

Using Natural Libraries

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

Libraries are managed in the library workspace or in a list view window that has been opened from the library workspace.

Note:

The applications in the application workspace also contain libraries and objects. However, these are just links to the libraries and objects which are normally available in the library workspace. See *Managing Applications* in the *Remote Development Using SPoD* documentation for further information.

This chapter covers the following topics:

- Library Types
- Steplibs
- Search Sequence for Object Execution
- Logging on to a Library
- Creating a New Library
- Filtering Libraries and Objects
- Finding Objects in a Library
- Suppressing Line Numbers in the Source Code
- Copying and Moving Libraries
- Renaming Libraries
- Deleting Libraries
- Defining Your Own Startup Library
- Example Library for New Features

Library Types

The following types of libraries are available.

| Library Type | Description |
|------------------|---|
| System library | <p>The system libraries are also known as the FNAT system file which is version-dependent. A system library contains all Natural objects required to run Natural tools (or utilities) provided by Software AG. An example of a system library is the library SYSERR which represents a system tool that is used to maintain error messages. The name of a system library always starts with "SYS".</p> <p>The system libraries are reserved for Software AG purposes only and are subject to change without notice.</p> <p>Important: Do not store any user-specific objects in a Natural system library. User-specific objects can be overwritten when a new version of Natural is installed.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Natural provides example libraries containing example programs for demonstration purposes. The names of these example libraries start with "SYSEX". 2. The system libraries SYSLIB and SYSLIBS are reserved for internal use by Software AG. |
| User library | <p>The user libraries are also known as the FUSER system file. A user library contains all user-defined objects (for example, programs and data areas) which make up an application.</p> |
| Inactive library | <p>All system files that are defined in the global configuration file and which are not defined in the parameter file that was used to start the current Natural session are inactive system files. See also <i>System Files</i> in the <i>Overview of Configuration File Parameters</i> section of the <i>Configuration Utility</i> documentation.</p> <p>It is not possible to execute a Natural object in an inactive library. However, it is possible to delete or rename objects in an inactive library and to copy or move objects from an inactive library to an active library, and vice versa.</p> <p>If you want to use an inactive library, the corresponding inactive system file must become an active system file (either FUSER or FNAT). To activate an inactive system file, you have to define it in the current parameter file. See also <i>System Files</i> in the <i>Overview of Profile Parameters</i> section of the <i>Configuration Utility</i> documentation.</p> |

See also *Icons for the Nodes* and *Library Naming Conventions*.

Steplibs

A steplib is a Natural user library or system library that is concatenated with the current user or system library. This avoids redundant storage of identical objects and helps organize applications. In addition, if Natural Security is installed, a steplib can be used to restrict access to particular objects.

Natural searches in a steplib when an object is not found in the current library (see *Search Sequence for Object Execution* for further information). The standard steplibs are the libraries SYSTEM in the FUSER and the FNAT system files.

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.

If Natural Security is not active, you can specify additional steplibs in the Configuration Utility, with the profile parameter STEPLIB. 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.

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

The currently active steplibs are shown on the **Steplibs** page of the **TECH** dialog box. See *Technical Information* for further information.

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 steplibs (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 steplibs (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`.

Logging on to a Library

In order to work with objects in a Natural library or to start an application inside a specific library, you must first log on to this library.

With Natural Studio, you can log on to a library in two different ways: automatically and manually. The name of the library to which you are logged on is always shown in the command line.

Note:

When Natural Security is active, all libraries that you are not allowed to use are not visible in the library workspace.

▶ To perform an automatic logon to a library

- Select the required library in the library workspace or in a list view window.

Or:

Select an object in the library workspace or in a list view window.

Or:

Activate an open editor window.

Note:

When you expand or collapse the node for a library in the tree by clicking the plus or minus sign in front of a node, you do not automatically logon to this library. A logon is only performed when you select the library (for example, by clicking on its name).

▶ To perform a manual logon to a library

- Enter the following system command in the command line:

```
LOGON library-ID
```

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

See also the description of the system command `LOGON`.

Creating a New Library

A new library can only be created in a system file (`FNAT` or `FUSER`) located inside the local or remote environment. Inactive libraries cannot be created; they are read-only.

Only one library can be created at a time.

To create a new library

1. In the library workspace, select the node for the system file that is to contain the new library (either below the node for the local environment or below the node of the development server to which you have previously connected).

The nodes for the system files have different names, depending on the current view. For example, if you want to create a user library in the logical view, you have to select the node named **User Libraries**.

2. From the **Library** menu, choose **New**.

Or:

Invoke the context menu and choose **New**.

A new library with the default name "USRNEW" is now shown in the tree. The default name is selected so that you can immediately enter a new name. Any text you enter automatically deletes the selection.

3. Enter a name for the library.

See also *Library Naming Conventions*.

Note:

When the name is in edit mode, you can invoke a context menu. In addition to the standard Windows editing commands such as **Cut** and **Paste**, the context menu may also contain Windows commands for Unicode. See your Windows documentation for further information.

4. Press ENTER.

Or:

Click any other position in the library workspace.

Your new library is now available in all views (sorted alphabetically). When a filter is currently active, it may happen that your new library is not shown since its name starts with different characters. See *Filtering Libraries and Objects* for further information.

Filtering Libraries and Objects

Using a filter, you can reduce the number of items that are shown in the library workspace, in the application workspace and in the list view windows that are opened from these workspaces.

When a filter has been defined in the library workspace, the same filter applies for the application workspace, and vice versa. All views (logical view, file view and flat view) reflect this filter. In a remote environment, all views which belong to the environment specified by server name and port number reflect this filter. It may be necessary to refresh the display in the other workspace before the change can be seen there.

The type of filter that is applied depends on your selection. When you select a system file, a library filter will be applied. When you select a library, an object filter will be applied; this object filter also allows the definition of resources.

The following exception applies for DDMs: When FDDM mode has been activated for the local environment or for a remote UNIX, OpenVMS or Windows environment, you have to select the FDDM system file in order to apply an object filter for the DDMs. In a remote mainframe environment, the DDMs are always stored in the system file `FDIC`; therefore, you have to select the `FDIC` system file in order to apply an object filter for the DDMs.

When a filter has been applied, the icons that are shown in the tree contain an additional plus sign:



System file with an active filter.



Library with an active filter.

To define a filter

1. To define a filter for libraries, select a system file.

Or:

To define a filter for the objects and resources in a library, select the library.

Note:

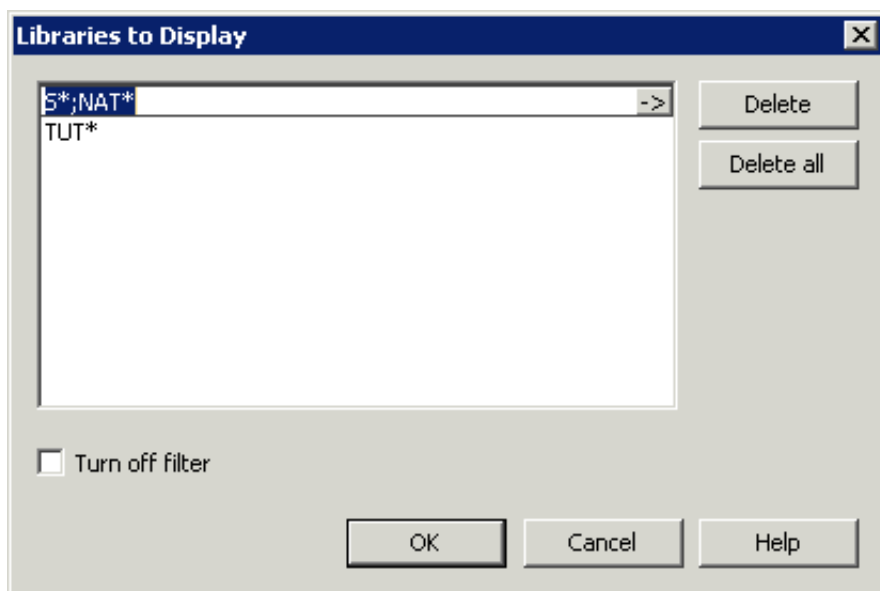
In a list view window, it is possible to select several libraries at the same time. Thus, you can define the same filter for all selected libraries at once.

Or:

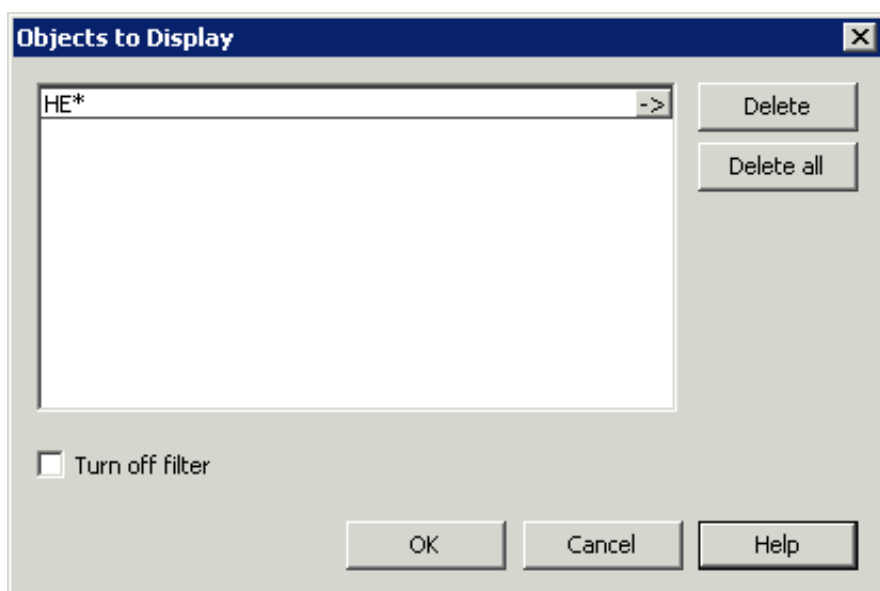
To define a filter for DDMs, select the system file `FDDM` (if FDDM mode is active in the local environment or in the remote UNIX, OpenVMS or Windows environment) or `FDIC` (remote mainframe environment).

2. From the **View** menu, choose **Display Filter**.

The following dialog box appears when you have selected a system file (except a system file for DDMs):



A similar dialog box appears when you have selected a library or a system file for DDMs. It has a different title:



When a filter has already been defined, it is shown in the dialog box (as in the above examples).

3. In the text box, enter the names of the libraries or objects/resources that are to be shown. All names must be separated by a semicolon.

The Natural-specific naming conventions for libraries and objects apply for the definition of a filter. See *Rules and Naming Conventions*.

Instead of entering the names in a single text box, you can also enter them using several text boxes. When you have defined at least one name, you can click the empty area below the text box to add an additional text box in which you can enter further names.

You can use wildcards (? or *) within the names, if you do not want to enter each name individually. The question mark (?) may be specified at any position inside the name. The asterisk (*) is only allowed at the end of a name. Instead of typing the wildcards, it also is possible to enter them by choosing the button to the right of the text box (the button contains an arrow pointing to the right); in this case, you can see short explanations for the wildcards.

You can also enter a range of names. Ranges must be entered as follows:

name1 - *name2*

When defining a range, it is important that you enter a space before and after the hyphen. The spaces are necessary since names may contain hyphens. Without the spaces, *name1-name2* would be interpreted as the name of a single library or object/resource.

Each name in a range definition may contain wildcards (see above). Example:

AL* - AM?TEST

Or:

Choose the button to the right of a text box (the button contains an arrow pointing to the right) and then choose **Select from list**. You can now select all required libraries or objects/resources from a selection list which appears in an additional dialog box. When you press CTRL in the selection list, you can select multiple names; when you press SHIFT, you can select a range of names. When you choose the **OK** button, the dialog box containing the selection list is closed and the selected names are shown in the text box.

4. Choose the **OK** button.

The content of the library workspace, application workspace and of the corresponding list view window changes. Now, just the libraries or objects/resources that match your filter criteria are shown.

To disable or delete a filter

1. Invoke the dialog box in which the filter has been defined as described above.
2. To disable the filter (without deleting all of the entries in the dialog box), activate the **Turn off filter** check box.

Or:

To delete just the entries in the currently selected text box, choose the **Delete** button.

Or:

To delete all entries in all text boxes, choose the **Delete all** button.

3. Choose the **OK** button.

The content of the library workspace, application workspace and of the corresponding list view window changes. When you have deactivated the filter or deleted all entries, all libraries or objects/resources are shown again. However, when you have just deleted one of several text boxes containing entries, just the libraries or objects/resources that match the new filter criteria are shown.

Finding Objects in a Library

You can search, for example, for objects containing specific text or for objects with a specific user ID. It is also possible to replace or delete found text.

The found objects are shown in the results window. An active filter is not considered.

See also the description of the system command SCAN.

▶ To find objects

1. Optional. Select a node in the library workspace or application workspace, or select one or more entries in a list view window. This selection will be considered in the **Find Objects** dialog box.
2. From the **Library** menu, choose **Find Objects**.

Or:

Invoke the context menu and choose **Find Objects**.

Or:

When the Library toolbar is shown, choose the following toolbar button.



The **Find Objects** dialog box appears. This dialog box provides several pages:

- **Location**
- **Contents**
- **Advanced**

When a library, object or a specific object type was selected before invoking the **Find Objects** command, this selection is considered in the **Find Objects** dialog box.

3. Specify your search criteria on the different pages as described below.

Make sure to fill all required edit controls. Problems may occur, for example, if you are searching for the objects of a specific user and the text boxes **Names** and **Libraries** are blank; in this case, no objects will be found. If you do not want to specify a specific object name or library, specify an asterisk (*) in the corresponding text boxes.

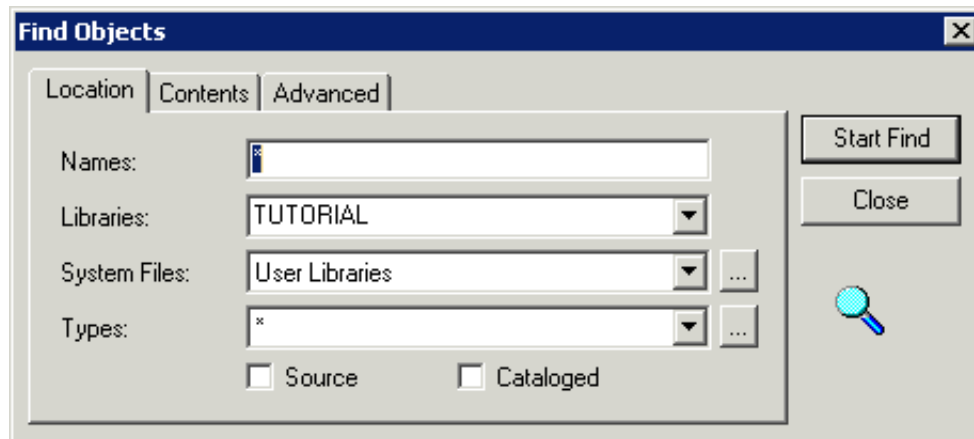
4. Choose the **Start Find** button.

The find process is started. Depending on the number of libraries and objects in the libraries, this may take a while.

A **Stop Find** button is available as long as the find process is running. You may choose this command button to abort the find process. All objects that have been found so far, are shown in the results window.

When the find process has completed, all found objects are shown in the results window. Any previous find results are overwritten. See *Results Windows* for further information.

Location

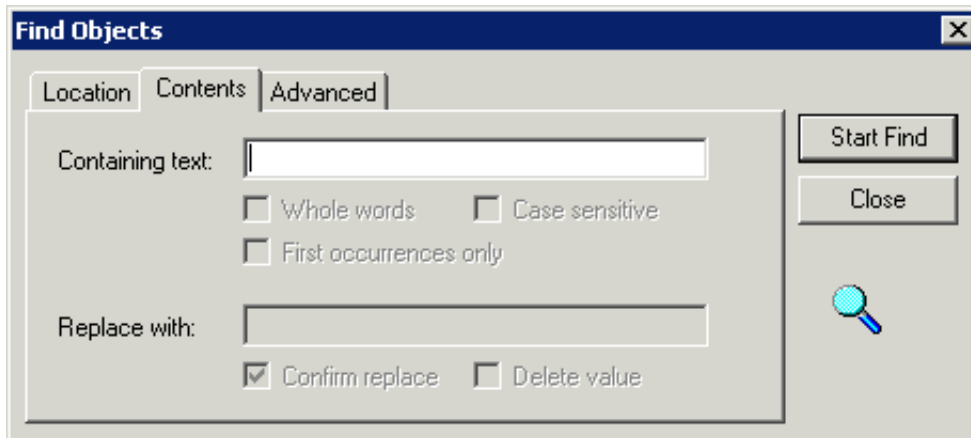


| Option | Description |
|---------------------|---|
| Names | The names of the objects to be found. The content of this text box depends on the previous selection. If you specify more than one name, separate the names with semicolons. You can also use wildcards (* or ?). |
| Libraries | The libraries in which to search for objects. The content of this drop-down list box depends on the previous selection. When a filter is active, only the libraries that match the filter criteria can be selected from the drop-down list box. However, you can specify the name of any other library. If you specify more than one library, separate the library names with semicolons. To specify all libraries, select the asterisk from the drop-down list box. You can also use wildcards with a library name (* or ?). |
| System Files | The system file to be used for the search. The content of this drop-down list box depends on the previous selection. In addition, the names in this drop-down list box depend on the current view (logical view, flat view or file view). Select the required system file from this drop-down list box. If you want to specify more than one system file, choose the button to the right of this drop-down list box and select the system files in the resulting dialog box. |
| Types | The types of objects (Natural objects and resources) to be included in the search. The content of this drop-down list box depends on the previous selection. Select the required type from this drop-down list box. If you want to specify more than one type, choose the button to the right of this drop-down list box and select the types in the resulting dialog box. To specify all types, select the asterisk from the drop-down list box. |
| Source | If selected, only Natural sources are found. |
| Cataloged | If selected, only Natural generated programs are found. |

Note:

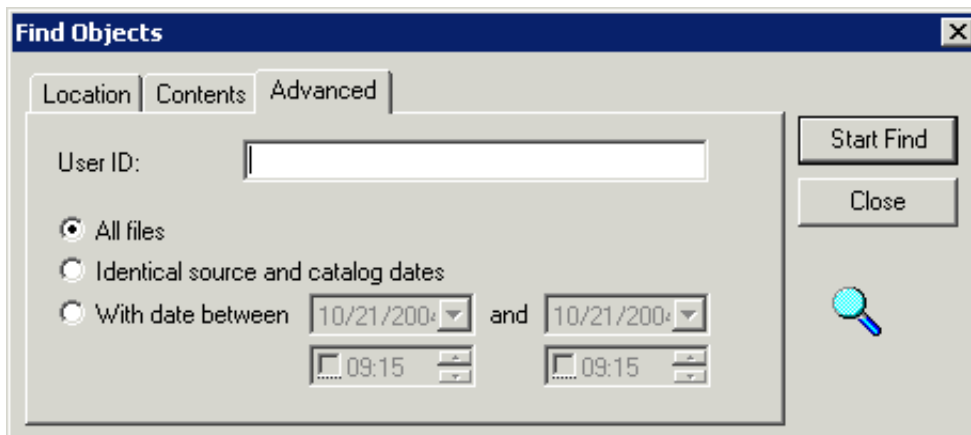
If both the **Source** and the **Cataloged** check boxes are activated, both the source and the generated program of the object must exist in order for the object to be found.

Contents



| Option | Description |
|-------------------------------|---|
| Containing text | The text that is to be found. The edit controls on this page are only available when you have entered text in this text box. |
| Whole words | If activated, only whole words are taken into account. |
| Case sensitive | If activated, a distinction is made between uppercase and lowercase characters. |
| First occurrences only | If activated, the objects containing the specified text are only displayed once in the result window. |
| Replace with | If you want to replace the found text, specify the new text in this text box. |
| Confirm replace | Only available, if a replace text has been specified or if the Delete value check box has been activated. If activated, the Confirm Replace dialog box is shown when the specified text has been found. You can confirm each replace or delete operation separately, or you can confirm all replace or delete operations at once. |
| Delete value | Only available, when a replace text has not been specified. If you want to delete the found text, activate this check box. |

Advanced



| Option | Description |
|---|---|
| User ID | The ID of the user who has created or modified an object. If specified, only objects with a matching user ID are found. If you specify more than one user ID, separate the IDs with semicolons. You can also use wildcards (* or ?). |
| All files | If selected, all specified Natural objects are searched. |
| Identical source and catalog dates | If selected, only those objects are found where the catalog date is identical with the source date. |
| With date between | If selected, only those objects are found where the last modification took place in the specified date and time range. You can specify the dates manually or select them from the drop-down list boxes. When you activate the check boxes for the dates, this information is also taken into account. You can specify a start time, an end time or both. You can specify the time either manually or with the spin boxes. |

Suppressing Line Numbers in the Source Code

Normally, line numbers are written to the source code when you save an object to the file system. However, you can define that these line numbers are not written. This is important if you are storing your objects in a source control system. The suppression of line numbers is defined in the properties of a library. See *Properties for the Nodes* for further information.

When line numbers are suppressed in a library, the library icon that is shown in the tree looks as follows:



In addition to the local environment, you can also define the suppression of line numbers for the libraries in a remote UNIX, OpenVMS or Windows environment.

Note:

The line number suppression state is stored in the file *FILEDIR.SAG*. The state can also be changed using the FTOUCH utility.

Copying and Moving Libraries

Libraries are copied and moved in the same way as any other object in the library workspace (that is: with **Cut**, **Copy** and **Paste**, or with drag-and-drop). See *General Information on Copying and Moving Objects* for further information.

The target node of the copy or the move of a library can be any system file node (user libraries, system libraries or an inactive system file) in the local or remote environment. It can even be any other library node; in this case, all objects of the source library are copied.

When a library is copied or moved to a system file node for user libraries (FUSER), the new library must conform to the library naming conventions. Thus, when you copy or move a system library which starts with "SYS" to the user libraries, a dialog box appears and you have to specify another name. The default library name "USRLIB" that is provided in this dialog box can be overwritten.

The same applies when copying or moving a user library to the system libraries (FNAT) where the library names must start with "SYS". In this case, the dialog box mentioned above offers the default name "SYSLIB".

In all other cases, for example, when copying a system library to an inactive system file, the name of the source library is taken as the target library name.

Renaming Libraries

A library is renamed in the same way as a Natural object. See *Renaming Objects* for further information.

When renaming a library, make sure to adhere to the library naming conventions. It is not possible to rename the library SYSTEM.

Deleting Libraries

A library is deleted in the same way as a Natural object. See *Deleting Objects* for further information.

If you are working in a multiple-user environment, you should only delete a Natural library if you have exclusive access to the library involved. It is not possible to delete the library SYSTEM.

Defining Your Own Startup Library

When you access Natural Studio for the first time, you log on to the library SYSTEM by default.

To log on to a different library at startup

This description applies only when Natural Security is not active. Different rules apply if you logon to Natural under Natural Security; see *Logging On* in the *Natural Security* documentation.

1. Use the Configuration Utility to create your own Natural parameter file.
2. Select your new parameter file in the Configuration Utility.
3. Locate the parameter INIT-LIB.

Tip:

Locate this parameter by searching for "INIT-LIB". See *Finding a Parameter* in the *Configuration Utility* documentation for further information.

4. Specify the name of the startup library with the INIT-LIB parameter.

A startup library can be one of your own libraries or a library set up for you by your administrator.

5. Make sure that the parameter AUTO (which is defined on the same page as INIT-LIB) has been set to "ON". Otherwise INIT-LIB is not used.
6. Save your changes.

7. Invoke Natural Studio with your own parameter file. See *Invoking Natural with an Alternative Parameter File* in the *Configuration Utility* documentation.

Example Library for New Features

The library *SYSEXV* contains several example programs which illustrate some of the new features of various Natural versions. See also *SYSEXV Utility* in the *Tools and Utilities* documentation.