



# natural

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Version 4.1.2 for Mainframes | Fundamentals

This document applies to Natural Version 4.1.2 for Mainframes and to all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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# Natural for Mainframes - Fundamentals

Natural is a complete environment for application development, offering all the commands and functions you need to create, maintain and execute an application. With Natural applications, you can access data that is stored in Adabas databases as well as in other database systems. In addition, Natural can be used to provide Web services and process XML documents.

This documentation describes the components that make up a Natural environment and provides cross-references to related topics.

In addition, this documentation introduces you to the usage of Natural on mainframe computers. It describes, for example, how to invoke and terminate a Natural session, execute Natural functions and use the online help provided.

- Components of Natural      Describes the components that form a Natural environment.
- Invoking and Terminating Natural Sessions      Explains how to invoke and terminate a Natural session.
- Natural Online Help      Describes the online help information Natural provides.
- Executing Commands and Menu Functions      Explains how to execute Natural commands and menu functions.
- Switching Natural Libraries      Explains how to open an existing or new Natural library.
- Natural Main Menu      Describes the Natural Main Menu and the subordinate menus that provide access to development functions, settings, utilities and example libraries.
- Natural Programming Objects      Provides general information on Natural programming objects.
- Work and Print Files      Provides general information on Natural work and print files.

# Components of Natural

The Natural nucleus is a collection of service routines that comprise the kernel of Natural.

This section is intended to give you an overview of the main Natural components and how they interact to provide Natural's functionality as a development tool:

- Natural Compiler
  - Natural Optimizer Compiler
  - Natural Runtime
  - Natural Buffer Pool
  - Natural System Files
  - Natural Parameters
  - Natural Commands
  - Natural Programming Language
  - Natural Editors
  - Natural Utilities
  - Database Interfaces
  - Web Interface
  - XML Toolkit
- 

## Natural Compiler

The Natural compiler creates the executable (cataloged) form of any source of Natural programming object (see the relevant section). During the compilation process, the Natural statements in the object source are converted into internal Natural object code.

## Natural Optimizer Compiler

Only applies if the Natural Optimizer Compiler is installed.

The Natural Optimizer Compiler optimizes Natural object code (see above) by translating it into machine code.

### Related Topic:

- Natural Optimizer Compiler documentation

## Natural Runtime

The Natural Runtime provides the environment necessary for executing cataloged Natural programming objects (see the relevant section) and Natural applications. The Natural runtime interprets Natural object code.

### Related Topic:

- Natural Programming Objects

## Natural Buffer Pool

The Natural buffer pool is a storage area used by the Natural nucleus to execute cataloged Natural programming objects (see the relevant section). When a Natural object is requested for execution, it is read from the Natural system file (see below) and placed in the buffer pool, where it can be used by several users simultaneously. Conceptually, the Natural buffer pool serves as a storage area for reentrant Natural objects.

### Related Topics:

- Natural Buffer Pool - Natural Operations for Mainframes documentation
- Natural Storage Management - Natural Operations for Mainframes documentation

## Natural System Files

Natural system files are used to store Natural object sources and executable (cataloged) Natural objects and/or control data.

Listed below are the system files provided:

System File	Contains
FNAT	All Natural programming objects (see the relevant section) delivered by Software AG.
FUSER	Natural programming objects generated by the user.
FSEC	Only applies if Natural Security is installed. Control information required by Natural Security.
FSPOOL	Only applies if Natural Advanced Facilities is installed. Control information and spool reports required by Natural Advanced Facilities.
FDIC	Information on data definition modules (DDMs). If Predict is installed, FDIC also contains the data for the Predict dictionary system. If the Natural Development Server is installed, FDIC also contains application descriptions.

### Related Topics:

- Natural Programming Objects
- Natural Security documentation
- Natural Advanced Facilities documentation
- DDMs - Database Access - Natural Programming Guide
- Predict documentation
- Single Point of Development (Natural Development Server) documentation

## Natural Parameters

Natural parameters are used to adjust the Natural environment to your needs. With a Natural parameter you can, for example, set defaults for report creation, define the size of a report or define the size of the editor area.

Most of the characteristics of a Natural environment are predefined by Software AG. However, depending on your individual requirements, you can override parameters that are set by default.

There are different types of parameter: profile parameters and session parameters.

The section below contains information on:

- Profile Parameters
- Session Parameters
- Parameter Hierarchy

## Profile Parameters

Profile parameters are specified statically or dynamically.

Static parameters are specified in the Natural parameter module NATPARM, during the installation of Natural. They are used as the default for each Natural session started.

Dynamic parameters are specified at the startup of a Natural session. You can predefine a set of dynamic parameters with the Natural SYSPARM utility.

## Session Parameters

Session parameters are specified within an active Natural session and/or within a Natural programming object. The main purpose of session parameters is to control the execution of running Natural programs.

## Parameter Hierarchy

There is a hierarchical structure of the levels on which Natural parameters can be set as described in the Natural Operations for Mainframes documentation. A parameter value set on a higher level overrides the value defined on a lower level. For example, when you specify a parameter dynamically, the new parameter value overrides the static specification as set for the corresponding parameter in the Natural parameter module.

### Related Topics:

- Profile Parameter Usage - Natural Operations for Mainframes documentation
- Profile Parameters - Natural Parameter Reference documentation
- Using a Natural Parameter Module - Natural Operations for Mainframes documentation
- Session Parameters - Natural Parameter Reference documentation
- SYSPARM Utility - Natural Utilities documentation
- Natural Parameter Hierarchy - Natural Operations for Mainframes documentation.

## Natural Commands

Natural commands are used to perform functions during a Natural session as described in the section Executing Commands and Menu Functions.

The section below contains information on the different categories of Natural commands: system commands, terminal commands, editor and utility commands.

- System Commands
- Terminal Commands
- Editor and Utility Commands

## System Commands

Natural system commands perform functions you need to create, maintain or execute Natural programming objects. In addition, Natural system commands are used to monitor and administer your Natural environment.

### Related Topics:

- [Introducing System Commands - Natural System Command Reference documentation](#)
- [System Commands Grouped by Functions - Natural System Command Reference documentation](#)
- [System Command List - Natural System Command Reference documentation](#)
- [System Command Syntax - Natural System Command Reference documentation](#)
- [Executing Commands and Menu Functions](#)

## Terminal Commands

Natural terminal commands are used, for example, to:

- Arrange the screen display and layout, such as the positioning of the PF-key and message line, and the assignment of colors:
- Obtain debug information on the current environment;
- Interrupt a current Natural operation.

A terminal command starts with a control character that can be defined by a Natural session parameter. The default control character is the percent (%) sign. You can invoke a terminal command while an application is executing. In addition to the Natural command prompts, terminal commands can be entered in any alphanumeric input field.

### Related Topics:

- [Screen Design - Designing User Interfaces - Natural Programming Guide](#)
- [Copying Data from a Screen - Dialog Design - Designing User Interfaces - Natural Programming Guide](#)
- [Terminal Commands Grouped by Function - Natural Terminal Commands documentation](#)
- [Terminal Command List - Natural Terminal Commands documentation](#)

## Editor and Utility Commands

In addition to Natural system and Natural terminal commands, each Natural editor and Natural utility provides its own commands that only apply to this very environment. These commands are documented in the relevant section of the editor or utility documentation.

# Natural Programming Language

The Natural programming language consists of:

- Natural Statements
- Natural System Functions
- Natural System Variables

## Natural Statements

Natural statements are programming instructions used to create a Natural program source.

When the program source has been created, the source is compiled into an executable Natural object by using the Natural system command CATALOG or STOW.

**Related Topics:**

- Statements - Overview - Natural Statements documentation (including an alphabetical list of Natural statements)
- SQL Statements - Overview - Natural Statements documentation
- Statements Grouped by Functions - Natural Statements documentation
- Syntax Symbols and Operand Definition Tables - Natural Statements documentation
- CATALOG, STOW - Natural System Command Reference documentation

## Natural System Functions

Natural system functions perform mathematical functions or functions used during break controls executed with the AT BREAK statement.

**Related Topics:**

- AT BREAK - Natural Statements documentation
- Alphabetical List of Natural System Functions - Natural System Functions documentation
- Natural System Functions for Use in Processing Loops - Natural System Functions documentation
- Mathematical Functions - Natural System Functions documentation

## Natural System Variables

Natural system variables are standard variables that are provided and generated by Natural. System variables are, for example, used to obtain the date and time.

**Related Topics:**

- System Variables - Natural System Variables documentation

## Natural Editors

Natural provides three editors: the program editor, the data area editor, the map editor and the DDM editor:

- Program Editor:  
Used for creating and maintaining programs, subroutines, subprograms, help routines, copycodes and texts.
- Data Area Editor  
Used for creating and maintaining global data areas, local data areas, and parameter data areas.  
This editor has a columnar format that is designed for defining the data used in Natural programs or routines.
- Map Editor  
Used for creating and maintaining maps (screen layouts) referenced in a program's INPUT or WRITE statement.  
The map editor allows direct manipulation of the fields used in an input or output map; the extended field editing feature facilitates the definition of fields; moreover, processing rules can be attached to fields in the map.
- DDM Editor  
Used for editing and maintaining data definition modules (DDMs). The DDM editor is part of the Natural SYSDDM utility (see also Natural Utilities below).

**Related Topics:**

- Natural for Mainframes - Tutorial (Examples of how to use editors)
- Natural Editors documentation including Tutorial - Using the Map Editor

- DDMs - Database Access - Natural Programming Guide

## Natural Utilities

Natural utilities are tools that provide a set of functions, such as maintaining error messages, debug environments or buffer pools.

Natural utilities are usually menu-driven but also provide commands for directly executing the utility functions available.

### Related Topics:

- Utilities Grouped by Function - Natural Utility documentation
- Utility List - Natural Utility documentation

## Database Interfaces

Natural provides an interface for accessing database or file management systems, such as Adabas, SQL and VSAM.

### Related Topics:

- Adabas documentation
- Natural for SQL/DS documentation
- Natural for VSAM documentation
- Natural for DB2 documentation
- Natural for DL/I documentation

## Web Interface

The Natural Web Interface provides a link between a web server (HTTP server) and a Natural mainframe environment.

The Natural Web Interface comprises three modules:

- The Natural system library SYSWEB which contains all Natural modules.
- Natural Web Server Extensions - the part which provides the interface to the web server on the same machine.
- The necessary middleware: EntireX or Entire Broker using RPC technology.

### Related Topic:

- Natural Web Interface documentation

## XML Toolkit

The Natural XML Toolkit is a set of tools for XML processing which provides functionality required for the integration of XML processing into Natural.

A Natural data definition can be generated from an XML Document Type Definition (DTD), and vice versa. The content of a Natural variable can be serialized into an XML document, and an XML document can be parsed into a Natural variable.

The Natural system library SYSEXXT contains all modules of the XML Toolkit.

**Related Topic:**

- [XML Toolkit documentation](#)

# Invoking and Terminating Natural Sessions

## Related Topics:

- Executing Commands and Menu Function
- Overview - Natural Operations for Mainframe documentation
- Natural in Batch Mode - Natural Operations for Mainframe documentation

Natural can be invoked for online or batch mode execution.

The way you invoke Natural depends on your local system environment. Ask your Natural administrator for details. If Natural Security is installed, the access to some libraries as well as the use of some functions can be restricted.

The section below contains information on terminating Natural sessions:

- Terminating a Natural Online Session
  - Terminating a Natural Batch Session
- 

## Terminating a Natural Online Session

The methods described below relate to the default standards as delivered with the original Natural software.

 **To terminate a Natural online session, use any of the following methods**

- On the Natural Main Menu:
  - Choose PF3/Exit or choose Exit Natural Session.
  - Or, in the command line, enter:  
A period (.).  
Or the system command FIN.  
Or the terminal command %%.
- At the NEXT prompt:
  - Enter the system command FIN.  
Or enter the terminal command %%.  
Or choose CLEAR or an equivalent key.
- At the MORE prompt:
  - Enter the system command FIN.  
Or enter the terminal command %%.
- From within a Natural program:  
Execute a Natural program that contains a TERMINATE statement.

## Terminating a Natural Batch Session

A Natural batch-mode session will be terminated when one of the following is encountered during the session:

- A FIN system command in the input dataset,
- An end-of-input condition in the command input dataset CMSYNIN,
- A TERMINATE statement in a Natural program that is being executed.

# Natural Online Help

Natural provides several types of help:

- General information on Natural components, such as Natural statements, commands, variables, editors and utilities.
- Detailed information on Natural system error messages and user-defined messages.
- Specific information on Natural menus and input fields that appear in Natural utilities and editors.

General information on Natural components is contained in the Natural Help utility which is accessed with the system command HELP.

Detailed information on Natural messages is provided by the system commands HELP and LASTMSG.

Specific information on menus and input fields is provided by individual help functions.

## Related Topics:

- HELP - Natural System Command Reference documentation
- LASTMSG - Natural System Command Reference documentation

This section describes the help topics provided and how to access them:

- General Information - Natural Help Utility
  - Detailed Information on Error Messages
  - Specific Information on Menus and Fields
- 

## General Information - Natural Help Utility

The Natural Help utility provides general information on Natural statements, commands, variables, editors, utilities and Natural messages. To invoke the online help for a particular help topic, you either navigate through the Natural Help utility and its subordinate menus, or directly access specific help topics.

The section below contains information on:

- Invoking the Natural Help Utility Menu
- Directly Accessing Help Topics

### Invoking the Natural Help Utility Menu

#### To invoke the Natural Help Utility Menu

1. In the command line, enter the system command HELP or a question mark (?).

The Natural Help Utility Menu appears with the list of help topics provided:

```

10:50:05          ***** NATURAL HELP UTILITY *****          2003-02-07
                    - Menu -

-----

                Natural Help provides information on:

                S Natural Statements
                V Natural System Variables
                F Natural System Functions
                C Natural System Commands
                E Natural Editors
                U Natural Utilities
                P Natural Session Parameters
                T Natural Terminal Commands
                N Natural System Messages
                M User-Defined Messages
                . Exit

                Code .. _

-----
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit                                     Canc

```

- In the Code field, enter the code (letter) that corresponds to the help topic desired. A result screen appears with information on the help topic selected, or another menu is invoked with further help topics that help narrowing down your search.

## Directly Accessing Help Topics

As an alternative to navigating through the subordinate menus of the Natural Help utility, you can also directly access help topics, such as Natural system commands.

### To directly access a help topic

- In the command line, enter the system command `HELP` followed by the name of the Natural component about which you request information, for example:

```
HELP LIST
```

The LIST screen of the Natural Help Utility appears with information on the system command requested as shown in the example screen below:

```

16:23:15                ***** NATURAL HELP UTILITY *****                2003-02-25
                                - LIST -                                Page 1

-----
General Syntax:   LIST  SEQUENTIAL  object-type  object-name  options
                  DIRECTORY  object-name
                  XREF
                  DDM  ddm-name

Options:  WITH DIRECTORY NUMBERS OFF  expand-option
          formatted-option

Expand-option:  EXPAND FORMATTED COMMENTS expand-type ...10  object-name
                  n

Formatted-option:  FORMATTED 'c' 'c' SETTINGS
                  FIELDS      RULES
                  EXTFIELDS    INLINERULES FREERULES AUTORULES

-----
                                                                More ...
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Menu  Exit                -      +                                Canc

```

If the help text extends beyond the screen, "Page 1" appears in the upper-right corner of the screen and "More ..." appears in the bottom-right corner of the screen.

2. Choose ENTER or choose PF8 to scroll down the text.  
The end of the text is indicated by "Last page" in the bottom-right corner of the screen.  
Choose PF7 if you want to scroll up the text and return to the first page (Page 1).

## Detailed Information on Error Messages

The section below contains a description of the information provided for Natural system error messages and user-defined messages:

The system messages issued by Natural begin with NAT followed by a four-digit number *nnnn*.

For each Natural error message, there is a short text and a long text:

- The short text is the one-line message which is displayed when the error occurs.
- The long text is an extended explanation of the error and the action to be taken.

When Natural issues a system message, only the error number and the short text are displayed on the screen. With the system command HELP, you can also display the long text of the message.

The section below contains information on:

- Displaying the Long Message Text
- Information on the Last Error

### Displaying the Long Message Text

The section below contains instructions for displaying the long message text of a Natural system error message or user-defined message. See also the instruction for displaying the long text of the Natural error that occurred last.

 **To display the long text of a Natural system message**

- In the command line, enter the system command

```
HELP NATnnnn
```

or

```
? nnnn
```

(where *nnnn* denotes the error number.)

The Natural System Message screen of the Natural Help utility appears with the long text of the error requested. This screen is similar to the example screen of Natural System Error NAT0082 displayed below.

 **To display the long text of a user-defined message**

- Log on to the library where the user-defined message desired is stored.
- In the command line, enter the system command

```
HELP USER nnnn
```

or

```
? U nnnn
```

(where *nnnn* denotes the error number.)

The User Message screen of the Natural Help utility appears with the long text of the user-defined message requested. This screen is similar to the example screen of Natural System Error NAT0082 displayed below.

## Information on the Last Error

With the system command `HELP ERROR` or by positioning the cursor (as described below), you can display the short and the long text of the error message that occurred last in the current Natural session.

With the system command `LASTMSG`, you can list the short text of the error message(s) that occurred last and additional information on the error situation. The information displayed includes associated error messages that possibly preceded the last message.

 **To display the long text of the error that occurred last use either method:**

1. In the command line, enter the system command

```
HELP ERROR
```

The Natural System Message screen of the Natural Help utility appears with the long text of the Natural error that occurred last as shown in the example screen of Natural System Error NAT0082:

```

15:18:27          ***** NATURAL HELP UTILITY *****          2003-02-25
Library SAG      - Natural System Message NAT0082 -          Page 1

  Invalid command, or Program ANTON does not exist in library.

Tx *** Short Text ***

  Invalid command, or ... .. does not exist in library.

Ex *** Explanation ***

  One of the following has occurred:
  - You entered a value in the command line which is neither a
    Natural command nor the name of a Natural program contained
    in the active library or in a library defined as a steplib.
  - An object which is required during execution of a program,
    subprogram, subroutine or helproutine is not contained in

                                                    More ...

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Menu  Exit          Print          +                      Canc
    
```

2. Or, place the cursor in the message line and choose PF1/Help. This alternative only applies when the message line is displayed on a menu screen.

The Current Natural Message window appears as shown below:

```

11:04:30          ***** NATURAL *****          2003-04-15
User SAG          - Main Menu -          Library TEST

+----- Current Natural Message NAT0082 -----+
! Sh Invalid command, or Program ANTON does not exist in library.      !
!                                                                           !
! Tx Invalid command, or ... .. does not exist in library.              !
! Ex One of the following has occurred:                                   !
!   - You entered a value in the command line which is neither a        !
!     Natural command nor the name of a Natural program contained        !
!     in the active library or in a library defined as a steplib.        !
!   - An object which is required during execution of a program,         !
!     subprogram, subroutine or helproutine is not contained in         !
!     the active library or in a library defined as a steplib.          !
!   - Your Natural session is currently applying system files other     !
!     than those containing the object you specified.                    !
! Ac Check to ensure that you entered a valid Natural command or the name !
!     of an existing Natural object. Use the command SYSPROF to check    !
!     whether you are using the correct system file.                      !
+-----+
NAT0082 Invalid command, or Program ANTON does not exist in library.
Command ==> ANTON
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
    
```

**Note:**

With the application programming interface USR2002P, you can customize the Current Natural Message window by modifying the title of the window and descriptive text, such as the field names Sh (short message), Tx (long message), Ex (explanation) and Ac (action). USR2002P is supplied in the library SYSEXT.

 **To display the last error message(s) and further details**

1. In the command line, enter the system command

```
LASTMSG
```

The LASTMSG window appears with the short text of the error message(s) that occurred last.

2. If desired, invoke the Detailed Information window with further details on the error message(s). Place the cursor in the message line and choose ENTER:

```
+----- LASTMSG -----More:  ++
! ERRST1  0080 NAT0917 Error 920 in COPYCODE ERRST2.      !
! ERRST2  0090 NAT0917 Error 920 in COPYCODE ERRST3.      !
! ERRST3  0070 NAT0920 Program HUGO cannot be loaded (00000004).  !
! +--- Detailed Information for NAT0920 ---+              !
! ! Error Number .. 920                                     !
! ! Error Line .... 70                                     !
! ! Object ..... ERRST3                                    !
! ! Object Type ... Copycode                               !
! ! Level ..... 5                                         !
! ! Library ..... SYSEXV                                  !
! ! DBID/FNR ..... 10 / 410                               !
! ! Error Class ... System                                !
! ! Error Type ... Runtime                                !
! ! Error Time .... 2003-02-27 15:58:01                  !
! +-----+                                              !
! !                                                    !
! Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF1 !
!                               Exit          --    ++          <<>    Can !
+-----+
```

For further details, see LASTMSG in the Natural System Command Reference documentation.

## Specific Information on Menus and Fields

In addition to the help topics of the Natural Help utility, Natural provides individual information on all Natural menus and the input fields available.

 **To invoke help on a menu**

- In the Command line or in the Code field, enter a question mark (?) Or choose PF1/Help as indicated in the PF-key lines on the screen.

 **To invoke help on a field**

- Place the cursor at the beginning of the field desired and enter a question mark (?).

# Executing Commands and Menu Functions

This section describes how to use a Natural command or a Natural menu.

## Related Topics:

- Natural Commands - Natural Components
- Natural Main Menu
- Natural Online Help

This section contains information on:

- Using Natural Commands
- Using Natural Menus

## Using Natural Commands

You enter a Natural command in the Command line or at any command prompt. Natural command prompts are: the NEXT prompt and the MORE prompt.

### Exceptions:

- For Natural editors, there are different command prompts, such as (>) in the program editor as shown in the example screen of the Natural program editor below.
- For most Natural utilities, Natural commands must be preceded by a special sign, such as double forward slashes (/). For details, refer to the relevant utility documentation.
- Natural terminal commands can be entered in the Command line, at any command prompt or in any alphanumeric input field.

The input of a Natural command is **not** case-sensitive. After you have entered a command in the Command line or at a command prompt, you choose the ENTER key. ENTER confirms the action and executes the command or invokes an extra confirmation window where you explicitly acknowledge command execution.

The section below contains information on:

- Command Line
- NEXT and MORE
- Example of a System Command

## Command Line

The Command line is located above the PF-key lines and looks as follows:

<b>Command</b> ==>											
Enter	-PF1---	PF2---	PF3---	PF4---	PF5---	PF6---	PF7---	PF8---	PF9---	PF10--	PF11--PF12---
	Help		Exit								Canc

The Command line usually appears on all Natural menu screens.

## NEXT and MORE

The NEXT prompt appears if no Natural program (for example, the program that invokes the Natural Main Menu) has been started yet. The NEXT prompt indicates that Natural is awaiting your next command input.

The MORE prompt appears during the execution of a program and indicates that additional output is available. Choose ENTER to display the additional output. If you enter a command in response to the MORE prompt, the program that is being executed will be stopped and the command will be executed.

The NEXT or MORE prompt is usually located in the left upper or lower corner of the screen as shown in the example below:

```
NEXTLIB=TEST
```

## Example of a System Command

The section below is an example of executing a Natural system command.

**To invoke the Natural editor for a Natural object**

- In a Command line or at the NEXT or MORE prompt, enter a Natural system command and one or more operands if applicable.  
For example:

```
EDIT P PROGX
```

(where **P** is the type (Program) and PROGX the name of the Natural programming object)

- Choose ENTER.  
The Natural program editor is invoked and the source code of PROGX is displayed in the edit work area:

```
>> + Program      PROGX      Lib TEST
All   . . . . . 1 . . . . . 2 . . . . . 3 . . . . . 4 . . . . . 5 . . . . . 6 . . . . . 7 . .
0010 READ (3) EMPLOYEES BY NAME
0020 DISPLAY NAME
0030 END
0040
0050
0060
0070
0080
```

- 

## Using Natural Menus

Every Natural menu screen provides a list of functions. The way you invoke a function from a menu depends on the menu structure and the options provided.

To select and invoke a menu function, Natural menus provide the following alternatives:

- An individual input field for each function listed.
- The Code field, where you enter the one-letter code that is assigned to each function.
- Function keys (PF keys) that correspond to a particular function on the menu.  
The PF-key lines at the bottom of the screen that indicate which function is assigned to which key. See also Standard PF Keys below.

In addition to functions, most of the Natural menus provide fields where you specify further options and/or selection criteria. For example, the Development Functions menu contains the Name field where you enter the name of a Natural object. For an explanation of these fields and their valid input values, refer to the relevant documentation or use the help function as described in the section Natural Online Help.

The section below contains information on:

- Executing a Menu Function
- Terminating a Menu Function
- Example of a Menu Function

## Executing a Menu Function

The section below describes alternative methods that can be used for executing and terminating menu functions.

### Executing a Menu Function

- Place the cursor in the input field next to the menu function desired and choose ENTER.  
Or, place the cursor in the input field next to the menu function desired and enter any character.  
Or, in the Code field, enter the one-letter code displayed before the function desired.  
Or, if available, from the PF-key lines, choose the PF key that corresponds to the function desired (see also Standard PF Keys below).  
Or double-click the input field next to the function desired.
- Additional options:  
If additional input fields are displayed on the menu, enter the information required. If you fail to do so, you receive either a window from which you can select a valid input value, or a corresponding Natural error message.  
For an explanation of possible field entries, invoke the help function by entering a question mark (?) in the field desired.
- Choose ENTER.  
A Natural result screen or menu appears.

## Terminating a Menu Function

The section below describes alternative methods you can usually use for terminating a menu function with or without saving modifications made previously on another Natural screen.

### To terminate a function without saving changes

- Enter a period (.).  
Or choose PF12.
- Choose PF3.

## Standard PF Keys

By default, the following functions keys (PF keys) are assigned to the following functions throughout most Natural menus:

Key	Function	Explanation
PF1	Help	Invokes the online help system.
PF2	Menu	Invokes the Main Menu.
PF3	Exit	Terminates a function.
PF12	Canc	Terminates a function and cancels the changes made previously.

## Example of a Menu Function

The section below is an example of specifying a function as an alternative to using a Natural system command as demonstrated in Example of a Natural System Command above.

 **To invoke the Natural editor for a Natural object**

1. In the Code field, enter the letter that corresponds to the function Edit Object.
2. In the Type field, enter the letter that corresponds to the type of Natural object (here: P for Program).
3. In the Name field, enter the name of the Natural object (here: PROGX).

```

15:23:42          ***** NATURAL *****          2003-02-22
User SAG          - Development Functions -          Library TEST
                                                Mode Structured
                                                Work area empty

Code  Function

C    Create Object
E    Edit Object
R    Rename Object
D    Delete Object
X    Execute Program
L    List Object(s)
S    List Subroutines Used
?    Help
.    Exit

Code .. E      Type .. P
Name .. PROGX_____

Command ===>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Menu  Exit                                     Canc
    
```

4. Choose ENTER.

The Natural program editor is invoked and the source code of PROGX is displayed in the edit work area as shown in Example of a Natural System Command.

# Switching Natural Libraries

All Natural programming objects and user-defined error messages are stored in libraries. When you start a Natural session, you will be assigned to a specific library. Except for the Natural utilities menus, all Natural screens provide a field (for example: LIB=*library-ID*) which indicates the ID of your library, that is, the current library where Natural programming objects are stored and from which they are retrieved.

The default library ID assigned by Natural is SYSTEM if the Natural parameter AUTO is set to OFF. You can change the default library ID at session startup by setting the parameter AUTO to ON. AUTO=ON initiates an automatic logon to the library that corresponds to your user ID. However, different rules apply, if you log on to Natural under Natural Security as described in the Natural Security documentation.

## Related Topics:

- AUTO - Profile Parameters - Natural Parameter Reference documentation
- Logging On - Natural Security documentation

The section below contains information on:

- Logging on to Libraries
- 

## Logging on to Libraries

To switch Natural libraries, you usually use the Natural system command LOGON. With the LOGON command, you can switch to another library that already contains Natural objects, or open a new (empty) library by entering a library-ID that does not yet exist.

Note that different rules apply if you log on to Natural or log off from Natural under Natural Security as described in the Natural Security documentation.

### To switch libraries

- Enter the system command

```
LOGON library-ID
```

where *library-ID* is the ID of the library you want to access or create.

Or, from the Natural Main Menu or its subordinate menus:

In the top right-hand corner of the screen, in the Library field, replace the library ID displayed with another library ID

(see the example menu in Example of a Menu Function in the section Executing Commands and Menu Functions).

A confirmation message appears: Logon accepted to library *library-ID*.

When a new library is opened, the message additionally says: This library is empty.

## Related Topics:

- LOGON and LOGOFF - Natural System Command Reference documentation.
- Logging On - Natural Security documentation

# Natural Main Menu

The Natural Main Menu provides access to Natural development functions, environment settings, utilities and example libraries.

The section below contains information on the functions and input options provided with the Natural Main Menu and its subordinate menus:

- Invoking the Natural Main Menu
  - Development Functions
  - Development Environment Settings
  - Maintenance and Transfer Utilities
  - Debugging and Monitoring Utilities
  - Example Libraries
  - Other Products
- 

## Invoking the Natural Main Menu

There are two methods of invoking the Natural Main Menu:

- You can define a default setting by switching on Menu mode. Menu mode causes the Natural Main Menu to be invoked automatically for the next session started.
- You can invoke the Natural Main Menu within a Natural session whenever desired.

### To switch Menu mode on or off

- At Natural startup, specify the Natural parameter MENU=ON (activate), or MENU=OFF (deactivate). See also MENU in the Natural Parameter Reference documentation.

### To invoke the Natural Main Menu within a Natural session

- At a Natural command prompt (such as NEXT or MORE), enter the system command MAINMENU.
- The Natural Main Menu appears:

```

15:00:52                ***** NATURAL *****                2002-12-18
User SAG                  - Main Menu -                          Library TEST

                                Function

                                _ Development Functions
                                _ Development Environment Settings
                                _ Maintenance and Transfer Utilities
                                _ Debugging and Monitoring Utilities
                                _ Example Libraries
                                _ Other Products
                                _ Help
                                _ Exit Natural Session

Logon accepted to library SYSTEM.
Command ===>
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
                                Help           Exit                               Canc
    
```

See also Executing a Menu Function in the section Executing Commands and Menu Functions.

Each function listed on the Natural Main Menu invokes a menu of the corresponding name where you can select further functions:

Function on Natural Main Menu	Explanation of Functions on Corresponding Menu
Development Functions	Create and maintain programs, maps, data areas and other components that make up a Natural application.
Development Environment Settings	Display and modify various settings that affect your Natural session.
Maintenance and Transfer Utilities	Invoke a Natural utility to create and maintain certain objects or transfer them to another environment.
Debugging and Monitoring Utilities	Invoke a Natural utility to monitor your Natural applications and locate errors in their processing flow.
Example Libraries	Select libraries containing example programs and application programming interfaces (APIs).
Other Products	Invoke other Software AG products.

**Note:**

The position and color of the message line and PF-key lines on the Natural Main Menu and its subordinate menus can be changed with the user exit USR2003P (provided in the Natural system library SYSEXT).

## Development Functions

The functions listed on the Development Functions menu are those you will need most frequently when you develop an application with Natural. The functions apply to all Natural programming objects and Predict Descriptions (if Predict is installed) that are available in the library where you are currently logged on.

**Other Related Topics:**

- Natural Programming Guide
- Executing Commands and Menu Functions

The table below contains information on the fields provided on the Development Functions menu:

<b>Field</b>	<b>Explanation</b>
User	The ID of the Natural user who logged in the current session.
Library	The Natural library currently active.  See also how to switch libraries in Switching Natural Libraries.
Mode	The programming mode: reporting or structured mode. See Programming Modes below.
Work area empty	Indicates that no source has been loaded into the Natural work area.  If an source has already been loaded into the work area, the type and the name of the object will be displayed instead, for example, Program PROGX.
Code	The code that corresponds to the function desired, for example, <b>C</b> for Create Object.  See also Executing a Menu Function in the section Executing Commands and Menu Functions.
Type	The type of programming object, such as <b>P</b> for Program. For further details, see Object Types in the Natural Programming Guide.  You can leave the Type field blank if you specify the name of a Natural object that already exists.
Name	The name of the programming object.  For an explanation of valid object names, see Object Names (General Information) in the Natural Editors documentation.
Command line	The Command line is an input field in which you enter a Natural command. For example: To edit an existing program named PROGX, in the Command line, you would enter the system command:  EDIT PROGX  See also Executing Commands and Menu Functions.
PF Keys	The PF keys can be used as an alternative to using system commands or menu functions. The PF-key lines at the bottom of the screen indicate which function is assigned to which key.  See also Standard PF Keys in Executing Commands and Menu Functions

The table below contains information on the functions provided on the Development Functions menu. For most of the menu functions, there are equivalent Natural system commands. These alternative system commands are listed in the table and further explained in the relevant sections in the Natural System Commands documentation.

Function	Code	Explanation
Create Object	C	<p>Invokes a Natural editor where you can create a new programming object, such as a program, map or data area.</p> <p>Specify the type and the name of the object to be created. You can enter a question mark (?) in the Type field, to select an object type from a list of all types available for this function.</p>
Edit Object	E	<p>Invokes a Natural editor and displays the source of the specified programming object in modify mode.</p> <p>Specify the name of an existing object to be edited. You can also invoke a selection list of objects: see Specifying Object Ranges below.</p> <p>You can enter a question mark (?) in the Type field, to select an object type from a list of all types available for this function.</p> <p>Equivalent system command: EDIT</p>
Rename Object	R	<p>Invokes the Rename Objects window where you change the name of the specified programming object and/or the object type.</p> <p>Equivalent system command: RENAME</p>
Delete Object	D	<p>Invokes the Delete window for the specified programming object. In the Delete window, confirm the deletion by entering the name of the object again in the relevant input field.</p> <p>You can also invoke a selection list of objects as described in Specifying Object Ranges below. On this list, you can mark one or more objects for deletion.</p> <p>Equivalent system command: DELETE</p>
Execute Program	X	<p>Executes a programming object of the type Program.</p> <p>Specify the name of the programming object to be executed.</p> <p>Other object types cannot be executed by themselves, but must be invoked from another object.</p> <p>Equivalent system command: EXECUTE</p>
List Object(s)	L	<p>Displays the source of the specified programming object.</p> <p>Specify the name of the programming object to be displayed. You can also invoke a selection list of objects: see Specifying Object Ranges below.</p> <p>You can enter a question mark (?) in the Type field, to select an object type from a list of all types available for this function.</p> <p>Equivalent system command: LIST</p>
List Subroutines Used	S	<p>Ascertain which programming objects use which external subroutines and classes.</p> <p>Equivalent system command: ROUTINES</p>

The section below contains information on:

- Programming Modes
- Natural Editors
- Specifying Object Ranges

## Programming Modes

Natural offers two programming modes: reporting mode and structured mode. Generally, it is recommended to use structured mode exclusively, because it provides for more clearly structured applications. Therefore, all explanations and examples in the documentation Natural for Mainframes - Tutorial and Natural Editors refer to structured mode. Any peculiarities of reporting mode will not be taken into consideration.

In the top right-hand corner of the Development Functions menu is the Mode field, which indicates the programming mode currently in effect: Structured or Reporting.

### To switch programming modes

- In the Mode field, overwrite the first position with an **S** to switch on structured mode, or an **R** to switch on reporting mode.

Or, in the Command line, enter the system command GLOBALS SM=ON to switch on structured mode, or GLOBALS SM=OFF to switch on reporting mode. See also GLOBALS in the Natural System Command Reference documentation.

### Related Topic:

- Reporting Mode and Structured Mode in the Natural Programming Guide.

## Natural Editors

Depending on the type of the programming object, Natural invokes the appropriate editor: the program editor, the map editor or the data area editor. For details, see the relevant sections in the Natural Editors documentation.

## Specifying Object Ranges

With the functions Edit Object, List Object(s) and Delete Object, you can specify the name of a single programming object or a range of objects. Specifying a range of objects will generate a list from which you can select one or more objects you wish to edit or list, or mark for deletion.

You can list either all programming objects available in the current library, or objects with names that start with a certain value.

### To list all objects

- In the Name field, enter an asterisk (\*).  
You will receive a list with all programming objects available in the current library.

### To list objects with start values

- In the Name field, specify a start value followed by an asterisk (\*).  
This option to enter a value followed by an asterisk is referred to as asterisk notation.  
Example:

AB\*

Selects all objects that begin with AB, such as AB, AB1, ABC, ABEZ.  
Does not select objects that start with AA1 or ACB, for example.

**Note:**

The List Object(s) function provides further options to specify object ranges as described for the equivalent system command LIST.

## Development Environment Settings

The table below contains a brief description of the functions provided on the Development Environment Settings menu, and lists the Natural system commands that correspond to these functions. For details on a system command, refer to the relevant section in the Natural System Command Reference documentation.

Function	Explanation	Correspond. Command
Function-Key Settings	Assigns functions to PF keys to be used in your Natural session.	KEY
Compilation Settings	Sets options that affect the way in which Natural programming objects are compiled.	COMPOPT
Session Parameter Settings	Changes the settings of Natural session parameters.  Session parameters are described in the Natural Parameter Reference documentation.	GLOBALS
Profile Parameter Settings	Changes the settings of Natural profile parameters.  Profile parameters are described in the Natural Parameter Reference documentation and in Profile Parameter Usage in the Natural Operations for Mainframes documentation.  The system command SYSPARM invokes a utility of the same name that is described in the Natural Utilities documentation.	SYSPARM
Technical Session Information	Displays technical information on your Natural session, such as user ID and operating system.	TECH
System File Information	Displays the current definitions of the Natural system files.  See also: Natural System Files in Natural Components.	SYSPROF
Product Installation Information	Displays a list of the products installed at your site and information on these products.	SYSPROD
Security Profile Information	Only available if Natural Security is installed.  Displays the security profile currently in effect for you.	PROFILE

## Maintenance and Transfer Utilities

The table below contains a brief description of the functions provided on the Maintenance and Transfer Utilities menu, and lists the Natural system commands that correspond to these functions. Each of these commands invokes a Natural utility that is described in the Natural Utility documentation.

Function	Explanation of Utility	Correspond. Command
Maintain Error Messages	Creates and maintains messages you wish to issue in your Natural applications.	SYSERR
Maintain DDMs	Creates and maintains data definition modules (DDMs), that is, logical definitions of the database files you wish to access in your Natural applications. For a detailed explanation of DDMs, see the section Database Access in the Natural Programming Guide.	SYSDDM
Maintain Command Processors	Creates and maintains the command processors you wish to use in your Natural applications.	SYSNCP
Maintain Remote Procedure Calls	Creates and maintains remote procedure calls, that is, provides the settings necessary to execute a Natural subprogram located on a remote server.	SYSRPC
Transfer Objects to Other Libraries	Transfers Natural programming objects, error messages, DDMs and several other objects from one library to another.	SYSMAIN
Transfer Objects to Other System Files	<p>Unloads or loads Natural programming objects.</p> <p>You can use either the system command SYSUNLD to invoke the initial utility menu for unloading or loading objects, or the system command NATUNLD or NATLOAD to directly invoke the subordinate load or unload utility:</p> <p>NATUNLD utility: unloads Natural programming objects, error messages and DDMs from a Natural system file to a work file.</p> <p>NATLOAD utility: loads Natural programming objects, error messages and DDMs from a work file into a Natural system file.</p>	SYSUNLD
Transfer Objects to Other Platforms	Transfers Natural programming objects, DDMs, error messages and Adabas FDTs from one hardware platform to another.	SYSSTRANS
Transfer Objects to Other Systems	Invokes the Object Handler to process Natural and non-Natural objects for distribution in Natural environments.	SYSOBJH

## Debugging and Monitoring Utilities

The table below contains a brief description of the functions provided on the Debugging and Monitoring Utilities menu, and lists the Natural system commands that correspond to these functions. Each of these commands invokes a Natural utility that is described in the Natural Utility documentation.

Function	Explanation of Utility	Correspond. Command
Debugging	Searches for errors in the processing flow of programs.	TEST
Logging of Database Calls	Logs database commands.	TEST DBLOG
Issuing Adabas Calls	Passes Adabas commands directly to the database.	SYSADA
Buffer Pool Maintenance	Monitors the Natural buffer pool and adjusts it to meet your requirements.	SYSBPM
Editor Buffer Pool Maintenance	Monitors the buffer pool of the Software AG Editor and adjusts it to meet your requirements.	SYSEDT
TP-Specific Monitoring	Monitors and controls TP-monitor-specific characteristics of Natural.	SYSTP
Data Collection and Tracing	Collects monitoring and accounting data about the processing flow of a Natural application.	SYSRDC
Error Information on Abnormal Termination	Provides information Software AG technical support requires for error diagnosis.	DUMP

## Example Libraries

When you select Example Libraries from the Natural Main Menu, a list of libraries is displayed. These libraries contain example programs for demonstration purposes and application programming interfaces (APIs) provided by Software AG:

Library	Contents
SYSEXP	Example programs shown and referred to in the Natural Programming Guide.
SYSEXR	Example programs shown and referred to in the Natural Statements documentation and the Natural System Variables documentation.
SYSEXV	Example programs that illustrate new Natural features.
SYSEXT	Application programming interfaces (APIs).  See also the system command SYSEXT as described in the Natural System Command Reference documentation.
SYSEXTP	Example programs and APIs for specific functions that apply only under certain TP monitors.

## Other Products

When you select Other Products from the Natural Main Menu, a list of Software AG add-on products appears. These products are installed at your site and can be accessed from this menu.

# Natural Programming Objects

Within a Natural application, several types of programming object can be used to establish an efficient application structure. Programming objects include subprograms, routines and data areas. Programming objects are described in detail in the Natural Programming Guide.

Natural programming objects can be stored in source form or executable (cataloged) form in a Natural system file (see the relevant section in Natural Components).

## Related Topics:

- Object Types - Natural Programming Guide
- SAVE, CATALOG, STOW - Natural System Command Reference documentation.

# Natural Work and Print Files

Natural uses work files as temporary storage media and for sequentially accessing the file system of the operating system. Some Natural components (for example, Natural utilities) use work files that must be defined for the current Natural session.

You can also define print files to be used during the current Natural session.

Defining work or print files depends on the operating system and TP system installed.

## **Related Topics in the Natural Operations for Mainframes documentation:**

- Natural User Access Method for Print and Work Files
- VM/CMS Environment - Print File and Work File Support
- NATVSE Print and Work File Support - Natural in Batch under VSE/ESA
- Print and Work File Handling with External Datasets in a Server Environment - Natural as a Server under OS/390

## **Related Topics in the Natural Parameter Reference documentation:**

- PRINT - Print File Assignments
- WORK - Work File Assignments