DELTA IMS User Guide

Supporting

Version 6.8 of DELTA IMS DB/DC
Version 6.8 of DELTA IMS DC
Version 6.8 of DELTA PLUS for DBCTL
Version 6.8 of DELTA PLUS VIRTUAL TERMINAL

December 2015
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■ Operating system and environment information
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  — Operating system type, version, and service pack or other maintenance level such as PUT or PTF
  — System hardware configuration
  — Serial numbers
  — Related software (database, application, and communication) including type, version, and service pack or maintenance level
■ Sequence of events leading to the problem
■ Commands and options that you used
■ Messages received (and the time and date that you received them)
  — Product error messages
  — Messages from the operating system
  — Messages from related software
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About this book

This book contains detailed information about the associated product or products. This preface explains the special conventions that the book uses, and how to access related publications.

If applicable, the preface also summarizes the major changes included in the latest release of the product.

Related publications

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  — Support Central (at http://www.bmc.com/support/mainframe-demonstrations)
  
  — BMC Mainframe YouTube channel (https://www.youtube.com/user/BMCSoftwareMainframe)


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Conventions

This document uses the following special conventions:

- All syntax, operating system terms, and literal examples are presented in this typeface.
- Variable text in path names, system messages, or syntax is displayed in italic text: `testsys/instance/fileName`
- Menu sequences use a symbol to convey the sequence. For example, `Actions => Create Test` instructs you to choose the `Create Test` command from the `Actions` menu.

Syntax statements

This topic explains conventions for showing syntax statements.

A sample statement follows:

```
COMMAND KEYWORD1 [KEYWORD2 | KEYWORD3] KEYWORD4={YES | NO} fileName...
```

The following table explains conventions for syntax statements and provides examples:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items in italic type represent variables that you must replace with a name</td>
<td><code>alias</code></td>
</tr>
<tr>
<td>or value. If a variable is represented by two or more words, initial</td>
<td><code>databaseDirectory</code></td>
</tr>
<tr>
<td>capitals distinguish the second and subsequent words.</td>
<td><code>serverHostName</code></td>
</tr>
<tr>
<td>Convention</td>
<td>Example</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Brackets indicate optional</td>
<td><code>[tableName, columnName, field]</code></td>
</tr>
<tr>
<td>items. Do not type the</td>
<td></td>
</tr>
<tr>
<td>brackets when you enter the</td>
<td></td>
</tr>
<tr>
<td>option. A comma means that</td>
<td><code>[-full, -incremental, -level]</code></td>
</tr>
<tr>
<td>you can choose one or more</td>
<td></td>
</tr>
<tr>
<td>of the listed options. You</td>
<td></td>
</tr>
<tr>
<td>must use a comma to</td>
<td></td>
</tr>
<tr>
<td>separate the options if you</td>
<td></td>
</tr>
<tr>
<td>choose more than one</td>
<td></td>
</tr>
<tr>
<td>option.</td>
<td></td>
</tr>
<tr>
<td>Braces indicate that at least</td>
<td>`{DBDName</td>
</tr>
<tr>
<td>one of the enclosed items is</td>
<td></td>
</tr>
<tr>
<td>required. Do not type the</td>
<td>`UNLOAD device={disk</td>
</tr>
<tr>
<td>braces when you enter the</td>
<td>fileName</td>
</tr>
<tr>
<td>item.</td>
<td>`{-a</td>
</tr>
<tr>
<td>A vertical bar means that</td>
<td>`{commit</td>
</tr>
<tr>
<td>you can choose only one of</td>
<td></td>
</tr>
<tr>
<td>the listed items. In the</td>
<td></td>
</tr>
<tr>
<td>example, you would choose</td>
<td></td>
</tr>
<tr>
<td>either commit or cancel.</td>
<td></td>
</tr>
<tr>
<td>An ellipsis indicates that</td>
<td><code>columnName...</code></td>
</tr>
<tr>
<td>you can repeat the</td>
<td></td>
</tr>
<tr>
<td>previous item or items as</td>
<td></td>
</tr>
<tr>
<td>many times as necessary.</td>
<td></td>
</tr>
</tbody>
</table>

**Syntax diagrams**

The following figure shows the standard format for syntax diagrams:

![Syntax Diagram](image)

The following example illustrates the syntax for a hypothetical DELETE statement. Because the FROM keyword, alias variable, and WHERE clause are optional, they appear below the main command line. In contrast, the `tableName` variable appears on the command line because the table name is required. If the statement includes a
WHERE clause, the clause must contain a search condition or a CURRENT OF clause. (The searchCondition variable appears on the main line for the WHERE clause, indicating that this choice is required.)

The following guidelines provide additional information about syntax diagrams:

- Read diagrams from left to right and from top to bottom.

- A recursive (left-pointing) arrow above a stack indicates that you may choose more than one item in the stack.

- An underlined item is a default option.

- If a diagram shows punctuation marks, parentheses, or similar symbols, you must enter them as part of the syntax.

- In general, IBM commands, keywords, clauses, and data types are displayed in uppercase letters. However, if an item can be shortened, the minimum required portion might be shown in uppercase letters, with the remainder in lowercase (for example, CANcel).

- The following conventions apply to variables in syntax diagrams:
  - Variables are typically displayed in lowercase letters and are always italicized.
  - If a variable is represented by two or more words, initial capitals distinguish the second and subsequent words (for example, databaseName).
Using the TSO/ISPF Interface

This chapter introduces you to the TSO/ISPF interface provided with DELTA IMS. You use this interface in all of your online transactions with DELTA IMS. The process for changing your CUA options is also described in this chapter.

Understanding the TSO/ISPF Panels

The conventions for using the TSO/ISPF panels provided with DELTA IMS are described in this section. All of the panels in the TSO/ISPF interface conform to the CUA standards published by IBM.

Command Line

You can type any valid commands on the **Command** line that appears on a panel. Depending on your ISPF settings, the **Command** line can be located either at the top or the bottom of the panel. The following figure shows a sample command area.

*Figure 1: Sample Command Area*


**Scroll Indicators**

Whenever the **Scroll** field appears on a panel, you can use the function keys designated as your scrolling keys to page forward or backward through a list. Press the function key designated as your UP key, usually **F7**, to move toward the top of the list. Press the key designated as your DOWN key, usually **F8**, to move toward the bottom of the list.

**More:** < + - > appears above the scrollable portion of the panel whenever all of the available data is not displayed.

The display continuation prompt has the following components:

- < — indicates that the **LEFT** scroll key will display more data
- > — indicates that the **RIGHT** scroll key will display more data
- -- — indicates that the **UP** scroll key will display more data
- + — indicates that the **DOWN** scroll key will display more data

If all available data fits on the panel, the scrolling symbols are not displayed.

The following figure shows the numbers listed above the scroll indicator. These numbers represent the current row number and the total rows in the list.

**Figure 2: Sample Scroll Indicators**

![Sample Scroll Indicators](image)

**Commands**

You can issue a command in two ways:
Type the command on the **Command** line and press **Enter**.

Press the designated function key.

Throughout this guide the instructions to type **END**, issue the END command, and press **F3** all mean the same thing.

On the panels described in this chapter you have the option, unless otherwise noted, to enter the following commands. These commands may also be assigned to function keys.

**SAVE**

Type **SAVE** on the **Command** line and press **Enter** to save the options as currently displayed without leaving the panel. Depending on the option selected, a save confirmation screen may be displayed.

**END and RETURN**

Type **END** or **RETURN** on the **Command** line and press **Enter**, or press the appropriate function key to save the options as currently displayed and exit the panel. Depending on the option selected, a save confirmation panel may be displayed.

**CANCEL**

Type **CANCEL** on the **Command** line and press **Enter** to immediately terminate the update without keeping any changes made since the last save.

## DELTA IMS Interface and Tier Views

The DELTA IMS interface allows you to select online interface tier views for each product tier. This section provides information and instructions on invoking the DELTA IMS interface and selecting online interface tier views.

### Invoking the DELTA IMS Interface

The approach you use to invoke the DELTA IMS online interface depends on how the product was installed. DELTA IMS can be invoked through a selection to your ISPF primary menu or through execution of a CLIST.

Members DLACl@00, DLADBDC, DLAVT, and DLADBCTL in DLASAMP are sample CLISTs that provide access to the DELTA IMS online interface. Use one of
the CLISTs shown in the following table to invoke a tier view of the DELTA IMS online interface.

Table 1: CLISTs for Invoking the DELTA IMS for DBCTL Online Interface

<table>
<thead>
<tr>
<th>If you want to view options for...</th>
<th>Then type one of the following on a TSO Command line...</th>
</tr>
</thead>
</table>
| DELTA IMS DC, DELTA IMS DB/DC, and optionally DELTA IMS for DBCTL | EX 'clist.dataset.name(DLACI@00)' 'OPT(DBDC)'  
-Or-  
EX 'clist.dataset.name(DLADBDC)' |
| DELTA IMS VIRTUAL TERMINAL and optionally DELTA IMS for DBCTL | EX 'clist.dataset.name(DLACI@00)' 'OPT(VT)'  
-Or-  
EX 'clist.dataset.name(DLAVT)' |
| DELTA IMS for DBCTL | EX 'clist.dataset.name(DLACI@00)' 'OPT(DBCTL)'  
Users who only support DBCTL regions and will not need to modify non-DBCTL IMS control regions should use the following CLIST. This CLIST locks the DELTA IMS for DBCTL for DBCTL tier view so that it cannot be changed to another tier view.  
EX 'clist.dataset.name(DLADBCTL)' |

The CLIST and/or execution option that you use determines the tier view that will be displayed. When you invoke the DELTA IMS online interface, a version of the DELTA IMS Primary Menu (Figure 3 on page 18) is displayed. Depending on interface preferences that may have been specified, the Tier View Selection panel (“Changing the Interface Tier View” on page 19) may precede the DELTA IMS Primary Menu.

Figure 3: DELTA IMS Primary Menu

PM                     DELTA IMS VT - Primary Menu
IMSID  . . . DLA5
Welcome to DELTA IMS. Select one of the following. Then press Enter.

_  1. Edit a DELTA List  (ES/ED)  
  2. Check a DELTA List  (CS/CH)  
  3. Execute a DELTA List  (XS/EX)  
  4. IMS commands operator interface  (CM)  
  5. Customize globals, options, profiles, etc.  (CU)  
  6. Utility functions  (UT)  
  7. Statistics for Virtual Terminal  (VT)  
  8. TSS translation tables  (TR)  
  I. Interface preferences  (VI)  

For options 1, 2, or 3:

DELTA IMS PDS  . . . . DLA.V5.DELTAPDS  
DELTA List name  . . .  Member name (blank for list of members)
In the Primary Menu, Statistics for Virtual Terminal (Option 7) and TSS translation tables (Option 8) are available only in DELTA IMS VIRTUAL TERMINAL.

Online Interface Tier Views

The DELTA IMS online interface allows you to select a view of the interface that displays only the options appropriate for each of the following DELTA IMS tiers:

- DELTA IMS DB/DC (includes DELTA IMS DC)
- DELTA IMS VIRTUAL TERMINAL (includes DELTA IMS DB/DC)
- DELTA IMS for DBCTL

If the IMSID that is specified on the DELTA IMS for DBCTL Primary Menu panel is the correct type for the specified tier view, you will be able to see and execute only the options that are appropriate for the tier you have selected. The DELTA IMS DB/DC and VIRTUAL TERMINAL tier views include DELTA List options that apply to DELTA IMS for DBCTL. DELTA Lists that include elements common to both IMS control and DBCTL regions can be executed against either type of control region. During execution of a DELTA List against a DBCTL region, DELTA List elements that are not applicable to DBCTL are ignored.

Changing the Interface Tier View

From the DELTA IMS for DBCTL Primary Menu, select option I and press Enter. The Interface Preferences panel, in the following figure, is displayed.

Figure 4: DELTA IMS for DBCTL Interface Preferences Panel

<table>
<thead>
<tr>
<th>VI</th>
<th>DELTA IMS VT - Interface Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select one of the following. Then press Enter.</td>
</tr>
<tr>
<td>1</td>
<td>Display options ...</td>
</tr>
<tr>
<td>2</td>
<td>Set colors ...</td>
</tr>
<tr>
<td>3</td>
<td>Toggle panel id display</td>
</tr>
<tr>
<td>4</td>
<td>Toggle PF keys display</td>
</tr>
<tr>
<td>5</td>
<td>Tier view selection ...</td>
</tr>
<tr>
<td>6</td>
<td>TSS Data Set option ...</td>
</tr>
</tbody>
</table>

Note

In the Tier View Selection menu, TSS Data Set option (Option 6) is available only in DELTA IMS VIRTUAL TERMINAL.
Select option 5 and press Enter. The Tier View panel, in the following figure, is displayed.

**Figure 5: Tier View Panel**

<table>
<thead>
<tr>
<th>Select one of the following. Then press Enter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired product tier . . .</td>
</tr>
<tr>
<td>1. DELTA IMS Virtual Terminal</td>
</tr>
<tr>
<td>2. DELTA IMS DB/DC or DC only</td>
</tr>
<tr>
<td>3. DELTA IMS for DBCTL</td>
</tr>
</tbody>
</table>

Select the option that corresponds to the interface tier view you want, press Enter to save your change, and press Enter when prompted to verify your change. The Interface Preferences panel will be displayed.

Press F3 to return to the DELTA IMS for DBCTL Primary Menu.

---

**Changing CUA and Other Interface Options**

This chapter describes the panels for the DELTA IMS interface preferences. The DELTA IMS online interface complies with the CUA guidelines for panel design. By typing I in the option field on the DELTA IMS Primary Menu, you can access and use the following panels to change standard CUA options and other options specific to DELTA IMS. You can change these options at any time.

**Interface Preferences**

From the Interface Preferences panel you can change the CUA standard options, such as the location of the Command line, colors, panel identification, and function key display. Type I in the option field on the DELTA IMS Primary Menu to display the Interface Preferences panel as shown in the following figure.

**Figure 6: Interface Preferences Panel**

<table>
<thead>
<tr>
<th>Select one of the following. Then press Enter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Display options ...</td>
</tr>
<tr>
<td>2. Set colors ...</td>
</tr>
<tr>
<td>3. Toggle panel id display</td>
</tr>
<tr>
<td>4. Toggle PF keys display</td>
</tr>
<tr>
<td>5. Tier view selection ...</td>
</tr>
<tr>
<td>6. TSS Data Set option ...</td>
</tr>
</tbody>
</table>

Press F3 to return to DELTA IMS VT.
Note
In the Tier View Selection menu, TSS Data Set option (Option 6) is available only in DELTA IMS VIRTUAL TERMINAL.

Typing 1 in the option field on the above panel displays the Display Options panel (“Display Options” on page 21).

Display Options

The Display Options panel, shown in the following figure, is displayed when you type 1 in the option field on the Interface Preferences panel. This panel lets you specify several options regarding the appearance and general functioning of DELTA IMS online interface panels.

Figure 7: Display Options Panel

Set Colors

The Set Colors panel, as shown in the following figure, is displayed when you type 2 in the option field on the Interface Preferences panel. This panel lets you choose the colors or intensity to be used on your display panels.

Figure 8: Set Colors Panel
To restore CUA defaults, blank out the field in the column you want to restore.

If you have a monochrome monitor, the following sentence is displayed:

This terminal uses only the Monochrome Intensity column.

If you have a color monitor, the following sentence is displayed:

This terminal uses only the Extended Color column.

**Toggle Panel ID and Function Keys**

By typing options 3 and 4 in the option field on the Interface Preferences panel, you can turn on or off the display of the full panel identification and the function keys.

**Tier View Selection**

You can use option 5 on the Interface Preferences panel.

See “Changing the Interface Tier View” on page 19 for instructions.

**TSS Data Set Option**

The TSS Data Set Option panel is available only for the DELTA IMS VIRTUAL TERMINAL tier view. In this tier view, the TSS Data Set Option panel, shown in the following figure, is displayed when you type 6 in the option field on the Interface Preferences panel. This panel lets you choose whether data set name retrieval for the Translate Subsystem Services (TSS) tables is specified by the user or set by the IMSID basic options.

**Figure 9: TSS Data Set Option Panel**

Select one from each group. Then press Enter.

TSS Data Set Name . 1 1. User specified / ISPF Profile
Restrictions in a Shared Queues Environment

If you are running ETO or ETA in a shared queues environment, the following restrictions apply:

- DELTA IMS allows a dynamic transaction to be deleted, even if there are messages in the Coupling Facility for the SMB. However, you cannot delete a dynamic transaction that is associated with a conversation. In addition, you cannot revise or rename a dynamic transaction.

- DELTA IMS does not allow a dynamic transaction (SMB) to be created that has the same name as a previously deleted system generated transaction.

If you attempt to create a dynamic transaction with the same name as a previously deleted generated transaction, DELTA IMS issues the following message to the MVS console:

```
BMC2176 DYNAMIC TRANSACTION ####### NOT CREATED - DUPLICATE OF DELETED SYSGENNED TRAN
```

Online Help

DELTA IMS provides online help for the online interface and for messages issued by the product.

Panel-Level Help

DELTA IMS provides information about all panels in the DELTA IMS interface. You can activate the help feature by pressing F1 or by typing HELP on the Command line.

Message Help

DELTA IMS provides two levels of help for BMC Software error messages: extended help and full message information. When an error message is displayed, you can press F1 to display extended message text. If you press F1 again, DELTA IMS displays full message information.
You can activate message help by performing any of the following actions:

- Press F1 after an error message is displayed (for extended text).
- Press F1 twice after an error message is displayed (for full information).
- Type one of the following on the Command line:
  — MESSAGE
  — MSG
  — MSG BMCnnnn, where BMCnnn is a BMC error message number

**Message Help Index**

If you type MESSAGE or MSG on the Command line without specifying a message number, the DELTA IMS online help feature provides an index you can use to view information on all error messages that DELTA IMS can issue. You can use the message help index at any time; you do not have to wait until DELTA IMS issues an error message.

**Locating DELTA IMS Tasks**

DELTA IMS tasks are described in the four manuals provided with the product. The following table shows the most common tasks and the manual name and chapter number of the task description.

**Table 2: Task Locator Table**

<table>
<thead>
<tr>
<th>Task</th>
<th>Manual and Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of All Product Tiers</td>
<td>DELTA IMS General Information</td>
</tr>
<tr>
<td>Initial and Maintenance Installation</td>
<td>Installation guide</td>
</tr>
<tr>
<td>Software Environment and Resource Requirements</td>
<td>Installation guide</td>
</tr>
<tr>
<td>CPU ID Passwords</td>
<td>Installation guide</td>
</tr>
<tr>
<td>DELTA IMS Customization for All Tiers Except DELTA IMS VIRTUAL TERMINAL</td>
<td>Installation guide</td>
</tr>
<tr>
<td>DELTA IMS VIRTUAL TERMINAL Customization</td>
<td>DELTA IMS VIRTUAL TERMINAL User Guide</td>
</tr>
<tr>
<td>TSO/ISPF Interface</td>
<td>DELTA IMS User Guide, “Using the TSO/ISPF Interface” on page 15</td>
</tr>
<tr>
<td>Task</td>
<td>Manual and Chapter</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DELTA Lists--Creating and Editing</td>
<td><em>DELTA IMS User Guide</em>, “Creating and Editing DELTA Lists” on page 79</td>
</tr>
<tr>
<td>DELTA Lists--Checking and Executing</td>
<td><em>DELTA IMS User Guide</em>, “Using DELTA List Check and Execute” on page 125</td>
</tr>
<tr>
<td>DELTA Lists--Generating and Converting</td>
<td><em>DELTA IMS User Guide</em>, “Generating DELTA Lists” on page 169</td>
</tr>
<tr>
<td>Translate Subsystem Services Tables</td>
<td><em>DELTA IMS VIRTUAL TERMINAL User Guide</em></td>
</tr>
<tr>
<td>DELTA Logs--Creating and Maintaining</td>
<td><em>DELTA IMS User Guide</em>, “DELTA Logs” on page 141</td>
</tr>
<tr>
<td>DELTA Log Reports</td>
<td><em>DELTA IMS User Guide</em>, “Creating DELTA Log Reports” on page 185</td>
</tr>
<tr>
<td>IMS Storage--Display and Zap</td>
<td><em>DELTA IMS User Guide</em>, “Administration” on page 27</td>
</tr>
<tr>
<td>XRF</td>
<td><em>DELTA IMS User Guide</em>, “Administration” on page 27</td>
</tr>
<tr>
<td>Online Change</td>
<td><em>DELTA IMS User Guide</em>, “Creating and Editing DELTA Lists” on page 79</td>
</tr>
<tr>
<td>IMS Operator Commands</td>
<td><em>DELTA IMS VIRTUAL TERMINAL User Guide</em></td>
</tr>
<tr>
<td>Problem Diagnosis</td>
<td><em>DELTA IMS User Guide</em>, “Administration” on page 27</td>
</tr>
</tbody>
</table>
Administration

This chapter describes how to secure and customize the functions provided with DELTA IMS.

Internal Security

As distributed, DELTA IMS access is unlimited. If you want to restrict DELTA IMS use, you must limit access through one of the following types of security:

- User Access Profiles (UPF)
- User ID list and RACF (or equivalent)
- System Authorization Facility (SAF)

Each of these types of security and the DELTA IMS features that they restrict are described in this section. This section also describes how to customize a DELTA List to restrict user access.

Dependent and Independent Functions

DELTA IMS allows users to perform various functions associated with the operation of DELTA IMS. These functions are generally grouped into two categories: IMSID dependent functions and IMSID independent functions.

IMSID dependent functions

Examples of IMSID dependent functions are IMSID options processing, DELTA List check/execute, IMS command interface, and storage display/ZAP.

The default access to IMSID dependent functions is restricted. A user will not be able to perform this type of function unless action is taken to grant the user authority.
You can secure IMSID dependent functions with either UPF or SAF.

**IMSID independent functions**

Examples of IMSID independent functions are global option processing, TSS table edit, and DELTA List edit.

Default access to IMSID independent functions is unrestricted. Any user will be able to perform this type of function unless action is taken to deny the user authority.

You can secure IMSID independent functions with RACF (or an equivalent security package), a hard-coded list of user IDs, or SAF.

**Determining Which Type of Security to Use**

If you use SAF to set security for DELTA IMS, no other method is allowed. If you do not use SAF, you may use a combination of UPF and user ID List, or UPF and RACF (or an equivalent security package).

**WARNING**

If your site is running ACF2 Version, and you elect not to install the SAF security interface that is available with DELTA IMS, you must add the following SAFDEF entry to your ACF2 parameters:

```plaintext
FUNCRET(4) FUNCRSN(0) ID(DELTA) MODE(IGNORE)
RACROUTE REQUEST=AUTH CLASS=DLA# RETCODE(4)
```

Failure to add this SAFDEF entry may cause you to receive the following error message when attempting to perform any DELTA IMS function:

**BMC 2146 UNAUTHORIZED TO ACCESS DELTA IMS**

Adding this SAFDEF entry will ensure that your existing DELTA IMS security (user profile, DLAXUID, or RACF/equivalent) will be used. If you decide to use the SAF security interface at a later time, you must delete this SAFDEF entry from your ACF2 parameters.

The following table lists the DELTA IMS functions and the types of security that can be used to restrict each function.

**Table 3: DELTA IMS Functions Restricted by a Security Facility**

<table>
<thead>
<tr>
<th>DELTA IMS Function</th>
<th>UPF</th>
<th>User ID list / RACF (Update)</th>
<th>User ID list / RACF (Control)</th>
<th>SAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convert Delta List to STAGE1</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
### DELTA IMS Function

<table>
<thead>
<tr>
<th>DELTA IMS Function</th>
<th>UPF c</th>
<th>User ID list / RACF (Update a)</th>
<th>User ID list / RACF (Control b)</th>
<th>SAF c</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU-ID Password Maintenance</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta List - Browse Member</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta List - Check</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta List - Delete Member</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta List - Edit/Create Member</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta List - Execute</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta Log Format</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta Log Generate</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta Log List</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta Log Purge</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta Log Recover</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Delta Log Status</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Global Options Browse</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Global Options Edit</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IMS Command Interface c</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IMSID CPU-ID Refresh</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IMSID Options Browse</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMSID Options Edit</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>IMSID Options Refresh</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Keyword Table Browse</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Keyword Table Edit</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Storage Display</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Storage Zap</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>User Profile Browse</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>User Profile Edit</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

**a** Update Level: Grants a user authority to create, delete, or replace a DELTA List using DELTA List Edit.

**b** Control Level: Grants a user authority to create, update, or replace DELTA IMS global options, user access profiles, and keyword tables. This level is the highest level of authority if you are using RACF (or equivalent) to restrict access. Unlike RACF, this level of authority does not override Update authority in a User ID list.

**c** UPF can only restrict an individual from entering commands. SAF can be used to restrict an individual from entering a specific command.
The following table lists the DELTA IMS VIRTUAL TERMINAL functions and the types of security that can be used to secure each function.

Table 4: DELTA IMS VIRTUAL TERMINAL Functions Restricted by a Security Facility

<table>
<thead>
<tr>
<th>DELTA IMS VIRTUAL TERMINAL Function</th>
<th>UPF c</th>
<th>User ID list / RACF (Update a)</th>
<th>User ID list / RACF (Control b)</th>
<th>SAF c</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS Data Set Backup</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Data Set Format</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Data Set Reorganize</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Data Set Status</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Browse</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Define</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Edit</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Load</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Refresh</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Remove</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Search/Modify</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Test</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSS Table Unload</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Profile Browse</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Profile Edit</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual Terminal Statistics</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a Update Level: Grants a user authority to create, delete, or replace a DELTA List using DELTA List Edit.

b Control Level: Grants a user authority to create, update, or replace DELTA IMS global options, user access profiles, and keyword tables. This is the highest level of authority if you are using RACF/ equivalent or a User ID list to restrict access.

c UPF can only restrict an individual from entering commands. SAF can be used to restrict an individual from entering a specific command.

RACF or Equivalent Security Packages

DELTA IMS issues RACF RACHECK or equivalent macro instructions before permitting a panel function that requires either Update or Control authority. The function is denied if the macro instruction fails for any reason. The macro instruction tests for the appropriate attribute for security class APPL and resource DELTAIMS.
The class and resource names are specified in the CSECT named DLAXRCN0 distributed in source form in DLASAMP. You can change the CSECT if necessary.

See Table 3 on page 28 and Table 4 on page 30 for a list of the functions related to Update and Control level access.

Use RACF commands to define a resource and permit users to access it. To implement RACF security, you must perform the following actions:

- Define the resource.
  You use the RACF RDEFINE command or an equivalent command to define DELTA IMS to class APPL. You can specify as many parameters as required using RDEFINE. The following is an example of the RDEFINE command:
  \[ RDEFINE APPL DELTAIMS UACC(READ) \]

- Define the level of access.
  Use the RACF PERMIT command or an equivalent command to grant Update or Control level to as many user IDs as you want authorized. The following is an example of the PERMIT command:
  \[ PERMIT DELTAIMS CLASS(APPL) ID(userid) ACCESS(UPDATE) \]

- Relink the DELTA IMS panel processor module.
  Use JCL similar to that provided in DLACNTL member DLA#RSCL to relink the DELTA IMS panel processor module and implement control through RACF or an equivalent security utility.

**User ID List**

DELTA IMS supports a hard-coded list of TSO user IDs that are assembled into a table that is link-edited with the DELTA IMS panel processor module. A default list provided with DELTA IMS simply allows everyone to do everything. The list is specified in member DLAXUID0 in DLASAMP.

User IDs specified in this list are assumed to be generic. That is, only the specified characters in the user ID are matched. An asterisk (*) specifies a wildcard character that is assumed to match when user IDs are checked against this list. The asterisk(s) can precede or be embedded in the user ID. An asterisk is assumed to follow the user ID.

Specify the most specific user IDs toward the beginning of the table because the first match, rather than the best match, will be used. The final user ID in the list may simply be an asterisk, to include all those not mentioned specifically. Use the
$DLAUID macro instruction to specify the user ID, Update authority, and Control authority. Code $DLAUID as follows:

$DLAUID userid,update-flag,control-flag

When setting up the user ID list, consider the following information:

- The user ID is the specific or generic TSO logon ID.
- The update flag can be Y or N, depending on whether the user has Update authority. The control flag can be Y or N, depending on whether the user has Control authority.
- Include as many $DLAUID lines as necessary in DLASAMP member DLAXUID0 to define user ID authority. Use JCL similar to that in DLACNTL member DLA#UIDL to assemble and relink the panel processor module to implement the new user ID list.

User Access Profiles

User access profiles define a TSO user’s level of authority to use DELTA IMS by IMSID. The same user may have different capabilities depending on the IMSID chosen. A user access profile must exist before any access to DELTA IMS IMSID-related features is granted.

A profile must be defined for a user even before options for the IMSID can be created. To simplify this requirement, DELTA IMS permits wildcard characters (*) to specify generic IMSIDs that allow one user access profile to access multiple IMSIDs.

To initialize the user profiles data set (UPDS) member, use the Add User Profile panel and create one valid user ID and IMSID combination.

See the installation guide for more information on creating DELTA IMS user access profiles.

SAF Security

The System Authorization Facility (SAF) security interface is an optional security interface which allows you to protect every function within DELTA IMS. SAF allows you to restrict any TSS table-level function by the TSS table name. If used, SAF eliminates UPF and Update/Control authority established through RACF (or equivalent) or through DLAXUID and a user ID list. However, if you have created modified keyword tables for use by specific userids, (identified with a user profile),
the keyword table suffix must continue to be maintained via UPF. All other information in the profile will be ignored.

**To implement SAF security checking:**

1. Add a new SAF class.

   The SAF class is used to define the functions that are to be protected. The default name of this class is DLA#. However, if you want to change the name of this class, you may do so by editing member DLAXSAF1 of the DLASAMP library and making the necessary changes (as documented in the member) and then running job DLA#SAF1 from the DLACNTL library. The class name supplied in member DLAXSAF1 of the DLASAMP library will be the class name used for DELTA IMS SAF security checking.

2. Define the class in the RACF or equivalent class descriptor table (ICHERCDE macro). Specify the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXLNTH</td>
<td>100</td>
</tr>
<tr>
<td>FIRST</td>
<td>ANY</td>
</tr>
<tr>
<td>OTHER</td>
<td>ANY</td>
</tr>
</tbody>
</table>

3. Define the class in the RACF or equivalent router table (ICHRFRTB macro).

4. Determine which functions within DELTA IMS are to be restricted.

   To protect a specific function, the associated resource name must be defined within the DELTA IMS class. A user must have read access to a resource to have access to the function. If the user requesting the function does not have read access to the resource, the request will be rejected.

   Any function that is not protected (the associated resource name is not defined within the DELTA IMS class) can be accessed by any user requesting the function.

   For those functions that provide EDIT and BROWSE capability, if a user has EDIT authority, BROWSE authority is also assumed. For example, a user that has READ access to the TSS.EDIT resource also has BROWSE authority to TSS.

   The following table shows a list of DELTA IMS functions and associated SAF resource names that can be defined to protect that function.

   **Note**

   In this table, the variable $iii$ represents the IMSID, and $cmd$ represents the three-character IMS command abbreviation.
Table 5: SAF Resources for DELTA IMS Functions

<table>
<thead>
<tr>
<th>DELTA IMS Function</th>
<th>SAF Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Options Browse</td>
<td>GLOBAL.BROWSE</td>
</tr>
<tr>
<td>Global Options Edit</td>
<td>GLOBAL.EDIT</td>
</tr>
<tr>
<td>User Profile Browse</td>
<td>UPF.BROWSE</td>
</tr>
<tr>
<td>User Profile Edit</td>
<td>UPF.EDIT</td>
</tr>
<tr>
<td>Keyword Table Browse</td>
<td>KWT.BROWSE</td>
</tr>
<tr>
<td>Keyword Table Edit</td>
<td>KWT.EDIT</td>
</tr>
<tr>
<td>CPU-ID Password Maintenance</td>
<td>PASSWORD.EDIT</td>
</tr>
<tr>
<td>Convert Delta List to STAGE1</td>
<td>DLALIST.CONVERT</td>
</tr>
<tr>
<td>Delta List - Delete Member</td>
<td>DLALIST.DELETE</td>
</tr>
<tr>
<td>Delta List - Edit/Create Member</td>
<td>DLALIST.EDIT</td>
</tr>
<tr>
<td>Delta List - Browse Member</td>
<td>DLALIST.BROWSE</td>
</tr>
<tr>
<td>IMSID Options Browse</td>
<td>iii.IMSID.BROWSE</td>
</tr>
<tr>
<td>IMSID Options Edit</td>
<td>iii.IMSID.EDIT</td>
</tr>
<tr>
<td>IMSID Options Refresh</td>
<td>iii.IMSID.REFRESH</td>
</tr>
<tr>
<td>IMSID CPU-ID Refresh</td>
<td>iii.PASSWORD.REFRESH</td>
</tr>
<tr>
<td>IMS Command Interface</td>
<td>iii.IMSCMD.cmd</td>
</tr>
<tr>
<td>Delta Log Generate</td>
<td>iii.DLALOG.GENERATE</td>
</tr>
<tr>
<td>Storage Display</td>
<td>iii.STORAGE.DISPLAY</td>
</tr>
<tr>
<td>Storage Zap</td>
<td>iii.STORAGE.ZAP</td>
</tr>
<tr>
<td>Delta Log List</td>
<td>iii.DLALOG.LIST</td>
</tr>
<tr>
<td>Delta Log Status</td>
<td>iii.DLALOG.STATUS</td>
</tr>
<tr>
<td>Delta Log Purge</td>
<td>iii.DLALOG.PURGE</td>
</tr>
<tr>
<td>Delta Log Recover</td>
<td>iii.DLALOG.RECOVER</td>
</tr>
<tr>
<td>Delta Log Format</td>
<td>iii.DLALOG.FORMAT</td>
</tr>
<tr>
<td>Delta List - Check</td>
<td>iii.DLALIST.CHECK</td>
</tr>
<tr>
<td>Delta List - Execute</td>
<td>iii.DLALIST.EXECUTE</td>
</tr>
</tbody>
</table>

The following table shows a list of DELTA IMS VIRTUAL TERMINAL functions and associated SAF resource names that can be defined to protect each function.
**Note**

In this table, the variable \( iii \) represents the IMSID, \( cmd \) represents the three-character IMS command abbreviation, and \( tablename \) represents resource names qualified by a table name or masking pattern. For example, TSS.BROWSE.LOGNOD.

Table 6: SAF Resources for DELTA IMS VIRTUAL TERMINAL Functions

<table>
<thead>
<tr>
<th>DELTA IMS VIRTUAL TERMINAL Function</th>
<th>SAF Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS Table Browse</td>
<td>TSS.BROWSE.tablename</td>
</tr>
<tr>
<td>TSS Table Edit</td>
<td>TSS.EDIT.tablename</td>
</tr>
<tr>
<td>TSS Table Test</td>
<td>TSS.BROWSE.tablename</td>
</tr>
<tr>
<td>TSS Table Search/Modify</td>
<td>TSS.EDIT.tablename</td>
</tr>
<tr>
<td>TSS Table Define</td>
<td>TSS.DEFINE.tablename</td>
</tr>
<tr>
<td>TSS Table Remove</td>
<td>TSS.REMOVE.tablename</td>
</tr>
<tr>
<td>TSS Table Load</td>
<td>TSS.LOAD.tablename</td>
</tr>
<tr>
<td>TSS Table Unload</td>
<td>TSS.UNLOAD.tablename</td>
</tr>
<tr>
<td>TSS Data Set Format</td>
<td>TSS.FORMAT</td>
</tr>
<tr>
<td>TSS Data Set Backup</td>
<td>TSS.BACKUP</td>
</tr>
<tr>
<td>TSS Data Set Reorganize</td>
<td>TSS.REORG</td>
</tr>
<tr>
<td>TSS Data Set Status</td>
<td>TSS.STATUS</td>
</tr>
<tr>
<td>TSS Table Refresh</td>
<td>( iii ).TSS.REFRESH</td>
</tr>
<tr>
<td>Virtual Terminal Stats</td>
<td>( iii ).VTSTATS</td>
</tr>
</tbody>
</table>

5 Define the ACTIVATE resource within the class.

The ACTIVATE resource must be defined before the SAF security interface will activate. This feature provides a method to quickly activate and deactivate the interface. Users must have READ access to the ACTIVATE resource to access the DELTA IMS primary option menu. The ACTIVATE resource should not be defined until all other resources have been defined.

Securing DELTA List Edit Options through Keyword Tables

DELTA IMS VIRTUAL TERMINAL keyword tables allow you to customize or limit the options displayed in DELTA list edit. Because keyword tables can be associated with user access profiles, you can apply these customizations to some or all DELTA
IMS users and create different customizations for different users or groups of users. For example, users in a network group may be restricted to inserting only terminals and LTERMs in a DELTA List; application programmers may be limited to modifying or inserting databases, programs, transactions, and route codes; system programmers may remain unrestricted.

Keyword tables allow you to perform the following tasks:

- Establish default values for DELTA List elements.
- Restrict the parameters and values available for DELTA List elements.
- Refine DELTA List-related displays and reports.

For more information on creating and editing DELTA Lists, refer to “Creating and Editing DELTA Lists” on page 79.

DELTA List customization options are stored in keyword tables, which are specially-named members of the DLALIB data set. The following table shows the keyword tables that are supplied with DELTA IMS.

<table>
<thead>
<tr>
<th>Table 7: Keyword Table Names for DELTA IMS Tiers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Tier</strong></td>
</tr>
<tr>
<td>DELTA IMS DC, DELTA IMS DB/DC, and DELTA IMS VIRTUAL TERMINAL</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>DELTA IMS for DBCTL</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The default keyword tables provided with DELTA IMS cannot be modified. However, you can create as many customized versions of the appropriate keyword tables as are necessary. These customized tables use the base table name followed by a unique two character suffix of your choice. Users with Control level authorization may modify these customized keyword tables at any time. If you customize your own keyword table, you must exit and reenter DELTA IMS to invoke the new version.

If DELTA IMS maintenance includes a new version of one or more keyword tables, the new version is automatically included in your customized keyword tables. When the DELTA IMS online interface is invoked after a maintenance installation, default keyword tables are merged into customized keyword tables to ensure that updates are available to all users.
How Customized Keyword Tables are Implemented

Once customized keyword tables have been created, you can assign keyword table suffixes to specific user access profiles. The Add or Update User Access Profile panels allow you to assign keyword tables to individuals or, using generic user IDs, to groups of users, ensuring that the changes to DELTA List Edit will be available as needed. Refer to the installation guide for more information about user access profiles.

The following table shows the processing that will occur if DELTA IMS is unable to locate a required keyword table.

Table 8: DELTA IMS Processing for Missing Keyword Tables

<table>
<thead>
<tr>
<th>If...</th>
<th>Then DELTA IMS will...</th>
</tr>
</thead>
<tbody>
<tr>
<td>the default keyword table for the selected tier view is</td>
<td>load the other default keyword table.</td>
</tr>
<tr>
<td>missing</td>
<td></td>
</tr>
<tr>
<td>both default keyword tables are missing</td>
<td>load an internal copy of the appropriate default keyword table.</td>
</tr>
<tr>
<td>a customized keyword table for a selected tier view</td>
<td>load a customized keyword table for the other tier view, if one with the same suffix is available. -Or- load the default keyword table for the selected tier view.</td>
</tr>
<tr>
<td>is missing</td>
<td></td>
</tr>
</tbody>
</table>

Selecting a Keyword Table to Modify

DELTA List Edit customization is accomplished through four levels of panels provided under option 5 of the Customization panel. The first panel, the Keyword Table Edit panel, as shown in the following figure, identifies the input keyword table and the load library where it resides. The second, third, and fourth panels customize the DELTA List keyword tables in increasing detail. The second panel displays the DELTA List elements. From each DELTA List element, you can select each attribute and display the values for each attribute.

Figure 10: Keyword Table Edit Panel

<table>
<thead>
<tr>
<th>KY Command ===&gt; DELTA IMS DB/DC - Keyword Table Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>This function creates or replaces a customized DELTA IMS keyword table load-module. The default keyword table name is DLAKWT. Customized table names begin with DLAKWT and have a two-character suffix. Type the two-character suffix of an existing table to be copied or changed. Then press Enter.</td>
</tr>
<tr>
<td>Keyword table name . . . DLAKWT Leave blank to create a new table (the default table will be copied)</td>
</tr>
<tr>
<td>DELTA IMS options library BMCNODE.DLALIB</td>
</tr>
</tbody>
</table>
The following field is available on this panel:

**Keyword table name**

Type a suffix to be appended to DLAKWT which identifies the keyword table. To designate the default keyword table, leave this field blank.

**Selecting a DELTA List Element**

The DELTA List Elements panel, as shown in the following figure, is displayed after a keyword table name has been chosen on the Keyword Table Edit panel. From this panel you can exclude or include elements, change keywords and titles, and select customization of an element’s attributes.

Changes made on the DELTA List Elements panel will be reflected in the element attribute panel. You can include or exclude elements and you can change keywords and titles, if necessary.

*Note*

Customized keyword tables have no effect on existing DELTA Lists. For example, excluded elements are not excluded from existing DELTA Lists in which they are already present. However, insertions to existing DELTA Lists and creations of new DELTA Lists are limited to those elements included in the DELTA List Elements panel.

**Figure 11: DELTA List Elements Panel**

<table>
<thead>
<tr>
<th>KE Command</th>
<th>DELTA IMS DB/DC - DELTA List Elements</th>
<th>Scroll ====&gt; PAGE</th>
</tr>
</thead>
</table>

Keyword table name . . . DLAKWT
The Keyword and Title fields below may be updated, as long as their combined length does not exceed 41 characters.
Type one or more action codes. Then press Enter.
A = Select from attributes  X = eXclude element  I = include element

<table>
<thead>
<tr>
<th>A</th>
<th>c</th>
<th>Keyword</th>
<th>DSECT</th>
<th>DLSID</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>_ DATABASE</td>
<td>DMBREC</td>
<td>X'01'</td>
<td>Define data base directory entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ APPLCTN</td>
<td>APLREC</td>
<td>X'02'</td>
<td>Define program directory entry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ TRANSACT</td>
<td>TRNREC</td>
<td>X'03'</td>
<td>Define transaction code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ TERMINAL</td>
<td>NODREC</td>
<td>X'04'</td>
<td>Define VTAM terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ LTERM</td>
<td>LTEREC</td>
<td>X'05'</td>
<td>Define logical terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ RELOAD</td>
<td>RELREC</td>
<td>X'06'</td>
<td>Reinitialize PDIR/DDIR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ EXECUTE</td>
<td>CMOREC</td>
<td>X'07'</td>
<td>Execute IMS operator command</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ RTCODE</td>
<td>RCTREC</td>
<td>X'0A'</td>
<td>Define Fast Path route code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ COMMENT</td>
<td>CMTREC</td>
<td>X'0E'</td>
<td>DELTA List comment line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_ SUBPOOL</td>
<td>SPLREC</td>
<td>X'0F'</td>
<td>Define VTAM LU 6.1 subpool</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note*

DATABASE, RELOAD, EXECUTE, and COMMENT are elements appropriate to both IMS control and DBCTL regions.

The following fields are available on this panel:
Keyword table name

You can overtype the two-character suffix to specify the output keyword table. When you save the table, it is saved under the new name. The original table is not changed.

Act

Type one or more of the following action codes in the field next to a keyword element, and press Enter:

- **S** – Display the attribute list for that DELTA List element.
- **X** – Indicate that the element is not available for inserting.
- **I** – Indicate elements previously excluded can be included.

Keyword

Whenever possible, keywords supplied with DELTA IMS are the same as IMS keywords used for system definition macro instructions. Titles provide an expanded explanation of the keyword. These can be changed by overtyping. You must type entries in the **Keyword** field in all uppercase, but you can use upper and lowercase in the **Title** field. The combined length of the keyword and title cannot exceed 41 characters.

DSECT and DLSID

The **DSECT** and **DLSID** fields in the display are for information purposes only. The DSECT referred to is generated by the $DLAMAP macro instruction for the corresponding element type. The DLSID is the internal code used by DELTA IMS to identify this element type when it is used in a DELTA List. You cannot modify these fields.

Title

An explanation of the field appearing on the DELTA List Edit panel.

With ISPF Version 2.3 or later, double-byte character set (DBCS) capable terminals (such as the IBM 5550) may edit the **Title** field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

### Modifying and Securing Element Attributes

The following example illustrates how to modify and secure element attributes:

If the keyword DATABASE is selected from the DELTA List Elements panel, the DATABASE Attributes panel is be displayed. From this panel, you can include or exclude, reorder (reordering should not be combined with other commands), and
change keywords and titles of any element attributes displayed by DELTA List Edit for this element type. You can also select element attribute values from this panel.

**Note**

Customized keyword tables have no effect on existing DELTA List attributes that have been changed; however, excluded attributes are not available for modification during the next DELTA List Edit session.

**Figure 12: DELTA List Attributes Panel (DATABASE Element)**

<table>
<thead>
<tr>
<th>KA</th>
<th>DELTA IMS DB/DC - DATABASE Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword table name</td>
<td>DLAKWT MC</td>
</tr>
<tr>
<td>The Keyword and Title fields below may be updated, as long as their combined length does not exceed 41 characters.</td>
<td></td>
</tr>
<tr>
<td>Type one or more action codes. Then press Enter.</td>
<td></td>
</tr>
<tr>
<td>S=Select from values</td>
<td>X=xExclude attribute</td>
</tr>
<tr>
<td>M=Move</td>
<td>A=Destination for move</td>
</tr>
<tr>
<td>Row 01 of 07</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Act</th>
<th>Keyword</th>
<th>Label</th>
<th>Length</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBD</td>
<td>DBMDBD</td>
<td>8</td>
<td>Name of DBD</td>
<td></td>
</tr>
<tr>
<td>RENAME</td>
<td>DMBMASK</td>
<td>8</td>
<td>New name</td>
<td></td>
</tr>
<tr>
<td>RESIDENT</td>
<td>DBFGCL</td>
<td>BIT(0)</td>
<td>DBD always in main storage?</td>
<td></td>
</tr>
<tr>
<td>ACCESS</td>
<td>DMBACC</td>
<td>1</td>
<td>Access is EX, RO, RD, or UP</td>
<td></td>
</tr>
</tbody>
</table>

The following fields are available on this panel:

**Keyword table name**

You can overtype the two-character suffix to specify the output keyword table. When you save the table, it is saved under the new name. The original table is not changed.

**Act**

Type one or more of the following action codes in the field next to a keyword element attribute, and press **Enter**:

- **S** – Display the value list for that DELTA List element.
- **I** – Indicate that attributes previously excluded can be included.
- **X** – Indicate that the attribute is not displayed and cannot be changed when the DELTA List is edited.
- **M** – Select an attributes to be moved (must be used with **A**).
- **A** – Mark a position in the attribute list after which another attribute (marked with an **M**) is moved.

**Note**

Excluding an attribute does not internally disable the attribute, but prevents the user from changing it. When an attribute is excluded, its value is either a default or the value copied from the IMS control region.
Keyword

Whenever possible, keywords supplied with DELTA IMS are the same as IMS keywords used for system definition macro instructions. Titles provide an expanded explanation of the keyword. These titles can be changed by overtyping. Entries in the **Keyword** field are converted to all uppercase, but you can use uppercase and lowercase in the **Title** field. The combined length of the keyword and title cannot exceed 41 characters.

Label

The name of the keyword element attribute in the DSECT is displayed for information only and cannot be changed.

Length

The length of the keyword element attribute is displayed for information only and cannot be changed. Some fields are only one bit long. For these one-bit fields, the bit number is shown in the designated flag byte.

Title

The title is an explanation of the field appearing on the DELTA List Edit panel.

With ISPF Version 2.3 or later, DBCS-capable terminals (such as the IBM 5550) may edit the **Title** field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

Modifying and Securing Keyword Values

The following example illustrates how to change and secure attributes for keywords available with a DELTA List element:

If the keyword ACCESS is selected on the DATABASE Attributes panel, the ACCESS Values panel (shown below) is displayed. Use this panel to exclude or include keywords and to tailor keywords, default values, and numeric values to the standards of your site. In this example, EX is defined as the default, and the UP value has been excluded.

![Figure 13: DELTA List Values Panel (for ACCESS Keyword)](image-url)
The following fields are available on this panel:

**Keyword table name**

Specify the two-character suffix that will be appended to the keyword table name when it is saved. The original table will not be changed.

**Act**

Type one or more of the following action codes in the field next to an attribute value and press **Enter**:

- **S** or **D** – Indicates the value to be the default for this attribute.
- **X** – Indicates that the value can not be edited.
- **I** – Indicates that elements previously excluded can be included.

---

**Note**

Customized keyword tables have no effect on existing DELTA List attribute values that have been changed. Excluded values are not available during the next DELTA List Edit session.

**Keyword/Value**

Values that may be selected for this attribute.

**Type**

Shows which of three data types is allowed for this attribute. The three types are **KEYWORD**, **STRING**, and **NUMERIC** data. This field is informational only and cannot be changed. Each type has different rules which are explained in the following table:
Table 9: Panel Character Values

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword</td>
<td>The value for a keyword attribute must be one of the keywords listed. Keywords are associated with an internal code. You can change the supplied keywords by typing over the old value. This action does not affect the internal code. There is a 13-character limit on keyword length and imbedded blanks are not permitted. Note that some may have aliases or synonyms which have the same internal code. Default: One of the listed keywords must be designated as the default. This value is used when you insert a new DELTA List element. You can change the default by typing D in the Act field next to the keyword you want to make the default. Exclude: You can exclude a keyword by typing X in the Act field. An excluded keyword will not be accepted during DELTA List editing. However, keywords already present in the DELTA List are not excluded by this action. If you exclude the default keyword, it is used when new DELTA List elements are inserted but not accepted during editing of existing elements. Include: You can include excluded keywords by typing I over the X in the Act field. Blanking out the X has no effect.</td>
</tr>
<tr>
<td>String</td>
<td>String values, used for element names and masks, contain plain text of various lengths. The keyword values panel will list one item, which cannot be excluded. Default: You can type a default string value in the Keyword/Value field. This default string is used to prime the field when you insert a new element in the DELTA List.</td>
</tr>
<tr>
<td>Numeric</td>
<td>The keyword values panel for numeric values lists three items: Default, Minimum, and Maximum. When editing a DELTA List with this keyword table, users are restricted to entering values within the minimum/maximum range shown. You can change any of these by typing over the displayed value. There are also implicit and undisplayed IMS minimum and maximum values that depend on the particular attribute. Default: This value must be within the minimum and maximum range specified by the other values. It is used to prime the field when a new element is inserted in the DELTA List. Minimum: This value sets the lower limit on a numeric range. It cannot violate the IMS limit, nor should it be greater than the default or the maximum shown. Maximum: This value sets the higher limit on a numeric range. It cannot violate the IMS limit, nor should it be less than the default shown.</td>
</tr>
</tbody>
</table>

Internal Code

The way keyword data is stored internally in a DELTA List. It is also used in the keyword table for numeric data to indicate default, minimum, and maximum values. These codes are informational only and may not be modified.
Saving Keyword Table Updates

The Confirm Keyword Table panel, as shown in the following figure, is displayed after changes are made to the DELTA IMS keyword table.

This panel lets you select an option to confirm, return to previous panel without saving, or cancel the changes.

**Figure 14: Confirm Keyword Table Panel**

```
KY               DELTA IMS DB/DC - Confirm Keyword Table
Command ===> ___________________________________________________________
Select one of the following. Then press Enter.
   1. Save changes to table DLAKWT__
   2. Return to previous panel without saving changes
   3. Exit without saving changes (CANCEL)

If 1 is selected, the keyword table will be saved to:
   DELTA IMS options library BM CNODE.DLALIB

Note: You may change the keyword table suffix to create a new table or replace an existing table.

The END command has no effect on this panel.
```

The following field is available on this panel:

**Select one of the following. Then press Enter.**

- Select one of the following:
  - **1 – Save changes to table** *tablename*
    
    You can change the name of the output keyword table by typing over the two character keyword table name suffix (*cc*). The table is saved with the new suffix. The original table is not changed. The suffix is a required field on this panel. You cannot change the default keyword table.
  
  - **2 – Return to previous panel without saving changes**

  - **3 – Exit without saving changes (CANCEL)**

---

**IMS Command Security for DELTA List EXECUTE Elements**

You can customize user access profiles for individual users or groups of users to restrict the IMS commands they can use with the DELTA list execute element. DBCTL commands are a subset of the standard IMS commands.
To limit the IMS commands that can be executed through a DELTA List, select option 4 on the Customization panel. The User Profile Sort Panel is displayed. After selecting the sort sequence and pressing Enter, the Update User Access Profiles panel is displayed and from this panel you select user IDs to update their command authority. The IMS Commands List panel, shown in the following figure, is displayed for each user ID you select.

**Figure 15: IMS Commands List Panel**

```
UZ DELTA IMS DB/DC- IMS Commands List
Command ===> ________________________________________________ Scroll ===> PAGE
Userid . . . : USERA IMSID . . . : IMSA
Number of columns to display . . . . . . 4 (1,2,3,4)
```

Select (type a '/') one or more of the following to allow that command, or use the ALL or NONE commands to allow or prohibit all commands. Then use the END command to exit.

```
IMS-CMD  IMS-CMD  IMS-CMD  IMS-CMD
-------  -------  -------  -------
_ /ACTIVATE /DISPLAY /PSTOP /SMCOPY
_ /ALLOCATE /END /PURGE /SSR
_ /ASSIGN /EXCLUSIVE /QUIESCE /START
_ /BROADCAST /EXIT /RDISPLAY /STOP
_ /CHANGE /FORMAT /RMCHANGE /SWITCH
_ /CHECKPOINT /IDLE /RMDELETE /TEST
_ /CLSDST /LOCK /RGENJCL /TRACE
_ /COMPT /LOG /RMINIT /UNLOCK
_ /CDBUMP /LOOPTEST /RMLIST /Z01USER
_ /DBRECOVERY /MONITOR /RMNOTIFY /Z02USER
_ /DELETE /MSASSIGN /RSTART
_ /DEQUEUE /OPDST /SECURE
```

**Note**

This panel does not limit the IMS commands that can be issued from the DELTA IMS Execute IMS Command panel. Refer to “Executing IMS Operator Commands Online” on page 51 for information on the Execute IMS Command panel.

The following fields are available on this panel:

**Userid**

The user ID selected for display on the Update User Access Profiles panel.

**IMSID**

The IMSID shown here is associated with options for the user access profile being defined. To access several IMSIDs with one user access profile, use a wildcard character (*) to specify generic IMSIDs. Each asterisk can represent one character. For example, if your site has four IMSIDs named IDA, IDB, IDC, and IDEX, the generic IMSID ID* would match IDA, IDB, and IDC, but would not match IDEX. To specify a generic IMSID to match all IMSIDs, type ****.
Number of columns to display

The number of IMS-CMD columns you selected to be displayed on this panel. The maximum is four which is the default.

IMS-CMD

A / next to the IMS commands shows those authorized for the user ID.

BMCLINK

BMCLINK is an inter-region control facility provided with DELTA IMS that allows DELTA IMS users to communicate with an IMS control region.

Figure 16 on page 47 provides an overview of BMCLINK communication.

The BMCLINK task must run on each CPU that has an IMS control region to be accessed by DELTA IMS. BMCLINK can be started and stopped asynchronously with IMS.

BMCLINK maintains an internal trace of all important activities. The trace is always active and can be printed on demand. It also appears in the SYSUDUMP. The minimum size of the trace table is 16 K, but this may be expanded if necessary.

A VTAM ACB is required for the DELTA IMS TSO session to communicate with BMCLINK. Parameter data specifies the ACBNAME used. It opens the VTAM ACB and permits logons. BMCLINK then waits for input from a DELTA IMS TSO user. When input is received, the PLU notifies the main BMCLINK task of the input and waits for a response to be queued.

DELTA IMS uses information you specify in the IMSID options to allocate RESLIB, prepare parameter data for the IMS region controller, and attach the DELTA IMS BMP.

The BMP determines the type of request. A user authorization exit is available from the BMP task that may inspect, alter, and reject any DELTA IMS update to an IMS control region. If an exit routine has been written and link-edited into the DLALIB data set, the load module name is specified in the IMSID basic options. If required, the user authorization exit is invoked. The exit may approve, alter, or reject the request, and the BMP acts accordingly.

BMCLINK requires a work area for moving data into and out of the IMS control region. The largest IMS command issued from a DELTA IMS TSO session must fit in this area. The area used is the IMS PSB index work area. Specify the size of this area using the PSB IOASIZE parameter. If you want to use the same BMCLINK for both DELTA IMS and EXTENDED TERMINAL ASSIST (version 2.2.01 and earlier), the
IOASIZE value must be at least 1024 bytes; otherwise, the value must be at least 512 bytes. The value you specify must be the same as the corresponding value specified in the DELTA IMS global customization options.

The result of processing is tested and before and after records are written. These records are then read during IMS restart. These records can also be used for reporting.

A response that indicates success or failure of the action is generated and sent to the TSO session.

A BMCLINK BMP subtask is considered inactive when a period of time elapses since the receipt of the last transaction from any DELTA IMS TSO session. A DELTA IMS global option specifies the time, in seconds, after which the inactive BMP subtask should be terminated. This frees the IMS PST, but does not prevent another BMP subtask from being created later, if needed.

**Figure 16: DELTA IMS VTAM Communication**
Start a VTAM BMCLINK

After installation and customization are complete, DELTA IMS is ready for use. At this point, activate BMCLINK on the IMS CPU. Sample JCL for this job is distributed in the DLACNTL library member DLA#LINK.

BMCLINK can be started before or after the IMS control regions are started. Both BMCLINK and the IMS control region must be active before any DELTA IMS user session may access the IMS system.

Successful initialization of BMCLINK produces the following messages. Other messages are generated if there are any problems in activating BMCLINK.

BMC1693 *BMCLINK* ACTIVE (STC=BMCLINK)

BMC1696 *BMCLINK* VTAM INTERFACE ACTIVE

The reply associated with message BMC1693 can be used to communicate with BMCLINK. It is also possible to communicate with BMCLINK with the MVS /MODIFY command. If desired, BMCLINK eliminates the outstanding message by replying nn DEL. If the reply has been deleted, you must use the /MODIFY command for further communications with BMCLINK.

BMCLINK honors a special HELP command. Enter this command in response to the BMCLINK outstanding reply; it produces a display listing of all the commands available to the JES operator.

Terminate a VTAM BMCLINK

You can terminate BMCLINK in three ways:

- Enter the MVS STOP command.
- Reply nn END or nn STOP to the outstanding reply.
- Reply END or STOP via the MVS MODIFY command (an alternative to STOP is DUMP, which produces SYSUDUMP) to the BMCLINK task (for example, F BMCLINK,STOP).

Upon receipt of a shutdown request, BMCLINK internally issues a request to terminate the BMCLINK BMP.
Note

BMC Software recommends that you stop BMCLINK before shutting down IMS. If you attempt to execute a DELTA List after issuing a /CHKPT FREEZE or DUMPQ, an abend U168 will occur if the DELTA Log does not get updated in time. Stopping BMCLINK before shutting down IMS will prevent any last-minute execution of DELTA IMS.

An additional reason to stop BMCLINK before shutting down IMS is that cross memory connections created under the BMCLINK task will not be cleaned up until the BMCLINK task is terminated.

BMCLINK Non-VTAM Communications

Non-VTAM communications is available for all DELTA IMS tiers *except* DELTA IMS for DBCTL. VTAM communication is required for DELTA IMS for DBCTL. The following figure provides an overview of non-VTAM communication.

When VTAM is not used in at a site or when it is inconvenient to use BMCLINK, you can specify a non-VTAM BMCLINK. The non-VTAM BMCLINK is implied for online TSO sessions by specifying the BMCLINK task network LU-name of **TSOBMP in the IMSID basic options. A local batch job can also imply the use of a non-VTAM BMCLINK by specifying **BATCH as the parm to the standard BMCLINK JCL.

Once an IMSID has been defined to use a VTAM or non-VTAM BMCLINK, you can change it by specifying a new LU-name. Your site can contain a mixture of VTAM and non-VTAM BMCLINKs.

Figure 17: DELTA IMS VIRTUAL TERMINAL Non-VTAM Communication

The non-VTAM BMCLINK uses the same modules as the standard VTAM BMCLINK attached as a subtask of the DELTA IMS VIRTUAL TERMINAL TSO user...
session or attached as a subtask of the local batch job step program. The user session or batch job communicates with the non-VTAM BMCLINK via ECBs using WAIT and POST macro instructions instead of VTAM macro instructions.

Consider the following requirements when using a non-VTAM BMCLINK:

- The IMS control region must be active on the same CPU as the DELTA IMS VIRTUAL TERMINAL TSO user session or local batch job.
- Only a single DELTA IMS VIRTUAL TERMINAL TSO user session or local batch job can access a given IMS control region at a time.
- WTO (write to operator) messages are suppressed since error conditions only affect one user.

**BMCLINK and XRF**

DELTA IMS VIRTUAL TERMINAL supports XRF environments. Changes made to the XRF primary system are recorded in the DELTA IMS VIRTUAL TERMINAL log data sets. The DELTA logs must be shared by both the primary and alternate systems so that the alternate system can track the DELTA IMS VIRTUAL TERMINAL log data sets. Changes made to the primary system are tracked and applied to the alternate system on an ongoing basis. When a takeover is completed, the only remaining action is to move BMCLINK to the CPU where the active system resides. If BMCLINK resides on the same CPU, no action is required.

**XRF Implementation**

Perform the following steps to implement DELTA IMS VIRTUAL TERMINAL in an XRF environment:

1. Create an IMSID options module for the primary (active) system. In addition to all other values, specify

   - XRF alternate IMSID
   - XRF alternate IMS APF-authorized library
**Note**
The IMS sysgen dates (DB and DC sysgen dates) must be the same date for the XRF primary IMSID and the XRF alternate IMSID. If the sysgen dates on the primary and alternate IMSIDs are not equal, the alternate IMSID abends with code U168 during IMS restart if a DELTA List has been previously executed on the primary IMSID.

2 Save the options module. When you save the primary options module to the DELTA IMS VIRTUAL TERMINAL options library, the alternate options module is automatically created and saved to the alternate IMS APF-authorized library using the XRF alternate IMSID specified in Step 1 on page 50.

**Using XRF**

After a failure on the active XRF session, move BMCLINK to the CPU where the XRF backup session has successfully performed a takeover. This procedure requires that the DELTA Logs and load libraries referenced by the XRF control regions and BMCLINK reside on shared DASD.

**To use XRF**

1 Terminate BMCLINK on the failing CPU.

2 Deactivate BMCLINK VTAM APPL on the failing CPU.

3 Activate BMCLINK VTAM APPL on the CPU where the XRF backup session has just completed a takeover.

4 Start BMCLINK on the CPU with the current active XRF session.

**Where to go from here**

For non-VTAM BMCLINK communications, you must move the DELTA IMS VIRTUAL TERMINAL TSO user session or local batch job to the CPU where the XRF backup IMS is executing.

**Executing IMS Operator Commands Online**

This section describes the panels for the DELTA IMS VIRTUAL TERMINAL Execute IMS Command function. When you use this panel to issue commands against a standard IMS control region or a DBCTL region, any response from the command is displayed on this panel.
To execute an IMS operator command directly from DELTA IMS VIRTUAL TERMINAL, select option 4 from the DELTA IMS VIRTUAL TERMINAL Primary Menu. The Execute IMS Cmd panel, in the following figure, is displayed.

Figure 18: Execute IMS Cmd Panel

The following fields are available on this panel:

**IMSID**

Enter the IMSID to which the IMS operator command will be issued. The IMSID is required.

**IMS COMMAND**

When you access this panel, the last command issued from it displays in this field. Press Enter to issue the displayed command. If you need to issue the command for a second time, retype one character of the command before pressing Enter or the command will be ignored.

If you need to issue a different command, type the new command with any keywords necessary to specify the target element of the operator function (for example, VTAM node, database, program, or terminal). Keywords follow the guidelines and restrictions found in the IBM publication IMS/ESA Customization Guide: DC.

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**Diagnostic Tools**

The following tools and documentation techniques will assist you in problem determination and resolution:

- displaying DELTA IMS VIRTUAL TERMINAL resources
- displaying IMS Resource Manager (RM) resources
- DELTA IMS VIRTUAL TERMINAL Journal
- IMS storage display and ZAP
- documenting BMC supplied ZAPS
- IMS control region diagnostics
Displaying DELTA IMS Resources

DELTA IMS VIRTUAL TERMINAL has added the DLA keyword to the IMS /DISPLAY command for the purpose of displaying DELTA IMS VIRTUAL TERMINAL resource information. A syntax diagram is provided to illustrate the format of this keyword.

The following figure shows the /DISPLAY DLA command syntax.

Figure 19: /DISPLAY Command

You can use the following keyword and parameters with the /DISPLAY command to display DELTA IMS VIRTUAL TERMINAL resources:

DLA
  Provides a report on DELTA IMS VIRTUAL TERMINAL resources.

OPTIONS
  Provides a listing of the specified DELTA IMS VIRTUAL TERMINAL IMSID options.
RPSB

Provides a report that lists all remote PSBs that have been applied by DELTA IMS VIRTUAL TERMINAL. This option is not valid for a DBCTL region.

psbname

Specify a PSB name after the RPSB parameter to display a report that lists the specified PSB.

PST

Provides a display in hexadecimal format of the PST control block for the PST number nnn or message region jobName specified.

SCD

Provides a display of the system contents directory.

CLB name

Provides a display of the communications line block for the name specified.

CNT name

Provides a display of the communications name table for the name specified.

SPQB name

Provides a display of the subpool queue block for the name specified.

DNT name

Provides a display of the destination name table for the name specified.

VDNT name

Provides a display of the virtual terminal name table for the name specified.

CDE

Provides a display of a specific module that is loaded for an address space.

RM

Provides a display of command output of IMS Resource Manager (RM) resources.
DLI

Provides a display of storage in the DLI/SAS region.

Sample DISPLAY Command and Output of DLISAS Storage

Issue the following command to display storage in the DLI/SAS region:

```
/DIS DLA xxxx DLI
```

If you want to limit the number of lines displayed, you can issue the command with the following additional, optional parameter (yyy):

```
/DIS DLA xxxx DLI yyy
```

For the display storage command:

- `xxxx` is the storage address.
- `yyy` is an additional, optional parameter that limits the number of lines displayed. The maximum value is 999.

The DLI keyword switches the command to run under the DLI TCB.

The following sample command will display storage in DLI/SAS for the specified storage address:

```
/DIS DLA 0004D008 DLI
```

The following sample output should display:

```
DFS000I     DELTA IMS Display - 0004D008                                               D10P
DFS000I     0004D008  +0000  47F0D022 C04C6ED2 1C07C0D4 F00D0F0F  *90..DFS00DM.10*  D10P
DFS000I     0004D018  +0010  F16D0E01 F16D0E06 61F6F660 F11F34BF2  *10.11.06.06.13.7*  D10P
DFS000I     0004D028  +0020  F9090909 C00010C8 6F008008 41A01000  *9............*  D10P
DFS000I     0004D038  +0030  5800A104 1F750F00 A3091000 4202A710  *..M.Abu.Jt.....*  D10P
DFS000I     0004D048  +0040  C5E45B20 C814B330 136B58F0 5B30409E  *EU.....*  D10P
DFS000I     0004D058  +0050  D2F47D00 C6659F00 C86D47BD 53865F00  *...........*  D10P
DFS000I     0004D068  +0060  C8447D00 C76D187E 6D307010 45EC6666  *H...........*  D10P
DFS000I     0004D078  +0070  18F47D07 C7961B11 18221833 18551899  *............*  D10P
DFS000I     0004D088  +0080  5800A104 1F750F00 A3091000 4202A710  *..M.Abu.Jt.....*  D10P
DFS000I     0004D098  +0090  5800A104 1F750F00 A3091000 4202A710  *..M.Abu.Jt.....*  D10P
DFS000I     0004D0A8  +0100  C6659F00 18091700 70204700 10A08103  *............*  D10P
DFS000I     0004D0B8  +0110  C6659F00 18091700 70204700 10A08103  *............*  D10P
DFS000I     0004D0C8  +0120  C6659F00 18091700 70204700 10A08103  *............*  D10P
DFS000I     0004D0D8  +0130  C6659F00 18091700 70204700 10A08103  *............*  D10P
DFS000I     0004D0E8  +0140  C6659F00 18091700 70204700 10A08103  *............*  D10P
DFS000I     0004D0F8  +0150  C6659F00 18091700 70204700 10A08103  *............*  D10P
```

To display all CDE entries under DLI/SAS, specify the ALLCDE keyword along with the DLI keyword. For each CDE entry, the following items will be displayed:

- CDE name
- module EP
- module use count
module subpool

The following sample command will display all CDE entries under DLI/SAS:

/DIS DLA CDE ALLCDE DLI

The following sample output should display.

```
DFS000I     DELTA IMS Display - CDE(ALLCDE)                                          D10P
DFS000I     CDE format -> CONAME/CDENTPT/CDUSE/CDSP                                D10P
DFS000I     CSSQ2ECB/35C1D000/01/E7  DFSABND0/BF111000/01/FA                     D10P
DFS000I     DFSACB10/0007B000/01/FB  DFSAMEE1/39081AD8/01/E7                    D10P
DFS000I     DFSBFSP/P/3F3EA000/01/FB  DFSCEP00/B00AF1ED/01/E7                  D10P
DFS000I     DFSCESSW/K/00339C00/01/FA  DFSCEST00/BF17F000/01/FA                D10P
DFS000I     DFSDBA0U/00067000/01/FA  DFSDBH00/0001C000/01/FA                   D10P
DFS000I     DFSDCAP0/BF104000/01/FA  DFSDCFCO/B4997000/01/F1                   D10P
DFS000I     DFSDCFRO/B009008E/01/F1  DFSDDLEO/B0026000/01/FA                  D10P
DFS000I     DFSDEF0/F79F0180/01/E6  DFSDFLS0/0000C000/01/FA                   D10P
DFS000I     DFSDEHS0/0002E000/01/FA  DFSDFLDOO/00034000/01/FA                 D10P
DFS000I     DFSDLIRS/3F405000/01/FA  DFSDFLNOK/0AABB70/01/E7                 D10P
DFS000I     DFSDLIR0/0003F000/01/FA  DFSDFLWR/0002D128/01/FA                  D10P
DFS000I     DFSDLROO/0004E000/01/FA  DFSDFLWR0/0078D458/01/E7                 D10P
DFS000I     DFSDMAW0/F79A8800/01/E6  DFSDFMBRS/3F3FC000/01/FB                 D10P
```

The following sample command will display the entire CDE entry for an individual CDE:

/DIS DLA CDE DFSDMBRS DLI

The following sample output should display.

```
DFS000I     DELTA IMS Display - CDE(DFSDMBRS)                                          D10P
DFS000I     006E29A0  +0000  006BA010 00000000 C4C6E2C4 D4C2D9E2  *...........DFSDMBRS*  D10P
DFS000I     006E29B0  +0010  3F3FC000 006E29C0 000100FB 02220000  *................*  D10P
DFS000I     *11266/140110*  D10P
```

Displaying IMS Resource Manager (RM) Resources

The DELTA IMS VIRTUAL TERMINAL Display IMS Resource Manager feature provides command display output of IMS Resource Manager (RM) resources.
This output can be used to identify and diagnose RM-related issues. The following figure shows the /DISPLAY DLA RM command syntax.

**Figure 20: /DISPLAY DLA RM Command**

For each parameter (CPIC, DB, LTERM, MSNAME, NODE, PGM, PLEX, RMGBL, SNU, TRAN, USER, and USERID) that can be used with the /DIS DLA RM command in Figure 20 on page 57, the following considerations apply when executing the command:

- You can replace name with ALL, ALLRSC, or * to display all resources. Exception: When executing /DIS DLA RM SNU, use the ALLRSC parameter instead of ALL to display all SNU resources; using ALL generates an error and might cause unpredictable results.

- You can add the optional FORMAT parameter after name to format the RM output buffer. For example:

  /DIS DLA RM TRAN PART FORMAT

You can use the DELTA IMS Display Resource Manager feature to display the following IMS resources in RM:

- **CPIC name** – Displays the CPIC transaction that is defined in RM.

- **DB name** – Displays the database that is defined in RM.

- **LTERM name** – Displays the logical terminal that is defined in RM.

- **MSNAME name** – Displays the MSNAME that is defined in RM.
- **NODE name** – Displays the static node that is defined in RM.
- **TRAN name** – Displays the transaction that is defined in RM.
- **PGM name** – Displays the scheduled serial program that is defined in RM.
- **PLEX name** – Displays IMSplex information that is defined in RM.
- **RMGBL name** – Displays RM global plex information that is defined in RM.
- **SNU name** – Displays the static node user that is defined in RM.
- **USER name** – Displays the dynamic user that is defined in RM.
- **USERID name** – Displays the user ID that is defined in RM.

**Note**

When executing the /DIS DLA RM command, you can substitute ALL, ALLRSC, or * for the resource name to display all resource names. For example:

/DIS DLA RM MSNAME ALL

Exception: When executing /DIS DLA RM SNU, use the ALLRSC parameter instead of ALL to display all SNU resources; using ALL generates an error and might cause unpredictable results.

**Sample DISPLAY Command and Output of IMS RM**

The following sample command will display the named IMS transaction in RM:

/DIS DLA RM TRAN PART

The following sample output should display:

```
DELTA IMS Display RM - TRA PART
*2013353/141256*   D13R
```

The following sample command will display the named IMS node in RM FORMAT mode:

/DIS DLA RM NODE E4SLUP1 FORMAT

The following sample output should display:

```
DELTA IMS DISPLAY RM - NOD E4SLUP1
DATA1(DFSRMD1) at +2C: DATA2(DFSRMD2) at +60 if any  D13R
7F1C9980 +0000 00000060 00000000 05C5F4E2 D3E4D7F1 *............E4SLUP1*
7F1C9990 +0010 40404040 05000000 00000000 00000002 *................*
7F1C99A0 +0020 00800000 C4F1F3D9 40404040 00510000 *..D13R........*
7F1C99B0 +0030 89004040 00010000 C5F4E2D3 E4D7F140 *..E4SLUP1 *
```
The following sample command will display the named IMS user in RM:

/DIS DLA RM USER XYZ550

The following sample output should display:

DELTA IMS DISPLAY RM - USR XYZ550
XYZ550
*2013353/142920*   D13R

The following sample command will display all IMS static node users in RM:

/DIS DLA RM SNU ALLRSC

The following sample output should display:

Delta DISPLAY RM - SNU ALLRSC
E4$0528    FPMDL02    E4$0511    E4$0529
FPMDL03    FPMDL10    E4$0512    FPMDL04
E4$0513    E4$0520    FPMDL05    E4$0514
E4$0521    E4$0515    E4$0522    E4$0516
E4$0523    E4$0530    FPMDL08    FPMDL22
$3601001    E4$0517    E4$0524    FPMDL09
E4$0518    E4$0525    E4$0519    E4$0526
E4$0527    FPMDL01
*2013353/114225*   D13R

The following sample command will display the IMSplex in RM in FORMAT mode:

/DIS DLA RM PLEX D13R FORMAT

The following sample output should display:

DELTA IMS DISPLAY RM - PLEX D13R
DATA1(DFSRMD1) at +2C; DATA2(DFSRMD2) at +60 if any        D13R
7F1C99C0 +0040 00000000 00000000 00000000 00000000 *................*
7F1C99D0 +0050 00000000 00000000 00000000 00000000 *................*
*2013352/165436*   D13Q

DELTA IMS Journal

The DELTA IMS Journal is a diagnostic facility that you can use to analyze DELTA IMS problems. When activated, it produces a detailed trace of events and activities.
The facility consists of a load module, an output data set, and a Journal task. At strategic points in the DELTA IMS code, the $DLAJNL macro instruction notes events that should be written to the Journal. The macro may be issued anywhere within the IMS control region regardless of the TCB or ITASK, provided that DLAXMVTD can be addressed.

**Activate the Journal**

The Journal facility is disabled by default because it creates considerable overhead for the IMS control region. To activate the Journal, perform the following steps:

1. Manually copy load module DLAXJNL into your IMS STEPLIB.

2. Add a DLATRACE DD statement to your control region JCL, defining a Journal output data set with the DCB BLKSIZE attribute as a multiple of 80.

3. Restart IMS.

   **Note**

   If the load module and DD statement are present, the Journal task is attached under the IMS control task TCB for writing the output data set. The Journal task is halted during IMS shutdown. It cannot be started and stopped at will by operator action.

**Journal Entry Types**

Entries in the journal consist of one or more formatted print lines per event. Some events, such as hexadecimal dumps of control blocks, contain a variable number of lines, while others contain only one line. The first three bytes of each line, starting at position 2, indicate the line type.

The following table explains the DELTA IMS Journal’s line types and their definitions.

<table>
<thead>
<tr>
<th>Line Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Variable text data. $DLAJNL is used to output a string of useful information. The first three characters of text zzz relate to the CSECT (DLAXzzzX) that issued the $DLAJNL.</td>
</tr>
<tr>
<td>200</td>
<td>The current DB and DC SYSGEN dates. This line is issued during initialization and after /MODIFY COMMIT.</td>
</tr>
<tr>
<td>Line Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>300</td>
<td>A record read from the DELTA Log. This entry can contain any of the following (as appropriate to the type of region): the IMS SYSGEN date, action, type of element, element name, spare mask/new name, and possible old element name in parentheses. Immediately following this line, the DELTA Log record is dumped as the LGRDSECT and DLSREC data areas. Records that show the status of IMS elements before DELTA IMS update are not written to the Journal.</td>
</tr>
<tr>
<td>310</td>
<td>A DELTA IMS X'02' log record encountered during /ERE. This line contains the action, type of element, element name, and spare mask/new name. Immediately following this line, the ITXDSECT and DLSREC data areas are dumped.</td>
</tr>
<tr>
<td>320</td>
<td>A DELTA IMS update received from BMCLINK. This line contains the action, type of element, element name, and spare mask/new name. Immediately following this line, the ITXDSECT and DLSREC data areas are dumped.</td>
</tr>
<tr>
<td>400</td>
<td>A message indicating the success of processing an update; a record for the update itself is written to the Journal in a preceding 300, 310, or 320 entry. Usually, this entry is simply the word Applied followed by a dump of the IMS control block updated. If no control block follows, it is unlikely that an update actually took place.</td>
</tr>
<tr>
<td>410</td>
<td>A BMCxxxx message that resulted from processing the preceding 300, 310, or 320 entry. Usually, this entry is simply the word Failed followed by the BMC Software message number. However, in some cases an error may have occurred or an update may have been made. If an update was made, the potentially updated control block is dumped on the lines that immediately follow this message.</td>
</tr>
<tr>
<td>500</td>
<td>A data area in dump format. Either the area name (such as DSECT name) or the area address appears. The offset into the area is given on subsequent lines (line type 510). The dumped area is otherwise produced in standard hexadecimal and character format.</td>
</tr>
<tr>
<td>600</td>
<td>Certain DELTA IMS messages issued from the IMS control region.</td>
</tr>
</tbody>
</table>

** IMS Storage Display and ZAP **

You can use DELTA IMS VIRTUAL TERMINAL to display main storage in the IMS control region address space. Portions of main storage in the IMS control region address space display on the TSO screen in a dump format. The dump format shows in 16-byte increments the virtual storage address of the data, its offset relative to the beginning of the area, its hexadecimal representation, and an EBCDIC character display. Zaps are recorded in the DELTA Log but are never reapplied by DELTA IMS VIRTUAL TERMINAL during restarts.

To display storage, select option 3 from the Utilities panel. The IMS Storage Display panel shown in Figure 21 on page 62 is displayed, prompting you for specification of dump parameters.

Once you have supplied storage display parameters, DELTA IMS VIRTUAL TERMINAL attempts to obtain the requested storage from the IMS address space. A
message indicating that the request was transmitted to the IMS control region appears. After several seconds, the requested storage displays.

The entire block of storage is copied from the IMS address space to your address space, which may not necessarily be on the same CPU. The amount of storage obtained and displayed depends on whether DELTA IMS VIRTUAL TERMINAL can determine a length for the storage block. A length can be determined for known control blocks and modules if the address is not complex. If the address is explicit or complex, DELTA IMS VIRTUAL TERMINAL defaults the length to 256 bytes unless overridden by the length field on the panel. If the length of a module exceeds 10,000 bytes, DELTA IMS VIRTUAL TERMINAL returns only the first 10,000 bytes unless you type **9999** in the **Length** field. When you type **9999**, the entire module is returned regardless of its length, as shown in Figure 21 on page 62.

**WARNING**

Use this option with care because very large load modules (such as DFSVNUC0) can exceed the virtual storage available in the TSO user’s address space and cause an S80A abend of the DELTA IMS VIRTUAL TERMINAL session.

Once the storage is displayed, you can make modifications in either the hexadecimal or the EBCDIC character display fields. When the ZAP command is issued after these online modifications have been made, the IMS control region is updated.

Zapping storage can be dangerous on a production system. For this reason, the ability to zap storage is disabled by default; you can enable it for the authorized user when necessary. Refer to the installation guide for information on enabling the storage display and zap features and adding user access authorization for these features.

**Figure 21: IMS Storage Display Panel**

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - IMS Storage Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSID</td>
<td>EAW3</td>
</tr>
<tr>
<td>Dump Address</td>
<td>MOD(DLA#EAW3)</td>
</tr>
<tr>
<td>Length</td>
<td>9999</td>
</tr>
<tr>
<td>Comment</td>
<td>TEST</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line 0001 of 0036</th>
<th>Line 0001 of 0036</th>
<th>Line 0001 of 0036</th>
</tr>
</thead>
<tbody>
<tr>
<td>0...2... 4...6... B...A... C...E...</td>
<td>0...2... 4...6... B...A... C...E...</td>
<td>0...2... 4...6... B...A... C...E...</td>
</tr>
<tr>
<td>000090C0 0000</td>
<td>000090C0 0000</td>
<td>000090C0 0000</td>
</tr>
<tr>
<td>000090D0 0008</td>
<td>C9D4E2E5 E24B09F3 F1044BD9 C5E2D3C9</td>
<td>* IMSVS.R31M.RESLI *</td>
</tr>
<tr>
<td>000090E0 0018</td>
<td>C2404040 40404040 40404040 40404040</td>
<td>* B *</td>
</tr>
<tr>
<td>000090F0 0028</td>
<td>40404040 40404040 40404040 40404040</td>
<td>* DELT *</td>
</tr>
<tr>
<td>00009100 0038</td>
<td>C1C9D4E2 C4C5D3E3 C1C9D4E2 C1C7D3C4</td>
<td>* AIMSDELTAIMSAGND *</td>
</tr>
<tr>
<td>00009110 0048</td>
<td>C5D3E3C1 5C5CE3B2 66C2D3D7 F3F1F0C5</td>
<td>* ELTA**TSoBMP310E *</td>
</tr>
<tr>
<td>00009120 0058</td>
<td>C1E6F3A0 40404000 40404040 40404040</td>
<td>* AW3 *</td>
</tr>
<tr>
<td>00009130 0068</td>
<td>40404040 40404040 40404040 40404040</td>
<td>* * * *</td>
</tr>
<tr>
<td>00009140 0078</td>
<td>40404040 40404040 40404040 40404040</td>
<td>* * * *</td>
</tr>
<tr>
<td>00009150 0088</td>
<td>0092122F C5C1E64B C4C5D3E3 C1C9D4E2</td>
<td>* .k..EAW.DELTAIMS *</td>
</tr>
<tr>
<td>00009160 0098</td>
<td>4BD3D6C7 F1044BD9 F1044BD9 F1044BD9</td>
<td>* .LOG1 *</td>
</tr>
<tr>
<td>00009170 00A8</td>
<td>40404040 40404040 40404040 40404040</td>
<td>* EAW.DELTAIMS.LOG *</td>
</tr>
<tr>
<td>00009180 00B8</td>
<td>C5C1E64B C4C5D3E3 C1C9D4E2 4BD3D6C7</td>
<td>* 2 *</td>
</tr>
<tr>
<td>00009190 00C8</td>
<td>F2404040 40404040 40404040 40404040</td>
<td>* NY *</td>
</tr>
<tr>
<td>000091A0 00D8</td>
<td>40404040 40404040 40404040 40404040</td>
<td>* D5EB4040 *</td>
</tr>
</tbody>
</table>

The following fields are available on this panel:
Command

The commands available with this panel are described below.

Up and DOWN

Use the UP and DOWN commands to scroll through the storage displayed on the IMS Storage Display panel.

FIND

Use the FIND command to locate character and hexadecimal strings in the block of storage. A character string is a string of characters, and a hexadecimal string is an even number of hexadecimal digits or a quoted hexadecimal string.

Use the format FIND ‘sss...ss’ for character strings, where sss...ss is the character string; use the format FIND X'ddd...dd' for hexadecimal strings, where ddd...dd is the hexadecimal string.

Subsequent finds for the same string may omit the prior strings found. The FIND command positions the line of storage that contains the string on the top line in the display area and issues a message indicating the offset into the area where the string was found.

ZAP

To alter IMS storage you display the storage to zap, make the desired change on the panel, provide a comment to document the change, and issue the ZAP command.

When storage has been displayed, you can change it. The alterations are zapped into the IMS address space. A zap is defined as one or more characters of changed data in the area.

**WARNING**
The maximum length of a zap is 32 bytes from the first byte changed to the last byte changed. This maximum length includes any unchanged bytes that occur between the first and last bytes that are changed.

The data in the display can be changed in either the hexadecimal or the character area. If both the hexadecimal and character areas are changed at the same time, the change in the character area overrides the change in the hexadecimal area. In the character area, the period is considered a null character and is never used to replace data. You can restore original contents of a word by pressing Erase EOF to clear a word of the hexadecimal display.
Before applying a zap, DELTA IMS VIRTUAL TERMINAL checks the current contents of the storage to ensure that no change has occurred while you were viewing it. If the current contents match the contents at the time DELTA IMS VIRTUAL TERMINAL copied the storage and the zap is applied. If there is a mismatch, DELTA IMS VIRTUAL TERMINAL issues an error message indicating that the verification failed and that the zap was not performed.

The **ZAP** command causes the zap to be applied to the IMS address space. If the zap is successful, the changed data in the display is considered permanent and is used as a base for additional displays and zaps.

All zaps made by DELTA IMS VIRTUAL TERMINAL to the IMS control region are recorded in the DELTA Log and remain there until the next restart. After the next restart, they remain as inactive log entries until removed by a log purge. If you reformat the DELTA Logs, all active and inactive entries are erased. DELTA IMS VIRTUAL TERMINAL never attempts to reapply the zaps during IMS restart; it records the zaps only for historical and reporting purposes.

**RESET**

Once data has been changed in the display, DELTA IMS VIRTUAL TERMINAL will not allow you to exit the storage display facility until the **ZAP** or **RESET** command is issued or a new display is requested. The **RESET** command restores the display to its original unaltered contents. Entering a new display address or length also cancels any pending changes.

**IMSID**

The name of the IMS control region to display.

**Dump Address**

Specify which portion of virtual storage you want to display. Use an explicit, implicit, or complex address.

**Note**

When the panel is first displayed, it contains the explicit, implicit, or complex storage address of the last storage display. To display the same area again, you must rekey one character in the **Dump address** field.

Explicit Address – An explicit address is a hexadecimal number of one to eight digits that identifies the virtual storage address of the storage to be displayed.
Implicit Address – An implicit address is the type and name of a particular control block or load module name, for example, CNT(MASTER). Only a limited subset of IMS control blocks may be referenced this way. Refer to the following table.

<table>
<thead>
<tr>
<th>Implicit Type</th>
<th>Description</th>
<th>DB/DC</th>
<th>VT</th>
<th>DBCTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCD</td>
<td>System contents directory</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CLB(l-p&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>Communications line block</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CTB(l-p&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>Communications terminal block</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CIB(l-p&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>Communications interface block</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>CNT(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Communications name table</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>SPQB(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Subpool queue block</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>DNT(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Destination name table</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDNT(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Virtual terminal destination name table</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDIR(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Program directory (APPLCTN)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>DDIR(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Data base directory (DATABASE)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>SMB(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Schedular message block (TRANSACT)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>MOD(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Locate an existing module</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>LOAD(p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Load a new module into IMS storage (using standard IMS IMODULE LOAD)</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>PST (p&lt;sup&gt;b&lt;/sup&gt;)</td>
<td>Partition Specification Table (PST)</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> The name of a VTAM node or BTAM line and PTERM is required. The format of the line and PTERM name is 1-p. For example, the CLB for line 3 PTERM 10 would be specified as CLB(3-10).

<sup>b</sup> The name of a particular element is required.

Complex Address

A complex address is an explicit or implicit address followed by a positive or negative value and/or indirect operators. An offset value is either added to or subtracted from (as indicated by the sign) the current address calculation. The indirect operators % and ? indicate that the contents of the word starting at the address calculated thus far are to be used as the address for any subsequent calculation operations. A % indicates that the low-order 24 bits of the word are to be used as the address. A ? indicates that the low-order 31 bits of the word are to be used as the address. The complex address is delimited by the first blank.
Indirect Address

Once a block of storage has been displayed and one of the words displayed contains an address, the block of storage at that address may be displayed by typing over the first character of the word with an indirect operator (\% or ?). The content of the Dump Address field is ignored for this display, but it is retained. Thus, you can display the previous block again by typing over a character in the Dump field. You can update the Length field at the same time the indirect operator is entered to control the length of the new block; updating the Length field later causes the block indicated in the Dump Address field to be displayed again.

Length

Specifies the amount of storage, in bytes, to display.

Comment

When a zap is made to storage, DELTA IMS VIRTUAL TERMINAL requires the specification of a comment. The most recently-used comment is the default value for the Comment field. A blank or one character comment is unacceptable. The comment appears in log reports to document the zap.

unlabeled columns

The following columns display the main storage in dump format:

- address – The virtual storage address from the IMS address space.
- offset – The offset relative to the beginning of the area.
- hexadecimal format – Each line contains four words (16 bytes) of data displayed in hexadecimal format. These fields are modifiable in case a zap is to be made.
- character format – The 16 bytes of data are also displayed in character format. In this field, a period represents a character that cannot be displayed. This field is modifiable. You can use upper and lowercase characters to alter original field contents. Input from this field overrides input from corresponding hexadecimal fields.

You can also use DELTA IMS VIRTUAL TERMINAL to display main storage in the IMS DLI/SAS region address space. When displaying main storage, you can complete the following tasks under the DLI TCB:

- dump all CDEs
- display storage
- zap storage
display an individual CDE

The following figure provides an example of dumping all CDEs under the DLI TCB.

Figure 22: Dumping All CDEs

File  Dump  Zap  Options  Help
DELTA IMS                      IMS Storage Display              Row 1 to 11 of 111
IMSID . . . . . . DIOP 2011.265 14:16:57.11
Dump Address . . CDE(ALLCDE):DLI (:DLI must be specified after the dump address)
Length . . . . . . 1776
Comment . . . . . . DUMP/ZAP function to be switched to DLI TCB)
Address Offset +0 +4 +8 +C Character
DELTA IMS                     IMS Storage Display              Row 1 to 11 of 111
IMSID . . . . . . DIOP 2011.265 14:16:57.11
Dump Address . . CDE(ALLCDE):DLI (:DLI must be specified after the dump address)
Length . . . . . . 1776
Comment . . . . . . DUMP/ZAP function to be switched to DLI TCB)
Address Offset +0 +4 +8 +C Character

The following figure provides an example of displaying storage under the DLI TCB.

Figure 23: Displaying Storage

File  Dump  Zap  Options  Help
DELTA IMS                      IMS Storage Display              Storage altered
IMSID . . . . . . DIOP 2011.265 14:19:47.76
Dump Address . . 3F405000:DLI (:DLI must be specified after dump address)
Length . . . . . . 1776
Comment . . . . . . DUMP/ZAP function to be switched to DLI TCB)
Address Offset +0 +4 +8 +C Character

The following figure provides an example of zapping storage under the DLI TCB.

Figure 24: Zapping Storage

File  Dump  Zap  Options  Help
DELTA IMS                      IMS Storage Display              Storage altered
IMSID . . . . . . DIOP 2011.265 15:02:10.64
Dump Address . . 3F405000:DLI (:DLI must be specified after zapping storage)
Length . . . . . . 1776
Comment . . . . . . DUMP/ZAP function to be switched to DLI TCB)
Address Offset +0 +4 +8 +C Character
The following figure provides an example of displaying an individual CDE under the DLI TCB. This example uses a CDE for DFSPSEL0.

**Figure 25: Displaying an Individual CDE**

Identifying ZAPS Supplied by BMC Software

Each zap supplied by BMC Software includes an IDRDATA control card. When keying in a BMC Software-supplied zap using the IBM AMASPZAP utility, always include the IDRDATA card.

The DLACNTL library contains member DLA#LIDR. If you have applied the IDRDATA control card along with each zap supplied by BMC Software, you can generate a list of the zaps that have been applied to DELTA IMS VIRTUAL TERMINAL at your site by running job DLA#LIDR.

The following figure shows a standard AMASPZAP job with typical control cards, including IDRDATA.

**Figure 26: Standard AMASPZAP Job with an IDRDATA Control Card**

IMS Control Region Diagnostics

When an IMS control or DBCTL region abends or is operating incorrectly, BMC Software Customer Support may require several documents to diagnose the
once obtained, keep this documentation until the problem has been
resolved to your satisfaction. BMC Software may not need any or all of this material;
however, if this documentation is needed, it is important that it is readily available.
The following describes creating documentation to send to BMC Software, when
required.

**Storage Dumps**

IMS produces only one unformatted dump for each failure (SYSMDUMP or
SYS1.DUMP). When submitting these dumps to BMC Software for analysis, write
the unformatted dump to tape using IEBGENER. BMC Software will perform the
necessary formatting.

**Operator Dumps**

For all releases of IMS, an operator dump produced using the O/S DUMP command
is acceptable if generated according to the following specifications:

```
DUMP COMM=(problem description)
```

The system returns the following message:

```
*nn  IEE094D  SPECIFY OPERAND(S) FOR DUMP COMMAND
```

You respond with the following command:

```
nn,JOBNAME=imsname,SDATA=(RGN,TRT,CSA), END
```

Operator dumps are especially useful for dumping IMS when you are experiencing a
loop or wait state or when it is undesirable to MODIFY DUMP the system.

**IPCS**

Executing an IPCS CLIST against a SYSMDUMP can provide information useful for
DELTA IMS VIRTUAL TERMINAL problem diagnosis. Use the IPCS CLIST
provided by IBM.

**DELTA Log Data Sets**

The DELTA Log holds the cumulative changes DELTA IMS VIRTUAL TERMINAL
made to the IMS control region. When you suspect a DELTA IMS VIRTUAL
TERMINAL failure, make a copy of the current DELTA Log in case it is required for
problem analysis. Since the primary and secondary DELTA Logs are duplicates of
each other, copy only one. For problem documentation, the actual DELTA Log
contents rather than a listing are required.
MVS System Log

Important IMS and DELTA IMS VIRTUAL TERMINAL messages are written to the MVS System Log using the WTO and/or WTOR macro instructions.

These messages should be noted and understood. Retain the complete text of any new or unusual message issued at or near the time of the problem.

IMS Master Terminal Log

Important IMS and DELTA IMS VIRTUAL TERMINAL messages are also written to the IMS Master Terminal. These messages should be noted and understood. Retain the complete text of any new or unusual message issued at or near the time of the problem.

BMCLINK Diagnostics

BMCLINK communicates requests from a TSO-based DELTA IMS VIRTUAL TERMINAL user to an IMS control region. Problems seldom occur in BMCLINK alone; usually the problem affects a TSO user and BMCLINK at the same time. Documentation of BMCLINK failures can involve storage dumps, operator dumps, and traces.

Storage Dumps

When BMCLINK abends, the SYSUDUMP is usually sufficient for problem analysis. SYSUDUMP output for a BMCLINK abend is usually small enough that printing is more efficient than spinning the output to tape; however, either method is acceptable.

Operator Dumps

When BMCLINK hangs or fails to respond to a TSO user, the problem is more complex. Documentation of this type of failure usually requires concurrent dumps of the IMS control region, the BMCLINK region, and the TSO user address space. The operator DUMP command can satisfy this requirement if generated with the following specifications:

\texttt{DUMP COMM=(problem description)}
The system returns the following message:

```
nn IEE094D SPECIFY OPERAND(S) FOR DUMP COMMAND
```

You respond with the following command:

```
nn, JOBNAME=(imsname, BMCLINK, tsoname), SDATA=(RGN, TRT, CSA), END
```

Submit unformatted operator dumps to BMC Software on 6250 BPI standard label (SL) tapes or 3480 cartridges.

At the request of BMC Software Customer Support, a SYSUDUMP can be taken by replying `nn DUMP` or `nn DUMP=imsid`, where `nn` is the number of the BMCLINK outstanding reply. If a SNAPOUT DD statement was previously allocated to BMCLINK as a SYSOUT file, abbreviated dump data will be listed therein.

## Traces

BMCLINK also traces all inputs and outputs. The BMCLINK Trace facility enables you to create a dump of the BMCLINK Trace table on demand by typing: `nn TRACE` to the BMCLINK outstanding reply where `nn` is the number of the outstanding reply. The trace output will be written to the BMCLIST DD, which will be dynamically allocated as a SYSOUT=A spin-off data set. The trace will also automatically produce a dump whenever BMCLINK abends. The trace operates continually, using very little overhead.

You can specify trace criteria on the DELTA IMS VIRTUAL TERMINAL Global Options panel. See the installation guide for information on selecting global options.

## TSO/ISPF Diagnostics

Because of the recovery mechanisms within TSO/ISPF, most dumps automatically generated by TSO/ISPF do not contain any useful information. You must take certain specific steps to prevent normal TSO/ISPF abend recovery. Without these steps, the resulting dump information is insufficient and unusable.

Typical examples of TSO/ISPF dumps that are insufficient and unusable are as follows:

- **S0C4 in LMOD(ISPMAIN) CSECT(ISPMRO)**

  ISPMRO invokes SVC13 to generate an additional abend after ISPF has already terminated and recovered from an ISPF dialog error. This is normal processing when ISPF is not in test mode.
- S0C4 in ISPSUBS, ISRSUBS, or ISPTASK

These are the names of ISPF load modules containing common service subroutines. You need to research the dump further or redocument the problem to identify the original abend and the abending CSECT.

When an ISPF-related problem can be duplicated, BMC Software Customer Support personnel may occasionally ask you to perform certain steps to obtain a dump of the TSO/ISPF address space. These steps typically include invoking TSO/ISPF in test mode, pre-allocating a SYSMDUMP DD statement, reproducing the original abend, or inducing a diagnostic abend via the DBC$ command. You must follow these steps exactly to generate an TSO/ISPF dump with meaningful and usable information.

Problem Determination Documentation

Please do not submit documentation unless it has been specifically requested by BMC Software Customer Support. BMC Software makes every effort to request the minimum documentation required to analyze a given problem.

When documentation is requested, send it to your BMC Software Customer Support Representative’s attention via an overnight carrier. The BMC Software Customer Support Representative will provide a carrier name and charge account number.
Defining Spare Elements

Spare elements must exist in the current IMSGEN before DELTA IMS can add new VTAM terminals, LTERMs, or subpools to an IMS system. Spare elements are not required for DBCTL regions, since these control blocks do not exist in DBCTL regions.

Spare elements are unused terminal, LTERM, and subpool control blocks which you define with Stage-1 macros and include in your IMSGEN.

The number of spare elements which you should include in your IMS system depends on the number of terminals, LTERMs, and subpools you expect to add between regularly-scheduled IMSGENs.

Spare Element Masks

When DELTA IMS needs a spare element, it searches through the IMSGEN-defined terminals, LTERMs, and subpools with the aid of a spare element mask until it finds a match. The mask is exactly eight characters in length, and is specified on the DELTA List Edit panel when adding terminals, LTERMs, or subpools. The mask can contain asterisk (*) wild card characters that will match any character in a spare element name.

VTAM Terminal Spare Elements

VTAM terminals are not sorted by the IMSGEN process, so control blocks for terminals are created in the order that you specify in your Stage-1 input file. A hashing technique is used to verify the node name at logon so placement of the terminal spare element definitions has no impact on performance.
LTERM Spare Elements

LTERMs are sorted by IMS during the IMSGEN process. For this reason, the placement of your LTERM spare element definitions in your Stage-1 input has no impact on performance. However, BMC Software recommends that you name spare elements so that they sort at or near the beginning of all the LTERMs defined to IMS.

LU 6.1 Subpool Spare Elements

Subpools are not sorted by the IMSGEN process, but because the number of subpools defined to IMS is usually small, placement of subpool spare element definitions in your Stage-1 input should have no impact on performance.

Sample Spare Element Definitions

Use the TYPE, TERMINAL, and NAME Stage-1 macro statements together to define one or more VTAM terminals and their associated LTERMs in the IMSGEN. The macros have the following hierarchical relationship:

- TYPE specifies a set of defaults that apply to subsequent terminals.
- TERMINAL represents a VTAM node. It can override options specified on the preceding TYPE as well as specify certain other options not permitted on the TYPE statement.
- NAME defines one or more LTERMs that are initially assigned to the preceding terminal.

You must supply one or more name statements for each terminal.

Evaluate the terminal types and options currently supported in your environment, and create a spare TYPE statement for each. Next, anticipate your terminal requirements for each type of terminal and create the necessary spare terminals for each type. Finally, place a NAME statement after each terminal that lists the LTERMs to be initially assigned to the terminal. Remember that the LTERM may be renamed or assigned by DELTA IMS to another terminal if necessary.

The sample macro statements shown in the following samples define spare elements for VTAM 3270 and SNA terminals and printers. DELTA IMS allows the names of network elements to be changed online, but not attributes or options. Be sure to vary $nnn$ and $mmm$ so that each spare element has a unique name.
For the best overall performance, place your terminal and LTERM pair definitions at, or near, the end of your Stage-1 input and use a dollar sign ($) or a similar character as the first character in spare element names. By setting up your Stage-1 input this way, searches for node names will be more effective, and the LTERM sort performed during the IMSGEN will place all LTERM spare elements at, or near, the top of the LTERM list.

Spare element masks for the following sample definitions are

- `$3277***` for spare 3277 type devices
- `$3286***` for spare 3286 devices
- `$SLU1***` for SLU TYPE1 devices
- `$SLU2***` for SLU TYPE2 devices
- `$SLUP***` for SLU TYPEP devices
- `$LT$***` for spare LTERMs
- `$RL$***` for spare remote LTERMs
- `$SP$***` for spare LU 6.1 subpools

**Note**
Spare element masks are set to the above defaults. BMC Software recommends that you use these spare element masks or similar masks in your Stage-1 input for spare elements. Usage of these names does not mean that DELTA IMS will try to match these names with the types of elements being added. It is the customer’s responsibility to use the appropriate spare element mask for the type of element being added.

---

**Sample for VTAM 3270 Terminals and Printers**

This topic provides sample for VTAM 3270 terminals and printers.

**TYPE**

```
UNITYPE=3270,MSGDEL=sysinfo,PTRSIZE=IGNORE,FEAT=IGNORE,
UNIT=3277,MODEL=2
```  

**TERMINAL**

```
NAME=$3270 nnn
```  

**NAME**

```
$3270 nnn
```
Sample for SNA SLUTYPE1 Printers

This topic provides sample for SNA SLUTYPE1 Printers.

**TYPE**

```
UNITYPE=SLUTYPE1,MSGDEL=SYSINFO,OUTBUF=768,
OPTIONS=(NORESP,SHARE)
```

**TERMINAL**

```
NAME=$SLU1nnn,COMPT1=(,MFS-SCS1)
```

**NAME**

```
$SLU1nnn
```

Sample for SNA SLUTYPE2 Terminals

This topic provides sample for SNA SLUTYPE2 Terminals.

**TYPE**

```
UNITYPE=SLUTYPE2,FEAT=IGNORE,MSGDEL=SYSINFO,MODEL=2
```

**TERMINAL**

```
NAME=$SLU2nnn
```

**NAME**

```
$SLU2nnn
```

Sample for SNA SLUTYPEP Terminals

This topic provides sample for SNA SLUTYPEP Terminals.

**TYPE**

```
UNITYPE=SLUTYPEP,FEAT=IGNORE,MSGDEL=SYSINFO,
OPTIONS=(NOCOPY), MODEL=2
```

**TERMINAL**

```
NAME=$SLUPnnn
```

**NAME**

```
$SLUPnnn
```
Sample for Remote LTERMs

This topic provides sample for Remote LTERMs.

**LINKM1**

```
MSPLINK TYPE=MTM,BUFSIZE=1000 MSLINK PARTNER=AB, MSPLINK=LINKM1
```

**MSC13**

```
MSNAME SYSID=(3,1)
NAME $$RL$mm1
NAME $$RL$mm2
```

Sample for LU 6.1 Subpools

This topic provides sample for LU 6.1 Subpools.

**VTAM POOL**

**SUBPOOL**

```
NAME= $$SP$$nnn
```

```
NAME
$$SP$$mmm
```
Creating and Editing DELTA Lists

This chapter describes how to create and edit DELTA Lists using the DELTA IMS TSO/ISPF panel interface.

Introduction

This chapter describes DELTA Lists. The following subjects are covered in this chapter:

- relationship of DELTA IMS and IMS online change
- editing keyword tables
- creating a DELTA List
- inserting (adding) elements into DELTA Lists
- editing DELTA List elements
- using the search and revise operations to locate and change keywords, elements, and values

DELTA IMS and IMS Online Change

Although DELTA IMS can coexist with the standard IMS Online Change facility, most sites rely solely on DELTA IMS for changes to databases, applications, transactions, and route codes. To ensure that DELTA IMS updates are not regressed by an online change, it is important to understand the relationship of these two facilities.

The standard IMS Online Change facility is invoked by the /MODIFY command. /MODIFY PREPARE compares the current system (in main storage) to the new system (in the new MODBLKS data set). When the comparison is made and the changing components have been quiesced, the /MODIFY COMMIT command is
used to make the appropriate updates to the current IMS system. The result is a new current system.

DELTA IMS uses a much simpler technique. As changes are received, service routines in the IMS control region update the current system to the desired result on an item-by-item basis. The result is a new current system after each update.

IMS Online Change does not support changing VTAM terminals, LTERMs, and Fast Path databases. The status of DELTA IMS updates to these elements is not affected by an IMS Online Change. However, IMS Online Changes can affect the status of DELTA IMS changes to databases (including full function databases), applications, transactions, and route codes.

If you use DELTA IMS to change the IMS configuration and then use the IMS Online Change facility to implement other changes to the IMS configuration, all DELTA IMS changes must be temporarily regressed and reapplied for IMS Online Change to successfully complete. IMS automatically regresses and reapplies its changes except when messages are queued to elements added through DELTA IMS. In this case, the Online Change facility does not complete and IMS issues the message DFS3452, "WORK IN PROGRESS."

**WARNING**
Mixing DELTA IMS with IMS Online Change requires careful consideration. Although system integrity is always preserved, element attribute settings implemented by DELTA IMS can be wiped out by a MODBLKS change. You can avoid these problems by incorporating DELTA IMS changes into the new MODBLKS IMSGEN.

When performing a MODBLKS IMSGEN, keep in mind that information in the MODBLKS data set that DELTA IMS uses to ensure system integrity contains a date stamp with no time stamp. Therefore, when you execute a DELTA list, you can perform only one MODBLKS IMSGEN or CTLBLKS IMSGEN on that day. Performing more than one MODBLKS IMSGEN or CTLBLKS IMSGEN in one day with active entries on the DELTA Log will produce unpredictable results. Switching the active MODBLKS data set several times with active entries on the DELTA Log will also produce unpredictable results.

**WARNING**
DELTA IMS is designed to prevent automatic simple checkpoints during a /MODIFY by making a temporary override of 2,147,483,647 to the CPLOG parameter. However, an *operator initiated* checkpoint, (for example, /CHE, /DBR) taken during online change processing will result in an invalid checkpoint that will abend on the next IMS restart.

If an operator initiated checkpoint does occur during a /MODIFY, do not restart your system using that checkpoint. Restart IMS using a prior, valid checkpoint.
DELTA List Edit

DELTA Lists are members of a partitioned data set. The individual IMS change instructions are written as records in a DELTA List member. A DELTA List may contain entries for the following elements:

- elements appropriate to both IMS control and DBCTL regions:
  - databases
  - applications
  - selected IMS operator commands
  - reload requests for program and database directories
  - comments

- elements appropriate to IMS control regions only:
  - transactions
  - route codes
  - IMSGEN-defined terminals, LTERMs, and subpools
  - changes to the TP_PROFILE data set used for APPC

You maintain DELTA List elements with commands with similar syntax and use as those of TSO/ISPF Edit.

When a DELTA List is executed, DELTA IMS makes the changes specified in the DELTA List to IMS or the APPC TP_PROFILE data set. DELTA IMS makes changes to IMS by taking each IMS element in the list and creating the necessary change instructions for that element. These instructions are then applied to an IMS control region using BMCLINK. DELTA IMS DB/DC and DELTA PLUS VIRTUAL TERMINAL make APPC changes by updating the TP_PROFILE data set. If you want to test a DELTA List before executing it, DELTA Lists can also be checked without affecting the IMS control region or TP_PROFILE data set.

DELTA Lists have no required association with a specific IMS control region (IMSID). A DELTA List may be applied to any, or all, IMSIDs.

Check and execute can be performed in an interactive mode with the DELTA IMS TSO/ISPF interface or in a batch mode using a special batch command language. Refer to “Using DELTA List Check and Execute” on page 125 for more information about checking and executing DELTA Lists. BMCLINK, which is used to make the changes to IMS, is discussed in “Administration” on page 27.
DELTA IMS supports lists with more than 10,000 elements. The region size limits the size of a DELTA List. With a 4 MB region, lists with up to 10,000 elements can be edited in detailed mode. In summary mode, lists of up to 30,000 elements can be edited, checked, and/or executed. Attempts to edit, check, or execute lists larger than the region size will result in S80A abends.

DELTA IMS DC DELTA List Edit Limitations

Although DELTA IMS DC facilities can create DELTA Lists for the full range of IMS elements possible with DELTA IMS, DELTA List execution is limited to updating and changing VTAM terminals and LTERMs. This limitation does not apply to DELTA IMS DB/DC. DELTA IMS DC and DELTA IMS DB/DC facilities can create and execute DELTA Lists that make use of the full range of APPC capabilities provided by DELTA IMS.

DELTA Lists created in the DELTA PLUS for DBCTL tier view can be executed against either an IMS control or DBCTL region. However, the types of elements you can add to a DELTA List are limited to those that are appropriate to a DBCTL region.

Creating and Editing DELTA Lists

DELTA Lists can be used in a variety of ways. Some customers use the same DELTA Lists over-and-over for different purposes while other customers use a different DELTA List for each element changed. Whichever approach you take to using DELTA Lists, BMC Software recommends that you identify each DELTA List by its contents and retain the DELTA Lists until the changes are made permanent by the next IMSGEN. After changes are implemented via an IMSGEN, the executed DELTA Lists are no longer needed.

Commands Available in DELTA List Edit

Two types of commands are provided for editing DELTA Lists. These commands and the DELTA List Edit session are very much like the ISPF Edit session. There are primary and line commands available with DELTA List Edit. Primary commands are typed on the Command line and work at the member level. Line commands are typed in the line number area and work at the DELTA List element level.

Primary Commands

You can type the following primary commands on the Edit DELTA List panel Command line:
CANCEL

The **CANCEL** command terminates the edit session without saving the DELTA List. Control returns to the Primary Menu. Any errors on the current panel are ignored, and all DELTA List changes since the last save are lost.

COPY

The **COPY** command copies one DELTA List into another DELTA List that is being edited. The format of the command is COPY *listName*, where *listName* is the name of the DELTA List to be copied. If the DELTA List being edited is empty, a line command is not necessary. However, if the DELTA List being edited is not empty, the **AFTER (A)** or **BEFORE (B)** line command is required to specify where to insert the copied list.

END

The **END** command rewrites the updated DELTA List and terminates the edit session. Any pending line commands are ignored if **END** is entered. Although you can exit from DELTA List Edit without correcting ERR or REQ conditions in value fields, this action should not become a standard practice.

SEARCH/RSEARCH

The **SEARCH** command finds a desired DELTA List element value. The **RSEARCH** command repeats the search. See “Using the Search and Revise Commands” on page 116 for instructions on using this command.

REVISE/RREVISE

The **REVISE/RREVISE** command finds and changes a desired DELTA List element value. The **RREVISE** command repeats the find and change process. See “Using the Search and Revise Commands” on page 116 for instructions on using this command.

SAVE

The **SAVE** command rewrites the updated DELTA List without terminating the edit session. If no changes have been made since the prior save, the command is ignored. Any pending line commands are ignored if **SAVE** is entered. Although you can save a DELTA List without correcting ERR or REQ conditions in value fields, this action should not become a standard practice.

RESET

The **RESET** command clears any pending line commands and/or resets any lines set with either the **SHOW** or **EXCLUDE** command to the display mode currently in effect.
RETURN

The **RETURN** command rewrites the updated DELTA List and terminates the edit session. Any pending line commands are ignored; however, you must correct any ERR or REQ conditions in value fields before **RETURN** is executed. The Primary Menu is displayed after this command is issued.

CREATE

The **CREATE** command works with the **COPY (C)** and **MOVE (M)** line commands to copy and/or move DELTA elements from the current list to a new DELTA List.

EDIT

The **EDIT** command edits a different DELTA List recursively. When you terminate editing of the list, you return to the current list.

LOCATE

The **LOCATE** command works with an element number operand to scroll a particular DELTA List element to the top of the panel. Use the **LOCATE** command with the **ERROR** operand to find an element with an invalid or missing value. You can indicate the starting point and the direction of the search by adding one of the following operands:

- **NEXT** or **PREVIOUS** indicates that the search should begin just after or just before the element currently displayed. **NEXT** is the default.

- **FIRST** or **LAST** indicates that the search should begin at the top or bottom of the list.

MOVE

The **MOVE** command works with the **AFTER (A)** or **BEFORE (B)** line commands to move all elements of an existing DELTA List into the current edit session.

REPLACE

The **REPLACE** command works with the **COPY (C)** or **MOVE (M)** line commands to copy the DELTA Elements from the current DELTA List and replace a previously existing DELTA List.

**Line Commands**

Line commands are typed on the line numbers of the DELTA List in a fashion similar to TSO/ISPF edit line commands. These commands can be abbreviated to the first letter of the command. For example, **AFTER** can be entered as **A**. The **MOVE (M)**,
COPY (C), REPEAT (R), or DELETE (D) commands work best if the DELTA List is in Summary mode, which avoids unnecessary cursor movements and scrolling commands. The line commands are described in the following list:

AFTER (A)

The AFTER command indicates an element after which a copy or move will occur. You can also specify this command as \textit{An}, which repeats a copy \textit{n} times.

BEFORE (B)

The BEFORE command indicates an element before which a copy or move will occur. You can also specify this command as \textit{Bn}, which repeats a copy \textit{n} times.

COPY (C)

The COPY command copies a single element before or after another element in the DELTA List. You can also specify this command as \textit{Cn}, which copies \textit{n} elements, beginning at the line where the command was entered.

You can specify a range to copy using the CC variant of the command; type a beginning and an ending CC to define the range. You can also use COPY with the CREATE or REPLACE primary commands to designate elements to be copied to another DELTA List.

DELETE (D)

The DELETE command deletes an element from a DELTA List. You can also specify this command as \textit{Dn}, which deletes \textit{n} number of elements, beginning at the point which the command was entered. You can specify a range to be deleted using the DD variant of the command; type a beginning and an ending DD to define the range.

EXTEND (E)

The EXTEND command is used only to add or remove IMS operator command parameter detail lines. You can specify this command as \textit{En} which adds \textit{n} detail lines to the command element. You can also specify this command as \textit{E}, which deletes unused parameter detail lines.

INSERT (I)

The INSERT command displays the Edit Insert panel, where you select a DELTA List element to be inserted, copied, or revised. This command has no variant (\textit{n} or \textit{II}); however, you can perform multiple inserts from the Edit Insert panel.
MOVE (M)

The MOVE command moves a single element before or after another element in the DELTA List. You can also specify the M command as Mn which moves n elements, beginning at the line where the command was entered. You can specify a range to move using the MM variant of the command; type a beginning and an ending MM to define the range. You can also specify MOVE with the CREATE or REPLACE primary commands to designate elements to be moved to another DELTA List.

REPEAT (R)

The REPEAT command repeats an element in a DELTA List. You can also specify this command as Rn, which repeats an element n times. You specify a range to be repeated using the RR variant of the command; type a beginning and an ending RR to define the range. You can repeat a range n times by specifying the beginning or ending RR command as RRn.

SHOW (S)

The SHOW command displays an element in detail when the DELTA List is either in Summary or Modified Default mode. You can also specify this command as Sn, which shows n elements. You specify a range to be shown using the SS variant of the command; type a beginning and an ending SS to define the range.

EXCLUDE (X)

The EXCLUDE command prevents the display of detailed information about an element, regardless of the display mode selected for editing the DELTA List. You specify a range to be suppressed using the XX variant of the command; type a beginning and an ending XX to define the range.

Beginning an Edit Session

You access the panels to edit a DELTA List from the DELTA IMS Primary Menu panel.

See DELTA IMS Interface and Tier Views on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.

Before editing a DELTA List, ensure that the IMSID specified on the DELTA IMS Primary Menu panel is for the type of control region that the DELTA List will be executed against (DELTA IMS VIRTUAL TERMINAL, DELTA IMS DB/DC, or DELTA PLUS for DBCTL).
If the IMSID is not for the type of control region that the DELTA List will be executed against, the correct keyword table will not be selected to create the DELTA List. Keyword tables are selected based on a combination of the IMSID and the user ID of the DELTA IMS user as specified in the DELTA IMS profiles.

From the DELTA IMS Primary Menu, you can access DELTA List Edit by typing 1 in the selection field and pressing Enter. A DELTA List can be created with DELTA List Edit, or it can be generated from the DELTA Log. This chapter describes how DELTA Lists are created using DELTA List Edit. To find out how to generate a DELTA List from the DELTA Log, see “Generating a DELTA List from a DELTA Log” on page 171.

Because the name of a DELTA List can be entered on the DELTA IMS Primary Menu, the effect of selecting option 1 depends on whether the name of a DELTA List is entered, and if it is, whether it is a new DELTA List or an existing DELTA List:

- If the **DELTA List name** field is blank or contains a masking pattern when option 1 is selected, the Edit Select panel is displayed, allowing you to select a DELTA List for editing.

- If the **DELTA List name** field contains the name of a new DELTA List, selecting option 1 creates a DELTA List and begins a DELTA List Edit session with the Edit Insert panel. You can make additional inserts by typing I in the line number area of the DELTA List Edit panel. The new element is inserted after that line.

- If the **DELTA List name** field contains the name of an existing DELTA List, selecting option 1 begins a DELTA List Edit session for that DELTA List.

### Selecting a DELTA List to Edit

The Edit Select panel, as shown in the following figure, is the first panel accessed with option 1 if the **DELTA List name** field on the Primary Menu is blank or contains a masking pattern. If the **DELTA List name** field was blank, it presents a scrollable selection list of all DELTA Lists in the DELTA IMS PDS. If the **DELTA List name** field contained a masking pattern, it presents a selection list of all DELTA Lists that matched the masking pattern. All entries on this panel display the member name, a descriptive title, and a brief history for each member.

**Figure 27: Edit Select Panel**
The following fields are available on this panel:

**Act**

Type one or more of the following action codes next to one or more of the member names listed on the panel:

- **S** – Edit the DELTA List.
- **E** – Edit the DELTA List.
- **C** – Check or browse the DELTA List.
- **X** – Execute the DELTA List.
- **D** – Delete the DELTA List.

**Member**

The Member field contains the DELTA IMS PDS member name for the DELTA List.

**Title**

An optional descriptive title of up to 30 characters can be entered in the Title field. The Title field enables you to provide a verbal description for each DELTA List as an aid in DELTA List management.

With ISPF Version 2.3 or later, double-byte character set (DBCS) capable terminals (such as the IBM 5550) can edit the Title field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

**Last Modification Date, Time, Userid**

These fields identify the individual responsible for the last update of each DELTA List and the date and time of the last update.

**Executed Date**

The Executed Date field identifies date the DELTA List was last executed against an IMS control region, DBCTL region, or TP_PROFILE data set.
Displaying a DELTA List

You can display a DELTA List in either Summary, Modified, or Detail mode. The following figure shows a DELTA List in detail mode.

**Figure 28: Edit DELTA List Panel**

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>Scroll</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELTA Mode</td>
<td>. . 3 1. Summary 2. Modified 3. Detail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricting IMSID</td>
<td>****</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELTA List</td>
<td>. . NEWLIST_</td>
<td>Element 000001 of 000002</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>. . . SAMPLE DELTA LIST</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element 000001 of 000002</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>000001 ADD DATABASE Name of DBD</td>
<td>. . . . . . . . . . . . _____________</td>
<td>&lt;=REQ</td>
</tr>
<tr>
<td>RESIDENT DBD always in main storage?</td>
<td>. . . . NO</td>
<td></td>
</tr>
<tr>
<td>ACCESS Access is EX, RO, RD, or UP</td>
<td>. . . . EX</td>
<td></td>
</tr>
<tr>
<td>AUTO Should sensitive ACBs be reloaded?</td>
<td>. . . . NO</td>
<td></td>
</tr>
<tr>
<td>ACCESS</td>
<td>. . . . . . . . . . . . _____________</td>
<td>&lt;=REQ</td>
</tr>
<tr>
<td>RESIDENT PSB always in main storage?</td>
<td>. . . . NO</td>
<td></td>
</tr>
<tr>
<td>PGMTYPE Program is a BMP or MPP</td>
<td>. . . . MPP</td>
<td></td>
</tr>
<tr>
<td>SCHDRTY Schedule serial or parallel</td>
<td>. . . . SERIAL</td>
<td></td>
</tr>
<tr>
<td>FPATH Fast Path program?</td>
<td>. . . . NO</td>
<td></td>
</tr>
<tr>
<td>DOPT Dynamic PSB modification?</td>
<td>. . . . NO</td>
<td></td>
</tr>
</tbody>
</table>

The following fields are available on this panel:

**DELTA Mode**

Type the number of one of the following options:

1 - Summary

In Summary mode, only the element lines are displayed. If the SHOW command is specified for an element line, the detail for that element is completely displayed.

2 - Modified

In Modified mode, only the detail lines that are not set to the default value for the given parameter type will be displayed.

3 - Detail

In Detail mode, all detail lines are displayed. This mode is the most detailed level of display. When in Detail mode, you can use the EXCLUDE command to request a summary level display on an element-by-element or block basis (xx to xx).

**Restricting IMSID**

The Restricting IMSID field specifies an IMSID mask that is used to restrict the target IMSID for a DELTA List Check or Execute. When specified, a DELTA List Check or Execute will only be allowed for IMSIDs that match this mask.
The mask can be for a specific IMSID or for multiple IMSIDs if asterisks (*) are used as wildcard characters in the specification. Wildcard characters will match any character in that position. Specifying four asterisks (****) will match any IMSID.

DELTA List

The DELTA List field specifies the name of the DELTA List. If a different DELTA List is specified in this field, the DELTA List currently being edited is saved, and a new edit session begins for the list specified.

Title

The Title field describes the member (up to 30 characters).

With ISPF Version 2.3 or later, DBCS-capable terminals (such as the IBM 5550) can edit the Title field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

Inserting DELTA List Elements for IMS Control and DBCTL Regions

Although you can add, delete, copy, and revise elements, DELTA List Edit options are described in the following pages as if each had begun a DELTA List Edit session by inserting that particular element. These entries actually describe additions to an IMS control region. Modifications are possible for each DELTA List element, excluding RELOAD and EXECUTE.

DELTA list database, application, reload, execute, and comment elements are appropriate for use in both IMS control and DBCTL regions.

See the following sections for instructions on inserting these elements into a DELTA list:

- “Inserting a Database Element” on page 91
- “Inserting an Application Element” on page 94
- “Inserting a Reload Element” on page 96
- “Inserting an Execute Element” on page 98
- “Inserting a Comment Element” on page 99
Inserting a Database Element

If DATABASE is selected from the Edit Insert panel, DELTA IMS inserts the DELTA List entry, as shown in the following figure. This entry adds a database to an online IMS system.

To modify an existing database, refer to Copying and Revising DELTA List Elements on page 113.

After executing a DELTA List to add or revise a database, you must define the database to DBRC, ACBLIB, etc., and establish the dynamic allocation member if needed.

**Figure 29: Edit DELTA List Panel - DATABASE**

The following fields are available on this panel:

**ADD DATABASE**

A DATABASE name is required and must be unique. The naming conventions are the same as for an IMSGEN.

Before a database is added, you must perform the following tasks:

- Define the database to ACBLIB. If you do not, message BMC1612 is displayed.

- Ensure that at least one of the required type of database (either Fast Path or Full Function) is SYSGENed in the system.

A Fast Path MSDB requires special consideration. Define the MSDB name to IMS through DELTA IMS and run the standard DBDGEN and ACBGEN utilities as required. Then, just before an IMS cold start, run the MSDB maintenance utility (DBFDBMA0) to re-create the MSDBINIT data set and update the MSDB start member (DBFMSDB) in IMS PROCLIB.
**Note**

After the MSDB is defined, any MODBLKS online change will fail with message DFS3498W. If you want to use MODBLKS online change, you must SYSGEN the MSDB, reformat the DELTA Logs, and cold start the system.

### RESIDENT

This parameter is required and is equivalent to the RESIDENT positional parameter of the DATABASE macro used during an IMSGEN. It must be **YES** for resident or **NO** or nonresident. If the database is a Fast Path DEDB, it must be **YES**.

If a database is converted to nonresident, it becomes nonresident immediately. If a database is converted to resident, it will become resident at the next restart of IMS.

### ACCESS

This required parameter is equivalent to the ACCESS keyword parameter of the DATABASE macro used during an IMSGEN. ACCESS is associated with database sharing and the intent a particular IMS subsystem may have against a database. The following accesses are available:

- **EX** – exclusive access to the database
- **RO** – read only access
- **RD** – read access
- **UP** – update intent access

### AUTO

This parameter specifies whether DELTA IMS should automatically reinitialize program directories for each program (ACB) that is sensitive to the database. This feature is optional because of the performance implication to IMS. A significant amount of I/O to ACBLIB may be incurred. The I/O is overlapped with all control region functions except MPP/BMP scheduling so that no new programs will be scheduled while the auto reload is processing.

If you do not use this option, you are responsible for manually issuing DELTA IMS reloads for each ACB referencing the database.

DELTA IMS determines database sensitivity in two ways:

- Programs are considered sensitive if their in-memory intent lists reference the named database.

- The ACBLIB directory is scanned for ACBs that have been generated since the database’s DMB was generated. For each ACB that was regenerated and is defined to IMS, the intent list will be read and scanned for the DMB reference.
RAND

The RAND option specifies whether DELTA IMS should reload a new copy of the Randomizer module identified in the ACBLIB. The default is NO.

If the name exists in the IMS system and RAND=YES is specified, DELTA IMS will ensure that all other DEDBs using the same randomizer name have been /DBRed. The new copy of the randomizer will be loaded, all other DEDBs using the same randomizer will be updated to have the latest copy of the randomizer module, and warning message BMC2129 will be issued.

RAND is an optional feature because of the performance implication to IMS. The RAND option is ignored if the database is not a Fast Path DEDB. If the Randomizer name is new, DELTA IMS will load the new Randomizer module regardless of the RAND option.

RELAREA

The RELAREA option specifies whether DELTA IMS should reload only the stopped DEDB areas. The default is NO.

Note

To reload specific areas of a DEDB, issue a /DBR AREA command prior to the RELOAD request to stop each of the areas that are to be reloaded. The /DBR AREA command may be specified in the same DELTA list, or issued outside of the DELTA List. Do NOT stop the entire database with a /DBR DB command.

The DELTA List RELOAD DB databaseName request is executed specifying the new RELAREA=YES keyword. DELTA IMS will reload only the DMACs (areas) that are in a stopped state. The remaining areas are still accessible by IMS.

The request will fail if DMAC changes are detected in areas that have not been stopped. The DMB read from ACBLIB will become the new DMCB and unaffected areas (DMACs not stopped) are merged back into the new DMCB. Any new areas detected in the new DMB will be added dynamically. Any old areas no longer in the new DMB will be removed (only if they are in a stopped state).

RELAREA is an optional feature and only impacts Fast Path DEDB databases.
Inserting an Application Element

If **APPLCTN** is selected from the Edit Insert panel, DELTA IMS inserts the DELTA List entry, shown in the following figure. This entry adds a PSB to an online IMS system. To revise an existing application.

See “Copying and Revising DELTA List Elements” on page 113.

**Figure 30: Edit DELTA List Panel - APPLCTN**

<table>
<thead>
<tr>
<th>ED</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>Scroll =&gt; PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELTA Mode</td>
<td>3 1. Summary 2. Modified 3. Detail</td>
<td></td>
</tr>
<tr>
<td>Restricting IMSID</td>
<td>NEWLIST Element 000001 of 000001</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>SAMPLE DELTA LIST</td>
<td></td>
</tr>
<tr>
<td>000002</td>
<td>ADD APPLCTN Name of PSB NO &lt;=REQ</td>
<td></td>
</tr>
<tr>
<td>RESIDENT</td>
<td>PSB always in main storage? NO</td>
<td></td>
</tr>
<tr>
<td>PGMTYPE</td>
<td>Program is a BMP or MPP MPP</td>
<td></td>
</tr>
<tr>
<td>SCHDTYP</td>
<td>Schedule serial or parallel SERIAL</td>
<td></td>
</tr>
<tr>
<td>FPATH</td>
<td>Fast Path program? NO</td>
<td></td>
</tr>
<tr>
<td>DOPT</td>
<td>Dynamic PSB modification? NO</td>
<td></td>
</tr>
<tr>
<td>GPSB</td>
<td>Dynamically Generate a PSB? NO</td>
<td></td>
</tr>
<tr>
<td>LANG</td>
<td>Programming language interface NONE</td>
<td></td>
</tr>
<tr>
<td>SYSID(1)</td>
<td>MSC - remote system ID 0</td>
<td></td>
</tr>
<tr>
<td>SYSID(2)</td>
<td>MSC - local system ID 0</td>
<td></td>
</tr>
</tbody>
</table>

The following fields are available on this panel:

**ADD APPLCTN**

An APPLCTN name is required and must be unique. The naming conventions are the same as for an IMSGEN.

**RESIDENT**

This required parameter is equivalent to the RESIDENT positional parameter of the APPLCTN macro used during an IMSGEN. It must be **YES** for resident or **NO** for resident or nonresident. If execution of a DELTA List changes an existing application from resident to nonresident, it becomes nonresident immediately. If execution of a DELTA List changes an existing application from nonresident to resident, it will become resident at the next restart of IMS.

**PGMTYPE, SCHDTYP, and DOPT**

These parameters are the same as for a normal IMSGEN when defining an APPLCTN.
FPATH

The FPATH parameter requires either YES or NO. It is equivalent to the FPATH keyword parameter of the APPLCTN macro used during an IMSGEN. DELTA IMS automatically sets the sync point per transaction (MODE=SNGL) and recoverable transaction options for each transaction converted to Fast Path exclusive.

If execution of a DELTA List changes an existing application from full function to Fast Path, all transactions processed by that program will become Fast Path exclusive. Fast Path transactions must be single segment input, response mode, non-MSC remote, and non-conversational. The transactions may not have messages currently on the message queue, and a Fast Path route code must exist for each transaction with a route code name identical to the transaction code. If any transaction violates these rules, the operation will be suppressed and an error message issued.

If execution of a DELTA List changes an existing application from Fast Path to full function, no Fast Path route code may reference the program. No change is made to the Fast Path status of any transaction because of this change.

GPSB

GPSB requires either YES or NO. It indicates whether IMS should generate a PSB for the application.

LANG

The LANG parameter indicates the interface language IMS should use when generating the PSB: ASM, COBOL, PASCAL, or PL/I.

SYSID

These parameters are the same as the keyword parameters for a normal IMSGEN when defining an APPLCTN. For example, specifying a SYSID for the application does not create a PDIR (application) control block if it is a remote application. DELTA IMS will treat the application as local if SYSID(1) and SYSID(2) are both specified as 0. If both SYSID(1) and SYSID(2) are specified with an equal value other than 0, the transaction will be rejected. The REVISE function cannot be used to change an APPLCTN from remote to local or vise versa.

Avoiding IMS Application Parameter Conflicts

DELTA IMS avoids IMS application parameter conflicts by modifying parameter values when a conflict is detected.
If a new parameter value is entered which DELTA IMS recognizes as being in conflict with other application parameter(s), the following occurs:

- The new parameter is identified on the Edit DELTA List panel.
- The conflicting parameter(s) are changed to eliminate the conflict.
- Message BMC1881, "DATA VALUES CHANGED," is issued. To find out which parameter(s) changed, issue the HELP command (or use the appropriate function key) to display another BMCnnnn-type message detailing the enforced change.

The following table shows a summary of application parameters which are checked for conflict.

### Table 12: Application Parameters Checked for Conflicts

<table>
<thead>
<tr>
<th>When these parameters are entered as</th>
<th>The following parameters are enforced as</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIDENT=YES</td>
<td>DOPT=NO</td>
</tr>
<tr>
<td>SCHDTYPE=PARALLEL</td>
<td>DOPT=NO</td>
</tr>
<tr>
<td>DOPT=YES</td>
<td>RESIDENT=NO</td>
</tr>
<tr>
<td></td>
<td>SCHDTYPE=SERIAL</td>
</tr>
<tr>
<td>FPATH=YES</td>
<td>SYSID(1)=0</td>
</tr>
<tr>
<td></td>
<td>SYSID(2)=0</td>
</tr>
</tbody>
</table>

**Inserting a Reload Element**

If RELOAD is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry, as shown in the following figure. This entry causes DELTA IMS to flush the current control block (ACB or DMB) from the respective pool, issue a BLDL to locate the current control block in ACBLIB, and update the program or database directory.

**Figure 31: Edit DELTA List Panel - RELOAD**

The following fields are available on this panel:
RELOAD

A RELOAD name is required. The name must match a name that
■ was previously defined to IMS either through an IMSGEN
■ was added through a previous execution of a DELTA List
■ is added through execution of the current list.

The specified name must also have a corresponding entry in the library referenced by the IMSACBx DD card.

---WARNING---

RELOAD of a resident DMB causes that DMB to be treated as a non-resident DMB until the next restart of IMS. The resulting non-resident DMB causes the DMB pool utilization to increase.

When the DELTA List is executed, the named ACB or DMB must be stopped and not opened in the online region before DELTA IMS will complete the RELOAD operation. If the ACB or DMB is not stopped, DELTA IMS will display the Execute Error Recovery panel, at which point you can stop the particular element and retry the DELTA List execution.

To minimize the amount of downtime for the associated ACB or DMB, precede the ACB reload with a /STOP PGM command or precede the DMB reload with a /DBR command. Then follow the reload with a /START command.

AUTO

AUTO specifies whether DELTA IMS should automatically reinitialize application directories for each application (ACB) that is sensitive to the DMB being reloaded. The AUTO option is ignored if ACB is specified on the TYPE parameter.

This feature is optional because of the performance implication to IMS. A significant amount of I/O to ACBLIB may be incurred. The I/O is overlapped with all control region functions except MPP/BMP scheduling so that no new applications will be scheduled while the auto reload is processing. If AUTO is not used, you must manually issue DELTA IMS reloads for each ACB referencing the database before reloading the DMB.

DELTA IMS determines database sensitivity in two ways:

■ Applications are considered sensitive if their in-memory intent lists reference the named database.
■ The ACBLIB directory is scanned for ACBs that have been generated since the database’s DMB was generated. For each ACB found to be regenerated
that is also defined to IMS, the intent list will be read and scanned for the DMB reference.

RAND

The **RAND** option specifies whether DELTA IMS should reload a new copy of the randomizer module identified in the ACBLIB. The default is **NO**.

If the name exists in the IMS system and **RAND=YES** is specified, DELTA IMS will ensure that all other DEDBs using the same randomizer name have been /DBRed. The new copy of the randomizer will be loaded, all other DEDBs using the same randomizer will be updated to have the latest copy of the randomizer module, and warning message BMC2129 will be issued.

**RAND** is an optional feature because of the performance implication to IMS. The **RAND** option is ignored if the database is not a Fast Path DEDB.

If the randomizer name is new, DELTA IMS will load the new randomizer module regardless of the **RAND** option.

### Inserting an Execute Element

If **EXECUTE** is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry causes DELTA IMS to issue the IMS command to the IMS control region at execution time.

**Figure 32: Edit DELTA List Panel - EXECUTE**

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>Scroll</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>DELTA IMS DB/DC - Edit DELTA List</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELTA Mode . . . 3   1. Summary   2. Modified   3. Detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricting IMSID ****</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELTA List . . . NEWLIST_</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title . . . . . . ______________________________</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------ --------------- ----------------------------------- -------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>000001 EXECUTE         Command . . . . . . . . . . . . . . /STOP________</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KEYWORD     Keyword . . . . . . . . . . . . . . DB=__________</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARAMETER   Parameter . . . . . . . . . . . . . TESTDB1_</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARAMETER   Parameter . . . . . . . . . . . . . TESTDB2_</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following fields are available on this panel:

**EXECUTE**

DELTA IMS allows you to enter IMS operator commands from a DELTA list. All operator commands (AOI commands) described in the IBM publication *IMS Command Reference* can be included in a DELTA List with the exception of the /FORMAT command.
KEYWORD

The **KEYWORD** field specifies the target element of the operator function (VTAM node, database, application, terminal, etc.). Keywords follow the guidelines and restrictions found in the IBM publication *IMS/ESA Customization Guide: DC*.

DELTA List conventions require a keyword parameter for all commands; however, you can use certain IMS commands such as `/CHECKPOINT` without a keyword. In these instances, you can use the special keyword of a single period (`.`).

PARAMETER

Type any additional keywords or values required for the successful execution of the operator command in the **PARAMETER** field. Each parameter line is limited to eight characters. You can add or delete parameter lines with the **EXTEND** line command. See “Line Commands” on page 84 for more information on the **EXTEND (E)** line command.

---

**Inserting a Comment Element**

If **COMMENT** is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds a user comment to the DELTA List.

If requested in the global options, history information about the execution of a DELTA List is saved in the DELTA List as a comment element that cannot be deleted. See the installation guide for information on global options and how to generate and save history information.

**Figure 33: Edit DELTA List Panel – COMMENTS**

<table>
<thead>
<tr>
<th>ED</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>Scroll === PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ===&gt;</td>
<td>Scroll ===&gt; PAGE</td>
<td>DELTA Mode ... 3 1. Summary 2. Modified 3. Detail</td>
</tr>
<tr>
<td>Restricting IMSID ****</td>
<td>DELTA List ... NEWLIST</td>
<td></td>
</tr>
<tr>
<td>Title . . . . NEWLIST</td>
<td>Element 000001 of 000002</td>
<td></td>
</tr>
<tr>
<td>SAMPLE DELTA LIST</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>000001 *</td>
<td>------------------</td>
<td></td>
</tr>
</tbody>
</table>

****************************************************** BOTTOM OF DATA ******************************************************
Inserting DELTA List Elements for IMS Control Regions Only

The following DELTA list elements apply only to IMS control regions and will not appear in the DELTA IMS for DBCTL tier view. Executing these DELTA list elements against a DBCTL region will have no effect.

Although you can copy and revise elements, this section describes DELTA List elements as if each has been inserted to a new delta list. Modifications are possible for each DELTA List element, excluding **RELOAD** and **EXECUTE**.

Inserting a Transaction Element

If **TRANSACT** is selected from the Edit Insert panel, DELTA IMS inserts the DELTA List entry shown in the following figures. This entry adds a transaction to an online IMS system.

To revise an existing transaction, see “Copying and Revising DELTA List Elements” on page 113.
The following fields are available on this panel:

**ADD TRANSACT**

A **TRANSACT** name is required and must be unique. The naming conventions are the same as for an IMSGEN.

**APPLCTN**

The **APPLCTN** parameter is required unless the transaction associated with the PSB is defined to a remote system. The PSB name can be a PSB created during an IMSGEN, one added previously by a DELTA List execution, or one added during the execution of the current list.

The DELTA List edit routine does not reject the insertion or revision of a transaction if the name of the PSB is missing. If the PSB name is required (because the transaction is defined to the local IMS system) and you do not supply it, DELTA List Check or Execute processing will fail.

**WFI, PRTY, MSGTYPE, PROCLIM, SCHD, and INQUIRY**

These parameters are the same as for a normal IMSGEN when defining a TRANSACT. Because these fields are validated at entry, certain entries may be rejected, even though they appear valid. For example, the **INQUIRY(2)** field cannot be set to **NO** unless the **INQUIRY(1)** field has previously been set to **YES** and the **SPA(1)** field has been set to 0.
PARLIM

Specify **NONE**, which is the default, to indicate that no parallel processing is allowed. Specify **0** through **32767** to indicate that parallel processing is allowed.

FPATH

**FPATH** is a required parameter with a **YES** or **NO** specification. It is equivalent to the **FPATH** keyword parameter of the TRANSACT macro used during an IMSGEN. It indicates whether the transaction can be processed by the Fast Path feature of IMS.

Fast Path transactions must be single segment input, response mode, non-MSC remote, and non-conversational. These transactions may not currently have any messages on the message queue and a Fast Path route code must exist with a route code name identical to the transaction code.

*Note*

If a route code does not exist, insert the DELTA ListADD RTCODEelement before the ADD TRAN element.

The Fast Path status of the transaction will be one of the following: non-Fast Path, Fast Path potential, or Fast Path exclusive. The status selected depends in part on whether the PSB referenced is Fast Path.

- **Non-Fast Path**: Both the APPLCTN and TRANSACTION specified **FPATH=NO**.
- **Fast Path potential**: The APPLCTN specified **FPATH=NO** and the TRANSACTION specified **FPATH=YES**.
- **Fast Path exclusive**: The APPLCTN (PSB) specified **FPATH=YES**. In this case, the TRANSACTION can specify **FPATH=YES** or **FPATH=NO**.

DELTA IMS automatically sets the sync point per transaction (MODE=SNGL) and recoverable transaction options for a Fast Path transaction.

FPSIZE

The **FPSIZE** parameter specifies the Fast Path EMH buffer size. It corresponds to the **FPATH=YES** parameter in the IMS TRANSACT macro. If **FPSIZE** is greater than zero, **FPATH=YES** is implied.

MODE

The **MODE** parameter can be set to **YES** (SNGL) or **NO** (MULT). The default is **NO(MULT)**. IMS requires MODE=SNGL for conversational and wait-for-
input (WFI) transactions; therefore, if a conversational or WFI transaction is added via DELTA IMS, MODE=SNGL is forced, regardless of what is specified in the MODE field.

EDIT(1), SPA, SEGSIZE and SEGNO

These parameters are the same as for a normal IMMSGEN when defining a TRANSACT. Because these fields are validated at entry, certain entries can be rejected even though they may appear to the user to be valid. For example, if the INQUIRY(2) field is currently set to NO, any attempt to set the SPA(1) field to a nonzero value is rejected.

EDIT(2)

The Input Edit Routine for this transaction code can be set the same as another transaction code that is already defined to IMS which uses the same input edit routine that is defined for this transaction.

To copy an Input Edit routine from one transaction to another, specify an existing transaction code that uses the required Input Edit Routine in the EDIT(2) field. The transaction code specified must be one that has already been defined to IMS. DELTA IMS updates the transaction code being added or revised to use the same Input Edit Routine as the transaction named in the EDIT(2) field or none if it does not use one.

To use the revise operation to delete an Input Edit routine from a transaction, type NONE in the EDIT(2) field.

SPA (1)

This is the only valid SPA field for SPA=(size).

SPA (2)

The STRUNC or RTRUNC option may be specified. If either option is used, that specification is set for the conversation and is used for the SPA inserted into the output message.

SYSID, ROUTING, and DCLWA

The SYSID, ROUTING, and DCLWA parameters are the same as the keyword parameters for a normal IMMSGEN when defining a TRANSACT. For example, specifying a SYSID for the transaction does not create a PDIR (application) control block.

SERIAL and MAXRGN

The SERIAL and MAXRGN parameters are the same as for a normal IMMSGEN when defining a TRANSACT.
AOI

The AOI parameter indicates whether the transaction is allowed to issue the Automated Operator Interface (AOI) command call (IMS 9.1 and later).

FORCE

The FORCE parameter requires a YES or NO value. If you specify NO, the transaction is not modified if its queue count is greater than zero. If you specify YES, the transaction is modified regardless of its queue count.

The FORCE keyword is ignored for requests that revise and rename transactions.

The FORCE=YES is ignored for queued transactions when a request to revise a transaction also renames the transaction, or when an attempt is made to revise a local transaction to a remote transaction (or vice versa).

Avoiding IMS Transaction Parameter Conflicts

DELTA IMS avoids IMS transaction parameter conflicts by modifying parameter values when a conflict is detected.

If a new parameter value is entered which DELTA IMS recognizes as being in conflict with other transaction parameter(s), the following actions occur:

- The new parameter is identified with the NOTE flag.
- The conflicting parameter(s) are changed to eliminate the conflict.
- Message BMC1881, "DATA VALUES CHANGED," is issued. To find out which parameter(s) changed, issue the HELP command to display another BMCnnnn-type message detailing the enforced change.

The following table shows the transaction parameters that are checked for conflicts.

<table>
<thead>
<tr>
<th>When these parameters are entered as</th>
<th>The following parameters are enforced as</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFI=YES</td>
<td>MODE=YES (SNGL)</td>
</tr>
<tr>
<td>MSGTYPE(1)=YES</td>
<td>FPATH=NO</td>
</tr>
<tr>
<td>MSGTYPE(2)=NO</td>
<td>FPATH=NO</td>
</tr>
<tr>
<td>PARLIM=greater than or = to 0</td>
<td>SERIAL=NO</td>
</tr>
<tr>
<td>INQ(1)=NO</td>
<td>INQ(2)=YES</td>
</tr>
</tbody>
</table>

Inserting DELTA List Elements for IMS Control Regions Only
<table>
<thead>
<tr>
<th>When these parameters are entered as</th>
<th>The following parameters are enforced as</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPATH=YES</td>
<td>MSGTYPE(1)=NO (SNGLSEG)</td>
</tr>
<tr>
<td></td>
<td>MSGTYPE(2)=YES (RESPONSE)</td>
</tr>
<tr>
<td></td>
<td>INQ(2)=YES</td>
</tr>
<tr>
<td></td>
<td>MODE=YES (SNGL)</td>
</tr>
<tr>
<td></td>
<td>SYSID(1) = SYSID(2)</td>
</tr>
<tr>
<td>MODE=NO(MULT)</td>
<td>WFI=NO</td>
</tr>
<tr>
<td></td>
<td>FPATH=NO</td>
</tr>
<tr>
<td></td>
<td>SPA(1)=0</td>
</tr>
<tr>
<td>SPA(1)=greater than 0</td>
<td>INQ(2)=YES</td>
</tr>
<tr>
<td></td>
<td>MODE=YES (SNGL)</td>
</tr>
<tr>
<td>SYSID</td>
<td>FPATH=NO</td>
</tr>
<tr>
<td>SERIAL=YES</td>
<td>PARLIM=0</td>
</tr>
<tr>
<td></td>
<td>MAXRGN=0</td>
</tr>
<tr>
<td>MAXRGN=greater than 0</td>
<td>SERIAL=NO</td>
</tr>
</tbody>
</table>

Inserting a Terminal Element

If **TERMINAL** is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds a VTAM terminal to an online IMS system.

To revise an existing VTAM terminal, see “Copying and Revising DELTA List Elements” on page 113.

**Figure 37: Edit DELTA List Panel - TERMINAL**

The following fields are available on this panel:
ADD TERMINAL

A unique TERMINAL node name is required. Virtual terminals cannot be renamed. The naming conventions are the same as for an IMSGEN.

MASK

DELTA IMS uses the MASK parameter during DELTA List execution to locate a spare terminal. MASK describes to DELTA IMS what spare node names look like. The mask is compared to terminal node names defined to the IMS control region until a match is found. Only those positions not containing asterisks (*) participate in the matching process. If the terminal found is eligible, it is used for this addition.

By default, this field displays the value you specified the last time you created a TERMINAL DELTA List, regardless of whether or not you saved the DELTA List. The mask cannot contain any blanks. It can contain one or more leading and/or trailing asterisks. Otherwise, naming conventions for masks are the same as for terminal names.

SECURITY

The SECURITY parameter is used to explicitly set or reset signon-required status for this terminal. A YES entry activates signon-required status, and a NO entry turns off signon-required status. A blank or an omitted entry sets the signon-required status to whatever the system-wide defaults are for the IMS system.

Inserting an LTERM Element

If LTERM is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds a logical terminal to an online IMS system.

To revise an existing LTERM, see “Copying and Revising DELTA List Elements” on page 113.

Figure 38: Edit DELTA List Panel - LTERM

<table>
<thead>
<tr>
<th>ED Command</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>Scroll ==&gt; PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELTA Mode</td>
<td>3</td>
<td>1. Summary 2. Modified 3. Detail</td>
</tr>
<tr>
<td>Restricting IMSID</td>
<td>****</td>
<td></td>
</tr>
<tr>
<td>DELTA List</td>
<td>NEWLIST</td>
<td>Element 000001 of 000001</td>
</tr>
<tr>
<td>Title</td>
<td>SAMPLE DELTA LIST</td>
<td></td>
</tr>
<tr>
<td>000001 ADD LTERM</td>
<td>Logical terminal name ____________________</td>
<td>&lt;==REQ</td>
</tr>
<tr>
<td>MASK</td>
<td>Spare element mask ____________________</td>
<td>$$LT$$____</td>
</tr>
<tr>
<td>ASSIGN</td>
<td>Assign this LTERM to node/subpool ____________________</td>
<td></td>
</tr>
<tr>
<td>MSNAME</td>
<td>MSC - Logical link path name ____________________</td>
<td></td>
</tr>
<tr>
<td>ISC</td>
<td>Is this an LU 6.1 subpool LTERM? \ NO</td>
<td></td>
</tr>
</tbody>
</table>
The following fields are available on this panel:

**ADD LTERM**

An LTERM name is required and must be unique. The naming conventions are the same as for an IMSGEN.

**MASK**

DELTA IMS uses the MASK parameter during DELTA List execution to locate a spare LTERM. MASK describes to DELTA IMS what spare LTERM names look like. The mask is compared to LTERM names defined to the IMS control region until a match is found. Only those positions not containing asterisks (*) participate in the matching process. If the LTERM found is eligible, it is used for this addition.

The mask name displayed initially is the last mask name used under the specific TSO user ID for creating a DELTA List to add an LTERM, even if the previous DELTA List creation was not saved. The mask may not contain any blanks. It may contain one or more leading and/or trailing asterisks. Otherwise, naming conventions for masks are the same as for LTERM names. If the spare element mask references a remote LTERM, an MSNAME must be provided.

**ASSIGN**

The ASSIGN parameter is used to request assignment of this LTERM to the specified VTAM node or LU 6.1 subpool. The node may not be the Primary or Secondary Master Terminal.

**MSNAME**

Use the MSNAME parameter to indicate that the LTERM entry should be defined as a remote LTERM and to specify the link name block name of the desired logical MSLINK. The MSNAME parameter is only valid on systems using the Multiple Systems Coupling (MSC) feature. If MSNAME is specified, omit ASSIGN, and set ISC to NO.

**ISC**

The ISC parameter specifies whether this is an LU 6.1 subpool LTERM. This fields contains either a YES or NO value. If you specify YES, you cannot specify the MSNAME parameter.
Inserting an APPC Element

DELTA IMS allows you to modify the APPC TP_PROFILE data set. If APPC is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds information to the APPC TP_PROFILE data set.

To use an existing APPC element as a basis for creating a new APPC element, see “Copying and Revising DELTA List Elements” on page 113.

Note

To revise an existing entry in the TP_PROFILE data set, the existing entry must be deleted and then added again with the updated information.

The following fields are available on this panel:

ADD APPC

Type the name of the transaction program (TP) in the ADD APPC field. The TP name can be up to 12 characters long.

APPCTYPE

Specify the type of APPC/MVS information you want to add, delete, or modify in the APPCTYPE field. TP_PROFILE is currently the only valid value for this field.

API_TYPE

Specify whether the TP uses the implicit or explicit API to retrieve or receive the initial data for the transaction in the API_TYPE field. Type IMPLICIT or I if the TP uses DL/I communications facilities to retrieve the initial data for
the transaction from the IO-PCB; type EXPLICIT or E if the TP uses SAA communications facilities to allocate resources and receive the initial transmission data for the transaction. See the appropriate IBM publication for additional information.

ACTIVE

Type YES or NO in the ACTIVE field to specify whether the TP_PROFILE data set is active to APPC/MVS.

LEVEL

Specify the TP_PROFILE audience level in the LEVEL field. Valid values for this field are SYSTEM, GROUPID, and USERID. Type SYSTEM if the TP can be used by all users on the system, GROUPID if only a specific group of users will use the TP, or USERID if only a particular user will use the TP.

LVLID

If you specified GROUPID or USERID in the LEVEL field, use this field to specify the group ID or user ID.

SCHED

Specify the exit used to check syntax of the scheduler section of the TP_PROFILE data in the SCHED field. DFSTPPE0 is the only valid value for this field; this exit is supplied by IBM with IMS.

Note

For DELTA IMS to update the TP_PROFILE data set, you must include this module in a LINKLIST data set.

TRAN

Type the IMS transaction code to be associated with this TP name in the TRAN field. The transaction code can be up to eight characters long.

If you specified IMPLICIT in the API_TYPE field, the transaction code must be defined to IMS. If you specified EXPLICIT in the API_TYPE field, the transaction code must not be defined to IMS. When you execute the DELTA List, DELTA IMS checks whether the transaction code you specify in this field has been defined to IMS.

ICLASS

If you specified EXPLICIT in the API_TYPE field, specify a value of 1 through 256 for the IMS scheduling class. This field is ignored if you specified IMPLICIT in the API_TYPE field.
MAXREGN

If you specified EXPLICIT in the API_TYPE field, specify the maximum number of dependent regions that this TP can use in the MAXREGN field. Valid values are 0 through 255. This field is ignored if you specified IMPLICIT in the API_TYPE field.

SECURITY

Specify the type of RACF security that IMS should use for this TP. Valid values for this field are NONE, CHECK, and FULL; CHECK is the default. Type NONE if IMS should call the DFSCTRN0 exit. Type CHECK if IMS should call RACF when IMS receives a transaction for this TP. Type FULL if IMS should clone the security environment when the TP is executed. See the appropriate IBM publication for additional information.

COMMENT

Use the COMMENT field to type a user comment.

Inserting a Route Code Element

If RTCODE is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds a Fast Path route code (RTCODE) to an online IMS system. The Fast Path feature must be present in the IMS system.

To revise an existing RTCODE, see “Copying and Revising DELTA List Elements” on page 113.

Note

When a new RTCODE element is added to a PSB by DELTA IMS, all IFP regions for the corresponding PSB must be stopped at the same time. The PDIRBALG in the master PDIR is then reset so that the BALG for the PSB may be rebuilt to incorporate the newly added route code when the IFPs are restarted. Otherwise, the new route code will not schedule, and error message DFS2533 will be generated.

Figure 40: Edit DELTA List Panel - RTCODE

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>1502 Verify data values</th>
<th>Scroll</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>DELTA IMS DB/DC - Edit DELTA List</td>
<td>1502 Verify data values</td>
<td>Scroll</td>
<td>PAGE</td>
</tr>
<tr>
<td>DELTA Mode . . . 3</td>
<td>1. Summary</td>
<td>2. Modified</td>
<td>3. Detail</td>
<td></td>
</tr>
<tr>
<td>Restricting IMSID ****</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELTA List . . . NEWLIST_</td>
<td>Element 000001 of 000001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title . . . . . . SAMPLE DELTA LIST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------</td>
<td>-----------------------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>000001 ADD RTCODE</td>
<td>Routing code name . . . . . . . . . . . . .</td>
<td>&lt;=REQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSB</td>
<td>Name of PSB . . . . . . . . . . . . . . . . . . . &lt;=REQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INQUIRY</td>
<td>Inquiry only? . . . . . . . . . . . . . . . . . . . NO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**********************************************</td>
<td>BOTTOM OF DATA **********************************************</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following fields are available on this panel:

**ADD RTCODE**

A RTCODE name is required and must be unique. The naming conventions are the same as for an IMSGEN.

**PSB**

A PSB name is required and must exist within the IMS system when this DELTA List is executed. If not, DELTA IMS will issue an error message at DELTA List execution time. The PSB name can be a PSB created during an IMSGEN, one added previously by a DELTA List execution, or one added during the execution of the current list.

**INQUIRY**

Type **YES** or **NO** to specify whether the message directed by the INQUIRY route code is inquiry only.

## Inserting a Subpool Element

If **SUBPOOL** is selected from the Edit Insert panel, DELTA IMS displays the DELTA List entry shown in the following figure. This entry adds a VTAM LU 6.1 subpool to the DELTA List. You can add or revise subpools.

To revise an existing subpool, see “Copying and Revising DELTA List Elements” on page 113.

### Figure 41: Edit DELTA List Panel - SUBPOOL

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Edit DELTA List</th>
<th>1502 Verify data values</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELTA Mode</td>
<td>3</td>
<td>1. Summary</td>
</tr>
<tr>
<td>Restricting IMSID</td>
<td>****</td>
<td></td>
</tr>
<tr>
<td>DELTA List</td>
<td>NEWLIST</td>
<td>Element 000001 of 000001</td>
</tr>
<tr>
<td>Title</td>
<td>SAMPLE DELTA LIST</td>
<td>000001 ADD SUBPOOL</td>
</tr>
</tbody>
</table>

The following fields are available on this panel:

**ADD SUBPOOL**

A **SUBPOOL** name is required and must be unique. The naming conventions are the same as for an IMSGEN.
MASK

DELTA IMS uses the MASK parameter during DELTA List execution to locate a spare subpool. MASK describes to DELTA IMS what spare subpools look like. The mask is compared to subpool names defined to the IMS control region until a match is found. Only those positions not containing asterisks (*) participate in the matching process. If the subpool found is eligible, it is used for this addition.

The mask name displayed initially is the last mask name used under the specific TSO user ID for creating a DELTA List to add a subpool, even if the previous DELTA List creation was not saved. The mask cannot contain any blanks. It can contain one or more leading and/or trailing asterisks. Otherwise, naming conventions for masks are the same as for subpool names.

MSGDEL

Type SYSINFO or NONIOPCB to delete SYSINFO or NONIOPCB messages. If you leave this field blank, the MSGDEL value defined in the spare element is used.

Editing DELTA List Elements

You access the Edit Insert panel, shown in the following figure, from the Edit Delta List panel by typing an INSERT (I) line command at the point in the DELTA List where you want to insert a new element. The panel also displays when you begin a new DELTA List Edit session for an empty DELTA List.

Besides inserting default add elements to the DELTA List, you can use the Edit Insert panel to insert a copy of an existing IMS element (defined either in the Stage 1 source or dynamically by DELTA IMS) or to insert a request to revise an existing IMS element. You can also enter a delete request on this panel.

Figure 42: DELTA Edit Insert Panel

<table>
<thead>
<tr>
<th>Action Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATABASE</td>
<td>Define data base directory entry</td>
</tr>
<tr>
<td>APPLCTN</td>
<td>Define program directory entry</td>
</tr>
<tr>
<td>TRANSACT</td>
<td>Define transaction code</td>
</tr>
<tr>
<td>TERMINAL</td>
<td>Define VTAM terminal</td>
</tr>
<tr>
<td>LTERM</td>
<td>Define logical terminal</td>
</tr>
<tr>
<td>RELOAD</td>
<td>Reinitialize PDIR/DDIR</td>
</tr>
<tr>
<td>EXECUTE</td>
<td>Execute IMS operator command</td>
</tr>
<tr>
<td>APPC</td>
<td>Define APPC TP Profile</td>
</tr>
<tr>
<td>RTCODE</td>
<td>Define Fast Path route code</td>
</tr>
</tbody>
</table>
The following fields are available on this panel:

**Action**

Type one or more of the following action codes next to one or more element types:

- **S** – Insert an add element action for any of the listed element types.
- **D** – Insert a delete element action for any of the listed element types.
  
  DELTA IMS delete element requests can be included in a DELTA List for databases, applications, transactions, and route codes only. When DELTA IMS is used to delete one of these IMS elements, it does not physically remove the control block from IMS storage; instead, it sets a delete bit on in the control block, thereby making it unavailable for use. The element cannot be displayed or used with IMS; however, it remains in virtual storage. Subsequent attempts to delete these already deleted elements are ignored, no error message is generated, and delete processing continues.

- **C** – Start the copy process by displaying the Copy/Revise panel.
- **R** – Start the revise process by displaying the Copy/Revise panel.

**Type**

The element type selected for the action.

**Description**

A description of the element type.

### Copying and Revising DELTA List Elements

If any element on the Edit Insert panel is selected as a copy or revise, a Copy/Revise panel similar to the sample panel shown in the following figure is displayed. This panel and the Copy/Revise function do not apply to **RELOAD** or **EXECUTE** elements.

**Figure 43: Copy/Revise Panel**

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Copy/Revise</th>
</tr>
</thead>
</table>

---

**Note**

DATABASE, APPLCTN, RELOAD, EXECUTE, and **COMMENT** are options that apply to both IMS control and DBCTL regions.
You have chosen to extract a copy of an APPLCTN defined to IMS.

- IMSID from which the APPLCTN is to be extracted . . . . . . . DLA5
- Type the name of the APPLCTN to copy . . . . . . . . . . . . . ________

Select one of the following. Then press Enter.

1. Extract only the APPLCTN
2. Include all TRANSACTs for the APPLCTN

Use the END command to return to the DELTA List Insert Menu.

Copy and Revise Operations

After the initial copy/revise, you can select subsequent copy/revise operations from the Edit Insert panel until you enter the END command.

Elements to be revised are copied directly from the IMS control region and are presented in the DELTA List as REVISE elements. Because the DELTA List is revising a particular element at execution time, it is not possible to change the name of the element and the arrow to the left of the value field is replaced with four hyphens. However, you can update detail lines of the element.

Elements to be copied from the IMS control region appear in the DELTA List as ADD element entries, with the name of the copied element included. It is important that you change the name or IMSID of the copied element to avoid the possibility of duplicate element names in the IMS control region.

An existing database is modified by selecting DATABASE as the element to be revised from the Edit Insert panel. The IMS control region where the database resides and the name of the database are then defined on the DELTA IMS - Copy/Revise panel.

When the DELTA List is executed, the named element type must be stopped and not opened in the online region before DELTA IMS will complete the REVISE operation. If the element is not stopped, DELTA IMS will display the Execute Error Recovery panel, at which point you can stop the particular element and retry the DELTA List execution.

To minimize the amount of downtime for the associated element, precede the revise with a /STOP command. Then follow the revise with a /START command.

Examples of Revise

The following three sample panels show the results of revising the DATABASE, APPLCTN, TRANSACT, TERMINAL and LTERM elements existing in the system.

Figure 44: Result of Revising the DATABASE and APPLCTN Elements
### Figure 45: Result of Revising the TRANSACT Element

<table>
<thead>
<tr>
<th>DELTA List</th>
<th>WREVISI</th>
<th>Element 000001 of 000005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Element</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>000001 REVISE DATABASE</td>
<td>Name of DBD</td>
<td>: DBFSAMD3____</td>
</tr>
<tr>
<td>RENAME</td>
<td>New name.</td>
<td>. . . . . . . . . .</td>
</tr>
<tr>
<td>RESIDENT</td>
<td>DBD always in main storage?</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>ACCESS</td>
<td>Access is EX, RO, RD, or UP</td>
<td>. . . . . . . . . . UP</td>
</tr>
<tr>
<td>AUTO</td>
<td>Should sensitive ACBs be reloaded?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>RAND</td>
<td>Should DEDB Randomizer be loaded?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>000002 REVISE APPLCTN</td>
<td>Name of PSB</td>
<td>: LCPTRAN1____</td>
</tr>
<tr>
<td>RENAME</td>
<td>New name.</td>
<td>. . . . . . . . . .</td>
</tr>
<tr>
<td>RESIDENT</td>
<td>PSB always in main storage?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>PGM TYPE</td>
<td>Program is a BMP or MPP</td>
<td>. . . . . . . . . . MPP</td>
</tr>
<tr>
<td>SCHD TYP</td>
<td>Schedule serial or parallel</td>
<td>. . . . . . . . . . SERIAL</td>
</tr>
<tr>
<td>FPATH</td>
<td>Fast Path program?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>DOPT</td>
<td>Dynamic PSB modification?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>GPSB</td>
<td>Dynamically Generate a PSB?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>LANG</td>
<td>Programming language interface</td>
<td>. . . . . . . . . . NONE</td>
</tr>
<tr>
<td>SYSID(1)</td>
<td>MSC - remote system ID</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>SYSID(2)</td>
<td>MSC - local system ID</td>
<td>. . . . . . . . . . 0</td>
</tr>
</tbody>
</table>

### Figure 46: Result of Revising the TERMINAL and LTERM Elements

<table>
<thead>
<tr>
<th>DELTA List</th>
<th>WREVISI</th>
<th>Element 000001 of 000005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Element</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>000003 REVISE TRANSACT</td>
<td>Transaction code.</td>
<td>: LCPTRAN1</td>
</tr>
<tr>
<td>RENAME</td>
<td>New name.</td>
<td>. . . . . . . . . .</td>
</tr>
<tr>
<td>APPLCTN</td>
<td>Name of PSB</td>
<td>: LCPTRAN1</td>
</tr>
<tr>
<td>WFI</td>
<td>Wait for input BMP?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>PRTY(1)</td>
<td>Normal priority</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>PRTY(2)</td>
<td>Limit priority</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>PRTY(3)</td>
<td>Limit count</td>
<td>. . . . . . . . . . 65,535</td>
</tr>
<tr>
<td>MSG TYPE(1)</td>
<td>Multiple segment input</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>MSG TYPE(2)</td>
<td>Transaction response mode</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>MSG TYPE(3)</td>
<td>Transaction class</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>PROCLIM(1)</td>
<td>Processing limit count</td>
<td>. . . . . . . . . . 65,535</td>
</tr>
<tr>
<td>PROCLIM(2)</td>
<td>Processing time in seconds</td>
<td>. . . . . . . . . . 65,535</td>
</tr>
<tr>
<td>PARLIM</td>
<td>Parallel processing limit</td>
<td>. . . . . . . . . . NONE</td>
</tr>
<tr>
<td>SCHD</td>
<td>Option if unschedulable</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>INQUIRY(1)</td>
<td>Inquiry only transaction?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>INQUIRY(2)</td>
<td>Recoverable transaction?</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>FPATH</td>
<td>Fast path transaction?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>FPSIZE</td>
<td>Fast Path EMH buffer size</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>MODE</td>
<td>Sync point per transaction?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>EDIT(1)</td>
<td>Translate input to upper case?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>EDIT(2)</td>
<td>Set INPUT-EDIT exit same as tran</td>
<td>. . . . . . . . . .</td>
</tr>
<tr>
<td>SPA(1)</td>
<td>SPA size if conversational</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>SPA(2)</td>
<td>SPA STRUNC/RTRUNC (option 6.1)</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>SEG SIZE</td>
<td>Maximum output segment size</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>SEGNO</td>
<td>Maximum # output msg segments</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>SYSID(1)</td>
<td>MSC - remote system ID</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>SYSID(2)</td>
<td>MSC - local system ID</td>
<td>. . . . . . . . . . 1</td>
</tr>
<tr>
<td>ROUTING</td>
<td>MSC - pass origin to application?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>DCLWA</td>
<td>DC log write ahead?</td>
<td>. . . . . . . . . . YES</td>
</tr>
<tr>
<td>SERIAL</td>
<td>Serial processing of messages?</td>
<td>. . . . . . . . . . NO</td>
</tr>
<tr>
<td>MAX RGN</td>
<td>Max regions allowed to schedule</td>
<td>. . . . . . . . . . 0</td>
</tr>
<tr>
<td>FORCE</td>
<td>Update when non-zero queue counts?</td>
<td>. . . . . . . . . . NO</td>
</tr>
</tbody>
</table>
Using the Search and Revise Commands

The `SEARCH/REVISE` and `RSEARCH/RREVISE` commands provide the ability to find and change character strings contained in a DELTA List.

The power and convenience of these commands becomes apparent in the various techniques that you can use to specify or limit a particular search or revision of the DELTA List field values.

The following types of qualification can be used when performing a search:

- search direction
- search context
- type
- field
- value or mask
- value range

To perform a search, type `SEARCH` or `S` on the `Command` line of the DELTA IMS - Edit DELTA List panel and press `Enter`. To perform a combined search/revise operation, type `REVISE` or `REV` on the `Command` line and press `Enter`.

In either case, the DELTA IMS - Edit Search/Revise panel is displayed as shown in the following panel.

**Figure 47: Edit Search/ Revise Panel**

```
SR                      DELTA IMS - Edit Search
Command ===> __________ Scroll ===> PAGE

Verify the parameters. Then press Enter to start a search.

Search direction ... 1  1. Next  2. Previous  3. First  4. Last  5. All
Select one or more from each column. Type a Search argument.
```
The following fields are available on this panel:

**Search Direction**

You can control the starting point, direction, and extent of the search. You can start or resume the search from the current cursor position and proceed either from top to bottom or from bottom to top. You can also start from the first element or last, and you can start from the top and search for all occurrences until the last match is found.

Select one of the following values to establish the search direction:

- **1. Next** – Start or resume a search from the current cursor position and proceed from top to bottom until the next match is found.
- **2. Previous** – Start or resume a search from the current cursor position and proceed from bottom to top until the previous match is found.
- **3. First** – Start a search from the first element and proceed from top to bottom until the first match is found.
- **4. Last** – Start a search from the last element and proceed from bottom to top until the last match is found.
- **5. All** – Start from the top and find all occurrences of the desired data.

**Search Context**

You can control the conditions for a successful match of the desired string based on whether the matched data begins and/or ends with a nonalphanumeric character (special characters such as plus signs, dashes, parentheses, apostrophes, or blanks). You can find a match regardless of context or a match where the desired string is prefix, suffix, or a separate word.

Select one of the following values to establish the search context:
1. **Any** – Find a match in any string regardless of context (such as the *DO* in DO-IT-YOURSELF, DON’T, ADOPT, and BULLDOZER).

2. **Prefix** – Find a match where the desired string is the prefix of a word (such as the *DO* in DON’T and DOWNLOAD but not in ADO, ADOPT, or BULLDOZER).

3. **Suffix** – Find a match where the desired string is the suffix of a word (such as the *IT* in EXHIBIT and RABBIT but not in IT’S, DITCH, or HOSPITAL).

4. **Word** – Find a match where the desired string is a separate word (such as the *AS* in AS or COME-AS-YOU-ARE but not in ASSUME, CASUAL, or HASN’T).

**Type**

You can select one or more types of DELTA List elements so that a search is limited to the specified types of elements. For example, if you specify that the search include only DATABASE, APPLCTN, and TRANSACT type elements, then matching data in a COMMENT or LTERM element is not found in the search.

To search all DELTA List element types, select *ALL*. To search for specific element types, select the individual element name(s).

**Field**

You can select one or more individual fields of a DELTA List element so that a search is limited to the specified fields of an element.

To search all element fields, select *ALL*. To search specific element fields, select the individual element name.

You can also select any valid combination of **Element type** and **Field** by typing / next to the appropriate type and field names.

The standard TSO/ISPF scrolling keys and a **LOCATE** command are supported. You can use all normal TSO/ISPF forms of scrolling, such as **PAGE**, **DATA**, and **CSR** to reposition the fields list to the desired field name. You can also use a **LOCATE** command followed by the name of the desired field to position to a specific field name. For field names that occur in multiple element types, you can type two operands with the **LOCATE** command: the element name followed by the field name.

**Value or Mask**

When typing the desired string, you can enter a normal character string or a masking character string so that you can search for a particular type of value
without regard for the specific characters. To enter a masking string, specify any desired specific characters mixed with asterisks (*) in each position (even trailing positions) where you do not care about the specific value. When typed at the beginning or end of a masking character string, wildcard characters can represent more than one character. For example, a masking string *DO* would match ADO, ADOPT, -DO-, (DON’T), +ADO, and ADO-; but not DO or DON’T.

You can type a search value or mask or a search value range pair, with the low value first and the high value second. Type either the search value/mask or the search range pair. If you provide both, the value range is ignored.

**Value Range**

When typing the desired string, you can provide a value range pair. Typically, this pair is used to search for ranges of numeric data values such as the priority values, limit counts, and so forth, found in a TRANSACT element. Since a value range attempts to interpret each DELTA List field as a unit data item, the search context criteria are automatically set to Word when a value range is specified.

**Search and Revise Operations**

If you originally entered a SEARCH command, press Enter to initiate the desired search.

If you originally entered a REVISE command, you must also provide a change-to string. Whenever the desired search string is successfully matched, the change-to string is used to replace the matched string.

After performing any valid search or revise operation, you can also use the RSEARCH and RREVISE commands to repeat the operation. In the same way that the TSO/ISPF EDIT RFIND and RCHANGE commands operate, the RSEARCH command repeats a search and the RREVISE repeats a revision. If you have function keys set up for the RFIND/RCHANGE commands, they are temporarily converted to RSEARCH/RREVISE commands for the duration of the DELTA List Edit session.

When a search/revise operation reaches the bottom of the DELTA List (assuming the search direction is from top to bottom), the next RSEARCH or RREVISE command resumes starting from the top of the DELTA List. Conversely, when the search direction is backwards (from bottom to top) and the top of the DELTA List is reached, the next RSEARCH or RREVISE command resumes starting from the bottom of the DELTA List.

Revised values are subjected to the same syntax and keyword table validation as if the value had been entered on the panel. When you have specified *ALL* as the search direction, an invalid value stops the operation so that you can manually correct the field in error.
Examples of Search and Revise

In the following example, a search operation is requested in all directions for any occurrence of the value MPP. The following figure shows the search conditions.

Figure 48: Sample Search Panel for MPP

The following figure shows the results of the search.

Figure 49: Results Search for MPP
In the following example, a search operation is requested in all directions for any occurrence of any value between A123 and B999. The following figure shows the search conditions.

**Figure 50: Sample Search Panel for Value from A123 to B999**

<table>
<thead>
<tr>
<th>Element type</th>
<th>Field</th>
<th>More</th>
<th>Search value or mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATABASE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPLCTN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSACT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TERMINAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LTERM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RELOAD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXECUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTCODE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPATH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DOPT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select one or more from each column. Type a Search argument.

<table>
<thead>
<tr>
<th>Search value range</th>
</tr>
</thead>
<tbody>
<tr>
<td>From . . . A123</td>
</tr>
<tr>
<td>To . . . . B999</td>
</tr>
</tbody>
</table>

The following figure shows the results of the previous search operation.

**Figure 51: Results of Search for Values Between A123 and B999**

<table>
<thead>
<tr>
<th>Title</th>
<th>Add APPLCTN</th>
<th>Name of PSB</th>
<th>RESIDENT</th>
<th>PSB always in main storage?</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>000001</td>
<td>A12345</td>
<td>A12345</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>000002</td>
<td>B67890</td>
<td>B67890</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>000003</td>
<td>C123456</td>
<td>C123456</td>
<td>NO</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

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In the following example, a search and revise operation is requested in all directions for the value MPP and a change to BMP. The following figure shows the search/revise conditions.

**Figure 52: Sample Search/Revise Panel for Changing MPP to BMP**

![Sample Search/Revise Panel for Changing MPP to BMP](image)

The following figure shows the results of the previous search and revise operation.

**Figure 53: Results of Search/Revise of MPP to BMP**

![Results of Search/Revise of MPP to BMP](image)

**IMS Catalog support for COPY**

To copy IMS Catalog APPLCTNs and DBs from the IMS control region to a DELTA List, you can use either the DELTA IMS online interface or the DELTA IMS CNTL library members DLA#BCP1 and DLA#BCP2.
IMS Catalog resources copied into a DELTA List are RELOAD elements *only*. For any other element type (for example, REVISE, ADD, or DELETE) in the DELTA List, a check error condition occurs and the copy does not execute.

DELTA IMS copies IMS Catalog DBs and APPLCTNs from IMS when IMS catalog resources are specified (for example, DFSCP*, DFSCD*, DFSCX000, DFSCP0001).

In contrast, DBs and APPLCTNs are not copied in the following cases:

- DBs are not copied if a COPY operation requests all IMS DBs.
- APPLCTNs are not copied if a COPY operation requests all IMS APPLCTNs.

If the DELTA IMS repository is active when a new configuration is created, IMS catalog resources are not written to the DELTA IMS repository. This is because, during IMS restart, IMS catalog resources are dynamically defined.
Using DELTA List Check and Execute

This chapter describes how to use the DELTA List Check and Execute functions of DELTA IMS.

Introduction

This chapter describes how you can check a DELTA List against the IMS control region without implementing the changes. The Check function verifies the elements you have inserted or changed on the DELTA List.

The Execute function implements the DELTA List on the IMS control region and logs all of the changes it makes. DELTA IMS verifies the user ID and IMSID to prevent unauthorized execution of a DELTA List.

You can generate a report of the elements on the DELTA Log as a result of the DELTA List Execute function. This report identifies the changes, any errors, and the date and time of each change and error.

Checking DELTA Lists Online

Once a DELTA List has been created or edited, you can check it without implementing the changes to the IMS control region or APPC data set. The Check function communicates with the IMS control region to verify whether the IMS or APPC additions or modifications can be made.

See “Executing a DELTA List” on page 132 for more information and instructions on executing a DELTA List to implement changes to the IMS control region or APPC data set.

The DELTA List Check function invokes the User Authorization Exit during a check of DELTA List elements that implement changes to IMS. The user ID validated
during Check can be that of the user actually performing the Check or of the user who last edited the DELTA List. Use the Global Options panel to specify which user ID is presented to the authorization exit. Refer to the installation guide for information on setting global options. The User Authorization Exit is not invoked during a check of DELTA List elements that implement APPC changes.

IMS operator commands presented in a DELTA List are skipped during the Check process.

---

**Note**

A DELTA List may contain multiple elements to be changed. An element that is dependent on a prior element may result in a error during check processing because the first element has not really been changed. This error will not occur during DELTA List execution.

---

### Beginning a DELTA IMS Session to Check a DELTA List

You access the panels that allow you to check a DELTA List from the DELTA IMS Primary Menu.

See “DELTA IMS Interface and Tier Views” on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.

From the DELTA IMS Primary Menu, type 2 in the selection field. If you know the name of the DELTA List you want to check, type the name in the **DELTA List name** field. Press **Enter**. The panel that is displayed depends on whether you completed the **DELTA List name** field.

- If the **DELTA List name** field is blank, the Check Select panel is displayed, allowing you to select the DELTA List you want to check. See “Selecting a DELTA List to Check” on page 126 for additional instructions.

- If the **DELTA List name** field contains the name of an existing DELTA List, the Check DELTA List panel is displayed. See “Checking a DELTA List” on page 128 for additional instructions.

### Selecting a DELTA List to Check

If you did not specify a Delta List name on the DELTA IMS Primary menu, the Check Select panel, shown in the following figure, allows you to select the DELTA List you want to check.

**Figure 54: Check Select Panel**

| CS | DELTA IMS DB/DC - Check Select |

---

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The following fields are available on this panel:

**Act**

Type one of the following action codes next to one or more of the member names listed on the panel:

- **S** – Select the DELTA List.
- **E** – Edit the DELTA List.
- **C** – Check or browse the DELTA List.
- **X** – Execute the DELTA List.
- **D** – Delete the DELTA List.

Update and Control access authority is required to delete a DELTA List.

**Member**

The DELTA IMS PDS member name for the DELTA List.

**Title**

An optional descriptive title of up to 30 characters typed on the DELTA List Edit panel. The title provides a description of each DELTA List as an aid in list management.

With ISPF Version 2.3 or later, DBCS-capable terminals (such as the IBM 5550) can edit the **Title** field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

**Last Modification Date, Time, Userid**

The individual responsible for the last update of each DELTA List and the date and time the last update was performed.
Checking a DELTA List

You can access the Check DELTA List panel, shown in the following figure, directly from the Primary Menu if a DELTA List name is provided or from the Check Select panel if the **DELTA List name** field is left blank.

**Figure 55: Check DELTA List Panel**

```plaintext
CH                     DELTA IMS DB/DC- Check DELTA List
Command ===> _____________________________________________ Scroll ===> PAGE
BMC1518 Use "GO" or "RUN" command to begin check
IMSID . . . . . . IMSA
DELTA List . . . BSMTESTD Element 000001 of 000002
Title . . . . . : GENERATED LIST: DELTA LOG BSM0
000001 ADD APPLCTN  Name of PSB . . . . . . . . . . . : CONVAPPL
000002 ADD TRANSACT  Transaction code. . . . . . . . . : CONVTRAN
******************************************************************************
```

The following commands can be issued from the **Command** area:

**GO or RUN**

You can start a DELTA List Check from the Check DELTA List panel using the **GO** or **RUN** commands. The Check will halt for errors and warnings. As it progresses, the line being checked will have its number replaced with an arrow. A six-character numeric argument can be specified with the **GO** or **RUN** commands to start the Check on a specified DELTA List line number.

**Comparing Check and Execute**

A DELTA List Check behaves exactly as a DELTA List Execute does, except that Check does not implement the requested changes to IMS and/or APPC, nor does it actually execute IMS commands stored in the DELTA List. Nothing is logged as a result of the Check function.

When the action taken by one DELTA List entry may affect the action taken by another, Check may appear to behave incorrectly. For example, your DELTA List may have entries to first delete the databases DBSE1 and DBSE2 and then delete the application APPL2. When a Check is done to this DELTA List, an error may occur when the instruction to delete APPL2 is checked because the deletes of DBSE1 and DBSE2 were not actually implemented to IMS. In Execute, however, the deletes would have been made, and no error would occur.
Recovering from Errors during a DELTA List Check

When DELTA List Check is interrupted because of an error, the Error Recovery panel, shown in the following figure, is displayed with a message detailing the reason for the interruption.

Figure 56: Error Recovery Panel

The following condition occurred while processing the element:

BMC1523 DELTA List element to be executed contains errors or is incomplete.

What should DELTA IMS do next? Select an action. Then press Enter.

_ 1. Continue with the next element as if no error had occurred.
  2. Quit processing the DELTA List (END).
  3. Retry the same element, again.
  4. Edit the DELTA List.
  5. Force the update, ignoring certain errors.
  6. Skip the named spare element, and try another.

The following field is available from this panel:

What should DELTA IMS do next?

Type the number of one of the following actions and press Enter:

1. Continue with the next element as if no error had occurred.

The Check continues with the element following the element that caused the interruption.

2. Quit processing the DELTA List (END).

The Check is ended at the point where the interruption occurred.

3. Retry the same element, again.

The element that caused the check to stop is retried, and the check continues.

4. Edit the DELTA List.

Invoke the DELTA List Edit function and display the list again in preparation for reprocessing the list from the same line where the error was detected.

The following two recovery options are available under certain circumstances:
5. Force the update, ignoring certain errors.

FORCE=YES was specified for this element, and a forcible error has been detected. DELTA IMS ignores the error and continues the update.

6. Skip the named spare element, and try another.

The first returned spare element has an error. DELTA IMS skips to the next spare element that matches the specified mask. This option is not applicable to DELTA IMS for DBCTL.

Executing DELTA Lists Online

Once a DELTA List has been created or edited, it can be executed against an IMS control region or APPC data set. The Execute function communicates with the IMS control region to verify whether the IMS and/or APPC additions or modifications can be made and it logs all IMS changes which have been made.

The DELTA List Execute function invokes the User Authorization Exit during execution of DELTA List elements that implement changes to IMS. The user ID validated during Execute can be that of the user actually performing the Execute or of the user who last edited the DELTA List. Use the Global Options panel to specify which user ID is presented to the authorization exit. Refer to the installation guide for information on setting global options.

Beginning a DELTA IMS Session to Execute a DELTA List

You access the panels that allow you to execute a DELTA List from the DELTA IMS Primary Menu.

See “DELTA IMS Interface and Tier Views” on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.

From the DELTA IMS Primary Menu, type 3 in the selection field. If you know the name of the DELTA List you want to execute, type the name in the DELTA List name field. Press Enter. The panel that is displayed depends on whether you completed the DELTA List name field.

- If the DELTA List name field is blank, the Execute Select panel is displayed, allowing you to select the DELTA List you want to check. See “Selecting a DELTA List to Execute” on page 131 for additional instructions.
If the DELTA List name field contains the name of an existing DELTA List, the Execute DELTA List panel is displayed. See “Executing a DELTA List” on page 132 for additional instructions.

Selecting a DELTA List to Execute

To execute a DELTA List, select option 3 from the Primary Menu. The Execute Select panel, shown in the following figure, is displayed if a DELTA List name is not specified on the Primary Menu.

Figure 57: Execute Select Panel

The following fields are available on this panel:

Act

Type one or more of the following action codes next to one or more of the member names listed on the panel:

- **S** – Execute the DELTA List.
- **E** – Edit the DELTA List.
- **C** – Check or browse the DELTA List.
- **X** – Execute the DELTA List.
- **D** – Delete the DELTA List.

Update and Control access authority is required to delete a DELTA List.

Member

The DELTA IMS PDS member name for the DELTA List.
Title

An optional descriptive title of up to 30 characters typed on the DELTA List Edit panel. The title provides a description of each DELTA List as an aid in list management.

With ISPF Version 2.3 or later, DBCS-capable terminals (such as the IBM 5550) can edit the Title field in mixed DBCS/SBCS mode. DBCS-capable terminals can display titles that contain both IBM Kanji double-byte characters and standard characters.

Last Modification Date, Time, Userid

The individual responsible for the last update of each DELTA List and the date and time the last update was performed.

Executed Date

The date the DELTA List was last executed.

Executing a DELTA List

You access the Execute DELTA List panel, shown in the following figure, directly from the DELTA IMS Primary Menu if you provide the DELTA List name on the DELTA List name field or from the Execute Select panel if the DELTA List name field is left blank.

Figure 58: Execute DELTA List Panel

The following commands can be issued from the Command area:

GO

If you start a DELTA List Execute from the Execute DELTA List panel using the GO command, the Execute halts for errors and warnings. As it progresses, the line being executed has its line number replaced with an arrow. You can specify a starting line number and a finishing line number if you want to limit the lines of the selected DELTA List member to be executed. The format is as follows:

GO startnum endnum
The variables startnum and endnum are optional, six-character numeric arguments. The startnum must be less than the endnum.

**RUN**

If you start a DELTA List execute from the Execute DELTA List panel using the RUN command, the Execute halts for errors only. As it progresses, the line being executed has its line number replaced with an arrow. You can specify a six-character numeric argument with the RUN command to start the Execute on a specific DELTA List line number.

---

**Note**

When a DELTA List is executed under ISPF, /DISPLAY commands are skipped.

---

**Recovering from Errors during a DELTA List Execute**

When DELTA List Execute is interrupted because of an error, the Error Recovery panel, shown in the following figure, is displayed with a message detailing the reason for the interruption.

**Figure 59: Error Recovery Panel**

The following condition occurred while processing the element:

BMC1523 DELTA List element to be executed contains errors or is incomplete.

What should DELTA IMS do next? Select an action. Then press Enter.

- 1. Continue with the next element as if no error had occurred.
- 2. Quit processing the DELTA List (END).
- 3. Retry the same element, again.
- 4. Edit the DELTA List.

The following field is available from this panel:

**What should DELTA IMS do next?**

Type the number of one of the following actions, and press **Enter**:

1. **Continue with the next element as if no error had occurred.**

The check continues with the element following the element which caused the interruption.
2. Quit processing the DELTA List (END).
   
   The check ends at the point where the interruption occurred.

3. Retry the same element, again.
   
   The element which caused the check to stop is retried, and the check continues.

4. Edit the DELTA List.

   Invoke the DELTA List Edit function, and display the list again in preparation for reprocessing the list from the same line where the error was detected.

   Two other recovery options are available from this panel under certain circumstances:

5. Force the update, ignoring certain errors.

   FORCE=YES was specified for this element, and a forcible error has been detected. DELTA IMS ignores the error and continues the update.

6. Skip the named spare element, and try another.

   The first returned spare element has an error. DELTA IMS skips to the next spare element that matches the specified mask. This option does not apply to DELTA PLUS for DBCTL.

Using DELTA List Check and Execute in Batch

DELTA Lists that implement changes to IMS can be checked and executed in batch mode using one of the following methods:

- **Local batch** (program DLAXCTL0—see sample in DLACNTL member DLA#EXCL) must execute on the same CPU as the IMS for which it is being executed. In addition, BMCLINK cannot have an active task for the target IMS while local batch is running.

- **Remote batch** (program DLAXVTB0—see sample in DLACNTL member DLA#EXCR) can run on any CPU and BMCLINK must remain active.

**Note**

BMC Software recommends that you execute the remote batch program because of its ease of use.
Each of these methods requires access to the DELTA IMS PDS for DELTA List, and to DLALIB for programs, IMSID options, and keyword tables.

DELTA List elements that implement APPC changes cannot be checked or executed in batch mode. See the appropriate IBM publication for instructions on implementing APPC changes in batch mode.

Running Local Batch

A local batch job must run on the same CPU as the IMS control region against which it will perform the Check or Execute. It will create a serial BMP subtask for each IMS control region it must access. The following figure shows sample JCL for a local batch job.

BMCLINK must be stopped before you submit any local batch job.

Figure 60: Sample JCL for Local Batch DELTA List Execution

```plaintext
//JOBNAME JOB (account
//* UPDATE JOB CARD
//*
//DELTAIMS EXEC PGM=DLAXCTL0,PARM='**BATCH',REGION=2M
//STEPLIB DD DSN=BMCNODE.DLALIB,DISP=SHR
//DELTAPDS DD DSN=BMCNODE.DELTAPDS,DISP=SHR
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
//*. . . BATCH COMMANDS
```

Running Remote Batch

Remote batch can run on one CPU and perform a Check or Execute to an IMS control region on another CPU if the CPU executing the batch job has a VTAM path to a BMCLINK on the CPU with the IMS control region. The VTAM networking considerations are identical for a DELTA IMS TSO session running on one CPU and updating an IMS control region on another. The remote batch job establishes a VTAM LU-LU session with the BMCLINK task active on the IMS CPU. The remote batch job then reads the DELTA List elements from the DELTA IMS PDS and transmits them to BMCLINK for execution. The following figure shows sample JCL for a remote batch job.

Note

If either BMCLINK or IMS is inactive, the Execute or Check fails with a condition code of 12.

Figure 61: Sample JCL for Remote Batch DELTA List Execution

```plaintext
//JOBNAME JOB (account
//* UPDATE JOB CARD
```
Using the Batch Commands

Local and remote batch jobs have their own command language which is used in the JCL job stream.

The commands are free form and consist of three fields separated by at least one blank, see Table 14 on page 137. All three fields must be contained in positions one through 71 of one SYSIN record.

For the batch `CHECK` and `EXECUTE` commands, DELTA IMS validates the active user ID and specified IMSID against the DELTA IMS user access profiles to prevent unauthorized use of the Check and Execute functions. To authorize individuals for the batch `CHECK` and `EXECUTE` commands, update the DELTA IMS user access profiles as you would for the TSO/ISPF `CHECK` and `EXECUTE` functions.

The User Authorization Exit is invoked by the batch `CHECK` and `EXECUTE` commands. The user ID presented to the User Authorization Exit can be that of the active MVS user ID or that of the user who last edited the DELTA List. Use the Global Options panel to specify which user ID is presented to the authorization exit. Refer to the installation guide for more information on setting the user ID for the authorization exit.

Before running either a local or a batch execution, ensure that you have the required DELTA IMS internal security authorization.

**Note**

The following considerations apply to using batch commands:

- A label on the command is optional, but it enables other statements to branch to the command. Labels must begin in column 1 and be followed by a blank. Statements without labels must leave column 1 blank.

- The operation code must be preceded and followed by a blank. It is required in all commands. Commands must be contained on a single input record and may not be continued.

- Not all commands require an operand; however, some commands can have more than one operand. When required, they consist of one or more positional and/or keyword-type parameters separated by commas. A blank terminates the operand.
field. Optional operands shown in the following table are enclosed in brackets; all others are required. Do not code brackets in the instruction.

- Comment lines may be inserted anywhere in the job stream and are distinguished by an asterisk (*) in column 1.

The following table shows the DELTA List batch commands.

Table 14: DELTA List Batch Commands

<table>
<thead>
<tr>
<th>Op Code</th>
<th>Operands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARM</td>
<td>[KWT=kw ]</td>
<td>$kw$ – The name of the keyword table to be used instead of the default DELTA List Edit keyword table.</td>
</tr>
<tr>
<td>CHECK</td>
<td>list, IMSID=$id$, [FAIL][,MODE=m]</td>
<td>$list$ – The DELTA List to be executed or checked.</td>
</tr>
</tbody>
</table>
| EXEC    | list, list, IMSID=$id$, [FAIL][,MODE=m] | $id$ – The one- to four-character name of the IMS control region to be accessed.  
FAIL is an optional operand that calls for termination of the CHECK or EXECUTE if a major error is detected. 
$m$ - Optional DELTA Mode operand (option $S$ is the default) to report element fields. Specify one of the following: |
<p>|         |                           | ■ $S$ - Summary |
|         |                           | ■ $M$ - Modified |
|         |                           | ■ $D$ - Detail |</p>
<table>
<thead>
<tr>
<th>Op Code</th>
<th>Operands</th>
<th>Description</th>
</tr>
</thead>
</table>
| IF      | $cc$, $ro$, $value$, GOTO= $label$ | A condition code is set during Check/Execute. LASTCC reflects the result of the last operation, whereas MAXCC reflects the highest code received in all operations. Condition codes set are
- 0 – OK
- 4 – Minor error (for example, ACBLIB BDL failed)
- 8 – DELTA List not found
- 12 – Major error during Check/Execute
- 16 – PDS I/O error
$cc$ – The keyword LASTCC or MAXCC
$ro$ – One of the following relational operators:
- EQ – Equal
- LE – Less than or equal to
- GE – Greater than or equal to
- NE – Not equal
- LT – Less than
- GT – Greater than
$value$ – Compared to $cc$ and can be from 0 to 20
$label$ – Branch to label if the tested condition is true |
| REFRESH | IMSID=$id$, TYPE=$t$ | $id$ – The one- to four-character name of the IMS control region to be refreshed.
$t$ – One of the following:
- CPU – refresh CPU-ID authorization
- TSS – refresh TSS L/A buffers
- OPTS – reload IMSID options |
Creating Batch Reports

As each DELTA List element is executed or checked by a batch job, a record is written to SYSPRINT showing the date, time, action, element type, and the element name. The date and time may not match exactly the date and time written to the DELTA Log.

If the DELTA List contains an IMS /DISPLAY command, the report generated is written to SYSPRINT following an image of the command.

A BMCnnnn-type message will immediately follow any report line whose element caused an error. If the command does not Execute or Check successfully, a DFS message documenting the error is written to SYSPRINT following an image of the command. MAXCC is returned as the job step completion code.
DELTA Logs

This chapter describes how to create and maintain the DELTA Logs of DELTA IMS.

Introduction

A key component of DELTA IMS is the DELTA Log. The DELTA Log is a pair of formatted BSAM data sets used to record all DELTA IMS updates to an IMS control region. When an existing IMS element is revised, the log record contains both the before and the after update attributes of the element. The DELTA Log can be used to record IMS operator commands and responses issued from DELTA IMS. Log records are used during IMS initialization to reapply all active DELTA IMS updates to IMS and are also used in a variety of reports that provide a comprehensive audit trail of DELTA IMS activity.

There is a pair of DELTA Logs for each IMSID defined to DELTA IMS, each serving as a backup for the other. Both data sets must be available and be without errors to perform DELTA IMS updates to the IMS control region. Only one log data set need be available for IMS restart, log reporting, and log utility functions.

You supply the data set names of the log data sets on the IMSID Options panel. You can allocate and format the DELTA Logs as a sub-function of this panel or by using the Log utility. When DELTA IMS has been activated on an IMS system, the DELTA Log data sets must be available before an IMS restart. Refer to the installation guide for information on naming the DELTA Logs.

You can allocate the log data sets for DELTA IMS use in two ways. The first way is to let DELTA IMS determine which log data sets are required for the IMSID in question by obtaining log data set names from the IMSID basic options module for the respective IMSID. This way, you need not be concerned about data set allocation. DELTA IMS dynamically allocates the required data sets and frees them when no longer needed. The second way is for you to specifically allocate log data sets (for example, with DD cards or the TSO ALLOCATE command). The ddnames used for this allocation are BMCDLAL1 and BMCDLAL2. If these ddnames are specified, DELTA IMS uses these data sets instead of using dynamic allocation.
DELTA IMS updates to IMS are written to the log data sets by BMCLINK’s BMP task (either VTAM or non-VTAM). To ensure integrity, a temporary log record is written before the IMS update. After the update, the temporary record is replaced with the before and after log records that reflect the IMS element’s before update and after update attributes. If the update was unsuccessful, the temporary record is erased.

If the DELTA IMS log data sets are to be accessed from multiple CPUs in a shared-DASD environment, they must be protected from simultaneous modifications. A systems-level ENQUEUE using the 8-byte qname of DELTA IMS and a 44-byte rname containing the log dsname is used for brief periods to synchronize individual I/O operations within each system. This same ENQUEUE must be propagated to all systems in a shared-DASD environment using a product such as IBM’s GRS package or its equivalent.

---

**Note**

During the update process, DELTA Logs determine which DELTA IMS changes are still active based on the IMS RESLIB being used. DELTA Logs should be backed up and protected in the same manner as the IMS RESLIB.

---

### Log Control Record

The first record in each log data set is the log control record. This record is mapped by LGCDSECT ($DLAMAP LGC=0). The log control record is created when the log data set is formatted and it is updated during normal DELTA IMS operation. The log control record contains information about the log as well as the IMS environment it is supporting. You should not update this record (with EDIT or SUPERZAP).

The log control record contains the IMSID for the IMS control region for which the log was declared. The IMSID is always matched during open processing; a mismatch will result in an error and the termination of processing. The log control record also describes the log data set, including the number of blocks, number of records, and current end-of-file.

### Current IMS SYSGEN

The log control record also contains the IMS SYSGEN dates as of the most recent IMS restart or online change. The SYSGEN date is recorded with each DELTA IMS update to IMS. An IMS element added through DELTA IMS is considered active if the SYSGEN date that was current at the time of the update matches the current SYSGEN date. During IMS restart and online change, DELTA IMS reapplies active elements to IMS.
The following table provides additional information about SYSGEN dates.

### Table 15: SYSGEN Information Used by DELTA IMS

<table>
<thead>
<tr>
<th>SYSGEN</th>
<th>Used for</th>
<th>Date defined as assembly date of</th>
<th>Comments</th>
</tr>
</thead>
</table>
| DB     | databases, programs, transactions, and route codes | one or both of the following CSECTs in module DFSSMB00 in the MODBLKS data set:  
- DFSDDIR0 for DELTA IMS for DBCTL  
- DFSISMB0 for all other DELTA IMS tiers | The current DB SYSGEN date may change after an IMS online change (/MODIFY PREPARE and /MODIFY COMMIT commands). Any change in the DB SYSGEN date is immediately reflected in the log control record. |
| DC     | LTERMs, subpools, and nodes | CSECT DFSICL0 in the IMS nucleus |  |

**Note**
Because SYSGEN dates contain only dates and no times, multiple online changes for MODBLKS on the same day could cause unpredictable results. The specific problem that will occur depends upon the elements on the log when DELTA IMS attempts to determine which elements are active or inactive.

If you perform one MODBLKS gen and then back it off, no problem will occur.

### Creation and Maintenance of DELTA Logs

Several panels are provided to enable you to create and maintain the DELTA Log data sets.

### Beginning a DELTA IMS Session to Create or Maintain DELTA Logs

You access the panels that allow creation and maintenance of DELTA logs from the DELTA IMS Primary Menu.

See “DELTA IMS Interface and Tier Views” on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.
From the DELTA IMS Primary Menu, type 6 in the selection field and press Enter. The DELTA IMS Utilities panel (below) is displayed.

**Figure 62: Utilities Menu**

<table>
<thead>
<tr>
<th>UT</th>
<th>DELTA IMS DB/DC - Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>____________________________</td>
</tr>
</tbody>
</table>

IMSID . . . DLA5  IMS system-id

Select one of the following. Then press Enter.

1. List DELTA IMS Logs. (LM)
2. Maintain DELTA IMS Logs. (LU)
3. Display and alter IMS storage. (ZP)
4. Generate a DELTA List from a DELTA log. (GN)
5. Convert a DELTA List to Stage I macros. (CV)
6. BMC Product Authorization by CPU-ID

From this panel, you can go to panels that allow you to list information in the DELTA Logs or go to panels that allow you to maintain DELTA Logs.

Type 2 in the selection field on the DELTA IMS Utilities panel and press Enter. The log maintenance utilities enable you to create and maintain the DELTA Log data sets.

**Log Utilities**

To use the Log Utility options menu, shown in the following figure, you must have UpdateParms authority. Refer to the installation guide for information on customizing DELTA IMS to add user access authorization.

**Figure 63: Log Utility Menu**

<table>
<thead>
<tr>
<th>LU</th>
<th>DELTA IMS DB/DC - Log Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command</td>
<td>____________________________</td>
</tr>
</tbody>
</table>

IMSID . . . DLA5  (for the desired DELTA IMS log)

Select one of the following. Then press Enter.

1. Status display of log data sets (LS)
2. Purge inactive log records. (LP)
3. Recover from log error conditions. (LR)
4. Format the log data sets. (LF)

The following fields are available on this panel:

**IMSID**

The IMSID is a required specification on the Log Utility panel.

Select one of the following. Then press Enter.

Type the number of one of the following actions, and press Enter:
1. Status display of log data sets.

Read the DELTA Log and report on its usage and any unusual conditions present. See “Log Status” on page 145 for information.

2. Purge inactive log records.

Delete inactive records from the DELTA Log, thereby compressing the log. See “Log Purge” on page 147 for information.

3. Recover from log error conditions.

Re-create the DELTA Logs and retain all log records currently on file. See “Log Recovery” on page 148 for information.

4. Format the log data set.

Allocate and/or format a new pair of DELTA Logs. See “Log Allocate and Format” on page 149 for information.

Log Status

The Log Status panel, sown in the following figure, is displayed after selecting option 1 from the Log Utility panel. Before being displayed, the DELTA Log is read, its usage is analyzed, and any unusual conditions are noted. The Log Status panel is provided for information only.

Figure 64: Log Status Panel

<table>
<thead>
<tr>
<th>LS Command =&gt;</th>
<th>DELTA IMS DB/DC - imsid Log Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary log data set name . . : IMSVS.R41BMC.DLA5LOG1</td>
<td></td>
</tr>
<tr>
<td>Volume serial number . . . . : DEV265</td>
<td></td>
</tr>
<tr>
<td>Secondary log data set name: IMSVS.R41BMC.DLA5LOG2</td>
<td></td>
</tr>
<tr>
<td>Volume serial number . . . . : DEV245</td>
<td></td>
</tr>
</tbody>
</table>

| Number of records . . . . . . : 7800 100 % |
| Records used . . . . . . . . : 20 0 % |
| Records available . . . . . . : 7780 100 % |

| Records active . . . . . . . : 18 0 % |
| Records inactive . . . . . . : 2 0 % |

Assembly dates . . . . . . . . DB: 03/06/95 (for active IMS sysgen)
DC: 03/06/95

The following fields are available on this panel:

Primary log data set name

The data set name of the log data set obtained from the IMSID basic options module (DLA#imsid) for the IMSID in question.
Volume serial number

The volume serial number of the primary log data set. It is obtained from the system catalog.

Secondary log data set name

The data set name of the secondary log data set obtained from the IMSID basic options module (DLA#imsid) for the IMSID in question.

Volume serial number

The volume serial number of the secondary log data set. It is obtained from the system catalog.

Number of records

The number of 150-byte log records possible in each log data set. It is 100 percent of the records in each data set.

Records used

The number of records used which includes two records for the log control record plus two records for each DELTA List add, delete, revise, reload, and operator command (except DISPLAY) issued by DELTA List. It represents the percentage of the total number of records.

Records available

The number of records available is the difference between the total records in the log and the records used. The percent is the percentage of the total number of records.

Records active

Those records (both before and after update) with IMSGEN dates that match the current (or active) IMS IMSGEN date. Operator commands and reloads are never considered active. The percent is the percentage of the total number of records.

Records inactive

All commands, reloads, and other updates with IMSGEN dates that do not match the current IMSGEN date. The percent is the percentage of the total number of records.

Assembly dates

The dates of the current IMSGEN as of the most recent IMS restart or online change.
Log Purge

The Log Purge panel, shown in the following figure, is displayed after selecting option 2 from the Log Utility panel. Use the Purge function to delete inactive entries from the DELTA Log. These entries include all IMS operator commands and responses, ACB and DMB reload requests, and other inactive elements which include adds, deletes, and revisions that are not applicable to the current IMSGEN.

The Purge function unloads active records from the DELTA Log to a temporary data set, then reformats and reloads the log data sets one at a time. The Purge function requires permission to proceed. Observe the caution displayed on the panel, and then select the appropriate option to continue or not.

Figure 65: Log Purge Panel

The following fields are available on this panel:

**IMSID**

The IMSID you specified on the Log Utilities panel.

Select one of the following. Then press Enter.

Type the number of one of the following actions, and press Enter:

- 1. Continue the log purge.
- 2. Do not continue (CANCEL the log purge).
Log Recovery

A DELTA Log recovery is required after an I/O error (or other type of error) occurs on one of the log data sets. If the log recovery process does not clear the problem, you will need to rebuild and/or expand your DELTA Logs.

To recover and expand your logs

1. Quiesce all DELTA IMS request processing on all IMS systems that use these DELTA IMS Log data sets.
2. Copy the current DELTA Log data sets to a backup data set using IEBGENER or equivalent.
3. Delete the current DELTA Log data sets using ISPF options.
4. Reallocate and reformat the new, larger DELTA Log data sets.

The DELTA Log Allocate/Format panel is available as option 4 on the Log Utility panel. Refer to “Log Allocate and Format” on page 149 for information on this panel.

5. Copy the backup data set to the new DELTA Log data sets using IEBGENER or an equivalent utility.
6. Run a log recovery to clear any existing error conditions. Recover from log error conditions is option 3 on the Log Utility panel.

The Log Recover panel shown in the following figure is displayed after selecting option 3 from the Log Utility panel. Use the log recovery process to re-create the DELTA Log and retain all records.

The log recovery process requires permission to proceed. Observe the caution displayed on the panel and then select the appropriate option to continue or not continue.

7. Execute a new DELTA List to verify that logging is functioning correctly.

Figure 66: Log Recover Panel

<table>
<thead>
<tr>
<th>LR</th>
<th>DELTA IMS DB/DC- Log Recover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ==&gt;</td>
<td>___________________________________________________________</td>
</tr>
<tr>
<td>IMSID . . : DLA5</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following. Then press Enter.

1. Continue the log recovery.
2. Do not continue (CANCEL recover)

CAUTION: Log Recover processing will temporarily destroy both DELTA IMS log data sets. During this time period, an IMS restart will not be possible.
Insure that you have a current backup of the log data sets before continuing.
Successful completion will be indicated by message "1634 DELTA logs rebuilt". If you do NOT receive this message, restore the log data sets from the most recent backup.

The following fields are available on this panel:

**IMSID**

The IMSID you specified on the Log Utilities panel.

**Select one of the following. Then press Enter.**

- 1. Continue the log recovery.
- 2. Do not continue (CANCEL recover).

---

**Log Allocate and Format**

The Log Allocate/Format panel, shown in the following figure, is displayed after selecting option 4 from the Log Utility panel and is used to initially allocate and format or reformat the DELTA Log data sets online.

**WARNING**
If you reformat an existing DELTA Log, you destroy the contents of the log. This action requires that the next IMS restart be a cold start.

**Figure 67: Log Allocate/Format Panel**

```
LF              DELTA IMS DB/DC - Log Allocate/Format
Command ===> _________________________________________________________________
Primary log : IMSVS.R41BMC.DLA5LOG1        (DISP=OLD or NEW)
  Disposition status . . . . OLD
  Volume serial number . . . DEV265               (required if DISP=NEW)
  Unit name . . . . . . . . ________              (required if DISP=NEW)
Secondary log: IMSVS.R41BMC.DLA5LOG2        (DISP=OLD or NEW)
  Disposition status . . . . OLD
  Volume serial number . . . DEV245               (required if DISP=NEW)
  Unit name . . . . . . . . ________              (required if DISP=NEW)

Common parameters for both logs
  Block size . . . . . . . . 3900_            (multiple of 300)
  Space units . . . . . . . . ____ (TRKS,CYLS) (required if NEW)
  Space quantity . . . . . __________       (required if NEW)
  Expiration date or . . . . _____ (yyddd)    (optional if NEW)
  Retention period . . . . ____ days        (optional if NEW)
```

The following fields are available on this panel:
Primary log, Secondary log

The data set names are obtained from the IMSID basic options. The data set name, disposition status, volume serial number, and unit name are specified for each log data set.

Disposition status

Valid values are NEW or OLD.

Volume serial number

Type the volume serial number of the DASD where the STATUS=NEW log data set is to be allocated. This field is ignored if STATUS=OLD. The log data set, whether new or old, must be completely allocated on a single volume with only a primary space allocation.

Unit name

Type the unit name or device type (SYSDA) where the STATUS=NEW data set is to be allocated. This field is ignored if STATUS=OLD.

Block size

Type the block size for the log data sets as a multiple of 300; otherwise, it is adjusted to the next lower multiple of 300. Specifying the block size in multiples of 300 ensures that each pair of 150 byte log records (required to record a single DELTA List update) are in the same physical block.

Space units

Type the units of space allocation for the STATUS=NEW log data set in either CYLS or TRKS.

Space quantity

Type the quantity of DASD to be allocated and formatted for each STATUS=NEW log data set.

Expiration date

The expiration date for the STATUS=NEW log data sets is optional and necessary only if required by the standards at your site. If you specify the expiration date, do not specify the retention period.

Retention period

The retention period for the STATUS=NEW log data sets is optional and necessary only if required by the standards at your site. If you specify the retention period, do not specify the expiration date.
Log Format Completion

The Log Format panel shown, shown in the following figure, is displayed after pressing Enter on the Log Allocate/Format panel. The Log format function requires permission to proceed. This function requires that the next IMS restart be a cold start.

**WARNING**

Log format processing deletes all DELTA Log entries. After this is done, an IMS warm start (/NRE without CHKPT 0) or emergency restart (/ERE) is not possible. Therefore, you must cold start IMS after formatting the logs, which will cause all audit information in the DELTA IMS logs to be lost.

**Figure 68: Log Format**

<table>
<thead>
<tr>
<th>Command</th>
<th>DELTA IMS DB/DC - Log Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSID . . : ABCD</td>
<td></td>
</tr>
<tr>
<td>Select one of the following. Then press Enter.</td>
<td></td>
</tr>
<tr>
<td>1. Continue the log format - Requires next IMS restart to be a COLD START.</td>
<td></td>
</tr>
<tr>
<td>2. Do not continue (CANCEL format)</td>
<td></td>
</tr>
</tbody>
</table>

**CAUTION:** Log Format processing deletes all DELTA IMS log entries. After this is done, an IMS warm start (/NRE without CHKPT 0) or emergency restart (/ERE) is NOT possible.

- You MUST COLD START IMS after formatting the DELTA IMS logs.
- Current active log entries will be removed and therefore will not be reapplied.
- Any audit information in the DELTA IMS logs will be lost.

Successful completion will be indicated by message "1652 LOGS FORMATTED".

The following fields are available on this panel:

**IMSID**

The IMSID you specified on the Log Utilities panel.

Select one of the following. Then press Enter.

Type the number of one of the following actions, and press Enter:

- 1. Continue the log format - Requires next IMS restart to be a COLD START.
- 2. Do not continue (CANCEL format) - Discontinues the Format function.
Log Maintenance in Batch

The following figure shows sample JCL that executes the Log Maintenance utility you can use to perform log maintenance in batch. You must have authority to update the parameters for the IMSID specified.

**Figure 69: Sample Batch Log Maintenance Utility JCL**

```
//JOBNAME  JOB  (account)
/* UPDATE JOB CARD
//*
//LOGMAINT EXEC PGM=IKJEFT01,
//         PARM=DLAXUTL0,DYNAMNBR=16,REGION=512K
//*
//STEPLIB  DD DSN=BMC.DLALIB,
//* UPDATE LIBRARY
//    DD DSN=BMC.DLALIB,
//SYSUT1   DD DSN=&&DLALOGS,
//    Disp=(NEW,DELETE,KEEP),UNIT=SYSDA,
//    SPACE=(CYL,(2,2))
//**//SYSUT1 SPACE PARAMETER MUST MATCH LOG DATA SET SPACE
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=* 
//SYSTSPRT DD SYSOUT=* 
//SYSTSPRT DD SYSOUT=* 
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//SYSTSPR
```

The commands shown in the following table require the input of the IMSID.

**Table 16: Log Maintenance Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS <em>imsid</em></td>
<td>Displays the current log data set status.</td>
</tr>
<tr>
<td>PURGE <em>imsid</em></td>
<td>Deletes inactive log records.</td>
</tr>
<tr>
<td>RECOVER <em>imsid</em></td>
<td>Re-creates the log or clears log errors.</td>
</tr>
<tr>
<td>FORMAT <em>imsid</em></td>
<td>Clears and formats the log data sets.</td>
</tr>
</tbody>
</table>
DELTA IMS repository

This chapter describes how to use the optional DELTA IMS repository.

Overview of the DELTA IMS repository

The DELTA IMS repository is an alternative medium for storing resource definitions from the MODBLKS data set and any updates made during DELTA IMS List processing.

Note

The repository is disabled by default. To enable it, perform the instructions in “Enabling the DELTA IMS repository” on page 154.

The repository stores objects in paired BSAM-formatted data sets that are accessed by relative record number. To optimize recovery and reliability, the repository maintains dual data sets: a primary (REP1) and a secondary (REP2). Both data sets must be available for updates to the control region, but only one is necessary for reading resources during a restart or for running DELTA IMS utilities.

Repository guidelines are as follows:

- Using the repository is optional.
- You can use the repository with one or more IBM IMS control regions.
- You specify repository data set names in the IMSID options, where you can allocate and format the data sets. For more information, see “Enabling the DELTA IMS repository” on page 154.
- The REP1 and REP2 data sets are updated during IMS shutdown when all DDIR, PDIR, SMB, and RCTE control blocks defined in the system are written to the repository.
- The repository’s configuration refers to all resources logged to the repository at a given time. At IMS shutdown, the product creates a new configuration that
contains all DDIR, PDIR, SMB, and RCTE control blocks. All records logged for this configuration are keyed with the same STCK time stamp.

- The repository can contain many configurations, but only the most recent configuration (the active configuration) is used at cold start. The repository is accessed during warm and emergency restarts, but not for reading resource definitions.

- The repository can contain configurations for one or multiple IMS systems.

- The DELTA IMS and DELTA PLUS products can share the same repository. No repository conversion is necessary if you decide to convert from DELTA IMS to DELTA PLUS.

- New configurations are logged during normal shutdown, but not during abnormal termination:
  - During shutdown, the product does not create a new configuration if no DELTA IMS dynamic updates or MODBLKS online changes have occurred since the last restart.
  - Any other online change type (such as ACBLIB OLC) has no effect on the records in the repository.
  - Old or inactive configurations remain in the repository until space is needed to create a new configuration; at that point, an automatic purge removes the unused resources to reclaim space.
  - The repository does not store resources related to data communications (DC). The DELTA IMS Log saves DC-related updates to NODES, LTERMS, and SUBPOOLS (that is, updates made in DELTA IMS List processing).

- BMCLINK continues to manage DELTA IMS Lists across a single IMS.

- XRF backup and FDR systems continue to run. Their resource definitions are rebuilt from checkpoint records on the OLDS.

- If you choose to enable the repository, you can continue to use MODBLKS online change operations, but BMC does not recommend doing so. However, you may leave MODBLKS data sets in place for compatibility. For more information, see “Enabling the DELTA IMS repository” on page 154.

### Enabling the DELTA IMS repository

Use the following procedure to enable the optional DELTA IMS repository.
Before you begin

To discontinue using MODBLKS (recommended), you can remove MODBLKSA/MODBLKSB from the IMS procedure. Also, if your IMS instance is part of an IMSPLEX, you can disable MODBLKS support by changing the parameter MODBLKS=OLC to MODBLKS=DYN (in DFSDFxxx).

To enable the repository

1. Define the primary (REP1) and secondary (REP2) data sets by performing the following steps:
   a. From the Primary Menu, select **Customize** (option 5).
   b. From the Customization Menu, select **IMSID Options** (option 2).
   c. From the IMSID Options Menu, select **IMSID Basic Options** (option 1).

   The IMSID Basic Options panel is displayed.

   d. Navigate to Page 2 and specify the repository data set names in the **Primary repository** and **Secondary repository** fields.

   **Note**
   By default, these fields are blank, which disables the repository.

The following example specifies RIHGPF.DELTAIMS.REP1 for the primary data set and RIHGPF.DELTAIMS.REP2 for the secondary.
To prevent simultaneous modifications in a shared DASD environment, a system-level ENQUEUE is used for brief periods to synchronize I/O operations within each system; the ENQUEUE uses the eight-byte QNAME of DELTAPLX and the 44-byte RNAME containing the repository data set name. The same ENQUEUE must be propagated to all systems in a shared DASD environment by using a product such as the IBM GRS package or its equivalent.

e Type SAVE on the Command line and press Enter.

2 Allocate and format the REP1 and REP2 data sets by performing the following steps:

a From the Primary Menu, select Utilities (option 6).

b From the Utilities Menu, select Maintain DELTA IMS repositories (option 4).

The DELTA IMS Virtual Terminal Repository Utility panel is displayed.

```
DELTA IMS VT - Repository Utility
Command ===> [button]
IMSID ... GPF3 (for the desired DELTA IMS repository)
Select one of the following. Then press Enter:
1. Status display of repository data sets
2. Purge inactive repository records.
3. Recover from repository error conditions.
4. Format the repository data sets
```

c Select Format the Repository data sets (option 4).

d In the Repository Allocation panel, enter your repository data set names (the ones you chose earlier in the procedure), in the Primary log field and Secondary log field and press ENTER.

```
DELTA IMS VT - GPF3 Repository Allocation
Command ===> [button]
Primary log : RIHGPF.DELTAIMS.REP1
   Disposition . . . . NEW (DISP=OLD or NEW)
   Volser...........
   Unit name.......  
   SMS Storage class...
   SMS Management class.
Secondary log: RIHGPF.DELTAIMS.REP2
   Disposition . . . . NEW (DISP=OLD or NEW)
   Volser...........
   Unit name.......  
   SMS Storage class...
   SMS Management class.

Common parameters for both logs
   Block size. . . . 4096 (multiple of 512)
   Space units . . . (TRKS,CYLS) (required if NEW)
   Space quantity. . . (required if NEW)
```
3 Restart IMS, either a cold start or a warm start.

After IMS restarts, the repository is enabled, and DELTA IMS creates the repository's first configuration containing all DDIR, PDIR, SMB, and RCT control blocks defined in that IMS instance. At the next cold start, IMS will read the DDIR, PDIR, SMB, and RCT resources from the repository. MODBLKSA and MODBLKSB data sets are no longer used. At normal shutdown, DELTA IMS will create a new repository configuration if you made changes by executing DELTA IMS Lists to modify or add new resource definitions.

Creating DELTA IMS repository reports

You can display information about your DELTA IMS repository's content by using ISPF panels and batch reports.

Creating repository reports by using ISPF

Use the following procedure to create DELTA IMS repository reports via ISPF.

1 From the Primary Menu, select Utilities (option 6).

2 From the Utilities Menu, select List DELTA Repositories (option 3).

The DELTA IMS VT - Repository List panel is displayed:

```
Command ===> DELTA IMS VT - Repository List
Enter the report specifications below. Then press Enter to generate the repository
More:

IMSID . . . GPF3
Report Type. Choose one selection.
  1. Terse - Brief report, one line per element
  2. Complete - Complete report with element details
Element Type. Select one or more element types to be listed.
  APPLCTN - Program directory entries
  TRANSACT - Transaction codes
  DATABASE - Database directory entries
  RTCODE - Fast Path route codes
Record status. Select one or more.
  Active - Used in most recent IMS restart
  Inactive - Not used in most recent IMS restart
Type 1,2,3,4 to sort the repository entries, prioritized in major-to-minor (1- to-4) order. Leave these fields blank for no sort.
  LIFO - Descending date/time sequence
  FIFO - Ascending date/time sequence
  TYPE - Element type
  NAME - Element name
```
Specify your preferences for the report in the appropriate fields according to the following table:

Table 17: Repository List fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report type</td>
<td>Type/ by option 1 if you want a terse report (only one line per element) or by option 2 if you want a complete (detailed) report.</td>
</tr>
<tr>
<td>APPLCTN</td>
<td>Type/ in this field to include program directory entries in the report.</td>
</tr>
<tr>
<td>TRANSACT</td>
<td>Type/ in this field to include transaction codes in the report.</td>
</tr>
<tr>
<td>DATABASE</td>
<td>Type/ in this field to include database directory entries in the report.</td>
</tr>
<tr>
<td>RTCODE</td>
<td>Type/ in this field to include Fast Path route codes in the report.</td>
</tr>
<tr>
<td>Active</td>
<td>Type/ in this field to include records in the active (current) configuration.</td>
</tr>
<tr>
<td>Inactive</td>
<td>Type/ in this field to include records not in the active configuration (records no longer used).</td>
</tr>
<tr>
<td>LIFO</td>
<td>To sort repository entries in the report, specify the numerical sort order you prefer (where 1 is highest priority and 4 is lowest) in the LIFO, FIFO, TYPE, and NAME fields. You can leave some or all of the fields blank for no sort order.</td>
</tr>
<tr>
<td>FIFO</td>
<td></td>
</tr>
<tr>
<td>TYPE</td>
<td></td>
</tr>
<tr>
<td>NAME</td>
<td></td>
</tr>
</tbody>
</table>

4 Press **Enter**.

A message indicates that a repository report is pending.

5 Press **Enter** again to generate the report.

The following example shows a terse report:
Creating repository reports in batch

The Repository Report utility enables you to run the SELECT and REPORT commands in batch, in a similar manner to reporting on the DELTA Log or History File. The Repository Report utility is a convenient way to report on the resource definitions in the repository for all configurations (active and inactive).

To create repository reports in batch

1. From member DLA#REPL in the DLACNTL data set, copy the sample JCL for running the Repository Report utility:

2. Change the copied JCL as needed based on your report preferences:
   a. Edit the SELECT command to specify the record types to be read in the repository, and whether to report on active records (in the current configuration) or inactive records (configurations no longer in use).
      
      For more information, see “SELECT” on page 159.
   b. Edit the REPORT command to enter your target and report-type criteria.
      
      The target parameter is required. The OUTDSN, TYPE, and SORT parameters are optional. For more information, see “REPORT” on page 160.

SELECT

Use the SELECT command to enter a list of record types to be read in the repository. You can also specify whether to select active records (in the current configuration) or inactive records (configurations no longer being used).

A plus sign (+) continuation mark is required when commands are continued to another line.

The default parameter for the SELECT command is ALL (all record types). Following is the SELECT command syntax:

```
SELECT {DATABASE | APPLCTN | TRANSACT | RTCODE | ALL} {ACTIVE | INACTIVE}
```

The following table describes the parameters that you can use with the SELECT command:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATABASE (or DBD)</td>
<td>Reads all database definitions (DDIRs) from the repository</td>
</tr>
</tbody>
</table>
### Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLCTN (or APL)</td>
<td>Reads all application definitions (PDIRs) from the repository</td>
</tr>
<tr>
<td>TRANSACT (or TRN)</td>
<td>Reads all transaction definitions (SMBs) from the repository</td>
</tr>
<tr>
<td>RTCODE (or RCT)</td>
<td>Reads all route code definitions from the repository</td>
</tr>
<tr>
<td>ALL</td>
<td>Reads all resource definitions from the repository</td>
</tr>
<tr>
<td>ACTIVE</td>
<td>Limits the records read to the records in the active (current) configuration</td>
</tr>
<tr>
<td>INACTIVE</td>
<td>Limits the records read to the records not in the active configuration (records no longer used)</td>
</tr>
</tbody>
</table>

### REPORT

Use the REPORT command to enter the target and report-type criteria. The `target` parameter is required. The OUTDSN, TYPE, and SORT parameters are optional.

Following is the REPORT command syntax:

```
REPORT target [OUTDSN(dsname)]
   [TYPE(REPTERS | REPCOMP)]
   [SORT(LIFO | FIFO | TYPE | NAME)]
```

The following conditions apply:

- `target` is the required four-character DELTA IMS group name or IMSID.
- A plus sign (+) continuation mark is required for the REPORT when the commands are continued to another line.

The following table describes the keywords to use with the REPORT command:

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTDSN(dsname)</td>
<td>Writes the report to the specified preallocated data set</td>
</tr>
<tr>
<td>TYPE(REPTERS)</td>
<td>Generates a terse report (a brief report that includes a one-line description of each element)</td>
</tr>
<tr>
<td>TYPE(REPCOMP)</td>
<td>Generates a complete report with a detailed description of each element</td>
</tr>
<tr>
<td>SORT(LIFO)</td>
<td>Sorts report lines in last in, first out (descending) order</td>
</tr>
<tr>
<td>SORT(FIFO)</td>
<td>Sorts report lines in first in, first out (ascending) order</td>
</tr>
<tr>
<td>SORT(TYPE)</td>
<td>Sorts report lines by element type</td>
</tr>
<tr>
<td>SORT(NAME)</td>
<td>Sorts report lines by element name</td>
</tr>
</tbody>
</table>
The following example shows a complete repository report:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>IMSID</th>
<th>Action</th>
<th>Type</th>
<th>Limited to:</th>
<th>Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/15/2015</td>
<td>14.38</td>
<td>GPF3</td>
<td>ADD</td>
<td>DATABASE</td>
<td>GPF3</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DBFSAMD1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Name of database . . . . . . . . . . . . DBFSAMD1
| Model after (valid for ADD,REV,ADDREV) : |                     |
| DBD resident in storage? . . . . . . . | No                      |
| Access is EX, RO, RO, or UP . . . . . | EX                      |
| Auto-reload sensitive ACBs? . . . . . | No                      |
| Reload DEDB randomizer? . . . . . | No                      |
| 09/15/2015 | 14.38 | GPF3  | ADD    | DATABASE   | GPF3        | YES |
|            |       |       |        | DBFSAMD2   |             |     |
| Name of database . . . . . . . . . . . . DBFSAMD2
| Model after (valid for ADD,REV,ADDREV) : |                     |
| DBD resident in storage? . . . . . . . | No                      |
| Access is EX, RO, RO, or UP . . . . . | EX                      |
| Auto-reload sensitive ACBs? . . . . . | No                      |
| Reload DEDB randomizer? . . . . . | No                      |

The end of the report (complete or terse) lists all of the repository's configurations. This section also lists the associated IMSID, create date and time, resource type counts, and whether the configurations are active or inactive, as shown in the following example:

```
GPF3 Configuration 2015258F/14382211 created on 09/15/2015 14.38
PDIR-  68 DDIR- 10 SMB-  51 RCT-  4, configuration is ACTIVE
```

### Changing the active configuration (CHGREP)

You can use the CHGREP utility to modify which configuration you want to be active. This changes which configuration IMS will use at cold start for building DDIR, PDIR, SMB, and RCT resources.

You use this utility when you have issues with the active configuration. Only one configuration is considered active for each IMS.

**Note**

BMC recommends that you contact BMC Customer Support before using the CHGREP utility.

The following figure shows sample JCL for running the CHGREP utility. You can view sample JCL in member DLA#XUT2 in the DLACNTL data set.
Maintaining the DELTA IMS repository

ISPF panels are provided to enable you to maintain the DELTA IMS repository data sets. You can access the panels from the DELTA IMS repository Maintenance Utility.

You can also maintain the repository by using batch jobs. For more information, see “Repository maintenance in batch jobs” on page 167.

Access to the repository maintenance utilities

You need UPDATE authority to the repository data sets themselves to use the repository maintenance utilities. Additionally, if you are securing DELTA IMS functions using SAF, you need READ access to the following SAF resources in the Delta product class.

In the following table, target is a four-character IMSID.

<table>
<thead>
<tr>
<th>Repository utility name</th>
<th>SAF resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORT</td>
<td>target. DLALOG DLPLLOG.LIST</td>
</tr>
<tr>
<td>STATUS</td>
<td>target. DLALOG DLPLLOG.STATUS</td>
</tr>
<tr>
<td>PURGE</td>
<td>target. DLALOG DLPLLOG.PURGE</td>
</tr>
<tr>
<td>RECOVER</td>
<td>target. DLALOG DLPLLOG.RECOVER</td>
</tr>
<tr>
<td>FORMAT</td>
<td>target. DLALOG DLPLLOG.FORMAT</td>
</tr>
<tr>
<td>CHANGE</td>
<td>target. DLALOG DLPLLOG.CHGREP</td>
</tr>
</tbody>
</table>

Using ISPF for repository maintenance

Use the following procedure if you want to maintain the repository by using ISPF.

To maintain the repository with ISPF

1. From the Primary Menu, select Utilities functions (option 6).
2. From the Utilities Menu, select Maintain DELTA repositories (option 4).
3. From the Repository Utility panel, select from the available utilities:
   - Status
- Purge
- Recover
- Format

DELTA IMS VT - Repository Utility

Command ===>

IMSID . . . GPF3 (for the desired DELTA IMS repository)

Select one of the following. Then press Enter.
1. **Status** display of repository data sets
2. **Purge** inactive repository records.
3. **Recover** from repository error conditions.
4. **Format** the repository data sets.

For more information about the available utilities, see these topics:

- “Repository status” on page 163
- “Repository purge” on page 164
- “Repository recovery” on page 165
- “Repository format and data set allocation” on page 167

**Repository status**

Use the Status utility to view information about the DELTA IMS repository.

Selecting **Status** (option 1) from the Repository Utility panel displays the Repository Status panel.

**Figure 70: Repository Status panel**

```
Command ===>                                                  Scroll ===> PAGE
Display configuration list
Primary data set name  . . : RHIHGPF.DELTAIMS.REP1
Primary volume serial  . . : DEV534
Secondary data set name  . : RHIHGPF.DELTAIMS.REP2
Secondary volume serial  . : DEV508
Number  Percent
Number of records  . . . . :    32400
Records used  . . . . . . . :      135      0 %
Records available  . . . . :    32265    100 %
Records active  . . . . . . :      135      0 %
Records inactive  . . . . . :        0      0 %
IMSID        Active     Inactive
GPF3            135            0
```

**Table 20: Repository Status panel field descriptions**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display configuration list</td>
<td>Field that lists the configurations that are currently in the repository Enter / in this field to display a the list.</td>
</tr>
<tr>
<td>Primary data set name</td>
<td>Name of the primary repository data set</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Primary volume serial</td>
<td>VOLSER where the primary repository data set resides</td>
</tr>
<tr>
<td>Secondary data set name</td>
<td>Name of the secondary repository data set</td>
</tr>
<tr>
<td>Secondary volume serial</td>
<td>VOLSER where the secondary repository data set resides</td>
</tr>
<tr>
<td>Number of Records</td>
<td>Total number of 512-byte records possible in the repository</td>
</tr>
<tr>
<td>Records used</td>
<td>Total number and percentage of records in use for the repository</td>
</tr>
<tr>
<td>Records available</td>
<td>Total number of the active or inactive records, and the percentage of the</td>
</tr>
<tr>
<td></td>
<td>repository that they use</td>
</tr>
<tr>
<td>Records active</td>
<td>Total number and percentage of the repository used by active or inactive</td>
</tr>
<tr>
<td>IMSID</td>
<td>IMS instance for which you are viewing the status</td>
</tr>
<tr>
<td>Records Active Count (IMSID)</td>
<td>Total number of repository records used by active configurations for this</td>
</tr>
<tr>
<td></td>
<td>IMS system</td>
</tr>
<tr>
<td></td>
<td>This count also includes configuration header records.</td>
</tr>
<tr>
<td>Records Inactive Count (IMSID)</td>
<td>Total number of repository records used by inactive configurations for this</td>
</tr>
<tr>
<td></td>
<td>IMS system</td>
</tr>
<tr>
<td></td>
<td>This count also includes configuration header records.</td>
</tr>
</tbody>
</table>

Selecting the **Display configuration list** field displays the Repository Configuration List panel. This panel shows the configurations in the repository, and the date and time each configuration was saved. In addition to the number of changes for each type of element, the list shows whether the configuration is active.

**Figure 71: Repository Configuration List panel**

<table>
<thead>
<tr>
<th>IMSID</th>
<th>Date</th>
<th>Time</th>
<th>Total</th>
<th>APPLCTNs</th>
<th>TRANs</th>
<th>DBs</th>
<th>RCTs</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPF3</td>
<td>09/15/2015</td>
<td>14:38:22</td>
<td>133</td>
<td>68</td>
<td>51</td>
<td>10</td>
<td>4</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Repository purge**

You can use the Purge utility to copy and rebuild the Repository data sets while deleting inactive configurations. The utility determines whether a configuration is active or inactive by comparing the date of the configuration's entries against the configuration date in the control record.

Selecting option **2** from the Repository Utility panel displays the Repository Purge panel.

**Figure 72: Repository Purge panel**

DELTA IMS VT - Repository Purge
The control record is the first record in the Repository. If the entry’s date does not match the configuration date in a control record, the entry is considered inactive and a candidate to be purged. However, the utility saves one inactive configuration along with the active configuration after the purge runs successfully.

---

**Note**

When creating a new configuration of DDIR, PDIR, SMB, and RCTE resources in the Repository at IMS shutdown, DELTA checks whether sufficient space exists in the Repository before proceeding. If there is insufficient space to create a new configuration, an automated PURGE reclaims unused space before logging any additional resource definitions.

---

### Repository recovery

You can recover the repository from error conditions by using the Recover utility, which copies and re-creates the repository data sets while retaining all logged records.

---

**WARNING**

Ensure that you have a current backup of the repository data sets before you run a recovery.

---

Selecting option 3 from the Repository Utility panel displays the Repository Recover panel.

**Figure 73: Repository Recover panel**

---

Command ===>  
IMSID . . : GPF3
Select one of the following. Then press Enter.  
_ 1. Continue the Repository purge.  
_ 2. Do not continue (CANCEL purge)  
CAUTION: Repository Purge processing will temporarily destroy both DELTA IMS repository data sets. During this time period, an IMS restart will not be possible.  
Ensure that you have a current backup of the repository data sets before continuing.  
Successful completion will be indicated by message "Repository rebuilt".  
If you do NOT receive this message, restore the repository data sets from the most recent backup.
Using dual data sets (primary and secondary repository) during the recovery helps to minimize integrity problems. A DELTA IMS repository recovery is required after an I/O error (or other type of error) occurs. If the recovery does not clear the problem, you must rebuild or expand your repository data sets as follows.

**To rebuild or expand the repository data sets**

1. Quiesce all DELTA IMS request processing on all IMS systems that use these DELTA Repository data sets.

2. Copy the current DELTA IMS repository data sets to a backup data set by using IEBGENER or an equivalent utility.

3. Delete the current DELTA IMS repository data sets by using ISPF options.

4. Select option 4 on the Repository Utility panel to reallocate and reformat the new DELTA IMS repository data sets.

   For more information, see “Repository format and data set allocation” on page 167.

5. Copy the backup data set to the new DELTA IMS repository data sets by using IEBGENER or an equivalent utility.

6. On the Repository Utility panel, select option 3 to recover the repository.

7. On the Repository Recover panel, select **Continue the repository recovery** (option 1) to proceed.

   **WARNING**
   
   The recovery will destroy both DELTA repository data sets; ensure that you backed up both repository data sets before continuing. Also, do not restart IMS during the recovery. The recovery clears any existing error conditions, re-creates the repository, and retains all records.

8. Execute a new DELTA IMS List to verify that the repository is functioning correctly.
Repository format and data set allocation

You use the Format utility to allocate and format new repository data sets. Additionally, you can reformat existing repository data sets.

Normally, you allocate and format the repository only once, before first using it. However, you might need to reformat it on rare occasions.

**WARNING**

Reformatting the repository deletes all previously recorded updates. In this situation, you must restore from a backup copy of the repository data sets.

Selecting option 4 from the Repository Utility panel displays the Repository Format panel.

**Figure 74: DELTA IMS VT - Repository Format panel**

Command ===>  
IMSID . . : GPF3  
Select one of the following. Then press Enter.  
  _ 1. Continue the format  
  2. Do not continue (CANCEL format)  
CAUTION: Any audit information in the DELTA IMS repository will be lost.

The repository data set names are obtained from the DELTA options library for the IMSID name specified. You must verify that the correct IMSID name is being used, and verify that the repository data set name is correct for the IMSID name in the DELTA options library.

Repository maintenance in batch jobs

DELTA IMS repository batch support includes sample JCL members. The following JCL samples are in the DLACNTL data set.

**Table 21: Sample JCL members for batch repository maintenance**

<table>
<thead>
<tr>
<th>Sample name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLA#REPA</td>
<td>Allocate and format the DELTA IMS repository data sets</td>
</tr>
<tr>
<td>DLA#REPL</td>
<td>Produce a DELTA IMS repository report</td>
</tr>
<tr>
<td>DLA#REPU</td>
<td>Run DELTA IMS repository maintenance</td>
</tr>
<tr>
<td>DLA#XUT2</td>
<td>Alter the active configuration date in the DELTA IMS repository</td>
</tr>
</tbody>
</table>
The following sample JCL runs the utility that you use to perform repository maintenance in batch:

**Table 22: DELTA IMS Repository batch commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMAT <em>insid</em> REP</td>
<td>Clears and formats the repository data sets</td>
</tr>
<tr>
<td>STATUS <em>insid</em> REP</td>
<td>Displays the current repository data set status</td>
</tr>
<tr>
<td>PURGE <em>insid</em> REP</td>
<td>Deletes inactive records in the repository</td>
</tr>
<tr>
<td>RECOVER <em>insid</em> REP</td>
<td>Re-creates the repository or clears error status</td>
</tr>
</tbody>
</table>
Generating DELTA Lists

This chapter describes how to use DELTA IMS to create DELTA Lists. DELTA Lists implement changes to IMS from Stage-1 macros either online or in batch. It also describes how to generate a DELTA List from a DELTA Log.

Introduction

You can create a DELTA List using IMS Stage-1 system definition macros as input, online or in batch. You can also convert a DELTA List to Stage-1 macros and create updates for the Stage-1 system definition from the DELTA Logs.

For more information about using the DELTA Logs to create updates for Stage-1 system definition, refer to “Selecting Report Format and Sort Sequence” on page 188.

Because APPC changes are made to data sets instead of an IMS control region, the DELTA List creation and conversion facilities cannot be used to create or convert DELTA Lists or DELTA List elements that implement APPC changes.

Planning a DELTA List Creation from Stage-1 Macros

You should review and be aware of the following considerations before creating DELTA Lists from IMS Stage-1 macros:

- Assembler H Version 2 is required.

- No user verification or keyword table validation is performed when creating DELTA Lists from IMS Stage-1 macros. Anyone with write access to the DELTA PDS data set can create a DELTA List. All keywords and parameters are allowed and are placed in the DELTA List.
If the DELTA IMS Convert utility is subsequently used to convert the DELTA List to IMS Stage-1 macros, the macros created will not necessarily match the macros used to create the DELTA List.

The DELTA List assembly step may result in a nonzero return code. MNOTEs in the assembly listing will explain the error. RC=8 indicates a syntax error--defaults are used instead of the value specified. RC=4 indicates a missing or an extraneous value. If a value is missing, the default is used. An extraneous value is ignored.

Generating a DELTA List Online

You use the following panels to specify the DELTA List to be created or replaced, select the elements for input to the generation process, or select the update types to be selected from the DELTA Log.

Beginning a DELTA IMS Session to Generate DELTA Lists

You access the panels that allow you to generate DELTA Lists from the DELTA IMS Primary Menu. From the DELTA IMS Primary Menu, type 6 in the selection field and press Enter. The DELTA IMS Utilities panel, shown in the following figure, is displayed.

**Note**

See “DELTA IMS Interface and Tier Views” on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.

**Figure 75: Utilities Menu**

<table>
<thead>
<tr>
<th>UT</th>
<th>DELTA IMS DB/DC- Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ===&gt;</td>
<td>____________________________</td>
</tr>
<tr>
<td>IMSID . . . DLA5 IMS system-id</td>
<td></td>
</tr>
<tr>
<td>Select one of the following. Then press Enter.</td>
<td></td>
</tr>
</tbody>
</table>

- 1. List DELTA IMS Logs. (LM)
- 2. Maintain DELTA IMS Logs. (LU)
- 3. Display and alter IMS storage. (ZP)
- 4. Generate a DELTA List from a DELTA log. (GN)
- 5. Convert a DELTA List to Stage I macros. (CV)
- 6. BMC Product Authorization by CPU-ID

Type 4 in the selection field on the DELTA IMS Utilities panel and press Enter. The Generate DELTA List panel is displayed.
Generating a DELTA List from a DELTA Log

The Generate DELTA List panel, shown in the following figure, enables you to generate a DELTA List from specified selection parameters or from add, revise, delete updates scanned from the DELTA Log.

Figure 76: Generate DELTA List Panel

<table>
<thead>
<tr>
<th>GN</th>
<th>DELTA IMS DB/DC - Generate DELTA List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command ===&gt;</td>
<td>________________________________________</td>
</tr>
<tr>
<td>IMSID . . . DLA5 IMS system-id for the desired DELTA IMS Log.</td>
<td></td>
</tr>
<tr>
<td>Select one of the following. Then press Enter.</td>
<td></td>
</tr>
<tr>
<td>1. Specify input selection parameters for generate.</td>
<td></td>
</tr>
<tr>
<td>2. Generate a DELTA List by scanning the DELTA IMS log data sets for ADD, REVISE, and DELETE type DELTA IMS updates.</td>
<td></td>
</tr>
<tr>
<td>DELTA List name . . ______ Name of DELTA List to be created or replaced</td>
<td></td>
</tr>
</tbody>
</table>

The following field is available on this panel:

Select one of the following. Then press Enter:

Type the number of one of the following actions, and press Enter:

1. Specify input selection parameters for generate.

To review or update the DELTA List selection criteria, type 1 in the selection field and press Enter. The Generate Input panel shown in “Selecting Elements for the DELTA List” on page 172 is displayed; see that topic for instructions on specifying selection parameters.

2. Generate a DELTA List by scanning the DELTA IMS Log data sets for ADD, REVISE, and DELETE type DELTA IMS updates.

To generate a DELTA List using the selection criteria specified on the Generate Input panel shown in “Selecting Elements for the DELTA List” on page 172, type 2 in the selection field, specify the IMSID, and specify the name of the DELTA List that will be generated. To use the Generate function requires UPDATE access authority.

When you press Enter, DELTA IMS reads the DELTA Log for the IMSID indicated and creates or replaces the DELTA List specified. When the Generate operation completes, the following message is displayed; in this message, listname is the name of the DELTA List you specified:

BMC1513 listname SAVED
Selecting Elements for the DELTA List

The Generate Input panel, shown in the following figure, is accessed as option 1 from the Generate DELTA List panel. Use this panel to specify the elements that are to be included in the DELTA List created from DELTA Logs. A selection for APPC elements does not appear on this panel because DELTA Lists and DELTA List elements that implement APPC changes cannot be generated from DELTA Logs.

**Figure 77: DELTA IMS Generate Input Panel.**

```
GI                 DELTA IMS DB/DC-imsid Generate Input
Command ===> ______________________________________________________________
Select (type a '/') one or more element types to be processed.
/ DATABASE ITEMS   (Changed DATABASE elements)
/ APPLCTN ITEMS    (Changed APPLICATION elements)
/ TRANSACT ITEMS   (Changed TRANSACTION elements)
/ LTERM ITEMS      (Changed Logical TERMINAL elements)
/ TERMINAL ITEMS   (Renamed VTAM Terminal NODE elements)
/ RTCODE ITEMS     (Changed Fast Path RTCODE elements)
/ SUBPOOL ITEMS    (Changed LU 6.1 SUBPOOL elements)
Select (type a '/') one or more element status categories.
/ Active           (used in most recent IMS restart)
/ Inactive         (not used in most recent IMS restart)
Input exit . . . . . DLAXGNI _   (Type only the one character suffix)
Use the END command to exit.
```

**Note**

DATABASE ITEMS and APPLCTN ITEMS are options appropriate to both IMS control and DBCTL regions.

Select the types of elements that should be added to the DELTA List and the status of the elements that should be considered.

In the element type fields, type / beside each type of element that should be added to the DELTA List. Changed as used on this panel means added, deleted, revised, or reloaded. If none is selected, all types are selected by default.

In the status fields, type / to specify whether active elements (as of the last IMS restart), inactive status (other than the last IMS restart), or both should be considered when DELTA IMS generates the DELTA List.

If your site has specialized requirements for filtering the DELTA Logs before generating a DELTA List from those logs, specify a one-character suffix to be appended to DLAXGNI to form the name of the input selection exit defined by your site. See the sample exit DLAXGNI0 in the DLASAMP library for an example of this exit.
Converting a DELTA List to Stage-1 Macros

DELTA IMS can produce IMS Stage-1 macros directly from a DELTA List, using the Convert function. The Convert DELTA List panel, shown in the following figure, is accessed as option 5 from the Utilities panel. Use this panel to specify the name of the DELTA List to convert and the characteristics of the Stage-1 output data set. You can specify up to 9999 blocks.

DELTA List elements that implement APPC changes cannot be generated to Stage-1 macros. If you convert a DELTA List that contains a combination of changes for an IMS system and APPC changes, the APPC elements will be ignored.

After you correctly specify the output data set characteristics and a valid DELTA List name, press Enter. DELTA IMS will respond with the following message:

BMC1949VERIFY/PRESS ENTER.

If the information is correct, press Enter. DELTA IMS will write the generated Stage-1 macros to the output data set you specified on the Convert DELTA List panel.

Figure 78: Convert DELTA List Panel

The Converted Output panel, shown in the following figure, is displayed after you press Enter on the Convert DELTA List panel. The Convert Output panel displays the Stage-1 macro IMMSGEN source from a specified DELTA List.

When generating Stage-1 macros, DELTA IMS sorts the generated macros in the order they would normally appear in the Stage-1 job stream. The macros are first
grouped by element type, and then they are sorted alphanumerically within each element type group.

**Figure 79: Converted Output Panel**

```plaintext
CV                       DELTA IMS DB/DC - Converted Output
Command ===> ________________________________________________ Scroll ===> PAGE
Line 000000 of 000012  Cols 001 080

NOP,QRSTU.VWXY

*************** TOP OF DATA  ***************
*  00003000
*  00004000
*INSERT DATABASE OLD NAME: XX21PART  NEW NAME: XX21PART
*   CHANGED BY ABC4 ON 08/03/95 AT 16.05
*  00005000
*  00006000
*DATABASE DBD=XX21PART,ACCESS=EX
*  00007000
*  00008000
* INSERT APPLCTN OLD NAME: XX21PGM  NEW NAME: XX21PGM
*   CHANGED BY ABC4 ON 08/03/95 AT 16.05
*  00009000
*  00010000
*APPLCTN PSB=XX21PGM,PGMTYPE=(TP),FPATH=NO,SCHDTYP=PARALLEL
*  00011000
*  00012000
*  00013000
******************************** BOTTOM OF DATA ****************************
```

You can use all of the TSO/ISPF browse commands to browse the reports.

**Note**

You can also convert DELTA LISTs to STAGE1 macros using a DELTA IMS batch utility job.

A sample job, to convert a DELTA LIST to STAGE1 macros using the batch utility, is provided as member DLA#STG1 in the DLACNTL library.

---

**Generating a DELTA List in Batch**

A sample job for generating DELTA Lists that implement changes to IMS is provided as member DLA#GEN in the DLACNTL library.

DELTA Lists that implement changes to APPC cannot be generated in batch.

The following figure shows the sample job for generating DELTA Lists that implement changes to IMS. The sample job includes an in-line procedure.

**Figure 80: Sample In-Line Procedure for Generating a DELTA List**

```plaintext
//*
// EXECUTE PROC (SAMPLE)
//*
//DLA#GEN EXEC DLA#GEN,
//* THE FOLLOWING SIX STATEMENTS ARE REQUIRED
// DLASAMP='BMCNODE.DLASAMP,'
// DLALIB='BMCNODE.DLALIB',
// IMSMAC='IMSVS.R22.MACLIB',
// IMSGEN='IMS.GEN.ASM(STAGE1)',
```

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Using DLA#GEN

The following parameters can be used with the DLA#GEN procedure.

This first set of parameters is required to identify input libraries.

**DLASAMP**

The name of the DELTA IMS provided sample library containing macros supplied by BMC Software.

**DLALIB**

The name of the DELTA IMS provided load library containing load libraries supplied by BMC Software.

**IMSMAC**

The name of the IMS MACLIB macro library for your release of IMS. This library must contain the DFSLEV macro. DFSLEV is the only macro used from this library.

**IMSGEN**

The name of the data set (and member, if the data set is partitioned) which contains the IMS Stage-1 input from which the DELTA List is to be generated.

**DLAPDS**

The name of the DELTA PDS where the generated DELTA List is stored. Do not specify a member name here.

The remaining parameters provide defaults for DELTA List fields that have no corresponding parameter on the IMS Stage-1 macros.

See the descriptions of the specific DELTA List elements in “Creating and Editing DELTA Lists” on page 79 for detailed information on the use of these fields.

Because of restrictions on the length of the JCL PARM field, it may not be possible to specify all of these parameters at the same time when invoking the procedure. If you receive JCL errors when using the parameters, use the $DLAGEN macro instead. You can also use $DLAGEN if global defaults are not sufficient. See the description of the $DLAGEN macro parameters below.
All of these parameters are optional except MEMBER, which must be provided either when invoking the procedure or on the first $DLAGEN$ macro.

MEMBER

The name of the DELTA List member to be created.

TITLE

A title for the DELTA List. The title is truncated to 30 characters. If the title contains blanks or special characters, enclose it in apostrophes.

IMSID

The option restricting IMSID for this DELTA List. Specify an IMSID or a mask (using asterisks) to indicate the target IMSIDs for which this DELTA List may be executed. The default is "****". Enclose the mask in apostrophes.

AUTO

Specify YES or NO. The value you specify on this panel becomes the default AUTO value for DATABASE and RELOAD DELTA List elements. The AUTO value indicates whether sensitive ACBs should be reloaded. The default is NO.

RAND

Specify YES or NO. The value you specify on this panel becomes the default RAND value for DATABASE and RELOAD DELTA List elements. The RAND value indicates whether the DEDB Randomizer module should be reloaded. The default is NO.

The following parameters do not apply to DELTA IMS for DBCTL.

VTMASK

Specify a mask, using asterisks, that describes spare terminal node names which are included in the IMSGEN for use by DELTA IMS. The value you specify on this panel becomes the default MASK value for TERMINAL DELTA List elements. The default is "$$VTS****". Enclose the mask in apostrophes.

LTMASK

Specify a mask, using asterisks, that describes spare LTERM names which are included in the IMSGEN for use by DELTA IMS. The value you specify on this panel becomes the default MASK value for LTERM DELTA List elements. The default is "$$LTS****". Enclose the mask in apostrophes.
SPMASK

Specify a mask, using asterisks, that describes spare subpool names which are included in the IMSGEN for use by DELTA IMS. The value you specify on this panel becomes the default MASK value for subpool DELTA List elements. The default is ’$$SP$$***’. Enclose the mask in apostrophes.

NSECURE

Specify YES or NO. This indicates the default SECURE value for the TERMINAL DELTA List element. YES means signons are required for this terminal. NO indicates that signons are not required. The default is a null value, which indicates that the spare element’s signon security is not changed.

EDIT2

Specify the name of a transaction in the IMSGEN from which the Input Edit routine is to be copied for transactions added by DELTA IMS. The value you specify on this panel becomes the default EDIT(2) value for TRANSACT DELTA List elements. There is no default. Refer to “Using the $DLAGEN Macro” on page 178 for other methods of identifying Input Edit routines for DELTA List elements.

FORCE

Specify YES or NO. The value you specify on this panel becomes the default FORCE value for TRANSACT and LTERM DELTA List elements. YES means that transactions and LTERMs are updated even when nonzero queue counts exist. NO means that transactions and LTERMs are modified only if the queue count is zero. The default is NO.

USER1 USER2

These parameters may be used to specify a default value for the user fields in all DELTA List elements. There are no defaults.

Validating Stage-1 Input

The input to the DLA#GEN procedure (IMSGEN=data set) must contain valid IMS Stage-1 system definition macros.

All macros and parameters that are valid for supported versions of IMS are acceptable. The following list describes conditions for validating Stage-1 system definition input:

- The IMS system definition macros must be syntactically valid. The syntax checking performed during a DELTA List assembly is intentionally limited to
allow generic support for the various releases of IMS. If an IMS Stage-1 assembly results in errors, a DELTA List assembly may or may not result in errors. If no errors occur, the DELTA List created will be valid, but default values may be used for some options. For example, if a keyword is spelled incorrectly, the DELTA List may contain the default value for that keyword.

- IMS macros and macro parameters that have no corresponding DELTA List parameters are ignored. However, the last macro in the IMS Stage-1 source must be an IMSGEN macro. Parameters for this macro are ignored, but it must be present for a successful assembly. DELTA List generation stops when the IMSGEN macro is processed. The IMSCTRL macro is not required, but the MAXCLAS and DCLWA parameters will be used if provided. Other environmental macros are ignored.

- The only data communication macros processed are TERMINAL, MSNAME, SUBPOOL, and NAME. TERMINAL macros are ignored unless they contain a NAME parameter (indicating that it is a VTAM terminal). All other parameters on the TERMINAL macro (including LTERM) are ignored.

- Subpool macros are only processed if they contain a NAME parameter indicating an LU 6.1 subpool and are preceded by a VTAMPOOL macro.

- NAME macros are only processed if they are preceded by a $DLAGEN macro, a VTAM TERMINAL macro, an MSNAME macro, or an LU 6.1 subpool. NAME macros for the Master or Secondary Terminal are ignored. The OUTPUT parameter and all other parameters except the LTERM name are ignored.

- An IMS LGEN (large system) definition may be too large to process as a DELTA List assembly.

- The DELTA List assembly ignores the IMS system definition type (for example, MODBLKS or CTLBLKS). The same DELTA List is created regardless of the IMS type used.

If you run DLA#GEN without the IMSGEN macro, you will receive message IEV044 indicating an undefined symbol.

Using the $DLAGEN Macro

Some options required for a DELTA List cannot be obtained from the IMS Stage-1 input source. Defaults for most of these may be provided as parameters to the DLA#GEN procedure. However, defaults provided for the procedure will be used for DELTA List elements that implement changes to IMS. The use of defaults may not be acceptable if different values are desired for some DELTA List elements.
One way to provide these values is to simply add the keyword to the IMS macro. For example, to create a DELTA List TERMINAL element with a mask value of \textit{XT******}, code the following TERMINAL macro:

\begin{verbatim}
TERMINAL NAME=NODE0001,MASK=XT******
\end{verbatim}

Although these keywords are valid and are accepted by the DLA#GEN procedure, they are not valid for a normal IMS system generation.

An alternative method has been provided so that the IMS Stage-1 input can be left intact and usable. This method requires adding a $DLAGEN macro immediately preceding the IMS macro with any necessary additional keywords. For example, instead of the above TERMINAL macro, you can code the following macro:

\begin{verbatim}
$DLAGEN MASK=XT******
TERMINAL NAME=NODE0001
\end{verbatim}

A dummy $DLAGEN macro is provided in the DLASAMP library. The DLASAMP library can be included in the SYSLIB concatenation during a normal IMSGEN so that the $DLAGEN macros are ignored. With this method, the same Stage-1 input source can be used for a normal IMSGEN or for a DELTA List generation.

You can also use $DLAGEN macros to change the defaults provided for the DLA#GEN procedure. In addition, you can use the macros to add comments, IMS commands, and RELOAD elements to the DELTA List. $DLAGEN allows tailoring of the DELTA List by processing only selected IMS macros.

Note that $DLAGEN macros are not required. Use of $DLAGEN is completely optional, but it provides much greater control over the DELTA List to be generated. The various forms of the $DLAGEN macro are described in the following examples.

### Using $DLAGEN with DEFAULTS

Use the $DLAGEN macro with DEFAULTS specified to change the defaults specified on the DLA#GEN procedure. These defaults apply to all subsequent IMS macros.

\begin{verbatim}
$DLAGEN DEFAULTS,AUTO=NO,...
\end{verbatim}

You can only specify the MEMBER, IMSID, and TITLE parameters if the $DLAGEN macro is the first macro in the source file. They are invalid if specified later after IMS macros or other $DLAGEN macros have been processed. If used, enclose the TITLE value in apostrophes. Do not use apostrophes for any of the other parameters listed here.

You can specify the remaining parameters on a $DLAGEN DEFAULTS macro anywhere in the source file. The values specified override the values specified for the DLA#GEN procedure and stay in effect until changed with another $DLAGEN DEFAULTS macro.
The following table shows the parameters that are valid for both IMS control and DBCTL regions.

Table 23: $DLAGEN Parameters for IMS Control and DBCTL Regions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>This parameter becomes the AUTO value for DATABASE elements.</td>
</tr>
<tr>
<td>RAND</td>
<td>This parameter becomes the RAND value for DATABASE elements that add DEDBs; it specifies whether the randomizer should be reloaded.</td>
</tr>
<tr>
<td>ACTION</td>
<td>This parameter becomes the ACTION value for APPLCTN, TRANSACT, and LTERM elements.</td>
</tr>
<tr>
<td>USER1</td>
<td>This parameter becomes the USER1 value for all DELTA List elements.</td>
</tr>
<tr>
<td>USER2</td>
<td>This parameter becomes the USER2 value for all DELTA List elements.</td>
</tr>
</tbody>
</table>

The following table shows the parameters that are valid for non-DBCTL IMS control regions.

Table 24: $DLAGEN Parameters for non-DBCTL IMS Control Regions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASK</td>
<td>This parameter is allowable on $DLAGEN but it is not allowed on the DLA#GEN procedure. This parameter provides a quick method of changing both the LTMASK and VTMASK defaults to the same value. The value becomes the default MASK value for both TERMINAL and LTERM DELTA List elements.</td>
</tr>
<tr>
<td>VTMASK</td>
<td>This parameter becomes the MASK value for TERMINAL elements.</td>
</tr>
<tr>
<td>LTMASK</td>
<td>This parameter becomes the MASK value for LTERM elements.</td>
</tr>
<tr>
<td>SPMASK</td>
<td>This parameter becomes the MASK value for SUBPOOL elements.</td>
</tr>
<tr>
<td>NSECURE</td>
<td>This parameter becomes the SECURITY value for TERMINAL elements.</td>
</tr>
<tr>
<td>EDIT2</td>
<td>This parameter becomes the EDIT(2) value for TRANSACT elements.</td>
</tr>
<tr>
<td>REPLACE</td>
<td>This parameter becomes the REPLACE value for LTERM elements.</td>
</tr>
<tr>
<td>FORCE</td>
<td>This parameter becomes the FORCE value for TRANSACT and LTERM elements.</td>
</tr>
<tr>
<td>PSB</td>
<td>This parameter is allowable on $DLAGEN but it is not allowed on the DLA#GEN procedure. This parameter specifies the name of an application used for subsequent TRANSACT and RTCODE DELTA List elements. Normally, the PSB name is taken from the preceding APPLCTN macro. $DLAGEN can be used to set a PSB name without coding an APPLCTN macro. The PSB name is reset when the next APPLCTN macro is encountered.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>ASSIGN</strong></td>
<td>This parameter is allowable on $DLAGEN but it is not allowed on the DLA#GEN procedure. It specifies the name of a VTAM terminal to be used for subsequent LTERM DELTA List elements. Normally, the terminal name is taken from the preceding TERMINAL or SUBPOOL macro. You can use $DLAGEN to set an ASSIGN name without coding a TERMINAL macro. The name is reset when the next LINEGRP, MSNAME, MSPLINK, TERMINAL, or TYPE macro is encountered. ASSIGN and MSNAME are mutually exclusive; if you use one, you cannot use the other.</td>
</tr>
<tr>
<td><strong>MSNAME</strong></td>
<td>This parameter is allowable on $DLAGEN but it is not allowed on the DLA#GEN procedure. It specifies the name of the MSC link used for subsequent LTERM DELTA List elements. Normally, the link name is taken from the preceding MSNAME macro. You can use $DLAGEN to set a link name without coding an MSNAME macro. The name is reset when the next LINEGRP, MSNAME, MSPLINK, TERMINAL, or TYPE macro is encountered. ASSIGN and MSNAME are mutually exclusive; if you use one, you cannot use the other.</td>
</tr>
<tr>
<td><strong>PSBFPATH</strong></td>
<td>This parameter is allowable on $DLAGEN DEFAULTS but it is not allowed on the DLA#GEN procedure. PSBFPATH=YES/NO allows you to override the FPATH value on the APPLCTN macro. If YES is specified, a RTCODE element will be inserted in the DELTA List and you must ensure that the related PSB is a Fast Path exclusive application program. If NO is specified, no RTCODE element will be inserted even though the previous APPLCTN macro specifies FPATH=YES. There is no default value.</td>
</tr>
</tbody>
</table>

**Using $DLAGEN without DEFAULTS**

Use the $DLAGEN macro without DEFAULTS to override default values for the next IMS macro only. Only values that apply to the next macro are allowed, and the defaults for subsequent IMS macros are not changed.

$DLAGEN AUTO=NO,...

The INCLUDE parameter indicates that only the named IMS macros are to be processed. That is, no DELTA List elements are created from any other macros. When used, the INCLUDE list completely replaces any previous INCLUDE or EXCLUDE list. INCLUDE is mutually exclusive with EXCLUDE and can only be used if DEFAULTS is used, but it can be combined with the other parameters that set defaults. If INCLUDE or EXCLUDE are never used, all IMS macros are processed. If you specify INCLUDE as ALL, all IMS macros are processed.

$DLAGEN DEFAULTS,INCLUDE=(NAME,DATABASE,...)

The EXCLUDE parameter indicates that the named IMS macros are to be ignored. That is, no DELTA List elements are created from those IMS macros. DELTA List elements may be created from all other IMS macros. When used, the EXCLUDE list completely replaces any previous INCLUDE or EXCLUDE list. EXCLUDE is mutually exclusive with INCLUDE, and can only be used if DEFAULTS is used but may be combined with the other parameters that set defaults. If INCLUDE or...
EXCLUDE are never used, all IMS macros are processed. If you specify EXCLUDE as ALL, all IMS macros are ignored.

$DLAGEN DEFAULTS, EXCLUDE=(APPLCTN, TRANSACT, ...)

### Specifying Element Action

There are three types of DELTA List elements: ADD to add new entities to IMS, REVISE to modify existing IMS entities, or DELETE to delete an existing IMS entity.

By default, IMS Stage-1 macros cause ADD elements to be created for the DELTA List. REVISE elements can be created by adding a RENAME parameter to the IMS macro.

The following example creates a REVISE DELTA List element to rename application PSB00001 to the new name PSB00002:

```
APPLCTN PSB=PSB00001, RENAME=PSB00002
```

Use the $DLAGEN macro with the ADD, REVISE, or DELETE keyword to explicitly set the type of DELTA List elements to be created from the next IMS macro. This type will apply to the next IMS macro only. When you use ADD, REVISE, or DELETE, the following IMS macro is processed even if a previous INCLUDE or EXCLUDE list indicated that it should be ignored.

You can combine ADD and REVISE with other parameters to override defaults for the next IMS macro. In addition, the RENAME keyword is optional for a REVISE, and indicates that the elements are to be renamed to the specified names. No other parameters are allowed with DELETE.

$DLAGEN ADD, ...
$DLAGEN REVISE, RENAME=NEWNAME, ...
$DLAGEN DELETE

### Ignoring IMS Macros

When you use NOGEN, the next IMS macro in the input is ignored. That is, no DELTA List elements are created from that macro, even if the macro name was included in a previous INCLUDE list. No other parameters may be specified with NOGEN.

$DLAGEN NOGEN
### Specifying TRANSACT

DELTA List TRANSACT elements do not apply to DBCTL regions. TRANSACT elements cannot contain the name of an input edit routine. Instead, they must contain the name of an IMSGEN-defined TRANSACT that uses the Input Edit Routine needed. Since IMS macros specify an Input Edit Routine, a method for obtaining the model transaction is required.

```
$DLGEN DEFAULTS,
EDIT=((ROUTINE1,TRANA),(ROUTINE2,TRANB),..)
```

### Using EDIT with TRANSACT

The EDIT parameter allows you to provide a list of model IMSGEN-defined transactions for Input Edit Routines. This list is then used to translate the routine name into the name of a transaction. The following macro illustrates using the EDIT parameter in this manner:

```
$DLGEN DEFAULTS,
EDIT=((DFSCSMB0,TRANA),(DFSCSMB9,TRANB)) ... TRANSACT
CODE=(TRAN1,TRAN2),EDIT=(,DFSCSMB0) TRANSACT
CODE=TRAN3,EDIT=(,DFSCSMB9)
```

The DELTA List elements created for transactions TRAN1 and TRAN2 will use TRANA as the model transaction for copying the Input Edit Routine. The element created for TRAN3 will use TRANB as the model transaction.

There are other ways to provide the model transaction. The simplest way is to use the EDIT2 parameter, either globally or for a specific TRANSACT macro. The following macro results in the same DELTA List as the above macro:

```
TRANSACT CODE=(TRAN1,TRAN2),
EDIT=(,DFSCSMB0),EDIT2=TRANA TRANSACT
CODE=TRAN3,EDIT=(,DFSCSMB9),EDIT2=TRANB
```

The EDIT list may also be built automatically from excluded TRANSACT macros. For example, the following macro results in an identical DELTA List:

```
$DLGEN DEFAULTS,EXCLUDE=TRANSACT
TRANSACT CODE=TRANA,EDIT=(,DFSCSMB0) TRANSACT
CODE=TRANB,EDIT=(,DFSCSMB9)
$DLGEN DEFAULTS,INCLUDE=ALL
TRANSACT CODE=(TRAN1,TRAN2),EDIT=(,DFSCSMB0) TRANSACT
CODE=TRAN3,EDIT=(,DFSCSMB9)
```

### Using a COMMENT Element

When you use COMMENT, a DELTA List COMMENT element is created. The comment text must be enclosed in apostrophes. No other parameters are allowed with COMMENT.

```
$DLGEN COMMENT='DELTA LIST COMMENT'
```
Using a COMMAND Element

When you use COMMAND, a DELTA List IMS COMMAND element is created. The command must begin with a `/` and must be enclosed in apostrophes. The command verb and the first keyword must be one of those allowed within a DELTA List. The remaining parameters must each be eight characters or less. You can provide a password by enclosing the password in parentheses immediately following the command.

```bash
$DLAGEN COMMAND='/DIS A'
$DLAGEN COMMAND='/DIS(password) ACTIVE'
```

Using a RELOAD Element

When you use RELOAD, a DELTA List RELOAD element is created. The only other parameters allowed with RELOAD are TYPE, RAND, AUTO, USER1, and USER2. AUTO is only allowed with TYPE=DMB. The defaults are TYPE=ACB and AUTO=NO.

```bash
$DLAGEN RELOAD=NAME,TYPE=DMB,RAND=YES,AUTO=YES,USER1=,USER2=
```
Creating DELTA Log Reports

This chapter describes how to create DELTA IMS reports and how to display information from the DELTA Logs. It also describes how to create updates for IMS Stage-1 system definition from the DELTA Logs.

Introduction

DELTA IMS allows you to generate reports about changes made to IMS systems based on data stored in the DELTA Logs. This chapter provides information and instructions for generating these reports through the DELTA IMS online interface and in batch.

See “DELTA Logs” on page 141.

Using Log Utilities Online

Following are instructions for generating a DELTA Log report through the DELTA IMS online interface.

See “Using Log Utilities in Batch” on page 195 for information on generating a DELTA Log report in batch.

Beginning a DELTA IMS Session to Generate Log Reports

You access the panels that allow you to generate DELTA Log reports from the DELTA IMS Primary Menu.

See “DELTA IMS Interface and Tier Views” on page 17 for information on invoking the DELTA IMS online interface and selecting an interface tier view.
From the DELTA IMS Primary Menu, type 6 in the selection field and press Enter. The DELTA IMS Utilities panel (below) is displayed.

**Figure 81: Utilities Menu**

<table>
<thead>
<tr>
<th>UT</th>
<th>DELTA IMS DB/DC- Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command =&gt;</td>
<td>__________________________</td>
</tr>
<tr>
<td>IMSID . . . DLA5 IMS system-id</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following. Then press Enter.

- 1. List DELTA IMS Logs. (LM)
- 2. Maintain DELTA IMS Logs. (LU)
- 3. Display and alter IMS storage. (ZP)
- 4. Generate a DELTA List from a DELTA log. (GN)
- 5. Convert a DELTA List to Stage I macros. (CV)
- 6. BMC Product Authorization by CPU-ID

Type 1 in the selection field on the DELTA IMS Utilities panel and press Enter. The Log List panel is displayed.

**Using Log List**

The Log List panel, shown in the following figure, provides access to the other panels necessary to generate a report from the DELTA Log.

DELTA IMS reports provide a comprehensive audit trail and record of DELTA IMS activity. The brief reports for the data processing or department manager reflect DELTA IMS activity and omit most detail. The more detailed reports are intended for the system programmer’s use in controlling the system and eventually migrating the DELTA IMS-applied updates into the IMS system definition. Various selection criteria, sort sequences, and output options are available for DELTA IMS reports.

The source of the DELTA IMS reports is the DELTA Log. DELTA IMS records all updates to an IMS control region in the DELTA Log. IMS operator commands issued through DELTA IMS can be recorded in a DELTA Log along with the command response. The accuracy and integrity of the DELTA Log and the reports is ensured since the same log data is used at each IMS restart to reapply the updates to IMS.

**Figure 82: DELTA IMS Log List**

<table>
<thead>
<tr>
<th>LM</th>
<th>DELTA IMS DB/DC - Log List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Command =&gt;</td>
<td>__________________________</td>
</tr>
<tr>
<td>IMSID . . . DLA5 IMS system-id</td>
<td>for the desired DELTA IMS Log.</td>
</tr>
</tbody>
</table>

Select one of the following. Then press Enter.

- 1. Specify input parameters for log list (LI)
- 2. Specify output parameters for log list (LO)
- 3. List the DELTA IMS log (LL)
You can use a DELTA Log to create online or printed reports to show activity in DELTA IMS.

For sites with more exacting or unusual reporting requirements, an interface to a user-written report module has been defined. The user module must adhere to naming and interface conventions. The reports it produces will be displayed online in a manner similar to the reports provided by DELTA IMS.

### Selecting Report Input Items

The Log List Input panel, shown in the following figure, is displayed when you select option 1 from the Log List panel.

Inputs for the DELTA Log reports are selected from this panel.

**Figure 83: Log List Input Panel**

<table>
<thead>
<tr>
<th>LI Command</th>
<th>DELTA IMS DB/DC - IMSA Log List Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select (type a '/') one or more element types to be listed.</td>
<td></td>
</tr>
<tr>
<td>/ DATABASE items</td>
<td>Changed DATABASE elements</td>
</tr>
<tr>
<td>/ APPLCTN items</td>
<td>Changed APPLICATION elements</td>
</tr>
<tr>
<td>/ TRANSACT items</td>
<td>Changed TRANSACTION elements</td>
</tr>
<tr>
<td>/ LTERM items</td>
<td>Changed Logical TERMINAL elements</td>
</tr>
<tr>
<td>/ TERMINAL items</td>
<td>Renamed VTAM Terminal NODE elements</td>
</tr>
<tr>
<td>/ RELOAD items</td>
<td>ACBLIB BLDL requests for DMB's and ACB's</td>
</tr>
<tr>
<td>/ EXECUTE items</td>
<td>Executed IMS operator commands</td>
</tr>
<tr>
<td>/ APPC items</td>
<td>Changed APPC elements</td>
</tr>
<tr>
<td>/ RTCODE items</td>
<td>Changed Fast Path RTCODE elements</td>
</tr>
<tr>
<td>/ ZAPS</td>
<td>IMS storage zaps</td>
</tr>
<tr>
<td>/ SUBPOOL items</td>
<td>Changed LU 6.1 SUBPOOL elements</td>
</tr>
<tr>
<td>Select (type a '/') one or more element status categories.</td>
<td></td>
</tr>
<tr>
<td>/ Active</td>
<td>(used in most recent IMS restart)</td>
</tr>
<tr>
<td>/ Inactive</td>
<td>(not used in most recent IMS restart)</td>
</tr>
</tbody>
</table>

Input exit . . . . . . DLAXALI _ (Type only the one character suffix)

Use the END command to exit.

**Note**

DATABASE items, APPLCTN items, RELOAD items, EXECUTE items, and ZAPS are elements that apply to both IMS control and DBCTL regions.

Select the types of elements for the DELTA Log List report and the status of the elements that should be considered.

In the element type fields, type / beside each type of element that should be added to the DELTA List. Changed as used on this panel means added, deleted, revised, or reloaded. If none is selected, all types are selected by default.
In the status fields, type / to specify whether active elements (as of the last IMS restart), inactive status (other than the last IMS restart), or both should be considered when DELTA IMS generates the DELTA List.

In the Input exit field, type only a one-character suffix. If your site has specialized requirements for filtering the DELTA Log records before generating a report, type a one-character suffix to be appended to DLAXALI to form the name of an input selection exit defined by your site.

Selecting Report Format and Sort Sequence

The List Output panel, shown in the following figure, is displayed when you select option 2 on the Log List panel. From the List Output panel, you can specify the report format and sort sequence of DELTA Log lists.

Figure 84: Log List Output Panel

The following fields are available on this panel:

Type of report

Select the type of output for each report run by typing the number of the report type. For the user report format, the name of a load module in DLALIB that you have written will produce your own format of the report. The default type of report is option 1 (Terse). The following types of reports can be generated:

1. Terse, brief report, one line per update.
2. Complete report with before and after data.
3. Complete report with only changed data.
4. User report - call user exit DLAXALU.
5. IMS Stage-1 Updates with comments.
6. IMS Stage-1 Updates without comments.

Type 1, 2, 3, 4, 5 to sort the log entries, prioritized in major-to-minor (1-to-5) order. Leave these fields blank for no sort.

- Descending date-and-time sequence
- Ascending date-and-time sequence
- Element-type category sequence
- Element name sequence
- Update-userid sequence

Optional output data set
(must be pre-allocated data set or PDS member)

The terse report will contain a one-line description of each update made to IMS. In the case of IMS commands executed from DELTA IMS, only the first part of the command executed will be provided. See “Generating a Terse Report” on page 190 for additional information.
2. Complete report with before and after data.

This report contains a complete explanation of each update made to IMS. Each element attribute is listed and includes a short explanation. Changes are accompanied by their original values, if they are meaningful. When IMS commands are executed from DELTA IMS, the entire command executed is provided. See “Generating Complete or Changed Reports” on page 191 for additional information.

3. Complete report with only changed data.

The changed report is similar to the complete report except that only changed attributes are displayed. Attributes that are unchanged are suppressed from the display. When IMS commands are executed from DELTA IMS, the entire command executed is provided. See “Generating Complete or Changed Reports” on page 191 for additional information.

4. User report - call user exit DLAXALU.

Select a user report by typing the suffix of the appropriate user report module. Many user reports may be defined by your site. The suffix is the character that, when concatenated with DLAXALU, will form the name of a load module in DLALIB that will produce the desired report.

5. IMS Stage-1 Updates with comments.

Updates for the IMS Stage-1 system definition can be produced from the DELTA Log. Sort specifications are ignored for this type of output. DELTA List outputs the Stage-1 macro statements in the order they would appear in the Stage-1 job stream. Individual elements are sorted into alphanumeric sequence within element type. See “Generating a Stage-1 Report” on page 194 for additional information.

6. IMS Stage-1 Updates without comments.

Same as the above report without comments. See “Generating a Stage-1 Report” on page 194 for additional information.

There is no need to specify log list outputs before generating each report. The previous outputs are used as default values.

Type 1,2,3,4,5 to sort the log entries, prioritized in major-to-minor (1-to-5) order.

The report is sequenced according to your specification. Type a number in each field to indicate the order that should be used for sequencing the report. Leave these fields blank for no sort.
Optional output data set

To generate machine readable output, enter the name of a preallocated sequential data set or preallocated PDS and member name to contain the report. The report lines will be written without blank lines and headings. The record format is FB with a record length of 80.

Generating a Terse Report

You can generate DELTA Log reports in terse, complete, changed, user, or Stage 1 formats. The type of report generated is specified on the Log List Output panel. You can generate reports by selecting option 3 from the Log List panel, which will access the Log List/Browse panel. The following figure shows a Log List/Browse panel with a terse report.

All ISPF browse commands are supported when browsing a DELTA Log report. Additionally, DELTA IMS offers a ROUTE command and a PPRT command, which can be issued to generate a hard copy of the DELTA Log report. ROUTE and PPRT are the same, except when the destination operand is omitted. PPRT will assume R0 as the default JES destination, whereas ROUTE will prompt for the missing operand.

Figure 85: Log List Browse Panel - Terse Report

The following fields are available on this panel:

DATE

The date that the update was originally performed.

TIME

The time that the update was originally performed.

USERID

The user ID of the TSO session that executed the update.
**Note**

An asterisk (*) is appended to the user ID if the specified user has initiated an action via a batch process.

<table>
<thead>
<tr>
<th>ACTION</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD</td>
<td>An element was added to IMS.</td>
</tr>
<tr>
<td>REVISE</td>
<td>Changed attributes to the name of an existing IMS element.</td>
</tr>
<tr>
<td>RELOAD</td>
<td>Forced directory reinitialization and new ACBLIB BLDL for the existing IMS ACB or DMB.</td>
</tr>
<tr>
<td>EXEC</td>
<td>Executed an IMS operator command.</td>
</tr>
<tr>
<td>ZAP</td>
<td>Altered IMS storage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELEMENT TYPE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>The new name of a renamed IMS element.</td>
</tr>
<tr>
<td>OLD NAME</td>
<td>The original name of a renamed IMS element.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTIVE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVE</td>
<td>Indicates whether this log record is considered active by DELTA IMS. An active element is still appropriate and will be reapplied to IMS at the next restart.</td>
</tr>
</tbody>
</table>

---

**Generating Complete or Changed Reports**

You can generate DELTA Log reports in terse, complete, changed, user, or Stage 1 formats. The type of report generated is specified on the Log List Output panel. You can generate reports by selecting option 3 from the Log List panel, which will access
the Log List/Browse panel. The following figure shows a Log List/Browse panel
with a complete report.

All ISPF browse commands are supported when browsing a DELTA Log report.
Additionally, DELTA IMS offers a ROUTE command and a PPRT command, which
can be issued to generate a hard copy of the DELTA Log report. ROUTE and PPRT
are the same, except when the destination operand is omitted. PPRT will assume R0
as the default JES destination, whereas ROUTE will prompt for the missing operand.

Figure 86: Log List Browse Panel - Complete Report

| IMSID: E51D | Line 000027 of 000047 | Cols 001 080 | More: - + |
| DATE | TIME | USERID | ACTION | ELEMENT | TYPE | AFTER | BEFORE | ACTIVE |
| 8/02/95 | 14.39 | SLJ2 | ADD | APPLCTN | | YES |
| Name of PSB: XX21PGM |
| PSB always in main storage?: NO |
| Program is a BMP or MPP: MPP |
| Schedule serial or parallel: PARALLEL |
| Fast Path program?: NO |
| Dynamic PSB modification?: NO |
| Dynamically Generate a PSB?: NO |
| Programming language interface: NONE |
| 8/02/95 | 14.39 | SLJ2 | ADD | DATABASE | | YES |
| Name of DBD: XX21PART |
| DBD always in main storage?: NO |

The following fields are available on this panel:

**DATE**

The date that the update was originally performed.

**TIME**

The time that the update was originally performed.

**USERID**

The user ID of the TSO session that executed the update.

---

*Note*

An asterisk (*) is appended to the user ID if the specified user has initiated an
action via a batch process.

**ACTION**

The type of action which DELTA IMS took. The possible actions are:

- **ADD** – An element was added to IMS.
- **REVISE** – Changed attributes to the name of an existing IMS element.
- **RELOAD** – Forced directory reinitialization and new ACBLIB BLDL for the existing IMS ACB or DMB.
- **EXEC** – Executed an IMS operator command.
- **ZAP** – Altered IMS storage.

**ELEMENT TYPE**

The type of IMS element acted upon. For EXEC action items, this column contains the first or part of the command executed. For other than EXEC actions, this column contains the type of element added, deleted, revised or reloaded.

**AFTER**

The new name of a renamed IMS element.

**BEFORE**

The original name of a renamed IMS element.

**ACTIVE**

Indicates whether this log record is considered active by DELTA IMS. An active element is still appropriate and will be reapplied to IMS at the next restart.

**Additional Information on Complete Reports**

The following information is available on complete reports only:

- For IMS operator commands, the complete operator command image is shown. If necessary, the command is continued on subsequent lines.

- The command response, up to 120 characters, is continued on the next line. If the response is given as OK, the command executed successfully and no response is returned by IMS.

- Each element attribute is listed on a separate line with a short explanation and its value. If the attribute represents a change, the old attribute, if meaningful, will also be displayed.

- When reporting on revisions to transactions and LTERM attributes involving nonzero queue counts or the FORCE parameter, there are four situations to consider:
— FORCE=YES was specified, and the revision was forced because of nonzero queue counts.

— FORCE=YES was specified but the revision was not forced because of zero queue counts.

— FORCE=NO was specified, and the revision was completed successfully.

— FORCE=NO was specified, and the revision was ignored.

The following table shows the information that appears on the Complete Report for the revision of a transaction or LTERM. The xxx and yyy values appear as shown in the following table based on what is specified and what action DELTA IMS eventually performs.

Table 25: FORCE Variable - DELTA List Complete Report

<table>
<thead>
<tr>
<th>ACTION Update when non-zero queue counts?</th>
<th>AFTER xxx</th>
<th>BEFORE yyy</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXX</td>
<td>YYYY</td>
<td>Meaning</td>
</tr>
<tr>
<td>YES</td>
<td>blank</td>
<td>FORCE=YES was specified, and the requested action was forced because of nonzero queue counts.</td>
</tr>
<tr>
<td>NO</td>
<td>YES</td>
<td>FORCE=YES was specified, but the queue counts were zero.</td>
</tr>
<tr>
<td>NO</td>
<td>blank</td>
<td>FORCE=NO was specified, and the queue counts were zero. Note: If FORCE=NO was specified and the queue counts were nonzero, there will not be an entry in any DELTA Log Report since the operation was unsuccessful.</td>
</tr>
</tbody>
</table>

Generating a Stage-1 Report

You can generate DELTA Log reports in terse, complete, changed, user, or Stage-1 formats. The type of report generated is specified on the Log List Output panel. You can generate reports by selecting option 3 from the Log List panel, which will access the Log List/Browse panel. The following figure shows the Log List/Browse panel with a Stage-1 report.

All ISPF browse commands are supported when browsing a DELTA Log report. Additionally, DELTA IMS offers a ROUTE command and a PPRT command, which can be issued to generate a hard copy of the DELTA Log report. ROUTE and PPRT are the same, except when the destination operand is omitted. PPRT will assume R0 as the default JES destination, whereas ROUTE will prompt for the missing operand.
When generating a Stage-1 report, DELTA IMS sorts the generated macros as they would normally appear in the Stage-1 job stream. The macros are grouped by element type and then sorted alphanumerically for each type.

**Figure 87: List Browse Panel - Stage-1 Report**

<p>| Command: DELTA IMS DB/DC - Log List Browse | Scroll: PAGE |
| IMSID: E51D | Line 000001 of 000013 Cols 001 080 |</p>
<table>
<thead>
<tr>
<th>MACRO</th>
<th>PREVIOUS NAME</th>
<th>CURRENT NAME</th>
<th>REFERS TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>*INSERT DATABASE OLD NAME:</td>
<td>XX21PART</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHANGED BY SLJ2</td>
<td>ON 08/02/95 AT 14.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATABASE DBD=XX21PART,ACCESS=EX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>*INSERT APPLCTN OLD NAME:</td>
<td>XX21PGM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHANGED BY SLJ2</td>
<td>ON 08/02/95 AT 14.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APPLCTN PSB=XX21PGM,PGMTYPE=(TP),FPATH=NO,SCHDTYP=PARALLEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>************************ Bottom Of Data **************************</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Using Log Utilities in Batch

Whenever using the online log utilities is inconvenient or undesirable, you may use the DELTA IMS batch log utilities.

### Using the Batch Log/List Utility

The following figure shows sample JCL to execute the Log/List utility.

**Figure 88: Sample Batch Log/List Utility JCL**

```plaintext
//JOBNAME JOB (account) /* UPDATE JOB CARD */
//LOGLIST EXEC PGM=IKJEFT01, PARM=DLAXALBO,DYNAMNBR=16,REGION=2048K /*
//STEPLIB DD DSN=BMC.DLALIB, DISP=SHR /* UPDATE LIBRARY */
//SYSTSPT DD SYSOUT=* /* SYSPRINT DD SYSOUT=* /* SYSSDUMP DD SYSOUT=* /* SYSTSIN DD * BATCH COMMANDS */
```

The Log/List utility enables you to run the SELECT and REPORT commands in batch. The SELECT command enables you to enter a list of log record types you
want to read for report data. The REPORT command enables you to specify the type of report or indicate whether you want to create the updates for Stage-1 system definition macros from the logs. The following pages describe these commands and their parameters. Also shown are the syntax and the format of the commands.

## Using the SELECT Command

Use the SELECT command to enter a list of DELTA Log record types to be read. You can also specify whether to select active or inactive records or to use a specific site-defined selection exit. The default for this command is ALL. The following figure shows the SELECT command syntax.

![Figure 89: Batch Log/List Utility SELECT Command](image)

The following parameters apply to both IMS control and DBCTL regions:

**DATABASE (or DBD)**

The DATABASE parameter reads database log record updates from the log.

**APPLCTN (or APL)**

The APPLCTN parameter reads application log record updates from the log.

**RELOAD (or REL)**

The RELOAD parameter reads reload log record updates from the log.

**COMMAND (or CMD)**

The COMMAND parameter reads command log record updates from the log.

**ALL**

The ALL parameter reads all log record updates from the log.

The following parameters apply to IMS control regions only:
TRANSACT (or TRN)

The TRANSACT parameter reads transaction log record updates from the log.

LTERM (or LTE)

The LTERM parameter reads LTERM log record updates from the log.

TERMINAL (or TER)

The TERMINAL parameter reads terminal log record updates from the log.

APPC

The APPC parameter reads APPC log record updates from the log.

RTCODE (or RCT)

The RTCODE parameter reads route code log record updates from the log.

SUBPOOL (or SPL)

The SUBPOOL parameter reads subpool log record updates from the log.

ZAPS (or ZAP)

The ZAPS parameter reads zap log record updates from the log.

ACTIVE

The ACTIVE parameter reads the active log record updates from the log.

INACTIVE

The INACTIVE parameter reads the inactive log record updates from the log.

EXIT(n)

The EXIT(n) parameter uses an exit you specify with n.

Using the REPORT Command

Use the REPORT command to enter the IMSID and report type criteria.

The IMSID parameter is required. The OUTDSN, TYPE, and SORT parameters are optional.
The following figure shows the REPORT command syntax.

**Figure 90: Batch Log/List Utility REPORT Command**

When coding the SELECT command, the parameters can be either completely spelled out or abbreviated.

A plus sign (+) continuation mark is required for both SELECT and REPORT when the commands are continued to another line.

You can use the following keywords with the REPORT command:

**TYPE**

- **TERSE** - The terse report consists of a one-line description of each update to IMS. For commands executed through DELTA IMS, only the first part of the command is given. TERSE is the report type default.

- **COMPLETE** – The complete report consists of a detailed description of each update. The attributes for each element will be listed along with a short explanation. For commands, the entire command is given.

- **CHANGED** – The changed report is similar to the complete report; however, only those attributes that have been changed are given.

- **USER** – Select the user report by indicating the suffix of the appropriate user report module (DLAXALUn).

- **STAGE1** – Updates for the IMS Stage-1 system definition are produced from the DELTA Logs. Sort criteria are ignored for this report type. The Stage-1 macro statements are output in the same order as the Stage-1 job stream. Elements are sorted alphanumerically within element type.
SORT

Select one of the following sort sequences:

- **LIFO** – The records are sorted in last in, first out (descending) order.
- **FIFO** – The records are sorted in first in, first out (ascending) order. This is the sort default.
- **TYPE** – The records are sorted by element type.
- **NAME** – The records are sorted by element name.
- **USERID** – The records are sorted by updating user ID.

OUTDSN

By specifying a data set name with the OUTDSN parameter, you can write the report to a preallocated data set.

Report Examples

The following are some report examples:

To select all active and inactive database, transactions, and command records for IMSID DLA4, use the formats shown in the following examples:

```
SELECT DATABASE TRANSACTION COMMAND (or)
SELECT DBD TRN CMD
REPORT DLA4
END
```

To select IMSID DLA4 active LTERM and TERMINAL records using the site-defined selection exit, DLAXALI0, you use the complete report type and sort the output by element type.

```
SELECT LTE TER          +
   ACTIVE           +
   EXIT(0)         +
REPORT DLA4         +
   TYPE(COMPLETE) +
   SORT(TYPE)
END
```

To create a list for IMSID DLA4 with all the changed records sorted by user ID, use the format shown in the following example:

```
SELECT ALL
REPORT DLA4        +
   TYPE(CHANGED) +
```
Creating User Reports

Depending on your site requirements, the report formats supplied by DELTA IMS may not be acceptable. If your site has special needs, DELTA IMS defines an interface between the DELTA Log and the report facility so that you can create the reports you need.

DELTA IMS Services

To assist you in creating reports from the DELTA Log, DELTA IMS allows you to:
- Read the DELTA Log data set
- Select records using parameters specified on the Log List Input panel
- Sort records using options specified on the Log List Output panel
- Provide log records to the user report module one record at a time
- Display and scroll the user created report lines at the terminal
- Open, close, and write the optional machine-readable output data set

User Report Module Services

To further assist you in creating reports from the DELTA Log, DELTA IMS provides the following user module services:
- Receive log records and recognize the end-of-file indication
- Load base registers for log record and audit list parameter block
- Determine record type and optionally format to 80-character print lines
- Maintain a line count and generate headings, if needed
- Call the output routine for each print line generated

### Registers

Registers at entry use standard linkage conventions with these exceptions:

- R0 - Address of ALPDSECT. This address is the Audit List parameter block. The DSECT is obtained from macro$DLAMAP ALP=0.

- R1 - The address of the log record or zero which is the end-of-file indication. The log record is mapped by DSECTs LGRDSECT, DLSREC, and several others depending on the type.

- R13 - Address of a save area in a pre-chained save area set. You may use one or more of the save areas, but you cannot alter the chain.

### Using the Report Module-DLAXALUx

The name of the user report module is DLAXALUx. The x is replaced with a unique one-character suffix that is used later when requesting a report of this type. The x may not be a blank and should not be a zero. The zero suffix is used for the example supplied by DELTA IMS. Your program should be written in assembler language. When written and assembled, link-edit the load module into the DLALIB data set.

The sample user report module DLAXALU0 is supplied in source form with DELTA IMS in the DLASAMP library.

Begin the program by loading the base registers and testing for end-of-file. As the end-of-file processing is optional, you may simply choose to return to caller. Determine which of the four types have been presented: a before image, an after image, a command record, or a response record. The record is mapped by DSECT LGRDSECT and field LGRFLAG1 can be interrogated to determine the record type.

For before and after image records, the LGRDSECT maps only the prefix of the log record. Field LGRVAR contains all the important data about the record and is mapped by DSECT DLSREC. DLSREC is a general DSECT that applies equally to all types of elements that may be found in a DELTA List. DLSREC is remapped by APLREC, DMBREC, TRNREC, LTEREC, NODREC, SPLREC, RCTREC, and ZAPREC as appropriate. Field DLSID identifies the type of element and suggests which other DSECT should be used. You may want to use all these DSECTs.
depending on requirements and convenience. Issue the $DLAMAP macro as coded below to obtain these DSECTs in your program.

```
$DLAMAP LGR=0,DLS=0,APL=0,DMB=0,TRN=0,LTE=0,NOD=0,
     SPL=0,RCT=0,ZAP=0
```

For command and response records, field LGRVAR contains the command or response. The first 4 bytes of LGRVAR for command records is the LLZZ field followed by the command. Ignore the first 4 bytes of LGRVAR for response records. A response follows these 4 bytes. A blank response means that none was returned by IMS and is assumed to be OK.

You must furnish and format a print line. Line counts and headings are optional. To create a print line, place an ANSI printer control character (a blank) in position 1, data in positions 2 through 80, and a line type identifier (APL1DTL, APL1HDR, or APL1TTL) in APLFLAG1. Load the address of the print line in R1 and call the output routine, using the address in ALPOUTPT. You control the number of print lines for each record.

When all lines have been created for the given record, return to caller. No significance is given to a nonzero return code.

---

**Updating Stage-1 Input**

DELTA IMS creates updates for the IMS Stage-1 system definition of those changes made to the IMS control region. You must insert the updates in the Stage-1 job stream.

DELTA IMS attempts to relate elements that are logically related. TRANSACT and RTCODE statements can be related to APPLCTN statements. Where DELTA IMS can establish the proper relationship, the related TRANSACT and RTCODE statements will immediately follow the APPLCTN. They will be indented to highlight the relationship. A similar convention is used for VTAM terminals and logical terminals (TERMINAL and NAME statements). The relationship, in this case, can only be established if the LTERM add or revise specified the name of the terminal assignment. While DELTA IMS attempts to generate all necessary Stage-1 macro operands, in the following situations this generation is not possible:

- **TRANSACT elements with an Input Edit routine**

  Since the name of the Input Edit routine is not available from the IMS transaction control block (SMB), DELTA IMS cannot determine the module name and therefore generates a macro operand such as EDIT=(UC,?????????) to indicate that you must supply the name.
- TERMINAL definitions with special feature operands

Since all TERMINAL updates use existing spare terminals, DELTA IMS does not record information about certain macro operands such as TYPE, FEAT, OUTBUF, etc. You must identify and copy these types of macro operands based upon the spare terminal name.
Glossary

A

ACB

See "application control blocks."

AOI

Automated operator interface. For more information, see IBM Terminology.

API

Application program interface. For more information, see IBM Terminology.

APPC

Advanced program-to-program communications. An implementation of the LU 6.2 protocol that allows interconnected systems to communicate and share processing of programs.

application control blocks

The control blocks created from the output of PSBGEN and placed in the ACB library for use during online and DBD region type execution of IMS.

area

See “Database Area.”

automated operator interface
An IMS interface that automates the interaction with various system processes.

**B**

**batch message processing**

A batch processing program that has access to online databases and message queues.

**BDAM data set**

Basic direct access method data set. For more information, see IBM Terminology.

**BMCLINK**

An interregion control facility provided with DELTA IMS that allows the DELTA IMS user to communicate with an IMS control region.

**BMCRESLB**

A DD name for the IMS RESLIB data set used in the IMS control region if IMS RESLIB is a LINKLIST data set.

**BMP**

See "batch message processing".

**C**

**CNT**

See “communications name table.”

**communications name table**

Communications name table. For more information, see IBM Terminology.

**control section**
The part of a program specified by the programmer to be a relocatable unit, all elements of which are to be loaded into adjoining main storage locations.

**CSECT**

Control section. For more information, see IBM Terminology.

**D**

**Data Base Recovery Control**

An IMS feature that maintains information needed for database recovery.

**data entry database**

A database consisting of one or more areas. It is a direct-access database in which each area contains both root and dependent segments.

**Data Language/I**

A language that provides an interface between user applications and IMS.

**data management block**

An IMS control block in main storage that describes and controls a physical database. It is constructed from information obtained from the ACB library or the DBD library.

**database**

A collection of data that is often stored hierarchically to eliminate data redundancy.

**database area**

The subset of a DEDB.

**database recovery**

The process of restoring a corrupted physical database data set to a point in time before the corruption occurred.
DBCS

Double-byte character set. For more information, see IBM Terminology.

DBRC

Data Base Recovery Control. For more information, see IBM Terminology.

DEDB

Data entry database. For more information, see IBM Terminology.

destination name table

An internal table containing the name of all destination SMBs, CNTs, and VCNs.

DL/I

Data Language/I. For more information, see IBM Terminology.

DL/I database

A database that is created and accessed using DL/I.

DMB

Data management block. For more information, see IBM Terminology.

DNT

See “destination name table” on page 208.

double-byte character set

A set of characters in which each character is represented by two bytes. Languages, such as Japanese, which contain more symbols than can be represented by 265 code points require double-byte characters. See “Kanji.”
DSECT

Dummy control section. For more information, see IBM Terminology.

dummy control section

A control section that an assembler can use to format an area of storage without producing any object code.

E

explicit API

In APPC, the SAA communications API.

G

general register storage

General registers R1-R15 store or compute values or addresses.

GRS

General Resource Serialization. A MVS facility that maintains integrity across multiple MVS users of the same resource.

I

implicit API

In APPC, an extension of the IMS standard DL/I API.

IMS

Information Management System. For more information, see IBM Terminology.

Information Management System
IBM’s system for managing large volumes of data and transactions.

ITASK

A unit of IMS work.

J

job

One or more programs, executed synchronously, under control of the operating system (OS/VS) and Job Entry Subsystem (JES).

K

Kanji

A graphic character set consisting of symbols used in Japanese ideographic alphabets. Each character is represented by 2 bytes.

L

logical terminal

A destination with a name related to a physical terminal.

LTERM

See “logical terminal.”

M

main storage database

A root-segment database residing in main storage that can be accessed to a field level.
Master terminal operator

The person using the logical terminal that controls all IMS resources and online operations.

MODBLKS

Two data sets, an active and an inactive set, in which the IMS Online Change modifications are placed for a MODBLKS update. Changes are made to the inactive data set and are applied by making that data set active.

MSC

Multiple Systems Coupling. For more information, see IBM Terminology.

MSDB

Main storage database. For more information, see IBM Terminology.

MSNAME

Indicates that an LTERM entry is to be defined as a remote LTERM specifying the link name block name of the desired logical system.

MTO

Master terminal operator. For more information, see IBM Terminology.

Multiple Systems Coupling

An IMS feature that permits geographically dispersed IMS systems to communicate with each other.

P

physical terminal

A hardware device attached to the computer and supported by IMS/DC as a terminal. A physical terminal usually has one or more logical terminals (LTERMs) associated with it.
PTERM

See “physical terminal.”

Q

quiesce

Ends a process by allowing operations to complete normally.

R

RCNT

See “Remote Communications Name Table.”

Remote Communications Name Table

A table containing the name of a terminal in another MSC-connected system where a transaction originated.

S

SBCS

Single-byte character set. For more information, see IBM Terminology.

single-byte character set

A character set in which each character is represented by a 1-byte code.

SMB

An IMS transaction control block.

spare element pool
A group of unused terminal, LTERM, and subpool control blocks used by DELTA IMS DC and DB/DC to add terminals, LTERMs, and subpools between IMSGENs.

SPQB

Subpool Control Block. A control block that links virtual LTERMs to virtual nodes.

TP

Transaction program. For more information, see IBM Terminology.

TP_PROFILE

A VSAM data set owned by APPC/MVS that provides attribute information for transaction profile names used by APPC applications.

U

UPDS

See “user profile data set.”

USB

See “user signon block.”

user profile data set

A partitioned data set used to store the DELTA IMS user access profiles. The user access profiles are used to control access to DELTA IMS functions.

user signon block

Contains a user ID that has been specified by the /SECURITY ALLOW command.
user/SPQB

In DELTA IMS documentation, this term is used to denote the IMS user element. See also SPQB.
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