

**Natural**

**Using Natural**

Version 8.2.8

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## Preface

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This documentation introduces you to the usage of Natural in a mainframe environment.

The instructions and methods described in this documentation relate to the default standards as delivered with the original Natural software. They are not a comprehensive description of all features provided by Natural. For a full description of all options and functions, refer to the related topics mentioned in this documentation.

The layout of the example screens provided in the *Using Natural* documentation and the behavior of Natural described here can differ from your results. For example, a command or message line may appear in a different screen position, or the execution of a Natural command may be protected by security control. The default settings in your environment depend on the system parameters set by your Natural administrator.

|  |   |
|--|---|
| <b>Invoking and Terminating Natural Sessions</b> | Explains how to invoke and terminate a Natural session.   |
| <b>Using Commands and Menu Functions</b>         | Explains how to execute Natural commands and menu functions.  |
| <b>Natural Online Help</b>                       | Describes the Natural online help functions and the type of help information provided.  |
| <b>Using Natural Libraries</b>                   | Explains the use of a Natural library and how to access, list and maintain libraries.   |
| <b>Maintaining and Executing Natural Objects</b> | Describes how to create, edit, maintain, delete and execute a Natural object.   |
| <b>Natural Main Menu</b>                         | Describes the Natural <b>Main Menu</b> and subordinate menus that provide access to development functions, settings, utilities and example libraries. |
| <b>Print and Work Files</b>                      | Provides information on Natural print files and work files.   |
| <b>Configuring your Natural Environment</b>      | Describes how to specify Natural parameters to customize a Natural environment and standardize or automate processes.                                 |
| <b>Rules and Naming Conventions</b>              | Describes Natural-specific rules and naming conventions.  |

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# 1

## About this Documentation

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## Document Conventions

---

| Convention     | Description  |
|----------------|--|
| <b>Bold</b>    | Identifies elements on a screen.   |
| Monospace font | Identifies service names and locations in the format <i>folder.subfolder.service</i> , APIs, Java classes, methods, properties.  |
| <i>Italic</i>  | Identifies:<br><br>Variables for which you must supply values specific to your own situation or environment.<br>New terms the first time they occur in the text.<br>References to other documentation sources. |
| Monospace font | Identifies:<br><br>Text you must type in.<br>Messages displayed by the system.<br>Program code.  |
| { }            | Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols.   |
|                | Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the   symbol.  |
| [ ]            | Indicates one or more options. Type only the information inside the square brackets. Do not type the [ ] symbols.  |
| ...            | Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...).  |

## Online Information and Support

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- Download products, updates and fixes.
- Search the Knowledge Center for technical information and tips.
- Subscribe to early warnings and critical alerts.
- Open and update support incidents.
- Add product feature requests.

## Data Protection

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Software AG products provide functionality with respect to processing of personal data according to the EU General Data Protection Regulation (GDPR). Where applicable, appropriate steps are documented in the respective administration documentation.



## 2 Invoking and Terminating a Natural Session

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A Natural session can be invoked for online or batch mode execution.

**Related Topics:**

- [Using Commands and Menu Function](#)
- [Natural Main Menu](#)

## Starting a Natural Online Session

---

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

## Using the Main Menu or a Command after Session Start

---

After starting Natural according to the procedures at your site, depending on the default settings in your environment, the Natural **Main Menu**, the NEXT command prompt or a user-defined startup menu appears.

When using the Natural **Main Menu**, you are guided through Natural development functions, environment settings, maintenance utilities and libraries that contain example programs. For information on the functions provided by the Natural **Main Menu** and its subordinate menus and instructions on invoking or closing the Natural **Main Menu**, refer to the section [Natural Main Menu](#).

When using the NEXT command prompt, you continue with a Natural command or execute a Natural object of the type program. For detailed instructions, see [Using Natural Commands](#).

## Terminating a Natural Online Session

---

You can terminate a Natural session from the Natural **Main Menu**, a Natural command prompt or from a Natural object.

➤ **To terminate a Natural online session**

- Use one of the following methods:
  - In the Natural **Main Menu**, press PF3 (Exit), or select **Exit Natural Session** and press ENTER.
  - Or:

In the command line (see [Command Line](#)), enter one of the following commands:

```
.
```

(a period)

or

```
FIN
```

or

```
% %  
/o /o
```

and press ENTER.

■ Or:

At the NEXT prompt (see [NEXT and MORE](#)), enter one of the following commands:

```
FIN
```

or

```
% %  
/o /o
```

or

```
CLEAR
```

and press ENTER.

■ Or:

At the MORE prompt (see [NEXT and MORE](#)), enter one of the following commands:

```
FIN
```

or

```
% %  
/o /o
```

and press ENTER.

■ Or:

From within a Natural object, execute a `TERMINATE` statement.

### Related Topics:

- [Using Natural Commands](#)
- [Introducing Natural Objects](#)

## Starting and Terminating a Natural Batch Session

---

The Natural batch interface provides the option to execute a Natural command or a Natural object of the type program in batch mode.

### ➤ To invoke a Natural session in batch

- Proceed as described in *Starting a Natural Session* in the *Operations* documentation.

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

- A `FIN` command in the input data set (file) CMSYNIN.
- An end-of-input condition in the command input data set (file) CMSYNIN.
- A `TERMINATE` statement in a Natural object that is being executed.

### Related Topic:

- *Natural in Batch Mode - Operations* documentation

# 3

## Using Commands and Menu Functions

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You can perform an operation during a Natural session by using a Natural command or a menu function. When using a Natural command, you can directly perform an operation without navigating through different menus.

A Natural object of the type program can also be executed without using a Natural command as mentioned in [Executing Programs](#).

This section describes the different categories of commands provided with Natural, how to execute a command and how to use a menu function.

**Related Topic:**

- [Natural Main Menu](#)

## Categories of Natural Commands

---

This section describes the different categories of Natural commands:

- [System Commands](#)
- [Terminal Commands](#)
- [Editor and Utility Commands](#)

### System Commands

Natural system commands perform functions you need in order to create, maintain or execute a Natural object. In addition, Natural system commands are used to monitor and administer your Natural environment.

**Related Topics in the System Commands Documentation:**

- [System Commands \(Overview\)](#)
- [System Commands Grouped by Category](#)
- [System Command Syntax](#)

### Terminal Commands

Natural terminal commands, for example, can be used for the following:

- 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.



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. A terminal command starts with a control character that can be specified by setting a Natural session parameter. The default control character is the percent (%) sign.

**Related Topics:**

- *Screen Design - Programming Guide*
- *Copying Data from a Screen - Programming Guide*
- *Terminal Commands Grouped by Function - Terminal Commands documentation*
- *Terminal Commands (Overview) - Terminal Commands documentation*
- *Using Session Parameters*

**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 described in the relevant sections of the *Editors* and *Utilities* documentation.

## Using Natural Commands

---

You enter a Natural system command at any command prompt. Natural command prompts are:

- The command line in the Natural **Main Menu** or on the screen of a Natural utility or system command (see also the following [example](#)).
- An editor command prompt such as the greater than (>) sign of the program editor (see also the following [example](#)).
- The NEXT prompt and the MORE prompt.

Some utilities require that a system command is preceded by a special sign such as double forward slashes (/). For details, refer to the relevant section in the *Utilities* documentation.

Most of the system commands can be entered in conjunction with one or more individual parameters and operands that further specify the operation to be performed. See also [Example of a System Command](#).

You enter a Natural terminal command at any command prompt or in any alphanumeric input field.

You enter a Natural editor or utility command at the command prompt or in the command line of the editor or utility.

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

This section covers the following topics:

- [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:

```
Command ==>

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

## 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. Press 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 terminated 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:

```
NEXT                                LIB=TEST
```

## Example of a System Command

The following instructions are an example of how to execute a Natural system command in order to edit an object.

### ➤ To invoke a Natural editor for a Natural object

- 1 At any command prompt, enter the system command `EDIT` and one or more operands, if required.

For example:

```
EDIT P PROGX
```

where `P` is the type of object (program) and `PROGX` the name of the object to be edited.

- 2 Press `ENTER`.

The Natural program editor is invoked and the source code of `PROGX` is displayed in the editing area as shown in the example below:

```
> + 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
0090
0100
0110
0120
0130
0140
0150
0160
0170
0180
0190
0200
0210
0220
0230
0240
0250
0260
0270
0280
....+....1....+....2....+....3....+....4....+....5....+.... S 3      L 1
```

See also the equivalent input when using the corresponding menu functions as described in [Example of a Menu Function](#).

#### Related Topic:

- *Example of Command Syntax - System Commands* documentation

## 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.

Natural menus provide the following alternative methods that can be used to select and invoke a menu function:

- An individual input field for each function listed.

- The **Code** field, where you can enter the one- or two-character code that is assigned to each function.
- Function keys (PF keys) that correspond to a particular function in the menu.

The PF-key lines (usually located at the bottom of the screen) indicate which function is assigned to which key. See also [Standard PF Keys](#).

In addition to the functions, most of the Natural menus provide fields where you can specify further options and/or selection criteria. For example, the **Development Functions** menu contains the **Name** field in which you can enter the name of a Natural object. For explanations 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](#).

This section covers the following topics:

- [Performing a Menu Function](#)
- [Terminating a Menu Function](#)
- [Standard PF Keys](#)
- [Example of a Menu Function](#)

## Performing a Menu Function

This section provides instructions for performing and terminating menu functions.

### » Performing a Menu Function

- In the **Code** field, enter the one- or two-character code displayed before the function required and press ENTER.

Or:

Enter any character in the input field next to the menu function required and press ENTER.

Or:

If available, press the PF key that corresponds to the function required (see also [Standard PF Keys](#)).

Or:

Place the cursor in the input field next to the menu function required and press ENTER.

If additional input fields are displayed in the menu, enter the information required. If you fail to do so, you will receive either a window from which you can select a valid input value or a corresponding Natural error message.

For explanations of possible field entries, invoke the help function by entering a question mark (?) in the required field.

### Terminating a Menu Function

The following instructions describe alternative methods you can usually use to terminate a menu function with or without saving modifications made previously on another Natural screen.

#### ➤ To terminate a function without saving changes

- Enter a period (.) and press ENTER.

Or:

Press PF12.

#### ➤ To terminate a function and save changes

- Press PF3.

### Standard PF Keys

The following function keys (PF keys) are assigned to the following functions throughout most Natural menus:

| PF Key | PF-Key Name | Explanation  |
|--------|-------------|--|
| PF1    | Help        | Invokes the online help function.                              |
| PF2    | Menu        | Invokes the Natural <b>Main Menu</b> .                         |
| PF3    | Exit        | Terminates a function.   |
| PF12   | Canc        | Terminates a function and cancels the changes made previously. |

### Example of a Menu Function

The following instructions are an example of how to use a Natural menu in order to edit an object.

#### ➤ To invoke a Natural editor for a Natural object

- 1 On the **Development Functions** screen:

In the **Code** field, enter the one-letter code that corresponds to the function **Edit Object**.

In the **Type** field, enter the one-letter code that corresponds to the type of Natural object (in the example below: P for program).

In the **Name** field, enter the name of the Natural object (in the example below: PROGX).

```

10:17:53          ***** NATURAL *****          2012-07-17
User SAG          - Development Functions -          Library TEST
                                                Mode Structured
                                                Work area empty

          Code  Function          Code  Function
          C    Create Object      L    List Objects or Single Source
          E    Edit Object        O    List Source with Expanded Sources
          X    Execute Program    N    List Extended Object Names
          R    Rename Object      I    List Directory Information
          D    Delete Objects      U    List Used Subroutines, etc.
          S    Scan Objects       ?    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

```

## 2 Press ENTER.

The Natural program editor is invoked and the source code of PROGX is displayed in the editing area as shown in [Example of a System Command](#).





# 4

## Natural Online Help

---

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| ■ Detailed Information on Error Messages .....     | 24 |
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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 - System Commands* documentation
- *LASTMSG - System Commands* documentation

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

## General Information - Natural Help Utility

---

The Natural Help utility provides general information on Natural statements, commands, system variables, editors, utilities and Natural messages. You can invoke the online help for a particular help topic either by navigating through the Natural Help utility and its subordinate menus, or by directly accessing specific help topics.

This section covers the following topics:

- [Invoking the Menu of the Natural Help Utility](#)
- [Directly Accessing Help Topics](#)

### Invoking the Menu of the Natural Help Utility

#### ➤ To invoke the menu of the Help utility

- 1 Enter the following system command:

```
HELP
```

or

```
?
```

- 2 Press ENTER.

The **Menu** of the Natural Help utility similar to the example below appears with the list of help topics provided:

```

10:58:19          ***** NATURAL HELP UTILITY *****          2009-05-20
                        - 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

```

- 3 In the **Code** field, enter the one-letter code that corresponds to the help topic desired.
- 4 Press ENTER.

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 information on a Natural command or the Natural programming language.

### ➤ To directly access a help topic

- 1 Enter the following system command:

```
HELP command
```

where *command*, for example, is the system command `EDIT` about which you request information:

```
HELP EDIT
```

- 2 Press `ENTER`.

The **EDIT** screen of the Natural Help utility appears with information on the command requested as shown on the example screen below:

```

11:36:16          ***** NATURAL HELP UTILITY *****          2011-10-20
                                - EDIT -                          Page 1 of 3
-----

Function: Invoke a Natural editor for the purpose of editing a Natural object.

Parameters:
  Object-type: Class(4), Copycode(C), Description(D), Function(7), Global(G),
              Helproutine(H), Local(L), Map(M), Parameter(A), Program(P),
              Subprogram(N), Subroutine(S) or Text(T).
              -> Must be specified if object-name is not specified.
  Object-name: The name of the object to be edited, which will then be
              loaded in the edit work area.
  Library-ID : May only be specified if the object is contained in a library
              other than the one to which you are currently logged on.
              -> Must not start with 'SYS' except 'SYSTEM'
              -> Must not be specified if Natural Security is installed.
-----

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 of  $n$  appears in the upper-right corner of the screen, where  $n$  is the number of the last page.

- 3 Press ENTER or PF8 to page forward.

Or:

Press PF7 to page backward.

Or:

Press PF6 to return to the first page.

## Detailed Information on Error Messages

---

This section contains information on 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. When using the system command `HELP`, you can also display the long text of the message.

This section covers the following topics:

- [Displaying the Long Message Text](#)
- [Information on the Last Error](#)

### Displaying the Long Message Text

This section provides instructions for displaying the long message text of a Natural system error message or user-defined message. See also the [instructions](#) for displaying the long text of the Natural error that occurred last.

#### » To display the long text of a Natural system message

- 1 Enter one of the following system commands:

```
HELP NATnnnn
```

or

```
? nnnn
```

where *nnnn* is the four-digit error number.

- 2 Press `ENTER`.

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 shown in the following section.

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

- 1 Log on to the library where the required user-defined message is stored.
- 2 Enter the following system command:

```
HELP USER nnnn
```

or

```
? U nnnn
```

where *nnnn* is the four-digit error number.

- 3 Press ENTER.

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 shown in the following section.

### Information on the Last Error

You can display the short and the long text of the error message that occurred last in the current Natural session either by using the command `HELP ERROR` or by positioning the cursor as described below.

You can list the short text of the error message(s) that occurred last and additional information on the error situation by using the system command `LASTMSG`. 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 of the following methods:

1. Enter the following system command:

```
HELP ERROR
```

Press ENTER.

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 below:

```
12:37:15          ***** NATURAL HELP UTILITY *****          2011-10-20
Library TEST      - Natural System Message NAT0082 -          Page 1 of 2

  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 processing of a Natural
    executable is not contained in the active library or in

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 press PF1 (Help). This alternative only applies when the message line is displayed on a menu screen.

A **Current Natural Message** window similar to the example below appears:



```

11:41:44          ***** NATURAL *****          2009-08-25
User SAG          - Main Menu -          Library TEST

          Function

          _ Development Functions
          _ Development Environment Settings
          _ Maintenance and Transfer Utilities
          _ Debugging and Monitoring Utilities
          _ Example Libraries
+-----+----- 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 processing of a Natural  |
|     executable 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 Enter 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.

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

```



**Note:** With the user exit routine USR2002P (see the *Operations* documentation), you can customize the **Current Natural Message** window.

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

- 1 Enter the following system command:

```
LASTMSG
```

- 2 Press ENTER.

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

- 3 To open the **Detailed Information** window with further information on the error message(s):

In the **LASTMSG** window, place the cursor in the line that contains the message for which you require additional information and press ENTER.

A **Detailed Information** window similar to the example below appears:

```
+----- 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 !
+-----+
Command ==> LASTMSG

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

For further details, see *LASTMSG* in the *System Commands* documentation.

## Specific Information on Menus and Fields

---

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

### ➤ To invoke help for a menu

- In the command line or in the **Code** field, enter a question mark (?) and press ENTER.

Or:

Press PF1 (Help).

### ➤ To invoke help for a field

- 1 Place the cursor at the beginning of the field required and enter a question mark (?).
- 2 Press ENTER.



# 5

## Using Natural Libraries

---

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Natural objects stored in the Natural system files FNAT and FUSER are grouped into logical constructs called libraries. A Natural library is used to organize objects according to functional criteria. For example, a library can consist of a set of objects that perform a particular task. If Natural Security is installed, a library can also be used to restrict object access to a particular group of users such as administrators.

A Natural application can access objects in multiple libraries depending on how the environment is set up.

All operations on a library are performed with Natural menu functions or corresponding commands. See also the section [Using Commands and Menu Functions](#).

### Related Topics:

- [Natural System Files - Natural System Architecture](#) documentation
- [Libraries in System Files - Natural System Architecture](#) documentation
- [Library Maintenance - Natural Security](#) documentation

## Objects Contained in a Library

---

A library contains object modules (source object and cataloged object, if applicable) of the following types of Natural object: program, subprogram, subroutine, copycode, helproutine, class, function, recording, map, local data area, global data area, parameter data area, command processor source, error message, dialog, debug environment, adapter and resource.

### Related Topics:

- [Cataloged Object](#)
- [Source Object](#)

## Library Types

---

This section describes the types of Natural library provided:

- [User Library](#)

- [System Library](#)

## User Library

A user library contains objects of a user application which are specific to this application and which are required to run the application. A user library is contained in the FUSER system file.

## System Library

A system library is maintained by Software AG. It is contained in the FNAT system file.

A system library contains all objects required to run a Natural system application.

In addition, there are system libraries that contain objects of the type program, which are provided for demonstration purposes: see [Example Libraries](#) in the section *Natural Main Menu*.

Note that you cannot log on to the system libraries SYSLIB and SYSLIBS. They are reserved for internal use by Software AG. If you try to log on to either library, you will receive the following message: Libraries SYSLIB and SYSLIBS reserved for system usage.



**Important:** Do not store any user-specific objects in a Natural system library. User-specific objects can be overwritten when Software AG installation or correction data sets/files are loaded into the system files.

## Steplib Libraries

---

A steplib is a Natural user library or system library that is concatenated with the current user or system library. A steplib can be used as a single storage location for multiple objects that are shared by different applications. This avoids redundant storage of identical objects and helps organize applications.

A steplib is a library in which Natural searches when an object is not found in the current library (see also the following section). The standard steplibs are the libraries SYSTEM in the FUSER and the FNAT system files.

### Related Topics in the Parameter Reference Documentation:

- *STEPLIB - Additional Steplib Library*
- *BPSFI - Object Search First in Buffer Pool*

This section covers the following topics:

- [Additional Steplibs with Natural Security](#)
- [Additional Steplibs without Natural Security](#)

- [Checking the Steplib Setting](#)

### Additional Steplibs with Natural Security

If Natural Security is active, you can define additional steplibs in the security profile of each library. The entries in a library security profile override any definitions made outside Natural Security. These steplibs are searched for an object before the standard steplibs SYSTEM (FUSER and FNAT).

#### Related Topic:

- [Steplibs - Natural Security](#) documentation

### Additional Steplibs without Natural Security

If Natural Security is not active, you can specify one additional steplib with the Natural profile parameter STEPLIB at session start. In addition, you can define further steplibs by using one of the Application Programming Interfaces (for example, USR1025N or USR3025N) that are supplied for this purpose in the Natural system library SYSEXT.

These steplibs are searched for an object before the standard steplibs SYSTEM (FUSER and FNAT).

### Checking the Steplib Setting

#### ➤ To check the steplib setting of your current library

- 1 Enter the following system command:

```
TECH
```

The **TECH** window appears.

- 2 Scroll down the window by choosing ENTER repeatedly until the **Steplib** column appears.

#### Related Topic:

- [TECH - System Commands](#) documentation

## Search Sequence for Object Execution

---

This section describes the sequence in which Natural libraries and system files are searched for a requested object that is to be executed from either a user library or a system library.



**Note:** If the profile parameter BPSFI is set to ON (the default setting is OFF), objects are searched for in the buffer pool first.



**The search sequence for a user-written object to be executed from a user library is as follows:**

1. The current library in the FUSER system file as defined by the system variable `*LIBRARY-ID`.
2. The steplib (in sequence) as specified in the Natural Security profile for the current library or in the steplib table.
3. The default steplib as defined by the system variable `*STEPLIB`.
4. The library SYSTEM in the FUSER system file.
5. The library SYSTEM in the FNAT system file.

**The search sequence for a Natural object to be executed from a system library is as follows:**

1. The current "SYS" library in the FNAT system file as defined by the system variable `*LIBRARY-ID`.
2. The steplib (in sequence) as specified in the Natural Security profile for the current library or in the steplib table.
3. The library SYSLIBS in the FNAT system file, which contains objects shared by system commands and utilities.
4. The library SYSTEM in the FNAT system file.
5. The library SYSTEM in the FUSER system file.

Since the FUSER system file is searched last, you must provide an object that is used in both the FUSER and the FNAT system files (for example, a user exit routine for a Natural utility) only in one location, namely in FUSER.

**Related Topics in the System Variables Documentation:**

- `*LIBRARY-ID`
- `*STEPLIB`

## Default Library Assignment

When you start a Natural session, you are logged on to a library assigned by Natural. A Natural screens usually provides a field (for example, **Library** or **LIB=**) that indicates the name (ID) of your library, that is, the current library (for example, `LIB=SYSTEM`) where Natural objects are stored and from which they are retrieved.

➤ **To find out your current library**

- Enter the following system command:

```
TECH
```

The **TECH** window appears. The library where you are currently logged on is listed in the **Library** field.

The default library ID assigned by Natural is `SYSTEM` if the Natural profile parameter `AUTO` is set to `OFF`. You can change the default library ID at session startup by setting `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.

You may have to log on to another library to perform a maintenance function or work on a different application as described in [Logging on to a Library](#).

#### Related Topics:

- *TECH - System Commands* documentation
- *AUTO - Parameter Reference* documentation
- *Logging On - Natural Security* documentation

## Logging on to a Library

---

When you create or maintain Natural objects or execute a Natural program inside a specific library, you may have to switch libraries and first log on to the library or `steplib` (see [Steplib Libraries](#)) that contains (or is to contain) the object.

You usually use the system command `LOGON` to log on to a library. However, different rules apply if you log on to Natural under Natural Security as described in the *Natural Security* documentation.

After a successful logon to a library that does not contain any objects, the confirmation message reads: `This library is empty.`



**Note:** The system command `LOGON` does not consider objects of the types error message and debug environment. Therefore, the confirmation message only refers to all object types other than error messages and debug environments. You can find out whether a library contains error messages or debug environments, for example, by using the `SYSMAIN` utility, or the utilities `SYSERR` and the debugger, respectively.

You can also find out whether a library is empty (except for error messages and/or debug environments) by using the system command `LIST` described in [Listing Objects in a Library](#).

The library to which you are logged on remains active until you log on to another library or terminate your Natural session.

### ➤ To log on to a library

- 1 Enter the following system command:

```
LOGON library-ID
```

where *library-ID* is the name (ID) of the library you want to access.

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 also *Example of a Menu Function* in the section *Using Commands and Menu Functions*).

- 2 Press ENTER.

If the library ID you entered complies with the [library naming conventions](#), the following confirmation message appears: Logon accepted to library *library-ID*.

### Related Topics:

- [LOGON and LOGOFF - System Commands](#) documentation
- [Logging On - Natural Security](#) documentation

## Creating a Library

---

You create a library by using either the system command LOGON for an empty library where you create an object, or the move or copy function of a Natural utility when transferring objects.

### ➤ To create a library

- If you use the system command LOGON, proceed as described in [Logging on to a Library](#). Specify a library ID (see also [Library Naming Conventions](#)) that logs you on to a library that does not contain any objects. In this library, create at least one cataloged object or one source object.

Or:

If you want to move or copy objects from an existing library to a new one, proceed as described in [Moving, Copying and Renaming Libraries](#).

## Listing Libraries

---

You can obtain a list of all libraries available in your current Natural system environment, for example, by using the SYSMAIN utility.

The instructions in this section are examples of listing libraries by using either SYSMAIN menu functions or a corresponding command.

### ➤ To list all libraries using menu functions

- 1 From the Natural **Main Menu**, choose **Maintenance and Transfer Utilities**.
- 2 Press ENTER.

The **Maintenance and Transfer Utilities** screen appears.

- 3 Select **Transfer Objects to Other Libraries**.

Or:

Enter the following system command:

```
SYSMAIN
```

- 4 Press ENTER.

The **Main Menu** of the SYSMAIN utility similar to the example below appears:

```

14:09:48          ***** NATURAL SYSMAIN UTILITY *****          2013-05-02
User SAG                      - Main Menu -

      Code  Object                                Code  Function
      A    Programming Objects                    C    Copy
      D    Debug Environments                     D    Delete
      E    Error Message Texts                    F    Find
      P    Profiles                               L    List
      R    Rules                                  M    Move
      S    DL/I Subfiles                          R    Rename
      V    DDMs                                  ?    Help
      X    Predict Sets                           .    Exit
      ?    Help
      .    Exit

Object Code .. A                      Function Code .. _

Command ==>

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Menu  Exit  Copy  Del  Find  List  Move  Ren

```

- 5 In the **Object Code** field, enter an A (default setting) to list all libraries that contain Natural objects except error messages and debug environments (for error messages, enter an E, for debug environments a D).

In the **Function Code** field, enter an L (for **List**).

- 6 Press ENTER.

The **List Programming Objects** screen appears.

- 7 In the **Code** field, enter an A to search for libraries that contain all types of object module: cataloged objects and source objects.

In the **Source Library** field, enter an asterisk (\*) to search for all libraries.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

Leave all other input fields unchanged.

- 8 Press ENTER.

The **Library Selection** screen appears with a list of all libraries available in the current system file.

Press ENTER to scroll down the list, PF11 to scroll right and PF12 to scroll left.

From the **Library Selection** screen, you can select a particular library and list the objects contained in that library. For further information on the **Library Selection** screen, see *Related Topic* below.

➤ **To list all libraries using a command**

- 1 Enter the following system command:

```
SYSMAIN LIST ALL * IN LIBRARY *
```

- 2 Press ENTER.

The **Library Selection** screen appears with a list of all libraries available in the current system file.

**Related Topic:**

- *Listing and Selecting Libraries - SYSMAIN Utility* documentation

## Listing Objects in a Library

---

You can obtain a list of objects contained in a library by using either the system command `LIST` or the corresponding function of the Natural utility `SYSMAIN` or the Object Handler.



**Note:** The system command `LIST` does not process objects of the types error message and debug environment. You can list error messages or debug environments, for example, by using the `SYSMAIN` utility.

This section describes how to obtain a list of objects by using `LIST`.

➤ **To list objects using `LIST`**

- 1 Enter the following system command:

```
LIST *
```

where asterisk (\*) specifies that all source objects and cataloged objects are to be listed (see also *object-name-range* in *LIST* in the *System Commands* documentation).

- 2 Press ENTER.

A **LIST Objects in a Library** screen similar to the example below appears with a list of source objects and cataloged objects available in the current library (in the example below: TEST) in the current system file:

| 10:09:25  |          | ***** NATURAL LIST COMMAND ***** |     |    |         |         | 2012-07-24   |                  |
|---|----------|----------------------------------|-----|----|---------|---------|--------------|------------------|
| User SAG  |          | - LIST Objects in a Library -    |     |    |         |         | Library TEST |                  |
| Cmd   | Name     | Type                             | S/C | SM | Version | User ID | Date         | Time             |
| ---   | *        | *                                | *   | *  | *       | *       | *            | *                |
| ---   | COPYLDA  | Copycode                         | S   | R  | 8.2.02  | SAG     | 2012-07-23   | 17:58:19         |
| ---   | DEMOSPGM | Subprogram                       | S/C | S  | 8.2.02  | SAG     | 2012-07-23   | 17:58:34         |
| ---   | EMP-L    | Local                            | S/C |    | 8.2.02  | SAG     | 2012-07-23   | 17:58:47         |
| ---   | GDATEST  | Global                           | S   |    | 8.2.02  | SAG     | 2012-07-24   | 10:09:25         |
| ---   | HELPR1   | Helproutine                      | S/C | S  | 8.2.02  | SAG     | 2012-07-24   | 10:02:59         |
| ---   | LDATEST  | Local                            | S/C |    | 8.2.02  | SAG     | 2012-07-23   | 17:59:16         |
| ---   | MAPTEST  | Map                              | S/C | S  | 8.2.02  | SAG     | 2012-07-24   | 10:04:44         |
| ---   | MAP01    | Map                              | S/C | S  | 8.2.02  | SAG     | 2012-07-24   | 10:04:25         |
| ---   | PDASTUB  | Subprogram                       | S/C | S  | 8.2.02  | SAG     | 2012-07-24   | 10:03:41         |
| ---   | PDATEST  | Parameter                        | S/C |    | 8.2.02  | SAG     | 2012-07-24   | 10:03:47         |
| ---   | PGMTEST  | Program                          | S/C | S  | 8.2.02  | SAG     | 2012-07-24   | 10:03:53         |
| ---   | PGM01    | Program                          | S   | S  | 8.2.02  | SAG     | 2012-07-23   | 17:59:02         |
| ---   | SUBPGM1  | Subprogram                       | S   | S  | 8.2.02  | SAG     | 2012-07-23   | 17:59:08         |
| ---   | SUBRTEST | Subroutine                       | S/C | R  | 8.2.02  | SAG     | 2012-07-24   | 10:07:58         |
| ---   | TESTPGM  | Program                          | S   | S  | 8.2.02  | SAG     | 2012-07-24   | 10:05:26         |
| ---   | TEXTTEST | Text                             | S   |    | 8.2.02  | SAG     | 2012-07-24   | 10:05:43         |
|   |          |                                  |     |    |         |         |              | 16 Objects found |
| Top of List.  |          |                                  |     |    |         |         |              |                  |
| Command ==>   |          |                                  |     |    |         |         |              |                  |
| Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12--- |          |                                  |     |    |         |         |              |                  |
| Help Print Exit Sort -- - + ++ > Canc   |          |                                  |     |    |         |         |              |                  |

The list is sorted by the name of the object (**Name** column) and contains further information on the object such as the type of object (for example, Program), the type of object module (**S/C** column: S = source object, C = cataloged object) available and the ID of the user who created or modified the object.

From the **LIST Objects in a Library** screen, you can select an object for further processing such as listing the source code of an object or deleting objects from a library as described in [To delete objects using LIST](#) in the section *Deleting Objects in a Library*.

For further information on the **LIST Objects in a Library** screen and other options provided with LIST such as listing a particular range of object names or sorting the list of objects, see the related topics below.

### Related LIST Topics in the System Commands Documentation:

- *object-name-range*
- *Explanation of the Column Headers*
- *Sorting the List of Objects*
- *Performing a Function on an Object*

## Printing a List of Objects

---

You can print a list of objects contained in the current library in the current system file.

### » To print a list of objects

- 1 Invoke the **LIST Objects in a Library** as described in [Steps 1 and 2](#) in *Listing Objects in a Library*.
- 2 Press PF2 (Print).

The **PRINT** window appears.

- 3 In the **Destination** field, enter a valid printer name (if required, ask your Natural administrator for a printer available in your current environment). If required, change the page size (the default setting is 60 lines).
- 4 Press ENTER.

The **Printout Specification** screen appears where you can specify printer settings such as the amount of copies to be printed.

- 5 Press ENTER.

The list of objects contained in the library is printed on the specified printer device.

### Related Topics:

- [Printing Objects](#)
- *LIST - System Commands* documentation



## Finding Objects in a Library

You can use the SYSMAIN utility or the system command `SCAN` to search for objects contained in a library.

- [Searching for Objects using SYSMAIN](#)
- [Searching for Objects using SCAN](#)

### Searching for Objects using SYSMAIN

The following instructions are examples of finding objects by specifying search criteria by using either SYSMAIN menu functions or a corresponding command.

#### ➤ To find objects using menu functions

- 1 Invoke the **Main Menu** of the SYSMAIN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.

- 2 In the **Object Code** field, enter an A (default setting) to search for all types of object.

(Exceptions: for error messages, enter an E, for debug environments a D.)

In the **Function Code** field, enter an F (Find).

- 3 Press ENTER.

The **Find Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to search for all types of object module: cataloged objects and source objects.

In the **Object Name** field, enter an asterisk (\*) to search for all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

In the **Source Library** field, enter the ID of the library, in which to perform the search operation.

In the **Criteria** field, replace N (No) by Y (Yes). N is the default setting.

Leave all other input fields unchanged.

- 5 Press ENTER.

The **Additional Criteria** window appears where you can enter additional search criteria as shown in the example below:

```

18:23:16          ***** NATURAL SYSMAN UTILITY *****          2009-05-20
User SAG          - Find Programming Objects -

+-----+
!      --- Additional Criteria ---      !
!                                     !
! Object Type ..... PM_____          !
! Date/Time From .. 2006-05-09 _____ !
! Date/Time To .... 2009-05-01 _____ !
! User ID ..... SAG_____            !
! Terminal ID ..... _____          !
!                                     !
!                                     !
! Command ==>                          !
!                                     !
Code .. !
Object Name .. +-----+

Source Library ... TEST_____ Database .... 10_____ File .. 32_____

Options                               Criteria .... Y

Command ==>

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
      Help Menu Exit Copy Del Find List Move Ren Fsec Fdic Fnat

```

- 6 Enter one or more search criteria and press ENTER.

The window is closed. A plus (+) sign in front of the **Criteria** field indicates when additional criteria other than the object type are specified in the window.

- 7 Press ENTER again.

The **Find Selection** screen appears with a list of all source objects and cataloged objects that are available in the specified library in the current system file and that meet the specified search criteria. In the example above, all objects of the types P (program) and M (map) that were created or modified between 2006-05-09 and 2009-05-01 by the user SAG are listed.

- 8 Press ENTER to scroll down the list until the following message appears: Library has been successfully listed.

From the **Find Selection** screen, you can select an object for further processing such as listing the source code of an object as described in *Selection Lists for Programming Objects* in the *SYSMAN Utility* documentation.

**Related Topic:**

- *Using Menu Functions and Commands - SYSMAIN Utility documentation*

➤ **To find objects using a command**

- 1 Enter the following system command:

```
SYSMAIN FIND ALL * TYPE PN WITH USER user-ID IN library-ID
```

where:

ALL specifies that all source objects and cataloged objects are to be selected for the search operation.

Asterisk (\*) specifies that all object names are to be selected for the search operation (see also *Specifying a Range of Names* in the *SYSMAIN Utility documentation*).

PN specifies the types of object for which to search: P denotes program, N denotes subprogram.

*library-ID* is the ID of the library in which to search.

*user-ID* is the ID of the user for which to search.

- 2 Press ENTER.

The **Find Selection** screen appears with a list of all source objects and cataloged objects of the types program and subprogram that were created or modified by the specified user.

**Related Topic:**

- *Keywords and Variables in Direct Commands - SYSMAIN Utility documentation*

**Searching for Objects using SCAN**

The following instructions are examples of finding objects by scanning their sources for a particular string of characters by using the system command SCAN.



**Note:** The SCAN does not process objects of the types error message and debug environment. You can scan error messages by using the **Scan in messages** function of the Natural utility SYSERR.

➤ **To scan sources using menu functions**

- 1 Enter the following system command:

```
SCAN
```

## 2 Press ENTER.

A **Scan Objects in Libraries** screen similar to the example below appears where you can specify an object range and a scan value:

```

18:24:53          ***** NATURAL SCAN COMMAND *****          2009-05-20
User SAG          - Scan Objects in Libraries -          Library TEST

          Code  Function
          T      Statistics
          L      List of Objects Containing Scan Value
          S      Object Lines with Scan Value
          ?      Help
          .      Exit

Code ..... L
Scan value ..... LOCAL_____
Replace value ... GLOBAL_____
Library ..... TESTLIB_
Object name ..... *_____ Selection list .. N
Object type(s) .. *_____
Absolute scan ... N          Trace ..... N

Command ==>

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

```

In the **Code** field, enter an L (for **List of Objects Containing Scan Value**) and specify a scan value, a library and an object range; asterisk (\*) selects all object names and object types.

In the **Replace value** field, you can enter a character string (for example, GLOBAL) that is to replace the specified scan value (for example, LOCAL).

## 3 Press ENTER.

The **Select Objects for Library** screen appears for the specified library in the current system file with a list of all source objects that meet the specified search criteria. In the example above, all objects in the library TESTLIB that contain the character string LOCAL are selected.

From the **Select Objects for Library** screen, you can select an object and display or modify the source line that contains the scan value.

### ➤ To scan sources using a command

- 1 Enter the following system command:

```
SCAN FUNC=L,SVAL=scan-value,LIB=library-ID,*
```

where:

*scan-value* is the character string (for example, LOCAL) for which to scan sources.

*library-ID* is the ID of the library in which to search (for example, TESTLIB).

Asterisk (\*) specifies that all source objects are selected for the search operation.

- 2 Press ENTER.

### Related Topic:

- *SCAN - System Commands* documentation

## Copying, Moving and Renaming Libraries

You copy or move a library by copying or moving all Natural objects from a source library to an existing or a new target library.

Renaming a library requires the same steps as moving a library. Once all objects of a library have been moved to a new target library, the old library is deleted automatically.

You can copy or move single or multiple objects from one library to another by using either the SYSMAN utility or the Object Handler. The instructions below are examples of copying or moving all objects with SYSMAN by using either menu functions or corresponding commands.

### ➤ To copy or move all objects using menu functions

- 1 Invoke the **Main Menu** of the SYSMAN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.
- 2 In the **Object Code** field, enter an A (default setting) to select all types of object.

(Exceptions: for error messages, enter an E, for debug environments a D.)

In the **Function Code** field, enter a C (for **Copy**) or an M (for **Move**).

- 3 Press ENTER.

Depending on the function code entered, either the **Copy Programming Objects** or the **Move Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to select all types of object module: cataloged objects and source objects.

In the **Sel. List** (Selection List) field, replace Y (Yes) by N (No). Y is the default setting.

In the **Object Name** field, enter an asterisk (\*) to select all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

In the **Source Library** field, enter the ID of the library that contains the objects to be copied or moved.

In the **Target Library** field, enter the ID of an existing or a new library to which you want to copy or move the objects.

Leave all other input fields unchanged.

- 5 Press ENTER.

All source and cataloged objects are copied or moved between the specified source and target libraries in the current system file and the following message appears: `Function completed successfully.`

### ➤ To copy or move all objects using commands

- 1 Enter one of the following system commands:

```
SYSMAIN COPY ALL * FM old-library TO new-library
```

(copies objects)

or

```
SYSMAIN MOVE ALL * FM old-library TO new-library
```

(moves objects)

where:

ALL specifies that all source objects and cataloged objects are to be selected.

Asterisk (\*) specifies that all object names are to be selected (see also *Specifying a Range of Names* in the *SYSMAIN Utility* documentation).

*old-library* is the ID of the library that contains the objects to be copied or moved.

*new-library* is the ID of an existing or a new library (see also [Library Naming Conventions](#)).

- 2 Press ENTER.

If the copy or move operation was successful, the command processed is displayed on the screen followed by the message: `Function completed successfully.`

For further information on the functions provided with the SYSMAN utility such as replacing or renaming objects, refer to the *Utilities* documentation.

## Deleting Objects in a Library

A library is only maintained in a Natural environment as long as it contains at least one source object or one cataloged object. If you delete all objects from a library, this library is no longer available.

You can delete single or multiple objects from a library by using the system command `LIST` or a Natural utility.

The instructions below are examples of deleting objects from the current library by using the system command `LIST`, and deleting objects from a different library by using the menu functions or commands of the SYSMAN utility.

### ➤ To delete objects using `LIST`

- 1 Enter the following system command:

```
LIST *
```

where asterisk (\*) specifies that all source objects and cataloged objects are to be listed (see also *object-name-range* in *LIST* in the *System Commands* documentation).

- 2 Press ENTER.

The **LIST Objects in a Library** screen appears with a list of source objects and cataloged objects available in the current library in the current system file.

- 3 In the **Cmd** column, next to the object(s) required, enter the following:

```
DE
```

as shown on the example screen below.

- 4 Press ENTER.

A **DELETE** window similar to the example below appears:

```

17:04:25          ***** NATURAL LIST COMMAND *****          2010-03-01
User SAG          - LIST Objects in a Library -          Library TEST

Cmd  Name      Type      S/C  SM Version  User ID  Date      Time
--- *-----*-----*--*--*-----*-----*-----*-----*
DE  COPYLDA    Co  +-----DELETE-----+  010-03-01  15:10:48
DE  DEMOSPGM   Su  |                                     |  010-02-05  19:00:08
DE  EMP-L      Lo  |      Please select one item:      |  010-03-01  15:31:31
DE  GDATEST    G1  |                                     |  010-03-01  15:23:37
   HELPR1     He  |      _ Confirm each deletion        |  010-03-01  15:13:12
   LDATEST    Lo  |      _ Delete without confirmation   |  010-02-05  18:49:14
   MAPTEST    Ma  |      _ Exit (no deletion)           |  010-03-01  15:14:16
   PDASTUB    Su  |                                     |  010-03-01  15:31:18
   PDATEST    Pa  +-----+  010-03-01  15:31:24
   PGM01      Program      S      S  8.2.01  SAG      2010-03-01  15:29:31
   SUBPGM1    Subprogram    S      S  8.2.01  SAG      2010-03-01  15:25:02
   SUBRTEST   Subroutine    S/C    R  8.2.01  SAG      2010-03-01  15:30:12
   TESTPGM    Program      S      S  8.2.01  SAG      2010-03-01  15:26:40
   TEXTTEST   Text          S          8.2.01  SAG      2010-03-01  15:05:23

                                          14 Objects found

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

```

- 5 Mark an item by typing in any character next to the option required and press ENTER:

**Confirm each deletion** invokes a window for each object to be deleted in which you type in the name of the object to confirm the delete operation.

**Delete without confirmation** immediately executes the delete operation(s).

**Exit** cancels the delete operation(s).

#### ➤ To delete objects using SYSMAN menu functions

- 1 Invoke the **Main Menu** of the SYSMAN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.
- 2 In the **Object Code** field, enter an A (default setting) to select all types of object.

(Exceptions: for error messages, enter an E, for debug environments a D.)



In the **Function Code** field, enter a D (for **Delete**).

- 3 Press ENTER.

The **Delete Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to select all types of object module: cataloged objects and source objects.

In the **Sel. List** (Selection List) field, replace Y (Yes) by N (No). Y is the default setting.

In the **Object Name** field, enter an asterisk (\*) to select all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

In the **Source Library** field, enter the ID of the library you want to delete.

Leave all other input fields unchanged.

- 5 Press ENTER.

All source objects and cataloged objects are deleted from the specified library in the current system file and the following message appears: Function completed successfully.

#### ➤ To delete all objects using a SYSMAIN command

- 1 Enter the following system command:

```
SYSMAIN DELETE ALL * FM library-ID
```

where:

ALL specifies that all source objects and cataloged objects are to be selected.

Asterisk (\*) specifies that all object names are to be selected  
(see also *Specifying a Range of Names* in the *SYSMAIN Utility* documentation).

*library-ID* is the ID of the library that contains the objects to be deleted.

- 2 Press ENTER.

If the delete operation was successful, the command processed is displayed on the screen followed by the message: Function completed successfully.



## 6 Maintaining and Executing Natural Objects

---

|  |    |
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An object is a component of an application. A Natural application consists of a set of objects that interact with one another to perform a particular task.

Objects available for setting up and maintaining a Natural application comprise Natural objects and non-Natural objects.

Non-Natural objects are objects that have not been created with a Natural development function and that are stored outside a Natural and an Adabas environment. Examples of non-Natural objects are bitmaps, XML sources, HTML files, DL/I subfiles and Predict rules.

This section provides general information on Natural objects and describes the steps required to create, maintain, delete or execute an object.

All operations on a Natural object are performed with Natural commands and/or menu functions. For instructions on using commands and menu functions, refer to the section [Using Commands and Menu Functions](#).

### Related Topics:

- [Listing Objects in a Library](#)
- [Finding Objects in a Library](#)
- [Deleting Objects in a Library](#)

## Introducing Natural Objects

---

The following characteristics identify a Natural object:

- It is stored in a Natural system file.
- It comprises a cataloged object and/or a source object.
- It is created with any of the Natural editors or utilities.

This section covers the following topics:

- [Cataloged Object](#)
- [Source Object](#)

- [Object Types](#)

### Cataloged Object

A cataloged object is the executable (compiled) form of a Natural object. It is created by the Natural compiler and is stored as an object module in a Natural system file. Compiling source code and creating a cataloged object is referred to as cataloging an object. A cataloged object is created by using the Natural system command `CATALOG` or `STOW`.

At execution time, the cataloged object is loaded into the Natural buffer pool and executed by the Natural runtime system. Natural objects can only be executed or reference one another if they have been stored as cataloged objects in a Natural system file.

A cataloged object cannot be modified or decompiled.

### Source Object

A source object (or a saved object) contains the human-readable form of Natural source code. Source code is saved as a source object in a Natural system file by using the Natural system command `SAVE` or `STOW`.

To execute source code contained in a source object, you need to compile the source code in order to create generated object code that can be interpreted and executed by the Natural runtime system.

### Related Topics:

- [Natural System Files - Natural System Architecture](#) documentation
- [Saving and Cataloging Objects](#)

### Object Types

Within a Natural application, several types of Natural object can be used to establish an efficient application structure and to meet particular programming and application requirements. Natural object types include programs, subprograms, routines and data areas. For descriptions of all types of object available, refer to the section *Objects for Natural Application Management* in the *Programming Guide*.

## Natural Editors and Utilities Used for Objects

---

When you create, maintain or delete a Natural object, you use either a Natural editor or a Natural utility.

There are maintenance functions that do not apply to all types of object. For example, you cannot edit an object of the type adapter.

A Natural editor is invoked for all object types that can be specified with the system command `EDIT` or on the **Development Functions** screen. Depending on the object type specified, Natural invokes the appropriate editor: the program editor, the data area editor or the map editor. For example, for an object of the type program, Natural invokes the program editor.

A Natural utility is used for object types that either require additional administration services and/or are not maintained in a library such as DDMs. A utility provides its own editor.

For an overview of all Natural object types and their appropriate editor or utility, see *Objects for Natural Application Management* in the *Programming Guide*.

### Related Topics:

- *Editors* documentation
- *Utilities* documentation

This section covers the following topics:

- [Invoking a Natural Editor](#)
- [Invoking a Natural Utility](#)
- [Setting Editor Preferences](#)

### Invoking a Natural Editor

#### ➤ To invoke a Natural editor

- Use the system command `EDIT`.

For an example of using `EDIT`, see [Example of a System Command](#).

Or:

From the Natural **Main Menu**, invoke the [Development Functions](#) menu (see *Natural Main Menu*) and choose either the function **Create Object** or **Edit Object**.

For an example of invoking an editor, see [Example of a Menu Function](#) in the section *Using Commands and Menu Functions*.

**Related Topic:**

- *EDIT - System Commands* documentation

**Invoking a Natural Utility****> To invoke a Natural utility**

- Enter one of the following system commands:

`SYSERR`

(for error messages)

`SYSDDM`

(for DDMs)

`SYSNCP`

(for command processor sources)

`SYSARM`

(for parameter profiles)

`TEST`

(for debug environments)

Or:

From the Natural **Main Menu**, invoke the appropriate menu and select the appropriate utility:

- **Maintenance and Transfer Utilities** for SYSERR, SYSDDM and SYSNCP.
- **Development Environment Settings** for SYSARM.
- **Debugging and Monitoring Utilities** for TEST.

**Related Topic:**

- *Natural Main Menu*

## Setting Editor Preferences

When working with the Natural program editor or data area editor, you can use the editor profile function to display the current settings of the editor and set preferences to be in effect when editing source code.

### ➤ To display or modify editor profile settings

- 1 At the command prompt of the program editor or data area editor, enter the following:

```
PROFILE
```

- 2 Press ENTER.

The **Editor Profile** screen appears.

For information on the fields and options provided on the screen, see *Editor Profile* in the *Editors* documentation.

## Selecting and Displaying Objects

---

You can display a source object to view or copy source code without modifying the source object. The source code of the specified object is then displayed in read-only mode in the editing area of the appropriate editor.

You can either select an object from a list or specify the name of the object you want to display.

This section describes how to list source code by using the system command `LIST`. As an alternative to `LIST`, you can use the **List Objects or Single Source** function provided in the **Development Functions** menu described in *Natural Main Menu*.

### ➤ To select an object from a list of objects

- 1 Invoke the **LIST Objects in a Library** screen as described in **Steps 1 and 2** of *To list objects using LIST*.
- 2 In the **Cmd** column, next to the object required, enter the following:

```
LI
```

- 3 Press ENTER.

The source code of the selected object is displayed.



➤ **To display source code of a specified object**

- 1 Enter the following system command:

```
LIST object-name
```

where *object-name* is the name of the object to be displayed.

If you do not specify *object-name*, the source code currently contained in the source work area is displayed.

- 2 Press ENTER.

The source code of the specified object is displayed in read-only mode.

**Related Topics:**

- [Listing Objects in a Library](#)
- [LIST - System Commands](#) documentation

---

## Creating and Editing Objects

This section describes the steps required to create and edit a Natural object by using a Natural editor. For information on using the Natural utilities mentioned earlier, refer to the relevant sections in the *Utilities* documentation.

- [Checking the Current Environment](#)
- [Setting the Programming Mode](#)
- [Using the Natural Programming Language](#)
- [Creating Source Code](#)
- [Editing a Source Object](#)
- [Setting the Object Type](#)

### Checking the Current Environment

A Natural object is created in the current library in the current system file. Before you start creating or editing an object, make sure that you are logged on to the library where you want to store or retrieve the object.

For instructions on library assignments and switching libraries, see [Default Library Assignment](#) and [Logging on to a Library](#).

## Setting the Programming Mode

Natural offers two programming modes: reporting mode and structured mode.

For explanations of the two modes and instructions on how to change the mode from reporting to structured (or vice versa), see [Programming Modes](#) in the section *Natural Main Menu*.

## Using the Natural Programming Language

The Natural programming language consists of statements, system functions and system variables.

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

Natural system functions, for example, are used to perform mathematical functions.

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

### Related Topics:

- *Statements* documentation (overview)
- *System Functions* documentation
- *System Variables* documentation

## Creating Source Code

This section describes how to create source code by using the system command `EDIT` and the program editor as an example. In addition, this section provides examples of editor commands and instructions for navigating in a source.

As an alternative to `EDIT`, you can use the [Create Object](#) function provided in the [Development Functions](#) menu described in *Natural Main Menu*.

### ➤ To enter source code

- 1 Enter the following system command:

```
EDIT object-type
```

where *object-type* is the type of object you want to create.

For example, to create an object of the type program, enter the following:

```
EDIT PROGRAM
```

If you do not specify *object-type*, the program editor is invoked by default.

(See also [Setting the Object Type](#).)

- 2 Press ENTER.

The editing area of the program editor appears where the type of object (here: Program) is displayed at the top of the screen as shown in the example below:

```
> + Program Lib SYSTEM
All .....1.....2.....3.....4.....5.....6.....7..
0010
0020
0030
0040
0050
0060
0070
0080
0090
0100
.....1.....2.....3.....4.....5..... S 0 L 1
```

- 3 If the editing area is not empty, at the editor command prompt (>), enter the following editor command:

```
CLEAR
```

and press ENTER.

CLEAR deletes the contents of the source work area.

- 4 Starting in the first line (numbered with 0010) of the empty editing area, insert the source code by using the copy and paste functions provided by your terminal emulation (for example, Entire Connection), or by typing in the source code.

If you want to stop automatic conversion from lower to upper case, change the default setting in the editor profile as described in *General Defaults* in the *Editors* documentation.

- 5 As you fill up a screen, for more empty lines, enter the following editor command:

```
ADD
```

and press ENTER.

The editor command ADD adds nine empty lines. From these lines, only the lines you fill in will be added to the program source. With the next ENTER, lines that are left empty are eliminated. You can change this default setting in the editor profile as described in *Editor Defaults* in the *Editors* documentation. For all program editor commands available, see the *Program Editor* documentation.

## > To scroll through a source

- 1 To return to the beginning of the source code, enter the following editor command:

TOP

- 2 To go to the end of the source code, enter the following editor command:

BOT

- 3 To scroll down one page in the source code, press PF8 or ENTER.
- 4 To scroll up one page in the source code, press PF7.

For all program editor commands available, see *Editor Commands for Positioning in the Program Editor* documentation.

## Editing a Source Object

Once source code has been saved as a source object (as described in [Saving and Cataloging Objects](#)), you open a Natural editor for a source object by specifying the name of the source object.

### ➤ To edit source code of a source object

- 1 Enter the following system command:

```
EDIT object-name
```

where *object-name* is the name of an existing source object that is contained in the current library in the current system file.

- 2 Press ENTER.

The source code of the specified source object is displayed in modify mode in the editing area of the appropriate editor.

As an alternative to `EDIT`, you can use the [Edit Object](#) function provided in the [Development Functions](#) menu described in *Natural Main Menu*.

As an alternative to `EDIT`, you can also use the system command `READ` as described in [Copying Objects](#).

### Related Topic:

- [EDIT - System Commands](#) documentation

## Setting the Object Type

The object type is specified when creating an object (the default setting is program) or set automatically when an existing source object is read into the source work area. When working with the program editor or data area editor, you can change the object type any time by using the editor command `SET TYPE`.

### ➤ To change the object type

- 1 Enter the following editor command:

```
SET TYPE object-type
```

where *object-type* denotes the type of object to be created.

For example:

```
SET TYPE SUBPROGRAM
```

- 2 Press ENTER.

The new object type specified with the command is indicated on the screen (here: Subprogram).

### Related Topics:

- *SET TYPE - Program Editor* documentation

*SET TYPE - Data Area Editor* documentation

## Checking and Testing Objects

---

Source code compilation (cataloging) performs a syntax check and generates executable object code.

The source code contained in the source work area can be compiled without saving the source code first (as described in [Saving and Cataloging Objects](#)). Additionally, compilation of source code for objects of the type program can be combined with program execution. See also [Executing Programs](#).

### ➤ To compile source code for syntax checks

- 1 Enter the following system command:

```
CHECK
```

- 2 Press ENTER.

If no syntax error is found, the source code contained in the source work area is compiled.

➤ **To compile source code for program execution**

- 1 Enter the following system command:

```
RUN
```

- 2 Press ENTER.

If no syntax error is found, the source code contained in the source work area is compiled and the generated code is executed.

**Related Topics:**

- *CHECK - System Commands* documentation
- *RUN - System Commands* documentation

**Online Help for Syntax Errors**

Source code compilation has been successful if no error message appears.

If Natural encounters a syntax error during compilation, an error message is displayed on the screen and the statement line that contains the error is highlighted and marked with an E as shown in the example below:

```

>                                     > + Program      PGM01      Lib SYSTEM
      ....+....1....+....2....+....3....+....4....+....5....+....6....+....7..
0250  RD1. READ EMPLOYEES-VIEW BY NAME
0260      STARTING FROM #NAME-START
0270      THRU #NAME-END
0280 *
0290      IF LEAVE-DUE >= 20
0300      PERFORM MARK-SPECIAL-EMPLOYEES
0310      ELSE
0320      RESET #MARK
0330      END-IF
0340 *
E 0350      DISPLAY NAME 3X DEPT 3X LEAVE-DUE 3X '>=20 #MARK
0360 *
0370  END-READ
0380 *
0390  IF *COUNTER (RD1.) = 0
0400      REINPUT 'PLEASE TRY ANOTHER NAME'
0410  END-IF
0420 *
0430  END-REPEAT
0440 *
      ....+....1....+....2....+....3....+....4....+....5....+.... S 49    L 25
NAT0305 Text string must begin and end on the same line.

```

You cannot compile an object before you have corrected the error. If there is a syntax error, you can only save the source code as a source object (see the following section). You can use the online help function for information on an error and advice on solving the problem.

### ➤ To obtain help on error messages

- 1 Enter one of the following system commands:

```
HELP nnnn
```

or

```
? nnnn
```

where *nnnn* is the four-digit error number.

For example:

```
HELP NAT0305
```

- 2 Press ENTER.

The **Natural System Message** screen appears with an explanation of the specified error.

For further information on online help, refer to [Detailed Information on Error Messages](#).

## Saving and Cataloging Objects

---

You can save the source code currently contained in the source work area as a source object by using the system command `SAVE`. `SAVE` does *not* catalog (compile) source code and hence no syntax check is performed.

You can save the source code currently contained in the source work area as a source object *and* as a cataloged (compiled) object by using the system command `STOW`.

You can catalog the source code currently contained in the source work area and save it as a cataloged object only by using the system command `CATALOG`. `CATALOG` does *not* save the source code as a source object, which can be edited. See also [Cataloging Multiple Objects](#).

### ➤ To save source code as a source object

- 1 At the editor command prompt, enter the following:

```
SAVE object-name
```

where *object-name* is the name of the source object you want to create. The name of the object must be unique and comply with the [object naming conventions](#) (see the relevant section).

For all syntax rules that apply to `SAVE`, see the *System Commands* documentation.

- 2 Press ENTER.

The source code is stored as a source object under the specified name in the current library in the current system file.

### ➤ To save source code as a source object and/or a cataloged object

- 1 At the editor command prompt, enter one of the following:

```
STOW object-name
```

or

```
CATALOG object-name
```

where *object-name* is the name of the source object and/or the cataloged object you want to create. The name of the object must be unique and comply with the [object naming conventions](#).

For all syntax rules that apply to `STOW` and `CATALOG`, see the *System Commands* documentation.

- 2 Press ENTER.



When using `STOW`, the source code is stored as a source object under the specified name in the current library in the current system file. Additionally, the generated object code is stored as a cataloged object in the same library and system file.

When using `CATALOG`, the source code is only stored as a cataloged object under the specified name in the current library in the current system file. The source code is *not* stored (or updated if the command is executed on an existing source object) as a source object in the system file. Source code is only stored or updated with `SAVE` or `STOW`.

If you want to find out whether an object has been saved as a source object and/or a cataloged object, see [To display object directory information](#).

## Cataloging Multiple Objects

You can catalog and recatalog multiple source objects contained in the current library by using the system command `CATALL`.

### ➤ To catalog multiple objects

- 1 Enter the following system command:

```
CATALL
```

- 2 Press ENTER.

A **Catalog Objects in Library** screen similar to the example below appears where you can specify the objects to be processed, the commands to be executed and additional options such as the creation of an error report.

```

17:00:42          ***** NATURAL CATAL COMMAND *****          2013-10-18
User SAG          - Catalog Objects in Library -          Library SAGTEST

Catalog Objects from .. *_____ (start value, range, input list)
                        to .... _____ (end value)
Predict set __ Set user _____ X Select cataloged source objects only
Select object types:          Select all source objects
  X Global data areas
  X Local data areas          Select function:
  X Parameter data areas      Save
  X Copycodes                X Catalog
  X Texts                    Stow
  X Functions                Check
  X Subprograms              Select options:
  X External subroutines      Condition code in batch
  X Help routines            X Renumber source-code lines
  X Maps                     Keep result list
  X Adapter                  X Processing information
  X Programs                 X Error report
  X Classes                  Extended error report
Command ==>

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

```

For detailed information on the options provided on the screen, refer to *CATAL* in the *System Commands* documentation.

### Related Topic:

- *Example of Compilation - Natural System Architecture* documentation

## Displaying Object Directory Information

The directory of a Natural object contains general information on the object such as the object name, the name of the library where it resides, and the date when the source object was created or modified.

### ➤ To display object directory information

- 1 Enter the following system command:

```
LIST DIR object-name
```

where object-name is the name of an existing object that is contained in the current library in the current system file.

For example:

```
LIST DIR PGMTEST
```

2 Press ENTER.

A **List Directory** screen similar to the example of program PGMTEST below appears:

```
10:26:58          ***** NATURAL LIST COMMAND *****          2010-05-28
User SAG              - List Directory -              Library SAGTEST

Directory of Program PGMTEST                      Saved on ... 2010-05-28 10:26:30
-----
Library .... SAGTEST      User-ID ..... SAG          Mode ..... Structured
TP-System .. COMPLETE    Terminal-ID .. 1          32
Op-System .. MVS/ESA      Transaction .. NAT82
NAT-Ver .... 8.2.1        Code page .... IBM01140
Source size ..... 1106 Bytes

Directory of Program PGMTEST                      Cataloged on 2010-05-28 10:26:34
-----
Library .... SAGTEST      User-ID ..... SAG          Mode ..... Structured
TP-System .. COMPLETE    Terminal-ID .. 1          32
Op-System .. MVS/ESA      Transaction .. NAT82
NAT-Ver .... 8.2.1        Code page .... IBM01140
Used GDA ...              Options ..... PCHECK DBSHORT PSIGNF GFID TQMARK
Size of global data ...   0 Bytes  Size in DATSIZE ..... 784 Bytes
Size in buffer pool ...   3824 Bytes
Size of OPT-Code .....   0 Bytes
Initial OPT string ....

ENTER to continue
```

For detailed information on the **List Directory** screen, refer to *Displaying Object Directory Information in LIST* in the *System Commands* documentation.

## Copying Objects

---

You can create new objects by either copying the source code contained in the source work area or using the copy function of a Natural utility such as SYSMAIN.

### ➤ To copy source code from the source work area

- 1 Read in the source code you want to copy by entering the following system command:

```
READ object-name
```

where *object-name* is the name of the object that contains the source code you want to copy.

- 2 Press ENTER.

The source code of the specified source object is read into the source work area.

- 3 Enter one of the following system commands:

```
SAVE object-name
```

or

```
STOW object-name
```

where *object-name* is the name of the object you want to create.

- 4 Press ENTER.

The new object is saved as a source object (using `SAVE`) and as a cataloged object (using `STOW`) in the current library in the current system file.

### ➤ To copy one or more objects using SYSMAIN

- 1 Invoke the **Main Menu** of the SYSMAIN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.

- 2 In the **Object Code** field, enter an A (default setting) to select all types of object. For object types that are listed separately on the menu screen, enter another code such as E for error messages.

In the **Function Code** field, enter a C (for **Copy**).

- 3 Press ENTER.

The **Copy Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to select all types of object module: cataloged objects and source objects.

In the **Sel. List** (Selection List) field, replace Y (Yes) by N (No). Y is the default setting.

In the **Object Name** field, enter the name of the object you want to copy or specify a range of names. An asterisk (\*) select all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

In the **Source Library** field, enter the ID of the library that contains the objects to be copied.

In the **Target Library** field, enter the ID of an existing or a new library to which you want to copy the objects.

Leave all other input fields unchanged.

- 5 Press ENTER.

All source and cataloged objects are copied from the specified source library to the specified target library in the current system file and the following message appears: `Function completed successfully.`

#### Related Topic:

- *READ - System Commands* documentation

## Printing Objects

You can print the source code of a source object by using the system command `LIST`.

You can also print a list of objects contained in a library as described in [Printing a List of Objects](#).

### ➤ To print a source object

- 1 Choose one of the following methods:

- Select an object from a list by invoking the **LIST Objects in a Library** screen as described in [Steps 1 and 2](#) of *To list objects using LIST*.

In the **Cmd** column, next to the object required, enter the following:

```
PR
```

Press ENTER.

- Or:

Enter the following system command:

```
LIST object-name
```

where *object-name* is the name of the object to be printed.

Press ENTER.

The source code of the specified object is displayed in read-only mode.

Press PF2.

The **PRINT** window appears.

- 2 In the **Destination** field, enter a valid printer name (if required, ask your Natural administrator for a printer available in your current environment). If required, change the page size (the default setting is 60 lines).
- 3 Press ENTER.

The **Printout Specification** screen appears where you can specify printer settings such as the amount of copies to be printed.

- 4 Press ENTER.

The specified source object is printed on the specified printer device.

#### Related Topics:

- [Printing Objects in a Library](#)
- [LIST - System Commands](#) documentation

## Renaming Objects

---

You can rename either single objects by using the system command `RENAME` or multiple objects by using the Natural utility `SYSMAIN`.

As an alternative to `RENAME`, you can use the [Rename Object](#) function provided in the [Development Functions](#) menu described in *Natural Main Menu*.

#### ➤ To rename an object by using `RENAME`

- 1 Enter the following system command:

```
RENAME object-name
```

where *object-name* is the name of the object you want to rename.

- 2 Press ENTER.
- 3 The **Rename Object** window appears where the name of the specified object is entered in the **Name** field.

- 4 In the **New Name** field, enter a new object name.

If required, in the **New Type** field, enter a new object type.

- 5 Press ENTER.

The following message appears: `Object renamed successfully.`

#### ➤ To rename one or more objects using SYSMAIN

- 1 Invoke the **Main Menu** of the SYSMAIN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.
- 2 In the **Object Code** field, enter an A (default setting) to select all types of object. For object types that are listed separately on the menu screen, enter another code such as E for error messages.

In the **Function Code** field, enter an R (for **Rename**).

- 3 Press ENTER.

The **Rename Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to select all types of object module: cataloged objects and source objects.

In the **Name** field, enter the name of the object you want to rename or specify a range of names (for example, TEST\* on the following example screen: ). An asterisk (\*) select all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the SYSMAIN Utility documentation.)

If you only rename a single object: in the **New Name** field, enter a new name, and, in the **Sel. List** field, replace Y (Yes) by N (No).

In the **Source Library** field, enter the ID of the library that contains the objects to be renamed.

If required, in the **Target Library** field, enter the ID of an existing or a new library where you want to store the renamed object(s).

Leave all other input fields unchanged.

- 5 Press ENTER.

A window appears where you can enter a Y (Yes) to keep a copy of the object(s) to be renamed.

- 6 Press ENTER.

If you specified a range of objects, a **Rename Selection** screen similar to the example below appears with a list of all objects that meet the specified selection criteria (on the example screen below: TEST\*).

In the **C** column, next to the object(s) required, enter an **A** to rename both source object(s) and cataloged object(s). In the **New Name** column, enter a new name as shown below:

16:39:39 \*\*\*\*\* NATURAL SYSMAIN UTILITY \*\*\*\*\* 2009-05-20

User SAG - Rename Selection -

RENAME ALL TEST\* WITH XREF N IN SAGTEST WHERE DBID 10 FNR 32

| C | Name     | Type   | S/C | New Name | C | Name     | Type   | S/C | New Name |
|---|----------|--------|-----|----------|---|----------|--------|-----|----------|
| - | -----    | -----  | --- | -----    | - | -----    | -----  | --- | -----    |
| A | TEST+    | Progrm | S   | PGMT+___ | _ | TEST+2   | Progrm | S   | _____    |
| A | TESTCHAR | Progrm | S/C | CHARTEST | A | TESTDIR  | Progrm | S   | PGMDIR__ |
| _ | TESTDISP | Progrm | S/C | _____    | _ | TESTDIS2 | Progrm | S/C | _____    |
| _ | TESTMMO  | Proc   | S/C | _____    | A | TESTPGM_ | Progrm | S/C | PGMTEST_ |
| _ | TESTTEST | Progrm | S   | _____    | _ | TESTXXX2 | Progrm | S   | _____    |
| A | TEST1    | Subpgm | S/C | SUBTEST1 | A | TEST10   | Subpgm | S/C | SUB10___ |
| A | TEST2    | Subpgm | S/C | SUBTEST2 | _ | TEST666  | Progrm | S/C | _____    |

Enter New Name and options, or '?' (Help) or '.' (Exit): \_

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

Help Menu Exit Copy Del Find List Move Ren Canc

7 Press ENTER.

A **Message Text** column appears where a confirmation message is displayed next to each re-named object. Depending on whether you marked the option to keep a copy of the original object, the message reads either **Renamed as** or **Copied as**.

## Moving Objects

You can move objects from one library into another by using a Natural utility such as SYSMAIN.

➤ **To move objects using SYSMAIN menu functions**

- 1 Invoke the **Main Menu** of the SYSMAIN utility as described in [Steps 1 through 4](#) of *To list all libraries using menu functions*.



- 2 In the **Object Code** field, enter an A (default setting) to select all types of object. For object types that are listed separately on the menu screen, enter another code such as E for error messages.

In the **Function Code** field, enter an M (for **Move**).

- 3 Press ENTER.

The **Move Programming Objects** screen appears.

- 4 In the **Code** field, enter an A to select all types of object module: source objects and cataloged objects.

In the **Sel. List** (Selection List) field, replace Y (Yes) by N (No). Y is the default setting.

In the **Object Name** field, enter the name of the object you want to move or specify a range of names. An asterisk (\*) select all object names. Asterisk (\*) is the default setting.

(For valid name ranges, see *Specifying a Range of Names* in the *SYSMAIN Utility* documentation.)

In the **Source Library** field, enter the ID of the library that contains the objects to be moved.

In the **Target Library** field, enter the ID of an existing or a new library to which you want to move the objects.

Leave all other input fields unchanged.

- 5 Press ENTER.

A confirmation window appears.

- 6 Press ENTER to execute the move operation or enter a period (.) to cancel the operation.

If the move operation has performed successfully, all source and cataloged objects were moved from the specified source library into the specified target library in the current system file and the following message appears: `Function completed successfully.`

## Deleting Objects

---

You can delete objects by using either the system command `DELETE`, the system command `LIST` or a Natural utility such as `SYSMAIN`. For instruction on deleting objects by using `LIST` or `SYSMAIN`, see [Deleting Objects in a Library](#).

As an alternative to `DELETE`, you can use the [Delete Objects](#) function provided in the [Development Functions](#) menu described in *Natural Main Menu*.

➤ **To delete single or multiple objects using DELETE**

- 1 Enter one of the following system commands:

```
DELETE object-name
```

or

```
DELETE object-name*
```

or

```
DELETE *
```

where:

*object-name* is the name of the object to be deleted.

*object-name\** is a particular range of objects to be selected (for example, TEST\* selects all objects that start with TEST).

Asterisk (\*) selects all objects available in the current library in the current system file.

- 2 Press ENTER.

- If you specified an individual object, the **DELETE** window appears.

Type in the name of the object to confirm the delete operation.

- If you specified a range of objects, the **Delete Sources and Objects** screen appears.

In the **M** column, next to the object(s) required, enter a **B** to delete both source object(s) and cataloged object(s).

Press ENTER.

The **DELETE** window appears.

Mark an item by typing in any character next to the option required:

**Confirm each deletion** invokes the **DELETE** window for the first object to be deleted. After you typed in the name of the object, press ENTER to confirm the deletion and open the **DELETE** window for the next object to be deleted.

**Delete without confirmation** immediately executes the delete operation(s).

**Exit (no deletion)** cancels the delete operation(s).

- 3 Press ENTER.

The **Delete Sources and Objects** screen appears where a message is displayed next to the object selected for deletion. The message indicates either that the object was deleted or that the delete operation was canceled (not deleted).

### Related Topic:

- *DELETE - System Commands* documentation

## Executing Programs

An object of the type program can be executed by using a system command. All other types of object are only executed or invoked when they are referenced in this program or in a subordinate object. See also *Multiple Levels of Invoked Objects* described in the *Programming Guide*.

You execute a program by using either the system command `RUN` or `EXECUTE`.

As an alternative to `EXECUTE`, you can use the **Execute Program** function provided in the **Development Functions** menu described in *Natural Main Menu*.

`RUN` executes the source code currently contained in the source work area or a cataloged object stored in a system file.

`EXECUTE` only executes cataloged objects. Unlike `RUN`, `EXECUTE` does not consider latest changes that may have been made to the corresponding source code in the source work area. These modifications are only considered after the source object has been updated and recompiled accordingly.

The execution of a cataloged object does not affect the source code currently contained in the source work area.

### ➤ To execute a program using `RUN`

- 1 Enter one of the following system commands:

```
RUN
```

or

```
RUN program-name
```

where *program-name* is the name of a source object of the type program that is read into the source work area.

- 2 Press `ENTER`.

If no syntax error is found, the source code contained in the source work area is compiled and executed.

➤ **To execute a program using EXECUTE**

- 1 Enter the following system command:

```
EXECUTE program-name
```

where *program-name* is the name of a cataloged object of the type program.

The keyword EXECUTE is optional; it is sufficient to specify *program-name*.

- 2 Press ENTER.

The program is executed.

**Related Topics:**

- [RUN - System Commands documentation](#)
- [EXECUTE - System Commands documentation](#)
- [Object Execution - Natural System Architecture documentation](#)
- [Search Sequence for Object Execution](#)
- [Example of Object Loading - Natural System Architecture documentation](#)

# 7

## Natural Main Menu

---

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

This section contains information on the functions and input options provided by the Natural **Main Menu** and its subordinate menus.

## Invoking or Closing the Natural Main Menu

---

There are two methods of invoking or closing the Natural **Main Menu**:

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

### ➤ To switch menu mode on or off before session start

- At Natural startup, specify either of the following profile parameters:

```
MENU=ON
```

(activates menu mode)

or

```
MENU=OFF
```

(deactivates menu mode)

See also *MENU* in the *Parameter Reference* documentation.

### ➤ To open or close the Natural Main Menu within a session

- 1 Enter either of the following system commands:

```
MAINMENU
```

(opens the menu)

or

```
MAINMENU OFF
```

(closes the menu)

- 2 Press ENTER.

The Natural **Main Menu** looks similar to the example shown below:

```

10:20:23          ***** NATURAL *****          2009-05-20
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

Command ==>

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

```

At session start, Natural assigns you to a default library that is indicated on the screen. In the example screen above, the ID (name) of the library is shown in the **Library** field in the top right-hand corner of the screen. See also [Default Library Assignment](#).

For instructions on [performing a menu function](#), refer to the relevant section in *Using Commands and Menu Functions*.

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

| Function in Natural Main Menu                      | Explanation of Functions in Corresponding Menu   |
|--|--|
| <a href="#">Development Functions</a>              | Creates and maintains programs, maps, data areas and other components that make up a Natural application.  |
| <a href="#">Development Environment Settings</a>   | Displays and modifies various settings that affect your Natural session.                                   |
| <a href="#">Maintenance and Transfer Utilities</a> | Invokes a Natural utility to create and maintain certain objects or transfer them to another environment.  |
| <a href="#">Debugging and Monitoring Utilities</a> | Invokes a Natural utility to monitor your Natural applications and locate errors in their processing flow. |
| <a href="#">Example Libraries</a>                  | Selects libraries containing example programs and Application Programming Interfaces (APIs).               |
| <a href="#">Other Products</a>                     | Invokes other Software AG products.  |

**Notes:**

1. The position and color of the message line and PF-key lines in the Natural **Main Menu** and its subordinate menus can be changed with the user exit routine USR2003P described in the *Operations* documentation.
2. When the Natural **Main Menu** is active, the environment settings of this menu are used (see also USR2003P) and restored automatically each time the menu is called. As a result, terminal commands (for example, %L or %U) and system variables (for example, \*STARTUP) may not function properly. You can save and restore the environment settings of your own application by using the Application Programming Interface USR1002N, which is supplied in the system library SYSEXT.

## Development Functions

The functions listed in the **Development Functions** menu are those you will need most frequently when you develop an application with Natural. The functions apply to all Natural objects that are available in the library where you are currently logged on.

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

| Field          | Explanation  |
|----------------|--|
| <b>User</b>    | The ID of the Natural user who logged in to the current session.   |
| <b>Library</b> | The name of the current library. To log on to a different library, replace the name.<br><br>See also the section <a href="#">Using Natural Libraries</a> .                     |
| <b>Mode</b>    | The current programming mode: reporting or structured mode. To switch modes, enter either R (reporting) or S (structured).<br><br>See also <a href="#">Programming Modes</a> . |



| Field                        | Explanation  |
|------------------------------|--|
| <b>Work area empty</b>       | <p>Indicates that no source has been loaded into the source work area.</p> <p>If a source has already been loaded into the source work area, the <b>type</b> and the <b>name</b> of the object will be displayed instead, for example, Program PROGX.</p>  |
| <b>Code</b>                  | <p>Input field for the code of the required function such as <b>C</b> for <b>Create Object</b>.</p> <p><b>All functions</b> available in the <b>Development Functions</b> menu, are described in the following table.</p> <p>See also <i>Performing a Menu Function</i>.</p>   |
| <b>Type</b>                  | <p>Input field for the object type such as <b>P</b> for object type program. For details, see <i>Objects for Natural Application Management</i> in the <i>Programming Guide</i>.</p> <p>To obtain a list of all object types available for the specified function, enter a question mark (?) in the <b>Type</b> field.</p> <p>You can leave the <b>Type</b> field blank if you specify the name of a Natural object that already exists.</p> <p>To change the object type within the editor, proceed as described in <i>Setting the Object Type</i>.</p> |
| <b>Name</b>                  | <p>Input field for the name of a single object or a range of names (if ranges are allowed for the specified function).</p> <p>For valid object names, see <i>Object Naming Conventions</i>.</p> <p>For valid name ranges, see <i>Specifying Object Ranges</i>.</p>   |
| <b>Command ==&gt;</b>        | <p>The command line in which you can enter a Natural command.</p> <p>For example:</p> <p>To edit an existing program named PROGX, you would enter the following system command:</p> <pre>EDIT PROGX</pre> <p>See also <i>Using Commands and Menu Functions</i>.</p>  |
| <b>PF</b><br>(function keys) | <p>The PF keys (function keys) that can be used instead of commands or menu functions. The PF-key lines at the bottom of the screen indicate which function is assigned to which key.</p> <p>See also <i>Standard PF Keys</i>.</p>   |

The table below contains information on the functions provided in 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 *System Commands* documentation.

| Function                      | Code | Explanation   | Equivalent System Command                           |
|-------------------------------|------|---|---|
| Create Object                 | C    | <p>Invokes a <b>Natural editor</b> where you can create a new object such as a program, map or data area.</p> <p>Specify the <b>type</b> and the <b>name</b> of the object to be created.</p> <p>See also <i>Creating and Editing Objects</i>.</p>  | EDIT <i>object-type</i>                             |
| Edit Object                   | E    | <p>Invokes a <b>Natural editor</b> and displays the source of the specified object in modify mode.</p> <p>See also <i>Creating and Editing Objects</i>.</p>   | EDIT  |
| Execute Program               | X    | <p>Executes the specified object of type program.</p> <p>Other object types cannot be executed by themselves, but must be invoked from another object.</p> <p>See also <i>Executing Programs</i>.</p>   | EXECUTE   |
| Rename Object                 | R    | <p>Invokes the <b>Rename Object</b> window where you change the <b>name</b> of the specified object and/or its <b>type</b>.</p> <p>See also <i>Renaming Objects</i>.</p>  | RENAME  |
| Delete Objects                | D    | <p>Invokes either of the following:</p> <ul style="list-style-type: none"> <li>■ The <b>Delete</b> window for the specified object. In the <b>Delete</b> window, confirm the deletion by entering the name of the object again in the relevant input field.</li> <li>■ A selection list of objects if a range of names is specified. In this selections list, you can mark one or more objects for deletion.</li> </ul> | DELETE  |
| Scan Objects                  | S    | <p>Invokes the <b>Scan</b> menu to search for and replace character strings within single or multiple objects.</p> <p>You need not fill the <b>Type</b> and <b>Name</b> fields, which are not evaluated on this screen.</p>   | SCAN  |
| List Objects or Single Source | L    | Displays one of the following, depending on the input to the command:   |   |
|                               |      | <ul style="list-style-type: none"> <li>■ A selection list of objects if a range of objects is specified.</li> </ul> <p>See also <i>Displaying a List of Objects</i> and <i>List of Objects</i> for information on using the selection screen.</p>   | LIST <i>object-type</i><br><i>object-name-range</i> |
|                               |      | <ul style="list-style-type: none"> <li>■ The source code of the specified object.</li> </ul> <p>See also <i>Displaying an Individual Source Code</i>.</p>   | LIST <i>object-type</i><br><i>object-name</i>       |
|                               |      | <ul style="list-style-type: none"> <li>■ The source code currently contained in the editing area if no object name is specified.</li> </ul>   | LIST <i>object-type</i>                             |

| Function                                 | Code | Explanation   | Equivalent System Command                                 |
|--|------|---|---|
|  |      | See also <i>Listing the Contents of the Work Area</i> .   |   |
| <b>List Source with Expanded Sources</b> | 0    | Displays the source code of the specified object with the sources of other objects referenced by the specified object.  | LIST <i>object-name</i><br>EXPAND <i>object-type</i>      |
| <b>List Extended Object Names</b>        | N    | Displays a selection list of extended (long) names of cataloged subroutines, classes and functions.<br><br>See also <i>Displaying Long Names of Cataloged Subroutines and Classes</i> .   | LIST EXTENDED<br><i>object-type</i><br><i>object-name</i> |
| <b>List Directory Information</b>        | I    | Displays directory information on one of the following:<br><ul style="list-style-type: none"> <li>■ The specified object.</li> <li>■ The object currently contained in the editing area if no object is specified.</li> <li>■ Several objects in sequence if a range of objects is specified.</li> </ul> See also <i>Displaying Directory Information</i> . | LIST DIRECTORY<br><i>object-name</i>                      |
| <b>List Used Subroutines, etc.</b>       | U    | Lists all cataloged objects in the current library showing which objects performs which subroutines, and which objects contain definitions for a subroutine, class or function. The list contains both object names and extended (long) names.  | ROUTINES  |

This section covers the following topics:

- [Programming Modes](#)
- [Natural Editors](#)
- [Specifying Object Ranges](#)

## Programming Modes

Natural offers two programming modes: reporting mode and structured mode. We recommend that you exclusively use structured mode, because it provides for more clearly structured applications. Therefore, all explanations and examples in the Natural tutorial *First Steps* and the *Editors* documentation refer to structured mode. Any peculiarities of reporting mode will not be taken into consideration.

For further information on programming modes, see the section *Natural Programming Modes* in the *Programming Guide*.

The **Mode** field in the top right-hand corner of the **Development Functions** menu indicates the programming mode currently in effect: structured or reporting.

### ➤ To switch programming modes

- 1 In the upper right-hand corner of the **Development Functions** screen, 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:

Enter either of the following system commands:

```
GLOBALS SM=ON
```

(switches on structured mode)

or

```
GLOBALS SM=OFF
```

(switches on reporting mode)

- 2 Press ENTER.

The contents of the **Mode** field have changed from **Reporting** to **Structured** or vice versa.

### Related Topics:

- *Natural Programming Modes - Programming Guide*
- *GLOBALS - System Commands* documentation

### Natural Editors

Depending on the type of object specified in the **Development Functions** menu, Natural invokes the appropriate editor: the program editor, the map editor or the data area editor. For further information on these editors, see the relevant sections in the *Editors* documentation.

### Specifying Object Ranges

The **Edit Object**, **Delete Objects** and the **List** functions provide the option to either specify the name of an individual object or a range of names. When you specify a range of names, a list of objects is displayed from which you can select one or more objects you want to edit or list, or mark for deletion.

### ➤ To list all objects

- 1 In the **Name** field, enter an asterisk:

```
*
```

- 2 Press ENTER.

A list of all objects available in the current library is displayed.

### ➤ To list objects using a start value

- 1 In the **Name** field, enter a start value followed by an asterisk (\*).

This option to enter a value followed by an asterisk is referred to as asterisk notation.

For example:

AB\*

- 2 Press ENTER.

A list of all objects with names that start with AB (for example, AB, AB1, ABC, ABEZ) is displayed for the current library. The list does not include object names that start with AA1 or ACB, for example.



**Note:** The **List** functions provide further options to specify object name ranges as described for the equivalent system command LIST (see the *System Commands* documentation).

## Development Environment Settings

The table below contains brief descriptions of the functions provided in the **Development Environment Settings** menu, and lists the Natural system commands that correspond to these functions. For further information on a system command, refer to the relevant section in the *System Commands* documentation.

| Function                          | Explanation   | Correspond. Command |
|-----------------------------------|---|---------------------|
| <b>Function-Key Settings</b>      | Assigns functions to PF keys to be used in your Natural session.  | KEY                 |
| <b>Compilation Settings</b>       | Sets options that affect the way in which Natural objects are compiled.   | COMPOPT             |
| <b>Session Parameter Settings</b> | Changes the settings of Natural session parameters.<br><br>See also <a href="#">Configuring your Natural Environment</a> and <i>Session Parameters</i> in the <i>Parameter Reference</i> documentation. | GLOBALS             |
| <b>Profile Parameter Settings</b> | Changes the settings of Natural profile parameters.   | SYSPARM             |

| Function                                | Explanation  | Correspond. Command |
|---|--|---------------------|
|   | Profile parameters are described in the <i>Parameter Reference</i> documentation and in <i>Profile Parameter Usage</i> in the <i>Operations</i> documentation.<br><br>The system command SYSPARM invokes a utility of the same name that is described in the <i>Utilities</i> documentation. |                     |
| <b>Technical Session Information</b>    | Displays technical information on your Natural session such as the current user ID, library and operating system.  | TECH                |
| <b>System File Information</b>          | Displays the current definitions of Natural system files.<br><br>See also <i>Natural System Files</i> in the <i>Natural System Architecture</i> documentation.   | SYSPROF             |
| <b>Product Installation Information</b> | Displays a list of the products installed at your site and information on these products.  | SYSPROD             |
| <b>Security Profile Information</b>     | Only available if Natural Security is installed.<br><br>Displays the security profile currently in effect.   | PROFILE             |

## Maintenance and Transfer Utilities

The table below contains brief descriptions of the functions provided in 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 *Utilities* documentation.

| Function                                   | Explanation of Utility  | Correspond. Command |
|--|---|---------------------|
| <b>Maintain Error Messages</b>             | Creates and maintains messages you want to issue in your Natural applications.  | SYSERR              |
| <b>Maintain DDMs</b>                       | Creates and maintains data definition modules (DDMs).   | SYSDDM              |
| <b>Maintain Command Processors</b>         | Creates and maintains the command processors you want to use in your Natural applications.  | SYSNCP              |
| <b>Maintain Remote Procedure Calls</b>     | Establishes and maintains remote procedure calls and provides the settings required to execute a Natural subprogram located on a remote server.   | SYSRPC              |
| <b>Maintain Code Page Information</b>      | Provides information on code pages and ICU (International Components for Unicode) data files used in the current Natural environment, changes code page assignments and converts code pages for source objects. | SYSCP               |
| <b>Transfer Objects to Other Libraries</b> | Transfers Natural objects between different libraries.  | SYSMAIN             |

| Function                                 | Explanation of Utility  | Correspond. Command |
|--|---|---------------------|
| <b>Transfer Objects to Other Systems</b> | Processes Natural objects and non-Natural objects in different Natural environments using the Object Handler. | SYSOBJH             |

## Debugging and Monitoring Utilities

The table below contains brief descriptions of the functions provided in 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 *Utilities* documentation.

| Function   | Explanation of Utility   | Correspond. Command |
|--|--|---------------------|
| <b>Debugging</b>                                 | Searches for errors in the processing flow of programs.                                      | TEST                |
| <b>Logging of Database Calls</b>                 | Logs database commands.  | TEST DBLOG          |
| <b>Issuing Adabas Calls</b>                      | Passes Adabas commands directly to the database.   | SYSADA              |
| <b>Buffer Pool Maintenance</b>                   | Monitors the Natural buffer pool and adjusts it to meet your requirements.                   | SYSBPM              |
| <b>Editor Buffer Pool Maintenance</b>            | Monitors the buffer pool of the Software AG Editor and adjusts it to meet your requirements. | SYSEDT              |
| <b>TP-Specific Monitoring</b>                    | Monitors and controls TP monitor-specific characteristics of Natural.                        | SYSTP               |
| <b>Data Collection and Tracing</b>               | Collects monitoring and accounting data about the processing flow of a Natural application.  | SYSRDC              |
| <b>Error Information on Abnormal Termination</b> | 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 <i>Programming Guide</i> .  |
| SYSEXSYN | Example programs shown and referred to in the <i>Statements</i> documentation and the <i>System Variables</i> documentation.                          |
| SYSEXV   | Example programs that illustrate new Natural features.  |
| SYSEXT   | APIs and example programs for using the APIs.<br><br>See also the system command <i>SYSEXT</i> described in the <i>System Commands</i> 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.



## 8 Print and Work Files

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Print files and work files are logically defined for a Natural online or batch environment and can be physically assigned to a file or a printer by using a Natural parameter and/or control statements of the underlying operating system or TP monitor. Assignments can be changed for the current session during runtime.

Data is written to and read from a work file, or written to a print file by using the appropriate Natural statements.

Physical print file or work file assignments are independent of the objects maintained in the corresponding Natural environment. Therefore, when an assignment changes, you do not have to change statements in objects that reference print files or work file.

For further general information on print files and work files, refer to *Print Files - Work Files* in the *Natural System Architecture* documentation.

For detailed information on using print files and work files, refer to the documentation listed below.

### **Operations:**

- *Data Sets Used by Natural in z/OS Batch Mode*
- *Files and System Files Used by Natural in BS2000 Batch Mode*
- *Natural Data Sets Used under a z/VSE Batch Mode Session*
- *NATVSE Print and Work File Support for z/VSE Library Members*
- *Print and Work File Handling with External Data Sets in a Server Environment - Natural as a Server under z/OS*

### **Statements:**

- *Control of Work Files / PC Files*
- *CLOSE WORK FILE*

- *DEFINE WORK FILE*
- *READ WORK FILE*
- *WRITE WORK FILE*

**Parameter Reference:**

- *PRINT - Print File Assignments*
- *WORK - Work File Assignments*
- *Output Reports and Work Files - Profile Parameters Grouped by Category*

# 9

## Configuring your Natural Environment

---

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Natural parameters manage the configuration of a Natural environment.

Natural parameters are used to standardize and automate development and production processes or adapt standard settings to the needs of individual users. A Natural parameter, for example, is used to set defaults for report creation, define the size of a report or define the size of storage area required such as the source area of an editor.

Most of the characteristics of a Natural environment are predefined by Software AG. The Natural administrator can configure different default environment settings valid for all Natural users. A user can adapt the settings to his needs by overriding default environment settings with a dynamic profile parameter or session parameter.

## Using Profile Parameters

---

Profile parameters are specified statically or dynamically.

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

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

A predefined set of dynamic parameters is a Natural object of the type parameter profile.

At session start, you can specify one or more parameter profiles and one or more single profile parameters as indicated in [To specify profile parameters at session start](#).

A parameter specified at session start (with a parameter profile or without), overrides any value specified for the corresponding parameter in a standard parameter profile assigned to a session and/or in the Natural parameter module; see also [Parameterization Levels](#).

### ➤ To set profile parameters in the Natural parameter module

- Follow the instructions provided in *Building a Natural Parameter Module* in the *Operations* documentation.

### ➤ To create a parameter profile using SYSPARM

- 1 Invoke the SYSPARM utility by entering the following system command:

```
SYSPARM
```

- 2 Press ENTER.

The **Menu** of the Natural SYSPARM utility appears.

- 3 In the **Code** field, enter an A (**Add New Profile**), and in the **Profile** field, enter the name of the parameter profile you want to create as shown in the example below:

```

11:36:19          ***** NATURAL SYSPARM UTILITY *****          2009-05-20
User SAG                      - Menu -

          Code  Function
          L    List Profiles
          D    Display Profile
          A    Add New Profile
          M    Modify Profile
          C    Copy Profile
          X    Delete Profile
          ?    Help
          .    Exit

Code ..... A
Profile .. TESTPROF   DBID ..   10  FNR ..... 1640
Copy to .. _____ Password ..
                               Cipher ....

Command ==>

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

```

- 4 Press ENTER.

The editing area of the SYSPARM utility appears.

- 5 Enter the profile parameter(s) and parameter value(s) required as shown in the example of a parameter profile below. For possible parameter settings, refer to the relevant descriptions of profile parameters in the section *Profile Parameters* in the *Parameter Reference* documentation.

```

16:57:37          ***** NATURAL SYSPARM UTILITY *****          2009-05-20
> FUSER=(10,32)                                                    <
> LS=250,PS=60                                                    <
> WORK=((6-8),AM=PC)                                              <
> DB=(ADAV7,*)                                                    <
> PC=ON                                                            <
> AUTO=ON                                                          <
> MENU=OFF                                                         <
>                                                                    <
>                                                                    <
>                                                                    <
>                                                                    <
>                                                                    <
Help with parameters .. _____ (Profile name: TESTPROF)

Command ==>

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help      Exit  Check Save                               Insrt Del   Copy  Canc

```

- 6 Press PF4 (Check) to check and, if required, correct the syntax.

For the syntax that applies, refer to *Dynamic Assignment of Parameter Values* in the *Operations* documentation.

- 7 Press PF5 (Save) to save the parameter profile as a source object under the specified name in the current system file (the default setting is FNAT).

#### ➤ To set profile parameters at session start

- Enter one or more parameter profiles (if available) and/or one or more profile parameters. Parameter profiles and profile parameters can be entered in any order. However, if a parameter is specified more than once (in the example below: FUSER), the value assigned to this parameter in the last specification is used (in the example below: 10,245).

```
PROFILE=TESTPROF FUSER=(10,123) DSIZE=40 LS=250,PS=50 FUSER=(10,245)
```

#### Related Topics:

- *Profile Parameter Usage - Operations* documentation
- *Overview of Profile Parameters - Parameter Reference* documentation
- *Profile Parameters Grouped by Category - Parameter Reference* documentation

- *Assignment of Parameter Values - Operations* documentation
- *SYSARM Utility* documentation

## Using Session Parameters

---

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

### ➤ To set a session parameter

- Follow the instructions provided in *How to Set Session Parameters* in the *Parameter Reference* documentation.

### ➤ To check or modify parameter settings for the current session

- Choose either of the following methods:

1. Enter the following system command:

```
GLOBALS
```

Press ENTER.

A **Session Parameters** screen similar to the example below appears which displays the current settings of session parameters:

```

10:28:03          ***** NATURAL GLOBALS COMMAND *****          2009-05-20
                        - Session Parameters -

(CC) Cond.Prog.Execution ..... OFF  (LT) Limit ..... __99999999
(CF) Term.Control Character .... %   (MT) Max.CPU Time ..... ____0
(CPCVERR) CP Conversion Error .. ON  (NC) Nat.Sys.Commands ..... OFF
(DC) Dec. Character ..... .         (OPF) Overw.Prot.Fields ..... ON
(DFOUT) Date Format Output ..... S   (PD) Page Dataset ..... _50
(DFSTACK) Date Format Stack Cmd .. S  (PM) Print Mode ..... RP
(DFTITLE) Date Format Title ..... S  (PS) Page Size ..... _31
(DO) Data to Display Order ..... L  (REINP) Reinput on Error ..... ON
(DU) Dump Generation ..... OFF      (SA) Sound Alarm ..... OFF
(EJ) Page Eject ..... ON            (SF) Spacing Factor ..... _1
(FS) Default Format ..... OFF        (SL) Source Line Length ..... _72
(FCDP) FC on Dyn.Prot.Fields ... ON  (SM) Structured Mode ..... OFF
(IA) Input Assign ..... =           (THSEPOCH) Thousands Separator .. ,
(ID) Input Delimiter ..... ,        (TS) Translate Sys.Prog ..... OFF
(IM) Input Mode ..... F             (WH) Wait on Hold ..... OFF
(LE) Limit Error ..... OFF          (ZD) Zero Division ..... ON
(LS) Line Size ..... _80            (ZP) Zero Printing ..... ON

Command ==>

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

```

The letters in parentheses indicate the session parameter; see also *List of Parameters in GLOBALS* in the *System Commands* documentation.

You can change the setting of a parameter by replacing the default value entered next to the parameter required. For valid input values, refer to the relevant description of the session parameter in the section *Session Parameters* in the *Parameter Reference* documentation.

For example:

To change the setting of the date format parameter `DFOUT`, overwrite the value next to the input field of **(DFOUT) Date Format Output** (in the example above S) by an I.

Press PF5 (Updat) to save the modification.

The format of date variables changes from *yy-mm-dd* (for example: 2009-06-16) to *yyymmdd* (for example: 20090616).

2. Enter the following system command:

```
GLOBALS parameter=value
```



where:

*parameter* is the session parameter (in the example below: DFOUT).

*value* is a valid value for this session parameter (in the example below: 1).

You can specify multiple parameters and values.

For example:

```
GLOBALS DFOUT=1 PS=60
```

Press ENTER.

### Related Topics:

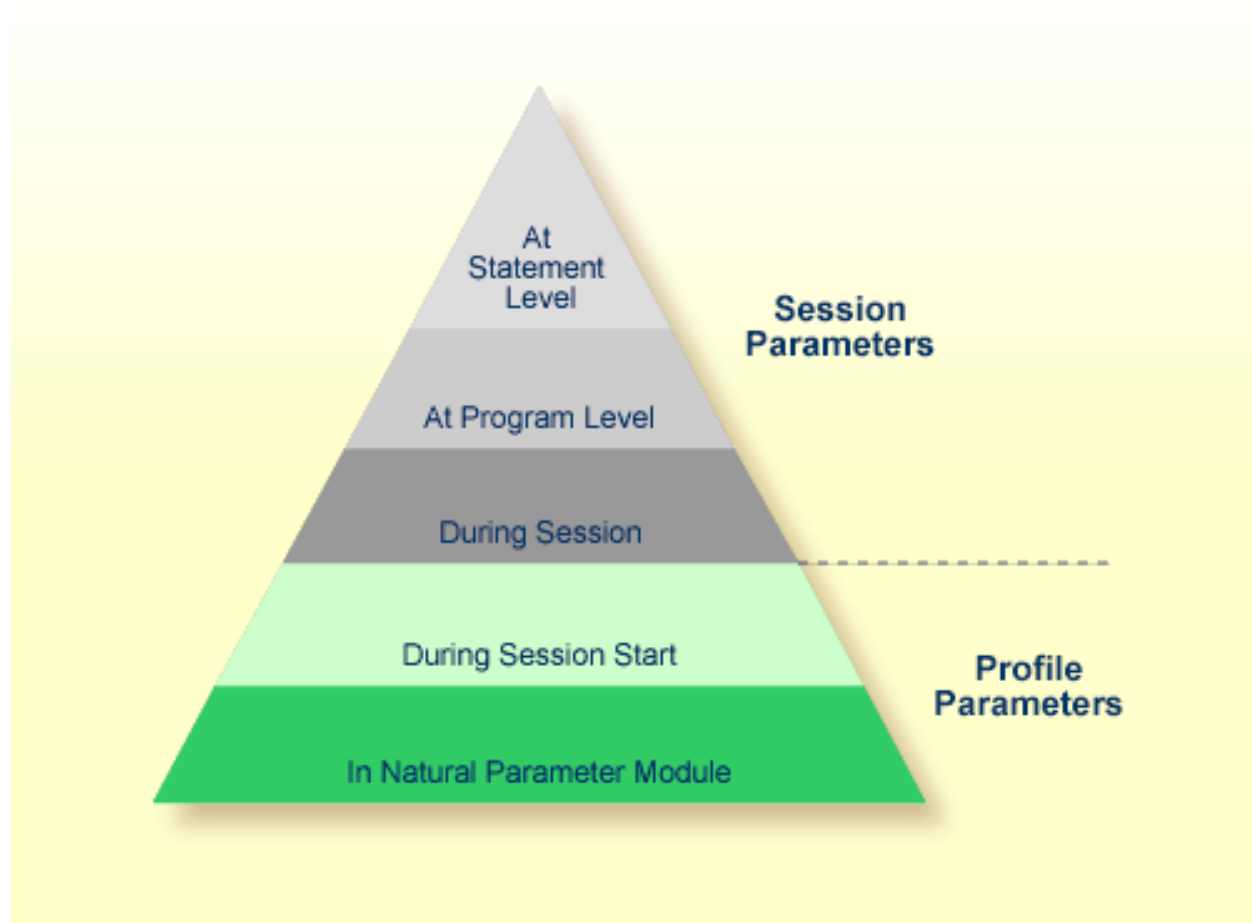
- [Introduction to Session Parameters - Parameter Reference](#) documentation
- [Overview of Session Parameters - Parameter Reference](#) documentation
- [GLOBALS - System Commands](#) documentation

## Parameterization Levels

---

There is a hierarchical structure of the levels at which Natural parameters can be set. 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.

The diagram below illustrates when a parameter can be set and the Natural parameter hierarchy from the lowest level at the base of the pyramid to the highest level at the apex:



**Related Topic:**

- *Natural Parameter Hierarchy - Operations* documentation

# 10

## Rules and Naming Conventions

---

|   |     |
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This section describes Natural-specific rules and naming conventions.

## Standard Character Settings

---

The tables in this section list the standard character settings that apply to Natural. These settings comply with the IBM code page 1140 (US English), which determines the assignment of code points to graphic characters. Code points are represented by hexadecimal values. For further details on IBM code pages, refer to the corresponding IBM documentation.

The display control unit or emulator determines what character to display for a hexadecimal value. The use of a code page other than 1140 can result in the following:

- A character provides a hexadecimal value that is not accepted by Natural.
- A character that differs from the standard character setting provides the same hexadecimal value defined for the standard character.

### Examples:

The character @ (commercial at) used with the German code page 1141 does not provide the hexadecimal value 7C.

The character £ (pound sign) used with the UK English code page 1146 provides the same hexadecimal value as the \$ (dollar sign) character used with the US English code page 1140.

The character § (section sign) used with the German code page 1141 provides the same hexadecimal value as the character @ used with the US English code page 1140.

## Object Naming Conventions

---

This section describes the naming conventions that apply when saving and/or cataloging a Natural object in a Natural system file.

The name of a Natural object can be 1 to 8 characters (listed in the following table) where the *first* character must be one of the following:

- an upper-case alphabetical character
- a number sign (#)
- a plus sign (+)

If the first character is a number sign (#) or a plus sign (+), the name must consist of at least one additional character.

**Exception:**

The name of a Natural DDM can be 1 to 32 characters (listed in the following table) where the *first* character must be an upper-case alphabetical character.

The name of a Natural object can consist of the following characters:

| Character | EBCDIC Hex Value        | ISO Character Name         | Remark  |
|-----------|-------------------------|----------------------------|---|
| A - Z     | C1-C9<br>D1-D9<br>E2-E9 | Latin capital letter A - Z | Upper-case alphabetical character   |
| 0 - 9     | F0-F9                   | Digit zero - digit nine    | Numeric character   |
| -         | 60                      | Hyphen-minus               | Hyphen  |
| _         | 6D                      | Low line                   | Underscore  |
| /         | 61                      | Solidus                    | Slash   |
| @         | 7C                      | Commercial at              |   |
| \$        | 5B                      | Dollar sign                |   |
| &         | 50                      | Ampersand                  | Only allowed in language codes<br><br>See also <i>Defining the Language of a Natural Object</i> in the <i>Programming Guide</i> . |
| #         | 7B                      | Number sign                | Hash sign   |
| +         | 4E                      | Plus sign                  |   |

## Library Naming Conventions

This section describes the naming conventions that apply to a Natural library.

The name (ID) of a library can be 1 to 8 characters and must *not* start with "SYS". The prefix "SYS" is reserved for Natural system libraries.

A library name must start with an upper-case alphabetical character.

A library name can consist of the following characters:

| Character | EBCDIC Hex Value        | ISO Character Name         | Remark                            |
|-----------|-------------------------|----------------------------|-----------------------------------|
| A - Z     | C1-C9<br>D1-D9<br>E2-E9 | Latin capital letter A - Z | Upper-case alphabetical character |
| 0 - 9     | F0-F9                   | Digit zero - digit nine    | Numeric character                 |
| -         | 60                      | Hyphen-minus               | Hyphen                            |

| Character | EBCDIC Hex Value | ISO Character Name | Remark     |
|-----------|------------------|--------------------|------------|
| _         | 6D               | Low line           | Underscore |
| /         | 61               | Solidus            | Slash      |
| @         | 7C               | Commercial at      |            |
| \$        | 5B               | Dollar sign        |            |
| &         | 50               | Ampersand          |            |
| #         | 7B               | Number sign        | Hash sign  |
| +         | 4E               | Plus sign          |            |



**Caution:** When using Natural libraries also on other platforms, for example NaturalONE or in a Single Point of Development (SPoD) context, attention must be paid to special characters. The slash character (/) for example may be used on other platforms as separator for the components of a system library path. Use Latin capital letters (A-Z), digits (0-9), hyphen or underscore to construct safe library names. Using other special characters is not recommended.

## Naming Conventions for User-Defined Variables

---

This section describes the naming conventions that apply to a user-defined variable:

- [Length of Variable Names](#)
- [Limitations of Variable Names](#)
- [Characters Allowed in Variable Names](#)
- [First Character of Variable Names](#)
- [Case of Characters in Variable Names](#)

For further information on user-defined variables, refer to the section *User-Defined Variables* in the *Programming Guide*.

### Length of Variable Names

The name of a user-defined variable can be 1 to 32 characters long.

You can use variable names of over 32 characters (for example, in complex applications where longer meaningful variable names enhance the readability of programs); however, only the first 32 characters are significant and must therefore be unique, the remaining characters will be ignored by Natural.

## Limitations of Variable Names

The name of a user-defined variable must *not* be a Natural reserved keyword.

Within one Natural program, you must *not* use the same name for a user-defined variable and a database field, because this might lead to referencing errors (see *Qualifying Data Structures* in the *Programming Guide*).

## Characters Allowed in Variable Names

The name of a user-defined variable can consist of the following characters:

| Character | EBCDIC Hex Value                                   | ISO Character Name                      | Remark  |
|-----------|--|---|---|
| A - Z     | C1-C9<br>D1-D9<br>E2-E9<br>81-89<br>91-99<br>A2-A9 | Latin capital and/or small letter A - Z | Upper-case and/or lower-case alphabetical character<br><br>Lower-case <i>not</i> allowed as the first character |
| 0 - 9     | F0-F9  | Digit zero - digit nine                 | Numeric character   |
| -         | 60   | Hyphen-minus                            | Hyphen  |
| _         | 6D   | Low line                                | Underscore  |
| /         | 61   | Solidus                                 | Slash   |
| @         | 7C   | Commercial at                           |   |
| \$        | 5B   | Dollar sign                             |   |
| &         | 50   | Ampersand                               |   |
| #         | 7B   | Number sign                             | Hash sign   |
| +         | 4E   | Plus sign                               | Only allowed as the first character   |

## First Character of Variable Names

The first character of the name must be one of the following:

| Character | EBCDIC Hex Value        | ISO Character Name         | Remark                            |
|-----------|-------------------------|----------------------------|-----------------------------------|
| A - Z     | C1-C9<br>D1-D9<br>E2-E9 | Latin capital letter A - Z | Upper-case alphabetical character |
| &         | 50                      | Ampersand                  |                                   |
| #         | 7B                      | Number sign                | Hash sign                         |
| +         | 4E                      | Plus sign                  |                                   |

If the first character is a number sign (#), a plus sign (+) or an ampersand (&), the name must consist of at least one additional character.

Variables in a global data area (GDA) with a plus sign (+) as the first character must be defined at Level 1; see also *Global Data Area* in the *Programming Guide*. Other levels are only used in a redefinition.

A plus sign (+) as the first character of a name is only allowed for application-independent variables (AIVs) and variables in a global data area (GDA).

Names of AIVs must begin with a plus sign (+); see also *Defining Application-Independent Variables* in the description of the `DEFINE DATA` statement in the *Statements* documentation.

An ampersand (&) as the first character of a name is used in conjunction with dynamic source program modification (see the `RUN` statement in the *Statements* documentation), and as a dynamically replaceable character when defining processing rules; see the relevant description in the *Map Editor* documentation.

### Case of Characters in Variable Names

Lower-case characters can only be entered as the second and subsequent characters of a variable name.

Lower-case characters entered as part of a variable name are internally converted to upper case if the `LOWSRCE` option of the `COMPOPT` system command (see also the *System Commands* documentation) is set to `ON`.

Lower-case characters are not translated to upper case and are therefore interpreted as being different from the respective upper-case characters, if

- the `LOWSRCE` option of the `COMPOPT` system command is set to `OFF` (the default value) and
- input in the editor is not translated to upper case (translation to upper case in the editor is controlled by editor profile options and by options depending on the operating system).

For example, this will cause the names `#FIELD` and `#field` to be interpreted as two different field names.



**Note:** For compatibility reasons, you should not use this feature if you plan to port Natural applications developed on mainframe computers to Windows, UNIX or OpenVMS. If you use lower-case characters as part of the variable name, it is highly recommended that variable names are unique regardless of their case.