

LMS Library Elements

The BS2000/OSD LMS library elements maintenance facility allows you to perform functions on elements of LMS programming libraries.

If the element consists of job control, you can make use of the Natural ISPF Macro facility. You can use all types of macro statements. Macro expansion is performed at submission time (see the SUBMIT command below). When creating a new element, you can also use the Edit macro feature to automatically create text lines which can then be modified. For details on the Macro facility, see the section Macro Facility in the Natural ISPF Programmer's Guide).

▶ To enter the LMS element maintenance facility

- Select the LMS option from the Natural ISPF Main Menu.

The LMS Elements Entry Panel appears:

```

----- LMS ELEMENTS - ENTRY PANEL -----
COMMAND ==>

File Name =>
Element   =>
Type      =>                ( S,M,J,D,H,P,R,C,X or combination )
Version   =>
Rec.length =>                ( If different from default (80/133) )
Password  =>                ( If library is password protected )
Scan for  =>
Edit macro =>
Node      => 31

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10---PF11---PF12---
      Help Split End  Suspe Rfind Rchan Up      Down Swap Left Right :s

```

You can specify the element you wish to maintain in the input fields and enter a function command in the command line.

Meaning of the input fields:

Field	Meaning
File Name	Displays the file name last used. You can select any other file by overtyping this name. Leave blank or use strings and wildcards (* and _) to generate a more selective list of PAM files. See the subsection Selection Windows and Wildcards in the section Command Logic. When requesting a list of files, the command is automatically transferred to object type BF (see the subsection BS2000/OSD Files).
Element	Name of the required element in the specified file. Leave blank or use selection criteria as described for the File Name field to generate a list of elements. If more than one version exists for an element, the highest version is listed.
Type	Type of required element. This is optional if the element name is unique. If you are creating a new element and omit this field, type S (source) or the value from your profile is taken as default. When listing elements, combinations of type notation are possible, for example, JD for jobs and data elements.
Version	You can specify a previous version of the element in this field. If this is omitted, either the highest version is selected, or a version according to the value in your user profile (default is the highest possible version, indicated by the character \$, or the character that corresponds to hexadecimal 7C) .
Record length	This must be specified if the actual record length exceeds the default length according to element type. The defaults are: 80 for types S, M, J and D. 133 for type P. 253 for all others.
Password	System password if library or element is protected. Must be specified irrespective of read or write protection.
Scan for	Lists elements which contain the string specified here. When you select a member from this list for EDIT or BROWSE, the cursor is placed on the first occurrence of this string in the element. Issue the RFIND command to find the next occurrence.
Edit macro	Name of macro object to be used as a model for the new element. The specified macro is executed and loaded into the Editor. See the section Macro Facility in the Natural ISPF Programmer's Guide for details. When used with LIST, the list contains all elements according to the name criteria that use the specified macro as a model.
Node	Select Entire System Server node. Enter a question mark ? and press Enter to open a window in which all node numbers are scrolled with an ACTIVE or INACTIVE status report. If you do not specify a node, the default node indicated on the Main Menu is assumed.

Function Commands

The available function commands for LMS elements are as follows:

Command	Parameter Syntax
BROWSE	file-name(element) TYPE= t VERSION=vvv RECLLEN=nnn PASSWORD=p NODE=id
COPY	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id, object-type object-parms, REP
DELETE	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id
EDIT	file-name(element) TYPE= t VERSION=vvv RECLLEN=nnn PASSWORD=p NODE=id MACRO=name
EXPORT	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id, target-environment
LIST	file-name (*_*) TYPE= t PASSWORD=p NODE=id SCAN=string MACRO=name
PLAY	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id
PRINT	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id, printer-name CC
RENAME	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id,new-name
SUBMIT	file-name(element) TYPE= t VERSION=vvv PASSWORD=p NODE=id1, TARGET=id2

A full description of these commands is contained in the section Command Reference. The object parameters correspond to the input fields on the LMS Elements Entry Panel.

Note:

If you issue any of the above function commands from outside the LMS elements facility, you must specify the object-type parameter LMS before the object parameters.

Notes:

1. The file-name parameter is optional, Natural ISPF then takes the current file name, or if you issue a command from outside the LMS elements facility, from your profile.
2. Instead of typing the keywords TYPE and VERSION when specifying an element, the following notations are valid:

```
FILENAME ( ELNAME ) T / VVVVVV
FILENAME ( element-selection )
element-selection /* Current file name is assumed
```

where **element-selection** can be any of the following:

```
( T ) ELNAME / VVVVVV
ELNAME / VVVVVV ( TTT )
ELNAME / VVVVVV
```

Note that TTT represents a string of valid element types when requesting a list of elements. The version notation (/VVVVV) is required only when selecting a version other than the highest one.

Listing LMS Elements

Lists of elements in an LMS-type library can be generated using the LIST command and selection criteria in the parameter input fields of the LMS Elements Entry Panel. Alternatively, you can issue the LIST command with appropriate parameters from any system screen. The list can be restricted to selected elements by specifying certain selection criteria:

- Element name prefix or pattern using wildcards * and _;
- Element type or multiple types;
- Specific element version;
- Scan value, listing only those elements that contain the specified string;
- Model name, listing only those elements that were generated by the specified Edit macro.

Example: LIST LMS (1)

Below are some examples of the LIST function commands using full command syntax.

1. **LIST LMS \$DEMO.DEMOLIB(*OC*)**

lists all elements in the specified library that have the string OC in their name.

2. **LIST LMS \$DEMO.DEMOLIB(ED*) TYPE=SM**

lists elements in the specified library with names starting with ED; only S (source) and M (macro) type elements are listed.

3. **LIST LMS \$DEMO.DEMOLIB(*120) TYPE=D**

lists all library elements of Type D that have Version Name 120 assigned.

4. **LIST LMS \$DEMO.DEMOLIB(E.*) SCAN=EXAMPLE**

lists all library elements that start with E. and which contain the string EXAMPLE.

5. **LIST LMS \$DEMO.DEMOLIB(E.*) MODEL=EXB5**

lists all library elements that start with E. and that were generated using Edit macro EXB5.

An example list of LMS elements follows.

Example: LIST LMS (2)

The following figure shows an example of a list of LMS elements generated using the command:

```
LIST LMS :D:$ASF.ASF.LMSLIB(*)
```

```

LIST-LMS::D:$ASF.ASF.LMSLIB(*) ----- Row 0 of 18 - Columns 018 072
COMMAND====>                                SCROLL====> CSR
  TYP ELEMENT-NAME          S V-C HIGH-VERSION CREATED    MODIF-DATE TIME
** ***** top of list *****
  (J) Z132B005              V  1 000          1993-08-05 1993-08-05 15:31
  (R) ACLTEST               V  1 §            1992-10-06 1992-10-08 12:53
  (R) ARCTEST               V  1 §            1992-08-05 1992-08-05 13:13
  (R) ASFJOIN               V  1 §            1993-03-31 1993-03-31 16:43
  (R) ASFJV                 V  1 §            1993-02-18 1993-02-26 17:08
  (R) ASFMACT               V  1 §            1993-01-20 1993-01-22 15:49
  (R) ASFMP                 V  1 §            1993-04-06 1993-04-08 11:32
  (R) ASFWS                 V  +2 §           1993-03-18 1993-03-25 18:34
  (R) ASFTEST               V  1 §            1992-09-29 1993-02-01 16:50
  (R) ASFTYPIO              V  1 §            1992-12-08 1993-05-05 11:00
  (R) FSTAT                 V  1 §            1992-09-29 1992-09-29 14:59
  (R) GUARDTST              V  1 §            1992-10-28 1992-10-28 18:05
  (R) MACTEST               V  1 §            1992-04-14 1992-04-14 15:16
  (R) MAC31                 V  1 §            1992-10-23 1992-10-23 14:46
  (R) SAMTEST               V  1 §            1993-03-18 1993-03-18 11:24
  (S) S.SAMTEST             V  1 §            1990-10-28 1990-10-28 15:39
  (S) SAMTEST               V  1 §            1990-10-28 1990-10-28 17:45
  (X) L.SAMTEST             V  1 §            1990-10-28 1990-10-28 15:39
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help Split End  Suspe Rfind Rchan Up    Down Swap Left Right :s

```

The list generated shows all elements in the specified library. The list appears in Editor format. This means you can use Editor BROWSE commands (UP, DOWN, TOP, BOTTOM, LEFT, RIGHT, FIND, LOCATE), as well as SORT and LAYOUT.

Meaning of column headings (without the SCAN option):

Column	Meaning
TYP	Element type, enclosed in parentheses
ELEMENT-NAME	Name of element
S	Storage mode (D=Delta, V=Full versions)
V-C	Number of versions for the element (version count)
HIGH-VERSION	Highest version encountered
CREATED	Creation date of highest version
MODIF-DATE	Date the highest version was last modified or renamed
TIME	Time the highest version was last modified or renamed

If the SCAN option were used to create a list, the following columns would be displayed:

Column	Meaning
TYP	Element type, enclosed in parentheses
ELEMENT-NAME	Name of element
NUM	Number of occurrences of the scan string in the highest version
FIRST FOUND	First occurrence of the scan string in the highest version.

Line Commands

You select an element from a list by typing in a line command in the input field preceding the element name and pressing Enter. Each line command is an abbreviation of a function command (but see the special LIST line command for an element):

Line Command	Function	Meaning
B	BROWSE	Display element. Not available for Type C. No modification is possible.
CP	COPY	Copy the element into another object (target object type and name will be prompted).
D	DELETE	Erase the element from the library. Note that all versions are deleted.
E	EDIT	Edit the element. Not available for types C and R. Elements stored in Delta mode cannot be updated (the SAVE command is rejected).
EX	EXPORT	Export element to external environment (PC or Connect). Not available for type C.
L	LIST	List all versions of the element. See the subsection Versions of LMS Elements below.
PL	PLAY	Run the element as a Natural ISPF command script. Not available for Types C and R.
PR	PRINT	Create a report of element. Not available for Type C.
R	RENAME	Rename the element (not available for elements stored in Delta mode). Note that all versions are renamed.
SB	SUBMIT	Submit the element (an ENTER job; if applicable, after macro expansion). Only available for Type J.

Line commands can also be used as valid abbreviations of function commands entered in the command line of any system screen.

Local Commands

If you display an LMS element in Editor format, you can issue some local commands from the Editor command line in addition to Editor commands.

The following local commands are available:

In Edit Mode:

Command	Meaning
IMPORT	Imports a PC file or Con-nect document into the element (see the section Useful Features).
NEWNAME <elname></version>	Specifies a new element name and/or version name to be used on subsequent SAVE operations. If you enter the NEWNAME command without parameters, a window prompts you for the new element and version name(s).
PASSWORD <password>	If either the library or the edited element is password- protected, use this command to enter the valid password in order to update the element. If you enter the PASSWORD command without parameter, a window prompts you for the password. Password input in the window is invisible.
REGENERATE	Available for elements written using the Edit macro option. Reexecutes the specified macro object and writes the result in protected lines in the current edit session. Any defined user code remains in place. For details, see the section Macro Facility in the Natural ISPF Programmer's Guide.

Hint for use of NEWNAME:

You may find it useful to define the character > as a magic character in your user profile and assign it to the command ;NEWNAME_. This allows you to use a direct command notation very similar to the command syntax of LMS when used in a TIAM dialog session. For example:

1. EDIT (D)DOCTX/002>DOCU-NEW

opens an edit session on data element DOCU-NEW, filled with the contents of data element DOCTX, version 002. The new element will have the same version identification 002 assigned.

2. E \$VG.CVRP(CVPROT)>/V-TEST

opens a session with element CVPROT of any type (provided this element exists and is of unique type) in library \$VG.CVRP. Data is read from the highest version encountered and is saved as version V-TEST.

In List Mode:

If you display lists of LMS elements in Editor format, you can issue the following local commands in addition to Editor scroll commands: ALL, LAYOUT, RELIST and SORT. For detailed information, see the corresponding subsections in the section Useful Features.

Concurrent Editing of LMS Elements

When you save an LMS library element, Natural ISPF checks if the same element has been modified by another user or another session while you were editing. If this is the case, you are notified by a message and the SAVE operation is not executed. You can use the BROWSE command to inspect the element and you can decide whether to override it with your latest modifications or not. To override it, you can either:

- use the REPLACE command for the existing element, or
- delete the existing LMS element and then save the version with your latest changes.

Versions of LMS Elements

Previous versions of LMS elements can be kept and retrieved using Natural ISPF. The way versioning is done for LMS elements is slightly different from objects on other platforms, therefore most of the information given in the subsection Versioning in the section Useful Features does not apply.

Listing Previous Versions

You can list previous versions of an LMS element by either:

- Issuing the LIST function command from any system screen, specifying the library and element selection criteria in the command syntax (note the version and type selection criteria described in the subsection Function Commands above), or:
- Selecting an element from a list of elements using the **L** line command.

Examples using function command syntax:

1. **LIST LMS \$DEMO.DEMOLIB(E.EXAM/*)**

lists all versions of the specified library element.

2. **LIST LMS \$DEMO.DEMOLIB(EXAMPLE/*N*) TYPE=S**

lists those versions of source-type element EXAMPLE that have the letter **N** in their names. The TYPE parameter is required only if the element name EXAMPLE is not unique in the library (for example, if an element EXAMPLE of Type J is contained in the same library).

3. **LIST LMS \$DEMO.DEMOLIB(EXAMPLE) VERSION=V* SCAN=EXAM**

lists those versions of library element EXAMPLE whose names start with **V** and which contain the string EXAM.

The following screen shows an example of a list of library element versions. The function command used to generate the list was:

```
LIST LMS :D:$ASF.ASF.LMSLIB(ASFSW)R/*
```

The list displays all versions of the element ASFSW in the specified library:

```
LIST-LMV: :D:$ASF.ASF.LMSLIB(ASFSW)R/* ----- Row 0 of 2 - Columns 014 071
COMMAND===>                                     SCROLL===> CSR
VERSION-NAME          S CREATED      MODIFIED-DATE TIME  USER-DATE  TIME
** ***** top of list *****
000                   V 1993-03-25    1993-03-25 18:27 1993-03-18 09:40
§                     V 1993-03-18    1993-03-25 18:34 1993-03-25 18:34
** ***** bottom of list *****

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Split End   Suspe Rfind Rchan Up    Down  Swap  Left  Right :s
```

Meaning of column headings:

Column	Meaning
VERSION-NAME	Name of element version.
S	Storage mode (D=Delta, V=Full versions)
CREATED	Creation date of version
MODIF-DATE	Date when version was last modified or renamed
TIME	Time when version was last modified or renamed.
USER-DATE	Date supplied by user on last modification
TIME	Time supplied by user on last modification

If the **SCAN** option were used to create a list, the following columns would be displayed:

Column	Meaning
VERSION-NAME	Name of element version.
NUM	Number of occurrences of the scan string in the version.
FIRST FOUND	First occurrence of the scan string in the version.

Available Functions for Previous Versions

A number of functions can be performed on versions of LMS elements. A version can be selected in either of the following ways:

- Select a version by entering a line command in the input field preceding the version name in the list of element versions;
- Perform the function from any system screen by issuing a function command directed at object type LMV, identifying the version by library name, element name, and version name. The TYPE parameter is required only if the element name is not unique in the library.

Line commands can also be used as abbreviations of function commands in command syntax. Available functions for LMS element versions are:

Line Command	Function	Meaning
B	BROWSE	Display element version. Not available for Type C. No modification is possible.
CP	COPY	Copy the version into another object (target object type and name will be prompted).
D	DELETE	Erase the element version.
E	EDIT	Edit the element version. Not available for Types C and R. Versions of elements stored in Delta mode cannot be updated (the SAVE command is rejected).
EX	EXPORT	Export element version to external environment (PC or Con-nect). Not available for Type C.
PL	PLAY	Run the element version as a Natural ISPF command script. Not available for Types C and R.
PR	PRINT	Create report of the version. Not available for Type C.
R	RENAME	Rename the element name, the version name, or both (V-storage type elements only).
SB	SUBMIT	Submit the element version (an ENTER job; if applicable, after macro expansion). Only available for Type J.

Updating Versioned LMS Elements in Full Storage Mode

Other Natural ISPF objects such as Natural programs or PDS members can be updated in place (with versioning disabled), or continuous versioning can be in effect for each update. In contrast, LMS elements kept in Full Storage Mode can be updated in place, even if there already are several versions of the element being updated. Additionally, for LMS elements in Full Storage Mode, no version identifier is automatically assigned. This means that every time you are about to update an LMS element, you can decide whether you wish to keep the current version or not, and if you do, you can specify a name for the new version according to your site's naming conventions.

Specifically, if you intend to update a certain LMS element and wish to keep the current version, you can proceed in any of the following ways:

1. Start an edit session with the current version, for example, by selecting it from a list of LMS elements with the **E** line command. Modify the data and use the **NEWNAME** local command to assign a new name to the version. This version is stored with the **SAVE** command, or when the session is ended (provided **AUTOSAVE=ON** is specified in your user profile).
2. If the LMS Override option has been set to ***** in your BS2000/OSD Defaults profile, a prompt window opens every time you save an LMS element or an existing element version. This window allows you to either assign a new version name, if a new version is to be created, or confirm that the modified version is overwritten (that is, updated in place, option **YES**):

```

EDIT-LMS::D:$ASF.ASF.LMSLIB(SAMTEST)S/§ ----- Columns 001 072
COMMAND==> save                                SCROLL==> CSR
***** ***** top of data *****
000001 *****
000002 * PROGRAM TO OPERATE SAM-FILE (OPEN, PUT, CLOSE) *
000003 * JUST TO GET FAMILIAR WITH FILE-OPERATING *
000 +-----+
000 ! !
000 ! Version § of type S LMS library element !
000 ! named !
000 ! SAMTEST !
000 ! already exists. !
000 ! !
000 ! Enter new version name _____ , !
000 ! !
000 ! or press the PF3 key to abort SAVE operation !
000 ! or enter YES to overwrite existing version ____ . !
000 ! !
000 +-----+
000017 OPEN (R6),EXTEND
000018 *
000019 * PUT RECORD
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
Help Split End Suspe Rfind Rchan Up Down Swap Left Right :s
    
```

3. If the LMS Override option is set to NO in your BS2000/OSD Defaults profile, a similar prompt window to the one in the above example is opened when you wish to save an existing element. In this window, however, you are not offered the option of overriding the old version.
4. Start an edit session with the current version, for example, by selecting it from a list of LMS elements with the E line command. Modify the data and issue the RENAME command without any parameters. A window opens in which you can specify a version name to be assigned to the previous version. When you store the modified version (with the SAVE command, or END with AUTOSAVE=ON), the new version will have the same version name as the previous version before it was modified. This method is recommended if you always wish to carry over the same name to the current version. This is particularly useful to retain version name § (or the character that corresponds to hexadecimal 7C), which always denotes the highest version with respect to the LMS internal sort sequence.

As an alternative to the prompt window, you can use the full RENAME function command syntax in the command line of the edit session with the LMS element. Issue either:

```
RENAME ,VERSION=vname
```

or:

```
RENAME , /vname
```

where *vname* is the version name to be assigned to the previous version.

Notes:

1. When specifying version names, you should ensure that the version names are created in ascending order, otherwise the ordering in a list of element versions will not correspond to the 'history' of the element.
2. Updating of LMS elements stored in Delta mode is currently not supported by Natural ISPF.