%     .00%     .08%     .00%     .00%     .00%     .00%     .23%
CPU     5.90S     .05S     .51S    5.20S     .12S     .43S     .01S    1:23M
CPUR     .00%     .05%     .51%     .00%     .00%     .00%     .01%    3.81%
JSTL     .15%     .00%     .01%   13.56%    1.00%     .00%     .00%    2.05%
CPLT DSSGSYD1    .00% .... .... .... .... .... .... .... .... ....
CPLT POIC502F    .05% .... .... .... .... .... .... .... .... ....
CPLT WTJGSYA1    .51% .... .... .... .... .... .... .... .... ....
CPLT SLKXPARR    .00% .... .... .... .... .... .... .... .... ....
CPLT WKLXSTRD    .00% .... .... .... .... .... .... .... .... ....
CPLT LXOGSYDI    .00% .... .... .... .... .... .... .... .... ....
CPLT TIMP030F    .01% .... .... .... .... .... .... .... .... ....
CPLT LWRGEAIX   3.81% **.. .... .... .... .... .... .... .... ....
CPLT TOTAL      4.39% **.. .... .... .... .... .... .... .... ....
```

These are the commands used processing TCBs and SRMs:

Command	Displays
TCB	Amount of CPU time used for processing TCBs.
TCBR	CPU utilization for TCBs since last analysis.
SRB	Amount of CPU time used for processing SRBs.
SRBR	CPU utilization for SRBs since last analysis.
CPU	TCB + SRB CPU time.

Command	Displays
CPUR	TCB + SRB CPU utilization.
JSTL	Percentage of job step time limit used (TCB time).
CPLT	Plot of CPUR (1 plot character for each 2 percent CPU utilization). Displays plot for jobs that have been selected for display. If sufficient CPLTs are listed, the total CPUR for the selected jobs are displayed.

Dispatching

In MVS, the MASTER SCHEDULER dispatches address spaces according to their positions on the dispatching queue. The job's performance group is used to assign a dispatching priority which is used by the SYSTEM RESOURCES MANAGER (SRM) to determine the job's position on the dispatching queue. Figure 102 shows a sample dispatching display:

Figure 102 • Dispatching display

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F SLKXPARR LXOGSYDI TIMP030F EXGXSTR3 PAJGSYAG PTGL581U
SEQN        5       40        8        6       36       41       34       61
DPRT  FF(255)  90(144)  FF(255)  FF(255)  97(151)  79(121)  97(151)  00(  0)
PGN     4   3    6   1    5   3    4   1    5   1    4   4    5   2    6   1
PGNA BATCHBI  BATCHDG  BATCHAEF BATCHBI  BATCHAEF BATCHBI  BATCHAEF BATCHDG
```

These line commands are used to display job information on the dispatching queue:

Command	Displays
SEQN	Position on the dispatching queue.
DPRT	Dispatching priority. HEX (DEC).
PGN	Performance group and period.
PGNA	Performance group name.

These line commands are used to assign a Report Performance Group to the job. This allows the installation to accumulate workload data by jobname, job class, user ID, and subsystem.

Command	Displays
RPGC	Report by job class
RPGN	Report by jobname
RPGS	Report by subsystem
RPGU	Report by user ID

Swapping

Swapping is the movement of an entire address space between virtual storage and auxiliary storage (swap datasets). It is used to balance system workload and prevent real storage shortages. Swapping is performed in response to recommendations from the System Resources Manager (SRM). Figure 103 shows a sample swapping display:

Figure 103 • Swapping display

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F SLKXPARR LXOGSYDI TIMP030F EXGXSTR3 PAJGSYAG PTGL581U
JSTA  WAT*SWP  WAT*RES  WAT*SWP  WAT*SWP  CPU*RES  WAT*RES  I/O*RES  WAT*SWP
SWCT                1                                  14
SWAP DET-WAIT          DET-WAIT DET-WAIT                            DET-WAIT
```

These commands are used when Swapping:

Command	Displays
JSTA	Job Status
SWCT	Number of times an address space has been swapped in.
SWAP	Swap reasons. See next table for additional information on swap reasons.

These are Swap reasons that may display when using the SWAP command:

Swap Reasons	Description
TERM-IN	Address space waiting on terminal input.
AUX-STOR	Auxiliary storage shortage. This address space swapped due to high paging rate.
REAL-STG	Real storage shortage. This address space swapped due to high real storage usage.
LONGWAIT	Address space swapped out due to a long WAIT state.
DET-WAIT	SRM detected WAIT state for the address space.
UNILATRL	System workload level too high, this address space swapped to lower the workload level.
EXCHANGE	Address space swapped out to allow swap in of another address space.

Swap Control

When SRM detects an overutilization of system resources, unilateral and exchange swaps are used to lower the number of address spaces executing in real storage. SRM uses the swap recommendation value to decide which address space within a domain is swapped out. The service rate since the last swap action is associated with a performance objective to calculate the swap recommendation value; the lower values are then swapped-out. Figure 104 displays sample recommendation values and objectives:

Figure 104 • Sample recommendation values and objectives

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F SLKXPARR LXOGSYDI TIMP030F EXGXSTR3 PAJGSYAG PTGL581U
DOMN        2        1        2        1        1        2        2        1
DOMA BATCH    BATCH    BATCH    BATCH    BATCH    BATCH    BATCH    BATCH
OBJ         4        2        4        3        3        4        4        2
SWRV     9.00    10.00     9.00    10.00    10.00     9.00     9.00    10.00
TMSW   46:45M    1:09M    1:45H    1:19H   10.00S    1:27M   21:00M   10.21S
TMLA    1:10M     .05S    1:04M    1:06M    8.60S     .05S     .05S   10.32S
```

These line commands are used:

Command	Displays
DOMN	Domain Number
DOMA	Domain Name
OBJ	Objective Number
SWRV	Swap Recommendation Value
TMSW	Time since last swap action (in or out)
TMLA	Time since last analysis

Figure 105 displays the service rates since the last swap action.

Figure 105 • Service rates

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F WTJGSYA2 SLKXPARR TPAY020U LXOGSYDI  TIMP030F TIMP008F
SUCP    19036    18008     3996    12368     1075      777       96       80
SUSR     1135     2054      500     2035      130       34        7        2
SUMS   121640    53170    27374    71974     6191     2561      346      322
SUIO    10035    16018     3570    23290      555     2616       93       24
SUAL   151846    89250    35440   109667     7951     5988      542      428

SRCP      5.8    219.7    114.2       .9     22.4       .0       .9       .9
SRSR       .0     24.4     13.6       .0      1.9       .0       .0       .0
SRMS     41.0    651.3    785.1     10.7    132.8       .0      4.8      3.9
SRIO      2.9    195.3    101.5      2.9     11.7       .0       .9       .0
SRAL     51.7     1092     1016     16.6    170.8       .9      7.8      5.8
```

These line commands display information compiled since the last swap action:

Units	Rate	Since Last Swap Action
SUCP	SRCP	TCB CPU Service
SUSR	SRSR	SRB CPU Service
SUMS	SRMS	Main Storage Service
SUIO	SRIO	Input and Output Service
SUAL	SRAL	Total Service

Paging

Paging is the movement of a block of virtual storage (PAGES) between real storage (FRAMES) and auxiliary storage (PAGE datasets) to ensure that currently active PAGES are in real storage. In MVS, each address space is divided into three areas:

Address Space Area	Description
NUCLEUS	Nonpageable system control programs and control blocks.
LOCAL	Pageable private virtual storage for each address space.
COMMON	Pageable common storage for all address spaces. Includes service routines (LPA) and common system data areas (CSA).

Paging occurs in LOCAL, LPA, and CSA areas of virtual storage. The paging activity for each address space is accountable by area. Page reclaims occur when a paged-out page is requested, and the real storage frame that page had previously occupied has not been modified. The page-in operation is thus eliminated. Figure 106 shows a sample page-in count display:

Figure 106 • Sample page-in count display

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F WTJGSYA2 SLKXPARR TPAY020U LXOGSYDI TIMP030F TIMP008F
PIN                34                10                 6      134        2
TPIN               36                10                 6      146        2
DPIN               41                12                 6      157        2
```

These line commands are used to display page-in counts by address space area:

Command	Displays
PIN	LOCAL area page in count
TPIN	Total page-in count (LOCAL + CSA + LPA)
DPIN	Demand page-in count (Total + reclaims)

Paging Rates

Paging rates are defined as the page-in count divided by the time since the last analysis. Figure 107 shows a sample paging rates display:

Figure 107 • Sample paging rates display

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F WTJGSYA2 SLKXPARR TPAY020U LXOGSYDI TIMP030F TIMP008F
PINR                .9                .0                .0      3.8       .0
TPIR               1.0                .0                .0      4.1       .0
DPIR               1.1                .0                .0      4.4       .0
```

Paging rates are displayed through the use of these line commands:

Command	Displays
PINR	Current LOCAL page-in rate
TPIR	Current TOTAL page-in rate
DPIR	Current DEMAND page-in rate

Paging Rate Plot

LOCAL page-in rates for address spaces are plotted via the PINP and PINL line commands. Each point on the plot scale represents 1 page per second; the entire plot scale is 50 pages per second. Figure 108 displays the address space paging rate plot:

Figure 108 • Address space paging rate plot

```
JSEL JNM=IDMS*
JOBN IDMSDEVL IDMSPROD IDMSASF
PGN    68   1   88   1   66  1
PINR      7.0      1.0      .0
==== ==========================================================================
PINP IDMSDEVL 7.02*******..|....|....|....|....|....|....|....|....|....|
PINP IDMSPROD 1.00*...|....|....|....|....|....|....|....|....|....|....|
PINP IDMSASF   .00....|....|....|....|....|....|....|....|....|....|....|
=== ==========================================================================
PINL 002           PAGING RATE LIMIT =   2
+    IDMSDEVL 7.02  *******..|....|....|....|....|....|....|....|....|....|
=== ==========================================================================
PGRU USE=PNAME,PGR=5
+ PGN NAME     RATE  ....5...10...15...20...25...30...35...40...45...50
+ TSO-HI      11.53  ************..|....|....|....|....|....|....|....|....|
+ IDMS         8.02  ********.|....|....|....|....|....|....|....|....|
```

These line commands are used:

Line Commands	Description
PINP	Plots the current LOCAL page-in rate for address spaces selected for display.
PINL	Plots the current LOCAL page-in rate for address spaces having a rate greater than the specified limit.
PGRU	Summarizes and plots address space paging activity by either performance group number (PGN), performance group name, domain number, or domain name.

Storage Usage

In MVS, the paging mechanism is used to control the mapping of an address space's virtual storage into real storage. In most instances, the amount of virtual storage actively being used is much less than the amount allocated. MVS maintains the active storage in real storage while the unreferenced storage is paged out.

The amount of virtual storage kept in real storage is known as the *working set size*, which varies depending upon the job's need for real storage and the demand for real storage from other jobs.

Figure 109 • Sample real storage usage display

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F LWRGEAIX SLKXPARR LXOGSYDI TIMP030F TIMP008F EXGXSTR3
FMCT     528K       0K     448K     436K     196K     320K     396K     168K
FXFR     100K       0K      92K     156K      80K      76K      72K      88K
PGFR     428K       0K     356K     280K     116K     244K     324K      80K
```

These line commands are used:

Command	Displays
FMCT	Real storage allocated (working storage set size)
FXFR	Fixed real storage
PGFR	Pageable real storage

Common Storage Usage

MVS maintains two types of common storage: Common System Area (CSA) and System Queue Area (SQA). Both of these are used to contain data commonly addressable by all address spaces.

With MVS common storage tracking active, PreAlert can monitor the amount of common storage obtained by each address space. PreAlert will report common storage usage by the area—CSA, SQA, or total—and by location—either above or below the 16MB line as shown in Figure 110.

Figure 110 • Common storage usage

```
JSEL SEL=JST,TRN=Y,SRT=CSTT
JOBN NET      DB2SMSTR DB3PMSTR DB3TMSTR DB3QMSTR DB3PDIST DB2SIRLM DB3QDIST +
PROC NET      IEFPROC  IEFPROC  IEFPROC  IEFPROC  IEFPROC           IEFPROC
STEP
CSTT    1764K    1116K     939K     932K     920K     879K     601K     537K
CSTA    1737K    1085K     908K     901K     889K     879K     560K     536K
CSTB      27K      31K      30K      30K      30K      176      41K      176
CSAT    1764K    1111K     935K     929K     917K     876K     599K     534K
CSAA    1736K    1080K     905K     898K     886K     876K     557K     534K
CSAB      27K      30K      30K      30K      30K      128      41K      128
SQAT      256     5200     3408     3408     3408     2952     2480     2952
SQAA      256     4320     2528     2528     2528     2904     2352     2904
SQAB               880      880      880      880       48      128       48
```

Line Command	Description
CSTT	Total common storage size
CSTA	Common storage size above 16MB line
CSTB	Commons storage size below 16MB line
CSAT	Total CSA size
CSAA	CSA size above 16MB line
CSAB	CSA size below 16MB line

Line Command	Description
SQAT	Total SQA size
SQAA	SQA size above 16MB line
SQAB	SQA size below 16MB line

Page Dataset Slot Usage

When the unreferenced storage for an address space is paged out, it occupies slots in a page dataset. The Auxiliary Storage Manager (ASM) maintains the external page table. Entries in the external page table indicate the location of a page residing in a page dataset.

Figure 111 • Sample display of page dataset slot usage

```
JOBN LBEGGPI  CLCGMSI  IDMSDC1  WERXSHPT RRSGSYA  IDMSDC4  RJSGSYS1 IDMSDC7
PROC $TSUSR01 $TSUSR01 IEFPROC  BLDTAPE  $TSUSRDP IEFPROC  ASMHCL   IEFPROC
STEP                                                       A
SLIN      234       78     5243      256      180     3224      128     2826
SLTV                       3000      531        9                61
SLIT      234       78     8243      787      189     3224      189     2826
```

These line commands are used:

Command	Displays
SLTN	Non-VIO Slots owned by the address space
SLTV	VIO Slots owned by the address space
SLTT	Total Slots owned by the address space

Input and Output Counts

Iinput and output counts contain the total number of blocks transferred between real storage and input and output devices for any input and output for the address space. This includes input and output associated with all DASD and tape files, paging, load module fetch processing, open and close processing, and catalog management. A sample display of input and output counts is shown in Figure 112.

Figure 112 • Input and Output Counts

```
JSEL SEL=JT,TRN=Y
JOBN DSSGSYD1 POIC502F LWRGEAIX SLKXPARR LXOGSYDI TIMP030F TIMP008F EXGXSTR3
IOCT     3345     5411     2118     7764      873       16        8      127
IOCR       .0       .0     31.6       .0       .0      1.0       .0       .0
DCTI    83.62   135.27    52.95   194.10    21.83      .04      .06     3.18
DCTR    .0000    .0000    .7903    .0000    .0000    .0234    .0000    .0000
```

The following line commands are used:

Command	Displays
IOCT	Count of blocks transferred.
IOCR	Average input and output rate since the last analysis.
DCTI	Device Connect Time (MVS/XA, MVS/ESA only).
DCTR	Device Connect Time Rate (seconds of connect time used per wall-clock second).

Enqueue Contention Analysis

Enqueuing is a technique used to serialize the use of resources. It allows the supervisor to prevent the use of a resource until the owner has completed his processing of the resource. A resource (e.g., a control block, dataset, record, or program) is identified by a MAJOR name (category) and a MINOR name with the owner having either EXCLUSIVE control or SHARED use. Figure 113 shows a sample enqueue contention display:

Figure 113 • Enqueue contention display

```
JSEL JNM=IDMS*,ENQ=Y
JOBN WERXSHPQ IDMSDC2  IDMSDC1  IDMSDC7  IDMSDC4
SWAP LONGWAIT
WAIT   19.86S
QMAJ SYSDSN            IDMSCV
QMIN WERXSHP.          BATC
QASI   35 SHR            92 EXC
QMIN WERXSHP           PPIP330R

JENQ WERXSHPQ EXC WAIT SYS  SYSDSN    19 WERXSHP.PREALERT.CNTL
+    IDMSDC1  EXC WAIT SYS  IDMSCV     8 BATC
+    C2C1E3C3 3021BCCF
```

These line commands are used:

Command	Displays
QMAJ	MAJOR name of resource.
QMIN	MINOR name of resource.
QASI	Resource owner ASID and control type.

Command	Displays
QJNM	Jobname of address space owning resource.
QCNT	Count of requested resources that are causing contention.
JENQ	Enqueue information for any enqueues on which the address space is waiting. The address spaces displayed are selected thru JSEL and JOBN. The format is described with the ENQU line command, jobname format.

Requested resources are displayed when contention is detected. Contention occurs when the address space has requested the resource and the owner has exclusive control, or when the address space requested exclusive control of a resource owned by another address space.

Address Space Horizontal Display

Information for address spaces can be displayed horizontally in a somewhat conventional report format. Under this format, information for each listed address space is displayed across one line.

The ASHL line command can display data in one of four fixed formats. The desired format can be specified by a format number, one through four, as a keyword value for the ASHL line command. When a format number is not specified, a default format number is selected and may be adjusted using the .RIGHT control command to add 1 to the format number or using the .LEFT control command to subtract 1.

The address spaces displayed by the ASHL line command are selected through selection keywords specified via the JSEL line command as shown in Figure 114. See "Address Space Selection" on page 174 for a description of this line command.

Figure 114 • ASHL line command

```
COMMAND:____________ASHL       11:38:53.1  94.060  15.50% .TUT for Tutorial
.  MVS Address Space Data, horizontal display

JSEL SEL=JTS,CPU=1,SRT>CPUR

.  Specify 1, 2, 3, 4, or 5 for the ASHL display format number.
ASHL 1 1/5 CPU Pct  CPUT    Dprty   Wssze    IOrte   Jobstat  Swap Reasn Pgrte
+ DEVSAJ      2.24%   1:18M  FF(255)  1192K      .6    WAT LSW TERM-IN       .0
+ DEVSME      2.22%   2:14M  FF(255)   304K      .2    WAT LSW TERM-IN       .0
+ LSCMSTR     1.95%  43:54M  FA(250)   968K      .0   *WAT*NSW               .0
+ JES2        1.78%  38:24M  5D( 93)  1484K     1.4    WAT*NSW               .0
+ DEVWBJ      1.38%  26.58S  FF(255)  1620K      .8    WAT LSW TERM-IN       .0
+ SPTDJM      1.38%   1:40M  FF(255)   968K      .7    WAT LSW TERM-IN       .0
+ RMF         1.18%  32:59M  6D(109)   256K      .0    WAT*NSW               .0
+ DEVNRW      1.12%   2:26M  FF(255)  1428K      .6    WAT LSW TERM-IN       .0
```

In the example above, the JSEL keywords request all address spaces with CPU activity. The ASHL line command displays the address spaces using the format number specified with the line command.

Figure 115 shows the five formats produced by the ASHL line command:

Figure 115 • ASHL line command formats

```
COMMAND:            ASHL       10:58:06.7  98.054  31.68% .TUT FOR TUTORIAL
 JSEL SEL=JTS,CPU=2,SRT>CPUR
 ASHL 1 1/5 CPU Pct    CPUT  Dprty   Wssze    IOrte   Jobstat  Swap Reasn Pgrte
 + DEVKML     7.87%   1.27S  FF(255)  1208K    18.8    WAT LSW TERM-IN       .0
 + DRNV3090   3.14%   5.04S  21( 33)  2728K      .0    WAT*RES               .0
 + JES2       3.14%   7:22M  5F( 95)  1852K    16.5    WAT*NSW              3.9
 ASHL 2 2/5 Job Asid  CPU Pct Userid  Typ/cls  IOcnt   Step     Swap Cnt   Estor
 + DEVKML        81    7.87%  DEVKML   TSO        374                 4      0K
 + DRNV3090      16    3.14%  DEVRNV   JOB A      541   GO                  64K
 + JES2          24    3.14%           STC     206204                     176K
 ASHL 3 3/5 Waittme   PGN/Per Dom     PGname   Domnme  TrnsTme  Slot Cnt   Dvcon
 + DEVKML              2   1    1     TSO      TSO-1                        .55
 + DRNV3090            1   2   13     BATCH    BATCH-2   4:56M        94     .82
 + JES2                6   1    6     JES2     JES2      2:01D       949  495.29
 ASHL 4 4/5 EXATASK
 + DEVKML    11/...
 + DRNV3090   1/...    2/...
 + JES2
 ASHL 5 5/5  CSA Low CSA High  SQA Low SQA High  Totl CS
 + DEVKML        128     2136       96      152     2512
 + DRNV3090     1504      21K      832               24K
 + JES2          19K     215K       48      368     235K
```

There are five formats produced by the ASHL line command:

ASHL Format 1

Column Heading	Description
CPU Pctp	Processor CPU utilization
CPUT	Total job step CPU time
Dprty	SRM dispatching priority
Wssze	Working set size—real storage allocated
IOrte	Average input and output rate per second
Jobstat	Job processing status
Swap Reasn	Swap reason
Pgrte	Total page-in rate

ASHL Format 2

Column Heading	Description
Job Asid	Address space number
CPU Pct	System CPU utilization
Userid	User ID from JCL jobcard
Typ/cls	Job type/batch job class
IOcnt	Input and output count (EXCPs)
Step	Batch job step name
Swap Cnt	Total number of swap-ins
Estor	Total allocated expanded storage

ASHL Format 3

Column Heading	Description
Waittme	Time address space has been in wait
PGN/Per	SRM performance group and period
Dom	SRM domain number
PGname	Performance group name
Domnme	Domain name
TrnsTme	Time in current transaction
Slot Cnt	Total auxiliary storage slots owned
Dvcon	Total device connect time (in seconds)

ASHL Format 4

Column Heading	Description
EXATASK	Address Space Exceptions and status Refer to JEXX line command for a description of the status display.

ASHL Format 5

Column Heading	Description
CSA Low	Low CSA (below 16MB line) size
CSA High	High CSA (above 16MB line) size
SQA Low	Low SQA (below 16MB line) size
SQA High	High SQA (above 16MB line) size
Totl CS	Total Common Storage Size

Address Space Detailed Display

The ASZZ line command provides a detailed display of events for a single address space, as shown in Figure 116. Identify this address space through cursor placement within the SPY feature. Refer to "SPY Feature" on page 37 for guidelines on using SPY.

Figure 116 • ASZZ line command

```
COMMAND:            SPYMAS     12:18:26.4  98.054  76.00% SPY Screen Active
 .   Address Space detailed display for .SPY
 ASZZ    Jobname:IDMSTST          Job Proc:IDMSTST            Userid:
 +      Job Asid:      56         Job Step:                 Job Type:STC
 +      Job Stat: WAT*NSW     Job wait tme:               Asid Dprty: 4D( 77)
 +      TCB Rate:  10.62%     Perf Grp/Per:  20   1     Perf Grp Nme:IDMS
 +      SRB Rate:   1.96%        Domain No:      20       Domain Nme:IDMS-1
 +      CPU Time:   1:43M         Sys CPU%:  12.58%     Procesr CPU%:  12.58%
 +    Real Alloc:   3408K       Fixed Real:    224K     Pageabl Stor:   3184K
 +         Estor:     52K     Lcl Pgin Rte:    29.9     Tot Pgin Rte:    29.9
 +  NonVio Slots:    1795        Vio Slots:              Total Slots:    1795
 +     Swap Rval:     .31         Swap Cnt:              Swap Reason:
 +      I/O Rate:   138.9          I/O Cnt:    5136     Dev Conn Tme:    9.83
 +      Srv Unts:   89182        Trans Cnt:       1         Trns Tme:   1:23D
 +       EXATASK:   8/...    9/...
 +      CSA Size:     128         SQA Size:     216       Common Low:     344
 +    E/CSA Size:     21K       E/SQA Size:     336      Common High:     22K
 +     CSA Total:     21K        SQA Total:     552   Common Storage:     22K

 .  To select another task for ASZZ, enter .SPY after COMMAND:
 .  place the cursor on the desired task, and press enter.

 JSEL SEL=J,JNM=IDMS*
 ASHL   1/5 CPU Pct    CPUT  Dprty   Wssze    IOrte   Jobstat  Swap Reasn Pgrte
 + DEVBERJ1    .78%    .18S  45( 69)  1572K      .3    WAT*RES               .0
```

In Figure 116, the SPYMAS screen displayed after the .SPY command identified address space IDMSTST. The ASZZ line command displays detailed statistics for this specific address space, as described in the following text.

Line 1

Field	Description
Jobname	Name of address space.
Job Proc	Procedure used by address space.
Userid	User ID associated with the address space.

Line 2

Field	Description
Job Asid	Address space number.
Job Step	Batch job step name.
Job Type	Job type / batch job class.

Line 3

Field	Description
Job Stat	Job Processing Status - Follows the format ABBBCDDD. Refer to "JSTA - Job Status," page 140.
Job wait tme	Time Address Space has been in wait..
Asid Dprty	SRM dispatching priority.

Line 4

Field	Description
TCB Rate	Job step TCB CPU utilization.
Perf Grp/Per	SRM performance group and period.
Perf Grp Nme	Performance group name.

Line 5

Field	Description
SRB Rate	Job step SRB CPU utilization.
Domain No	SRM domain number.
Domain Nme	Domain name.

Line 6

Field	Description
CPU Time	Total job step CPU time.
Sys CPU%	System CPU utilization.
Procesr CPU%	Processor CPU utilization.

Line 7

Field	Description
Real Alloc	Real storage allocated (working set size).
Fixed Real	Non-swappable real storage.
Pageabl Stor	Pageable real storage.

Line 8

Field	Description
Estor	Total allocated expanded storage.
Lcl Pgin Rte	Local page-in rate.
Tot Pgin Rte	Total page-in rate.

Line 9

Field	Description
NonVio Slots	Non-VIO slots owned by the address space.
Vio Slots	VIO slots owned by the address space.
Total Slots	Total auxiliary storage slots owned.

Line 10

Field	Description
Swap Rval	Swap recommendation value.
Swap Cnt	Total number of swap-ins.
Swap Reason	Swap reason. Refer to "Swapping" on page 145 for a list with descriptions.

Line 11

Field	Description
I/O Rate	Average input and output rate per second.
I/O Cnt	Input and output count (EXCP's).
Dev Conn Tme	Total Device Connect time (in seconds).

Line 12

Field	Description
Srv Unts	Total Service Units since last swap.
Trans Cnt	Transaction Count for this Address Space.
Trns Tme	Total Time in Current Transaction.

Line 13

Field	Description
EXATASK	Address space exceptions and status. Refer to the description of the JEXX line command, on page 166, for a description of the status display.

Note:

Line 13 displays only when one or more Exception Definitions have been associated with the address space.

Line 14

Field	Description
CSA Size	Low CSA (below 16MB line) size
SQA Size	Low SQA (below 16MB line) size
Common Low	Low Common Storage size

Line 15

Field	Description
E/CSA Size	Extended CSA (above 16MB line) size
E/SQA Size	Extended SQA (above 16MB line) size
Common High	High Common Storage Size

Line 16

Field	Description
CSA Total	Total CSA (above + below) size
SQA Total	Total SQA (above + below) size
Common Storage	Total Common Storage Size

Note:

Lines 14 through 16 are displayed only when MVS Common Storage Tracking is active and the address space has obtained some amount of common storage.

Address Space Exceptions

The JEXA line command lists the exceptions found in the address space. The exception keyword codes that correspond to the exceptions display. When an exception occurs, JEXX displays the exception keyword codes corresponding to the exceptions found. Additionally, the jobname and the data items causing the exceptions are highlighted. Refer to "MVS Exception Analysis" on page 289 for additional information.

The JEXX line command in Figure 117 identifies the exception definitions that are active for the address space. The number and status for each exception definition displays.

Figure 117 • JEXX line command

```
JSEL SEL=J
JOBN BATCH001 BATCH002 BATCH003 BATCH004
FMCT     192K    5448K       0K     768K
CPUR   11.20%    9.37%    0.00%   61.49%
JEXA         WKS                CPU
JEXX    3/OFF    1/*..              2/*.D
+       1/...                       1/...
```

These are the fields that display using the JEXX command:

Jobname	Description
BATCH001	Indicates that exception definitions 1 and 3 are active for the address space. Since the status for exception definition 3 is OFF, no exception analysis was performed for the address space.
BATCH002	Exception definition 1 located the working storage set size exception. The status * . . indicates that an exception was located, but neither screen chaining nor the command interface were invoked.
BATCH004	Exception definitions 1 and 2 are active. Exception definition 2 located the CPU utilization exception. Also, the exception definition has delayed invoking the command interface. The command interface may be invoked if the exception continues through the command delay count.

Command	Displays
JEXA	Exception keyword codes:
	SYS Related System exception
	SWP Swap status exception
	NSW Non-swappable status exception
	TTM Transaction time exception
	WTM Wait time exception
	WKS Working storage set size exception
	FIX Fixed storage size exception
	EST Extended storage size exception
	SLT Auxiliary storage slot count exception
	SWC Swap count exception
	CPU CPU utilization (by system) exception
	CPX CPU utilization (by processor) exception
	STL Job step time limit exception
	IOR Input and output rate exception
	PGR Page-in rate exception
	CSA Total CSA size exception
	CSB Low CSA (below 16MB line) size exception
	SQA Total SQA size exception
	SQB Low SQA (below 16MB line) size exception
	CST Total common storage size exception
	JST Job step time exception
	QWT Enqueue wait time exception
JEXX	Address Space Exception Definition / Status (*nnn*/*abc*)
	nnn exception definition number
	a exception status
	. Exception did not occur
	* Exception occurred
	L Exception limit reached (LIM=*n*)
	X Exception limit-x reached (LMX=*n*)

Command	Displays		
JEXX		D	Exception delayed (DLY=*n*)
		T	Exception time delayed (TDL=*n*)
		I	Exception bypassed, time interval (TIN=*n*)
		R	Exception bypassed, time of day range (TOD< or TOD>)
	b	Screen chaining status	
		.	Not requested
		*	Screen chaining requested
		L	Screen chaining limit reached (SLM=*n*)
		D	Screen chaining delayed (SDL=*n*)
	c	C	Command status
		.	Not requested
		*	Command issued or job submitted
		L	Command limit reached (CLM=*n*)
		D	Command delayed (CDL=*n*)

Address Space Plots

The ASPL line command plots specific statistics for selected address spaces. Keywords select address spaces for display and specify the statistic to be plotted. The address spaces may be selected in one of three ways:

- Selection keywords specified with the ASPL line command. The JNM=, SEL=, and SRT= keywords are used to select the address spaces.
- Address spaces selected in a previous JOBN line command. If none of the selection keywords have been used, the plot includes only the address spaces selected in a previous JOBN line command, as shown below.
- If neither the selection keywords nor the JOBN line command has been used, the MIN=1 default is used to select address spaces where the value of the plot field is 1 or more. See the keyword "MIN=nnn" on page 171 for an explanation.

Figure 118 shows statistics produced using the ASPL line command.

Figure 118 • ASPL line command—statistics

```
JSEL JNM=IDMS*,CICS*
JOBN IDMSDC8  CICS005  CICS002  CICS001  IDMSDC4  IDMSDC1  CICS006  IDMSDC2  +
CPUX     .12%     .24%     .12%   38.65%     .24%   26.76%     .00%   16.72%
IOCR       .0       .0       .0     31.7       .0     57.3       .0     25.6
FMCT    1400K    3020K    1500K    5416K    4340K   26076K    1680K    4760K
ASPL
+  JOB NAME   CPU RATE  ...10...20...30...40...50...60...70...80...90..100
+  IDMSDC8        .12%  ....|....|....|....|....|....|....|....|....|....|
+  CICS005        .24%  ....|....|....|....|....|....|....|....|....|....|
+  CICS002        .12%  ....|....|....|....|....|....|....|....|....|....|
+  CICS001      38.65%  *******************|....|....|....|....|....|....|
+  IDMSDC4        .24%  ....|....|....|....|....|....|....|....|....|....|
+  IDMSDC1      26.76%  *************.|....|....|....|....|....|....|....|
+  CICS006        .00%  ....|....|....|....|....|....|....|....|....|....|
+  IDMSDC2      16.72%  ********.|....|....|....|....|....|....|....|....|
=== ========================================================================
JOBN IDMSDC3  IDMSDC6  IDMSDC7
CPUX     .12%     .86%    9.16%
IOCR       .0       .1     30.1
FMCT    3948K    1664K    4608K
ASPL
+  JOB NAME   CPU RATE  ...10...20...3(...40...50...60...7+...80...90..100
+* IDMSDC3        .12%  ....|....|....|....|....|....|....|....|....|....|
+  IDMSDC6        .86%  ....|....|....|....|....|....|....|....|....|....|
```

In the previous screen, the ASPL line command plotted the CPU utilization (by system) for the address spaces selected by the preceding JOBN line command. The ASPL line command was only specified once. The second section of the display was automatically produced by the line command Automatic Repeat feature of PreAlert MVS.

Keyword	Description
JNM=*xxx*	Specifies 1 to 8 jobname masks to be selected for display. The jobnames may be masked using an asterisk (*).
SEL=*xxx*	Specifies the address space types selected for display. Default is JST.
	J Batch Jobs
	S Started Tasks
	T TSO users
	U Undefined (system) address spaces
FLD=*xxx*	Specifies the field to be plotted. Default is CPUX.
	CPUX CPU utilization (by processor)

Keyword	Description	
FLD=*xxx*	CPUR	CPU utilization (by system)
	IOCR	Input and output rate
	TPIR	Total Page-in rate
	FMCT	Working storage set size
	ESCT	Extended storage allocated
	CSAT	Total CSA size
	CSAB	Low CSA (below 16MB line) size
	SQAT	Total SQA size
	SQAB	Low SQA (below 16MB line) size
	CSTT	Total Common Storage Size
SRT=*xxx*	Specifies the sort field. Defaults to the plot field.	
SRT<*xxx*	Specifies the sort field, ascending sequence.	
SRT>*xxx*	Specifies the sort field, descending sequence.	
	ASID	Address space ID
	JOBN	Jobname
	CPUX	CPU utilization (by processor)
	CPUR	CPU utilization (by system)
	IOCR	Input and output rate
	TPIR	Total Page-in rate
	FMCT	Working storage set size
	ESCT	Extended storage allocated
	CSAT	Total CSA Size
	CSAB	Low CSA (below 16MB line) size
	SQAT	Total SQA Size
	SQAB	Low SQA (below 16MB line) size
	CSTT	Total Common Storage Size

Keyword	Description
PLT=*nnn*	Specifies the plot measurement scale. If the specified scale is less than 50, the scale is rounded up to the next multiple of 10. If greater than 50, it is rounded up to the next multiple of 50. Defaults for the scale are:

Sort Field	Description
CPUX	default is 100 percent
CPUR	default is 100 percent
IOCR	default is 100 input and output per second
TPIR	default is 100 page-ins per second
FMCT	default is 1000 K bytes
ESCT	default is 1000 K bytes
CSAT	default is 1,000,000 bytes
CSAB	default is 100,000 bytes
SQAT	default is 1,000,000 bytes
SQAB	default is 100,000 bytes
CSTT	default is 1,000,000 bytes

Keyword	Description
MIN=*nnn*	Specifies the minimum value to be plotted. The default is 1. Devices with the selected value less than the minimum are not displayed.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold is specified as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot is displayed in yellow if color support is active. Default is specified in the PLOTYEL keyword of the userdata UDPARMS macro.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold is specified as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot is displayed in red if color support is active. If color support is not active, the plot is highlighted. Default is specified in the PLOTRED keyword of the userdata UDPARMS macro.
EXA=*x*	Specifies the exception color option. Plots are displayed in white (or highlighted) when an exception occurs for the plot field. The exception color option has precedence over the red and yellow color options.

Keyword	Description
	Consequently, if an exception occurs, then the plot is displayed in white regardless of the red and yellow thresholds. If an exception does not occur, the red and yellow color options may still be active or may also be suppressed. These options are controlled by the following EXA keyword values: Y Request exception color option. O Request exception color option, suppress red and yellow when the exception has not occurred.

In Figure 119, the CPU utilization (by system) was plotted for the address spaces based on the JNM and MIN keywords.

Figure 119 • JNM and MIN keywords

```
ASPL JNM=IDMS*,CICS*,MIN=1
+  JOB NAME    CPU RATE  ...10...20...30...40...50...60...70...80...90..100
+  CICS001       38.65%  ********************....|....|....|....|....|....|
+  IDMSDC1       26.76%  *************.|....|....|....|....|....|....|....|
+  IDMSDC2       16.72%  ********.|....|....|....|....|....|....|....|....|
+  IDMSDC7        9.16%  *****....|....|....|....|....|....|....|....|....|
```

Address Space Trace

The TRAC line command displays a trace of an address space's activity. The display consists of 50 samples taken at a specified interval. Use the .ASID control command or the .ASD line command to specify the address space to be traced. Use the .TRAC control command to specify the interval between trace samples.

Figure 120 is an example of the TRAC line command:

Figure 120 • TRAC line command

```
JSEL SEL=JS
JOBN JES2     RMF      NETSOL   DSSGSYD1 POIC502F LWRGEAIX SLKXPARR
ASID        8       10       12       14       15       16       17
==== ==================================================================
.ASD  016
TRAC TCB ACTIVE     ***************************************************
TRAC TCB COUNT        1 1    1     1  1      1    1      11    11 1
TRAC TCB CPU WAIT
TRAC SRB ACTIVE     ***************************************************
TRAC SRB COUNT
TRAC DISP SEQN      FFFEEEEEEEFFFEEEFFEFEEFEEEEEEFFEEFFDDDDDEEEEEDDEE
TRAC SHORT WAIT     A64CA79A8CCA6676BA4*779*DD66*AE*4*9787*******C**77
TRAC SWAP COUNT
TRAC SWAP REASON
TRAC PAGE COUNT      1                    1I
TRAC I/O COUNT      4856A49757223335553455544422442423333321212132446 4
TRAC      ASID =  16  LWRGEAIX   INTERVAL =  .05
```

These line commands are used with the TRAC line command:

Line Command	Description
TRAC TCB ACTIVE	If job had TCB time during interval.
TRAC TCB COUNT	Count of ready TCBs at end of interval.
TRAC TCB CPU WAIT	If TCBs were ready, but no job had TCB time.
TRAC SRB ACTIVE	If job had SRB time during interval.
TRAC SRB COUNT	Count of ready SRBs at end of interval.
TRAC DISP SEQN	Position on dispatching queue at end of interval.
TRAC SHORT WAIT	Count of SHORT WAITs issued during interval.
TRAC SWAP COUNT	Count of SWAP-INs during interval.

Line Command	Description
TRAC PAGE COUNT	Count of PAGE-INs during interval.
TRAC input and output COUNT	Count of inputs and outputs during interval.
TRAC	ASID and jobname.

Note:

Count fields display as 1-F representing 1-15; an asterisk (*) display if the count is over 15.

Address Space Selection

The JSEL line command can be restricted to display only those jobs matching specific criteria. This criteria includes: jobname; performance group number; performance group period; job type (batch, stc, or TSO); domain; in a transaction; swapped in or out; CPU rate; and page rate.

The JSEL line command is followed by a JOBN, ASHL, or ASPL line commands. The JSEL line command only specifies the selection criteria. The JOBN, ASHL, or ASPL line commands actually select the jobs and displays the requested information.

JSEL has several keywords used to describe the selection criteria. These may be used in any combination and may be specified multiple times. JSEL may also be specified more than once, as shown in Figure 121.

Figure 121 • JSEL line command

```
JSEL JNM=PRODIDMS,SEL=J
JOBN PRODIDMS BATCH001 BATCH002



JSEL SEL=J
JOBN BATCH1   BATCH2   BATCH3
JSEL SEL=S
JOBN RMF      TSO      VTAMLCL
JSEL SEL=T
JOBN TSOUSER1 TSOUSER2 TSOUSER3 TSOUSER4 TSOUSER5
```

JSEL uses these keywords:

Keyword	Description
JNM=*xxx*	Specifies 1 to 8 jobname masks. Address spaces are selected by their jobname. The JOBN line command displays the jobname. Any jobnames that match the mask are selected regardless of any other JSEL keywords.
ASD=*nnn*	Specifies 1 to 8 address space IDs. The specified address space IDs are selected for display regardless of any other JSEL keywords. The ASID line command displays the address space ID.
PRC=*xxx*	Specifies 1 to 8 procedure name masks. Address spaces are selected by their procedure name. The PROC line command displays the procedure name.

Keyword	Description
SEL=*xxx*	Specifies address space type parameters. Address spaces are selected by type. The JID line command displays the address space type. J Batch Jobs S Started Tasks T TSO Users U Undefined (system) address spaces I Idle Batch Initiators
CLS=*xxx*	Specifies 1 to 8 job class parameters. Batch jobs executing within the specified job class(es) are selected for display. Only batch jobs may be selected by job class. The JID line command displays the job class.
PGN=*nnn*	Specifies 1 to 8 performance group numbers. Address spaces executing in the specified performance group(s) are selected for display. The PGN line command displays the performance group number and period.
PRD=*nnn*	Specifies 1 to 8 performance group periods. Address spaces executing in the specified period(s) are selected for display. The PGN line command displays the performance group number and period.
DMN=*nnn*	Specifies 1 to 8 domain numbers. Address spaces executing within the specified domain(s) are selected for display. The DOMN line command displays the domain number.
SWP=*xxx*	Specifies swap status parameters. Address spaces either swapped-in or swapped-out may be selected for display. The SWAP line command displays the reason for an address spaces being swapped-out. O Swapped-out address spaces I Swapped-in address spaces
TRN=*xxx*	Specifies transaction status parameters. Address spaces currently in a transaction are selected for display. Typically this is used to show TSO activity without displaying TSO address spaces waiting for terminal input. The JSTA line command indicates the transaction status. Y Transaction active N Transaction not active

Keyword	Description
CPU=*nnn*	Specifies CPU rate (by system). Address spaces that have a CPU rate greater than the specified rate are selected for display. The CPUR line command displays the CPU rate for the address space.
PGR=*nnn*	Specifies local page-in rate (per second). Address spaces that have a local page-in rate greater than the specified rate are selected for display. The PINR line command displays the local page-in rate for the address space.
ENQ=*xxx*	Specifies enqueue contention. Address spaces that are waiting on enqueue contention are selected for display. Refer to "Enqueue Contention Analysis" on page 156 for the line commands to display enqueue contention. Y Waiting on enqueue contention N No enqueue contention
EXA=*xxx*	Specifies exception analysis status parameter. Address spaces having one or more exceptions are selected for display. Refer to "MVS Address Space Exception Analysis" on page 325. Y One or more exceptions N No exceptions
SRT<*xxx*	Specifies the sort field, ascending sequence. The display of address spaces is sorted in ascending order on the specified field. IOCR input and output rate CSAT Total CSA size CSAB Low CSA (below 16MB line) size CSAA High CSA (above 16MB line) size SQAT Total SQA size SQAB Low SQA (below 16MB line) size SQAA High SQA (above 16MB line) size CSTT Total Common Storage Size CSTB Total Low Common Storage Size CSTA Total High Common Storage Size

Keyword	Description
REP=*xxx*	Specifies the Auto-repeat option. When the number of address spaces selected for display exceeds the number that can by displayed across the screen, the line commands are repeated until all the selected address spaces are displayed. Refer to "Auto-repeat Option" on page 22. Y Request Auto-repeat option N Suppress Auto-repeat option

Address Space Restricted Functions

The information retrieved by the Address Space Restricted Functions resides either within the private region of an address space or in fetch protected storage. This requires PreAlert MVS to be running authorized and in key 0 to obtain this information. When required, PreAlert MVS uses Cross Memory Services (CMS) to obtain data stored within the private region of the target address space. CMS can only be used when the target address space is swapped-in. Before using CMS, PreAlert MVS examines the swap transition flags for the target address space. If the address space is not swapped-in, PreAlert MVS suppresses the function and produces an error message.

The SWPI or SWPN line commands may be used to make the address space non-swappable. Refer to "Address Space Non-swappable Status" on page 269.

Task Control Block Map

The TCBM line command displays the current TCB map for the target address space. The TCB map for an IDMS-DC address space is shown in Figure 122.

Figure 122 • TCBM line command

```
TCBM 68 IDMSDC2  MOTHER   SISTER   DAUGHTER JOB-STEP TCB-ADDR KEY APF DISP
+   1.  IEAVAR00                   IEEPRWI2 (SAME)    8FDE40   0   N   N
+   2.  IEAVTSDT IEAVAR00                   (SAME)    8FD080   0   N   N
+   3.  IEEPRWI2 IEAVAR00 IEAVTSDT IDMSDCV  (SAME)    8FFD70   5   N   N
+   4.  RHDCTCKR IDMSDCV                   IDMSDCV   8C9640   5   Y   N
+   5.  IDMSDCV  IEEPRWI2          RHDCCKUR (SAME)    8CB078   5   Y   N
+   6.  RHDCCKUR IDMSDCV  RHDCCKUR          IDMSDCV   8AD970   5   Y   N
+   7.  RHDCCKUR IDMSDCV  RHDCCKUR          IDMSDCV   8ADBB0   5   Y   N
+   8.  RHDCCKUR IDMSDCV  RHDCTCKR          IDMSDCV   8AF3D8   5   Y   N
```

The first column indicates the load module name for the oldest RB for each TCB. MOTHER, SISTER, and DAUGHTER are the program names for the mother, oldest sister, and daughter TCBs of the program TCB. The name of the JOB-STEP TCB, and the address of the program TCB is also shown. KEY, APF, and DISP indicate the storage protect key, authorized program facility (APF) status, and the dispatchability flag, respectively.

TCBs are shown in order by their dispatching priority, the first TCB being the highest, the last being the lowest.

From the TCB map shown above, a picture of the TCB structure could be constructed as shown in Figure 123.

Figure 123 • Picture of the TCB structure

---

(1) IEAVAR00

(3) IEEPRWI2 --> (2) IEAVTSDT

(5) IDMSDCV

(4) RHDCTCKR --> (6) RHDCCKUR --> (7) RHDCCKUR -->
(8) RHDCCKUR

TCBs 1, 2, and 3 were created by the operating system to control the address space. TCB 5 (the JOB-STEP TCB) was created by the operating system to control execution of the user program (IDMSDCV). This was the program on the EXEC PGM = parameter. TCBs 4, 6, 7, and 8 were attached the JOB STEP TCB (TCB 5).

Address Space Region Map

The RGNA and RGNM line commands display summaries of virtual storage allocated within an address space. RGNA provides a map of virtual storage allocation. RGNM summarizes virtual storage by area, free space, subpool and addressable blocks of storage.

These line commands scan a large number of control blocks within the private area of the target address space. Occasionally, the operating system may change these control blocks while PreAlert MVS is scanning them. This may result in the storage blocks not totaling correctly or, possibly, in an error condition. This forces PreAlert MVS to suppress the command and generate an error message. These problems are usually resolved simply by attempting the command again.

The RGNA line command displays a map of the address space, as shown in Figure 124. The map summarizes virtual storage allocation of private areas for both 24-bit and 31-bit addresses. The private areas are analyzed for user and system storage allocation, free storage and region size limits. Only the private areas are analyzed: common system storage, nucleus, CSA and SQA are not included.

Figure 124 • RGNA line command

```
RGNA 248  WERXSHP  ADDRESS SPACE REGION MAP
+ ------------ EXTENDED PRIVATE AREA, SYSTEM STORAGE --------------------
+ 2 GIG LINE         7FFFFFFF       HIGHEST 31 BIT ADDR
+ ELSQA/SWA          7F716000       9,056K ALLOC, 72K FREE
+ AVAILABLE          06200000       1,941M AVAIL FOR ELSQA/SWA
+ ------------ EXTENDED PRIVATE AREA, USER STORAGE -----------------------
+ E-REGION LIMIT     061FFFFF       EXTENDED REGION LIMIT, 32,768K
+ TOP OF USER AREA   0429BFFF       32,144K AVAIL USER REGION
+ BEGIN USER AREA    04200000       624K ALLOC, 0K FREE
+ ------------ COMMON SYSTEM STORAGE -----------------------------------
+ EXTENDED COMMON    01000000       ECSA, ESQA, ELPA, NUCLEUS
+ COMMON AREA        00A00000       CSA, SQA, LPA, NUCLEUS
+ ------------ PRIVATE AREA, SYSTEM STORAGE ----------------------------
+ LSQA/SWA           0099A000       368K ALLOC, 40K FREE
+ AVAILABLE          00405000       5,716K AVAIL FOR LSQA/SWA
+ ------------ PRIVATE AREA, USER STORAGE ------------------------------
+ REGION LIMIT       00404FFF       REGION LIMIT, 4,096K
+ TOP OF USER AREA   000EEFFF       3,160K AVAIL USER REGION
+ BEGIN USER AREA    00005000       924K ALLOC, 12K FREE
+ ------------ COMMON SYSTEM STORAGE -----------------------------------
+ PSA, SYSTEM AREA   00000000       RESERVED
```

Extended Private Area, System Storage:

Area	Sys Stor	Description
2 GIG Line	7FFFFFFF	This is the highest allowed 31 bit address.
ELSQA/SWA	7F716000	System related storage is allocated from the top of the region down. The address shown is the lowest address of allocated system storage in the extended region.
Available	06200000	This address represents the lower limit of unallocated system storage, it cannot be allocated for user storage. This is established through the extended storage region limit.

Extended Private Area, User Storage:

Area	User Stor	Description
E-Region Limit	061FFFFF	This is the highest address allowed for user storage. This limit is established from the region parameter for the job step.
Top of User Area	0429BFFF	This is the highest address of allocated user storage in the extended region. The storage from here to the E-region limit may be allocated for user storage.
Begin User Area	04200000	This is the lowest address in the extended user area. User storage is allocated from the beginning of the user area up to the E-region limit.

Common System Storage:

Area	Sys Stor	Description
Extended Common	01000000	Extended common storage is allocated from the 16 MB line upwards. This contains ECSA, SQA, ELPA and extended nucleus.
Common Area	00A00000	Common area storage is allocated from the 16 MB line down. This address is the lowest address for common storage.

Private Area, System Storage:

Area	Sys Stor	Description
LSQA/SWA	0099A000	System related storage is allocated from the top of the private area down. This address is the lowest for system storage allocated in the private area.
Available	00405000	This address represents the lower limit of unallocated system storage. It cannot be allocated for user storage. This is established through the region limit.

Private Area, User Storage:

Area	User Stor	Description
Region Limit	00404FFF	This is the highest address allowed for user storage. This limit is established from the region parameter for the job step.
Top of User Area	000EEFFF	This is the highest address of allocated user storage in the region. The storage from here to the region limit may be allocated for user storage.
Begin User Area	00005000	This is the lowest address in user area. User storage is allocated from the beginning of the user area up to the region limit.

Common System Storage:

Area	Sys Stor	Description
PSA, System Area	00000000	The first 20K of virtual storage is reserved for system usage.

The RGNM line command provides a detailed report of storage allocated within the address space. This includes a summary of user and system storage allocated; available free space for user or system allocation; storage allocated by subpool; and a map of all allocated storage by address, subpool, and key.

The RGNM line command may generate a large report. The .UP and .DOWN control commands may be used to scroll up and down through the report.

In Figure 125, several lines have been omitted. The actual RGNM report contains the entire report.

Figure 125 • RGNM line command

```
RGNM 248  WERXSHP  SIZE:   BELOW      ABOVE      TOTAL
+    USER STORAGE           924K       624K     1,548K
+    SYSTEM STORAGE         368K     9,056K     9,424K
+    TOTAL STORAGE        1,292K     9,680K    10,972K

+        FREE SPACE:       BELOW    LARGEST      ABOVE    LARGEST
+    USER STORAGE         3,172K     3,160K    32,144K    32,144K
+    SYSTEM STORAGE       5,756K     5,716K 1,987,740K 1,987,672K

+        SUBPOOL TOTALS:   BELOW      ABOVE      TOTAL
+          0 USER           136K         4K       140K
+          1 USER            52K        24K        76K
     ... several lines not shown ...
+        237 SYS             12K         0K        12K
+        251 USER           128K        24K       152K
+        252 USER           120K         4K       124K
+        255 SYS             40K     8,748K     8,788K

+        SUBPOOL:  ADDRESS   SIZE      TCB-ADDR
+         252/ 0   00005000  00001000   9FFA10
     ... several lines not shown ...
+         252/ 0   0006A000  00019000   9DE5E0
+        SHOPMMV1  0006A3D0  00018C30   9DE5E0
+           9/ 8   00083000  00002000   9B1CD8
+           4/ 8   00085000  00051000   9B1CD8
+        FREE STG  000D6000  00004000
```

The first section of the report (SIZE:) summarizes and totals the amount of virtual storage allocated for user or system storage either above or below the 16 MB line.

The second section (FREE SPACE:) summarizes the unallocated free storage available for user or system allocation either above or below the 16 MB line. The size of the largest block of free storage for each area is also displayed.

The third section (SUBPOOL TOTALS:) shows the total amount of storage allocated by subpool both above and below the 16MB line.

The last section (SUBPOOL:) displays the subpool number, storage key, address, length and owning TCB address for all allocated storage; address and length of all free storage; and the name, address, and length of any programs contained in the job pack queue.

Contents Directory Entry Map

The CDEM line command displays the modules contained in the Contents Directory Entries (CDEs) for the address space, as shown in Figure 126. A CDE is created for each module brought into the address space through the LINK, LOAD, ATTACH, XCTL macros. CDEs are built for modules loaded into the address space only, CDEs are not built for modules residing in LPA or ELPA.

PreAlert MVS lists the CDEs for each Task Control Block (TCB) active in the address space. Typically, only the job step TCB contains any CDEs. Refer to the explanation of the TCBM line command in "Address Space Restricted Functions" on page 178 for more information on TCBs.

Figure 126 • CDEM line command

```
CDEM 74   PREALERT PROGNAME LOAD-ADD ENTRY-PT LENGTH USE  SP ATTRB ATTR  ATTR2
+    5.    9C1038  SHOPMMV1 000413D0 000413D0 018C30   1 252  00    31    23
+                  SHOPMPAM 00026450 00026450 000800   1 251  00    03    23
+                  SHOPMCMD 00006078 00006078 0000C0   1 251  00    03    23
+                  SHOPMXIT 00006138 00006138 000088   1 251  00    03    23
+                  SHOPMOND 00026C50 00026C50 0063B0   1 251  00    03    23
+                  SHOPMON  0000CE38 0000CE38 0181C8   1 252  00    31    23
+                  SHOPMT01 0000BF18 0000BF18 0000E8   2 252  00    39    23
+                  SHOPMV00 000061C0 000061C0 003E40   1 251  00    0B    23
TCBM 74   PREALERT MOTHER   SISTER   DAUGHTER JOB-STEP TCB-ADDR KEY APF DISP
+    1.   IEAVAR00                   IEEPRWI2 (SAME)    9FE178   0   N   N
+    2.   IEAVTSDT IEAVAR00                   (SAME)    9FFD18   0   N   N
+    3.   IEEPRWI2 IEAVAR00 IEAVTSDT IEFIIC   (SAME)    9FFA10   0   N   N
+    4.   IEFIIC   IEEPRWI2          SHOPMV00 (SAME)    9F2470   8   N   N
+    5.   SHOPMV00 IEFIIC            SHOPMT01 (SAME)    9C1038   8   Y   N
+    6.   SHOPMT01 SHOPMV00                   SHOPMV00  9CA458   8   Y   N
+    7.   SHOPMON  SHOPMV00 SHOPMT01          SHOPMV00  9C12D0   8   Y   Y
+    8.   SHOPMT01 SHOPMV00 SHOPMON           SHOPMV00  9D0390   8   Y   N
```

In the previous example, the CDEM and TCBM line commands display the Contents Directory Entry Map and Task Control Block Map for the PreAlert MVS address space ID 74. The CDEM line command displayed all of the CDEs associated with the job step TCB 5.

Field	Description	
PROGNAME	Module name.	
LOAD-ADD	Module load address in HEX. Beginning address where the module was loaded.	
ENTRY-PT	Module entry point address in HEX. The address where the program begins execution, not necessarily the same as the load address.	
LENGTH	Module length in HEX.	
USE	Total module usage count. The number of times loaded less the number of times deleted.	
SP	The storage subpool number where the program was loaded.	
ATTRB	CDATTRB field:	
	x'80'	Delete module at memory termination
	x'04'	Module loaded to Global
ATTR	CDATTR field:	
	x'20'	Module is re-enterable
	x'10'	Module is serially re-usable
	x'08'	Module is not re-useable
	x'02'	Module is in job pack area
	x'01'	Module is not loadable
ATTR2	CDATTR2 field:	
	x'80'	Module is in subpool zero
	x'20'	Extent list built for module
	x'08'	Routine runs in any mode
	x'04'	Module is in overlay format
	x'02'	Authorized library module
	x'01'	Program Authorization flag

The majority of the bit settings for the module attributes are listed above. Refer to the appropriate MVS Data Areas publication for a complete description of the Contents Directory Entry and the module attributes.

Load List Element Map

The LLEM line command displays the modules contained in the Load List Elements (LLEs) for the address space, as shown in Figure 127. An LLE is created for each module brought into the address space through the LOAD macro.

PreAlert MVS lists the LLEs for each Task Control Block (TCB) active in the address space. Usually, only the job step and daughter TCBs contain any LLEs. Refer to the explanation of the TCBM line command in "Address Space Restricted Functions" on page 178 for more information on TCBs.

Figure 127 • LLEM line command

```
LLEN 74   PREALERT PROGNAME  ENTRY-PT  USE-CT SYS-CT    SP
+    5.    9C1038  IGG019BB  00CB5018       2      2   LPA
+                  IGG019BA  00CA06F0       2      2   LPA
+                  IGG0193B  00DAAAD0       2      2   LPA
+    7.    9C12D0  SHOPMMV1  000413D0       1      1   252
+                  SHOPMPAM  00026450       1      1   251
+                  IGG019DJ  00CBE2B0       1      1   LPA
+                  SHOPMCMD  00006078       1      1   251
+                  IGG019BB  00CB5018       1      1   LPA
+                  IGG019BA  00CA06F0       1      1   LPA
+                  IGG0193B  00DAAAD0       1      1   LPA
+                  SHOPMXIT  00006138       1      1   251
+                  SHOPMOND  00026C50       1      1   251
TCBN 74   PREALERT MOTHER   SISTER   DAUGHTER JOB-STEP TCB-ADDR KEY APF DISP
+    1.   IEAVAR00                   IEEPRWI2 (SAME)    9FE178   0   N   N
+    2.   IEAVTSDT IEAVAR00                   (SAME)    9FFD18   0   N   N
+    3.   IEEPRWI2 IEAVAR00 IEAVTSDT IEFIIC   (SAME)    9FFA10   0   N   N
+    4.   IEFIIC   IEEPRWI2          SHOPMV00 (SAME)    9F2470   8   N   N
+    5.   SHOPMV00 IEFIIC            SHOPMT01 (SAME)    9C1038   8   Y   N
+    6.   SHOPMT01 SHOPMV00                   SHOPMV00  9CA458   8   Y   N
+    7.   SHOPMON  SHOPMV00 SHOPMT01          SHOPMV00  9C12D0   8   Y   Y
+    8.   SHOPMT01 SHOPMV00 SHOPMON           SHOPMV00  9D0390   8   Y   N
```

The LLEM and TCBM display the Load List Elements and Task Control Blocks for the PreAlert MVS address space ID 74. The LLEM line command displays the LLEs associated with modules loaded through TCBs 5 and 7.

The LLEs listed represent programs that have been loaded (LOAD macro) into the address space. LLEs are not built for ATTACHed programs.

Field	Description
PROGNAME	Module name for the load module.
ENTRY-PT	Program entry point address in HEX.
USE-CT	Total module use count. This is the total number of times the module has been loaded minus the number of times deleted.
SYS-CT	Module use count by authorized programs only.
SP	Storage subpool number that the program was loaded into. `LPA` displays if the module resides in the Link Pack Area.

4 Device Analysis

PreAlert MVS has several functions that provide you with disk device information. These include the ability to display disk statistics plots, disk statistics for MVS/XA and MVS/ESA, disk exception definition status, disk selection parameters, disk device trace activity, tape statistics, and tape selection parameters.

This chapter contains these sections:

Disk Statistics 190

Disk Statistics Plots 193

Disk Exception Definition Status 196

Disk Selection Parameters 198

Disk Unit Names 201

Disk Device Trace 202

Disk Device Horizontal Display 203

Disk Device Detailed Display 206

Tape Statistics 208

Tape Selection Parameters 210

Disk Statistics

Figure 128 and Figure 129 on page 191 are sample disk statistics displays.

Figure 128 • Sample disk statistics display

```
DSEL BSY=10
DISK       1A0      1A1      1A3      1A6      1A8      1AA      1AB      1E0
DVOL    PUB180   DBAX8A   STGX81   SPL180   LOC183   SLB181   LOC184   DBAX8C
DSTA  PUBLIC   PRIVATE  STORAGE  PRIVATE  PRIVATE  PRIVATE  PRIVATE  PRIVATE
DALC       242       15      220       40        2      349        2        7
DOPN         6       13        9      124                93                 7
DUSR          IDMSDC1                    *MASTER*          *MASTER* IDMSDC1
DCYL             48  11                     66  14            60   1  546   5
```

Disk device information is taken from UCB fields and RMF sampling. Disk information taken from RMF sampling indicates disk activity since the last RMF reporting interval.

These line commands are used:

Command	Displays
DISK	Select disks / display device address. Overflow Indicator (+) available.
DVOL	Disk VOLUME SERIAL number.
DSTA	Disk mount status (PUBLIC, PRIVATE, STORAGE).
DALC	Count of address spaces that have allocated this disk.
DOPN	Count of open DCBs on this disk.
DUSR	Disk current user jobname.
DCYL	Cylinder/head of currently active input and output.

Figure 129 • Sample disk statistics display

```
DSEL BSY=10
DISK      1A0      1A1      1A3      1A6      1A8      1AA      1AB      1E0
DVOL   PUB180   DBAX8A   STGX81   SPL180   LOC183   SLB181   LOC184   DBAX8C
DIOQ    .004S    .000S    .000S    .006S    .000S    .038S    .052S    .000S
DLCU      004      004      004      004      004      004      004      005
DBSY   15.72%   35.12%   10.81%   15.69%   12.37%   26.71%   23.69%   11.57%
DDST    .027S    .023S    .015S    .029S    .022S    .061S    .090S    .026S
DIOR    6.940   15.352    7.354    6.847    5.667   12.037    6.302    4.374
DCUT    .000S    .000S    .000S    .000S    .000S    .000S    .000S    .000S
DDVT    .000S    .000S    .000S    .000S    .000S    .000S    .000S    .000S
DPND    .000S    .000S    .000S    .000S    .000S    .000S    .000S    .000S
DDIS    .019S    .020S    .013S    .019S    .017S    .017S    .017S    .024S
DCON    .003S    .002S    .001S    .003S    .004S    .004S    .020S    .002S
```

The following line commands display statistics acquired from RMF. The information displayed is computed from the beginning of the current RMF reporting interval. If RMF is not active or RMF is not recording DASD statistics, the line commands display: `RMF DATA NOT AVAILABLE`.

Command	Displays
DLCU	Logical Control Unit associated with the device.
DBSY	Percent Busy: percentage of time during which the devise was in use during the interval.
DIOR	Input and output Rate: average rate per second at which start subchannel (SSCH) instructions were completed successfully.
DDST	Device Response Time: average time that the device required to complete an input and output request.
DIOQ	IOS Queue Time: average time that an input and output request must wait on an IOS queue before a SSCH instruction can be issued.
DPND	Channel Pending Time: average time that an input and output request remains queued in the channel.
DDIS	Disconnect Time: average time per input and output request that the device was disconnected (not transferring data) while processing an SSCH instruction.
DCON	Connect Time: average time per input and output request that the device was connected to a channel path and transferring data to/from real storage.
DCUT	Average delay time that an input and output request encountered because the control unit was busy. (Valid for 3090 processors only).
DDVT	Average delay time that an input and output request encountered because the device was busy. (Valid for 3090 processors only).

Disk Statistics Plots

The DPLT line command plots either the device busy percentage, input and output rate, or response time (service time) for selected DASD devices. Keywords select DASD devices for display and specify the statistic to be plotted. The DASD devices may be selected in one of three ways:

- Via selection keywords specified with the DPLT line command. The VOL, CUA, MIN, and SRT keywords are used to select the devices.
- Via devices selected in a previous DISK line command. If none of the selection keywords have been used, the plot includes only those devices selected in a previous DISK line command.
- If neither the selection keywords nor the DISK line command has been used, the MIN=1 default is used to select devices where the value of the plot field is 1 or more.

Keyword	Description
CUA=*xxx*	Specifies 1 to 8 device addresses to be selected for display. The device addresses may be masked using an asterisk (*).
VOL=*xxx*	Specifies 1 to 8 Volume Serial (VOLSER) numbers to be selected for display. The VOLSER's may be masked using an asterisk (*).
FLD=*xxx*	Specifies the field to be plotted. The default is DBSY. DBSY Percent busy DIOR Input and output rate DDST Device response time
SRT=*xxx*	Specifies the sort field. Defaults to the plot field.
SRT<*xxx*	Specifies the sort field, ascending sequence.
SRT>*xxx*	Specifies the sort field, descending sequence. **Sort Field** **Description** CUA Device address VOL VOLSER DBSY Percent busy DIOR Input and output rate DDST Device response time.

Keyword	Description
PLT=*nnn*	Specifies the plot measurement scale. If the specified scale is less than 50, the scale is rounded up to the next multiple of 10. If greater than 50, it is rounded up to the next multiple of 50. Defaults for the scale follow: DBSY Default 100 percent DIOR Default 100 input and output per second DDST Default 100 milliseconds (.100 secs).
MIN=*nnn*	Specifies the minimum value to be plotted. The default is 1. Devices with a selected value of less than the minimum are not displayed.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold is specified as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot is displayed in yellow if color support is active. Default is specified in the userdata UDPARMS macro, PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold is specified as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot is displayed in red if color support is active. If color support is not active, the plot is highlighted. Default is specified in the userdata UDPARMS macro, PLOTRED keyword.
EXA=*x*	Specifies the exception color option. Plots are displayed in white (or highlighted) when an exception occurs for the plot field. The exception color option has precedence over the red and yellow color options. If the exception has occurred, then the plot is displayed in white regardless of the red and yellow thresholds. If the exception has not occurred, then the red and yellow color options may or may not be suppressed according to the following options: Y Request exception color option. O Request exception color option, suppress red and yellow when the exception has not occurred.

In Figure 130, the DPLT line command plotted the response times for the DASD devices selected by the preceding DISK line command. The DPLT line command, along with all the other line commands, was only specified once. The second section of the display was automatically produced by the Auto-repeat feature of PreAlert MVS.

Figure 130 • DPLT line command

```
DSEL VOL=DBA*
DISK      182      18B      21D      35C      3C5      4AB      4B3      4B8 +
DVOL   DBAX88   DBAX80   DBAX8K   DBAX85   DBAX8A   DBAX82   DBAX8B   DBAX81
DBSY    1.87%   41.19%    4.71%    6.16%     .63%     .72%    1.53%    1.50%
DIOR    2.648   30.374    3.367    5.539    2.117    3.249     .965    1.589
DDST    .009S    .022S    .015S    .011S    .003S    .002S    .018S    .012S
DPLT FLD=DDST
+ CUA VOLSER   RESP TM  ...10...20...30...40...50...60...70...80...90..100
+ 182 DBAX88     .009S  *****....|....|....|....|....|....|....|....|....|
+ 18B DBAX80     .022S  ***********...|....|....|....|....|....|....|....|
+ 21D DBAX8K     .015S  ********.|....|....|....|....|....|....|....|....|
+ 35C DBAX85     .011S  ******...|....|....|....|....|....|....|....|....|
+ 3C5 DBAX8A     .003S  **..|....|....|....|....|....|....|....|....|....|
+ 4AB DBAX82     .002S  *...|....|....|....|....|....|....|....|....|....|
+ 4B3 DBAX8B     .018S  *********|....|....|....|....|....|....|....|....|
+ 4B8 DBAX81     .012S  ******...|....|....|....|....|....|....|....|....|
==== ======================================================================
DISK      4BD      4BE
DVOL   DBAX8U   DBAX8V
DBSY    1.10%     .47%
DIOR    2.272     .260
DDST    .006S    .023S
DPLT
+ CUA VOLSER   RESP TM  ...10...20...30...40...50...60...70...80...90..100
+ 4BD DBAX8U     .006S  ***.|....|....|....|....|....|....|....|....|....|
+ 4BE DBAX8V     .023S  ************..|....|....|....|....|....|....|....|
```

In Figure 131, the device response was plotted for the DASD devices based on the VOL and MIN keywords. Additionally, the plot measurement scale was set to 50 milliseconds. The first two plots were highlighted since the values reached the red threshold of 20 milliseconds, 40% of 50 milliseconds.

Figure 131 • DPLT line command

```
DPLT VOL=DBA*,FLD=DDST,SRT=DDST,MIN=15,PLT=50,RED=40
+ CUA VOLSER   RESP TM  ....5...10...15...20...25...30...35...40...45...50
+ 4BE DBAX8V     .023S  **********************.|....|....|....|....|....|
+ 18B DBAX80     .022S  **********************..|....|....|....|....|....|
+ 4B3 DBAX8B     .018S  *****************.|....|....|....|....|....|....|
+ 21D DBAX8K     .015S  **************....|....|....|....|....|....|....|
```

Disk Exception Definition Status

The DEXX line command identifies the DASD exception definitions active for the disk device. The number and status of each exception definition is displayed.

Command	Exception
DEXX	DASD Exception Definition / Status (*nnn*/*abc*) *nnn* = exception definition number *a* = exception status . Exception did not occur * Exception occurred L Exception limit reached (LIM=*n*) X Exception limit-x reached (LMX=*n*)

Command	Exception	
	D	Exception delayed (DLY=*n*)
	T	Exception time delayed (TDL=*n*)
	I	Exception bypassed, time interval (TIN=*n*)
	R	Exception bypassed, time of day range (TOD< or TOD>)
	b = Screen chaining status	
	.	Not requested
	*	Screen chaining requested
	L	Screen chaining limit reached (SLM=*n*)
	D	Screen chaining delayed (SDL=*n*)
	c = Command status	
	.	Not requested
	*	Command issued or job submitted
	L	Command limit reached (CLM=*n*)
	D	Command delayed (CDL=*n*)

Figure 132 shows a sample disk exception definition display:

Figure 132 • Sample disk exception definition display

```
DESL
DISK     1A0      1A1      1A2      1A3      1A4      1A5      1A6      1A7 +
DVOL  DBAX88   LOC18F   DBAX80   PUB180   STGX88   STGX8N   PRDX8Q   PRDX8L
DBSY  10.45%    1.01%   53.58%    9.37%    1.01%     .62%   41.12%    3.17%
DIOR  19.037     .451   35.285    8.511    1.030     .842    8.466    1.676
DDST   .008S    .023S    .028S    .013S    .011S    .008S    .064S    .019S
DEXX   3/...    1/OFF    3/T..    2/OFF    4/...    4/...    5/*..    5/...
```

For the DBA database volumes, DASD Exception Definition 3 has been built to watch for high device busy percentages. DBAX80 has exceeded the device busy threshold, but the exception has been time delayed to eliminate exceptions caused by surges of input and output activity.

For the LOC local page dataset and PUB public volumes, exception definitions 1 and 2 were set OFF to suppress all DASD Exception Analysis for these volumes.

For the PRD production volumes, exception definition 5 has been built to watch the response time (device service time). PRDX8Q has exceeded the response time threshold.

Disk Selection Parameters

The DSEL line command allows you to restrict the selection of disks for display. Without the DSEL command, all online disks are displayed beginning with the lowest unit address. The DSEL command allows you to enter keywords that describe the criteria used in selecting disks for display. These include unit address, volume serial number, online/offline, mount status, input and output queue length, and percent busy.

The DSEL command is usually followed by the DISK, DDHL, or DDPL line commands. The DSEL line command only specifies the selection criteria. The DISK, DDHL, or DDPL line commands actually select which disks to display and displays the requested information.

These keywords are used with the DSEL line command:

Keyword	Description
CUA=*xxx*	Specifies 1 to 8 device address masks. DASD devices matching the specified device addresses are selected. The DISK line command displays device addresses.
VOL=*xxx*	Specifies 1 to 8 volume serial number (VOLSER) masks. DASD devices matching the specified VOLSERs are selected. The DVOL line command displays VOLSERs.
LCU=*xxx*	Specifies 1 to 8 logical control unit (LCU) masks. DASD devices associated with the specified LCUs are selected for display. The DLCU line command displays the LCU number.
UNT=*xxx*	Specifies one unit name. DASD devices associated with the specified unit name are selected for display. The DUNT line command may be used to display all valid DASD unit names.

Keyword	Description
ONL=*xxx*	Specifies device online status parameter. DASD devices either online or offline are selected for display. Default is ONL=Y, online devices only. Y online devices N offline devices
MNT=*xxx*	Specifies device mount status parameter. DASD devices mounted the same as the specified mount status are selected. The DSTA line command displays the mount status. P Private volumes S Storage volumes U Public volumes
ATV=*xxx*	Specifies device input and output active parameter. DASD devices actively processing an input and output are selected for display. The DCYL line command displays the cylinder and head for the active input and output. Y Devices active with input and output N Devices not active with input and output
BSY=*nnn*	Specifies device busy percentage. DASD devices exceeding the specified busy percentage are selected for display. The DBSY line command displays device busy percentage.
CON=*nnn*	Specifies device connect time in milliseconds. DASD devices exceeding the specified connect time are selected for display. The DCON line command displays device connect time.
DIS=*nnn*	Specifies device disconnect time in milliseconds. DASD devices exceeding the specified disconnect time are selected for display. The DDIS line command displays device disconnect time.
IOQ=*nnn*	Specifies IOS queue time in milliseconds. DASD devices exceeding the specified IOS queue time are selected for display. The DIOQ line command displays IOQ queue time.
PND=*nnn*	Specifies channel pending time in milliseconds. DASD devices exceeding the specified channel pending time are selected for display. The DPND line command displays channel pending time.

Keyword	Description
DST=*nnn*	Specifies response time (device service time) in milliseconds. DASD devices exceeding the response time are selected for display. The DDST line command displays response time.
SRT=*xxx*	Specifies the sort field, default sequence. The display of selected DASD devices is sorted on the specified field using a default sort sequence.
SRT<*xxx*	Specifies the sort field, ascending sequence. The display of DASD devices is sorted in ascending order on the specified field.
SRT>*xxx*	Specifies the sort field, descending sequence. The display of DASD devices is sorted in descending order on the specified field.
	Sort Field — **Description** DVOL — Volume Serial number, VOLSER DBSY — Device busy percent DIOR — Device input and output rate DDST — Device response time.
REP=*xxx*	Specifies the Auto-repeat option. When the number of DASD devices selected for display exceeds the number that can by displayed across the screen, the line commands are repeated until all the selected DASD devices are displayed. Refer to "Auto-repeat Option" on page 22. Y — Request Auto-repeat option N — Suppress Auto-repeat option

Disk Unit Names

The DUNT line command displays a list of all DASD unit names (group names) contained in the MVS eligible device table (EDT). The display should resemble Figure 133. The unit names may be used with the DSEL line command, UNT keyword to select DASD devices for display.

Figure 133 • DUNT line command

```
.   DUNT displays all DASD unit names
DUNT 9345     SYSDA    SYSTS    SYSDB    VIO      SYSALLDA

.   UNT=SYSDA selects all DASD devices associated with SYSDA unit name
DSEL UNT=SYSDA
DISK      C00      C01      C02      C03      C04      C05      C06      C07 +
DVOL   MVSMR1   MVSMR2   DBS009   MVSMD1   MVSMD2   MVSSS1   ASGSS3   DBS008

.   UNT=SYSDB selects all DASD devices associated with SYSDB unit name
DSEL UNT=SYSDB
DISK      C14      C15
DVOL   ASGSS1   ASGSS2
```

Disk Device Trace

The DTRC line command displays a trace of the activity on a disk drive, as shown in Figure 134. The display consists of 20 samples taken at a specified interval. Use the .TRAC control command to specify the trace interval and the .VTR or .DTR control commands to specify the disk device.

Figure 134 • DTRC line command

```
DSEL BSY=20
DISK      1A0      1A1      1A6      1AA      1AB      1E0      1E3      1EA   +
DVOL   PUB180   DBAX8A   SPL180   SLB181   LOC184   DBAX8C   SLB184   DBAX8G
DISK      1EB      1EF      2A6      2AB      2E0      2E3      6A3      6A6   +
DVOL   SPL181   PUB182   DBAX87   PUB181   DBAX8B   DBAX8E   LOC186   DBAX85
DISK      6A7      6A9      6E8      6EF      7A2      7A3      7AA
DVOL   DBAX8J   STGX8D   DBAX83   RES180   SLB183   CAT180   RDM180
=== ==========================================================================
.DTR 6EF
.TRL 10
DTRC USER ASID                 139                  105         105
DTRC CYLINDER                  29F                  1C0         160
DTRC HEAD                                                        3
DTRC SIO COUNT                1     3     1        1     3           1  3
DTRC USER COUNT      7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7  7
DTRC DCB COUNT      82 82 82 82 82 82 82 82 82 82 82 83 83 82 82 82 82 83 83 82
DTRC      CUU = 6EF  VOLSER = RES180    INTERVAL =  .10
DTRC
```

These Disk Device Trace line commands are used:

Command	Description
DTRC USER ASID	ASID of address space requesting current input and output.
DTRC CYLINDER	Cylinder of current input and output (Displays in HEX).
DTRC HEAD	Head of current input and output.
DTRC SIO COUNT	Count of input and outputs completed during interval.
DTRC QUEUE LENGTH	Count of queued input and output requests (MVS/SP3 only).
DTRC USER COUNT	Count of address spaces having allocation.
DTRC DCB COUNT	Count of open DCBs on the device.
DTRC	Volume serial number and unit address.

Disk Device Horizontal Display

Information for disk devices can be displayed horizontally, with the information for each disk device listed across each line.

The DDHL line command displays data in one of four fixed formats. The display format is determined by a format number 1 through 4, which is specified with the DDHL line command. When the format number has not been specified, a default format number is selected. This number may be adjusted using the .RIGHT control command to add 1 to the format number or using the .LEFT control command to subtract 1.

The DDHL line command displays all online disk devices, as shown in Figure 135. The display data can be restricted by using the selection keywords specified via the DSEL line command, described in "Disk Selection Parameters" on page 198.

Figure 135 • DDHL line command

```
 COMMAND:____________DDHL       16:37:08.3  94.067  18.00% .TUT for Tutorial
.  MVS Disk Device Data, horizontal display

.  Use DSEL to customize the Disk Device display
DSEL ONL=Y,SRT>DBSY,DST=005

.  Specify 1, 2, 3, or 4 for the DDHL display format number
DDHL 1 1/4     Dev BUSY  SSCH/ sec  Serv Time    CYL/ HD  Curr User     Log CU
+  PROD01  C1F   20.91%      1.643      .012S                               005
+  SPOOL0  C18    1.16%      1.317      .012S                               005
+  SCR001  C11     .41%       .325      .013S                               005
+  WORK01  C16     .37%       .548      .007S                               005
+  IPOCAV  C1C     .15%       .272      .006S                               005
+  DBS005  C08     .08%       .005      .152S                              005
DPLT
+ CUA VOLSER  PCT BUSY  ...10...20...30...40...50...60...70...80...90..100
+ C1F PROD01    20.91   **********....|....|....|....|....|....|....|....|
+ C18 SPOOL0     1.16   *...|....|....|....|....|....|....|....|....|....|
+ C11 SCR001      .41   ....|....|....|....|....|....|....|....|....|....|
+ C16 WORK01      .37   ....|....|....|....|....|....|....|....|....|....|
+ C1C IPOCAV      .15   ....|....|....|....|....|....|....|....|....|....|
+ C08 DBS005      .08   ....|....|....|....|....|....|....|....|....|....|
```

In the example above, the DSEL keywords requests statistics on all disk devices with average service times of 5 milliseconds or more. The DDHL line command displays the disk devices using the format number specified with the line command.

Figure 136 shows the four formats produced by the DDHL line command:

Figure 136 • DDHL line command—four formats

```
COMMAND:____________ECHADDHL   17:06:22.1  94.067   9.00% .TUT for Tutorial
DSEL DST=7,SRT=DDST
DDHL   1/4     Dev BUSY  SSCH/ sec  Serv Time    CYL/ HD  Curr User     Log CU
+  SCR001  C11     .23%       .157      .015S                              005
+  PROD01  C1F   17.83%      1.251      .013S                              005
+  SPOOL0  C18     .25%       .253      .010S                              005
+  SPOOL1  C10     .15%       .240      .007S                              005
DDHL 2 2/4    Disc Time  Conn Time   Que Time  Pend Time  CU BSY TM  DV BSY TM
+  SCR001  C11    .004S      .011S      .000S      .000S      .000S      .000S
+  PROD01  C1F    .011S      .002S      .000S      .000S      .000S      .000S
+  SPOOL0  C18    .009S      .001S      .000S      .000S      .000S      .000S
+  SPOOL1  C10    .006S      .001S      .000S      .000S      .000S      .000S
DDHL 3 3/4     Dev Stat  Mgmt Stat    User CT  Open DCBs
+  SCR001  C11   PUBLIC    NON-SMS         22          6
+  PROD01  C1F  STORAGE    NON-SMS        123         92
+  SPOOL0  C18  PRIVATE    NON-SMS         11          3
+  SPOOL1  C10  PRIVATE    NON-SMS         17          5
DDHL 4 4/4     EXADASD
+  SCR001  C11   1/...    2/...
+  PROD01  C1F   1/...    2/...
+  SPOOL0  C18   1/...    2/...
+  SPOOL1  C10   1/...    2/...
```

DDHL Format 1

Column Heading	Description
Dev BUSY	Percentage of interval during which device was busy.
SSCH/ sec	Input and output rate (Start subchannel per second).
Serv Time	Total input and output service time.
CYL/ HD	Cylinder and head of currently active input and output.
Curr User	Current user of device.
Log CU	Logical Control Unit of device.

DDHL Format 2

Column Heading	Description
Disc Time	Average disconnect time per input and output for device.
Conn Time	Average connect time per input and output for device.
Que Time	Average time input and output must wait (in queue) for device.
Pend Time	Average time input and output must wait for channel path.
CU BSY TM	Average input and output delay time waiting due to control unit busy (3090 support).
DV BSY TM	Average input and output delay time waiting due to device busy (3090 support).

DDHL Format 3

Column Heading	Description
Dev Stat	Device mount status.
Mgmt Stat	System Managed Storage status.
User CT	Number of address spaces allocated to device.
Open DCBs	Number of open DCBs on this device.

DDHL Format 4

Column Heading	Description
EXADASD	Disk device exceptions and status. Refer to the explanation of the DEXX line command in "Disk Exception Definition Status" on page 196 for a description of the status display.

Disk Device Detailed Display

The DDZZ line command provides a detailed display of events for a single disk device, as shown in Figure 137. This disk device must be identified through the SPY feature by using cursor placement. Refer to "SPY Feature" on page 37 for guidelines on using SPY.

Figure 137 • DDZZ line command

```
COMMAND:____________SPYMDD     13:37:47.0  94.068  79.81% SPY SCREEN ACTIVE
.    Disk Device detailed display  for .SPY
DDZZ     VOLSER:  SMGD01         Dev Addr:     C1F       Logical CU:     005
+      Dev BUSY:  22.54%         SSCH/sec:   6.205        Serv Time:   .006S
+     Disc Time:   .004S        Conn Time:   .002S       Queue Time:   .000S
+     Pend Time:   .000S          CU Time:   .000S         DEV Time:   .000S
+    Curr User:*MASTER*              Open DCBs:     112        Dev Stat: STORAGE
+     CYL/HEAD: 1749  4             Dev Allocs:     223       Mgmt Stat: NON-SMS
+       EXADASD:   1/*..    2/...

.  To select another Disk for DDZZ, enter .SPY after COMMAND:
.  place the cursor on the desired device, and press enter.

DDHL   1/4     Dev BUSY  SSCH/ sec  Serv Time    CYL/ HD  Curr User     Log CU
+  SMGD01  C1F   22.54%      6.205      .006S    1749  4   *MASTER*        005
+  SCR001  C11   12.13%     10.548      .009S                              005
+  WORK01  C16    4.05%      3.625      .005S                              005
+  SPOOL0  C18    1.98%      2.832      .007S                              005
+  SPOOL1  C10    1.92%      1.920      .002S                              005
+  CIC001  C13    1.19%      1.963      .005S                              005
+  TSO001  C1A     .85%      2.220      .003S                              005
```

In the example above, the SPYMDD screen was displayed after the .SPY command identified disk device SMGD01. The DDZZ line command displays the detailed statistics for this specific disk device.

DDZZ legend

Line 1

Field	Description
VOLSER	Disk device volume serial number.
Dev Addr	Disk device number.
Logical CU	Logical Control Unit of device.

Line 2

Field	Description
Dev BUSY	Percentage of interval during which the device was busy.
SSCH/sec	Input and output rate—start subchannels per second.
Serv Time	Total input and output service time—Pend + Conn + Disc time.

Line 3

Field	Description
Disc Time	Average disconnect time per input and output for device.
Conn Time	Average connect time per input and output for device.
Queue Time	Average time input and output must wait (in queue) for device.

Line 4

Field	Description
Pend Time	Average time input and output must wait for channel path.
CU Time	Average input and output delay time waiting due to control unit busy (3090 Support).
DEV Time	Average input and output Delay time waiting due to device busy (3090 Support).

Line 5

Field	Description
Curr User	Current user of Device.
Open DCBs	Number of open DCB's on this device.
Dev Stat	Device mount status.

Line 6

Field	Description
CYL/HEAD	Cylinder and head of currently active input and output.
Dev Allocs	Number of address spaces allocated to device.
Mgmt Stat	System Managed Storage status.

Line 7

Field	Description
EXADASD	Disk device exceptions and status. Refer to the explanation of the DEXX line command in "Disk Exception Definition Status" on page 196 for a description of the status display.

Note:

Line 7 displays only when one or more Exception Definitions are associated with the DASD device.

Tape Statistics

Tape device information is taken from UCB fields and RMF sampling. Tape information taken from RMF sampling indicates tape activity since the last RMF reporting interval. These line command are used:

Command	Display
TAPE	Select tapes / display device address. Overflow Indicator (+) available.

These fields require the tape device to be currently allocated, the information is valid for the current allocation only. These line commands are used:

Command	Display
TVOL	Tape volume serial number
TLBL	Current label type
TUSR	Current tape user jobname
TSIO	Current tape input and output count
TERT	Current tape temporary error count
TERP	Current tape permanent error count
TMNT	Tape mount wait time. PreAlert MVS calculates the mount wait time as the time since PreAlert MVS found the tape mount. The mount request may have occurred prior to this; therefore, the actual wait time may be greater than the time displayed.
TDST	Device response time (average time to service an input and output request).

Figure 138 shows a sample tape statistics display:

Figure 138 • Tape statistics display

```
TAPE      480      481      482      483      F90      F91      F92      F93  +
TVOL   *MOUNT                                                 706272   *MOUNT
TLBL       SL                                                   7 SL       SL
TUSR GINV114E                                             TIMP008F IDMSJNL1
TSIO        1                                                   144        2
TMNT    1:42M                                                          7:09M
```

If RMF is not active or RMF is not recording TAPE statistics, the line commands display: `RMF DATA NOT AVAILABLE.`

Tape Selection Parameters

The TSEL line command allows you to restrict the selection of tapes for display. Without the TSEL command, all online tapes display beginning with the lowest unit address. The TSEL command allows you to enter keywords that describe the criteria used in selecting tapes for display. These include unit address, volume serial number, online/offline, and allocation status.

The TSEL line command is usually followed by the TAPE line command. The TSEL line command specifies the selection criteria. The TAPE line command actually selects which tapes to display and displays the unit address.

These keywords are used with the TSEL line command:

Keyword	Description
CUA=*xxx*	Specifies 1 to 8 device address masks. Tape devices matching the specified device addresses are selected. The TAPE line command displays device addresses.
VOL=*xxx*	Specifies 1 to 8 volume serial number (VOLSER) masks. Tape devices matching the specified VOLSERs are selected. The TVOL line command displays VOLSERs.
ALC=*xxx*	Specifies allocated tape parameter. Tape devices currently allocated are selected for display. Y Allocated tape devices N Non-allocated tape devices
ONL=*xxx*	Specifies device online status parameter. Tape devices either online or offline are selected for display. Default is ONL=Y, online devices only. Y Online devices N Offline devices

Option	Description
REP=*xxx*	Specifies the Auto-repeat option. When the number of tape devices selected for display exceeds the number that can by displayed across the screen, the line commands are repeated until all the selected tape devices are displayed. Refer to "Auto-repeat Option" on page 22. Y Request Auto-repeat option N Suppress Auto-repeat option

5 Dataset Information

PreAlert MVS provides several functions to help you investigate dataset allocations. These include the ability to display dataset label information, list the datasets allocated to a job, and list which jobs have allocation to a specified dataset.

This chapter contains these sections:

Dataset Label Information 211

Dataset at a Given Cylinder/Head 213

Dataset Allocations 214

Datasets Allocated to a Job 215

DD Information for a Job 216

DSNJ and DSNA Selection Keywords 217

Dataset Label Information

The DSN line command displays dataset label information (DCB attributes and extent information) maintained in the volume table of contents (VTOC) entries, as shown in Figure 139 on page 212. The DSN keyword specifies the dataset name. If the dataset is cataloged, then the location of the dataset is obtained from the catalog.

If the dataset is not cataloged, then the VOL keyword specifies one to eight volume serial numbers (VOLSER) to be searched. Only online DASD volumes are searched. The VOLSER(s) may be masked by entering an asterisk (*) in any position of the VOLSER. This excludes that position from testing.

Figure 139 • DSN line command

```
DSN=SYS1.LINKLIB,VOL=SYSR8J,TST*
+   VOLSER CUA  RECFM LRECL BLKSZ  DSORG  CREDT REFDT  EXT  TRKS  USED  2ND-ALC
+   TSTCAT 148  DATASET NOT FOUND ON VOLUME
+   SYSR8J 241   U    19069 19069   PO    85125 85159    1  1350   904
+   TSTRES 248   U    19069 19069   PO    84362 85151    1  1350   569
```

Dataset at a Given Cylinder/Head

The DSNX line command displays the name of the dataset for a specified VOLSER, cylinder, and head, as shown in Figure 140.

Figure 140 • DSNX line command

```
DISK      1B0      1B1      1B2      1B3      1B4      1B5      1B6      1B7  +
DVOL   MVSRES   DBA001   WORK01   DBA008   DBA005   DBA006   DICCAT   DBA007
DUSR         IDMSPROD
=== ==========================================================================
DSNX VOL=DBA001,CYL=189,HDD=13
+   DBA001   189: 13 = PMFGDDN.IDMS.SFCDRL3
DSNX VOL=DBA001,CLX=BD,HDX=D
+   DBA001   189: 13 = PMFGDDN.IDMS.SFCDRL3
```

The DSNX line command uses these keywords:

Keyword	Description
VOL=*xxxxxx*	VOLSER
CYL=*nnn*	Cylinder Number, Decimal
HDD=*nnn*	Head Number, Decimal
CLX=*hhh*	Cylinder Number, HEX
HDX=*hhh*	Head Number, HEX

Dataset Allocations

The DSNW line command displays who has allocation to a dataset. This displays the jobs that have allocated the specified dataset name. Included with the jobname, is the job's address space ID (ASID), the type of allocation (shared or exclusive), and an indicator of whether the job owns the dataset or is waiting for allocation. Figure 141 is a sample DSNW display:

Figure 141 • DSNW line command

```
DSNW SYS1.HELP                                    WAIT=   1  OWNER=   5
+    TPRR      ASID=  28  OWN/SHR         PREALERT ASID=  33  OWN/SHR
+    TWER      ASID=  35  OWN/SHR         TGJM     ASID=  31  OWN/SHR
+    TRDH      ASID=  37  OWN/SHR         PWERA    ASID=   9 WAIT/EXC
```

Datasets Allocated to a Job

The DSNJ line command displays the names of all datasets allocated to an address space, as shown in Figure 142. Included in the display are the type (exclusive or shared) and the status (own or wait) of the allocation. The JNM= or ASI= keywords specify either the target jobname or ASID. The default number of lines displayed is 10.

Figure 142 • DSNJ line command

```
DSNJ JNM=*
+   1.  WERXSHP     OWN/SHR   DCPGSYZ.PDC.PERM.CLIST
+   2.  WERXSHP     OWN/SHR   SP1GSYS.ISP.ISPTLIB
+   3.  WERXSHP     OWN/SHR   SYS1.ISPMLIB
+   4.  WERXSHP     OWN/SHR   SYS1.ISRSLIB
+   5.  WERXSHP     OWN/SHR   PR1GSYZ.ISP.ISPSLIB
```

See "DSNJ and DSNA Selection Keywords" on page 217 for a list of keywords available for use with DSNJ.

DD Information for a Job

The DSNA line command displays dataset information from all Data Definition (DD) statements used in a job, as shown in Figure 143. The display includes the ddname, VOLSER, unit address, input and output counts, and dataset name. A dataset name may display more than once if it is allocated in multiple DDs. Also, a ddname may be repeated if it has concatenated datasets. The default number of lines displayed is 10.

The JNM or ASI keywords specify either the target jobname or address space ID. Several other selection keywords are available that allow you to limit the displayed items.

Note:

DD information displays only if the target job is swapped-in. A warning message displays if it is swapped-out.

The DSNA line command is allowed only if you are an authorized user.

Figure 143 • DSNA line command

```
DSNA JNM=*
+   1. STEPLIB  C19 DBS002     69 PAC.V360.STG.LINKLIB
+   2. ASFLINK  C15 PROD01      3 ASF110.PROD.LOADLIB
+   3. HELPFILE C19 DBS002    103 PAC.V360.STG.HELP
+   4. SYSUDUMP                   ++++++++.PAC360.STC00341.D0000101.?
+   5. SNAPFILE                   ++++++++.PAC360.STC00341.D0000102.?
+   6. PRINTFILE                  ++++++++.PAC360.STC00341.D0000103.?
+   7. ABNLIGNR                   NULLFILE
+   8. SYS00025 C16 WORK01     13 DEVBER.PREALERT.HELP
+   9. SYS00026                   ++++++++.PAC360.STC00341.D0000105.?
```

DSNJ and DSNA Selection Keywords

Either the JNM or ASI keyword is required to specify the target jobname or ASID; one must be specified. If both keywords are specified, the ASID is used to select the target job.

Keyword	Description
JNM=*jobname*	Specifies the jobname of the target job. A single asterisk (*) may be used in place of your jobname.
ASI=*asid*	Specifies the address space ID of the target job.

Values for several of the selection keywords may be masked. Entering an asterisk (*) in any position of the value results in a match with any character in that position. Also, any value followed by an asterisk is treated as a prefix. Thus, if you entered `SYS*` as the value for the DSN= keyword, only dataset names beginning with `SYS` display. The selection keywords may be specified in any order or combination.

These keywords may be used with either the DSNA or DSNJ command:

Keyword	Function
DSN=*data.set.name*	Select, by dataset name, one to eight values up to 44 characters each. These values may be masked.
DS1=*qualifier*	Select, by dataset name first-level qualifier, one to eight values of up to eight characters each. These values may be masked.
DS2=*qualifier*	Select, by dataset name second-level qualifier, one to eight values of up to eight characters each. These values may be masked.
DS3=*qualifier*	Select, by dataset name third-level qualifier, one to eight values of up to eight characters each. These values may be masked.
DS4=*qualifier*	Select, by dataset name fourth-level qualifier, one to eight values of up to eight characters each. These values may be masked.
SKP=*nnn*	Specifies the skip count as a numeric value. The skip count is used to scroll forward through the display.
CNT=*nnn*	Specifies the display count as a numeric value. The display count limits the number of lines displayed. Default count is 10.

These keywords may be used with the DSNJ command only:

Keyword	Function
TYP=S|E	Select by allocation type.
	S = Shared allocation
	E = Exclusive allocation
STA=O|W	Select by allocation status
	O = Owns dataset allocation
	W = Waiting for allocation

These keywords may be used with the DSNA command only:

Keyword	Function
DDN=*DDname*	Select, by *DDname*, one to eight values of up to eight characters each. These values can be masked.
CUA=*unit address*	Select, by unit address, one to eight values of up to three characters each. These values can be masked.
VOL=*volser*	Select, by volume serial number, one to eight values of up to six characters each. These values can be masked.

6 System Analysis

PreAlert MVS displays critical MVS system statistical information on utilization of resources. CPU utilization, SRM, input and output, and paging are displayed, providing easy analysis of over or under utilization.

This chapter includes these sections:

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CPU Utilization by Performance Group or Domain 221

Real Storage Utilization 223

Extended Storage Utilization 226

CSA and SQA Subpool Usage 227
CSA and SQA Storage Allocation 228
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MPL Adjustment 256
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CPU, Input and Output, and Storage Load Balancing 259
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CPU Utilization Plots

CPU utilization plots are a summary of the CPUR rates for each type of address space. Each plot character represents two percent of CPU utilization.

Figure 144 demonstrates how the CPU plots display.

Figure 144 • CPU utilization plots

```
SYSP CPU   1   72.38% ************************************... .... ....
+    CPU   2   71.78% ************************************... .... ....
+    SYSTEM    72.08% ************************************... .... ....
MPLT *MVS 167  20.96% **********.... .... .... .... .... .... .... ....
APLT *ALL 167  51.12% *************************... .... .... .... ....
=== ==========================================================================
JPLT *JOB  17  17.67% ********* .... .... .... .... .... .... .... ....
SPLT *STC  42  25.65% *************. .... .... .... .... .... .... ....
TPLT *TSO  98   6.94% ***. .... .... .... .... .... .... .... .... ....
UPLT *UND  10    .86% .... .... .... .... .... .... .... .... .... ....
=== ==========================================================================
CPUP  003           CPU USAGE LIMIT =    3
+    MRJGERIT  12.00% ******... .... .... .... .... .... .... .... ....
+    IDMSDC4   27.10% ************** .... .... .... .... .... .... ....
+    JXJGRVI    5.22% ***. .... .... .... .... .... .... .... .... ....
```

Command	Display
SYSP	SYSTEM CPU utilization. SYSP = (APLT + MPLT)
MPLT	MVS overhead (includes any VM overhead).
APLT	Total CPU utilization for all ADDRESS SPACES. APLT = (JPLT + SPLT + TPLT + UPLT)
====	Line Separator/Auto-repeat
JPLT	Total CPU utilization for all BATCH jobs.
SPLT	Total CPU utilization for all STARTED tasks.
TPLT	Total CPU utilization for all TSO users.
UPLT	Total CPU utilization for SYSTEM tasks.
CPUP	CPU utilization for any address space whose utilization exceeds the specified percentage.

Note:

When the CPU is used by any undetected jobs, their utilization is included in the total. An *undetected* job is defined as one that starts and ends between PreAlert MVS cycle displays.

CPU Utilization by Performance Group or Domain

The CPUU line command summarizes and plots address space CPU usage by either performance group number (PGN), performance group name, domain number, or domain name. The performance group names and domain names are assigned through the UDPGN and UDDOM macros in the PreAlert MVS userdata. Refer to "Installation of PreAlert" in the *ASG-PreAlert IDMS/MVS Systems Guide* for additional information on the userdata macros.

For multi processor systems, the CPU usage is calculated as the amount of CPU time used divided by the amount of time passed, divided by the number of processors in the system. Thus CPU usage represents the percentage of CPU usage for all processors in the system, not the usage of a single processor.

Figure 145 is a sample CPUU line command display:

Figure 145 • CPUU line command

```
CPUU USE=PNAME
+ PGN NAME      PCT  ...10...20...30...40...50...60...70...80...90..100
+ BATCH-HI    26.07  *************.|....|....|....|....|....|....|....|
+ STC         10.95  *****....|....|....|....|....|....|....|....|....|
+ TSO-LO       9.29  *****....|....|....|....|....|....|....|....|....|
+ BATC*-LO     9.25  *****....|....|....|....|....|....|....|....|....|
+ SYSTEM       4.45  **..|....|....|....|....|....|....|....|....|....|
+ TSO-HI       4.22  **..|....|....|....|....|....|....|....|....|....|
+ PGN   16     2.76  *...|....|....|....|....|....|....|....|....|....|
+ TSO-MED       .21  ....|....|....|....|....|....|....|....|....|....|
```

Keyword	Description
USE=*xxxx*	Specifies the type for summarizing CPU usage. Defaults to performance group name. PGN — Performance group number PNAME — Performance group name DOM — Domain number DNAME — Domain name
CPU=*nnn*	Specifies the CPU usage threshold. Only the types whose CPU usage has met or exceeded the threshold are displayed. Default is zero.

Keyword	Description
PLT=*nnn*	Specifies the measurement scale for the plots. If the specified scale is less than 50, the scale rounds up to the next multiple of 10. If the scale is greater than 50, it rounds up to the next multiple of 50. Default is 100.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in yellow if color support is active. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in red if color support is active. If color support is not active, the plot highlights. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Real Storage Utilization

The RSTG line command provides a summary of real storage and expanded storage usage, as shown in Figure 146. The counts displayed indicate the number of 4K frames used.

Figure 146 • RSTG line command

```
COMMAND:            REALSTOR  9:35:05.4  93.060  86.87%  .TUT for Tutorial
RSTG CENTRAL STORAGE   FRAMES       FIXED    PAGEABLE      EXPANDED
+    TOTAL            51,712                                 32,768
+    ON-LINE          51,691                                 32,768
+    NUCLEUS           1,051
+    IN-USE           49,992       8,087      41,905        32,733
+    AVAILABLE            648                                    35
+
+    SQA               2,091       2,084           7            36
+    LPA               2,078         109       1,969           330
+    CSA               1,329          71       1,258            87
+    LSQA              5,218       5,034         184         1,129
+    REGIONS+SWA      38,409         789      37,620        32,280
```

Note:

For extended storage counts, the REGIONS+SWA count includes the LSQA count. For real storage counts (frames, fixed, and pageable), the LSQA count is *not* included in the REGIONS+SWA counts.

The real storage utilization line commands (RS*xx*) plot the real storage usage in MVS/XA and MVS/ESA. The counts shown indicate the number of KBs of storage used.

Figure 147 shows how real storage utilization plots display.

Figure 147 • Real storage utilization plots

```
COMMAND:____________FRAMES    9:35:05.4  93.060  86.87%  .TUT for Tutorial
RSHD          EACH PLOT POINT EQUALS  4096K    EACH BAR EQUALS 32768K
RSSZ   206848K .......|.......|.......|.......|.......|.......|...
RSOS   206764K .......|.......|.......|.......|.......|.......|...
RSNU     4204K .
RSPO   202560K .......|.......|.......|.......|.......|.......|..
==== ======================================================================
RSTS   199968K .......|.......|.......|.......|.......|.......|.
RSTP   167620K .......|.......|.......|.......|.......|.
RSTF    32348K .......|
RSAS     2592K .
=== ======================================================================
RSSS     8364K ..
RSLS     8312K ..
RSCS     5316K ..
RSQS    20872K .....
RSRS   153636K .......|.......|.......|.......|......
=== ====================================================================
RSSF     8336K ..
RSLF      436K
RSCF      284K
RSQF    20136K .....
RSRF     3156K .
==== ======================================================================
```

These are the real storage utilization line commands:

Command	Display
RSSZ	Total Real Storage size.
RSOS	Online Real Storage, excluding frames backing permanent storage and offline frames.
RSNU	Nucleus Real Storage usage.
RSPO	Paging Pool size, amount of real storage available for paging.
RSTS	Total Allocated Real Storage

Command	Display
RSTP	Total Pageable Real Storage
RSTF	Total Fixed Real Storage
RSAS	Total Available Real Storage
RSSS	SQA Real Storage
RSLS	LPA Real Storage
RSCS	CSA Real Storage
RSQS	LSQA Real Storage
RSRS	Regions + SWA Real Storage
====	Line Separator/Auto-repeat
RSSF	SQA Fixed Real Storage
RSLF	LPA Fixed Real Storage
RSCF	CSA Fixed Real Storage
RSQF	LSQA Fixed Real Storage
RSRF	Regions + SWA Fixed Real Storage
RSSP	SQA Pageable Real Storage
RSLP	LPA Pageable Real Storage
RSCP	CSA Pageable Real Storage
RSQP	LSQA Pageable Real Storage
RSRP	Regions + SWA Pageable Real Storage

Extended Storage Utilization

Extended (expanded) storage is used by MVS to reduce the movement (paging and swapping) of pages between central (real) storage and auxiliary storage. Typically, the MVS Real Storage Manager (RSM) moves a page from central storage into expanded storage, instead of having ASM write the page to auxiliary storage. Pages migrate from expanded storage to auxiliary storage when contention for expanded storage increases.

Figure 148 shows how expanded storage utilization plots display:

Figure 148 • Expanded storage utilization plots

```
ESHD         EACH PLOT POINT EQUALS  2048K    EACH BAR EQUALS 16384K
ESSZ 131072K .......|.......|.......|.......|.......|.......|.......|.......|
ESOS 131072K .......|.......|.......|.......|.......|.......|.......|.......|
ESIN 130932K .......|.......|.......|.......|.......|.......|.......|.......|
ESAV    140K
=== ========================================================================
ESSQ    144K
ESLP   1320K .
ESCS    348K
ESLS   4516K ..
ESRG 129120K .......|.......|.......|.......|.......|.......|.......|.......
==== ========================================================================
ESTG MIGRATION AGE:  1173   WRITE:  231.2  READ:  204.3  MIGR:   58.4
```

Command	Display
ESHD	Extended Storage Plot header
ESSZ	Extended Storage size (amount installed)
ESOS	Extended Storage Online
ESIN	Extended Storage in use
ESAV	Available Extended Storage
====	Line Separator/Auto-repeat
ESSQ	SQA Extended Storage usage
ESLP	LPA Extended Storage usage

Command	Display
ESCS	CSA Extended Storage usage
ESLS	LSQA Extended Storage usage
ESRG	Regions+SWA Extended Storage usage, includes LSQA usage
ESTG	Expanded Storage Activity

The ESTG line command fields have these meanings:

Field	Description
MIGRATION AGE: *nnnnn*	The age at which an unreferenced page in extended storage migrates to auxiliary storage.
WRITE: *nnnn.n*	The number of pages per second being written to extended storage.
READ: *nnnn.n*	The number of pages per second being read from extended storage.
MIGR: *nnnn.n*	The number of pages per second migrating from extended storage to auxiliary storage.

CSA and SQA Subpool Usage

The Common Service Area (CSA) and System Queue Area (SQA) contain system and userdata that are common to all address spaces. These areas are allocated by subpool and protection key. The subpools describe the attributes and usage of the storage areas.

The CSAM and SQAM line commands describe the usage of CSA and SQA by subpool and key. One CSAM or SQAM line command is required to map subpool usage in each area.

Figure 149 shows how CSA and SQWA subpool usage displays:

Figure 149 • CSAM and SQAM line commands

```
CSAH    SUBPOOL/KEY      ALLOC    AVAIL   USED     USED%  FIX PROT  USER
CSAM       231/  8       12288     3088    9200   74.86%   N    Y   V=V PROG
CSAM       227/  6       90112    78376   11736   13.02%   Y    Y   VTAM
CSAM       228/  6        4096       64    4032   98.43%   Y    N   VTAM
SQAM       245/  0         448K     128K    320K  71.42%   Y    N   SYSTEM
               <--------  BYTES  ------->

                                  fixed storage---

                                    fetch protected----
```

CSA and SQA Storage Allocation

The CSUM line command displays a summary of virtual storage allocated for the CSA and SQA. The display shows the total number of 4K pages available for each area, allocated (GETMAINed) pages, CSA pages, SQA pages, and unallocated pages. Additionally, the percentage of total pages available is displayed for each.

The CSTG line command displays any changes in the status of any pages in CSA or SQA since the last PreAlert MVS cycle. This is particularly useful in diagnosing CSA storage shortages. As CSA usage increases, the CSTG line command displays the address of new pages being allocated in CSA. The storage can then be viewed by specifying the address in the ADDR line command on the DUMP screen. MVS does not provide any accounting of CSA and SQA usage; viewing the entire page and making an educated guess are the only means of identifying the storage.

Figure 150 is a sample of CSUM command usage:

Figure 150 • CSUM command usage

```
CSUM  AREA    TOTAL    ALLOC-PCT     CSA-PCT     SQA-PCT    FREE-PCT
+     CSA       713      476  66     429  60      45   6     237  33
+     SQA       176      176 100                 176 100
+     ECSA     5023     1708  34    1708  34                3315  65
+     ESQA     3792     3792 100                3792 100

CSTG PAGE AT 00AF0000 ALLOCATED TO CSA
+    PAGE AT 00AF3000 CSA STORAGE FREED
+    PAGE AT 00B12000 CSA STORAGE FREED
+    PAGE AT 01E2A000 ALLOCATED TO CSA
+    PAGE AT 01E2B000 ALLOCATED TO CSA
+    PAGE AT 01E2C000 ALLOCATED TO CSA
+    PAGE AT 01E2D000 ALLOCATED TO CSA
```

In this example, the displayed output from the CSUM command indicates that both SQA and Extended SQA showed 100 percent allocation and SQA has overflowed into CSA by 45 pages. This may indicate a need to increase the SQA allocation. This need becomes more urgent as the number of free pages reaches zero.

The CSTG line command indicates some activity with CSA allocations. This may be normal in systems where CSA is used to pass data between address spaces, particularly in data base and data communications packages.

The CSAV and SQAV line commands display a virtual storage map for CSA and SQA, respectively. Each 4K page is represented by a single character as follows:

Command	Description
C	Page allocated for CSA
S	Page allocated for SQA
.	Page is not allocated

Each CSAV and SQAV output line displays 64 pages for a total of 256K bytes of storage.

The CSAS and SQAS line commands (Figure 151) list a virtual address range map for CSA and SQA, respectively. A display line is generated for each contiguous block of similarly allocated pages. Each line shows the number of pages, the virtual address of the first page, and the type of allocation (CSA, ECSA, SQA, ESQA, or not allocated).

Figure 151 • CSAS and SQAS line commands

```
CSAS      235 PAGES AT 00A00000 NOT ALLOCATED
+           5 PAGES AT 00AEB000 ALLOCATED TO SQA
+           1 PAGES AT 00AF0000 NOT ALLOCATED
+           1 PAGES AT 00AF1000 ALLOCATED TO SQA
+           1 PAGES AT 00AF2000 NOT ALLOCATED
+          28 PAGES AT 00AF3000 ALLOCATED TO CSA
+           3 PAGES AT 00B0F000 ALLOCATED TO SQA
+          38 PAGES AT 00B12000 ALLOCATED TO CSA
+           2 PAGES AT 00B38000 ALLOCATED TO SQA
CSA/ECSA VIRTUAL STORAGE MAP
+ 00A00000   ..............................................................
+ 00A40000   ..............................................................
+ 00A80000   ..............................................................
+ 00AC0000   ...........................................SSSSS.S.CCCCCCCCCCCCC
+ 00B00000   CCCCCCCCCCCCCCCSSSCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCSSCCCCCC
```

Only the first few lines of each line command have been shown in Figure 151. The actual number of lines displayed depends upon the length of the area and the amount of fragmentation within the area.

Common Storage Tracking

With MVS common storage tracking active, PreAlert can monitor common storage usage. The CSTU line reports common storage usage by the area (CSA, SQA, ECSA, or ESQA) and totals them for all CSA and SQA.

The usage is reported by the size of the area, the amount used (GETMAINed), the amount available, and the unowned amount. Figure 152 is an example of this report. The amount used represents the total amount of common storage GETMAINed by all address spaces. The amount available represents the amount remaining, still available for GETMAIN. The unowned amount represents the common storage GETMAINed by address spaces that have since terminated.

Figure 152 • Common storage tracking

```
CSTU           Size      Used-PCT      Avail-PCT    Unowned-PCT
+      CSA    3956K      731K  18%     3224K  81%      148K   3%
+      SQA     896K      262K  29%      633K  70%        1K   0%
+     ECSA   24916K    14968K  60%     9947K  39%      883K   3%
+     ESQA    9864K     4044K  40%     5819K  58%        1K   0%
+ ALL CSA   28872K    15700K  54%    13171K  45%     1031K   3%
+ ALL SQA   10760K     4307K  40%     6452K  59%        3K   0%
```

Unowned Common Storage Management

With MVS common storage tracking active, PreAlert can monitor unowned common storage. An area of common storage is considered "unowned" when the address space or batch job that obtained the storage terminates without releasing the storage.

The UCSL line lists unowned common storage areas. The list shows the common storage area, CSA, SQA, ECSA, or ESQA, the subpool number, the address and length of the storage, the jobname and number of the job that obtained the storage, and the date and time that the job terminated.

The UCSF line command (Figure 153) releases unowned common storage areas. The ADR=addr keyword specifies the address of the unowned common storage area to be released.

Figure 153 • UCSF line command

```
.  Use CNT=n, SKP=n, JNM=jobname, or JID=jobid keywords
 UCSL CNT=5
 +  CSA 241  00C19B68  9368   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 241  00C1C000  8192   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 241  00C1F1B8  2632   DEVDBA    TSU02386  98.075  16:58:03
 +  CSA 231  00C5BE88   152   ASFCORPC  STC01965  98.075  08:53:18
 +  CSA 241  00C89030   104   ASFTEST3  STC02395  98.075  08:32:36
 +  MORE UNOWNED COMMON STORAGE AREAS, USE CNT= OR SKP= TO DISPLAY

 .  Specify ADR=address to free Unowned Common Storage
 UCSF ADR=00C1F1B8
 +    COMMON STORAGE FREEMAIN SUCCESSFUL, ADDRESS=00C1C1B8, LENGTH=   2632
```

These keywords are used with the UCSL line command:

Keyword	Description	
LOC=*xxx*	Specify one or more common storage areas to be included in the display, default LOC=ALL	
	CSA	Common System Area, below 16MB
	SQA	System Queue Area, below 16MB
	ECSA	Extended Common System Area, above 16MB
	ESQA	Extended Common System Queue Area, above 16MB
	ABOVE	ECSA and ESQA
	BELOW	CSA and SQA
	ALL	All common storage areas.
JNM=*xxx*	Specifies 1 to 8 jobname masks. Only the areas obtained by jobs that match the jobname masks are displayed	

Keyword	Description
JID=*xxx*	Specifies 1 to 8 job ID masks. Only the areas obtained by jobs that match the job ID masks are displayed
CNT=*nnn*	Specifies the display count. The number of unowned common storage areas to be displayed. Default CNT=10
SKP=*nnn*	Specifies the skip count. The leading unowned common storage areas are skipped, not included in the display.

These keywords are used with the UCSF line command:

Keyword	Description
ADR=*xxx*	Specifies the address of unowned common storage area to be released. This address must exactly match the address displayed in the UCSL line command.

Page and Swap Datasets

A minimum of three PAGE datasets must be defined, one for the Pageable Link Pack Area (LPA), one for the CSA, and one for address space virtual storage (Local). Optionally, a Duplex page dataset may be defined to hold a duplicate copy of all pages written to PLPA and CSA page datasets. Also, additional local page datasets may be defined. One or more swap datasets may be defined to hold all private area virtual storage for swapped-out address spaces.

An asterisk (*), displays before the DSNAME if it can accept VIO pages, as shown in Figure 154.

Figure 154 • Page and swap datasets

```
PDSH TYPE   DSNAME                CUA VOLSER SLOTS-AVAIL---USED%   RATE   RESP
PDSN PLPA   PAGE.VLOC182.PLPA1    628 LOC182  7500  4818  35.76%    .00
PDSN COMMON PAGE.VLOC182.COMMON   628 LOC182  1500  1487    .86%    .00
PDSN LOCAL *PAGE.VLOC180.LOCAL1   620 LOC180 18000 14177  21.23%   7.56
PDSN LOCAL *PAGE.VLOC18F.LOCAL1   186 LOC18F 18000 14098  21.67%   9.61 .005S
PDSN LOCAL *PAGE.VLOC183.LOCAL1   1A8 LOC183 18000 14202  21.20%   9.06 .006S
```

Field	Description
RATE	The RATE field shows the number of input and output rates per second.
RESP	The RESP field shows the RMF response time.

Line Command	Description
PDSN	This line command describes a PAGE dataset. Use a PDSN line command for each page dataset defined.
SDSN	SDSN describes a swap dataset, with each page dataset defined. Use the SDSN line command for each swap dataset defined.
PDSH	This line command displays a header for the PDSN and SDSN line commands.

Paging Activity by Performance Group or Domain

The PGRU line command summarizes and plots address space paging activity by performance group number (PGN), performance group name, domain number, or domain name, as shown in Figure 155. The performance group names and domain names are assigned through the PreAlert MVS userdata UDPGN and UDDOM macros. Refer to "Installation of PreAlert" in the *ASG-PREALERT Systems Guide* for additional information on the userdata macros.

The paging activity rate is calculated as the number of non-swap address space pages read from auxiliary storage per second of realtime.

Figure 155 • PGRU line command

```
PGRU USE=PNAME
+ PGN NAME     RATE  ....5...10...15...20...25...30...35...40...45...50
+ TSO-HI       8.33  ********.|....|....|....|....|....|....|....|....|
+ SYSTEM       4.45  ****|....|....|....|....|....|....|....|....|....|
+ PGN   16     3.16  ***.|....|....|....|....|....|....|....|....|....|
+ BATCH-HI     2.37  **..|....|....|....|....|....|....|....|....|....|
+ STC            .85  *...|....|....|....|....|....|....|....|....|....|
+ TSO-MED        .40  ....|....|....|....|....|....|....|....|....|....|
```

Keyword	Description	
USE=*xxx*	Specifies the type for summarizing paging activity. Defaults to performance group name.	
	PGN	Performance group number
	PNAME	Performance group name
	DOM	Domain number
	DNAME	Domain name.

Keyword	Description
PGR=*nnn*	Specifies the paging rate threshold. Only the page activity types for which the paging rate has met or exceeded the threshold displays. Default is zero.
PLT=*nnn*	Specifies the measurement scale for the plots. If the specified scale is less than 50, the scale rounds up to the next multiple of 10. If the scale is greater than 50, then it rounds up to the next multiple of 50. Default is 50.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in yellow if color support is active. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in red if color support is active. If color support is not active, the plot will be highlighted. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Paging Activity

The PGRT line command monitors paging activity in central (real) storage. All rates shown represent pages per second since the last PreAlert MVS sample.

The paging activity is displayed by page reclaims, page-ins, and page-outs for common areas (LPA and CSA) and address spaces.

The rates are structured as follows.

Page Reclaim Rates	Description
N-SWAP	Pages reclaimed for non-swap page-in operations.
PCT	Percent of TOTAL SYSTEM page reclaim rate.

Page-In Rates	Description
SWAP	Pages read into central (real) storage for address space swap-ins.
N-SWAP	Pages read into central (real) storage for non-swap page-in operations.
TOTAL	Total pages read into central storage.
PCT	Percent of TOTAL SYSTEM page-in rate.

Page-Out Rates	Description
SWAP	Pages written to auxiliary storage for address space swap-outs.
N-SWAP	Pages written to auxiliary storage for non-swap page-outs.
TOTAL	Total pages written to auxiliary storage.
PCT	Percent to TOTAL SYSTEM page-out rate.

Common Pageable System Areas	Description (Swap Rates Not Available)
LPA	Link Pack Area.
CSA	Common System Area.
===	Sum of LPA and CSA rates.

Address Space Private Areas	Description
HSP	Hiperspace paging activity (swap rates not available).
VIO	Address Space VIO paging activity (swap rates not available).
N-VIO	Address Space non-VIO paging activity.
===	Sum of hiperspace, VIO, and non-VIO rates.

Total System	Description
HSP	Address Space hiperspace paging activity.
VIO	Address Space VIO paging activity.
N-VIO	Common and Address Space non-VIO paging activity.
===	Sum of common and address space paging activity.

Figure 156 is a sample PGRT display.

Figure 156 • PGRT display

```
PGRT     PAGE RECLAIMS          PAGE IN                      PAGE OUT
+  COMMON  N-SWAP  PCT    SWAP N-SWAP  TOTAL  PCT     SWAP N-SWAP  TOTAL  PCT
+   LPA       .0    0              .2     .2    0
+   CSA       .0    0              .0     .0    0              .0     .0    0
+   ===       .0    0              .2     .2    0              .0     .0    0
+ ADDRESS SPACE
+   HSP                            .0     .0    0              .0     .0    0
+   VIO     75.5   86            27.8   27.8   20            11.5   11.5   19
+  N-VIO    11.8   14     68.2   42.7  110.9   80     41.8    6.3   48.2   81
+   ===     87.3  100     68.2   70.5  138.8  100     41.8   17.9   59.8  100
+ TOTAL SYSTEM
+   HSP                            .0     .0    0              .0     .0    0
+   VIO     75.5   86            27.8   27.8   20            11.5   11.5   19
+  N-VIO    11.8   14     68.2   42.9  111.2   80     41.8    6.3   48.2   81
+   ===     87.3  100     68.2   70.7  139.0  100     41.8   17.9   19.8  100
```

The PGRP line command plots the rates (per second) for common, hiperspace, VIO, swap, address space, and total page-in activity. Figure 157 is a sample PGRP display.

Figure 157 • PGRP display

```
PGRP PLT=200
+ PAGING RATES          ...20...40...60...80..100..120..140..160..180..200
+ CSA+LPA          .2   ....|....|....|....|....|....|....|....|....|....|
+ HIPERSPACE       .0   ....|....|....|....|....|....|....|....|....|....|
+ VIO            27.8   *******..|....|....|....|....|....|....|....|....|
+ SWAP           68.2   *****************..|....|....|....|....|....|....|
+ ADDR SPACE     42.7   ***********...|....|....|....|....|....|....|....|
+ ---TOTAL---   139.0   ************************************....|....|....|
```

Field	Description
CSA+LPA	Pageable common system areas page-in rate
HIPERSPACE	Address Space hiperspace page-in rate
VIO	Address Space VIO page-in rate
SWAP	Address Space Swap-in page-in rate
ADDR SPACE	Non-swap, non-VIO page-in rate
---TOTAL---	Total system page-in rate.

Keyword	Description
PLT=*nnn*	Specifies the measurement scale for the plots. If the specified scale is less than 50, the scale rounds up to the next multiple of 10. If the scale is greater than 50, it rounds up to the next multiple of 50. Default is 50.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in yellow if color support is active. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in red if color support is active. If color support is not active, the plot highlights. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Swap Activity

The SWPT line command provides a summary of swap activity by swap reason, and swap placement within each swap reason, as shown in Figure 158. The swap placement indicates the total number of swaps, logical swaps (in central storage), physical swaps to expanded storage, and physical swaps to auxiliary storage. Refer to the *MVS Initialization and Tuning* publication for discussions on logical and physical swapping and extended storage.

Figure 158 • SWPT line command

```
SWPT RATES    TOTAL PCT    LOGICAL  EFF    EXPANDED EFF  LOG/EXP PCT  AUX STG
+ TERM-OUT     1.17   9     1.15   1.12      .02    .02     1.15  97      .02
+ TERM-IN     10.02  80     9.32   9.30      .70    .65     9.95  99      .07
+ LONGWAIT      .72   6      .62    .45      .20    .20      .65  89      .07
+ DET-WAIT      .65   5      .57    .57      .07    .07      .65 100      .00
+ ALL SWAP    12.58 100    11.68  11.45     1.00    .95    12.40  98      .17
```

Field	Description
TOTAL PCT	The rate of swaps occurring for that swap reason and the percentage of all swaps that occur for that swap reason.
LOGICAL EFF	The rate of logical swaps occurring for that swap reason and the effective rate of logical swaps that were never physically swapped.

Field	Description
EXPANDED EFF	The rate of all swaps sent to expanded storage and the effective rate of swaps sent to expanded storage that were never migrated to auxiliary storage.
LOG/EXP PCT	The effective rate of logical swaps that remained in central storage and the physical swaps sent to expanded storage without being migrated to auxiliary storage, and the percent of total swaps (for that swap reason).
AUX STG	The rate of swaps being sent to auxiliary storage.

Note:

All rates indicate the average number of swaps per second since the last PreAlert MVS sample.

If no swaps occurred for a swap reason, that swap reason is omitted from the display.

The SWPP line command plots swap activity for each swap reason, as shown in Figure 159. Selected fields from the SWPT line command may be plotted.

Figure 159 • SWPP line command

```
.   Plot of the total swap rate for each swap reason
SWPP PLT=20
+ TOTAL SWAPS       ....2....4....6....8...10...12...14...16...18...20
+ TERM-OUT    1.17  ***.|....|....|....|....|....|....|....|....|....|
+ TERM-IN    10.02  *************************....|....|....|....|....|
+ LONGWAIT     .72  **..|....|....|....|....|....|....|....|....|....|
+ DET-WAIT     .65  **..|....|....|....|....|....|....|....|....|....|
+ ALL SWAP   12.58  ******************************...|....|....|....|

.   Plot of the Logical & Expanded Storage effective swap rate
SWPP FLD=L/E,PLT=20
+ LOG/EXP EFF       ....2....4....6....8...10...12...14...16...18...20
+ TERM-OUT    1.15  ***.|....|....|....|....|....|....|....|....|....|
+ TERM-IN     9.95  *************************....|....|....|....|....|
+ LONGWAIT     .65  **..|....|....|....|....|....|....|....|....|....|
+ DET-WAIT     .65  **..|....|....|....|....|....|....|....|....|....|
+ ALL SWAP   12.40  ******************************...|....|....|....|
```

Keyword	Description
FLD=*xxxx*	Specifies the swap activity field to be plotted. Defaults to total swaps. TOT Total swap rate LOG Logical swap rate LOGE Logical swap effective rate EXP Swaps to expanded storage rate EXPE Swaps to expanded storage effective rate L/E Logical swap and expanded storage effective rate AUX Swaps to auxiliary storage rate.
PLT=*nnn*	Specifies the measurement scale for the plots. If the specified scale is less than 50, the scale rounds up to the next multiple of 10. If the scale is greater than 50, it rounds up to the next multiple of 50.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in yellow if color support is active. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in red if color support is active. If color support is not active, the plot highlights. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Swap Reason	Description
TERM-OUT	Terminal output swap — the TSO address space was waiting for output buffers.
TERM-IN	Terminal input swap — the TSO address space was waiting for input buffers.
LONGWAIT	Long wait swap — the address space entered a wait state via a long WAIT SVC, or an STIMER wait occurred for longer than 0.5 seconds.
DET-WAIT	Detect wait swap — the address space has been waiting for longer than the SRM wait time threshold, but had not issued a long wait SVC.
UNILATRL	Unilateral swap — the address space was swapped from a domain whose multi programming level exceeded the target MPL.
EXCHANGE	Exchange on recommendation value swap — the address space was swapped from a domain to allow the swap-in of another address with a lower recommendation value (within the same domain).

Swap Reason	Description
ENQ-EXC	Enqueue exchange swap—the address space was swapped to make room for users enqueued upon a system resource required by other users.
REQUEST	Request swap—the address space was swapped due to a request from the system in response to a configure storage offline command, or a program properties table (PPT) non-swappable indication occurred.
AUX-STOR	Auxiliary storage shortage—the address space acquiring auxiliary storage page slots at the greatest rate is swapped.
REAL-STG	Real (central) storage shortage—the address spaces with the most fixed storage are swapped.
TRANSITN	Transition to non-swappable—an address space was swapped due to a change from swappable to non-swappable.
ALL SWAP	Total for all swap reasons.

Note:

All rates indicate the average number of swaps per second since the last PreAlert MVS sample.

System Rates

The SYSR and SIOR line commands provide a summary of system CPU utilization, input and output rate, and paging rates. These rates represent the activity since the last PreAlert MVS cycle.

Paging rates may vary considerably when updated over an interval of only a few seconds. A long interval between PreAlert MVS cycles should be used to allow the peaks and valleys to be averaged out.

Command	Field	Description
SYSR	CPU	Current CPU utilization percentage
	input and output	Current input and output rate, input and outputs per second
	PPR	Private area and VIO page-in rate
	CPR	Common area page-in rate

Command	Field	Description
	TPR	Total (Private+VIO+Common) page-in rate
SIOR	Input and output RATE	Current input and output rate
	BY TPI	Percentage of input and output interrupts handled by TPI.

A sample display of system rates is shown in Figure 160:

Figure 160 • System rates

```
SYSR CPU: 97.81  I/O: 1236.9    PPR:    1.5   CPR:     .3   TPR    1.8

SIOR I/O RATE: 1236.9     6.37% BY TPI
```

Logical Control Unit Activity

The LCUR line command plots the total input and output activity for all channel paths attached to the physical control units in a logical control unit (LCU), as shown in Figure 161. The line command is available for MVS/XA and MVS/ESA on 3090 class processors only.

Figure 161 • LCUR line command

```
LCUR PLT=500,IOR=50
+ LCU   ALL %  I/O RT ...50..100..150..200..250..300..350..400..450..500
+ 010    0.00      95 **********....|....|....|....|....|....|....|....|
+ 014    0.36     295 ******************************....|....|....|....|
+ 01B    0.76     348 ************************************....|....|....|
+ 01E    0.61     197 ********************....|....|....|....|....|....|
+ 020    0.20      90 *********|....|....|....|....|....|....|....|....|
+ 032    0.00      50 *****....|....|....|....|....|....|....|....|....|
```

The LCUR line command uses these keywords:

Keyword	Description
LCU=*xxx*	Specifies 1 to 8 logical control unit (LCU) names to be selected for display. The LCU names may be masked using an asterisk (*).
IOR=*nnn*	Specifies the input and output rate threshold for selecting LCUs. Only the LCUs with an input and output rate greater than or equal to the threshold is displayed.

Keyword	Description
PLT=*nnn*	Specifies the measurement scale for the plots. The specified scale is rounded up to the next multiple of 50. Default=200.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in yellow if color support is active. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold specifies as a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, the plot displays in red if color support is active. If color support is not active, the plot highlights. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Figure 161 on page 246 displays these fields:

Field	Description
LCU	Logical Control Unit ID. An LCU consists of the devices attached to a physical control unit or up to four physical control units with one or more common devices.
ALL %	The percentage of time when all channel paths attached to the LCU were busy at the same time.
I/O RT	The rate (per second) of input and output requests being completed through the LCU.

Note:

Only the LCUs being monitored by RMF for IOQ activity display. All statistics are derived from the current RMF interval.

Logical Control Unit Queuing

The LCUQ line command reports the information related to input and output queueing on logical control units (LCUs), as shown in Figure 162. When long device pending times are encountered, the LCUQ display can indicate the primary cause of the delay. Device pending times consist of the time waiting for a channel path and control unit and the delay from shared DASD contention. The LCUQ line command is available for MVS/XA and MVS/ESA systems on 3090 class processors only.

Figure 162 • LCUQ line command

```
LCUQ LCU=010,014
+ LCU D  CONT RT  DLY Q  ALL %  CONTROL UNITS   CHP   I/O RT   CU %   CH %
+ 010 D    0.147   0.19   0.00  022              07   25.881   6.85  14.38
+                                               46   21.527  29.52   4.22
+                               023              1E   32.187   5.75  17.18
+                                               5C   16.268  31.42   2.94
+ 014 D    0.190   0.00   0.36  014              14   69.369   3.88  30.46
+                                               59   78.548   2.98  20.26
+                               015              10   69.859   4.02  30.10
+                                               4A   77.706   2.80  19.48
+ 01B D    0.194   0.14   0.76  012              48   81.279   6.86  36.44
+                                               49   92.715   5.45  24.49
+                               013              52   81.874   6.90  36.85
+                                               54   92.740   5.32  23.20
```

The LCUQ line command uses theses keywords:

Keyword	Description
LCU=*xxx*	Specifies 1 to 8 logical control unit (LCU) names to be selected for display. The LCU names may be masked using an asterisk (*).
CUA=*xxx*	Specifies 1 to 8 control unit address (CUA) names to be selected for display. The control unit names may be masked using an asterisk (*). If multiple control units are attached to a channel path, the CU/CHP is any control unit that matches.
CHP=*xx*	Specifies 1 to 8 channel path IDs (CHPIDs) to be selected for display. The CHPIDs may be masked using an asterisk (*).

Keyword	Description
DEV=*x*	Specifies 1 or more device classes to be selected for display. D DASD devices T Tape devices G Graphics devices C Communications devices U Unit Record devices R Character readers * All device classes (default).
IOR=*nnn*	Specifies the channel path input and output rate threshold. The CU/CHP displays if the input and output rate is greater than or equal to the threshold.
CUB=*nnn*	Specifies the control unit busy delay percentage threshold. The CU/CHP displays if the control unit delay percentage is greater than or equal to the threshold.
CHB=*nnn*	Specifies the channel path busy percentage threshold. The CU/CHP displays if the channel path busy percentage is greater than or equal to the threshold.
ACB=*nnn*	Specifies the LCU all-channel-paths-busy percentage threshold. The LCU displays if the all-paths- busy percentage is greater than or equal to the threshold.
CON=*nnn*	Specifies the LCU contention rate threshold. The LCU displays if the contention rate is greater than or equal to the threshold.
DLY=*nnn*	Specifies the LCU delay queue length threshold. The LCU displays if the delay queue length is greater than or equal to the threshold.

Figure 162 on page 248 displays these fields:

Field	Description
LCU	Logical Control Unit ID. An LCU consists of the devices attached to a physical control unit or up to four physical control units with one or more common devices.
D	Device class. Only the LCUs for the device classes being monitored by RMF displays. D DASD devices T Tape devices G Graphics devices

Field	Description	
D	C	Communications devices
	U	Unit Record devices
	R	Character readers
	*	All device classes (default).
CONT RT	The contention rate (per second) of input and output requests being delayed for the LCU.	
DLY Q	The average length (number) of input and output requests delayed on the LCU.	
ALL %	The percentage of time when all channel paths attached to the LCU were busy at the same time.	
CONTROL	Control unit IDs. Up to four physical control units	
UNITS	Associated with the channel paths in the LCU.	
CHP	Channel path ID. Up to four channel paths may be included in a LCU.	
I/O RT	The rate (per second) of input and output requests being completed through the channel paths.	
CU %	For each channel path, the percentage of input and output requests that have been deferred due to the control unit being busy.	
CH %	The percentage of time that the channel path is busy.	

Channel Path Activity

The CHPR and CHPB line commands plot the channel path input and output rate and percentage busy. The input and output rate and percentage busy reflect activity in the current RMF interval.

Figure 163 is a sample channel path activity display:

Figure 163 • Channel path activity

```
CHPB LCU=014
+ CHP LCU    BUSY  I/O RT ...10...20...30...40...50...60...70...80...90..100
+  14 014   30.46      69 ***************....|....|....|....|....|....|....|
+  59 014   20.26      78 **********....|....|....|....|....|....|....|....|
+  10 014   32.96      69 ****************...|....|....|....|....|....|....|
+  4A 014   19.48      77 **********....|....|....|....|....|....|....|....|

CHPR LCU=014
+ CHP LCU    BUSY  I/O RT ...20...40...60...80..100..120..140..160..180..200
+  14 014   30.46      69 *****************..|....|....|....|....|....|....|
+  59 014   20.26      78 ********************....|....|....|....|....|....|
+  10 014   32.96      69 *****************..|....|....|....|....|....|....|
+  4A 014   19.48      77 *******************|....|....|....|....|....|....|
```

CHPR and CHPB line commands use these keywords:

Keyword	Description
LCU=*xxx*	Specifies 1 to 8 logical control unit (LCU) names. The channel paths for the LCUs are selected for display. The LCU names may be masked using an asterisk (*). The selected channel paths display in LCU ID order.
CHP=*xx*	Specifies 1 to 8 channel path IDs (CHPIDs) to be selected for display. The CHPIDs may be masked using an asterisk (*).
IOR=*nnn*	Specifies the channel path input and output rate threshold. The channel path displays if the input and output rate is greater than or equal to the threshold.
CHB=*nnn*	Specifies the channel path busy percentage threshold. The channel path displays if the channel path busy percentage is greater than or equal to the threshold.

Keyword	Description
PLT=*nnn*	Specifies the measurement scale for the plots. The specified scale rounds up to the nearest multiple of 50. The default is 100 for the CHPB command and 200 for the CHPR command.
YEL=*nnn*	Specifies the yellow plot threshold. The yellow plot threshold is a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, and if color support is active, the plot displays in yellow. Default is specified in the userdata UDPARMS macro PLOTYEL keyword.
RED=*nnn*	Specifies the red plot threshold. The red plot threshold is a percentage of the plot measurement scale. When the size of the plot exceeds the yellow threshold, and if color support is active, the plot displays in red. If color support is not active, the plot is highlighted. Default is specified in the userdata UDPARMS macro PLOTRED keyword.

Figure 163 on page 251 displays these fields:

Field	Description
CHP	Channel path ID.
LCU	Logical control unit ID.
BUSY	The percentage of time that the channel path is busy.
I/O RT	The rate (per second) of input and output requests being completed through the channel path.

RMF Status

The RMF line command provides the status of the current RMF sampling interval, as shown in Figure 164. Many of the PreAlert MVS DASD, tape, LCU, CHP ID, page, and swap dataset statistics are obtained from the current RMF interval.

Figure 164 • RMF status

```
RMF  CYCLE TIME =  1.000S   INTERVAL =  10M   COMPLETE =  26.33%
+    RMF VERSION = 4.1.1       START @   8:10:00  90.290
```

Field	Description
CYCLE TIME	The amount of time between RMF data sampling cycles. Measured in seconds.
INTERVAL	The amount of time between RMF reporting intervals. Measured in minutes.
COMPLETE	The percentage of the interval that has been completed.
RMF VERSION	The RMF version number, level number, and modification level number.
START	The time and date the current interval began.

Note:

The second line of the RMF line command displays if the RMF address space is non-swappable and PreAlert MVS is APF authorized.

System Resources Manager

The System Resources Manager (SRM) is the component of the MVS control program that is responsible for determining which active address space should be allowed to use system resources and the rate at which the address space can use these resources. SRM activity in this area is controlled by the installation through three PARMLIB members: IEAIPS*xx*; IEAICS*xx*; and IEAOPT*xx*. For a complete discussion of SRM see the *OS/VS2 MVS Systems Programming Library: Initialization and Tuning Guide.*

Performance Group Table

The PGNT and PGPT line commands display performance group statistics since the last RMF interval. PGPT shows the statistics for each performance group period, as shown in Figure 165. PGNT summarizes all periods in a performance group into a single display.

Figure 165 • PGNT and PGPT line commands

```
PGPT 1,1          RESP  DMN  OBJ   TRAN   SWAP    CPU    I/O    MSO    SRB   TOT
+   PGN  1/  1     5.2    1    3  1.000   .000  4.52K  4.65K  1.46K   .000  10.6K
+   PGN  1/  2   251.3    2    4  10.00  13.00  175.K  51.0K  43.6K  74.00  270.K
+   PGN  1/ALL   228.9  ALL  ALL  11.00  13.00  180.K  55.7K  45.1K  74.00  281.K
```

Field	Description
1,1	Input area for indicating the performance groups for which information displays. 1,1 means that, starting with PGN 1, display 1 performance group.
RESP	Average Response Time
DMN	Domain
OBJ	Objective

Field	Description
TRAN	Transaction count
SWAP	Swap count
CPU	TCB CPU service units
I/O	Input and output service units
MSO	Main Storage service units
SRB	SRB CPU service units
TOT	TOTAL service units.

Domain Descriptor Table

Each active address space is assigned to a domain. Usually a domain represents a distinct type of work. Through domain control, an installation may tailor SRM controls for each type of work. The DMDT line command displays the current status of each domain, as shown in Figure 166.

Figure 166 • DMDT line command

```
DMDT 1,3          MIN MAX TGT CUR    RUA INC NSW GOO OUT  CIDX
+   DOMAIN  1 MPL   1  10   1   0    .0                    0W
+   DOMAIN  2 MPL   0  10   1   1   1.7   1   5       1   20W
+   DOMAIN  3 MPL   1  20   3   2    .8   1               80W
```

Field	Description
1,3	Input area for indicating the domains for which information displays. 1,3 means that, starting with domain 1, display 3 domains.
MIN	Minimum MPL
MAX	Maximum MPL
TGT	Target MPL
CUR	Current MPL
RUA	Ready User Average
INC	Count of In-Core Users
NSW	Count of Non-Swappable Users
GOO	Count of Users Going-Out
OUT	Count of Swapped-Out Users
CIDX	Contention Index
CIDX Control	W - Weighting used
	A - AOBJ specified
	D - DOBJ specified
	F - Fixed workload.

MPL Adjustment

SRM adjusts the MPL levels periodically based on values defined in the IEAOPTxx PARMLIB member. SRM compares the OPT values to averages calculated from values obtained from sampling system resources.

The SRM and RCT line commands display the OPT values and the averages.

Figure 167 is a sample SRM display.

Figure 167 • SRM display

```
SRM  CPU=  46  UIC=  17  DPR=  26  PDT=  23  IPS=DY OPT=WR ICS=WR
+    CPU=10.0  IOC= 5.0  MSO= 3.0  SRB= 0.1
```

LINE 1:

CPU=	Average CPU Utilization
UIC=	Average Unreferenced Interval Count
DPR=	Average Demand Paging Rate
PDT=	Average Page Delay Time
IPS=	IEAIPS Suffix
OPT=	IEAOPT Suffix
ICS=	IEAICS Suffix

LINE 2:

CPU=	TCB CPU Service Coefficient
IOC=	Input and output Service Coefficient
MSO=	Main Storage Service Coefficient
SRB=	SRB CPU Service Coefficient

The RCT line command gives a complete display of the computed values and thresholds used by SRM to determine if an MPL adjustment is needed, as shown in Figure 168.

Figure 168 • RCT line command

```
RCT     FIELD                CURRENT     LOW     HIGH   |      OPT Keyword
+    UNREF INTVL COUNT         240       2        4   |        RCCUICT
+    PAGING RATE                 1       5       50   |        RCCPTRT
+    CPU UTILIZATION           105      98      101   |        RCCCPUT
+    PCT ALL STORAGE FIXED      20      86       92   |        RCCFXTT
+    PCT STG BELOW 16M FIXED    14      92       98   |        RCCFXET
```

Note:

PreAlert MVS highlights any value or combination of values that causes a reduction in the MPL levels.

Logical Swapping Control

SRM uses logical swapping to reduce processor and channel overhead associated with the automatic physical swapping of a TSO user after a terminal wait or swapping of any address space after a long wait or detected wait. When an address space is logically swapped, SRM keeps its frames in real storage instead of moving them to auxiliary storage (disk) as in a physical swap. Once the wait time for a logically swapped address space has exceeded the logical swap think time, the address space is then physically swapped. The logical swap think time is dynamically adjusted in response to thresholds defined in IEAOPT*xx*.

The LSCT line command displays these thresholds and the current value as calculated by SRM, as shown in Figure 169.

Figure 169 • LSCT line command

```
LSCT      FIELD              CURRENT    LOW    HIGH     |     OPT Keyword
+    LOGICAL SWAP THINK TIME    1.0     .0    30.0     |      LSCTMTE
+    UNREF INTVL COUNT *         37     20      30     |      LSCTUCT
+    AVAIL FRAME COUNT           55      0     300     |      LSCTAFQ
+    UTIL PAGING FIXED STG       17     58      66     |       LSCTFTT
+    UTIL AVAIL FIXED STG        17     76      82     |      LSCTFET
```

Note:

PreAlert MVS highlights any value that causes a decrease in the logical swap think time.

CPU, Input and Output, and Storage Load Balancing

SRM uses CPU load balancing to attempt to maintain a dispatchable job mix that neither under-utilizes or over-utilizes the CPU. Input and output load balancing is used similarly for the system's logical channels, and storage load balancing for real storage. When an imbalance of a system resource is detected, SRM adjusts the swap recommendation value for heavy users of that resource. The swap recommendation value adjusts for those heavy users who have Response Throughput Bias (RTB) for the resource turned on in their performance group period.

The CCT, ICT, and MCTS line commands display the thresholds defined in IEAOPT*xx* and the current values calculated by SRM for detecting an imbalance in a system resource, as shown in Figure 170.

Figure 170 • CCT, ICT, and MCTS line commands

```
CCT       FIELD                CURRENT     LOW     HIGH     |    OPT Keyword
+    PROCESSOR UTILIZATION      30.14   85.00   100.00     |     CCCUTT
MCTS      FIELD                CURRENT     LOW     HIGH     |
+    AVAIL FRAME COUNT              0     100      200     |     MCCSBAT
+    UNREF INTVL COUNT             20      10       30     |      MCCSBST
+   UTIL AVAIL FIXED STG        0           76    |    MCCSBSTH    FIELD
CURRENT     LOW     HIGH               |
+    LCH xxx UTILIZATION           15      30       70     |      ICCINT1/2
```

Pageable Storage Control

SRM uses pageable storage control to ensure that enough pageable real storage is available to the system. SRM looks for pageable storage shortages caused by either excessive page fixing or excessive paging input and output. When one of these causes is detected, SRM swaps the largest swappable users of fixed storage until the shortage is relieved.

The MCTP line command displays the thresholds defined in IEAOPT*xx* and the current values calculated by SRM to detect a shortage of pageable real storage, as shown in Figure 171.

Figure 171 • MCTP line command

```
MCTP   PAGEABLE STG CNTL     CURRENT     HIGH    PCT    |    OPT Keyword
+    UTIL PAGING FIXED STG       334     1456     80    |      MCCFXTPR
+    UTIL AVAIL FIXED STG        332     1638     92    |      MCCFXEPR
```

Enqueue Contention

The ENQU line command provides the ability to view the enqueues maintained in the system. Keywords may be used to select enqueues by jobname or ASID, by queue name, or by wait count. The display defaults to dataset enqueue contention, a queue name equal to SYSDSN, and wait count of 1 or more.

Keyword	Function
JNM=*jobname*	Display enqueues for the specified jobname
ASI=ASID	Display enqueues for the specified address space ID
QNM=*queue name*	Display enqueues for the specified queue name
WCT=*n*	Display enqueues with a wait count greater than or equal to *n*.

Default	Description
QNM=SYSDSN,WCT=1	Dataset enqueue contention.

The ENQU display format changes based on the keywords used. For jobname or ASID requests, the display is based on the jobname. For queue name and wait count requests, the display is based on the queue name.

Example:

Jobname Format

```
ENQU JNM=jobname
+   jobname type status scope q-name r-len r-name
```

Queue Name Format

```
ENQU QNM=q-name
+   q-name   scope   r-len r-name
+        jobname type status
```

The fields found in the ENQU Line Command screens, Jobname Format and Queue Name Format, are described as follows:

Field	Description
type	EXC = exclusive
	SHR = shared
status	OWNS = the address space "OWNS" the resource
	WAIT = the address space is waiting for the resource
scope	STEP = enqueue held within the address space only
	SYS = enqueue held throughout the system
	SYSS = enqueue held across multiple systems
q-name	Enqueue queue name
r-len	Length of the resource name
r-name	Enqueue resource name. If the resource name contains any non-display characters, PreAlert MVS automatically generates an additional line to display the resource name in HEX.

Default Display

In the following example, job WERXSHPQ is waiting on a dataset held by WERXSHP.

Example:

```
ENQU
+    SYSDSN   SYS   19 WERXSHP.PREALERT.CNTL
+     WERXSHP SHR OWNS               WERXSHPQ EXC WAIT
```

Selected Jobname

In the following example, job IDMSDC1 is waiting on the resource BATC*xxxx*. PreAlert MVS generated an additional line to display the resource name in HEX.

Example:

```
ENQU JNM=IDMSDC1
+    IDMSDC1 EXC WAIT SYS IDMSCV     8 BATC
+      C2C1E3C3 3021BCCF
```

Selected Queue Name and Wait Count

In the following example, job IDMSDC1 is waiting on the resource BATC*xxxx*. PreAlert MVS generated an additional line to display the resource name in HEX. The resource is owned by job PPIP330R.

Example:

```
ENQU QNM=IDMSCV,WCT=1
+   IDMSCV   SYS    8 BATC
+     PPIP330R EXC OWNS                IDMSDC1 EXC WAIT
```

7 MVS System Services

This chapter includes these sections:

APF List Management 265

Terminate an Address Space 266

Add/Replace LPA Modules 267

Address Space Non-swappable Status. 269

APF List Management

The APFL line command allows an authorized user to dynamically add, list, or delete entries in the Authorized Program Facility APF list without using an IPL. Changes to the APF list through the APFL line command exist in central storage only for the life of the IPL. Sometime before the next IPL, the changes should be reflected in the IEAAPF*xx* member of PARMLIB.

Keyword	Function
DSN=*dsname*	Dataset to be added to the APF list.
VOL=*VOLSER*	VOLSER on which the dataset resides.
LST=*dsname**	Specifies up to the first 8 characters of the dataset names to be listed. (LST=* for all datasets).
SRT=DSN|VOL	Sort the list by dsname or VOLSER, ascending sequence.
SRT<DSN|VOL	Sort, ascending sequence.
SRT>DSN|VOL	Sort, descending sequence.
DEL=*dsname*	Dataset to be deleted from the APF list.

Figure 172 shows examples of how to ADD, DELETE, and LIST APF entries.

Figure 172 • APFL line command

```
.    To ADD APF entries:  DSN=dsname,VOL=volser

APFL DSN=SYS2.IDMSDBAX.LOADLIB,VOL=DBAX02
+   DATASET/VOLSER ADDED TO APF LIST


.    To DELETE APF entries:  DEL=dsname,VOL=volser
APFL DEL=SYS2.IDMSDBAX.LOADLIB,VOL=DBAX02
+   DATASET/VOLSER DELETED FROM APF LIST


.    To LIST APF entries:  LST=dsname* [,SRT=xxx]
APFL LST=SYS2,SRT=DSN
+   DBAP01 SYS2.IDMSDBAP.LOADLIB
+   DBAT01 SYS2.IDMSDBAT.LOADLIB
+   DBAX01 SYS2.IDMSDBAX.LOADLIB
```

"PreAlert MVS Messages" on page 389 describes the messages produced by the APFL line command, should an error occur.

Terminate an Address Space

The KILL line command issues the CALLRTM TYPE=MEMTERM macro to terminate an address space with a System 722 abend. MVS circumvents all task recovery and task resource manager processing when the MEMTERM option is used. This includes all system- and user-established recovery routines, dump processing, and dataset disposition processing.

Use these keywords with the KILL command:

Keyword	Function
JNM=*jobname*	Specifies the jobname of the address space.
ASD=*nnnn*	Specifies the asid of the address space.

Figure 173 is an example of the KILL line command.

Figure 173 • KILL line command

```
.ATH ON
KILL JNM=RAUDABET
+    ADDRESS SPACE TERMINATED
MCON  07.01.00           IEF402I INIT     FAILED - CODE S722 - IN ADDRESS SPACE
MCON   0020
MCON  07.01.00           IEF402I RAUDABET FAILED - CODE S722 - IN ADDRESS SPACE
MCON  0020
MCON  07.01.01 JOB  615  $HASP310 RAUDABET TERMINATED AT END OF MEMORY
MCON  07.01.01 STC   26  $HASP310 INIT     TERMINATED AT END OF MEMORY
MCON  07.01.01           $HASP314    INIT T1 DRAINED  ******** C=T
MCON  07.01.01 STC   26  $HASP250 INIT     IS PURGED
```

In the previous example, the batch job RAUDABET was terminated by the KILL command. Since the KILL command requested memory termination, the batch initiator was terminated also.

"PreAlert MVS Messages" on page 389 describes the messages produced by the KILL line command, should an error occur.

Add/Replace LPA Modules

The LPAM line command allows authorized users to dynamically load new or reload existing modules in the LPA. Modules may be loaded from any authorized load library into either fixed (subpool 228) storage or pageable (subpool 241) storage.

Note:

CSA storage is obtained for loading the module. This does not free the area previously occupied by the module. Excessive reloading of large modules may cause CSA shortages.

Changes made to the LPA with the LPAM line command are in effect only for the life of the IPL. The modules must be copied to SYS1.LPALIB for the changes to be permanent.

All alias entries linked with the load module add or replace in the LPA directory. If an alias name is used, the load module loads along with all aliases.

After the module has been loaded and the LPA directory updated, PreAlert MVS issues a LOAD for the module. The LOAD causes MVS to locate or create a CDE on the ALPAQ (Active LPA Queue) for the module. PreAlert MVS compares the entry points in the CDE against the updated LPA directory. If the entry points do not match, PreAlert MVS updates the CDE for the new module. A warning message is displayed indicating the changes.

The following keywords are used in association with the LPAM line command:

Keyword	Function
MOD=*module name*	Specifies either the load module or alias name to be loaded into the LPA.
FIX=N/Y	Specifies whether the module should be loaded into fixed (Y) or pageable (N) storage. Default is N.
ALQ=Y/N	Specifies whether the ALPAQ reset function should be allowed (Y) or suppressed (N). Default is Y.
DSN=*library name*	Specifies the name of the load library which contains the specified module. Default is SYS1.LPALIB.
VOL=*volser*	Specifies the VOLSER if the library is not catalogued.
UNT=*unit name*	Specifies the unit name if the library is not cataloged. Default is SYSDA.

Figure 174 is a sample of LPAM line command usage:

Figure 174 • LPAM line command

```
.ATH ON
LPAM MOD=SHOPMATH,DSN=SYS2.PREALERT.LINKLIB
+  MODULE:SHOPMATH  EFA=00B48BF8  LPDE=00B85FF0  REPLACED  AMODE=24  RMODE=24
+  *** WARNING: ALPAQ CDE FOR SHOPMATH AT 00FD5940; ENTRY POINT REPLACED
+   ALIAS:SHOPMAT1  EPA=80B48C18  LPDE=00B48C28  ADDED     AMODE=31
```

In the previous example, the module SHOPMATH was reloaded into the LPA from SYS2.PREALERT.LINKLIB. The Link Pack Directory Entry (LPDE) was replaced to reflect the new Entry Point Address (EPA) and to reset the entry point in the ALPAQ CDE. Also, PreAlert MVS added an alias for SHOPMATH that had not been previously loaded in LPA.

"PreAlert MVS Messages" on page 389 describes the messages produced by the LPAM line command, should an error occur.

Address Space Non-swappable Status

The SWPI and SWPN line commands are used to mark an address space non-swappable. The SWPO line command is used to remove the non-swappable attribute. All three line commands schedule an SRB into the target address space.

The SRB then issues a SYSEVENT, as follows:

Line Command	SysEvent	Usage
SWPI	DONTSWAP	Used to mark an address space as non-swappable for a short period of time, usually less than one minute.
SWPN	TRANSWAP	Used to mark an address space as non-swappable for an extended period of time, more than one minute.
SWPO	OKSWAP	Used to remove the non-swappable attribute from an address space. This does not force the address space to be swapped-out. It only allows MVS to swap out the address space.

This keyword and return codes are used in association with the SWPI, SWPO, and SWPN line commands:

Keyword	Function
ASI=*nnn*	Specifies the address space ID for the target address space.

Return Code	Description	
SWPI	0	DONTSWAP completed OK.
	8	DONTSWAP failed, DONTSWAP count reached maximum.
SWPO	0	OKSWAP completed OK.
SWPN	0	TRANSWAP completed OK.
	4	TRANSWAP failed, address space already non-swappable

In Figure 175, the SWPI line command is used to swap in an address space. The message indicates that the SRB completed normally, the return code for the DONTSWAP SYSEVENT was zero, and the DONT SWAP COUNT for the address space had been set to one.

Figure 175 • SWPI line command

```
COMMAND:____________MMVSSWAP  15:22:43.7  93.060   84.23%
JSEL SEL=J,TRN=Y
JOBN DSSGSYD1 POIC502F SLXKPARR LXOGSYDI
ASID       14       15       17       19
JSTA  WAT*SWP  WAT*RES  WAT*SWP  WAT*RES
SWAP DET-WAIT          DET-WAIT
SWCT        5                23
=== ==========================================================================
SWPI ASI=14
+    SWAP IN/OUT SRB COMPLETED, R/C = 0, DONT SWAP COUNT = 1
```

Appendix, "PreAlert MVS Messages," on page 389 describes the messages produced by the SWPI, SWPN, or SWPO line commands, should an error occur.

8 Address Space Wait Analysis

This chapter contains these sections:

Controlling Wait Analysis 274
Starting and Stopping Wait Analysis 274
Selecting, Removing, and Listing Job(s) and Performance Group(s) 275
Displaying Wait Counts 276
Displaying Wait Percents 277
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PreAlert MVS's Wait Analysis shows you the major factors causing an active job to wait when it could be executing in the CPU. Wait Analysis automatically analyzes the various waits that a job may encounter. By periodically sampling the target address space(s), the Wait Analysis routines build a statistical sample of wait reasons. This is then combined with the job(s) actual CPU utilization to produce statistical estimates of the relative impact of each of the wait reasons.

Assume that PreAlert MVS had produced the following Wait Analysis statistics for an online transaction processing system (CICS IDMS-DC), and that the online users were experiencing 4.0 second response time.

CPU utilization	30% * 4.0 = 1.2 secs
Paging	45% * 4.0 = 1.8 secs
Device 341 queued	15% * 4.0 = 0.6 secs
Waiting for CPU	5% * 4.0 = 0.2 secs
Channel 2 busy	5% * 4.0 = 0.2 secs

This shows that paging is the most significant cause of waits; 1.8 seconds of the response time is spent waiting for paging. Some tuning effort with paging may help reduce response time.

Controlling Wait Analysis

Before you start Wait Analysis, the sample time and sample limit values should be reset from their defaults. The WTIM line command resets the sample time from its default of 0.5 secs. The WLIM line command resets the sample limit from its default of 7200 samples. If these are left to their defaults, the Wait Analysis routines automatically stop after approximately one hour (7200 * 0.5 secs).

The line commands and their functions follow:

Command	Function
WTIM 12	Resets the sample time interval to 1.2 seconds.
WLIM 3000	Resets the sample limit to 3000 samples.
WLIM 0	Resets the sample limit to 0. Sample limit checking is bypassed.

Note:

Specifying a sample time greater than 0.5 seconds can cause excessively long wait swapping.

Starting and Stopping Wait Analysis

The WBGN line command is used to start the Wait Analysis data collection routines. Once started, the data collection routine continues to sample the selected address space(s) until either the PreAlert MVS session is terminated, the sample limit is reached, or the WSTP or WSPD line commands are entered. When either the WSPD line command is entered or the sample limit has been reached, data collection is suspended and may be resumed by entering the WBGN line command.

When the WSTP line command is entered, data collection is terminated and all address spaces are removed from Wait Analysis.

Command	Function
WBGN	Start Wait Analysis
WSTP	Stop Wait Analysis
WSPD	Suspend Wait Analysis.

Selecting, Removing, and Listing Job(s) and Performance Group(s)

The WSJB line command followed by the jobname selects that address space for Wait Analysis. The WRJB line command followed by the jobname removes it from Wait Analysis and frees all data collected for it.

The WSPG line command followed by a performance group number selects that performance group for Wait Analysis. All address spaces in the selected performance group summarize into one common Wait Analysis. The WRPG line command followed by the performance group number removes it from Wait Analysis and frees all data collected for it.

WLJB and WLPG line commands display the jobnames and performance group numbers selected for Wait Analysis.

Any number or combination of jobnames and performance group numbers may be selected for Wait Analysis. For example, you can select two batch jobs, a started task, and a TSO performance group for Wait Analysis, all to be analyzed concurrently.

These line commands are used:

Command	Function
WSJB PRODIDMS	Selects PRODIDMS
WRJB PRODIDMS	Removes PRODIDMS
WLJB	Lists all selected jobnames
WSPG 2	Selects performance group number 2
WRPG 2	Removes performance group number 2
WLPG	Lists all selected performance group numbers.

Displaying Wait Counts

WCTJ and WCTP line commands display the top 14 wait counts and CPU usage for the selected jobname and performance group number, as shown in Figure 176. Note that the total of the wait counts may be greater than the sample count since an address space may be waiting for more than one event to occur.

For example, to display Wait Counts for job PRODIDMS, type `WCTJ PRODIDMS` and press Enter. PreAlert MVS displays Figure 176.

Figure 176 • WCTJ and WCTP line commands

```
WCTJ  PRODIDMS      SAMPLES   1640  ELAP=13:40MIN
+      CPU PAGE Q341 CPUW LC02        <<==-- Wait abbreviations
+     30.0 1119  372  130  124        <<==-- CPU pct. / wait counts
```

Displaying Wait Percents

The WPCJ and WPCP line commands display the top 14 wait percents and CPU usage for the selected jobname and performance group number. Note that the total of the wait percents may not add up to 100 due to truncation or rounding errors.

For example, to display Wait Percents for job PRODIDMS, enter `WPCJ PRODIDMS` and PreAlert MVS displays Figure 177.

Figure 177 • WPCJ and WPCP line commands

```
WPCJ  PRODIDMS      SAMPLES   1640  ELAP=13:40MIN
+      CPU PAGE Q341 CPUW LC02        <<==-- Wait abbreviations
+     30.0 45.0 15.0  5.0  5.0        <<==-- CPU / wait percents
```

Displaying Wait Plots

The WPLJ and WPLP line commands plot the wait percentages for the specified jobname or performance group number. The CPU usage is always plotted first, followed by the wait percentages in descending order. PreAlert MVS plots the wait percentages that exceed the threshold entered in the WPCT line command. The plot threshold default is 30%.

To specify the plot threshold enter:

`WPCT 10` Set plot threshold to 10%

To plot wait percentages for job PRODIDMS, enter `WPLJ PRODIDMS` and PreAlert MVS displays Figure 178.

Figure 178 • WPLJ and WPLP line commands

```
WPLJ  PRODIDMS      SAMPLES 1640   ELAP=13:40MIN
+    CPU          30.0%  ***************.... .... .... .... .....
+    PAGE  1119   45.0%  **********************. .... .... .....
+    Q341   372   15.0%  *******.. .... .... .... .... .... .....
```

In Figure 178, percentages less than 10% are not displayed since the plot threshold is set at 10%.

Wait Abbreviations

Wait abbreviations are described in the following list:

Miscellaneous Waits	Description
CPUW	Waiting for CPU
PAGE	Private area page-in
ECBW	Voluntary wait on an ECB
PGCM	Common area page-in
STIM	STIMER wait

Miscellaneous Waits	Description
LOCK	Waiting for a LOCK
NACT	No active ASID for jobname or PGN
TMNT	Waiting for Tape Mount

Swap Reason Waits	Description
SWTO	Terminal output swap
SWTI	Terminal input swap
SWLW	Long wait swap
SWAS	Auxiliary storage shortage
SWRS	Real storage shortage
SWDW	Detected wait swap
SWRQ	Requested swap
SWEQ	Enqueue-exchange swap
SWEX	Exchange swap
SWUL	Unilateral swap
SWTR	Transition swap
LGSW	Logically swapped
SWIN	Waiting for swap-in

Device/Channel Waits	Description
cua	Input and output active on device *cua*
LC*nn*	Input and output queued on logical channel *nn*
Q*cua*	Input and output queued on device *cua*
Q*cu*U	Input and output queued on control unit *cuu*.

Wait Analysis Command Summary

Wait analysis commands are summarized in the list that follows.

Command	Description
WBGN	Start Wait Analysis
WSTP	Stop Wait Analysis
WSPD	Suspend Wait Analysis
WLIM	Set Sample Limit
WTIM	Set Sample Interval
WSJB	Select Jobname
WRJB	Remove Jobname
WLJB	List Jobname(s)
WSPG	Select Performance Group No.
WRPG	Remove Performance Group No.
WLPG	List Performance Group No(s).
WCTJ	Display Wait Counts for Jobname
WCTP	Display Wait Counts for Performance Group
WPCJ	Display Wait Percentages for Jobname
WPCP	Display Wait Percentages for Performance Group
WPLJ	Display Wait Plot for Jobname
WPLP	Display Wait Plot for Performance Group
WPCT	Set Plot Threshold Percent.

Example Wait Analysis

To start PreAlert MVS Wait Analysis functionality, key the screen name `WAIT` in the command input area and press Enter. The screen displays as shown in Figure 179.

Figure 179 • PreAlert MVS Wait Analysis

```
COMMAND:________ WAIT       14:59:53.4  93.060  79.43%  .TUT For Tutorial
.ASL 001,WAIT1
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   46:38M    5:36M    2:14H   59:05M   2:19H
=== ==========================================================================
WBGN WAIT ANALYSIS STARTED
WTIM                WAIT ANALYSIS SAMPLE PERIOD =   1.0 SECONDS
WLIM                WAIT ANALYSIS SAMPLE LIMIT =  7200   LEFT=  7200
WPCT                PLOT THRESHOLD SET TO   5%
```

In the example, four Wait Analysis line commands have been used:

Command	Description
WBGN	Starts the Wait Analysis data collector sub-task.
WTIM	Specifies the Wait Analysis sample period with a 1.0 second interval between samples.
WLIM	Specifies the Wait Analysis sample limit. In this example, Wait Analysis suspends after 7200 samples.
WPCT	Specifies the Wait Analysis plot threshold as 5%.

The Automatic Screen Chaining facility (.ASL) is also specified on the WAIT screen. The WAIT1 screen displays when the Enter key is pressed.

Pressing Enter displays the second Wait Analysis screen, WAIT1, Figure 180.

Figure 180 • WAITI screen

```
COMMAND:________WAIT1      15:00:03.4  93.060  80.03%  .TUT For Tutorial
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   46:48M    5:46M    2:14H   59:15M   2:19H
==== ========================================================
WSJB                 ENTER JOB NAME
WCTJ                 ENTER JOB NAME
WPCJ                 ENTER JOB NAME
WPLJ                 ENTER JOB NAME
```

In this example, four additional Wait Analysis line commands are introduced:

Command	Description
WSJB	Allows entry of jobnames to be selected for analysis.
WCTJ	Lists the sample counts for the top 14 wait reasons for the specified jobname.
WPCJ	Lists the wait percents for the top 14 wait reasons for the specified jobname.
WPLJ	Plots the wait percents for the specified jobname. Only those percents that are greater than the plot threshold are displayed.

The desired jobname (PRODIDMS) is entered in the input area following the WSJB line command. This selects the job PRODIDMS for analysis and requests the wait reasons for the job to be displayed.

After pressing Enter, the Wait Analysis data collector starts the analysis for the job.

The display is refreshed as shown in Figure 181.

Figure 181 • Refreshed WAIT1 screen

```
COMMAND:________ WAIT1      15:00:09.1  93.060  83.86%   .TUT For Tutorial
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   46:54M    5:51M    2:14H   59:20M   2:19H
=== ==========================================================================
WSJB                 JOB PRODIDMS SELECTED
WCTJ PRODIDMS      SAMPLES    0   ELAPS     .00SEC
+     CPU
+       .0
WPCJ PRODIDMS      SAMPLES    0   ELAPS     .00SEC
+     CPU
+       .0
WPLJ PRODIDMS      SAMPLES    0   ELAPS     .00SEC
+     CPU            .0%   .... .... .... .... .... .... .... .... .... ....
```

Since PRODIDMS has just been selected, no samples have yet been taken for this job. At this point, Wait Analysis begins accumulating statistics on the various conditions that may have caused the job to wait. The data collector runs as a sub-task to PreAlert MVS, thus allowing it to continue sampling without requiring any user intervention. This allows the use of other PreAlert MVS functions independent of Wait Analysis. Multiple Wait Analyses can be performed concurrently.

After waiting about a minute or so to allow the Wait Analysis to collect samples, press Enter. PreAlert MVS displays the wait reasons accumulated so far for the job PRODIDMS, as shown Figure 182.

Figure 182 • Wait analysis results for job PRODIDMS

```
COMMAND:________ WAIT1      15:01:09.5  93.060  83.86%  .TUT For Tutorial
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   47:54M    6:52M    2:15H    1:00H   2:20H
=== ==========================================================================
WSJB                 ENTER JOB NAME
WCTJ PRODIDMS      SAMPLES   60   ELAPS   59.82SEC
+     CPU  STIM  246 PAGE CPUW  344  24B  445  444  14E  14C  146
+     48.2   60   48   41   36   11    6    3    1    1    1    1
WPCJ PRODIDMS      SAMPLES   60   ELAPS   59.82SEC
+     CPU  STIM  246 PAGE CPUW  344  24B  445  444  14E  14C  146
+     48.2 14.8 11.9 10.1  8.9  2.7  1.4   .7   .2   .2   .2   .2
WPLJ PRODIDMS      SAMPLES   60   ELAPS   59.82SEC
+    CPU          48.2%   ************************ .... .... .... .... ....
+    STIM    60   14.8%   *******.. .... .... .... .... .... .... .... ....
+     246    48   11.9%   ******... .... .... .... .... .... .... .... ....
+    PAGE    41   10.1%   *****.... .... .... .... .... .... .... .... ....
+    CPUW    36    8.9%   **** .... .... .... .... .... .... .... .... ....
```

In each of the 60 samples taken in the past minute, Wait Analysis examined the system and looked for activities that may have caused PRODIDMS to have to wait for their completion. Typically, Wait Analysis finds a single wait reason for a job in any one sample. The exceptions to this are jobs that use multi tasking. In these jobs (such as the job in this example), Wait Analysis frequently finds multiple wait reasons in one sample.

In the past minute, Wait Analysis has found 60 occurrences of an STIMER wait (STIM) accountable to the job. Also, there have been 48 occurrences where the job had an input and output active on 246 (246), 41 occurrences of the job waiting on a page-in operation (PAGE), 36 occurrences of the job waiting for CPU resources (CPUW), etc.

The wait percentages represent the percentage of time that the job has been waiting on the individual wait reason. Thus, the total for all wait reasons equals the percentage of time during which the job has not been using the CPU.

For example, the wait percentage for input and outputs on 246 (for Figure 182 on page 284) is calculated as follows:

WAIT PERCENTAGE= (100 - CPU%) * (COUNT / TOTAL COUNT)
= (100 - 48.2) * (48 / 209)
= (51.8) * (.229)
= 11.9%

After waiting another two minutes, press Enter. The screen displays as shown in Figure 183.

Figure 183 • Wait analysis results

```
COMMAND:________ WAIT1      15:03:10.3  93.060  83.86%  .TUT For Tutorial
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   49:55M    8:53M    2:17H    1:02H   2:22H
==== ======================================================================
WSJB                 ENTER JOB NAME
WCTJ PRODIDMS      SAMPLES  180   ELAPS    3:00MIN
+     CPU  STIM  246 PAGE CPUW  344  24B  14C  444  445  14E  146 LC02
+     48.6  180  136  114  105   35   12    7    6    5    2    2    1
WPCJ PRODIDMS      SAMPLES  180   ELAPS    3:00MIN
+     CPU  STIM  246 PAGE CPUW  344  24B  14C  444  445  14E  146 LC02
+     48.6 15.2 11.5  9.6  8.9  2.9  1.0   .5   .5   .4   .1   .1   .0
WPLJ PRODIDMS      SAMPLES  180   ELAPS    3:00MIN
+    CPU          48.6%   *************************.... .... .... .... ....
+    STIM   180   15.2%   ********. .... .... .... .... .... .... .... ....
+     246   136   11.5%   *****.... .... .... .... .... .... .... .... ....
+    PAGE   114    9.6%   *****.... .... .... .... .... .... .... .... ....
+    CPUW   105    8.9%   **** .... .... .... .... .... .... .... .... ....
WSTP
```

The percentages for the top four wait reasons have changed very little from the previous display. This implies a consistent workload being applied to the job.

Also, another Wait Analysis line command (WSTP) has been entered in one of the blank lines at the bottom of the screen. The WSTP line command terminates Wait Analysis the next time you press Enter.

After another two minutes, press Enter. Figure 184 display.

Figure 184 • Wait analysis results

```
COMMAND:________ WAIT1      15:05:11.2  93.060  83.86%  .TUT For Tutorial
JSEL SEL=J
JOBN OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
PROC OPD270D  MFD010D  MPR290D  MKW040D  PRODIDMS
STEP S010B    S050B    S010B    S040B    IDMS
JSTA  CPU*RES  I/O*RES  CPU SWP  I/O*RES  CPU*RES
DPRT  9A(154)  AA(170)  9A(154)  9A(154)  AE(174)
TMTR   51:56M   10:53M    2:19H    1:04H   2:24H
==============================================================================
WSJB                 ENTER JOB NAME
WCTJ PRODIDMS      SAMPLES  301   ELAPS    5:01MIN
+     CPU  STIM PAGE  246 CPUW  344  24B  442  14C  445  444  14E  146  343
+     50.5  301  194  182  152   56   14   11    9    8    7    6    5    4
WPCJ PRODIDMS      SAMPLES  301   ELAPS    5:01MIN
+     CPU  STIM PAGE  246 CPUW  344  24B  442  14C  445  444  14E  146  343
+     50.5 15.6 10.0  9.4  7.9  2.9   .7   .5   .4   .4   .3   .3   .2   .2
WPLJ PRODIDMS      SAMPLES  301   ELAPS    5:01MIN
+    CPU          50.5%   *************************.... .... .... .... ....
+    STIM   301   15.6%   ********. .... .... .... .... .... .... .... ....
+    PAGE   194   10.0%   *****.... .... .... .... .... .... .... .... ....
+     246   182    9.4%   *****.... .... .... .... .... .... .... .... ....
+    CPUW   152    7.9%   **** .... .... .... .... .... .... .... .... ....
WSTP WAIT ANALYSIS STOPPED
```

In this display, there has been some change in the ranking of the top wait reasons. The wait percentage for paging has changed very little, but the percentage for input and output on 246 has dropped. This implies that the demand for input and output on 246 has decreased.

Also, the last line of the display (WSTP) has terminated Wait Analysis processing. This stops the data collector subtask, and frees all data collected.

Example Wait Analysis - Summary and Conclusions

From the previous analysis, four areas have been found that may warrant additional investigation and possibly some tuning effort.

- STIM 15.6% - STIMER waits along with ECB waits typically indicate that the job has nothing to do. It is waiting for some event to be posted, signaling that there is some work for that job to perform.
- PAGE 10.0% - private area page-in waits indicate a shortage of main memory available to the job. Several possible solutions exist: reduce paging; add main memory; use storage isolation to ensure a minimum amount of storage available to the job; or adjust the SRM tuning parameters to swap out more jobs when paging increases.

Paging is also particularly degrading to multi tasked transaction processing systems. When a page fault occurs, the entire address space--not just the offending task--must wait until page resolution. A common cause of this is the use of extremely large input and output buffers, intended to reduce input and output activity. When large input and output buffers are used for infrequently referenced data, the buffer may be paged-out due to lack of use. Thus, when the data is referenced by a task, the entire address space may have to wait for the data to be paged-in.

The solution to this would be to reduce the buffer size to the point where it remains paged-in. This may cause the task to wait for an input and output to retrieve the data, but then the other tasks in the address space could continue to execute while the original task is waiting for the input and output to complete.

- 246 9.4% - waits on input and output require additional investigation to determine if any tuning may be performed. In this example, there are no instances where Wait Analysis detected input and output(s) queued on 246 (Q246). This implies that the job was probably the only user of the device and was passing data serially. In this case, about the only solution would be to move the data to a faster device.

  If a significant amount of input and outputs queued on either the device, control unit, or channel, this would indicate some input and output contention. In this case, it would be advisable to locate the cause of the contention and possibly move the data or adjust the job mix to more effectively balance the demand on input and output.

- CPUW 7.9% - CPU waits are difficult to diagnose. Quite frequently this may be overstated because the Wait Analysis has been run at a dispatching priority higher than the job being analyzed. Also the inverse may be true when the analysis is run at a lower priority. In this case, Wait Analysis would only be able to execute when the job is not ready to execute. Consequently Wait Analysis would never detect any CPU waits that may have been caused by some other job.

Note:

Wait Analysis also records the swap activity of the jobs being analyzed. Swapping is invoked by SRM to control system-wide performance aspects and to exercise control of domains and the competition for resources between address spaces within the domain. Refer to *MVS/ESA SPL: Initialization and Tuning Guide* for more details on the swap reasons.

9 MVS Exception Analysis

PreAlert MVS Exception Analysis provides a means of automatically locating potential performance problems.

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SQA Usage Exception 316
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Free Low SQA Exception 317
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Unowned SQA Exception 319
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MVS Exception Analysis is comprised of:

- MVS System Exception Analysis to monitor resources related to the overall performance of the operating system.
- MVS Address Space Exception Analysis to monitor the resource utilization by individual address spaces.
- MVS DASD Exception Analysis to monitor individual disk device activity.

PreAlert MVS's MVS Exception Analysis monitors many variables within the MVS operating system. The analysis of each variable is controlled by a threshold keyword in a System Exception Definition. A single System Exception Definition may contain any number of threshold keywords, with each individual keyword appearing only once. Also, a particular threshold may appear in any number of exception definitions.

PreAlert MVS watches for a set of conditions defined in an Exception Definition. When these conditions are met, PreAlert MVS considers the exception to have occurred.

The exception definition defines the exception conditions to PreAlert MVS, such as CPU utilization greater than 50 percent, tape mount wait time greater than 15 minutes. Each area of MVS Exception Analysis, system, address space, and DASD, has its own type of exception definitions. These exception definitions contain a set of exception conditions, called thresholds, which are unique to the type of definition.

Additional keywords are available to control the exception definition and to specify the actions to be taken when the exception occurs.

Each exception definition contains a number of options relating to how often the exception may occur, how long the condition must exist, how many times the exception may occur, etc.

In addition to displaying an exception message, the exception definition may specify some action to be taken when the exception occurs. Such actions may be: displaying an additional screen; sending a message to the console or a TSO user; issuing an MVS command; logging system statistics; and more.

The exception definitions are specified through the MVS exception definition macros which are assembled and linked to form an exception level set. Although multiple level sets may be built, only a single level set may be loaded into PreAlert MVS.

An exception level set must be loaded to activate MVS Exception Analysis. The level set contains predefined exception definitions to identify the conditions to be monitored. Spare exception definitions may also be included to allow additional exceptions to be defined during the PreAlert MVS session.

The exception level set may be loaded using the EXAS line command described in the subsection below. The level set may also be loaded automatically by PreAlert MVS. Refer to "UDEXAL - MVS Exception Analysis Default Level Sets" in the *ASG-PreAlert IDMS/MVS Systems Guide*.

Controlling MVS Exception Analysis

These line commands are used to control MVS Exception Analysis:

Command	Function
EXAS	Activate MVS Exception Analysis
EXAL	List exception level set
EXAD	Display exception messages.

EXAS - Activate MVS Exception Analysis

The EXAS line command specifies the name of the MVS exception level set to be loaded. The EXAS line command may also activate or terminate the different areas of exception analysis and specify the default options for statistics logging and message handling.

A level set must be loaded to activate MVS Exception Analysis. Although only one level set may be loaded at a time, a new level set may be loaded through the EXAS line command at any time.

A default exception level set may be assigned through the userdata UDEXAL macro. The default level sets are assigned by the user ID and MVS system ID. PreAlert MVS automatically loads the default level set when the PreAlert MVS interface is initialized.

A sample level set (LVL=99) has been included with PreAlert MVS. The level set includes 20 spare system exception definitions, 20 spare task exception definitions, and 10 spare DASD exception definitions with all exception areas activated.

Keyword	Function
LVL=*xx*	Specifies exception level set name
RLD=*xx*	Reloads current level set name
SYS=ON|OFF	Activates/Terminates MVS System Exception Analysis
TSK=ON|OFF	Activates/Terminates Address Space (task) Exception Analysis
DSK=ON|OFF	Activates/Terminates DASD Exception Analysis
MSG=N|Y|S|D	Specifies Message Display options N Never display MVS exception messages Y Always display MVS exception messages S Display MVS exception messages during screen chaining only D Display MVS exception messages during normal processing only, not during screen chaining
MIN=*nnn*	Specifies minimum priority for exception messages to be displayed
MAX=*nnn*	Specifies maximum priority for exception messages to be displayed
LOG=*xxx*	Specifies default logging options. See "MVS Exception Analysis Logging Option" on page 359.

Figure 185 shows an example level set display:

Figure 185 • Level set display

```
EXAS LVL=99
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=
EXAL LVL=99  SYS=ON  CNT=20  TSK=ON  EXAL CNT=20  DSK=ON  CNT=10
```

In this example, the EXAS line command was used to load the default exception level set, LVL=99.

The status of each area (system, task, and DASD) displays as follows:

Status	Description
ON	Exception analysis active for the area.
OFF	Exception analysis terminated for the area.
PEND	Exception analysis pending for the area is active with the next PreAlert MVS cycle.
TERM	Exception analysis terminating for the area is terminated with the next PreAlert MVS cycle.

All control changes to MVS Exception Analysis are delayed through one cycle of PreAlert MVS. This occurs since PreAlert MVS first performs data collection and analysis, and then processes the line commands. MVS Exception Analysis occurs in the data collection phase, and then processes the line commands used for control.

EXAL - List MVS Exception Level Set

The EXAL line command displays a condensed listing of the loaded MVS Exception Level Set, as shown in Figure 186. The threshold keywords for all non-spare exception definitions are listed. Spare exception definitions are not listed.

Figure 186 • EXAL line command

```
EXAS
+   LVL=99           SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                    MIN=   0 MAX= 255 LOG=
EXAL LVL=99  SYS=ON  CNT=20  TSK=ON  CNT=20  DSK=ON  CNT=10
+ SYS: EXA=1  SET=ON  CPU>99
+      EXA=2  SET=ON  TPM>1800
+ TSK: EXA=1  JNM=IDMS*     SET=ON  CPU>15  IOR<1
+      EXA=2  JNM=IDMSJRN*  SET=OFF
+ DSK: EXA=1  VOL=DBAX*   SET=ON  RTM>100
+      EXA=2  VOL=DBAX80  SET=OFF
```

The first line of EXAL shows the name (LVL=99) of the loaded level set, the number of exception definitions, and the status of each area followed by the condensed display of the exception definitions.

EXAD - Display MVS Exception Messages

The EXAD line command displays all MVS Exception Messages, as shown in Figure 187. Once MVS Exception Analysis has been activated, EXAD is the only line command needed for PreAlert MVS to perform MVS Exception Analysis and display the exception messages.

Figure 187 • EXAD line command

```
EXAD *** IDMSDC3 POSSIBLE CPU LOOP, CPX=86.22%, I/O=.1 (T1) ***
+    *** 481 MOUNT WAIT TIME 16:34M (S2) ***
JSEL JNM=IDMS*,SRT=JOBN
JOBN IDMSDC1  IDMSDC2  IDMSDC3  IDMSDC4  IDMSJRN2
CPUR   46.37%   12.11%   86.22%    0.31%    0.00%
IORT     47.3     13.2       .1       .0       .0
WAIT                                       16:34M

TSEL MNT=Y
TAPE     481
TVOL   *MOUNT
TUSR IDMSJRN2
TMNT   16:34M
```

In the example, two exceptions were found. The first indicates a possible CPU loop condition on IDMSDC3, where the CPU rate was high and the input and output rate was low. The second message indicates a missed tape mount. The tape mount for IDMSJRN2 on 481 has been outstanding for over 16 minutes.

The codes (in parentheses) following the exception message indicate the exception definition that detected the exception. The first character is S for System exception definitions, T for Task (address space) exception definitions, or D for DASD exception definitions. The number indicates the exception definition number.

MVS System Exception Analysis

PreAlert MVS's MVS Exception Analysis monitors many variables within the MVS operating system. The analysis of each variable is controlled through a threshold keyword in a System Exception Definition. A single System Exception Definition may contain any number of threshold keywords with each individual keyword appearing only once. Also, a particular threshold may appear in any number of exception definitions.

Additional keywords are available to control the exception definition and to specify the actions to be taken when the exception occurs.

A number of spare system exception definitions must be included when the exception level set is initially built (through the EXAINIT macro). The system exception definitions may be predefined with the EXASYS macro, or may be dynamically modified using the XVSY line command. The EXAINIT and EXASYS macros are described in "MVS Exception Analysis Macros" on page 372. The XVSY line command is described in "XVSY - Vary MVS System Exception Definitions" on page 299.

XDSY - Display MVS System Exception Definitions

The XDSY line command displays MVS System Exception Definitions. The display defaults to all non-spare system exception definitions. Keywords may be used to display any or all system exception definitions.

Keyword	Function
SET=ON|OFF	Display Active or terminated system exception definitions
EXA=*nnn,nnn,...*	Display the specified system exception definitions
SPR=Y	Display spare system exception definitions.

Figure 188 shows an example XDSY line command display:

Figure 188 • XDSY line command

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=

XDSY
EXA=1,2,3
+   EXA=1  SET=ON  PRI=51  TDL=15  CPU>99
+   EXA=2  SET=ON  PRI=50  TPM>1800
+   EXA=3  SPR=Y
```

In Figure 188, the XDSY line command displays System Exception Definitions 1, 2, and 3 in response to the EXA keyword. The first two exception definitions represent working definitions; the third is a spare exception definition that may be built using the XVSY line command.

XVSY - Vary MVS System Exception Definitions

The XVSY line command is used to modify System Exceptions Definitions. The EXA= keyword specifies the exception definitions to be modified. If multiple definitions are specified, the changes propagates through all specified exception definitions.

Changes made using the XVSY line command are made to the currently loaded level set only. The changes are temporary and are lost when a level set is loaded or the PreAlert MVS session is terminated.

Only the keywords and a brief description are listed here. Refer to the indicated section later in this chapter for additional information.

Keyword	Function
EXA=*nnn,nnn,...*	Exception definition number(s)
SET=ON|OFF	Activate/terminate the exception definitions
SPR=Y|N	Alter to spare exception definition.

EXCEPTION THRESHOLDS - See "MVS System Exception Thresholds" on page 305.

Keyword		Exception
CPU>*nnn*	CPU<*nnn*	CPU utilization (from SYSR line command)
CPO>*nnn*	CPO<*nnn*	MVS CPU overhead
PGR>*nnn*	PGR<*nnn*	Paging rate (from SYSR line command)
IOR>*nnn*	IOR<*nnn*	Input and output rate (from SIOR line command)
TPI>*nnn*	TPI<*nnn*	Percent input and output handled by TPI instruction
ASE>*nnn*	ASE<*nnn*	ASM local slot error count
ASQ>*nnn*	ASQ<*nnn*	ASM IOQ length
ASL>*nnn*	ASL<*nnn*	ASM slots left percent
ASN>*nnn*	ASN<*nnn*	ASM non-VIO slot usage percent
ASV>*nnn*	ASV<*nnn*	ASM VIO slot usage percent
PDE=Y|N		Any page dataset errors
PDF=Y|N		Any page dataset failure
SDE=Y|N		Any swap dataset errors
SDF=Y|N		Any swap dataset failure
SRM=Y|N		SRM reducing MPL
SRC>*nnn*	SRC<*nnn*	SRM average CPU rate
SRA>*nnn*	SRA<*nnn*	SRM ASM IOQ length
SRD>*nnn*	SRD<*nnn*	SRM demand paging rate
SRU>*nnn*	SRU<*nnn*	SRM unreferenced interval count (UIC)
SRP>*nnn*	SRP<*nnn*	SRM page rate

Keyword		Exception
SRT>.*nnn*	SRT<.*nnn*	SRM page delay time
DMN=Y|N		Any domain overload.
OPW>*nnn*	OPW<*nnn*	Operator WTO buffer usage percent
OPR>*nnn*	OPR<*nnn*	Outstanding operator reply count
STG>*nnn*	STG<*nnn*	Main (central) storage usage percent
CSA>*nnn*	CSA<*nnn*	CSA usage percent
SQA>*nnn*	SQA<*nnn*	SQA usage percent
FCS>*nnn*	FCS<*nnn*	Free CSA storage above and below 16MB (K bytes)
FCB>*nnn*	FCB<*nnn*	Free CSA storage below 16MB (K bytes)
FSQ>*nnn*	FSQ<*nnn*	Free SQA storage above and below 16MB (K bytes)
FSB>*nnn*	FSB<*nnn*	Free SQA storage below 16MB (K bytes)
UCS>*nnn*	UCS<*nnn*	Unowned CSA storage above and below 16MB (K bytes)
UCB>*nnn*	UCB<*nnn*	Unowned CSA storage below 16MB (K bytes)
USQ>*nnn*	USQ<*nnn*	Unowned SQA storage above and below 16MB (K bytes)
USB>*nnn*	USB<*nnn*	Unowned SQA storage below 16MB (K bytes)
CTF=Y|N		CSA tracking failure
STF=Y|N		SQA tracking failure
EMA>*nnn*	EMA<*nnn*	Extended storage migration age
ESW>*nnn*	ESW<*nnn*	Extended storage write rate
ESR>*nnn*	ESR<nnn	Extended storage read rate
ESM>*nnn*	ESM<*nnn*	Extended storage migration rate
SWR>*nnn*	SWR<*nnn*	Total swap rate (all swaps)
SWE>*nnn*	SWE<*nnn*	Logical or expanded swap effective percent
TPM>*nnn*	TPM<*nnn*	Any tape mount waiting time
LIO<*nnn*	LIO<*nnn*	Any LCU input and output rate
LCB>*nnn*	LCB<*nnn*	Any LCU all channel busy percent

Keyword	Exception
RMF=Y/N	RMF active
MIS=*jobname*	Missing task analysis.
ENQ=*queue-name*	Enqueue contention

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword		Function
TOD>*hhmm*	TOD<*hhmm*	Time of day range, lower limit
TOD<*hhmm*	TOD>*hhmm*	Time of day range, upper limit
TIN=*nnn*		Time interval, seconds
DLY=*nnn*		Exception delay count
TDL=*nnn*		Exception delay time, seconds
LIM=*nnn*		Exception limit count
LMX=*nnn*		Exception limit-x count
TLM=*nnn*		Time of day limit count
PRI=*nnn*		Exception priority, 1-255
AND=Y|N		Request AND logic for exception thresholds
SND=Y|N		Activate/terminate terminal sound.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOG=*xxx*	Exception logging options.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify a four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG='*message*'	User specified exception message
USR='*userids list*'	Sends message to TSO user IDs list
USO=L|N	User send option, LOGON or NOW
CON=Y|N	Sends message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes; 2, 7, or 11 only
CLR=*x*	Specifies exception message color.

SCREEN OPTIONS - See on page "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Requests screen print
SCR=*screen name*	Requests screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Requests freeze frame with screen chaining.

COMMAND OPTIONS - See "MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD='*command*'	Issues command, command image
JOB=*member*	Submits job, member name
CDL=*nnn*	Commands delay count
CLM=*nnn*	Commands limit count.

In Figure 189, system exception definition number 3 has been added to watch for SQA overflowing into CSA when the SQA usage exceeds 100% of its allocation. Additionally, the limit-x count is set to limit the number of messages generated when the allocation creeps over 100%.

Figure 189 • XVSY line command

```
EXAS
+   LVL=99           SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                    MIN=   0 MAX= 255 LOG=

XVSY EXA=3,SET=ON,SQA>100,PRI=100,MSG='SQA OVERFLOWING INTO CSA',LMX=2
+   EXA=3  SET=ON  PRI=100  LMX=2  SQA>100  MSG='SQA OVERFLOWING INTO CSA'

XDSY
+   EXA=1  SET=ON  PRI=51  TDL=15  CPU>99
+   EXA=2  SET=ON  PRI=50  TPM>1800
+   EXA=3  SET=ON  PRI=100  LMX=2  SQA>100  MSG='SQA OVERFLOWING INTO CSA'
```

MVS System Exception Thresholds

These sections describe the various types of MVS System Exception Thresholds:

CPU Utilization Exception

Exception Keywords	CPU>*nnn* or CPU<*nnn*
Default Message	CURRENT CPU UTILIZATION = *nnn.nn*%
Message Number	PAEXA125
Text Keyword	&CPUR

MVS Exception Analysis uses the CPU utilization figure from the SYSR line command for this exception threshold. This figure represents the average CPU utilization for all processors in the system. It never exceeds 100%, regardless of the number of processors on the system. For example, on a 3090-600 with 6 processors, a value of 90% would indicate that average utilization across all 6 processors is 90%; a value of 100% indicates that all 6 processors are saturated.

On single processor systems, an exception definition with a high CPU utilization and a low input and output rate may be used to indicate a possible CPU loop condition. On multi-processor systems, MVS Address Space Exception Analysis should be used to detect CPU loops.

MVS CPU Overhead Exception

Exception Keywords	CPO>*nnn* or CPO<*nnn*
Default Message	MVS CPU OVERHEAD=*nnn.nn*%
Message Number	PAEXA139
Text Keyword	&CPUO

The MVS CPU overhead has met or exceeded the exception threshold. PreAlert calculates the MVS CPU overhead as the MVS CPU utilization less the total of TCB and SRB CPU time for all address spaces active at the end of the PreAlert cycle. Essentially, the MVS CPU overhead value represents the unaccounted CPU time. Refer to the "MVS/ESA SP V5 System management Facilities (SMF)" for a description of TCB and SRB times.

When address spaces or batch jobs terminate during a PreAlert cycle, the CPU time for those will be in the CPU overhead value since their statistics are no longer available to PreAlert. That is, if PreAlert is in a 30 second Auto-update interval, and a batch job terminates after 25 seconds in that interval, the CPU time statistics for that batch job within those 25 seconds would not be available to PreAlert. So that CPU time would be included in the MVS CPU overhead value.

Exception definitions using the MVS CPU overhead should include the DLY= or TDL= keywords to eliminate exceptions created when an occasional spike occurs in the CPU overhead.

Paging Rate Exception

Exception Keywords	PGR>*nnn* or PGR<*nnn*
Default Message	CURRENT PAGING RATE = *nnn.n*
Message Number	PAEXA127
Text Keyword	&PGRT

MVS Exception Analysis uses the total paging rate from the SYSR line command for the exception threshold. This rate is the total number of non-swap page-ins per second for the private area, VIO datasets, and system areas.

When using the paging rate threshold, an exception delay factor should be included in the exception definition. This results only in longer term peaks in the paging rate to cause an exception. The short term peaks, however, do not cause any exceptions.

To detect address spaces that are causing high paging rates, an exception definition may use screen chaining and freeze frame to chain to a screen showing all swapped-in address spaces sorted by their paging rate. The address space with the highest paging rate may not necessarily be the cause, but rather only a symptom. A job with a large amount of storage in a relatively short time may be the cause.

Input and Output Rate Exception

Exception Keywords	IOR>*nnn* or IOR<*nnn*
Default Message	CURRENT input and output RATE = *nnn.n*
Message Number	PAEXA126
Text Keyword	&IORT

MVS Exception Analysis uses the input and output rate from the SIOR line command for this exception threshold. This rate is the total number of input and output interrupts processed per second since the last PreAlert MVS cycle. An exception definition for high input and output rates and low CPU rates may be used to watch for pending input and output bottlenecks. These exceptions along with the Logical Control Unit analysis, Channel Path analysis, and DASD device analysis may help identify problems.

Input and Output Interrupts Handled by TPI Exception

Exception Keywords	TPI>*nnn* or TPI<*nnn*
Default Message	*nn.nn*% input and output(S) HANDLED BY TPI
Message Number	PAEXA137
Text Keyword	&TPIP

For this exception, MVS Exception Analysis uses the input and output interrupts handled by TPI percentage (from the SIOR line command). This represents the percentage of all input and output interrupts handled by the TPI (Test Pending Interrupt) instruction since the last PreAlert MVS cycle. This indicates the percentage of input and output interrupts that are being delayed because an enabled processor was not available.

The percentage of input and outputs handled by TPI is used by SRM to determine if the number of processors enabled for input and output interruptions should be increased or decreased. SRM attempts to enable only the minimum number of processors needed to handle the input and output interrupts.

ASM Local Slot Error Count Exception

Exception Keywords	ASE>*nnn* or ASE<*nnn*
Default Message	ASM LOCAL SLOT ERROR COUNT = *nnn*
Message Number	PAEXA101
Text Keyword	&ASEC

MVS Exception Analysis uses the Local Slot Error Count from the Auxiliary Storage Manager (ASM) for this threshold. This indicates the total number of unusable page slots on all local page datasets.

The Local Slot Error Count exception may indicate that the condition of a page dataset is getting worse. That is, the PDE=Y exception only indicates that an error has occurred on a page dataset, but do not give any indication that the condition is degrading. By setting ASE to a value greater than the number of known local slot errors, ASE can produce a warning when additional errors are detected.

ASM IOQ Length Exception

Exception Keywords	ASQ>*nnn* or ASQ<*nnn*
Default Message	ASM IOQ LENGTH= *nnn*
Message Number	PAEXA102
Text Keyword	&ASQL

MVS Exception Analysis computes the IOQ length from the ASM values for the number of page input and output requests, less the number completed. This represents the number of page input and outputs outstanding.

A consistently large value, over 70%, of the number of page datasets may indicate either a need for additional page datasets or an input and output contention problem to the existing page datasets. When the IOQ length increases sharply, this usually indicates a heavy paging situation which may be resolved quickly.

ASM Local Slots Left Exception

Exception Keywords	ASL>*nnn* or ASL<*nnn*
Default Message	ASM AUXILIARY SLOTS LEFT = *nnn.nn*%
Message Number	PAEXA103
Text Keyword	&ASLP

MVS Exception Analysis computes the Local Slots Left percent as the number of local slots available divided by the total number of slots on all local page datasets. This indicates a shortage condition is pending in auxiliary storage.

When a shortage in auxiliary storage occurs, SRM swaps out address spaces acquiring auxiliary storage at the highest rate. When this occurs with a large increase in the VIO slot usage, it indicates an improper use of VIO datasets. The slot count exception in MVS Address Space Exception Analysis can help identify address spaces using a large number of slots.

ASM Non-VIO Slot Usage Exception

Exception Keywords	ASN>*nnn* or ASN<*nnn*
Default Message	ASM NON-VIO SLOT USAGE = *nnn.nn*%
Message Number	PAEXA105
Text Keyword	&ASNV

MVS Exception Analysis computes non-VIO Slot Usage as the percentage of the total number of local slots used for non-VIO pages. Non-VIO slots are used to back virtual storage for uses other than VIO, such as normal address space activity, data, and hyperspaces. A consistently high value for non-VIO slots indicates a need for additional page datasets.

ASM VIO Slot Usage Exception

Exception Keywords	ASV>*nnn* or ASV<*nnn*
Default Message	ASM VIO SLOT USAGE = *nnn.nn*%
Message Number	PAEXA104
Text Keyword	&ASVU

MVS Exception Analysis computes VIO Slot Usage as the percentage of the total number of local slots used for VIO pages. This percentage indicates the amount of VIO dataset activity on the system. It may also indicate the need for either additional page datasets or a problem with VIO dataset usage.

Page Dataset Errors Exception

Exception Keywords	PDE=Y|N
Default Message	*nnn* ERRORS OCCURRED ON *page.dataset.name*
Message Number	PAEXA129
Text Keyword	&PDEE *error count*
	&PDEN *page dataset name*

For each page dataset, the Auxiliary Storage Manager (ASM) maintains a count of the number of permanent input and output errors that have occurred for the page dataset.

When this count is greater than zero, MVS Exception Analysis generates an exception.

After the PDE threshold has detected the first few errors, the ASE threshold watches for any additional errors.

Page Dataset Failure Exception

Exception Keywords	PDF=Y|N
Default Message	*page.dataset.name* HAS FAILED
Message Number	PAEXA130
Text Keyword	&PDFN *page dataset name*

The Auxiliary Storage Manager (ASM) has marked the page dataset as bad. The page dataset no longer writes requests and is effectively read-only. MVS Exception Analysis generates an exception whenever a page dataset is marked as bad.

Swap Dataset Errors Exception

Exception Keywords	SDE=Y|N
Default Message	*nnn* ERRORS OCCURRED ON *swap.dataset.name*
Message Number	PAEXA131
Text Keyword	&SDEE *error count*
	&SDEN *swap dataset name*

For each swap dataset, the Auxiliary Storage Manager (ASM) maintains a count of the number of permanent input and output errors that have occurred for the swap dataset. When the count is greater than zero, MVS Exception Analysis generates an exception.

Swap Dataset Failure Exception

Exception Keywords	SDF=Y|N
Default Message	*swap.dataset.name* HAS FAILED
Message Number	PAEXA132
Text Keyword	&SDFN

The Auxiliary Storage Manager (ASM) has marked the swap dataset as bad. The swap dataset no longer writes requests, and is effectively read-only. MVS Exception Analysis generates an exception whenever a swap dataset is marked as bad.

SRM Reducing MPL Exception

Exception Keywords	SRM=Y|N
Default Message	SRM REDUCING MPL, *reason*
Message Number	PAEXA106
Text Keyword	&SRMM *variable causing MPL reduction*

Exception Analysis has examined the System Resources Manager (SRM) MPL adjustment variables and has detected a condition that would cause the SRM to reduce the current MPL. When reducing the MPL, SRM selects a domain based upon its contention index and reduces its target MPL by one.

An exception definition with SRM=Y may be used to monitor MPL reductions to determine which variables are causing the MPL reductions. If the MPL is being reduced excessively, the corresponding keyword in IEAOPT*xx* may require adjustment.

Additional exception thresholds are available to monitor any of the MPL adjustment variables.

SRM Average CPU Rate Exception

Exception Keywords	SRC>*nnn* or SRC<*nnn*
Default Message	SRM AVERAGE CPU RATE = *nnn.nn*%
Message Number	PAEXA107
Text Keyword	&SRMC

MVS Exception Analysis uses the average CPU rate from SRM for this exception. This is the same CPU rate SRM uses to determine whether an MPL adjustment is needed. SRM calculates this value as the average CPU utilization of all processors in the system. Values over 100% represent the average number of ready users not being dispatched. The maximum value is 128, indicating at least 28 users not dispatched.

SRM Page Rate Exception

Exception Keywords	SRP>*nnn* or SRP<*nnn*
Default Message	SRM PAGE RATE = *nnn*
Message Number	PAEXA111
Text Keyword	&SRMP

MVS Exception Analysis examines the SRM Page Fault Rate for this exception threshold. SRM uses the page fault rate as an indicator of pageout activity. When this rate exceeds its MPL adjustment threshold, SRM reduces the MPL in order to reduce the number of page-outs. Usually the default IEAOPT*xx* page fault rate thresholds are used, having no impact on MPL adjustment.

SRM Unreferenced Interval Count (UIC) Exception

Exception Keywords	SRU>*nnn* or SRU<*nnn*
Default Message	SRM UIC = *nnn*
Message Number	PAEXA110
Text Keyword	&SRMU

MVS Exception Analysis uses the SRM Unreferenced Interval Count (UIC) for this exception threshold. The UIC value maintained by SRM represents the highest UIC of any page frame within the system. The UIC itself is a measure of the amount of time since the page has been referenced. When the SRM UIC drops below its MPL adjustment threshold, SRM reduces the MPL in order to raise the UIC. Having a larger UIC allows page stealing of less used pages, thus reducing the overall paging rate.

SRM ASM IOQ Length Exception

Exception Keywords	SRA>*nnn* or SRA<*nnn*
Default Message	SRM AVERAGE ASM IOQ LENGTH = *nnn*
Message Number	PAEXA108
Text Keyword	&SRMA

For MVS/XA systems, MVS Exception Analysis uses the average ASM input and output Queue Length from SRM for this exception threshold. For MVS/ESA systems, the value is not maintained by SRM. MVS Exception Analysis always uses a value of zero.

The ASM input and output Queue Length represents the average number of outstanding page input and output requests. This is an indicator of how active the paging subsystem is. Usually, the default IEAOPT*xx* ASM IOQ length thresholds are used, having no impact on MPL adjustment.

SRM Demand Page Rate Exception

Exception Keywords	SRD>*nnn* or SRD<*nnn*
Default Message	SRM DEMAND PAGE RATE = *nnn*
Message Number	PAEXA109
Text Keyword	&SRMD

For MVS/XA systems, MVS Exception Analysis uses the SRM Demand Paging Rate for this exception. For MVS/ESA systems, the value is not maintained by SRM. MVS Exception Analysis always uses a value of zero.

The Demand Paging Rate is comprised of the total number of page-ins and page reclaims for the private, common, and systems areas per second. SRM uses this value along with the CPU rate and page delay time to consider MPL adjustments.

SRM Page Delay Time Exception

Exception Keywords	SRT>*nnn* or SRT<*nnn*
Default Message	SRM PAGE DELAY TIME = *nnn*
Message Number	PAEXA112
Text Keyword	&SRMT

For MVS/XA systems, MVS Exception Analysis uses the SRM Page Delay Time for this threshold. For MVS/ESA systems, the value is not maintained by SRM. MVS Exception Analysis always uses a value of zero.

The Page Delay Time represents the amount of time needed to resolve a page-in. SRM uses this value in conjunction with the CPU rate and demand paging rate when considering an MPL adjustment.

Domain Overload Exception

Exception Keywords	DMN=Y|N
Default Message	DOMAIN *nnn* OVERLOAD, RUA=*n.nn*
Message Number	PAEXA113
Text Keyword	&DMNN
	&DMNR (Ready User Average)

The Domain Overload Exception occurs whenever MVS Exception Analysis detects a domain whose ready user average is greater than its target multi-programming level (MPL). This indicates that the domain is overloaded with more ready users than the target MPL allows. One or more address spaces may be swapped out in order to reduce the number of swapped-in address spaces to match the target MPL.

Operator Console WTO Buffer Usage Exception

Exception Keywords	OPW>*nnn* or OPW<*nnn*
Default Message	OPER CONSOLE WTO BUFFER USAGE =*nnn.nn*%
Message Number	PAEXA113
Text Keyword	&OPRW

MVS Exception Analysis uses the percentage of WTO buffers in use for this exception threshold. This indicates whether the operator consoles may be "backed up," possibly by a hardware failure or by a console that is not in roll-delete mode. WTO messages have been generated but are not displayed on an operator console; thus, the buffer element can be freed.

When all WTO buffers are used, any additional WTO commands delay until buffers are available. This may cause significant waits across all address spaces.

Outstanding Operator Reply Elements Exception

Exception Keywords	OPR>*nnn* or OPR<*nnn*
Default Message	OPER OUTSTANDING REPLY ELEMENTS=*nnn.nn%*
Message Number	PAEXA114
Text Keyword	&OPRR

MVS Exception Analysis uses the number of Outstanding Operator WTOR Reply Elements for this exception. This is the number of issued WTOR commands to which the operator has not yet replied.

Typically, in installations where several WTOR may be present, this is used to alert the operator when an additional WTOR has been issued. By setting the OPR> threshold to one more than the usual number of WTORs, an exception occurs when additional WTORs are issued.

Main Storage Usage Exception

Exception Keywords	STG>*nnn* or STG<*nnn*
Default Message	*nnn.nn%* REAL STORAGE IN USE
Message Number	PAEXA115
Text Keyword	&STGU

The Main Storage Usage Exception threshold is designed to monitor memory when insufficient memory is available and to cause page stealing when additional real storage frames are needed. With central (real) storage sizes exceeding 16MB, this value is no longer significant. That is, a percentage of 99% does not indicate a potential problem.

CSA Usage Exception

Exception Keywords	CSA>*nnn* or CSA<*nnn*
Default Message	*nnn.nn%* CSA ALLOCATED
Message Number	PAEXA116
Text Keyword	&CSAU

MVS Exception Analysis computes CSA usage as a percentage of the maximum amount of CSA allowed. This represents only the amount allocated, not the actual amount in use or paged-in.

The CSA Usage Exception threshold may be used to watch for CSA creep. When the CSA Usage Exception occurs, the CSTG line command can identify whether additional CSA storage is being allocated. The ADDR and DUMP line commands may then be used to view the storage.

SQA Usage Exception

Exception Keywords	SQA>*nnn* or SQA<*nnn*
Default Message	*nnn.nn%* SQA USAGE
Message Number	PAEXA117
Text Keyword	&SQAU

MVS Exception Analysis computes SQA usage as a percentage of the maximum amount of SQA allowed. When SQA allocation exceeds its limit, SQA overflows in CSA. This may cause performance problems because SQA is usually fixed storage and CSA is pageable.

When SQA usage exceeds 100%, the CSUM line command may be used to identify SQA storage with CSA. The ADDR and DUMP line commands may then be used to view the storage.

Free CSA Exception

Exception Keywords	FCS>*nnn* or FCS<*nnn* (Specified in K bytes)
Default Message	FREE CSA =*nnn* BYTES
Message Number	PAEXA140
Text Keyword	&FCSA

The total amount of available Common System Area (CSA) above and below the 16MB line, has met or exceeded the exception threshold. PreAlert calculates this as the total CSA size less the "GETMAINed" amount as determined by the MVS Common Storage tracking facility.

This exception is available only if MVS Common storage tracking for CSA is active. The CTF= keyword may be used to monitor common storage tracking for CSA.

Free Low CSA Exception

Exception Keywords	FCB>*nnn* or FCB<*nnn* (Specified in K bytes)
Default Message	FREE LOW CSA =*nnn* BYTES (BELOW 16MB)
Message Number	PAEXA141
Text Keyword	&FCSB

The total amount of available Common System Area (CSA) below the 16MB line has met or exceeded the exception threshold. PreAlert calculates this as the size of the CSA below the 16MB line less the "GETMAINed" amount as determined by the MVS Common Storage Tracking Facility.

This exception is available only if MVS Common storage tracking for CSA is active. The CTF= keyword may be used to monitor common storage tracking for CSA.

Free SQA Exception

Exception Keywords	SQA>*nnn* or SQA<*nnn* (Specified in K bytes)
Default Message	FREE SQA = *nnn* BYTES
Message Number	PAEXA142
Text Keyword	&FSQA

The total amount of available SQA above and below the 16MB line has met or exceeded the exception threshold. PreAlert calculates this as the total SQA size less the "GETMAINed" amount as determined by the MVS common storage tracking facility.

This exception is available only if MVS Common storage tracking for SQA is active. The STF= keyword may be used to monitor common storage tracking for SQA.

Free Low SQA Exception

Exception Keywords	SQB>*nnn* or SQB<*nnn* (Specified in K bytes)
Default Message	FREE LOW SQA = *nnn* BYTES (BELOW 16MB)
Message Number	PAEXA143
Text Keyword	&FSQB

The amount of available SQA below the 16MB line has met or exceeded the exception threshold. PreAlert calculates this as the size of the SQA below the 16MB line less the "GETMAINed" amount as determined by the MVS common storage tracking facility.

This exception is available only if MVS Common storage tracking for SQA is active. The STF= keyword may be used to monitor common storage tracking for SQA.

Unowned CSA Exception

Exception Keywords	UCS>*nnn* or UCS<*nnn* (Specified in K bytes)
Default Message	UNOWNED CSA = *nnn* BYTES
Message Number	PAEXA144
Text Keyword	&UCSA

The total amount of unowned Common System Area (CSA) above and below the 16MB line has met or exceeded the exception threshold. The unowned CSA value is determined by the MVS common storage tracking facility. It represents the total amount of CSA obtained by address spaces or batch jobs that have since terminated.

This exception is available only if MVS Common storage tracking for CSA is active. The CTF= keyword may be used to monitor common storage tracking for CSA.

Unowned Low CSA Exception

Exception Keywords	UCB>*nnn* or UCB<*nnn* (Specified in K bytes)
Default Message	UNOWNED LOW CSA = *nnn* BYTES
Message Number	PAEXA145
Text Keyword	&UCSB

The amount of unowned Common System Area (CSA) below the 16MB line has met or exceeded the exception threshold. The value for unowned CSA below the 16MB line is determined by the MVS common storage tracking facility. It represents the amount of low CSA obtained by address spaces or batch jobs that have since terminated.

This exception is available only if MVS Common storage tracking for CSA is active. The CTF= keyword may be used to monitor common storage tracking for CSA.

Unowned SQA Exception

Exception Keywords	USQ>*nnn* or USQ<*nnn* (Specified in K bytes)
Default Message	UNOWNED SQA = *nnn* BYTES
Message Number	PAEXA146
Text Keyword	&USQA

The total amount of unowned SQA above and below the 16MB line has met or exceeded the exception threshold. The unowned SQA value is determined by the MVS common storage tracking facility. It represents the total amount of SQA obtained by address spaces or batch jobs that have since terminated.

This exception is available only if MVS Common storage tracking for SQA is active. The STF= keyword may be used to monitor common storage tracking for SQA.

Unowned Low SQA Exception

Exception Keywords	USB>*nnn* or USB<*nnn* (Specified in K bytes)
Default Message	UNOWNED LOW SQA = *nnn* BYTES
Message Number	PAEXA147
Text Keyword	&USQB

The amount of unowned SQA below the 16MB line has met or exceeded the exception threshold. The value for unowned SQA below the 16MB line is determined by the MVS common storage tracking facility. It represents the amount of low SQA obtained by address spaces or batch jobs that have since terminated.

This exception is available only if MVS Common storage tracking for SQA is active. The STF= keyword may be used to monitor common storage tracking for SQA.

CSA Storage Tracking Failure

Exception Keywords	CTF=Y|N
Default Message	CSA STORAGE TRACKING OFF/FAILED
Message Number	PAEXA148

This exception occurs when either CSA storage tracking is inactive, or common storage tracking has failed. CSA storage tracking must be active for PreAlert to monitor the Free CSA or Unowned CSA exceptions.

SQA Storage Tracking Failure

Exception Keywords	STF=Y|N
Default Message	SQA STORAGE TRACKING OFF/FAILED
Message Number	PAEXA149

This exception occurs when either SQA storage tracking is inactive, or common storage tracking has failed. SQA storage tracking must be active for PreAlert to monitor the Free SQA or Unowned SQA exceptions.

Extended Storage Migration Age Exception

Exception Keywords	EMA>*nnn* or EMA<*nnn* (seconds)
Default Message	E-STG MIGRATION AGE = *nnn*
Message Number	PAEXA118
Text Keyword	&EMAG

MVS Exception Analysis uses the migration age from SRM for this exception threshold. The migration age is the amount of time a page has remained unreferenced in extended storage. This value indicates the contention for extended storage.

The migration age is used by the Real Storage Manager (RSM) to determine which pages should be sent to extended storage. The intent is to send pages to extended storage only if they are likely to be referenced before being migrated to auxiliary storage. RSM sends a page to extended storage based upon a criteria age for various types of page groups. When the migration age (plus system high UIC for some page types) exceeds the criteria age, the page is sent to extended storage.

Extended Storage Page Write Rate Exception

Exception Keywords	ESW>*nnn* or ESW<*nnn*
Default Message	*nnn.n* PAGES/SEC WRITTEN TO E-STG
Message Number	PAEXA119
Text Keyword	&ESWR

MVS Exception Analysis computes this exception threshold as the rate (per second) of central storage pages sent to extended storage since the last PreAlert MVS interval. This indicates the demand for extended storage, that is, how fast pages are being sent to extended storage.

Extended Storage Page Read Rate Exception

Exception Keywords	ESR>*nnn* or ESR<*nnn*
Default Message	*nnn.n* PAGES/SEC READ FROM E-STG
Message Number	PAEXA120
Text Keyword	&ESRR

MVS Exception Analysis computes this exception threshold as the rate (per second) of pages read from extended storage (to central storage) since the last PreAlert MVS interval. This indicates the relief of extended storage (i.e., how fast pages are being removed from extended storage).

Extended Storage Migration Rate Exception

Exception Keywords	ESM>*nnn* or ESM<*nnn*
Default Message	*nnn.n* E-STG PAGES/SEC MIGRATED TO AUX STG
Message Number	PAEXA121
Text Keyword	&ESMR

MVS Exception Analysis computes this exception threshold as the rate (per second) of extended storage pages migrated to auxiliary storage since the last PreAlert MVS cycle. A large extended storage migration rate is an indicator of contention for extended storage. A low migration rate may indicate a low demand for extended storage; however, when combined with high extended storage read and write rates, it shows high activity for extended storage. This may imply the need for additional central storage.

Total Swap Rate Exception

Exception Keywords	SWR>*nnn* or SWR<*nnn*
Default Message	SWAP RATE = *nnn.n* SWAPS/SEC
Message Number	PAEXA122
Text Keyword	&SWRR

MVS Exception Analysis computes this exception threshold as the rate (per second) of address space swap-outs since the last PreAlert MVS cycle. An address space may be swapped out for several reasons. The SWPT line command displays a table indicating the reasons for swap activity. Refer to the *MVS SPL: Initialization and Tuning* guide for the causes of each swap reason.

Logical and Extended Storage Swap Effective Percent Exception

Exception Keywords	SWE>*nnn* or SWE<*nnn*
Default Message	LOGICAL OR EXPANDED EFFECTIVE SWAPS = *nnn.nn%*
Message Number	PAEXA123
Text Keyword	&SWER

MVS Exception Analysis computes this exception threshold as a percentage of all swaps that were either logically swapped or physically swapped to extended storage. This is an inverse indicator of address spaces being swapped to auxiliary storage. Use the SWPT line command to determine the causes of physical swapping.

Tape Mount Wait Time Exception

Exception Keywords	TPM>*nnn* or TPM<*nnn* (seconds)
Default Message	tape-cua MOUNT WAIT TIME= *nnn.nS*
Message Number	PAEXA134
Text Keyword	&TPMC *tape-cua*
	&TPMT *wait time*

MVS Exception Analysis uses the Tape Mount Wait Time from the TMNT line command for this exception threshold. The Tape Mount Wait Time is the amount of time since PreAlert MVS noticed the mount wait. The actual wait time may be greater since the mount may have been issued prior to a PreAlert MVS cycle.

The exception occurs when any tape meets the exception threshold. Also, the exception message is generated for all tape mount waits meeting the threshold.

Logical Control Unit Input and Output Rate Exception

Exception Keywords	LIO>*nnn* or LIO<*nnn*
Default Message	*nnn.nn* I/O RATE ON LCU *nnn*
Message Number	PAEXA153
Text Keyword	&LIOL LCU ID
	&LIOR (input and output rate)

MVS Exception uses the total input and output rate for all channel paths attached to the logical control unit for this exception threshold. This reflects the input and output rate from the current RMF reporting interval.

The exception occurs when any LCU meets the input and output rate exception threshold. Exception messages generate for all LCUs that meet the threshold.

Since the input and output rates tend to vary considerably during the beginning of the RMF interval, a time delay (TDL=*nnn*) should be included to allow the rate to stabilize. Additionally, the limit-x (LMX=*nnn*) may be included to limit the number of times the exception is reported for each interval.

Logical Control Unit All Channels Busy Exception

Exception Keywords	LCB>*nnn* or LCB<*nnn* (percent)
Default Message	*nnn.nn%* ALL CHANNELS BUSY ON LCU *nnn*
Message Number	PAEXA136
Text Keyword	&LCBL LCU ID
	&LCBP (percent busy)

For this exception threshold, MVS Exception Analysis uses the RMF value for all-channels-busy percentage for the logical control unit. This is the percentage of time during which all channels attached to the logical control unit are simultaneously busy. The value reflects the percentage since the beginning of the current RMF reporting interval.

The exception occurs when any LCU meets the all channels busy exception threshold. Exception messages generate for all LCUs that meet the threshold.

RMF Active Exception

Exception Keywords	RMF=Y|N
Default Message	RMF NOT ACTIVE
Message Number	PAEXA124

When RMF=Y has been specified in an exception definition, MVS System Exception Analysis monitors the status of RMF. When RMF is stopped, the exception occurs. MVS Exception Analysis only verifies that RMF is active; it does not check the status of the various RMF reporting areas.

Missing Task Analysis Exception

Exception Keywords	MIS=*jobname*
Default Message	*jobname* MISSING
Message Number	PAEXA128
Text Keyword	&MIST

Missing Task Analysis is used to ensure that specific jobnames remain active. Typically, production DBDC packages are monitored through Missing Task Analysis. When MVS Exception Analysis cannot find the specified Jobname, the exception occurs. A message can then be sent to the operator or one or more TSO user IDs responsible for the package.

Only one missing task jobname may be specified per exception definition. Separate exception definitions may be used for additional jobnames.

Enqueue Contention Exception

Exception Keywords	ENQ=*queue-name*
Default Message	ENQUEUE CONTENTION, OWNERS/WAITERS = *nnn/nnn,*
	queue-name : resource-name
	ENQUEUE CONTENTION, HEX DATA: *resource-name*
Message Number	PAEXA138
Text Keyword	&XQOC *owner count*
	&XQWC *waiter count*
	&XQQN *queue-name*
	&XQRN *resource-name* (EBCDIC)
	&XQRH *resource-name* (Hex)

PreAlert has detected an enqueue contention situation for the indicated queue-name and resource-name. Refer to "MVS/ESA SP V5 Diagnosis: Reference" for a list of MVS system queue names and their usage.

Use ENQ=& to monitor for any enqueue contentions. Or use ENQ=*queue-name* to monitor for contention on a specific queue-name.

MVS Address Space Exception Analysis

PreAlert MVS's MVS Address Space Exception Analysis provides the ability to monitor address space for a few specific conditions. The analysis of each condition is controlled through a threshold keyword in an Address Space Exception Definition. Each exception definition may contain one or more of the exception threshold keywords, allowing for AND logic and exceptions based on a range of values.

An Address Space Exception Definition assigns a specific set of exception thresholds to a group of one or more address spaces. The group of address spaces may be identified by either a jobname mask, job class, or performance group number and period, if specified. Each exception definition must specify either a jobname mask, a job class, or a performance group number, and period, if specified.

Throughout this discussion of Address Space Exception Analysis, the terms job, task and address space may be used interchangeably.

A number of spare address space exception definitions must be included when the exception level set is initially built (through the EXAINIT macro). Address space exception definitions may be predefined with the EXATASK macro or may be dynamically modified using the XVTK line command. The EXAINIT and EXATASK macros are described under "MVS Exception Analysis Macros" on page 372. The XVTK line command is described on page 328.

Address Space Exception Definition Selection

For each address space, any number of exception definitions may be selected. PreAlert MVS selects the exception definitions in the following order:

1. Jobname mask, by the best fit value of the mask. The best fit value is based upon the number of characters in the mask plus the position of each character (asterisks are not counted). That is, JOBNAME* has a better best fit value than JOB* since more characters were specified. If the same number of characters are specified, the characters at the beginning of the mask are weighted more heavily (i.e., J123* fits better than J12*4*).

2. Job class, available for batch jobs only.

3. Performance group, and period if specified. If the period has been specified, then the exception definition is selected only if both the PGN and period match. If the period has been set to zero, the period is not checked.

For each exception definition, either a jobname, job class, or performance group must be specified. Only one may be specified since they are mutually exclusive. Additionally, the performance group period may only be specified if the performance group has been specified.

A job type may also be specified in the exception definition. The job type may be specified as either J for batch jobs, S for started tasks, or T for TSO users. The type must match in order for an exception definition to be selected. The job type is not validated against the job class specification. An exception definition using job class and a TSO or started task type never is selected.

If multiple exception definitions have been selected for the address space, and the highest exception definition has been terminated (SET=OFF), then all exception analysis is suppressed for that address space.

XDTK - Display MVS Address Space Exception Definitions

The XDTK line command displays MVS Address Space Exception Definitions. The display defaults to all non-spare Address Space Exception Definitions. Keywords may be used to display any or all Address Space Exception Definitions.

Keyword	Function
SET=ON|OFF	Display active or terminated address space exception definitions
EXA=*nnn,nnn*,...	Display the specified address space exception definitions
SPR=Y	Display spare address space exception definitions.

Figure 190 shows an example XDTK line command display:

Figure 190 • XDTK line command

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=

XVTK

XDTK EXA=1,2,3
+   EXA=1  JNM=IDMS*     SET=ON  AND=Y  TDL=10  CPX>75  IOR<1
+     MSG='POSSIBLE CPU LOOP, CPX=&CPUX, I/O=&IOCR'
+   EXA=2  JNM=IDMSJRN*  SET=OFF
+   EXA=3  SPARE=Y
```

The XDTK line command displayed address space exception definitions 1, 2, and 3 in response to the EXA= keyword. The first two exception definitions are working definitions. The third is a spare exception definition that may be built using the XVTK line command.

XVTK - Vary MVS Address Space Exception Definitions

The XVTK line command is used to modify Address Space Exception Definitions. The EXA= keyword specifies the exception definitions to be modified. If multiple exception definitions are specified, the changes propagate through all specified exception definitions.

Changes made using the XVTK line command are made to the currently loaded level set only. The changes are only temporary and are lost when a level set is loaded or the PreAlert MVS session is terminated.

The following contains a listing of keywords and a brief/functional description. Refer to the indicated section for additional information.

Keyword	Function
EXA=*nnn,nnn,...*	Exception definition number(s)
SET=ON|OFF	Activate/terminate the exception definition
SPR=Y	Alter to spare exception definition.

SELECTION OPTIONS - See "Address Space Exception Definition Selection" on page 326.

Keyword	Option
JNM=*jobname*	Jobname mask
CLS=*job class*	Job class, single character only
PGN=*nnn*	Performance Group number
PRD=*nnn*	Performance Group period, 0 to remove period
TYP=J|S|T|*	Address Space type:
	J Batch jobs
	S Started tasks
	T TSO users
	* to remove type.

EXCEPTION THRESHOLDS - See "MVS System Exception Thresholds" on page 305.

Keyword		Exception
CPU>*nnn*	CPU<*nnn*	CPU utilization by system
CPX>*nnn*	CPX<*nnn*	CPU utilization by processor
STL>*nnn*	STL<*nnn*	Job step time limit percent remaining
IOR>*nnn*	IOR<*nnn*	Input and output rate
PGR>*nnn*	PGR<*nnn*	Paging rate
TTM>*nnn*	TTM<*nnn*	Transaction time (seconds)
WTM>*nnn*	WTM<*nnn*	Waiting time (seconds)
SWP=I|O|L|*		Swap status:
		I swapped-in
		O swapped-out
		L logically swapped-out
		* remove swap status exception.
NSW=Y|N		Non-swappable status:
		Y address space marked non-swappable
		N remove non-swappable exception.
SWC>*nnn*	SWC<*nnn*	Swap count
WKS>*nnn*	WKS<*nnn*	Working storage set size
FIX>*nnn*	FIX<*nnn*	Fixed storage size
EST>*nnn*	EST<*nnn*	Extended storage size
SLT>*nnn*	SLT<*nnn*	Auxiliary storage slot count
CSA>*nnn*	CSA<*nnn*	Total CSA size
CSB>*nnn*	CSB<*nnn*	Low CSA (below 16MB line) size
SQA>*nnn*	SQA<*nnn*	Total SQA size
SQB>*nnn*	SQB<*nnn*	Low SQA (below 16MB line) size
CST>*nnn*	CST<*nnn*	Total common storage size
JST>*nnn*	JST<*nnn*	Job step time
QWT>*nnn*	QWT<*nnn*	Enqueue wait time
SYS=*nnn*		Related system definition.

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword		Option
TOD>*hhmm*	TOD<*hhmm*	Time of day range, lower limit
TOD<*hhmm*	TOD>*hhmm*	Time of day range, upper limit
TIN=*nnn*		Time interval, seconds
DLY=*nnn*		Exception delay count
TDL=*nnn*		Exception delay time, seconds
LIM=*nnn*		Exception limit count
LMX=*nnn*		Exception limit-x count
TLM=*nnn*		Time of day limit count
PRI=*nnn*		Exception priority, 1-255
AND=Y|N		Request AND logic for exception thresholds
SND=Y|N		Activate/terminate terminal sound
SUP=A|E|N|*		Supersede other exception definitions:
		A Always supersede
		E Supersede only when exception occurs
		N Never supersede.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOG=*xxx*	Exception logging options.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify a four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG='*message*'	User-specified exception message
USR='*userids list*'	Sends message to TSO userids list
USO=L|N	User send option, LOGON or NOW
CON=Y|N	Sends message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes 2, 7, or 11 only
CLR=*x*	Specifies exception message color.

SCREEN OPTIONS - See "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Requests screen print
SCR=*screen name*	Requests screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Requests freeze frame with screen chaining.

COMMAND OPTIONS - See "MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD='*command*'	Issue command, command image
JOB=*member*	Submit job, member name
CDL=*nnn*	Command delay count
CLM=*nnn*	Command limit count.

Figure 191 shows an example XVTK display:

Figure 191 • XVTK line command

```
EXAS
+   LVL=99           SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                    MIN=   0 MAX= 255 LOG=
XVTK
EXA=3,JNM=IDMS*,SET=ON,NSW=Y,USR=DBA1,LIM=2,PRI=20,TDL=60
+   EXA=3  JNM=IDMS*     SET=ON  PRI=20  LIM=2  TDL=60  USR=DBA1  NSW=Y

XDTK
+   EXA=1  JNM=IDMS*     SET=ON  PRI=150  AND=Y  TDL=10  CPX>75  IOR<1
+     MSG='POSSIBLE CPU LOOP, CPU=&CPUX, I/O=&IOCR'
+   EXA=2  JNM=IDMSJRN*  SET=OFF
+   EXA=3  JNM=IDMS*     SET=ON  PRI=20  LIM=2  TDL=60  USR=DBA1  NSW=Y
```

In the example above, exception definition 3 (EXA=3) was added to watch for IDMS address spaces (JNM=IDMS*) losing their non-swappable status. The time delay (TDL=60) is set to 60 seconds to allow MVS to complete initialization of the address space before the exception is tested. When an exception occurs, the exception message is sent to the DBA1 TSO user (USR=DBA1). After the exception has occurred for the address space twice (LIM=2), that address space no longer tests for the non-swappable exception.

Exception definition 1 (EXA=1) was built to watch for CPU loops in any IDMS (JNM=IDMS*) address space. The CPU rate (by processor) threshold is set to 75%, basing the CPU rate calculation on a single processor rather than the entire system. Additionally, the time delay is set to 10 seconds to allow for occasional short peaks without generating an exception.

Exception definition 2 (EXA=2) was built to exclude any IDMS journal offload job (JNM=IDMSJRN*) from exception analysis. These address spaces would select exception definitions 1, 2, and 3. However, since exception definition 2 has the highest best fit value and has been terminated (SET=OFF), no exception analysis is performed for the address space.

MVS Address Space Exception Thresholds

These sections describe the types of MVS address space exception thresholds:

CPU (System) Utilization Exception

Exception Keywords	CPU>*nnn* or CPU<*nnn*
Default Message	*jobname* CPU RATE = *nnn.nn%*
Message Number	PAEXA211
Text Keyword	&CPUR (CPU rate by system)

MVS Exception Analysis uses the CPU rate from the CPUR line command for this exception threshold. PreAlert MVS calculates the CPUR rate as the CPU usage based on the entire system. Therefore, if an address space has completely saturated a single processor on a 3090-600 (six processors in the system), the CPU rate is calculated as 16.66% (100% divided by 6).

CPU (Processor) Utilization Exception

Exception Keywords	CPX>*nnn* or CPX<*nnn*
Default Message	*jobname* PROCESSOR CPU RATE = *nnn.nn%*
Message Number	PAEXA215
Text Keyword	&CPUX (CPU rate by processor)

MVS Exception Analysis uses the CPU rate from the CPUX line command for this exception threshold. PreAlert MVS calculates the CPUX rate as the CPU usage based on a single processor. When an address space completely saturates a single processor, the CPU rate is calculated as 100%. Address spaces using multi-tasking may exceed 100% CPU utilization.

The CPU rate is commonly used with the input and output rate threshold to watch for CPU loop conditions. An exception definition with CPX>70, IOR<1, and AND=Y generates an exception when the CPU rate is greater than 70% and the input and output rate is less than one input and output per second. A time delay (TDL=*nnn*) may be added to allow for occasional peaks within the address space.

Job Step Time Limit Exception

Exception Keywords	STL>*nnn* or STL<*nnn*
Default Message	*jobname* JOB STEP TIME LIMIT USAGE = *nnn.nn%*
Message Number	PAEXA212
Text Keyword	&JSTL

MVS Exception Analysis uses the Job Step Time Limit usage from the JSTL line command for this exception. The percentage is calculated as the amount of TCB time used by the job step, divided by the job step time limit. A zero value is used for any job steps that are executing without a time limit (TIME=1440) specified in the JCL.

The Job Step Time Limit threshold is used to provide a warning when jobs are about to exceed their time limit. An exception definition with CSL=P, STL>90, LIM=1, and CON=Y sends a message to the console whenever a class P job exceeds 90% of its time limit. The exception occurs once (LIM=1) for each job step exceeding the time limit threshold.

Input and Output Rate Exception

Exception Keywords	IOR>*nnn* or IOR<*nnn*
Default Message	*jobname* I/O RATE = *nnn.n*
Message Number	PAEXA213
Text Keyword	&IOCR

MVS Exception Analysis uses the input and output rate from the IOCR line command for this exception. The input and output rate is calculated as the rate per second of input and outputs since the last PreAlert MVS cycle.

The input and output Rate Exception threshold may be helpful in diagnosing input and output loops, particularly in data base data communications packages. An exception definition with IOR>50, CPX<1, and AND=Y generates an exception when the input and output rate exceeds 50 input and outputs per second and the CPU utilization (by processor) is less than 1%. This should only be used for DBDC packages, and not batch jobs, since this may represent normal processing for a batch job.

Paging Rate Exception

Exception Keywords	PGR>*nnn* or PGR<*nnn*
Default Message	*jobname* PAGING RATE = *nnn.n*
Message Number	PAEXA214
Text Keyword	&PGRT

MVS Exception Analysis uses the total paging rate from the TPIR line command for this exception. The paging rate represents the total (local and common) page-in, rate-per-second for the address space since the last PreAlert MVS interval. The paging rate is available for swapped-in address spaces only.

A generic (JNM=*) address space exception definition may be used to monitor paging rates (PGR>10) across all address spaces. This exception definition could be related back to a system exception definition for system paging rates. By adding SYS=nnn (system exception definition number) and AND=Y to the address space exception definition, the exception occurs only when both the system paging rate exceeds its threshold (in the system exception definition) and an address space exceeds the paging rate threshold in the address space definition.

Transaction Time Exception

Exception Keywords	TTM>*nnn* or TTM<*nnn*
Default Message	*jobname* TRANSACTION TIME = *nnn.nnS*
Message Number	PAEXA204
Text Keyword	&TMTR

MVS Exception Analysis uses the Transaction Time from the TMTR line command for this exception threshold. The transaction usually represents the amount of time since the beginning of a batch job or started task or the beginning of a TSO transaction. The Transaction Time may be reset whenever the performance group for the address space is reset or when a new IPS is loaded.

The Transaction Time threshold can be used to monitor the duration of batch jobs by job class. For each job class (CLS=*x*), an exception definition must be built with the Transaction Time threshold (TTM>*nnn*). Additionally, the exception message may be sent to the TSO userID specified in the JOB card USER= parm.

Waiting Time Exception

Exception Keywords	WTM>*nnn* or WTM<*nnn* (seconds)
Default Message	*jobname* WAITING TIME = *nnn.nnS*
Message Number	PAEXA205
Text Keyword	&WAIT

MVS Exception Analysis uses the Wait Time value from the WAIT line command for this exception threshold. The wait time is the amount of time since any instructions have been executed in the address space. If the address space has accumulated any CPU time since the last PreAlert MVS cycle, MVS Exception Analysis does not consider the address space to be waiting, thus the exception is not generated.

MVS Exception Analysis also attempts to identify the reason(s) for the wait. Exception Analysis reviews the swap status of the address space, any active or queued input and outputs, unresolved enqueues, and CPU dispatching. If the address space is found to be waiting on one of these areas, MVS Exception Analysis generates additional exception messages describing the wait.

Swap Status Exception

Exception Keywords	SWP=I Swapped in
	SWP=P Physical swap out
	SWP=L Logical swap out
	SWP=O Any swap out
Default Message	*jobname* ADDRESS SPACE *status*
Message Number	PAEXA202
Text Keyword	&SWPS *swap status*

MVS Exception Analysis recognizes three distinct address space swap status values: swapped in (SWP=I), logically swapped out (SWP=L), and physically swapped out (SWP=P). Also, the SWP=O keyword detects either physical or logical swaps.

To monitor the swap status of active TSO users, the exception definition should also include the TTM>1 threshold. This eliminates TSO address spaces waiting on terminal input.

Non-swappable Status Exception

Exception Keywords	NSW=Y
Default Message	*jobname* ADDRESS SPACE *non-swappable status*
Message Number	PAEXA203
Text Keyword	&NSWS *Non-swappable status*

MVS Exception Analysis examines the non-swappable status of an address space for this exception. The exception occurs when the address space is swappable.

The non-swappable exception is typically used to monitor packages that are typically run non-swappable for performance reasons.

Swap Count Exception

Exception Keywords	SWC>*nnn* or SWC<*nnn*
Default Message	*jobname* SWAP COUNT = *nnn*
Message Number	PAEXA210
Text Keyword	&SWCT *Swap Count*

MVS Exception Analysis uses the Swap Count value from the SWCT line command for this exception threshold. This value represents the number of completed swap actions (swap out followed by a swap in) for the address space.

The swap count exception is often included in a general exception definition for production batch jobs. This may indicate a poor job mix, too many jobs competing for the same resources, or an overloaded domain.

Working Storage Set Size Exception

Exception Keywords	WKS>*nnn* or WKS<*nnn*
Default Message	*jobname* WORKING STORAGE SET SIZE = *nnnK*
Message Number	PAEXA206
Text Keyword	&MFCT (Storage size, K bytes)

MVS Exception Analysis uses the Working Storage Set Size from the FMCT line command for this exception threshold. The Working Storage Set Size represents the amount of real (central) storage currently used by the address space. Although the virtual storage requirements for the address space may be larger, the working storage set size represents only the amount of storage currently in use, not the amount being paged out or that has not yet been requested by a GETMAIN statement.

Fixed Storage Size Exception

Exception Keywords	FIX>*nnn* or FIX<*nnn*
Default Message	*jobname* FIXED STORAGE SIZE = *nnnK*
Message Number	PAEXA207
Text Keyword	&FXFR (Fixed storage, K bytes)

MVS Exception Analysis uses the Fixed Storage Size from the FXFR line command for this exception threshold. Fixed (non-pageable) storage for an address space is typically used for input and output. Every address space usually has a small amount of fixed storage for input and output. Often, sort jobs use fixed storage to improve performance.

During periods of heavy paging, fixed storage usage should be closely examined. An address space exception definition for fixed storage size may be related back to a system exception definition for paging rates.

Extended Storage Usage Exception

Exception Keywords	EST>*nnn* or EST<*nnn*
Default Message	*jobname* E-STORAGE USAGE = *nnnK*
Message Number	PAEXA208
Text Keyword	&ESCT (E-stg size, K bytes)

MVS Exception Analysis uses the Extended Storage Size from the ESCT line command for this exception threshold. Extended storage may be used by an address space for paged out or swapped out pages, or for backing hyperspace storage.

Auxiliary Storage Slot Count Exception

Exception Keywords	SLT>*nnn* or SLT<*nnn*
Default Message	*jobname* AUXILIARY STORAGE SLOT USAGE = *nnn*
Message Number	PAEXA209
Text Keyword	&SLTT

MVS Exception Analysis uses the Auxiliary Storage Slot Count from the SLTT line command for this exception. The slot count represents the total number of pages that have been moved to auxiliary storage through paging, swapping, or migration of extended storage pages.

Common Storage Size Exception

Exception Keywords	CST>*nnn* or CST<*nnn*
Default Message	*jobname* TOTAL COMMON STORAGE SIZE=*nnn*
Message Number	PAEXA220
Text Keyword	&CSTT

PreAlert uses the Total Common Storage size from the CSTT line command for this exception. This represents to total amount of either CSA or SQA owned by the address space.

This exception is available only if MVS common storage tracking is active.

Low CSA Size Exception

Exception Keywords	CSB>*nnn* or CSB<*nnn*
Default Message	*jobname* LOW CSA SIZE =*nnn*
Message Number	PAEXA216
Text Keyword	&CSAB

PreAlert uses the Low CSA size from the CSAB line command for this exception. This is the amount of Common System Area (CSA) below the 16MB line owned by the address space.

This exception is available only if MVS common storage tracking is active.

Total CSA Size Exception

Exception Keywords	CSA>*nnn* or CSA<*nnn*
Default Message	*jobname* TOTAL CSA SIZE =*nnn*
Message Number	PAEXA218
Text Keyword	&CSAT

PreAlert uses the Total CSA size from the CSAT line command for this exception. This is the total amount of Common System Area (CSA), above and below the 16MB line, owned by the address space.

This exception is available only if MVS common storage tracking is active.

Low SQA Size Exception

Exception Keywords	SQB>*nnn* or SQB<*nnn*
Default Message	*jobname* LOW SQA SIZE =*nnn*
Message Number	PAEXA217
Text Keyword	&SQAB

PreAlert uses the Low SQA size from the SQAB line command for this exception. This is the amount of SQA below the 16MB line owned by the address space.

This exception is available only if MVS common storage tracking is active.

Total SQA Size Exception

Exception Keywords	SQA>*nnn* or SQA<*nnn*
Default Message	*jobname* TOTAL SQA SIZE =*nnn*
Message Number	PAEXA219
Text Keyword	&SQAT

PreAlert uses the total SQA size from the SQAT line command for this exception. This is the total amount of SQA owned by the address space.

This exception is available only if MVS common storage tracking is active.

Job Step Time Exception

Exception Keywords	JST>*nnn* or JST<*nnn*
Default Message	*jobname* JOB STEP TCB TIME =*nnn.nnS*
Message Number	PAEXA221
Text Keyword	&TCBT

The TCB time (task CPU time) has met or exceeded the exception threshold. This is the amount of task mode CPU time accumulated for the job step. This exception is often used to monitor CPU time limits for specific job classes.

Enqueue Wait Time Exception

Exception Keywords	QWT>*nnn* or QWT<*nnn*
Default Message	*jobname* ENQUEUE WAITING TIME =*nnn.nnS*
	jobname WAITING ON *jobname2 : queue-name resource-name*
Message Number	PAEXA222
Text Keyword	&QWTM (enqueue waiting time)

The address space was found to have one or more enqueue requests outstanding, and its waiting time has met or exceeded the exception threshold. Typically this is used to monitor dataset disposition conflicts. By using the enqueue waiting, it gives the user a chance to resolve the conflict before the exception is generated.

Related System Definition Exception

Exception Keywords	SYS=*nnn*
Default Message	*jobname* SYSTEM EXCEPTION *nnn* OCCURRED
Message Number	PAEXA201
Text Keyword	&SYSN

The SYS=*nnn* keyword may be specified in a task exception definition to relate it with a system exception definition. That is, the SYS=*nnn* exception occurs whenever the specified system exception definition detects an exception.

For example, you may only want to monitor the working storage set size of test batch jobs when paging is heavy. If paging is not occurring, the working storage set size is no longer critical. System exception definition number 1 (EXA=1) has been built with the paging rate threshold set to 100 (PGR>100). Build an address space exception definition with the related system definition (SYS=1), the working storage set size (WKS>1024), and AND logic (AND=Y).

MVS DASD Exception Analysis

PreAlert MVS's MVS DASD Exception Analysis provides the ability to automatically monitor your DASD devices. Each DASD device may be monitored for ready status, device busy percentage, input and output rate, and response time. Exception analysis for each item is provided through a threshold keyword in a DASD Exception Definition. Each exception definition may contain one or more of the exception threshold keywords. This allows for AND logic and exception based on a range of values.

A DASD Exception Definition assigns a specific set of exception thresholds to one or more DASD devices. Exception definitions are selected for each DASD device based on either the volume serial number (VOLSER) or the device address (CUA). Each exception definition contains either a VOLSER mask, a CUA mask, or a unit name. A best fit value is calculated for each mask. Multiple exception definitions may be selected for each DASD device. The selection is based on the best fit value of the mask.

The DASD device statistics are obtained from the current RMF reporting interval. The statistics represent the DASD activity since the beginning of the RMF reporting interval. If RMF is not available or is not monitoring DASD devices, then the device busy, input and output rate, and response time exceptions are not be available.

A number of spare DASD exception definitions must be included when the exception level set is initially built (through the EXAINIT macro). The DASD exception definitions may be predefined as with the EXADASD macro, or may be dynamically modified using the XVDK line command. The EXAINIT and EXADASD macros are described in "MVS Exception Analysis Macros" on page 372. The XVDK line command is described on page 344.

DASD Exception Definition Selection

For each DASD device, any number of exception definitions may be selected. PreAlert MVS selects the exception definitions in the following order:

1. Volume Serial (VOLSER) mask, by best fit value of the mask. The best fit value is based upon the number of characters in the mask plus the position of each character (asterisks are not counted).

   VOL12* has a better best fit value than VOL* since more characters are specified. If the same number of characters are specified, the characters at the beginning of the mask are weighted more heavily. For instance, VOL1* fits better than VOL*1*.

2. Device Address (CUA) mask, by best fit value of the mask. The best fit value for the Device Address follows the same rules as the Volume Serial mask (above).

3. Unit name value. Unit names are not masked, Only the DASD unit names specified in the MVS eligible device table (EDT) are recognized by PreAlert. The DUNT line command may be used to display the valid DASD unit names.

For each exception definition, either the Volume Serial mask or the Device Address mask must be specified. Only one may be specified, as they are mutually exclusive.

If multiple exception definitions have been selected for the device, and the highest exception definition has been terminated (SET=OFF), then all exception analysis is suppressed for that device.

XDDK - Display MVS DASD Exception Definitions

The XDDK line command displays the MVS DASD Exception Definitions. The display defaults to all non-spare DASD Exception Definitions. Keywords may be used to display any or all DASD Exception Definitions.

Keyword	Function
SET=ON|OFF	Display active or terminated DASD exception definitions, ON/OFF
EXA=*nnn,nnn,...*	Display the specified DASD exception definitions
SPR=Y|N	Display spare DASD exception definitions, Y/N.

Figure 192 shows an example XDDK line command display:

Figure 192 • XDDK line command

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=

XVDK

XDDK EXA=1,2,3
+   EXA=1  VOL=DBAX*     SET=ON  PRI=1  RDY=Y  TDL=60  RTM>.100  IOR<20
+   EXA=2  VOL=*         SET=ON  PRI=1  RDY=Y
+   EXA=3  SPARE=Y
```

In this example, the XDDK line command has displayed DASD exception definitions 1, 2, and 3 in response to the EXA= keyword. The first two exception definitions represent working definitions. The third is a spare exception definition that may be built using the XVDK line command.

XVDK - Vary MVS DASD Exception Definitions

The XVDK line command is used to modify DASD Exception Definitions. The EXA= keyword specifies the exception definitions to be modified. If multiple exception definitions are specified, the changes propagate through all specified exception definitions.

Changes made using the XVDK line command are made to the currently loaded level set only. The changes are only temporary and are lost when a level set is loaded or the PreAlert MVS session is terminated.

The following is a listing of keywords and a brief functional description. Refer to the indicated section for additional information.

Keyword	Function
EXA=*nnn,nnn,...*	Exception definition number(s)
SET=ON|OFF	Activate/terminate the exception definition
SPR=Y	Alter to spare exception definition.

SELECTION OPTIONS - See "DASD Exception Definition Selection" on page 343.

Keyword	Option
VOL=*VOLSER*	Volume Serial (VOLSER) mask
CUA=*device addr*	Device address (CUA) mask.
UNT=*unit-name*	Unit name value

EXCEPTION THRESHOLDS - See "MVS DASD Exception Thresholds" on page 348.

Keyword	Keyword	Exception
BSY<*nnn*	BSY>*nnn*	DASD Busy Percentage
IOR<*nnn*	IOR>*nnn*	DASD input and output Rate
RTM<*.nnn*	RTM>*.nnn*	Device Response Time
RDY=Y|N		Device dropped ready
SYS=*nnn*		Related system exception.

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword	Option
TOD>*hhmm*	Time of day range, lower limit
TOD<*hhmm*	Time of day range, upper limit
TIN=*nnn*	Time interval, seconds
DLY=*nnn*	Exception delay count
TDL=*nnn*	Exception delay time, seconds
LIM=*nnn*	Exception limit count
LMX=*nnn*	Exception limit-x count

Keyword	Option
TLM=*nnn*	Time of day limit count
PRI=*nnn*	Exception priority, 1-255
AND=Y|N	Request AND logic for exception thresholds
SND=Y|N	Activate/terminate terminal sound
SUP=A|E|N|*	Supersede other exception definitions A Always supersede E Supersede only when exception occurs N Never supersede.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOG=*xxx*	Exception logging options.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG='*message*'	User specified exception message
USR='*userids list*'	Sends message to TSO userids list
USO=L|N	User Send Option, LOGON or NOW
CON=Y|N	Sends message to MVS console
RTC=*n,n,n*,...	Console route codes, 1-16
DSC=*n,n,n*,...	Console descriptor codes; 2, 7, or 11 only
CLR=*x*	Specifies exception message color.

SCREEN OPTIONS - See "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Requests screen print
SCR=*screen name*	Requests screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Requests freeze frame with screen chaining.

COMMAND OPTIONS - See "MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD='*command*'	Issue command, command image
JOB=*member*	Submit job, member name
CDL=*nnn*	Command delay count
CLM=*nnn*	Command limit count.

Figure 193 shows an example XVDK line command display:

Figure 193 • XVDK line command

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=

XVDK EXA=3,VOL=DBAX80,SET=OFF
+   EXA=3  VOL=DBAX80    SET=OFF

XDDK
+   EXA=1  VOL=DBAX*     SET=ON  PRI=1  TDL=60  RTM>.100  IOR>20
+   EXA=2  VOL=*         SET=ON  PRI=1  RDY=Y
+   EXA=3  VOL=DBAX80    SET=OFF
```

In the example above (Figure 193 on page 347), exception definition 3 (EXA=3) was added to remove the DBAX80 volume from all DASD exception analysis. By specifying the full VOLSER, this exception definition has the highest best fit value possible. Therefore, this is the first exception definition for the device. Since this is the first exception definition for the device and it has been terminated (SET=OFF), no exception analysis is performed for the device.

Exception definition 1 (EXA=1) was built to watch for excessive device response time (RTM>.100) or high input and output rates (IOR>20) on the DBAXxx volumes.

Additionally, a time delay of 60 seconds was used to allow the RMF statistics to stabilize, particularly at the beginning of an RMF interval.

Exception definition 2 (EXA=2) was built to watch the ready status (RDY=Y) of all DASD devices (VOL=*). Note, DBAX80 is excluded since its first exception definition was terminated.

MVS DASD Exception Thresholds

These sections describe the MVS DASD exception thresholds:

DASD Busy Percentage Exception

Exception Keywords	BSY>*nnn* or BSY<*nnn*
Default Message	*cua VOLSER nnn.nn%* BUSY
Message Number	PAEXA303
Text Keyword	&DBSY

MVS Exception Analysis uses the Device Busy Percentage from the DBSY line command for this exception threshold. This value is obtained from the current RMF reporting interval and represents the device busy percentage since the start of the RMF interval.

The Device Busy Percentage is the percentage of time during the interval that the device was in use. This percentage includes the connect and disconnect times for input and output operations and the time the device was reserved by another system.

DASD Input and Output Rate Exception

Exception Keywords	IOR>*nnn* or IOR<*nnn*
Default Message	CUA *VOLSER* I/O RATE = *nnn.n* PER SECOND
Message Number	PAEXA304
Text Keyword	&DIOR

MVS Exception Analysis uses the input and output rate from the DIOR line command for this exception threshold. The input and output rate is obtained from the current RMF reporting interval and represents the input and output rate per second since the start of the RMF interval.

The input and output rate is calculated as the number of start subchannel (SSCH) instructions completed, divided by the number of seconds since the beginning of the interval.

Device Response Time

Exception Keywords	RTM>*.nnn* or RTM<*.nnn* (seconds)
Default Message	CUA VOLSER RESPONSE TIME = *nnn.n* SECONDS
Message Number	PAEXA305
Text Keyword	&DDST

MVS Exception Analysis uses the Device Response time from the DDST (Device Service Time) line command for this exception threshold. The service time is obtained from the current RMF reporting interval and reflects the average device service time since the start of the RMF interval.

The Device Service Time is the average time required to complete an input and output request. This includes any IOS (software) queueing time plus the hardware (channel) service time.

Device Dropped Ready Exception

Exception Keywords	RDY=Y|N
Default Message	CUA VOLSER DEVICE HAS DROPPED READY
Message Number	PAEXA302

MVS Exception Analysis watches the Device Ready Status for this exception threshold. The exception occurs when the MVS Exception Analysis sees that the device has become "not ready".

MVS Exception Analysis maintains the ready status for any DASD device that has been ready while the PreAlert MVS session has been active. If the device has been not ready during the entire session, the exception does not occur.

Related System Exception

Exception Keywords	SYS=*nnn*
Default Message	CUA VOLSER SYSTEM EXCEPTION *nnn* OCCURRED
Message Number	PAEXA301
	&SYSN

The SYS=*nnn* keyword may be specified in a DASD exception definition to relate it with a system exception definition. That is, the SYS=*nnn* exception occurs whenever the specified system exception definition detects an exception.

For example, a system exception has been built to watch for possible input and output loop conditions (EXA=5, SET=ON, CPU<50, IOR>1000, AND=Y). When the system exception occurs, you would also like to know which DASD devices are exceeding 30% busy. A DASD exception built with VOL=*, BSY>30, SYS=5, and AND=Y generates the device busy exception only when system exception definition 5 has occurred while the device is over 30% busy.

MVS Exception Analysis Control Options

The MVS Exception Analysis Control Options are used to regulate the exception definitions. The control options include time of day, exception delays, exception limits, priorities, AND logic, terminal sound (beep), and supersede options.

The exception time interval, delay, and limit options basically control how often and how many times an exception definition can detect an exception. For MVS System Exception Analysis, the delays and limits apply directly to the exception definition.

For address space exception definitions and DASD exception definitions, the time interval, delay, and limit options apply to the address space or DASD device. Since an exception definition may apply to multiple address spaces or DASD devices, and the same job may be run several times during a PreAlert MVS session, the interval, delays, and limits are maintained for each exception definition selected for the address space or DASD device.

Keyword	Function
TOD>*hhmm*	Time of day range, lower limit
TOD<*hhmm*	Time of day range, upper limit
TIN=*nnn*	Time interval, seconds
DLY=*nnn*	Exception delay count
TDL=*nnn*	Exception delay time, seconds
LIM=*nnn*	Exception limit count
LMX=*nnn*	Exception limit-x count
TLM=*nnn*	Time of day limit count
PRI=*nnn*	Exception priority, 1-255
AND=Y|N	Request AND logic for exception thresholds
SND=Y|N	Activate/terminate terminal sound
SUP=A|E|N|*	Supersede other exception definitions.

Figure 194 shows an example exception definition display:

Figure 194 • Exception definition display

```
EXAD *** SQA OVERFLOWING INTO CSA (S3) ***
+    *** STC IDMSTST2 SWAPPABLE (T3) ***

XDSY EXA=3
+   EXA=3  SET=ON  PRI=100  LIM=2(2) SQA>100  MSG='SQA OVERFLOWING INTO CSA'
XDTK
+   EXA=1  JNM=IDMS*     SET=ON  PRI=150  ....
+   EXA=2  JNM=IDMSJRN*  SET=OFF
+   EXA=3  JNM=IDMS*     SET=ON  PRI=20  LIM=2  TDL=60  USR=DBA1  NSW=Y

JSEL JNM=IDMS*
JOBN IDMSPROD IDMSTST1 IDMSTST2 IDMSJRN1 IDMSTST3
JSTA CPU*NSW  I/O*NSW  WAT*RES  I/O*RES  WAT*NSW
JEXX   1/...    1/...    1/...    2/OFF    1/...
+      3/...    3/...    3/L..             3/...
```

In the previous example, system exception definition number 3 (EXA=3) has a limit of 2 (LIM=2). Since the exception has occurred twice, the exception is no longer checked. The XDSY line command displays the exception definition as still active, SET=ON, with the limit reached, LIM=2(2).

Address space exception definition 3 (EXA=3) has detected that the IDMSTST2 started task is being run swappable and has lost its non-swappable status. Since the exception has occurred twice for IDMSTST2, the exception definition 3 is skipped for that address space. Exception definition 3 remains active for all other IDMS* jobs. If the IDMSTST2 task is stopped and restarted, the limits and delays reestablish from the exception definition.

Time of Day Range Option

The TOD>*hhmm* and TOD<*hhmm* keywords provide control over the time of day that the exception definition is to be active. If the time of day falls within the time of day range, the exception definition is active. Otherwise, the exception definition is not be tested.

The time of day control allows different thresholds to be implemented based upon the time of day, as shown in Figure 195:

Figure 195 • Time of day range option

```
XDTK EXA=1,2
+   EXA=1  CLS=A  SET=ON  TOD>0800  TOD<1659  PRI=50  WKS>1000
+   EXA=2  CLS=A  SET=ON  TOD>1700  PRI=50  WKS>5000
```

In the example, between 8:00 A.M. and 4:59 P.M. (inclusive), the working storage size threshold for class A jobs is set to 1000K (WKS>1000). After 5:00 P.M. and until midnight, the threshold is set to 5000K (WKS>5000).

Time Interval Option

The TIN=*nnn* keyword limits how often the exception definition is tested (via every *nnn* seconds). PreAlert MVS maintains a time stamp indicating when the exception definition is to be tested again. When PreAlert MVS cycles up to or past this time, the exception is tested.

For system exception analysis, the time interval is maintained for each system exception definition. For address space and DASD exception analysis, a time stamp is maintained for each exception definition selected for an address space or DASD device.

Exception Delay Options

The exception delay option ensures that the exception thresholds are met continuously over a period of time. This provides the ability to ignore short term peaks and valleys associated with statistics such as paging rates and DASD input and output rates.

The DLY=*nnn* keyword specifies the exception delay as the number of PreAlert MVS cycles (or update intervals). With the exception delay count, the exception thresholds must be met during each PreAlert MVS cycle for the past nnn cycles before the exception actually occurs and exception messages are generated.

The TDL=*nnn* keyword specifies the exception delay in seconds. With the time delay, the exception conditions must exist over a period of *nnn* seconds before the exception actually occurs and any exception messages are produced.

For example, a system exception definition is defined with PGR>50 and TDL=30. When the paging rate exceeds 50 pages per second for 30 seconds, the exception occurs. With the PreAlert MVS session in a 5-second Auto-update, the paging rate must exceed 50 pages/second for 6 consecutive PreAlert MVS cycles to trigger the exception. With a 20-second Auto-update, only 2 cycles are needed to meet the 30-second time delay.

For system exception analysis, the exception delay is maintained for each system exception definition. For address space and DASD exception analysis, the exception delay is maintained for each exception definition selected for an address space or DASD device.

Exception Limit Options

The exception limit is used to limit the number of times an exception is allowed to occur. Essentially, this is used to eliminate repetitive messages for long term exceptions. The exception limit can apply permanently for the life of the exception definition, or temporarily for the duration of the exception or during the Time of Day Range.

For system exception analysis, the exception limits are maintained for each system exception definition. For address space and DASD exception analysis, the exception limits are maintained for each exception definition selected for an address space or DASD device.

The LIM=*nnn* keyword specifies the permanent exception limit. After the exception has occurred nnn times, the exception suspends. For system exceptions, the exception definition is suspended. For address space and DASD exception definitions, the definition suspends for the affected address space or DASD device only.

The LMX=*nnn* (limit-x) keyword specifies a temporary exception limit for the duration of the exception only. For long-term exceptions that occur occasionally, the limit-x option enforces the limit for each occurrence of the exception. That is, the exception definition suspends while the conditions continue. Once the conditions cease, the limit-x option is reset and the exception definition is reactivated.

The TLM=*nnn* (time of day limit) keyword specifies a temporary exception limit for the duration of the Time of Day Range only. Once the limit is reached during a Time of Day Range, the exception definition is suspended. At the end of the Time of Day Range, the limit is reset and the exception definition is reactivated. This provides a convenient means of enforcing a once-a-day exception.

Exception Priority Option

The PRI=*nnn* keyword assigns a priority value (1-255) to the exception definition. The priority is used to:

- Prioritize exception messages when multiple exceptions occur simultaneously.
- Suppress exception messages when the priority falls outside the minimum and maximum priority range established for the level set (through either the EXAS line command or EXAINIT macro).
- Select screen chaining when multiple exception definitions have requested screen chaining simultaneously.

AND Logic Option

The AND=Y keyword requests AND logic for all exception thresholds in the exception definition. The AND=N keyword removes the AND logic option, allowing OR logic.

Normally, when multiple thresholds are specified in an exception definition, each threshold is treated separately using OR logic. That is, one or more thresholds must be met for the exception to occur.

When multiple thresholds have been specified with AND logic, all thresholds must be met for the exception to occur.

Terminal Sound Option

The SND=Y keyword requests that the terminal alarm be sounded when the exception occurs. The SND=N keyword removes the sound option.

The sound option is available during PreAlert MVS sessions where output is displayed on a terminal. It is ignored during PreAlert MVS background sessions.

Supersede Option

The Supersede option is used to eliminate redundant exception analysis when multiple exception definitions are selected for an address space or a DASD device. It allows an exception definition to supersede the lower (by best fit value) exception definitions. That is, the lower exception definitions supersede and no exception analysis is performed for those exception definitions.

The Supersede option is available for address space exception definitions and DASD exception definitions only. It is not available for system exception definitions.

The SUP=A keyword specifies that the exception definition is to always supersede all lower exception definitions.

The SUP=E keyword specifies that the exception definition is to supersede lower exception definitions only when the exception occurs.

The SUP=N or SUP=* keyword removes the Supersede option from the exception definition.

Figure 196 shows an example of the Supersede option:

Figure 196 • Supersede option

```
EXAD *** 14A DBAX03 I/O RATE = 23.7 PER SECOND (D2) ***
+    *** 34D DBAT01 I/O RATE = 54.1 PER SECOND (D3) ***
+    *** 448 DBAX17 RESPONSE TIME = .081 SECONDS (D1) ***

XDDK
+   EXA=1  VOL=*         SET=ON  PRI=1  IOR>40  RTM>.040
+   EXA=2  VOL=DBAX*     SET=ON  PRI=1  SUP=E  IOR>20
+   EXA=3  VOL=DBAT*     SET=ON  PRI=1  SUP=A  IOR>50

DSEL VOL=DBA*
DISK      142      14A      240      243      341      34D      447      448 +
DVOL   DBAX14   DBAX03   DBAT02   DBAX07   DBAX01   DBAT01   DBAT11   DBAX17
DIOR     11.7     23.7      1.4      7.2     13.3     54.1      6.8      3.3
DDST    .021S    .017S    .013S    .024S    .019S    .011S    .044S    .081S
DEXX    2/...    2/*..    3/...    2/...    2/...    3/*..    3/...    2/...
+       1/...    1/...    1/...    1/...    1/...    1/...    1/...    1/*..
```

In the example, DASD exception definition 1 (EXA=1) was built to watch the input and output rate and response time for all DASD devices.

Exception definition 2 (EXA=2) for the DBAX volumes watches for an input and output rate of 20. If the exception occurs, all lower exception definitions are superseded.

Exception definition 3 (EXA=3) for the DBAT volumes watches for an input and output rate of 50. It always supersedes the lower exception definitions. This effectively eliminates exception definition 1 for all DBAT volumes.

The DBAX03 volume experienced an input and output rate exception from exception definition 2. This exception definition superseded exception definition 1, which prevents it from detecting the exception again.

The DBAT01 volume experienced an input and output rate exception from exception definition 3. Since exception definition 3 always supersedes the lower exception definitions, exception definition 1 was ignored.

The DBAX17 volume did not experience the input and output rate exception from exception definition 2, allowing exception definition 1 to detect the response time exception.

MVS Exception Analysis Screen Options

The MVS Exception Analysis Screen Options include screen printing and screen chaining. Each of these options is available in all MVS exception definitions.

Keyword	Function
PRT=Y/N	Request screen print
SCR=*screen name*	Request screen chaining
SCR=*	Remove screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y/N	Request freeze frame with screen chaining.

Screen Print Option

The PRT=Y keyword requests that the contents of the current screen be printed to the PreAlert MVS print file. Although several exception definitions may request the Screen Print option, the screen only prints once regardless of the number of exceptions that have occurred.

The screen print is requested through the Screen Print Facility. Refer to the PRNT line command description under "Screen Print Facility" on page 10 for assigning SYSOUT attributes to the print file. The PRNT line command is not required when a screen print is requested through MVS Exception Analysis.

Screen Chaining Option

The SCR keyword specifies the name of a screen definition for the Screen Chaining option. When an exception occurs, the Screen Chaining option passes control to the specified screen. This screen may be used to collect additional information concerning the exception, request screen printing, or call additional screens, etc. When the analysis of the exception is completed, the .RET line command returns control to the calling screen. Since the Screen Chaining option is specified individually for each exception definition, several sets of screen definitions may be tailored, one for each exception definition.

If an exception definition requests screen chaining, the current screen is displayed with the message EXA SCREEN PENDING in the upper righthand corner. With the next PreAlert MVS cycle, the called screen is displayed with the message EXA SCREEN ACTIVE in the upper righthand corner. This message displays on all screens until control is returned to the calling screen.

While screen chaining is active, any additional requests for screen chaining is delayed. This allows the current screen chaining request to complete before another exception begins a new screen chaining request.

When multiple exceptions request screen chaining simultaneously, PreAlert MVS honors the request with the highest priority. The lower priority screen chaining requests may be pre-emoted by a higher priority request.

Screen Chaining Freeze Option

The FRZ=Y keyword requests that the Freeze option is in effect while Screen Chaining is active. The Freeze option honors with a screen chaining request only; without screen chaining the Freeze option is ignored.

When the freeze option is requested with screen chaining, PreAlert MVS freezes updating when the called screen is displayed. The message EXA SCREEN FROZEN displays to indicate that both MVS Exception Analysis Screen Chaining and the Freeze option are in effect. When control returns to the calling screen, the freeze frame setting returns to its original value.

Rules observed by the Screen Chaining Freeze Option:

1. Requested screen(s) remains frozen for the duration of screen chaining, but can be reset by the user (.Z command).

2. When screen chaining is invoked, the current setting for freeze frame is saved and restored when control is returned (.RET) to the calling screen.

3. If freeze frame is active when screen chaining is invoked, it remains active during screen chaining regardless of the FRZ= value.

4 While the Freeze option remains during screen chaining, EXA SCREEN FROZEN displays in the upper righthand corner of the screen.

Screen Chaining Delay Option

The SDL keyword specifies the Screen Chaining Delay count. Screen chaining delays until the exception has occurred nnn times consecutively (allowing for any exception delay). If the exception delay is set to 3 (DLY=3) and screen delay is set to 2 (SDL=2), the exception conditions must exist through 6 consecutive PreAlert MVS cycles before screen chaining is requested.

For system exception analysis, the Screen Chaining Delay is maintained for each system exception definition. For address space and DASD exception analysis, the screen chaining delay is maintained for each exception definition selected for an address space or DASD device.

Screen Chaining Limit Option

The SLM keyword specifies the Screen Chaining Limit, the number of screen chaining requests allowed before screen chaining is terminated. The screen limit is useful when a condition occurs often but the additional information provided by screen chaining is only needed once.

For system exception analysis, the Screen Chaining Limit is maintained for each system exception definition. For address space and DASD exception analysis, the Screen Chaining Limit is maintained for each exception definition selected for an address space or DASD device.

MVS Exception Analysis Logging Option

The MVS Exception Analysis Logging Option provides an interface to the PreAlert MVS Statistics Logging Feature. Through this interface, an exception definition can request the logging of PreAlert MVS display images, MVS exception messages, and/or the MVS System statistics monitored by exception analysis. Refer to "Statistics Logging Feature" on page 40 for details on controlling the logging feature.

A logging option may be specified in each exception definition and a default logging option may be established for the entire level set. When an exception occurs, the logging from the exception definition is used first. If a logging option was not included in the exception definition, the default logging option from the level set is used.

When multiple exception definitions request logging simultaneously, each set of statistics records only once, regardless of the number of requests.

Keyword	Function	
LOG=*xxx*	Request logging of the following (any combination of values)	
	D	PreAlert MVS display image
	S	MVS system statistics (from exception analysis)
	M	MVS exception messages
	N	No logging for this exception
	*	Reset logging option.

Figure 197 shows an example of the Exception Analysis Logging option:

Figure 197 • Exception Analysis Logging option

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=M

XVSY

XDSY
+   EXA=1  SET=ON  PRI=100  TDL=15  LOG=SM  CPU>99
+   EXA=2  SET=ON  PRI=15  TPM>1800
```

In the example above, whenever the exception for system exception definition 1 (EXA=1) occurs, both the exception messages and MVS system statistics are logged (LOG=SM). For exception definition number 2 (EXA=2), the logging option was not specified; therefore, the default for the level set LOG=M is used.

Record formats for the logged data may be obtained by assembling the MLOGRECD macro in the PreAlert MVS control file. The ASMMLOG member contains the JCL required to assemble the macro.

MVS Exception Analysis ASG-Server Facility Options

PreAlert MVS provides realtime routing of exception messages to the ASG-SERVER FACILITY. The Event Notification Manager then delivers the exception messages to the application(s) responsible for services such as help desk calls, problem management, performance management, etc. Refer to the *ASG-Server Facility Reference Guide* for more information on the application.

The ASF=*xxxx* keyword specifies the four character subsystem ID for the ASG-Server Facility (ASF). Additionally, a default server ID is specified in the Userdata UDPARMS macro, ASFID=*xxxx* keyword. The default is used when an equal sign (=) is specified for the server ID in the exception definition.

Either ASF=*xxxx* or ASF='=' must be specified in the exception definition for the exception message(s) to be sent to the server.

To send exception messages to the server, PreAlert MVS calls the ASFLINK module. ASFLINK is loaded from the library identified in the ASFLINK DD statement in the PreAlert MVS startup JCL. The ASFLINK DD statement must be included in the startup JCL for PreAlert MVS. Refer to the *ASG-PreAlert IDMS/MVS System Guide* for details on ASFLINK DD.

For each exception message sent to the server, PreAlert MVS calls ASFLINK using the following parameter list:

+0	Fullword	Address of the server function being requested.
+4	Fullword	Address of the server command.
+8	Fullword	Length of the data area.
+12	Fullword	Address of the data area.
+16	Fullword	Address of error message return area.
+20	Fullword	Address of the server subsystem ID.

The server identifies the requested server function. The default is EVENT NOTIFICATION MANAGER, specified in the Userdata UDPARMS macro, ASFFUN=*keyword*.

The server command identifies the exception message by type, either system, address space, or DASD exception messages.

For PreAlert MVS exception messages, one of these three commands is used:

- 'PREALERT.MVS.SYSTEM.EXCEPTION' (system exceptions)
- 'PREALERT.MVS.ASID.EXCEPTION' (address space exceptions)
- 'PREALERT.MVS.DASD.EXCEPTION' (DASD exceptions).

The length of the data area is the actual length of the text in the data area.

The data area contains the text to identify the exception and the source of the server call. The data is specified in a keyword format, keyword='text', with a single blank character separating the keywords. The following keywords are sent for each exception message:

Keyword	Description
DATE=*yy.ddd*	Julian date when the exception was detected
TIME=*hh:mm:ss.t*	Time the exception was detected
PREALERT=*name*	Job (started task) name for PreAlert MVS
USER=*userid*	User ID for the PreAlert MVS session
MESSAGE=*text*	Exception message text
MESSAGE_ID=*message*	Message number for the exception message number
SYSTEM_ID=*MVS id*	MVS system ID

The error message return area allows ASFLINK to provide a message if it is unable to process the request. PreAlert MVS displays the error message on the top line of the screen. Refer to the *ASG-Server Facility Reference Guide* for information regarding the specific messages.

The server ID identifies which server is to process the request. The server is supplied through the ASF keyword for the exception definition.

MVS Exception Analysis Message Options

The MVS Exception Analysis Message options allows a user to construct a replacement exception message. The message may contain text keywords, as described in "MVS Exception Analysis Text Keyword Processor" on page 367. In addition to being displayed on the PreAlert MVS screen (EXAD line command), the messages may be sent to an MVS console or to one or more TSO users. Messages may also be logged using the "MVS Exception Analysis Logging Option" on page 359.

Address space exception messages always precede with the job type and jobname. The device address (CUA) and VOLSER precedes any DASD exception messages.

When MVS Exception Analysis sends an exception message either to an MVS console or TSO user ID(s), the message prefixes with the exception message number. The message numbers are listed along with the messages in the exception thresholds sections. The default message number prefix PAEXA may be replaced in the userdata UDPARMS macro, with the keyword EXAPFX.

MVS Exception Analysis also includes a time stamp when exception messages are sent to an MVS console or TSO users. The date may also be included in these messages. Refer to description of the USERDATA UDPARMS macro EXADATE keyword in the *ASG-PreAlert IDMS/MVS System Guide*.

Keyword	Function
MSG=*message*	User specified exception message
MSG=*	Removes user specified exception message
USR=*userid list*	Sends message to TSO userid list
USR=*	Removes TSO userid list
USO=L|N	User Send Option LOGON or NOW
CON=Y|N	Sends message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes; 2, 7, or 11 only
CLR=*x*	Specifies exception message color.

User Specified Exception Message

The MSG keyword provides the ability to replace the default exception message with a user specified message. The message text may contain text keywords, as described in "MVS Exception Analysis Text Keyword Processor" on page 367.

Normally, when an exception definition contains multiple thresholds, an exception message produces for each threshold. When a user message is specified, the message is produced only once. This helps eliminate extraneous messages, particularly when AND logic is used.

User specified exception messages are assigned a message number based upon the exception area: PAEXA100 for system exceptions, PAEXA200 for address space exceptions, and PAEXA300 for DASD exceptions.

TSO User Message Option

With the USR list keyword, MVS exception analysis sends the exception message(s) to one or more TSO users. If multiple user IDs are specified, they must be separated with commas and the entire list must be enclosed in quotes. To enable TSO users to receive messages, their TSO PROFILE INTERCOM option must be on.

For MVS Address Space Exception Definitions, the &JOBUSER keyword may be used in the list of TSO user IDs. PreAlert MVS replaces &JOBUSER with the user ID from the JOB card USER= parameter. This allows PreAlert MVS to send exception messages directly to the user responsible for the job.

TSO User Send Options

The USO keyword specifies the option to be used with the send command for sending messages to TSO users.

The default, USO=L, requests the LOGON option; messages are sent to the TSO user if he is currently logged on and receiving messages. If the user is not logged on or is not receiving messages, the message is retained until the user logs on to TSO.

The USO=N keyword requests the NOW option. Messages are sent immediately to the user. If the user is not logged on, the message is deleted.

MVS Console Message Option

With the CON keyword, MVS exception analysis sends the exception message to an MVS console. Additionally, the RTC and DSC keywords specify console routing and descriptor codes. Default routing and descriptor codes are specified in the userdata UDPARMS macro WTORTC and WTODSC keywords.

Exception Message Color

The CLR keyword specifies a color in which the exception message(s) is be displayed. The following values may be specified to select the desired color.

N No color, default to base display color
R Red message color
G Green message color
B Blue message color
Y Yellow message color
W White message color
* Reset color option.

The exception messages display in color only if the Color Support option has been activated through the .COLRON or .COLRXON control commands. For more information, refer to "Color Support" on page 19.

MVS Exception Analysis Command Option

The MVS Exception Analysis Command option provides the ability to issue an MVS command or submit a batch job whenever an exception occurs. The command text or the job text may contain text keywords, as described in "MVS Exception Analysis Text Keyword Processor" on page 367. The text keywords are substituted with actual values from the MVS Exception Analysis.

When the exception command is requested, PreAlert MVS verifies user authorization to issue MVS commands through the Line Command Exclude feature or by calling the Security Exit. Refer to "User Security Exit" in the *ASG-PreAlert IDMS/MVS System Guide* for details on the security exit.

Security for batch jobs is provided through the security measures used for any batch job. PreAlert MVS does not provide security for submitting jobs.

Figure 198 shows an example address space exception definition display:

Figure 198 • Address space exception definition display

```
EXAS
+   LVL=99            SYS=ON   TSK=ON   DSK=ON    MSG=Y ALWAYS DISPLAY
+                     MIN=   0 MAX= 255 LOG=M

XVTK

XDTK
+   EXA=1  CLS=T  TYP=J  SET=ON  PRI=1  LIM=1  TDL=15  CPX>50  IOR<1  AND=Y
+     MSG=CANCELLED BY PREALERT, POSSIBLE CPU LOOP  USR=&JOBUSER
+     CMD=CANCEL &JOBN,DUMP
```

In the example, address space exception definition number 1 (EXA=1) was built to automatically cancel class T batch jobs that appear to have gone into a CPU loop condition. Also, the user supplied exception message is sent to the TSO user responsible for the job. Note that the job type and jobname is always included with any address space exception messages. Therefore, there is no need to include the jobname in the user supplied message.

Keyword	Function
CMD=*command*	Command text, quotes required
CMD=*	Remove command text
JOB=*member*	Batch Job option, member name
JOB=*	Remove job option
CDL=*nnn*	Command Delay count
CLM=*nnn*	Command Limit count.

Command Option

The CMD keyword specifies the exception command text. When an exception definition requests the Command option, PreAlert MVS passes the command text through the Text Command Processor. The text keywords are replaced with the appropriate values from MVS Exception Analysis. The command is then issued through an MVS console, where it is processed by the MVS operating system.

PreAlert MVS validates user authorization to issue MVS commands. The COMD function may be secured through the Line Command Exclude feature or through the Security Exit. If the MVS command authorization is not allowed, PreAlert MVS generates an additional exception message to indicate that the user cannot issue MVS commands.

Batch Job Option

The JOB keyword specifies the name of a member in the PreAlert MVS HELPFILE. PreAlert MVS reads the text from the member, passes it through the Text Keyword Processor, and then submits the job through the MVS Internal Reader (INTRDR).

PreAlert MVS does not perform any verification or validation on the text being submitted. The job is subject to all security procedures associated with normal batch jobs.

Command Delay Option

The CDL keyword specifies the Command Delay count. The Command Delay count applies to both the Command option and the Batch Job option. Both options delay until the exception has occurred (*nnn* times consecutively), allowing for any exception delay. If the exception delay is set to 3 (DLY=3) and the command delay is set to 2 (CDL=2), then the exception conditions must exist through six (6) consecutive PreAlert MVS cycles before the Command or Batch Job option is requested.

For system exception analysis, the Command Delay is maintained for each system exception definition. For address space and DASD exception analysis, the Command Delay is maintained for each exception definition selected for an address space or DASD device.

Command Limit Option

The CLM keyword specifies the Command Limit. The Command Limit applies to both the Command option and the Batch Job option. Both options terminate after either has been requested (nnn times) the number of times specified with CLM (e.g., CLM=3). The Command Limit is intended to eliminate the possibility of issuing the command more than once, particularly in situations where the effects of the command may not immediately resolve the exception.

For system exception analysis, the Command Limit is maintained for each system exception definition. For address space and DASD exception analysis, the Command Limit is maintained for each exception definition selected for an address space or DASD device.

MVS Exception Analysis Text Keyword Processor

The Text Keyword Processor replaces text keywords with the appropriate values from MVS Exception Analysis. The processor is called for command text (CMD=), message text (MSG=), and the member text for the job option (JOB=).

The text keywords attempt to correspond to existing PreAlert MVS line commands. In some cases, their meanings may have been slightly modified, or new codes may have been created.

Note:

If you are coding the exception text keywords in the macros to build an exception level set in batch, you must begin any exception text keyword with a double ampersand (&&) rather than a single ampersand (&). The Assembler compiler ignores the first ampersand.

If you are working with PreAlert MVS online, you may specify the exception text keywords (with a single ampersand) as they are listed in the following text.

System Exception Text Keywords

These text keywords are available for all system exceptions:

Keyword	Function
&CPUR	CPU utilization (percent)
&CPUO	MVS CPU overhead (percent)
&PGRT	Paging rate
&IORT	Input and output rate
&TPIP	Input and output interrupts handled by TPI (percent)
&ASEC	Auxiliary storage slot error count
&ASQL	Auxiliary storage IOQ length
&ASLP	Auxiliary storage slots left (percent)
&ASNV	Auxiliary storage non-VIO slot usage (percent)
&ASVU	Auxiliary storage VIO slot usage (percent)
&SRMM	SRM variable causing MPL reduction
&SRMC	SRM average CPU rate (percent)
&SRMP	SRM page fault rate
&SRMU	SRM unreferenced interval count (UIC)
&SRMA	SRM average ASM IOQ length
&SRMD	SRM demand paging rate
&SRMT	SRM page delay time
&OPRW	Operator console WTO buffer usage (percent)
&OPRR	Outstanding operator reply elements
&STGU	Main storage usage (percent)
&CSAU	CSA usage (percent)
&SQAU	SQA usage (percent)
&FCSA	Free CSA size, above and below 16MB
&FCSB	Free CSA size, below 16MB
&FSQA	Free SQA size, above and below 16MB
&FSQB	Free SQA size, below 16MB
&UCSA	Unonwned CSA size, above and below 16MB

Keyword	Function
&UCSB	Unowned CSA size, below 16MB
&USQA	Unowned SQA size, above and below 16MB
&USQB	Unowned SQA size, below 16MB
&EMAG	Extended storage migration age (time)
&ESWR	Extended storage page write rate
&ESRR	Extended storage page read rate
&ESMR	Extended storage page migration rate
&SWRR	Total swap rate
&SWER	Logical expanded storage swaps; percent of all swaps.

The following categories give keywords and exceptions available for specific system exceptions.

Text keywords for Page Dataset Errors exceptions only:

&PDEN	Page dataset name
&PDEE	Error count for the page dataset.

Text keywords for Page Dataset Failure exceptions only:

&PDFN	Page dataset name.

Text keywords for Swap Dataset Errors exceptions only:

&SDEN	Swap dataset name
&SDEE	Error count for the swap dataset.

Text keywords for Swap Dataset Failure exceptions only:

&SDFN	Swap dataset name.

Text keywords for Domain Overload Exceptions only:

&DMNN	Domain number
&DMNR	Ready user average for domain.

Text keywords for Tape Mount Wait exceptions only:

&TPMC	Tape device address (CUA)
&TPMT	Tape mount wait time.

Text keywords for LCU input and output rate exceptions only:

&LIOL	Logical control unit ID
&LIOR	LCU input and output rate.

Text keywords for LCU all Channels Busy exceptions only:

&LCBL	Logical control unit ID
&LCBP	LCU all channels busy (percent).

Text keywords for Missing Task exceptions only:

&MIST	Missing task Jobname.

Text keywords for Enqueue Contention exceptions only:

&XQOC	Owner count
&XQWC	Waiter count
&XQQN	Queue name
&XQRN	Resource name (EBCDIC)
&XQRH	Resource name (Hex)

Address Space Exception Text Keywords

The following text keywords are available for all address space exceptions:

Keyword	Exception
&JOBN	Jobname for address space
&JTYP	Job type: STC, TSO, or JOB
&CPUR	CPU utilization (percent of system)
&CPUX	CPU utilization (percent of a processor)
&JSTL	Percent of job step time limit used
&IOCR	Current input and output rate

Keyword	Exception
&PGRT	Total paging rate
&TMTR	Transaction time
&WAIT	Waiting time
&SWPS	Swap status
&NSWS	Non-swappable status
&SWCT	Swap count
&FMCT	Working storage set size (K bytes)
&FXFR	Fixed storage size (K bytes)
&ESCT	Extended storage size (K bytes)
&CSTT	Total common storage size
&CSAT	Total CSA Size
&CSAB	Low CSA Size (below 16MB line)
&SQAT	Total SQA Size
&SQAB	Low SQA Size (below 16MB line)
&TCBT	Job Step CPU Time
&QWTM	Enqueue wait time
&SLTT	Auxiliary Storage slot usage count
&SYSN	System exception number.

DASD Exception Text Keywords

The following text keywords are available for all DASD exceptions:

Keyword	Exception
&DISK	DASD device address, CUA
&DVOL	DASD volume serial number, VOLSER
&DBSY	Device busy (percent)
&DIOR	Input and output rate
&DDST	Device response time
&SYSN	System exception number

MVS Exception Analysis Macros

The MVS Exception Analysis Macros are used to build an exception level set. The macros also allow you to predefine the level set. This saves considerable time and effort over tailoring the exceptions interactively. Any MVS Exception definition may be predefined using the macros.

The MVS exception level set is assembled and linked into either the PreAlert MVS step library or the SHOPMLIB load library. Sample JCL to assemble and link a level set is provided in the ASMEXA or ASMHEXA member of the PreAlert MVS control file. The macro specifications used to define the default level set (level 99) is provided in the EXALVL99 member.

Whenever text keywords are coded in the macros, the keyword must be preceded by double ampersands (&&). For example, the keyword for the system CPU rate would be coded as &&CPUR. The double ampersand is a requirement of the assembler language.

EXAINIT - MVS Exception Level Set Macro

The EXAINIT macro builds the skeleton of the Exception Level Set. It builds the basic Exception Level Set and a number of exception definitions for system, address space, and DASD exception analysis. The exception definitions are then replaced using the EXASYS, EXATASK, or EXADASD macros. Any remaining exceptions definitions are available as spare exception definitions.

For the keywords listed below, default values are underlined.

Keyword	Function
SYS=ON/OFF	Activate/terminate MVS system exception analysis
SYSCT=20	Number of system exception definitions
TASK=ON/OFF	Activate/terminate MVS address space exception analysis
TASKCT=20	Number of address space exception definitions
DASD=ON/OFF	Activate/terminate MVS DASD exception analysis
DASDCT=10	Number of DASD exception definitions
MSG=Y/D/S/N	Exception Message Display Options:
	Y= Always display MVS exception messages
	D= Display MVS exception messages during normal screen processing only, not during screen chaining
	S= Display MVS exception messages during screen chaining processing only
MSG=Y/D/S/N	N= Never display MVS exception messages
MINPRI=0	Minimum exception priority for message display
MAXPRI=255	Maximum exception priority for message display
LOGA=*xxx*	Default logging options, see "MVS Exception Analysis Logging Option" on page 359

Figure 199 • EXAINIT macro

```
----+----1----+----2----+----3----+----4----+---5----+----6----+----7----+----8
        EXAINIT SYS=ON,SYSCT=20,                                        X
                TASK=ON,TASKCT=20,                                      X
                DASD=ON,DASDCT=10,                                      X
                MINPRI=1,MAXPRI=255,                                    X
                MSG=Y,LOGA=N
```

In Figure 199, the EXAINIT macro has been coded using all the default values. This level set contains 20 spare system exception definitions, 20 spare address space exception definitions, and 10 spare DASD exception definitions. This is equivalent to the default level set (level 99).

EXASYS - MVS System Exception Definition Macro

The EXASYS macro predefines an MVS system exception definition. The EXA= keyword is required to identify the exception definition to be defined.

Keyword	Function
EXA=*nnn*	Exception definition number
SET=ON/OFF	Activate/terminate the exception definitions

EXCEPTION THRESHOLDS - See "MVS System Exception Thresholds" on page 305.

EXASYS Keyword	XVSY Keyword	Function
CPU1=*nnn*	CPU>*nnn*	CPU utilization
CPU2=*nnn*	CPU<*nnn*	
CPO1=*nnn*	CPO>*nnn*	MVS CPU Overhead (percent)
CPO2=*nnn*	CPO<*nnn*	
PGR1=*nnn*	PGR>*nnn*	Paging rate
PGR2=*nnn*	PGR<*nnn*	
IOR1=*nnn*	IOR>*nnn*	Input and output rate
IOR2=*nnn*	IOR<*nnn*	
TPI1=*nnn*	TPI>*nnn*	Percent I/O handled by TPI instruction
TPI2=*nnn*	TPI<*nnn*	
ASE1=*nnn*	ASE>*nnn*	ASM local slot error count
ASE2=*nnn*	ASE<*nnn*	
ASQ1=*nnn*	ASQ>*nnn*	ASM IOQ length
ASQ2=*nnn*	ASQ<*nnn*	
ASL1=*nnn*	ASL>*nnn*	ASM slots left percent
ASL2=*nnn*	ASL<*nnn*	
ASN1=*nnn*	ASN>*nnn*	ASM non-VIO slot usage percent
ASN2=*nnn*	ASN<*nnn*	
ASV1=*nnn*	ASV>*nnn*	ASM VIO slot usage percent
ASV2=*nnn*	ASV<*nnn*	
PDE=Y/N	PDE=Y/N	Any page dataset errors

EXASYS Keyword	XVSY Keyword	Function
PDF=Y/N	PDF=Y/N	Any page dataset failure
SDE=Y/N	SDE=Y/N	Any swap dataset errors
SDF=Y/N	SDF=Y/N	Any swap dataset failure
SRM=Y/N	SRM=Y/N	SRM reducing MPL
SRC1=*nnn*	SRC>*nnn*	SRM average CPU rate
SRC2=*nnn*	SRC<*nnn*	
SRA1=*nnn*	SRA>*nnn*	SRM ASM IOQ length
SRA2=*nnn*	SRA<*nnn*	
SRD1=*nnn*	SRD>*nnn*	SRM demand paging rate
SRD2=*nnn*	SRD<*nnn*	
SRU1=*nnn*	SRU>*nnn*	SRM unreferenced interval count (UIC)
SRU2=*nnn*		SRU<*nnn*
SRP1=*nnn*	SRP>*nnn*	SRM page rate
SRP2=*nnn*	SRP<*nnn*	
SRT1=.*nnn*	SRT>.*nnn*	SRM page delay time
SRT2=.*nnn*	SRT<.*nnn*	
DMN=Y/N	DMN=Y/N	Any domain overload
OPW1=*nnn*	OPW>*nnn*	Operator WTO buffer usage percent
OPW2=*nnn*	OPW<*nnn*	
OPR1=*nnn*	OPR>*nnn*	Outstanding operator reply count
OPR2=*nnn*	OPR<*nnn*	
STG1=*nnn*	STG>*nnn*	Main (central) storage usage percent
STG2=*nnn*	STG<*nnn*	
CSA1=*nnn*	CSA>*nnn*	CSA usage percent
CSA2=*nnn*	CSA<*nnn*	
SQA1=*nnn*	SQA>*nnn*	SQA usage percent
SQA2=*nnn*	SQA<*nnn*	
FCS1=*nnn*	FCS>*nnn*	Free CSA storage above and below 16MB (K bytes)
FCS2=*nnn*	FCS<*nnn*	

EXASYS Keyword	XVSY Keyword	Function
FCB1=*nnn*	FCB>*nnn*	Free CSA storage below 16MB (K bytes)
FCB2=*nnn*	FCB<*nnn*	
FSQ1=*nnn*	FSQ>*nnn*	Free SQA storage above and below 16MB (K bytes)
FSQ2=*nnn*	FSQ<*nnn*	
FSB1=*nnn*	FSB>*nnn*	Free SQA storage below 16MB (K bytes)
FSB2=*nnn*	FSB<*nnn*	
UCS1=*nnn*	UCS>*nnn*	Unowned CSA storage above and below 16MB (K bytes)
UCS2=*nnn*	UCS<*nnn*	
UCB1=*nnn*	UCB>*nnn*	Unowned CSA storage below 16MB (K bytes)
UCB2=*nnn*	UCB<*nnn*	
USQ1=*nnn*	USQ>*nnn*	Unowned SQA storage above and below 16MB (K bytes)
USQ2=*nnn*	USQ<*nnn*	
USB1=*nnn*	USB>*nnn*	Unowned SQA storage below 16MB (K bytes)
USB2=*nnn*	USB<*nnn*	
CTF=Y/N	CTF=Y/N	CSA tracking failure
STF=Y/N	STF=Y/N	SQA tracking failure
EMA1=*nnn*	EMA>*nnn*	Extended storage migration age
EMA2=*nnn*	EMA<*nnn*	
ESW1=*nnn*	ESW>*nnn*	Extended storage write rate
ESW2=*nnn*	ESW<*nnn*	
ESR1=*nnn*	ESR>*nnn*	Extended storage read rate
ESR2=*nnn*	ESR<*nnn*	
ESM1=*nnn*	ESM>*nnn*	Extended storage migration rate
ESM2=*nnn*	ESM<*nnn*	
SWR1=*nnn*	SWR>*nnn*	Total swap rate (all swaps)
SWR2=*nnn*	SWR<*nnn*	
SWE1=*nnn*	SWE>*nnn*	Logical or expanded swap effective

EXASYS Keyword	XVSY Keyword	Function
SWE2=*nnn*	SWE<*nnn*	percent
TPM1=*nnn*	TPM>*nnn*	Any tape mount waiting time
TPM2=*nnn*	TPM<*nnn*	
LIO1=*nnn*	LIO>*nnn*	Any LCU input and output rate
LIO2=*nnn*	LIO<*nnn*	
LCB1=*nnn*	LCB>*nnn*	Any LCU all channel busy percent
LCB2=*nnn*	LCB<*nnn*	
RMF=Y/N	RMF=Y/N	RMF active
MIS=*jobname*	MIS=*jobname*	Missing task analysis
ENQ=*queue-name*	ENQ=*queue-name*	Enqueue contention. Double ampersands (&&) required for generic queue name.

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword	Option
TOD1=*hhmm*	Time of day range, lower limit
TOD2=*hhmm*	Time of day range, upper limit
TIN=*nnn*	Time interval, seconds
DLY=*nnn*	Exception delay count
TDL=*nnn*	Exception delay time, seconds
LIM=*nnn*	Exception limit count
LMX=*nnn*	Exception limit-x count
TLM=*nnn*	Time of day limit count
PRI=*nnn*	Exception priority, 1-255
AND=Y/N	Request AND logic for exception thresholds
SND=Y/N	Activate/terminate terminal sound.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOGA=*xxx*	Exception logging option values.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG='*message*'	User specified exception message. Double ampersands (&&) required for text keywords.
USR='*userid list*'	Send message to TSO userids list. Double ampersands (&&) required for Job user ID.
USO=L|N	User send message option, L=LOGON, N=NOW
CON=Y|N	Send message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes; 2, 7, or 11 only.

SCREEN OPTIONS - See "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Request screen print
SCR=*screen name*	Request screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Request freeze frame with screen chaining.

COMMAND OPTIONS - See "MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD=*command*	Issue command, command image. Double ampersands (&&) required for text keywords.
JOB=*member*	Submit job, member name. Double ampersands (&&) required for text keywords. You need not specify a double ampersand in any text within the member.
CDL=*nnn*	Command delay count
CLM=*nnn*	Command limit count.

Figure 200 • EXAINIT macro

```
----+----1----+----2----+----3----+----4----+---5----+----6----+----7----+--
--8
         EXAINIT SYS=ON,SYSCT=20,                                      X
               TASK=ON,TASKCT=20,                                      X
               DASD=ON,DASDCT=10,                                      X
               MINPRI=1,MAXPRI=255,                                    X
               MSG=Y,LOGA=N
         EXASYS EXA=1,SET=ON,PRI=51,TDL=15, CPU1=99                    X
         EXASYS EXA=2,SET=ON,PRI=50,TPM1=1500
         EXASYS EXA=3,SET=ON,PRI=100,SQA1=100,LMX=2                    X
               MSG='SQA OVERFLOWING INTO CSA'
```

In Figure 200, the EXAINIT macro built the basic Exception Level Set with 20 system, 20 address space, and 10 DASD exception definitions. System exception definitions 1, 2, and 3 have been predefined using the EXASYS macros. The remaining system exception definitions, 4 through 20, are available as spare definitions when the level set is loaded.

The exception definitions defined above are equivalent to the exception definitions from the example in "XVSY - Vary MVS System Exception Definitions" on page 299. Refer to the example for a description of the exception definitions.

EXATASK - MVS Address Space Exception Definition Macro

The EXATASK macro predefines an MVS address space exception definition. The EXA keyword is required to identify the exception definition to be defined.

For each exception definition, either a jobname, job class, or performance must be specified. Only one may be specified as they are mutually exclusive.

Keyword	Function
EXA=*nnn*	Exception definition number
SET=ON|OFF	Activate/terminate the exception definition.

SELECTION OPTIONS - See "Address Space Exception Definition Selection" on page 326.

Keyword	Option
JNM=*jobname*	Jobname mask
CLS=*job class*	Job class, single character only
PGN=*nnn*	Performance Group number
PRD=*nnn*	Performance Group period (optional)
TYP=J|S|T	Address Space type (optional):
	J Batch jobs
	S Started tasks
	T TSO users.

EXCEPTION THRESHOLDS - See "MVS Address Space Exception Thresholds" on page 333.

EXATASK Keyword	XVTK Keyword	Function
CPU1=*nnn*	CPU>*nnn*	CPU utilization by system
CPU2=*nnn*	CPU<*nnn*	
CPX1=*nnn*	CPX>*nnn*	CPU utilization by processor
CPX2=*nnn*	CPX<*nnn*	
STL1=*nnn*	STL>*nnn*	Job step time limit percent remaining
STL2=*nnn*	STL<*nnn*	
IOR1=*nnn*	IOR>*nnn*	Input and output rate
IOR2=*nnn*	IOR<*nnn*	
PGR1=*nnn*	PGR>*nnn*	Paging rate
PGR2=*nnn*	PGR<*nnn*	

EXATASK Keyword	XVTK Keyword	Function
TTM1=*nnn*	TTM>*nnn*	Transaction time (seconds)
TTM2=*nnn*	TTM<*nnn*	
WTM1=*nnn*	WTM>*nnn*	Waiting time (seconds)
WTM2=*nnn*	WTM<*nnn*	
SWP=I|O|L|P	SWP=I|O|L|P	Swap status:
		I Swapped-in
		O Swapped-out
		L Logically swapped-out
		P Physically swapped-out
NSW=Y|N	NSW=Y|N	Address space non-swappable
SWC1=*nnn*	SWC>*nnn*	Swap count
SWC2=*nnn*	SWC<*nnn*	
WKS1=*nnn*	WKS>*nnn*	Working storage set size
WKS2=*nnn*	WKS<*nnn*	
FIX1=*nnn*	FIX>*nnn*	Fixed storage size
FIX2=*nnn*	FIX<*nnn*	
EST1=*nnn*	EST>*nnn*	Extended storage size
EST2=*nnn*	EST<*nnn*	
SLT1=*nnn*	SLT>*nnn*	Auxiliary storage slot count
SLT2=*nnn*	SLT<*nnn*	
CSA1=*nnn*	CSA>*nnn*	Total CSA size
CSA2=*nnn*	CSA<*nnn*	
CSB1=*nnn*	CSB>*nnn*	Low CSA (below 16MB line) size
CSB2=*nnn*	CSB<*nnn*	
SQA1=*nnn*	SQA>*nnn*	Total SQA size
SQA2=*nnn*	SQA<*nnn*	
SQB1=*nnn*	SQB>*nnn*	Low SQA (below 16MB line) size
SQB2=*nnn*	SQB<*nnn*	
CST1=*nnn*	CST>*nnn*	Total common storage size

EXATASK Keyword	XVTK Keyword	Function
CST2=*nnn*	CST<*nnn*	
JST1=*nnn*	JST>*nnn*	Job step time
JST2=*nnn*	JST<*nnn*	
QWT1=*nnn*	QWT>*nnn*	Enqueue wait time
QWT2=*nnn*	QWT<*nnn*	
SYS=*nnn*	SYS=*nnn*	Related system definition.

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword	Option
TOD1=*hhmm*	Time of day range, lower limit
TOD2=*hhmm*	Time of day range, upper limit
TIN=*nnn*	Time interval, seconds
DLY=*nnn*	Exception delay count
TDL=*nnn*	Exception delay time, seconds
LIM=*nnn*	Exception limit count
LMX=*nnn*	Exception limit-x count
TLM=*nnn*	Time of day limit count
PRI=*nnn*	Exception priority, 1-255
AND=Y/N	Request "AND" logic for exception thresholds
SND=Y/N	Activate/terminate terminal sound
SUP=A/E/N	Supersede other exception definitions
	A Always supersede
	E Supersede only when exception occurs
	N Never supersede.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOGA=*xxx*	Exception logging option values.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG='*message*'	User specified exception message. Double ampersands (&&) required for text keywords.
USR='*userids list*'	Send message to TSO userids list. Double ampersands (&&) required for Job user ID.
USO=L|N	User send message option, L=LOGON, N=NOW
CON=Y|N	Send message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes; 2, 7, or 11 only.

SCREEN OPTIONS - See "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Request screen print
SCR=*screen name*	Request screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Request freeze frame with screen chaining.

COMMAND OPTIONS - See"MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD='*command*'	Issue command, command image. Double ampersands (&&) required for text keywords.
JOB=*member*	Submit job, member name. Double ampersands (&&) required for text keywords. You need not specify a double ampersand in any text within the member.
CDL=*nnn*	Command delay count
CLM=*nnn*	Command limit count.

Figure 201 • EXAINIT macro

```
----+----1----+----2----+----3----+----4----+---5----+----6----+----7----+----8
         EXAINIT SYS=ON,SYSCT=20,                                        X
               TASK=ON,TASKCT=20,                                        X
               DASD=ON,DASDCT=10,                                        X
               MINPRI=1,MAXPRI=255,                                      X
               MSG=Y,LOGA=N
         EXATASK EXA=1,SET=ON,JNM=IDMS*,PRI=150,                         X
               AND=Y,CPX1=75,IOR2=1,TDL=10,                              X
               MSG='POSSIBLE CPU LOOP, CPU=&&CPUX, I/O=&&IOCR'
         EXATASK EXA=2,JNM=IDMSJRN,SET=OFF
         EXATASK EXA=3,SET=ON,JNM=IDMS*,PRI=200,LIM=2,TDL=60,            X
               NSW=Y,USR=DBA1
```

In Figure 201, the EXAINIT macro built the basic Exception Level Set with 20 system, 20 address space, and 10 DASD exception definitions. Address space exception definitions 1, 2, and 3 have been predefined using the EXATASK macros. The remaining address space exception definitions, 4 through 20, are available as spare definitions when the level set is loaded.

The exception definitions defined above are equivalent to the exception definitions from the example in "XVTK - Vary MVS Address Space Exception Definitions" on page 328. Refer to the example for a description of the exception definitions.

EXADASD - MVS DASD Exception Definition Macro

The EXADASD macro predefines an MVS DASD Exception Definition. The EXA keyword is required to identify the exception definition to be defined.

For each exception definition, either a volume serial number or a device address must be specified. Only one may be specified as they are mutually exclusive.

Keyword	Function
EXA=*nnn*	Exception definition number
SET=ON|OFF	Activate/terminate the exception definition.

SELECTION OPTIONS - See "DASD Exception Definition Selection" on page 343.

Keyword	Option
VOL=*volser*	Volume Serial (VOLSER) mask, default is VOL=*.
CUA=*device addr*	Device address (CUA) mask.
UNT=*unit-name*	Unit name value

EXCEPTION THRESHOLDS - See "MVS DASD Exception Thresholds" on page 348.

EXADASD Keyword	XVDK Keyword	Function
BSY1=*nnn*	BSY>*nnn*	DASD Busy percentage
BSY2=*nnn*	BSY<*nnn*	
IOR1=*nnn*	IOR>*nnn*	DASD input and output rate
IOR2=*nnn*	IOR<*nnn*	
RTM1=.*nnn*	RTM>.*nnn*	Device response time
RTM2=.*nnn*	RTM<.*nnn*	
RDY=Y|N	RDY=Y|N	Device dropped ready
SYS=*nnn*	SYS=*nnn*	Related system exception.

CONTROL OPTIONS - See "MVS Exception Analysis Control Options" on page 350.

Keyword	Option
TOD1=*hhmm*	Time of day range, lower limit
TOD2=*hhmm*	Time of day range, upper limit
TIN=*nnn*	Time interval, seconds
DLY=*nnn*	Exception delay count
TDL=*nnn*	Exception delay time, seconds

Keyword	Option
LIM=*nnn*	Exception limit count
LMX=*nnn*	Exception limit-x count
TLM=*nnn*	Time of day limit count
PRI=*nnn*	Exception priority, 1-255
AND=Y|N	Request AND logic for exception thresholds
SND=Y|N	Activate/terminate terminal sound
SUP=A|E|N	Supersede other exception definitions A Always supersede E Supersede only when exception occurs N Never supersede.

LOGGING OPTIONS - See "MVS Exception Analysis Logging Option" on page 359.

Keyword	Option
LOGA=*xxx*	Exception logging option values.

ASG-SERVER FACILITY OPTIONS - See "MVS Exception Analysis ASG-Server Facility Options" on page 361.

Keyword	Option
ASF=*xxxx*	Specify four character subsystem ID for the ASG-SERVER FACILITY.

MESSAGE OPTIONS - See "MVS Exception Analysis Message Options" on page 362.

Keyword	Option
MSG=*message*	User specified exception message. Double ampersands (&&) required for text keywords.
USR=*userid list*	Send message to TSO userids list. Double ampersands (&&) required for Job user ID.
USO=L|N	User send message option L=LOGON, N=NOW
CON=Y|N	Send message to MVS console
RTC=*n,n,n,...*	Console route codes, 1-16
DSC=*n,n,n,...*	Console descriptor codes; 2, 7, or 11 only

SCREEN OPTIONS - See "MVS Exception Analysis Screen Options" on page 357.

Keyword	Option
PRT=Y|N	Request screen print
SCR=*screen name*	Request screen chaining
SDL=*nnn*	Screen chaining delay count
SLM=*nnn*	Screen chaining limit count
FRZ=Y|N	Request freeze frame with screen chaining

COMMAND OPTIONS - See "MVS Exception Analysis Command Option" on page 365.

Keyword	Option
CMD=*command*	Issue command, command image. Double ampersands (&&) required for text keywords.
JOB=*member*	Submit job, member name. Double ampersands (&&) required for text keywords. You need not specify a double ampersand in any text within the member.
CDL=*nnn*	Command delay count
CLM=*nnn*	Command limit count

Figure 202 • EXAINIT macro

```
----+----1----+----2----+----3----+----4----+---5----+----6----+----7----+----8
         EXAINIT SYS=ON,SYSCT=20,                                        X
               TASK=ON,TASKCT=20,                                        X
               DASD=ON,DASDCT=10,                                        X
               MINPRI=1,MAXPRI=255,                                      X
               MSG=Y,LOGA=N
         EXADASD EXA=1,SET=ON,VOL=DBAX*,PRI=10,                          X
               RTM1=.100,IOR1=20
         EXADASD EXA=2,SET=ON,VOL=*,PRI=200,RDY=Y
         EXADASD EXA=3,SET=OFF,VOL=DBAX80
```

In Figure 202, the EXAINIT macro built the basic exception level set with 20 system, 20 address space, and 10 DASD exception definitions. DASD exception definitions 1, 2, and 3 have been predefined using the EXADASD macros. The remaining DASD exception definitions, 4 through 10, are available as spare definitions when the level set is loaded.

The exception definitions defined above are equivalent to the exception definitions from the example in "XVDK - Vary MVS DASD Exception Definitions" on page 344. Refer to the example for a description of the exception definitions.

Appendix

PreAlert MVS Messages

This appendix provides a brief explanation of the messages generated by PreAlert MVS.

Messages - MLOG Line Command

`SMF RECORDING DISALLOWED AT INSTALLATION`
The default SMF record ID was specified as zero in the userdata macros. This disallows logging to the SMF datasets. Use a sequential dataset for logging.

`SMF CONFLICTS WITH DATASET KEYWORDS`
The SMF= keyword was entered with dataset keywords (DSN=, BLK=,...). Logging is allowed only to SMF or a sequential dataset, not both.

`INVALID SMF RECORD ID`
SMF record ID 128 through 255 are available for user-written records. Specifies a correct SMF record ID in the SMF=.

`USER NOT ALLOWED SMF RECORDING`
Logging to SMF has been denied through the user security exit. Use a sequential dataset for logging.

`DSN= KEYWORD REQUIRED`
Dataset attribute keywords have been entered without the dataset name keyword (DSN=). Include a dataset name using the DSN= keyword.

`DATASET IN USE BY ANOTHER PREALERT USER`
The dataset specified through the MLOG line command is currently being used by another PreAlert MVS user. Only one user may be logging to a dataset. Allocate a different dataset.

Messages - Log File Open Errors

`MLOGFILE NOT OPEN`
A logging request has been made, but the log file has not been defined. Use the MLOG line command to direct logging to either SMF or a dataset.

`MLOGFILE OPEN FAILED`
The OPEN for the log file has failed. Check the MVS job messages, or specifies a different dataset through the MLOG line command.

`INVALID MLOGFILE DCB ATTRIBUTES`
The DCB attributes for the log file are invalid. Use the MLOG line command to allocate a dataset with the correct DCB attributes.

`MLOGFILE OPEN ERROR` *`abc-rc`*
An abend has occurred during the OPEN of the log file. The abend code (*`abc`*) and return code (*`rc`*) are displayed.

`MLOGFILE DYNAMIC UNALLOCATION ERROR` *`rrrr-iiii`*
An error has been detected while trying to dynamically unallocate the log file. The dynamic unallocation error reason (*`rrrr`*) and information (*`iiii`*) codes are displayed.

`MLOGFILE DYNAMIC ALLOCATION ERROR` *`rrrr-iiii`*
An error has been detected while trying to dynamically allocate the log file. The dynamic allocation error reason (*`rrrr`*) and information (*`iiii`*) codes are displayed.

Messages - Logging Activity Errors

`MLOG RECORDING SUSPENDED - BUFFER GETMAIN FAILED`

The GETMAIN for buffer storage failed because insufficient private region is available to hold the logging buffers. All previous logging requests are kept and all new logging requests are denied until the buffers can be written. Use the MLOG line command to allocate a log file.

`MLOG RECORDING SUSPENDED - BUFFERS FULL`

The maximum buffer capacity (specified in the userdata macros) has been reached. All previous logging requests are kept and all new logging requests are denied until the buffers can be written. Use the MLOG line command to allocate a log file.

`ATTACH FOR SHOPMLWT ABENDED` *`abc-rc`*

The ATTACH for the log file writer sub-task (SHOPMLWT) has abended. The abend code (*`abc`*) and return code (*`rc`*) are displayed.

`MLOGFILE WRITER TASK ABEND` *`abc`*

An abend (*`abc`*) has been detected in the log file write sub-task. If a D37 abend occurs (`log file full`), use the MLOG line command to allocate a new log file to continue logging.

`MLOGFILE WRITER TASK TIMEOUT`

The log file writer sub-task did not complete after executing for 10 seconds. PreAlert MVS recovers any buffers not successfully written, and attempt to write the buffers again. If the message continues, allocate the log file on a faster device, or reduce the number of logging requests.

Messages - APFL Line Command

`INVALID KEYWORD COMBINATION`

The combination of keywords used is invalid. Only the following combinations are valid:

Add	DSN=*dsname*,VOL=*volser*
Delete	LST=*dsname**
List	LST=*dsname**,SRT=*VOL*|*DSN*

`DATASET/VOLSER ALREADY IN APF LIST`

The specified dataset and VOLSER were already included in the APF list. The dataset was not added.

`DATASET/VOLSER NOT FOUND, DELETE FAILED`

The specified dataset and VOLSER were not found in the existing APF list. The dataset was not deleted.

`GETMAIN FAILED, SQA STORAGE NOT AVAILABLE`
PreAlert MVS was unable to obtain sufficient SQA storage to store the updated APF list. The APF list was not updated.

Messages - KILL Line Command

`USE EITHER JNM= OR ASD=, NOT BOTH`
Both keywords were entered; only one may be used at a time.

`DUPLICATE JOBNAMES, USE ASD=`
PreAlert MVS has found duplicate jobnames in response to the JNM= keyword. Use the ASD= keyword to specifies the ASID of the address space.

`JOBNAME NOT FOUND`
PreAlert MVS was unable to find the specified jobname.

`INVALID ASID`
The ASD= keyword specified an invalid ASID.

`CALLRTM FAILED, ADDRESS SPACE NOT AVAIL FOR TERMINATION`
PreAlert MVS received a non-zero return code from the CALLRTM macro. The address space was not terminated.

Messages - LPAM Line Command

`WARNING: ALPAQ CDE FOR` *`module`* `AT` *`address`*`; ENTRY POINT RESET`
PreAlert MVS reset the entry point on the ALPAQ (Active LPA Queue) CDE for the module. This also indicates that an active copy of the module probably exists in another address space. Any subsequent loads are to the new entry point.

`WARNING: ALPAQ CDE FOR` *`module`* `AT` *`address`*`; RESET SUPPRESSED`
PreAlert MVS located a CDE on the ALPAQ for the module with an entry point other than the entry point in the updated LPA directory. The entry point reset was suppressed by the ALQ=N keyword. This indicates that an active copy of the module exists; while an active copy exists, any further loads points to the active module, not the updated module.

`UNABLE TO LOCATE ALPAQ CDE, TEST LOAD NOT FROM LPA`
The test LOAD found the module in a link library before searching the LPA directory, probably from the JOBLIB or STEPLIB for the current address space. Move the module to another APF authorized library and try LPAM again.

`MOD= KEYWORD REQUIRED TO SPECIFY MODULE NAME`
The MOD= keyword was not found in the input string.

`DATASET NOT AVAILABLE FOR ALLOCATION`

PreAlert MVS is unable to allocate the dataset because it is exclusively allocated to another address space. Use the DSNW line command to determine which jobs have allocated the library.

`DATASET NOT CATALOGED`

The library is not cataloged. Use the VOL= and UNT= keywords to specify the VOLSER and unit name where the library resides.

`DYNAMIC ALLOCATION ERROR` *`aaaa/bbbb`*

An error has been detected during dynamic allocation of the library. *`aaaa/bbbb`* shows the dynamic allocation error/information codes.

`DIRECTORY OPEN ERROR` *`abc-rc`*

An abend has occurred while trying to open the library for reading the directory. *`abc`* is the abend code and *`rc`* is the return code.

`DIRECTORY OPEN FAILED, R15=`*`nnnn`* `R0=`*`nnnn`*

PreAlert MVS received a non-zero return code from the OPEN macro for the DCB to read the library directory.

`DATASET OPEN ERROR` *`abc-rc`*

An abend has occurred while trying to open the library for loading the module. *`abc`* is the abend code and *`rc`* is the reason code.

`DATASET OPEN FAILED, R15=`*`nnnn`* `R0=`*`nnnn`*

PreAlert MVS received a non-zero return code from the OPEN macro for the DCB to load the module.

`DATASET RECFM NOT U, OR DSORG NOT PO`

The library has been opened successfully, but the DCB attributes are invalid for a load library.

`BLDL FAILED, MODULE NOT IN DATASET`

The BLDL macro did not find the specified module or alias name in the load library.

`BLDL FAILED, R15=`*`nnnn`*

PreAlert MVS received a non-zero return code from the BLDL macro to obtain the directory information for the load module.

`MODULE LINKED WITH SCATTER OR OVERLAY`
`MODULE NOT PROCESSED BY LINKAGE EDITOR`
`MODULE MARKED NON-EXECUTABLE`

PreAlert MVS found invalid linkage editor attributes for the load module. The module cannot be loaded into LPA.

`PRIVATE AREA STORAGE SHORTAGE, NEED LARGER REGION`
PreAlert MVS received a non-zero return code from a GETMAIN to obtain working storage within the private region.

`GETMAIN FAILED, CSA STORAGE NOT AVAILABLE`
PreAlert MVS received a non-zero return code from a GETMAIN to obtain CSA storage for loading the module.

`LOAD FAILED, abc-rc`
An abend has occurred while loading the module into CSA storage. *abc* is the abend code and *rc* is the return code. Abend 306-0C occurs when either the dataset is not APF authorized, or the module has been linked without AC=1.

Messages - Swap Status Line Commands

`SWAP IN/OUT SRB COMPLETED, R/C = aa, DONT SWAP COUNT = bb`
The SRB was scheduled to the address space and has completed normally. *aa* is the return code from the SYSEVENT macro and *bb* is the Dont Swap count for the address space.

`INVALID ADDRESS SPACE ID (ASID)`
The address space ID specified through the ASI=*asid* keyword is invalid. Refer to the ASID line command for the correct address space ID.

`DONT SWAP COUNT ALREADY GREATER THAN ZERO`
Either the SWPI or SWPN line command has found the target address space to have already been marked non-swappable, and its Dont Swap count greater than zero. No action is taken.

`DONT SWAP COUNT ALREADY ZERO`
The SWPO line command has found the target address space to be swappable, and its Dont Swap count equal to zero. No action is taken.

`ADDRESS SPACE TERMINATING`
PreAlert MVS's address space validation routines have detected that the address space is terminating. No action is taken.

`TRANSACTION NOT ACTIVE OR ATTACHED`
PreAlert MVS's address space validation routines detected that a transaction does not exist, and that the problem program has not been attached. Essentially, PreAlert MVS found an address space that has not completed initialization.

`SHOPMSRB LOAD FAILED, aaa/rr`
The load macro for the SHOPMSRB module abended. *aaa* is the abend code, *rr* the return code. Contact ASG Service Desk.

`SQA GETMAIN FAILED, SWAP SRB NOT AVAILABLE`

PreAlert MVS's GETMAIN for 4K of SQA has failed. The Swap SRB cannot be built. This indicates other problems with your system. An IPL is probably needed to recover the SQA shortage.

`FUNCTION FAILED, SWAP SRB TIMED OUT`

PreAlert MVS scheduled the Swap in/out SRB to the target address space, but it did not begin execution within 10 seconds. PreAlert MVS purged the SRB from the target address space. This only occurs when the target address space does not get dispatched due to a low dispatching priority on an extremely busy system. Wait until the system is less busy before retrying the command.

`SRB STARTED, NOT COMPLETE`

The Swap in/out SRB has been scheduled to the target address space and has started, but has not completed within 10 seconds. This may indicate that either the target address space is not getting dispatched, or that there is a shortage of real storage. The SRB is allowed to complete when more resources are available.

`SRB PURGEDQ ISSUED, NOT COMPLETE`

PreAlert MVS scheduled the Swap in/out SRB to the target address space but did not begin execution within 10 seconds, typically due to an extremely busy system. PreAlert MVS attempted to purge the SRB from the target address space, but the SRB did not purge within 10 seconds. The SRB is purged without executing when the system becomes less busy.

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