CA IDMS™

DML Reference Guide for COBOL

Release 18.5.00, 3rd Edition

CA Technologies Product References

This document references the following CA products:

- CA IDMS™/DB
- CA IDMS™/DC
- CA IDMS™ UCF
- CA IDMS™ DC/UCF
- CA IDMS™ DDS

Contact CA Technologies

Contact CA Support

For your convenience, CA Technologies provides one site where you can access the information that you need for your Home Office, Small Business, and Enterprise CA Technologies products. At http://ca.com/support, you can access the following resources:

- Online and telephone contact information for technical assistance and customer services
- Information about user communities and forums
- Product and documentation downloads
- CA Support policies and guidelines
- Other helpful resources appropriate for your product

Providing Feedback About Product Documentation

If you have comments or questions about CA Technologies product documentation, you can send a message to techpubs@ca.com.

To provide feedback about CA Technologies product documentation, complete our short customer survey which is available on the CA Support website at http://ca.com/docs.

Documentation Changes

The following documentation updates were made for the 18.5.00, 2nd and 3rd Edition releases of this documentation:

- IDMS-STATUS Routine (see page 60), Sample Batch Program as Output from the DML Compiler (see page 369), Sample Batch Program from the COBOL Precompiler (see page 387)—Updated the code in the context of IDMS-STATUS.
- Executing Programs (see page 25)—Added information about the TRUNC option.
- Features Supported by CA IDMS (see page 503)—Added a reference to the information about the TRUNC option.
- 18-Byte IDMS Block (see page 518), 18-Byte IDMS DC Block (see page 519),Communications Blocks (see page 33)—Updated the tables and field descriptions.
- Copying and Pasting COBOL Code from this Guide (see page 13)—Added this section containing the recommendation to copy COBOL code from the HTML version of this guide to preserve indention.

The following documentation updates were made for the 18.5.00 release of this documentation:

- IDMS STATUS Routine (see page 60)—Routine updated to display last dbkey, page group, and database-key format.
- ACCEPT DB-KEY FROM CURRENCY (see page 106)—The description of this statement was updated with information on the PAGE-INFO parameter.
- READY (see page 272)—The description of the FORCE option was added.
- ERROR-STATUS Condition Names (see page 59)—This new section was previously available in the Programming Quick Reference Guide.
- Online Debugger Syntax (see page 527)—This new appendix was previously available in the Programming Quick Reference Guide.
- ACCEPT TRANSACTION STATISTICS (see page 113)—Added a sample of the TRANSACTION-STATISTICS to the description of the INTO parameter.
- WORKING-STORAGE and LINKAGE SECTIONS (see page 76)—Added the TRANSACTION-STATISTICS parameter.

Contents

Chapter 1: Introduction

This guide contains reference material for writing applications programs in the COBOL language to use CA IDMS/DB, CA IDMS/DC, and CA IDMS UCF services.

This guide is intended to be used by COBOL programmers whose programs access CA IDMS databases and who want to use the DC/UCF system facilities Programmers using Assembler language or PL/I should refer to CA IDMS DML Reference Guide for Assembler or CA IDMS DML Reference Guide for PL/I.

Copying and Pasting COBOL Code from this Guide

COBOL compiler requires that the source code is correctly indented.

To preserve the indention of code examples in this guide, copy the code examples from the HTML version of the guide. Copying from the PDF format does not preserve the indention; it is necessary to restore the indention manually after pasting.

Syntax Diagram Conventions

The syntax diagrams presented in this guide use the following notation conventions:

`UPPERCASE OR SPECIAL CHARACTERS`

Represents a required keyword, partial keyword, character, or symbol that must be entered completely as shown.

`lowercase`

Represents an optional keyword or partial keyword that, if used, must be entered completely as shown.

`italicized lowercase`

Represents a value that you supply.

`lowercase bold`

Represents a portion of the syntax shown in greater detail at the end of the syntax or elsewhere in the document.

Points to the default in a list of choices.

Indicates the beginning of a complete piece of syntax.

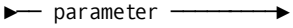
Indicates the end of a complete piece of syntax.

Indicates that the syntax continues on the next line.

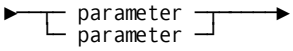
Indicates that the syntax continues on this line.

Indicates that the parameter continues on the next line.

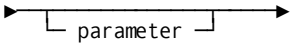
Indicates that a parameter continues on this line.



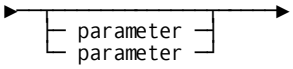
Indicates a required parameter.



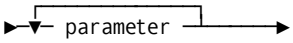
Indicates a choice of required parameters. You must select one.



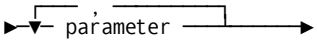
Indicates an optional parameter.



Indicates a choice of optional parameters. Select one or none.



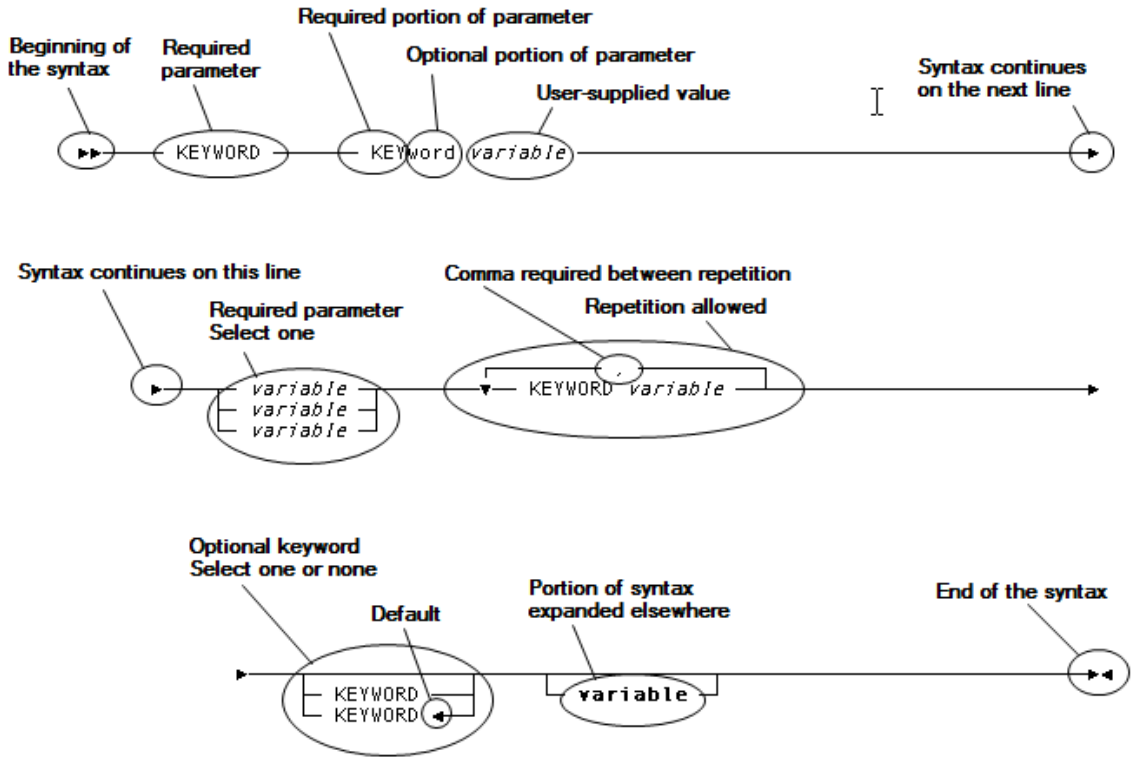
Indicates that you can repeat the parameter or specify more than one parameter.



Indicates that you must enter a comma between repetitions of the parameter.

Sample Syntax Diagram

The following sample explains how the notation conventions are used:



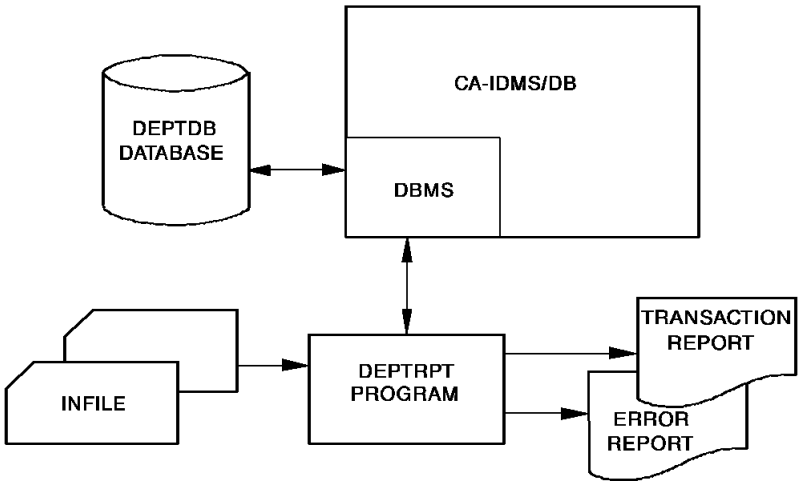
Chapter 2: Introduction to CA IDMS Data Manipulation Language

The CA IDMS data manipulation language (DML) consists of statements that direct CA IDMS database (DB) and data communications (DC) processing. DML statements are coded in the program source as if they were a part of the host language. The precompiler converts DML statements into standard COBOL statements and performs source-level error checking.

Depending on the operating environment, your program will use different sets of DML statements. For example, a batch program uses only database DML statements; an online program can use both database and data communications DML statements.

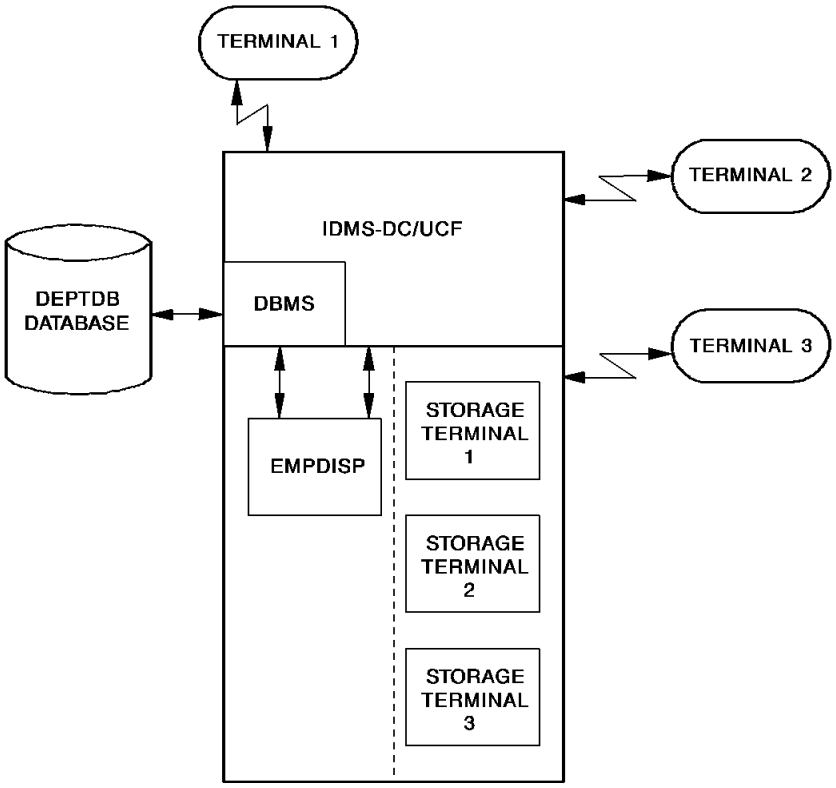
Batch processing typically involves large volumes of transactions, sequential processing, and output in the form of files and reports. Batch programs use database DML statements only.

The following figure illustrates the flow of a typical batch application. Input to DEPTRPT consists of department IDs. Output consists of a listing of departments and their employees. The error report lists the department IDs of missing and empty departments.



Online processing typically involves transaction requests entered from terminals connected directly to the computer, transaction results displayed at the terminal, multiple requests from multiple sources, and sharing one copy of a program among multiple users. Additionally, online processing is immediate; fast response time is essential in processing large volumes of transactions from multiple online users. Online programs use data communications DML statements and can include database DML statements.

The following figure illustrates the flow of a typical online application. EMPDISP retrieves information for an operator-specified employee ID. Output to the terminal consists of DEPARTMENT, EMPLOYEE, JOB, and OFFICE information.



The CA IDMS programming environment is outlined below, followed by a discussion of compile and runtime considerations.

This section contains the following topics:

Programming in the CA IDMS Environment

CA IDMS DML statements are divided into two categories:

- **Database** statements perform retrieval and update functions in either the batch or the online environment. There are three categories of database DML statements:
  - **Navigational** statements access database records and sets, one record at a time
  - **LRF** statements access groups of database records using the Logical Record Facility (LRF)
  - **SQL** statements access groups of database records using the Structured Query Language (SQL)
- **Data communications** (also called online) statements, request data communications services such as for online programs

You can include database DML statements in batch programs or combine them with data communications DML statements in online programs that require database access. A discussion of accessing the database by using DML statements is presented below, followed by a discussion of additional considerations for coding online programs.

Accessing the Database

Database access under CA IDMS can be accomplished by using navigational, LRF DML, or SQL DML statements. Navigational statements are used with a subschema usage mode of either DML or MIXED.

LRF DML statements, which use the Logical Record Facility (LRF), are used with a subschema usage mode of either LR or MIXED.

SQL DML statements, which use Structured Query Language, access records without reference to subschemas.

Some statements, such as BIND RUN-UNIT, READY, and FINISH, are used in all three environments. They are noted in the individual discussions of each DML statement in Data Manipulation Language Statements (see page 89).

Navigational, LRF, and SQL DML statements are discussed separately below.

Navigational DML Statements

Navigational DML statements access database records and sets one record at a time, checking and maintaining currency in order to assure correct results. Navigational DML statements give you control over error checking and flexibility in choosing database access strategy. To use navigational DML statements, you must have a thorough knowledge of the database structure. For an example of a data structure diagram, refer to EMPLOYEE Database Definition (see page 487).

Navigational DML statements provide:

- **Control over error checking**—You can check the result of each navigational statement, enabling more thorough error detection
- **Flexibility in choosing database access strategy**—You can enter the database either sequentially (area sweep), by using a symbolic key value (CALC), or by using a database key value (DIRECT)

Navigational DML statements are grouped into four categories:

- **Control** statements initiate and terminate processing, effect recovery, prevent concurrent updates, and evaluate set conditions
- **Retrieval** statements locate data in the database and make it available to the application program
- **Modification** statements update the database
- **Accept** statements pass database keys, storage address information, and statistics to the program

LRF DML Statements

LRF DML statements use the Logical Record Facility (LRF) to access database records. LRF allows you to access fields from multiple database records as if they were data fields in a single record. LRF DML statements allow you to specify selection criteria (by using the WHERE clause) that enable you to access only those logical records you need.

LRF DML statements provide:

- **Easy access to database records**—You need not be familiar with database structure; your programs need not include database navigation logic.
- **Data flexibility**—Modification and recompilation of LRF programs are not necessarily required when the physical or logical structure of the database is changed.
- **Run-time efficiency**—LRF minimizes communication between the program and the DBMS.

The LRF DML statements are listed below:

- **ERASE** deletes a logical record as specified in the path definition
- **MODIFY** modifies a logical record as specified in the path definition
- **OBTAIN** retrieves a logical record as specified in the path definition
- **STORE** stores a new logical record as specified in the path definition

SQL DML Statements

You can use SQL DML to access the same databases you access using navigational DML. Additionally, you can use SQL DML to access databases that have been defined using SQL DDL.

Using SQL DML, you do not have to be familiar with database structure and your programs do not have to include database navigation logic.

You can perform the following functions using SQL DML statements:

- Select rows
- Update rows
- Delete rows
- Insert rows

Note: For more information about SQL DML statements, see the *CA IDMS SQL Reference Guide*.

Programming in the Online Environment

The CA IDMS/DC system is fully integrated with the CA IDMS DBMS and the data dictionary. It enables you to request both data communications and database services through standard subroutine calls generated by the precompiler from DML statements. The following figure illustrates a typical stream of online DML statements in a COBOL program. This example maps in a user-specified employee ID, retrieves and displays the specified information, and performs a DC RETURN naming TSK02 as the next task to be performed.

```
PROCEDURE DIVISION.
  BIND MAP EMPMAPLR.
  BIND MAP EMPMAPLR RECORD EMPLOYEE.
  ACCEPT TASK CODE INTO TASK-CODE-IN.
  IF TASK-CODE-IN = 'TSK01'
          GO TO INITIAL-MAPOUT.
  MAP IN USING EMPMAPLR.
      .
      .
```

```
navigational, LRF, or SQL database DML statements
    .
    .
 MAP OUT USING EMPMAPLR
     OUTPUT DATA IS YES
     MESSAGE IS DISPLAY-MESSAGE LENGTH 80.
 DC RETURN NEXT TASK CODE 'TSK02'.
```

Online DML statements, which request CA IDMS to perform data communications services, are grouped into nine categories:

1. **Program management** statements govern flow of control and abend processing
2. **Storage management** statements allocate and release variable storage
3. **Task management** statements provide runtime services that enhance control over task processing
4. **Time management** statements obtain the time and date, and define time-related events
5. **Scratch management** statements create, delete, or retrieve records from the scratch area
6. **Queue management** statements create, delete, or retrieve records in a queue area
7. **Terminal management** statements transfer data between the application program and a terminal
8. **Utility function** statements retrieve task-related information or statistics, send messages, and monitor access to database records
9. **Recovery** statements perform functions relating to database, scratch, and queue area recovery in the event of a system failure

Compiling and Executing CA IDMS Programs

A CA IDMS COBOL source program contains DML statements that are processed by the precompiler. The precompiler converts DML statements into COBOL CALL statements and copies information maintained in the data dictionary into the application program. After successful compilation and link editing, the application program can be executed. The compilation and runtime processes are described separately below.

Compiling Programs

There are three components that prepare a COBOL DML program for execution: the precompiler, the COBOL compiler, and the linkage editor.

1. The precompiler converts DML statements in the source program to COBOL CALL statements and copies information maintained in the data dictionary into the application program. For example, database record descriptions, file definitions, map records, map definitions, and other predefined modules such as the IDMS communications block can be copied into the program.

   Output from the precompiler is a source file that serves as input to the COBOL precompiler and as an optional source listing. The output file differs from the source input to the precompiler in the following ways:

   - Source code (such as the IDMS communications block and the IDMS-STATUS routine) has been added to the program.
   - DML statements have been replaced by COBOL CALL statements and changed to comment entries (asterisk in column 7).

   Additionally, the precompiler produces a listing of the following errors:

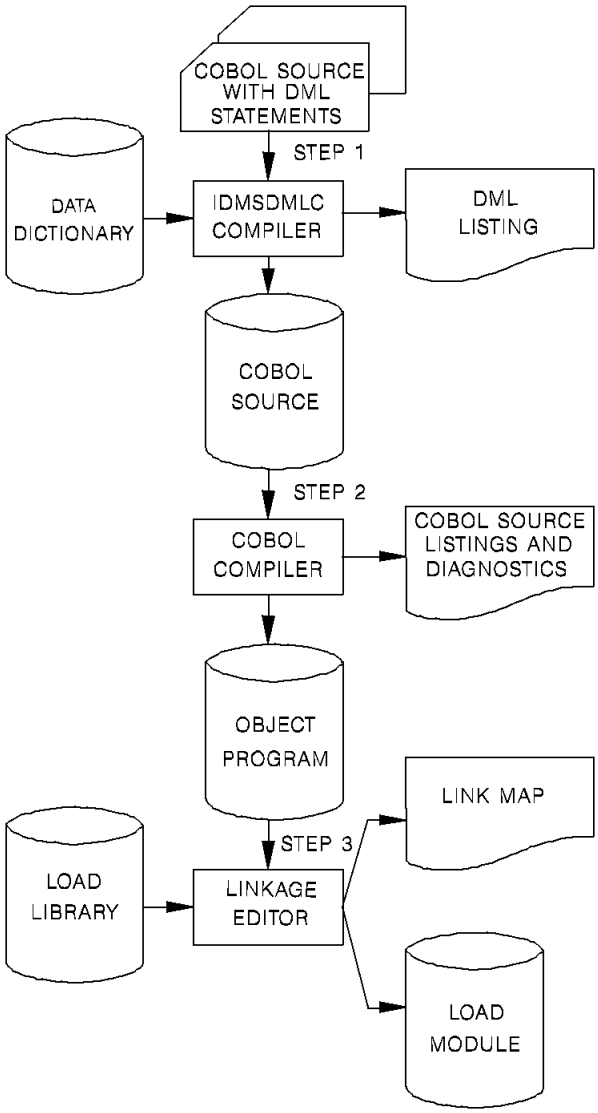
   - Incorrect DML entries
   - Statements inconsistent with the program's declared subschema view
   - Any other error conditions detected during DMLC processing
   - Warning messages indicating source code conditions that could adversely affect run units using the program

2. The COBOL compiler compiles the source program after it has been successfully processed by the precompiler. Output from the COBOL compiler consists of an object program and a source listing that includes any generated diagnostics.

3. The linkage editor link edits the object program into a specified load library. Output from the linkage editor consists of a load module (or phase) and a link map.

The job control language required to execute each step is listed in DML Precompile, COBOL Compile, and Link-Edit JCL (see page 337).

The component steps needed to prepare a COBOL DML program for execution are illustrated in the following figure:



Executing Programs

At run time, CA IDMS requests are treated as application program subroutine calls. When the subroutine call is executed, control passes to the DBMS or the DC system, which processes the requested function.

A CA IDMS program must be defined to the CA IDMS system in which it will operate. The program can be defined either at system generation or at run time by using a DCMT VARY DYNAMIC PROGRAM command.

The following COBOL features are *not* used in programs running in an online environment under CA IDMS:

- ENVIRONMENT and DATA DIVISION entries normally associated with file management (for example, INPUT-OUTPUT SECTION, FILE SECTION)
- The Report Writer and Segmentation features, as well as features invoked by the SORT, EXHIBIT, TRACE, DISPLAY, ACCEPT, STRING, UNSTRING, and INSPECT commands. The EXAMINE and TRANSFORM verbs, though valid under VS/COBOL, will not compile under VS/COBOL-II since the logic of these verbs has been incorporated into the inspect verb and are not valid verbs in COBOL-II. Additionally, the EXTERNAL clause of the record statement is invalid for all versions of COBOL.

  Note: The restriction on INSPECT, STRING, and UNSTRING commands arise because they issue supervisor calls in some environments. This restriction applies mainly when running VS COBOL on a VSE or z/OS operating system. It does not apply when using LE-compiant COBOL with IBM's runtime Language environment. See section H.2 for considerations when using these commands with VS/COBOL II.
- The I/O statements READ, WRITE, OPEN, and CLOSE
- The COBOL compiler DEBUG option; the COUNT, FLOW, STATE, ENDJOB, TEST, RESIDENT, DYNAM, and SYMDMP commands (OS only); or the COUNT, FLOW, STATE, STXIT, and SYMDMP commands (z/VSE only)

The TEST compile option can be used for a program compiled using an Language Environment compliant compiler, but the DEBUG runtime option must not be used in the online environment. A load module compiled with the TEST option can be run with the DEBUG runtime option in batch. This allows the same load module which is being tested in a batch environment to run in an online environment without being recompiled.

- Any feature that can lead to the issuance of a supervisor call (SVC)

These features lead to a supervisor call (SVC), which will inhibit system performance and can also crash the DC system.

Usage of the DBCS COBOL compile time option by a CA IDMS program can lead to IGYPS0156-E run time errors. Programs using LRF are especially susceptible to this problem. This option is the default for LE/COBOL compilers starting with z/OS. 3.2.0. You should compile CA IDMS programs using the NODBCS option.

The COBOL compiler provides a TRUNC option. Use this option with care in any CA IDMS program that accesses dbkey values. Exercise particular care if arithmetic operations are performed on the dbkey, for example multiplying a page number by the dbkey radix. Unexpected results can occur if an inappropriate value is specified for the TRUNC option. Such unexpected results can occur because COBOL truncates numeric values to fit the PICTURE clause in some cases.

Avoid this problem by using the compiler option TRUNC(BIN). On some older COBOL compilers the equivalent option is NOTRUNC.

Note: For more information about the TRUNC option, see the documentation of your compiler vendor.

Callable Services and Common Facilities

CA IDMS provides callable services and common facilities to use with your application programs.

Callable Services

The callable services include:

- The IDMSCALC utility that lets you sort input into target page sequence.
- The IDMSIN01 facility that lets you perform miscellaneous CA IDMS functions.
- The TCP/IP socket program interface that lets you communicate with another TCP/IP application.

Note: For more information about using these callable services, see the *CA IDMS Callable Services Guide*.

Common Facilities

The common facilities include:

- The Command Facility that lets you submit command statements in a batch or online environment.
- The Online Compiler Text Editor that lets you edit compiler output and resubmit it as input using the CA IDMS development tools.
- The Transfer Control Facility that lets you transfer between CA IDMS development tools.
- The SYSIDMS parameter file that contains parameters that you can add to a batch job running in local mode or under the central version. These parameters let you specify environment requirements, runtime directives, and operating system-dependent information.

Note: For more information about using these common facilities and the SYSIDMS parameter file, see the *CA IDMS Common Facilities Guide*.

Chapter 3: Precompiler Options

This chapter contains the syntax for COBOL precompiler options. These options, included as special format entries in the COBOL source code input to the precompiler, are used to:

- Override the DDLDML area default usage mode
- Enable the printing of data dictionary and subschema comments
- Control the generation of precompiler source listings
- Suppress the logging of program activity statistics

This section contains the following topics:

Dictionary Ready Override

When the DDLDML area of the data dictionary (that is, the main area of the dictionary accessed by the precompiler) is readied, a number of different options are available. The default mode used is shared update. Shared update mode readies the DDLDML area for both retrieval and update and allows other concurrently executing run units to ready the DDLDML area in shared update or shared retrieval usage mode. An application program can override the default usage mode by specifying either retrieval or protected update usage.

Syntax

```
Begin in column 7.
```

Parameters

***RETRIEVAL**

Readies the DDLDML area for retrieval only and allows other concurrently executing run units to open the area in shared retrieval, shared update, protected retrieval, or protected update usage modes.

Note: If the DDLDML area is readied for retrieval only, no program activity statistics can be logged.

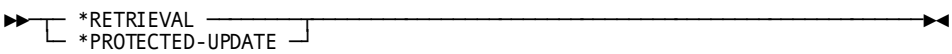
***PROTECTED-UPDATE**

Readies the DDLDML area for both retrieval and update and allows other concurrently executing run units to ready the area in retrieval usage mode only. The protected update usage mode prevents concurrent update of the area by run units executing under the same central version.

If used, the dictionary ready override statement must precede all source input statements.

Dictionary Ready Override

Begin in column 7.



Comment Generation

The *SCHEMA-COMMENTS option causes schema-defined data-item comments and IDD-defined record-element comments in the data dictionary to be printed on the precompiler source listing and inserted into the program.

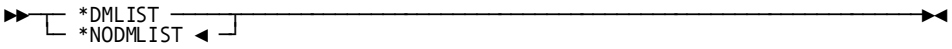
Syntax

Code the *SCHEMA-COMMENTS statement after the dictionary ready override statements (if any) and before any DML or COBOL statements: If the *SCHEMA-COMMENTS statement is not included with the input, comment lines are not generated.

List Generation

The source statement listing output by the precompiler can be turned on or off by inserting a list generation option into the source program.

Syntax



Parameters

***DMLIST**

Specifies that the source listing is to be generated for the statements that follow.

***NODMLIST**

Specifies that no source listing is to be generated for the statements that follow.

This is the default.

Generation of the list can be turned on or off any number of times within one source program by inserting appropriate *DMLIST and/or *NODMLIST entries in the code.

Note: A listing of error messages is always produced. The *DMLIST option controls output of the processor source listing.

Log Suppression

The *NO-ACTIVITY-LOG option suppresses the logging of program activity statistics. The precompiler generates and logs the following program activity statistics unless the *NO-ACTIVITY-LOG option is specified:

- Program name
- Language
- Date last compiled
- Number of lines
- Number of compilations
- Date created
- Subschema name (if any)
- File statistics
- Database access statistics (records and modules copied from the data dictionary; subprograms called; and records, sets, and areas accessed by DML verbs)

Syntax

The *NO-ACTIVITY-LOG statement follows the NODENAME/DBNAME and dictionary ready override statements.

Note: Program activity statistics cannot be logged if the DDLDML area is readied for retrieval only.

Chapter 4: Communications Blocks and Error Detection

This chapter describes the 16-byte communications block available under CA IDMS. These blocks return status information about requested database and data communications services to the application program. This chapter also describes the ERROR-STATUS field in the IDMS and IDMS-DC communications blocks, status codes, and error detection routines.

Note: For more information about 18-byte communications blocks, see 18-Byte Communications Blocks (see page 517).

This section contains the following topics:

Communications Blocks

Communications blocks return status information about requested database and data communications services to the application program. Depending on the usage mode (LR, DML, or MIXED) defined in the subschema, your program will use one or two of the following blocks:

- **IDMS communications block**—The IDMS communications block is used when the operating mode is either BATCH or BATCH-AUTOSTATUS.
- **Logical-record request control (LRC) block**—The LRC block is used when the subschema usage mode is either LR or MIXED.

The LRC block is copied in with either the IDMS communications block (operating mode of BATCH or BATCH-AUTOSTATUS) or the IDMS-DC communications block (operating mode of IDMS-DC or DC-BATCH).

- **IDMS-DC communications block**—The IDMS-DC communications block is used when the operating mode is either IDMS-DC or DC-BATCH.

Each of these blocks is discussed in detail below.

Note: For more information about operating modes and protocols, see Precompiler-Directive Statements (see page 67).

IDMS Communications Block

The IDMS communications block is used when the operating mode is either BATCH or BATCH-AUTOSTATUS; it serves as an interface between the database management system (DBMS) and the application program. Whenever a run unit issues a call to the DBMS for a database operation, the DBMS returns information about the outcome of the requested service to the application program's IDMS communications block.

The data description (identified as SUBSCHEMA-CTRL) of the IDMS communications block is copied from the data dictionary into the WORKING-STORAGE SECTION or LINKAGE SECTION of the program. When you submit the program to the precompiler, the IDMS communications block is copied automatically unless an IDMS-RECORDS MANUAL statement is included in the ENVIRONMENT DIVISION. In that case, the program can explicitly call in the data description by using a COPY IDMS SUBSCHEMA-CTRL statement.

Note: For more information about the IDMS-RECORDS MANUAL and the COPY IDMS statements, see Precompiler-Directive Statements (see page 67).

You should examine the ERROR-STATUS field of the IDMS communications block after every call to the DBMS. Depending on the value contained in this field, you should perform the IDMS-STATUS routine (see IDMS-STATUS Routine (see page 60) later in this chapter). For example, if the ERROR-STATUS field contains the value 0307 (DB-END-OF-SET) while walking a set, you should perform end-of-set processing; otherwise, IDMS-STATUS should be performed.

The following figure show the layout of the 16-byte IDMS communications block. Each field is described separately following the figure.

16-CHARACTER IDMS COMMUNICATIONS BLOCK

		Field	Data Type	Length (bytes)	Initial Value
*	1 8	PROGRAM-NAME	Alphanumeric	8	Program Name
	9 12	ERROR-STATUS	Alphanumeric	4	'1400'
	13 16	DBKEY	Binary	4(Fullword)	0000
	17 32	RECORD-NAME	Alphanumeric	16	Spaces
	33 48	AREA-NAME	Alphanumeric	16	Spaces
	49 64	ERROR-SET	Alphanumeric	16	Spaces
	65 80	ERROR-RECORD	Alphanumeric	16	Spaces
	81 96	ERROR-AREA	Alphanumeric	16	Spaces
**	97 100	PAGE-INFO	Binary	4(Fullword)	0000
	97 196	IDBMSCOM-AREA	Alphanumeric	100	Low Values
	197 200	DIRECT-DBKEY	Binary	4(Fullword)	0000
	201 207	DATABASE-STATUS	Alphanumeric	7	Spaces
	208	FILLER	...	1	...
	209 212	RECORD-OCCUR	Binary	4(Fullword)	0000
	213 216	DML-SEQUENCE	Binary	4(Fullword)	0000

* word aligned
** PAGE-INFO-GROUP overlays bytes 97 and 98 and PAGE-INFO-DBK-FORMAT overlays bytes 99 and 100. Both of these fields are binary datatype, each with a length of two bytes. Suggested initial values for both are 00. Together these two fields represent PAGE-INFO.

The IDMS DB communications block contains the following fields that describe program status information:

Field name	Description
PROGRAM-NAME	The name of the program being executed, as defined in the program's IDENTIFICATION DIVISION. This field is initialized automatically at the beginning of program execution if the program contains a COPY IDMS SUBSCHEMA-BINDS statement in its PROCEDURE DIVISION. Otherwise, it must be initialized by the programmer.

Field name	Description
ERROR-STATUS	An alphanumeric value indicating the outcome of the last DML statement executed. The ERROR-STATUS field must be initialized to 1400 by the program. The ERROR-STATUS field is updated by the DBMS after (attempted) performance of a requested database service and before control is returned to the program. A program that consists of more than one run unit must reinitialize the ERROR-STATUS field to 1400 after finishing one run unit and before binding the next.
DBKEY	The database key of the last record accessed by the run unit. For example, after successful execution of a FIND command, DBKEY is updated with the database key of the located record. DBKEY is not changed if the call to the DBMS results in a nonzero status condition.
RECORD-NAME	The name of the last record accessed successfully by the run unit. This field is left-justified and padded with spaces on the right.
AREA-NAME	The name of the last area accessed successfully by the run unit. This field is left-justified and padded with spaces on the right.
ERROR-SET	The name of the set involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.
ERROR-RECORD	The name of the record involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.
ERROR-AREA	The name of the area involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.

Field name	Description
PAGE-INFO	Two binary halfwords that represent the page information associated with the last record accessed by the run unit. PAGE-INFO is not changed if the call to the DBMS results in a non-zero status. The first halfword (PAGE-INFO-GROUP) represents the page group number. The second halfword (PAGE-INFO-DBK-FORMAT) represents the db-key radix. The db-key radix portion of the page information can be used in interpreting a db-key for display purposes and in formatting a db-key from page and line numbers. The db-key radix represents the number of bits within a db-key value that are reserved for the line number of a record. By default, this value is 8, meaning that up to 255 records can be stored on a single page of the area. Given a db-key, you can separate its associated page number by dividing the db-key by 2 raised to the power of the db-key radix. For example, if the db-key radix is 4, you would divide the db-key value by 2**4. The resulting value is the page number of the db-key. To separate the line number, you would multiply the page number by 2 raised to the power of the db-key radix and subtract this value from the db-key value. The result would be the line number of the db-key. The following two formulas can be used to calculate the page and line numbers from a db-key value: Page-number = db-key value / (2 ** db-key radix) Line-number = db-key value - (page-number * (2 ** db-key radix))
IDBMSCOM-AREA	Used internally by the DBMS for specification of runtime function information.
DIRECT-DBKEY	Either a user-specified db-key value or a null db-key value of -1. This field is used for storing a record with a location mode of DIRECT. It must be initialized by the user; it is not updated by the DBMS.
DATABASE-STATUS	Reserved for use by the DBMS.
FILLER	Used to ensure fullword alignment.
RECORD-OCCUR	A record occurrence sequence identifier used internally by the DBMS.
DML-SEQUENCE	The source level sequence number generated by the precompiler. This field is updated before each call to the DBMS if DEBUG is specified in the program's ENVIRONMENT DIVISION; it is not used by the runtime system.

Native VSAM users: The DIRECT-DBKEY field can be used only when storing a record in a native VSAM relative record data set (RRDS) or when storing records with DIRECT location mode. You must initialize DIRECT-DBKEY to the relative record number of the record being stored.

After a call has been made to the DBMS, one or more of the fields described above may have been updated, depending on the DML statement issued and if the statement was executed successfully. The following figure illustrates the IDMS communications block fields updated by successful and unsuccessful calls to the DBMS; only those fields accessed by the runtime system are shown. Fields used internally by the DBMS are not shown. Blank fields are not updated by DML statements.

	SUCCESSFUL									UNSUCCESSFUL								
	PROGRAM-NAME	ERROR-STATUS	DBKEY	RECORD-NAME	AREA-NAME	ERROR-SET	ERROR-RECORD	ERROR-AREA	PAGE-INFO	DIRECT-DBKEY	PROGRAM-NAME	ERROR-STATUS	DBKEY	RECORD-NAME	AREA-NAME	ERROR-SET	ERROR-RECORD	ERROR-AREA	PAGE-INFO	DIRECT-DBKEY
Controlstatements																				
BINDRUN-UNIT		O										14nn								
BINDRECORD		O										14nn				Y	Y	Y		
BINDPROCEDURE		O										14nn				Y	Y	Y		
READY		O										09nn				C	C	C		
FINISH		O	N	C		C	C	C				01nn				C	C	C		
COMMIT(ALL)		O	N	C		C	C	C				18nn				C	C	C		
ROLLBAK(CONTINUE)		O	N	C		C	C	C				19nn				C	C	C		
KEEP(EXCLUSIVE)		O	Y	Y	Y	C	C	C	Y			06nn				Y	Y	Y		
IFSET		*	Y	Y	Y	C	C	C	Y			16nn				Y	Y	Y		
IFNOTSET		*	Y	Y	Y	C	C	C	Y			16nn				Y	Y	Y		
Retrievalstatements																				
FIND/OBTAINRECORD		O	Y	Y	Y	C	C	C	Y			03nn				Y	Y	Y		
GETRECORD		O	Y	Y	Y	C	C	C	Y			05nn				Y	Y	Y		
RETURNRECORD		O	Y	Y	Y	C	C	C	Y			17nn				Y	Y	Y		
Modificationstatements																				
STORERECORD		O	Y	Y	Y	C	C	C	Y			12nn				Y	Y	Y		
CONNECTRECORD		O	Y	Y	Y	C	C	C	Y			07nn				Y	Y	Y		
MODIFYRECORD		O	Y	Y	Y	C	C	C	Y			08nn				Y	Y	Y		
DISCONNECTRECORD		O	Y	Y	Y	C	C	C	Y			11nn				Y	Y	Y		
ERASERECORD		O	N	Y	Y	C	C	C				02nn				Y	Y	Y		
Acceptstatements																				
ACCEPTDBKEYOFCURRENCY		O				C	C	C				15nn				Y	Y	Y		
ACCEPTDBKEYOFN/P/O		O				C	C	C				15nn				Y	Y	Y		
ACCEPTIDMSSTATISTICS		O				C	C	C				15nn				Y	Y	Y		
ACCEPTBINDRECORD		O				C	C	C				15nn				Y	Y	Y		
ACCEPTPROCEDURE		O				C	C	C				82nn				Y	Y	Y		

ACCEPTpage-info-location			O				C	C	C				15nn				Y	Y	Y				

Acceptstatements																							
ACCEPTFROMCURRENCY			O				C	C	C				15nn				Y	Y	Y				
ACCEPTFROMN/P/OCURRENCY			O				C	C	C				15nn				Y	Y	Y				
ACCEPTFROMIDMS-STATISTICS			O				C	C	C				15nn				Y	Y	Y				
ACCEPTFROMBIND			O				C	C	C				15nn				Y	Y	Y				
ACCEPTFROMPROCEDURE			O				C	C	C				15nn				Y	Y	Y				

```
*Iftrue,fieldissettozonedecimalzeroes(0000)
Iffalse,fieldissetto1601

OFieldissettozonedecimalzeroes

YFieldisupdated

CFieldisclearedtospaces

NFieldissettonulldb-keyvalue(-1)

nnSpecificminorerrorcode
```

LRC Block

The logical-record request control (LRC) block is used when the subschema usage mode is LR or MIXED. The LRC block, which is used in conjunction with the IDMS or IDMS-DC communications block, provides an interface between LRF and the application program. It passes information about a logical-record request to LRF and returns path status information about the processing of the request to the program.

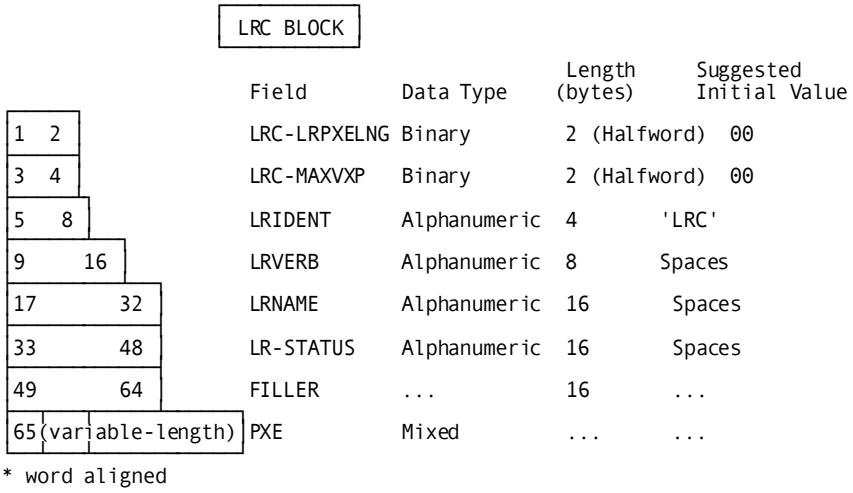
The data description (identified as SUBSCHEMA-LR-CTRL) of the LRC block is copied from the data dictionary into the WORKING-STORAGE SECTION or LINKAGE SECTION of the program. When the program is submitted to the precompiler, the LRC block and the IDMS or IDMS-DC communications block are copied automatically, unless the IDMS-RECORDS MANUAL statement is included in the ENVIRONMENT DIVISION. In that case, both descriptions can be called in explicitly by the program by using a COPY IDMS SUBSCHEMA-LR-CTRL statement

For more information about the IDMS-RECORDS MANUAL and the COPY IDMS statements, see Precompiler-Directive Statements (see page 67).

You should examine the LR-STATUS field of the LRC block for all possible statuses after every call to LRF. If the value returned is LR-ERROR, you should then examine the ERROR-STATUS field of the IDMS or IDMS-DC communications block.

The following figure shows the layout of the LRC block. Each field is described separately, following the figure.

Logical-Record Request Control Block



The LRC block contains the following fields:

Field name	Position	Description
LRC-LRPXELNG	1-2	Specifies the length of the LRC block.
LRC-MAXVXP	3-4	Specifies the length of the work area required to evaluate the WHERE clause.
LRIDENT	5-8	The constant 'LRC' followed by a space.
LRVERB	9-16	The verb passed to LRF.
LRNAME	17-32	The name of the logical record being accessed.

Field name	Position	Description
LR-STATUS	33-48	The path status of a logical-record request. Path statuses are 1- to 16-character strings; they can be either standard or defined in the subschema by the DBA. LRF provides three standard path statuses: LR-FOUND, LR-NOT-FOUND, and LR-ERROR. **Note:** For more information about path statuses, see the Logical-Record Clauses (see page 327).
FILLER	49-64	Used internally by LRF.
PXE	65-end	The variable-length expansion of the WHERE clause. From 0 to 512 1-byte elements. The 512-byte limit can be raised or lowered by using the SIZE IS parameter of the COPY IDMS SUBSCHEMA-LR-CTRL statement. **Note:** For more information about the SIZE IS parameter and the COPY IDMS statement, see Precompiler-Directive Statements (see page 67).

IDMS-DC Communications Block

The IDMS DC communications block replaces the IDMS communications block when the operating mode is either IDMS-DC or DC-BATCH. At run time, the IDMS-DC communications block is used to pass information about the outcome of requested data communications and database services to an application program.

The data description (identified as SUBSCHEMA-CTRL) of the IDMS-DC communications block is copied from the data dictionary into the WORKING-STORAGE SECTION or LINKAGE SECTION of the program. When the program is submitted to the precompiler, the IDMS-DC communications block is copied automatically unless the IDMS-RECORDS MANUAL statement is included in the ENVIRONMENT DIVISION. In that case, the program can explicitly call in the data description by using a COPY IDMS SUBSCHEMA-CTRL statement (for more information on the IDMS-RECORDS MANUAL and the COPY IDMS statements, see Precompiler-Directive Statements (see page 67)).

The following figure shows the layout of the IDMS-DC communications block. Each field is described separately below.

IDMS-DC COMMUNICATIONS BLOCK

		Field	Data Type	(bytes)	Initial Value
*	1 8	PROGRAM-NAME	Alphanumeric	8	Program Name
	9 12	ERROR-STATUS	Alphanumeric	4	'1400'
	13 16	DBKEY	Binary	4(Fullword)	0000
	17 32	RECORD-NAME	Alphanumeric	16	Spaces
	33 48	AREA-NAME	Alphanumeric	16	Spaces
	49 64	ERROR-SET	Alphanumeric	16	Spaces
	65 80	ERROR-RECORD	Alphanumeric	16	Spaces
	81 96	ERROR-AREA	Alphanumeric	16	Spaces
**	97 100	PAGE-INFO	Binary	4(Fullword)	0000
	97 ... 196	IDBMSCOM-AREA	Alphanumeric	100	Low Values
	197 200	DIRECT-DBKEY	Binary	4(Fullword)	0000
	201 ... 300	DCBMSCOM-AREA	Alphanumeric	100	Low Values
	301 304	SSC-ERRSTAT-SAVE	Alphanumeric	4	Spaces
	305 308	SSC-DMLSEQ-SAVE	Binary	4(Fullword)	0000
	309 312	DML-SEQUENCE	Binary	4(Fullword)	0000
	313 316	RECORD-OCCUR	Binary	4(Fullword)	0000
	317 320	SUBSCHEMA-CTRL-END	Alphanumeric	4	Spaces

* word aligned
** PAGE-INFO-GROUP overlays bytes 97 and 98 and PAGE-INFO-DBK-FORMAT overlays bytes 99 and 100. Both of these fields are binary datatype each having a length of two bytes. Suggested initial values for both are 00. Together these two fields represent PAGE-INFO.

Field Descriptions

The IDMS-DC communications block contains the following fields that describe program status information:

Field name	Position	Description
PROGRAM-NAME	1-8	The name of the program being executed, as defined in the program's IDENTIFICATION DIVISION. This field is initialized automatically at the beginning of program execution if the program contains a COPY IDMS SUBSCHEMA-BINDS statement in its PROCEDURE DIVISION. Otherwise, it must be initialized by the programmer.
ERROR-STATUS	9-12	A value indicating the outcome of the last DML statement executed. The ERROR-STATUS field must be initialized to 1400 by the program. This field is updated by CA IDMS after (attempted) performance of a requested database or data communications service and before control is returned to the program. The ERROR-STATUS field and its use are described in greater detail under ERROR-STATUS Field and Codes (see page 48). A program that consists of more than one run unit must reinitialize the ERROR-STATUS field to 1400 after finishing one run unit and before binding the next.
DBKEY	13-16	The database key of the last record accessed by the run unit. For example, after successful execution of a FIND command, DBKEY is updated with the database key of the located record. DBKEY is not changed if the database call results in a nonzero status condition.

Field name	Position	Description
RECORD-NAME	17-32	The name of the last record accessed successfully by the run unit. This field is left-justified and padded with spaces on the right.
AREA-NAME	33-48	The name of the last area accessed successfully by the run unit. This field is left-justified and padded with spaces on the right.
ERROR-SET	49-64	The name of the set involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.
ERROR-RECORD	65-80	The name of the record involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.
ERROR-AREA	81-96	The name of the area involved in the last operation to produce a nonzero status code. This field is left-justified and padded with spaces on the right.

Field name	Position	Description
PAGE-INFO	97-100	Two binary halfwords that represent the page information associated with the last record accessed by the run unit. PAGE-INFO is not changed if the call to the DBMS results in a non-zero status. The first halfword (PAGE-INFO-GROUP) represents the page group number. The second halfword (PAGE-INFO-DBK-FORMAT) represents the db-key radix. The db-key radix portion of the page information can be used in interpreting a db-key for display purposes and in formatting a db-key from page and line numbers. The db-key radix represents the number of bits within a db-key value that are reserved for the line number of a record. By default, this value is 8, meaning that up to 255 records can be stored on a single page of the area. Given a db-key, you can separate its associated page number by dividing the db-key by 2 raised to the power of the db-key radix. For example, if the db-key radix is 4, you would divide the db-key value by 2**4. The resulting value is the page number of the db-key. To separate the line number, you would multiply the page number by 2 raised to the power of the db-key radix and subtract this value from the db-key value. The result would be the line number of the db-key. The following two formulas can be used to calculate the page and line numbers from a db-key value: Page-number = db-key value / (2 ** db-key radix) Line-number = db-key value - (page-number * (2 ** db-key radix))

Field name	Position	Description
IDBMSCOM-AREA	97-196	Used internally by CA IDMS for specification of DBMS runtime function information.
DIRECT-DBKEY	197-200	Either a user-specified db-key value or a null db-key value of -1. This field is used for storing a record with a location mode of DIRECT. It must be initialized by the user; it is not updated by CA IDMS. **Native VSAM users:** The DIRECT-DBKEY field can be used when storing a record in a native VSAM relative record data set (RRDS). You must initialize DIRECT-DBKEY to the relative record number of the record being stored.
DCBMSCOM-AREA	201-300	Used internally by CA IDMS for specification of runtime function information.
SSC-ERRSTAT-SAVE	301-304	Used by the IDMS-STATUS routine to save a nonzero ERROR-STATUS in the event of an abend.
SSC-DMLSEQ-SAVE	305-308	Used by the IDMS-STATUS routine to save the value of DML-SEQUENCE in the event of an abend.
DML-SEQUENCE	309-312	The source level sequence number generated by the precompiler. This field is updated before each call to CA IDMS if DEBUG is specified in the program's ENVIRONMENT DIVISION; it is not used by the runtime system.
RECORD-OCCUR	313-316	A record occurrence sequence identifier used internally by CA IDMS.
SUBSCHEMA-CTRL-END	317-320	Marks the end of the IDMS-DC communications block.

ERROR-STATUS Field and Codes

You can use the ERROR-STATUS field of the IDMS or IDMS-DC communications block to determine if a DML request was processed successfully. The DBMS or the DC system returns a value to the ERROR-STATUS field indicating the result of each DML request. For more information on using the ERROR-STATUS field, see Error Detection (see page 59).

LRF users: You should check the LR-STATUS field of the LRC block before checking the ERROR-STATUS field.

Major and Minor Codes

The ERROR-STATUS field is a four-byte zoned decimal field. The first two bytes represent a major code; the second two bytes represent a minor code. Major codes identify the function performed; minor codes describe the status of that function.

Value of Codes

A value of 0000 indicates successful completion of the requested function. A value other than 0000 indicates completion of the function in a manner that may or may not be in error, depending on your expectations. For example, 0326 (DB-REC-NOT-FOUND) should be anticipated after FIND CALC retrieval; this allows you to trap the condition and continue processing.

DB status codes have a major code in the range 01 to 20. They occur during database access in batch or online processing. DC status codes have a major code in the range 30 to 51. They occur in online or DC-BATCH processing. Status codes with a major code of 00 apply to all DML functions. DB status codes and DC status codes are discussed separately below.

DB Status Codes

The following tables list DB major and minor codes and their meanings.

Major DB Status Codes

Major Code	Database Function
00	Any DML statement
01	FINISH

Major Code	Database Function
02	ERASE
03	FIND/OBTAIN
05	GET
06	KEEP
07	CONNECT
08	MODIFY
09	READY
11	DISCONNECT
12	STORE
14	BIND
15	ACCEPT
16	IF
17	RETURN
18	COMMIT
19	ROLLBACK
20	LRF requests

Minor DB Status Codes

Minor Code	Database Function Status
00	Combined with a major code of 00, this code indicates successful completion of the DML operation. Combined with a nonzero major code, this code indicates that the DML operation was not completed successfully due to central version causes, such as time-outs and program checks.
01	An area has not been readied. When this code is combined with a major code of 16, an IF operation has resulted in a valid false condition.
02	Either the db-key used with a FIND/OBTAIN DB-KEY statement or the direct db-key suggested for a STORE is not within the page range for the specified record name.

Minor Code	Database Function Status
03	Invalid currency for the named record, set, or area. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to retrieve or update a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
04	The occurrence count of a variably occurring element has been specified as either less than zero or greater than the maximum number of occurrences defined in the control element.
05	The specified DML function would have violated a duplicates-not-allowed option for a CALC, sorted, or index set.
06	No currency has been established for the named record, set, or area.
07	The end of a set, area, or index has been reached or the set is empty.
08	The specified record, set, procedure, or LR verb is not in the subschema or the specified record is not a member of the set.
09	The area has been readied with an incorrect usage mode.
10	An existing access restriction or subschema usage prohibits execution of the specified DML function. For LRF users, the subschema in use allows access to database records only. Combined with a major code of 00, this code means the program has attempted to access a database record, but the subschema in use allows access to logical records only.
11	The record cannot be stored in the specified area due to insufficient space.
12	There is no db-key for the record to be stored. This is a system internal error and should be reported.
13	A current record of run unit either has not been established or has been nullified by a previous ERASE statement.
14	The CONNECT statement cannot be executed because the requested record has been defined as a mandatory automatic member of the set.
15	The DISCONNECT statement cannot be executed because the requested record has been defined as a mandatory member of the set.
16	The record cannot be connected to a set of which it is already a member.
17	The transaction manager encountered an error.
18	The record has not been bound.
19	The run unit's transaction was forced to back out.
20	The current record is not the same type as the specified record name.
21	Not all areas being used have been readied in the correct usage mode.

Minor Code	Database Function Status
22	The record name specified is not currently a member of the set name specified.
23	The area name specified is either not in the subschema or not an extent area; or the record name specified has not been defined within the area name specified.
25	No currency has been established for the named set.
26	No duplicates exist for the named record or the record occurrences cannot be found.
28	The run unit has attempted to ready an area that has been readied previously.
29	The run unit has attempted to place a lock on a record that is locked already by another run unit. A deadlock results. Unless the run unit issued either a FIND/OBTAIN KEEP EXCLUSIVE or a KEEP EXCLUSIVE, the run unit is aborted.
30	An attempt has been made to erase the owner record of a nonempty set.
31	The retrieval statement format conflicts with the record's location mode.
32	An attempt to retrieve a CALC/DUPLICATE record was unsuccessful; the value of the CALC field in variable storage is not equal to the value of the CALC control element in the current record of run unit.
33	At least one set in which the record participates has not been included in the subschema.
40	The WHERE clause in an OBTAIN NEXT logical-record request is inconsistent with a previous OBTAIN FIRST or OBTAIN NEXT command for the same record. Previously specified criteria, such as reference to a key field, have been changed. A path status of LR-ERROR is returned to the LRC block.
41	The subschema contains no path that matches the WHERE clause in a logical-record request. A path status of LR-ERROR is returned to the LRC block.
42	An ON clause included in the path by the DBA specified return of the LR-ERROR path status to the LRC block; an error has occurred while processing the LRF request.
43	A program check has been recognized during evaluation of a WHERE clause; the program check indicates that either a WHERE clause has specified comparison of a packed decimal field to an unpacked nonnumeric data field, or data in variable storage or a database record does not conform to its description. A path status of LR-ERROR is returned to the LRC block unless the DBA has included an ON clause to override this action in the path.

Minor Code	Database Function Status
44	The WHERE clause in a logical-record request does not supply a key element (sort key, CALC key, or db-key) expected by the path. A path status of LR-ERROR is returned to the LRC block.
45	During evaluation of a WHERE clause, a program check has been recognized because a subscript value is neither greater than 0 nor less than its maximum allowed value plus 1. A path status of LR-ERROR is returned to the LRC block unless the DBA has included an ON clause to override this action in the path.
46	A program check has revealed an arithmetic exception (for example: overflow, underflow, significance, divide) during evaluation of a WHERE clause. A path status of LR-ERROR is returned to the LRC block unless the DBA has included an ON clause to override this action in the path.
53	The subschema definition of an indexed set does not match the indexed set's physical structure in the database.
54	Either the prefix length of an SR51 record is less than zero or the data length is less than or equal to zero.
55	An invalid length has been defined for a variable-length record.
56	An insufficient amount of memory to accommodate the CA IDMS compression/decompression routines is available.
57	A retrieval-only run unit has detected an inconsistency in an index that should cause an 1143 abend, but optional APAR bit 216 has been turned on.
58	An attempt was made to rollback updates in a local mode program. Updates made to an area during a local mode program's execution cannot be automatically rolled out. The area must be manually recovered.
60	A record occurrence type is inconsistent with the set named in the ERROR-SET field in the IDMS communications block. This code usually indicates a broken chain.
61	No record can be found for an internal db-key. This code usually indicates a broken chain.
62	A system-generated db-key points to a record occurrence, but no record with that db-key can be found. This code usually indicates a broken chain.
63	The DBMS cannot interpret the DML function to be performed. When combined with a major code of 00, this code means invalid function parameters have been passed on the call to the DBMS. For LRF users, a WHERE clause includes a keyword that is longer than the 32 characters allowed.
64	The record cannot be found; the CALC control element has not been defined properly in the subschema.

Minor Code	Database Function Status
65	The database page read was not the page requested.
66	The area specified is not available in the requested usage mode.
67	The subschema invoked does not match the subschema object tables.
68	The CICS interface was not started.
69	A BIND RUN-UNIT may not have been issued; the CV may be inactive or not accepting new run units; or the connection with the CV may have been broken due to time out or other factors. When combined with a major code of 00, this code means the program has been disconnected from the DBMS.
70	The database will not ready properly; a JCL error is the probable cause.
71	The page range or page group for the area being readied or the page requested cannot be found in the DMCL.
72	There is insufficient memory to dynamically load a subschema or database procedure.
73	A central version run unit will exceed the MAXERUS value specified at system generation.
74	The dynamic load of a module has failed. If operating under the central version, a subschema or database procedure module either was not found in the data dictionary or the load (core image) library or, if loaded, will exceed the number of subschema and database procedures provided for at system generation.
75	A read error has occurred.
76	A write error has occurred.
77	The run unit has not been bound or has been bound twice. When combined with a major code of 00, this code means either the program is no longer signed on to the subschema or the variable subschema tables have been overwritten.
78	An area wait deadlock has occurred.
79	The run unit has requested more db-key locks than are available to the system.
80	The target node is either not active or has been disabled.
81	The converted subschema requires specified database name to be in the DBNAME table.
82	The subschema must be named in the DBNAME table.
83	An error has occurred in accessing native VSAM data sets.

Minor Code	Database Function Status
87	The owner and member records for a set to be updated are not in the same page group or do not have the same db-key radix.
91	The subschema requires a DBNAME to do the bind run unit.
92	No subschema areas map to DMCL.
93	A subschema area symbolic was not found in DMCL.
94	The specified dbname is neither a dbname defined in the DBNAME table, nor a SEGMENT defined in the DMCL.
95	The specified subschema failed DBTABLE mapping using the specified dbname.

Note: For a complete description of DB runtime status codes, see the chapter "CA IDMS Status Codes" in the *Messages and Codes Guide*.

DC Status Codes

The following tables list the DC major and minor codes and their meanings.

Major DC Status Codes

Major Code	Function
00	Any DML statement
30	TRANSFER CONTROL
31	WAIT/POST
32	GET STORAGE/FREE STORAGE
33	SET ABEND EXIT/ABEND CODE
34	LOAD/DELETE TABLE
35	GET TIME/SET TIMER
36	WRITE LOG
37	ATTACH/CHANGE PRIORITY
38	BIND/ACCEPT/END TRANSACTION STATISTICS
39	ENQUEUE/DEQUEUE

Major Code	Function
40	SNAP
43	PUT/GET/DELETE SCRATCH
44	PUT/GET/DELETE QUEUE
45	BASIC MODE TERMINAL MANAGEMENT
46	MAPPING MODE TERMINAL MANAGEMENT
47	LINE MODE TERMINAL MANAGEMENT
48	ACCEPT/WRITE PRINTER
49	SEND MESSAGE
50	COMMIT TASK/ROLLBACK TASK/FINISH TASK/WRITE JOURNAL
51	KEEP LONGTERM
58	SVC SEND/RECEIVE

Minor DC Status Codes

Minor Code	Function Status
00	Combined with a major code of 00, this code indicates either successful completion of the DML function or that all tested resources have been enqueued.
01	The requested operation cannot be performed immediately; waiting will cause a deadlock.
02	Either there is insufficient storage in the storage pool or the storage required for control blocks is unavailable.
03	The scratch area ID cannot be found.
04	Either the queue ID (header) cannot be found or a paging session was in progress when a second STARTPAGE command was received (that is, an implied ENDPAGE was processed before this STARTPAGE was executed successfully).
05	The specified scratch record ID or queue record cannot be found.
06	No resource control element (RCE) exists for the queue record; currency has not been established.
07	Either an I/O error has occurred or the queue upper limit has been reached.

Minor Code	Function Status
08	The requested resource is not available.
09	The requested resource is available.
10	New storage has been assigned.
11	A maximum task condition exists.
12	The named task code is invalid.
13	The named resource cannot be found.
14	The requested module is defined as nonconcurrent and is currently in use.
15	The named module has been overlaid and cannot be reloaded immediately.
16	The specified interval control element (ICE) address cannot be found.
17	The record has been replaced.
18	No printer terminals have been defined for the current DC system.
19	The return area is too small; data has been truncated.
20	An I/O, program-not-found, or potential-deadlock status condition exists.
21	The message destination is undefined, the long term ID cannot be found, or a KEEP LONGTERM request was issued by a nonterminal task.
22	A record already exists for the scratch area specified.
23	No storage or resource control element (RCE) could be allocated for the reply area.
24	The maximum number of outstanding replies has been exceeded.
25	An attention interrupt has been received.
26	There is a logical error in the output data stream.
27	A permanent I/O error has occurred.
28	The terminal dial-up line is disconnected.
29	An invalid parameter has been passed in the list set up by the DML processor.
30	The named function has not yet been implemented.
31	An invalid parameter has been passed; the TRB, LRB, or MRB contains an invalid field; or the request is invalid because of a possible logic error in the application program. In a DC-BATCH environment, a possible cause is that the record length specified by the command exceeds the maximum length based on the packet size.
32	The derived length of the specified variable storage is negative or zero.

Minor Code	Function Status
33	Either the named table or the named map cannot be found in the data dictionary load area.
34	The named variable-storage area must be an 01-level entry in the LINKAGE SECTION.
35	A GET STORAGE request is invalid because the LINKAGE SECTION variable has already been allocated.
36	The program either was not defined during system generation or is marked out-of-service.
37	A GET STORAGE operand is invalid because the specified variable storage area is in the WORKING-STORAGE SECTION instead of the LINKAGE SECTION.
38	Either no GET STORAGE operand was specified or the specified LINKAGE SECTION variable has not been allocated.
39	The terminal device being used is out of service.
40	NOIO has been specified but the datastream cannot be found.
41	An IF operation resulted in a valid true condition.
42	The named map does not support the terminal device in use.
43	A line I/O session has been cancelled by the terminal operator.
44	The referenced field does not participate in the specified map; a possible cause is an invalid subscript.
45	An invalid terminal type is associated with the issuing task.
46	A terminal I/O error has occurred.
47	The named area has not been readied.
48	The run unit has not been bound.
49	NOWAIT has been specified but WAIT is required.
50	Statistics are not being kept.
51	A lock manager error occurred during the processing of a KEEP LONGTERM request
52	The specified table is missing or invalid.
53	An error occurred from a user-written edit routine.
54	Either there is invalid internal data or a data conversion error has occurred.
55	The user-written edit routine cannot be found.
56	No DFLDS have been defined for the map.

Minor Code	Function Status
57	The ID cannot be found, is not a long-term permanent ID, or is being used by another run unit.
58	Either the LRID cannot be found, the maximum number of concurrent task threads was exceeded, or an attempt was made to rollback database changes in local mode.
59	An error occurred in transferring the KEEP LONGTERM request to IDMSKEEP
60	The requested KEEP LONGTERM lock id was already in use with a different page group
63	Invalid function parameters have been passed on the call to the DBMS.
64	No detail exists currently for update; no action has been taken. Alternatively, the requested node for a header or detail is either not present or not updated.
68	There are no more updated details to MAP IN or the amount of storage defined for pageable maps at sysgen is insufficient. In the latter case, subsequent MAP OUT DETAIL statements are ignored.
72	No detail occurrence, footer, or header fields exist to be mapped out by a MAP OUT RESUME command, or the scratch record that contains the requested detail could not be accessed. The latter case is a mapping internal error and should be reported.
76	The first screen page has been transmitted to the terminal.
77	Either the program is no longer signed on to the subschema or the variable subschema tables have been overwritten.
80	The target node is either not active or has been disabled.
97	An error was encountered processing a syncpoint request; check the log for details.
98	An unsupported COBOL compiler option (for example, DEBUG) has been specified for an online program or a program running in a batch region has issued a DML verb that is only valid when running online under CA IDMS/DC/UCF.
99	An unexpected internal return code has been received; the terminal device is out of service.

Note: For a complete description of DC runtime status codes, see the chapter "CA IDMS Status Codes" in the *Messages and Codes Guide*.

ERROR-STATUS Condition Names

Code	Condition name	Explanation
0000	DB-STATUS-OK	No error
0307	DB-END-OF-SET	End of set, area, or SPF index
0326	DB-REC-NOT-FOUND	No record found
0001 to 9999	ANY-ERROR-STATUS	Any nonzero status
0000 to 9999	ANY-STATUS	Any status
3101 3201 3401 3901	DC-DEADLOCK	Waiting will cause a deadlock
3202 3402	DC-NO-STORAGE	Insufficient space available
4303	DC-AREA-ID-UNK	ID cannot be found
4404	DC-QUEUE-ID-UNK	Queue header cannot be found
4305 4405	DC-REC-NOT-FOUND	Record cannot be found
3908	DC-RESOURCE-NOT-AVAIL	Resource not available
3909	DC-RESOURCE-AVAIL	Resource is available
3210	DC-NEW-STORAGE	New space allocated
3711	DC-MAX-TASKS	Maximum attached tasks
4317	DC-REC-REPLACED	Record has been replaced
4319 4419 4519 4719	DC-TRUNCATED-DATA	Return area too small; data has been truncated
4525 4625	DC-ATTN-INT	Attention interrupt received
4743	DC-OPER-CANCEL	Session cancelled

Error Detection

The value returned to the ERROR-STATUS field must be checked after each DML request. When using the Logical Record Facility, you should check the LR-STATUS field of the LRC block before checking the ERROR-STATUS field.

CA IDMS provides three aids for error detection: the IDMS-STATUS routine, the AUTOSTATUS protocols, and the USER-DEFINED protocols. Each of these aids is described below.

IDMS-STATUS Routine

IDMS-STATUS is an error-checking routine included in the dictionary. You can copy IDMS-STATUS into your program by coding the following statement at the end of the PROCEDURE DIVISION:

```
COPY IDMS IDMS-STATUS.
```

For more information on the use of the COPY IDMS IDMS-STATUS statement, refer to Precompiler-Directive Statements (see page 67).

IDMS-STATUS Routine Used Under Batch

The following code is copied into batch programs by the COPY IDMS IDMS-STATUS statement:

```
*****************************************************************
 IDMS-STATUS                                              SECTION.
*****************************************************************
 IDMS-STATUS-PARAGRAPH.
        IF DB-STATUS-OK GO TO ISABEX.
        PERFORM IDMS-ABORT.
        DISPLAY '*************************'
                ' ABORTING - ' PROGRAM-NAME
                ', '           ERROR-STATUS
                ', '           ERROR-RECORD
                ' **** RECOVER IDMS ****'
               UPON CONSOLE.
        DISPLAY 'PROGRAM NAME ------ ' PROGRAM-NAME.
        DISPLAY 'ERROR STATUS ------ ' ERROR-STATUS.
        DISPLAY 'ERROR RECORD ------ ' ERROR-RECORD.
        DISPLAY 'ERROR SET --------- ' ERROR-SET.
        DISPLAY 'ERROR AREA -------- ' ERROR-AREA.
        DISPLAY 'LAST GOOD RECORD -- ' RECORD-NAME.
        DISPLAY 'LAST GOOD AREA ---- ' AREA-NAME.
        MOVE 39  TO SSC-IN01-REQ-CODE.
        MOVE 0   TO SSC-IN01-REQ-RETURN.
        MOVE ' ' TO SSC-STATUS-LABEL.
        PERFORM IDMS-STATUS-LOOP
                UNTIL SSC-IN01-REQ-RETURN > 0.
        ROLLBACK.
        CALL 'ABORT'.
        GO TO ISABEX.
 IDMS-STATUS-LOOP.
```

```
        CALL 'IDMSIN1' USING IDBMSCOM(41)
                             SSC-IN01-REQ-WK
                             SUBSCHEMA-CTRL
                             IDBMSCOM(1)
                             DML-SEQUENCE
                             SSC-STATUS-LINE.
        IF SSC-IN01-REQ-RETURN GREATER THAN 4
            DISPLAY 'DML SEQUENCE ------ ' DML-SEQUENCE
        ELSE
            DISPLAY SSC-STATUS-LABEL '--- ' SSC-STATUS-VALUE.
 ISABEX. EXIT.
```

IDMS-STATUS Routine Used Under a DC/UCF System

The following code is copied into DC/UCF programs by the COPY IDMS IDMS-STATUS statement:

```
*****************************************************************
 IDMS-STATUS                        SECTION.
******************** IDMS-STATUS FOR IDMS/DC *********************
     IF DB-STATUS-OK GO TO ISABEX.
     PERFORM IDMS-ABORT.
     MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE
     MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE
     SNAP FROM SUBSCHEMA-CTRL TO SUBSCHEMA-CTRL-END
          ON ANY-STATUS
                NEXT SENTENCE.
     ABEND CODE SSC-ERRSTAT-SAVE
          ON ANY-STATUS
                NEXT SENTENCE.
 ISABEX. EXIT.
```

IDMS-STATUS abends your program if the ERROR-STATUS field contains a nonzero value. Because some values do not indicate processing errors, your program should check ERROR-STATUS for nonzero values before calling IDMS-STATUS.

Pageable Map ERROR-STATUS Condition Names

The following table lists the condition names that are automatically included when using pageable maps.

Note: You cannot make checks for these codes within the IDMS-STATUS routine.

Code	Condition name	Explanation
4604	DC-SECOND-STARTPAGE	Second consecutive STARTPAGE
4664	DC-DETAIL-NOT-FOUND	No current detail

Code	Condition name	Explanation
4668	DC-NO-MORE-UPD-DETAILS	All details mapped in
4668	DC-MAX-SPACE-REACHED	Pageable map space exceeded
4672	DC-NO-DETAILS	Nothing to map out
4676	DC-FIRST-PAGE-SENT	First page transmitted
4680	DC-PAGE-READY	A complete map page was built

When IDMS-STATUS executes, it exits immediately if the error-status check indicates successful completion of the function (ERROR-STATUS of 0000).

Effects of Nonzero Status on IDMS-STATUS

This section describes the effects of nonzero status conditions on IDMS-STATUS execution. The effects depend on the operating mode (BATCH or IDMS-DC) of the application program.

Effect When the Operating Mode Is BATCH

When the operating mode is BATCH, a nonzero error status causes IDMS-STATUS to:

- Print status information on the unsuccessful function
- Issue a rollback
- Abend the program

The status information retrieved from the IDMS-DB communications block includes program name, error status, error record, error set, error area, record name (the last record successfully accessed), area name (the last area successfully accessed), page number and line index of the dbkey (the last record accessed by the run unit), dbkey in hexadecimal format, page group and database-key format (associated with the last record accessed by the run unit), and the DML sequence number.

Effect When the Operating Mode Is IDMS-DC

When the operating mode is IDMS-DC, a nonzero error status causes IDMS-STATUS to:

- Snap the IDMS-DC communications block (SUBSCHEMA-CTRL)
- Abend the program

The status information retrieved from the IDMS-DC communications block includes program name, error status, error record, error set, error area, record name (the last record successfully accessed), area name (the last area successfully accessed), and the DML sequence number.

IDMS-STATUS includes a call to perform a routine named IDMS-ABORT, which you can use for additional error processing. CA IDMS supplies only the PERFORM statement; if the IDMS-ABORT routine is to be used, you must supply the routine itself by coding the section name and exit as shown below:

```
IDMS-ABORT SECTION.
IDMS-ABORT-EXIT.
  EXIT.
```

For example, you can use the IDMS-ABORT SECTION to display information regarding the LRC block as shown below:

```
IDMS-ABORT SECTION.
    IF LR-STATUS = 'LR-ERROR'
      DISPLAY 'LOGICAL RECORD ERROR'
          'LR NAME -- ' LR-NAME
          'LR VERB -- ' LR-VERB.
IDMS-ABORT-EXIT.
    EXIT.
```

A routine can be coded directly into the program or copied in as a module, according to the requirements of the program. However, if no abort routine is to be performed, the reference to IDMS-ABORT must be deleted from IDMS-STATUS by the DBA.

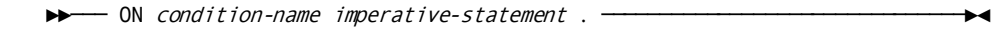
AUTOSTATUS Protocols

The precompiler automatically generates a PERFORM IDMS-STATUS statement after each DML command (except IF) if the protocol in use includes AUTOSTATUS. For each standard protocol (for example BATCH or CICS) provided at installation time, an AUTOSTATUS protocol (for example BATCH-AUTOSTATUS or CICS-AUTOSTATUS) is also provided. (The IDMS DC and DC-BATCH protocols already include AUTOSTATUS.) The DBA determines which protocol should be used; you must specify this protocol in the ENVIRONMENT DIVISION by means of the MODE IS statement (for more information on protocols, see Precompiler-Directive Statements (see page 67)).

When AUTOSTATUS is in use, the PERFORM IDMS-STATUS statement can still be preceded by a check for a nonzero return code by including an ON clause at the end of the DML command. If the DBMS returns the specified status code to the IDMS communications block, the imperative statement included in the ON clause is executed; if the status code tested for is not returned, IDMS-STATUS is performed.

Any DML command can include an ON clause; only one ON clause is allowed per command.

Syntax



Parameters

ON parameter

Tests for a nonzero status returned as a result of a DML command.

condition-name

A preassigned nonzero status condition name. Valid condition names include DB-STATUS-OK, DB-END-OF-SET, DB-REC-NOT-FOUND, ANY-ERROR-STATUS, and any condition names defined by the DBA.

imperative-statement

Specifies the program action to be taken if the nonzero status identified by *condition-name* results from the DML command.

The example below illustrates use of the ON clause. A DML source program might contain the following statements:

```
0800-OBTAIN-REC.
  OBTAIN CALC OFFICE ON DB-REC-NOT-FOUND GO TO 0900-NO-REC.
         .
         .
         .
0900-NO-REC.
  STORE OFFICE.
```

The precompiler converts the DML statements to comments, translates the ON clause into an IF statement, and generates the following expanded COBOL source code:

```
 0800-OBTAIN-REC.
*  OBTAIN CALC OFFICE ON DB-REC-NOT-FOUND
         MOVE 0001 TO DML-SEQUENCE
         CALL 'IDMS' USING SUBSCHEMA-CTRL
                  IDBMSCOM (32)
                  SR450
                  IDBMSCOM (43)
         IF NOT DB-REC-NOT-FOUND PERFORM IDMS-STATUS;
         ELSE
                     GO TO 0900-NO-REC.
          .
          .
          .
```

```
 0900-NO-REC.
*  STORE OFFICE.
         MOVE 0002 TO DML-SEQUENCE
         CALL 'IDMS' USING SUBSCHEMA-CTRL
                  IDBMSCOM (42)
                  SR450
          PERFORM IDMS-STATUS.
```

For further details on the expansion of calls to CA IDMS, see CA IDMS Call Formats (see page 453).

USER-DEFINED Protocols

To establish a user-defined protocol, follow these steps:

1. Establish a uniquely named user-defined MODE.
2. Identify an existing CA supplied protocol that meets the program's requirements, and use this protocol, with modifications as needed, to create a new protocol with the same name as the user-defined MODE.
3. Modify the appropriate SUBSCHEMA-CTRL record definition to include the user-defined MODE.
4. Specify the user-defined MODE in the PROTOCOL parameter of the program.

For example, to create a version of the DC-BATCH protocol that does not include AUTOSTATUS, follow these steps:

1. Define the user-defined MODE:

   ```
   ADD ATTRIBUTE DC-BATCH-NOAUTO WITHIN CLASS MODE.
   ```

2. Define the user-defined protocol based on the CA supplied DC-BATCH protocol, editing the DC-BATCH protocol to remove the @AUTOSTATUS references:

   ```
   ADD MODULE NAME DC-BATCH-NOAUTO VERSION 1 LANGUAGE IS COBOL
   MODE IS DC-BATCH-NOAUTO
   MODULE SOURCE FOLLOWS
        .
        .
        .
   MSEND.
   ```

3. Modify the SUBSCHEMA-CTRL record for MODE IS DC-BATCH to include the user-defined MODE:

   ```
   MODIFY RECORD SUBSCHEMA-CTRL VERSION 1 LANGUAGE COBOL
   MODE IS DC-BATCH-NOAUTO.
   ```

4. Specify the user-defined MODE in the program:

   ```
   PROTOCOL MODE IS DC-BATCH-NOAUTO
   ```

Chapter 5: Precompiler-Directive Statements

Compiler-directive statements instruct the precompiler to copy source code from the data dictionary into the COBOL application program. These statements do not produce any executable commands. Compiler-directive statements are coded beginning in columns 8-11 of the IDENTIFICATION and ENVIRONMENT DIVISIONs, and in columns 8-72 of the DATA and PROCEDURE DIVISIONs, as follows:

- **IDENTIFICATION DIVISION**—The PROGRAM-ID statement specifies a program name and version number.
- **ENVIRONMENT DIVISION**—The IDMS-CONTROL SECTION establishes the operating mode, debug sequencing, and variable storage allocation.
- **DATA DIVISION**—The following sections are included in the DATA DIVISION:
  - **FILE SECTION**—COPY IDMS FILE statements copy descriptions of non-IDMS files from the data dictionary.
  - **SCHEMA SECTION**—The DB statement identifies the subschema view to be used by the program.
  - **MAP SECTION**—These statements notify the precompiler that mapping mode terminal I/O is being used, define the program's maps, and specify the size of map field lists.
  - **WORKING-STORAGE and LINKAGE SECTIONs—PROCEDURE DIVISION**—COPY IDMS statements copy source data descriptions or non-IDMS data description code for records from the data dictionary.
- COPY IDMS statements copy source data for BIND statements or program source modules defined in the data dictionary.

All compiler-directive statements are optional except the SCHEMA SECTION and DB statement. If a program accesses the database, it must include a SCHEMA SECTION that contains a DB statement identifying the subschema. All other compiler-directive statements can be omitted; the precompiler will generate the required source code components automatically.

If the program does not access the database (that is, does not invoke a subschema and does not issue any DML statements), the SCHEMA SECTION and DB statement can be omitted as well.

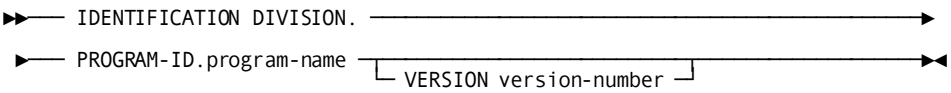
The COPY IDMS and other compiler-directive statements are explained separately for each of the following divisions. References to the IDMS communications block apply equally to the IDMS-DC communications block.

This section contains the following topics:

IDENTIFICATION DIVISION

The PROGRAM-ID statement in the IDENTIFICATION DIVISION identifies your program to the precompiler.

Syntax



Parameters

PROGRAM ID

Specifies the program.

program-name

The name of the program. If the program has been previously defined in the data dictionary through IDD facilities, *program-name* must match the name assigned to the program when it was defined in order for the precompiler to recognize it as the same program.

VERSION

Qualifies *program-name* with a version number (for example, for purposes of testing or development).

version-number

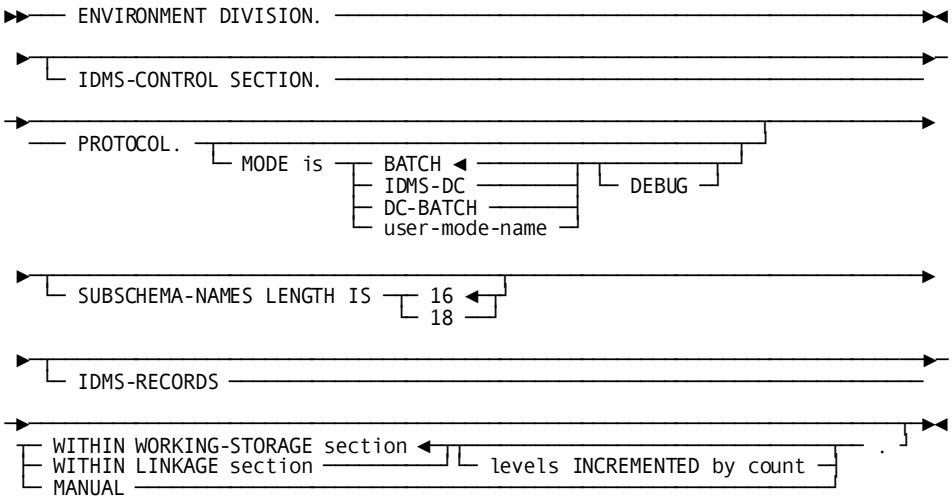
An integer in the range 1 through 9999. By default, if you do not specify a number, the default is either the highest number defined in the data dictionary for the named program or 1 if the program does not already exist in the data dictionary.

ENVIRONMENT DIVISION

An IDMS-CONTROL SECTION is required in the ENVIRONMENT DIVISION to establish the following:

- **Operating mode**—The environment in which the program will execute, and the form and content of calling sequences produced by the precompiler
- **Debug sequencing**—Whether each PROCEDURE DIVISION DML command will be numbered for identification during error reporting
- **Variable storage allocation**—How source data description code for the IDMS communications block and other DATA DIVISION components will be inserted in the program

Syntax



Parameters

PROTOCOL

Specifies how CA IDMS CALL statements are generated and whether the debugging sequence option is included.

MODE IS

Identifies the operating mode used by the precompiler to generate call statements for the program's PROCEDURE DIVISION DML statements.

BATCH

Specifies to execute the program in batch mode.

This is the default.

The IDMS communications block is copied into variable storage; standard CALL statements (CALL 'IDMS') are generated in the PROCEDURE DIVISION.

IDMS DC

Specifies to execute the program in IDMS-DC mode.

The IDMS DC communications block is copied into variable storage; CA IDMS CALL statements (CALL 'IDMSCOBI') are generated in the PROCEDURE DIVISION for DC requests.

DC-BATCH

Specifies to execute the program in DC-BATCH mode. The IDMS-DC communications block is copied into variable storage; DC-BATCH CALL statements (CALL 'IDMSDCCI') are generated in the PROCEDURE DIVISION for DC requests.

Specify MODE IS DC-BATCH to access DC queues and printers from batch applications running under the central version.

user-mode-name

Specifies to execute the program in a special environment (for example, under a teleprocessing monitor or in a user-defined operating mode) as determined by the DBA. The appropriate communications block is copied into variable storage; mode-specific CALL statements (for example, in CICS: CALL 'IDMSINC1' USING DFHCADS) are generated in the PROCEDURE DIVISION. The following list provides the standard operating modes (protocols) available for COBOL programs.

If *user-mode-name* specifies an AUTOSTATUS protocol (for example, CICS-AUTOSTATUS), the precompiler automatically generates an IDMS-STATUS statement after every DML command except IF. When using an AUTOSTATUS protocol, be sure to include the COPY IDMS IDMS-STATUS statement in the PROCEDURE DIVISION. For details on programming under an AUTOSTATUS protocol, see Communications Blocks and Error Detection (see page 33).

DEBUG

Specifies that a unique DML sequence number is placed in the IDMS communications block for each DML statement. These numbers appear in columns 81-88 of the COBOL compiler output listing in the form DMLC*nnnn*. The precompiler generates numbers to identify the sequence in which DML statements appear in the program. Depending on the error routine defined by the DBA, you can use the DML sequence number to help debug your program.

If DEBUG is not specified, the precompiler does not associate sequence numbers with source statements.

SUBSCHEMA-NAMES LENGTH IS

Specifies whether to use a 16-byte or 18-byte communications block.

For information about 16-byte communications blocks, see Communications Blocks and Error Detection (see page 33).

For information about 18-byte communications blocks, see 18-Byte Communications Blocks (see page 517).

IDMS-RECORDS

Specifies whether source CA IDMS data description code is inserted into the DATA DIVISION automatically.

WITHIN WORKING-STORAGE section

Instructs the processor to insert automatically the copied DATA DIVISION components as the last entries in the WORKING-STORAGE SECTION of the source program.

This is the default.

WITHIN LINKAGE section

Instructs the processor to automatically insert the copied DATA DIVISION components as the last entries in the LINKAGE SECTION of the source program. Any VALUE clauses present in source code will be dropped automatically.

levels INCREMENTED by

Varies the level numbers for inserted descriptions from those stored in the data dictionary. If you specify a level number, the first level of code will be inserted to the level specified by *count*; all other levels will be adjusted accordingly. If you do not specify a level, the descriptions inserted will begin at 01 and have the same level numbers as originally specified in the data dictionary.

count

An integer in the range 1 through 48.

Specifies the value by which the DATA DIVISION level numbers (including the 01 level number) of all stored elements are to be incremented.

Note: Using the LEVELS INCREMENTED BY clause may cause unpredictable results if record fields have been defined with a SYNCHRONIZED clause. Such fields may contain extra bytes (slack bytes) inserted to ensure correct alignment. Because CA IDMS does not recognize slack bytes as functional, it may misinterpret data fields that contain them. Therefore, you should ensure that all fields and records are properly structured.

MANUAL

Indicates that CA IDMS-related source data description code (for example, SUBSCHEMA-CTRL or SUBSCHEMA-NAMES) will be inserted explicitly into the source program by means of DATA DIVISION COPY IDMS statements. If MANUAL is not specified, the required DATA DIVISION code is inserted automatically by the precompiler.

Standard Modes Available for COBOL Programs

BATCH	DC-BATCH	TASKMASTER
BATCH-AUTOSTATUS	IDMS-DC	TASKMASTER-AUTO
CICS	INTERCOMM	UTM
CICS-AUTOSTATUS	INTERCOMM-AUTO	UTM-AUTOSTATUS
CICS-EXEC	INTERCOMM-REENT	WESTI
CICS-EXEC-AUTO	ICOMM-REENT-AUTO	WESTI-AUTOSTATUS
CICS-STANDARD	SHADOW	WESTI-REENT
CICS-STD-AUTO	SHAD-AUTOSTATUS	WESTI-REENT-AUTO

The following example illustrates the statements used to code the IDMS-CONTROL SECTION of a program running under DC with DEBUG sequencing and automatic insertion of IDMS-RECORDS in WORKING-STORAGE SECTION:

```
ENVIRONMENT DIVISION.
 IDMS-CONTROL SECTION.
 PROTOCOL.
 MODE IS IDMS-DC
  DEBUG
  IDMS-RECORDS WITHIN WORKING-STORAGE SECTION.
```

DATA DIVISION

Compiler-directive statements can be in the following sections of the DATA DIVISION:

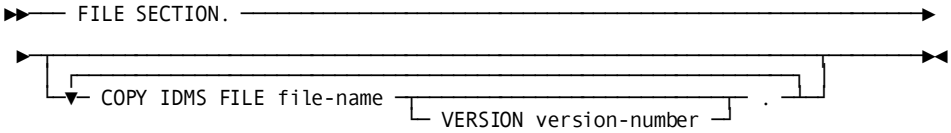
- **FILE SECTION**—COPY IDMS statements copy descriptions of non-IDMS files from the data dictionary
- **SCHEMA SECTION**—A DB statement identifies the subschema view to be used by the program
- **MAP SECTION**—These statements notify the precompiler that mapping mode terminal I/O is being used, define the program's maps, and specify the size of map field lists

- **WORKING-STORAGE SECTION**—COPY IDMS statements copy source data description or non-IDMS data description code for records from the data dictionary
- **LINKAGE SECTION**—COPY IDMS statements copy source data description or non-IDMS data description code for records from the data dictionary

FILE SECTION

The FILE SECTION can include one or more COPY IDMS statements to copy non-IDMS file descriptions from the data dictionary into the program. Each COPY IDMS statement generates the file definition that includes record size, block size, and recording mode from the data dictionary. Additionally, any records defined within the file through the IDD facilities are also copied.

Syntax



Parameters

COPY IDMS FILE

Copies the description of a non-IDMS file into the DATA DIVISION.

file-name

Either the primary name or a synonym for a file defined in the data dictionary.

VERSION

Qualifies *file-name* with a version number.

If you do not specify a version number, the default is the highest version number defined in the data dictionary for *file-name*.

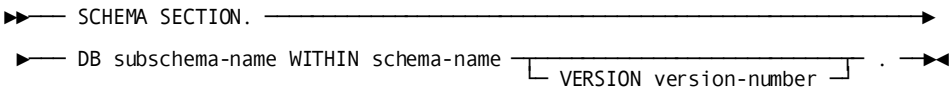
version-number

An integer in the range 1 through 9999.

SCHEMA SECTION

For any program that accesses the database, a SCHEMA SECTION is included in the DATA DIVISION to identify a subschema view to the precompiler. The subschema named in the DB statement of the SCHEMA SECTION determines which record descriptions can be copied into the program from the data dictionary. Every DML command issued by the program is checked against the record, set, and area access restrictions specified in this subschema.

Syntax



Parameters

DB *subschema-name*

Specifies a subschema defined in the data dictionary. If the DBA has chosen to preregister valid program names for this subschema in the data dictionary, the program named in the IDENTIFICATION DIVISION must be associated with *subschema-name* in the data dictionary.

WITHIN *schema-name*

Specifies the schema under which *subschema-name* is compiled.

VERSION

Qualifies *schema-name* with a version number.

If you do not specify a version number, the default is the highest version number defined in the data dictionary for *file-name*.

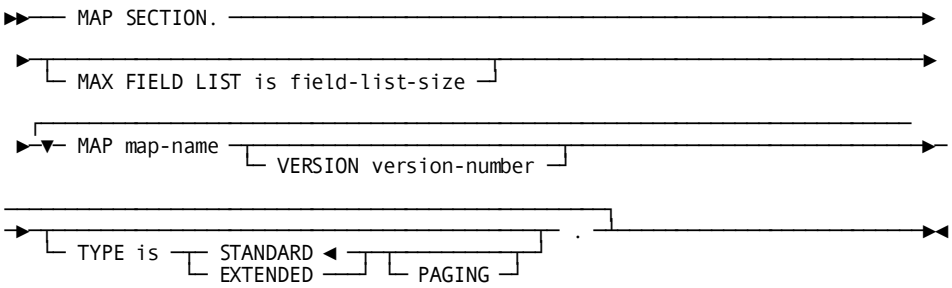
version-number

An integer in the range 1 through 9999.

MAP SECTION

The MAP SECTION notifies the precompiler that mapping mode terminal I/O is being used, defines the program's maps, and specifies the size of map field lists.

Syntax



Parameters

MAX FIELD LIST is

Specifies the size of field lists used in MODIFY MAP and INQUIRE MAP statements.

field-list-size

The field list size or the size is expressed as a numeric constant.

The specified size must be at least one greater than the size of the largest field list used by the program. For example, if the largest map field list contains 5 fields, the value of *field-list-size* must be at least 6.

The MAX FIELD LIST statement must be specified if the program uses a field list in a MODIFY MAP or INQUIRE MAP request.

MAP

Defines the map used by the program. This parameter can be repeated as necessary to define each map to be used.

map-name

The name of a map used by the program.

VERSION

Qualifies the named map with a version number.

version-number

An integer in the range 1 through 9999.

There is no default for *version-number*. If your site uses multiple versions, you must specify a version number.

TYPE Is

Specifies whether the map request block (MRB) built for the map is to be standard or extended.

STANDARD

Specifies that the map has standard 3270-type terminal attributes.

This is the default.

EXTENDED

Specifies that the map has extended 3279-type terminal attributes (for example, color, blinking fields, reverse video).

PAGING

Specifies that the named map is a pageable map.

Note: For more information about pageable maps, see "MAP OUT" and MAP IN (see page 227), or see the *CA IDMS Mapping Facility Guide*.

The following example shows the DATA DIVISION statements required to access the EMPSS09 subschema and the EMPMAPLR map; the largest map field list allowed is 4.

```
DATA DIVISION.
SCHEMA SECTION.
DB EMPSS09 WITHIN EMPSCHM.
MAP SECTION.
MAX FIELD LIST IS 5.
MAP EMPMAPLR VERSION 1 TYPE IS STANDARD.
```

WORKING-STORAGE and LINKAGE SECTIONS

COPY IDMS statements can be coded in the WORKING-STORAGE and LINKAGE SECTIONs, allowing you to explicitly copy source code from the data dictionary into the program. *No COPY IDMS statements are required in the DATA DIVISION* unless the IDMS-RECORDS MANUAL clause has been specified in the IDMS-CONTROL SECTION of the ENVIRONMENT DIVISION.

If the source code to be copied into the LINKAGE SECTION includes VALUE clauses, these clauses are not copied.

WORKING-STORAGE SECTION and LINKAGE SECTION source code requirements differ according to the usage mode defined in the program's subschema: DML, LR, or MIXED. These usage modes determine whether the program can access database records only, logical records only, or both database records and logical records. The program should not copy components that conflict with its subschema's usage mode (for example, do not copy SUBSCHEMA-LR-CTRL if the subschema's usage mode is DML).

An explanation of each usage mode and the required source code components in the program is shown below:

- **DML** allows a program to access database records only and requires the following source code components:
  - **SUBSCHEMA-CTRL**—The IDMS communications block, through which the application program and the DBMS communicate. For more information, see Chapter 4 (see page 33).
  - **SUBSCHEMA-NAMES**—The name of the program's subschema and the names of all records, sets, and areas to which the program has access through this subschema. SUBSCHEMA-NAMES is used by the precompiler to generate appropriate CA IDMS CALL statements in the PROCEDURE DIVISION.

- **SUBSCHEMA-RECORDS**—The description of all records to which the subschema permits access.

- **LR** allows a program to access logical records only and requires the following source code components:
  - **SUBSCHEMA-CTRL**—The IDMS communications block, through which LRF and the DBMS communicate. For more information, see Chapter 4 (see page 33).
  - **SUBSCHEMA-LR-CTRL**—The logical-record request control (LRC) block, through which the application program and LRF communicate. For more information, see Chapter 4 (see page 33).
  - **SUBSCHEMA-LR-NAMES**—The name of the program's subschema and the names of all database areas that can be accessed through the subschema. Logical-record names are not copied into the program; rather, they are moved as literals into the LRC block when needed to process a logical-record request.
  - **SUBSCHEMA-LR-RECORDS**—The descriptions of all logical records contained in the subschema.

- **MIXED** allows a program to access both database records and logical records; this usage mode requires the following source code components:
  - SUBSCHEMA-CTRL
  - SUBSCHEMA-NAMES
  - SUBSCHEMA-RECORDS
  - SUBSCHEMA-LR-CTRL
  - SUBSCHEMA-LR-RECORDS

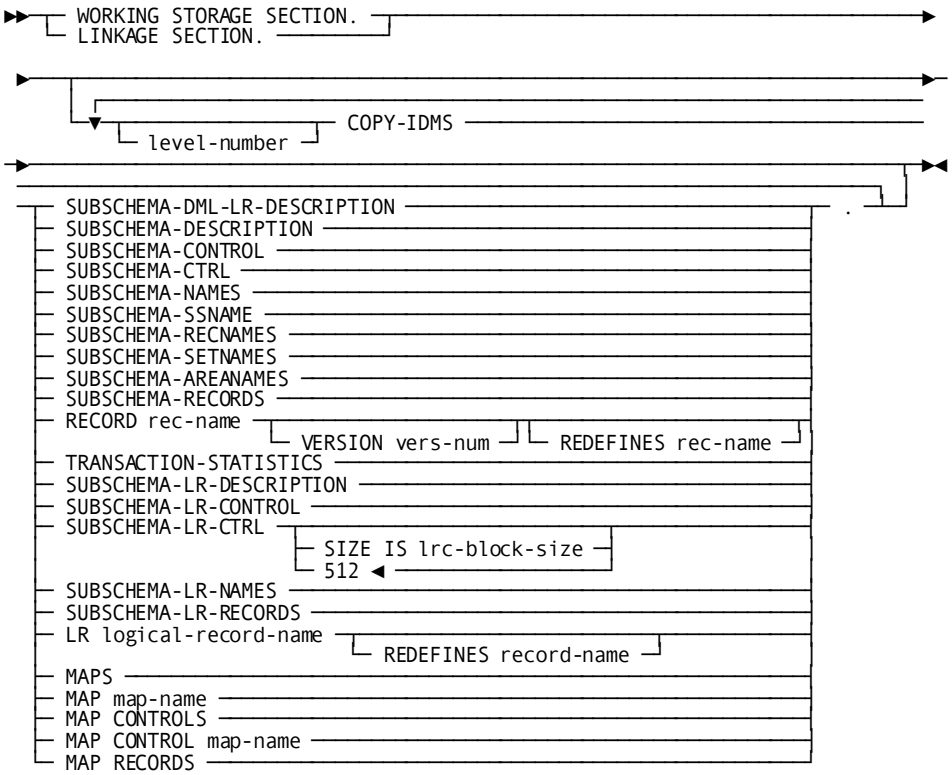
The use of MIXED mode is not recommended for the following reasons:

- Issuing both logical-record and database requests requires that the program take into account the database currencies maintained in the paths used to service logical-record requests.
- Accessing both logical records and database records in the same program can diminish the program's independence from the database structure and possibly interfere with the execution of paths invoked to provide requested logical-record access.
- Logical-record path processing can interfere with program access to database records. You may need to insert a DML statement after a logical-record request to reestablish the appropriate currency.

The precompiler inserts the required data descriptions into the program automatically unless IDMS RECORDS MANUAL is specified in the IDMS-CONTROL SECTION of the ENVIRONMENT DIVISION. If IDMS RECORDS MANUAL is specified, you must explicitly copy the required components, as outlined above, by coding COPY IDMS statements in the DATA DIVISION.

UTM modes only: You must include SUBSCHEMA-CTRL and all subschema records in the LINKAGE SECTION. You must include SUBSCHEMA-NAMES in the WORKING-STORAGE SECTION.

Syntax



Parameters

level-number

An integer in the range 01 through 48.

Instructs the precompiler to copy the descriptions into the program at a level other than that originally specified for the description in the data dictionary. If you specify a level number, the first level of code will be copied to the specified level; all other levels will be adjusted accordingly. If you do not specify a level, the descriptions copied will begin at 01 and have the same level numbers as originally specified in the data dictionary.

Note: Using the *level-number* clause can cause unpredictable results if record fields have been defined with a SYNCHRONIZED clause. Such fields may contain slack bytes, inserted to ensure correct alignment. Because CA IDMS does not regard slack bytes as functional, it may misrepresent fields that contain such bytes. Therefore, you should ensure that all fields and records are properly structured.

COPY IDMS

Requests that the specified source data description code be copied into the DATA DIVISION at the location of the COPY IDMS statement.

SUBSCHEMA-DML-LR-DESCRIPTION

Copies all components required to access both database and logical records (SUBSCHEMA-CTRL, SUBSCHEMA-NAMES, SUBSCHEMA-RECORDS, SUBSCHEMA-LR-CTRL, SUBSCHEMA-LR-RECORDS).
SUBSCHEMA-DML-LR-DESCRIPTION should be specified only when the subschema's usage mode is MIXED; do not specify SUBSCHEMA-DML-LR-DESCRIPTION if the usage mode is DML or LR.

SUBSCHEMA-DESCRIPTION

Copies all components required to access database records (SUBSCHEMA-CTRL, SUBSCHEMA-NAMES, and SUBSCHEMA-RECORDS). Do not specify SUBSCHEMA-DESCRIPTION if the subschema's usage mode is LR.

SUBSCHEMA-CONTROL

Copies both the SUBSCHEMA-CTRL and SUBSCHEMA-NAMES components. Do not specify SUBSCHEMA-CONTROL if the subschema's usage mode is LR.

SUBSCHEMA-CTRL

Copies the IDMS communications block data description; if the operating mode is IDMS-DC or DC-BATCH, SUBSCHEMA-CTRL copies the IDMS-DC communications block.

SUBSCHEMA-NAMES

Copies the eight-character literal name of the subschema and the literal names of all database records, sets, and areas contained in the subschema.
SUBSCHEMA-NAMES includes SUBSCHEMA-SSNAME, SUBSCHEMA-RECNAMES, SUBSCHEMA-SETNAMES, and SUBSCHEMA-AREANAMES. Do not specify SUBSCHEMA-NAMES if the subschema's usage mode is LR.

SUBSCHEMA-SSNAME

Copies the eight-character literal name of the program's subschema. Do not specify SUBSCHEMA-SSNAME if the subschema's usage mode is LR.

SUBSCHEMA-RECNAMES

Copies the literal names of all database records contained in the subschema. Do not specify SUBSCHEMA-RECNAMES if the subschema's usage mode is LR.

SUBSCHEMA-SETNAMES

Copies the literal names of all sets contained in the subschema. Do not specify SUBSCHEMA-SETNAMES if the subschema's usage mode is LR.

SUBSCHEMA-AREANAMES

Copies the literal names of all database areas that can be accessed through the subschema. Do not specify SUBSCHEMA-AREANAMES if the subschema's usage mode is LR.

SUBSCHEMA-RECORDS

Copies the descriptions of all records contained in the subschema. COBOL synonyms defined for the subschema records in the data dictionary may be copied into the program, according to the rules of synonym usage. Do not specify SUBSCHEMA-RECORDS if the subschema's usage mode is LR.

Note: The OCCURS DEPENDING ON clause will be commented out for all schema-owned records. Therefore, although the maximum length of variable storage will be reserved, only the correct amount of data will be transferred to variable storage at run time.

Since COBOL will doubleword align an 01 level record, the precompiler adds up to seven bytes, if necessary, to make the record length divisible by eight when copying in a schema-owned record to an 01 level.

RECORD

Copies the description of a record defined in the data dictionary. If the subschema's usage mode is LR, only copy in IDD work records.

rec-name

The name of the record to be copied. Either the primary name or a synonym for a record stored in the data dictionary.

Schema-owned records cannot be copied into non-IDMS programs (that is, programs that do not use a subschema and that do not access the database). However, a synonym defined for a schema-owned record *can* be copied into a non-IDMS program (use the VERSION clause to identify the synonym).

IDD records: If an operating mode is associated with *record-name* in the data dictionary, it must agree with the mode in effect for the program (see "ENVIRONMENT DIVISION" earlier in this chapter).

VERSION

Optionally qualifies IDD records (but not schema-owned records) with a version number.

If you do not specify a version number, the default is the highest version number defined in the data dictionary for the language and operating mode under which the program is being compiled.

When copying a record that is schema owned using a synonym name, a version clause is needed, even if the synonym is not schema owned. The only time the version clause may be left off when copying a record using a synonym name is when the record is IDD owned. Once a record becomes schema owned, version clauses are needed.

vers-num

An integer in the range 1 through 9999.

You cannot specify a version number for a *rec-name* specified in the subschema named in the DB *subschema-name* statement. The precompiler will automatically copy the correct version into the program.

REDEFINES

Copies a record description to an area previously defined by another record description. Two record descriptions can thus provide alternative definitions of the same storage location.

rec-name

The name of the record to be redefined.

TRANSACTION-STATISTICS

Copies the definition of the transaction statistics block (TSB) with a length of 560 bytes. This block can be used in the ACCEPT TRANSACTION STATISTICS or END TRANSACTION STATISTICS DML statements.

SUBSCHEMA-LR-DESCRIPTION

Copies all components required to access logical records (SUBSCHEMA-CTRL, SUBSCHEMA-LR-CTRL, SUBSCHEMA-LR-NAMES, and SUBSCHEMA-LR-RECORDS). Do not include SUBSCHEMA-LR-DESCRIPTION if the subschema's usage mode is DML.

SUBSCHEMA-LR-CONTROL

Copies the SUBSCHEMA-CTRL, SUBSCHEMA-LR-CTRL, and SUBSCHEMA-LR-NAMES components. Do not include SUBSCHEMA-LR-CONTROL if the subschema's usage mode is DML.

SUBSCHEMA-LR-CTRL

Copies the LRC block data description.

SIZE IS

Specifies the size of that portion of the LRC block that contains information about the logical-request request WHERE clause (PXE).

If included, this parameter should specify a size large enough to accommodate the most complex WHERE clause in the program. The default, 512, is large enough to include approximately 32 operators, operands, and literals.

Do not include SUBSCHEMA-LR-CTRL if the subschema's usage mode is DML.

lrc-block-size

A positive integer in the range 0 through 9999.

Calculate the size as follows:

- Multiply the greatest number of operands and operators that will be included in a single WHERE clause by 16 bytes
- Add the number of bytes, rounded up to the nearest multiple of 8, associated with the data field for each operand that is a keyword or a program variable or logical-record field named in the OF LR clause
- Add the length, rounded up to the nearest multiple of eight, of each operand that is a character literal
- Add 12 bytes for each operand that is a numeric literal
- Do not specify a block size if none of the logical-record requests issued by the program will include WHERE clauses.

SUBSCHEMA-LR-NAMES

Copies the literal name of the program's subschema and the literal names of all database areas that can be accessed through the subschema. Logical-record names are not copied into the program. Do not include SUBSCHEMA-LR-NAMES if the subschema's usage mode is DML.

SUBSCHEMA-LR-RECORDS

Copies the descriptions of all logical records defined in the subschema. All participating database records become 02-level group fields, permitting the program to reference as a group field that portion of a logical record that corresponds to a database record. Do not include SUBSCHEMA-LR-RECORDS if the subschema's usage mode is DML.

Note: The OCCURS DEPENDING ON clause will be commented out for all schema-owned records. Therefore, although the maximum length of variable storage will be reserved, only the correct amount of data will be transferred to variable storage at runtime.

When copying a schema-owned record to a level other than 01, the precompiler adds up to seven bytes, if necessary, to make the record length divisible by eight for doubleword alignment.

LR

Copies the description of an individual logical record contained in the subschema.

logical-record-name

The name of the logical record to copy.

REDEFINES

Copies a redefinition of the data contained in another logical record, a database record, or a non-IDMS record, while maintaining the same location in variable storage.

Do not include this statement if the subschema's usage mode is DML.

record-name

The name of the record to be redefined.

MAPS

Copies the map request block (MRB) and map records associated with all maps defined in the MAP SECTION.

MAP *map-name*

Copies the MRB and map records associated with the named map. The map version number defaults to the version specified for the map in the MAP SECTION.

MAP-CONTROLS

Copies the MRBs associated with all maps specified in the MAP SECTION.

MAP-CONTROL *map-name*

Copies the MRB for the named map. The map version number defaults to the version specified for the map in the MAP SECTION.

MAP-RECORDS

Copies the map records associated with all maps specified in the MAP SECTION.

Results of COPY IDMS Specifications

The following figure shows the code copied into the DATA DIVISION as a result of COPY IDMS specifications.

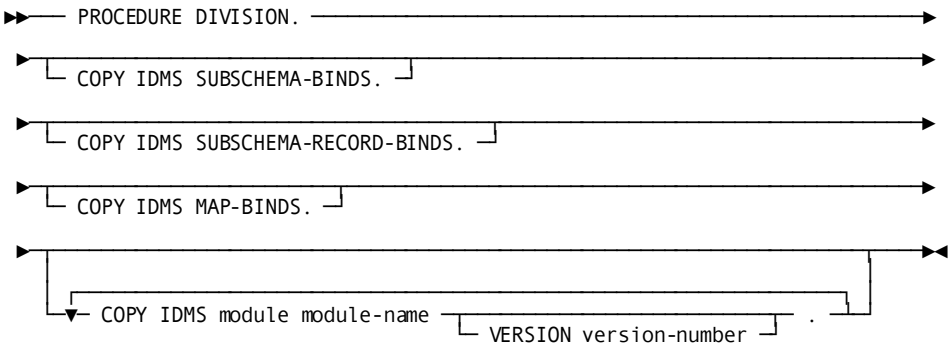
COPY IDMS statements coded in the DATA DIVISION	Source code components brought in from the data dictionary by the DML Cprocessor															
	SUBSCHEMA | CTRL	SUBSCHEMA | SSNAME	SUBSCHEMA | RECNAMES	SUBSCHEMA | SETNAMES	SUBSCHEMA | AREANAMES	SUBSCHEMA | RECORDS	record name	SUBSCHEMA | LR | CTRL	SUBSCHEMA | LR | NAMESD	SUBSCHEMA | LR | RECORDS	logical | record | name	All Map Request Blocksk	Named Map Request Bloc	All Map Records	map | name Map Records
SUBSCHEMA-DML-LR-DESCRIPTION	X	X	X	X	X	X										
SUBSCHEMA-DESCRIPTION	X	X	X	X	X	X		X		X						
SUBSCHEMA-CONTROL	X	X	X	X	X											
SUBSCHEMA-CTRL	X															
SUBSCHEMA-NAMES		X	X	X	X											
SUBSCHEMA-SSNAME		X														
SUBSCHEMA-RECNAMES			X													
SUBSCHEMA-SETNAMES				X												
SUBSCHEMA-AREANAMES					X											
SUBSCHEMA-RECORDS						X										
RECORDrecord-name							X									
SUBSCHEMA-LR-DESCRIPTION	X							X	X	X						
SUBSCHEMA-LR-CONTROL	X							X	X							
SUBSCHEMA-LR-CTRL								X								
SUBSCHEMA-LR-NAMES									X							
SUBSCHEMA-LR-RECORDS										X						
LRlogical-record-name											X					
MAPS												X		X		
MAP-CONTROLS												X				
MAPCONTROLmap-name													X			

MAPmap-name													X		X
MAP-RECORDS														X	

PROCEDURE DIVISION

The COPY IDMS statements in the PROCEDURE DIVISION allow inclusion into the source program of BIND statements for CA IDMS records and for procedure source statements defined as modules in the data dictionary by the DBA.

Syntax



Parameters

COPY IDMS SUBSCHEMA-BINDS

Initializes the PROGRAM-NAME field in the IDMS communications block and copies a standard BIND RUN-UNIT statement and appropriate standard BIND *record-name* commands for each CA IDMS record in the program's DATA DIVISION. COPY IDMS SUBSCHEMA-BINDS does not generate BIND RECORD statements for logical records, nor are any needed.

In cases where more than one copy of a given database record description (including synonyms) is present in the program, COPY IDMS SUBSCHEMA-BINDS will not automatically generate bind record statements. Individual bind record statements must be issued to bind the record to the correct location.

If IDMS-RECORDS MANUAL has been specified in the ENVIRONMENT DIVISION, the COPY IDMS SUBSCHEMA-BINDS statement generates BINDS only for subschema records explicitly copied into the DATA DIVISION by means of COPY IDMS statements; it does not automatically generate BINDS for all subschema records.

Do not use the COPY IDMS SUBSCHEMA-BINDS statement when binding several records to the same location. Instead, code DML BIND statements in the PROCEDURE DIVISION for each record (for more informails, see BIND RECORD (see page 124)).

Note: If AUTOSTATUS is in use, a PERFORM IDMS-STATUS occurs automatically after each BIND generated by a COPY IDMS SUBSCHEMA-BINDS statement. If AUTOSTATUS is not in use, you should explicitly code the BIND RUN-UNIT and BIND RECORD statements so that a PERFORM IDMS-STATUS can be coded after each BIND.

For more information about AUTOSTATUS, see Chapter 4: (see page 33).

COPY IDMS SUBSCHEMA-RECORD-BINDS

Copies appropriate standard BIND *record-name* commands for each CA IDMS record in the program's DATA DIVISION.

In cases where more than one copy of a given database record description (including synonyms) is present in the program, COPY IDMS SUBSCHEMA-RECORD-BINDS will not automatically generate bind record statements. Individual bind record statements must be issued to bind the record to the correct location.

If IDMS-RECORDS MANUAL has been specified in the ENVIRONMENT DIVISION, the COPY IDMS SUBSCHEMA-RECORD-BINDS statement generates BINDS only for subschema records explicitly copied into the DATA DIVISION by means of COPY IDMS statements; it does not automatically generate BINDS for all subschema records.

Do not use the COPY IDMS SUBSCHEMA-RECORD-BINDS statement when binding several records to the same location. Instead, code DML BIND statements in the PROCEDURE DIVISION for each record (for more information, see BIND RECORD (see page 124)).

Note: If AUTOSTATUS is in use, a PERFORM IDMS-STATUS occurs automatically after each BIND generated by a COPY IDMS SUBSCHEMA-BINDS statement. If AUTOSTATUS is not in use, you should explicitly code the BIND RUN-UNIT and BIND RECORD statements so that a PERFORM IDMS-STATUS can be coded after each BIND.

For more information about AUTOSTATUS, see Chapter 4: (see page 33).

COPY IDMS MAP-BINDS

Copies map- and map-record-specific BIND MAP statements for all maps in the program's MAP SECTION. For more information, see BIND MAP (see page 121).

COPY IDMS module

Copies source statements from a module stored in the data dictionary into the source program.

The unmodified module is placed into the program by the precompiler at the location of the request. The module can, but need not, contain DML statements. Any DML statements will be examined and expanded within the context of the program's subschema view and compile mode as if they were coded directly.

COPY IDMS MODULE statements *can* be nested (that is, code invoked by a COPY IDMS MODULE entry can itself contain a COPY IDMS MODULE statement). However, you must ensure that a copied module does not, in turn, copy itself.

module-name

The name of a module previously defined by the DBA by means of the IDD DDDL compiler.

The following standard modules are available for COBOL programs:

- IDMS-STATUS

Note: The IDMS-STATUS module must be copied into the program if an AUTOSTATUS protocol is in effect, as specified in the IDMS-CONTROL SECTION of the ENVIRONMENT DIVISION.

- IDMS-STATUS (BATCH-AUTOSTATUS)
- IDMS-STATUS (DC)
- IDMS-WAIT (DC)
- IDMS-WAIT (CICS)
- IDMS-WAIT (CICS STANDARD)
- IDMS-WAIT (CICS AUTOSTATUS)
- IDMS-WAIT (CICS STANDARD AUTOSTATUS)

VERSION

Optionally qualifies *module-name* with a version number.

If you do not specify a version number, the default is the highest version number defined in the data dictionary for the language mode under which the program is being compiled (for example, BATCH or IDMS-DC).

If no mode-specific version exists for *module-name*, the non-mode-specific version (if present) is copied. If neither a mode-specific entry nor a non-mode-specific entry for *module-name* has been established, an error results. The same rules apply to the module's language (that is, *version-number* defaults to the highest value defined in the data dictionary for the language in which the program is written).

version-number

An integer in the range 1 through 9999.

By default, if you do not specify a version number, the highest value defined in the data dictionary will be used.

Chapter 6: Data Manipulation Language Statements

This section contains the following topics:

About Data Manipulation Language (DML)

CA IDMS data manipulation language (DML) consists of statements that enable you to access the database management system (DBMS) and to request Logical Record Facility (LRF) and DC system services. The DML statements can be grouped into categories by function:

- **Control** statements:
  - Initiate and terminate processing
  - Effect recovery
  - Prevent concurrent retrieval and update of database records
  - Evaluate set conditions
- **Retrieval** statements locate records in the database and make them available to the application program.
- **Modification** statements add new records to the database and modify and delete existing records.
- **Accept** statements move special information such as database keys, storage addresses, and statistics from the DBMS to program variable storage.
- **Logical-record** statements retrieve, modify, store, and erase logical records.
- **Program management** statements:
  - Pass and return control from one program to another
  - Load and delete programs and tables
  - Define exit routines to be performed before an abnormal program termination (abend)
  - Force an abend condition
- **Storage management** statements allocate and release variable storage.
- **Task management** statements:
  - Initiate a new task
  - Change the dispatching priority of the issuing task
  - Enqueue and dequeue system resources
  - Signal that a task is to wait pending completion of an event
  - Post an event control block (ECB) indicating completion of an event

- **Time management** statements obtain the time and date, and define time-related events. These events include:
  - Placing the issuing task in a wait state for a specified duration of time
  - Posting a user-specified ECB after a specified interval
  - Initiating a new task after a specified interval
- **Scratch management** statements create, delete, or retrieve records from the scratch area.
- **Queue management** statements create, delete, or retrieve records from the queue area.
- **Terminal management** statements transfer data between the application program and the terminal.
- **Utility function** statements:
  - Request retrieval of task-related information
  - Request a memory dump of selected parts of storage
  - Retrieve and send a predefined message stored in the data dictionary
  - Send a specified message to one or more users or logical terminals
  - Collect, retrieve, and write CA IDMS statistics on a transaction basis
  - Establish longterm database locks and monitor access to database records used across tasks during a pseudo-conversational transaction
- **Recovery** statements perform functions relating to database, scratch, and queue area recovery in the event of a system failure. These functions:
  - Establish checkpoints in the journal file for database, scratch, and queue records used by the issuing task
  - Roll back user database, scratch, and queue areas to the last checkpoint established
  - Establish an end-of-task checkpoint and relinquish control of all database, scratch, and queue areas associated with the issuing task
  - Write user-defined records to the journal file

This section describes each DML statement that requests an CA IDMS database access or an online service. The DML statements are presented in two ways to help you understand their function in the CA IDMS environment. The following table presents the DML statements by function (for example, retrieval statements and program management statements). Statements that apply to the online environment only are marked with (o). Statements that apply to DC-BATCH only are marked with (dcb). Statements that apply to DC-BATCH or the online environment only are marked with (o,dcb). Following the table, each DML statement is presented in alphabetical order; function, syntax, syntax rules, examples, and associated error-status codes are described in detail. Run-time currency affected by DML statements that navigate the database is described where appropriate.

The WHERE and ON clauses, which are used with LRF DML statements, are described in detail at the end of this section.

Note: All DML operands are positional.

DML Statements Grouped by Function

Function	DML Statement
Control Statements	■ BIND RUN-UNIT—Signs on the application program to the DBMS ■ BIND TASK—Establishes a connection with the DC/UCF system from a batch program and allows certain online functions, such as writing to queues or printing to a printer controlled by the DC/UCF system (dcb) ■ BIND RECORD—Establishes addressability in variable storage for one or more records included in the program's subschema ■ BIND PROCEDURE—Establishes communication between the application program and a DBA-defined database procedure ■ READY—Prepares database areas for processing ■ FINISH—Commits changes made to the database through an individual run unit or through all database sessions associated with a task ■ IF—Evaluates the presence of records in a set or a record's membership status and specifies action based on the outcome ■ COMMIT—Commits changes made to the database through an individual run unit or through all database sessions associated with a task ■ ROLLBACK—Rolls back uncommitted changes made to the database through an individual run unit or through all database sessions associated with a task ■ KEEP CURRENT—Places an explicit shared or exclusive lock on a record that is current of run unit, record, set, or area

Function	DML Statement
Retrieval Statements	■ FIND/OBTAIN DB-KEY—Accesses a record using a db-key previously saved bythe program ■ FIND/OBTAIN CURRENT—Accesses a record using previously established currencies ■ FIND/OBTAIN WITHIN SET/AREA—Accesses a record based on its logical location within a set or its physical location within an area ■ FIND/OBTAIN OWNER—Accesses the owner record of a set occurrence ■ FIND/OBTAIN CALC/DUPLICATE—Accesses a record using its CALC-key value ■ FIND/OBTAIN USING SORT KEY—Accesses a record in a sorted set using its sort-key value ■ GET—Moves all data associated with a previously located record into program variable storage ■ RETURN—Retrieves the database key and symbolic key of an indexed record entry
Modification Statements	■ STORE—Adds a new record to the database ■ MODIFY—Changes the contents of an existing record ■ CONNECT—Links a record to a set ■ DISCONNECT—Removes a member record from a set ■ ERASE—Deletes a record from the database
Recovery Functions	■ COMMIT—Commits changes made to the database through an individual run unit orthrough all database sessions associated with a task ■ FINISH—Commits changes made to the database through an individual run unit or through all database sessions associated with a task ■ ROLLBACK—Rolls back uncommitted changes made to the database through an individual run unit or through all database sessions associated with a task

Function	DML Statement
Accept Statements	■ ACCEPT DB-KEY FROM CURRENCY—Saves the db-key of the current record of run unit, record type, set, or area ■ ACCEPT DB-KEY RELATIVE TO CURRENCY—Saves the db-key of the next, prior, or owner record relative to the current record of a set ■ ACCEPT IDMS STATISTICS—Returns system run-time statistics to the program ■ ACCEPT BIND RECORD—Returns a record's bind address to the program ■ ACCEPT PROCEDURE—Returns information from the application program information block associated with a database procedure to the program
Logical Record Facility	■ ERASE—Deletes a logical record ■ MODIFY—Modifies a logical record ■ OBTAIN—Accesses a logical record ■ STORE—Stores a logical record
Program Management	■ TRANSFER CONTROL (LINK)—Passes control to another program with the expectation of receiving it back (o) ■ TRANSFER CONTROL (XCTL)—Passes control to another program with no expectation of receiving it back (o) ■ DC RETURN—Returns control to the next higher level calling program (o) ■ LOAD TABLE—Loads a program or table into the CA IDMS system program pool (o) ■ DELETE TABLE—Signals that a program has finished using a program or a table in the program pool (o) ■ SET ABEND EXIT (STAE)—Establishes linkage to a program or routine that will receive control in the event of an abend (o) ■ ABEND—Abnormally terminates the issuing task (o)
Storage Management	■ GET STORAGE—Allocates variable storage from an CA IDMS system storage pool (o) ■ FREE STORAGE—Frees all or part of a block of variable storage (o)

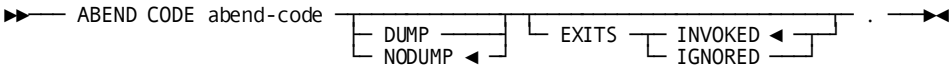
Function	DML Statement
Task Management	■ ATTACH—Attaches a new task within the CA IDMS system (o) ■ CHANGE PRIORITY—Changes the dispatching priority of the issuing task (o) ■ ENQUEUE—Acquires a resource or a list of resources (o) ■ DEQUEUE—Releases a resource (o) ■ WAIT—Relinquishes control to the CA IDMS system while awaiting completion of an event (o) ■ POST—Posts an event control block (ECB) (o)
Time Management	■ GET TIME—Obtains the time and date from the system ■ SET TIMER—Defines a time-delayed event (o)
Scratch Management	■ PUT SCRATCH—Stores a scratch record (o) ■ GET SCRATCH—Retrieves a scratch record (o) ■ DELETE SCRATCH—Deletes a scratch record (o)
Queue Management	■ PUT QUEUE—Stores a queue record (o,dcb) ■ GET QUEUE—Retrieves a queue record (o,dcb) ■ DELETE QUEUE—Deletes a queue record (o,dcb)
Terminal Management (Basic Mode)	■ READ TERMINAL—Requests a synchronous or asynchronous data transfer from the terminal to program variable storage (o) ■ WRITE TERMINAL—Requests a synchronous or asynchronous data transfer from program variable storage to the terminal buffer (o) ■ WRITE THEN READ TERMINAL—Requests a synchronous or asynchronous data transfer from program variable storage to the terminal buffer and, upon an operator signal, back to variable storage (o) ■ CHECK TERMINAL—Ensures that a previously issued asynchronous I/O operation is complete (o)
Terminal Management (Line Mode)	■ READ LINE FROM TERMINAL—Requests a synchronous data transfer from the terminal to the issuing program (o) ■ WRITE LINE TO TERMINAL—Requests a synchronous or asynchronous data transfer from the issuing program to the terminal (o) ■ END LINE TERMINAL SESSION—Terminates the current line I/O session (o) ■ WRITE PRINTER—Requests transmission of data from a task to a printer (o,dcb)

Function	DML Statement
Terminal Management (Mapping Mode)	■ BIND MAP—Identifies the location of the map request block (MRB) and initializes MRB fields (o) ■ MAP IN—Requests a transfer of data from the terminal to program variable storage (o) ■ MAP OUT—Requests a transfer of data from program variable storage to the terminal (o) ■ MAP OUTIN—Requests a transfer of data from program variable storage to the terminal and, upon an operator signal, back to variable storage (o) ■ INQUIRE MAP—Obtains information or tests conditions concerning the previous map operation (o) ■ MODIFY MAP—Requests modifications of mapping options for a map (o) ■ STARTPAGE—Begins a map paging session and specifies options for that session (o) ■ ENDPAGE—Terminates a map paging session (o)
Utility Functions	■ ACCEPT—Retrieves task-related information (o) ■ SNAP—Requests a memory dump of selected parts of storage (o) ■ SEND MESSAGE—Sends a message to a user, logical terminal, or list of users or logical terminals (o) ■ BIND TRANSACTION STATISTICS—Defines the beginning of a transaction for the purpose of collecting transaction statistics (o) ■ ACCEPT TRANSACTION STATISTICS—Returns the contents of the transaction statistics block (TSB) to program variable storage (o) ■ END TRANSACTION STATISTICS—Defines the end of a transaction (o) ■ KEEP LONGTERM—Either modifies a prior KEEP LONGTERM request, or enables database longterm locks or database monitoring for records, sets, or areas ■ WRITE JOURNAL—Writes user-defined records to the journal file ■ WRITE LOG—Retrieves a message from the data dictionary and sends it to a predefined destination (o)

ABEND

The ABEND statement terminates the issuing task abnormally. It also invokes or ignores previously established abend exits and writes a task dump to the log file. After completion of the ABEND function, processing control is returned to the CA IDMS program-control module.

Syntax



Parameters

CODE

Specifies a four-character user-defined abend code.

abend-code

Either the symbolic name of a variable-storage field that contains the abend code or the code itself enclosed in quotation marks.

Note: Because the specified abend code appears in the system log and is displayed at the task's terminal, you should not use CA IDMS system abend codes.

DUMP/NODUMP

Specifies whether to write a formatted task dump to the log file. The default is NODUMP.

EXITS INVOKED/IGNORED

Specifies whether to invoke or ignore abend routines established by SET ABEND EXIT (STAE) requests. The default is INVOKED.

Example

The following example specifies an abend request that terminates the issuing task abnormally and requests CA IDMS to write a task dump to the log file and to ignore any abend exits:

```
ABEND CODE 'U876'
  DUMP
  EXITS IGNORED.
```

Status Codes

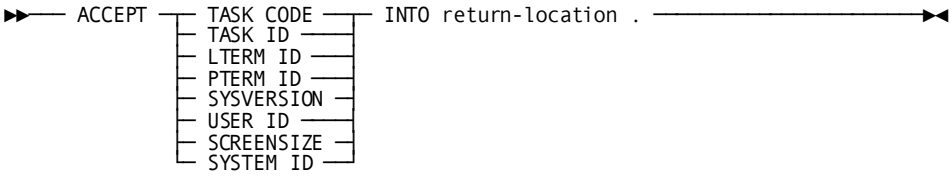
Because control is passed to the CA IDMS program-control module, there is no need for the program to check the ERROR-STATUS field.

ACCEPT

The ACCEPT statement retrieves the following task-related information:

- Current task code
- Task identifier
- Logical terminal identifier
- Physical terminal identifier
- CA IDMS system version
- User identifier (the ID of the user signed on to the task's logical terminal)
- Physical terminal screen dimensions
- System ID

Syntax



Parameters

ACCEPT

Retrieves the specified information.

TASK CODE

Retrieves the 1 through 8 character code used to invoke the current task.

TASK ID

Retrieves the task identifier assigned by CA IDMS. The task identifier is a unique sequence number stored in a PIC S9(8) COMP SYNC (fullword) field. At system startup, the identifier is set to zero; each time a task is executed, the ID is incremented by one.

LTERM ID

Retrieves the 1 through 8 character identifier of the logical terminal associated with the current task. If the current task is not associated with a terminal, a null value of all spaces is returned.

PTERM ID

Retrieves the 1 through 8 character identifier of the physical terminal associated with the current task. If the current task is not associated with a terminal, a null value of all spaces is returned.

SYSVERSION

Retrieves the version of the current CA IDMS system. The version number is an integer in the range 0 through 9999 stored in a PIC S9(4) COMP (halfword) field.

USER ID

Retrieves the 32-character identifier of the user signed on to the logical terminal associated with the current task. If no user is signed on, a null value of all spaces is returned.

SYSTEM ID

Specifies the 8 character name (nodename) by which the DC/UCF system is known to other nodes in the DC/UCF communications network.

SCREENSIZE

Retrieves the screen dimensions of the physical terminal associated with the current task. The screen size is returned to a field that is divided into two PIC S9(4) COMP (halfword) fields. The first halfword contains the row, the second halfword contains the column. For example, a 24-line by 80-character screen is represented by a value of 24 in the first halfword and 80 in the second halfword. If the current task is not associated with a terminal, a null value of zero is returned.

INTO

Specifies the location to which CA IDMS returns the requested task-related information.

return-location

The symbolic name of a user-defined field; the picture and usage of this field must be compatible with the picture and usage of the requested data.

Example

The following example illustrates ACCEPT statements that retrieve the ID of the current task and the ID of the user signed on to the logical terminal associated with that task:

```
ACCEPT TASK ID INTO TASK-ID.
ACCEPT USER ID INTO USER-ID.
```

Status Codes

After completion of the ACCEPT function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4829	An invalid parameter has been passed from the program

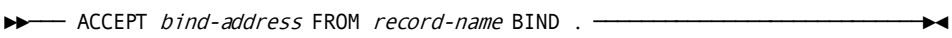
ACCEPT BIND ADDRESS

The ACCEPT BIND ADDRESS statement moves the bind address of a record to a specified location in program variable storage. This statement is typically requested by a subprogram that requires the address of a record in order to access it.

Currency

The ACCEPT BIND ADDRESS statement updates no currencies and requires no currencies to be set relative to the specified record.

Syntax



Parameters

bind-address

A PIC S9(8) COMP SYNC (fullword) field, containing the location into which the bind address of the specified record will be copied.

FROM ... BIND

Specifies the record whose bind address will be copied into the specified location in variable storage.

record-name

The name of a record previously bound by the run unit.

Example

The following statement moves the bind address for an EMPLOYEE record to a location identified as REG1 in the requesting subprogram:

```
ACCEPT REG1 FROM EMPLOYEE BIND.
```

Status Codes

After completion of the ACCEPT BIND ADDRESS function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1508	The named record is not in the specified subschema

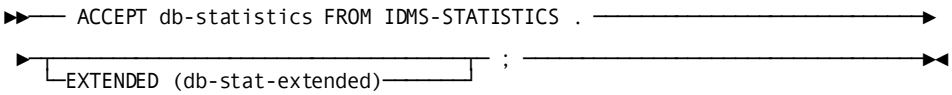
ACCEPT DATABASE STATISTICS

The ACCEPT DATABASE STATISTICS statement copies system runtime statistics located in the program's IDMS statistics block to program variable storage. This statement can be issued any number of times during the execution of a run unit. For example, you might request database statistics after storing a variable-length record to determine whether the entire record was stored in one place or if fragments were placed in an overflow area.

The ACCEPT DATABASE STATISTICS statement does not reset any of the statistics fields to zero; resetting of IDMS statistics block fields occurs only upon issuing a FINISH command.

The ACCEPT DATABASE STATISTICS statement is used in both the navigational and the non-navigational environments.

Syntax



Parameters

db-statistics

The name of a fullword-aligned 100-byte field in program variable storage.

The data copied from IDMS-STATISTICS to *db-statistics* is formatted as follows:

```
01 DB-STATISTICS
 03 DATE-TODAY                PIC X(8).
 03 TIME-TODAY                PIC X(8).
 03 PAGES-READ                PIC S9(8)  COMP.
 03 PAGES-WRITTEN             PIC S9(8)  COMP.
 03 PAGES-REQUESTED           PIC S9(8)  COMP.
 03 CALC-TARGET               PIC S9(8)  COMP.
 03 CALC-OVERFLOW             PIC S9(8)  COMP.
 03 VIA-TARGET                PIC S9(8)  COMP.
 03 VIA-OVERFLOW              PIC S9(8)  COMP.
 03 LINES-REQUESTED           PIC S9(8)  COMP.
 03 RECS-CURRENT              PIC S9(8)  COMP.
 03 CALLS-TO-IDMS             PIC S9(8)  COMP.
 03 FRAGMENTS-STORED          PIC S9(8)  COMP.
 03 RECS-RELOCATED            PIC S9(8)  COMP.
 *03 LOCKS-REQUESTED          PIC S9(8)  COMP.
```

```
 *03 SEL-LOCKS-HELD              PIC S9(8)  COMP.
 *03 UPD-LOCKS-HELD              PIC S9(8)  COMP.
 *03 RUN-UNIT-ID                 PIC S9(8)  COMP.
 *03 TASK-ID                     PIC S9(8)  COMP.
 *03 LOCAL-ID                    PIC X(8).
 03 FILLER                       PIC X(8).

 *Applies to the central version only
```

The LOCAL-ID field consists of the four-byte identifier of the interface in which the run unit originated (for example, BATC, DBDC, or CICS) and a unique identifier (fullword) assigned to the run unit by that interface. For batch and CMS run units, this identifier specifies the internal machine time. For CICS run units, this identifier specifies the CICS transaction number assigned to the run unit.

To display the originating interface identifier and the run-unit identifier for a program, the LOCAL-ID field can be moved to a work field:

```
01  WORK-LOCAL-ID.
 02 WORK-LOCAL-ORIGIN   PIC X(4).
 02 WORK-LOCAL-NUMBER   PIC S9(8)  COMP.
```

Alternatively, the DB-STATISTICS record from the data dictionary can be modified by your DBA to define two subordinate fields for the LOCAL-ID field. The DB-STATISTICS record describes the IDMS statistics block. To use this record, code the following statement in program variable storage:

```
01 COPY IDMS DB-STATISTICS.
```

db-stat-extended

The name of a fullword-aligned 100-byte field in program variable storage The data copied from IDMS-STATISTICS to *db-stat-extended* is formatted as as follows:

```
01 DB-STAT-EXTENDED
 03 SR8-SPLITS              PIC    S9(8) COMP.
 03 SR8-SPAWNS              PIC    S9(8) COMP.
 03 SR8-STORES              PIC    S9(8) COMP
 03 SR8-ERASES              PIC    S9(8) COMP.
 03 SR7-STORES              PIC    S9(8) COMP
 03 SR7-ERASES              PIC    S9(8) COMP.
 03 BINARY-SEARCHES-TOTAL   PIC    S9(8) COMP.
 03 LEVELS-SEARCHED-TOTAL   PIC    S9(8) COMP.
 03 ORPHANS-ADOPTED         PIC    S9(8) COMP.
 03 LEVELS-SEARCHED-BEST    PIC    S9(4) COMP.
 03 LEVELS-SEARCHED-WORST   PIC    S9(4) COMP.
 03 FILLER                  PIC    X(60).
```

This record layout can be copied from the data dictionary. Code the following statement in program variable storage:

```
01 INCLUDE IDMS (DB_STAT_EXTENDED).
```

Note: For more information about the CA IDMS statistics blocks, see the *CA IDMS Database Administration Guide*.

Example

The following statements establish currency for the sets in which a new EXPERTISE record will participate as a member, store the EXPERTISE record, and move statistics regarding the stored EXPERTISE record to the DB-STATISTICS location in main storage:

```
MOVE EMP-ID-IN TO EMP-ID-0415.
FIND CALC EMPLOYEE.
MOVE SKILL-ID-IN TO SKILL-ID-0455.
FIND CALC SKILL.
STORE EXPERTISE.
ACCEPT DB-STATISTICS FROM IDMS-STATISTICS.
```

Status Codes

After completion of the ACCEPT DATABASE STATISTICS function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1518	The database statistics location has not been bound properly

ACCEPT DB-KEY FROM CURRENCY

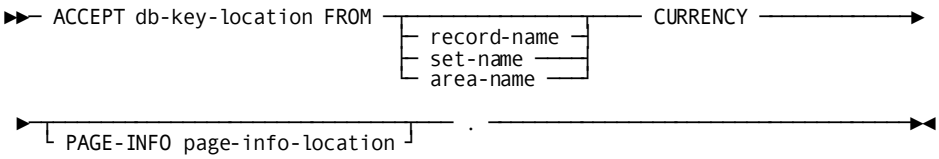
The ACCEPT DB-KEY FROM CURRENCY statement moves the db-key of the current record of run unit, record type, set, or area to a specified location in program variable storage. Records whose db-keys are saved in this manner are available for subsequent direct access by using a FIND/OBTAIN DB-KEY statement.

Note: You must establish currency before using this statement. If no currency has been established, the DBMS returns 0000 to the ERROR-STATUS field and -1 to the *db-key* field.

Currency

ACCEPT DB-KEY FROM CURRENCY does not update any currencies.

Syntax



Parameters

db-key-location

A PIC S9(8) COMP SYNC (fullword) field. Identifies the location in variable storage that will contain the db-key of the specified record.

FROM CURRENCY

Specifies the record whose db-key will be placed in the specified location. By default, if you omit a record, set, or area qualifier, the db-key of the record that is current of the run unit is saved.

record-name Saves the db-key of the record that is current of the specified record type.

set-name Saves the db-key of the record that is current of the specified set.

area-name Saves the db-key of the record that is current of the specified area.

PAGE-INFO

Indicates that the page-info of the specified record is collected and recorded into page-info-location.

page-info-location

Identifies the location in variable storage that contains the page-info of the requested record. This field is a PIC S9(8) COMP SYNC (fullword) field.

Example

The following statements establish a DEPARTMENT record as current of run unit and save its db-key in location SAVE-DB-KEY:

```
MOVE '8683' TO DEPT-ID-0410.
FIND CALC DEPARTMENT.
ACCEPT SAVE-DB-KEY FROM CURRENCY.
```

Note: The same results can be accomplished using the following COBOL MOVE statement:

```
MOVE DB-KEY TO SAVE-DB-KEY.
```

Status Codes

After completion of the ACCEPT DB-KEY FROM CURRENCY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
1503	The dbkey that is the object of an ACCEPT has been invalidated. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to retrieve a dbkey and a currency has been invalidated because of changes made by another database session that is sharing the same transaction.
1508	The named record or set is not in the subschema. The program has probably invoked the wrong subschema.
1523	The named area is not in the subschema.

ACCEPT DB-KEY RELATIVE TO CURRENCY

The ACCEPT DB-KEY RELATIVE TO CURRENCY statement moves a selected db-key to a specified location in program variable storage. The db-key moved to variable storage can be the db-key of the next, prior, or owner record relative to the current record of set.

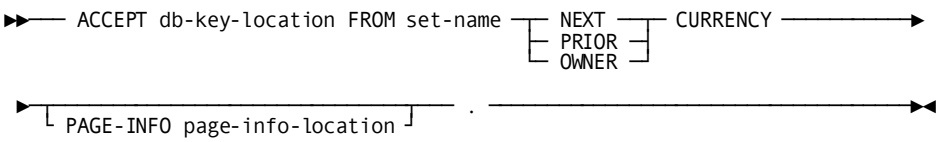
This version of the ACCEPT statement allows you to save the db-key of a record within a set without actually having to access the record. Records whose db-keys are saved in this manner are available for subsequent direct access by using a FIND/OBTAIN DB-KEY statement.

Note: You must establish currency before using this statement. If no set currency has been established, the DBMS returns 0000 to the ERROR-STATUS field and -1 to the *db-key-location* field.

Currency

ACCEPT DB-KEY RELATIVE TO CURRENCY does not update any currencies.

Syntax



Parameters

db-key-location

A PIC S9(8) COMP SYNC (fullword) field. Identifies the location in variable storage that will contain the db-key of the requested record.

FROM .. CURRENCY

Identifies the record whose db-key will be moved into the specified location.

set-name The name of a set included in the subschema. **Native VSAM users:**. NEXT/PRIOR/OWNER CURRENCY cannot be requested for sets defined for native VSAM records.

NEXT

Saves the db-key of the next record relative to the record that is current of the specified set. NEXT CURRENCY cannot be requested unless the specified set has prior pointers; prior pointers ensure that the next pointer in the prefix of the current record does not point to a logically deleted record.

PRIOR

Saves the db-key of the prior record relative to the record that is current of the specified set. PRIOR CURRENCY cannot be requested unless the specified set has prior pointers.

Note: No indication of an end-of-set condition is possible for an ACCEPT NEXT or PRIOR. A retrieval command must be issued to determine whether the next or prior record in the set occurrence is the owner record.

OWNER

Saves the db-key of the owner of the record that is current of the specified set. A request for OWNER CURRENCY cannot be executed unless the specified set has owner pointers. However, if the current record of the named set is the owner record occurrence, requests for OWNER CURRENCY return the db-key of the record itself, even if this set does not have owner pointers.

Note: When a record declared as an optional or manual member of a set is accessed, it is *not* established as current of set if it is not currently connected to an occurrence of the specified set. A subsequent attempt to access the owner record will locate instead the owner of the current record of set. In such cases, determine whether the retrieved record is actually a set member before executing the ACCEPT DB-KEY FROM OWNER CURRENCY statement. The IF statement, explained later in this chapter, can be used for this purpose.

PAGE-INFO

Indicates that the page-info of the specified record is collected and recorded into page-info-location.

page-info-location

Identifies the location in variable storage that contains the page-info of the requested record. This field is a PIC S9(8) COMP SYNC (fullword) field.

Example

The following statements access the EMP-EXPERTISE set and save the db-key of the owner record of the SKILL-EXPERTISE set:

```
MOVE '0119' TO EMP-ID-0415.
FIND CALC EMPLOYEE.
FIND FIRST WITHIN EMP-EXPERTISE.
ACCEPT SAVE-DB-KEY FROM SKILL-EXPERTISE OWNER CURRENCY.
```

Status Codes

After completion of the ACCEPT DB-KEY RELATIVE TO CURRENCY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
1503	The dbkey that is the object of an ACCEPT has been invalidated. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to retrieve a dbkey and a currency has been invalidated because of changes made by another database session that is sharing the same transaction.
1508	The named set is not in the subschema. The program has probably invoked the wrong subschema.

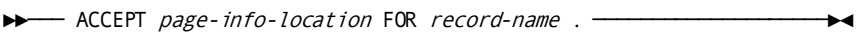
ACCEPT page-info-location

The ACCEPT page-info-location statement moves the page information for a given record to a specified location in program variable storage. Page information that is saved in this manner is available for subsequent direct access by using a FIND/OBTAIN DB-KEY statement.

The dbkey radix portion of the page information can be used in interpreting a dbkey for display purposes and in formatting a dbkey from page and line numbers. The dbkey radix represents the number of bits within a dbkey value that are reserved for the line number of a record. By default, this value is 8, meaning that up to 255 records can be stored on a single page of the area. Given a dbkey, you can separate its associated page number by dividing the dbkey by 2 raised to the power of the dbkey radix. For example, if the dbkey radix is 4, you would divide the dbkey value by 2**4. The resulting value is the page number of the dbkey. To separate the line number, you would multiply the page number by 2 raised to the power of the dbkey radix and subtract this value from the dbkey value. The result would be the line number of the dbkey. The following two formulas can be used to calculate the page and line numbers from a dbkey value:

- Page-number = dbkey value / (2 ** dbkey radix)
- Line-number = dbkey value - (page-number * (2 ** dbkey radix))

Syntax



Parameters

ACCEPT

Retrieves the specified information.

page-info-location Specifies a four-byte field that may be defined either as a group field or as a fullword field (PIC S9(8) COMP). Identifies the location in variable storage that contains page information for the specified record. Upon successful completion of this statement, the first two bytes of the field contain the page group number and the last two bytes contain a value that may be used for interpreting dbkeys.

FOR

Specifies the record whose page information will be placed in the specified location.

record-name

Specifies the record whose page information will be placed in the specified location.

Example

The following example retrieves the page information for the DEPARTMENT record and uses the dbkey format information to transform a page number into a dbkey.

```
01 W-PG-INFO.
  02 W-GRP-NUM    PIC S9(4) COMP.
  02 W-DBK-FORMAT  PIC 9(4) COMP.
```

```
  ACCEPT W_PG_INFO FOR DEPARTMENT.
  MOVE W-PAGE TO W-DBKEY.
  PERFORM ADJUST-PAGE W-DBK-FORMAT TIMES.

ADJUST-PAGE SECTION.
  MULTIPLY W-DBKEY BY 2.}
```

Status Codes

After completion of the ACCEPT page-info-location function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

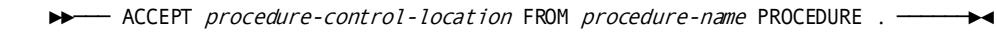
Status code	Meaning
0000	The request has been serviced successfully.
1508	The named record is not in the subschema. The program probably invoked the wrong subschema.

ACCEPT PROCEDURE CONTROL LOCATION

The ACCEPT PROCEDURE CONTROL LOCATION statement copies the 256-byte application program information block associated with a previously defined database procedure to a specified location in program variable storage. A BIND PROCEDURE statement (explained later in this chapter) previously placed information into this block; this information may have been subsequently updated by the procedure.

The ACCEPT PROCEDURE CONTROL LOCATION statement should be used only by programs running under, but in a different partition from, the central version.

Syntax



Parameters

procedure-control-location

The fullword-aligned 256-byte location in variable storage to which the application program information block is to be copied.

FROM *procedure-name* PROCEDURE

The name of the database procedure whose application program information block is to be copied into variable storage. *Procedure-name* must refer to an eight-character field in variable storage.

Example

The following statement copies the application program information block used by the CHECKALL procedure to the location identified as CHECK-IT in main storage:

```
ACCEPT CHECK-IT FROM CHECKALL PROCEDURE.
```

Status Codes

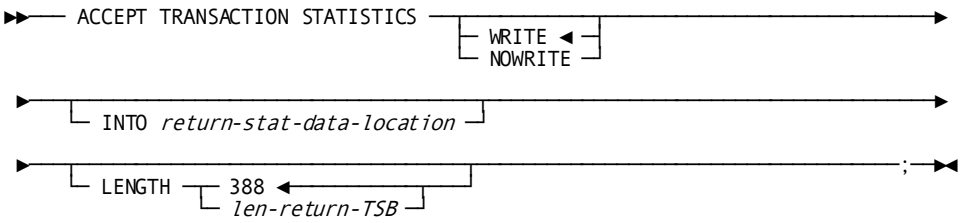
After completion of the ACCEPT PROCEDURE CONTROL LOCATION function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1508	The named procedure is not in the specified subschema
1518	The procedure control location has not been bound properly

ACCEPT TRANSACTION STATISTICS

The ACCEPT TRANSACTION STATISTICS statement copies the contents of the transaction statistics block (TSB) to a location in program variable storage. Optionally, the statement can also write the TSB to the DC system log file and you can define the length of the TSB.

Syntax



Parameters

WRITE/NOWRITE

Specifies whether the TSB is written to the DC system log file.

Default: WRITE

INTO

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION data area into which to return the TSB.

return-stat-data-location

A fullword-aligned 388-byte field (you can customize the length using the LENGTH parameter).

The data copied from the TSB to *return-stat-data-location* is formatted as follows:

```
01 STATISTICS-BLOCK.
  03 SYS-INTERN1     PIC X(8)     SYSTEM INTERNAL USE ONLY
  03 PROG-CALL       PIC S9(8) COMP  # OF PROGRAMS CALLED
  03 PROG-LOAD       PIC S9(8) COMP  # OF PROGRAMS LOADED
  03 TERM-READ       PIC S9(8) COMP  # OF TERMINAL READS
  03 TERM-WRITE      PIC S9(8) COMP  # OF TERMINAL WRITES
  03 TERM-ERROR      PIC S9(8) COMP  # OF TERMINAL ERRORS
  03 STORAGE-GET     PIC S9(8) COMP  # OF STORAGE GETS
  03 SCRATCH-GET     PIC S9(8) COMP  # OF SCRATCH GETS
  03 SCRATCH-PUT     PIC S9(8) COMP  # OF SCRATCH PUTS
  03 SCRATCH-DEL     PIC S9(8) COMP  # OF SCRATCH DELETES
  03 QUEUE-GET       PIC S9(8) COMP  # OF QUEUE GETS
  03 QUEUE-PUT       PIC S9(8) COMP  # OF QUEUE PUTS
  03 QUEUE-DEL       PIC S9(8) COMP  # OF QUEUE DELETES
  03 GET-TIME        PIC S9(8) COMP  # OF GET TIMES
  03 SET-TIME        PIC S9(8) COMP  # OF SET TIMES
  03 DB-SRVREQ       PIC S9(8) COMP  # OF DB SERVICE REQUESTS
  03 MAX-STACK       PIC S9(8) COMP  MAX WORDS USED IN STACK
  03 USER-TIME       PIC S9(8) COMP  USER MODE TIME (10**-4 SEC)
  03 SYS-TIME        PIC S9(8) COMP  SYS MODE TIME (10**-4 SEC)
  03 WAIT-TIME       PIC S9(8) COMP  WAIT TIME (10** -4 SEC)
  03 MAX-RCE-USED    PIC S9(8) COMP  MAXIMUM NUMBER OF RCES USED
  03 MAX-RLE-USED    PIC S9(8) COMP  MAXIMUM NUMBER OF RLES USED
  03 MAX-DPE-USED    PIC S9(8) COMP  MAXIMUM NUMBER OF DPES USED
  03 STG-HI-MARK     PIC S9(8) COMP  STORAGE HIGH WATER MARK
  03 FREESTG-REQ     PIC S9(8) COMP  # OF FREE STORAGE REQUESTS
  03 SYS-SERV        PIC S9(8) COMP  # OF SYSTEM SERVICE REQUEST
  03 SYS-INTERN2     PIC X(8)     SYSTEM INTERNAL USE ONLY
  03 PAGES-READ      PIC S9(8) COMP  # OF PAGES READ
  03 PAGES-WRIT      PIC S9(8) COMP  # OF PAGES WRITTEN
  03 PAGES-REQ       PIC S9(8) COMP  # OF PAGES REQUESTED
  03 CALC-NO         PIC S9(8) COMP  # OF CALC RECS NO OFLOW
  03 CALC-OF         PIC S9(8) COMP  # OF CALC RECS OFLOW
  03 VIA-NO          PIC S9(8) COMP  # OF VIA RECS NO OFLOW
  03 VIA-OF          PIC S9(8) COMP  # OF VIA RECS OFLOW
  03 RECS-REQ        PIC S9(8) COMP  # OF RECS REQUESTED
  03 RECS-CURR       PIC S9(8) COMP  # OF RECS CURR OF RU
  03 DB-CALLS        PIC S9(8) COMP  # OF DBMS CALLS
```

```
03 FRAG-STORED    PIC S9(8) COMP  # OF FRAGMENTS STORED
03 RECS-RELO      PIC S9(8) COMP  # OF RECS RELOCATED
03 TOT-LOCKS      PIC S9(8) COMP  TOTAL # OF LOCKS ACQUIRED
03 SHR-LOCKS      PIC S9(8) COMP  # OF SHARE LOCKS HELD
03 NSH-LOCKS      PIC S9(8) COMP  # OF NON-SHARE LOCKS HELD
03 LOCKS-FREED    PIC S9(8) COMP  # OF LOCKS FREED
03 SR8-SPLITS     PIC S9(8) COMP  # OF SR8 SPLITS
03 SR8-SPAWN      PIC S9(8) COMP  # OF SR8 SPAWNS
03 SR8-STORE      PIC S9(8) COMP  # OF SR8S STORED
03 SR8-ERASE      PIC S9(8) COMP  # OF SR8S ERASED
03 SR7-STORE      PIC S9(8) COMP  # OF SR7S STORED
03 SR7-ERASE      PIC S9(8) COMP  # OF SR7S ERASED
03 BTREE-SRCH     PIC S9(8) COMP  # OF BTREE SEARCHES
03 BTREE-LEVEL    PIC S9(8) COMP  # OF BTREE LEVELS SEARCHED
03 ORPHANS        PIC S9(8) COMP  # OF ORPHANS ADAPTED
03 BTREE-LEV-B    PIC S9(4) COMP  # OF LVLS SRCH'D (BEST CASE)
03 BTREE-LEV-W    PIC S9(4) COMP  # OF LVLS SRCH'D (WORST CASE)
03 RECS-UPD       PIC S9(8) COMP  # OF RECS UPDATED
03 PAGE-INCACHE   PIC S9(8) COMP  # OF PAGES FOUND IN CACHE
03 PAGE-INPREFET  PIC S9(8) COMP  # OF PAGES FOUND IN PREFETCH
03 RESERVED       PIC X(8)     RESERVED FOR FUTURE USE
03 SYS-INTERN3    PIC X(8)     SYSTEM INTERNAL USE ONLY
03 USER-ID        PIC X(32)    DC USER ID
03 LTERM-ID       PIC X(8)     LOGICAL TERMINAL ID
03 USER-SUPP-ID   PIC X(8)     USER-SUPPLIED ID
03 BIND-DATE      PIC S9(7) COMP-3 DATE BIND COMMAND ISSUED
03 BIND-TIME      PIC S9(8) COMP  TIME BIND COMMAND ISSUED
03 TRANSTAT-FLGS  PIC S9(8) COMP  FOUR 1-BYTE FLAGS
03 SYS-INTERN4    PIC X(8)     SYSTEM INTERNAL USE ONLY
03 SQL-COMMANDS   PIC S9(8) COMP  # OF SQL COMMANDS EXECUTED
03 SQL-FETCH      PIC S9(8) COMP  # OF ROWS FETCHED
03 SQL-INSERT     PIC S9(8) COMP  # OF ROWS INSERTED
03 SQL-UPDATE     PIC S9(8) COMP  # OF ROWS UPDATED
03 SQL-DELETE     PIC S9(8) COMP  # OF ROWS DELETED
03 SQL-SORTS      PIC S9(8) COMP  # OF SORTS PERFORMED
03 SQL-ROWSORT    PIC S9(8) COMP  # OF ROWS SORTED
03 SQL-MINRSORT   PIC S9(8) COMP  MINIMUM ROWS SORTED
03 SQL-MAXRSORT          PIC S9(8) COMP  MAXIMUM ROWS SORTED
03 SQL-AMCMPL     PIC S9(8) COMP  # OF AM RECOMPILES
03 SQL-RESERVED          PIC X(32)    RESERVED FOR FUTURE USE
```

If you extend the length to 560 bytes, the full TRANSACTION-STATISTICS are also included. The following block can be expanded using the COPY IDMS TRANSACTION-STATISTICS statement:

```
01  TRANSACTION-STATISTICS.
     03  TSB-STATS-R18          PIC X(560).
     03  TSB-STATS-R17          REDEFINES TSB-STATS-R18.
      04  TSB-DC-STATS          PIC X(108).
      04  TSB-DC-STATS1         REDEFINES TSB-DC-STATS.
       05  SYS-INTERN1          PIC X(8).
       05  PROG-CALL            PIC S9(8) COMP.
       05  PROG-LOAD            PIC S9(8) COMP.
       05  TERM-READ            PIC S9(8) COMP.
       05  TERM-WRITE           PIC S9(8) COMP.
       05  TERM-ERROR           PIC S9(8) COMP.
       05  STORAGE-GET          PIC S9(8) COMP.
       05  SCRATCH-GET          PIC S9(8) COMP.
       05  SCRATCH-PUT          PIC S9(8) COMP.
       05  SCRATCH-DEL          PIC S9(8) COMP.
       05  QUEUE-GET            PIC S9(8) COMP.
       05  QUEUE-PUT            PIC S9(8) COMP.
       05  QUEUE-DEL            PIC S9(8) COMP.
       05  GET-TIME             PIC S9(8) COMP.
       05  SET-TIME             PIC S9(8) COMP.
       05  DB-SRVREQ            PIC S9(8) COMP.
       05  MAX-STACK            PIC S9(8) COMP.
       05  USER-TIME            PIC S9(8) COMP.
       05  SYS-TIME             PIC S9(8) COMP.
       05  WAIT-TIME            PIC S9(8) COMP.
       05  MAX-RCE-USED         PIC S9(8) COMP.
       05  MAX-RLE-USED         PIC S9(8) COMP.
       05  MAX-DPE-USED         PIC S9(8) COMP.
       05  STG-HI-MARK          PIC S9(8) COMP.
       05  FREESTG-REQ          PIC S9(8) COMP.
       05  SYS-SERV             PIC S9(8) COMP.
      04  TSB-DB-STATS          PIC X(72).
      04  TSB-DB-STATS1         REDEFINES TSB-DB-STATS.
       05  SYS-INTERN2          PIC X(8).
       05  PAGES-READ           PIC S9(8) COMP.
       05  PAGES-WRIT           PIC S9(8) COMP.
       05  PAGES-REQ            PIC S9(8) COMP.
       05  CALC-NO              PIC S9(8) COMP.
       05  CALC-OF              PIC S9(8) COMP.
       05  VIA-NO               PIC S9(8) COMP.
       05  VIA-OF               PIC S9(8) COMP.
       05  RECS-REQ             PIC S9(8) COMP.
```

```
 05  RECS-CURR            PIC S9(8) COMP.
 05  DB-CALLS             PIC S9(8) COMP.
 05  FRAG-STORED          PIC S9(8) COMP.
 05  RECS-RELO            PIC S9(8) COMP.
 05  TOT-LOCKS            PIC S9(8) COMP.
 05  SHR-LOCKS            PIC S9(8) COMP.
 05  NSH-LOCKS            PIC S9(8) COMP.
 05  LOCKS-FREED          PIC S9(8) COMP.
04  TSB-IX-STATS          PIC X(40).
04  TSB-IX-STATS1         REDEFINES TSB-IX-STATS.
 05  SR8-SPLITS           PIC S9(8) COMP.
 05  SR8-SPAWN            PIC S9(8) COMP.
 05  SR8-STORE            PIC S9(8) COMP.
 05  SR8-ERASE            PIC S9(8) COMP.
 05  SR7-STORE            PIC S9(8) COMP.
 05  SR7-ERASE            PIC S9(8) COMP.
 05  BTREE-SRCH           PIC S9(8) COMP.
 05  BTREE-LEVEL          PIC S9(8) COMP.
 05  ORPHANS              PIC S9(8) COMP.
 05  BTREE-LEV-B          PIC S9(4) COMP.
 05  BTREE-LEV-W          PIC S9(4) COMP.
04  TSB-DB-STATS-EXTENDED PIC X(20).
04  TSB-DB-STATS-EXTENDED1
                          REDEFINES TSB-DB-STATS-EXTENDED.
 05  RECS-UPD             PIC S9(8) COMP.
 05  PAGE-INCACHE         PIC S9(8) COMP.
 05  PAGE-INPREFET        PIC S9(8) COMP.
 05  RESERVED             PIC X(8).
04  TSB-HDR               PIC X(68).
04  TSB-HDR1              REDEFINES TSB-HDR.
 05  SYS-INTERN3          PIC X(8).
 05  USER-ID              PIC X(32).
 05  LTERM-ID             PIC X(8).
 05  USER-SUPP-ID         PIC X(8).
 05  BIND-DATE            PIC S9(7) COMP-3.
 05  BIND-TIME            PIC S9(8) COMP.
 05  TRANSTAT-FLGS        PIC S9(8) COMP.
04  TSB-SQL-STATS         PIC X(80).
04  TSB-SQL-STATS1        REDEFINES TSB-SQL-STATS.
```

```
 05  SYS-INTERN4          PIC X(8).
 05  SQL-COMMANDS         PIC S9(8) COMP.
 05  SQL-FETCH            PIC S9(8) COMP.
 05  SQL-INSERT           PIC S9(8) COMP.
 05  SQL-UPDATE           PIC S9(8) COMP.
 05  SQL-DELETE           PIC S9(8) COMP.
 05  SQL-SORTS            PIC S9(8) COMP.
 05  SQL-ROWSORT          PIC S9(8) COMP.
 05  SQL-MINRSORT         PIC S9(8) COMP.
 05  SQL-MAXRSORT         PIC S9(8) COMP.
 05  SQL-AMCMPL           PIC S9(8) COMP.
 05  SQL-RESERVED         PIC X(32).
04  TSB-STATS-DCX         PIC X(168).
04  TSB-STATS-DCX1        REDEFINES TSB-STATS-DCX.
 05  TSB-STATS-DCX-FILLER PIC X(8).
 05  TSB-SYS-MODE-CPU-TOD PIC 9(18) COMP.
 05  TSB-SYS-ZIIP-ON-CP-TOD
                          PIC 9(18) COMP.
 05  TSB-SYS-ZIIP-ON-ZIIP-TOD
                          PIC 9(18) COMP.
 05  TSB-USER-MODE-CPU-TOD
                          PIC 9(18) COMP.
 05  TSB-TCB-CPU-TIME-TOD PIC 9(18) COMP.
 05  TSB-SRB-CPU-TIME-TOD PIC 9(18) COMP.
 05  TSB-STATS-DCX-FILL01 PIC X(112).
```

LENGTH

Specifies the length of the returned TSB. To retrieve all statistics including the DC extended statistics section that records CPU times in the Time of Day (TOD) format, specify LENGTH as 560.

len-return-TSB

Specifies either the symbolic name of a user-defined field that contains the length of the TSB, or the length expressed as a numeric constant.

Limits: Integer of 388 or greater

Default: If you do not specify *len-return-TSB*, the first 388 bytes of the TSB are returned.

Example

The following statement returns the contents of the TSB to STATISTICS-BLOCK and writes transaction statistics to the log file:

```
ACCEPT TRANSACTION STATISTICS
  WRITE
  INTO STATISTICS-BLOCK.
```

Status Codes

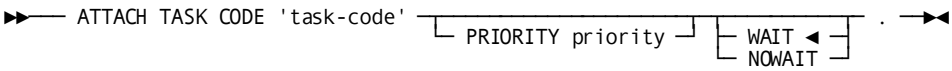
After completion of the ACCEPT TRANSACTION STATISTICS function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3801	Storage for the transaction statistics block is not available; to wait would cause a deadlock
3813	No transaction statistics block exists; a BIND TRANSACTION STATISTICS request has not been issued
3831	Either the parameter list is invalid or no logical terminal element (LTE) is associated with the issuing task
3850	The collection of transaction statistics or task statistics has not been enabled during system generation

ATTACH

The ATTACH statement initiates a new task by acquiring the necessary control blocks and storage and by adding the task to its dispatching list. CA IDMS initializes the attached task and queues it up for execution; the issuing program receives control in accordance with normal dispatching priority.

Syntax



Parameters

task-code

Either the symbolic name of a user-defined field that contains the task code or the code itself enclosed in quotation marks.

The referenced task code must have been defined during system generation or dynamically by using the DCMT VARY DYNAMIC TASK command.

PRIORITY

Specifies the dispatching priority of the attached task.

priority Either the symbolic name of a user-defined field that contains the dispatching priority or the priority itself expressed as a numeric constant in the range 000 through 240. By default, if you do not specify a priority or its location, the priority established during system generation for the specified task code, terminal, and user is used.

WAIT

Specifies that the issuing task waits until the maximum task condition no longer exists and the specified task can be attached.

This is the default.

NOWAIT

Specifies that the issuing task does not wait for the task to be attached. When NOWAIT is specified, the program should check the ERROR-STATUS field in the CA IDMS communications block to determine if the ATTACH request has been completed. If the ERROR-STATUS value is 3711, indicating that a maximum task condition exists, the request has not been serviced and the program should perform alternative processing before reissuing the ATTACH request.

Example

The following example illustrates how to initiate task TASKATCH and assign it a dispatching priority of 199:

```
ATTACH TASK CODE 'TASKATCH'
  PRIORITY 199
  NOWAIT.
```

Status Codes

After completion of the ATTACH function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
3711	The task cannot be attached because the maximum number of tasks has already been attached.
3712	The specified task code is not known to the CA IDMS system.
3758	The task cannot be attached because the maximum number of concurrent tasks threads was exceeded.

Status code	Meaning
3799	The requested task could not be attached because the current user is not authorized to execute the task.

BIND MAP

The BIND MAP statement identifies the location of a map request block (MRB) and initializes MRB fields. For each MRB used by a program, code a BIND MAP statement; for each record defined to a map, code a BIND MAP RECORD statement.

BIND MAP statements can be global or record-specific, as follows:

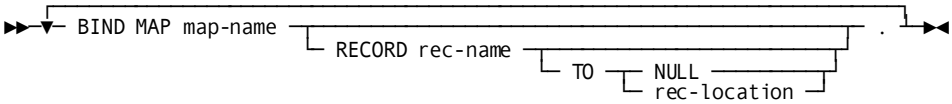
- **Global**—The BIND MAP statement applies to the map as a whole. It initializes the entire MRB and fills in fields that apply to the map in general.
- **Record-specific**—The BIND MAP statement applies only to the named map record. It initializes the variable storage address of the named record in the MRB.

Typically, a program issues a global BIND MAP statement for each map, followed by BIND MAP statements for each map record used by the program.

You can request the precompiler to include global and record-specific BIND MAP statements automatically by using a COPY IDMS MAP-BINDS statement (see Chapter 5: (see page 67)). COPY IDMS MAP-BINDS includes the necessary BINDS for all maps and map records defined for the program.

The program can alter the storage address for a map record at any time by issuing another BIND MAP statement for that record. After the initial global bind (BIND MAP), all map records are considered unbound; map operations that use those records will have no effect on storage. After binding a map record to a storage address (BIND MAP RECORD), subsequent map operations will use that address to access the record. To unbind a map record, issue a record-specific BIND MAP statement that specifies the TO NULL option.

Syntax



Parameters

map-name

The name of an existing map. The map version defaults to the version specified for the map in the program's MAP SECTION.

RECORD

Initializes the variable storage address of the named record in the MRB.

record-name

The name of a record used by the map.

TO

Specifies whether the record is to be unbound or bound to a specified address.

NULL

Leaves the record unbound.

rec-location

The symbolic name of a user-defined field that contains the address to which the record is to be bound. *Record-location* defaults to *record-name*. Subsequent I/O operations will use this area of storage for any operation associated with the record.

Example

The following statements bind the map EMPMAPLR and its five associated map records:

```
BIND MAP EMPMAPLR.
BIND MAP EMPMAPLR RECORD EMPLOYEE.
BIND MAP EMPMAPLR RECORD DEPARTMENT.
BIND MAP EMPMAPLR RECORD JOB.
BIND MAP EMPMAPLR RECORD OFFICE.
BIND MAP EMPMAPLR RECORD EMP-DATE-WORK-REC.
```

Status Codes

After completion of the BIND MAP function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

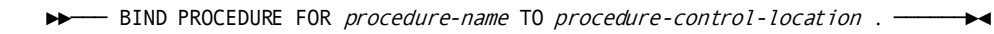
Status code	Meaning
0000	The request has been serviced successfully

BIND PROCEDURE

The BIND PROCEDURE statement establishes communication between a program and a DBA-written database procedure (for example, a security routine). You should use this statement only when the application program is required to pass to the procedure more information than is provided by the DBMS itself. Such instances are unusual; in most cases, you will not be aware of which procedures gain control before or after various DML functions.

The BIND PROCEDURE statement is used in both the navigational and the non-navigational environments.

Syntax



Parameters

procedure-name

Specifies the database procedure in program variable storage to be made available to the program.

TO procedure-control-location

Specifies the 256-byte (fixed-length) location to which the named procedure will be bound.

A program that runs in a different partition from the central version may need to pass certain information to the database procedure. When the DBMS invokes the database procedure, this information is copied from the program storage area identified by *procedure-control-location* into the IDMS application program information block. The information passed is the information in *procedure-control-location* when the BIND PROCEDURE was performed; it is not the information in the program's storage at the time of the procedure call.

Example

The following statement binds the procedure with the variable name PROGCHEK to the 256-byte area PROC-CTL:

```
BIND PROCEDURE FOR PROGCHEK TO PROC-CTL.
```

Status Codes

After completion of the BIND PROCEDURE function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

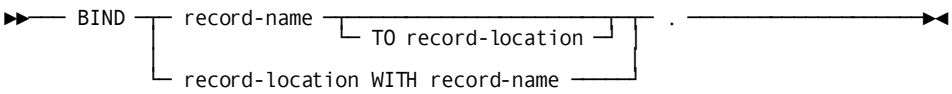
Status code	Meaning
0000	The request has been serviced successfully.
1400	The BIND PROCEDURE statement cannot be recognized. This code usually indicates that the IDMS communications block (SUBSCHEMA-CTRL) is not aligned on a fullword boundary.
1408	The named procedure is not in the specified subschema.
1418	The procedure has been bound improperly to location 0.
1472	The available memory is insufficient to dynamically load the database procedure.
1474	An attempt to load a module from the load/core-image library or DDLDCLOD has failed.

BIND RECORD

The BIND RECORD statement establishes addressability for a record in program variable storage. In most cases, you need not issue individual BIND RECORD statements since the necessary statements are generated as a group by the COPY IDMS SUBSCHEMA-BINDS statement (see Chapter 5: (see page 67)). However, you can issue BIND RECORD commands separately as necessary (for example, to bind several records to the same storage location). In any case, addressability must be established for each subschema record to be used by the program.

The program should perform the IDMS-STATUS routine after each BIND RECORD statement to ensure that the statement was executed successfully. When AUTOSTATUS is in use (see AUTOSTATUS Protocols (see page 63)), a PERFORM IDMS-STATUS operation occurs automatically after each BIND RECORD statement, even if the BIND RECORD statements are generated as a group by a COPY IDMS SUBSCHEMA-BINDS statement. You should use COPY IDMS SUBSCHEMA-BINDS only when AUTOSTATUS is in use.

Syntax



Parameters

record-name

Specifies the record to be bound to a location in variable storage.

The specified record must be included in the subschema.

TO *record-location*

Specifies the location to which the record is to be bound. The location corresponds to the record description as copied into the program manually or automatically through DATA DIVISION statements.

Note: *record-location* must be the same length as *record-name*.

Note: Exercise caution when using the TO *record-location* option because source-object mismapping can result from improper use. In cases where more than one copy of a given database record description is present in the program, you must ensure that the proper record description is bound at the proper time.

record-location WITH record-name

Binds a record name literal, specified by *record-name*, with a variable storage record description, specified by *record-location*. *Record-name* must specify a record included in the subschema.

Example

The following statement binds the EMPLOYEE record:

```
BIND EMPLOYEE.
```

Status Codes

After completion of the BIND RECORD function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
1400	The BIND RECORD statement cannot be recognized. This code usually indicates that the IDMS communications block (SUBSCHEMA-CTRL) is not aligned on a fullword boundary.
1408	The named record is not in the subschema. The program has probably invoked the wrong subschema.
1418	The record has been bound improperly to location 0.
1472	The available memory is insufficient to dynamically load a database procedure.

Status code	Meaning
1474	An attempt to load a module from the load/core-image library or DDLDCLOD has failed.

BIND RUN-UNIT

The BIND RUN-UNIT statement establishes a run unit for accessing the database, identifies the location of the IDMS communications block being used, and names the subschema to be loaded for the run unit. BIND RUN-UNIT can also name the node under which the run unit will execute and identify the database to be accessed. BIND RUN-UNIT must be the first functional DML call passed to the DBMS at execution time; it must logically precede all other DML statements (for example, BIND RECORD, READY, FIND) in the program's PROCEDURE DIVISION. **UTM modes only:** You must move LOW VALUES to SUBSCHEMA-CTRL before issuing the BIND RUN-UNIT statement.

When AUTOSTATUS is in use, COPY IDMS SUBSCHEMA BINDS can be used to automatically invoke the BIND RUN-UNIT statement and the appropriate BIND RECORD statements (see Chapter 5: (see page 67)).

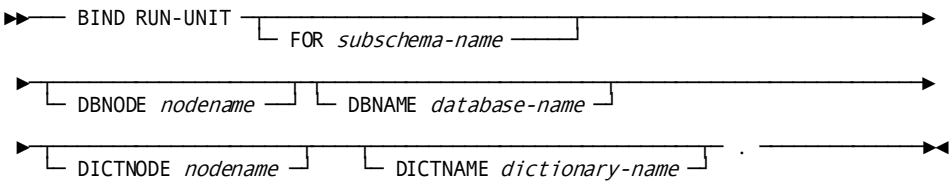
If program registration is in effect (that is, all programs must be registered in the data dictionary before compilation), the program must initialize the PROGRAM-NAME field of the IDMS communications block either automatically or manually:

- **Automatically**—A COBOL MOVE statement automatically generated by COPY IDMS SUBSCHEMA-BINDS moves the program name (stated in the IDENTIFICATION DIVISION) to the PROGRAM-NAME field.
- **Manually**—A COBOL MOVE statement is coded by the programmer before the BIND RUN-UNIT statement is executed. For example:

  ```
  MOVE 'EMPDISP' TO PROGRAM-NAME.
  ```

  The BIND RUN-UNIT statement is used in both the navigational and the non-navigational environments.

Syntax



Parameters

FOR subschema-name

Identifies a subschema view other than that specified in the DB clause of the SCHEMA SECTION. It must be the symbolic name of a user-defined eight-character field in variable storage.

By default, if you do not specify a subschema, the run unit uses the subschema named in the DB clause of the SCHEMA SECTION.

Note: Exercise care when using the FOR *subschema-name* option; improper use can lead to mismappings between the named subschema and record descriptions in variable storage.

DBNODE

Specifies the node where the database resides.

nodename

Either the symbolic name of a user-defined eight-character field in variable storage or the database name itself enclosed in quotation marks.

DBNAME

Specifies the database to be accessed by the run unit.

database-name

Either the symbolic name of a user-defined eight-character field in variable storage or the database name itself enclosed in quotation marks.

DICTNODE

Specifies the node that controls the dictionary where the subschema resides.

nodename

Either the symbolic name of a user-defined eight-character field in variable storage or the node name itself enclosed in quotation marks.

DICTNAME

Specifies the dictionary where the subschema resides.

dictionary-name

Either the symbolic name of a user-defined eight-character field in variable storage or the dictionary name itself enclosed in quotation marks.

Note: The DBNODE, DBNAME, DICTNODE, and DICTNAME parameters can be overridden at runtime by the DCUF SET DBNODE/DBNAME and DCUF SET DICTNODE/DICTNAME commands.

Batch users: The DBNODE AND DBNAME parameters can be overridden at runtime if the IDMSOPTI module or the SYSCTL clause in the system generation SYSTEM statement specifies a nodename or a dbname with the ALWAYS option. For more information about the use of DBNODE, DBNAME, DICTNODE, and DICTNAME, see the *System Generation Guide*.

Example

The following statement binds the run unit to the DBMS:

```
BIND RUN-UNIT.
```

Status Codes

After completion of the BIND RUN-UNIT function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
1400	The BIND RUN-UNIT statement cannot be recognized. This code usually indicates that the IDMS communications block (SUBSCHEMA-CTRL) is not aligned on a fullword boundary.
1410	Security violation; an existing access restriction or subschema usage prohibits execution of the specified DML function. For LRF users, the subschema in use allows access to database records only. Combined with a major code of 00, this code means the program has attempted to access a database record, but the subschema in use allows access to logical records only.
1417	The transaction manager encountered an error. See the log for additional information.
1467	Invalid subschema load module; the subschema invoked does not match the subschema object tables. subschema object tables.
1469	The run unit is not bound to the DBMS. This code indicates that the central version is not active, that the central version is not accepting new run units, or that the run unit's connection to the central version is broken due to timeout or other factors, as noted on the CV log.
1470	A journal file will not open (local mode only); under OS, the most probable cause is that a DD statement for the journal file is missing in the JCL.
1472	There is insufficient memory to dynamically load a subschema or database procedure.
1473	The central version is not accepting new run units.

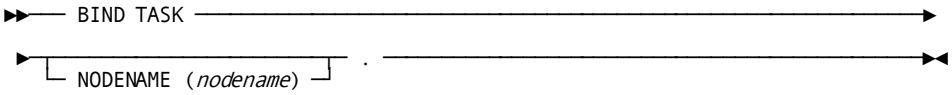
Status code	Meaning
1474	The subschema was not found in the dictionary load area or in the load library.
1477	The run unit has been bound previously.
1480	The node specified is not active or has been disabled.
1481	The converted subschema requires specified database name to be in the DBNAME table.
1482	The subschema must be named in the DBNAME table.
1483	The available memory is insufficient to allocate native VSAM work areas.
1491	The subschema requires a DBNAME to do the bind run unit.
1492	No subschema areas map to DMCL.
1493	A subschema area symbolic was not found in DMCL.
1494	The specified dbname is neither a dbname defined in the DBNAME table, nor a SEGMENT defined in the DMCL.
1495	The specified subschema failed DBTABLE mapping using the specified dbname.

BIND TASK

The BIND TASK statement initiates an CA IDMS task when the operating mode is DC-BATCH. This statement establishes communication with the DC system and, if accessing CA IDMS queues, allocates a packet-data movement buffer to contain the queue data. Once a task is started, the program can issue any number of consecutive BIND-READY-FINISH sequences.

Note: Do not issue this command in local mode.

Syntax



Parameters

NODENAME

Specifies the node to which the task will be bound.

nodename

Either the symbolic name of a user-defined field that contains the nodename or the nodename itself enclosed in quotation marks. The specified node name must match the node named in the DDS statement at system generation.

Example

The following statement establishes communication with a DC system.

```
BIND TASK.
```

Status Codes

After completion of the BIND TASK function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.

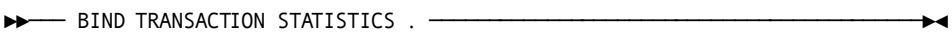
BIND TRANSACTION STATISTICS

The BIND TRANSACTION STATISTICS statement defines the beginning of a transaction for the purposes of collecting transaction statistics. CA IDMS allocates a block of storage in which to accumulate these statistics. Because this block is owned by the logical terminal associated with the current task, the BIND TRANSACTION STATISTICS statement cannot be used with nonterminal tasks.

Note: If a transaction statistics block (TSB) is already allocated for the logical terminal associated with the current task, the BIND request clears the block and writes any previously accumulated transaction statistics to the log file.

When a BIND TRANSACTION STATISTICS request is issued, the transaction is assigned a 40-character identifier; the first 32 characters are the identifier of the signed-on user (if any) and the last eight characters are the identifier of the logical terminal associated with the current task.

Syntax



Example

The following example illustrates the BIND TRANSACTION STATISTICS statement:

```
BIND TRANSACTION STATISTICS.
```

Status Codes

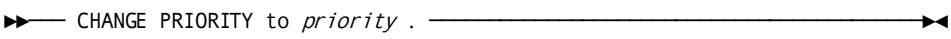
After completion of the BIND TRANSACTION STATISTICS function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully; any existing transaction statistics block was written to the log file before being cleared
3801	Storage for the transaction statistics block is not available; to wait would cause a deadlock
3810	A new transaction statistics block has been allocated
3831	Either the parameter list is invalid or no logical terminal element (LTE) is associated with the issuing task
3850	The collection of transaction statistics or task statistics has not been enabled during system generation

CHANGE PRIORITY

The CHANGE PRIORITY statement changes the dispatching priority of the issuing task. The new dispatching priority applies only to the current execution of the task. CHANGE PRIORITY does not relinquish control to another task and cannot be used to alter the priority of other tasks.

Syntax



Parameters

priority

The new dispatching priority for the issuing task.

Either the symbolic name of a user-defined field that contains the priority value or the value itself expressed as a numeric constant in the range 0 through 240.

Example

The following example changes the dispatching priority of the issuing task to the value contained in the PRIORITY-210 field:

```
CHANGE PRIORITY TO PRIORITY-210.
```

Status Codes

After completion of the CHANGE PRIORITY function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

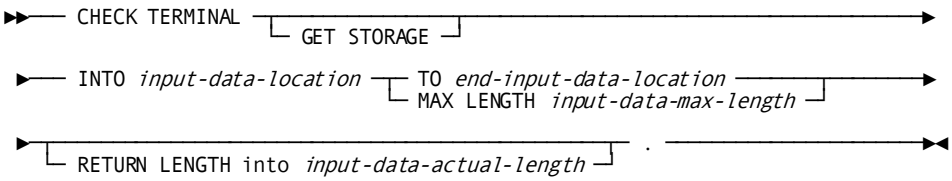
Status code	Meaning
0000	The request has been serviced successfully

CHECK TERMINAL

The CHECK TERMINAL statement delays task processing until a previously issued I/O request has completed.

If a READ TERMINAL, WRITE TERMINAL, or WRITE THEN READ TERMINAL request specifies the NOWAIT option, the program must issue a CHECK TERMINAL request before specifying any other I/O operation. If the I/O operation is not complete, the task execution is suspended. When the I/O operation is complete, the task resumes execution according to its established dispatching priority.

Syntax



Parameters

GET STORAGE

Asynchronous requests only. Acquires an input buffer for the data being read into the program; CA IDMS allocates the required storage when the read operation is complete.

INTO

Specifies the 01-level WORKING-STORAGE SECTION or LINKAGE SECTION data area reserved for the input data stream.

input-data-location

Specifies the symbolic name of a user-defined field.

If GET STORAGE is specified, the data area reserved for the input data stream must be an unallocated 01-level LINKAGE SECTION entry. If GET STORAGE is not specified, the data area must be a previously allocated WORKING-STORAGE SECTION or LINKAGE SECTION entry.

TO

Specifies the end of the data area reserved for the input.

end-input-data-location

Either the symbolic name of a user-defined dummy byte field or a field that contains a data item not associated with the data area reserved for the input data stream.

MAX LENGTH

Defines the length, in bytes, of the data area reserved for the input data stream.

input-data-max-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

If the input data stream is larger than the data area reserved in the WORKING-STORAGE SECTION or LINKAGE SECTION, the data stream is truncated as needed to fit the available space.

RETURN LENGTH INTO

Specifies the location to return the actual length of the input data stream.

input-data-actual-length

The symbolic name of a user-defined field. If the data stream has been truncated, *input-data-actual-length* will contain the original length before truncation.

Example

The following statement determines whether an I/O operation is complete, acquires an input buffer, and reads 72 bytes of data into TERM-LINE:

```
CHECK TERMINAL
  GET STORAGE
  INTO TERM-LINE MAX LENGTH 72.
```

Status Codes

After completion of the CHECK TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4519	The input area specified for the return of data is too small; the returned data has been truncated to fit the available space.
4525	The output operation has been interrupted; the terminal operator has pressed ATTENTION or BREAK.
4526	A logical error (for example, an invalid control character) has been encountered in the output data stream.
4527	A permanent I/O error has occurred during processing.
4528	The dial-up line for the terminal being used has been disconnected.
4531	The terminal request block (TRB) contains an invalid field, indicating a possible error in the program's parameters.
4535	Storage for the input buffer cannot be acquired because the specified 01-level LINKAGE SECTION entry has been allocated.
4537	Storage for the input buffer cannot be acquired because the specified data area is defined in the WORKING-STORAGE SECTION rather than in the LINKAGE SECTION.
4538	The specified 01-level LINKAGE SECTION entry has not been allocated and the GET STORAGE option has not been specified. No I/O has been performed.
4539	The terminal device associated with the issuing task is out of service.

COMMIT

The COMMIT statement commits changes made to the database through an individual run unit or through all database sessions associated with a task. A task-level commit also commits all changes made in conjunction with scratch, queue, and print activity.

If the commit applies to an individual run unit and the run unit is sharing its transaction with another database session, the run unit's changes may not be committed at the time the COMMIT statement is executed.

Note: For more information about the impact of transaction sharing, see the *CA IDMS Navigational DML Programming Guide*.

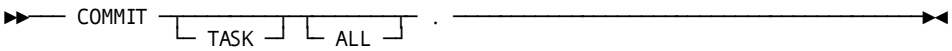
Run units (and SQL sessions) impacted by the COMMIT statement remain active after the operation is complete.

The COMMIT statement is used in both the navigational and logical record facility environments. The COMMIT TASK statement is also used in an SQL programming environment.

Currency

Use of the ALL option, as in COMMIT ALL, sets all currencies to null.

Syntax



Parameters

TASK

Commits the changes made by all scratch, queue, and print activity and all top-level run units associated with the current task. Its impact on SQL sessions associated with the task depends on whether those sessions are suspended and whether their transactions are eligible to be shared.

More information:

For more information about the impact of a COMMIT TASK statement on SQL sessions, see the *CA IDMS SQL Programming Guide*.

For more information about run units and the impact of COMMIT TASK, see the *CA IDMS Navigational DML Programming Guide*.

(ALL)

Releases all currency locks held on records in database, scratch, and queue areas associated with the issuing task (COMMIT TASK ALL) or run unit (COMMIT ALL) and sets all currencies to null.

Example

The following statement commits changes made by the run unit through which it is issued:

```
COMMIT.
```

Status Codes

After completion of the COMMIT function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
5031	The specified request is invalid; the program may contain a logic error
5097	An error was encountered processing a syncpoint request; check the log for details

CONNECT

The CONNECT statement establishes a record occurrence as a member of a set occurrence. The specified record must be defined as an optional automatic, optional manual, or mandatory manual member of the set. **Native VSAM users:**. The CONNECT statement is not valid since all sets in native VSAM data sets must be defined as mandatory automatic.

Before execution of the CONNECT statement, the following conditions must be satisfied:

- All areas affected either explicitly or implicitly by the CONNECT statement must be readied in one of the update usage modes (see READY (see page 272) later in this chapter).
- The specified record must be established as current of its record type.
- The occurrence of the set into which the specified record will be connected must be established. The current record of set determines the set occurrence and, if set order is NEXT or PRIOR, the position at which the specified record will be connected within the set.

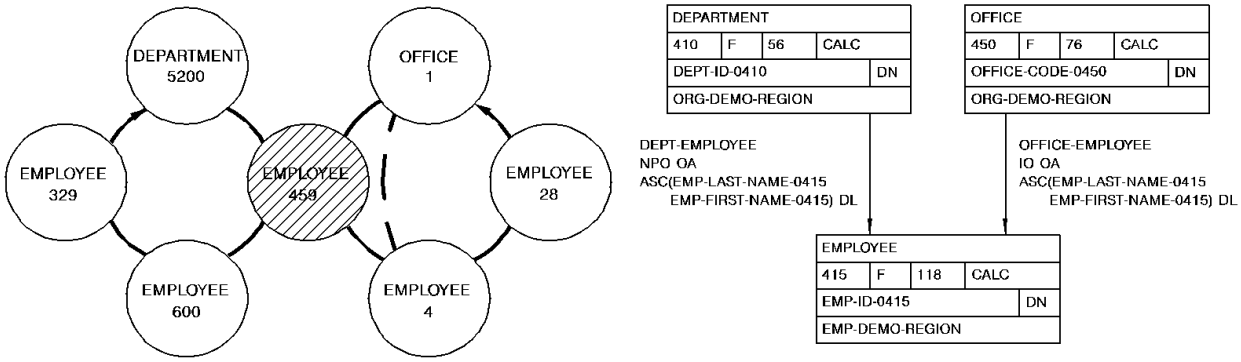
Currency

Following successful execution of a CONNECT statement, the specified record is current of run unit, its record type, its area, and all sets in which it currently participates.

Connecting a Record to a Set

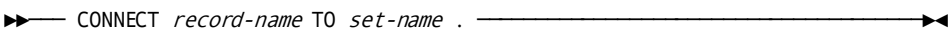
The following figure illustrates the steps required to connect an EMPLOYEE record to an occurrence of the OFFICE-EMPLOYEE set.

To connect EMPLOYEE 459 to OFFICE 1 in the OFFICE-EMPLOYEE set, establish EMPLOYEE 459 as current of record type, locate the proper occurrence of the OFFICE record, and issue the CONNECT command.



	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	DEPARTMENT	EMPLOYEE	OFFICE	DEPT-EMPLOYEE	OFFICE-EMPLOYEE	ORG-DEMO-REGION	EMP-DEMO-REGION
MOVE 5200 TO DEPT-ID. FIND CALC DEPARTMENT.	5200	5200			5200		5200	
OBTAIN FIRST EMPLOYEE WITHIN DEPT-EMPLOYEE.	459	5200	459		459		5200	459
MOVE 1 TO OFFICE-CODE. FIND CALC OFFICE.	1	5200	459	1	459	1	1	459
CONNECT EMPLOYEE TO OFFICE-EMPLOYEE.	459	5200	459	1	459	459	1	459

Syntax



Parameters

CONNECT

Specifies the record whose current occurrence is to be connected to the current occurrence of the specified set.

record-name

Must be a record included in the subschema and must be defined as an optional automatic, optional manual, or mandatory manual member of the set to which it is being connected.

TO

Specifies the set to which the member record is to be connected.

set-name

Specifies the name of a set included in the subschema. The record is connected to the set in accordance with the ordering rules defined for that set in the schema.

Example

The following statement connects the current EMPLOYEE record to the current occurrence of the OFFICE-EMPLOYEE set:

```
CONNECT EMPLOYEE TO OFFICE-EMPLOYEE.
```

Status Codes

After completion of the CONNECT function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0705	The CONNECT would violate a duplicates-not-allowed option.
0706	Currency has not been established for the named record or set.
0708	The named record is not in the subschema. The program has probably invoked the wrong subschema.
0709	The named record's area has not been readied in one of the update usage modes.
0710	The subschema specifies an access restriction that prohibits connecting the named record in the named set.

Status code	Meaning
0714	The CONNECT statement cannot be executed because the named record has been defined as a mandatory automatic member of the set.
0716	The record cannot be connected to a set in which it is already a member.
0721	An area other than the area of the named record has been readied with an incorrect usage mode.
0725	Currency has not been established for the named set type.

DC RETURN

The DC RETURN statement returns control to a program at the next higher level within a task. Additionally, you can use the DC RETURN statement to specify:

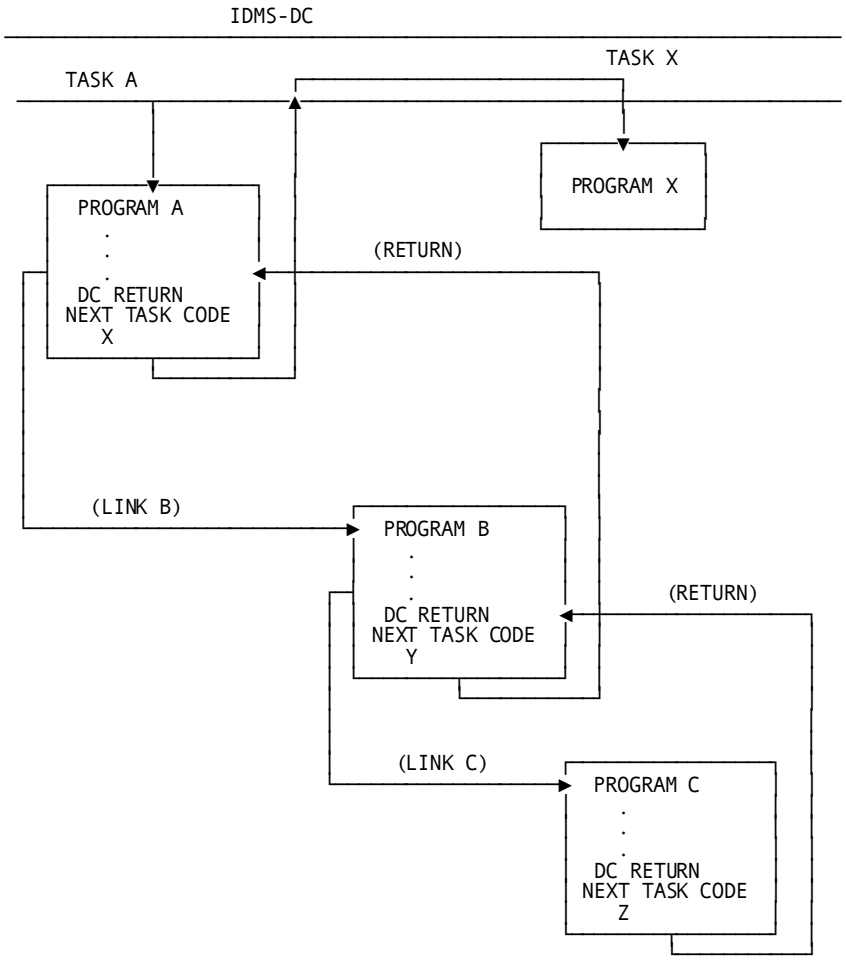
- The next task to be initiated on the same terminal
- Recovery procedures for abend routines established by SET ABEND EXIT functions
- The action to be taken if the user fails to initiate the next task

Following a DC RETURN request, control returns to the program at the next higher level within the task. If the issuing program is the highest level program, control returns to CA IDMS. Any DC RETURN statement can include a NEXT TASK CODE option to specify the next task to initiate. However, the position of the issuing program within the task governs whether the specified task will, in fact, receive control.

DC RETURN Processing

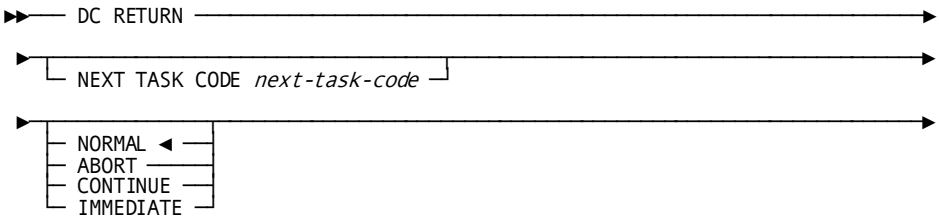
The following figure illustrates how a task is executed when DC RETURN statements within three programs specify the NEXT TASK CODE option.

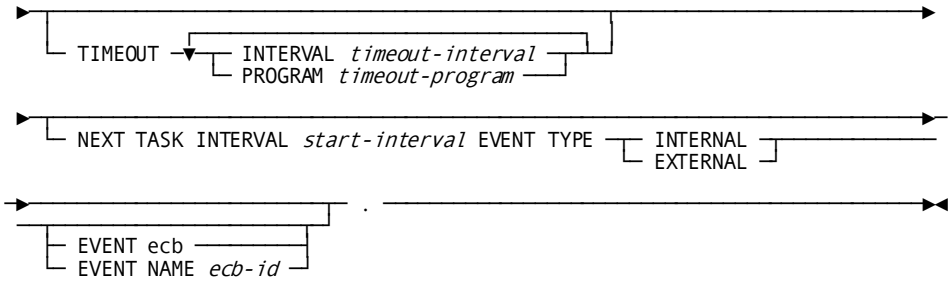
Task A invokes program A. Program A links to program B, which in turn links to program C. Program C issues a DC RETURN NEXT TASK CODE 'Z' request; control returns to program B. Program B contains a DC RETURN NEXT TASK CODE 'Y' request, which takes precedence over program C's DC RETURN specification. Control returns to program A, which issues a DC RETURN NEXT TASK CODE 'X' request. Because program A is at the highest level in the task, task X will be invoked.



When CA IDMS receives control from the highest level program that issued a DC RETURN NEXT TASK CODE request, the specified task is executed immediately if the specified task code has been assigned the NOINPUT attribute during system generation; if the task code was assigned the INPUT attribute, the task executes only when the user presses an attention identifier (AID) key. Typical AID keys include all PA and PF keys, ENTER, and CLEAR.

Syntax





Parameters

NEXT TASK CODE

Specifies the next task to be initiated on the same terminal.

next-task-code

Either the symbolic name of a user-defined field that contains the task code or the task code itself enclosed in quotation marks. The task code must be defined to the DC system under which it is running, either during system generation or at runtime.

NORMAL/ABORT/CONTINUE

Defines the recovery action to take within the program logic (CA IDMS recovery occurs automatically) and specifies whether to execute abend routines for higher-level programs. These options apply to DC RETURNs issued from abend routines established by SET ABEND EXIT (STAE) functions only.

NORMAL

Specifies to not attempt recovery and execute all abend routines established for programs at higher task levels.

This is the default.

ABORT

Specifies to not attempt recovery and abort the task immediately without executing any abend routines established for programs at higher task levels.

CONTINUE

Specifies to return control to the program that failed at an address established in the abend control element (ACE) for the program.

IMMEDIATE

Is ignored when issued from ABEND routine; it is only applied when NOT issued from an ABEND routine.

TIMEOUT

Specifies the action to take if the user fails to enter data required to initiate a task. This parameter overrides resource timeout interval and program specifications established during system generation.

INTERVAL

Specifies the time, in seconds, that can elapse before releasing the resources held by the terminal on which the task is executing.

timeout-interval

Either the symbolic name of a user-defined PIC S9(4) COMP SYNC (halfword) field that contains the timeout interval or the interval itself expressed as a numeric constant.

PROGRAM

Specifies the program to be invoked to handle and release resources held by the terminal on which the task is executing when the specified timeout interval has been reached.

timeout-program

Either the symbolic name of a user-defined field that contains the program name or the name itself enclosed in quotation marks.

The specified program must be defined to the DC system either during system generation or at runtime.

NEXT TASK INTERVAL *start-interval*

Either the symbolic name of a user-defined PIC S9(4) COMP SYNC (halfword) field that contains the start interval or the interval itself expressed as a numeric constant.

Note: When specified alone, NEXT TASK INTERVAL will cause task to be initiated after *start-interval*. When specified along with EVENT/EVENT NAME, task will be initiated either after *start-interval* or posting of the EVENT(S)/EVENT NAME(S), whichever occurs first.

EVENT TYPE INTERNAL/EXTERNAL

Specifies events that happen either internal or external to the system.

INTERNAL

An event that occurs within IDMS-DC, such as waiting for space in a storage pool, or waiting for a completed task.

EXTERNAL

An event that occurs outside the system's control, such as waiting for a file to be read, or waiting for an I/O to complete.

EVENT

Defines one or more ECBs upon which the task will wait.

ecb

The symbolic name of a user-defined area that contains three PIC S9(8) COMP SYNC (fullword) fields. Multiple EVENT parameters must be separated by at least one blank.

EVENT NAME

Specifies the ECB upon which the task will wait.

Note: When specified alone, NEXT TASK INTERVAL will cause task to be initiated after *start-interval*. When specified along with EVENT/EVENT NAME, task will be initiated either after *start-interval* or posting of the EVENT(S)/EVENT NAME(S), whichever occurs first.

ecb-id

Either the symbolic name of a user-defined field that contains the ECB ID or the ID itself enclosed in quotation marks.

Example

The following statement illustrates the use of DC RETURN. The task code associated with MENU-TASK-CODE, if defined with the INPUT parameter, will be invoked when the user next presses an AID key; if MENU-TASK-CODE is defined with the NOINPUT parameter, it will be invoked immediately.

```
DC RETURN
  NEXT TASK CODE MENU-TASK-CODE.
```

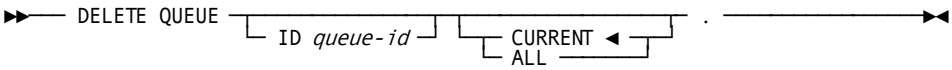
Status Codes

Because control is returned to the next-higher level, there is no need to check the ERROR-STATUS field.

DELETE QUEUE

The DELETE QUEUE statement deletes all or part of a queue. If only one queue record is deleted, CA IDMS maintains currency within the queue by saving the next and prior currencies of the deleted record.

Syntax



Parameters

ID

Specifies the queue that contains the record to be deleted.

queue-id

Either the symbolic name of a user-defined field that contains the ID or the ID itself enclosed in quotation marks. If you do not specify an ID, a blank ID is assumed.

CURRENT

Deletes the current record of the queue associated with the requesting task.

This is the default.

ALL

Deletes all records in the queue and the queue header ID.

Example

The following example illustrates a request to delete the current record in the RES-Q queue:

```
DELETE QUEUE
  ID 'RES-Q'
  CURRENT.
```

Status Codes

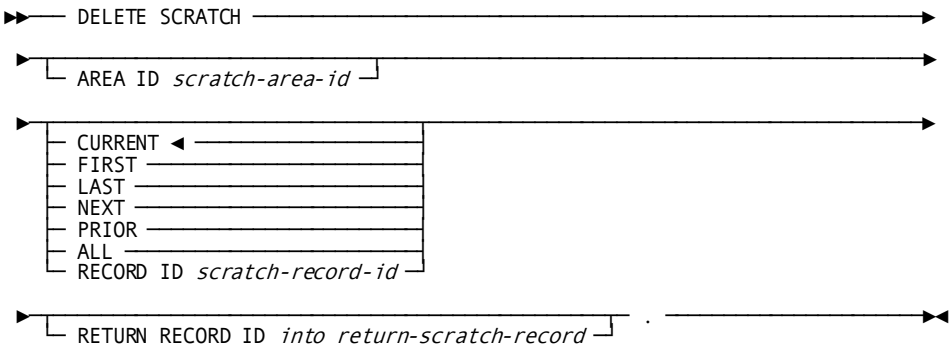
After completion of the DELETE QUEUE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4404	The requested queue header record cannot be found.
4405	The requested queue record cannot be found.
4406	No resource control element (RCE) exists for the queue record, indicating that currency has not been established.
4407	A database error occurred during queue processing. A common cause is a DBKEY deadlock. For a PUT QUEUE operation, this code can also mean that the queue upper limit has been reached. If a database error has occurred, there are usually be other messages in the CA-IDMS/DC/UCF log indicating a problem encountered in RHDCRUAL, the internal Run Unit Manager. If a deadlock has occurred, messages DC001000 and DC001002 are also produced.
4431	The parameter list is invalid.

DELETE SCRATCH

The DELETE SCRATCH statement deletes one scratch record or all records in the scratch area.

Syntax



Parameters

AREA ID

Specifies the scratch area associated with the scratch records being deleted.

scratch-area-id

Either the symbolic name of a user-defined field that contains the scratch area ID or the ID itself enclosed in quotation marks. If you do not specify an AREA ID, an area ID of eight blanks is assumed.

CURRENT

Deletes the current record in the scratch area (that is, that record most recently referenced by another scratch function).

This is the default.

FIRST

Deletes the first record in the specified scratch area.

LAST

Deletes the last record in the specified scratch area.

NEXT

Deletes the next record in the specified scratch area.

PRIOR

Deletes the prior record in the specified scratch area.

ALL

Deletes all records in the specified scratch area.

RECORD ID

Deletes the identified record.

scratch-record-id

The symbolic name of a user-defined field that contains the ID.

RETURN RECORD ID into

Specifies the location in the program in which to return the ID of the last record deleted by means of the DELETE SCRATCH function.

return-scratch-record

The symbolic name of a user-defined four-byte field.

Example

The following example illustrates a request to delete the scratch record that is prior to the current scratch record and return the ID of the deleted record to the SCR-REC-ID field:

```
DELETE SCRATCH
  PRIOR
  RETURN RECORD ID INTO SCR-REC-ID.
```

Status Codes

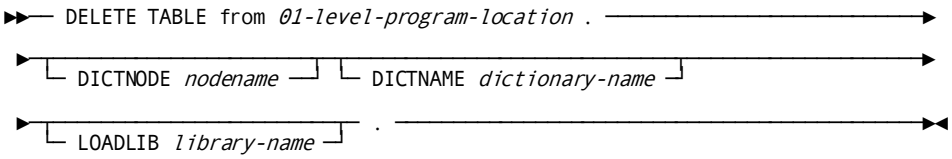
After completion of the DELETE SCRATCH function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4303	The requested scratch area ID cannot be found
4305	The requested scratch record ID cannot be found
4307	An I/O error has occurred during processing
4331	The parameter list is invalid

DELETE TABLE

The DELETE TABLE statement notifies CA IDMS that the issuing task has finished using a table that has been loaded into the program pool by using the LOAD TABLE function. DELETE TABLE does not physically delete reusable tables from the program pool; rather, it decrements the in-use count maintained by CA IDMS. An in-use count of 0 signals to reuse the space occupied by the table.

Syntax



Parameters

01-level-program-location

The LINKAGE SECTION entry of the 01-level record area specified in the associated LOAD TABLE request.

DICTNODE

Specifies the node that controls the dictionary where the subschema containing the table resides.

nodename

Specifies the symbolic name of a user-defined eight-character field in variable storage.

DICTNAME

Specifies the dictionary where the subschema containing the table resides.

dictionary-name

Specifies the symbolic name of a user-defined eight-character field in variable storage.

LOADLIB

Specifies the load library containing the table.

library-name

Specifies the symbolic name of a user-defined eight-character field in variable storage.

Example

The following example releases a previously loaded table from the location in variable storage identified by RATE-TABLE:

```
DELETE TABLE FROM RATE-TABLE.
```

Status Codes

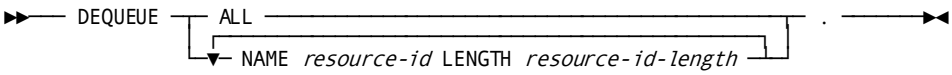
After completion of the DELETE TABLE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3433	The specified table was not loaded by the task

DEQUEUE

The DEQUEUE statement releases resources acquired by the issuing task with an ENQUEUE request. Acquired resources not released explicitly with a DEQUEUE request are released automatically at task termination.

Syntax



Parameters

ALL

Releases all resources acquired by the issuing task by means of ENQUEUE requests.

NAME

Specifies a resource to be dequeued.

Multiple resource specifications must be separated by at least one blank.

resource-id

The symbolic name of a user-defined field that contains the resource ID.

LENGTH

Specifies the length of the resource.

resource-id-length

Either the symbolic name of a PIC S9(8) COMP SYNC (fullword) field that contains the length of the resource ID or the length itself expressed as a numeric constant.

Example

The following statement illustrates a request to release all the resources enqueued by the issuing task:

```
DEQUEUE PAYROLL-LOCK
    LENGTH 16.
```

Status Codes

After completion of the DEQUEUE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3913	At least one resource ID cannot be found; all resources that were located have been dequeued
3931	The parameter list is invalid.

DISCONNECT

The DISCONNECT statement cancels the current membership of a record occurrence in a set occurrence. The named record must be defined as an *optional* member of the named set. **Native VSAM users:**. The DISCONNECT statement is not valid since all sets in native VSAM data sets must be defined as mandatory automatic.

Before execution of the DISCONNECT statement, the following conditions must be satisfied:

- All areas affected either explicitly or implicitly by the DISCONNECT statement must be readied with one of the three update usage modes (see READY (see page 272) later in this chapter).
- The named record must be established as current of its record type.
- The named record must currently participate as a member in an occurrence of the named set.

Following successful execution of the DISCONNECT statement, the named record can no longer be accessed through the set for which membership was cancelled. The disconnected record can still be accessed either by means of a complete scan of the area in which it participates or directly through its db-key, if known. A disconnected record can also be accessed either through any other sets in which it participates as a member or if it has a location mode of CALC.

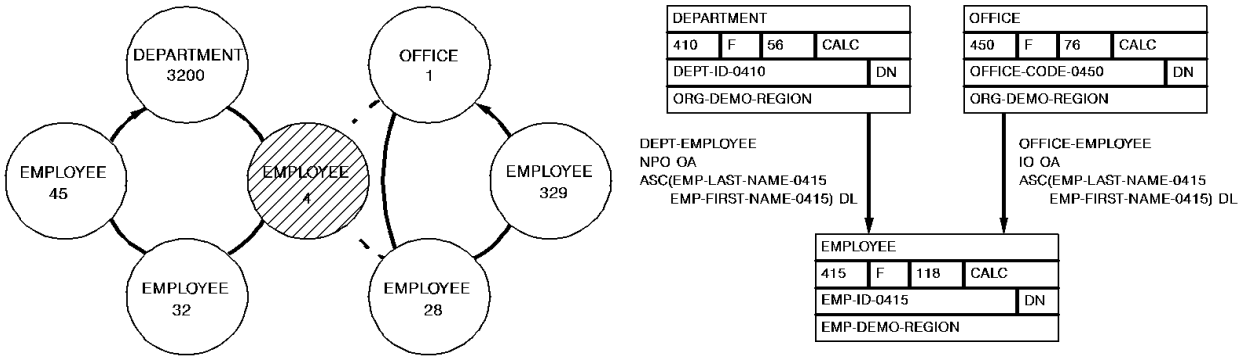
Currency

A successfully executed DISCONNECT statement nullifies currency in the specified set. However, next, prior, and owner of set are maintained, enabling continued access within the set. The disconnected record is current of run unit, its record type, its area, and any other sets in which it participates.

Disconnecting a Record from a Set

The following figure illustrates the steps required to disconnect an EMPLOYEE record from an occurrence of the OFFICE-EMPLOYEE set.

To disconnect EMPLOYEE 4 from the OFFICE 1 of the OFFICE-EMPLOYEE set, enter the database on OFFICE, establish EMPLOYEE 4 as current of the EMPLOYEE record type, and disconnect it from the OFFICE-EMPLOYEE set.



	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	DEPARTMENT	EMPLOYEE	OFFICE	DEPT-EMPLOYEE	OFFICE-EMPLOYEE	ORG-DEMO-REGION	EMP-DEMO-REGION
MOVE 1 TO OFFICE-CODE. FIND CALC OFFICE.	1			1		1	1	
FIND FIRST EMPLOYEE WITHIN OFFICE-EMPLOYEE.	4		4	1	4	4	1	4
DISCONNECT EMPLOYEE. FROM OFFICE-EMPLOYEE.	4		4	1	4	NPO	1	4

Syntax

Parameters

DISCONNECT

Specifies the record to disconnect from the named set.

record-name

Must be a record included in the subschema and must be defined as an optional member of the specified set.

FROM

Specifies the set from which the named record will be disconnected.

set-name

Specifies the name of a set included in the subschema.

Example

The following statement disconnects the current EMPLOYEE record from the OFFICE-EMPLOYEE set:

```
DISCONNECT EMPLOYEE FROM OFFICE-EMPLOYEE.
```

Status Codes

After completion of the DISCONNECT function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

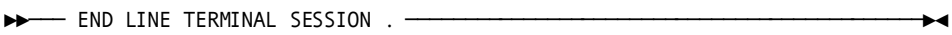
Status code	Meaning
0000	The request has been serviced successfully
1106	Currency has not been established for the named record
1108	The named record is not in the subschema. The program has probably invoked the wrong subschema
1109	The named record's area has not been readied in one of the update usage modes
1110	The subschema specifies an access restriction that prohibits use of the DISCONNECT statement
1115	The DISCONNECT statement cannot be executed because the named record has been defined as a mandatory member of the set
1121	An area other than the area that contains the named record has been readied with an incorrect usage mode

Status code	Meaning
1122	The named record is not currently a member of the specified set

END LINE TERMINAL SESSION

The END LINE TERMINAL SESSION statement terminates the current line I/O session. All output data lines that remain in the current buffer and all pages queued for asynchronous I/O operations are deleted.

Syntax



Example

The following statement terminates a line mode I/O session:

```
END LINE TERMINAL SESSION.
```

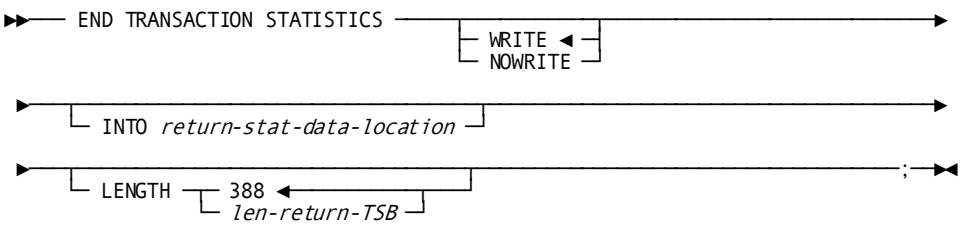
Status Codes

There are no status codes associated with the END LINE TERMINAL SESSION command.

END TRANSACTION STATISTICS

The END TRANSACTION STATISTICS statement defines the end of a transaction. The transaction typically ends when the issuing task terminates. Optionally, END TRANSACTION STATISTICS can be used to write the transaction statistics block (TSB) to the DC system log file and to return the TSB to a preallocated location in variable storage. You can define the length of the TSB.

Syntax



Parameters

WRITE/NOWRITE

Specifies whether the TSB is written to the DC system log file when the task terminates.

Default: WRITE.

INTO

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION data area into which to return the TSB.

return-stat-data-location

A fullword-aligned 388-byte field (you can customize the length using the LENGTH parameter).

LENGTH

Specifies the length of the returned TSB. To retrieve all statistics including the DC extended statistics section that records CPU times in the Time of Day (TOD) format, specify LENGTH as 560.

len-return-TSB

Specifies either the symbolic name of a user-defined field that contains the length of the TSB, or the length expressed as a numeric constant.

Limits: Integer of 388 or greater

Default: If you do not specify *len-return-TSB*, the first 388 bytes of the TSB are returned.

Example

The following statement illustrates a request to end a transaction, write statistics to the log file, and return a copy of the TSB to the STATISTICS-BLOCK field:

```
END TRANSACTION STATISTICS
  WRITE
  INTO STATISTICS-BLOCK.
```

Status Codes

After completion of the END TRANSACTION STATISTICS function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

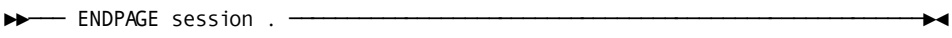
Status code	Meaning
0000	The request has been serviced successfully.
3801	Storage for the transaction statistics block is not available; to wait would cause a deadlock.

Status code	Meaning
3813	No transaction statistics block exists; a BIND TRANSACTION STATISTICS request has not been issued.
3831	Either the parameter list is invalid or no logical terminal element (LTE) is associated with the issuing task.
3850	The collection of transaction statistics or task statistics has not been enabled during system generation.

ENDPAGE

The ENDPAGE statement terminates a map paging session, clears the scratch record for the session, and clears the map paging options for the completed session. A STARTPAGE/ENDPAGE pair encloses commands that handle a pageable map at runtime. The STARTPAGE command is discussed later in this chapter.

Syntax



Example

The following statement ends a map paging session:

```
ENDPAGE session.
```

Status Codes

After completion of the ENDPAGE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully

ENQUEUE

The ENQUEUE statement acquires or tests the availability of a resource or list of resources. Resources are defined during installation and system generation and typically include storage areas, common routines, queues, and processor time.

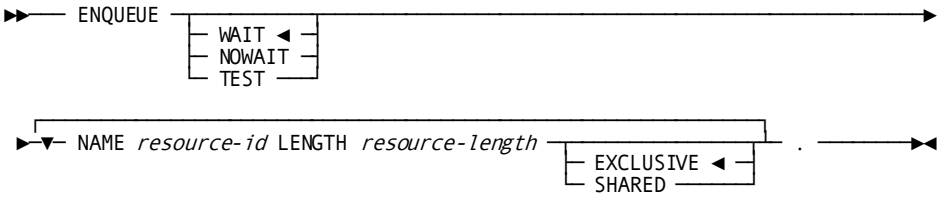
An enqueued resource can be exclusive or shared:

- **Exclusive**—The resource is owned exclusively by the issuing task and is not available to any other tasks. CA IDMS prohibits other tasks from obtaining resources that have been ENQUEUED exclusively.

  Note: An exclusive ENQUEUE request prohibits another task from enqueuing a resource by name; however, it does not prohibit the use of the resource by another task. Therefore, to effect true resource protection, you must enqueue and dequeue resources consistently.

- **Shared**—The resource is available to all tasks. CA IDMS allows other tasks to issue nonexclusive ENQUEUE requests for the resources, permitting the resources to be shared.

Syntax



Parameters

WAIT

Specifies to wait for all resources to be freed, if it cannot service the request immediately.

This is the default.

NOWAIT

Specifies to not wait to acquire resources that are not currently available. If NOWAIT is specified, the program should check the ERROR-STATUS field in the IDMS-DC communications block to determine if the function has been completed. If the ERROR-STATUS value is 3901, indicating that a resource could not be obtained immediately, the request has not been serviced and the program should perform alternative processing before reissuing the NOWAIT request.

TEST

Specifies to test the availability of the specified resources. If TEST is specified, the program should check the ERROR-STATUS field in the IDMS-DC communications block to determine the outcome of the test.

NAME

Specifies the ID associated with a resource.

Multiple resource specifications must be separated by at least one blank.

resource-id

Specifies the symbolic name of a user-defined field that contains the name of the resource. The resource name is a 1–256 byte character string used to identify the resource that an enqueue is to be set or tested with. Any character string can be defined as long as all programs that access the resource use the same name, and as long as the name is unique relative to all other names used to identify other resources within the CV.

LENGTH

Specifies the length of the resource.

resource-id-length

Either the symbolic name of a user-defined field that contains the length of the resource ID or the length itself expressed as a numeric constant.

EXCLUSIVE

Assigns the exclusive attribute to the named resource.

This is the default.

SHARED

Assigns the shared attribute to the named resource.

Examples

The statements below illustrate the use of the ENQUEUE statement:

Example 1

The following statement enqueues the CODE-VALUE and PAYROLL-LOCK resources. CODE-VALUE is reserved for the issuing task's exclusive use; PAYROLL-LOCK can be shared.

```
ENQUEUE
  WAIT
  NAME CODE-VALUE LENGTH 10
  NAME PAYROLL-LOCK LENGTH 16 SHARED.
```

Example 2

The following statement tests the availability of the resource whose identifier is contained in the RESOURCE-NAME field:

```
ENQUEUE
  TEST
  NAME RESOURCE-NAME LENGTH RESOURCE-LENGTH.
```

Status Codes

After completion of an ENQUEUE function to *acquire* resources, the ERROR-STATUS field in the IDMS DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
3901	At least one of the requested resources cannot be enqueued immediately; to wait would cause a deadlock. No new resources have been acquired.
3908	At least one of the requested exclusive resources is currently owned by another task. No new resources have been acquired.
3931	Parameter list is invalid.

After completion of an ENQUEUE function to *test* resources, the ERROR-STATUS field in the IDMS DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	All requested resources are available.
3908	At least one of the tested resources is already owned by another task.
3909	At least one of the tested resources is not yet owned by another task and is available to the issuing task.
3931	Parameter list is invalid.

ERASE

The ERASE statement performs the following functions:

- Disconnects the specified record from all set occurrences in which it participates as a member and logically or physically deletes the record from the database
- Optionally erases all records that are mandatory members of set occurrences owned by the specified record
- Optionally disconnects or erases all records that are optional members of set occurrences owned by the specified record

ERASE is a two-step procedure that first cancels the existing membership of the named record in specific set occurrences and then releases for reuse the space occupied by the named record and its db-key. Erased records are unavailable for further processing by any DML statement.

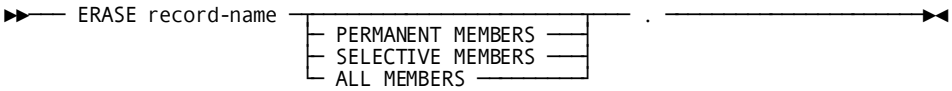
Before execution of the ERASE statement, the following conditions must be satisfied:

- All areas affected either implicitly or explicitly must be readied in one of the update usage modes (see READY (see page 272) later in this chapter)
- All sets in which the specified record participates as owner either directly or indirectly (for example, as owner of a set with a member that is owner of another set) and all member record types in those sets must be included in the subschema in use
- The specified record must be established as current of run unit

Currency

Following successful execution of an ERASE statement, currency is nullified for all record types involved in the erase both explicitly and implicitly. Run unit and area currency remain unchanged. Next, prior, and owner currencies are preserved for sets from which the last record occurrence was erased. These currencies enable you to retrieve the next or prior records within the area or the next, prior, or owner records within the set in which the erased record participated. An attempt to retrieve erased records results in a non-zero status condition.

Syntax



Parameters

record-name

Specifies the name of the record to be erased. It must be a record included in the subschema. The current of *record-name* must be current of run unit.

Unless PERMANENT, SELECTIVE, or ALL qualification follows, a non-zero status condition results if the named record is the owner of any nonempty set occurrences.

Native VSAM users: ERASE *record-name* is the only form of the ERASE statement valid for records in a native VSAM KSDS or RRDS; the ERASE statement is not valid for a native VSAM ESDS.

PERMANENT MEMBERS

Erases the specified record and all mandatory member record occurrences owned by the specified record. Optional member records are disconnected. If any of the erased mandatory members are themselves the owner of any set occurrences, the ERASE statement is executed on such records as if they were directly the object record of an ERASE PERMANENT statement (that is, all mandatory members of such sets are also erased). This process continues until all direct and indirect members have been processed.

SELECTIVE MEMBERS

Erases the specified record and all mandatory member record occurrences owned by the specified record. Optional member records are erased if they do not *currently participate* as members in other set occurrences. All erased member records that are themselves the owners of any set occurrences are treated as if they were the object of an ERASE SELECTIVE statement.

ALL MEMBERS

Erases the specified record and all mandatory and optional member record occurrences owned by the specified record. All erased member records that are themselves the owners of any set occurrences are treated as if they were the object record of an ERASE ALL statement.

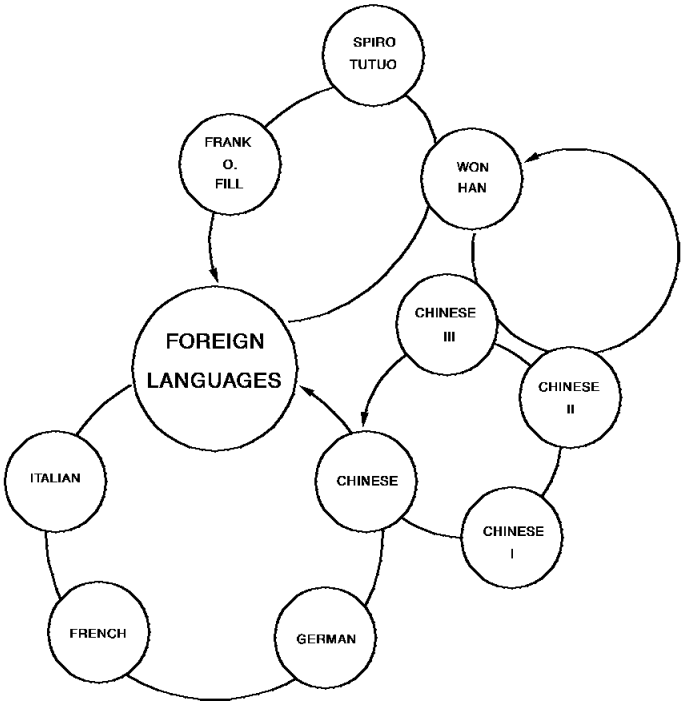
Example

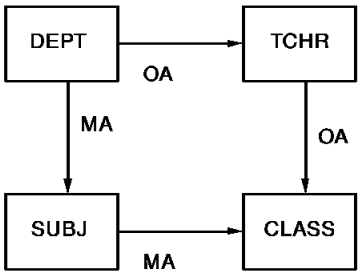
Use of the ERASE Statement

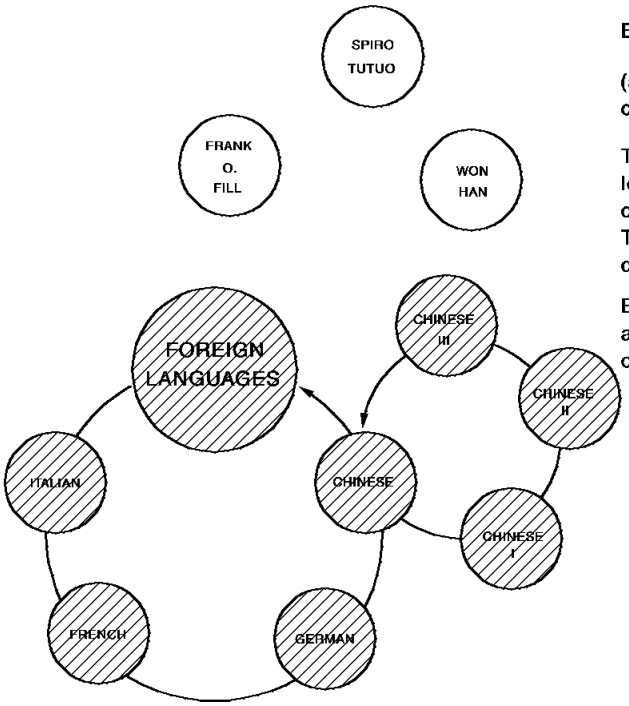
The following figure illustrates use of the three parameters of the ERASE statement.

The outcome of the ERASE statement varies based on the qualifier specified (PERMANENT, SELECTIVE, or ALL). Although all three qualifiers cause all mandatory members owned by the specified record to be erased, they differ in their effect on optional members.

Because the sample employee database provides no appropriate examples of these parameters, this figure and the one after use a sample high school database instead.





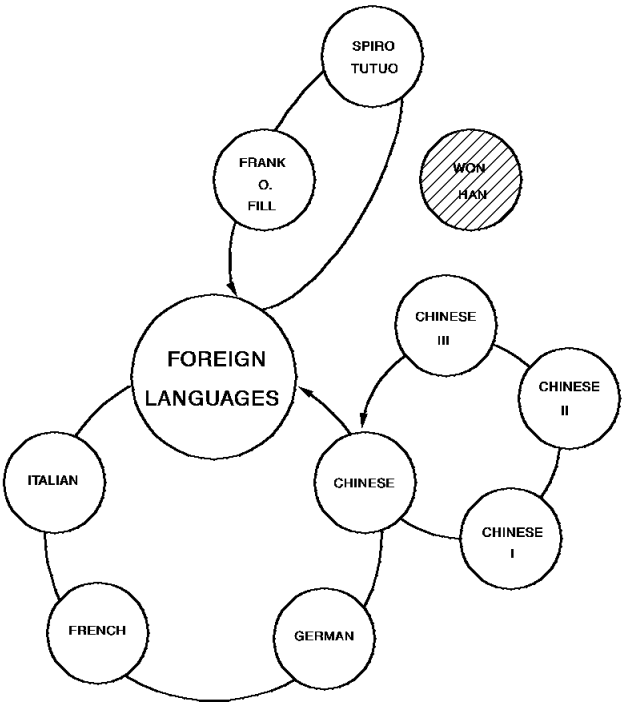


ERASE DEPT PERMANENT

(assuming that FOREIGN LANGUAGES is current of run unit)

The Foreign Languages Department can no longer be funded, so it is deleted from the database along with its subjects and classes. The teachers will be reassigned to other departments.

Erases the foreign language record and all mandatory members; disconnects optional members.

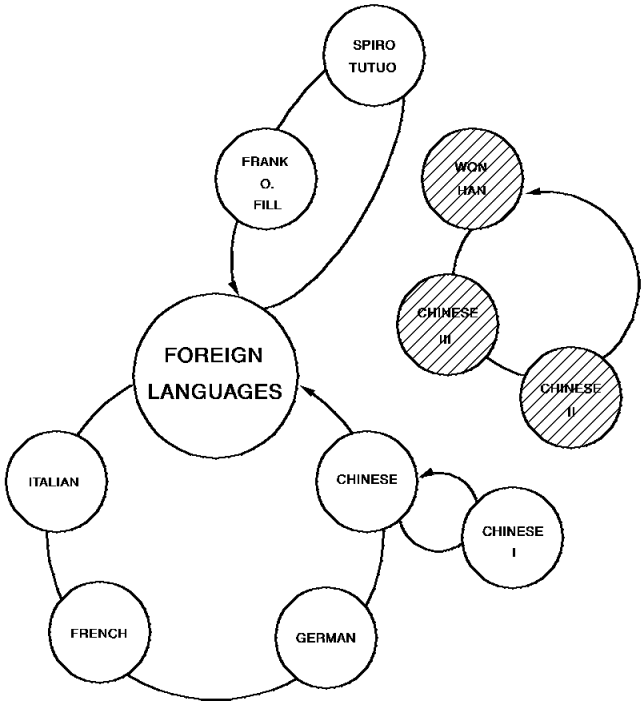


ERASE TCHR SELECTIVE

(assuming that WON HAN is current of the run unit)

Won Han has quit in the middle of the semester. His classes will be finished by another teacher, so only Won Han is erased. (Remember that an unqualified ERASE command cannot be used to erase the owner of a non-empty set.)

Erases the TCHR record occurrence, mandatory members (none, TCHR-CLASS is OA), and optional orphans (none, CHI is in the SUBJ-CLASS set).



ERASE TCHR ALL

(assuming that Won Han is current of run unit)

No one is available to teach Won Han's classes, so both he and his classes are deleted from the database.

Erases the TCHR record occurrence and all mandatory and optional members.

ERASE Currency

The following figure shows the effect each of the parameters has on currency.

Status Codes

	CURRENCIES: RUN UNIT, RECORD, SET, AREA									
	RUN UNIT	DEPT	TCHR	SUBJ	CLASS	DEPT-TCHR	DEPT-SUBJ	TCHR-CLASS	SUBJ-CLASS	SCHOOL-REGION
ESTABLISHED CURRENCIES	FOREIGN LANG.	FOREIGN LANG.		FRENCH	CHI I.	FOREIGN LANG.	FOREIGN LANG.	CHI I.	FRENCH	FOREIGN LANG.
ERASE DEPT PERMANENT	FOREIGN LANG.	NULL		NULL	NULL	NP	NULL	NP	NULL	FOREIGN LANG.
ESTABLISHED CURRENCIES	WON HAN	FOREIGN LANG.	WON HAN		CHI I.	WON HAN	FOREIGN LANG.	WON HAN	CHI I.	WON HAN
ERASE TCHR SELECTIVE	WON HAN	FOREIGN LANG.			CHI I.	NP	FOREIGN LANG.	NP	CHI I.	WON HAN
ESTABLISHED CURRENCIES	WON HAN		WON HAN	FRENCH		WON HAN	FRENCH	WON HAN	FRENCH	WON HAN
ERASE TCHR ALL	WON HAN			FRENCH	NULL	NP	FRENCH	NP	NP	WON HAN

After completion of the ERASE function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0203	Invalid currency for the named record to ERASE. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to erase a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0208	The object record is not in the specified subschema.
0209	The named record's area has not been readied in one of the three update usage modes.
0210	The subschema specifies an access restriction that prohibits use of the ERASE statement. For SPF users, this code can also indicate use of an invalid form of the ERASE statement.
0213	A current record of run unit has either not been established or has been nullified by a previous ERASE statement.
0217	A db-key has been encountered that contains a long-term permanent lock.

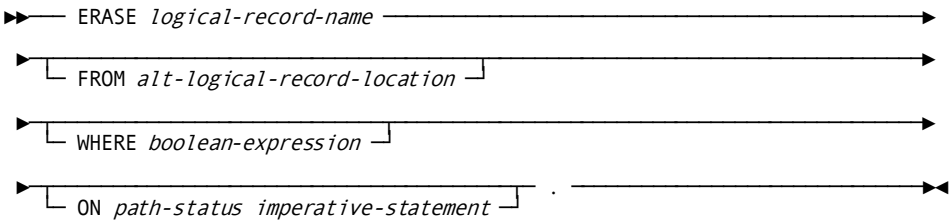
Status code	Meaning
0220	The current record of run unit is not the same record type as the named record.
0221	An area other than the area of the specified record has been readied with an incorrect usage mode.
0225	Currency has not been established.
0226	A broken chain has been encountered in the process of executing an ERASE ALL, PERMANENT, or SELECTIVE.
0230	An attempt has been made to erase the owner record of a nonempty set.
0233	Either erasure of the record occurrence is not allowed in this subschema or all sets in which the record participates have not been included in the subschema.
0260	A record occurrence has been encountered whose type is inconsistent with the set named in the ERROR-SET field of the IDMS communications block; probable causes include: a broken chain and improper database description.
0261	The record cannot be erased because of broken chains in the database.

ERASE (LRF)

The ERASE statement deletes a logical-record occurrence. The ERASE statement does not necessarily result in the deletion of all or any of the database records used to create the specified logical record; the path selected to service an ERASE logical-record request performs whatever database access operations the DBA has specified to service the request. For example, if a DEPARTMENT loses an employee, the EMP-JOB-LR logical record that contains information about that employee would be erased. However, only the information about the former employee would be erased from the database, not all the information about the department; that is, EMPLOYEE information would be erased, but not DEPARTMENT, JOB, or OFFICE information.

LRF uses field values present in the variable-storage location reserved for the logical record to update the database. You can specify an alternative storage location from which LRF is to take field values to make the appropriate updates to the database.

Syntax



Parameters

logical-record-name

Specifies the name of the logical record to erase. The logical record must be defined in the subschema. Unless you specify FROM, LRF uses field values present in the variable-storage location reserved for the logical record to make any necessary updates to the database.

FROM *alt-logical-record-location*

Names an alternative variable-storage location from which LRF is to obtain field values to perform the appropriate database updates in response to this request. When erasing a logical record that has previously been retrieved into an alternative storage location, use the FROM clause to name the same location specified in the OBTAIN request. The alternate record location must be defined in the WORKING-STORAGE/LINKAGE SECTION.

WHERE *boolean-expression*

Specifies the selection criteria to be applied to the specified logical record. For details on coding this clause, see Logical-Record Clauses (see page 327) at the end of this chapter.

ON *path-status imperative-statement*

Specifies the action to be taken if *path-status* is returned to the LR-STATUS field in the LRC block. For details on coding this clause, see Logical-Record Clauses (see page 327) at the end of this chapter.

Example

The following example illustrates a request to erase all occurrences of a former employee's EMP-INSURANCE-LR logical record; the DBA-designated path status ALL-ERASED indicates that all occurrences of the EMP-INSURANCE-LR logical record have been erased.

```
ERASE EMP-INSURANCE-LR WHERE EMP-ID-0415 EQ '0316'
 ON ALL-ERASED PERFORM EMP-INS-DELETION-RPT.
```

ERASE EMP-INSURANCE-LR

As defined by the DBA, the ERASE EMP-INSURANCE-LR path group logically deletes all of the specified EMP-INSURANCE-LR occurrences but physically deletes only the COVERAGE records, as illustrated by the following figure.

FIND/OBTAIN

The FIND statement locates a record occurrence in the database; the OBTAIN statement locates a record and moves the data associated with the record to the record buffers. Because the FIND and OBTAIN command statements have identical formats, they are discussed together. The six formats of the FIND/OBTAIN statement are as follows:

- **FIND/OBTAIN CALC** accesses a record occurrence by using its CALC key value.
- **FIND/OBTAIN CURRENT** accesses a record occurrence by using established currencies.
- **FIND/OBTAIN DB-KEY** accesses a record occurrence by using its database key.
- **FIND/OBTAIN OWNER** accesses the owner record of a set occurrence.
- **FIND/OBTAIN WITHIN SET USING SORT KEY** accesses a record occurrence in a sorted set by using its sort key value.
- **FIND/OBTAIN WITHIN SET/AREA** accesses a record occurrence based on its logical location within a set or on its physical location within an area.

You can place locks on located record occurrences by using the KEEP clause of a FIND/OBTAIN statement. The KEEP clause sets a shared or exclusive lock:

- **KEEP** places a shared lock on the located record occurrence. Other concurrently executing run units can access but not update the locked record.
- **KEEP EXCLUSIVE** places an exclusive lock on the located record occurrence. Other concurrently executing run units can neither access nor update the locked record.

  Note: For more information about record locks, see KEEP CURRENT (see page 215).

Each format of the FIND/OBTAIN statement is discussed separately on the following pages.

FIND/OBTAIN CALC/DUPLICATE

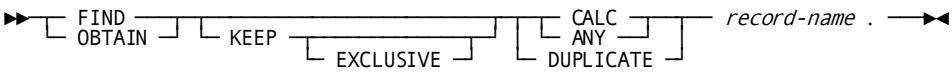
The FIND/OBTAIN CALC/DUPLICATE statement locates a record based on the value of an element defined as a CALC key in the record. The specified record must be stored in the database with a location mode of CALC. Before issuing the FIND/OBTAIN CALC/DUPLICATE statement, you must initialize a field in program variable storage with the CALC-key value.

You can use the DUPLICATE option to access duplicate records with the same CALC-key value as the record that is current of record type, provided that a FIND/OBTAIN CALC statement has previously accessed an occurrence of the same record type.

Currency

Following successful execution of a FIND/OBTAIN CALC/DUPLICATE statement, the accessed record becomes the current record of run unit, its record type, its area, and all sets in which it currently participates as member or owner.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

CALC (ANY)

Locates the first or only occurrence of the specified record type whose CALC key matches the value of the CALC data item in program variable storage.

CALC and ANY are synonyms and can be used interchangeably.

DUPLICATE

Locates the next record with the same CALC key value as the current of the specified record type. Use of the DUPLICATE option requires prior selection of an occurrence of the same record type with the CALC option. If the value of the CALC key in variable storage is not equal to the CALC-key field of the current of record type, a status code of 0332 is returned.

record-name

The name of the record type to be located.

Example

To retrieve an occurrence of the EMPLOYEE record by using the FIND/OBTAIN CALC/DUPLICATE statement, you must first initialize the variable-storage field that contains the CALC control element. The following statements initialize the CALC field EMP-ID-0415 and retrieve an occurrence of the EMPLOYEE record:

```
MOVE EMP-ID-IN TO EMP-ID-0415.
OBTAIN CALC EMPLOYEE.
```

Status Codes

After completion of the FIND/OBTAIN CALC/DUPLICATE function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0301	The area in which the named record participates has not been readied.
0306	A successful FIND/OBTAIN CALC has not yet been executed (applies to the DUPLICATE option only).
0308	The named record is not in the subschema. The program probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the named record.
0318	The record has not been bound.
0326	Either the record or cannot be found or no more duplicates exist for the named record.
0331	The retrieval statement format conflicts with the record's location mode.
0332	The value of the CALC data item in program variable storage does not equal the value of the CALC data item in the current record (applies to the DUPLICATE option only).
0364	The CALC control element has not been described correctly either in the program or in the subschema.
0370	A database file will not open properly.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

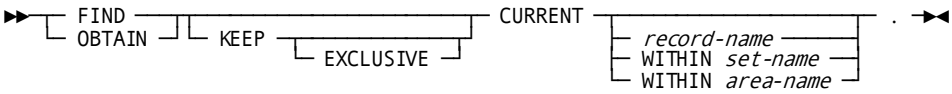
FIND/OBTAIN CURRENT

The FIND/OBTAIN CURRENT statement locates the record that is current of its record type, set, or area. This form of the FIND/OBTAIN statement is an efficient means of establishing the appropriate record as current of run unit before executing a DML statement that uses run-unit currency (for example, ACCEPT, IF, GET, MODIFY, ERASE).

Currency

Following successful execution of a FIND/OBTAIN CURRENT statement, the accessed record is current of run unit, its record type, its area, and all sets in which it currently participates as member or owner.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

CURRENT

Locates the current record occurrence of a specified record type, set, or area.

record-name

Accesses the current record of the specified record type.

WITHIN *set-name*

Accesses the current record of the specified set.

WITHIN *area-name*

Accesses the current record of the specified area.

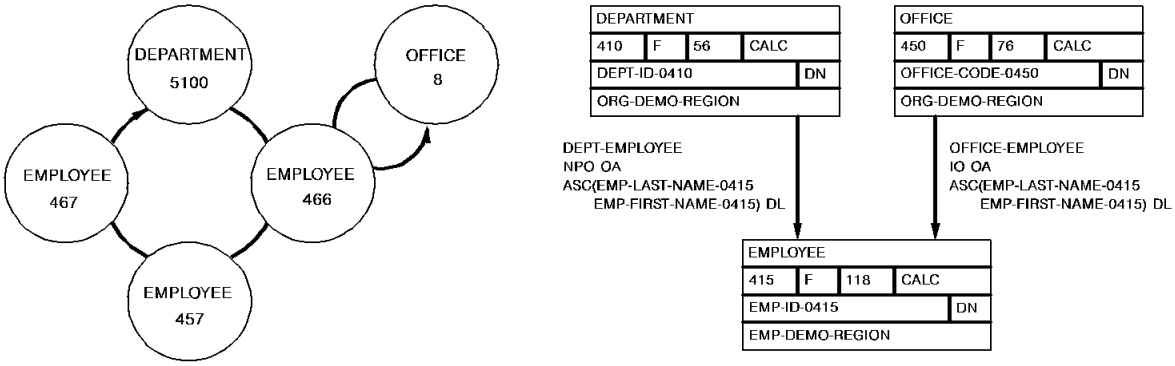
Example

Using the FIND/OBTAIN CURRENT Statement

The following figure illustrates use of the FIND/OBTAIN CURRENT statement to establish the proper record as current of run unit before the record is modified.

Enter the database on DEPARTMENT 5100 by using CALC retrieval. Then examine EMPLOYEE 466 by using within set retrieval and obtain further information from its owner OFFICE record (OFFICE 8). OFFICE 8 becomes current of run unit. Before modifying EMPLOYEE 466, you must issue the FIND CURRENT statement to reestablish EMPLOYEE 466 as current of run unit.

For a complete description of the MODIFY statement and its use, see MODIFY (see page 243).



	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	*DEPARTMENT*	*EMPLOYEE*	*OFFICE*	*DEPT-EMPLOYEE*	*OFFICE-EMPLOYEE*	*ORG-DEMO-REGION*	*EMP-DEMO-REGION*
MOVE 5100 TO DEPT-ID. FIND CALC DEPARTMENT.	5100	5100			5100		5100	
OBTAIN FIRST WITHIN DEPT-EMPLOYEE.	466	5100	466		466	466	5100	466
OBTAIN OWNER WITHIN OFFICE-EMPLOYEE.	8	5100	466	8	466	8	8	466
FIND CURRENT EMPLOYEE.	466	5100	466	8	466	466	8	466
MODIFY EMPLOYEE.	466	5100	466	8	466	466	8	466

Status Codes

After completion of the FIND/OBTAIN CURRENT function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0301	The area in which the named record participates has not been readied.
0303	Invalid currency for a record to be retrieved on a FIND. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to find a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0306	Currency has not been established for the named record, set, or area.
0308	The named record or set is not in the subschema. The program has probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the named record.
0313	A current record of run unit either has not been established or has been nullified by a previous ERASE statement.
0323	The specified area name has not been included in the subschema invoked.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

FIND/OBTAIN DB-KEY

The FIND/OBTAIN DB-KEY statement locates a record occurrence directly using a database key that has been stored previously by the program. The DML ACCEPT statement, explained earlier in this chapter, or the COBOL MOVE statement can be used to save a db-key. Any record in the program's subschema can be accessed directly in this manner, regardless of its location mode.

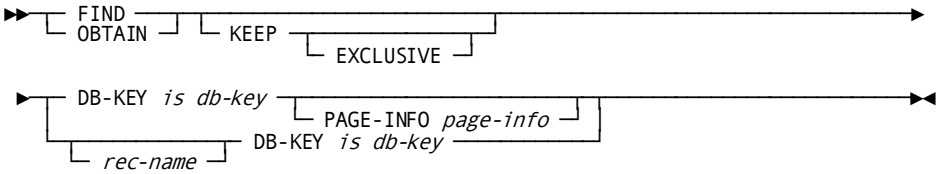
Native VSAM users: This statement is not valid for accessing data records in a native VSAM key-sequenced data set (KSDS).

Currency

After successful execution of a FIND/OBTAIN DB-KEY statement, the accessed record becomes the current record of run unit, its record type, its area, and all sets in which it currently participates as member or owner. In addition, the RECORD-NAME field of the IDMS communications block is updated with the name of the accessed record.

Note that currency is not used to determine the specified record of the FIND/OBTAIN DB-KEY statement; the record is identified by its db-key and, optionally, by its record type.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

DB-KEY is

Locates a record directly by using a db-key value contained in program variable storage.

db-key

A field that identifies the location within program variable storage that contains a db-key previously saved by the program.

If a record name has been specified, *db-key* must contain the db-key of an occurrence of the named record type. If a record name has not been specified, *db-key* can contain the db-key of an occurrence of any record type in the subschema.

PAGE-INFO

Specifies page information that is used to determine the area with which the dbkey is associated. If not specified, the page information associated with the record that is current of rununit is used.

Note: Page information is only used if the subschema includes areas that have mixed page groups; otherwise, it is ignored.

page-info

A four-byte field that may be defined either as a group field or as a fullword field (PIC S9(8) COMP). Identifies the location in variable storage that contains the page information previously saved by the program.

Page information is returned in the PAGE-INFO field in the subschema control area if the subschema includes areas in mixed page groups. Page information may also be returned using an ACCEPT PAGE-INFO statement.

rec-name

The record type of the requested record. *Rec-name* must name a record that is included in the subschema.

Example

The following statement locates the occurrence of the HOSPITAL-CLAIM record whose db-key matches the value of a field in program variable storage called SAVED-KEY:

```
FIND HOSPITAL-CLAIM DB-KEY IS SAVED-KEY.
```

The located record becomes current of run unit, current of the HOSPITAL-CLAIM record type, current of the INS-DEMO-REGION area, and current of the COVERAGE-CLAIMS set.

Status Codes

After completion of the FIND/OBTAIN DB-KEY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0301	The area in which the named record participates has not been readied.
0302	The db-key is inconsistent with the area in which the record is stored. Either the db-key has not been initialized properly or the record name is incorrect.

Status code	Meaning
0303	Invalid currency for a record to be retrieved on a FIND. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to find a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0308	The named record is not in the subschema. The program has probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the named record.
0326	The record cannot be found; record occurrence not correct type.
0370	A database file will not open properly.
0371	The requested page cannot be found in the DMCL.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

FIND/OBTAIN OWNER

The FIND/OBTAIN OWNER statement locates the owner record of the current occurrence of a set. This statement can be used to retrieve the owner record of any set whether or not that set has been assigned owner pointers.

Native VSAM users: The FIND/OBTAIN OWNER statement is not valid since owner records are not defined in native VSAM data sets.

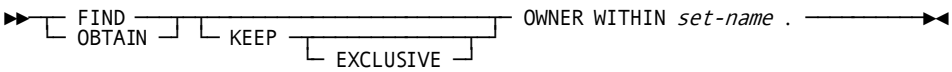
Currency

In order to execute a FIND/OBTAIN OWNER statement, currency must be established for the specified set.

Note: When a record declared as an optional or manual member of a set is retrieved, it is *not* established as current of set if it is not currently connected to the specified set. A subsequent attempt to retrieve the owner record will locate instead the owner of the current record of set. In such cases, you should determine whether the retrieved record is actually a member in the specified set before executing the FIND/OBTAIN OWNER statement. The IF MEMBER statement, explained later in this chapter, can be used for this purpose.

Following successful execution of a FIND/OBTAIN OWNER statement, the accessed record becomes the current record of run unit, its record type, its area, and all sets in which it currently participates as member or owner. If the current record of set is the owner record when the statement is executed, currency within the specified set remains unchanged.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

OWNER

Locates the owner record of the specified set.

WITHIN

Specifies the set whose owner record is to be retrieved.

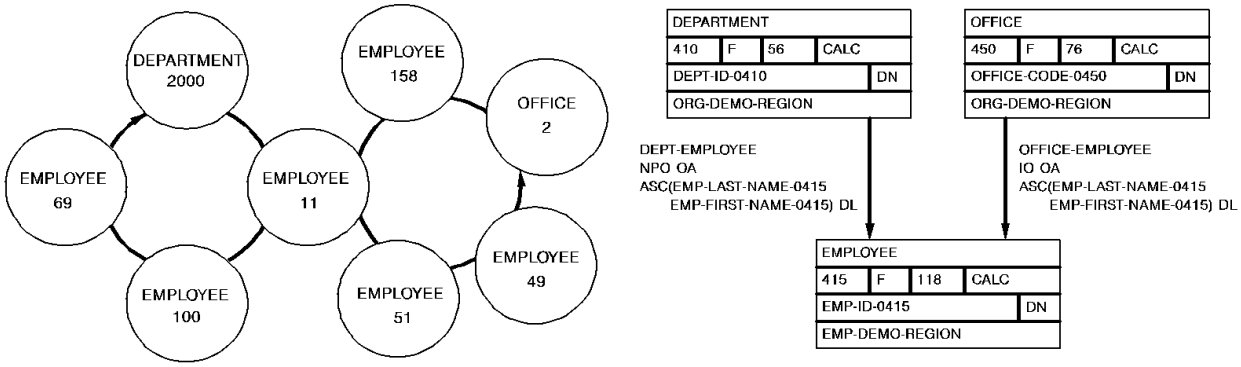
set-name

The name of a set included in the subschema.

Example

Using the FIND/OBTAIN OWNER Statement to Move Through the Database

The following figure illustrates use of the FIND/OBTAIN OWNER statement.



	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	DEPARTMENT	EMPLOYEE	OFFICE	DEPT-EMPLOYEE	OFFICE-EMPLOYEE	ORG-DEMO-REGION	EMP-DEMO-REGION
MOVE 2000 TO DEPT-ID. OBTAIN CALC DEPARTMENT.	2000	2000			2000		2000	
OBTAIN FIRST WITHIN DEPT-EMPLOYEE.	11	2000	11		11	11	2000	11
OBTAIN OWNER WITHIN OFFICE-EMPLOYEE.	2	2000	11	2	11	2	2	11

Status Codes

After completion of the FIND/OBTAIN OWNER function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0301	The area in which the object record participates has not been readied.
0303	Invalid currency for a record to be retrieved on a FIND. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to find a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0306	Currency has not been established for the record, set, or area.
0308	The named set is not in the subschema. The program has probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the object record.
0360	A record occurrence has been encountered whose record type is not a member or owner of the set as it is defined in the subschema.

Status code	Meaning
0370	A database file will not open properly.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

FIND/OBTAIN WITHIN SET USING SORT KEY

The FIND/OBTAIN WITHIN SET USING SORT KEY statement locates a member record in a sorted set. Sorted sets are ordered in ascending or descending sequence based on the value of a sort-control element in each member record. The search begins with either the current of set or the owner of the current of set and always proceeds through the set in the next direction.

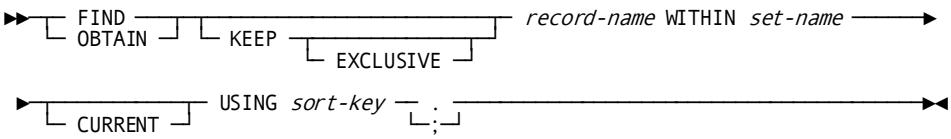
Before issuing this statement, you must initialize the sort control element in program variable storage. The record occurrence selected will have a key value equal to the value of the sort control element. If more than one record occurrence contains a sort key equal to the key value in variable storage, the first such record will be selected.

In a batch environment, sorted sets can be processed more efficiently by sorting the input transactions.

Currency

Following successful execution of a FIND/OBTAIN WITHIN SET USING SORT KEY statement, the accessed record becomes current of run unit, its record type, its area, and all sets in which it currently participates as member or owner. If a member record with the requested sort-key value is not found, the current of set is nullified but the next of set and prior of set are maintained. The next of set is the member record with the next higher sort-key value (or next lower for descending sets) than the requested value; the prior of set is the member record with the next lower value (or higher for descending sets) than requested. Because these currencies are maintained, the program can walk the set to do a generic search on the sort-key value.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

record-name

Specifies the record type to locate.

WITHIN

Specifies the set to be searched.

Unless you specify CURRENT, the search begins with the *owner* of the specified set.

set-name

The name of a sorted set included in the subschema.

CURRENT

Indicates that the search begins with the currencies already established for the specified set.

If the key value for the record that is current of set is higher than the key value of the requested record (assuming ascending set order), a non-zero status condition results. In a descending set order, if the key value for the record that is current of set is lower than the key value of the requested record, a non-zero status condition results.

USING

Specifies the sort control element to be used in searching the sorted set.

sort-key

The symbolic name of a field defined in working storage that contains the value of the sort control element.

Note: Due to the architecture of the client interface for CA IDMS, 256 bytes will be moved regardless of the actual length of the working storage sort key. This additional storage should be accounted for in order to avoid potential program exceptions that can occur. While these exceptions are rare, they are more probable if the sort-key is defined in a FILE or LINKAGE SECTION definition. To avoid this problem, it is recommended that the sort-key be defined in the program's WORKING STORAGE SECTION, padded to a full 256 bytes; and moved in and out of the FILE or LINKAGE SECTION fields.

Note: The value coded for *sort-key* can only specify a single field name. If the sort key is comprised of multiple elementary fields, the value coded should be a group-level name. The elementary fields that make up the group element must be in the same sequence as defined for the corresponding fields in the database set's schema definition. The data formats for the individual elementary fields must also match the formats of the corresponding fields within the database record.

Note: A period or semicolon is required to terminate the statement unless an ON clause has been coded.

Here is an example of OBTAIN RECA WITHIN RECA-SET USING RECA-KEY. The record's sort key would be defined as follows in the WORKING-STORAGE SECTION:

```
01 RECA-KEY.
  02 RECA-FIELD1      PIC X(10).
  02 RECA-FIELD2      PIC X(10).
```

It should be changed to:

```
01 RECA-KEY.
  02 RECA-FIELD1      PIC X(10).
  02 RECA-FIELD2      PIC X(10).
  02 FILLER           PIC X(236).
```

Example

The following example illustrates the use of a FIND/OBTAIN WITHIN SET USING SORT KEY statement. Assume that the SKILL-NAME-NDX set is ordered in ascending sequence based on the value stored in SKILL-NAME-0455 in each SKILL record occurrence. Retrieval of a SKILL record with a skill name equal to PL/I is accomplished by the following statements:

```
MOVE 'PL/I' TO SKILL-NAME-0455.
FIND SKILL WITHIN SKILL-NAME-NDX
          USING SKILL-NAME-0455.
```

Status Codes

After completion of the FIND/OBTAIN WITHIN SET USING SORT KEY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.

Status code	Meaning
0301	The area in which the named record participates has not been readied.
0303	Invalid currency for a record to be retrieved on a FIND. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to find a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0306	Currency has not been established for the named set.
0308	Either the named record or set is not in the subschema or the named record is not a member of the named set. The program has probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the named record.
0326	The record cannot be found.
0331	The retrieval statement format conflicts with the record's location mode.
0360	A record occurrence has been encountered whose record type is not a member or owner of the set as it is defined in the subschema.
0370	A database file will not open properly.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

FIND/OBTAIN WITHIN SET/AREA

The FIND/OBTAIN WITHIN SET/AREA statement locates records either logically, based on set relationships, or physically, based on database location. The formats of this statement allow you either to access serially each record in a set or area or to select specific occurrences of a given record type within the set or area.

The following rules apply to the selection of member records within a **set**:

- The set occurrence used as the basis for the operation is determined by the current record of the specified set. Set currency must be established before attempting to access records within a set.
- The next or prior record within a set is the subsequent or previous record relative to the *current record of the named set* in the logical order of the set. The prior record in a set can be retrieved only if the set has been assigned prior pointers.

- The first or last record within a set is the first or last member occurrence in terms of the logical order of the set. The selected record is the same as would be selected if the current of set were the owner record and the next or prior record had been requested. The last record in a set can be retrieved only if the set has prior pointers.
- The *n*th occurrence of a record within a set can be retrieved by specifying a sequence number that identifies the position of the record in the set. The DBMS begins its search with the *owner of the current of set* for the specified set and continues until it locates the *n*th record or encounters an end-of-set condition. If the specified sequence number is negative, the search proceeds in the prior direction within the set. A negative sequence number can be used only if the set has prior pointers; a sequence number of 0 produces a status code of 0304.
- When an end-of-set condition occurs, the owner record occurrence of the set becomes the current record of run unit, current of its record type, current of its area, and current record of *only* the set involved in this operation. Currency of other sets in which the specified record participates as owner or member remains unaffected.

  Note: If OBTAIN has been specified, the contents of the owner record are not moved to program variable storage (that is, OBTAIN under these circumstances is treated as a FIND).

  Native VSAM users:.When an end-of-set condition occurs, all currencies remain unchanged.

The following rules apply to the selection of records within an **area**:

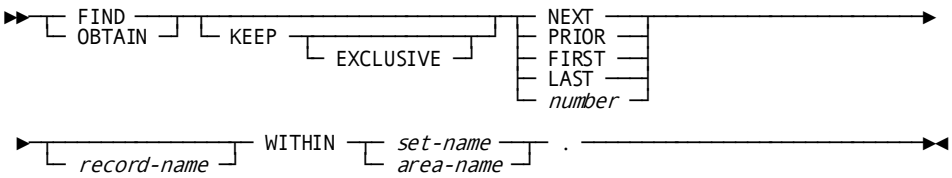
- The first record occurrence within an area is the one with the lowest database key; the last record is the one with the highest database key
- The next record within an area is the one with the next higher database key relative to the *current record of the named area*; the prior record is the one with the next lower database key relative to the current of area
- The first or last or *n*th record in an area must be retrieved to establish the correct starting position before next or prior records are requested

Currency

Following successful execution of a FIND/OBTAIN WITHIN SET/AREA statement, the accessed record becomes the current record of run unit, its record type, its area, and all sets in which it currently participates as member or owner.

When an end-of-set condition occurs selecting records within a set, the owner record occurrence of the set becomes the current record of run unit, its record type, its area, and *only* the set involved in this operation. Currency of other sets in which the specified record participates as owner or member remains unaffected.

Syntax



Parameters

KEEP

Places a shared lock on the accessed record.

EXCLUSIVE

Places an exclusive lock on the accessed record.

NEXT

Accesses the next record in the specified set or area relative to the current record.

PRIOR

Accesses the prior record in the specified set or area relative to the current record. The specified set must have prior pointers.

FIRST

Accesses the first record in the specified set or area.

LAST

Accesses the last record in the specified set or area. The specified set must have prior pointers.

number

Accesses the indicated record number in the specified set or area. *Number* must either be a non-zero number or the symbolic name of a numeric field that contains a non-zero value. If the number is negative, the specified set must have prior pointers.

record-name

Specifies that within a set or area, only occurrences of the named record type will be accessed. *Record-name* must be defined as a member of the specified set or contained within the specified area.

WITHIN

Locates a record based on its location within a set or area.

set-name Specifies the set to be searched. The set must be included in the subschema.

area-name Specifies the area to be searched. The area must be included in the subschema.

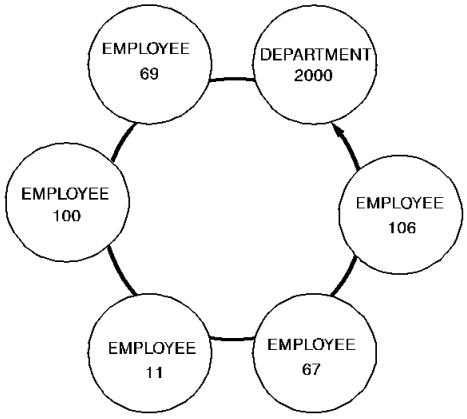
Native VSAM users: .FIRST, LAST, and *sequence* options are not valid for a native VSAM KSDS with spanned records.

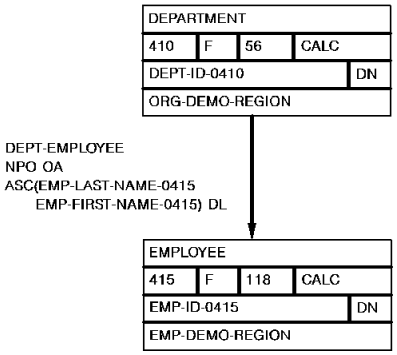
Example

Retrieval of Records in an Occurrence of the DEPT-EMPLOYEE Set

The following figure illustrates the retrieval of records within an occurrence of the DEPT-EMPLOYEE set.

The FIND CALC statement establishes currency in the DEPT-EMPLOYEE set. Member EMPLOYEE records are then retrieved by a series of OBTAIN WITHIN SET statements. EMPLOYEE 106 is the last record in the set and the next OBTAIN statement returns an end-of-set condition, positioning run unit currency at the owner of the set, DEPARTMENT 2000.



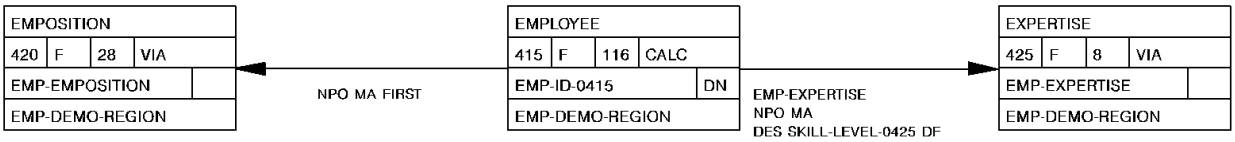


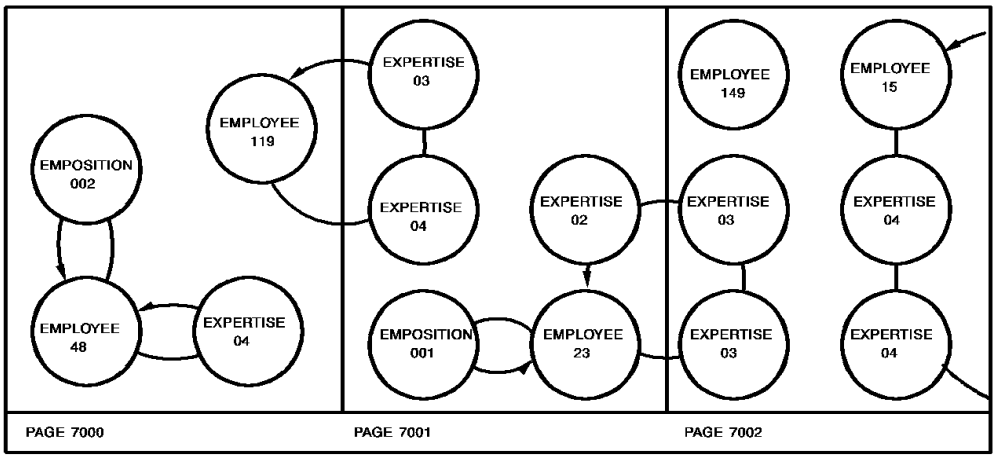
	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	DEPARTMENT	EMPLOYEE	DEPT-EMPLOYEE	OFFICE-EMPLOYEE	ORG-DEMO-REGION	EMP-DEMO-REGION	
MOVE 2000 TO DEPT-ID. FIND CALC DEPARTMENT.	2000	2000		2000		2000		
OBTAIN FIRST WITHIN DEPT-EMPLOYEE.	69	2000	69	69	69	2000	69	
OBTAIN NEXT WITHIN DEPT-EMPLOYEE.	100	2000	100	100	100	2000	100	
OBTAIN 5 WITHIN DEPT-EMPLOYEE.	106	2000	106	106	106	2000	106	
OBTAIN NEXT WITHIN DEPT-EMPLOYEE.	2000	2000	106	2000	106	2000	106	ERROR-STATUS OF '0307'

Retrieving Records in Area Containing Multiple Record Types

The following figure illustrates special considerations relating to the retrieval of records within an area that contains multiple record types.

In this example, a sweep of the EMP-DEMO-REGION is performed, retrieving sequentially each EMPLOYEE record and all records in the associated EMPLOYEE-EXPERTISE set. The first command retrieves EMPLOYEE 119. Subsequent OBTAIN WITHIN SET statements retrieve the associated EXPERTISE records and establish currency on EXPERTISE 03. The FIND CURRENT statement is used to reestablish the proper position before retrieving EMPLOYEE 48. If FIND CURRENT EMPLOYEE is not specified, an attempt to retrieve the next EMPLOYEE record in the area would return EMPLOYEE 23.





	RUN UNIT	EMPLOYEE	EXPERTISE	EMP-EXPERTISE	EMP-DEMO-REGION
OBTAIN FIRST EMPLOYEE WITHIN EMP-DEMO-REGION.	119	119		119	119
OBTAIN FIRST EXPERTISE WITHIN EMP-EXPERTISE	04	119	04	04	04
OBTAIN NEXT EXPERTISE WITHIN EMP-EXPERTISE	03	119	03	03	03
FIND CURRENT EMPLOYEE	119	119	03	119	119
OBTAIN NEXT EMPLOYEE WITHIN EMP-DEMO-REGION	48	48	03	48	48

Status Codes

After completion of the FIND/OBTAIN WITHIN SET/AREA function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0301	The area in which the named record participates has not been readied.
0303	Invalid currency for a record to be retrieved on a FIND. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to find a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0306	A successful FIND/OBTAIN CALC has not yet been executed (applies to the DUPLICATE option only).

Status code	Meaning
0307	The end of the set or area has been reached, or the set is empty.
0308	The named record is not in the subschema. The program probably invoked the wrong subschema.
0310	The subschema specifies an access restriction that prohibits retrieval of the named record.
0318	The record has not been bound.
0326	Either the record or SPF index entry cannot be found or no more duplicates exist for the named record.
0331	The retrieval statement format conflicts with the record's location mode.
0332	The value of the CALC data item in program variable storage does not equal the value of the CALC data item in current record (applies to the DUPLICATE option only).
0364	The CALC control element has not been described correctly either in the program or in the subschema.
0370	A database file will not open properly.

If the FIND/OBTAIN statement includes an explicit KEEP: 03 is the major code returned if an error occurs during FIND processing, 06 if the error occurs during KEEP processing.

FINISH

The FINISH statement commits changes made to the database through an individual run unit or through all database sessions associated with a task. A task-level finish also commits all changes made in conjunction with scratch, queue, and print activity.

If the finish applies to an individual run unit and the run unit is sharing its transaction with another database session, the run unit's changes may not be committed at the time the FINISH statement is executed.

Note: For more information about the impact of transaction sharing, see the *CA IDMS Navigational DML Programming Guide*.

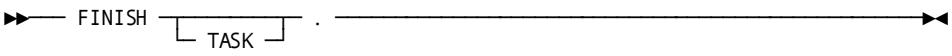
Run units (and SQL sessions) impacted by the FINISH statement end, and their access to the database is terminated.

The FINISH statement is used in both the navigational and logical record facility environments. The FINISH TASK statement is also used in an SQL programming environment.

Currency

Following the successful execution of a FINISH request, all currencies are set to null; the issuing program or task cannot perform database access through an impacted run unit without executing another BIND/READY sequence.

Syntax



Parameters

TASK

Commits the changes made by all scratch, queue, and print activity and all top-level run units associated with the current task and terminates those run units. Its impact on SQL sessions associated with the task depends on whether those sessions are suspended and whether their transactions are eligible to be shared.

More information:

For more information about the impact of a FINISH TASK statement on SQL sessions, see the *SQL Programming Guide*.

For more information about run units and the impact of FINISH TASK, see the *Navigational DML Programming Guide*.

Example

The following statement commits changes made by the run unit through which it is issued and terminates that run unit:

```
FINISH.
```

Status Codes

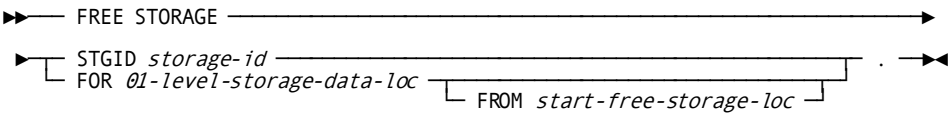
After completion of the FINISH function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
5031	The specified request is invalid; the program may contain a logic error
5097	An error was encountered processing a syncpoint request; check the log for details.

FREE STORAGE

The FREE STORAGE statement illustrates a request to release all or a part of a variable storage area. The storage to be released must have been acquired by means of a GET STORAGE request in the issuing task or by another task running on the same terminal as the issuing task. A partial release is valid only for user storage; shared storage must be freed in its entirety.

Syntax



Parameters

STGID

Specifies variable storage area to be released.

storage-id

Either the symbolic name of a user-defined field that contains the ID or the ID itself enclosed in quotation marks.

FOR *01-level-storage-data-loc*

Specifies the LINKAGE SECTION entry of the storage area to be released.

FROM

Releases storage from the specified location to the end of the storage area.

start-free-storage-loc

The symbolic name of a user-defined field that contains the starting point of the storage area to be released.

Example

The following example illustrates a request to release the storage area identified by 09PA:

```
FREE STORAGE STGID '09PA'.
```

Status Codes

After completion of the FREE STORAGE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3213	The requested storage ID cannot be found
3232	The derived length of the variable storage area is zero or negative
3234	The request cannot be serviced because the variable storage area is not an 01-level entry in the LINKAGE SECTION

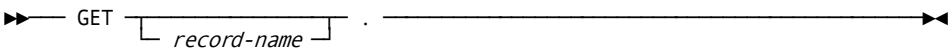
GET

The GET statement transfers the contents of a specified record occurrence from the record buffer into program variable storage. Elements in the specified record are moved to their respective locations in variable storage according to the subschema view of the record. The transferred elements will appear in storage at the location to which the record has been bound (for further details, see BIND RECORD (see page 124)).

Currency

The GET statement operates only on the record that is current of run unit. Following successful execution of a GET statement, the accessed record is current of run unit, its record type, its area, and all sets in which it participates as member or owner.

Syntax



Parameters

record-name

Specifies that the current of run unit must be an occurrence of the named record type.

Example

The following statement moves the record that is current of run unit (in this case, the OFFICE record) from the record buffer into program variable storage:

```
GET OFFICE.
```

Status Codes

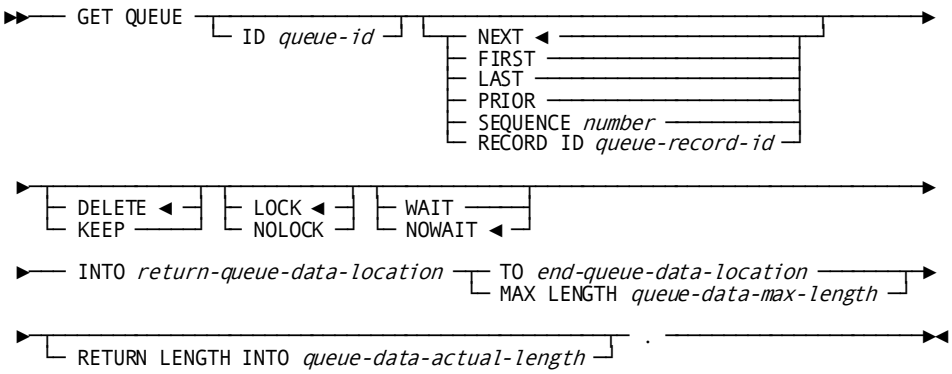
After completion of the GET function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
0503	Invalid currency for a record to be retrieved on a GET. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to get a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0506	Currency has not been established.
0508	The named record is not in the subschema. The program has probably invoked the wrong subschema.
0510	The subschema specifies an access restriction that prohibits retrieval of the named record.
0513	A current record of run unit either has not been established or has been nullified by a previous ERASE statement.
0518	The record has not been bound.
0520	The current record is not the same type as the named record.
0526	The requested record has been erased.
0555	An invalid length has been returned for a variable-length record.

GET QUEUE

The GET QUEUE statement retrieves a queue record and places it in a storage area associated with the issuing program. If the queue record is larger than the designated storage area, the record is truncated. The retrieved record is automatically deleted from the queue unless the GET QUEUE statement explicitly requests to keep the record in the queue.

Syntax



Parameters

ID

Specifies the queue associated with the record to be retrieved.

queue-id

Either the symbolic name of a user-defined field that contains the ID or the ID itself enclosed in quotation marks. If the queue ID is not specified, a null ID of 16 blanks is assumed.

NEXT

Retrieves the next record in the queue.

This is the default.

If currency has not been established, NEXT is equivalent to FIRST.

FIRST

Retrieves the first record in the queue.

LAST

Retrieves the last record in the queue.

PRIOR

Retrieves the prior record in the queue. If currency has not been established, PRIOR is equivalent to LAST.

SEQUENCE

Retrieves the specified queue record.

number

Either the symbolic name of a user-defined field that contains the sequence number of the record or the sequence number itself expressed as a numeric constant.

RECORD ID

Retrieves the specified record.

queue-record-id

The symbolic name of the PIC S9(8) COMP (fullword) field that contains the queue record ID returned by the PUT QUEUE function.

DELETE

Deletes the record from the queue.

This is the default.

If DELETE is specified and the record has been truncated, the truncated data is lost.

KEEP

Keeps the record in the queue.

LOCK/NOLOCK

These parameters have been non-functional since CA IDMS Release 12.0. They are included as parameters for release compatability. Queue record locking is performed as part of the standard database locking routines since CA IDMS Release 12.0.

WAIT

Suspends task execution until the requested queue exists.

NOWAIT

Continues task execution in the event of a nonexistent queue.

This is the default.

An ERROR-STATUS value of 4405 (DC-REC-NOT-FOUND) indicates that the requested queue record cannot be found.

INTO

Indicates the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data area reserved for the requested queue record.

return-queue-data-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry reserved for the requested queue record.

end-queue-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the requested queue record.

MAX LENGTH

Explicitly defines the length of the data area reserved for the requested queue record.

queue-data-max-length

Either the symbolic name of the user-defined field that contains the length of the queue records data or the length itself expressed as a numeric constant.

RETURN LENGTH INTO

Specifies the location to which CA IDMS is to return the actual length of the retrieved queue record.

queue-data-actual-length

The symbolic name of a user-defined four-byte field. If the record has been truncated, the value returned to this field is the actual length of the queue record before truncation.

Example

The following example illustrates a request to retrieve the first record in the RES-Q queue, return it to the PEND-RES field, and keep the record in the queue:

```
GET QUEUE
  ID 'RES-Q'
  FIRST
  KEEP
  INTO PEND-RES MAX LENGTH 125.
```

Status Codes

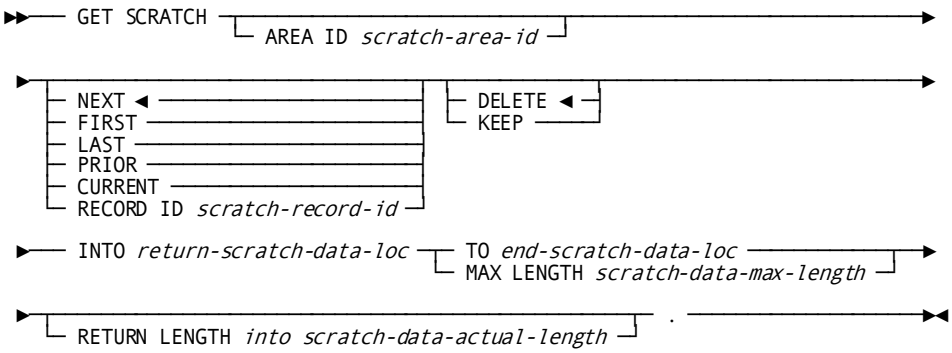
After completion of the GET QUEUE function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4404	The requested queue header record cannot be found.
4405	The requested queue record cannot be found.
4407	A database error occurred during queue processing. A common cause is a DBKEY deadlock. For a PUT QUEUE operation, this code can also mean that the queue upper limit has been reached. If a database error has occurred, there are usually be other messages in the CA-IDMS/DC/UCF log indicating a problem encountered in RHDCRUAL, the internal Run Unit Manager. If a deadlock has occurred, messages DC001000 and DC001002 are also produced.
4419	The program storage area specified for return of the queue record is too small; the returned record has been truncated as appropriate to fit the available space. In a DC-BATCH environment, a possible cause is that the size of the queue record exceeds the value specified in the MAX LENGTH parameter of the BIND TASK statement. In a DC-BATCH environment, a possible cause is that the size of the record read by a GET QUEUE statement exceeds the value specified in the max length parameter of the BIND TASK statement. This can also happen if the record size specified in the GET QUEUE statement is large enough for the queue record, but the maximum specified in the BIND TASK statement is too small. The record size is always truncated to the maximum length determined in the BIND TASK statement.
4431	The parameter list is invalid. In DC-BATCH, this code signifies that the specified record length has exceeded the maximum length based on the packet size.
4432	The derived length of the queue record data area is negative.

GET SCRATCH

The GET SCRATCH statement obtains a scratch record and places it in a storage area associated with the issuing program. The storage area must already be allocated to the requesting task; no implicit GET STORAGE function is performed during the GET SCRATCH operation. If the scratch record is larger than the designated storage area, data is truncated.

Syntax



Parameters

AREA ID

Identifies the scratch area associated with the record being retrieved. If you do not specify an area ID, an area ID of eight blanks is assumed.

scratch-area-id

Either the symbolic name of a user-defined field that contains the scratch area ID or the ID itself enclosed in quotation marks.

NEXT

Retrieves the next record in the scratch area.

This is the default.

FIRST

Retrieves the first record in the scratch area.

LAST

Retrieves the last record in the scratch area.

PRIOR

Retrieves the prior record in the scratch area.

CURRENT

Retrieves the current record in the scratch area; the current record is the record most recently referenced by another scratch function.

RECORD ID

Retrieves the specified scratch record.

scratch-record-id

The symbolic name of a user-defined PIC S9(8) COMP SYNC (fullword) field that contains the four-byte scratch record ID.

DELETE

Deletes the record from the scratch area.

This is the default.

If DELETE is specified and the record has been truncated, the truncated data is lost. To maintain currency following a DELETE request, CA IDMS saves the next and prior currencies of the scratch area.

KEEP

Keeps the record in the scratch area.

INTO

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data area to which CA IDMS is to return the scratch record.

return-scratch-data-loc

The symbolic name of a user-defined field.

TO

Indicates the end of the data area to which CA IDMS will return the scratch record.

end-scratch-data-loc

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the scratch record.

MAX LENGTH

Specifies the length in bytes of the data area associated with the requested scratch record.

scratch-data-max-length

Either the symbolic name of a WORKING-STORAGE SECTION or LINKAGE SECTION field that contains the length or the length itself expressed as a numeric constant.

RETURN LENGTH into

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry to which CA IDMS will return the actual length of the requested scratch record.

scratch-data-actual-length

The symbolic name of the entry. If the record has been truncated, *scratch-data-actual-length* will contain the length of the full, untruncated scratch record.

Example

The following statement illustrates a request to return the contents of the current record in the scratch area to the variable-storage area defined by WORK-PROC-AREA and END-WORK-PROC-AREA:

```
GET SCRATCH
  CURRENT
  INTO WORK-PROC-AREA TO END-WORK-PROC-AREA.
```

Status Codes

After completion of the GET SCRATCH function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4303	The requested scratch area ID cannot be found
4305	The requested scratch record ID cannot be found
4307	An I/O error has occurred during processing
4319	The program storage area specified for return of the scratch record is too small; the returned record has been truncated to fit the available space
4331	The parameter list is invalid
4332	The derived length of the scratch record is negative

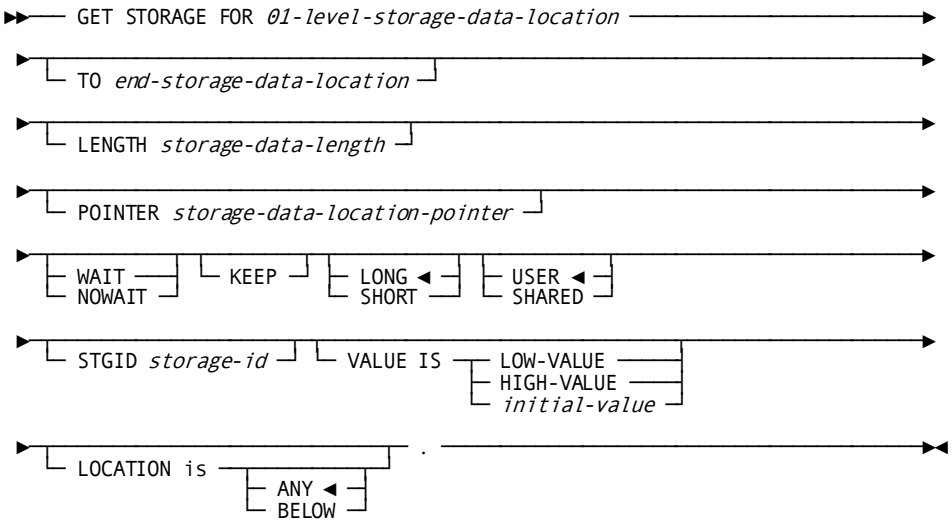
GET STORAGE

The GET STORAGE statement is used either to acquire variable storage from a DC system storage pool or to obtain the address of a previously acquired storage area. Once acquired, the storage is available for use:

- By the issuing task only (user storage)
- By subsequent tasks running on the same terminal (user kept storage)
- By all tasks in the system (shared or shared kept storage)

Storage availability is governed by GET STORAGE parameter specifications.

Syntax



Parameters

FOR

Specifies the LINKAGE SECTION entry of the storage area to be acquired.

01-level-storage-data-location

The name of the 01-level entry used to acquire the storage area.

TO

Specifies the end of the storage area. This parameter is required when the precompiler execution option COBOL=1 is specified. It is accepted but not required if COBOL=2 is specified. See

Note: For more information about the COBOL= option, see Passing Parameters to the Precompiler (see page 355).

end-storage-data-location

The symbolic name of a user-defined dummy byte field. It is specified as a subordinate item within the 01-level record area following the last real data field.

Note: CA IDMS does not support the use of an OCCURS DEPENDING ON clause within 01-level-storage-data-location.

LENGTH

Specifies the length of the storage location (COBOL85 only).

storage-data-length

The symbolic name of a user-defined field that contains the length of the storage location.

POINTER

Specifies a pointer that is to receive the address of the storage location (COBOL 85 only).

storage-data-location-pointer

The symbolic name of a user-defined field that contains a pointer to the address of the storage location.

WAIT

Specifies that the issuing task will wait until sufficient storage is available in a storage pool.

This is the default.

NOWAIT

Specifies that the issuing task will not wait for storage to become available if an insufficient storage condition exists. If NOWAIT is specified, the program should check the ERROR-STATUS field in the IDMS-DC communications block to determine if the GET STORAGE request has been completed. If the ERROR-STATUS value is 3202 (DC-NO-STORAGE), the program should perform alternative processing before reissuing the GET STORAGE request.

KEEP

Optionally specifies whether the storage area will be used by subsequent tasks executing on the same logical terminal. When KEEP is specified, the storage area can be accessed by subsequent tasks; otherwise the storage area cannot be accessed by subsequent tasks. For a more detailed discussion of the KEEP parameter, refer to *CA IDMS Navigational DML Programming Guide*.

LONG

Allocates storage from the bottom of the storage pool.

This is the default.

You should specify LONG when allocating kept storage to be held across pseudo-converses.

An incorrect LONG/SHORT specification will not affect normal program execution; however, it may affect the overall performance of the DC system.

SHORT

Allocates storage from the top of the storage pool. You should specify SHORT when allocating small pieces of storage for a short duration.

An incorrect LONG/SHORT specification will not affect normal program execution; however, it may affect the overall performance of the DC system.

USER

Specifies that *only* the issuing task can access the storage area or, if KEEP is specified, only subsequent tasks executing on the same terminal.

This is the default.

Note: During system execution, a program defined at sysgen with the NOPROTECT option can access any storage area within the system, including an area associated exclusively with another task. Thus, the USER attribute may not protect the storage area being acquired. However, storage areas can be protected on a system-wide or program-by-program basis during system generation and by the modes specified when storage is allocated.

SHARED

Specifies that any task in the system can access and modify the acquired storage. Each task must establish addressability to the storage area by explicitly issuing a GET STORAGE request.

STGID

Specifies storage area. The STGID parameter must be specified with GET STORAGE requests for either previously allocated storage areas or areas to be reallocated.

storage-id

Either the symbolic name of a user-defined field that contains the storage ID or the ID itself enclosed in quotation marks.

The specified storage ID must be unique; although multiple variable storage areas (that is, one shared and the others user) can have the same ID, only one such area can be owned by a given task at a time. To access the CA IDMS common work area, specify STGID 'CWA'.

Note: If the STGID parameter specifies the address of an existing storage area, the USER/SHARED parameter must specify the same option as that specified in the GET STORAGE statement that originally allocated the storage area.

VALUE IS

Specifies how the storage area is to be initialized.

LOW-VALUE Initializes the storage area to all zeros.

HIGH-VALUE Initializes the storage area to the highest value in the computer collating sequence.

initial-value

Either the symbolic name of a user-defined field that contains the initial value or the value itself enclosed in quotation marks. All bytes of the acquired storage area are initialized to the same value.

LOCATION is

Specifies whether the storage is to be restricted to below the 16-megabyte line or if space above the 16-megabyte line is also eligible.

ANY Specifies that space above the 16-megabyte line is eligible for allocation.

This is the default.

BELOW Specifies that storage must be allocated from below the 16-megabyte line.

Example

The following statement illustrates a request to allocate the shared kept storage area, 09PA, and initialize it to all zeros:

```
GET STORAGE FOR EMPLMENU-KEPT-STORAGE TO
  EMPLMENU-KEPT-STORAGE-END
  NOWAIT
  KEEP
  SHORT
  SHARED
  STGID '09PA'
  VALUE IS LOW-VALUE.
```

Status Codes

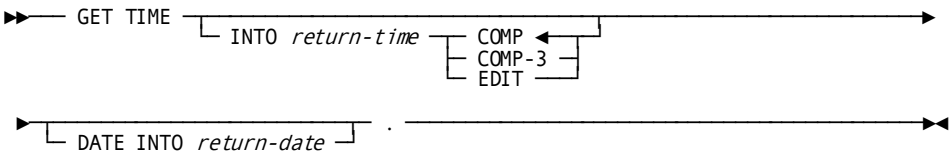
After completion of the GET STORAGE function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3201	The requested storage cannot be allocated immediately; to wait would cause a deadlock
3202	The requested storage cannot be allocated because insufficient space exists in the storage pool
3210	The request specified a storage ID that did not previously exist; the required space has been allocated
3231	The request specifies an invalid parameter list
3232	The requested length is zero or negative
3234	The request cannot be serviced because the variable storage area is not an 01-level LINKAGE SECTION variable
3235	The request cannot be serviced because the specified 01-level LINKAGE SECTION entry has either been previously allocated or contains an OCCURS DEPENDING ON clause

GET TIME

The GET TIME statement obtains the time of day and date from the operating system. The system time is returned to the issuing task in either fixed binary, packed decimal, or edited format. The date is returned to the program in packed decimal format.

Syntax



Parameters

INTO

Specifies the field to which CA IDMS is to return the time.

return-time

The symbolic name of a user-defined field to which the current time will be returned. The following format options apply:

COMP Returns the time as a fixed binary value representing the elapsed time since midnight in ten-thousandths of a second.

This is the default.

If COMP is specified, the field associated with *return-time* should be a PIC S9(8) COMP SYNC (fullword) field. The COMP option returns the most precise time.

COMP-3 Returns the time as a six-byte packed decimal value in the format *0hhmmsstttc* (padded zero, hours, minutes, seconds, ten-thousandths of a second, sign). If COMP-3 is specified, the field associated with *return-time* should be defined as PIC S9(11) COMP-3.

EDIT Returns the time as an edited character string in the format *hh:mm:ss:hh* (hours, minutes, seconds, hundredths of a second). If EDIT is specified, *return-time* should be defined as PIC X(11) DISPLAY.

DATE INTO

Specifies the field to which CA IDMS is to return the data obtained from the operating system.

return-date

The symbolic name of a user-defined COMP-3 PIC S9(7) field. The date is returned in the Julian format *0yyyyddd* (padded zero, current year relative to 1900, date, sign). For example, 0099365C would represent December 31, 1999. 0100001C would represent January 1, 2000.

Example

The following statement illustrates a request to return the current time and date to the CURRENT-TIME and CURRENT-DATE fields, respectively:

```
GET TIME
  INTO CURRENT-TIME EDIT
  DATE INTO CURRENT-DATE.
```

Status Codes

After completion of the GET TIME function, the only possible value in the ERROR-STATUS field of the IDMS-DC communications block is 0000.

IF

The IF statement allows the program to test for the presence of member record occurrences in a set and to determine the membership status of a record occurrence in a specified set; once the set has been evaluated, the IF statement specifies further action based on the outcome of the evaluation. For example, an IF statement might be used to determine whether a set occurrence is empty and, if it is empty, to erase the owner record.

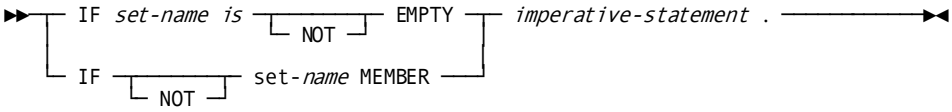
Depending on its format, the IF statement uses set or run-unit currency. The object set occurrence of an IF statement is determined by the owner of the current record of the named set; the object record occurrence is determined by the current of run unit.

Each IF statement contains a conditional phrase and an imperative statement. When an IF is issued, the precompiler first generates a call to the DBMS to execute the conditional phrase. Then, the precompiler generates a COBOL IF statement that tests the results of the call to the DBMS to determine whether the imperative statement is executed. Exercise care when nesting DML IF within COBOL IF statements as logic can be difficult to follow. You may need to code explicit scope terminators.

Note: If AUTOSTATUS is in use (see AUTOSTATUS Protocols (see page 63)), IDMS-STATUS is *not* performed automatically when an IF statement is issued.

Native VSAM users:.The IF statement is not valid for sets defined with member records that are stored in native VSAM data sets.

Syntax



Parameters

set-name

Specifies the set whose owner should be examined for the presence of member record occurrences.

The specified set must be included in the subschema.

EMPTY

Specifies that the imperative statement be executed if the current occurrence of the named set is empty.

NOT EMPTY

Specifies that the imperative statement be executed if the current occurrence of the named set is **not** empty.

MEMBER

Specifies that the imperative statement be executed if the current record of the run unit is a member of any occurrence of the specified set.

NOT *set-name* MEMBER

Specifies that the imperative statement be executed if the current record of the run unit is **not** a member of any occurrence of the specified set.

imperative-statement

Identifies the action to execute if the specified condition is true.

Examples

The examples below illustrate the use of the IF statement.

Example 1

The following statement tests the COVERAGE-CLAIMS set for existing CLAIMS members and, if no occurrences of the CLAIMS record are found (ERROR-STATUS is 0000), moves a message to that effect to location CLAIMS-WS.

```
IF COVERAGE-CLAIMS IS EMPTY MOVE 'NONE' TO CLAIMS-WS.
```

If the current occurrence of the COVERAGE-CLAIMS set contains one or more occurrences of the CLAIMS record (ERROR-STATUS is 1601), the MOVE statement is ignored and the next statement in the program is executed.

Example 2

The following statement verifies that the EMPLOYEE record that is current of run unit is not a member of the current occurrence of the OFFICE-EMPLOYEE set before code is executed to connect the EMPLOYEE record to that set.

```
IF NOT OFFICE-EMPLOYEE MEMBER PERFORM LINK-SET.
```

If the EMPLOYEE record is not a member of the OFFICE-EMPLOYEE set (ERROR-STATUS is 1601), the program performs the LINK-SET paragraph. If the EMPLOYEE record is already a member of the OFFICE-EMPLOYEE set (ERROR-STATUS is 0000), the PERFORM statement is ignored and the next statement in the program is executed.

Status Codes

After completion of the IF function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	Either the set is empty or the record that is current of run unit is a member of the set
1601	Either the set is not empty or the record that is current of run unit is not a member of the set
1606	Currency has not been established for the named set
1608	Either an invalid set name has been specified or the current record of run unit is not a member of the named set
1613	A current record of run unit either has not been established or has been nullified by a preceding ERASE statement

INQUIRE MAP

The INQUIRE MAP statement is used after a map input request to accomplish one of the following actions related to the input operation:

- Move map-related information into variable storage
- Test for conditions relating to global map input operations
- Test specific map fields for the presence of the cursor
- Test for conditions relating to specific map fields

Each of these actions is discussed on the following pages.

The following rules apply to INQUIRE MAP statements:

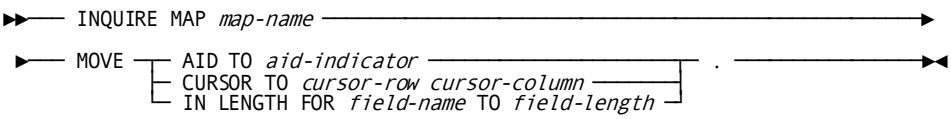
- If any of the test conditions are requested, INQUIRE MAP must specify a statement to execute if the condition is found to be true.
- An INQUIRE MAP statement can specify only one field-oriented inquiry. This inquiry can be specified alone or with a map-specific inquiry.
- A MAP IN request must be issued before INQUIRE MAP is used.

Moving Map-related Data

This version of the INQUIRE MAP statement moves one of the following map-related data items into variable storage:

- The attention ID (AID) key used
- The current cursor position (row and column)
- The entered length of a specific map input field

Syntax



Parameters

map-name

Specifies the map for which the inquiry is to be made. The specified map must be included in the program's MAP SECTION.

MOVE

Move screen-related information to program variable storage.

AID TO

Return the attention ID to the specified location in variable storage.

aid-indicator

The symbolic name of a one-byte user-defined field that will be set to the 3270 AID character received in the last map input request. The table below lists the AID characters associated with each 3270-type control key.

Note: The data dictionary includes a record that defines the AID character values as level-88 items to test for particular keyed input by including a COPY IDMS DC-AID-CONDITION-NAMES statement in the WORKING-STORAGE SECTION.

CURSOR TO

Returns the cursor address from the last map input function to the specified location in program variable storage.

cursor-row cursor-column

The symbolic names of user-defined PIC S9(4) COMP fields to which the row and column cursor address will be returned.

IN LENGTH FOR

Specifies to return the length in bytes of the data in the specified map field.

field-name

The name of the map field for which the length is being requested.

TO

Specifies where to return the length of the field.

field-length

The symbolic name of a user-defined PIC S9(4) COMP field.

Attention ID (AID) Key Values

Key	AID Character	Key	AID Character
ENTER	''' (single quote)	PF14	'B'
CLEAR	'_' (underscore)	PF15	'C'
PF01	'1'	PF16	'D'
PF02	'2'	PF17	'E'
PF03	'3'	PF18	'F'
PF04	'4'	PF19	'G'
PF05	'5'	PF20	'H'
PF06	'6'	PF21	'I'
PF07	'7'	PF22	'¢'
PF08	'8'	PF23	'.'
PF09	'9'	PF24	'<'
PF10	':'	PA01	'%'
PF11	'#'	PA02	'>'
PF12	'@'	PA03	','
PF13	'A'		

The following figure shows the code copied into the program as a result of the COPY IDMS DC-AID-CONDITION-NAMES specification.

```
*01 COPY IDMS DC-AID-CONDITION-NAMES.
 01 DC-AID-CONDITION-NAMES.
   03 DC-AID-IND-V      PIC X.
              88 ENTER-HIT VALUE QUOTE.
              88 CLEAR-HIT VALUE '_'.
              88 PF01-HIT VALUE '1'.
              88 PF02-HIT VALUE '2'.
              88 PF03-HIT VALUE '3'.
              88 PF04-HIT VALUE '4'.
              88 PF05-HIT VALUE '5'.
              88 PF06-HIT VALUE '6'.
              88 PF07-HIT VALUE '7'.
              88 PF08-HIT VALUE '8'.
              88 PF09-HIT VALUE '9'.
              88 PF10-HIT VALUE ':'.
              88 PF11-HIT VALUE '#'.
              88 PF12-HIT VALUE '@'.
              88 PF13-HIT VALUE 'A'.
              88 PF14-HIT VALUE 'B'.
              88 PF15-HIT VALUE 'C'.
              88 PF16-HIT VALUE 'D'.
              88 PF17-HIT VALUE 'E'.
              88 PF18-HIT VALUE 'F'.
              88 PF19-HIT VALUE 'G'.
              88 PF20-HIT VALUE 'H'.
              88 PF21-HIT VALUE 'I'.
              88 PF22-HIT VALUE '¢'.
              88 PF23-HIT VALUE '.'.
              88 PF24-HIT VALUE '<'.
              88 PA01-HIT VALUE '%'.
              88 PA02-HIT VALUE '>'.
              88 PA03-HIT VALUE ','.
              88 PEN-ATTN-SPACE-NULL VALUE '='.
              88 PEN-ATTN VALUE QUOTE.
```

Example

The following example illustrates the use of an INQUIRE MAP statement to move the 3270 AID character received in the last map input request to DC-AID-IND-V. If the AID character indicates that PF1 was pressed, the program performs a DC RETURN.

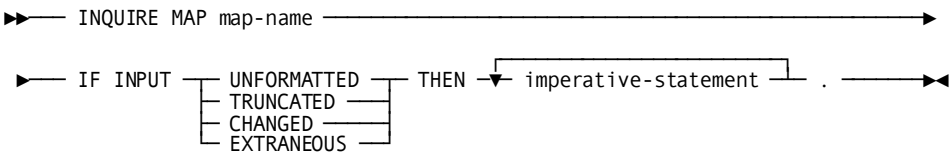
```
INQUIRE MAP EMPMAPLR

  MOVE AID TO DC-AID-IND-V.
IF CLEAR-HIT
  DC RETURN.
```

Testing for Global Map Input Conditions

This version of the INQUIRE MAP statement tests for one of the following global map input conditions:

- If the screen was not formatted before the input operation was performed
- If one or more input fields were truncated when transferred to variable storage data fields
- If one or more input fields were modified on the screen before being transferred
- If one or more fields that were modified on the screen are undefined in the map being used

Syntax



Parameters

map-name

The name of the map for which the inquiry is being made. The map must be included in the program's MAP SECTION.

IF INPUT

Tests the outcome of the last map input request for conditions relating to the data input to the program.

UNFORMATTED Tests whether the screen had been formatted before the input operation was performed.

TRUNCATED Tests whether any of the map fields were truncated when transferred to variable-storage data fields.

CHANGED Tests whether any of the map fields actually had been mapped to variable-storage data fields when the map input operation was performed.

EXTRANEOUS Tests whether the input data stream contained any data from a field not defined to the map. If this condition is true, the undefined data field is ignored by CA IDMS.

THEN

Specifies the action to be taken when the test condition is true.

imperative-statement A COBOL statement, a DML statement, or a nested block of COBOL and/or DML statements.

Example

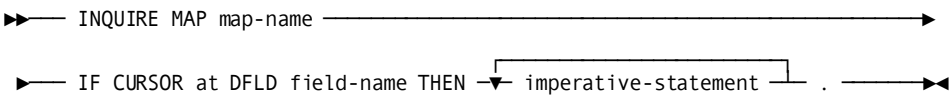
The following example illustrates an INQUIRE MAP statement that tests to determine if any fields in the EMPMAPLR map have been truncated and, if so, requests CA IDMS to perform the DATA-TRUNC routine:

```
INQUIRE MAP EMPMAPLR
  IF INPUT TRUNCATED
   THEN PERFORM DATA-TRUNC.
```

Testing for Cursor Position

This version of the INQUIRE MAP statement tests a specified map field for the presence of the cursor.

Syntax



Parameters

map-name

The name of the map for which the inquiry is being made. The map must be included in the program's MAP SECTION.

IF CURSOR at DFLD

Determines whether the cursor was in the named map field during the last map input operation.

field-name Identifies the field within the named map to be tested.

THEN

Specifies the action to be taken if the test condition is true.

imperative-statement A COBOL statement, a DML statement, or a nested block of COBOL and/or DML statements.

Example

The following example illustrates an INQUIRE MAP statement that tests for the presence of the cursor in the PASSED-DATA-01 data field and, if so, performs the CHECK-2 routine:

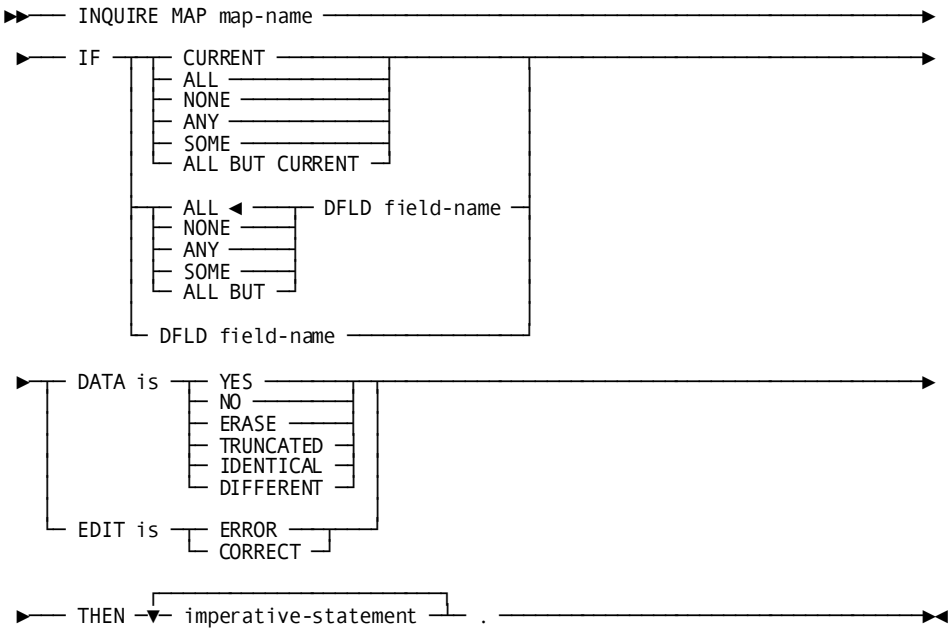
```
INQUIRE MAP EMPMAPLR
   IF CURSOR AT DFLD EMP-LAST-NAME-0415
     THEN PERFORM CHECK-2.
```

Testing for Input Non-zero Status Conditions

This version of the INQUIRE MAP statement tests for the following input conditions relating to specific map fields:

- If map fields have been modified
- If map fields have been erased by operator action
- If map fields have been truncated
- If map fields are identical to map data currently in program variable storage
- If map fields are different from map data currently in program variable storage
- If the specified map fields are either in error (the error flag has been set on for those fields) or are correct (the error flag has been set off); this option applies only to those maps and map fields for which automatic editing is enabled

Syntax



Parameters

map-name

Specifies the map for which the inquiry is being made. The map must be included in the program's MAP SECTION.

IF

Specifies the map fields to which the test applies.

CURRENT Applies the test only to the current field; that is, the map field that was referenced in the last MODIFY MAP or INQUIRE MAP statement issued by the program. If the last MODIFY MAP or INQUIRE MAP statement specified a field list, no currency exists.

ALL Specifies that the test is true if all map fields meet the specified condition.

NONE Specifies that the test is true if none of the map fields meet the specified condition.

ANY Specifies that the test is true if one or more of the map fields meet the specified condition.

SOME Specifies that the test is true if one or more **but not all** of the map fields meet the specified condition.

ALL BUT CURRENT Specifies that the test is true if all map fields except the current field meet the specified condition.

IF

Specifies the extent to which the condition applies to the map field.

ALL Specifies that the test is true if all of the named map fields meet the specified condition.

NONE Specifies that the test is true if none of the named map fields meet the specified condition.

ANY Specifies that the test is true if one or more of the named map fields meet the specified condition.

SOME Specifies that the test is true if one or more but not all of the named map fields meet the specified condition.

ALL BUT Specifies that the test is true if all map fields except for the named field meet the specified condition.

DFLD

Specifies the individual map fields to which the test conditions apply.

Multiple DFLD specifications must be separated by at least one blank.

field-name The name of a field within the named map.

DFLD *field-name*

Specifies the individual map field(s) to which the test condition applies. The specified field(s) must exist within the named map.

Multiple DFLD specifications must be separated by at least one blank.

DATA IS

Tests the input data in the specified map field(s).

YES Determines if the terminal operator entered data in the specified map field(s).

NO Determines if the terminal operator did not enter data in the specified map field(s).

ERASE Determines if data has been erased from the specified map field(s).

TRUNCATED Determines if data has been truncated in the specified map field(s).

IDENTICAL Tests whether input data is identical to map data currently in program variable storage.

IDENTICAL is true in either of the following cases:

- The field's modified data tag (MDT) is off. On mapin, the MDT is usually off if the user did not type any characters in the field.
- The field's MDT is on, but each character that the user typed in is identical (including capitalization) to the data in variable storage.

DIFFERENT Tests whether input data is different from map data currently in program variable storage.

DIFFERENT is true if the field's MDT is both:

- on

and

- at least one input character differs from the data in variable storage.

EDIT IS

Tests for errors in the named map field(s).

If the EDIT parameter is specified, automatic editing must be enabled for the map and for each of the named map fields.

ERROR Determines if the named map field(s) were found to be in error during automatic editing.

CORRECT Determines if the named map field(s) were found to be correct during automatic editing.

THEN

Specifies the action to be taken when the test condition is true.

imperative-statement A single COBOL statement, a DML statement, or a nested block of COBOL and/or DML statements.

Examples

The examples below illustrate the use of the INQUIRE MAP statement.

Example 1—Testing for Erroneous Data

The following example determines if automatic editing has detected erroneous data in any field in the EMPMAPLR map; if so, the program modifies the map temporarily to display the erroneous fields with the bright and blinking attributes:

```
INQUIRE MAP EMPMAPLR
  IF ANY EDIT IS ERROR
   THEN MODIFY MAP EMPMAPLR TEMPORARY
      FOR ALL ERROR FIELDS
      ATTRIBUTES BRIGHT BLINK.
```

Example 2—Testing for Identical Data

Use an INQUIRE MAP statement to test whether the user has entered an employee ID number:

- If the IDENTICAL condition is *true* (the user doesn't specify a different ID number), the program displays the menu screen.
- If the IDENTICAL condition is *false* (the user specifies a different ID number), the program obtains the corresponding employee record from the database.

The sample INQUIRE MAP statement is:

```
INQUIRE MAP MAP01
  IF DFLD EMP-ID-0415 DATA IS IDENTICAL THEN
   PERFORM EMP-PROMPT-20
  ELSE
   PERFORM EMP-OBTAIN-20.
```

Example 3—Testing for Changed Data

Use an INQUIRE MAP statement to test whether the user has entered a new department ID or department name. If the user has changed either value (DIFFERENT is *true*), the program branches to DEPTUP-30:

```
INQUIRE MAP MAP02
  IF ANY DFLD DEPT-ID-0410
     DFLD DEPT-NAME-0410 DATA IS DIFFERENT
  THEN PERFORM DEPTUP-30.
```

Status Codes

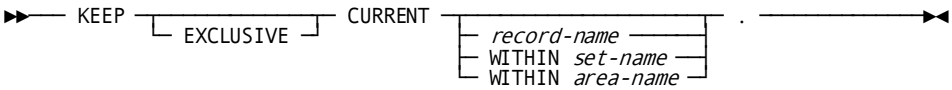
After completion of the INQUIRE MAP function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4629	An invalid parameter has been passed from the program.
4641	The test condition has been found to be true. (This condition is tested for automatically by COBOL DML expansion statements.)
4644	The referenced map field is not in the specified map; a possible cause is a reference to an invalid map field subscript.
4656	The referenced map contains no data fields.

KEEP CURRENT

The KEEP CURRENT statement places an explicit shared or exclusive lock on a record that is current of run unit, record, set, or area. Locks placed on records through the KEEP CURRENT function are maintained for the duration of the database transaction or until explicitly released by means of the COMMIT or FINISH statements.

Syntax



Parameters

EXCLUSIVE

Specifies to place an exclusive lock on the current record of run unit, record, set, or area. If you do not specify EXCLUSIVE, the record receives a shared lock by default.

record-name

Specifies to place the lock on the current record of the specified record type.

WITHIN *set-name*

Specifies to place the lock on the current record of the specified set.

WITHIN *area-name*

Specifies to place the lock on the current record of the specified area.

Example

The following example places a shared lock on the current EMPLOYEE record occurrence:

```
KEEP CURRENT EMPLOYEE.
```

Status Codes

After completion of the KEEP function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
0606	Currency has not been established for the named record, set, or area
0608	Either the named record or set is not in the subschema or the current record of run unit is not a member of the named set
0610	The program's subschema specifies an access restriction that prohibits execution of the KEEP function
0623	The named area is not in the subschema
0626	The record to be kept has been erased
0629	A deadlock has occurred while attempting to set the lock.

KEEP LONGTERM

The KEEP LONGTERM statement establishes longterm record locks and/or monitors access to records between tasks. Longterm database locks are used in pseudo-conversational transactions and can be shared or exclusive:

- **Longterm shared locks** allow other run units to access the locked record but prevent run units from updating the record as long as the lock is maintained.
- **Longterm exclusive locks** prevent other run units from accessing the locked record. However, run units executing on the logical terminal associated with the issuing task are not restricted from accessing the locked record. Therefore, subsequent tasks in a transaction can access the locked record and complete the database processing required by the transaction.

If a record has been locked with a KEEP LONGTERM or KEEP request, restrictions exist on the type of lock that can be placed on that record by other run units. These restrictions are based on existing locks and whether the requesting run unit is executing on the same logical terminal as the run unit that originally placed the lock on the record. The following table illustrates these restrictions.

Keep Longterm Record Lock Options

Locks in effect	Locks allowed for other run units	Locks disallowed for other run units
Shared	■ shared ■ longterm shared	■ exclusive ■ longterm exclusive
Exclusive	None	■ shared ■ exclusive ■ longterm shared ■ longterm exclusive
Longterm shared	For all run units: ■ shared ■ longterm shared For run units on the same terminal: ■ exclusive ■ longterm exclusive	For run units on other terminals: ■ exclusive ■ longterm exclusive
Longterm exclusive	For run units on the same terminal: ■ shared ■ exclusive ■ longterm shared ■ longterm exclusive	For run units on other terminals: ■ shared ■ exclusive ■ longterm shared ■ longterm exclusive

Tasks can monitor database activity associated with a specified record during a pseudo-converse and, if desired, can place a longterm lock on the record being monitored. A subsequent task can then make inquiries about that database activity for the record and take the appropriate action.

CA IDMS maintains information on database activity by using five bit flags, each of which is either turned on (binary 1) or turned off (binary 0). This information is returned to the program as a numeric value. The bit assignments, the corresponding numeric value returned to the program, and a description of the associated database activity follow:

Numeric Value	Bit Assignment	Description
16	X'00000010'	The record was physically deleted
8	X'00000008'	The record was logically deleted

Numeric Value	Bit Assignment	Description
4	X'00000004'	The record's prefix was modified; that is, a set operation (for example, CONNECT or DISCONNECT) occurred involving the record
2	X'00000002'	The record's data was modified
1	X'00000001'	The record was obtained

To determine the action or combination of actions that has occurred, you can compare the numeric value returned to the program with an appropriate constant. For example:

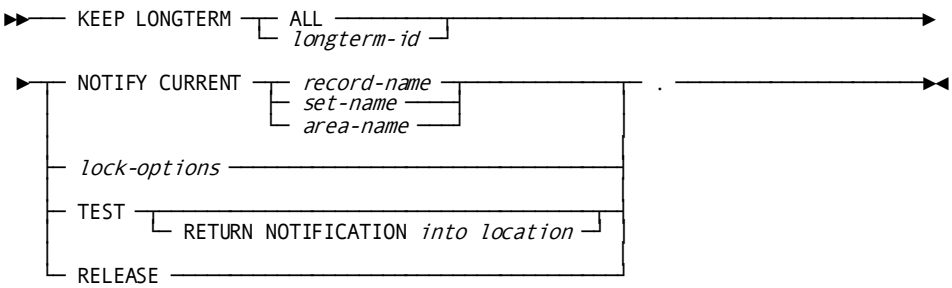
- If the returned value is zero, no database activity occurred for the specified record.
- If the returned value is two, the record's data was modified.
- If the returned value is two or greater, the record was altered in some way.
- If the returned value is eight or greater, the record was deleted.

The maximum possible value is 31, indicating that all the above actions occurred for the specified record.

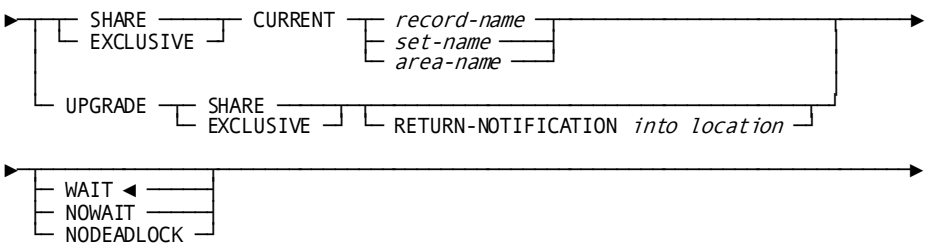
You may prefer to monitor database activity across a pseudo-converse rather than to set longterm locks. Monitoring does not restrict access to database records, sets, or areas by other run units; however, it does enable a program to test a record for alterations made by other run units. The presence of longterm locks can prevent other run units from accessing locked records for an undesirable amount of time if, during a pseudo-converse, the terminal operator fails to enter a response. If longterm locks are used, you may want to release them at specified intervals.

Note: For more information about the use of timeout intervals, see the *CA IDMS System Generation Guide* ..

Syntax



Expansion of lock-options



Parameters

ALL

Used only with the RELEASE parameter, to release all longterm locks kept for the logical terminal associated with the current task.

longterm-id

Either the symbolic name of a user-defined field that contains the longterm ID or the ID itself enclosed in quotation marks. This ID will be used in any subsequent references to the lock, when it is changed or released.

NOTIFY CURRENT

Specifies to monitor database activity associated with the current record. When NOTIFY CURRENT is specified, CA IDMS initializes a preallocated location in the program to contain information on database activity for the specified record.

record-name

Monitors database activity associated with the current occurrence of *record-name*.

set-name

Monitors database activity associated with the record current of *set-name*.

area-name

Monitors database activity associated with the record current of *area-name*.

TEST RETURN NOTIFICATION into

Specifies to return information on database activity associated with the record identified by *longterm-id* to a previously allocated location in the program's storage.

The TEST request must specify a longterm lock ID that matches the longterm lock ID specified in a previous KEEP LONGTERM NOTIFY CURRENT request.

location

The symbolic name of a user-defined PIC S9(8) COMP (fullword) field that contains the WORKING-STORAGE or LINKAGE SECTION entry of the data area to which CA IDMS will return the information.

RELEASE

Releases the longterm lock for the record identified by *longterm-id* or all record locks (ALL) owned by the logical terminal associated with the current task. RELEASE also releases the information associated with a previous KEEP LONGTERM NOTIFY request.

Lock Options

SHARE

Applies a longterm shared lock to the specified record.

EXCLUSIVE

Applies a longterm exclusive lock to the specified record.

CURRENT *record-name* Applies the lock to the current occurrence of *record-name*.

CURRENT *set-name* Applies the lock to the record current of *set-name*.

CURRENT *area-name* Applies the lock to the record current of *area-name*.

UPGRADE

Upgrades a previous KEEP LONGTERM NOTIFY CURRENT request.

SHARE Places a shared longterm lock on the record.

EXCLUSIVE Places an exclusive longterm lock on the record.

RETURN NOTIFICATION into

Returns information on database activity for the specified record.

return-location The symbolic name of a user-defined PIC S9(8) COMP (fullword) field that contains the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data area to which CA IDMS will return the information.

WAIT

Requests the issuing task to wait for an existing lock to be released.

This is the default.

If the wait would cause a deadlock, the task is terminated abnormally.

NOWAIT

Requests the issuing task not to wait for an existing lock to be released.

NODEADLOCK

Requests the issuing task to wait for an existing lock to be released, unless to do so would cause a deadlock. If the wait would cause a deadlock, control is returned to the task.

Example

The steps below illustrate the use of the KEEP LONGTERM statement.

1. Begin monitoring database activities for the current occurrence of the EMPLOYEE record by coding:

   ```
   KEEP LONGTERM KEEP-ID NOTIFY CURRENT EMPLOYEE.
   ```

2. Return statistics of database activities for the record identified by KEEP-ID into STAT-VALUE by coding:

   ```
   KEEP LONGTERM KEEP-ID TEST RETURN NOTIFICATION
          INTO STAT-VALUE.
   ```

3. Depending on the value returned to STAT-VALUE, you may want to put a longterm shared lock on the EMPLOYEE record identified by KEEP-ID by coding:

   ```
   KEEP LONGTERM KEEP-ID UPGRADE SHARE.
   ```

4. After processing, release all longterm locks by coding:

   ```
   KEEP LONGTERM ALL RELEASE.
   ```

Status Codes

After completion of the KEEP LONGTERM function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

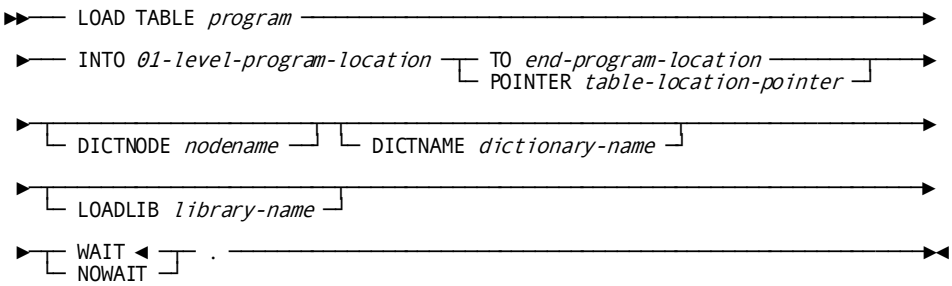
Status code	Meaning
0000	The request has been serviced successfully.
5101	The NODEADLOCK option has been specified; however, to wait would cause a deadlock. Control has returned to the issuing task.
5102	Unable to obtain storage for the required KEEP LONGTERM control blocks.
5105	Either the requested record type cannot be found or currency has not been established.
5113	The required area control block was not found in the DMCL.
5121	Either the requested longterm ID cannot be found or the KEEP LONGTERM request was issued by a nonterminal task.
5123	The specified area cannot be found.
5131	The parameter list is invalid.
5147	The KEEP LONGTERM area has not been readied.
5148	The run unit associated with the KEEP LONGTERM request has not been bound.

Status code	Meaning
5149	The NOWAIT option has been specified; however, a wait is required.
5151	A lock manager error occurred during the processing of the KEEP LONGTERM request.
5159	An error occurred in transferring the KEEP LONGTERM request to IDMSKEEP.
5160	The requested KEEP LONGTERM lock ID was already in use with a different page group.
5161	The requested KEEP LONGTERM lock ID was already in use with a different dbkey format.

LOAD TABLE

The LOAD TABLE statement instructs CA IDMS/DC to load a table (module or program) into the program pool and provide access to it through a COBOL LINKAGE SECTION entry.

Syntax



Parameters

program

Either the symbolic name of a user-defined field that contains the table or the name itself enclosed in quotation marks.

INTO

Specifies the LINKAGE SECTION entry of the 01-level record area that references the loaded table.

01-level-program-location

The symbolic name of a user-defined field that contains the name of the 01-level LINKAGE SECTION entry used to load the table.

Note: CA IDMS/DC does not support the use of an OCCURS DEPENDING ON clause within *01-level-program-location*.

TO

Specifies the end of the LINKAGE SECTION entry of the 01-level record area that references the loaded table.

This parameter is optional under COBOL 85.

end-program-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the module being loaded. *End-program-location* is an entry subordinate to the 01-level record.

POINTER

Specifies a pointer to the address of the table (COBOL 85 only).

table-location-pointer

The symbolic name of a user-defined field that is to contain the pointer to the address of the table.

DICTNODE

Specifies the node that controls the dictionary where the table resides.

nodename

Either the symbolic name of a user-defined eight-character field in variable storage or the node name itself enclosed in quotation marks.

DICTNAME

Specifies the dictionary where the table resides.

dictionary-name

Either the symbolic name of a user-defined eight-character field in variable storage or the dictionary name itself enclosed in quotation marks.

LOADLIB

Specifies the load library containing the table.

library-name

Either the symbolic name of a user-defined eight-character field in variable storage or the library name itself enclosed in quotation marks.

WAIT

Requests the issuing task to wait for sufficient storage in the event that program pool storage is not immediately available to meet the requirements of the LOAD TABLE request.

This is the default.

If you specify WAIT and CA IDMS/DC encounters an insufficient storage condition, the issuing task is placed in an inactive state; when the LOAD TABLE function is completed, control returns to the issuing task according to its previously established dispatching priority.

NOWAIT

Requests the issuing task not to wait for storage to become available. If you specify NOWAIT, CA IDMS/DC returns a value of 3402 (DC-NO-STORAGE) to the ERROR-STATUS field when an insufficient storage condition exists.

Example

The example below defines the 01-level LINKAGE SECTION entry for use with the LOAD TABLE request for a table built from an Assembler program.

Note: IDD edit and code tables contain special characters and variable-length fields. In general, such fields are not used in a COBOL program.

The following source code defines the 01-level LINKAGE SECTION entry for use with the LOAD TABLE request:

```
 LINKAGE SECTION.

 01 STATE-TABLE.
   02 STATES          OCCURS 50 TIMES.
     03 STATE-ABB       PIC X(2).
     03 STATE-FULL      PIC X(15).
   02 END-STATE-TABLE     PIC X.
```

Examples

The examples below illustrate the use of the LOAD TABLE statement:

Example 1

The following statement loads the STATECON table into the 01-level LINKAGE SECTION entry STATE-TABLE:

```
LOAD TABLE 'STATECON'
   INTO STATE-TABLE TO END-STATE-TABLE.
```

Example 2

The example below defines the 01-level LINKAGE SECTION entry for use with the LOAD TABLE request for an IDD CODE TABLE, defined as follows:

```
ADD TABLE NAME IS DECODMTH
  TABLE DESCRIPTION IS 'MONTH CODE CONVERT'
  TYPE IS CODE
  SEARCH IS LINEAR
  ENCLODE DATA IS ALPHANUMERICPIC 9(4) COMP.
  TABLE IS UNSORTED
  DUPLICATES ARE NOT ALLOWED
  VALUES ARE ( 01 JAN 02 FEB 03 MAR 04 APR
         05 MAY 06 JUN 07 JUL 08 AUG
         09 SEP 10 OCT 11 NOV 12 DEC ).
```

The following source code defines the 01-level LINKAGE SECTION entry for use with the LOAD TABLE request:

```
 LINKAGE SECTION.

 01 MONTH-TABLE.
   02 TABLE-HEADER.
     03 HDR-NUM-ENTRIES   PIC 9(4) COMP.
   02 TABLE-DATA.       OCCURS 12 TIMES.
     03 DTA-FILLER1     PIC X(2).
     03 DTA-MONTH-NUM    PIC 9(2).
     03 DTA-FILLER2     PIC X.
     03 DTA-MONTH-TXT    PIC X(3).
   02 END-MONTH-TABLE     PIC X.
```

The following statement loads the DECODMTH tables into the 01-level LINKAGE SECTION entry MONTH-TABLE:

```
PROCEDURE DIVISION USING MONTH-TABLE.

 LOAD TABLE 'DECODMTH'
   INTO MONTH-TABLE TO END-MONTH-TABLE.
```

Note: For BS2000, starting from the COBOL85 compiler V2.2C and higher, each 01-level entry in the LINKAGE SECTION has to be defined in the USING-clause of the PROCEDURE DIVISION.

Note: For BS2000, TABLE definition must be the very last definition in the LINKAGE SECTION.

Status Codes

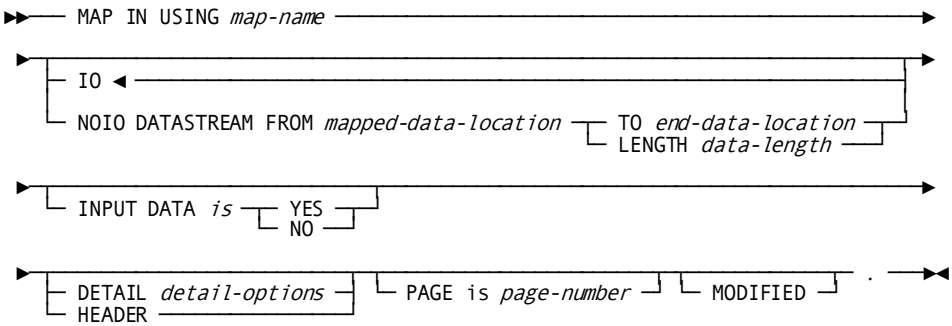
After completion of the LOAD TABLE function, the ERROR-STATUS field in the CA IDMS/DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
3401	The requested module cannot be loaded immediately due to insufficient storage; to wait would cause a deadlock.
3402	The requested module cannot be loaded because insufficient storage exists in the program pool.
3407	The requested module cannot be loaded because an I/O error has occurred during processing.
3414	The requested module cannot be loaded because it has been defined as nonconcurrent and is currently in use.
3415	The requested module has been overlaid temporarily in the program pool and cannot be reloaded immediately.
3435	The request cannot be serviced because the specified 01-level LINKAGE SECTION entry has either been previously allocated or contains an OCCURS DEPENDING ON clause.
3436	Either the requested program is not defined in the program definition table (PDT) or is marked out of service, or null PDEs are not specified or valid in this CA IDMS/DC system.

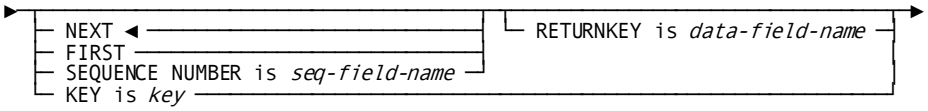
MAP IN

The MAP IN statement requests a synchronous transfer of data from map fields on the screen to the corresponding variable-storage data fields. The MAP IN statement can also be used to transfer data from an area in variable storage that contains a 3270-like data stream to map-related variable-storage data fields; this is referred to as a native mode data transfer.

Syntax



Expansion of detail-options



Parameters

map-name

The name of the map to be used for the MAP IN request. It must be a map included in the program's MAP SECTION.

IO

Specifies to transfer data from map fields to variable-storage data fields that are associated with the specified map.

This is the default type of data transfer.

NOIO DATASTREAM FROM

Requests to transfer data from an area in program variable storage to the variable-storage data fields that correspond to the specified map. No terminal I/O is associated with the request.

mapped-data-location

The symbolic name of a user-defined field that contains the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data stream to be read by CA IDMS. The length of the data stream is determined by one of the following specifications:

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the data stream.

end-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the input data stream.

LENGTH

Explicitly defines the length in bytes of the input data stream.

data-length

Either the symbolic name of a user-defined field that contains the length of the data stream or the length itself expressed as a numeric constant.

INPUT DATA IS

I/O requests only. Specifies whether the contents of all fields of the specified map will be moved to variable-storage data fields, or left unchanged.

This specification applies to all variable-storage data fields unless overridden by an INPUT DATA IS YES/NO clause in a previously issued MODIFY MAP request.

YES

Moves the contents of all fields of the specified map to variable-storage data fields.

NO

Leaves the contents of all variable-storage data fields unchanged.

DETAIL

Pageable maps only. Specifies that the MAP IN operation is to retrieve data from a modified detail occurrence (MDT set on). The contents of all map fields in the detail occurrence are retrieved unless MODIFIED is specified for the MAP IN DETAIL statement; MODIFIED causes only modified fields to be retrieved.

Note: For more information about pageable maps, see the *CA IDMS Mapping Facility Guide*.

NEXT

Retrieves the next sequential modified detail occurrence.

This is the default.

An end-of-data condition (DC-NO-MORE-UPD-DETAILS) is returned in either of the following cases:

- No detail occurrences have been modified.
- All modified detail occurrences have been mapped in already.

FIRST

Retrieves the first available modified detail occurrence.

SEQUENCE-NUMBER is

Retrieves a detail occurrence by sequence number. Detail occurrences are built at run time by the application program and stored in the sequence in which they are created.

seq-field-name

A PIC S9(8) COMP (fullword) field.

A detail-not-found condition is returned in either of the following cases:

- The specified occurrence is not a modified detail occurrence.
- No detail occurrence with the specified value is found.

RETURNKEY IS

Specifies the variable field in which CA IDMS stores the four-byte value (if any) associated with the retrieved detail occurrence. If no value is associated with the detail occurrence, the *data-field-name* is set to zero.

data-field-name

The symbolic name of either a PIC X(4) or PIC S9(8) COMP (fullword) field that contains the key value. *Data-field-name* does not have to be fullword aligned.

KEY IS

Retrieves a modified detail occurrence based on the value associated with the detail occurrence.

key

The name of a PIC S9(8) COMP (fullword) field.

Note: A value is associated with a detail occurrence by using the KEY IS parameter in the MAP OUT DETAIL command for that occurrence.

HEADER

Pageable maps only. Specifies that the MAP IN operation is to retrieve the contents of data fields in the header and footer areas. The contents of all data fields in the header and footer areas are retrieved unless MODIFIED is specified for the MAP IN HEADER statement; MODIFIED causes only modified fields to be retrieved.

PAGE IS

Pageable maps only. Specifies the name of a variable field to store the current value of the $PAGE field on mapin.

page-number

A PIC S9(8) COMP (fullword) field.

MODIFIED

Pageable maps only. Specifies that, within a modified detail occurrence, only modified fields (MDT set on) are to be retrieved in the MAP IN operation.

Examples

The examples below illustrate the use of the MAP IN statement.

Example 1

The following statement illustrates a request to read the EMPMAPLR map. Data values are transferred from map fields on the EMPMAPLR map to the corresponding variable-storage data fields. Subsequent commands can evaluate the input values and perform appropriate processing.

```
MAP IN USING EMPMAPLR
  INPUT DATA IS YES.
```

Example 2

The following statement illustrates a request to map in the next modified detail occurrence of the EMPMAPPG MAP:

```
MAP IN USING EMPMAPPG
  DETAIL
  NEXT MODIFIED.
```

Status Codes

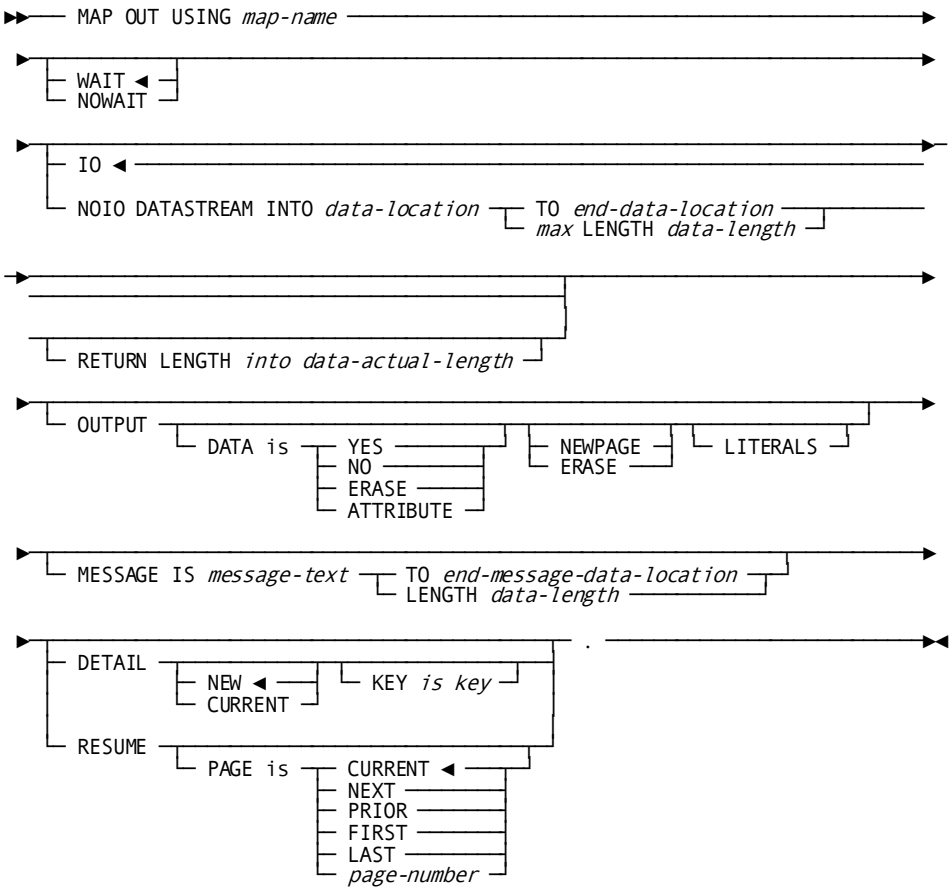
After completion of the MAP IN function, the ERROR-STATUS field of the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4627	A permanent I/O error has occurred during processing
4628	The dial-up line for the terminal has been disconnected
4631	The map request block (MRB) contains an invalid field, indicating a possible error in the program's parameters
4632	The derived length of the specified map input data area is zero or negative
4633	The map load module named in the MRB cannot be found
4634	The LINKAGE SECTION entry specified is not at COBOL 01-Level.
4638	The specified 01-level WORKING-STORAGE SECTION or LINKAGE SECTION entry has not been allocated
4639	The terminal being used is out of service
4640	The NOIO option has been specified but the requested data stream cannot be found
4642	The requested map does not support the terminal device being used
4652	The specified edit or code table either cannot be found or is invalid for use with the named map
4654	A data conversion error has occurred; internal map data does not match the map's data description
4655	The user-written edit routine specified for the named map cannot be found
4664	The requested node for a header or detail was either not present or not updated
4668	No more modified detail occurrences require mapin
4672	The scratch record that contains the requested detail could not be accessed (internal error)

MAP OUT

The MAP OUT statement creates or modifies detail occurrences for a pageable map or requests a transfer of data from variable-storage data fields to map fields on the terminal screen. MAP OUT can also be used to transfer data to another area in program variable storage; this is referred to as a native mode data transfer.

Syntax



Parameters

map-name

The map to be used for the MAP OUT request. The map must be included in the program's MAP SECTION.

WAIT

Specifies that the data transfer will be synchronous. The issuing task is placed in an inactive state. When the MAP OUT operation is complete, the task resumes processing according to its established dispatching priority.

This is the default.

NOWAIT

Specifies that the data transfer will be asynchronous; the task will continue executing. If NOWAIT is specified, the program must issue a CHECK TERMINAL before performing any other I/O operation.

IO

Specifies to transfer data from variable-storage data fields associated with the named map to the terminal device associated with the issuing task.

This is the default.

NOIO DATASTREAM INTO

Specifies to transfer data from variable-storage data fields associated with the named map to another area of program variable storage; no terminal I/O is associated with the request.

data-location

The symbolic name of a user-defined field that contains the WORKING-STORAGE SECTION or LINKAGE SECTION entry to which the data is to be transferred.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry for the output data stream and is specified following the last data-item entry in *data-location*.

end-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data stream.

max LENGTH

Defines the maximum length of the output data stream.

data-length

Either the symbolic name of the user-defined field that contains the length of the data stream or the length itself expressed as a numeric constant.

RETURN LENGTH INTO

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry to which CA IDMS will return the length in bytes of the output data stream.

data-actual-length

If the data stream has been truncated, contains the length before truncation.

OUTPUT

IO requests only. Specifies screen display options for the data being output.

DATA IS

Specifies whether the variable-storage data fields are to be transmitted to the terminal. This specification applies to all variable-storage data fields unless overridden by an OUTPUT DATA IS YES/NO clause in a previously issued MODIFY MAP request.

YES

Transmits the contents of variable-storage data fields to the corresponding map fields.

NO

Does not transmit the contents of variable-storage data fields to the corresponding map fields. However, if the automatic error handling facility detects an error in any field, CA IDMS will transmit the applicable attribute bytes.

ERASE

Does not transmit the contents of variable-storage data fields and fills the corresponding map fields with null values.

ATTRIBUTE

Transmits only the attribute bytes for variable-storage data fields. Data in the record buffer is not sent to the terminal.

NEWPAGE (ERASE)

The keywords NEWPAGE and ERASE are synonymous.

Activates the erase-write function; the screen is cleared and both literal and variable fields are transmitted to the map. If NEWPAGE is not specified, any existing screen display is overwritten without first erasing it.

To erase individual map fields, use the OUTPUT DATA IS ERASE option of the MODIFY MAP statement. To erase all screen fields and to activate the erase-write function, the MAP OUT statement must specify OUTPUT DATA IS ERASE NEWPAGE.

LITERALS

Transmits literal fields as well as variable-storage data fields to the terminal. If LITERALS is not specified, literal fields are written to the map only when a MAP OUT request specifies the ERASE option.

MESSAGE IS

IO requests only. Specifies the message to be displayed in the map's message area.

message-text

The symbolic name of a WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the message text.

TO

Specifies the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the message text and is specified following the last data item in *message-text*.

end-message-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data stream.

LENGTH

Defines the length in bytes of the message text.

data-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

Note: The MESSAGE parameter can only be used with MAP OUT DETAIL if the $MESSAGE field is associated with the detail occurrence at map generation.

Note: To reference a message stored in the data dictionary, use the ACCEPT TEXT INTO parameter of the WRITE LOG statement to copy the message into *message-text*.

DETAIL

Pageable maps only. Specifies that the MAP OUT command is to create or modify a detail occurrence, and optionally associates a numeric key value with the occurrence. For more information about pageable maps, see the *Mapping Facility Guide*.

NEW

Creates a detail occurrence of a pageable map.

This is the default.

Occurrences are displayed in the order in which they are created by the application program.

CURRENT

Modifies the detail occurrence that was referenced by the most recent MAP IN DETAIL or MAP OUT DETAIL statement.

KEY IS

Specifies a value to be associated with the created or modified detail occurrence. The four-byte numeric value is not displayed on the terminal screen.

When the KEY IS parameter is used with the MAP OUT DETAIL CURRENT command, the specified value replaces the value (if any) previously associated with the detail occurrence.

key

The name of a PIC S9(8) COMP (fullword) field that contains the key of a database record associated with the detail occurrence.

RESUME

Pageable maps only. Specifies the page of detail occurrences to be mapped out to the terminal.

PAGE is CURRENT

Redisplays the current page.

This is the default.

If no page has been displayed, the first page of the pageable map is displayed.

PAGE is NEXT

Displays the page that follows the current page. If no page follows the current page, the current page is redisplayed.

PAGE is PRIOR

Displays the page that precedes the current page. If no page precedes the current page, the current page is redisplayed.

PAGE is FIRST

Displays the first available page of detail occurrences.

PAGE is LAST

Displays the page of detail occurrences with the highest available page number.

PAGE is *page-number*

A user field that contains the number of the page to be displayed. A page number is stored in the variable field by a preceding MAP IN PAGE IS *page-number* statement that names the same numeric variable field.

Examples

The examples below illustrate the use of the MAP OUT statement:

Example 1

The following statement illustrates a request to write all literal and data fields associated with the EMPMAPLR map to the terminal:

```
MAP OUT USING EMPMAPLR
  OUTPUT DATA IS YES
  NEWPAGE
  MESSAGE IS INITIAL-MESSAGE LENGTH 80.
```

Example 2

The following statement maps out the current detail; no terminal I/O is associated with this request if the first page of the pageable map is not yet filled.

```
MAP OUT USING EMPMAPPG
  DETAIL
  KEY IS DETAIL-KEY.
```

Status Codes

After completion of the MAP OUT function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

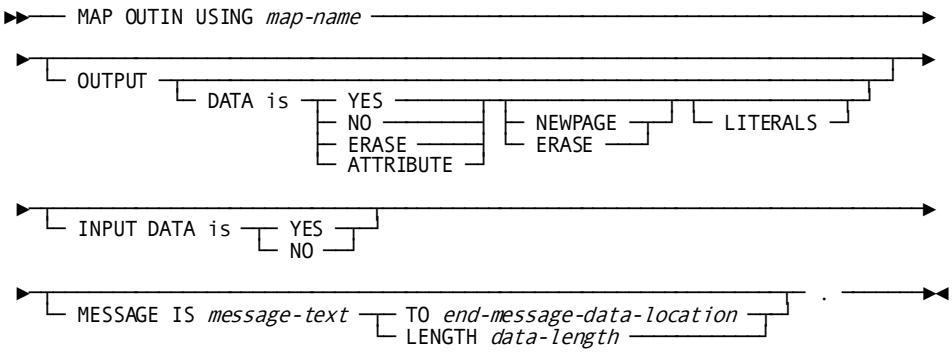
Status code	Meaning
0000	The request has been serviced successfully.
4625	The output operation has been interrupted; the operator has pressed ATTENTION or BREAK.

Status code	Meaning
4626	A logical error (for example, an invalid control character) has been encountered in the output data stream.
4627	A permanent I/O error has occurred during processing.
4628	The dial-up line for the terminal has been disconnected.
4631	The map request block (MRB) contains an invalid field, indicating a possible error in the program's parameters.
4632	The derived length of the specified map output data area is zero or negative.
4633	The map load module named in the MRB cannot be found.
4634	The LINKAGE SECTION entry specified is not at COBOL 01-Level.
4638	The WORKING-STORAGE SECTION or LINKAGE SECTION entry specified for return of the output data stream has not been allocated.
4639	The terminal being used is out of service.
4640	The NOIO option has been specified but the requested data stream cannot be found.
4642	The requested map does not support the terminal device being used.
4652	The specified edit or code table either cannot be found or is invalid for use with the named map.
4653	An error has occurred in a user-written edit routine.
4654	A data conversion error has occurred; internal map data does not match the map's data description.
4655	The user-written edit routine specified for the named map cannot be found.
4664	There is no current detail occurrence to be updated (MAP OUT DETAIL CURRENT only). No action is taken.
4668	The amount of storage defined for pageable maps at system generation time is insufficient. No action is taken. This and subsequent MAP OUT DETAIL statements are ignored.
4672	No detail occurrence, footer, or header fields exist to be mapped out by a MAPOUT RESUME command.
4676	The first screen page has been transmitted to the terminal.
4680	A pageable map page has been built but the page has not been displayed. This can happen after you specify STARTPAGE NOAUTODISPLAY. Test for it after each MAP OUT DETAIL statement.

MAP OUTIN

The MAP OUTIN statement requests an output data transfer (MAP OUT) followed by an input data transfer (MAP IN). MAP OUTIN combines the functions of the MAP OUT and MAP IN requests; however, it cannot be used to perform pageable map functions or native mode data transfers. By definition, the MAP OUTIN request is synchronous; it forces the program to be conversational.

Syntax



Parameters

map-name

Specifies the map to be used for the MAP OUTIN request. Must be the name of a map included in the program's MAP SECTION.

OUTPUT

Specifies screen display options for the data being output.

DATA is

Specifies whether variable-storage data fields are to be transmitted to the terminal. This specification applies to all variable-storage data fields unless overridden by an OUTPUT DATA IS YES/NO clause in a previously issued MODIFY MAP request.

YES

Transmits the contents of variable-storage data fields to the corresponding map fields.

NO

Does not transmit the contents of variable-storage data fields to the corresponding map fields. However, if the automatic error handling facility detects an error in any field, CA IDMS will transmit the applicable attribute bytes.

ERASE

Does not transmit the contents of variable-storage data fields and fills the corresponding map fields with null values.

ATTRIBUTE

Transmits only the attribute bytes for variable-storage data fields. Data in the record buffer is not sent to the terminal.

NEWPAGE (ERASE)

The keywords NEWPAGE and ERASE are synonymous.

Activates the erase-write function; the screen is cleared and both literal and variable fields are transmitted to the map. If NEWPAGE is not specified, any existing screen display is overwritten without first erasing it.

To erase individual map fields, use the OUTPUT DATA IS ERASE option of the MODIFY MAP statement (described later in this chapter). To erase all screen fields and to activate the erase-write function, the MAP OUT statement must specify OUTPUT DATA IS ERASE NEWPAGE.

LITERALS

Specifies to transmit literal fields as well as variable-storage data fields to the terminal. If LITERALS is not specified, literal fields are written to the map only when a MAP OUT request specifies the ERASE option.

INPUT DATA is

Specifies whether the contents of map fields will be moved to variable-storage data fields (YES), or left unchanged (NO).

This specification applies to all variable-storage data fields unless overridden by an INPUT DATA IS YES/NO clause in a previously issued MODIFY MAP request.

YES

Moves the contents of map fields to variable-storage data fields.

NO

Leaves the contents of map fields unchanged.

MESSAGE IS

Specifies the message to be displayed in the map's message area.

message-text

The symbolic name of a WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the message text.

TO

Specifies the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the message text and is specified following the last data item in *message-text*.

end-message-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data stream.

LENGTH

Defines the length in bytes of the message text.

data-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

Note: To reference a message stored in the data dictionary, use the ACCEPT TEXT INTO parameter of the WRITE LOG statement (described later in this chapter) to copy the message into *message-text*.

Example

The following statement erases the screen, transmits literal and variable map fields (null values), and performs a MAP IN when the operator presses an AID key:

```
MAP OUTIN USING EMPMAPLR
  OUTPUT DATA IS ERASE NEWPAGE
  INPUT DATA IS YES.
```

Status Codes

After completion of the MAP OUTIN function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4625	The I/O operation has been interrupted; the terminal operator has pressed ATTENTION or BREAK
4626	A logical error (for example, an invalid control character) has been encountered in the output data stream
4627	A permanent I/O error has occurred during processing
4628	The dial-up line for the terminal is disconnected
4631	The map request block (MRB) contains an invalid field, indicating a possible error in the program's parameters
4633	The map load module named in the MRB cannot be found
4639	The terminal being used is out of service
4642	The requested map does not support the terminal device being used
4652	The specified edit or code table either cannot be found or is invalid for use with the named map
4653	An error has occurred in a user-written edit routine
4654	A data conversion error has occurred; internal map data does not match the map's data description
4655	The user-written edit routine specified for the named map cannot be found

MODIFY

The MODIFY statement replaces element values of the specified record occurrence in the database with new element values defined in program variable storage.

Before execution of the MODIFY statement, the following conditions must be satisfied:

- All areas affected either implicitly or explicitly must be readied in one of the update usage modes (see READY (see page 272)).
- The specified record must be established as current of run unit. If the record that is current of run unit is not an occurrence of the specified record, a non-zero status condition results.
- The values of all elements defined for the specified record in the program's subschema view must be in variable storage. If the MODIFY statement is not preceded by an OBTAIN statement, you must initialize the appropriate values. The best practice, however, is to precede MODIFY with an OBTAIN statement to ensure that all the elements in the modified record are present in variable storage.

The following special considerations apply to the modification of CALC- and sort-control elements:

- If modification of a CALC- or sort-control element will violate a duplicates-not-allowed option, the record is not modified and a non-zero status condition results.
- If a CALC-control element is modified, successful execution of the MODIFY statement enables the record to be accessed on the basis of its new CALC-key value. The db-key of the specified record is not changed.
- If a sort-control element is to be modified, the sorted set in which the specified record participates must be included in the subschema invoked by the program. A record occurrence that is a member of a set not defined in the subschema can be modified *if the undefined set is not sorted.*
- If any of the modified elements in the specified record are defined as sort-control elements for any set occurrence in which that record is currently a member, the set occurrence is examined. If necessary, the specified record is disconnected and reconnected in the set occurrence to maintain the set order specified in the schema.

The following special considerations apply to the modification of records in native VSAM data sets:

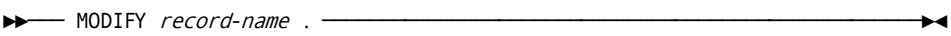
- The length of a record in an entry-sequenced data set (ESDS) cannot be changed even if the records are variable length.
- The prime key for a key-sequenced data set (KSDS) cannot be modified.

Currency

The specified record must be established as current of run unit.

Following successful execution of the MODIFY statement, the modified record becomes the current record of run unit, its record type, its area, and all sets in which it participates as member or owner.

Syntax



Parameters

record-name

The record type to update. The record must be a type included in the subschema. The occurrence of *record-name* residing in program variable storage will be updated.

Example

The following example illustrates the steps involved in modifying an occurrence of the EMPLOYEE record. Assume that the employee address is to be changed.

1. Retrieve the desired EMPLOYEE record, moving its contents to variable storage:

   ```
   MOVE EMP-ID-IN TO EMP-ID-0415.
   OBTAIN CALC EMPLOYEE.
   ```

2. Update the value of the EMP-ADDRESS-0415 field by moving the new address into the proper location in the EMPLOYEE record:

   ```
   MOVE NEW-ADDRESS TO EMP-ADDRESS-0415.
   ```

3. Issue a MODIFY statement to return all data items in the EMPLOYEE record to the database:

   ```
   MODIFY EMPLOYEE.
   ```

Status Codes

After completion of the MODIFY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

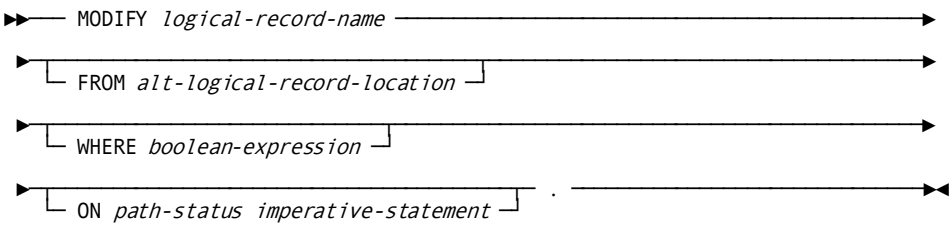
Status code	Meaning
0000	The request has been serviced successfully

Status code	Meaning
0803	Invalid currency for a record to be altered by a MODIFY. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to modify a record using a currency that has been invalidated because of changes made by another database session that is sharing the same transaction.
0804	The OCCURS DEPENDING ON item is less than zero or greater than the maximum number of occurrences of the control element
0805	Modification of the record would violate a duplicates-not-allowed option for a CALC record, a sorted set, or an index set
0806	Currency has not been established for the named record
0808	The specified record cannot be found; the record name has probably been misspelled
0809	The named record's area has not been readied in one of the update usage modes
0810	The subschema specifies an access restriction that prohibits modification of the named record
0811	There is insufficient space to hold the modified variable-length record occurrence
0813	A current record of run unit has not been established or has been nullified by a previous ERASE statement
0818	The record has not been bound
0820	The current record of run unit is not the same type as the named record
0821	An area other than the area of the named record has been readied with an incorrect usage mode
0825	No current record of set type has been established
0833	At least one sorted set in which the named record participates has not been included in the subschema
0855	An invalid length has been defined for a variable length record
0860	A record occurrence has been encountered whose type is inconsistent with the set named in the ERROR-SET field of the IDMS communications block; probable causes include: a broken chain and improper database description
0883	Either the length of a record in a native VSAM ESDS has been changed or a prime key in a native VSAM KSDS has been modified

MODIFY (LRF)

The MODIFY statement changes field values in an existing logical-record occurrence. LRF uses the field values present in the variable storage location reserved for the logical record to update the appropriate database records in the database. You can optionally specify an alternative variable storage location from which the changed field values are to be taken.

Syntax



Parameters

logical-record-name

Updates data field values in the named logical record. Unless the FROM clause is specified (see below), the field values used to update the database are taken from the area in program variable storage reserved for the named logical record. The logical record must be defined in the subschema.

FROM

Specifies an alternative variable storage location from which the field values used to perform the requested modification are to be obtained. When modifying a logical record that was retrieved into an alternative location in variable storage, the FROM clause should name the same location specified in the OBTAIN request.

alt-logical-record-location

A record location defined in the WORKING-STORAGE SECTION or LINKAGE SECTION.

WHERE

Specifies the selection criteria to be applied to the named logical record. For details on coding this clause, see Logical-Record Clauses (see page 327).

boolean-expression

The selection criteria to apply.

ON parameter

Specifies the action to be taken depending on the value returned to the LR-STATUS field in the LRC block. For details on coding this clause, see Logical-Record Clauses (see page 327).

path-status

The value of the LR-STATUS field in the LRC block which triggers the specified action.

imperative-statement

The action to take.

Example

The following example illustrates the steps taken to modify an occurrence of the EMP-SKILL-LR logical record. Assume that the skill level for employee 120 is to be upgraded from 02 (COMPETENT-0425) to 03 (PROFICIENT-0425).

1. Retrieve the desired logical-record occurrence:

```
OBTAIN FIRST EMP-SKILL-LR WHERE EMP-ID-0415 EQ '0120'
   AND SKILL-ID-0455 EQ '3610'
   AND COMPETENT-0425.
```

2. Update the SKILL-LEVEL-0425 field:

```
MOVE '03' TO SKILL-LEVEL-0425.
```

3. Issue the MODIFY statement for the updated EMP-SKILL-LR logical record:

```
MODIFY EMP-SKILL-LR.
```

MODIFY EMP-SKILL-LR

The following figure illustrates the above example by showing three occurrences of the EMP-SKILL-LR logical record.

LRF retrieves the EMP-SKILL-LR logical record where

- EMP-ID-0415 = '0120'
- SKILL-ID-0455 = '0120'
- SKILL-LEVEL-0425 = '02' (COMPETENT-0425)

The bottom EXPERTISE occurrence represents the only data physically modified in the database.

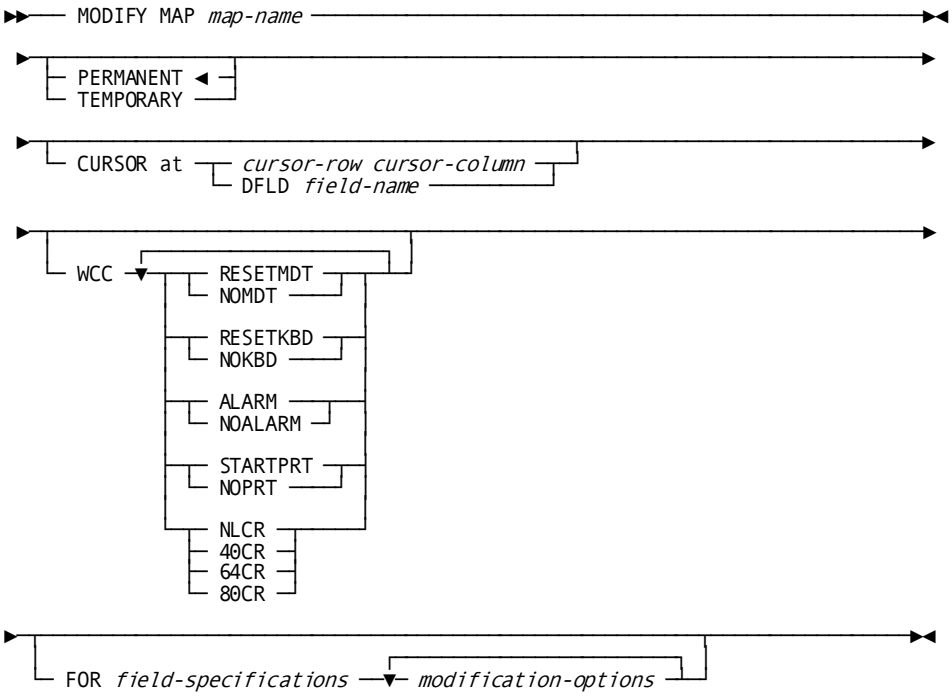
```
EMPLOYEE   EXPERTISE    SKILL
  120        04         7620
  120        03         3710
  120      (02) 03      3610
```

MODIFY MAP

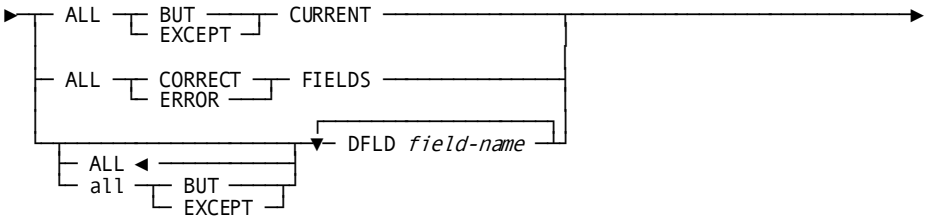
The MODIFY MAP statement modifies options in the map request block (MRB) for a map; modifications can be designated as permanent or temporary. Requested revisions can be field-specific, map-specific, or both; field-specific revisions apply to the map's variable data fields.

Note: The MODIFY MAP statement parameters used to revise predefined map and/or map data field attributes have no defaults. If a MODIFY MAP parameter is not specified, the applicable option remains set to the value specified at map generation or to the value specified in a previously issued MODIFY MAP PERMANENT statement.

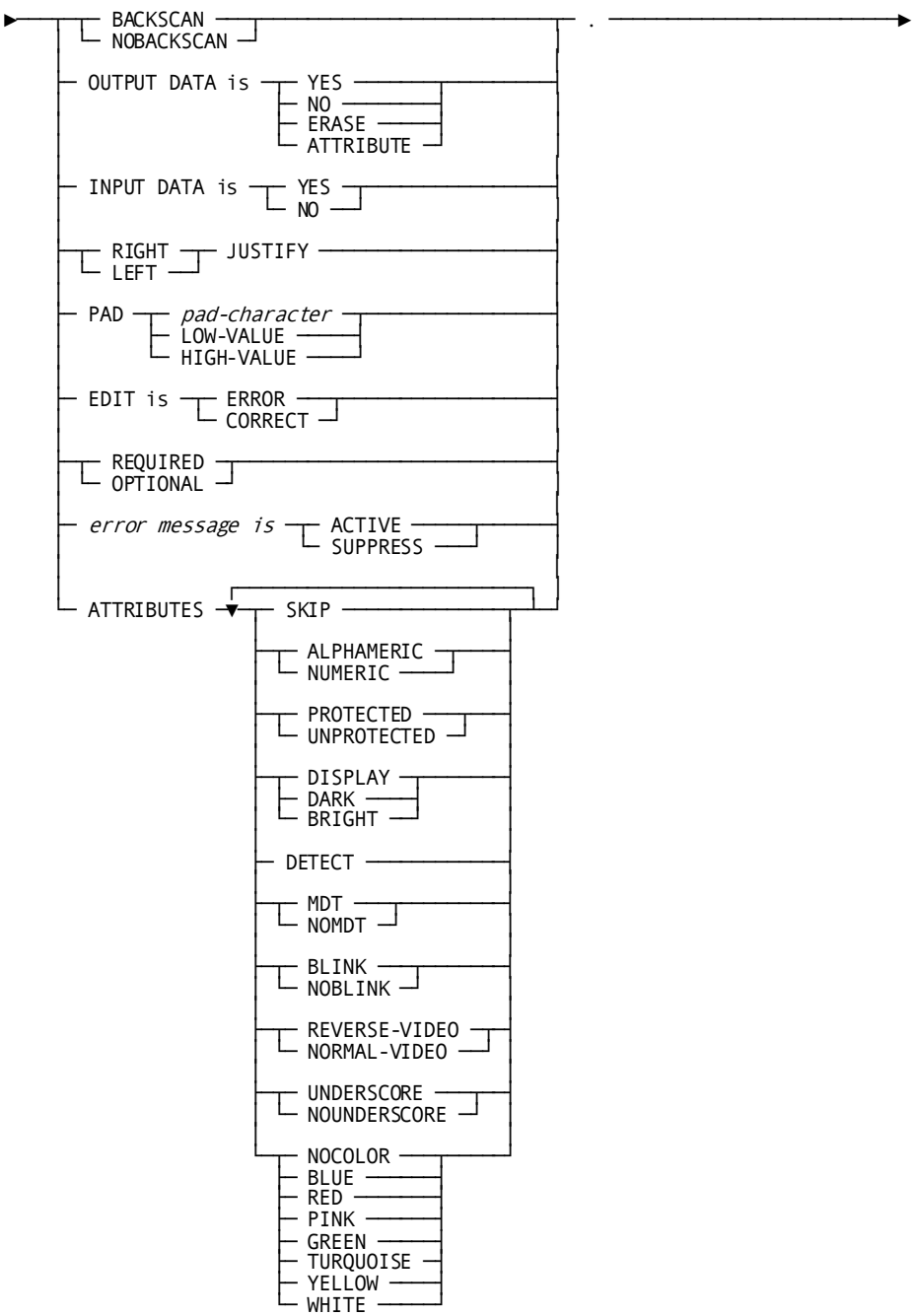
Syntax



Expansion of field-specifications



Expansion of modification-options



Parameters

map-name

The name of the map to be modified. It must be a map included in the program's MAP SECTION.

PERMANENT

Specifies that modifications will apply to all mapping mode I/O requests issued until the program terminates or until a subsequent MODIFY MAP request overrides the requested revisions.

This is the default.

TEMPORARY

Specifies that modifications will apply only to the next mapping mode I/O request (that is, MAP IN, MAP OUT, or MAP OUTIN).

CURSOR AT

Identifies the screen location at which the cursor will be positioned during output operations.

cursor-row

The row on the terminal screen to which the cursor will be moved. Either the symbolic name of the user-defined field that contains the row value or the value itself expressed as a numeric constant. Typically, fields that contains cursor row and column coordinates are level-77 data items defined as PIC S9(4) USAGE COMP (halfword).

cursor-column

The column on the terminal screen to which the cursor will be moved. Either the symbolic name of a user-defined field that contains the column value or the value itself expressed as a numeric constant. Typically, fields that contains cursor row and column coordinates are level-77 data items defined as PIC S9(4) USAGE COMP (halfword).

DFLD Specifies that the cursor will be moved to the first position in the specified field.

field-name

The name of a map field.

WCC

Specifies the write-control character (WCC) options requested for the output operation.

If a MODIFY MAP request alters any WCC option, unspecified options are reset to the following values:

- NOMDT
- NOKBD
- NOALARM

RESETMDT

Specifies that the modified data tags (MDTs) for the map fields will be reset (turned off) automatically when the map is displayed.

NOMDT

Specifies that the modified data tags (MDTs) for the map fields will be not reset (turned off) automatically when the map is displayed. In this case, the associated data is retransmitted to variable-storage data fields during the next MAP IN request.

RESETKBD

Specifies that the keyboard will be unlocked automatically when the map is displayed.

NOKBD

Specifies that the keyboard will not be unlocked automatically when the map is displayed.

ALARM

Specifies that the terminal audible alarm (if installed) will sound automatically when the map is displayed.

NOALARM

Specifies that the terminal audible alarm will not sound automatically when the map is displayed.

STARTPRT

3280-type printers only. Specifies that the contents of the terminal buffer will be printed automatically when the data has been transmitted to the terminal.

NOPRT

3280-type printers only. Specifies that the contents of the terminal buffer will not be printed automatically when the data has been transmitted to the terminal.

NLCR

Specifies that no line formatting will be performed on the printer output. Printing will begin on a new line only if the printer encounters new line (NL) and carriage control (CR) characters.

40CR

Specifies that the contents of the 3280-type printer buffer will be printed at 40 characters per line.

64CR

Specifies that the contents of the 3280-type printer buffer will be printed at 64 characters per line.

80CR

Specifies that the contents of the 3280-type printer buffer will be printed at 80 characters per line.

FOR

Specifies the map fields to be modified or excluded from modification.

Expansion of field-specifications

ALL BUT (EXCEPT) CURRENT

Modifies all fields except the current field. The current field is the map field that was referenced in the last MODIFY MAP or INQUIRE MAP request issued by the program. However, if that request referenced a list of fields rather than a single map field, no currency exists and all map fields are modified.

BUT and EXCEPT are synonyms and can be used interchangeably.

ALL CORRECT FIELDS

Modifies all fields found to be correct, during automatic editing or by a user-written edit module.

To specify, ALL CORRECT FIELDS, automatic editing must be enabled for the map.

ALL ERROR FIELDS

Modifies all fields found to be in error, during automatic editing or by a user-written edit module.

To specify, ALL ERROR FIELDS, automatic editing must be enabled for the map.

ALL

Specifies that all named map fields will receive the requested modifications.

This is the default.

all BUT (EXCEPT)

Specifies that all map fields except those named will receive the requested modifications.

BUT and EXCEPT are synonyms and can be used interchangeably.

DFLD

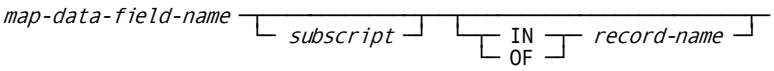
Specifies the map field(s) to modify or exclude from modification. Multiple DFLD specifications must be separated by at least one blank and must come from the same map record.

field-name

The name of the field(s) to modify or exclude from modification.

Field names that are not unique within the program must be qualified with the name of the associated record. Likewise, multiply-occurring fields must be qualified with the appropriate subscripts.

Use the following syntax:



Modification Options

BACKSCAN

Specifies to backscan the specified fields to remove trailing blanks before performing a mapout operation. Only characters up to the last nonblank will be sent to the terminal; fields remaining on the screen will contain whatever characters were present before the MAP OUT or MAP OUTIN request was issued. If the MAP OUT or MAP OUTIN request specifies the ERASE option, the contents of all terminal data fields are erased.

NOBACKSCAN

Specifies not to backscan the specified fields to remove trailing blanks before performing a mapout operation.

OUTPUT DATA IS

Specifies how to treat the output map fields.

YES

Sets the fields to the value of the corresponding variable-storage data fields.

NO

Leaves the fields unchanged.

ERASE

Erases the fields.

ATTRIBUTE

Transmits only the attribute byte of the fields.

INPUT DATA is YES

Moves map fields automatically to the corresponding variable-storage data fields during an input operation.

INPUT DATA is NO

Does not move map fields to the corresponding variable-storage data fields during an input operation.

RIGHT JUSTIFY

Right justifies the variable-storage fields on input.

LEFT JUSTIFY

Left justifies the variable-storage fields on input.

PAD

Indicates whether variable-storage data fields will be padded on input and, if so, defines the value or character with which the fields are to be padded.

If RIGHT JUSTIFY is specified, fields will be padded on the left; if LEFT JUSTIFY is specified, fields will be padded on the right.

pad-character

Either the symbolic name of a user-defined PIC X DISPLAY field that contains the pad character or the character itself enclosed in quotation marks.

The fields will be padded with the specified character.

LOW-VALUE

Pads the fields with zeros.

HIGH-VALUE

Pads the fields with the highest value in the computer collating sequence.

EDIT IS ERROR

Explicitly sets the error flag **on** for the specified map fields.

Automatic editing must be enabled for the map.

The ability to set the error flag enables programs to perform their own editing and validation in addition to that provided by the automatic editing feature.

On a MAPOUT operation, if any field is flagged to be in error, then for all fields (both CORRECT and INCORRECT), only attribute bytes are transmitted; no data is moved from program variable storage to the screen.

EDIT IS CORRECT

Explicitly sets the error flag **off** for the specified map fields.

Automatic editing must be enabled for the map.

The ability to set the error flag enables programs to perform their own editing and validation in addition to that provided by the automatic editing feature.

On a MAPOUT operation, if any field is flagged to be in error, then for all fields (both CORRECT and INCORRECT), only attribute bytes are transmitted; no data is moved from program variable storage to the screen.

REQUIRED

Requires the user to enter data in the specified map fields. An error results on mapin if you specify REQUIRED and the user fails to enter data in a required field.

Automatic editing must be enabled for the map and for the specified map fields.

OPTIONAL

Does not require the user to enter data in the specified map fields.

error message is

Suppresses or enables display of an error message associated with the field.

ACTIVE

Enables display of the error message associated with the field.

This is the default.

You typically enable display of a message only after specifying ERROR MESSAGE SUPPRESS for the map in a previous MODIFY MAP PERMANENT statement.

SUPPRESS

Disables display of the error message associated with the field. When the map is redisplayed because of errors, the message defined for the map field will not be displayed even if the field contains edit errors.

ATTRIBUTES

Indicates the 3270- and 3279-type terminal display attributes for the specified map fields.

Multiple attributes must be separated by blanks.

Only the named attributes will be modified in the map's MRB.

SKIP

Repositions the cursor automatically past the map fields to the next unprotected field. When you specify SKIP, the affected map fields are assigned the NUMERIC and PROTECTED attributes (described below) automatically.

ALPHAMERIC

Allows the data input to the map fields by the user to be any character on the 3270 keyboard.

NUMERIC

Allows the data input to the map fields by the user to be numeric only. If the terminal does not have the numeric lock option, a specification of NUMERIC is ignored.

PROTECTED

Protects the specified map fields from data entry or modification by the user.

UNPROTECTED

Makes the specified map fields available for data entry or modification by the user.

You cannot specify both UNPROTECTED and SKIP.

DISPLAY

Displays the specified map fields in normal intensity.

DARK

Does not display the specified map fields.

You cannot specify both DARK and DETECT.

BRIGHT

Displays the specified map fields in bright intensity.

Fields assigned the BRIGHT attribute are automatically detectable by a light pen.

DETECT

Makes the specified map fields detectable by a light pen.

Fields assigned the BRIGHT attribute are automatically detectable by a light pen.

MDT

Sets the modified data tag automatically for the map fields when they are displayed.

NOMDT

Does not set the modified data tag automatically for the map fields when they are displayed.

BLINK

3279s only. Displays the specified map fields with blinking characters.

If you specify BLINK, you cannot specify REVERSE-VIDEO or UNDERSCORE.

NOBLINK

3279s only. Does not display the specified map fields with blinking characters.

REVERSE-VIDEO

3279s only. Displays the specified map fields in reverse video (background and character colors reversed).

If you specify REVERSE-VIDEO, you cannot specify BLINK or UNDERSCORE.

NORMAL-VIDEO

3279s only. Displays the specified map fields in normal video.

UNDERSCORE

3279s only. Displays the specified map fields with underlined characters. If you specify UNDERSCORE, you cannot specify BLINK or REVERSE-VIDEO.

NOUNDERSCORE

3279s only. Displays the specified map fields without underlined characters.

NOCOLOR/BLUE/RED/PINK/GREEN/TURQUOISE/YELLOW/WHITE

3279s only. Specifies the color which the specified map fields will be displayed.

Examples

The following examples illustrate the use of the MODIFY MAP statement.

Example 1

The following statement positions the cursor at EMP-ID-0415 and prohibits the user from entering data in any field except EMP-ID-0415 and DEPT-ID-0410:

```
MODIFY MAP EMPMAPLR TEMPORARY
  CURSOR AT DFLD EMP-ID-0415
  FOR ALL BUT DFLD EMP-ID-0415
        DFLD DEPT-ID-0410
  ATTRIBUTES PROTECTED.
```

Example 2

The following statement sets the edit flag on for the TASK-CODE-01 field, thereby overriding automatic editing and error handling for the next MAP IN request:

```
MODIFY MAP EMPMAPLR TEMPORARY
  FOR DFLD TASK-CODE-01
  EDIT IS ERROR.
```

Example 3

Use MODIFY MAP to suppress display of default error messages for fields EMP-ID and DEPT-ID on the current map:

```
MODIFY MAP EMPMAPLR TEMPORARY
  FOR DFLD EMP-ID DFLD DEPT-ID
   ERROR MESSAGE IS SUPPRESS.
```

Because this MODIFY MAP statement specifies TEMPORARY, error messages for these fields are suppressed for the next mapout only. If PERMANENT (default) were used, the error messages would be suppressed until the program terminated or until the error message specifications were overridden by a subsequent MODIFY MAP statement.

Status Codes

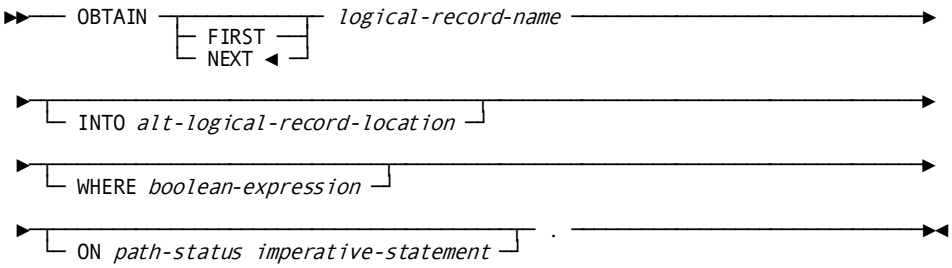
After completion of the MODIFY MAP function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4629	An invalid parameter has been passed from the program
4644	The map field is not in the specified map; a possible cause is a reference to an invalid map field subscript
4656	The referenced map contains no data fields

OBTAIN (LRF)

The OBTAIN statement retrieves the named logical record and places it in the variable-storage location reserved for that logical record. The OBTAIN statement can be issued to retrieve a single logical record, or it can be issued in iterative logic to retrieve all logical records that meet criteria specified in the WHERE clause. Additionally, the OBTAIN statement can specify that the retrieved logical record is to be placed into an alternative variable storage location.

Syntax



Parameters

FIRST

Retrieves the first occurrence of the logical record. OBTAIN FIRST is typically used to retrieve the first in a series of logical-record occurrences following the iterative retrieval of a different series of logical-record occurrences.

NEXT

Retrieves a (subsequent) occurrence of the named logical record, in the order specified by the DBA in the path.

This is the default.

OBTAIN NEXT is typically issued in iterative logic to retrieve a series of logical-record occurrences (possibly including the first).

When LRF receives repeated OBTAIN NEXT commands, it replaces field values in program variable storage with new values obtained through repeated access to the appropriate database records, thereby supplying the program with new occurrences of the desired logical record.

If an OBTAIN FIRST statement is followed by an OBTAIN NEXT statement to retrieve a series of occurrences of the same logical record, the OBTAIN statements must direct LRF to the same path. For this reason, you must ensure that the selection criteria specified in the WHERE clause that accompanies the OBTAIN FIRST and OBTAIN NEXT statements describe the same attributes of the desired logical record.

If the program issues an OBTAIN NEXT statement without issuing an OBTAIN FIRST, or if the last path status returned for the path was LR-NOT-FOUND, LRF interprets the OBTAIN NEXT as OBTAIN FIRST. After LR-ERROR or a DBA-defined path status, LRF does *not* interpret OBTAIN NEXT as OBTAIN FIRST.

logical-record-name

The name of a logical record defined in the subschema.

INTO

Specifies an alternative location in variable storage into which LRF is to place the retrieved logical record. Any subsequent MODIFY, STORE, or ERASE statements for a logical record placed in *alt-logical-record-location* should name that area as the one from which LRF is to obtain the data to be used to update the logical record.

alt-logical-record-location

A record location defined in the WORKING-STORAGE SECTION or LINKAGE SECTION.

WHERE

Specifies the selection criteria to be applied to the named logical record. For details on coding this clause, see Logical-Record Clauses (see page 327).

boolean-expression

The selection criteria to apply.

ON parameter

Specifies the action to be taken depending on the value returned to the LR-STATUS field in the LRC block. For details on coding this clause, see Logical-Record Clauses (see page 327).

path-status

The value of the LR-STATUS field in the LRC block which triggers the specified action.

imperative-statement

The action to take.

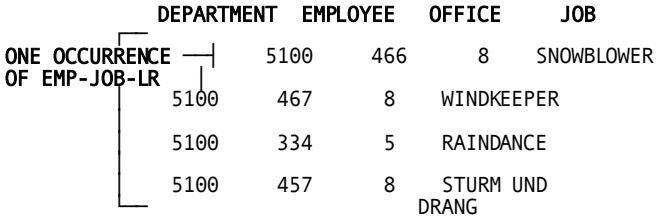
Example

The following example illustrates the use of the OBTAIN NEXT statement to retrieve a series of logical-record occurrences. The program issues the OBTAIN NEXT statement iteratively to retrieve the first and all subsequent occurrences of the EMP-JOB-LR logical record for all employees in the specified department.

```
GET-AN-ORDER.
 MOVE DEPT-ID-IN TO DEPT-ID-0410.
 OBTAIN NEXT EMP-JOB-LR WHERE DEPT-ID-410 EQ DEPT-ID-0410 OF LR.
  IF LR-STATUS = LR-ERROR
   PERFORM ERROR-PROCESSING.
  IF LR-STATUS = LR-NOT-FOUND
   PERFORM END-PROCESSING.
  .
  .
  .
 GO TO GET-AN-ORDER.
```

OBTAIN NEXT EMP-JOB-LR

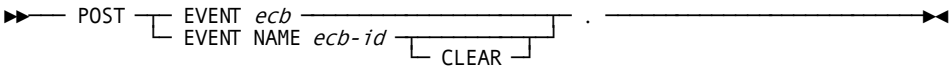
The following figure illustrates the information retrieved by each OBTAIN NEXT statement. The EMP-JOB-LR logical record consists of DEPARTMENT, OFFICE, EMPLOYEE, and JOB information.



POST

The POST statement alters an event control block (ECB), either by posting it to indicate completion of an event upon which another task is waiting or by clearing it to an unposted status.

Syntax



Parameters

EVENT

Identifies the ECB to be posted.

ecb

The symbolic name of a user-defined area that contains three PIC S9(8) COMP SYNC (fullword) fields. Program-allocated ECBs are cleared by moving zeros to *ecb*.

EVENT NAME

Specifies the ECB to be posted or cleared.

ecb-id

Either the symbolic name of a user-defined field that contains the ECB ID or the ID itself enclosed in quotation marks.

CLEAR

Clears the specified ECB to an unposted status.

Programs posting and waiting on ECBs are responsible for clearing ECBs before issuing subsequent WAIT requests.

Example

The following example illustrates a request to post the event whose ECB identifier is in the FOUND-ECB field and to clear the ECB to an unposted status:

```
POST
  EVENT NAME FOUND-ECB
  CLEAR.
```

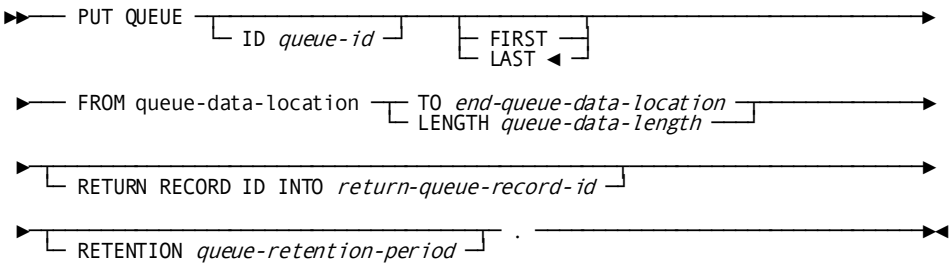
Status Codes

After completion of the POST function, the only possible value in the ERROR-STATUS field of the IDMS-DC communications block is 0000.

PUT QUEUE

The PUT QUEUE statement stores a queue record in either the DDLDCRUN or the DDLDCQUE area of the data dictionary. CA IDMS assigns an ID to the queue record and places it at the beginning or end of its associated queue.

Syntax



Parameters

ID

Directs the queue record to a previously defined queue.

queue-id

Either the symbolic name of a user-defined field that contains the ID or the ID itself enclosed in quotation marks.

Default: 16 blanks

FIRST

Places the queue record at the beginning of the queue.

LAST

Places the queue record at the end of the queue.

This is the default.

FROM

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry associated with the data to be stored in the queue record.

queue-data-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the data to be stored in the queue.

end-queue-data-location

The symbolic name of a user-defined dummy byte field or a field that contains a data item not associated with the queue record.

LENGTH

Explicitly defines the length, in bytes, of the area that contains the data to be stored in the queue record.

queue-data-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

RETURN RECORD ID INTO

Specifies the location in the program to which CA IDMS will return the system assigned ID of the queue record.

The returned ID is used to reference the queue record in subsequent GET QUEUE and DELETE QUEUE statements.

return-queue-record-id

The symbolic name of a user-defined PIC S9(8) COMP (fullword) field.

RETENTION

Specifies the time in days to retain the queue in the data dictionary. At system startup, queues having expired retention periods are automatically deleted. The retention period begins when the first record is stored in the queue.

The specified retention period takes precedence over retention periods associated with previously defined queues. The RETENTION parameter is ignored if the record being allocated is not the first record in the queue.

queue-retention-period

Either the symbolic name of a user-defined fixed binary field that contains the retention period or the retention period itself expressed as a numeric constant in the range 0 through 255.

A retention period of 255 indicates that the queue is never to be automatically deleted.

Note: If RETENTION is omitted, the default retention period for dynamic queues is taken. For more information on the default retention period for dynamic queues, refer to the *System Generation Guide*.

Example

The following example illustrates a request to allocate a queue record in the beginning of the RES-Q queue, return the ID of the record to the Q-REC-ID field, and retain the queue for 45 days:

```
PUT QUEUE
  ID 'RES-Q'
  FIRST
  FROM NEW-RES TO END-NEW-RES
  RETURN RECORD ID INTO Q-REC-ID
  RETENTION 45.
```

Status Codes

After completion of the PUT QUEUE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

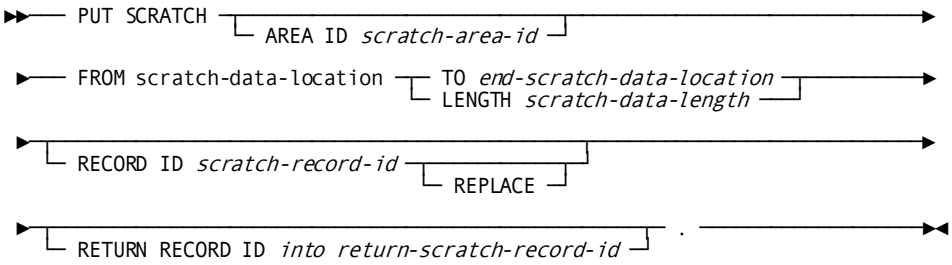
Status code	Meaning
0000	The request has been serviced successfully
0019	In a DC-BATCH environment, the record size exceeds the value specified in the MAX LENGTH parameter of the BIND TASK statement
4407	A database error occurred during queue processing. A common cause is a DBKEY deadlock. For a PUT QUEUE operation, this code can also mean that the queue upper limit has been reached. If a database error has occurred, there are usually be other messages in the CA-IDMS/DC/UCF log indicating a problem encountered in RHDCRUAL, the internal Run Unit Manager. If a deadlock has occurred, messages DC001000 and DC001002 are also produced.
4431	The parameter list is invalid; under DC-BATCH, this status indicates that the specified record length exceeds the maximum length based on the packet size

Status code	Meaning
4432	The derived length of the specified queue record is either zero or negative

PUT SCRATCH

The PUT SCRATCH statement stores or replaces a scratch record in the DDLDCSCR area of the data dictionary. For new records, PUT SCRATCH generates an index entry in a scratch area associated with the issuing task. If the scratch area does not already exist, CA IDMS allocates it dynamically in the storage pool.

Syntax



Parameters

AREA ID

Specifies the scratch area associated with the record being allocated.

If you do not specify an AREA ID, an area ID of eight blanks is assumed.

scratch-area-id

Either the symbolic name of a user-defined field that contains the ID or the ID itself enclosed in quotation marks.

FROM

Specifies the data to be stored in the scratch record.

scratch-data-location

The symbolic name of a user-defined WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the data.

TO

Indicates the end of the data area to be stored in the scratch record.

end-scratch-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the scratch data being stored.

LENGTH

Defines the length in bytes of the data area.

scratch-data-length

The symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

RECORD ID

Specifies the ID of the scratch record being stored.

scratch-record-id

Either the symbolic name of a user-defined PIC S9(8) COMP (fullword) field that contains the ID or the ID itself expressed as a numeric constant.

REPLACE

Specifies that the specified scratch record replaces an existing scratch record. If you specify REPLACE, and the specified scratch record does not exist, the record is stored and the status code is set to 0000.

RETURN RECORD ID into

Returns the automatically assigned ID of a scratch record to the program.

return-scratch-record-id

The symbolic name of a user-defined field into which CA IDMS will place the four-byte scratch record ID.

Example

The following statement illustrates a request to replace the scratch record identified by SCR-REC-ID with data in the WORK-PROC-AREA field:

```
PUT SCRATCH
  FROM WORK-PROC-AREA LENGTH 125
  RECORD ID SCR-REC-ID REPLACE.
```

Status Codes

After completion of the PUT SCRATCH function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

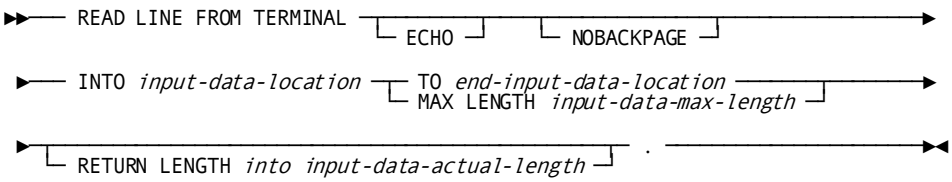
Status code	Meaning
0000	The request to add a scratch record has been serviced successfully
4305	The requested scratch record ID cannot be found
4307	An I/O error has occurred during processing

Status code	Meaning
4317	The request to replace a scratch record has been serviced successfully
4322	The request to add a scratch record cannot be serviced because the specified scratch record already exists in the scratch area and REPLACE has not been specified
4331	The parameter list is invalid.
4332	The derived length of the specified scratch record is either zero or negative

READ LINE FROM TERMINAL

The READ LINE FROM TERMINAL statement requests a synchronous, line-by-line transfer of data from the terminal to the issuing program.

Syntax



Parameters

ECHO

3270-type devices only. Saves the line of data being input in the current page (as displayed on the screen). If you do not specify ECHO, data entered will not be retained and will not be available for review by the user.

NOBACKPAGE

3270-type devices only. Specifies not to save previously input pages in a scratch area. If you specify NOBACKPAGE, the user can view only the current page of data. NOBACKPAGE is valid only with the first input request in a line mode session.

INTO

Indicates the WORKING-STORAGE SECTION or LINKAGE SECTION entry reserved for the input data.

input-data-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION reserved for the input data stream.

end-input-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the data area reserved for the input data stream.

MAX LENGTH

Defines the length in bytes of the input data stream.

If the input data stream is larger than the data area reserved in the WORKING-STORAGE SECTION or LINKAGE SECTION, the data is truncated to fit the available space.

input-data-max-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

RETURN LENGTH into

Indicates the location to which CA IDMS will return the actual length of the input data stream.

input-data-actual-length

The symbolic name of a user-defined field. If the data stream has been truncated, the field will contain the original length before truncation.

Examples

The following examples illustrate the use of the READ LINE FROM TERMINAL statement.

Example 1

The following statement illustrates a request to read the specified data from a 3270-type device into the specified location in the program and to echo the input data on the screen:

```
READ LINE FROM TERMINAL
  ECHO
  INTO EMPL-DATA TO END-EMPL-DATA.
```

Example 2

The following statement illustrates a request to read the specified data into the program but not to save pages associated with the line I/O session:

```
READ LINE FROM TERMINAL
  NOBACKPAGE
  INTO EMPL-DATA MAX LENGTH 8
  RETURN LENGTH INTO REC-DATA-LENGTH.
```

Status Codes

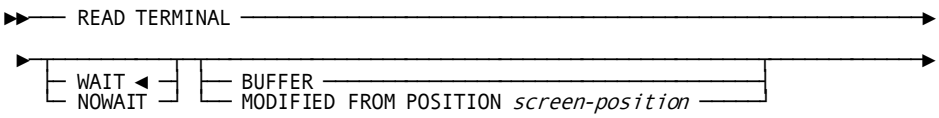
After completion of the READ LINE FROM TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

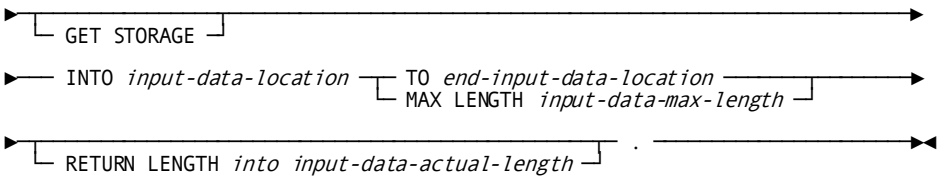
Status code	Meaning
0000	The request has been serviced successfully
4707	A logical or permanent I/O error has been encountered in the input data stream
4719	The input area specified for the return of data is too small; the returned data has been truncated to fit the available space
4731	The line request block (LRB) contains an invalid field, indicating a possible error in the program's parameters
4732	The derived length of the specified line input area is zero or negative
4738	The specified 01-level LINKAGE SECTION entry has not been allocated as required A prior GET STORAGE request must be issued
4743	The line I/O session has been canceled; the user has pressed CLEAR (3270s), ATTENTION (2741s), or BREAK (teletypes)

READ TERMINAL

The READ TERMINAL statement requests a synchronous or asynchronous basic mode data transfer from the terminal to program variable storage.

Syntax





Parameters

WAIT

Specifies that the read operation will be synchronous; the issuing task will automatically relinquish control to CA IDMS and must wait for completion of the read operation before processing can continue.

This is the default.

NOWAIT

Specifies that the read operation will be asynchronous; the issuing task will continue executing.

If you specify NOWAIT, the program must issue a CHECK TERMINAL request (described earlier in this chapter) before performing any other I/O operations.

MODIFIED

3270-type devices only. Reads all modified fields in the terminal buffer into variable storage without requiring the user to signal completion of data entry.

BUFFER

3270-type devices only. Executes a READ BUFFER command that reads the entire contents of the terminal buffer into variable storage without requiring the user to signal completion of data entry.

FROM POSITION

Defines the buffer address (screen position) at which the read will start.

screen-position

Either the symbolic name of a user-defined PIC S9(4) COMP SYNC (halfword) field or the address itself enclosed in quotation marks.

GET STORAGE

Synchronous requests only. Acquires an input buffer for the data being read into the program; CA IDMS allocates the required storage when the read operation is complete.

INTO

Specifies the 01-level WORKING-STORAGE SECTION or LINKAGE SECTION entry of the input data stream.

If you also specify GET STORAGE, the data area reserved for the input data stream must be an unallocated 01-level LINKAGE SECTION entry.

If you do not specify GET STORAGE, the data area must be a WORKING STORAGE or previously allocated LINKAGE SECTION entry.

input-data-location

The symbolic name of a user-defined field.

TO

Indicates the end of the data area reserved for the input data stream.

end-input-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the data area reserved for the input data stream.

MAX LENGTH

Defines the length, in bytes, of the data area reserved for the input data stream.

If the input data stream is larger than the specified WORKING-STORAGE SECTION or LINKAGE SECTION entry, the data is truncated to fit the available space.

input-data-max-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

RETURN LENGTH into

Indicates the location to which CA IDMS will return the actual length of the input data stream.

input-data-actual-length

The symbolic name of a user-defined field. If the data stream has been truncated, *input-data-actual-length* contains the original length before truncation.

Example

The following statement illustrates a basic mode request to read data from the terminal to the specified location in variable storage:

```
READ TERMINAL
  WAIT
  INTO TERM-LINE TO END-TERM-LINE.
```

Status Codes

After completion of the READ TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4519	The input area specified for the return of data to the issuing program is too small; the returned data has been truncated to fit the available space
4527	A permanent I/O error has occurred during processing
4528	The dial-up line for the terminal has been disconnected
4531	The terminal request block (TRB) contains an invalid field, indicating a possible error in the program's parameters
4532	The derived length of the specified input data area is zero or negative
4535	Storage for the input buffer cannot be acquired because the specified 01-level LINKAGE SECTION entry has been previously allocated; no I/O has been performed
4537	Storage for the input buffer cannot be acquired because the specified entry is defined in the WORKING-STORAGE SECTION rather than in the LINKAGE SECTION; no I/O has been performed
4538	The specified 01-level LINKAGE SECTION entry has not been previously allocated and the GET STORAGE option has not been specified; no I/O has been performed
4539	The terminal device associated with the issuing task is out of service

READY

The READY statement prepares a database area for access by DML functions and specifies the usage mode of the area.

The DBA can specify default usage modes in the subschema. Run-units that use such a subschema need not issue any READY statements; the areas are automatically readied in the predefined usage modes. However, if a run-unit issues a READY statement for one area, it must issue READY statements for all areas that it will access unless the FORCE option was specified for the default usage mode. Areas using the default usage mode combined with the FORCE option are automatically readied even if the run-unit already issued READY for other areas.

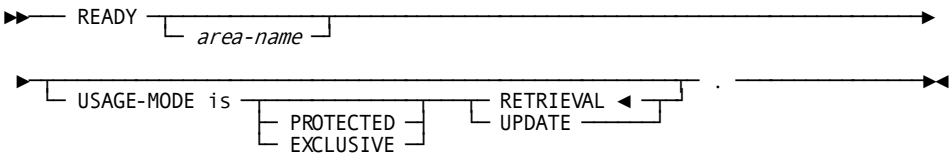
The specified usage mode can be qualified with a PROTECTED option to prevent concurrent update or an EXCLUSIVE option to prevent concurrent use of areas by other run units executing under the central version. Each area can be readied in its own usage mode. Usage modes can be changed by executing a FINISH statement (see FINISH (see page 185)) then starting a new run unit by issuing a BIND RUN-UNIT statement, the appropriate BIND RECORD statements, and a READY statement specifying the new usage mode.

When the run unit readies database areas, all areas can be readied with a single READY statement or each area to be accessed can be readied individually. All areas affected explicitly or implicitly by the DML statements issued by the run unit must be readied. Other areas included in the subschema need not be readied.

The READY statement can appear anywhere within an application program; however, to avoid runtime deadlock, the best practice is to ready all areas before issuing any other DML statements.

The READY statement is used in both the navigational and the non-navigational environments.

Syntax



Parameters

area-name

The name of an area included in the subschema.

By default, if you do not specify an area, READY will open all areas in the subschema.

USAGE-MODE IS

Specifies the usage mode in which the area will be opened.

PROTECTED

Prevents concurrent update of the area by run units executing under the same central version. Once a run unit has readied an area with the PROTECTED option, no other run unit can ready that area in any UPDATE usage mode until the first run unit releases it by means of the FINISH statement (see FINISH (see page 185)). A run unit cannot ready an area with the PROTECTED option if another run unit has readied the area in UPDATE usage mode or with the EXCLUSIVE option.

By default, if you do not specify PROTECTED or EXCLUSIVE, the areas will be opened in shared mode.

EXCLUSIVE

Prevents concurrent use of the area by any other run unit executing under the central version. Once a run unit has readied an area with the EXCLUSIVE option, no other run unit can ready that area in any usage mode until the first run unit releases it.

By default, if you do not specify PROTECTED or EXCLUSIVE, the areas will be opened in shared mode.

RETRIEVAL

Opens the area for retrieval only and allows other concurrently executing run units to open the same area in any non-exclusive usage mode.

This is the default.

UPDATE

Opens the area for both retrieval and update and allows other concurrently executing run units to open the same area in any usage mode other than exclusive or protected.

Note: If a READY statement would result in a usage mode conflict for an area, while running under the central version, the run unit issuing the READY is placed in a wait state on the first functional database call.

Note: Modification statements involving areas opened in one of the update usage modes are not valid if they affect sets that include records in an area opened in one of the retrieval usage modes.

Example

The following statement readies all subschema areas in a usage mode of PROTECTED UPDATE:

```
READY USAGE-MODE IS PROTECTED UPDATE.
```

Status Codes

After completion of the READY function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
0910	The subschema specifies an access restriction that prohibits readying the area in the specified usage mode
0923	The named area is not in the subschema

Status code	Meaning
0928	The run unit has attempted to ready an area that has been readied previously
0966	The area specified is not available for update. If the 0966 status code is ignored, subsequent attempts to access the area will return a 01 or 09 minor code. Probable causes for the return of the status code are as follows: ■ If running in local mode, the area is locked against update ■ If running under the central version, the area is not available to the program in the desired access mode
0970	The database or journal file will not ready properly; a JCL error is the probable cause
0971	The page range for the area being readied could not be found in the DMCL
0978	A wait for an area would cause a deadlock. It is recommended that all areas be readied either before the first functional call is issued or that all programs ready areas in the same order.

RETURN

The RETURN statement retrieves the database key for an indexed record without retrieving the record itself, thus establishing currency in the indexed set. The record's symbolic key is moved into the data fields within the record in program variable storage. The contents of all non-key fields for the record are unpredictable after the execution of the RETURN verb. Optionally, the program can indicate that the symbolic key can be moved into some other specified variable storage location.

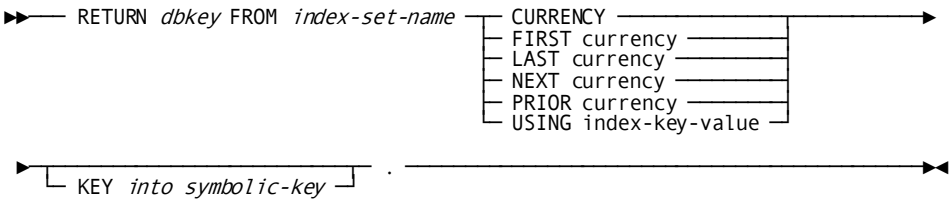
Current of index is established by:

- Successful execution of the RETURN statement, which sets current of index at the index entry from which the database key was retrieved.
- A status code of 1707 (end of index), which set currency on the index owner. The DBMS returns the owner's db-key.
- An status code of 1726 (index entry not found), which sets current of index as follows:
  - Between the two entries that are higher and lower than the specified value

- After the highest entry, if the specified value is higher than all index entries
- Before the lowest entry, if the specified value is lower than all index entries

The RETURN statement is used in both the navigational and the non-navigational environments.

Syntax



Parameters

db-key

The symbolic name of a user-defined PIC S9(8) COMP SYNC (fullword) field.

FROM

Identifies the indexed set from which the specified database key is to be returned.

index-set-name

The name of the indexed set.

CURRENCY

Retrieves the database key for the current index entry.

FIRST currency

Retrieves the database key for the first index entry.

LAST currency

Retrieves the database key for the last index entry.

NEXT currency

Retrieves the database key for the index entry following current of index. If the current of index is the last entry, status code 1707 (end of index) is returned.

PRIOR currency

Retrieves the database key for the index entry preceding current of index. If the current of index is the first entry, status code 1707 (end of index) is returned.

USING

Retrieves the database key for the first index entry with the specified symbolic key.

index-key-value

The symbolic key to be used.

If no such entry exists, status code 1726 (index entry not found) is returned.

KEY into

Saves the symbolic key (CALC, sort, or index) of the specified record.

symbolic-key

The name of a user-defined alphanumeric field into which the symbolic key of the specified record will be returned. *Symbolic-key* must be large enough to contain the largest contiguous or noncontiguous symbolic key.

If the 'KEY into' clause is not specified, the symbolic key will be moved into the corresponding fields in the user record's storage.

The precompiler views an incorrectly formatted RETURN statement as a COBOL RETURN function and does not flag the error. The incorrect RETURN DML statement is passed to the COBOL compiler without expansion into a CALL statement, causing compile-time errors.

Example

The following RETURN statement retrieves the database key for the first index entry in the EMP-LNAME-NDX set and moves the record's symbolic key into the NDX-LNAME-SYM-KEY field.

```
RETURN INT-INDEX-KEY FROM EMP-LNAME-NDX
  FIRST CURRENCY
  KEY INTO NDX-LNAME-SYM-KEY.
```

Status Codes

After completion of the RETURN function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1701	The area in which the object record or its index owner record participates has not been readied

Status code	Meaning
1707	Either the end of the indexed set has been reached or the indexed set is empty
1725	Currency has not been established for the specified indexed set
1726	The record cannot be found

ROLLBACK

The ROLLBACK statement rolls back uncommitted changes made to the database through an individual run unit or through all database sessions associated with a task. A task-level rollback also backs out all uncommitted changes made in conjunction with scratch, queue, and print activity.

Whether the changes are automatically backed out depends on the execution environment:

- If the changes were made under the control of a central version that is journaling to a disk file, they are backed out automatically. The central version continues to process other applications during recovery.
- The changes are not backed out automatically under the following circumstances:
  - If the changes were made under the control of a central version that is journaling to a tape file.
  - If the changes were made in local mode.

  In these cases, the ROLLBACK statement causes the affected areas to remain locked against subsequent access by other database sessions. They must be manually recovered. If changes cannot be backed out and CONTINUE was specified on the rollback request, a non-zero error status is returned to the application and if the request was for an individual run unit, that run unit is terminated.

  Note: For more information about manual recovery, see the *CA IDMS Database Administration Guide*.

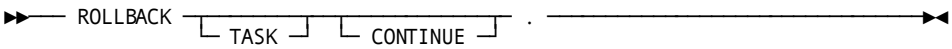
If CONTINUE is not specified, run units (and SQL sessions) impacted by the ROLLBACK statement end, and their access to the database is terminated. If CONTINUE is specified, impacted database sessions remain active after the operation is complete.

The ROLLBACK statement is used in both the navigational and logical record facility environments. The ROLLBACK TASK statement is also used in an SQL programming environment.

Currency

Following a ROLLBACK statement, all currencies are set to null. Unless the CONTINUE option is specified, the issuing program or task cannot perform database access through an impacted run unit without executing another BIND/READY sequence.

Syntax



Parameters

TASK

Rolls back the uncommitted changes made by all scratch, queue, and print activity and all top-level run units associated with the current task and terminates those run units. Its impact on SQL sessions associated with the task depends on whether those sessions are suspended and whether their transactions are eligible to be shared.

For more information about the impact of a ROLLBACK TASK statement on SQL sessions, see the *SQL Programming Guide*.

For more information about run units and the impact of ROLLBACK TASK, see the *Navigational DML Programming Guide*.

CONTINUE

Central version only. Causes the affected run units and SQL sessions to remain active after their changes are backed out. Database access can be resumed without reissuing BIND and READY statements.

Note: The CONTINUE option should not be used in local mode if database changes have been made.

Example

The following statement reverses the effects of the run unit through which it is issued and terminates the run unit:

```
ROLLBACK.
```

Status Codes

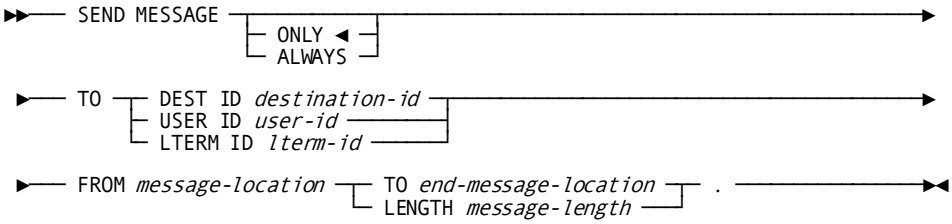
After completion of the ROLLBACK function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1958	CONTINUE was specified and database changes could not be backed out. The run unit has been terminated.
5031	The specified request is invalid; the program may contain a logic error
5058	TASK CONTINUE was specified and database changes could not be backed out.
5097	An error was encountered processing a syncpoint request; check the log for details.

SEND MESSAGE

The SEND MESSAGE statement sends a message to another terminal or user or to a group of terminals or users defined as a *destination* during system generation. The SEND MESSAGE function does not employ the data dictionary message area; instead, CA IDMS places each message in a queue, sending the message to the appropriate terminal only when it is possible to do so without disrupting executing tasks. Typically, CA IDMS sends queued messages to a terminal the next time the ENTER NEXT TASK CODE message is displayed.

Syntax



Parameters

ONLY

Sends the message immediately if the destination, user, or terminal is available, and does not queue the message for subsequent transmission if the destination, user, or terminal is not available.

This is the default.

Note: If ONLY is specified with the DEST ID option (described below) and if some, but not all, of a group of users or terminals in the destination are available, CA IDMS will send the message to those available. The sender will not be aware of any unsuccessful transmissions.

ALWAYS

Sends the message immediately if the destination, user, or terminal is available, and queues the message for later transmission if the destination, user, or terminal is not available.

TO DEST ID

Identifies the recipient of the message as a destination. The specified destination must have been defined during system generation.

destination-id

Either the symbolic name of a user-defined field that contains the destination ID or the ID itself enclosed in quotation marks.

TO USER ID

Identifies the user to receive a message. The specified user can be signed on to any terminal.

user-id

Identifies the user to receive the message. The specified user can be signed on to any terminal. *User-id* is the symbolic name of a 32-byte user-defined field that contains the user-id.

TO LTERM ID

Identifies the logical terminal to receive the message.

lterm-id

Either the symbolic name of a user-defined field that contains the terminal ID or the ID itself enclosed in quotation marks.

FROM

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the text of the message to be sent.

message-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the message text.

end-message-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the message text.

LENGTH

Defines the length in bytes of the message text.

message-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

Examples

The following examples illustrate the use of the SEND MESSAGE statement.

Example 1

The following statement illustrates a request to send the message in the TERM-MESS field to the logical terminal KENNEDYA:

```
SEND MESSAGE ALWAYS
  TO LTERM ID 'KENNEDYA'
  FROM TERM-MESS TO END-TERM-MESS.
```

Example 2

The following statement illustrates a request to send the message in the TERM-MESS field to the user field:

```
MOVE 'KYJOE2' to USER32.
   SEND MESSAGE
    TO USER ID USER32
    FROM TERM-MESS TO END-TERM-MESS.
```

Example 3

The following statement illustrates a request to send the message in the TERM-MESS field to the destination ALL:

```
SEND MESSAGE
  TO DEST ID 'ALL'
  FROM TERM-MESS TO END-TERM-MESS.
```

Status Codes

After completion of the SEND MESSAGE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

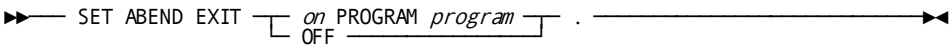
Status code	Meaning
0000	The request has been serviced successfully.
4907	An I/O error has occurred during processing.
4921	The specified message recipient has not been defined.
4931	The parameter list is invalid.
4932	The derived length of the specified message data area is zero or negative.
4934	The specified variable storage area that contains the message text is in the LINKAGE SECTION but is not an 01-level entry.
4938	The specified WORKING-STORAGE SECTION or LINKAGE SECTION entry has not been allocated, as required. A GET STORAGE request must be issued.

SET ABEND EXIT

The SET ABEND EXIT (STAE) statement establishes or cancels linkage to an abend routine to which CA IDMS passes control if the issuing task terminates abnormally. Any program within a task can establish an abend exit; however, only one abend exit is in effect at any given time for each task level. If more than one abend exit has been established, CA IDMS recognizes the exit associated with the last STAE request issued.

When a task terminates abnormally (following either a processing error or an ABEND request), abend exits for the program that was executing at the time of the abend and for all higher-level programs will be executed before the task is terminated. The program can prevent CA IDMS from executing abend exits automatically either by coding the EXITS IGNORED clause in an ABEND request or by coding a DC RETURN request in the abend routine.

Syntax



Parameters

on PROGRAM

Specifies the program to which control is to transfer if the issuing task terminates abnormally.

program

Either the symbolic name of a user-defined field that contains the program name or the name itself enclosed in quotation marks.

Note: CA IDMS does not check to determine if the specified program name is valid when the STAE request is issued. Rather, if the program is not found or is otherwise unloadable when CA IDMS attempts to execute it, the STAE request will be ignored.

OFF

Cancels any previously issued STAE request for the issuing task level.

Examples

The following examples illustrate the use of the SET ABEND EXIT statement.

Example 1

The following statement establishes an abend exit that will execute the program ABENDRTN if the issuing task terminates abnormally:

```
SET ABEND EXIT ON PROGRAM 'ABENDRTN'.
```

Example 2

The following statement cancels all abend exits previously established at the task level of the issuing program:

```
SET ABEND EXIT OFF.
```

Status Codes

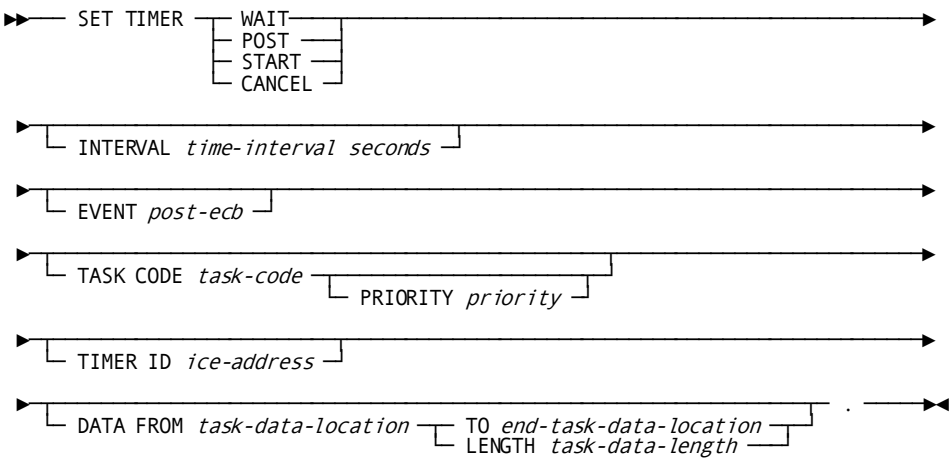
After completion of the SET ABEND EXIT function, the only possible value in the ERROR-STATUS field of the IDMS-DC communications block is 0000.

SET TIMER

The SET TIMER statement defines an event that is to occur after a specified time interval or cancels the effect of a previously issued SET TIMER request. Using the SET TIMER function, a program can:

- Delay task processing for a specified period of time
- Post an ECB at the end of a specified period of time
- Initiate a task at the end of a specified period of time

Syntax



Parameters

WAIT

Places the issuing task in a wait state and redispatches the issuing task after the specified time interval elapses. Because WAIT relinquishes control until the time interval has elapsed, a subsequent SET TIMER request cannot be used to cancel this WAIT request.

POST

Posts a user-specified ECB after the specified time interval elapses; the issuing task continues to run. If POST is specified, the EVENT parameter (described below) must also be specified.

START

Initiates a user-specified task after the specified time interval elapses. If START is specified, the TASK CODE parameter (described below) must also be specified.

CANCEL

Cancels the effect of a previously issued SET TIMER request.

INTERVAL ... seconds

WAIT, POST, START requests only. Specifies the time, in seconds, from the issuance of a SET TIMER request at which the requested event will occur.

time-interval

Either the symbolic name of a user-defined field that contains the time interval or the interval itself expressed as a numeric constant.

EVENT

POST requests only. Specifies the ECB to be posted.

post-ecb

The symbolic name of a user-defined area that contains three PIC S9(8) COMP SYNC (fullword) fields.

Note: The POST instruction will only POST an ECB that is within storage owned by the TASK initiating the POST instruction. If the storage is not owned by the same task, it will not be executed.

TASK CODE

START requests only. Specifies the task to be initiated.

task-code

Either the symbolic name of the user-defined field that contains the task code or the task code itself enclosed in quotation marks.

The specified task code must have been defined to CA IDMS during system generation or at runtime with a DCMT VARY DYNAMIC TASK command.

PRIORITY

Specifies a dispatching priority for the task.

priority

Either the symbolic name of a user-defined field that contains the priority or the priority itself expressed as a numeric constant in the range 0 through 240. The new task's priority defaults to the priority defined for that task code.

TIMER ID

POST, START, CANCEL requests only. Specifies the address of the interval control element (ICE) associated with the timed event.

ice-address

The symbolic name of a user-defined PIC S9(8) COMP SYNC (fullword) field. If either POST or START has been specified, *ice-address* references a field to which CA IDMS will return the ICE address. If CANCEL has been specified, *ice-address* references the field that contains the ICE address returned by CA IDMS following a SET TIMER POST or SET TIMER START request.

Note: The TIMER ID parameter must be specified with SET TIMER POST and SET TIMER START requests if the program is to issue subsequent SET TIMER CANCEL requests.

DATA FROM

START requests only. Identifies the user data to be passed to the new task.

task-data-location

The symbolic name of a user-defined field that identifies the beginning of an area containing the data item(s) to be passed.

TO

Indicates the end of the data area being passed to the new task.

end-task-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the data area being passed.

LENGTH

Specifies the length in bytes of the data area.

task-data-length

Either the symbolic name of a user-defined WORKING-STORAGE SECTION or LINKAGE SECTION field that contains the length of the data area or the length itself expressed as a numeric constant.

Note: The data passed to the new task consists of two bytes containing the length of the original data followed by the original data itself. This may be accessed by means of a LINKAGE SECTION entry corresponding to the data and a USING clause in the PROCEDURE DIVISION header.

Examples

The following examples illustrate the use of the SET TIMER statement.

Example 1

The following statement illustrates a request to place the issuing task in a wait state and redispatch it after nine seconds have elapsed:

```
  SET TIMER WAIT
INTERVAL 9 SECONDS.
```

Example 2

The following statement illustrates a request to post the event PODB after five seconds have elapsed:

```
  SET TIMER POST
INTERVAL 5 SECONDS
EVENT PODB
TIMER ID TMR-ID.
```

Example 3

The following statement illustrates a request to start the SPSG task after five seconds have elapsed and to pass the specified data to that task:

```
SET TIMER START
INTERVAL 5 SECONDS
TASK CODE 'SPSG'
TIMER ID TMR-ID
DATA FROM PASSGR LENGTH REC-LENGTH.
```

Example 4

The following statement illustrates a request to cancel the timed event referenced by TMR-ID:

```
SET TIMER CANCEL
TIMER ID TMR-ID.
```

Status Codes

After completion of the SET TIMER function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3512	The specified task code is not known to the DC/UCF system.
3516	The interval control element (ICE) specified for a SET TIMER CANCEL request cannot be found
3531	Parameter list is invalid.
3532	The derived length of the data area is negative

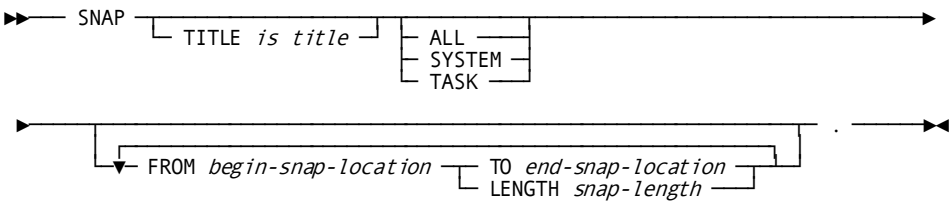
SNAP

The SNAP statement requests a memory snap of one or all of the following areas:

- **Task areas**—Includes all resources associated with the issuing task, as well as the task control element (TCE) and dispatch control element (DCE) for the task. Information displayed by the snap is formatted with headers.
- **System areas**—Includes areas for all tasks and CA IDMS internal control blocks. Task areas are not itemized separately. Information displayed by the snap is formatted with headers.
- **Specified locations in memory**—Includes one or more areas of memory specifically requested by location and length. The information displayed is not formatted with headers.

The areas requested in the SNAP request are written to the DC system log file, which is defined during system generation as a sequential data set or a data dictionary area.

Syntax



Parameters

TITLE is

Specifies the title to be printed at the beginning of each page of the snap.

title

The symbolic name of a user-defined field that contains the title.

A title must contain 134 characters; the first character is reserved for use by CA IDMS, and the second character must be a valid ASA carriage control character (blank, 0, 1, +, or -).

ALL

Writes a snap of both task and system areas. Areas associated with the issuing task are formatted separately from the system areas. (Task areas are also included with the system areas but are not itemized by task.)

SYSTEM

Writes a snap of system areas.

TASK

Writes a snap of task areas.

FROM

Writes a snap of the specified memory location.

begin-snap-location

The symbolic name of a user-defined field indicating the starting location of the area to be snapped.

TO

Indicates the end of the area to be snapped.

end-snap-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the area requested in the snap.

LENGTH

Defines the length in bytes of the area to be included in the snap.

snap-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

Note: If snap-length is greater than 100, some COBOL compilers may produce errors. In this case, either use a symbolic name that contains the length, or use the FROM/TO form of the verb.

Example

The following example illustrates a SNAP statement that requests CA IDMS to write a memory snap of the specified memory location:

```
SNAP TITLE IS SNAP-TITLE
  FROM WS-START TO WS-END.
```

Status Codes

After completion of the SNAP function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

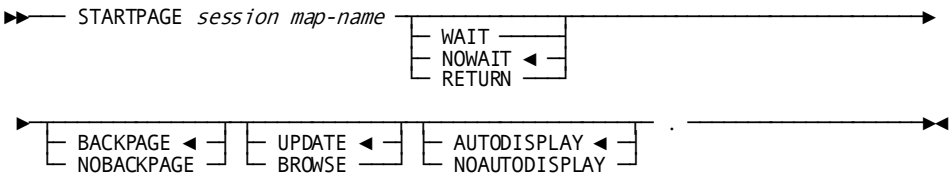
Status code	Meaning
0000	The request has been serviced successfully
4032	The derived length of the specified snap storage area is zero or negative

STARTPAGE

The STARTPAGE statement initiates a paging session. It can be followed by any number of DML commands, including MAP IN and MAP OUT commands. The map paging session is terminated by an ENDPAGE command (or by another STARTPAGE command, if one is encountered before an ENDPAGE command).

Note: Only *one* pageable map can be handled by the statements enclosed by a given STARTPAGE/ENDPAGE pair.

Syntax



Parameters

map-name

Specifies the pageable map to be used for the session.

WAIT

Specifies that runtime mapping automatically handles paging transactions that do not cause data to be updated. Control is passed to the program when the user presses a control key that requests an update or nonpaging operation.

NOWAIT

Specifies that runtime mapping automatically handles all paging and update transactions.

This is the default.

Control is passed to the program only when neither an update nor paging request is made when the operator presses a control key.

RETURN

Specifies that runtime mapping does not handle any terminal transactions in the paging session. Control is passed to the program whenever the operator presses a control key.

Note: Runtime mapping does not update program variable storage unless a MAP IN command is issued. In cases where the operator can update data, it is recommended that WAIT or RETURN be specified for the session so that data can be retrieved as it is updated.

BACKPAGE

Specifies that the operator can display previous pages of detail occurrences.

This is the default.

NOBACKPAGE

Specifies that the operator cannot display any page of detail occurrences with a page number lower than the current page number. Modifications made on a given page of the map must be requested by MAP IN statements in the application program before a MAP OUT RESUME command is issued. The previous page of detail occurrences is deleted from the session scratch record when a new map page is displayed.

Note: NOBACKPAGE cannot be assigned if UPDATE and NOWAIT are specified for the session.

UPDATE

Specifies that the user can modify variable map fields, subject to restrictions specified for the map either at map definition time or by statements in the program.

This is the default.

BROWSE

Specifies that the user can modify only the page and response fields (if any) of the map. The MDTs for variable fields on the map can be set on only according to specifications made either in the map definition or by statements in the program.

AUTODISPLAY

Enables automatic display of the pageable map's first page.

This is the default.

NOAUTODISPLAY

Disables automatic display of the pageable map's first page. You manually display the page by using a MAP OUT RESUME statement.

Examples

Initiating a Paging Session

The following statement initiates a paging session in which the operator can page forward and backward within the pageable map but can make no modifications:

```
STARTPAGE SESSION EMPMAPPG NOWAIT BACKPAGE BROWSE.
```

Overriding Automatic Display

Use STARTPAGE to override automatic display for the first page of pageable map EMPMAPPG:

```
STARTPAGE SESSION EMPMAPPG NOAUTODISPLAY.
```

Status Codes

After completion of the STARTPAGE function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4604	A paging session was already in progress when this STARTPAGE command was received. An implied ENDPAGE was processed before this STARTPAGE was successfully executed.

STORE

The STORE statement performs the following functions:

- Acquires space and a database key for a new record occurrence in the database
- Transfers the value of the appropriate elements from program variable storage to the specified record occurrence in the database
- Connects the new record occurrence to all sets for which it is defined as an automatic member

Before execution of the STORE statement, the following conditions must be satisfied:

- All areas affected either implicitly or explicitly must be readied in one of the update usage modes (see READY (see page 272)).
- All control elements (that is, CALC and sorted set control fields) must be initialized by the program.
- If the record being stored has a location mode of DIRECT, the contents of DIRECT-DBKEY (positions 197-200 of the IDMS communications block, as described in Chapter 4: (see page 33)) must be initialized with a suggested db-key value or a null db-key value of -1.
- If the record is to be stored in a native VSAM relative-record data set (RRDS), the contents of DIRECT-DBKEY must be initialized with the relative record number that represents the location within the data set where the record is to be stored.
- All sets in which the named record is defined as an automatic member, and the owner record of each of those sets must be included in the subschema. Sets for which the named record is defined as a manual member need not be defined in the subschema since the STORE statement does not access those sets. (An automatic member is connected automatically to the selected set occurrence when the record is stored; a manual member is not connected automatically to the selected set occurrence.)

- If the record being stored has a location mode of VIA, currency must be established for that VIA set, regardless of whether the record being stored is an automatic or manual member of that set. Current of the VIA set provides the suggested page for the record being stored.
- Currency must be established for all set *occurrences* in which the stored record will participate as an *automatic* member. Depending on set order, the STORE statement uses currency as follows:
  - If the named record is defined as a member of a set that is ordered FIRST or LAST, the record that is current of set establishes the set occurrence to which the new record will be connected.
  - If the named record is defined as a member of a set that is ordered NEXT or PRIOR, the record that is current of set establishes the set occurrence into which the new record will be connected *and* determines its position within the set.
  - If the named record is defined as a member of a sorted set, the record that is current of set establishes the set occurrence into which the new record will be connected. The DBMS compares the sort key of the new record with the sort key of the current record of set to determine if the new record can be inserted into the set by movement in the next direction. If it can, the current of set remains positioned at the record that is current of set and the new record is inserted. If it cannot, the DBMS finds the owner of the current of set (not necessarily the current occurrence of the owner record type) and moves as far forward in the next direction as is necessary to determine the logical insertion point for the new record.

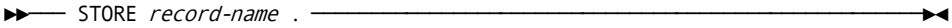
A record is stored in the database based on the location mode specified in the schema definition of the record. The location modes are as follows:

- **CALC**—The record being stored is placed on or near a page calculated by CA IDMS from a control element (the CALC key) in the record.
- **VIA**—The record being stored is placed either as close as possible to the current of set (if current of set and member record occurrences share a common page range) or in the same relative position in the member record's page range as the current of set is in its associated page range (if current of set and member record occurrences do not share a common page range).
- **DIRECT**—The record being stored is placed on or near a user-specified page as determined by the value in the DIRECT-DBKEY field of the IDMS communications block. If DIRECT-DBKEY contains a valid db-key for the record being stored, the DBMS assigns a db-key on the same page if space is available to the new record occurrence. Otherwise, it assigns the next available db-key, subject to the page-range limits of the record being stored. If DIRECT-DBKEY contains a value of -1, the first db-key available in the page range in which the record is to be stored is assigned to the record. In any case, the db-key of the stored record occurrence is returned to DBKEY (positions 13-16 in the IDMS communications block). The contents of DIRECT-DBKEY remain unchanged.

Currency

Following successful execution of a STORE statement, the stored record becomes current of run unit, its record type, its area, and all sets in which it participates as owner or automatic member.

Syntax



Parameters

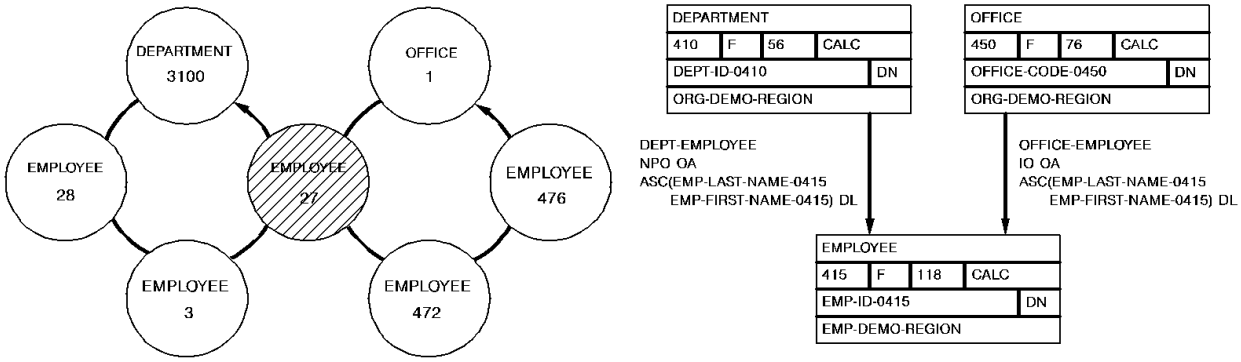
record-name

The name of a record type included in the subschema. The current occurrence of the record type will be moved from variable storage to the database, connected to an occurrence of each set for which it is defined as an automatic member, and established as the owner of a set occurrence for each set in which it is defined as an owner.

The ordering rules for each set govern the insertion point of the specified record in the set.

Example

The following figure illustrates the steps necessary to add a new EMPLOYEE record to the database. Since EMPLOYEE is defined as an automatic member of both the DEPT-EMPLOYEE and OFFICE-EMPLOYEE sets, currency must be established in each of those sets before issuing the STORE. The first two DML statements establish OFFICE 1 and DEPARTMENT 3100 as current of the OFFICE-EMPLOYEE and DEPT-EMPLOYEE sets, respectively. When EMPLOYEE 27 is stored, it is connected automatically to each set.



	CURRENCIES RUN UNIT, RECORD, SET, AREA							
	RUN UNIT	DEPARTMENT	EMPLOYEE	OFFICE	DEPT-EMPLOYEE	OFFICE-EMPLOYEE	ORG-DEMO-REGION	EMP-DEMO-REGION
MOVE OFFICE-CODE-IN TO OFFICE-CODE. FIND CALC OFFICE.	1			1		1	1	
MOVE DEPT-ID-IN TO DEPT-ID. FIND CALC DEPARTMENT.	3100	3100		1	3100	1	3100	
STORE EMPLOYEE.	27	3100	27	1	27	27	3100	27

Status Codes

After completion of the STORE function, the ERROR-STATUS field in the IDMS communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
1201	The area in which the named record is to be stored has not been readied
1202	The suggested DIRECT-DBKEY value is not within the page range for the named record
1203	Invalid currency for a record to be inserted by a STORE. This can only occur when a run unit is sharing a transaction with other database sessions. The 03 minor status is returned if the run unit tries to store a record and a currency in any set in which the record is a owner or member of has been invalidated because of changes made by another database session that is sharing the same transaction.
1204	The OCCURS DEPENDING ON item is either less than zero or greater than the maximum number of occurrences of the control element
1205	Storage of the record would violate a duplicates-not-allowed option for a CALC record, a sorted set, or an index set

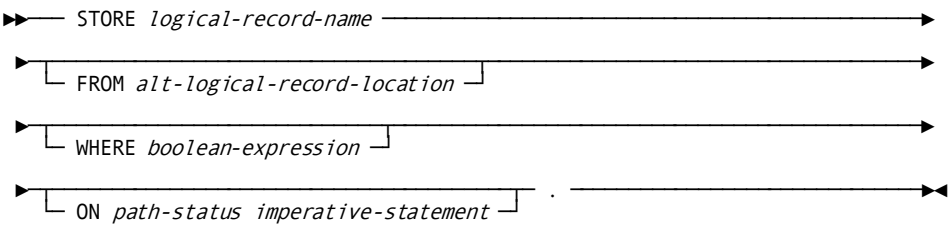
Status code	Meaning
1208	The named record is not in the subschema; The program has probably invoked the wrong subschema.
1209	The named record's area has not been readied in one of the update usage modes
1210	The subschema specifies an access restriction that prohibits storage of the named record
1211	The record cannot be stored in the area because of insufficient space
1212	The record cannot be stored because no db-key is available; this is a system internal error.
1218	The record has not been bound
1221	An area other than the area of the named record occurrence has been readied with an incorrect usage mode
1225	A set occurrence has not been established for each set in which the named record is to be stored
1233	At least one set in which the record participates as an automatic member has not been included in the subschema
1253	The subschema definition of an indexed set does not match the indexed set's physical structure in the database
1254	Either the prefix length of an SR51 record is less than zero or the data length is less than or equal to zero
1255	An invalid length has been defined for a variable length record
1260	A record occurrence encountered in the process of connecting automatic sets is inconsistent with the set named in the ERROR-SET field of the IDMS communications block; probable causes include: a broken chain and improper database description.
1261	The record cannot be stored because of broken chains in the database

STORE (LRF)

The STORE statement updates the database with field values for a logical-record occurrence. STORE does not necessarily result in storing new occurrences of all or any of the database records that participate in the logical record; the path selected to service a STORE logical-record request performs whatever database access operations the DBA has specified to service the request. For example, if an existing department gets a new employee, only the new employee information will be stored in the database; the department information need not be stored in the database because it already exists.

LRF uses field values present in the variable storage location reserved for the logical record to make the appropriate updates to the database. You can optionally name an alternative storage location from which the new field values are to be obtained to perform the requested store operation.

Syntax



Parameters

logical-record-name

The name of a logical record defined in the subschema.

FROM

Specifies an alternative variable storage location that contains the field values to be used to make appropriate updates to the database. When storing a logical record that has previously been retrieved into an alternative variable storage location, use the FROM clause to name the same area specified in the OBTAIN request.

alt-logical-record-location

A record location defined in the WORKING-STORAGE SECTION or LINKAGE SECTION.

WHERE

Specifies selection criteria to be applied to the object logical record. For details on coding this clause, see Logical-Record Clauses (see page 327).

boolean-expression

The selection criteria to apply.

ON parameter

Specifies the action to be taken depending on the value returned to the LR-STATUS field in the LRC block. For details on coding this clause, see Logical-Record Clauses (see page 327).

path-status

The value of the LR-STATUS field in the LRC block which triggers the specified action.

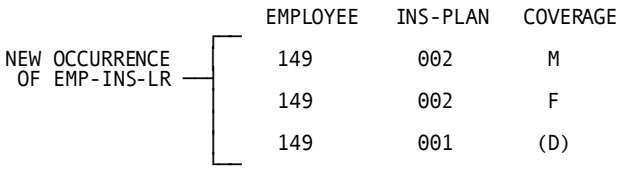
imperative-statement The action to take.

Example

The following example illustrates the steps necessary to store a new EMP-INSURANCE-LR for a given employee:

```
MOVE EMP-ID-IN TO EMP-ID-0415.
MOVE INS-PLAN-IN TO INS-PLAN-CODE-0435.
MOVE S-DATE-IN TO SELECTION-DATE-0400
MOVE T-DATE-IN TO TERMINATION-DATE-0400
MOVE TYPE-IN TO TYPE-0400
MOVE PLAN-IN TO INS-PLAN-CODE-0400.
STORE EMP-INSURANCE-LR.
```

The following figure illustrates the new occurrence of the EMP-INSURANCE-LR, which consists of EMPLOYEE 149, INS-PLAN 001, and COVERAGE 'D'. The bottom COVERAGE occurrence represents the only data physically added to the database.

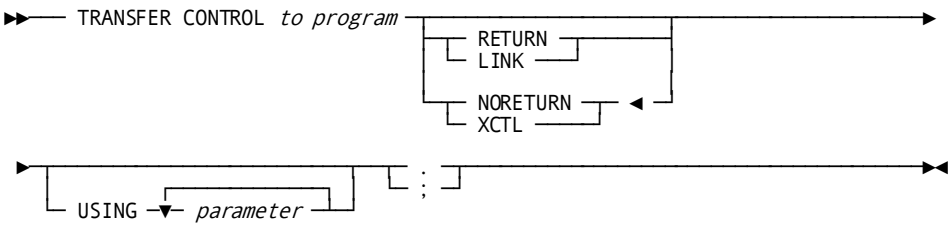


TRANSFER CONTROL

The TRANSFER CONTROL statement is used to:

- Establish linkage with a specified program and to pass control and an optional parameter list to that program. The program issuing the TRANSFER CONTROL RETURN request expects return of control at the instruction immediately following the TRANSFER CONTROL statement when the linked program terminates or issues a DC RETURN request.
- Transfer control and an optional parameter list to a specified program. The program issuing the TRANSFER CONTROL NORETURN request does *not* expect return of control.

Syntax



Parameters

program

Either the symbolic name of a user-defined field that contains the program name or the name itself enclosed in quotation marks.

RETURN (LINK)

Establishes linkage with the specified program, expecting return of control.

RETURN and LINK are synonyms and can be used interchangeably.

NORETURN (XCTL)

Transfers control to the specified program, not expecting return of control.

This is the default.

NORETURN and XCTL are synonyms and can be used interchangeably.

USING

Passes one or more parameters (data items) to the program receiving control.

parameter

The symbolic name of a user-defined field that contains the names of the data items to be passed. Multiple parameter specifications must be separated with a blank.

If the USING clause is specified with the RETURN option, the data items being passed are defined in either the WORKING-STORAGE SECTION or the LINKAGE SECTION of the calling program, and in the LINKAGE SECTION of the linked program.

If the USING clause is specified with the NORETURN option, the data items being passed are defined in the LINKAGE SECTION of *both* the calling program and the program receiving control. In either case, the program receiving control must have a corresponding USING clause and parameter list as part of its PROCEDURE DIVISION header.

Examples

The following examples illustrate the use of the TRANSFER CONTROL statement.

Example 1

The following statement illustrates a request to transfer control to the program in the PROGRAM-NAME field; the issuing program expects return of control:

```
TRANSFER CONTROL TO PROGRAM-NAME
  LINK.
```

Example 2

The following statement illustrates a request to transfer control to PROGRAMD and passes three data items (FIELD-1, FIELD-2, and FIELD-3) to the program; the issuing program does not expect return of control:

```
TRANSFER CONTROL TO 'PROGRAMD'
  NORETURN
  USING FIELD-1 FIELD-2 FIELD-3.
```

Status Codes

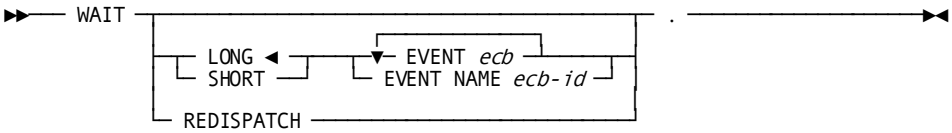
After completion of the TRANSFER CONTROL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3020	The request cannot be serviced because an I/O, program-not-found, or potential deadlock error has occurred

WAIT

The WAIT statement relinquishes control either to CA IDMS, pending completion of one or more events, or to a higher priority ready-to-run task. If control is relinquished to wait for the completion of one or more events, an event control block (ECB) must be defined for each event. If an ECB is already posted when the WAIT is issued, the task is redispatched immediately and control does not pass to another task.

Syntax



Parameters

LONG

Specifies that the wait is expected to be long-term.

This is the default.

LONG should be specified for all waits expected to last a second or more (for example, terminal input).

SHORT

Specifies that the wait is expected to be short-term. SHORT should be specified for all waits expected to last less than a second (for example, a disk I/O).

EVENT

Defines one or more ECBs upon which the task will wait.

ecb

The symbolic name of a user-defined area that contains three PIC S9(8) COMP SYNC (fullword) fields.

Multiple EVENT parameters must be separated by at least one blank.

EVENT NAME

Specifies the ECB upon which the task will wait.

ecb-id

Either the symbolic name of a user-defined field that contains the ECB ID or the ID itself enclosed in quotation marks.

You cannot specify multiple EVENT NAMEs.

REDISPATCH

Specifies that the issuing task wishes to relinquish control to any higher priority ready-to-run task before being redispatched.

Example

The following example requests a short-term wait on the event PODB:

```
WAIT
  SHORT
  EVENT NAME 'PODB'.
```

Status Codes

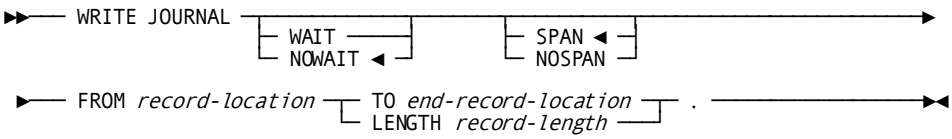
After completion of the WAIT function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3101	To wait on the specified ECB would cause a deadlock

WRITE JOURNAL

The WRITE JOURNAL statement writes a task-defined record to the journal file. Records written to the journal file with the WRITE JOURNAL function will be available to user-defined exit routines during a task- or system-initiated rollback.

Syntax



Parameters

WAIT

Specifies that the issuing task will wait for completion of the physical I/O associated with the WRITE JOURNAL function before resuming execution. This option will cause CA IDMS to write a partially filled buffer to the journal file.

NOWAIT

Specifies that the issuing task will not wait for completion of the WRITE JOURNAL function; the journal record will remain in a storage buffer until a future request necessitates writing the buffer to the journal file.

This is the default.

SPAN

Specifies to write the record across several journal file blocks, if necessary.

This is the default.

NOSPAN

Specifies to write the record to a single journal file block; if it is longer than the journal block, the record will be split.

When a record is shorter than a journal file block, based on space available in the current journal block, CA IDMS will either place the record in the block, split it across multiple blocks (SPAN), or write it to a new block after the current block is written (NOSPAN).

The following considerations apply to using an exit routine to retrieve journal file records during recovery:

- If a WRITE JOURNAL statement issued before a failure specified the SPAN option, records may have been written across several journal blocks. To retrieve these records, the exit routine will be invoked once for each segment of each record to be retrieved.

- If a WRITE JOURNAL statement issued before a failure specified the NOSPAN option and records written to the journal file are shorter than journal blocks, the exit routine need only be concerned with the complete records.

  Note: In general, the SPAN option provides better space utilization in the journal file because it increases the average fullness of each block.

FROM

Defines the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the record to be written to the journal file.

record-location

The symbolic name of a user-defined field.

TO

Indicates the end of the record area to be written to the journal file.

end-record-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the record being written to the journal file.

LENGTH

Defines the length in bytes of the record to be written to the journal file.

record-length

Either the symbolic name of the user-defined field that contains the length or the length itself expressed as a numeric constant.

Example

The following statement illustrates a request to write the JOURNAL-DATA record to the journal file, spanning it across several blocks if necessary:

```
WRITE JOURNAL SPAN
  FROM JOURNAL-DATA TO END-JOURNAL-DATA.
```

Status Codes

After completion of the WRITE JOURNAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
5002	Storage is not available for the required control blocks
5032	The derived length of the specified journal record is zero or negative

Status code	Meaning
5097	An invalid status has been received from DBIO/DBMS; check the DC system log for details

WRITE LINE TO TERMINAL

The WRITE LINE TO TERMINAL statement illustrates a request to transfer data from program variable storage to a terminal. WRITE LINE TO TERMINAL also establishes, modifies, and deletes page header lines.

Data transfers requested by WRITE LINE TO TERMINAL statements can be synchronous or asynchronous:

- Following a **synchronous** request, control passes to CA IDMS, which places the issuing task in an inactive state. For non-3270 devices, control does not return to the issuing program until the WRITE LINE TO TERMINAL request is complete. For 3270-type devices, all lines of output are saved in a buffer; the buffer is not transmitted to the terminal until it is full.

  The transfer of a line to the buffer will result in a processing delay; however, control returns to the program immediately following the request. If the line of data fills the buffer, the entire page of data must be transmitted to the terminal. In this case, control does not return to the issuing program until the user responds by pressing ENTER. Thus, the program is made conversational.

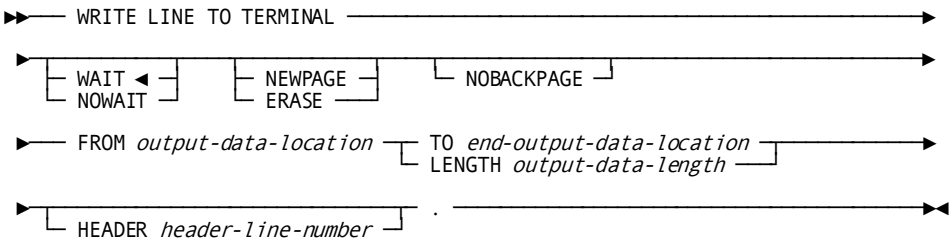
- Following an **asynchronous** request, control returns immediately to the issuing program. Thereafter, each time the program issues a line mode I/O request, CA IDMS automatically checks to determine if the last asynchronous request has completed and, therefore, whether a new data transfer can be initiated.

  With asynchronous requests, programs can buffer all required pages of output without suspending task execution during the actual transmission of data. However, the task can optionally terminate itself, thereby freeing resources and allowing the user to review the buffered output.

I/O requests are processed in the sequence received from the task; thus, if a program issues a synchronous WRITE LINE TO TERMINAL request after issuing one or more asynchronous requests, all I/O requests are completed before returning control to the issuing program.

The WRITE LINE TO TERMINAL request issued automatically by CA IDMS to empty partially filled buffers upon completion of a task is synchronous; therefore, the user can view all screens and catch up with processing at that time. If an application allows the user to interrupt or terminate processing at some point within a task, a synchronous WRITE LINE TO TERMINAL request must be issued to suspend processing while awaiting an operator response.

Syntax



Parameters

WAIT

Specifies that the write operation is synchronous; the issuing task automatically relinquishes control and must wait for completion of the output operation before processing can continue.

This is the default.

NOWAIT

Specifies that the write operation is asynchronous; the issuing task continues executing.

NEWPAGE (ERASE)

Write the output data line beginning on a new page. For 3270-type devices, the NEWPAGE option forces CA IDMS to output the contents of the current buffer, even if the buffer is not full.

NEWPAGE and ERASE are synonyms and can be used interchangeably.

NOBACKPAGE

3270-type devices only. Does not keep pages output in a scratch area. If NOBACKPAGE is specified, the user can view only the current page of output. NOBACKPAGE is valid only with the first I/O request in a line mode session.

FROM

Identifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data to be transferred to the terminal device or the page header line being created, modified, or deleted.

output-data-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the output data stream.

end-output-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data.

LENGTH

Defines the length in bytes of the output data area.

output-data-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

Note: If the WRITE LINE TO TERMINAL statement is being used to delete a page header line, *output-data-length* must be zero.

HEADER

Specifies the number of the page header line being created, modified, or deleted.

header-line-number

Either the symbolic name of a user-defined field that contains the header line number or the header line number itself expressed as a numeric constant.

Examples

The following examples illustrate the use of the WRITE LINE TO TERMINAL statement.

Example 1

The following statement defines the value of a data area as a header to be displayed at the top of each new page written to the terminal:

```
WRITE LINE TO TERMINAL
 FROM EMPL-HEAD TO END-EMPL-HEAD
 HEADER 1.
```

Example 2

The following statement illustrates a request to write the value in the specified data area to a new page on the terminal:

```
WRITE LINE TO TERMINAL
  NOWAIT
  FROM EMPL-RPT LENGTH 60.
```

Status Codes

After completion of the WRITE LINE TO TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4707	A logical or permanent I/O error has occurred during processing.
4731	The line request block (LRB) contains an invalid field, indicating a possible error in the program's parameters.
4732	The derived length of the specified line output area is zero or negative.
4738	The specified 01-level LINKAGE SECTION entry has not been allocated as required. A GET STORAGE request must be issued.
4743	The line I/O session has been canceled; the user has pressed CLEAR (3270s), ATTENTION (2741s), or BREAK (teletypes).

WRITE LOG

The WRITE LOG statement retrieves a predefined message from the message area of the data dictionary and optionally writes the message to a specified location in program variable storage. Retrieved messages are sent to the destination specified in the message definition; typical destinations are the operator's console and the DC system log file. If the operator's console has been defined as the message destination, the WRITE LOG statement can request a reply. When a reply is requested, control is not returned to the issuing task until the reply is received.

Note: For more information about global messages, see the *CA IDMS IDD DDDL Reference Guide*.

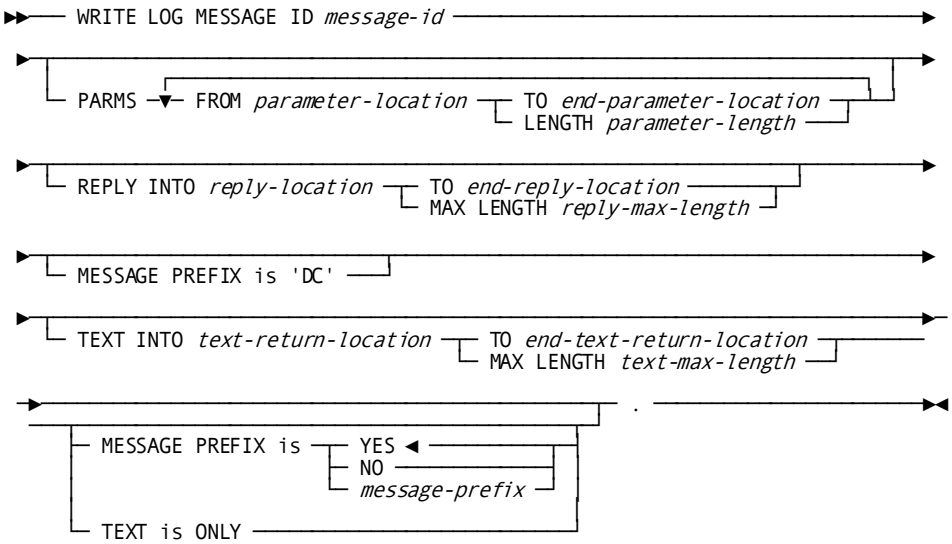
The message ID specified in the WRITE LOG statement is a seven-digit number. The first six (most significant) digits make up the actual message ID used to retrieve the message from the data dictionary; the seventh digit is a severity code. This severity code is predefined in the dictionary and is retrieved along with the message text to indicate the action to be taken after the message is written to the log:

Severity Level	CA IDMS Action
0	Return control to the issuing program and continue processing
1	Snap all task resources and return control to the issuing program
2	Snap all system areas and return control to the issuing program
3	Snap all task resources and abend the task with a task abend code of D002
4	Snap all system areas and abend the task with a task abend code of D002
5	Terminate the task with a task abend code of D002
6	Undefined
7	Undefined
8	Snap all system areas and abend the system with a system abend code of 3996
9	Terminate the system with a system abend code of 3996

If a WRITE LOG statement specifies a message ID that is not in the data dictionary, CA IDMS will use a prototype message but will perform the action associated with the severity code specified in the WRITE LOG request.

Messages stored in the data dictionary can contain symbolic parameters. Symbolic parameters, identified by an ampersand (&). followed by a two-digit numeric identifier, can appear in any order within the message. The WRITE LOG statement can specify replacement values for one or more symbolic parameters; however, the position of replacement values within the WRITE LOG request must correspond exactly with the two-digit numeric identifier in the message text. For example, the first value specified corresponds to &01., the second to &02., and so forth.

Syntax



Parameters

MESSAGE ID

Specifies the message ID. The first six digits specify the ID of the message; the seventh digit specifies the message's severity code.

message-id

Either the symbolic name of a user-defined PIC S9(8) COMP (fullword) field that contains the message ID or the ID itself expressed as a numeric constant.

Message IDs 000001 through 900000 are reserved for use by CA IDMS; the WRITE LOG statement can specify any number in the range 900001 through 999999.

Caution: The message length must be seven digits. The system will always interpret the last digit as the severity level. If you request message 987659 and do not code a severity level of zero (that is, 9876590) you are actually requesting that message 098765 be written to the log and that the system should be terminated with a 3996 abend code.

When messages are added to the data dictionary for use with the WRITE LOG statement, they are assigned an eight-character identification number; the first two characters are DC. A request for message 987654 retrieves DC987654.

PARMS FROM

Supplies replacement values for one or more symbolic parameters stored with the message text.

parameter-location

The symbolic name of a user-defined field that contains the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the replacement parameter.

This field must begin with a one-byte field into which the system places the length of the adjacent field. The value in the length does not include the length byte.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the replacement parameter.

end-parameter-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the replacement parameter.

LENGTH

Defines the length, in bytes, of the replacement parameter.

parameter-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

REPLY INTO

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the area reserved for a reply to the message issued by the WRITE LOG request.

reply-location

The symbolic name of a user-defined field.

This field must begin with a one-byte field into which the system places the length of the adjacent field. The value in the length does not include the length byte.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry reserved for the reply.

end-reply-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the reply.

MAX LENGTH

Defines the maximum length, in bytes, of the area reserved for the reply.

reply-max-length

Either the symbolic name of a user-defined field that contains the length or the length itself expressed as a numeric constant.

MESSAGE PREFIX IS 'DC'

Specifies the two characters that precede the numeric position of a message. The default is 'DC'.

TEXT INTO

Specifies that the contents of the named message, along with any replacement parameters, are to be written to the issuing program.

text-return-location

The symbolic name of a user-defined 1 through 132 character alphanumeric field that contains the WORKING-STORAGE SECTION or LINKAGE SECTION entry to which the message text is to be returned.

This field must begin with a 1-byte field into which the system places the length of the adjacent field. The value in the length does not include the length byte.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry reserved for the text.

end-text-return-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the returned text.

MAX LENGTH

Defines the maximum length in bytes of the WORKING-STORAGE SECTION or LINKAGE SECTION entry reserved for the returned message text.

text-max-length

Either the symbolic name of a user-defined field that contains the text length or the length itself expressed as a numeric constant.

MESSAGE PREFIX is

Defines the format of the message prefix. To override the default DC prefix, specify any one or two characters for *message-prefix*. To suppress a prefix, specify blanks.

YES

Indicates that the message text is preceded by:

IDMS *ppnnnnnnn* V*ssssss* REPLY*nn*

- *pp* is the prefix specified in the MESSAGE PREFIX parameter
- *nnnnnnn* is the message number
- *Vssssss* is the system number
- REPLY*nn* is the message's system-supplied reply number (present only if the REPLY parameter is used)

This is the default.

NO

Indicates that the message text is preceded by:

ppnnnnnnn

- *pp* is the prefix specified in the MESSAGE PREFIX parameter
- *nnnnnnn* is the message number

TEXT is ONLY

Indicates that the message text is output with no prefix.

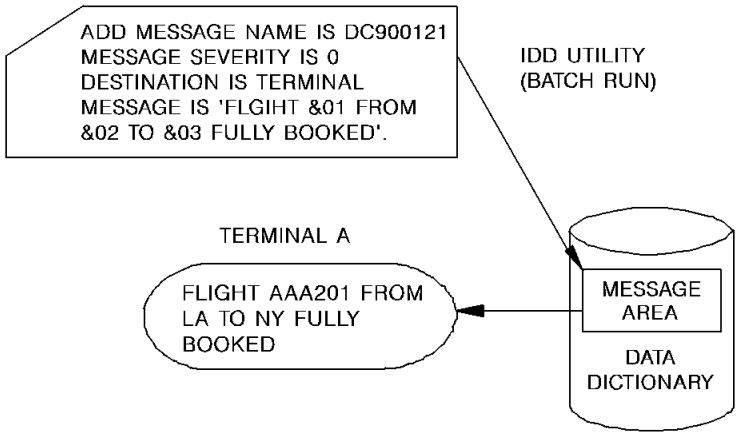
Example

The following figure illustrates a WRITE LOG statement that supplies three replacement parameters.

WRITE LOG Activities

Task A issues a WRITE LOG request for message 900121, specifying values to replace symbolic parameters &01., &02., and &03. stored with the message text. The message is sent to its destination, which has been defined as the logical terminal associated with the issuing task.

MESSAGE SOURCE AS INPUT TO IDD



WRITE LOG REQUEST

```
WRITE LOG MESSAGE ID 9001210
PARMS FROM FLT-NO TO END-FLT-NO
      FROM DPT-CITY TO END-DEPT-CITY
      FROM ARV-CITY TO END-ARV-CITY.
```

WHERE: FLT-NO = AAA201
DPT-CITY = LA
ARV-CITY = NY

Status Codes

After completion of the WRITE LOG function, the ERROR-STATUS field of the IDMS DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
3623	No storage or resource control element (RCE) can be allocated for the specified reply area
3624	The maximum number of outstanding replies has been exceeded; a maximum of 98 messages can be awaiting reply at a given time

Status code	Meaning
3625	The maximum number of replacement parameters has been exceeded; a maximum of 8 replacement parameters may be used if the "Message Prefix" option is not used. If the"Message Prefix" option is used then the maximum number of replacement parameters is limited to 7.
3631	The parameter list is invalid

WRITE PRINTER

The WRITE PRINTER statement transmits data from a task to a terminal defined to the system as a printer device during system generation. Any type of terminal can be designated as a printer; however, the terminal is usually a hard-copy device.

CA IDMS does not transmit data directly from program variable storage to the terminal. Rather, data is passed to a queue maintained by CA IDMS, and from the queue to the printer. The data stream passed to the queue by the WRITE PRINTER request contains only data; CA IDMS adds the necessary line and device control characters when it writes the data to the printer.

Note: Native mode data streams (that is, those that contain device-control information as well as user data) can also be transmitted with a WRITE PRINTER request. This capability is useful in formatting reports for 3280-type printers.

Each line of data transmitted in a WRITE PRINTER request is considered a record. Each record is associated with a **report** in the print queue. A report consists of one or more records. Any task can have up to 256 active print reports. A program can issue multiple WRITE PRINTER requests, each specifying a different report. Because the records associated with each report are maintained individually, records associated with one report are not interspersed with records associated with other reports when printed.

The WRITE PRINTER request can direct reports to print classes and to destinations:

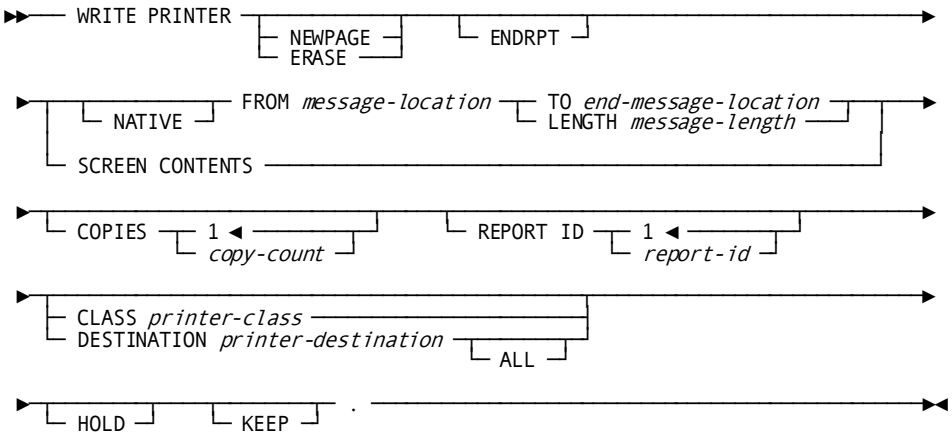
- During system generation, one or more **print classes** are associated with each terminal designated as a printer. For each report, the first record transmitted to the print queue by means of a WRITE PRINTER request establishes the print class for that report. The report will be printed on the first available printer that is assigned the same print class.
- **Destinations** are groups of terminals, printers, or users. If destinations have been defined during system generation, the WRITE PRINTER request can direct a report to a destination. Reports sent to printer destinations are printed on the first available printer for the destination, regardless of print class.

A report is printed only when that report is completed, either explicitly as part of a WRITE PRINTER request or implicitly when the issuing task terminates.

Note: Normal task termination, a FINISH TASK request, or a COMMIT TASK request will end all of the task's reports. Queued reports are made eligible for printing.

Abnormal task termination (abend) or a ROLLBACK TASK request will cause any queued reports belonging to the task to be deleted.

Syntax



Parameters

NEWPAGE (ERASE)

Specifies that the data stream will be printed beginning on a new page.

NEWPAGE and ERASE are synonyms and can be used interchangeably.

ENDRPT

Indicates that the data stream constitutes the last record in the specified report. When ENDRPT is specified, the report can be printed before the issuing task has terminated. However, the program must issue a COMMIT TASK request to signal to print the ended report. A subsequent WRITE PRINTER request with the same report ID will start a separate report.

NATIVE

Specifies that the data stream contains device control characters. If NATIVE is not specified, the necessary characters are automatically inserted.

FROM

Specifies the WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data to be transmitted to the print queue.

message-location

The symbolic name of a user-defined field.

TO

Indicates the end of the WORKING-STORAGE SECTION or LINKAGE SECTION entry that contains the data to be transmitted to the print queue.

end-message-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data.

LENGTH

Defines the length, in bytes, of the data stream.

message-length

Either the symbolic name of a user-defined field that contains the length of the data or the length itself expressed as a numeric constant.

SCREEN CONTENTS

3270-type devices only. Specifies that the contents of the currently displayed screen are to be transmitted to the print queue.

COPIES

Specifies the number of copies of the report to be printed.

copy-count

Either the symbolic name of a user-defined field that contains the copy count or the count itself expressed as a numeric constant.

The count must be an integer in the range 1 through 255; the default is one.

REPORT ID

Specifies the identifier of the report to be printed.

report-id

Either the symbolic name of a user-defined field that contains the report ID or the ID itself expressed as a numeric constant. *Report-id* must be an integer in the range 1 through 255; the default is one.

CLASS

Specifies the print class to which the report will be assigned.

The CLASS or DESTINATION should be specified only for the first line of each report. If no class or destination is specified, the default print class assigned to the issuing task's physical terminal during system generation will be used.

printer-class

Either the symbolic name of a user-defined field that contains the print class or the class itself expressed as a numeric constant.

Valid print classes are 1 through 64; the default is 1.

DESTINATION

Specifies the destination to which the report will be routed.

The CLASS or DESTINATION should be specified only for the first line of each report. If no class or destination is specified, the default print class assigned to the issuing task's physical terminal during system generation will be used.

printer-destination

Either the symbolic name of a user-defined field that contains the destination or the destination itself enclosed in quotation marks.

The specified destination must have been defined during system generation.

ALL Specifies that the report is to be printed on all of the printers belonging to the specified destination. The report will be printed, one printer at a time, and saved until it has been printed on each of the printers associated with the destination.

HOLD

Specifies that a queued report will be held without being printed. The specified report will be held until a DCMT VARY REPORT *report-name* RELEASE command is issued at run time.

KEEP

Specifies to keep the report in the print queue after it has been printed. The report can be released for printing with a DCMT VARY REPORT *report-name* RELEASE command. In this way, the report can be printed several times. A KEPT report can be deleted from the print queue manually (using a DCMT VARY REPORT *report-name* DELETE command at run time) or automatically (when the queue retention period has been exceeded).

Examples

The following examples illustrate the use of the WRITE PRINTER statement.

Example 1

The following statement illustrates a request to associate the data in the specified location with report 32 in the print queue and to print it beginning on a new page. Report 32 will print on the first terminal assigned to print class 3 when the program notifies CA IDMS that the report is complete or when the task terminates.

```
WRITE PRINTER
  NEWPAGE
  FROM PASSGR-RPT TO END-PASSGR-RPT
  REPORT ID 32
  CLASS 3.
```

Example 2

The following statement illustrates a request to print three copies of the current screen contents on a printer associated with destination A and to keep the contents of the report in the print queue after it has printed:

```
WRITE PRINTER
  SCREEN CONTENTS
  COPIES 3
  DESTINATION 'A'
  KEEP.
```

Status Codes

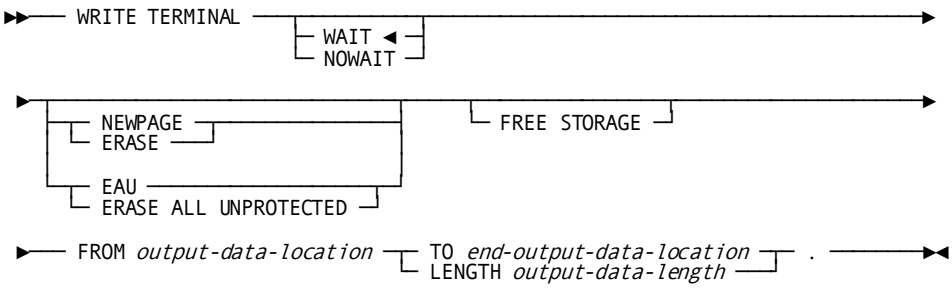
After completion of the WRITE PRINTER function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully.
4807	An I/O error has occurred while placing the record in the print queue.
4818	The current DC system definition contains no logical terminal-printer associations.
4821	The specified printer destination is undefined or is not a printer.
4831	The parameter list is invalid.
4832	The derived length of the specified printer output data area is zero or negative.
4838	The specified 01-level LINKAGE SECTION entry has not been allocated, as required. A GET STORAGE request for the specified variable must be issued before the WRITE PRINTER statement.
4845	A WRITE PRINTER SCREEN CONTENTS request cannot be serviced because the terminal associated with the issuing task is not a 3270-type device or is a remote 3270 device running under TCAM.
4846	A terminal I/O error has occurred.

WRITE TERMINAL

The WRITE TERMINAL statement requests a synchronous or asynchronous data transfer from program variable storage to the terminal buffer.

Syntax



Parameters

WAIT

Specifies that the write operation will be synchronous; the issuing task will automatically relinquish control to CA IDMS and wait for completion of the write operation before continuing processing.

This is the default.

NOWAIT

Specifies that the write operation will be asynchronous; the issuing task will continue executing.

Note: If NOWAIT is specified, the program must issue a CHECK TERMINAL request (described earlier in this chapter) before performing any other I/O operation.

NEWPAGE (ERASE)

Activates the page-eject (SYSINOUT devices) or erase-write (3270-type devices) mechanism to erase the contents of a screen. If NEWPAGE is not specified, the WRITE TERMINAL request will write over rather than erase data displayed on the terminal.

NEWPAGE and ERASE are synonyms and can be used interchangeably.

EAU (ERASE ALL UNPROTECTED)

3270-type devices only. Activates the erase-all-unprotected mechanism. Following a WRITE TERMINAL EAU function, only protected fields remain on the terminal. If EAU is specified, the FROM clause (described below) need not be specified.

EAU and ERASE ALL UNPROTECTED are synonyms and can be used interchangeably.

FREE STORAGE

Releases the output buffer associated with the data being written to the terminal. The storage area being freed must have been acquired by a GET STORAGE statement (described earlier in this chapter) or the GET STORAGE option of a previously issued READ TERMINAL or WRITE THEN READ TERMINAL request. If FREE STORAGE is not specified, the storage associated with the output buffer is not freed until the issuing task terminates.

FROM

Specifies the 01-level WORKING-STORAGE SECTION or LINKAGE SECTION entry of the output data stream.

output-data-location

The symbolic name of a user-defined field. If FREE STORAGE is specified, *output-data-location* must be an 01-level LINKAGE SECTION entry.

TO

Indicates the end of the output data stream and is specified following the last data-item entry in *output-data-location*.

end-output-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data stream.

LENGTH

Defines the length in bytes of the output data stream.

output-data-length

Either the symbolic name of a user-defined field that contains the length of the data area or the length itself expressed as a numeric constant.

Example

The following statement illustrates an asynchronous basic mode request to write data to the terminal from the specified location in program variable storage:

```
WRITE TERMINAL
  NOWAIT
  FROM TERM-LINE LENGTH 72.
```

Status Codes

After completion of the WRITE TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

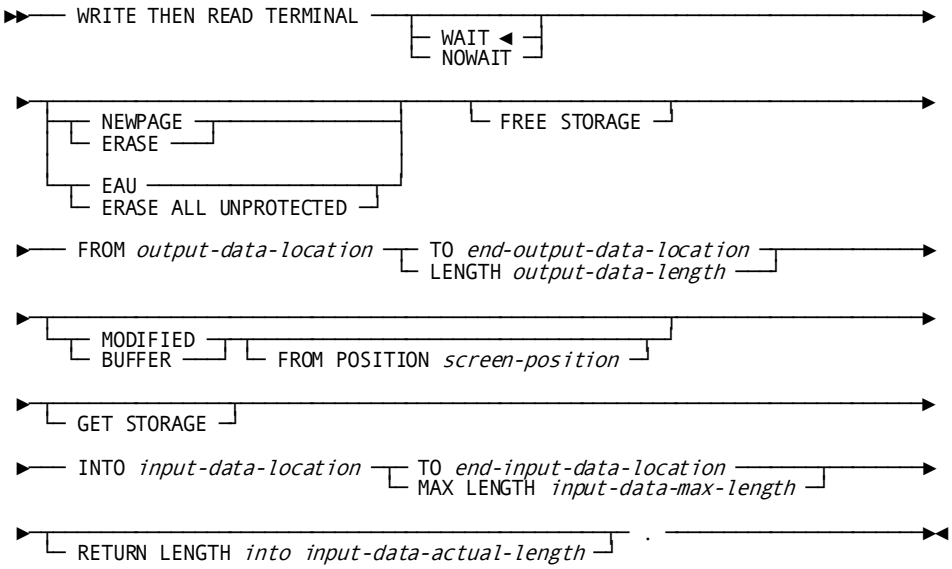
Status code	Meaning
0000	The request has been serviced successfully
4525	The output operation has been interrupted; the user has pressed ATTENTION or BREAK
4526	A logical error (for example, an invalid control character) has been encountered in the output data stream
4527	A permanent I/O error has occurred during processing

Status code	Meaning
4528	The dial-up line for the terminal has been disconnected
4531	The terminal request block (TRB) contains an invalid field, indicating a possible error in the program's parameters
4532	The derived length of the specified output data area is zero or negative
4537	Storage for the output buffer cannot be freed because the specified data area is defined in the WORKING-STORAGE SECTION rather than in the LINKAGE SECTION.
4539	The terminal associated with the issuing task is out of service

WRITE THEN READ TERMINAL

The WRITE THEN READ TERMINAL statement requests a transfer of data from program variable storage to the terminal buffer and, when the user has completed entering data, a transfer of that data back to program variable storage.

Syntax



Parameters

WAIT

Specifies that the I/O operation will be synchronous; the issuing task will automatically relinquish control to CA IDMS and must wait for completion of the I/O operation before processing can continue.

This is the default.

NOWAIT

Specifies that the I/O operation will be asynchronous; the issuing task will continue executing.

Note: If NOWAIT is specified, the program must issue a CHECK TERMINAL request (described earlier in this chapter) before performing any other I/O operation.

NEWPAGE (ERASE)

Activates the page-eject (SYSINOUT devices) or erase-write (3270-type devices) mechanism to erase the contents of a screen. If NEWPAGE is not specified, the WRITE TERMINAL request will write over rather than erase data displayed on the terminal.

NEWPAGE and ERASE are synonyms and can be used interchangeably.

EAU (ERASE ALL UNPROTECTED)

3270-type devices only. Activates the erase-all-unprotected mechanism. Following a WRITE TERMINAL EAU function, only protected fields remain on the terminal. If EAU is specified, the FROM clause (described below) need not be specified.

EAU and ERASE ALL UNPROTECTED are synonyms and can be used interchangeably.

FREE STORAGE

Releases the output buffer associated with the data being written to the terminal. The storage area being freed must have been acquired by a GET STORAGE statement (described earlier in this chapter) or the GET STORAGE option of a previously issued READ TERMINAL or WRITE THEN READ TERMINAL request. If FREE STORAGE is not specified, the storage associated with the output buffer is not freed until the issuing task terminates.

FROM

Specifies the 01-level WORKING-STORAGE SECTION or LINKAGE SECTION entry of the output data stream.

output-data-location

The symbolic name of a user-defined field. If FREE STORAGE has been specified, *output-data-location* must be an 01-level LINKAGE SECTION entry.

TO

Indicates the end of the output data stream.

end-output-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the output data stream.

LENGTH

Defines the length in bytes of the output data stream.

output-data-length

Either the symbolic name of a user-defined field that contains the length of the data stream or the length itself expressed as a numeric constant.

MODIFIED

3270-type devices only. Reads all modified fields in the terminal buffer into program variable storage.

BUFFER

3270-type devices only. Executes a READ BUFFER command that reads the entire contents of the terminal buffer into the program variable storage.

FROM POSITION

Defines the buffer address (screen position) at which the read will start.

screen-position

Either the symbolic name of a user-defined PIC S9(8) COMP SYNC (fullword) field or the address itself enclosed in quotation marks.

GET STORAGE

Synchronous requests only. Acquires an input buffer for the data being read into the program; CA IDMS allocates the required storage when the read operation is complete.

INTO

Specifies the 01-level WORKING-STORAGE SECTION or LINKAGE SECTION entry of the data area reserved for the input data stream.

input-data-location

The symbolic name of a user-defined field.

If GET STORAGE is specified, the data area reserved for the input data stream must be an unallocated 01-level LINKAGE SECTION entry. If GET STORAGE is not specified, the data area must be a WORKING-STORAGE SECTION or previously allocated LINKAGE SECTION entry.

TO

Indicates the end of the data area reserved for the input data stream.

end-input-data-location

The symbolic name of either a user-defined dummy byte field or a field that contains a data item not associated with the data area reserved for the input data stream.

MAX LENGTH

Defines the length, in bytes, of the data area reserved for the input data stream.

input-data-max-length

Either the symbolic name of a user-defined field that contains the length of the data stream or the length itself expressed as a numeric constant.

If the input data stream is larger than the data area reserved in the WORKING-STORAGE SECTION or LINKAGE SECTION, the data stream is truncated to fit the available space.

RETURN LENGTH into

Indicates the location to which CA IDMS will return the actual length of the input data stream.

input-data-actual-length

The symbolic name of a user-defined field. If the data stream has been truncated, *input-data-actual-length* contains the original length before truncation.

Example

The following statement illustrates a basic mode request to write data from the program (OUTPUT-LINE) to the terminal, read the data from the terminal to the specified location (INPUT-LINE) in the program, and return the actual length of the input data stream (LINE-LENGTH) to variable storage:

```
WRITE THEN READ TERMINAL
  WAIT
  FROM OUTPUT-LINE TO END-INPUT-LINE
  INTO INPUT-LINE MAX LENGTH 80
  RETURN LENGTH INTO LINE-LENGTH.
```

Status Codes

After completion of the WRITE THEN READ TERMINAL function, the ERROR-STATUS field in the IDMS-DC communications block indicates the outcome of the operation:

Status code	Meaning
0000	The request has been serviced successfully
4519	The input area specified for the return of data is too small; the returned data has been truncated to fit the available space
4525	The output operation has been interrupted; the terminal operator has pressed ATTENTION or BREAK
4526	A logical error (for example, an invalid control character) has been encountered in the output data stream
4527	A permanent I/O error has occurred
4528	The dial-up line for the terminal has been disconnected
4531	The terminal request block (TRB) contains an invalid field, indicating a possible error in the program's parameters .
4532	The derived length of the specified I/O data area is zero or negative.
4535	Storage for the input buffer cannot be acquired because the specified 01-level LINKAGE SECTION entry has been allocated
4537	A storage area cannot be acquired or freed because the specified data area is defined in the WORKING-STORAGE SECTION rather than in the LINKAGE SECTION
4538	The specified 01-level LINKAGE SECTION entry has not been allocated and the GET STORAGE option has not been specified
4539	The terminal device associated with the issuing task is out of service

Logical-Record Clauses

Logical-record clauses are used with any of the four DML statements that access logical records (that is, OBTAIN, MODIFY, STORE, or ERASE). The logical-record clauses are as follows:

- **WHERE** specifies criteria used to select and/or criteria used to limit the selection of logical-record occurrences.
- **ON** tests for a specific path status returned to indicate the result of a logical-record DML statement.

WHERE

The WHERE clause has two major functions:

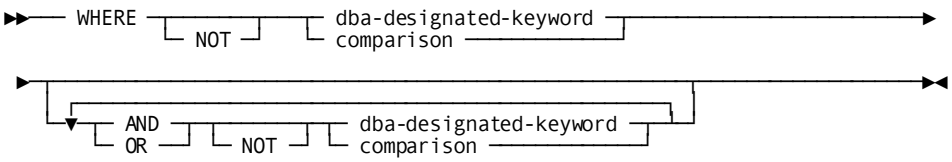
- **To direct the program to a path**, predefined in the subschema by the DBA and transparent to the application program. This allows you to access the database without issuing specific instructions for navigating the database.

  You need not be concerned about path selection; LRF automatically picks the most appropriate path to efficiently service the request.

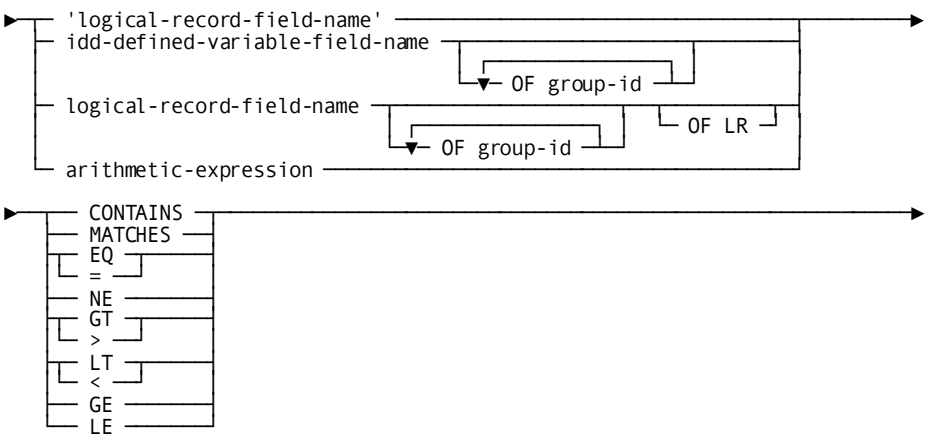
- **To specify selection criteria to be applied to a logical record**. This allows the program to specify attributes of the desired logical record, thereby reducing the need for the program to inspect multiple logical records to isolate the logical record of interest.

The WHERE clause is issued in the form of a boolean expression that consists of comparisons and keywords connected by boolean operators (AND, OR, and NOT). The format of the WHERE clause follows COBOL syntax rules (that is, operands or operators are separated by a blank).

Syntax



Expansion of comparison



Parameters

dba-designated-keyword

Specifies a DBA-designated keyword to be applied to the logical record that is the object of the command. *Dba-designated-keyword* is a keyword specified by the DBA that is applicable to the logical record named in the command; it can be no longer than 32 characters. The keyword represents an operation to be performed at the path level and serves only to route the logical-record request to the appropriate, predetermined path.

A path must exist to service a request that issues *dba-designated-keyword*. If no such path exists, the precompiler flags this condition by issuing an error message.

comparison

Specifies a comparison operation to be performed, using the indicated operands and operators. It also serves to direct the logical-record request to a path.

Individual comparisons and keywords are connected by the boolean operators AND, OR, and NOT. Parentheses can be used to clarify a multiple-comparison boolean expression or to override the precedence of operators.

Parameters

logical-record-field-name

Specifies a data field that participates in the named logical record.

CONTAINS/MATCHES/EQ/NE/GT/LT/GE/LE

Specifies the comparison operator:

- **CONTAINS**— Is true if the value of the right operand occurs in the value of the left operand. Both operands included with the CONTAINS operator must be alphanumeric values.
- **MATCHES**— Is true if each character in the left operand matches a corresponding character in the right operand (the mask). When MATCHES is specified, LRF compares the left operand with the mask, one character at a time, moving from left to right. The result of the match is either true or false: the result is true if the end of the mask is reached before encountering a character in the left operand that does not match a corresponding character in the mask; the result is false if LRF encounters a character in the left operand that does not match a mask character.

  Three special characters can be used in the mask to perform pattern matching: **@**, which matches any alphabetic character; **#**, which matches any numeric character; and *****, which matches any alphabetic or numeric character. Both the left operand and the mask must be alphanumeric values and elementary elements.

  - **EQ**— Is true if the value of the left operand is equal to the value of the right operand.
  - **NE**— Is true if the value of the left operand is not equal to the value of the right operand.
  - **GT**— Is true if the value of the left operand is greater than the value of the right operand.
  - **LT**— Is true if the value of the left operand is less than the value of the right operand.
  - **GE**— Is true if the value of the left operand is greater than or equal to the value of the right operand.
  - **LE**— Is true if the value of the left operand is less than or equal to the value of the right operand.

'literal'

Any alphanumeric or numeric literal. Alphanumeric literals must be enclosed in quotation marks.

idd-defined-variable-field-name

The name of a program variable storage field predefined in the data dictionary.

OF

Uniquely identifies the named variable field.

This qualifier is required if *idd-defined-variable-field-name* is not unique within program variable storage.

A maximum of 15 different OF *group-id* qualifiers can be specified to identify as many as 15 levels of group elements.

group-id The name of the group element that contains the field.

logical-record-field-name

Specifies a data field that participates in the named logical record.

OF

Uniquely identifies the named logical-record field.

This qualifier is required if *logical-record-field-name* is not unique within all subschema records, including those not part of the logical record, and including all non-CA IDMS database records copied into the program.

A maximum of 15 different OF *group-id* qualifiers can be specified to identify as many as 15 levels of group elements.

group-id The name of the group element or database record that contains the field.

OF LR

Specifies that the value of the named field at the time the request is issued will be used throughout processing of the request.

If the value of the field changes during request processing, LRF will continue to use the original value. If you do not specify OF LR, and the value of the field changes during request processing, the new field value in variable storage will be used if the field is required for further processing.

arithmetic-expression

Specifies an arithmetic expression designated as a unary minus (-), unary plus (+), simple arithmetic operation, or compound arithmetic operation. Arithmetic operators permitted in an arithmetic expression are add (+), subtract (-), multiply (*), and divide (/). Operands can be literals, variable-storage fields, and logical-record fields as described above.

If the WHERE clause compares a CALC-key field to a *literal*, the literal's format must correspond exactly to the CALC-key definition. Enclose the literal in quotation marks if the CALC key has a usage of DISPLAY and use leading zeros if the literal consists of fewer characters than the field's picture. For example, if the *calc-key-field* CALC key is defined as PIC 9(3) USAGE DISPLAY, code the WHERE clause as follows:

```
WHERE calc-key-field EQ '054'
```

The WHERE clause can contain as many comparisons and keywords as required to specify the criteria to be applied to the logical record. If necessary, the value of the SIZE parameter on the COPY IDMS SUBSCHEMA-LR-CTRL statement can be increased to accommodate very large and complex WHERE clause specifications. Processing efficiency is not affected by the composition of the WHERE clause (other than the logical order of the operators, as noted below), since LRF automatically uses the most efficient path to process the logical-record request.

Operators in a WHERE clause are evaluated in the following order:

1. Comparisons enclosed in parentheses
2. Arithmetic, comparison, and boolean operators by order of precedence, from highest to lowest:
   a. Unary plus or minus in an arithmetic expression
   b. Multiplication or division in an arithmetic expression
   c. Addition or subtraction in an arithmetic expression
   d. MATCHES or CONTAINS comparison operators
   e. EQ, NE, GT, LT, GE, LE comparison operators
   f. NOT boolean operator
   g. AND boolean operator
   h. OR boolean operator
3. From left to right within operators of equal precedence

Examples

The following examples illustrate the use of the WHERE clause.

Example 1

The following logical-record request uses a DBA-designated keyword (PROGRAMMER-ANALYSTS) to direct LRF to a DBA-defined access path:

```
OBTAIN NEXT EMP-JOB-LR
  WHERE PROGRAMMER-ANALYSTS.
```

Example 2

The following logical-record request uses boolean selection criteria to specify the desired occurrence of EMP-JOB-LR:

```
OBTAIN EMP-JOB-LR
  WHERE OFFICE-CODE-0450 EQ '001'.
```

ON Clause

The ON clause tests for a specific path status returned to indicate the result of the statement. If LRF returns the specified path status, the imperative statement included in the ON clause is executed; if the specified path status is not returned, the imperative statement included in the ON clause is ignored and IDMS-STATUS is performed.

If the DML statement with the ON clause is the object of a PERFORM, then the user should avoid scope problems by using the THROUGH option of the PERFORM statement.

A logical-record DML statement can include an ON clause only if the AUTOSTATUS protocol is in effect for the program. AUTOSTATUS automatically invokes an error-checking routine after every DML statement except IF. For more details, see Error Detection (see page 59).

The ON clause tests for a standard or DBA-defined path status, which is in the form of a 1- through 16-character unquoted string. Path statuses are issued during execution of the path selected to service the request. The standard path statuses are:

- **LR-FOUND** is returned when the logical-record request has been successfully executed. This status can be returned as the result of any of the four LRF DML statements. When LR-FOUND is returned, the ERROR-STATUS field of the IDMS communications block contains 0000.
- **LR-NOT-FOUND** is returned when the logical record specified cannot be found, either because no such record exists or because all such occurrences have already been retrieved. This status can be returned as the result of any of the four LRF DML statements, provided that the path to which LRF is directed includes retrieval logic. When LR-NOT-FOUND is returned, the ERROR-STATUS field of the IDMS communications block contains 0000.

  Note: A successful STORE can return LR-NOT-FOUND if its WHERE clause references a logical-record field and the STORE path performs no OBTAINs.
- **LR-ERROR** is returned when a logical-record request is issued incorrectly or when an error occurs in the processing of the path selected to service the request. When LR-ERROR is returned, the type of status code returned to the program in the ERROR-STATUS field of the IDMS communications block differs according to the type of error:
  - When the error occurs in the **logical-record request**, the ERROR-STATUS field contains a status code issued by LRF (major code of 20).
  - When an error occurs in the **logical-record path processing**, the ERROR-STATUS field contains a status code issued by the DBMS (major code from 00 to 19). For more information about status codes, see Chapter 4: (see page 33).

When accessing ASF-defined data tables, you should always check for all of the following path statuses:

- **INVALID-DATA** is returned when the data violates the definition-time selection criteria (for example, WHERE STATE EQ 'MA' and the program tries to replace the state with 'NY'). When INVALID-DATA is returned, the ERROR-STATUS field in the IDMS communications block is set to 0000.
- **DEFN-MISSING** is returned when the record definition cannot be found. When DEFN-MISSING is returned, the ERROR-STATUS field in the IDMS communications block is set to 0000.
- **OOAK-MISSING** is returned when a one-of-a-kind record cannot be found. When OOAK-MISSING is returned, the ERROR-STATUS field in the IDMS communications block is set to 0000.
- **SYNC-ERROR** is returned when the time stamp in the catalog and the table definition do not match. When SYNC-ERROR is returned, the ERROR-STATUS field in the IDMS communications block is set to 0000. This applies to ASF tables only.

The return of any of these statuses indicates a fatal error; for more information, consult your DBA.

Syntax

Parameters

ON parameter

Tests for a path status returned as the result of the logical-record request issued by the program.

path-status A 1 through 16 character alphanumeric value.

imperative-statement Specifies the program action to be taken if the indicated path status results from the logical-record request.

Examples

The following statements use the path status LR-NOT-FOUND in two different ways. If LR-NOT-FOUND occurs following the initial statement, a LR-MISSING message is output; if LR-NOT-FOUND occurs in subsequent statements, an END-OF-LR message is output.

```
OBTAIN-FIRST-LR.
  OBTAIN FIRST EMP-JOB-LR
    WHERE OFFICE-CODE-450 EQ OFFICE-CODE-IN
    ON LR-NOT-FOUND
      GO TO LR-MISSING.
   .
   .
   .
```

```
OBTAIN-REST-LR.
  OBTAIN NEXT EMP-JOB-LR
    WHERE OFFICE-CODE-0450 EQ OFFICE-CODE-IN
    ON LR-NOT-FOUND
      GO TO END-OF-LR.
    .
    .
    .
    .
    .
  GO TO OBTAIN-REST-LR.
```

Status Codes

The following codes are returned to the ERROR-STATUS field in the IDMS or IDMS-DC communications block when an LR-ERROR path status is returned to the LR-STATUS field in the LRC block:

Status code	Meaning
2001	The requested logical record was not found in the subschema. (The path DML statement, EVALUATE, returns 0000 if true, and 2001 if false.)
2008	The named record is not in the subschema, or the specified request is not permitted for the named record.
2010	The subschema prohibits access to logical records.
2018	A path command has attempted to access a database record that has not been bound.
2040	The WHERE clause in an OBTAIN NEXT command directed LRF to a different processing path than did the WHERE clause in the preceding OBTAIN command for the same logical record.
2041	The request's WHERE clause cannot be matched to a path in the subschema.
2042	The logical-record path for the request specifies return of the LR-ERROR status.
2043	Bad or inconsistent data was encountered in the logical-record buffer during evaluation of the request's WHERE clause.
2044	The request's WHERE clause does not include data required by the logical-record path.
2045	A subscript value in a WHERE clause is either less than zero or greater than its maximum allowed value.

Status code	Meaning
2046	A program check has revealed an arithmetic exception (for example, overflow, underflow, significance, divide) during evaluation of a WHERE clause.
2063	The request's WHERE clause contains a keyword that exceeds the 16-character maximum.
2064	The path command has attempted to access a CALC data item that has not been defined properly in the subschema.
2072	The request's WHERE clause is too long to be evaluated in the available work area.

Appendix A: DML Precompile, COBOL Compile, and Link-Edit JCL

This appendix contains the JCL used to prepare COBOL source code that contains DML statements for execution. Link-edit considerations are also discussed. Samples of z/OS, z/VSE, and z/VM JCL are included.

This section contains the following topics:

Compiling a COBOL Program

To compile a COBOL program under the DML precompiler:

1. Execute the program IDMSDMLC
2. Execute the COBOL compiler
3. Link edit

Input to IDMSDMLC consists of source code written in COBOL/DML, protocol/control information, and data dictionary record descriptions. Output from IDMSDMLC is as follows:

- A source COBOL program
- A DML source listing and diagnostics

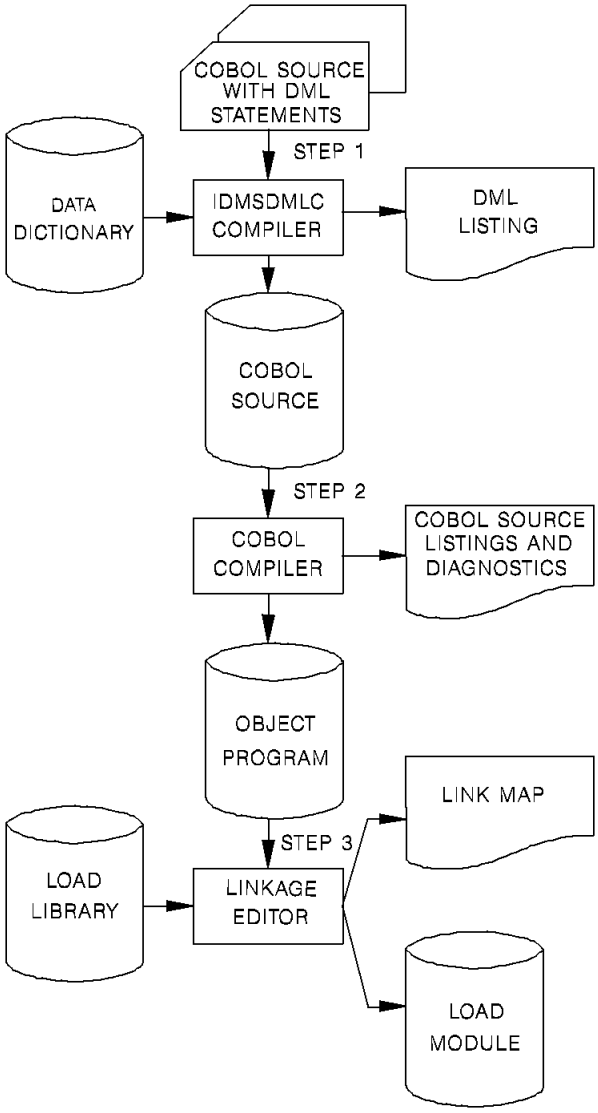
Input to the COBOL compiler consists of the source program produced by IDMSDMLC. Output is as follows:

- An object program
- COBOL listings

Input to the linkage editor consists of the object program produced by the COBOL compiler. Output is as follows:

- A load module (phase)
- A link-edit map

The following figure illustrates the steps involved in compiling a COBOL program.



z/OS JCL

Sample JCL for z/OS operating systems is shown below, followed by a description of statements that need tailoring for site-specific conditions.

```
//*****************************************************************
//**         PRECOMPILE COBOL PROGRAM          **
//*****************************************************************
//precomp EXEC PGM=IDMSDMLC,REGION=4096K,
//       PARM='precompiler-options'
//STEPLIB DD  DSN=idms.dba.loadlib,DISP=SHR
//        DD  DSN=idms.custom.loadlib,DISP=SHR
//         DD DSN=idms.cagjload,DISP=SHR
//sysctl  DD  DSN=idms.sysctl,DISP=SHR
//dcmsg   DD  DSN=idms.sysmsg.ddldcmsg,DISP=SHR
//SYS001  DD  UNIT=sysda,SPACE=(TRK,(10,10)),
//       DCB=(RECFM=VB,LRECL=133,BLKSIZE=1334,DSORG=PS)
//SYS002  DD  UNIT=sysda,SPACE=(TRK,(10,10)),
//       DCB=(RECFM=VB,LRECL=133,BLKSIZE=1334,DSORG=PS)
//SYS003  DD  UNIT=sysda,SPACE=(TRK,(10,10)),
//       DCB=(RECFM=VB,LRECL=133,BLKSIZE=1334,DSORG=PS)
//SYSPCH  DD  DSN=&&SOURCE.,DISP=(NEW,PASS),
//       UNIT=sysda,SPACE=(TRK,(10,5),RLSE),
//       DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//SYSLST  DD  SYSOUT=A
//SYSIDMS DD  *
DMCL=dmcl-name
sysidms-input-parms
/*
//SYSIPT  DD  *
COBOL DML source statements
/*
//*****************************************************************
//**         COMPILE COBOL PROGRAM           **
//*****************************************************************
//cblcmp  EXEC PGM=igycrctl,REGION=4096K,
//       PARM='compiler-options'
//STEPLIB DD  DSN=cobol.loadlib,DISP=SHR
//SYSUT1  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT2  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT3  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT4  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT5  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT6  DD  UNIT=sysda,SPACE=(TRK,(10,5))
//SYSUT7  DD  UNIT=sysda,SPACE=(TRK,(10,5))
```

```
//syslin  DD  DSN=&&OBJECT.,DISP=(NEW,PASS),
//       UNIT=sysda,SPACE=(TRK,(10,5),RLSE),
//       DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//SYSPRINT DD  SYSOUT=A
//SYSIN  DD  DSN=&&SOURCE.,DISP=(OLD,DELETE)

//*****************************************************************
//**         LINK PROGRAM MODULE            **
//*****************************************************************
//link   EXEC PGM=HEWL,REGION=1024K,PARM='LET,LIST,MAP,XREF'
//SYSUT1  DD  UNIT=sysda,SPACE=(TRK,(20,5))
//SYSLIB  DD  DSN=cobol.linklib,DISP=SHR
//vanilla DD  DSN=idms.cagjload,DISP=SHR
//custom  DD DSN=idms.custom.loadlib,DISP=SHR
//SYSLMOD DD  DSN=idms.custom.loadlib,DISP=SHR
//SYSPRINT DD  SYSOUT=A
//SYSLIN  DD  DSN=&&OBJECT.,DISP=(OLD,DELETE)
//     DD  *
 INCLUDE vanilla(IDMS)   required, except omit for CICS
 INCLUDE vanilla(IDMSCANC) required for BATCH and DC-BATCH if using IDMS-STATUS module
 INCLUDE custom(IDMSOPTI) optional; BATCH and DC-BATCH only
 INCLUDE custom(idmscint) required for CICS, otherwise omit
 ENTRY  userentry
 NAME  userprog(R)
/*
//*
```

Note: If using the IDMSOPTI module, you must assemble and link edit it before using the JCL above.

The link of CICS application programs that use IDMSCINT must incorporate JCL to resolve external reference DFHEI1. The particular JCL depends on the nature and language of your application. See the appropriate IBM CICS application programming documentation for details.

precompiler-options	Options that control various aspects of the precompile process. See Passing Parameters to the Precompiler (see page 355) for a complete description of the options.
idms.dba.loadlib	Data set name of the load library containing the DMCL and database name table
idms.cagjload	Data set name of the load library containing the vanilla CA IDMS executable modules
idms.custom.loadlib	Data set name of the load library containing the customized CA IDMS executable modules
sysctl	DDname of SYSCTL file

idms.sysctl	Data set name of SYSCTL file
dcmsg	DDname of the system message (DDLDCMSG) area
idms.sysmsg.ddldcmsg	Data set name of the system message (DDLDCMSG) area
sysda	Symbolic device name for work files
sysidms-input-parms	Parameters that specify physical requirements of the environment, runtime directives, or operating system-dependent file information. For a complete description of all SYSIDMS parameters and syntax, see *CA IDMS Common Facilities Guide*. Also see Passing Parameters to the Precompiler (see page 355) for a discussion of parameters that can be passed using the PARM=SYSIDMS input statement.
dmcl-name	Specifies the name of the DMCL that the precompiler should use to access the message dictionary
igycrctl	Program name of the COBOL compiler
compiler-options	Parameters that specify options that are appropriate to your version of the COBOL compiler. See Chapter 2: (see page 17), VS COBOL II Support (see page 503), and Considerations for IBM Language Environment (see page 507) for restrictions and recommendations specific to CA IDMS access. Also see the IBM documentation for your compiler.
cobol.loadlib	Load library that contains COBOL compiler
syslin	DDname of the object data set output by the COBOL compiler
cobol.linklib	Load library that contains COBOL support modules
user.loadlib	User application load library
idmscint	Load module created by compiling IDMSCINT or IDMSCINL. For more information, see the *CA IDMS System Operations Guide*.
userentry	Name of program entry point
userprog	Name of program in load library

Note: Depending on the central version operating environment, an IDMSOPTI module link edited with IDMSDMLC can be used in place of or in addition to the SYSCTL file.

Local Mode JCL

To execute the compiler in local mode, remove the SYSCTL statement from the precompile step and replace it with the following:

```
//dictdb  DD DSN=idms.appldict.ddldml,DISP=SHR
//sysjrnl DD DSN=idms.tapejrnl,DISP=(NEW,CATLG),UNIT=tape
```

dictdb	DDname of the application dictionary DDLDML area
idms.appldict.ddldml	Data set name of application dictionary
sysjrnl	DDname of the tape journal file
idms.tapejrnl	Data set name of the tape journal file
tape	Symbolic device name of the tape journal file

z/VSE JCL

IDMSDMLC ('VSE')

```
/*****************************************************************
/**          PRECOMPILE PROGRAM              **
/*****************************************************************
* step1
// EXEC PROC=IDMSLBLS
// UPSI b         if specified in IDMSOPTI module
// DLBL   sysctl,'idms.sysctl',0
// EXTENT  SYS000,nnnnnn,,,ssss,llll
// ASSGN   SYS000,DISK,VOL=nnnnnn,SHR
// DLBL   idmspch,'temp.dmlc',0
// EXTENT  SYS020,nnnnnn,,,ssss,llll
// ASSGN   SYS020,DISK,VOL=nnnnnn,SHR
// DLBL   SYS001,'wkfile1',0
// EXTENT  SYS001,nnnnnn,,,ssss,llll
// ASSGN   SYS001,DISK,VOL=nnnnnn,SHR
// DLBL   SYS002,'wkfile2',0
// EXTENT  SYS002,nnnnnn,,,ssss,llll
// ASSGN   SYS002,DISK,VOL=nnnnnn,SHR
// DLBL   SYS003,'wkfile3',0
// EXTENT  SYS003,nnnnnn,,,ssss,llll
// ASSGN   SYS003,DISK,VOL=nnnnnn,SHR
// EXEC   IDMSDMLC,PARM='COBOL=2'
```

```
Input SYSIDMS parameters here, as required

/*

COBOL/DML source statements

/*****************************************************************
/**          COMPILE PROGRAM              **
/*****************************************************************
/*
* step2
// DLBL   IJSYSIN,'temp.dmlc',0
// EXTENT  SYSIPT,nnnnnn
  ASSGN   SYSIPT,DISK,VOL=nnnnnn,SHR
// OPTION  CATAL,NODECK,NOSYM
 PHASE userprog,*
// EXEC   IGYCRCTL
/*****************************************************************
/**          LINK PROGRAM MODULE            **
/*****************************************************************
* step3
  CLOSE   SYSIPT,SYSRDR
ENTRY (dmlc)
// EXEC   LNKEDT
/*
```

IDMSLBLS	Name of the procedure provided at installation that contains the file definitions for CA IDMS dictionaries and databases. **Note:** For complete listing of IDMSLBLS, see IDMSLBLS Procedure (see page 345).
b	appropriate UPSI switch, 1 through 8 characters, if specified in the IDMSOPTI module
sysctl	filename of SYSCTL file
idms.sysctl	file-ID of SYSCTL file
idmspch	filename of data set output from the IDMSDMLC precompiler
temp.dmlc	file ID of data set output from the IDMSDMLC precompiler
SYS020	logical unit assignment of the DMLC output
nnnnnn	volume serial identifier of appropriate disk volume
ssss	starting track (CKD) or block (FBA) of disk extent
llll	number of tracks (CKD) or blocks (FBA) of disk extent
userprog	name of program in the library

precompiler-options	options that control various aspects of the precompile process. See Passing Parameters to the Precompiler (see page 355) for a complete description of the options.
dmlc	name of COBOL/DML module

You can use SYSIDMS parameters to specify information about your runtime environment.

Note: For more information about SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

Local Mode

To execute the IDMSDMLC precompiler in local mode:

- Remove the UPSI specification, if present, or remove the JCL for the SYSCTL file from the precompiler step.
- Add the following statements in step 1 (the IDMSDMLC step):

```
// TLBL   sysjrnl,'idms.tapejrnl',,nnnnnn,,f
// ASSGN  SYS009,TAPE,VOL=nnnnnn
```

idms.tapejrnl	file ID of tape journal file
f	file number of tape journal file
sys009	logical unit assignment for journal file

INCLUDE statements should be provided in local mode or central version JCL as follows:

```
INCLUDE IDMS        IDMS interface

INCLUDE IDMSOPTI            IDMSOPTI module

INCLUDE IDMSCANC            Local mode abort entry point
                            omit IDMSCANC if TP application)

INCLUDE IDMSCINT            For CICS only, replaces INCLUDE IDMS
```

INCLUDE *IDMSOPTI* can be omitted for programs executed in local mode.

Note: COBOL overlay programs must resolve references to IDMS within their root segment; care must be taken to prevent the overlaying of the IDMS interface. Use of IDMS and IDMSLDPT is recommended for these programs.

IDMSLBLS Procedure

IDMSLBLS is a procedure provided during an CA IDMS z/VSE installation. It contains file definitions for the CA IDMS components listed below. These components are provided during installation:

- Dictionaries
- Sample databases
- Disk journal files
- SYSIDMS file

Tailor the IDMSLBLS procedure to reflect the filenames and definitions in use at your site and include this procedure in z/VSE JCL job streams.

The sample z/VSE JCL provided in this document includes the IDMSLBLS procedure. Therefore, individual file definitions for CA IDMS dictionaries, sample databases, disk journal files, and SYSIDMS files are not included in the sample JCL.

IDMSLBLS procedure (z/VSE)

```
* -------- LIBDEFS --------
// LIBDEF *,SEARCH=idmslib.sublib
// LIBDEF *,CATALOG=user.sublib
/* ------------------------ LABELS ------------------------
// DLBL  idmslib,'idms.library',1999/365
// EXTENT ,nnnnnn,,,ssss,1500
// DLBL  dccat,'idms.system.dccat',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,31
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dccatl,'idms.system.dccatlod',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dccatx,'idms.system.dccatx',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,11
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dcdml,'idms.system.ddldml',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,101
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dclod,'idms.system.ddldclod',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,21
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dclog,'idms.system.ddldclog',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,401
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dcrun,'idms.system.ddldcrun',1999/365,DA
```

```
// EXTENT SYSnnn,nnnnnn,,,ssss,68
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dcscr,'idms.system.ddldcscr',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,135
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dcmsg,'idms.sysmsg.ddldcmsg',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,201
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dclscr,'idms.sysloc.ddlocscr',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dirldb,'idms.sysdirl.ddldml',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,201
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dirllod,'idms.sysdirl.ddldclod',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,2
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  empdemo,'idms.empdemo1',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,11
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  insdemo,'idms.insdemo1',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  orgdemo,'idms.orgdemo1',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  empldem,'idms.sqldemo.empldemo',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,11
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  infodem,'idms.sqldemo.infodemo',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  projdem,'idms.projseg.projdemo',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6

// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  indxdem,'idms.sqldemo.indxdemo',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,6
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  sysctl,'idms.sysctl',1999/365,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,2
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  secdd,'idms.sysuser.ddlsec',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,26
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dictdb,'idms.appldict.ddldml',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,51
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  dloddb,'idms.appldict.ddldclod',1999/365,DA
```

```
// EXTENT SYSnnn,nnnnnn,,,ssss,51
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  sqldd,'idms.syssql.ddlcat',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,101
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  sqllod,'idms.syssql.ddlcatl',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,51
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  sqlxdd,'idms.syssql.ddlcatx',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,26
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  asfdml,'idms.asfdict.ddldml',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,201
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  asflod,'idms.asfdict.asflod',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,401
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  asfdata,'idms.asfdict.asfdata',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,201
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  ASFDEFN,'idms.asfdict.asfdefn',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,101
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  j1jrnl,'idms.j1jrnl',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,54
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  j2jrnl,'idms.j2jrnl',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,54
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  j3jrnl,'idms.j3jrnl',1999/365,DA
// EXTENT SYSnnn,nnnnnn,,,ssss,54
// ASSGN  SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL  SYSIDMS,'#SYSIPT',0,SD
/+
/*
```

idmslib.sublib	name of the sublibrary within the library containing CA IDMS modules
user.sublib	name of the sublibrary within the library containing user modules
idmslib	filename of the file containing CA IDMS modules
idms.library	file-ID associated with the file containing CA IDMS modules
SYSnnn	logical unit of the volume for which the extent is effective
nnnnnn	volume serial identifier of appropriate disk volume
ssss	starting track (CKD) or block (FBA) of disk extent
dccat	filename of the system dictionary catalog (DDLCAT) area

idms.system.dccat	file-ID of the system dictionary catalog (DDLCAT) area
dccatl	filename of the system dictionary catalog load (DDLCATLOD) area
idms.system.dccatlod	file-ID of the system dictionary catalog load (DDLCATLOD) area
dccatx	filename of the system dictionary catalog index (DDLCATX) area
idms.system.dccatx	file-ID of the system dictionary catalog index (DDLCATX) area
dcdml	filename of the system dictionary definition (DDLDML) area
idms.system.ddldml	file-ID of the system dictionary definition (DDLDML) area
dclod	filename of the system dictionary definition load (DDLDCLOD) area
idms.system.ddldclod	file-ID of the system dictionary definition load (DDLDCLOD) area
dclog	filename of the system log area (DDLDCLOG) area
idms.system.ddldclog	file-ID of the system log (DDLDCLOG) area
dcrun	filename of the system queue (DDLDCRUN) area
idms.system.ddldcrun	file-ID of the system queue (DDLDCRUN) area
dcscr	filename of the system scratch (DDLDCSCR) area
idms.system.ddldcscr	file-ID of the system scratch (DDLDCSCR) area
dcmsg	filename of the system message (DDLDCMSG) area
idms.sysmsg.ddldcmsg	file-ID of the system message (DDLDCMSG) area
dclscr	filename of the local mode system scratch (DDLOCSCR) area
idms.sysloc.ddlocscr	file-ID of the local mode system scratch (DDLOCSCR) area
dirldb	filename of the IDMSDIRL definition (DDLDML) area
idms.sysdirl.ddldml	file-ID of the IDMSDIRL definition (DDLDML) area
dirllod	filename of the IDMSDIRL definition load (DDLDCLOD) area
idms.sysdirl.dirllod	file-ID of the IDMSDIRL definition load (DDLDCLOD) area
empdemo	filename of the EMPDEMO area
idms.empdemo1	file-ID of the EMPDEMO area
insdemo	filename of the INSDEMO area
idms.insdemo1	file-ID of the INSDEMO area
orgdemo	filename of the ORGDEMO area
idms.orgdemo1	file-ID of the ORDDEMO area
empldem	filename of the EMPLDEMO area
idms.sqldemo.empldemo	file-ID of the EMPLDEMO area

infodem	filename of the INFODEMO area
idms.sqldemo.infodemo	file-ID of the INFODEMO area
projdem	filename of the PROJDEMO area
idms.projseg.projdemo	file-ID of the PROJDEMO area
indxdem	filename of the INDXDEMO area
idms.sqldemo.indxdemo	file-ID of the INDXDEMO area
sysctl	filename of the SYSCTL file
idms.sysctl	file-ID of the SYSCTL file
secdd	filename of the system user catalog (DDLSEC) area
idms.sysuser.ddlsec	file-ID of the system user catalog (DDLSEC) area
dictdb	filename of the application dictionary definition area
idms.appldict.ddldml	file-ID of the application dictionary definition (DDLDML) area
dloddb	filename of the application dictionary definition load area
idms.appldict.ddldclod	file-ID of the application dictionary definition load (DDLDCLOD) area
sqldd	filename of the SQL catalog (DDLCAT) area
idms.syssql.ddlcat	file-ID of the SQL catalog (DDLCAT) area
sqllod	filename of the SQL catalog load (DDLCATL) area
idms.syssql.ddlcatl	file-ID of SQL catalog load (DDLCATL) area
sqlxdd	filename of the SQL catalog index (DDLCATX) area
idms.syssql.ddlcatx	file-ID of the SQL catalog index (DDLCATX) area
asfdml	filename of the asf dictionary definition (DDLDML) area
idms.asfdict.ddldml	file-ID of the asf dictionary definition (DDLDML) area
asflod	filename of the asf dictionary definition load (ASFLOD) area
idms.asfdict.asflod	file-ID of the asf dictionary definition load (ASFLOD) area
asfdata	filename of the asf data (ASFDATA) area
idms.asfdict.asfdata	file-ID of the asf data area (ASFDATA) area
ASFDEFN	filename of the asf data definition (ASFDEFN) area
idms.asfdict.asfdefn	file-ID of the asf data definition area (ASFDEFN) area
j1jrnl	filename of the first disk journal file
idms.j1jrnl	file-ID of the first disk journal file
j2jrnl	filename of the second disk journal file

idms.j2jrnl	file-ID of the second disk journal file
j3jrnl	filename of the third disk journal file
idms.j3jrnl	file-ID of the third disk journal file
SYSIDMS	filename of the SYSIDMS parameter file

IDMSDMLC

```
   /ADD-FILE-LINK
L-NAME=CDMSLIB,F-NAME=idms.dba.loadlib
/ADD-FILE-LINK L-NAME=CDMSLIB1,F-NAME=idms.loadlib
/ADD-FILE-LINK L-NAME=CDMSLODR,F-NAME=idms.loadlib
/ADD-FILE-LINK L-NAME=sysctl,F-NAME=idms.sysctl,SHARED-UPD=*YES
/ADD-FILE-LINK L-NAME=SYSIDMS,F-NAME=*DUMMY
/ASSIGN-SYSOPT TO=temp.punch
/ASSIGN-SYSDTA TO=*SYSCMD
/START-PROG
*MOD(ELEM=IDMSDMLC,LIB=idms.dba.loadlib,RUN-MODE=*ADV)
DICTNAME=dictionary-name DMCL=dmcl-name sysidms-input-parms
PARM='precompiler-options' END-SYSIDMS
```

COBOL/DML source statements

```
/ASSIGN-SYSOPT TO=*PRIMARY
/ASSIGN-SYSDTA TO=temp.punch
/START-COBOL85-COMPILER                    -
/  MODULE-OUTPUT=LIB-ELEM(LIB=idms.objlib.user,ELEM=userprog,  -
/  COMPILER-ACTION=MODULE-GENERATION(MODULE-FORMAT=OM),     -
/  LISTING=(SOURCE=YES,DIAGNOSTICS=YES,OUTPUT=SYSLIST)
/START-BINDER
//START-LLM-CREATION INTERNAL-NAME=userprog
//INC-MOD LIB=idms.objlib.user,ELEM=userprog
//INC-MOD LIB=idms.loadlib,ELEM=IDMSPBS2   For DC, BATCH and DCBATCH
//INC-MOD LIB=idms.loadlib,ELEM=IDMSTCM    UTM only
//RESOLVE-BY-AUTOLINK LIB=cobol.objlib
//SAVE-LLM LIB=idms.loadlib.user,ELEM=userprog(VER=@),OVER=YES
//END
/DELETE-FILE temp.punch
```

idms.loadlib	filename of the load library containing the CA IDMS executable modules
idms.dba.loadlib	filename of the load library containing the DMCL and database name table load modules
sysctl	linkname of SYSCTL file
idms.sysctl	filename of SYSCTL file

temp.punch	filename of temporary file that contains DML compiler output
sysidms-input-parms	parameters that specify physical requirements of the environment, runtime directives, or operating system-dependent file information. For a complete description of all SYSIDMS parameters and syntax, see *CA IDMS Common Facilities Guide*.
precompiler-options	options that control various aspects of the precompile process. See Passing Parameters to the Precompiler (see page 355) for a complete description of the options.
idms.objlib.user	filename of user object library
userprog	name of user application program
cobol.objlib	filename of the COBOL runtime object library
idms.loadlib.user	filename of the user load library

Note: Depending on the CV operating environment, an IDMSOPTI module link edited with the DML compiler can be used in place of or in addition to the SYSCTL file.

Local Mode

To execute the compiler in local mode:

- Remove the SYSCTL ADD-FILE-LINK command
- Add:

```
/ADD-FILE-LINK L-NAME=dictdb,F-NAME=idms.appldict.ddldml,SHARED-UPD=*YES
[/CREATE-FILE F-NAME=idms.tapejrnl,SUPPRESS-ERRORS=*FILE-EXIST,     -
/  SUP=*TAPE(VOLUME=nnnnnn,DEVICE=tape)]
/ADD-FILE-LINK L-NAME=sysjrnl,F-NAME=idms.tapejrnl [,BUF-LEN=bbbb,   -
/  SUP=*TAPE(F-SEQ=1)]
Statements and parameters between brackets must be specified only
when using the journal file on tape.
```

dictdb	linkname of the data dictionary file
idms.appldict.ddldml	filename of the data dictionary file
sysjrnl	linkname of the tape journal file
idms.tapejrnl	filename of the tape journal file
bbbb	page size of the file
nnnnnn	volume serial number of the tape archive file
tape	device name for the tape journal file

CMS Commands

IDMSDMLC ('CMS')

```
FILEDEF SYSIPT DISK sysipt data a (RECFM F LRECL ppp BLKSIZE nnn
FILEDEF SYSPCH DISK prgnme cobol a
FILEDEF SYSIDMS DISK sysidms parms a (RECFM F LRECL ppp. BLKSIZE nnn
EXEC IDMSFD
OSRUN IDMSDMLC PARM='CVMACH=vmid,precompiler-options'
FILEDEF TEXT DISK prgnme TEXT A
GLOBAL TXTLIB coblibvs IDMSLIB1
COBOL prgnme (OSDECK APOST LIB        COBOL compile step
TXTLIB DEL utextlib prgnme
TXTLIB ADD utextlib prgnme
FILEDEF SYSLMOD uloadlib LOADLIB a (RECFM V LRECL 1024 BLKSIZE 10 24
FILEDEF objlibl DISK IDMSLIB1 TXTLIB A
FILEDEF objlib DISK utextlib TXTLIB a
FILEDEF SYSLIB DISK coblibvs TXTLIB p
FILEDEF SYS001 DISK wfn wft wfm
LKED linkctl (LIST XREF LET MAP RENT NOTERM PRINT SIZE 512K 64K
                    Link edit step
```

sysipt data a	Filename, type, and mode of the file containing the COBOL/DML source statements
ppp	Record length of the data file
nnn	Block size of the data file
prgnme cobol a	Filename of the COBOL program
sysidms parms a	Filename, filetype, and filemode of the file that contains SYSIDMS parameters (parameters that define your runtime environment)
vmid	ID of the virtual machine running the central version
precompiler-options	options that control various aspects of the precompile process. See Passing Parameters to the Precompiler (see page 355) for a complete description of the options.
coblibvs	Filename of the library that contains COBOL logic modules
utextlib	Filename of the user text library
uloadlib LOADLIB a	Filename, filetype, and filemode of the user load library
objlib1	DDname of the first CA IDMS object library
objlib	DDname of the user object library
coblibvs TXTLIB p	Filename, filetype, and filemode of the library that contains COBOL logic modules

wfn wft wfm	Filename, type, and mode of the files to be used as intermediate work files by IDMSDMLC
linkctl	Filename of the file that contains the linkage editor control statements

How to Edit the SYSIDMS File

To create the SYSIDMS file, enter these CMS commands:

```
XEDIT sysidms parms a (NOPROF
INPUT
 .
 .
 .
SYSIDMS parameters
 .
 .
 .
FILE
```

To run IDMSDMLC, you must include the NODENAME and DICTNAME SYSIDMS parameters.

Note: For more information about SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

How to Create the SYSIPT File

To create the SYSIPT file, enter these CMS commands:

```
XEDIT sysipt data a (NOPROF
INPUT
 .
 .
 .
DML source statements
 .
 .
 .
FILE
```

How to Create the LINKCTL File

To create the LINKCTL file, enter these CMS commands:

```
XEDIT linkctl data a (NOPROF
INPUT
 .
 .
 .
INCLUDE objlib(prgnme)
INCLUDE objlib1(IDMS)   IDMS is required, omit for CICS
INCLUDE objlib1(IDMSCINT) for CICS only
INCLUDE objlib1(IDMSCANC) IDMSCANC for BATCH and DC_BATCH
ENTRY prgnme
NAME prgnme(R)
 .
 .
 .
FILE
```

Executing in Local Mode

To execute IDMSDMLC in local mode, remove the CVMACH parameter from OSRUN, and do *one* of the following:

- Link IDMSDMLC with an IDMSOPTI program that specifies local execution mode
- Specify *LOCAL* as the first input parameter in the file specified in the FILEDEF SYSIPT statement
- Modify the OSRUN statement, as follows:

  ```
  OSRUN IDMSDMLC PARM='*LOCAL*'
  ```

  Note: This option is valid only if the OSRUN command is issued from a System Product Interpreter or from an EXEC2 file.

Link-Edit Considerations

The modules involved in the link edit of an application program contain three external references. Some must be resolved, others can be left unresolved depending on the mode of operation. The table below lists and explains the external references.

Reference	Referenced by	Resolved by	Comments
ABORT	Application program	IDMSCANC	Should be resolved ONLY in a batch environment; should NOT be included in a tp environment.
IDMS	Application program	IDMS	Must be resolved
IDMSOPTI*	IDMS	IDMSOPTI module	Must be resolved if using the central version without a SYSCTL file

* IDMSOPTI is a weak external reference (WXTRN).

Passing Parameters to the Precompiler

A number of parameters can be provided to control the action taken by the precompiler. The parameters can be specified in one of three ways:

- An IDMSPPRM module can be compiled with parameter values that are always appropriate to a particular operating system or client site. IDMSPPRM must be a stand-alone assembler module that will be loaded by the precompiler at run-time. The module must consist of a string of characters terminated by a binary zero.
- A PARM= clause can be coded on the EXEC statement that invokes IDMSDMLC in a z/OS, or z/VSE environment or on the OSRUN statement that invokes IDMSDMLC in a CMS environment. Any option that is specified on the EXEC or OSRUN statement will take precedence over the same parameter if it is coded with a different value in the IDMSPPRM module.
- A PARM= statement can be coded as a SYSIDMS input parameter. See CA IDMS Common Facilities Guide for more information about using SYSIDMS. Any option that is specified in the PARM= statement will take precedence over the same parameter if it is coded with a different value in the IDMSPPRM module. Note that if PARM= is specified both as a SYSIDMS input statement and on an EXEC or OSRUN statement, the PARM= clause on the EXEC or OSRUN statement will be ignored completely.

Precompiler Options

Parameter options available to code in the EXEC statement of the precompile step are:

- RCM=rcm-name

  Specifies the name of the RCM created for the program by the precompiler if the program uses SQL access.

- RCMVERSION=rcm-version-number

  Specifies the version number of the RCM created for the program by the precompiler.

- AM=access-module-name

  Specifies the name of the access module to be executed for the program at runtime if the program uses SQL access.

- SCHEMA=schema-name

  Specifies the default schema-name qualifier for the precompiler to use when processing an INCLUDE TABLE statement that does not supply a qualifier.

- NOINSTALL

  Specifies that the precompiler should only check syntax.

- DICTNAME=dictionary-name

  Specifies the name of the dictionary the precompiler should access.

- SQL=NO/89/FIPS/DISABLED

  Specifies the SQL syntax standard that the precompiler should apply when checking the validity of SQL statements in the program.

  Option NO, the default, means that compliance with a named SQL standard is not checked or enforced, and all CA IDMS extensions are permitted.

  Option 89 directs the precompiler to use ANSI X3.135-1989 (Rev), Database Language SQL with integrity enhancement as the standard for compliance.

  Option FIPS directs the precompiler to use FIPS PUB 127-1, *Database Language SQL* as the standard for compliance.

  Option DISABLED directs the precompiler not to process any SQL commands (denoted by EXEC SQL, END-EXEC delimiters) in the program.

- LIST/NOList

  LIST directs the precompiler to create a listing of the program with precompiler messages. NOList directs the compiler not to create a listing of the program with precompiler messages.

- DATE=ISO/USA/EUR/JIS

  Specifies the format of the DATE data type to be used for communication between the program and the database when the access module is executed.

- TIME=ISO/USA/EUR/JIS

  Specifies the format of the TIME data type to be used for communication between the program and the database when the access module is executed.

- COBOL=1/2/85

  Specifies the version of COBOL with which COBOL statements generated by the precompiler must comply.

  Option 1 directs the precompiler to generate statements that comply with any of the following:

  Versions of VS COBOL that precede VS COBOL II for z/OS, or z/VSE operating systems all CBOL compiler versions for BS2000 operating systems

  Option 2, the default, directs the precompiler to generate statements that comply with VS COBOL II or LE-compliant COBOL compilers.

  Option 85 directs the precompiler to comply with COBOL85, the version of COBOL required for the Fujitsu and Hitachi compilers.

- SR1SR7 = YES/NO

  If YES is specified then SR1 and SR7 will be emitted in SUBSCHEMA-RECNAMES. NO is the default.

  Note: For more information about SQL-related parameter options, see the *SQL Programming Guide*.

Site-specific Parameters

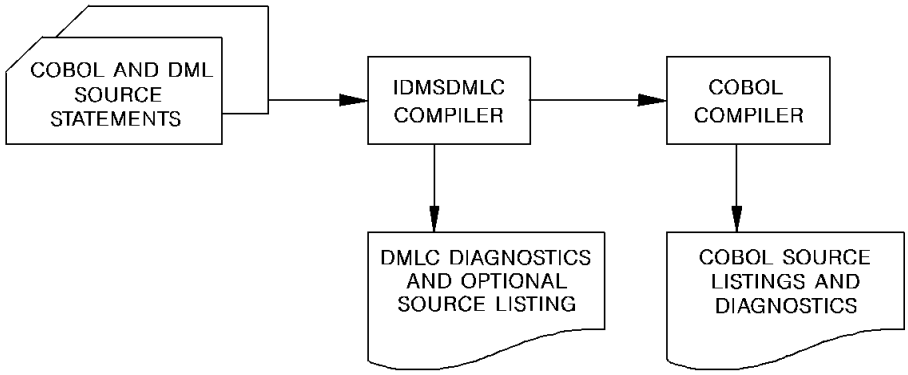
The following sample IDMSPPRM source will change the default for the COBOL parameter from COBOL=2 to COBOL=1 and will direct the precompiler not to produce a listing of the source program.

```
EDBPPARM CSECT
DC C'COBOL=1,NOLIST'
DC X'00'
END
```

Appendix B: Sample Batch Program

This appendix contains a sample batch COBOL program that accesses database records using navigational DML statements. The following figure shows the program as it appears in the various stages of the compilation process. You create a program using COBOL and DML statements. This program is input to the DML compiler, which produces a listing that contains diagnostics and, optionally, DML source statements. The expanded code is input to the COBOL compiler, which generates a listing of the fully expanded code and diagnostics.

Compilation Process



This section contains the following topics:

Sample Batch Program as Input to the DML Compiler

The sample program contains COBOL and DML source statements.

```
*RETRIEVAL
*DMLIST
*NO-ACTIVITY-LOG
*SCHEMA-COMMENTS

 IDENTIFICATION DIVISION.

  PROGRAM-ID.         DEPTRPT.

  AUTHOR.           COMPUTER ASSOCIATES INTERNATIONAL.

  DATE-WRITTEN.        APRIL 1995.

  REMARKS.            THIS PROGRAM DEMONSTRATES
                   CA IDMS DATABASE ACCESS USING
                   COBOL DML STATEMENTS. IT READS
                   DEPARTMENT ID NUMBERS AND RETRIEVES
                   RELATED RECORD OCCURRENCES,
                   PRINTING A REPORT THAT INCLUDES
                   DEPARTMENT, EMPLOYEE, JOB, AND
                   OFFICE INFORMATION.
****************************************************************
 ENVIRONMENT DIVISION.
 INPUT-OUTPUT SECTION.
 FILE-CONTROL.
   SELECT DEPT-FILE-IN      ASSIGN TO INFILE.
   SELECT DEPT-FILE-OUT     ASSIGN TO OUTFILE.
   SELECT ERR-FILE-OUT      ASSIGN TO ERRFILE.
****************************************************************
 IDMS-CONTROL SECTION.

 PROTOCOL.            MODE IS BATCH DEBUG
                  IDMS-RECORDS MANUAL.
   SKIP3
****************************************************************
 DATA DIVISION.

 SCHEMA SECTION.

 DB EMPSS01 WITHIN EMPSCHM.

****************************************************************
 FILE SECTION.
```

```
FD DEPT-FILE-IN
  RECORD CONTAINS 80
  BLOCK CONTAINS 80 CHARACTERS
  RECORDING MODE IS F
  LABEL RECORDS ARE OMITTED.

01 DEPT-REC-IN.
  02 DEPT-ID-IN       PIC 9(4).
  02 DEPT-IN-FILLER     PIC X(76).

FD DEPT-FILE-OUT
  RECORD CONTAINS 133
  BLOCK CONTAINS 133 CHARACTERS
  RECORDING MODE IS F
  LABEL RECORDS ARE OMITTED.

01 DEPT-REC-OUT.
  02 CC           PIC X.
  02 PRINT-LINE       PIC X(132).

FD ERR-FILE-OUT
  RECORD CONTAINS 133
  BLOCK CONTAINS 133 CHARACTERS
  RECORDING MODE IS F
  LABEL RECORDS ARE OMITTED.

01 ERR-REC-OUT.
  02 ERR-CC         PIC X.
  02 ERR-LINE        PIC X(132).
```

```
*****************************************************************
 WORKING-STORAGE SECTION.
 01 EOF-SW       PIC X   VALUE 'N'.
   88 END-OF-FILE        VALUE 'Y'.
 01 LINE-COUNT    PIC 99   VALUE 0.
 01 ERR-LINE-COUNT  PIC 99   VALUE 0.
 01 LINE-MAX     PIC 99   VALUE 50.
*****************************************************************
 01 DEPT-HEADER.
   05 FILLER    PIC X(30)  VALUE SPACES.
   05 FILLER    PIC X(13)  VALUE 'DEPARTMENT ID'.
   05 FILLER    PIC X(10)  VALUE SPACES.
   05 FILLER    PIC X(9)   VALUE 'DEPT NAME'.
   05 FILLER    PIC X(70)  VALUE SPACES.
 01 DEPT-DETAIL-LINE.
   05 FILLER    PIC X(33)  VALUE SPACES.
   05 DEPT-ID-OUT  PIC X(4).
   05 FILLER    PIC X(16)  VALUE SPACES.
   05 DEPT-NAME-OUT PIC X(45).
   05 FILLER    PIC X(34)  VALUE SPACES.
 01 EMP-HEADER.
   05 FILLER    PIC X(5)   VALUE SPACES.
   05 FILLER    PIC X(6)   VALUE 'EMP ID'.
   05 FILLER    PIC X(2)   VALUE SPACES.
   05 FILLER    PIC X(9)   VALUE 'LAST NAME'.
   05 FILLER    PIC X(8)   VALUE SPACES.
   05 FILLER    PIC X(10)  VALUE 'FIRST NAME'.
   05 FILLER    PIC X(3)   VALUE SPACES.
   05 FILLER    PIC X(10)  VALUE 'START DATE'.
   05 FILLER    PIC X(2)   VALUE SPACES.
   05 FILLER    PIC X(9)   VALUE 'JOB TITLE'.
   05 FILLER    PIC X(13)  VALUE SPACES.
   05 FILLER    PIC X(14)  VALUE 'OFFICE ADDRESS'.
   05 FILLER    PIC X(42)  VALUE SPACES.
```

```
01 EMP-DETAIL-LINE.
  05 FILLER    PIC X(5)   VALUE SPACES.
  05 ID-OUT    PIC X(4).
  05 FILLER    PIC X(4)   VALUE SPACES.
  05 LAST-OUT   PIC X(15).
  05 FILLER    PIC X(2)   VALUE SPACES.
  05 FIRST-OUT   PIC X(10).
  05 FILLER    PIC X(3)   VALUE SPACES.
  05 SD-OUT.
    10 SD-MM   PIC XX.
    10 FILLER   PIC X    VALUE '/'.
    10 SD-DD   PIC XX.
    10 FILLER   PIC X    VALUE '/'.
    10 SD-YY   PIC XX.
  05 FILLER    PIC X(4)   VALUE SPACES.
  05 TITLE-OUT   PIC X(20).
  05 FILLER    PIC X(2)   VALUE SPACES.
  05 OFF-ADDRESS-OUT.
    10 STREET-OUT PIC X(20).
    10 FILLER   PIC XX    VALUE SPACES.
    10 CITY-OUT  PIC X(15).
    10 FILLER   PIC XX    VALUE SPACES.
    10 STATE-OUT PIC XX.
    10 FILLER   PIC XX    VALUE SPACES.
    10 ZIP-OUT  PIC X(5).
  05 FILLER    PIC X(8)   VALUE SPACES.
01 ERR-HEADER-1.
  05 FILLER    PIC X(40)  VALUE SPACES.
  05 FILLER    PIC X(12)  VALUE 'ERROR REPORT'.
  05 FILLER    PIC X(80)  VALUE SPACES.
01 ERR-HEADER-2.
  05 FILLER    PIC X(10)  VALUE SPACES.
  05 FILLER    PIC X(4)   VALUE '*** '.
  05 FILLER    PIC X(51)  VALUE
    'THIS REPORT LISTS EMPTY AND NONEXISTENT DEPARTMENTS'.
  05 FILLER    PIC X(4)   VALUE ' ***'.
  05 FILLER    PIC X(63)  VALUE SPACES.
01 ERR-HEADER-3.
  05 FILLER    PIC X(20)  VALUE SPACES.
  05 FILLER    PIC X(7)   VALUE 'DEPT ID'.
  05 FILLER    PIC X(9)   VALUE SPACES.
  05 FILLER    PIC X(7)   VALUE 'MESSAGE'.
  05 FILLER    PIC X(89)  VALUE SPACES.
```

```
 01 ERR-DETAIL-LINE.
   05 FILLER    PIC X(20)  VALUE SPACES.
   05 ERR-ID-OUT  PIC X(4).
   05 FILLER    PIC X(12)  VALUE SPACES.
   05 ERR-MESS-OUT PIC X(15).
   05 FILLER    PIC X(79)  VALUE SPACES.
*****************************************************************
 01 MESSAGES.
   05 NO-JOB-MESSAGE.
    10 FILLER     PIC X(20) VALUE 'NO JOB ASSIGNED'.
   05 NO-OFFICE-MESSAGE.
    10 FILLER     PIC X(20)
              VALUE 'NO OFFICE ASSIGNED'.
   05 NO-DEPT-MESSAGE.
    10 FILLER     PIC X(15) VALUE 'DOES NOT EXIST'.
   05 NO-EMP-MESSAGE.
    10 FILLER     PIC X(15) VALUE 'IS EMPTY'.
   05 NO-INPUT-MESSAGE.
    10 FILLER     PIC XX   VALUE SPACES.
    10 FILLER     PIC X(11) VALUE '========>> '.
    10 FILLER     PIC X(8)  VALUE 'NO INPUT'.
    10 FILLER     PIC X(11) VALUE ' <<========'.
    10 FILLER     PIC X(100) VALUE SPACES.

 01 COPY IDMS SUBSCHEMA-CTRL.

 01 COPY IDMS SUBSCHEMA-SSNAME.

 01 COPY IDMS SUBSCHEMA-RECNAMES.

 01 COPY IDMS SUBSCHEMA-SETNAMES.

 01 COPY IDMS RECORD EMPLOYEE.

 01 COPY IDMS RECORD DEPARTMENT.

 01 COPY IDMS RECORD JOB.

 01 COPY IDMS RECORD EMPOSITION.

 01 COPY IDMS RECORD OFFICE.
   EJECT
 PROCEDURE DIVISION.
```

```
*  ********************************************************
*  * PROCEDURE DIVISION GENERAL STRATEGY:         *
*  *   1) READ DEPT-ID-IN, WHICH CONTAINS THE      *
*  *     DEPT-ID NUMBER                *
*  *   2) ACCESS THE DATABASE USING THE DEPT-ID NUMBER *
*  *     WITH AN OBTAIN CALC ON THE DEPARTMENT RECORD *
*  *   3) ACCESS ALL EMPLOYEES IN THE DEPT-EMPLOYEE SET *
*  *     AND RETRIEVE RELATED JOB AND OFFICE DATA   *
*  *   4) PRINT A REPORT FOR EACH DEPARTMENT      *
*  *   5) PRINT AN ERROR REPORT FOR EMPTY DEPARTMENTS  *
*  *     AND NONEXISTENT DEPARTMENTS (NO MATCHING   *
*  *     DEPT-ID)                  *
*  ********************************************************

 MAIN-LINE.
   PERFORM INIT-FILES.
   IF END-OF-FILE
    PERFORM EMPTY-INPUT-PROCESSING
   ELSE
    PERFORM INIT-BIND-READY
    PERFORM U220-ERR-HEADER
    PERFORM DEPT-PROCESSING THRU DEPT-PROCESSING-EXIT
           UNTIL END-OF-FILE.
   PERFORM END-PROCESSING.
   GOBACK.

 INIT-BIND-READY.
****************************************************************
* THE BIND STATEMENTS ARE PERFORMED INDIVIDUALLY (RATHER   *
* THAN BY USING A COPY IDMS SUBSCHEMA-BINDS) IN ORDER TO   *
* CHECK EACH ERROR-STATUS BY PERFORMING THE IDMS-STATUS    *
* ROUTINE.                          *
****************************************************************
   MOVE 'DEPTRPT' TO PROGRAM-NAME.
   BIND RUN-UNIT.
   PERFORM IDMS-STATUS.
   BIND EMPLOYEE.
   PERFORM IDMS-STATUS.
   BIND DEPARTMENT.
   PERFORM IDMS-STATUS.
   BIND JOB.
   PERFORM IDMS-STATUS.
   BIND EMPOSITION.
   PERFORM IDMS-STATUS.
   BIND OFFICE.
   PERFORM IDMS-STATUS.
   READY.
   PERFORM IDMS-STATUS.
```

```
 INIT-FILES.
   OPEN INPUT DEPT-FILE-IN.
   OPEN OUTPUT DEPT-FILE-OUT.
   OPEN OUTPUT ERR-FILE-OUT.
   MOVE SPACES TO PRINT-LINE.
   MOVE SPACES TO ERR-LINE.
   READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.

 EMPTY-INPUT-PROCESSING.
   MOVE NO-INPUT-MESSAGE TO PRINT-LINE.
   MOVE '1' TO CC.
   PERFORM U000-WRITE-LINE.

*****************************************************************
* THIS PARAGRAPH ACCESSES THE DATABASE USING THE DEPT-ID-0415 *
* CALCKEY VALUE.                        *
*****************************************************************
 DEPT-PROCESSING.
   MOVE DEPT-ID-IN TO DEPT-ID-0410.
   OBTAIN CALC DEPARTMENT.
   IF DB-REC-NOT-FOUND THEN
     PERFORM NO-DEPT-PROCESSING
   ELSE
     PERFORM IDMS-STATUS
     IF DEPT-EMPLOYEE IS NOT EMPTY THEN
       PERFORM U020-VALID-HEADER
       MOVE DEPT-ID-0410 TO DEPT-ID-OUT
       MOVE DEPT-NAME-0410 TO DEPT-NAME-OUT
       MOVE DEPT-DETAIL-LINE TO PRINT-LINE
       PERFORM U000-WRITE-LINE
       PERFORM U030-EMP-HEADERS
       PERFORM SET-WALK THRU SET-WALK-EXIT
             UNTIL DB-END-OF-SET
     ELSE
       PERFORM EMPTY-SET.
   READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.
 DEPT-PROCESSING-EXIT.
   EXIT.
```

```
*****************************************************************
* THIS PARAGRAPH RETRIEVES EMPLOYEE, JOB, AND OFFICE DATA   *
* FOR EACH EMPLOYEE IN THE DEPT-EMPLOYEE SET.          *
*****************************************************************
 SET-WALK.
   OBTAIN NEXT EMPLOYEE WITHIN DEPT-EMPLOYEE.
   IF DB-END-OF-SET
    GO TO SET-WALK-EXIT
   ELSE
    PERFORM IDMS-STATUS.
   MOVE EMP-ID-0415 TO ID-OUT.
   MOVE EMP-LAST-NAME-0415 TO LAST-OUT.
   MOVE EMP-FIRST-NAME-0415 TO FIRST-OUT.
   MOVE START-YEAR-0415 TO SD-YY.
   MOVE START-MONTH-0415 TO SD-MM.
   MOVE START-DAY-0415 TO SD-DD.
   IF EMP-EMPOSITION IS EMPTY
     MOVE NO-JOB-MESSAGE TO TITLE-OUT
   ELSE
     FIND FIRST WITHIN EMP-EMPOSITION
     PERFORM IDMS-STATUS
     IF NOT JOB-EMPOSITION MEMBER
       MOVE NO-JOB-MESSAGE TO TITLE-OUT
     ELSE
       OBTAIN OWNER WITHIN JOB-EMPOSITION
       PERFORM IDMS-STATUS
       MOVE TITLE-0440 TO TITLE-OUT.
   IF OFFICE-EMPLOYEE IS EMPTY
     MOVE NO-OFFICE-MESSAGE TO STREET-OUT
     MOVE SPACES TO CITY-OUT
     MOVE SPACES TO STATE-OUT
     MOVE SPACES TO ZIP-OUT
   ELSE
     OBTAIN OWNER WITHIN OFFICE-EMPLOYEE
     PERFORM IDMS-STATUS
     MOVE OFFICE-STREET-0450 TO STREET-OUT
     MOVE OFFICE-CITY-0450 TO CITY-OUT
     MOVE OFFICE-STATE-0450 TO STATE-OUT
     MOVE OFFICE-ZIP-FIRST-FIVE-0450 TO ZIP-OUT
     MOVE EMP-DETAIL-LINE TO PRINT-LINE.
   PERFORM U000-WRITE-LINE.
 SET-WALK-EXIT.
   EXIT.
```

```
END-PROCESSING.
  FINISH.
  PERFORM IDMS-STATUS.
  CLOSE DEPT-FILE-OUT.
  CLOSE ERR-FILE-OUT.
  CLOSE DEPT-FILE-IN.

EMPTY-SET.
  MOVE SPACES TO ERR-LINE.
  MOVE DEPT-ID-0410 TO ERR-ID-OUT.
  MOVE NO-EMP-MESSAGE TO ERR-MESS-OUT.
  MOVE ERR-DETAIL-LINE TO ERR-LINE.
  PERFORM U200-WRITE-ERR-LINE.

NO-DEPT-PROCESSING.
  MOVE DEPT-ID-IN TO ERR-ID-OUT.
  MOVE NO-DEPT-MESSAGE TO ERR-MESS-OUT.
  MOVE ERR-DETAIL-LINE TO ERR-LINE.
  PERFORM U200-WRITE-ERR-LINE.

U000-WRITE-LINE.
  WRITE DEPT-REC-OUT AFTER POSITIONING CC.
  IF CC = '1' THEN MOVE 0 TO LINE-COUNT
   ELSE IF CC = ' ' THEN ADD 1 TO LINE-COUNT
     ELSE IF CC = '0' THEN ADD 2 TO LINE-COUNT.
  IF LINE-COUNT > LINE-MAX
       THEN PERFORM U010-NEW-PAGE-ROUTINE.
U010-NEW-PAGE-ROUTINE.
  PERFORM U020-VALID-HEADER.
  MOVE DEPT-DETAIL-LINE TO PRINT-LINE.
  PERFORM U000-WRITE-LINE.
  PERFORM U030-EMP-HEADERS.
U020-VALID-HEADER.
  MOVE DEPT-HEADER TO PRINT-LINE.
  MOVE '1' TO CC.
  PERFORM U000-WRITE-LINE
  MOVE ' ' TO CC.
U030-EMP-HEADERS.
  MOVE '0' TO CC.
  MOVE EMP-HEADER TO PRINT-LINE.
  PERFORM U000-WRITE-LINE.
  MOVE SPACES TO PRINT-LINE.
  MOVE ' ' TO CC.
  PERFORM U000-WRITE-LINE.
```

```
U200-WRITE-ERR-LINE.
  WRITE ERR-REC-OUT AFTER POSITIONING ERR-CC.
  IF ERR-CC = '1' THEN MOVE 0 TO ERR-LINE-COUNT
   ELSE IF ERR-CC = ' ' THEN ADD 1 TO ERR-LINE-COUNT
     ELSE IF ERR-CC = '0' THEN ADD 2 TO ERR-LINE-COUNT.
  IF ERR-LINE-COUNT > LINE-MAX THEN
          PERFORM U220-ERR-HEADER.
U220-ERR-HEADER.
  MOVE ERR-HEADER-1 TO ERR-LINE.
  MOVE '1' TO ERR-CC.
  PERFORM U200-WRITE-ERR-LINE
  MOVE '0' TO ERR-CC.
  MOVE ERR-HEADER-2 TO ERR-LINE.
  PERFORM U200-WRITE-ERR-LINE.
  MOVE ERR-HEADER-3 TO ERR-LINE.
  PERFORM U200-WRITE-ERR-LINE.
  MOVE SPACES TO ERR-LINE.
  MOVE ' ' TO ERR-CC.
  PERFORM U200-WRITE-ERR-LINE.
IDMS-ABORT.
  EXIT.
IDMS-ABORT-EXIT.
  COPY IDMS IDMS-STATUS.
```

Sample Batch Program as Output from the DML Compiler

Since the *DMLIST option is specified in the program's IDENTIFICATION DIVISION, printed output consists of expanded code as well as diagnostics. This output is in the following format:

- **Heading**—The top of each page of the listing contains the name of the DML compiler being used (IDMSDMLC), the release number of the processor (Release 10.0), the name of the listing (Listing of Messages), the date, the time, and the page number.
- **Input listing and DML compiler-generated code**—The body of the printout contains the program input listing along with the DML compiler-generated code, formatted as follows:

Column	Explanation
1	Sequence numbers generated by the DML compiler
12	Line numbers generated by the DML compiler
19	Line numbers generated by the user program

Column	Explanation
26	Text of the COBOL source code including text generated by the DML compiler

- **Warnings and Status Messages**—Diagnostics are imbedded in the input listing and DML compiler-generated code following the errant lines of source code.

  Note: For more information about the DML compiler status messages, see the *CA IDMS Messages and Codes Guide*.

This listing contains the sample batch program and partially expanded code generated by the DML compiler.

```
          00001      *RETRIEVAL
          00002      *DMLIST
          00003      *NO-ACTIVITY-LOG
          00004      *SCHEMA-COMMENTS
          00005
          00006      IDENTIFICATION DIVISION.
          00007
          00008        PROGRAM-ID.         DEPTRPT.
          00009
          00010        AUTHOR.           COMPUTER ASSOCIATES INTERNATIONAL.
          00011
          00012        DATE-WRITTEN.        APRIL 1995.
          00013
          00014        REMARKS.           THIS PROGRAM DEMONSTRATES
          00015                       CA IDMS DATABASE ACCESS USING
          00016                       COBOL DML STATEMENTS. IT READS
          00017                       DEPARTMENT ID NUMBERS AND RETRIEVES
          00018                       RELATED RECORD OCCURRENCES,
          00019                       PRINTING A REPORT THAT INCLUDES
          00020                       DEPARTMENT, EMPLOYEE, JOB, AND
          00021                       OFFICE INFORMATION.
          00022     ***************************************************************
          00023        ENVIRONMENT DIVISION.
          00024        INPUT-OUTPUT SECTION.
          00025        FILE-CONTROL.
          00026          SELECT DEPT-FILE-IN      ASSIGN TO INFILE.
          00027          SELECT DEPT-FILE-OUT     ASSIGN TO OUTFILE.
          00028          SELECT ERR-FILE-OUT      ASSIGN TO ERRFILE.
          00029     ***************************************************************
DMLC      00030      IDMS-CONTROL SECTION.
          00031
          00032        PROTOCOL.           MODE IS BATCH DEBUG
          00033                         IDMS-RECORDS MANUAL.
          00034           SKIP3
```

```
          00035   ****************************************************************
          00036     DATA DIVISION.
          00037
DMLC      00038     SCHEMA SECTION.
          00039
          00040     DB EMPSS01 WITHIN EMPSCHM.
          00041
          00042   ****************************************************************
          00043     FILE SECTION.
          00044
          00045     FD DEPT-FILE-IN
          00046       RECORD CONTAINS 80
          00047       BLOCK CONTAINS 80 CHARACTERS
          00048       RECORDING MODE IS F
          00049       LABEL RECORDS ARE OMITTED.
          00050
          00051     01 DEPT-REC-IN.
          00052          02 DEPT-ID-IN       PIC 9(4).
          00053          02 DEPT-IN-FILLER     PIC X(76).
          00054
          00055     FD DEPT-FILE-OUT
          00056       RECORD CONTAINS 133
          00057       BLOCK CONTAINS 133 CHARACTERS
          00058       RECORDING MODE IS F
          00059       LABEL RECORDS ARE OMITTED.
          00060
          00061     01 DEPT-REC-OUT.
          00062       02 CC           PIC X.
          00063       02 PRINT-LINE       PIC X(132).
          00064
          00065     FD ERR-FILE-OUT
          00066       RECORD CONTAINS 133
          00067       BLOCK CONTAINS 133 CHARACTERS
          00068       RECORDING MODE IS F
          00069       LABEL RECORDS ARE OMITTED.
          00070
          00071     01 ERR-REC-OUT.
          00072       02 ERR-CC         PIC X.
          00073       02 ERR-LINE        PIC X(132).
          00074
          00075   ****************************************************************
          00076     WORKING-STORAGE SECTION.
          00077     01 EOF-SW       PIC X   VALUE 'N'.
          00078       88 END-OF-FILE        VALUE 'Y'.
          00079     01 LINE-COUNT    PIC 99   VALUE 0.
          00080     01 ERR-LINE-COUNT  PIC 99   VALUE 0.
```

```
00081      01 LINE-MAX     PIC 99   VALUE 50.
00082    ************************************************************
00083      01 DEPT-HEADER.
00084        05 FILLER    PIC X(30)  VALUE SPACES.
00085        05 FILLER    PIC X(13)  VALUE 'DEPARTMENT ID'.
00086        05 FILLER    PIC X(10)  VALUE SPACES.
00087        05 FILLER    PIC X(9)   VALUE 'DEPT NAME'.
00088        05 FILLER    PIC X(70)  VALUE SPACES.
00089      01 DEPT-DETAIL-LINE.
00090        05 FILLER    PIC X(33)  VALUE SPACES.
00091        05 DEPT-ID-OUT  PIC X(4).
00092        05 FILLER    PIC X(16)  VALUE SPACES.
00093        05 DEPT-NAME-OUT PIC X(45).
00094        05 FILLER    PIC X(34)  VALUE SPACES.
00095      01 EMP-HEADER.
00096           05 FILLER    PIC X(5)   VALUE SPACES.
00097        05 FILLER    PIC X(6)   VALUE 'EMP ID'.
00098        05 FILLER    PIC X(2)   VALUE SPACES.
00099        05 FILLER    PIC X(9)   VALUE 'LAST NAME'.
00100        05 FILLER    PIC X(8)   VALUE SPACES.
00101        05 FILLER    PIC X(10)  VALUE 'FIRST NAME'.
00102        05 FILLER    PIC X(3)   VALUE SPACES.
00103        05 FILLER    PIC X(10)  VALUE 'START DATE'.
00104        05 FILLER    PIC X(2)   VALUE SPACES.
00105        05 FILLER    PIC X(9)   VALUE 'JOB TITLE'.
00106        05 FILLER    PIC X(13)  VALUE SPACES.
00107        05 FILLER    PIC X(14)  VALUE 'OFFICE ADDRESS'.
00108        05 FILLER    PIC X(42)  VALUE SPACES.
00109      01 EMP-DETAIL-LINE.
00110        05 FILLER    PIC X(5)   VALUE SPACES.
00111        05 ID-OUT    PIC X(4).
00112        05 FILLER    PIC X(4)   VALUE SPACES.
00113        05 LAST-OUT   PIC X(15).
00114        05 FILLER    PIC X(2)   VALUE SPACES.
00115        05 FIRST-OUT   PIC X(10).
00116        05 FILLER    PIC X(3)   VALUE SPACES.
00117        05 SD-OUT.
00118          10 SD-MM   PIC XX.
00119          10 FILLER   PIC X    VALUE '/'.
00120          10 SD-DD   PIC XX.
00121          10 FILLER   PIC X    VALUE '/'.
00122          10 SD-YY   PIC XX.
00123        05 FILLER    PIC X(4)   VALUE SPACES.
00124        05 TITLE-OUT   PIC X(20).
00125        05 FILLER    PIC X(2)   VALUE SPACES.
00126        05 OFF-ADDRESS-OUT.
00127          10 STREET-OUT PIC X(20).
00128          10 FILLER   PIC XX    VALUE SPACES.
```

```
00129          10 CITY-OUT  PIC X(15).
00130          10 FILLER   PIC XX    VALUE SPACES.
00131          10 STATE-OUT PIC XX.
00132          10 FILLER   PIC XX    VALUE SPACES.
00133          10 ZIP-OUT  PIC X(5).
00134        05 FILLER    PIC X(8)   VALUE SPACES.
00135      01 ERR-HEADER-1.
00136        05 FILLER    PIC X(40)  VALUE SPACES.
00137        05 FILLER    PIC X(12)  VALUE 'ERROR REPORT'.
00138        05 FILLER    PIC X(80)  VALUE SPACES.
00139      01 ERR-HEADER-2.
00140        05 FILLER    PIC X(10)  VALUE SPACES.
00141        05 FILLER    PIC X(4)   VALUE '*** '.
00142        05 FILLER    PIC X(51)  VALUE
00143          'THIS REPORT LISTS EMPTY AND NONEXISTENT DEPARTMENTS'.
00144        05 FILLER    PIC X(4)   VALUE ' ***'.
00145        05 FILLER    PIC X(63)  VALUE SPACES.
00146      01 ERR-HEADER-3.
00147        05 FILLER    PIC X(20)  VALUE SPACES.
00148        05 FILLER    PIC X(7)   VALUE 'DEPT ID'.
00149        05 FILLER    PIC X(9)   VALUE SPACES.
00150        05 FILLER    PIC X(7)   VALUE 'MESSAGE'.
00151        05 FILLER    PIC X(89)  VALUE SPACES.
00152      01 ERR-DETAIL-LINE.
00153        05 FILLER    PIC X(20)  VALUE SPACES.
00154        05 ERR-ID-OUT  PIC X(4).
00155        05 FILLER    PIC X(12)  VALUE SPACES.
00156        05 ERR-MESS-OUT PIC X(15).
00157        05 FILLER    PIC X(79)  VALUE SPACES.
00158     ************************************************************
00159      01 MESSAGES.
00160        05 NO-JOB-MESSAGE.
00161          10 FILLER     PIC X(20) VALUE 'NO JOB ASSIGNED'.
00162        05 NO-OFFICE-MESSAGE.
00163          10 FILLER     PIC X(20)
00164                   VALUE 'NO OFFICE ASSIGNED'.
00165        05 NO-DEPT-MESSAGE.
00166          10 FILLER     PIC X(15) VALUE 'DOES NOT EXIST'.
00167        05 NO-EMP-MESSAGE.
00168          10 FILLER     PIC X(15) VALUE 'IS EMPTY'.
00169        05 NO-INPUT-MESSAGE.
00170          10 FILLER     PIC XX   VALUE SPACES.
```

```
00171          10 FILLER     PIC X(11) VALUE '========>> '.
00172          10 FILLER     PIC X(8)  VALUE 'NO INPUT'.
00173          10 FILLER     PIC X(11) VALUE ' <<========'.
00174          10 FILLER     PIC X(100) VALUE SPACES.
00175
DMLC     00176      01 COPY IDMS SUBSCHEMA-CTRL.
00177      01 SUBSCHEMA-CTRL.
00178         03 PROGRAM-NAME      PIC X(8)
00179                     VALUE SPACES .
00180         03 ERROR-STATUS      PIC X(4)
00181                     VALUE '1400' .
00182                   88 DB-STATUS-OK
00183                     VALUE '0000' .
00184                   88 ANY-STATUS
00185                     VALUE '  ' THRU '9999' .
00186                   88 ANY-ERROR-STATUS
00187                     VALUE '0001' THRU '9999' .
00188                   88 DB-END-OF-SET
00189                     VALUE '0307' .
00190                   88 DB-REC-NOT-FOUND
00191                     VALUE '0326' .
00192         03 DBKEY         PIC S9(8) COMP SYNC.
00193         03 RECORD-NAME      PIC X(16)
00194                     VALUE SPACES .
00195         03 RRECORD-NAME      REDEFINES RECORD-NAME.
00196          05 SSC-NODN       PIC X(8).
00197          05 SSC-DBN       PIC X(8).
00198         03 AREA-NAME       PIC X(16)
00199                     VALUE SPACES .
00200         03 AREA-RNAME       REDEFINES AREA-NAME.
00201          05 SSC-DNO       PIC X(8).
00202          05 SSC-DNA       PIC X(8).
00203         03 ERROR-SET       PIC X(16)
00204                     VALUE SPACES .
00205         03 ERROR-RECORD      PIC X(16)
00206                     VALUE SPACES .
00207         03 ERROR-AREA       PIC X(16)
00208                     VALUE SPACES .
00209         03 IDBMSCOM-AREA     PIC X(100)
00210                     VALUE LOW-VALUE .
00211         03 IDBMSCOM        REDEFINES IDBMSCOM-AREA
00212                     PIC X
00213                     OCCURS 100.
00214         03 RIDBMSCOM       REDEFINES IDBMSCOM-AREA.
00215          05 DB-SUB-ADDR     PIC X(4).
00216          05 FILLER        PIC X(96).
```

```
00217         03 R1DBMSCOM       REDEFINES IDBMSCOM-AREA.
00218          05 PAGE-INFO.
00219           07 PAGE-INFO-GROUP  PIC S9(4) COMP.
00220           07 PAGE-INFO-DBK-FORMAT
00221                     PIC 9(4) COMP.
00222          05  SSC-IDMS-STATUS-WRK.
00223           07  SSC-IN01-REQ-WK.
00224             09  SSC-IN01-REQ-CODE
00225                                 PIC S9(8) COMP.
00226             09  SSC-IN01-REQ-RETURN
00227                                 PIC S9(8) COMP.
00228           07  SSC-STATUS-LINE.
00229             09  SSC-STATUS-LABEL PIC X(16).
00230             09  SSC-STATUS-VALUE PIC X(12).

00231          05 FILLER        PIC X(60).
00232         03 DIRECT-DBKEY      PIC S9(8) COMP SYNC.
00233         03 DIRECT-DBK       REDEFINES DIRECT-DBKEY
00234                     PIC S9(8) COMP SYNC.
00235         03 DATABASE-STATUS.
00236          05 DBSTATMENT-CODE   PIC X(2).
00237          05 DBSTATUS-CODE    PIC X(5).
00238         03 FILLER         PIC X.
00239         03 RECORD-OCCUR      PIC S9(8) COMP SYNC.

00240         03 DML-SEQUENCE      PIC S9(8) COMP SYNC.
00241
DMLC     00242      01 COPY IDMS SUBSCHEMA-SSNAME.
00243      01 SUBSCHEMA-SSNAME      PIC X(8)
00244                     VALUE 'EMPSS01 ' .
00245
DMLC     00246      01 COPY IDMS SUBSCHEMA-RECNAMES.
00247      01 SUBSCHEMA-RECNAMES.
00248         03 SR460         PIC X(16)
00249                     VALUE 'STRUCTURE    ' .
00250         03 SR455         PIC X(16)
00251                     VALUE 'SKILL      ' .
00252         03 SR450         PIC X(16)

00253                     VALUE 'OFFICE     ' .
00254         03 SR445         PIC X(16)
00255                     VALUE 'NON-HOSP-CLAIM ' .
00256         03 SR440         PIC X(16)
00257                     VALUE 'JOB       ' .
00258         03 SR435         PIC X(16)
00259                     VALUE 'INSURANCE-PLAN ' .
00260         03 SR430         PIC X(16)
00261                     VALUE 'HOSPITAL-CLAIM ' .
```

```
                00262         03 SR425         PIC X(16)
                00263                      VALUE 'EXPERTISE    ' .
                00264         03 SR420         PIC X(16)
                00265                      VALUE 'EMPOSITION   ' .
                00266         03 SR415         PIC X(16)
                00267                      VALUE 'EMPLOYEE     ' .
                00268         03 SR410         PIC X(16)

                00269                      VALUE 'DEPARTMENT   ' .
                00270         03 SR405         PIC X(16)
                00271                      VALUE 'DENTAL-CLAIM  ' .
                00272         03 SR400         PIC X(16)
                00273                      VALUE 'COVERAGE     ' .
                00274
DMLC            00275       01 COPY IDMS SUBSCHEMA-SETNAMES.
                00276       01 SUBSCHEMA-SETNAMES.
                00277          03 COVERAGE-CLAIMS    PIC X(16)
                00278                      VALUE 'COVERAGE-CLAIMS ' .
                00279          03 DEPT-EMPLOYEE     PIC X(16)
                00280                      VALUE 'DEPT-EMPLOYEE  ' .
                00281          03 EMP-COVERAGE      PIC X(16)
                00282                      VALUE 'EMP-COVERAGE  ' .

                00283          03 EMP-EXPERTISE     PIC X(16)
                00284                      VALUE 'EMP-EXPERTISE  ' .
                00285          03 EMP-NAME-NDX      PIC X(16)
                00286                      VALUE 'EMP-NAME-NDX  ' .
                00287          03 EMP-EMPOSITION     PIC X(16)
                00288                      VALUE 'EMP-EMPOSITION ' .
                00289          03 JOB-EMPOSITION     PIC X(16)
                00290                      VALUE 'JOB-EMPOSITION ' .
                00291          03 JOB-TITLE-NDX     PIC X(16)

                00292                      VALUE 'JOB-TITLE-NDX  ' .
                00293          03 MANAGES        PIC X(16)
                00294                      VALUE 'MANAGES     ' .
                00295          03 OFFICE-EMPLOYEE    PIC X(16)
                00296                      VALUE 'OFFICE-EMPLOYEE ' .
                00297          03 REPORTS-TO       PIC X(16)
                00298                      VALUE 'REPORTS-TO   ' .
                00299          03 SKILL-EXPERTISE    PIC X(16)
                00300                      VALUE 'SKILL-EXPERTISE ' .
                00301          03 SKILL-NAME-NDX     PIC X(16)
```

```
                00302                     VALUE 'SKILL-NAME-NDX ' .
                00303          03 CALC          PIC X(16)
                00304                     VALUE 'CALC      ' .
                00305
DMLC            00306       01 COPY IDMS RECORD EMPLOYEE.
                00307       01 EMPLOYEE.
                00308         02 EMP-ID-0415       PIC 9(4).
                00309         02 EMP-NAME-0415.
                00310          03 EMP-FIRST-NAME-0415  PIC X(10).
                00311          03 EMP-LAST-NAME-0415   PIC X(15).
                00312         02 EMP-ADDRESS-0415.
                00313          03 EMP-STREET-0415    PIC X(20).
                00314          03 EMP-CITY-0415     PIC X(15).
                00315          03 EMP-STATE-0415     PIC X(2).

                00316          03 EMP-ZIP-0415.
                00317          04 EMP-ZIP-FIRST-FIVE-0415
                00318                     PIC X(5).
                00319          04 EMP-ZIP-LAST-FOUR-0415
                00320                     PIC X(4).
                00321         02 EMP-PHONE-0415     PIC 9(10).
                00322         02 STATUS-0415       PIC X(2).
                00323                    88 ACTIVE-0415
                00324                      VALUE '01' .

                00325                    88 ST-DISABIL-0415
                00326                      VALUE '02' .
                00327                    88 LT-DISABIL-0415
                00328                      VALUE '03' .
                00329                    88 LEAVE-OF-ABSENCE-0415
                00330                      VALUE '04' .
                00331                    88 TERMINATED-0415
                00332                      VALUE '05' .
                00333         02 SS-NUMBER-0415     PIC 9(9).
                00334         02 START-DATE-0415.

                00335          03 START-YEAR-0415    PIC 9(4).
                00336          03 START-MONTH-0415    PIC 9(2).
                00337          03 START-DAY-0415     PIC 9(2).
                00338         02 TERMINATION-DATE-0415.
                00339          03 TERMINATION-YEAR-0415 PIC 9(4).
                00340          03 TERMINATION-MONTH-0415 PIC 9(2).
                00341          03 TERMINATION-DAY-0415  PIC 9(2).
                00342         02 BIRTH-DATE-0415.
```

```
                00343         03 BIRTH-YEAR-0415    PIC 9(4).
                00344         03 BIRTH-MONTH-0415    PIC 9(2).
                00345         03 BIRTH-DAY-0415     PIC 9(2).
                00346
DMLC            00347       01 COPY IDMS RECORD DEPARTMENT.
                00348       01 DEPARTMENT.
                00349         02 DEPT-ID-0410      PIC 9(4).
                00350         02 DEPT-NAME-0410     PIC X(45).
                00351         02 DEPT-HEAD-ID-0410    PIC 9(4).
                00352         02 FILLER         PIC XXX.
                00353

DMLC            00354       01 COPY IDMS RECORD JOB.
                00355       01 JOB.
                00356         02 JOB-ID-0440       PIC 9(4).
                00357         02 TITLE-0440       PIC X(20).
                00358         02 DESCRIPTION-0440.
                00359          03 DESCRIPTION-LINE-0440 PIC X(60)
                00360                      OCCURS 2.
                00361         02 REQUIREMENTS-0440.
                00362          03 REQUIREMENT-LINE-0440 PIC X(60)
                00363                      OCCURS 2.
                00364         02 MINIMUM-SALARY-0440   PIC S9(6)V99.
                00365         02 MAXIMUM-SALARY-0440   PIC S9(6)V99.

                00366         02 SALARY-GRADES-0440   PIC 9(2)
                00367                      OCCURS 4.
                00368         02 NUMBER-OF-POSITIONS-0440
                00369                      PIC 9(3).
                00370         02 NUMBER-OPEN-0440    PIC 9(3).
                00371         02 FILLER         PIC XX.
                00372
DMLC            00373       01 COPY IDMS RECORD EMPOSITION.
                00374       01 EMPOSITION.
                00375         02 START-DATE-0420.
                00376          03 START-YEAR-0420    PIC 9(4).
                00377          03 START-MONTH-0420    PIC 9(2).

                00378          03 START-DAY-0420     PIC 9(2).
                00379         02 FINISH-DATE-0420.
                00380          03 FINISH-YEAR-0420    PIC 9(4).
                00381          03 FINISH-MONTH-0420   PIC 9(2).
                00382          03 FINISH-DAY-0420    PIC 9(2).
                00383         02 SALARY-GRADE-0420    PIC 9(2).
                00384         02 SALARY-AMOUNT-0420   PIC S9(7)V99 COMP-3.
                00385         02 BONUS-PERCENT-0420   PIC SV999 COMP-3.
                00386         02 COMMISSION-PERCENT-0420 PIC SV999 COMP-3.
```

```
00387        02 OVERTIME-RATE-0420   PIC S9V99 COMP-3.
00388        02 FILLER         PIC XXX.
00389
DMLC    00390      01 COPY IDMS RECORD OFFICE.
00391      01 OFFICE.
00392        02 OFFICE-CODE-0450    PIC X(3).
00393        02 OFFICE-ADDRESS-0450.
00394        03 OFFICE-STREET-0450   PIC X(20).
00395         03 OFFICE-CITY-0450    PIC X(15).
00396         03 OFFICE-STATE-0450   PIC X(2).

00397         03 OFFICE-ZIP-0450.
00398         04 OFFICE-ZIP-FIRST-FIVE-0450
00399                     PIC X(5).
00400         04 OFFICE-ZIP-LAST-FOUR-0450
00401                     PIC X(4).
00402        02 OFFICE-PHONE-0450    PIC 9(7)
00403                     OCCURS 3.
00404        02 OFFICE-AREA-CODE-0450  PIC X(3).

00405        02 SPEED-DIAL-0450     PIC X(3).
00406        02 FILLER         PIC X(4).
00407        EJECT
00408      PROCEDURE DIVISION.

00409      *  ******************************************************
00410      *  * PROCEDURE DIVISION GENERAL STRATEGY:         *
00411      *  *   1) READ DEPT-ID-IN, WHICH CONTAINS THE      *
00412      *  *     DEPT-ID NUMBER               *
00413      *  *   2) ACCESS THE DATABASE USING THE DEPT-ID NUMBER *
00414      *  *     WITH AN OBTAIN CALC ON THE DEPARTMENT RECORD *
00415      *  *   3) ACCESS ALL EMPLOYEES IN THE DEPT-EMPLOYEE SET *
00416      *  *     AND RETRIEVE RELATED JOB AND OFFICE DATA   *

00417      *  *   4) PRINT A REPORT FOR EACH DEPARTMENT      *
00418      *  *   5) PRINT AN ERROR REPORT FOR EMPTY DEPARTMENTS  *
00419      *  *     AND NONEXISTENT DEPARTMENTS (NO MATCHING   *
00420      *  *     DEPT-ID)                  *
00421      *  ******************************************************
00422
00423      MAIN-LINE.
00424        PERFORM INIT-FILES.
00425        IF END-OF-FILE
00426          PERFORM EMPTY-INPUT-PROCESSING
00427        ELSE
00428          PERFORM INIT-BIND-READY
00429          PERFORM U220-ERR-HEADER
```

```
          00430          PERFORM DEPT-PROCESSING THRU DEPT-PROCESSING-EXIT
          00431                  UNTIL END-OF-FILE.
          00432        PERFORM END-PROCESSING.
          00433        GOBACK.
          00434
          00435      INIT-BIND-READY.
          00436     ************************************************************
          00437      * THE BIND STATEMENTS ARE PERFORMED INDIVIDUALLY (RATHER   *
          00438      * THAN BY USING A COPY IDMS SUBSCHEMA-BINDS) IN ORDER TO   *

          00439      * CHECK EACH ERROR-STATUS BY PERFORMING THE IDMS-STATUS    *
          00440      * ROUTINE.                          *
          00441
***********************************************************
          00442        MOVE 'DEPTRPT' TO PROGRAM-NAME.
DMLC0001  00443        BIND RUN-UNIT.
          00444           MOVE 1 TO DML-SEQUENCE
          00445           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00446               IDBMSCOM (59)
          00447               SUBSCHEMA-CTRL
          00448               SUBSCHEMA-SSNAME.
          00449        PERFORM IDMS-STATUS.
DMLC0002  00450        BIND EMPLOYEE.
          00451           MOVE 2 TO DML-SEQUENCE
          00452           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00453               IDBMSCOM (48)

          00454               SR415
          00455               EMPLOYEE.
          00456        PERFORM IDMS-STATUS.
DMLC0003  00457        BIND DEPARTMENT.
          00458           MOVE 3 TO DML-SEQUENCE
          00459           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00460               IDBMSCOM (48)
          00461               SR410
          00462               DEPARTMENT.
          00463        PERFORM IDMS-STATUS.
DMLC0004  00464        BIND JOB.
          00465           MOVE 4 TO DML-SEQUENCE
          00466           CALL 'IDMS' USING SUBSCHEMA-CTRL
```

```
           00467              IDBMSCOM (48)
           00468              SR440
           00469              JOB.
           00470        PERFORM IDMS-STATUS.
DMLC0005   00471        BIND EMPOSITION.
           00472           MOVE 5 TO DML-SEQUENCE
           00473           CALL 'IDMS' USING SUBSCHEMA-CTRL
           00474               IDBMSCOM (48)
           00475               SR420
           00476               EMPOSITION.
           00477        PERFORM IDMS-STATUS.
DMLC0006   00478        BIND OFFICE.
           00479           MOVE 6 TO DML-SEQUENCE
           00480           CALL 'IDMS' USING SUBSCHEMA-CTRL

           00481               IDBMSCOM (48)
           00482               SR450
           00483               OFFICE.
           00484        PERFORM IDMS-STATUS.
DMLC0007   00485        READY.
           00486           MOVE 7 TO DML-SEQUENCE
           00487           CALL 'IDMS' USING SUBSCHEMA-CTRL
           00488               IDBMSCOM (37).
           00489        PERFORM IDMS-STATUS.
           00490
           00491      INIT-FILES.
           00492        OPEN INPUT DEPT-FILE-IN.
           00493        OPEN OUTPUT DEPT-FILE-OUT.
           00494        OPEN OUTPUT ERR-FILE-OUT.

           00495        MOVE SPACES TO PRINT-LINE.
           00496        MOVE SPACES TO ERR-LINE.
           00497        READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.
           00498
           00499      EMPTY-INPUT-PROCESSING.
           00500        MOVE NO-INPUT-MESSAGE TO PRINT-LINE.
           00501        MOVE '1' TO CC.
           00502        PERFORM U000-WRITE-LINE.
           00503
```

```
*************************************************************
          00504      * THIS PARAGRAPH ACCESSES THE DATABASE USING THE DEPT-ID-0415
*
          00505      * CALCKEY VALUE.                          *
          00506     *************************************************************
          00507       DEPT-PROCESSING.
          00508         MOVE DEPT-ID-IN TO DEPT-ID-0410.
DMLC0008  00509         OBTAIN CALC DEPARTMENT.
          00510            MOVE 8 TO DML-SEQUENCE
          00511            CALL 'IDMS' USING SUBSCHEMA-CTRL
          00512                IDBMSCOM (32)
          00513                SR410
          00514                IDBMSCOM (43).

          00515         IF DB-REC-NOT-FOUND THEN
          00516           PERFORM NO-DEPT-PROCESSING
          00517         ELSE
          00518           PERFORM IDMS-STATUS
DMLC0009  00519           IF DEPT-EMPLOYEE IS NOT EMPTY
          00520            MOVE 9 TO DML-SEQUENCE
          00521            CALL 'IDMS' USING SUBSCHEMA-CTRL
          00522                IDBMSCOM (65)
          00523                DEPT-EMPLOYEE;
          00524            IF ERROR-STATUS EQUAL TO '1601'
          00525                         THEN
          00526             PERFORM U020-VALID-HEADER
          00527             MOVE DEPT-ID-0410 TO DEPT-ID-OUT

          00528             MOVE DEPT-NAME-0410 TO DEPT-NAME-OUT
          00529             MOVE DEPT-DETAIL-LINE TO PRINT-LINE
          00530             PERFORM U000-WRITE-LINE
          00531             PERFORM U030-EMP-HEADERS
          00532             PERFORM SET-WALK THRU SET-WALK-EXIT
          00533                    UNTIL DB-END-OF-SET
          00534           ELSE
          00535              PERFORM EMPTY-SET.
          00536         READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.

          00537       DEPT-PROCESSING-EXIT.
          00538         EXIT.
          00539     *************************************************************
          00540       * THIS PARAGRAPH RETRIEVES EMPLOYEE, JOB, AND OFFICE DATA   *
          00541       * FOR EACH EMPLOYEE IN THE DEPT-EMPLOYEE SET.         *
          00542     *************************************************************
          00543       SET-WALK.
```

```
DMLC0010  00544        OBTAIN NEXT EMPLOYEE WITHIN DEPT-EMPLOYEE.
          00545           MOVE 10 TO DML-SEQUENCE
          00546           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00547               IDBMSCOM (10)
          00548               SR415
          00549               DEPT-EMPLOYEE
          00550               IDBMSCOM (43).
          00551        IF DB-END-OF-SET
          00552          GO TO SET-WALK-EXIT
          00553        ELSE
          00554          PERFORM IDMS-STATUS.
          00555        MOVE EMP-ID-0415 TO ID-OUT.

          00556        MOVE EMP-LAST-NAME-0415 TO LAST-OUT.
          00557        MOVE EMP-FIRST-NAME-0415 TO FIRST-OUT.
          00558        MOVE START-YEAR-0415 TO SD-YY.
          00559        MOVE START-MONTH-0415 TO SD-MM.
          00560        MOVE START-DAY-0415 TO SD-DD.
DMLC0011  00561        IF EMP-EMPOSITION IS EMPTY
          00562           MOVE 11 TO DML-SEQUENCE
          00563           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00564               IDBMSCOM (64)
          00565               EMP-EMPOSITION;

          00566           IF ERROR-STATUS EQUAL TO '0000'
          00567          MOVE NO-JOB-MESSAGE TO TITLE-OUT
          00568        ELSE
DMLC0012  00569          FIND FIRST WITHIN EMP-EMPOSITION
          00570           MOVE 12 TO DML-SEQUENCE
          00571           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00572               IDBMSCOM (20)
          00573               EMP-EMPOSITION;
          00574          PERFORM IDMS-STATUS
DMLC0013  00575          IF NOT JOB-EMPOSITION MEMBER
          00576           MOVE 13 TO DML-SEQUENCE
          00577           CALL 'IDMS' USING SUBSCHEMA-CTRL
          00578               IDBMSCOM (62)
          00579               JOB-EMPOSITION;
```

```
           00580           IF ERROR-STATUS EQUAL TO '1601'
           00581            MOVE NO-JOB-MESSAGE TO TITLE-OUT
           00582          ELSE
DMLC0014   00583            OBTAIN OWNER WITHIN JOB-EMPOSITION
           00584           MOVE 14 TO DML-SEQUENCE
           00585           CALL 'IDMS' USING SUBSCHEMA-CTRL
           00586               IDBMSCOM (31)
           00587               JOB-EMPOSITION
           00588               IDBMSCOM (43);
           00589            PERFORM IDMS-STATUS
           00590            MOVE TITLE-0440 TO TITLE-OUT.
DMLC0015   00591         IF OFFICE-EMPLOYEE IS EMPTY
           00592            MOVE 15 TO DML-SEQUENCE
           00593            CALL 'IDMS' USING SUBSCHEMA-CTRL
           00594                IDBMSCOM (64)
           00595                OFFICE-EMPLOYEE;

           00596            IF ERROR-STATUS EQUAL TO '0000'
           00597          MOVE NO-OFFICE-MESSAGE TO STREET-OUT
           00598          MOVE SPACES TO CITY-OUT
           00599          MOVE SPACES TO STATE-OUT
           00600          MOVE SPACES TO ZIP-OUT
           00601         ELSE
DMLC0016   00602          OBTAIN OWNER WITHIN OFFICE-EMPLOYEE
           00603           MOVE 16 TO DML-SEQUENCE
           00604           CALL 'IDMS' USING SUBSCHEMA-CTRL
           00605               IDBMSCOM (31)
           00606               OFFICE-EMPLOYEE
           00607               IDBMSCOM (43);
           00608          PERFORM IDMS-STATUS
           00609          MOVE OFFICE-STREET-0450 TO STREET-OUT
           00610          MOVE OFFICE-CITY-0450 TO CITY-OUT
           00611          MOVE OFFICE-STATE-0450 TO STATE-OUT
```

```
                00612          MOVE OFFICE-ZIP-FIRST-FIVE-0450 TO ZIP-OUT
                00613          MOVE EMP-DETAIL-LINE TO PRINT-LINE.
                00614        PERFORM U000-WRITE-LINE.
                00615      SET-WALK-EXIT.
                00616        EXIT.
                00617
                00618      END-PROCESSING.
DMLC0017        00619        FINISH.
                00620           MOVE 17 TO DML-SEQUENCE
                00621           CALL 'IDMS' USING SUBSCHEMA-CTRL
                00622               IDBMSCOM (2).
                00623        PERFORM IDMS-STATUS.
                00624        CLOSE DEPT-FILE-OUT.
                00625        CLOSE ERR-FILE-OUT.
                00626        CLOSE DEPT-FILE-IN.

                00627
                00628      EMPTY-SET.
                00629        MOVE SPACES TO ERR-LINE.
                00630        MOVE DEPT-ID-0410 TO ERR-ID-OUT.
                00631        MOVE NO-EMP-MESSAGE TO ERR-MESS-OUT.
                00632        MOVE ERR-DETAIL-LINE TO ERR-LINE.
                00633        PERFORM U200-WRITE-ERR-LINE.
                00634
                00635      NO-DEPT-PROCESSING.
                00636        MOVE DEPT-ID-IN TO ERR-ID-OUT.
                00637        MOVE NO-DEPT-MESSAGE TO ERR-MESS-OUT.
                00638        MOVE ERR-DETAIL-LINE TO ERR-LINE.
                00639        PERFORM U200-WRITE-ERR-LINE.
                00640

                00641      U000-WRITE-LINE.
                00642        WRITE DEPT-REC-OUT AFTER POSITIONING CC.
                00643        IF CC = '1' THEN MOVE 0 TO LINE-COUNT
                00644         ELSE IF CC = ' ' THEN ADD 1 TO LINE-COUNT
                00645            ELSE IF CC = '0' THEN ADD 2 TO LINE-COUNT.
                00646        IF LINE-COUNT > LINE-MAX
                00647              THEN PERFORM U010-NEW-PAGE-ROUTINE.
                00648      U010-NEW-PAGE-ROUTINE.
                00649        PERFORM U020-VALID-HEADER.
                00650        MOVE DEPT-DETAIL-LINE TO PRINT-LINE.
                00651        PERFORM U000-WRITE-LINE.
                00652        PERFORM U030-EMP-HEADERS.
                00653      U020-VALID-HEADER.
                00654        MOVE DEPT-HEADER TO PRINT-LINE.
                00655        MOVE '1' TO CC.
```

```
           00656        PERFORM U000-WRITE-LINE
           00657        MOVE ' ' TO CC.
           00658      U030-EMP-HEADERS.
           00659        MOVE '0' TO CC.
           00660        MOVE EMP-HEADER TO PRINT-LINE.
           00661        PERFORM U000-WRITE-LINE.
           00662        MOVE SPACES TO PRINT-LINE.
           00663        MOVE ' ' TO CC.
           00664        PERFORM U000-WRITE-LINE.
           00665
           00666      U200-WRITE-ERR-LINE.
           00667        WRITE ERR-REC-OUT AFTER POSITIONING ERR-CC.
           00668        IF ERR-CC = '1' THEN MOVE 0 TO ERR-LINE-COUNT
           00669         ELSE IF ERR-CC = ' ' THEN ADD 1 TO ERR-LINE-COUNT
           00670            ELSE IF ERR-CC = '0' THEN ADD 2 TO ERR-LINE-COUNT.
           00671        IF ERR-LINE-COUNT > LINE-MAX THEN

           00672                PERFORM U220-ERR-HEADER.
           00673      U220-ERR-HEADER.
           00674        MOVE ERR-HEADER-1 TO ERR-LINE.
           00675        MOVE '1' TO ERR-CC.
           00676        PERFORM U200-WRITE-ERR-LINE
           00677        MOVE '0' TO ERR-CC.
           00678        MOVE ERR-HEADER-2 TO ERR-LINE.
           00679        PERFORM U200-WRITE-ERR-LINE.
           00680        MOVE ERR-HEADER-3 TO ERR-LINE.
           00681        PERFORM U200-WRITE-ERR-LINE.
           00682        MOVE SPACES TO ERR-LINE.
           00683        MOVE ' ' TO ERR-CC.
           00684        PERFORM U200-WRITE-ERR-LINE.
           00685      IDMS-ABORT.
           00686        EXIT.
           00687      IDMS-ABORT-EXIT.
DMLC       00688        COPY IDMS IDMS-STATUS.
           00689
****************************************************************
           00690      IDMS-STATUS                       SECTION.
           00691
****************************************************************
           00692      IDMS-STATUS-PARAGRAPH.
           00693          IF DB-STATUS-OK GO TO ISABEX.
           00694          PERFORM IDMS-ABORT.
           00695          DISPLAY '*************************'
           00696              ' ABORTING - ' PROGRAM-NAME
           00697              ', '      ERROR-STATUS
           00698              ', '      ERROR-RECORD
           00699              ' **** RECOVER IDMS ****'
           00700             UPON CONSOLE.
```

```
           00701       DISPLAY 'PROGRAM NAME ------ ' PROGRAM-NAME.
           00702         DISPLAY 'ERROR STATUS ------ ' ERROR-STATUS.
           00703         DISPLAY 'ERROR RECORD ------ ' ERROR-RECORD.
           00704         DISPLAY 'ERROR SET --------- ' ERROR-SET.
           00705         DISPLAY 'ERROR AREA -------- ' ERROR-AREA.
           00706         DISPLAY 'LAST GOOD RECORD -- ' RECORD-NAME.
           00707         DISPLAY 'LAST GOOD AREA ---- ' AREA-NAME.
           00708         MOVE 39  TO SSC-IN01-REQ-CODE.
           00709         MOVE 0   TO SSC-IN01-REQ-RETURN.
           00710        MOVE ' ' TO SSC-STATUS-LABEL.
           00711        PERFORM IDMS-STATUS-LOOP
           00712                UNTIL SSC-IN01-REQ-RETURN > 0.
DMLC0018   00713         ROLLBACK.
           00714          MOVE 18 TO DML-SEQUENCE
           00715         CALL 'IDMS' USING SUBSCHEMA-CTRL
           00716              IDBMSCOM (67).
           00717         CALL 'ABORT'.
           00718         GO TO ISABEX.
           00719     IDMS-STATUS-LOOP.
           00720         CALL 'IDMSIN1' USING IDBMSCOM(41)
           00721                              SSC-IN01-REQ-WK
           00722                              SUBSCHEMA-CTRL
           00723                              IDBMSCOM(1)
           00724                              DML-SEQUENCE
           00725                              SSC-STATUS-LINE.
           00726         IF SSC-IN01-REQ-RETURN GREATER THAN 4
           00727             DISPLAY 'DML SEQUENCE ------ ' DML-SEQUENCE
           00728         ELSE
           00729             DISPLAY SSC-STATUS-LABEL '--- ' SSC-STATUS-VALUE.
           00730     ISABEX. EXIT.

 NO MESSAGES FOR PROGRAM DEPTRPT
```

Sample Batch Program from the COBOL Precompiler

The following listing illustrates the sample batch program after precompilation by the COBOL precompiler. The original code is further expanded and includes the following:

- Line numbers generated by the COBOL compiler
- CA IDMS call statements for the requested DML functions
- Diagnostic messages

  Note: For more information about expanded code generated by the DML compiler, see CA IDMS Call Formats (see page 453).

This listing contains the sample program output from the COBOL compiler with the fully expanded code (including the calls to CA IDMS) generated by the DML compiler.

```
00001     *DMLIST
00002     *NO-ACTIVITY-LOG
00003     *SCHEMA-COMMENTS
00004
00005     IDENTIFICATION DIVISION.
00006
00007       PROGRAM-ID.         DEPTRPT.
00008
00009       AUTHOR.           COMPUTER ASSOCIATES INTERNATIONAL.
00010
00011       DATE-WRITTEN.        APRIL 1995.
00012
00013       REMARKS.            THIS PROGRAM DEMONSTRATES
00014                     CA IDMS DATABASE ACCESS USING
00015                     COBOL DML STATEMENTS. IT READS
00016                     DEPARTMENT ID NUMBERS AND RETRIEVES
00017                     RELATED RECORD OCCURRENCES,
00018                     PRINTING A REPORT THAT INCLUDES
00019                     DEPARTMENT, EMPLOYEE, JOB, AND
00020                     OFFICE INFORMATION.
00021     ****************************************************************
00022     ENVIRONMENT DIVISION.
00023     INPUT-OUTPUT SECTION.
00024     FILE-CONTROL.
00025       SELECT DEPT-FILE-IN      ASSIGN TO INFILE.
00026       SELECT DEPT-FILE-OUT     ASSIGN TO OUTFILE.
00027       SELECT ERR-FILE-OUT      ASSIGN TO ERRFILE.
00028     ****************************************************************
00029     *IDMS-CONTROL SECTION.
00030     *
00031     *PROTOCOL.           MODE IS BATCH DEBUG
00032     *                IDMS-RECORDS MANUAL.
00034     ****************************************************************
00035     DATA DIVISION.
00036
00037     *SCHEMA SECTION.
00038     *
00039     *DB EMPSS01 WITHIN EMPSCHM.
00040
00041     ****************************************************************
00042     FILE SECTION.
00043
00044     FD DEPT-FILE-IN
00045       RECORD CONTAINS 80
00046       BLOCK CONTAINS 80 CHARACTERS
00047       RECORDING MODE IS F
00048       LABEL RECORDS ARE OMITTED.
```

```
00049
00050     01 DEPT-REC-IN.
00051       02 DEPT-ID-IN       PIC 9(4).
00052       02 DEPT-IN-FILLER     PIC X(76).
00053
00054     FD DEPT-FILE-OUT
00055       RECORD CONTAINS 133
00056       BLOCK CONTAINS 133 CHARACTERS
00057       RECORDING MODE IS F
00058       LABEL RECORDS ARE OMITTED.
00059
00060     01 DEPT-REC-OUT.
00061       02 CC           PIC X.
00062       02 PRINT-LINE       PIC X(132).
00063
00064     FD ERR-FILE-OUT
00065       RECORD CONTAINS 133
00066       BLOCK CONTAINS 133 CHARACTERS
00067       RECORDING MODE IS F
00068       LABEL RECORDS ARE OMITTED.
00069
00070     01 ERR-REC-OUT.
00071       02 ERR-CC         PIC X.
00072       02 ERR-LINE        PIC X(132).
00073
00074     ****************************************************************
00075     WORKING-STORAGE SECTION.
00076     01 EOF-SW       PIC X   VALUE 'N'.
00077       88 END-OF-FILE        VALUE 'Y'.
00078     01 LINE-COUNT    PIC 99   VALUE 0.
00079     01 ERR-LINE-COUNT  PIC 99   VALUE 0.
00080     01 LINE-MAX     PIC 99   VALUE 50.
00081     ****************************************************************
00082     01 DEPT-HEADER.
00083       05 FILLER    PIC X(30)  VALUE SPACES.
00084       05 FILLER    PIC X(13)  VALUE 'DEPARTMENT ID'.
00085       05 FILLER    PIC X(10)  VALUE SPACES.
00086       05 FILLER    PIC X(9)   VALUE 'DEPT NAME'.
00087       05 FILLER    PIC X(70)  VALUE SPACES.
00088     01 DEPT-DETAIL-LINE.
00089       05 FILLER    PIC X(33)  VALUE SPACES.
```

```
00090       05 DEPT-ID-OUT  PIC X(4).
00091       05 FILLER    PIC X(16)  VALUE SPACES.
00092       05 DEPT-NAME-OUT PIC X(45).
00093       05 FILLER    PIC X(34)  VALUE SPACES.
00094     01 EMP-HEADER.
00095       05 FILLER    PIC X(5)   VALUE SPACES.
00096       05 FILLER    PIC X(6)   VALUE 'EMP ID'.
00097       05 FILLER    PIC X(2)   VALUE SPACES.
00098       05 FILLER    PIC X(9)   VALUE 'LAST NAME'.
00099       05 FILLER    PIC X(8)   VALUE SPACES.
00100       05 FILLER    PIC X(10)  VALUE 'FIRST NAME'.
00101       05 FILLER    PIC X(3)   VALUE SPACES.
00102       05 FILLER    PIC X(10)  VALUE 'START DATE'.
00103       05 FILLER    PIC X(2)   VALUE SPACES.
00104       05 FILLER    PIC X(9)   VALUE 'JOB TITLE'.
00105       05 FILLER    PIC X(13)  VALUE SPACES.
00106       05 FILLER    PIC X(14)  VALUE 'OFFICE ADDRESS'.
00107       05 FILLER    PIC X(42)  VALUE SPACES.
00108     01 EMP-DETAIL-LINE.
00109       05 FILLER    PIC X(5)   VALUE SPACES.
00110       05 ID-OUT    PIC X(4).
00111       05 FILLER    PIC X(4)   VALUE SPACES.
00112       05 LAST-OUT   PIC X(15).
00113       05 FILLER    PIC X(2)   VALUE SPACES.
00114       05 FIRST-OUT   PIC X(10).
00115       05 FILLER    PIC X(3)   VALUE SPACES.
00116       05 SD-OUT.
00117         10 SD-MM   PIC XX.
00118         10 FILLER   PIC X    VALUE '/'.
00119         10 SD-DD   PIC XX.
00120         10 FILLER   PIC X    VALUE '/'.
00121         10 SD-YY   PIC XX.
00122       05 FILLER    PIC X(4)   VALUE SPACES.
00123       05 TITLE-OUT   PIC X(20).
00124       05 FILLER    PIC X(2)   VALUE SPACES.
00125       05 OFF-ADDRESS-OUT.
00126         10 STREET-OUT PIC X(20).
00127         10 FILLER   PIC XX    VALUE SPACES.
00128         10 CITY-OUT  PIC X(15).
00129         10 FILLER   PIC XX    VALUE SPACES.
00130         10 STATE-OUT PIC XX.
00131         10 FILLER   PIC XX    VALUE SPACES.
00132         10 ZIP-OUT  PIC X(5).
00133       05 FILLER    PIC X(8)   VALUE SPACES.
00134     01 ERR-HEADER-1.
00135       05 FILLER    PIC X(40)  VALUE SPACES.
00136       05 FILLER    PIC X(12)  VALUE 'ERROR REPORT'.
00137       05 FILLER    PIC X(80)  VALUE SPACES.
```

```
00138     01 ERR-HEADER-2.
00139       05 FILLER    PIC X(10)  VALUE SPACES.
00140       05 FILLER    PIC X(4)   VALUE '*** '.
00141       05 FILLER    PIC X(51)  VALUE
00142         'THIS REPORT LISTS EMPTY AND NONEXISTENT DEPARTMENTS'.
00143       05 FILLER    PIC X(4)   VALUE ' ***'.
00144       05 FILLER    PIC X(63)  VALUE SPACES.
00145     01 ERR-HEADER-3.
00146       05 FILLER    PIC X(20)  VALUE SPACES.
00147       05 FILLER    PIC X(7)   VALUE 'DEPT ID'.
00148       05 FILLER    PIC X(9)   VALUE SPACES.
00149       05 FILLER    PIC X(7)   VALUE 'MESSAGE'.
00150       05 FILLER    PIC X(89)  VALUE SPACES.
00151     01 ERR-DETAIL-LINE.
00152       05 FILLER    PIC X(20)  VALUE SPACES.
00153       05 ERR-ID-OUT  PIC X(4).
00154       05 FILLER    PIC X(12)  VALUE SPACES.
00155       05 ERR-MESS-OUT PIC X(15).
00156       05 FILLER    PIC X(79)  VALUE SPACES.
00157     ************************************************************
00158     01 MESSAGES.
00159       05 NO-JOB-MESSAGE.
00160         10 FILLER     PIC X(20) VALUE 'NO JOB ASSIGNED'.
00161       05 NO-OFFICE-MESSAGE.
00162         10 FILLER     PIC X(20)
00163                  VALUE 'NO OFFICE ASSIGNED'.
00164       05 NO-DEPT-MESSAGE.
00165         10 FILLER     PIC X(15) VALUE 'DOES NOT EXIST'.
00166       05 NO-EMP-MESSAGE.
00167         10 FILLER     PIC X(15) VALUE 'IS EMPTY'.
00168       05 NO-INPUT-MESSAGE.
00169         10 FILLER     PIC XX   VALUE SPACES.
00170         10 FILLER     PIC X(11) VALUE '========>> '.
00171         10 FILLER     PIC X(8)  VALUE 'NO INPUT'.
00172         10 FILLER     PIC X(11) VALUE ' <<========'.
00173         10 FILLER     PIC X(100) VALUE SPACES.
```

```
00174
00175     *01 COPY IDMS SUBSCHEMA-CTRL.
00176     01 SUBSCHEMA-CTRL.
00177        03 PROGRAM-NAME      PIC X(8)
00178                    VALUE SPACES .
00179        03 ERROR-STATUS      PIC X(4)
00180                    VALUE '1400' .
00181                  88 DB-STATUS-OK
00182                    VALUE '0000' .
00183                  88 ANY-STATUS
00184                    VALUE '  ' THRU '9999' .
00185                  88 ANY-ERROR-STATUS
00186                    VALUE '0001' THRU '9999' .
00187                  88 DB-END-OF-SET
00188                    VALUE '0307' .
00189                  88 DB-REC-NOT-FOUND
00190                    VALUE '0326' .
00191        03 DBKEY          PIC S9(8) COMP SYNC.
00192        03 RECORD-NAME      PIC X(16)
00193                    VALUE SPACES .
00194        03 RRECORD-NAME      REDEFINES RECORD-NAME.
00195         05 SSC-NODN       PIC X(8).
00196         05 SSC-DBN       PIC X(8).
00197        03 AREA-NAME       PIC X(16)
00198                    VALUE SPACES .
00199        03 AREA-RNAME       REDEFINES AREA-NAME.
00200         05 SSC-DNO       PIC X(8).
00201         05 SSC-DNA       PIC X(8).
00202        03 ERROR-SET       PIC X(16)
00203                    VALUE SPACES .
00204        03 ERROR-RECORD      PIC X(16)
00205                    VALUE SPACES .
00206        03 ERROR-AREA       PIC X(16)
00207                    VALUE SPACES .
00208        03 IDBMSCOM-AREA     PIC X(100)
00209                    VALUE LOW-VALUE .
00210        03 IDBMSCOM        REDEFINES IDBMSCOM-AREA
00211                    PIC X
00212                    OCCURS 100.
00213        03 RIDBMSCOM       REDEFINES IDBMSCOM-AREA.
00214         05 DB-SUB-ADDR     PIC X(4).
00215         05 FILLER        PIC X(96).
00216        03 R1DBMSCOM       REDEFINES IDBMSCOM-AREA.
00217         05 PAGE-INFO.
00218          07 PAGE-INFO-GROUP  PIC S9(4) COMP.
```

```
00219          07 PAGE-INFO-DBK-FORMAT
00220                     PIC 9(4) COMP.
00221          05  SSC-IDMS-STATUS-WRK.
00222           07  SSC-IN01-REQ-WK.
00223             09  SSC-IN01-REQ-CODE
00224                                  PIC S9(8) COMP.
00225             09  SSC-IN01-REQ-RETURN
00226                                  PIC S9(8) COMP.
00227           07  SSC-STATUS-LINE.
00228             09  SSC-STATUS-LABEL PIC X(16).
00229             09  SSC-STATUS-VALUE PIC X(12).
00300         05 FILLER        PIC X(60).
00301        03 DIRECT-DBKEY      PIC S9(8) COMP SYNC.
00302        03 DIRECT-DBK       REDEFINES DIRECT-DBKEY
00303                     PIC S9(8) COMP SYNC.
00234        03 DATABASE-STATUS.
00235         05 DBSTATMENT-CODE   PIC X(2).
00236         05 DBSTATUS-CODE    PIC X(5).
00237        03 FILLER         PIC X.
00238        03 RECORD-OCCUR      PIC S9(8) COMP SYNC.
00239       03 DML-SEQUENCE      PIC S9(8) COMP SYNC.
00240
00241     *01 COPY IDMS SUBSCHEMA-SSNAME.
00242     01 SUBSCHEMA-SSNAME      PIC X(8)
00243                     VALUE 'EMPSS01 ' .
00244
00245     *01 COPY IDMS SUBSCHEMA-RECNAMES.
00246     01 SUBSCHEMA-RECNAMES.
00247        03 SR460         PIC X(16)
00248                     VALUE 'STRUCTURE    ' .
00249        03 SR455         PIC X(16)
00250                     VALUE 'SKILL      ' .
00251        03 SR450         PIC X(16)
00252                     VALUE 'OFFICE     ' .
00253        03 SR445         PIC X(16)
00254                     VALUE 'NON-HOSP-CLAIM ' .
00255        03 SR440         PIC X(16)
00256                     VALUE 'JOB       ' .
00257        03 SR435         PIC X(16)
00258                     VALUE 'INSURANCE-PLAN ' .
00259        03 SR430         PIC X(16)
00260                     VALUE 'HOSPITAL-CLAIM ' .
00261        03 SR425         PIC X(16)
00262                     VALUE 'EXPERTISE    ' .
00263        03 SR420         PIC X(16)
00264                     VALUE 'EMPOSITION   ' .
00265        03 SR415         PIC X(16)
00266                     VALUE 'EMPLOYEE    ' .
```

```
00267       03 SR410         PIC X(16)
00268                    VALUE 'DEPARTMENT   ' .
00269       03 SR405         PIC X(16)
00270                    VALUE 'DENTAL-CLAIM  ' .
00271       03 SR400         PIC X(16)
00272                    VALUE 'COVERAGE    ' .
00273
00274    *01 COPY IDMS SUBSCHEMA-SETNAMES.
00275    01 SUBSCHEMA-SETNAMES.
00276       03 COVERAGE-CLAIMS    PIC X(16)
00277                    VALUE 'COVERAGE-CLAIMS ' .
00278       03 DEPT-EMPLOYEE     PIC X(16)
00279                    VALUE 'DEPT-EMPLOYEE  ' .
00280       03 EMP-COVERAGE      PIC X(16)
00281                    VALUE 'EMP-COVERAGE  ' .
00282       03 EMP-EXPERTISE     PIC X(16)
00283                    VALUE 'EMP-EXPERTISE  ' .
00284       03 EMP-NAME-NDX      PIC X(16)
00285                    VALUE 'EMP-NAME-NDX  ' .
00286       03 EMP-EMPOSITION     PIC X(16)
00287                    VALUE 'EMP-EMPOSITION ' .
00288       03 JOB-EMPOSITION     PIC X(16)
00289                    VALUE 'JOB-EMPOSITION ' .
00290       03 JOB-TITLE-NDX     PIC X(16)
00291                    VALUE 'JOB-TITLE-NDX  ' .
00292       03 MANAGES        PIC X(16)
00293                    VALUE 'MANAGES     ' .
00294       03 OFFICE-EMPLOYEE    PIC X(16)
00295                    VALUE 'OFFICE-EMPLOYEE ' .
00296       03 REPORTS-TO       PIC X(16)
00297                    VALUE 'REPORTS-TO   ' .
00298       03 SKILL-EXPERTISE    PIC X(16)
00299                    VALUE 'SKILL-EXPERTISE ' .
00300       03 SKILL-NAME-NDX     PIC X(16)
00301                    VALUE 'SKILL-NAME-NDX ' .
00302       03 CALC          PIC X(16)
00303                    VALUE 'CALC      ' .
00304
00305    *01 COPY IDMS RECORD EMPLOYEE.
00306    01 EMPLOYEE.
00307      02 EMP-ID-0415       PIC 9(4).
00308      02 EMP-NAME-0415.
```

```
00309        03 EMP-FIRST-NAME-0415  PIC X(10).
00310        03 EMP-LAST-NAME-0415   PIC X(15).
00311       02 EMP-ADDRESS-0415.
00312        03 EMP-STREET-0415    PIC X(20).
00313        03 EMP-CITY-0415     PIC X(15).
00314        03 EMP-STATE-0415     PIC X(2).
00315        03 EMP-ZIP-0415.
00316        04 EMP-ZIP-FIRST-FIVE-0415
00317                    PIC X(5).
00318        04 EMP-ZIP-LAST-FOUR-0415
00319                    PIC X(4).
00320       02 EMP-PHONE-0415     PIC 9(10).
00321       02 STATUS-0415       PIC X(2).
00322                  88 ACTIVE-0415
00323                    VALUE '01' .
00324                  88 ST-DISABIL-0415
00325                    VALUE '02' .
00326                  88 LT-DISABIL-0415
00327                    VALUE '03' .
00328                  88 LEAVE-OF-ABSENCE-0415
00329                    VALUE '04' .
00330                  88 TERMINATED-0415
00331                    VALUE '05' .
00332       02 SS-NUMBER-0415     PIC 9(9).
00333       02 START-DATE-0415.
00334        03 START-YEAR-0415    PIC 9(4).
00335        03 START-MONTH-0415    PIC 9(2).
00336        03 START-DAY-0415     PIC 9(2).
00337       02 TERMINATION-DATE-0415.
00338        03 TERMINATION-YEAR-0415 PIC 9(4).
00339        03 TERMINATION-MONTH-0415 PIC 9(2).
00340        03 TERMINATION-DAY-0415  PIC 9(2).
00341       02 BIRTH-DATE-0415.
00342        03 BIRTH-YEAR-0415    PIC 9(4).
00343        03 BIRTH-MONTH-0415    PIC 9(2).
00344        03 BIRTH-DAY-0415     PIC 9(2).
```

```
00345
00346     *01 COPY IDMS RECORD DEPARTMENT.
00347     01 DEPARTMENT.
00348       02 DEPT-ID-0410      PIC 9(4).
00349       02 DEPT-NAME-0410     PIC X(45).
00350       02 DEPT-HEAD-ID-0410    PIC 9(4).
00351       02 FILLER         PIC XXX.
00352
00353     *01 COPY IDMS RECORD JOB.
00354     01 JOB.
00355       02 JOB-ID-0440       PIC 9(4).
00356       02 TITLE-0440       PIC X(20).
00357       02 DESCRIPTION-0440.
00358        03 DESCRIPTION-LINE-0440 PIC X(60)
00359                    OCCURS 2.
00360       02 REQUIREMENTS-0440.
00361        03 REQUIREMENT-LINE-0440 PIC X(60)
00362                    OCCURS 2.
00363       02 MINIMUM-SALARY-0440   PIC S9(6)V99.
00364       02 MAXIMUM-SALARY-0440   PIC S9(6)V99.
00365       02 SALARY-GRADES-0440   PIC 9(2)
00366                    OCCURS 4.
00367       02 NUMBER-OF-POSITIONS-0440
00368                    PIC 9(3).
00369       02 NUMBER-OPEN-0440    PIC 9(3).
00370       02 FILLER         PIC XX.
00371
00372     *01 COPY IDMS RECORD EMPOSITION.
00373     01 EMPOSITION.
00374       02 START-DATE-0420.
00375        03 START-YEAR-0420    PIC 9(4).
00376        03 START-MONTH-0420    PIC 9(2).
00377        03 START-DAY-0420     PIC 9(2).
00378       02 FINISH-DATE-0420.
00379        03 FINISH-YEAR-0420    PIC 9(4).
00380        03 FINISH-MONTH-0420   PIC 9(2).
00381        03 FINISH-DAY-0420    PIC 9(2).
00382       02 SALARY-GRADE-0420    PIC 9(2).
00383       02 SALARY-AMOUNT-0420   PIC S9(7)V99 COMP-3.
00384       02 BONUS-PERCENT-0420   PIC SV999 COMP-3.
```

```
00385       02 COMMISSION-PERCENT-0420 PIC SV999 COMP-3.
00386       02 OVERTIME-RATE-0420   PIC S9V99 COMP-3.
00387       02 FILLER         PIC XXX.
00388
00389     *01 COPY IDMS RECORD OFFICE.
00390     01 OFFICE.
00391       02 OFFICE-CODE-0450    PIC X(3).
00392       02 OFFICE-ADDRESS-0450.
00393        03 OFFICE-STREET-0450   PIC X(20).
00394        03 OFFICE-CITY-0450    PIC X(15).
00395        03 OFFICE-STATE-0450   PIC X(2).
00396        03 OFFICE-ZIP-0450.
00397        04 OFFICE-ZIP-FIRST-FIVE-0450
00398                    PIC X(5).
00399        04 OFFICE-ZIP-LAST-FOUR-0450
00400                    PIC X(4).
00401       02 OFFICE-PHONE-0450    PIC 9(7)
00402                    OCCURS 3.
00403       02 OFFICE-AREA-CODE-0450  PIC X(3).
00404       02 SPEED-DIAL-0450     PIC X(3).
00405       02 FILLER         PIC X(4).
00406     PROCEDURE DIVISION.
00407
00408     *  ********************************************************
00409     *  * PROCEDURE DIVISION GENERAL STRATEGY:         *
00410     *  *   1) READ DEPT-ID-IN, WHICH CONTAINS THE      *
00411     *  *     DEPT-ID NUMBER                *
00412     *  *   2) ACCESS THE DATABASE USING THE DEPT-ID NUMBER *
00413     *  *     WITH AN OBTAIN CALC ON THE DEPARTMENT RECORD *
00414     *  *   3) ACCESS ALL EMPLOYEES IN THE DEPT-EMPLOYEE SET *
00415     *  *     AND RETRIEVE RELATED JOB AND OFFICE DATA   *
00416     *  *   4) PRINT A REPORT FOR EACH DEPARTMENT      *
00417     *  *   5) PRINT AN ERROR REPORT FOR EMPTY DEPARTMENTS  *
00418     *  *     AND NONEXISTENT DEPARTMENTS (NO MATCHING   *
00419     *  *     DEPT-ID)                  *
```

```
00420     *  ********************************************************
00421
00422     MAIN-LINE.
00423       PERFORM INIT-FILES.
00424       IF END-OF-FILE
00425         PERFORM EMPTY-INPUT-PROCESSING
00426       ELSE
00427         PERFORM INIT-BIND-READY
00428         PERFORM U220-ERR-HEADER
00429         PERFORM DEPT-PROCESSING THRU DEPT-PROCESSING-EXIT
00430                 UNTIL END-OF-FILE.
00431       PERFORM END-PROCESSING.
00432       GOBACK.
00433
00434     INIT-BIND-READY.
00435     ****************************************************************
00436     * THE BIND STATEMENTS ARE PERFORMED INDIVIDUALLY (RATHER   *
00437     * THAN BY USING A COPY IDMS SUBSCHEMA-BINDS) IN ORDER TO   *
00438     * CHECK EACH ERROR-STATUS BY PERFORMING THE IDMS-STATUS    *
00439     * ROUTINE.                          *
00440     ****************************************************************
00441       MOVE 'DEPTRPT' TO PROGRAM-NAME.
00442     *  BIND RUN-UNIT.                          DMLC0001
00443          MOVE 1 TO DML-SEQUENCE
00444          CALL 'IDMS' USING SUBSCHEMA-CTRL
00445              IDBMSCOM (59)
00446              SUBSCHEMA-CTRL
00447              SUBSCHEMA-SSNAME.
00448       PERFORM IDMS-STATUS.
00449     *  BIND EMPLOYEE.                          DMLC0002
00450          MOVE 2 TO DML-SEQUENCE
00451          CALL 'IDMS' USING SUBSCHEMA-CTRL
00452              IDBMSCOM (48)
00453              SR415
00454              EMPLOYEE.
00455       PERFORM IDMS-STATUS.
00456     *  BIND DEPARTMENT.                         DMLC0003
00457          MOVE 3 TO DML-SEQUENCE
00458          CALL 'IDMS' USING SUBSCHEMA-CTRL
00459              IDBMSCOM (48)
00460              SR410
00461              DEPARTMENT.
00462       PERFORM IDMS-STATUS.
00463     *  BIND JOB.                           DMLC0004
00464          MOVE 4 TO DML-SEQUENCE
00465          CALL 'IDMS' USING SUBSCHEMA-CTRL
00466              IDBMSCOM (48)
```

```
00467            SR440
00468            JOB.
00469      PERFORM IDMS-STATUS.
00470     *  BIND EMPOSITION.                        DMLC0005
00471          MOVE 5 TO DML-SEQUENCE
00472          CALL 'IDMS' USING SUBSCHEMA-CTRL
00473              IDBMSCOM (48)
00474              SR420
00475              EMPOSITION.
00476      PERFORM IDMS-STATUS.
00477     *  BIND OFFICE.                           DMLC0006
00478          MOVE 6 TO DML-SEQUENCE
00479          CALL 'IDMS' USING SUBSCHEMA-CTRL
00480              IDBMSCOM (48)
00481              SR450
00482              OFFICE.
00483      PERFORM IDMS-STATUS.
00484     *  READY.                               DMLC0007
00485          MOVE 7 TO DML-SEQUENCE
00486          CALL 'IDMS' USING SUBSCHEMA-CTRL
00487              IDBMSCOM (37).
00488      PERFORM IDMS-STATUS.
00489
00490     INIT-FILES.
00491      OPEN INPUT DEPT-FILE-IN.
00492      OPEN OUTPUT DEPT-FILE-OUT.
00493      OPEN OUTPUT ERR-FILE-OUT.
00494      MOVE SPACES TO PRINT-LINE.
00495      MOVE SPACES TO ERR-LINE.
00496      READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.
00497
00498     EMPTY-INPUT-PROCESSING.
00499      MOVE NO-INPUT-MESSAGE TO PRINT-LINE.
00500       MOVE '1' TO CC.
00501      PERFORM U000-WRITE-LINE.
00502
00503     ***************************************************************
00504     * THIS PARAGRAPH ACCESSES THE DATABASE USING THE DEPT-ID-0415 *
00505     * CALCKEY VALUE.                        *
00506     ***************************************************************
00507     DEPT-PROCESSING.
00508      MOVE DEPT-ID-IN TO DEPT-ID-0410.
00509     *  OBTAIN CALC DEPARTMENT.                   DMLC0008
00510          MOVE 8 TO DML-SEQUENCE
00511          CALL 'IDMS' USING SUBSCHEMA-CTRL
00512              IDBMSCOM (32)
00513              SR410
00514              IDBMSCOM (43).
```

```
00515       IF DB-REC-NOT-FOUND THEN
00516         PERFORM NO-DEPT-PROCESSING
00517       ELSE
00518         PERFORM IDMS-STATUS
00519     *    IF DEPT-EMPLOYEE IS NOT EMPTY              DMLC0009
00520          MOVE 9 TO DML-SEQUENCE
00521          CALL 'IDMS' USING SUBSCHEMA-CTRL
00522              IDBMSCOM (65)
00523              DEPT-EMPLOYEE;
00524          IF ERROR-STATUS EQUAL TO '1601'
00525                       THEN
00526           PERFORM U020-VALID-HEADER
00527           MOVE DEPT-ID-0410 TO DEPT-ID-OUT
00528           MOVE DEPT-NAME-0410 TO DEPT-NAME-OUT
00529           MOVE DEPT-DETAIL-LINE TO PRINT-LINE
00530           PERFORM U000-WRITE-LINE
00531           PERFORM U030-EMP-HEADERS
00532           PERFORM SET-WALK THRU SET-WALK-EXIT
00533                  UNTIL DB-END-OF-SET
00534         ELSE
00535            PERFORM EMPTY-SET.
00536       READ DEPT-FILE-IN AT END MOVE 'Y' TO EOF-SW.
00537     DEPT-PROCESSING-EXIT.
00538       EXIT.
00539
00540     ****************************************************************
00541     * THIS PARAGRAPH RETRIEVES EMPLOYEE, JOB, AND OFFICE DATA   *
00542     * FOR EACH EMPLOYEE IN THE DEPT-EMPLOYEE SET.         *
00543     ****************************************************************
00544     SET-WALK.
00545     *  OBTAIN NEXT EMPLOYEE WITHIN DEPT-EMPLOYEE.          DMLC0010
00546          MOVE 10 TO DML-SEQUENCE
00547          CALL 'IDMS' USING SUBSCHEMA-CTRL
00548              IDBMSCOM (10)
00549              SR415
00550              DEPT-EMPLOYEE
00551              IDBMSCOM (43).
00552       IF DB-END-OF-SET
00553         GO TO SET-WALK-EXIT
00554       ELSE
00555         PERFORM IDMS-STATUS.
00556       MOVE EMP-ID-0415 TO ID-OUT.
00557       MOVE EMP-LAST-NAME-0415 TO LAST-OUT.
00558       MOVE EMP-FIRST-NAME-0415 TO FIRST-OUT.
00559       MOVE START-YEAR-0415 TO SD-YY.
00560       MOVE START-MONTH-0415 TO SD-MM.
00561       MOVE START-DAY-0415 TO SD-DD.
00562     *  IF EMP-EMPOSITION IS EMPTY                  DMLC0011
```

```
00563          MOVE 11 TO DML-SEQUENCE
00564          CALL 'IDMS' USING SUBSCHEMA-CTRL
00565              IDBMSCOM (64)
00566              EMP-EMPOSITION;
00567          IF ERROR-STATUS EQUAL TO '0000'
00568            MOVE NO-JOB-MESSAGE TO TITLE-OUT
00569        ELSE
00570      *     FIND FIRST WITHIN EMP-EMPOSITION             DMLC0012
00571          MOVE 12 TO DML-SEQUENCE
00572          CALL 'IDMS' USING SUBSCHEMA-CTRL
00573              IDBMSCOM (20)
00574              EMP-EMPOSITION;
00575          PERFORM IDMS-STATUS
00576      *     IF NOT JOB-EMPOSITION MEMBER                DMLC0013
00577          MOVE 13 TO DML-SEQUENCE
00578          CALL 'IDMS' USING SUBSCHEMA-CTRL
00579              IDBMSCOM (62)
00580              JOB-EMPOSITION;
00581          IF ERROR-STATUS EQUAL TO '1601'
00582           MOVE NO-JOB-MESSAGE TO TITLE-OUT
00583          ELSE
00584      *       OBTAIN OWNER WITHIN JOB-EMPOSITION          DMLC0014
00585          MOVE 14 TO DML-SEQUENCE
00586          CALL 'IDMS' USING SUBSCHEMA-CTRL
00587              IDBMSCOM (31)
00588              JOB-EMPOSITION
00589              IDBMSCOM (43);
00590           PERFORM IDMS-STATUS
00591           MOVE TITLE-0440 TO TITLE-OUT.
00592      *  IF OFFICE-EMPLOYEE IS EMPTY                   DMLC0015
00593          MOVE 15 TO DML-SEQUENCE
00594          CALL 'IDMS' USING SUBSCHEMA-CTRL
00595              IDBMSCOM (64)
00596              OFFICE-EMPLOYEE;
00597          IF ERROR-STATUS EQUAL TO '0000'
00598          MOVE NO-OFFICE-MESSAGE TO STREET-OUT
00599          MOVE SPACES TO CITY-OUT
00600          MOVE SPACES TO STATE-OUT
00601          MOVE SPACES TO ZIP-OUT
00602        ELSE
00603      *     OBTAIN OWNER WITHIN OFFICE-EMPLOYEE          DMLC0016
00604          MOVE 16 TO DML-SEQUENCE
00605          CALL 'IDMS' USING SUBSCHEMA-CTRL
00609              IDBMSCOM (31)
00607              OFFICE-EMPLOYEE
00608              IDBMSCOM (43);
00609          PERFORM IDMS-STATUS
00610          MOVE OFFICE-STREET-0450 TO STREET-OUT
```

```
00611         MOVE OFFICE-CITY-0450 TO CITY-OUT
00612         MOVE OFFICE-STATE-0450 TO STATE-OUT
00613         MOVE OFFICE-ZIP-FIRST-FIVE-0450 TO ZIP-OUT
00614         MOVE EMP-DETAIL-LINE TO PRINT-LINE.
00615       PERFORM U000-WRITE-LINE.
00616     SET-WALK-EXIT.
00617       EXIT.
00618
00619     END-PROCESSING.
00620     *  FINISH.                              DMLC0017
00621          MOVE 17 TO DML-SEQUENCE
00622          CALL 'IDMS' USING SUBSCHEMA-CTRL
00623              IDBMSCOM (2).
00624       PERFORM IDMS-STATUS.
00625       CLOSE DEPT-FILE-OUT.
00626       CLOSE ERR-FILE-OUT.
00627       CLOSE DEPT-FILE-IN.
00628
00629     EMPTY-SET.
00630       MOVE SPACES TO ERR-LINE.
00631       MOVE DEPT-ID-0410 TO ERR-ID-OUT.
00632       MOVE NO-EMP-MESSAGE TO ERR-MESS-OUT.
00633       MOVE ERR-DETAIL-LINE TO ERR-LINE.
00634       PERFORM U200-WRITE-ERR-LINE.
00635
00636     NO-DEPT-PROCESSING.
00637       MOVE DEPT-ID-IN TO ERR-ID-OUT.
00638       MOVE NO-DEPT-MESSAGE TO ERR-MESS-OUT.
00639       MOVE ERR-DETAIL-LINE TO ERR-LINE.
00640       PERFORM U200-WRITE-ERR-LINE.
00641
00642     U000-WRITE-LINE.
00643       WRITE DEPT-REC-OUT AFTER POSITIONING CC.
00644       IF CC = '1' THEN MOVE 0 TO LINE-COUNT
00645        ELSE IF CC = ' ' THEN ADD 1 TO LINE-COUNT
00646          ELSE IF CC = '0' THEN ADD 2 TO LINE-COUNT.
00647       IF LINE-COUNT > LINE-MAX
00648            THEN PERFORM U010-NEW-PAGE-ROUTINE.
00649     U010-NEW-PAGE-ROUTINE.
00650       PERFORM U020-VALID-HEADER.
```

```
00651       MOVE DEPT-DETAIL-LINE TO PRINT-LINE.
00652       PERFORM U000-WRITE-LINE.
00653       PERFORM U030-EMP-HEADERS.
00654     U020-VALID-HEADER.
00655       MOVE DEPT-HEADER TO PRINT-LINE.
00656       MOVE '1' TO CC.
00657       PERFORM U000-WRITE-LINE
00658       MOVE ' ' TO CC.
00659     U030-EMP-HEADERS.
00660       MOVE '0' TO CC.
00661       MOVE EMP-HEADER TO PRINT-LINE.
00662       PERFORM U000-WRITE-LINE.
00663       MOVE SPACES TO PRINT-LINE.
00664       MOVE ' ' TO CC.
00665       PERFORM U000-WRITE-LINE.
00666
00667     U200-WRITE-ERR-LINE.
00668       WRITE ERR-REC-OUT AFTER POSITIONING ERR-CC.
00669       IF ERR-CC = '1' THEN MOVE 0 TO ERR-LINE-COUNT
00670        ELSE IF ERR-CC = ' ' THEN ADD 1 TO ERR-LINE-COUNT
00671          ELSE IF ERR-CC = '0' THEN ADD 2 TO ERR-LINE-COUNT.
00672       IF ERR-LINE-COUNT > LINE-MAX THEN
00673               PERFORM U220-ERR-HEADER.
00674     U220-ERR-HEADER.
00675       MOVE ERR-HEADER-1 TO ERR-LINE.
00676       MOVE '1' TO ERR-CC.
00677       PERFORM U200-WRITE-ERR-LINE
00678       MOVE '0' TO ERR-CC.
00679       MOVE ERR-HEADER-2 TO ERR-LINE.
00680       PERFORM U200-WRITE-ERR-LINE.
00681       MOVE ERR-HEADER-3 TO ERR-LINE.
00682       PERFORM U200-WRITE-ERR-LINE.
00683       MOVE SPACES TO ERR-LINE.
00684       MOVE ' ' TO ERR-CC.
00685       PERFORM U200-WRITE-ERR-LINE.
00686     IDMS-ABORT.
00687       EXIT.
00688     IDMS-ABORT-EXIT.
00689     *  COPY IDMS IDMS-STATUS.
00690     ****************************************************************
```

```
00691     IDMS-STATUS                         SECTION.
00692     ****************************************************************
00693     IDMS-STATUS-PARAGRAPH.
00694         IF DB-STATUS-OK GO TO ISABEX.
00695         PERFORM IDMS-ABORT.
00696         DISPLAY '*************************'
00697              ' ABORTING - ' PROGRAM-NAME
00698              ', '      ERROR-STATUS
00699              ', '      ERROR-RECORD
00700              ' **** RECOVER IDMS ****'
00701             UPON CONSOLE.
00702          DISPLAY 'PROGRAM NAME ------ ' PROGRAM-NAME.
00703          DISPLAY 'ERROR STATUS ------ ' ERROR-STATUS.
00704          DISPLAY 'ERROR RECORD ------ ' ERROR-RECORD.
00705          DISPLAY 'ERROR SET --------- ' ERROR-SET.
00706          DISPLAY 'ERROR AREA -------- ' ERROR-AREA.
00707          DISPLAY 'LAST GOOD RECORD -- ' RECORD-NAME.
00708          DISPLAY 'LAST GOOD AREA ---- ' AREA-NAME.
00709          MOVE 39  TO SSC-IN01-REQ-CODE.
00710          MOVE 0   TO SSC-IN01-REQ-RETURN.
00711          MOVE ' ' TO SSC-STATUS-LABEL.
00712          PERFORM IDMS-STATUS-LOOP
00713                  UNTIL SSC-IN01-REQ-RETURN > 0.
00714     *    ROLLBACK.                          DMLC0018
00715          MOVE 18 TO DML-SEQUENCE
00716          CALL 'IDMS' USING SUBSCHEMA-CTRL
00717              IDBMSCOM (67).
00718          CALL 'ABORT'.
00719          GO TO ISABEX.
00720     IDMS-STATUS-LOOP.
00721          CALL 'IDMSIN1' USING IDBMSCOM(41)
00722                               SSC-IN01-REQ-WK
00723                               SUBSCHEMA-CTRL
00724                               IDBMSCOM(1)
00725                               DML-SEQUENCE
00726                               SSC-STATUS-LINE.
00727          IF SSC-IN01-REQ-RETURN GREATER THAN 4
00728              DISPLAY 'DML SEQUENCE ------ ' DML-SEQUENCE
00729          ELSE
00730              DISPLAY SSC-STATUS-LABEL '--- ' SSC-STATUS-VALUE.
00731     ISABEX. EXIT.
```

Appendix C: Sample Online Program

This appendix contains a sample CA IDMS online application that illustrates the structure of CA IDMS programs that accept data from a terminal operator and retrieve information from the database. The application program highlights the following CA IDMS features:

- Mapping mode input and output
- Automatic editing and error handling
- Pseudo-conversational transactions
- LRF DML statements

The application's components, runtime requirements, and DML code are described below.

This section contains the following topics:

Application Components

The application comprises a program, two tasks, a map, and a subschema:

- **Program**—The EMPDISP program either performs a MAP OUT to start a session or performs a MAP IN, error checking, database access, and a MAP OUT.
- **Tasks**—The task codes TSK01 and TSK02 affect the program flow of control:

  TSK01 causes the program to perform the INITIAL-MAPOUT portion of the program, mapping out the empty screen with an initial input message.

  TSK02 causes the program to perform the GET-EMP portion of the program, mapping in the data, checking the AID byte, performing the error checking and database access portion of the program, and mapping out either an error message or employee data.
- **Map**—The application uses a map named EMPMAPLR to communicate with the terminal operator. The EMPMAPLR map is illustrated below. Its map definition specifies:

  Eight literal fields including the title *** EMPLOYEE INFORMATION SCREEN ***.

  Ten variable data fields, to contain: employee ID, last name, first name, job title, start date, department name, and office address (street, city, state, and zip code). All data is contained in the EMP-JOB-LR logical record.

Automatic editing for the employee ID field specifies that the field is in error if the ID entered by the terminal operator does not comply with the field's external picture (PIC 9(4)).

Messages are output in the $MESSAGE field.

- **Subschema**—The application uses the EMPSS09 subschema, which specifies a usage mode of LR. The program uses LRF DML statements to retrieve the EMP-JOB-LR logical record.

```
          *** EMPLOYEE INFORMATION SCREEN ***

         EMPLOYEE ID:
         LAST NAME :
         FIRST NAME:

    JOB TITLE:                  START DATE:

      DEPARTMENT NAME:
           OFFICE:
              :
              :




    ENTER AN EMP ID AND PRESS ENTER ** CLEAR TO EXIT
```

Application Runtime Requirements

The following requirements must be met to execute the sample online application under CA IDMS:

- Define and generate the EMPMAPLR map.
- Compile and link edit the EMPDISP program into a load library that is identified to CA IDMS.
- Define the EMPDISP program to the CA IDMS system either by submitting PROGRAM statements to the system generation compiler or by using the DCMT VARY DYNAMIC PROGRAM command at runtime.
- Define the EMPMAPLR map and the EMPSS09 subschema to the CA IDMS system by submitting PROGRAM statements to the system generation compiler. Maps and subschemas are defined automatically at system startup if null program definition elements (PDEs) have been allocated for them at system generation.

Sample Online COBOL Program as Input to the DML Precompiler

```
*NO-ACTIVITY-LOG
*DMLIST
 IDENTIFICATION DIVISION.

 PROGRAM-ID.           EMPDISP.
 AUTHOR.            COMPUTER ASSOCIATES INTERNATIONAL.

 DATE-WRITTEN.          APRIL 1995.

 REMARKS.            THIS PROGRAM DEMONSTRATES
                  CA IDMS PROGRAMMING USING
                  THE LOGICAL RECORD FACILITY.

*****************************************************************
 ENVIRONMENT DIVISION.
*****************************************************************
 IDMS-CONTROL SECTION.

 PROTOCOL.           MODE IS IDMS-DC DEBUG
                  IDMS-RECORDS MANUAL.
   SKIP3
 DATA DIVISION.

 SCHEMA SECTION.

   DB EMPSS09 WITHIN EMPSCHM.

 MAP SECTION.
 MAX FIELD LIST IS 5.
 MAP EMPMAPLR VERSION 1 TYPE IS STANDARD.

 WORKING-STORAGE SECTION.
 01 TASK-CODE     PIC X(8).
 01 TSK01       PIC X(8)   VALUE 'TSK01'.
 01 TSK02       PIC X(8)   VALUE 'TSK02'.

 01 MESSAGES.
   05 INITIAL-MESSAGE     PIC X(80) VALUE
    'ENTER AN EMP ID AND PRESS ENTER ** CLEAR TO EXIT'.
   05 EDIT-ERROR-MESSAGE   PIC X(80) VALUE
    'EMP-ID EITHER NOT ENTERED OR NOT NUMERIC'.
   05 EMP-NOT-FOUND-MESSAGE  PIC X(80) VALUE
    'SPECIFIED EMPLOYEE COULD NOT BE FOUND'.
   05 DISPLAY-MESSAGE     PIC X(80) VALUE
    'CLEAR TO EXIT ** NEW EMP-ID AND ENTER TO CONTINUE'.
```

```
 01 COPY IDMS DC-AID-CONDITION-NAMES.

 01 COPY IDMS EMP-DATE-WORK-REC.

 01 COPY IDMS SUBSCHEMA-LR-CONTROL.

 01 COPY IDMS SUBSCHEMA-LR-RECORDS.
   03 SUBSCHEMA-LR-CTRL-END     PIC X.

 01 COPY IDMS MAP-CONTROLS.

   EJECT
 PROCEDURE DIVISION.

*  ********************************************************
*  * PROCEDURE DIVISION GENERAL STRATEGY:         *
*  *   RETRIEVE INFORMATION FOR A SPECIFIED EMPLOYEE.  *
*  *   DISPLAYED DATA INCLUDES EMPLOYEE, DEPARTMENT,  *
*  *          JOB, AND OFFICE INFORMATION.    *
*  * ==> THIS PROGRAM USES THE EMP-JOB-LR LOGICAL RECORD<= *
*  * PROGRAM STRATEGY:                  *
*  *     ** CHECK FOR TASK CODE: TSK01= INITIAL MAPOUT *
*  *           ANYTHING ELSE = RETRIEVE LR  *
*  *     ** CLEAR TO EXIT APPLICATION         *
*  *     ** ENTER AND NEW EMP-ID TO CONTINUE      *
*  ********************************************************

 MAIN-LINE.
*****************************************************************
* THE BIND MAP STATEMENTS ADVISE IDMS-DC OF THE LOCATION OF *
* THE MRB AND THE MAP RECORDS.                *
*****************************************************************
   BIND MAP EMPMAPLR.
   BIND MAP EMPMAPLR RECORD EMPLOYEE.
   BIND MAP EMPMAPLR RECORD DEPARTMENT.
   BIND MAP EMPMAPLR RECORD JOB.
   BIND MAP EMPMAPLR RECORD OFFICE.
   BIND MAP EMPMAPLR RECORD EMP-DATE-WORK-REC.
*  ACCEPT TASK CODE INTO TASK-CODE.
   IF TASK-CODE = TSK01
     GO TO INITIAL-MAPOUT
   ELSE
     GO TO GET-EMP.
*****************************************************************
*****************************************************************
* THE INITIAL-MAPOUT PARAGRAPH IS PERFORMED IF THE CALLING  *
* TASK CODE IS TSK01.                     *
```

```
*************************************************************
* THE MODIFY MAP STATEMENT ASSIGNS THE PROTECTED       *
* ATTRIBUTE TO ALL MAP FIELDS EXCEPT EMP-ID-0415.      *
*************************************************************
* THE MAP OUT STATEMENT TRANSMITS THE EMPMAPLR MAP     *
* TO THE TERMINAL.                    *
*************************************************************
* THE DC RETURN STATEMENT SPECIFIES THAT THE NEXT      *
* TASK THAT WILL BE INITIATED ON THE SAME TERMINAL WHEN THE  *
* OPERATOR PRESSES A CONTROL KEY WILL BE TSK02.        *
*************************************************************
 INITIAL-MAPOUT.

   MODIFY MAP EMPMAPLR TEMPORARY
    FOR ALL EXCEPT EMP-ID-0415
     ATTRIBUTES PROTECTED.
*
   MOVE ZERO TO EMP-ID-0415.
   MAP OUT USING EMPMAPLR
    OUTPUT DATA IS YES NEWPAGE
    MESSAGE IS INITIAL-MESSAGE LENGTH 80.

   DC RETURN
    NEXT TASK CODE TSK02.
 INITIAL-MAPOUT-EXIT.
   EXIT.
*************************************************************
*************************************************************
* THE GET-EMP PARAGRAPH IS PERFORMED IF THE CALLING TASK   *
* CODE IS NOT TSK01.                    *
*************************************************************
* THE MAP IN STATEMENT TRANSMITS DATA FROM THE TERMINAL TO  *
* VARIABLE STORAGE DATA FIELDS.               *
*************************************************************
* THIS FIRST INQUIRE MAP STATEMENT IS USED TO DETERMINE   *
* THE AID KEY PRESSED.                   *
*************************************************************
* THIS SECOND INQUIRE MAP STATEMENT USES AUTOMATIC EDITING  *
* TO DETERMINE IF THE DATA ENTERED IS CONSISTENT WITH     *
* THE EXTERNAL PICTURE OF THE NAMED DATA ELEMENT.      *
*************************************************************
* THE MAP OUT STATEMENT TRANSMITS DATA FROM THE       *
* EMP-JOB-LR LOGICAL RECORD IN VARIABLE STORAGE TO MAP    *
* FIELDS.                        *
*************************************************************
 GET-EMP.

   MAP IN USING EMPMAPLR.
```

```
*
   INQUIRE MAP EMPMAPLR
    MOVE AID TO DC-AID-IND-V.
   IF CLEAR-HIT
    DC RETURN.

*
   INQUIRE MAP EMPMAPLR
    IF DFLD EMP-ID-0415 EDIT IS ERROR
     THEN GO TO EDIT-ERROR.
*
   COPY IDMS SUBSCHEMA-BINDS.
   READY USAGE-MODE IS RETRIEVAL.
****************************************************************
* SINCE THE MAP FIELD IS ASSOCIATED WITH THE EMP-ID-0415   *
* FIELD, THE PROGRAM USES THE "OF LR" RETRIEVAL. NOTE THAT  *
* AUTOSTATUS IMPLICITLY CHECKS FOR THE LR-ERROR PATH STATUS. *
****************************************************************
   OBTAIN EMP-JOB-LR
     WHERE EMP-ID-0415 = EMP-ID-0415 OF LR
     ON LR-NOT-FOUND
       GO TO NOT-FOUND.
   FINISH.
****************************************************************
* REFORMAT DATE TO MMDDYY; OUTPUT AS MM/DD/YY USING THE OLM *
* EXTERNAL PICTURE SPECIFICATION (XX/XX/XX).         *
****************************************************************
   MOVE START-YEAR-0415 TO WORK-YY.
   MOVE START-MONTH-0415 TO WORK-MM.
   MOVE START-DAY-0415 TO WORK-DD.

   MAP OUT USING EMPMAPLR
    OUTPUT DATA IS YES
    MESSAGE IS DISPLAY-MESSAGE LENGTH 80.
*
   DC RETURN NEXT TASK CODE TSK02.
 GET-EMP-EXIT.
   EXIT.

****************************************************************
****************************************************************
* THE MODIFY MAP STATEMENT SPECIFIES THAT ALL MAP      *
* FIELDS EXCEPT THE INCORRECT EMP-ID-0415 FIELD WILL BE    *
* ERASED ON THE NEXT MAP OUT.                *
****************************************************************
 EDIT-ERROR.
   MODIFY MAP EMPMAPLR TEMPORARY
    FOR ALL EXCEPT DFLD EMP-ID-0415
     OUTPUT DATA IS ERASE.
```

```
*
   MAP OUT USING EMPMAPLR
    MESSAGE IS EDIT-ERROR-MESSAGE LENGTH 80.
*
   DC RETURN
    NEXT TASK CODE TSK02.
 EDIT-ERROR-EXIT.
   EXIT.
****************************************************************
****************************************************************
* THE FOLLOWING MODIFY MAP STATEMENT SPECIFIES THAT ALL   *
* MAP FIELDS EXCEPT THE EMP-ID-0415 FIELD WILL BE ERASED   *
* ON THE NEXT MAP OUT.                    *
****************************************************************
 NOT-FOUND.
   MODIFY MAP EMPMAPLR TEMPORARY
    FOR ALL EXCEPT DFLD EMP-ID-0415
     OUTPUT DATA IS ERASE.
*
   MAP OUT USING EMPMAPLR
    MESSAGE IS EMP-NOT-FOUND-MESSAGE LENGTH 80.
*
   DC RETURN
    NEXT TASK CODE TSK02.
 NOT-FOUND-EXIT.
   EXIT.

****************************************************************
 IDMS-ABORT.
   MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE.
   MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE.
   SNAP FROM SUBSCHEMA-LR-CTRL TO SUBSCHEMA-LR-CTRL-END
     ON ANY-STATUS NEXT SENTENCE.
   MOVE SSC-ERRSTAT-SAVE TO ERROR-STATUS.
   MOVE SSC-DMLSEQ-SAVE TO DML-SEQUENCE.
 IDMS-ABORT-EXIT.
   EXIT.
   COPY IDMS IDMS-STATUS.
```

Sample Online COBOL Program as Output from the DML Precompiler

```
      00002    *DMLIST
      00003
      00004     IDENTIFICATION DIVISION.
      00005
      00006     PROGRAM-ID.           EMPDISP.
      00007
      00008     AUTHOR.             COMPUTER ASSOCIATES INTERNATIONAL.
      00009
      00010     DATE-WRITTEN.          APRIL 1995.
      00011
      00012     REMARKS.            THIS PROGRAM DEMONSTRATES
      00013                       CA IDMS PROGRAMMING USING
      00014                       THE LOGICAL RECORD FACILITY.
      00015
      00016    ************************************************************
      00017     ENVIRONMENT DIVISION.
      00018    ************************************************************
DMLC  00019     IDMS-CONTROL SECTION.
      00020
DMLC  00021     PROTOCOL.           MODE IS IDMS-DC DEBUG
DMLC  00022                       IDMS-RECORDS MANUAL.
      00023       SKIP3
      00024     DATA DIVISION.
      00025
DMLC  00026     SCHEMA SECTION.
      00027
DMLC  00028       DB EMPSS09 WITHIN EMPSCHM.
      00029
DMLC  00030     MAP SECTION.
DMLC  00031     MAX FIELD LIST IS 5.
DMLC  00032     MAP EMPMAPLR VERSION 1 TYPE IS STANDARD.
      00033
      00034
      00035

      00036     WORKING-STORAGE SECTION.
      00037     01 TASK-CODE     PIC X(8).
      00038     01 TSK01       PIC X(8)   VALUE 'TSK01'.
      00039     01 TSK02       PIC X(8)   VALUE 'TSK02'.
      00040
      00041     01 MESSAGES.
      00042       05 INITIAL-MESSAGE     PIC X(80) VALUE
      00043        'ENTER AN EMP ID AND PRESS ENTER ** CLEAR TO EXIT'.
      00044       05 EDIT-ERROR-MESSAGE   PIC X(80) VALUE
      00045        'EMP-ID EITHER NOT ENTERED OR NOT NUMERIC'.
      00046       05 EMP-NOT-FOUND-MESSAGE  PIC X(80) VALUE
```

```
      00047        'SPECIFIED EMPLOYEE COULD NOT BE FOUND'.
      00048      05 DISPLAY-MESSAGE     PIC X(80) VALUE
      00049       'CLEAR TO EXIT ** NEW EMP-ID AND ENTER TO CONTINUE'.
      00050
DMLC  00051    01 COPY IDMS DC-AID-CONDITION-NAMES.
      00052    01 DC-AID-CONDITION-NAMES.
      00053      03 DC-AID-IND-V      PIC X.
      00054                 88 ENTER-HIT VALUE QUOTE.
      00055                 88 CLEAR-HIT VALUE '_'.
      00056                 88 PF01-HIT VALUE '1'.
      00057                 88 PF02-HIT VALUE '2'.
      00058                 88 PF03-HIT VALUE '3'.
      00059                 88 PF04-HIT VALUE '4'.
      00060                 88 PF05-HIT VALUE '5'.
      00061                 88 PF06-HIT VALUE '6'.
      00062                 88 PF07-HIT VALUE '7'.
      00063                 88 PF08-HIT VALUE '8'.
      00064                 88 PF09-HIT VALUE '9'.
      00065                 88 PF10-HIT VALUE ':'.
      00066                 88 PF11-HIT VALUE '#'.
      00067                 88 PF12-HIT VALUE '@'.

      00068                 88 PF13-HIT VALUE 'A'.
      00069                 88 PF14-HIT VALUE 'B'.
      00070                 88 PF15-HIT VALUE 'C'.
      00071                 88 PF16-HIT VALUE 'D'.
      00072                 88 PF17-HIT VALUE 'E'.
      00073                 88 PF18-HIT VALUE 'F'.
      00074                 88 PF19-HIT VALUE 'G'.
      00075                 88 PF20-HIT VALUE 'H'.
      00076                 88 PF21-HIT VALUE 'I'.
      00077                 88 PF22-HIT VALUE '_'.
      00078                 88 PF23-HIT VALUE '.'.
      00079                 88 PF24-HIT VALUE '<'.
      00080                 88 PA01-HIT VALUE '%'.
      00081                 88 PA02-HIT VALUE '>'.
      00082                 88 PA03-HIT VALUE ','.
      00083                 88 PEN-ATTN-SPACE-NULL VALUE '='.
      00084                 88 PEN-ATTN VALUE QUOTE.
      00085
DMLC  00086    01 COPY IDMS EMP-DATE-WORK-REC.
      00087    01 EMP-DATE-WORK-REC.
      00088      02 WORK-DATE.
      00089      03 WORK-MM        PIC 9(2).
      00090      03 WORK-DD        PIC 9(2).
      00091      03 WORK-YY        PIC 9(2).
      00092
```

```
DMLC  00093     01 COPY IDMS SUBSCHEMA-LR-CONTROL.
      00094     01 SUBSCHEMA-CTRL.
      00095       03 PROGRAM-NAME      PIC X(8) VALUE SPACES.
      00096       03 ERROR-STATUS      PIC X(4) VALUE '1400'.
      00097                   88 DB-STATUS-OK VALUE '0000'.
      00098                   88 ANY-STATUS
      00099                     VALUE '0000' THRU '9999'.
      00100                   88 ANY-ERROR-STATUS
      00101                     VALUE '0001' THRU '9999'.

      00102                   88 DB-END-OF-SET VALUE '0307'.
      00103                   88 DB-REC-NOT-FOUND VALUE '0326'.
      00104                   88 DC-DEADLOCK VALUE '3101'
      00105                     '3201' '3401' '3901'.
      00106                   88 DC-NO-STORAGE VALUE '3202'
      00107                     '3402'.
      00108                   88 DC-AREA-ID-UNK VALUE '4303'.
      00109                   88 DC-QUEUE-ID-UNK VALUE '4404'.
      00110                   88 DC-REC-NOT-FOUND VALUE '4305'
      00111                     '4405'.
      00112                   88 DC-RESOURCE-NOT-AVAIL
      00113                     VALUE '3908'.
      00114                   88 DC-RESOURCE-AVAIL
      00115                     VALUE '3909'.
      00116                   88 DC-NEW-STORAGE VALUE '3210'.
      00117                   88 DC-MAX-TASKS VALUE '3711'.
      00118                   88 DC-REC-REPLACED VALUE '4317'.
      00119                   88 DC-TRUNCATED-DATA
      00120                     VALUE '4319' '4419'
      00121                     '4519' '4719'.
      00122                   88 DC-ATTN-INT VALUE '4525'
      00123                     '4625'.
      00124                   88 DC-OPER-CANCEL VALUE '4743'.
      00125                   88 DC-FIRST-PAGE-SENT
      00126                     VALUE '4676'.
      00127                   88 DC-SECOND-STARTPAGE
      00128                     VALUE '4604'.
      00129                   88 DC-DETAIL-NOT-FOUND

      00130                     VALUE '4664'.
      00131       03 DBKEY         PIC S9(8)
```

```
00132                    USAGE COMP.
00133       03 RECORD-NAME      PIC X(16) VALUE SPACES.
00134       03 RRECORD-NAME      REDEFINES RECORD-NAME.
00135        05 SSC-NODN       PIC X(8).
00136        05 SSC-DBN       PIC X(8).
00137       03 AREA-NAME       PIC X(16) VALUE SPACES.
00138       03 ERROR-SET       PIC X(16) VALUE SPACES.
00139       03 ERROR-RECORD      PIC X(16) VALUE SPACES.
00140       03 ERROR-AREA       PIC X(16) VALUE SPACES.
00141       03 IDBMSCOM-AREA     PIC X(100) VALUE LOW-VALUE.
00142       03 IDBMSCOM        REDEFINES IDBMSCOM-AREA
00143                    PIC X
00144                    OCCURS 100.
00145       03 RIDBMSCOM       REDEFINES IDBMSCOM-AREA.
00146        05 DB-SUB-ADDR     PIC X(4).
00147        05 FILLER        PIC X(0096).
00148       03 DIRECT-DBKEY      PIC S9(8)
00149                    USAGE COMP.
00150       03 DIRECT-DBK       REDEFINES DIRECT-DBKEY
00151                    PIC S9(8)
00152                    USAGE COMP.
00153       03 DCBMSCOM-AREA     PIC X(100) VALUE LOW-VALUE.
00154       03 DCBMSCOM        REDEFINES DCBMSCOM-AREA
00155                    PIC X
00156                    OCCURS 100.

00157       03 R1DCBMSCOM       REDEFINES DCBMSCOM-AREA.
00158        05 R2DCBMSCOM      PIC S9(8)
00159                    OCCURS 11
00160                    USAGE COMP.
00161        05 DCSTR1        PIC X(16).
00162        05 R3DCBMSCOM      REDEFINES DCSTR1.
00163         07 DCSTR2       PIC X(8).
00164         07 R4DCBMSCOM     REDEFINES DCSTR2.
00165          09 DCSTR4      PIC X(4).
00166          09 DCSTR5      PIC X(4).
00167         07 DCSTR3       PIC X(8).
00168        05 R5DCBMSCOM      REDEFINES DCSTR1.
00169         07 DCPNUM1      PIC S9(15)
00170                    USAGE COMP-3.
00171        05 DCNUM1        PIC S9(8)
00172                    USAGE COMP.
00173        05 R6DCBMSCOM      REDEFINES DCNUM1.
00174         07 DCPNUM2      PIC S9(7)
00175                    USAGE COMP-3.
00176        05 DCNUM2        PIC S9(8)
00177                    USAGE COMP.
00178        05 DCNUM3        PIC S9(8)
```

```
00179                    USAGE COMP.
00180         05 DCFLG1        PIC S9(4)
00181                    USAGE COMP.
00182         05 DCFLG2        PIC S9(4)
00183                    USAGE COMP.

00184         05 DCFLG3        PIC S9(4)
00185                    USAGE COMP.
00186         05 DCFLG4        PIC S9(4)
00187                    USAGE COMP.
00188       03 SSC-ERRSTAT-SAVE    PIC X(4) VALUE SPACES.
00189       03 SSC-DMLSEQ-SAVE    PIC S9(8)
00190                    USAGE COMP.
00191       03 DML-SEQUENCE      PIC S9(8)
00192                    USAGE COMP.
00193       03 RECORD-OCCUR      PIC S9(8)
00194                    USAGE COMP.
00195       03 SUBSCHEMA-CTRL-END   PIC X(4) VALUE SPACES.
00196     01 SUBSCHEMA-LR-CTRL.
00197       03 LRC-LRPXELNG      PIC S9(4)
00198                    USAGE COMP.
00199       03 LRC-MAXVXP       PIC S9(4)
00200                    USAGE COMP.
00201       03 LRIDENT        PIC X(4) VALUE 'LRC '.
00202       03 LRVERB         PIC X(8).
00203       03 LRNAME         PIC X(16).
00204       03 LR-STATUS       PIC X(16).
00205       03 FILLER         PIC X(16).
00206       03 LRPXE         PIC X
00207                    OCCURS 0 TO 512
00208                    DEPENDING ON LRC-LRPXELNG.
00209       03 PXE.
00210        05 PXENEXT       PIC S9(8)
00211                    USAGE COMP.

00212        05 PXETABO       PIC S9(4)
00213                    USAGE COMP.
00214        05 PXEDSPL       PIC S9(4)
00215                    USAGE COMP.
00216        05 PXEDYN        PIC S9(4)
```

```
00217                    USAGE COMP.
00218          05 PXEDLEN      PIC S9(4)
00219                    USAGE COMP.
00220          05 PXENDEC      PIC X.
00221          05 PXEDTYP      PIC X.
00222          05 PXEOTYP      PIC X.
00223          05 PXEFLAG      PIC X.
00224          05 FILLER       PIC X(240).
00225       03 PXEDSP256        REDEFINES PXE
00226                    PIC X(256).
00227       03 PXEDSP248        REDEFINES PXE
00228                    PIC X(248).
00229       03 PXEDSP240        REDEFINES PXE
00230                    PIC X(240).
00231       03 PXEDSP232        REDEFINES PXE
00232                    PIC X(232).
00233       03 PXEDSP224        REDEFINES PXE
00234                    PIC X(224).
00235       03 PXEDSP216        REDEFINES PXE
00236                    PIC X(216).
00237       03 PXEDSP208        REDEFINES PXE
00238                    PIC X(208).

00239       03 PXEDSP200        REDEFINES PXE
00240                    PIC X(200).
00241       03 PXEDSP192        REDEFINES PXE
00242                    PIC X(192).
00243       03 PXEDSP184        REDEFINES PXE
00244                    PIC X(184).
00245       03 PXEDSP176        REDEFINES PXE
00246                    PIC X(176).
00247       03 PXEDSP168        REDEFINES PXE
00248                    PIC X(168).
00249       03 PXEDSP160        REDEFINES PXE
00250                    PIC X(160).
00251       03 PXEDSP152        REDEFINES PXE
00252                    PIC X(152).
00253       03 PXEDSP144        REDEFINES PXE
00254                    PIC X(144).
00255       03 PXEDSP136        REDEFINES PXE
00256                    PIC X(136).
00257       03 PXEDSP128        REDEFINES PXE
00258                    PIC X(128).
00259       03 PXEDSP120        REDEFINES PXE
00260                    PIC X(120).
00261       03 PXEDSP112        REDEFINES PXE
00262                    PIC X(112).
00263       03 PXEDSP104        REDEFINES PXE
```

```
00264                    PIC X(104).
00265       03 PXEDSP96        REDEFINES PXE
00266                    PIC X(96).
00267       03 PXEDSP88        REDEFINES PXE
00268                    PIC X(88).
00269       03 PXEDSP80        REDEFINES PXE
00270                    PIC X(80).
00271       03 PXEDSP72        REDEFINES PXE
00272                    PIC X(72).
00273       03 PXEDSP64        REDEFINES PXE
00274                    PIC X(64).
00275       03 PXEDSP56        REDEFINES PXE
00276                    PIC X(56).
00277       03 PXEDSP48        REDEFINES PXE
00278                    PIC X(48).
00279       03 PXEDSP40        REDEFINES PXE
00280                    PIC X(40).
00281       03 PXEDSP32        REDEFINES PXE
00282                    PIC X(32).
00283       03 PXEDSP24        REDEFINES PXE
00284                    PIC X(24).
00285       03 PXEDSP16        REDEFINES PXE
00286                    PIC X(16).
00287       03 PXEDSP8        REDEFINES PXE
00288                    PIC X(8).
00289       03 PXECOMP-1       REDEFINES PXE

00290                    USAGE COMP-1.
00291       03 PXECOMP-2       REDEFINES PXE
00292                    USAGE COMP-2.
00293       03 PXECOMP-30       REDEFINES PXE
00294                    PIC S9(18)
00295                    USAGE COMP-3.
00296       03 PXECOMP-31       REDEFINES PXE
00297                    PIC S9(17)V9(1)
00298                    USAGE COMP-3.
00299       03 PXECOMP-32       REDEFINES PXE
00300                    PIC S9(16)V9(2)
00301                    USAGE COMP-3.
00302       03 PXECOMP-33       REDEFINES PXE
00303                    PIC S9(15)V9(3)
00304                    USAGE COMP-3.
00305       03 PXECOMP-34       REDEFINES PXE
00306                    PIC S9(14)V9(4)
00307                    USAGE COMP-3.
00308       03 PXECOMP-35       REDEFINES PXE
00309                    PIC S9(13)V9(5)
00310                    USAGE COMP-3.
```

```
00311       03 PXECOMP-36       REDEFINES PXE
00312                   PIC S9(12)V9(6)
00313                   USAGE COMP-3.
00314       03 PXECOMP-37       REDEFINES PXE
00315                   PIC S9(11)V9(7)
00316                   USAGE COMP-3.
00317       03 PXECOMP-38       REDEFINES PXE
00318                   PIC S9(10)V9(8)

00319                   USAGE COMP-3.
00320       03 PXECOMP-39       REDEFINES PXE
00321                   PIC S9(9)V9(9)
00322                   USAGE COMP-3.
00323       03 PXECOMP-310      REDEFINES PXE
00324                   PIC S9(8)V9(10)
00325                   USAGE COMP-3.
00326       03 PXECOMP-311      REDEFINES PXE
00327                   PIC S9(7)V9(11)
00328                   USAGE COMP-3.
00329       03 PXECOMP-312      REDEFINES PXE
00330                   PIC S9(6)V9(12)
00331                   USAGE COMP-3.
00332       03 PXECOMP-313      REDEFINES PXE
00333                   PIC S9(5)V9(13)
00334                   USAGE COMP-3.
00335       03 PXECOMP-314      REDEFINES PXE
00336                   PIC S9(4)V9(14)
00337                   USAGE COMP-3.
00338       03 PXECOMP-315      REDEFINES PXE
00339                   PIC S9(3)V9(15)
00340                   USAGE COMP-3.
00341       03 PXECOMP-316      REDEFINES PXE
00342                   PIC S9(2)V9(16)
00343                   USAGE COMP-3.
00344       03 PXECOMP-317      REDEFINES PXE
00345                   PIC S9(1)V9(17)
00346                   USAGE COMP-3.

00347       03 PXECOMP-318      REDEFINES PXE
00348                   PIC SV9(18)
00349                   USAGE COMP-3.
00350       03 PXECOMP20       REDEFINES PXE
00351                   PIC S9(4)
00352                   USAGE COMP.
00353       03 PXECOMP21       REDEFINES PXE
00354                   PIC S9(3)V9(1)
00355                   USAGE COMP.
00356       03 PXECOMP22       REDEFINES PXE
```

```
00357                   PIC S9(2)V9(2)
00358                   USAGE COMP.
00359       03 PXECOMP23      REDEFINES PXE
00360                   PIC S9(1)V9(3)
00361                   USAGE COMP.
00362       03 PXECOMP24      REDEFINES PXE
00363                   PIC SV9(4)
00364                   USAGE COMP.
00365       03 PXECOMP40      REDEFINES PXE
00366                   PIC S9(9)
00367                   USAGE COMP.
00368       03 PXECOMP41      REDEFINES PXE
00369                   PIC S9(8)V9(1)
00370                   USAGE COMP.
00371       03 PXECOMP42      REDEFINES PXE
00372                   PIC S9(7)V9(2)
00373                   USAGE COMP.
00374       03 PXECOMP43      REDEFINES PXE
00375                   PIC S9(6)V9(3)
00376                   USAGE COMP.
00377       03 PXECOMP44      REDEFINES PXE
00378                   PIC S9(5)V9(4)
00379                   USAGE COMP.
00380       03 PXECOMP45      REDEFINES PXE
00381                   PIC S9(4)V9(5)
00382                   USAGE COMP.
00383       03 PXECOMP46      REDEFINES PXE
00384                   PIC S9(3)V9(6)
00385                   USAGE COMP.
00386       03 PXECOMP47      REDEFINES PXE
00387                   PIC S9(2)V9(7)
00388                   USAGE COMP.
00389       03 PXECOMP48      REDEFINES PXE
00390                   PIC S9(1)V9(8)
00391                   USAGE COMP.
00392       03 PXECOMP49      REDEFINES PXE
00393                   PIC SV9(9)
00394                   USAGE COMP.
00395       03 PXECOMP80      REDEFINES PXE
00396                   PIC S9(18)
00397                   USAGE COMP.
00398       03 PXECOMP81      REDEFINES PXE
00399                   PIC S9(17)V9(1)
00400                   USAGE COMP.
00401       03 PXECOMP82      REDEFINES PXE
00402                   PIC S9(16)V9(2)
```

```
00403                    USAGE COMP.
00404       03 PXECOMP83      REDEFINES PXE
00405                    PIC S9(15)V9(3)
00406                    USAGE COMP.
00407       03 PXECOMP84      REDEFINES PXE

00408                    PIC S9(14)V9(4)
00409                    USAGE COMP.
00410       03 PXECOMP85      REDEFINES PXE
00411                    PIC S9(13)V9(5)
00412                    USAGE COMP.
00413       03 PXECOMP86      REDEFINES PXE
00414                    PIC S9(12)V9(6)
00415                    USAGE COMP.
00416       03 PXECOMP87      REDEFINES PXE
00417                    PIC S9(11)V9(7)
00418                    USAGE COMP.
00419       03 PXECOMP88      REDEFINES PXE
00420                    PIC S9(10)V9(8)
00421                    USAGE COMP.
00422       03 PXECOMP89      REDEFINES PXE
00423                    PIC S9(9)V9(9)
00424                    USAGE COMP.
00425       03 PXECOMP810      REDEFINES PXE
00426                    PIC S9(8)V9(10)
00427                    USAGE COMP.
00428       03 PXECOMP811      REDEFINES PXE
00429                    PIC S9(7)V9(11)
00430                    USAGE COMP.
00431       03 PXECOMP812      REDEFINES PXE
00432                    PIC S9(6)V9(12)
00433                    USAGE COMP.
00434       03 PXECOMP813      REDEFINES PXE
00435                    PIC S9(5)V9(13)
00436                    USAGE COMP.
00437       03 PXECOMP814      REDEFINES PXE

00438                    PIC S9(4)V9(14)
00439                    USAGE COMP.
00440       03 PXECOMP815      REDEFINES PXE
```

```
00441                   PIC S9(3)V9(15)
00442                   USAGE COMP.
00443       03 PXECOMP816       REDEFINES PXE
00444                   PIC S9(2)V9(16)
00445                   USAGE COMP.
00446       03 PXECOMP817       REDEFINES PXE
00447                   PIC S9(1)V9(17)
00448                   USAGE COMP.
00449       03 PXECOMP818       REDEFINES PXE
00450                   PIC SV9(18)
00451                   USAGE COMP.
00452     01 SUBSCHEMA-SSNAME      PIC X(8) VALUE 'EMPSS09 '.
00453     01 SUBSCHEMA-AREANAMES.
00454       03 EMP-DEMO-REGION    PIC X(16)
00455                   VALUE 'EMP-DEMO-REGION '.
00456       03 INS-DEMO-REGION    PIC X(16)
00457                   VALUE 'INS-DEMO-REGION '.
00458       03 ORG-DEMO-REGION    PIC X(16)
00459                   VALUE 'ORG-DEMO-REGION '.

00460
DMLC  00461     01 COPY IDMS SUBSCHEMA-LR-RECORDS.
      00462     01 EMP-JOB-LR.
      00463       02 EMPLOYEE.
      00464       03 EMP-ID-0415      PIC 9(4).
      00465       03 EMP-NAME-0415.
      00466        04 EMP-FIRST-NAME-0415  PIC X(10).
      00467        04 EMP-LAST-NAME-0415  PIC X(15).
      00468       03 STATUS-0415      PIC X(2).
      00469                  88 ACTIVE-0415 VALUE '01'.
      00470                  88 ST-DISABIL-0415 VALUE '02'.
      00471                  88 LT-DISABIL-0415 VALUE '03'.
      00472                  88 LEAVE-OF-ABSENCE-0415
      00473                    VALUE '04'.
      00474                  88 TERMINATED-0415 VALUE '05'.
      00475       03 SS-NUMBER-0415     PIC 9(9).
      00476       03 START-DATE-0415.
      00477        04 START-YEAR-0415    PIC 9(2).
      00478        04 START-MONTH-0415   PIC 9(2).
      00479        04 START-DAY-0415    PIC 9(2).
      00480       03 FILLER         PIC X(2).
      00481       02 DEPARTMENT.
      00482       03 DEPT-ID-0410      PIC 9(4).
      00483       03 DEPT-NAME-0410     PIC X(45).
      00484       03 DEPT-HEAD-ID-0410   PIC 9(4).
      00485       03 FILLER         PIC XXX.
      00486       02 JOB.
```

```
00487       03 JOB-ID-0440      PIC 9(4).
00488       03 TITLE-0440       PIC X(20).
00489       02 OFFICE.

00490       03 OFFICE-CODE-0450    PIC X(3).
00491       03 OFFICE-ADDRESS-0450.
00492        04 OFFICE-STREET-0450  PIC X(20).
00493        04 OFFICE-CITY-0450   PIC X(15).
00494        04 OFFICE-STATE-0450   PIC X(2).
00495        04 OFFICE-ZIP-0450.
00496        05 OFFICE-ZIP-FIRST-FIVE-0450
00497                    PIC X(5).
00498        05 OFFICE-ZIP-LAST-FOUR-0450
00499                    PIC X(4).
00500       03 OFFICE-PHONE-0450   PIC 9(7)
00501                    OCCURS 3.
00502       03 OFFICE-AREA-CODE-0450 PIC X(3).
00503       03 SPEED-DIAL-0450    PIC X(3).
00504       03 FILLER         PIC X(4).
00505       03 SUBSCHEMA-LR-CTRL-END     PIC X.
00506
DMLC   00507     01 COPY IDMS MAP-CONTROLS.
       00508     01 MRB-EMPMAPLR.
       00509       03 MRB-EMPMAPLR-ID    PIC X(8).
       00510       03 MRB-EMPMAPLR-MCOMP-VER.
       00511        05 MRB-EMPMAPLR-MCOMP-DATE
       00512                    PIC X(8).
       00513        05 MRB-EMPMAPLR-MCOMP-TIME
       00514                    PIC X(6).
       00515        05 MRB-EMPMAPLR-MCOMP-VERID
       00516                    PIC X(2).
       00517       03 MRB-EMPMAPLR-SUBSCHEMA PIC X(8).
       00518       03 MRB-EMPMAPLR-FLGS   PIC X
       00519                    OCCURS 4.
       00520       03 FILLER         PIC X(6).
       00521       03 MRB-EMPMAPLR-NFLDS   PIC S9(4)
       00522                    USAGE COMP.
       00523       03 MRB-EMPMAPLR-NRECS   PIC S9(4)

00524                    USAGE COMP.
00525       03 MRB-EMPMAPLR-RECOF   PIC S9(4)
00526                    USAGE COMP.
00527       03 MRB-EMPMAPLR-PERM-CURSOR
00528                    PIC XX.
00529       03 MRB-EMPMAPLR-TEMP-CURSOR
00530                    PIC XX.
00531       03 MRB-EMPMAPLR-PERM-WCC PIC X.
00532       03 MRB-EMPMAPLR-TEMP-WCC PIC X.
00533       03 MRB-EMPMAPLR-CURSOR  PIC XX.
```

```
00534       03 MRB-EMPMAPLR-AID    PIC X.
00535       03 MRB-EMPMAPLR-INPUT-FLGS
00536                   PIC X.
00537       03 MRB-EMPMAPLR-SEGVIEW  PIC X.
00538       03 FILLER         PIC X.
00539       03 MRB-EMPMAPLR-MREO   PIC S9(4)
00540                   USAGE COMP.
00541       03 MRB-EMPMAPLR-ERR-CNT  PIC S9(4)
00542                   USAGE COMP.
00543       03 MRB-EMPMAPLR-ATTR-FLGS PIC X
00544                   OCCURS 4.
00545       03 MRB-EMPMAPLR-CURR-MFLD PIC S9(4)
00546                   USAGE COMP.
00547       03 MRB-EMPMAPLR-XTYP   PIC X.
00548       03 MRB-EMPMAPLR-FILLER  PIC X.
00549       03 MRB-EMPMAPLR-MRE-XLEN PIC S9(4)
00550                   USAGE COMP.

00551       03 MRB-EMPMAPLR-MRB-XLEN PIC S9(4)
00552                   USAGE COMP.
00553       03 MRB-EMPMAPLR-MRE    OCCURS 11.
00554        05 MRB-EMPMAPLR-MRE-FLGS
00555                   PIC X
00556                   OCCURS 8.
00557        05 MRB-EMPMAPLR-MRE-INLEN
00558                   PIC S9(4)
00559                   USAGE COMP.
00560        05 MRB-EMPMAPLR-MRE-PAD-CHAR
00561                   PIC X
00562                   OCCURS 2.
00563        05 MRB-EMPMAPLR-MRE-FLG2
00564                   PIC X
00565                   OCCURS 2.
00566       03 MRB-EMPMAPLR-RECS   PIC S9(8)
00567                   OCCURS 5
00568                   USAGE COMP
00569                   SYNC.
00570       03 MRB-EMPMAPLR-END    PIC X.
00571       03 MRB-EMPMAPLR-MRE-SUB  PIC S9(4)
00572                   USAGE COMP.
00573
00574       EJECT
00575     01 MRB-FLDLST.
00576       02 FLDLST         PIC S9(8)
00577                   OCCURS 6
00578                   USAGE COMP.

00579     PROCEDURE DIVISION.
00580
```

```
      00581    *  ********************************************************
      00582    *  * PROCEDURE DIVISION GENERAL STRATEGY:         *
      00583    *  *   RETRIEVE INFORMATION FOR A SPECIFIED EMPLOYEE.  *
      00584    *  *   DISPLAYED DATA INCLUDES EMPLOYEE, DEPARTMENT,  *
      00585    *  *          JOB, AND OFFICE INFORMATION.    *
      00586    *  * ==> THIS PROGRAM USES THE EMP-JOB-LR LOGICAL RECORD<= *
      00587    *  * PROGRAM STRATEGY:                  *
      00588    *  *     ** CHECK FOR TASK CODE: TSK01= INITIAL MAPOUT *
      00589    *  *           ANYTHING ELSE = RETRIEVE LR  *
      00590    *  *     ** CLEAR TO EXIT APPLICATION         *
      00591    *  *     ** ENTER AND NEW EMP-ID TO CONTINUE      *
      00592    *  ********************************************************
      00593
      00594     MAIN-LINE.
      00595    ****************************************************************
      00596    * THE BIND MAP STATEMENTS ADVISE IDMS-DC OF THE LOCATION OF *
      00597    * THE MRB AND THE MAP RECORDS.                 *
      00598    ****************************************************************
DMLC0001  00599       BIND MAP EMPMAPLR.
DMLC0002  00628       BIND MAP EMPMAPLR RECORD EMPLOYEE.
DMLC0003  00635       BIND MAP EMPMAPLR RECORD DEPARTMENT.
DMLC0004  00642       BIND MAP EMPMAPLR RECORD JOB.
DMLC0005  00649       BIND MAP EMPMAPLR RECORD OFFICE.
DMLC0006  00656       BIND MAP EMPMAPLR RECORD EMP-DATE-WORK-REC.
          00663    *
DMLC0007  00664       ACCEPT TASK CODE INTO TASK-CODE.
      00671       IF TASK-CODE = TSK01
      00672         GO TO INITIAL-MAPOUT
      00673       ELSE
      00674         GO TO GET-EMP.

      00675    ****************************************************************
      00676    ****************************************************************
      00677    * THE INITIAL-MAPOUT PARAGRAPH IS PERFORMED IF THE CALLING  *
      00678    * TASK CODE IS TSK01.                    *
      00679    ****************************************************************
      00680    * THE MODIFY MAP STATEMENT ASSIGNS THE PROTECTED       *
      00681    * ATTRIBUTE TO ALL MAP FIELDS EXCEPT EMP-ID-0415.       *
      00682    ****************************************************************
      00683    * THE MAP OUT STATEMENT TRANSMITS THE EMPMAPLR MAP      *
      00684    * TO THE TERMINAL.                     *
      00685    ****************************************************************
      00686    * THE DC RETURN STATEMENT SPECIFIES THAT THE NEXT      *
      00687    * TASK THAT WILL BE INITIATED ON THE SAME TERMINAL WHEN THE  *
      00688    * OPERATOR PRESSES A CONTROL KEY WILL BE TSK02.        *
      00689    ****************************************************************
      00690     INITIAL-MAPOUT.
DMLC0008  00691       MODIFY MAP EMPMAPLR TEMPORARY
```

```
DMLC0008  00692        FOR ALL EXCEPT EMP-ID-0415
DMLC0008  00693         ATTRIBUTES PROTECTED.
          00707    *
          00708       MOVE ZERO TO EMP-ID-0415.
DMLC0009  00709       MAP OUT USING EMPMAPLR
DMLC0009  00710        OUTPUT DATA IS YES NEWPAGE
DMLC0009  00711        MESSAGE IS INITIAL-MESSAGE LENGTH 80.
          00722
DMLC0010  00723       DC RETURN
DMLC0010  00724        NEXT TASK CODE TSK02.
          00731     INITIAL-MAPOUT-EXIT.
          00732       EXIT.

      00733    ****************************************************************
      00734    ****************************************************************
      00735    * THE GET-EMP PARAGRAPH IS PERFORMED IF THE CALLING TASK   *
      00736    * CODE IS NOT TSK01.                      *
      00737    ****************************************************************
      00738    * THE MAP IN STATEMENT TRANSMITS DATA FROM THE TERMINAL TO  *
      00739    * VARIABLE STORAGE DATA FIELDS.               *
      00740    ****************************************************************
      00741    * THIS FIRST INQUIRE MAP STATEMENT IS USED TO DETERMINE   *
      00742    * THE AID KEY PRESSED.                    *
      00743    ****************************************************************
      00744    * THIS SECOND INQUIRE MAP STATEMENT USES AUTOMATIC EDITING  *
      00745    * TO DETERMINE IF THE DATA ENTERED IS CONSISTENT WITH     *
      00746    * THE EXTERNAL PICTURE OF THE NAMED DATA ELEMENT.       *
      00747    ****************************************************************
      00748    * THE MAP OUT STATEMENT TRANSMITS DATA FROM THE       *
      00749    * EMP-JOB-LR LOGICAL RECORD IN VARIABLE STORAGE TO MAP    *
      00750    * FIELDS.                         *
      00751    ****************************************************************
      00752     GET-EMP.

DMLC0011  00753       MAP IN USING EMPMAPLR.
          00763    *
DMLC0012  00764       INQUIRE MAP EMPMAPLR
DMLC0012  00765        MOVE AID TO DC-AID-IND-V.
          00773       IF CLEAR-HIT
DMLC0013  00774        DC RETURN.
          00780
          00781    *
DMLC0014  00782       INQUIRE MAP EMPMAPLR
DMLC0014  00783        IF DFLD EMP-ID-0415 EDIT IS ERROR
          00795         THEN GO TO EDIT-ERROR.
          00796    *
DMLC    00797       COPY IDMS SUBSCHEMA-BINDS.
          00798       MOVE 'EMPDISP ' TO PROGRAM-NAME
```

```
DMLC0015  00799       BIND RUN-UNIT.
DMLC0016  00810       READY USAGE-MODE IS RETRIEVAL.
          00815     ****************************************************************
          00816      * SINCE THE MAP FIELD IS ASSOCIATED WITH THE EMP-ID-0415   *
          00817      * FIELD, THE PROGRAM USES THE "OF LR" RETRIEVAL. NOTE THAT  *
          00818      * AUTOSTATUS IMPLICITLY CHECKS FOR THE LR-ERROR PATH STATUS. *
          00819     ****************************************************************
DMLC      00820       OBTAIN EMP-JOB-LR
DMLC      00821         WHERE EMP-ID-0415 = EMP-ID-0415 OF LR
DMLC0017  00822         ON LR-NOT-FOUND
          00845           GO TO NOT-FOUND.
DMLC0018  00846       FINISH.
          00851

************************************************************
          00853      * REFORMAT DATE TO MMDDYY; OUTPUT AS MM/DD/YY USING THE OLM *
          00854      * EXTERNAL PICTURE SPECIFICATION (XX/XX/XX).         *
          00855     ****************************************************************
          00856       MOVE START-YEAR-0415 TO WORK-YY.
          00857       MOVE START-MONTH-0415 TO WORK-MM.
          00858       MOVE START-DAY-0415 TO WORK-DD.
          00859
DMLC0019  00860       MAP OUT USING EMPMAPLR
DMLC0019  00861        OUTPUT DATA IS YES
DMLC0019  00862        MESSAGE IS DISPLAY-MESSAGE LENGTH 80.
          00873      *
DMLC0020  00874       DC RETURN NEXT TASK CODE TSK02.
          00881      GET-EMP-EXIT.
          00882       EXIT.
          00883     ****************************************************************
          00884     ****************************************************************
          00885      * THE MODIFY MAP STATEMENT SPECIFIES THAT ALL MAP      *
          00886      * FIELDS EXCEPT THE INCORRECT EMP-ID-0415 FIELD WILL BE    *
          00887      * ERASED ON THE NEXT MAP OUT.                  *
          00888     ****************************************************************
          00889      EDIT-ERROR.
DMLC0021  00890       MODIFY MAP EMPMAPLR TEMPORARY
DMLC0021  00891        FOR ALL EXCEPT DFLD EMP-ID-0415
DMLC0021  00892         OUTPUT DATA IS ERASE.
          00906      *
DMLC0022  00907       MAP OUT USING EMPMAPLR
DMLC0022  00908        MESSAGE IS EDIT-ERROR-MESSAGE LENGTH 80.
```

```
          00919    *
DMLC0023  00920       DC RETURN
DMLC0023  00921        NEXT TASK CODE TSK02.
          00928     EDIT-ERROR-EXIT.
          00929       EXIT.

          00930    ****************************************************************
          00931    ****************************************************************
          00932     * THE FOLLOWING MODIFY MAP STATEMENT SPECIFIES THAT ALL   *
          00933     * MAP FIELDS EXCEPT THE EMP-ID-0415 FIELD WILL BE ERASED   *
          00934     * ON THE NEXT MAP OUT.                    *
          00935    ****************************************************************
          00936     NOT-FOUND.
DMLC0024  00937       MODIFY MAP EMPMAPLR TEMPORARY
DMLC0024  00938        FOR ALL EXCEPT DFLD EMP-ID-0415
DMLC0024  00939         OUTPUT DATA IS ERASE.
          00953    *
DMLC0025  00954       MAP OUT USING EMPMAPLR
DMLC0025  00955        MESSAGE IS EMP-NOT-FOUND-MESSAGE LENGTH 80.
          00966    *
DMLC0026  00967       DC RETURN
DMLC0026  00968        NEXT TASK CODE TSK02.
          00975     NOT-FOUND-EXIT.
          00976       EXIT.
          00977    ****************************************************************
          00978     IDMS-ABORT.
          00979       MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE.
          00980       MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE.
DMLC      00981       SNAP FROM SUBSCHEMA-LR-CTRL TO SUBSCHEMA-LR-CTRL-END
DMLC0027  00982         ON ANY-STATUS
          00993                 NEXT SENTENCE.
          00994       MOVE SSC-ERRSTAT-SAVE TO ERROR-STATUS.
          00995       MOVE SSC-DMLSEQ-SAVE TO DML-SEQUENCE.
          00996     IDMS-ABORT-EXIT.
          00997       EXIT.
DMLC      00998       COPY IDMS IDMS-STATUS.
:edisplay.

          00999
****************************************************************01617000
          01000     IDMS-STATUS                       SECTION.01618000
          01001    ******************** IDMS-STATUS FOR IDMS-DC
********************01619000
          01002         IF DB-STATUS-OK GO TO ISABEX.             01620000
          01003         PERFORM IDMS-ABORT.                  01621000
```

```
          01004         MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE          01622000
          01005         MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE           01623000
DMLC     01006        SNAP FROM SUBSCHEMA-CTRL TO SUBSCHEMA-CTRL-END     01624000
DMLC0028  01007              ON ANY-STATUS                 01625000
          01018                    NEXT SENTENCE.
DMLC      01019         ABEND CODE SSC-ERRSTAT-SAVE              01626000
DMLC0029  01020              ON ANY-STATUS                 01627000
          01028                    NEXT SENTENCE.
          01029     ISABEX. EXIT.                          01628000
***2000      * W BIND RECORD NOT ISSUED
***2400      * W WAS MOST SEVERE ERROR FOUND

0002 MESSAGES FOR PROGRAM EMPDISP
```

Sample Online COBOL Program from the COBOL Compiler

```
00001     *NO-ACTIVITY-LOG
00002     *DMLIST
00003
00004     IDENTIFICATION DIVISION.
00005
00006     PROGRAM-ID.           EMPDISP.
00007
00008     AUTHOR.             COMPUTER ASSOCIATES.
00009
00010     DATE-WRITTEN.          APRIL 1995.
00011
00012     REMARKS.            THIS PROGRAM DEMONSTRATES
00013                       CA IDMS PROGRAMMING USING
00014                       THE LOGICAL RECORD FACILITY.
00015
00016     ****************************************************************
00017     ENVIRONMENT DIVISION.
00018     ****************************************************************
00019     *IDMS-CONTROL SECTION.
00020
00021     *PROTOCOL.           MODE IS IDMS-DC DEBUG
00022     *                    IDMS-RECORDS MANUAL.
00024     DATA DIVISION.
00025
00026     *SCHEMA SECTION.
00027
00028     *  DB EMPSS09 WITHIN EMPSCHM.
00029
00030     *MAP SECTION.
```

```
00031     *MAX FIELD LIST IS 5.
00032     *MAP EMPMAPLR VERSION 1 TYPE IS STANDARD.

00033
00034
00035
00036     WORKING-STORAGE SECTION.
00037     01 TASK-CODE     PIC X(8).
00038     01 TSK01       PIC X(8)   VALUE 'TSK01'.
00039     01 TSK02       PIC X(8)   VALUE 'TSK02'.
00040
00041     01 MESSAGES.
00042       05 INITIAL-MESSAGE     PIC X(80) VALUE
00043         'ENTER AN EMP ID AND PRESS ENTER ** CLEAR TO EXIT'.
00044       05 EDIT-ERROR-MESSAGE   PIC X(80) VALUE
00045         'EMP-ID EITHER NOT ENTERED OR NOT NUMERIC'.
00046       05 EMP-NOT-FOUND-MESSAGE  PIC X(80) VALUE
00047         'SPECIFIED EMPLOYEE COULD NOT BE FOUND'.
00048       05 DISPLAY-MESSAGE     PIC X(80) VALUE
00049         'CLEAR TO EXIT ** NEW EMP-ID AND ENTER TO CONTINUE'.
00050
00051     *01 COPY IDMS DC-AID-CONDITION-NAMES.
00052     01 DC-AID-CONDITION-NAMES.
00053        03 DC-AID-IND-V      PIC X.
00054                  88 ENTER-HIT VALUE QUOTE.
00055                  88 CLEAR-HIT VALUE '_'.
00056                  88 PF01-HIT VALUE '1'.
00057                  88 PF02-HIT VALUE '2'.
00058                  88 PF03-HIT VALUE '3'.
00059                  88 PF04-HIT VALUE '4'.
00060                  88 PF05-HIT VALUE '5'.
00061                  88 PF06-HIT VALUE '6'.
00062                  88 PF07-HIT VALUE '7'.
00063                  88 PF08-HIT VALUE '8'.
00064                  88 PF09-HIT VALUE '9'.
00065                  88 PF10-HIT VALUE ':'.

00066                  88 PF11-HIT VALUE '#'.
00067                  88 PF12-HIT VALUE '@'.
00068                  88 PF13-HIT VALUE 'A'.
00069                  88 PF14-HIT VALUE 'B'.
00070                  88 PF15-HIT VALUE 'C'.
00071                  88 PF16-HIT VALUE 'D'.
00072                  88 PF17-HIT VALUE 'E'.
00073                  88 PF18-HIT VALUE 'F'.
00074                  88 PF19-HIT VALUE 'G'.
00075                  88 PF20-HIT VALUE 'H'.
00076                  88 PF21-HIT VALUE 'I'.
```

```
00077                 88 PF22-HIT VALUE '_'.
00078                 88 PF23-HIT VALUE '.'.
00079                 88 PF24-HIT VALUE '<'.
00080                 88 PA01-HIT VALUE '%'.
00081                 88 PA02-HIT VALUE '>'.
00082                 88 PA03-HIT VALUE ','.
00083                 88 PEN-ATTN-SPACE-NULL VALUE '='.
00084                 88 PEN-ATTN VALUE QUOTE.
00085
00086     *01 COPY IDMS EMP-DATE-WORK-REC.
00087     01 EMP-DATE-WORK-REC.
00088       02 WORK-DATE.
00089        03 WORK-MM        PIC 9(2).
00090        03 WORK-DD        PIC 9(2).
00091        03 WORK-YY        PIC 9(2).

00092
00093     *01 COPY IDMS SUBSCHEMA-LR-CONTROL.
00094     01 SUBSCHEMA-CTRL.
00095        03 PROGRAM-NAME      PIC X(8) VALUE SPACES.
00096        03 ERROR-STATUS      PIC X(4) VALUE '1400'.
00097                 88 DB-STATUS-OK VALUE '0000'.
00098                 88 ANY-STATUS
00099                   VALUE '0000' THRU '9999'.
00100                 88 ANY-ERROR-STATUS
00101                   VALUE '0001' THRU '9999'.
00102                 88 DB-END-OF-SET VALUE '0307'.
00103                 88 DB-REC-NOT-FOUND VALUE '0326'.
00104                 88 DC-DEADLOCK VALUE '3101'
00105                   '3201' '3401' '3901'.
00106                 88 DC-NO-STORAGE VALUE '3202'
00107                   '3402'.
00108                 88 DC-AREA-ID-UNK VALUE '4303'.
00109                 88 DC-QUEUE-ID-UNK VALUE '4404'.
00110                 88 DC-REC-NOT-FOUND VALUE '4305'
00111                   '4405'.
00112                 88 DC-RESOURCE-NOT-AVAIL
00113                   VALUE '3908'.
00114                 88 DC-RESOURCE-AVAIL
00115                   VALUE '3909'.
00116                 88 DC-NEW-STORAGE VALUE '3210'.
00117                 88 DC-MAX-TASKS VALUE '3711'.
00118                 88 DC-REC-REPLACED VALUE '4317'.
00119                 88 DC-TRUNCATED-DATA
00120                   VALUE '4319' '4419'
00121                   '4519' '4719'.
00122                 88 DC-ATTN-INT VALUE '4525'

00123                   '4625'.
```

```
00124                 88 DC-OPER-CANCEL VALUE '4743'.
00125                 88 DC-FIRST-PAGE-SENT
00126                   VALUE '4676'.
00127                 88 DC-SECOND-STARTPAGE
00128                   VALUE '4604'.
00129                 88 DC-DETAIL-NOT-FOUND
00130                   VALUE '4664'.
00131        03 DBKEY         PIC S9(8)
00132                 USAGE COMP.
00133        03 RECORD-NAME      PIC X(16) VALUE SPACES.
00134        03 RRECORD-NAME      REDEFINES RECORD-NAME.
00135         05 SSC-NODN       PIC X(8).
00136         05 SSC-DBN       PIC X(8).
00137        03 AREA-NAME       PIC X(16) VALUE SPACES.
00138        03 ERROR-SET       PIC X(16) VALUE SPACES.
00139        03 ERROR-RECORD      PIC X(16) VALUE SPACES.
00140        03 ERROR-AREA       PIC X(16) VALUE SPACES.
00141        03 IDBMSCOM-AREA     PIC X(100) VALUE LOW-VALUE.
00142        03 IDBMSCOM        REDEFINES IDBMSCOM-AREA
00143                 PIC X
00144                 OCCURS 100.
00145        03 RIDBMSCOM       REDEFINES IDBMSCOM-AREA.
00146         05 DB-SUB-ADDR     PIC X(4).
00147         05 FILLER        PIC X(0096).
00148        03 DIRECT-DBKEY      PIC S9(8)
00149                 USAGE COMP.

00150        03 DIRECT-DBK       REDEFINES DIRECT-DBKEY
00151                 PIC S9(8)
00152                 USAGE COMP.
00153        03 DCBMSCOM-AREA     PIC X(100) VALUE LOW-VALUE.
00154        03 DCBMSCOM        REDEFINES DCBMSCOM-AREA
00155                 PIC X
00156                 OCCURS 100.
00157        03 R1DCBMSCOM       REDEFINES DCBMSCOM-AREA.
00158         05 R2DCBMSCOM      PIC S9(8)
00159                 OCCURS 11
00160                 USAGE COMP.
00161         05 DCSTR1        PIC X(16).
00162         05 R3DCBMSCOM      REDEFINES DCSTR1.
00163          07 DCSTR2       PIC X(8).
00164          07 R4DCBMSCOM     REDEFINES DCSTR2.
00165           09 DCSTR4      PIC X(4).
00166           09 DCSTR5      PIC X(4).
00167          07 DCSTR3       PIC X(8).
00168         05 R5DCBMSCOM      REDEFINES DCSTR1.
00169          07 DCPNUM1      PIC S9(15)
```

```
00170                    USAGE COMP-3.
00171          05 DCNUM1        PIC S9(8)
00172                    USAGE COMP.
00173          05 R6DCBMSCOM      REDEFINES DCNUM1.
00174           07 DCPNUM2       PIC S9(7)
00175                    USAGE COMP-3.
00176          05 DCNUM2        PIC S9(8)
00177                    USAGE COMP.
00178          05 DCNUM3        PIC S9(8)
00179                    USAGE COMP.
00180          05 DCFLG1        PIC S9(4)

00181                    USAGE COMP.
00182          05 DCFLG2        PIC S9(4)
00183                    USAGE COMP.
00184          05 DCFLG3        PIC S9(4)
00185                    USAGE COMP.
00186          05 DCFLG4        PIC S9(4)
00187                    USAGE COMP.
00188        03 SSC-ERRSTAT-SAVE    PIC X(4) VALUE SPACES.
00189        03 SSC-DMLSEQ-SAVE    PIC S9(8)
00190                    USAGE COMP.
00191        03 DML-SEQUENCE      PIC S9(8)
00192                    USAGE COMP.
00193        03 RECORD-OCCUR      PIC S9(8)
00194                    USAGE COMP.
00195        03 SUBSCHEMA-CTRL-END   PIC X(4) VALUE SPACES.
00196     01 SUBSCHEMA-LR-CTRL.
00197        03 LRC-LRPXELNG      PIC S9(4)
00198                    USAGE COMP.
00199        03 LRC-MAXVXP       PIC S9(4)
00200                    USAGE COMP.
00201        03 LRIDENT        PIC X(4) VALUE 'LRC '.
00202        03 LRVERB         PIC X(8).
00203        03 LRNAME         PIC X(16).
00204        03 LR-STATUS       PIC X(16).
00205        03 FILLER         PIC X(16).
00206        03 LRPXE         PIC X
00207                    OCCURS 0 TO 512
00208                    DEPENDING ON LRC-LRPXELNG.
00209        03 PXE.
00210         05 PXENEXT       PIC S9(8)
00211                    USAGE COMP.
00212         05 PXETABO       PIC S9(4)
00213                    USAGE COMP.

00214         05 PXEDSPL       PIC S9(4)
00215                    USAGE COMP.
00216         05 PXEDYN        PIC S9(4)
```

```
00217                    USAGE COMP.
00218          05 PXEDLEN       PIC S9(4)
00219                    USAGE COMP.
00220          05 PXENDEC       PIC X.
00221          05 PXEDTYP       PIC X.
00222          05 PXEOTYP       PIC X.
00223          05 PXEFLAG       PIC X.
00224          05 FILLER        PIC X(240).
00225        03 PXEDSP256       REDEFINES PXE
00226                    PIC X(256).
00227        03 PXEDSP248       REDEFINES PXE
00228                    PIC X(248).
00229        03 PXEDSP240       REDEFINES PXE
00230                    PIC X(240).
00231        03 PXEDSP232       REDEFINES PXE
00232                    PIC X(232).
00233        03 PXEDSP224       REDEFINES PXE
00234                    PIC X(224).
00235        03 PXEDSP216       REDEFINES PXE
00236                    PIC X(216).
00237        03 PXEDSP208       REDEFINES PXE
00238                    PIC X(208).
00239        03 PXEDSP200       REDEFINES PXE
00240                    PIC X(200).
00241        03 PXEDSP192       REDEFINES PXE
00242                    PIC X(192).
00243        03 PXEDSP184       REDEFINES PXE
00244                    PIC X(184).
00245        03 PXEDSP176       REDEFINES PXE
00246                    PIC X(176).
00247        03 PXEDSP168       REDEFINES PXE
00248                    PIC X(168).

00249        03 PXEDSP160       REDEFINES PXE
00250                    PIC X(160).
00251        03 PXEDSP152       REDEFINES PXE
00252                    PIC X(152).
00253        03 PXEDSP144       REDEFINES PXE
00254                    PIC X(144).
00255        03 PXEDSP136       REDEFINES PXE
00256                    PIC X(136).
00257        03 PXEDSP128       REDEFINES PXE
00258                    PIC X(128).
00259        03 PXEDSP120       REDEFINES PXE
00260                    PIC X(120).
00261        03 PXEDSP112       REDEFINES PXE
00262                    PIC X(112).
```

```
00263       03 PXEDSP104       REDEFINES PXE
00264                     PIC X(104).
00265       03 PXEDSP96        REDEFINES PXE
00266                     PIC X(96).
00267       03 PXEDSP88        REDEFINES PXE
00268                     PIC X(88).
00269       03 PXEDSP80        REDEFINES PXE
00270                     PIC X(80).
00271       03 PXEDSP72        REDEFINES PXE
00272                     PIC X(72).
00273       03 PXEDSP64        REDEFINES PXE
00274                     PIC X(64).
00275       03 PXEDSP56        REDEFINES PXE
00276                     PIC X(56).
00277       03 PXEDSP48        REDEFINES PXE
00278                     PIC X(48).
00279       03 PXEDSP40        REDEFINES PXE
00280                     PIC X(40).
00281       03 PXEDSP32        REDEFINES PXE
00282                     PIC X(32).
00283       03 PXEDSP24        REDEFINES PXE
00284                     PIC X(24).
00285       03 PXEDSP16        REDEFINES PXE
00286                     PIC X(16).
00287       03 PXEDSP8         REDEFINES PXE
00288                     PIC X(8).
00289       03 PXECOMP-1       REDEFINES PXE
00290                     USAGE COMP-1.
00291       03 PXECOMP-2       REDEFINES PXE
00292                     USAGE COMP-2.
00293       03 PXECOMP-30      REDEFINES PXE
00294                     PIC S9(18)
00295                     USAGE COMP-3.
00296       03 PXECOMP-31      REDEFINES PXE
00297                     PIC S9(17)V9(1)
00298                     USAGE COMP-3.
00299       03 PXECOMP-32      REDEFINES PXE
00300                     PIC S9(16)V9(2)
00301                     USAGE COMP-3.
00302       03 PXECOMP-33      REDEFINES PXE
```

```
00303                   PIC S9(15)V9(3)
00304                   USAGE COMP-3.
00305       03 PXECOMP-34       REDEFINES PXE
00306                   PIC S9(14)V9(4)
00307                   USAGE COMP-3.
00308       03 PXECOMP-35       REDEFINES PXE
00309                   PIC S9(13)V9(5)
00310                   USAGE COMP-3.
00311       03 PXECOMP-36       REDEFINES PXE
00312                   PIC S9(12)V9(6)
00313                   USAGE COMP-3.
00314       03 PXECOMP-37       REDEFINES PXE
00315                   PIC S9(11)V9(7)
00316                   USAGE COMP-3.
00317       03 PXECOMP-38       REDEFINES PXE
00318                   PIC S9(10)V9(8)
00319                   USAGE COMP-3.
00320       03 PXECOMP-39       REDEFINES PXE
00321                   PIC S9(9)V9(9)
00322                   USAGE COMP-3.
00323       03 PXECOMP-310      REDEFINES PXE
00324                   PIC S9(8)V9(10)
00325                   USAGE COMP-3.
00326       03 PXECOMP-311      REDEFINES PXE
00327                   PIC S9(7)V9(11)
00328                   USAGE COMP-3.
00329       03 PXECOMP-312      REDEFINES PXE
00330                   PIC S9(6)V9(12)
00331                   USAGE COMP-3.

00332       03 PXECOMP-313      REDEFINES PXE
00333                   PIC S9(5)V9(13)
00334                   USAGE COMP-3.
00335       03 PXECOMP-314      REDEFINES PXE
00336                   PIC S9(4)V9(14)
00337                   USAGE COMP-3.
00338       03 PXECOMP-315      REDEFINES PXE
00339                   PIC S9(3)V9(15)
00340                   USAGE COMP-3.
00341       03 PXECOMP-316      REDEFINES PXE
00342                   PIC S9(2)V9(16)
00343                   USAGE COMP-3.
00344       03 PXECOMP-317      REDEFINES PXE
00345                   PIC S9(1)V9(17)
00346                   USAGE COMP-3.
00347       03 PXECOMP-318      REDEFINES PXE
00348                   PIC SV9(18)
00349                   USAGE COMP-3.
```

```
00350       03 PXECOMP20      REDEFINES PXE
00351                   PIC S9(4)
00352                   USAGE COMP.
00353       03 PXECOMP21      REDEFINES PXE
00354                   PIC S9(3)V9(1)
00355                   USAGE COMP.
00356       03 PXECOMP22      REDEFINES PXE
00357                   PIC S9(2)V9(2)
00358                   USAGE COMP.
00359       03 PXECOMP23      REDEFINES PXE

00360                   PIC S9(1)V9(3)
00361                   USAGE COMP.
00362       03 PXECOMP24      REDEFINES PXE
00363                   PIC SV9(4)
00364                   USAGE COMP.
00365       03 PXECOMP40      REDEFINES PXE
00366                   PIC S9(9)
00367                   USAGE COMP.
00368       03 PXECOMP41      REDEFINES PXE
00369                   PIC S9(8)V9(1)
00370                   USAGE COMP.
00371       03 PXECOMP42      REDEFINES PXE
00372                   PIC S9(7)V9(2)
00373                   USAGE COMP.
00374       03 PXECOMP43      REDEFINES PXE
00375                   PIC S9(6)V9(3)
00376                   USAGE COMP.
00377       03 PXECOMP44      REDEFINES PXE
00378                   PIC S9(5)V9(4)
00379                   USAGE COMP.
00380       03 PXECOMP45      REDEFINES PXE
00381                   PIC S9(4)V9(5)
00382                   USAGE COMP.
00383       03 PXECOMP46      REDEFINES PXE
00384                   PIC S9(3)V9(6)
00385                   USAGE COMP.
00386       03 PXECOMP47      REDEFINES PXE
00387                   PIC S9(2)V9(7)
00388                   USAGE COMP.
00389       03 PXECOMP48      REDEFINES PXE
00390                   PIC S9(1)V9(8)
00391                   USAGE COMP.

00392       03 PXECOMP49      REDEFINES PXE
00393                   PIC SV9(9)
00394                   USAGE COMP.
00395       03 PXECOMP80      REDEFINES PXE
00396                   PIC S9(18)
```

```
00397                   USAGE COMP.
00398        03 PXECOMP81       REDEFINES PXE
00399                   PIC S9(17)V9(1)
00400                   USAGE COMP.
00401        03 PXECOMP82       REDEFINES PXE
00402                   PIC S9(16)V9(2)
00403                   USAGE COMP.
00404        03 PXECOMP83       REDEFINES PXE
00405                   PIC S9(15)V9(3)
00406                   USAGE COMP.
00407        03 PXECOMP84       REDEFINES PXE
00408                   PIC S9(14)V9(4)
00409                   USAGE COMP.
00410        03 PXECOMP85       REDEFINES PXE
00411                   PIC S9(13)V9(5)
00412                   USAGE COMP.
00413        03 PXECOMP86       REDEFINES PXE
00414                   PIC S9(12)V9(6)
00415                   USAGE COMP.
00416        03 PXECOMP87       REDEFINES PXE
00417                   PIC S9(11)V9(7)
00418                   USAGE COMP.
00419        03 PXECOMP88       REDEFINES PXE
00420                   PIC S9(10)V9(8)
00421                   USAGE COMP.
00422        03 PXECOMP89       REDEFINES PXE
00423                   PIC S9(9)V9(9)
00424                   USAGE COMP.
00425        03 PXECOMP810       REDEFINES PXE
00426                   PIC S9(8)V9(10)
00427                   USAGE COMP.
00428        03 PXECOMP811       REDEFINES PXE
00429                   PIC S9(7)V9(11)
00430                   USAGE COMP.
00431        03 PXECOMP812       REDEFINES PXE
00432                   PIC S9(6)V9(12)
00433                   USAGE COMP.
00434        03 PXECOMP813       REDEFINES PXE
00435                   PIC S9(5)V9(13)
00436                   USAGE COMP.
00437        03 PXECOMP814       REDEFINES PXE
00438                   PIC S9(4)V9(14)
00439                   USAGE COMP.
00440        03 PXECOMP815       REDEFINES PXE
00441                   PIC S9(3)V9(15)
00442                   USAGE COMP.
```

```
00443        03 PXECOMP816       REDEFINES PXE
00444                    PIC S9(2)V9(16)
00445                    USAGE COMP.
00446        03 PXECOMP817       REDEFINES PXE
00447                    PIC S9(1)V9(17)
00448                    USAGE COMP.
00449        03 PXECOMP818       REDEFINES PXE
00450                    PIC SV9(18)
00451                    USAGE COMP.
00452     01 SUBSCHEMA-SSNAME      PIC X(8) VALUE 'EMPSS09 '.

00453     01 SUBSCHEMA-AREANAMES.
00454        03 EMP-DEMO-REGION    PIC X(16)
00455                    VALUE 'EMP-DEMO-REGION '.
00456        03 INS-DEMO-REGION    PIC X(16)
00457                    VALUE 'INS-DEMO-REGION '.
00458        03 ORG-DEMO-REGION    PIC X(16)
00459                    VALUE 'ORG-DEMO-REGION '.
00460
00461     *01 COPY IDMS SUBSCHEMA-LR-RECORDS.
00462     01 EMP-JOB-LR.
00463       02 EMPLOYEE.
00464        03 EMP-ID-0415      PIC 9(4).
00465        03 EMP-NAME-0415.
00466        04 EMP-FIRST-NAME-0415  PIC X(10).
00467        04 EMP-LAST-NAME-0415  PIC X(15).
00468        03 STATUS-0415      PIC X(2).
00469                  88 ACTIVE-0415 VALUE '01'.
00470                  88 ST-DISABIL-0415 VALUE '02'.
00471                  88 LT-DISABIL-0415 VALUE '03'.
00472                  88 LEAVE-OF-ABSENCE-0415
00473                    VALUE '04'.
00474                  88 TERMINATED-0415 VALUE '05'.
00475        03 SS-NUMBER-0415     PIC 9(9).
00476        03 START-DATE-0415.
00477        04 START-YEAR-0415    PIC 9(2).
00478        04 START-MONTH-0415   PIC 9(2).
00479        04 START-DAY-0415    PIC 9(2).
00480        03 FILLER         PIC X(2).
00481       02 DEPARTMENT.
00482        03 DEPT-ID-0410      PIC 9(4).
00483        03 DEPT-NAME-0410     PIC X(45).
00484        03 DEPT-HEAD-ID-0410   PIC 9(4).

00485        03 FILLER         PIC XXX.
00486       02 JOB.
00487        03 JOB-ID-0440      PIC 9(4).
00488        03 TITLE-0440       PIC X(20).
00489       02 OFFICE.
```

```
00490       03 OFFICE-CODE-0450    PIC X(3).
00491       03 OFFICE-ADDRESS-0450.
00492       04 OFFICE-STREET-0450  PIC X(20).
00493       04 OFFICE-CITY-0450   PIC X(15).
00494       04 OFFICE-STATE-0450   PIC X(2).
00495       04 OFFICE-ZIP-0450.
00496        05 OFFICE-ZIP-FIRST-FIVE-0450
00497                   PIC X(5).
00498        05 OFFICE-ZIP-LAST-FOUR-0450
00499                   PIC X(4).
00500       03 OFFICE-PHONE-0450   PIC 9(7)
00501                   OCCURS 3.
00502       03 OFFICE-AREA-CODE-0450 PIC X(3).
00503       03 SPEED-DIAL-0450    PIC X(3).
00504       03 FILLER         PIC X(4).
00505      03 SUBSCHEMA-LR-CTRL-END     PIC X.
00506
00507     *01 COPY IDMS MAP-CONTROLS.
00508     01 MRB-EMPMAPLR.
00509        03 MRB-EMPMAPLR-ID    PIC X(8).
00510        03 MRB-EMPMAPLR-MCOMP-VER.
00511         05 MRB-EMPMAPLR-MCOMP-DATE
00512                   PIC X(8).
00513         05 MRB-EMPMAPLR-MCOMP-TIME
00514                   PIC X(6).
00515         05 MRB-EMPMAPLR-MCOMP-VERID
00516                   PIC X(2).

00517       03 MRB-EMPMAPLR-SUBSCHEMA PIC X(8).
00518       03 MRB-EMPMAPLR-FLGS   PIC X
00519                   OCCURS 4.
00520       03 FILLER         PIC X(6).
00521       03 MRB-EMPMAPLR-NFLDS   PIC S9(4)
00522                   USAGE COMP.
00523       03 MRB-EMPMAPLR-NRECS   PIC S9(4)
00524                   USAGE COMP.
00525       03 MRB-EMPMAPLR-RECOF   PIC S9(4)
00526                   USAGE COMP.
00527       03 MRB-EMPMAPLR-PERM-CURSOR
00528                   PIC XX.
00529       03 MRB-EMPMAPLR-TEMP-CURSOR
00530                   PIC XX.
00531       03 MRB-EMPMAPLR-PERM-WCC PIC X.
00532       03 MRB-EMPMAPLR-TEMP-WCC PIC X.
00533       03 MRB-EMPMAPLR-CURSOR  PIC XX.
00534       03 MRB-EMPMAPLR-AID    PIC X.
00535       03 MRB-EMPMAPLR-INPUT-FLGS
```

```
00536                    PIC X.
00537        03 MRB-EMPMAPLR-SEGVIEW  PIC X.
00538        03 FILLER         PIC X.
00539        03 MRB-EMPMAPLR-MREO   PIC S9(4)
00540                    USAGE COMP.
00541        03 MRB-EMPMAPLR-ERR-CNT  PIC S9(4)
00542                    USAGE COMP.
00543        03 MRB-EMPMAPLR-ATTR-FLGS PIC X
00544                    OCCURS 4.
00545        03 MRB-EMPMAPLR-CURR-MFLD PIC S9(4)
00546                    USAGE COMP.
00547        03 MRB-EMPMAPLR-XTYP   PIC X.
00548        03 MRB-EMPMAPLR-FILLER  PIC X.

00549        03 MRB-EMPMAPLR-MRE-XLEN PIC S9(4)
00550                    USAGE COMP.
00551        03 MRB-EMPMAPLR-MRB-XLEN PIC S9(4)
00552                    USAGE COMP.
00553        03 MRB-EMPMAPLR-MRE    OCCURS 11.
00554         05 MRB-EMPMAPLR-MRE-FLGS
00555                    PIC X
00556                    OCCURS 8.
00557         05 MRB-EMPMAPLR-MRE-INLEN
00558                    PIC S9(4)
00559                    USAGE COMP.
00560         05 MRB-EMPMAPLR-MRE-PAD-CHAR
00561                    PIC X
00562                    OCCURS 2.
00563         05 MRB-EMPMAPLR-MRE-FLG2
00564                    PIC X
00565                    OCCURS 2.
00566        03 MRB-EMPMAPLR-RECS   PIC S9(8)
00567                    OCCURS 5
00568                    USAGE COMP
00569                    SYNC.
00570        03 MRB-EMPMAPLR-END    PIC X.
00571        03 MRB-EMPMAPLR-MRE-SUB  PIC S9(4)
00572                    USAGE COMP.
00573
00574
00575     01 MRB-FLDLST.
00576       02 FLDLST         PIC S9(8)

00577                    OCCURS 6
00578                    USAGE COMP.
00579     PROCEDURE DIVISION.
00580
00581     *  ********************************************************
00582     *  * PROCEDURE DIVISION GENERAL STRATEGY:         *
```

```
00583     *  *   RETRIEVE INFORMATION FOR A SPECIFIED EMPLOYEE.  *
00584     *  *   DISPLAYED DATA INCLUDES EMPLOYEE, DEPARTMENT,  *
00585     *  *         JOB, AND OFFICE INFORMATION.    *
00586     *  * ==> THIS PROGRAM USES THE EMP-JOB-LR LOGICAL RECORD<= *
00587     *  * PROGRAM STRATEGY:                  *
00588     *  *     ** CHECK FOR TASK CODE: TSK01= INITIAL MAPOUT *
00589     *  *           ANYTHING ELSE = RETRIEVE LR  *
00590     *  *     ** CLEAR TO EXIT APPLICATION         *
00591     *  *     ** ENTER AND NEW EMP-ID TO CONTINUE      *
00592     *  ******************************************************
00593
00594     MAIN-LINE.
00595     ****************************************************************
00596     * THE BIND MAP STATEMENTS ADVISE IDMS-DC OF THE LOCATION OF *
00597     * THE MRB AND THE MAP RECORDS.                 *
00598     ****************************************************************
00599     *  BIND MAP EMPMAPLR.
00600              MOVE 0001 TO DML-SEQUENCE           DMLC0001
00601              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00602                  DCBMSCOM (90)
00603                  MRB-EMPMAPLR
00604                  MRB-EMPMAPLR-END
00605              MOVE '08/12/85112414R2'
00606                 TO MRB-EMPMAPLR-MCOMP-VER
00607              MOVE 'EMPSS09 '
00608                 TO MRB-EMPMAPLR-SUBSCHEMA
00609              MOVE 'EMPMAPLR'
00610                 TO MRB-EMPMAPLR-ID
00611              MOVE 11

00612                 TO MRB-EMPMAPLR-NFLDS
00613              MOVE 5
00614                 TO MRB-EMPMAPLR-NRECS
00615              MOVE 156
00616                 TO MRB-EMPMAPLR-RECOF
00617              MOVE 76
00618                 TO MRB-EMPMAPLR-MREO
00619              MOVE '0'
00620                 TO MRB-EMPMAPLR-XTYP
00621              MOVE 0
00622                 TO MRB-EMPMAPLR-MRE-XLEN
00623              MOVE 0
00624                 TO MRB-EMPMAPLR-MRB-XLEN
00625              MOVE 'Y'
00626                 TO MRB-EMPMAPLR-SEGVIEW
00627               PERFORM IDMS-STATUS.
00628     *  BIND MAP EMPMAPLR RECORD EMPLOYEE.
00629              MOVE 0002 TO DML-SEQUENCE           DMLC0002
```

```
00630            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00631                DCBMSCOM (91)
00632                MRB-EMPMAPLR-RECS (1)
00633                EMPLOYEE
00634             PERFORM IDMS-STATUS.
00635       *  BIND MAP EMPMAPLR RECORD DEPARTMENT.
00636            MOVE 0003 TO DML-SEQUENCE            DMLC0003
00637            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00638                DCBMSCOM (91)
00639                MRB-EMPMAPLR-RECS (2)
00640                DEPARTMENT
00641             PERFORM IDMS-STATUS.

00642       *  BIND MAP EMPMAPLR RECORD JOB.
00643            MOVE 0004 TO DML-SEQUENCE            DMLC0004
00644            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00645                DCBMSCOM (91)
00646                MRB-EMPMAPLR-RECS (3)
00647                JOB
00648             PERFORM IDMS-STATUS.
00649       *  BIND MAP EMPMAPLR RECORD OFFICE.
00650            MOVE 0005 TO DML-SEQUENCE            DMLC0005
00651            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00652                DCBMSCOM (91)
00653                MRB-EMPMAPLR-RECS (4)
00654                OFFICE
00655             PERFORM IDMS-STATUS.
00656       *  BIND MAP EMPMAPLR RECORD EMP-DATE-WORK-REC.
00657            MOVE 0006 TO DML-SEQUENCE            DMLC0006
00658            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00659                DCBMSCOM (91)
00660                MRB-EMPMAPLR-RECS (5)
00661                EMP-DATE-WORK-REC
00662             PERFORM IDMS-STATUS.
00663       *
00664       *  ACCEPT TASK CODE INTO TASK-CODE.
00665            MOVE 0007 TO DML-SEQUENCE            DMLC0007
00666            MOVE 1 TO DCNUM1
00667            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00668                DCBMSCOM (2)
00669                TASK-CODE
00670             PERFORM IDMS-STATUS.

00671          IF TASK-CODE = TSK01
00672             GO TO INITIAL-MAPOUT
00673          ELSE
00674             GO TO GET-EMP.
00675       ****************************************************************
00676       ****************************************************************
```

```
00677     * THE INITIAL-MAPOUT PARAGRAPH IS PERFORMED IF THE CALLING  *
00678     * TASK CODE IS TSK01.                    *
00679     ************************************************************
00680     * THE MODIFY MAP STATEMENT ASSIGNS THE PROTECTED       *
00681     * ATTRIBUTE TO ALL MAP FIELDS EXCEPT EMP-ID-0415.       *
00682     ************************************************************
00683     * THE MAP OUT STATEMENT TRANSMITS THE EMPMAPLR MAP      *
00684     * TO THE TERMINAL.                      *
00685     ************************************************************
00686     * THE DC RETURN STATEMENT SPECIFIES THAT THE NEXT      *
00687     * TASK THAT WILL BE INITIATED ON THE SAME TERMINAL WHEN THE  *
00688     * OPERATOR PRESSES A CONTROL KEY WILL BE TSK02.        *
00689     ************************************************************
00690     INITIAL-MAPOUT.
00691     *  MODIFY MAP EMPMAPLR TEMPORARY
00692     *    FOR ALL EXCEPT EMP-ID-0415
00693     *     ATTRIBUTES PROTECTED.
00694               MOVE 0008 TO DML-SEQUENCE           DMLC0008
00695               MOVE 8 TO DCNUM1
00696               MOVE 2561 TO DCFLG1
00697               MOVE 0 TO DCFLG2
00698               MOVE 0 TO DCFLG3
00699               MOVE 0 TO DCFLG4
00700               MOVE 1 TO FLDLST (2)
00701               MOVE 1 TO FLDLST (1)
00702               CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00703                   DCBMSCOM (93)
00704                   MRB-EMPMAPLR
00705                   MRB-FLDLST

00706                PERFORM IDMS-STATUS.
00707     *
00708       MOVE ZERO TO EMP-ID-0415.
00709     *  MAP OUT USING EMPMAPLR
00710     *    OUTPUT DATA IS YES NEWPAGE
00711     *    MESSAGE IS INITIAL-MESSAGE LENGTH 80.
00712               MOVE 0009 TO DML-SEQUENCE           DMLC0009
00713               MOVE 5 TO DCFLG1
00714               MOVE 16 TO DCFLG2
00715               MOVE 1 TO DCFLG3
00716               MOVE 4 TO DCFLG4
00717               CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00718                   DCBMSCOM (34)
00719                   MRB-EMPMAPLR
00720            INITIAL-MESSAGE DCBMSCOM (80)
00721                PERFORM IDMS-STATUS.
00722
00723     *  DC RETURN
```

```
00724     *    NEXT TASK CODE TSK02.
00725              MOVE 0010 TO DML-SEQUENCE           DMLC0010
00726              MOVE TSK02 TO DCSTR2
00727              MOVE 128 TO DCFLG1
00728              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00729                  DCBMSCOM (19)
00730               PERFORM IDMS-STATUS.

00731     INITIAL-MAPOUT-EXIT.
00732       EXIT.
00733     ****************************************************************
00734     ****************************************************************
00735     * THE GET-EMP PARAGRAPH IS PERFORMED IF THE CALLING TASK   *
00736     * CODE IS NOT TSK01.                      *
00737     ****************************************************************
00738     * THE MAP IN STATEMENT TRANSMITS DATA FROM THE TERMINAL TO  *
00739     * VARIABLE STORAGE DATA FIELDS.                *
00740     ****************************************************************
00741     * THIS FIRST INQUIRE MAP STATEMENT IS USED TO DETERMINE   *
00742     * THE AID KEY PRESSED.                    *
00743     ****************************************************************
00744     * THIS SECOND INQUIRE MAP STATEMENT USES AUTOMATIC EDITING  *
00745     * TO DETERMINE IF THE DATA ENTERED IS CONSISTENT WITH     *
00746     * THE EXTERNAL PICTURE OF THE NAMED DATA ELEMENT.       *
00747     ****************************************************************
00748     * THE MAP OUT STATEMENT TRANSMITS DATA FROM THE       *
00749     * EMP-JOB-LR LOGICAL RECORD IN VARIABLE STORAGE TO MAP    *
00750     * FIELDS.                          *
00751     ****************************************************************
00752     GET-EMP.
00753     *  MAP IN USING EMPMAPLR.
:edisplay.

00754              MOVE 0011 TO DML-SEQUENCE           DMLC0011
00755              MOVE 6 TO DCFLG1
00756              MOVE 0 TO DCFLG2
00757              MOVE 0 TO DCFLG3
00758              MOVE 0 TO DCFLG4
00759              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00760                  DCBMSCOM (34)
00761                  MRB-EMPMAPLR
```

```
00762              PERFORM IDMS-STATUS.
00763     *
00764     *  INQUIRE MAP EMPMAPLR
00765     *    MOVE AID TO DC-AID-IND-V.
00766              MOVE 0012 TO DML-SEQUENCE            DMLC0012
00767              MOVE 7 TO DCNUM1
00768              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00769                  DCBMSCOM (92)
00770                  MRB-EMPMAPLR
00771              MOVE DCSTR2 TO DC-AID-IND-V
00772               PERFORM IDMS-STATUS.
00773        IF CLEAR-HIT
00774     *    DC RETURN.
00775              MOVE 0013 TO DML-SEQUENCE            DMLC0013
00776              MOVE 0 TO DCFLG1
00777              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00778                  DCBMSCOM (19)
00779               PERFORM IDMS-STATUS.
00780
00781     *
00782     *  INQUIRE MAP EMPMAPLR
00783     *    IF DFLD EMP-ID-0415 EDIT IS ERROR
00784              MOVE 0014 TO DML-SEQUENCE            DMLC0014
00785              MOVE 17 TO DCNUM1
00786              MOVE 5 TO DCNUM2

00787              MOVE 2048 TO DCFLG1
00788              MOVE 1 TO FLDLST (2)
00789              MOVE 1 TO FLDLST (1)
00790              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00791                  DCBMSCOM (92)
00792                  MRB-EMPMAPLR
00793                  MRB-FLDLST;
00794              IF ERROR-STATUS EQUAL TO '4641'
00795           THEN GO TO EDIT-ERROR.
00796     *
00797     *  COPY IDMS SUBSCHEMA-BINDS.
00798        MOVE 'EMPDISP ' TO PROGRAM-NAME
00799     *  BIND RUN-UNIT.
00800              MOVE 0015 TO DML-SEQUENCE            DMLC0015
00801              MOVE 576 TO LRC-LRPXELNG
00802              MOVE 6  TO LRC-MAXVXP
00803              MOVE 'LRF-BIND' TO LR-STATUS
00804              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00805                  IDBMSCOM (59)
00806                  SUBSCHEMA-CTRL
00807                  SUBSCHEMA-SSNAME
```

```
00808                SUBSCHEMA-LR-CTRL
00809              PERFORM IDMS-STATUS.
00810       *  READY USAGE-MODE IS RETRIEVAL.
00811              MOVE 0016 TO DML-SEQUENCE           DMLC0016
00812              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00813                  IDBMSCOM (37)
00814              PERFORM IDMS-STATUS.

00815       ************************************************************
00816       * SINCE THE MAP FIELD IS ASSOCIATED WITH THE EMP-ID-0415   *
00817       * FIELD, THE PROGRAM USES THE "OF LR" RETRIEVAL. NOTE THAT  *
00818       * AUTOSTATUS IMPLICITLY CHECKS FOR THE LR-ERROR PATH STATUS. *
00819       ************************************************************
00820       *  OBTAIN EMP-JOB-LR
00821       *    WHERE EMP-ID-0415 = EMP-ID-0415 OF LR
00822       *    ON LR-NOT-FOUND
00823              MOVE 0017 TO DML-SEQUENCE           DMLC0017
00824              MOVE 0  TO LRC-LRPXELNG
00825              MOVE 0036 TO LRC-MAXVXP
00826              MOVE 'LR-ERROR' TO LR-STATUS
00827              MOVE 'OBTAIN N' TO LRVERB
00828              MOVE 'EMP-JOB-LR' TO LRNAME
00856        MOVE START-YEAR-0415 TO WORK-YY.
00857        MOVE START-MONTH-0415 TO WORK-MM.
00858        MOVE START-DAY-0415 TO WORK-DD.
00859
00860       *  MAP OUT USING EMPMAPLR
00861       *    OUTPUT DATA IS YES
00862       *    MESSAGE IS DISPLAY-MESSAGE LENGTH 80.
00863              MOVE 0019 TO DML-SEQUENCE           DMLC0019
00864              MOVE 5 TO DCFLG1
00865              MOVE 16 TO DCFLG2
```

```
00866            MOVE 0 TO DCFLG3
00867            MOVE 4 TO DCFLG4
00868            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00869                DCBMSCOM (34)
00870                MRB-EMPMAPLR
00871         DISPLAY-MESSAGE DCBMSCOM (80)
00872              PERFORM IDMS-STATUS.

00873      *
00874      *  DC RETURN NEXT TASK CODE TSK02.
00875            MOVE 0020 TO DML-SEQUENCE           DMLC0020
00876            MOVE TSK02 TO DCSTR2
00877            MOVE 128 TO DCFLG1
00878            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00879                DCBMSCOM (19)
00880             PERFORM IDMS-STATUS.
00881      GET-EMP-EXIT.
00882        EXIT.
00883      ****************************************************************
00884      ****************************************************************
00885      * THE MODIFY MAP STATEMENT SPECIFIES THAT ALL MAP      *
00886      * FIELDS EXCEPT THE INCORRECT EMP-ID-0415 FIELD WILL BE    *
00887      * ERASED ON THE NEXT MAP OUT.                 *
00888      ****************************************************************
00889      EDIT-ERROR.
00890      *  MODIFY MAP EMPMAPLR TEMPORARY
00891      *    FOR ALL EXCEPT DFLD EMP-ID-0415
00892      *     OUTPUT DATA IS ERASE.
00893            MOVE 0021 TO DML-SEQUENCE           DMLC0021
00894            MOVE 0 TO DCNUM1
00895            MOVE 2561 TO DCFLG1
00896            MOVE 16 TO DCFLG2
00897            MOVE 0 TO DCFLG3
00898            MOVE 0 TO DCFLG4
00899            MOVE 1 TO FLDLST (2)
00900            MOVE 1 TO FLDLST (1)
00901            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00902                DCBMSCOM (93)
00903                MRB-EMPMAPLR
00904                MRB-FLDLST
00905             PERFORM IDMS-STATUS.

00906      *
00907      *  MAP OUT USING EMPMAPLR
00908      *    MESSAGE IS EDIT-ERROR-MESSAGE LENGTH 80.
00909            MOVE 0022 TO DML-SEQUENCE           DMLC0022
00910            MOVE 5 TO DCFLG1
00911            MOVE 0 TO DCFLG2
00912            MOVE 0 TO DCFLG3
```

```
00913            MOVE 4 TO DCFLG4
00914            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00915                DCBMSCOM (34)
00916                MRB-EMPMAPLR
00917        EDIT-ERROR-MESSAGE DCBMSCOM (80)
00918             PERFORM IDMS-STATUS.
00919      *
00920      *  DC RETURN
00921      *    NEXT TASK CODE TSK02.
00922            MOVE 0023 TO DML-SEQUENCE            DMLC0023
00923            MOVE TSK02 TO DCSTR2
00924            MOVE 128 TO DCFLG1
00925            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00926                DCBMSCOM (19)
00927             PERFORM IDMS-STATUS.
00928      EDIT-ERROR-EXIT.
00929        EXIT.
00930      ****************************************************************
00931      ****************************************************************
00932      * THE FOLLOWING MODIFY MAP STATEMENT SPECIFIES THAT ALL   *
00933      * MAP FIELDS EXCEPT THE EMP-ID-0415 FIELD WILL BE ERASED   *
00934      * ON THE NEXT MAP OUT.                    *
00935      ****************************************************************

00936      NOT-FOUND.
00937      *  MODIFY MAP EMPMAPLR TEMPORARY
00938      *    FOR ALL EXCEPT DFLD EMP-ID-0415
00939      *     OUTPUT DATA IS ERASE.
00940            MOVE 0024 TO DML-SEQUENCE            DMLC0024
00941            MOVE 0 TO DCNUM1
00942            MOVE 2561 TO DCFLG1
00943            MOVE 16 TO DCFLG2
00944            MOVE 0 TO DCFLG3
00945            MOVE 0 TO DCFLG4
00946            MOVE 1 TO FLDLST (2)
00947            MOVE 1 TO FLDLST (1)
00948            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00949                DCBMSCOM (93)
00950                MRB-EMPMAPLR
00951                MRB-FLDLST
00952             PERFORM IDMS-STATUS.
00953      *
00954      *  MAP OUT USING EMPMAPLR
00955      *    MESSAGE IS EMP-NOT-FOUND-MESSAGE LENGTH 80.
00956            MOVE 0025 TO DML-SEQUENCE            DMLC0025
00957            MOVE 5 TO DCFLG1
00958            MOVE 0 TO DCFLG2
```

```
00959            MOVE 0 TO DCFLG3
00960            MOVE 4 TO DCFLG4
00961            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00962                DCBMSCOM (34)
00963                MRB-EMPMAPLR
00964          EMP-NOT-FOUND-MESSAGE DCBMSCOM (80)
00965             PERFORM IDMS-STATUS.

00966      *
00967      *  DC RETURN
00968      *    NEXT TASK CODE TSK02.
00969            MOVE 0026 TO DML-SEQUENCE           DMLC0026
00970            MOVE TSK02 TO DCSTR2
00971            MOVE 128 TO DCFLG1
00972            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00973                DCBMSCOM (19)
00974             PERFORM IDMS-STATUS.
00975      NOT-FOUND-EXIT.
00976        EXIT.
00977      ****************************************************************
00978      IDMS-ABORT.
00979        MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE.
00980        MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE.
00981      *  SNAP FROM SUBSCHEMA-LR-CTRL TO SUBSCHEMA-LR-CTRL-END
00982      *     ON ANY-STATUS
00983            MOVE 0027 TO DML-SEQUENCE           DMLC0027
00984            MOVE 0 TO DCFLG1
00985            CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
00986                DCBMSCOM (22)
00987                DCSTR1
00988                DCSTR1
00989                DCSTR1
00990          SUBSCHEMA-LR-CTRL SUBSCHEMA-LR-CTRL-END DCBMSCOM (1)
00991            IF NOT ANY-STATUS PERFORM IDMS-STATUS;
00992            ELSE
00993                NEXT SENTENCE.
00994        MOVE SSC-ERRSTAT-SAVE TO ERROR-STATUS.
00995        MOVE SSC-DMLSEQ-SAVE TO DML-SEQUENCE.
00996      IDMS-ABORT-EXIT.
00997        EXIT.
00998      *  COPY IDMS IDMS-STATUS.

00999
****************************************************************01617000
01000      IDMS-STATUS                       SECTION.01618000
01001     ********************* IDMS-STATUS FOR IDMS-DC *********************01619000
01002          IF DB-STATUS-OK GO TO ISABEX.             01620000
01003          PERFORM IDMS-ABORT.                  01621000
```

```
01004          MOVE ERROR-STATUS TO SSC-ERRSTAT-SAVE          01622000
01005          MOVE DML-SEQUENCE TO SSC-DMLSEQ-SAVE           01623000
01006      *    SNAP FROM SUBSCHEMA-CTRL TO SUBSCHEMA-CTRL-END      01624000
01007      *          ON ANY-STATUS                 01625000
01008              MOVE 0028 TO DML-SEQUENCE            DMLC0028
01009              MOVE 0 TO DCFLG1
01010              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
01011                  DCBMSCOM (22)
01012                  DCSTR1
01013                  DCSTR1
01014                  DCSTR1
01015          SUBSCHEMA-CTRL SUBSCHEMA-CTRL-END DCBMSCOM (1)
01016              IF NOT ANY-STATUS PERFORM IDMS-STATUS;
01017              ELSE
01018                      NEXT SENTENCE.
01019      *    ABEND CODE SSC-ERRSTAT-SAVE              01626000
01020      *          ON ANY-STATUS                 01627000
01021              MOVE 0029 TO DML-SEQUENCE            DMLC0029
01022              MOVE SSC-ERRSTAT-SAVE TO DCSTR4
01023              MOVE 2 TO DCFLG1
01024              CALL 'IDMSCOBI' USING SUBSCHEMA-CTRL
01025                  DCBMSCOM (1)
01026              IF NOT ANY-STATUS PERFORM IDMS-STATUS;
01027              ELSE
01028                      NEXT SENTENCE.
01029      ISABEX. EXIT.                          01628000
```

Appendix D: CA IDMS Call Formats

This appendix contains the call formats used by CA IDMS to execute DML commands. Each DML function can be coded using standard CALL statements.

The two tables in this appendix present the function codes and arguments that are passed to CA IDMS for execution of a DML command. Argument 0, which contains SUBSCHEMA-CTRL (the IDMS communications block), is passed for all functions.

The following example shows the expanded CA IDMS call format for a BIND RECORD statement (BIND EMPLOYEE):

```
CALL 'IDMS' USING SUBSCHEMA-CTRL
          IDBMSCOM (48)
          SR415
          EMPLOYEE.
```

The call expansions are presented in two tables; the first table lists the DB expansions and the second table lists the DC expansions.

This section contains the following topics:

DB Call Formats

CONTROL STATEMENTS

CALLING ARGUMENTS

argument _ contains SUBSCHEMA-CTRL)

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	BIND RUN-UNIT FOR subschema-name	59	IDMS Communications Block*	subschema-name		
	BIND RUN-UNIT NODENAME node-name	59	IDMS Communications Block*	subschema-name*	subschema-ctrl* OR subschema-lr-ctrl*	node-name
	BIND RUN-UNIT FOR subschema-name NODENAME node-name	59	IDMS Communications Block*	subschema-name	subschema-ctrl* OR subschema-lr-ctrl*	node-name
	BIND RUN-UNIT FOR subschema-name DBNAME database-name	59	IDMS Communications Block*	subschema-name	subschema-ctrl* OR subschema-lr-ctrl*	node-name

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	BIND RUN-UNIT NODENAME node-name DBNAME database-name	59	IDMS Communications Block*	subschema-name*	subschema-ctrl* OR subschema-lr-ctrl*	node-name
	BIND RUN-UNIT FOR subschema-name NODENAME node-name DBNAME database-name	59	IDMS Communications Block*	subschema-name	subschema-ctrl* OR subschema-lr-ctrl*	node-name
	BIND record-name	48	record-id	record-location*		
	BIND record-name TO record-name	48	record-id	record-location		

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	BIND record-location WITH record-name	48	record-id	record-location		
	BIND PROCEDURE FOR procedure-name TO procedure-control-location	73	procedure-name	procedure-control-location		
09	READY	37				
	READY area-name	37	area-name			
	READY area-name USAGE-MODE IS RETRIEVAL	37	area-name			

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	READY area-name USAGE-MODE IS PROTECTED RETRIEVAL	39	area-name			
	READY area-name USAGE-MODE IS EXCLUSIVE RETRIEVAL	40	area-name			
	READY area-name USAGE-MODE IS UPDATE	36	area-name			
	READY area-name USAGE-MODE IS PROTECTED UPDATE	38	area-name			

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	READY area-name USAGE-MODE IS EXCLUSIVE UPDATE	41	area-name			
	READY USAGE-MODE IS ... **Choose function code from 36-41 as shown above.	**				
01	FINISH	02				
	FINISH TASK	113				
18	COMMIT	66				
	COMMIT ALL	95				
	COMMIT TASK	114				
	COMMIT TASK ALL	115				
19	ROLLBACK	67				
	ROLLBACK ALL	96				
	ROLLBACK TASK	116				

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	ROLLBACK TASK CONTINUE	117				
06	KEEP CURRENT	87				
	KEEP EXCLUSIVE CURRENT	90				
	KEEP CURRENT record-name	89	record-name			
	KEEP EXCLUSIVE CURRENT record-name	90	record-name			
	KEEP CURRENT WITHIN set-name	91	set-name			
	KEEP EXCLUSIVE CURRENT WITHIN set-name	92	set-name			
	KEEP CURRENT WITHIN area-name	93	area-name			

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
14	BIND RUN-UNIT	59	IDMS Communications Block*	subschema-name*		
	KEEP EXCLUSIVE CURRENT WITHIN area-name	92	area-name			
16	IF set-name IS EMPTY ...	64	set-name			
	IF set-name IS NOT EMPTY...	65	set-name			
	(Upon return to user run-unit, the status indicator='0000' if set is empty;' 1601' if not empty.)					
	IF set-name MEMBER ...	60	set-name			
	IF NOT set-name MEMBER ...	62	set-name			
	(Upon return to user run-unit, the status indicator = '0000' if the record(current of run unit) is linked into the specified set; '1601' if it is not a member.)					

MODIFICATION STATEMENTS

Major Function Code	Database Service(in COBOL DML)	(1) IDBMSCOM (nn)	(2)	(3)	(4)	(5)
12	STORE record-name	42	record-name			
07	CONNECT record-name TO set-name	44	record-name	set-name		
08	MODIFY record-name	35	record-name			
11	DISCONNECT record-name FROM set-name	46	record-name	set-name		
02	ERASE record-name	52	record-name			
	ERASE record-name PERMANENT MEMBERS	03	record-name			
	ERASE record-name SELECTIVE MEMBERS	53	record-name			
	ERASE record-name ALL MEMBERS	4	record-name			

RETRIEVAL STATEMENTS

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
03	FIND DB-KEY db-key	75	db-key			
	FIND record-name DB-KEY IS db-key	06	record-name	db-key		
	FIND CURRENT	30				
	FIND CURRENT record-name	07	record-name			
	FIND CURRENT WITHIN set-name	08	set-name			
	FIND CURRENT WITHIN area-name	09	area-name			
	FIND NEXT WITHIN set-name	14	set-name			
	FIND NEXT record-name WITHIN set-name	10	record-name	set-name		
	FIND PRIOR WITHIN set-name	16	set-name			
	FIND PRIOR record-name WITHIN set-name	12	record-name	set-name		
	FIND FIRST WITHIN set-name	20	set-name			

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	FIND FIRST record-name WITHIN set-name	18	record-name	set-name		
	FIND LAST WITHIN set-name	24	set-name			
	FIND LAST record-name WITHIN set-name	22	record-name	set-name		
	FIND number WITHIN set-name	78	set-name	number		
	FIND number record-name WITHIN set-name	76	record-name	set-name	number	
	FIND NEXT WITHIN area-name	15	area-name			
	FIND NEXT record-name WITHIN area-name	11	record-name	area-name		
	FIND PRIOR WITHIN area-name	17	area-name			
	FIND PRIOR record-name WITHIN area-name	13	record-name	area-name		

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	FIND FIRST WITHIN area-name	21	area-name			
	FIND FIRST record-name WITHIN area-name	19	record-name	area-name		
	FIND LAST WITHIN area-name	25	area-name			
	FIND LAST record-name WITHIN area-name	23	record-name	area-name		
	FIND number WITHIN area-name	79	area-name	number		
	FIND number record-name WITHIN area-name	77	record-name	area-name	number	
	FIND OWNER WITHIN set-name	31	set-name			
	FIND CALC (ANY) record-name	32	record-name			
	FIND DUPLICATE record-name	50	record-name			
	FIND record-name WITHIN set-name USING sort-key	33	record-name	set-name	sort-key	

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	FIND record-name WITHIN set-name CURRENT USING sort-key	51	record-name	set-name	sort-key	
	OBTAIN					
	Any of the above FIND record selection expressions. Call generated consists of arguments described above for the FIND in question plus an additional argument of IDBMSCOM (43) function. For example:					
	OBTAIN CALC record-name	32	record-name	IDBMSCOM(43)		
	OBTAIN PRIOR record-name WITHIN set-name	12	record-name			
	KEEP KEEP EXCLUSIVE					
	Any of the above FIND/OBTAIN record selection expressions Call generated consists of arguments described above for the FIND/OBTAIN in question plus one of the following additional IDBMSCOM function: KEEP……..IDBMSCOM(87) KEEP EXCLUSIVE……IDBMSCOM(**) For example:					
	OBTAIN KEEP CALC record-name	32	record-name	IDBMSCOM(43)	IDBMSCOM(87)	
	FIND KEEP EXCLUSIVE CURRENT	30	IDBMSCOM(88)			
05	GET	43	index-set-name	db-key	symbolic-key	

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	GET record-name	34	index-set-name	db-key	symbolic-key	
17	RETURN db-key FROM index-set-name CURRENCY KEY INTO symbolic-key	81	index-set-name	db-key	symbolic-key	
	RETURN db-key FROM index-set-name FIRST KEY INTO symbolic-key	82	index-set-name	db-key	symbolic-key	
	RETURN db-key FROM index-set-name LAST KEY INTO symbolic-key	83	index-set-name	db-key	symbolic-key	
	RETURN db-key FROM index-set-name NEXT KEY INTO symbolic-key	84	index-set-name	db-key	symbolic-key	

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	RETURN db-key FROM index-set-name PRIOR KEY INTO symbolic-key	85	index-set-name	db-key	symbolic-key	
	RETURN db-key FROM index-set-name USING index-key-value KEY INTO symbolic-key	86	index-set-name	db-key	index-key-value	symbolic-key

ACCEPT STATEMENTS

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
15	ACCEPT db-key FROM CURRENCY	54	db-key			
	ACCEPT db-key FROM record-name CURRENCY	55	record-name	db-key		
	ACCEPT db-key FROM set-name CURRENCY	57	set-name	db-key		

Major Function Code	Database Service(in COBOL DML)	(1) IDBMS COM (nn)	(2)	(3)	(4)	(5)
	ACCEPT db-key FROM area-name CURRENCY	56	area-name	db-key		
	ACCEPT db-key FROM set-name NEXT CURRENCY	68	set-name	db-key		
	ACCEPT db-key FROM set-name PRIOR CURRENCY	69	set-name	db-key		
	ACCEPT db-key FROM set-name OWNER CURRENCY	70	set-name	db-key		
	ACCEPT db-statistics FROM IDMS STATISTICS	71	db-statistics			
	ACCEPT bind-address FROM record-name BIND	72	record-name	bind-address		
	ACCEPT procedure-control-location FROM procedure-name PROCEDURE	74	procedure-name	procedure-control-location		

LRF DML STATEMENTS

Major Function Code	Database Service(in COBOL DML)	(1) IDBMSCOM (nn)	(2)	(3)	(4)	(5)
20	OBTAIN FIRST logical-record-name	99	subschema-lr-ctrl*	logical-record-location*		
	OBTAIN FIRST logical-record-name INTO alt-logical-record location	99	subschema-lr-ctrl*	logical-record-location*		
	OBTAIN NEXT logical-record-name	99	subschema-lr-ctrl*	logical-record-location*		
	OBTAIN NEXT logical-record-name INTO alt-logical-record location	99	subschema-lr-ctrl*	logical-record-location*		
	MODIFY logical-record-name	99	subschema-lr-ctrl*	logical-record-location*		
	MODIFY logical-record-name FROM alt-logical-record-location	99	subschema-lr-ctrl*	logical-record-location*		
	STORE logical-record-name	99	subschema-lr-ctrl*	logical-record-location*		

Major Function Code	Database Service(in COBOL DML)	(1) IDBMSCOM (nn)	(2)	(3)	(4)	(5)
	STORE logical-record-name FROM alt-logical-record-location	99	subschema-lr-ctrl*	logical-record location		
	ERASE logical-record-name	99	subschema-lr-ctrl*	logical-record-location*		
	ERASE logical-record-name FROM alt-logical-record-location	99	subschema-lr-ctrl*	logical-record-location		
	To differentiate between the LRF DML statements,the DML compiler places the name of the verb issued into the LRC Block (subschema-lr-ctrl).					

DC Call Formats

PROGRAM MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
30	TRANSFER CONTROL	23	DCFLG1	DCSTR2	parameter	
30	DC RETURN	19				
34	LOAD TABLE	15	01-level-program-location	end-program-location		
34	DELETE TABLE	5	01-level-program-location			

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
33	SET ABEND EXIT (STATE)	20				
33	ABEND	1				

STORAGE MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
32	GET STORAGE	13	01-level-storage-data-location	end-storage-data-location		
32	FREE STORAGE	10	01-level-storage-data-location	start-free-storage-location		

TASK MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
37	ATTACH	3	DCFLG1	DCSTR2	parameter	
37	CHANGE PRIORITY	4				

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
39	ENQUEUE	9	DCFLG1	DCBMSCOM (mode)	DCBMSCOM(length)	resource-id..
39	DEQUEUE	8	DCFLG1	DCBMSCOM (length)	resource-id..	
31	WAIT	24	ecb			
31	POST	16	ecb			

TIME MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
35	GET TIME	14	return-time	return-date		
35	SET TIMER	21	task-data-location	end-task-data-location-location		
35	SET TIMER (post)	21	post- ecb			

SCRATCH MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
43	PUT SCRATCH	18	scratch-data-location	end-scratch-data-location		
43	GET SCRATCH	12	return-scratch-data-location	end-scratch-data-location		

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
43	DELETE SCRATCH	6	post- ecb			

QUEUE MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
44	PUT QUEUE	17	queue-data-location	end-queue-data-location		
44	GET QUEUE	11	return-queue-data-location	end-queue-data-location		
44	DELETE QUEUE	6				

TERMINAL MANAGEMENT STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
45	READ TERMINAL	30	input-data-location	end-input-data-location		
45	WRITE TERMINAL	30	output-data-location	end-output-data-location		
45	WRITE THEN READ TERMINAL	30	output-data-location	end-output-data-location	input-data-location	end-input-data-location
45	CHECK TERMINAL	31	input-data-location	end-input-data-location		

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
47	READ LINE FROM TERMINAL	32	input-data-location	end-input-data-location		
47	WRITE LINE TO TERMINAL	32	output-data-location	end-output-data-location		
47	END LINE TERMINAL SESSION	32				
48	WRITE PRINTER	37	message-location	end-message-location		
46	MAP IN (IO)	34	MRB-mapname			
46	MAP IN (NOIO)	34	MRB-mapname	mapped-data-location	end-mapped-data-location	
46	MAP IN (paging) (a)	34	MRB-mapname	data-field-name	sequence-field-name	page-number
46	MAP IN (paging) (b)	34	MRB-mapname	key	page-number	
46	MAP OUT (IO)	34	MRB-mapname	message-text	end-message-data-location OR DCBMSCOM (length)	
46	MAP OUT (NOIO)	34	MRB-mapname	mapped-data-location	end-mapped-data-location	
46	MAP OUT (paging)	34	MRB-mapname	message-text	end-message-location OR DCBMSCOM (length)	key
46	MAP OUTIN	34	MRB-mapname	message-text	end-message-data-location OR DCBMSCOM (length)	
46	MODIFY MAP	93	MRB-mapname	MRE	MRB-FLDLST	

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
46	INQUIRE MAP (a)	92	MRB-mapname	MRE		
46	INQUIRE MAP (b)	92	MRB-mapname			
46	INQUIRE MAP (c)	92	MRB-mapname	MRE		
46	INQUIRE MAP (d)	92	MRB-mapname	MRB-FLDLST		
46	STARTPAGE	40	MRB-mapname			
46	ENDPAGE	41	MRB-mapname			

UTILITY STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
48	ACCEPT	2	return-location			
40	SNAP	22	DCSTR1	DCSTR1 (6) begin-dump-location	DCSTR1 (7) end-dump-location	title (8)
49	SEND MESSAGE	38	user-id	message-location	end-message-location	DCBMSCOM(1)
38	BIND TRANSACTION STATISTICS	28				

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
38	ACCEPT TRANSACTION STATISTICS	28	return-stat-data-location			
38	END TRANSACTION STATISTICS	28	return-stat-data-location			
51	KEEP LONGTERM	29	record-name set-name area-name			
36	WRITE LOG	25	text-return-location	end-text-return-location	reply-location (6) parameter-location	end-reply-location (7) end-parameter-location

RECOVERY STATEMENTS

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
50	COMMIT	66				
50	COMMIT TASK	27				
50	FINISH	2				
50	FINISH TASK	27				
50	ROLLBACK	67				
50	ROLLBACK TASK	27				

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
50	WRITE JOURNAL	26	record-location	end-record-location		

DC-BATCH

Major Function Code	DC System Service(in COBOL DML)	(1) DCBMSCOM (nn)	(2)	(3)	(4)	(5)
14	BIND-TASK	28	DCSTR2			

Appendix E: CA IDMS Keywords

This appendix contains a list of keywords recognized by the DML precompiler, including words applicable in the online environment only. All keywords marked with an asterisk are also *reserved* words. Reserved words cannot be used for user-defined element, record, set, paragraph, or area variable names.

Note: The method of parsing used by the IDMSDMLC preprocessor is significantly different in CA IDMS Release 12.0 and later releases from that used in prior releases. The current parsing method looks at individual words in the source code. If it encounters a keyword, it assumes that the keyword should be expanded and tries to do so. Invalid use of reserved words can thus result in either coding errors or syntax errors. For example, if you use FIND as a variable, the parser will try to handle it as the DML verb FIND.

This section contains the following topics:

List of Keywords (see page 479)

List of Keywords

*ABEND
ABORT
*ACCEPT
AID
ALARM
ALL
ALPHAMERIC
ALWAYS
ANY
AREA
ASSIGN
AT
*ATTACH
ATTRIBUTES
BACKPAGE
BACKSCAN
*BIND
BLINK
BLUE
BRIGHT
INTERNAL
INTERVAL
INTO
INVOKED
IO
IS
JOURNAL
JUSTIFY
*KEEP
KEY
LAST
LEAVE
LEFT
LENGTH
LEVELS
LINE
LINK
*LINKAGE
LIST
LITERALS
*REMARKS
REPLACE
REPLY
REPORT
REQUIRED
REREAD
RESETKBD
RESETMDT
RESUME
RETENTION
RETURNKEY
RETRIEVAL
RETRY
*RETURN
REVERSE-VIDEO
REVERSED
REWIND
RIGHT
*ROLLBACK
RUN

```
 BROWSE          *LOAD           RUN-UNIT
 BUFFER          LOCK            *SCHEMA
 BUT             LOG             SCRATCH
 BY              LONG            SCREEN
 CALC            LONGTERM        SCREENSIZE
*CALL            LR              SECONDS
 CANCEL          LSSC-NODN       *SECTION
*CHANGE          LTERM           *SELECT
 CHANGED         MANUAL          SELECTIVE
*CHECK           *MAP            *SEND
 CLASS           MAP-BINDS       SEQUENCE
 CLEAR           MAP-CONTROL             SEQUENCE-NUMBER
 CODE            MAP-CONTROLS            SESSION
*COMMIT          MAP-RECORDS             *SET
 COMP            MAPS            SHARE
 COMP-3          MAX             SHARED
*CONNECT         MDT             SHORT
 CONTENTS        MEMBER          SKIP
 CONTINUE        MEMBERS         SKIP1
 CONTROL         MESSAGE         SKIP2
 COPIES          MODE            SKIP3
*COPY            MODIFIED        SNAP
 CORRECT         *MODIFY         SOME
 CURRENCY        MODULE          SPAN
 CURRENT         MOVE            STANDARD
 CURSOR          MRB-FLDLST              START
 DARK            NAME            STARTPAGE
*DATA            NATIVE          STARTPRT
 DATABASE-KEY            NEWPAGE         STATISTICS
 DATASTREAM              NEXT            STGID
 DATE            NLCR            *STOP
 DB              NO              STORAGE
 DB-KEY          NOALARM         *STORE
 DBNAME          NOBACKPAGE              SUBSCHEMA-AREANAMES
*DC              NOBACKSCAN              SUBSCHEMA-BINDS
 DEBUG           NOBLINK         SUBSCHEMA-CONTROL
*DECLARATIVES            NOCOLOR         SUBSCHEMA-CTRL
*DELETE          NODEADLOCK              SUBSCHEMA-DESCRIPTION
*DEQUEUE         NODENAME        SUBSCHEMA-DML-LR-
 DEST            NODUMP          DESCRIPTION
 DESTINATION             NOIO            SUBSCHEMA-LR-CONTROL
 DETAIL          NOKBD           SUBSCHEMA-LR-CTRL
 DETECT          NOLOCK          SUBSCHEMA-LR-
 DFLD            NOMDT           DESCRIPTION
*DISCONNECT              NONE            SUBSCHEMA-LR-NAMES
 DISP            NOPAD           SUBSCHEMA-LR-RECORDS
 DISPLAY         NOPRT           SUBSCHEMA-NAMES
```

```
 DIVISION        NORETURN         SUBSCHEMA-RECNAMES
 DUMP            NORMAL           SUBSCHEMA-RECORDS
 DUPLICATE       NORMAL-VIDEO             SUBSCHEMA-SETNAMES
 EAU             NOSPAN           SUBSCHEMA-SSNAME
 ECHO            NOT              SYSTEM
 EDIT            *NOTE            SYSVERSION
 EJECT           NOTIFICATION             TABLE
 EMPTY           NOTIFY           TASK
*END             NOUNDERSCORE             TEMPORARY
 ENDPAGE         NOWAIT           TERMINAL
 ENDRPT          NOWRITE          TEST
*ENQUEUE         NULL             TEXT
*ENTRY           NUMERIC          THEN
*ENVIRONMENT             *OBTAIN          TIME
*ERASE           OF               TIMEOUT
 ERROR           OFF              TIMER
 EVENT           ON               TITLE
 EXCEPT          ONLY             TO
 EXCLUSIVE       *OPEN            TRACE
 EXIT            OPTIONAL         TRANSACTION
 EXITS           OUT              *TRANSFER
 EXTENDED        OUTIN            TRUNCATED
 EXTERNAL        OUTPUT           TURQUOISE
 EXTRANEOUS              OWNER            TYPE
 FIELD           PAD              UNDERSCORE
 FIELDS          PAGE             UNFORMATTED
 FILE            PAGING           UNPROTECTED
*FIND            PARMS            UPDATE
*FINISH          PERMANENT        UPGRADE
 FIRST           PINK             USAGE-MODE
 FOR             POSITION         USER
*FREE            *POST            USING
 FROM            PREFIX           VALUE
*GET             PRINTER          VERSION
 GREEN           PRIOR            *WAIT
 HEADER          PRIORITY         WCC
 HOLD            PRIVACY          WHERE
 I-O             *PROCEDURE               WHITE
*ID              PROGRAM          WITH
*IDENTIFICATION          *PROGRAM-ID              WITHIN
 IDMS            PROTECTED        *WORKING-STORAGE
*IDMS-CONTROL            PROTOCOL         *WRITE
 IDMS-RECORDS            PTERM            XCTL
 IDMS-STATISTICS         *PUT             YELLOW
*IF              QUEUE            YES
```

```
 IGNORED         *READ            40CR
 IN              *READY           64CR
 INCREMENTED             RECORD           80CR
 INPUT           RED
*INQUIRE         REDISPATCH
 INTENT          RELEASE
```

Appendix F: Notes to Teleprocessing Monitor Users

This appendix describes special considerations relating to application programs running under teleprocessing (TP) monitors supported by CA IDMS (that is, CICS, INTERCOMM, SHADOW, TASK/MASTER, UTM, and WESTI).

This section contains the following topics:

TP Monitor Coding Guidelines

While there are no special coding requirements for TP monitor transactions, the following guidelines should be adhered to:

- DML statements should be coded such that all database requests (for example, BIND, READY, OBTAIN, FINISH) are executed together whenever possible to achieve maximum efficiency and ease of recovery.
- For each TP monitor, you should check with the DBA to determine the operating mode (protocol) installed. The proper mode must then be specified in the IDMS-CONTROL SECTION of the ENVIRONMENT DIVISION.
- For CICS, INTERCOMM, SHADOW, UTM, and WESTI applications, the mode as installed may require the inclusion of additional statements in the IDMS-CONTROL SECTION, WORKING-STORAGE SECTION, and LINKAGE SECTION of each program. These requirements and the applicable modes are outlined in the following table.

  Note: The same rules apply to the COPY IDMS statements used to insert logical-record source code components into the program: IDMS-RECORDS MANUAL should be coded in the ENVIRONMENT DIVISION; SUBSCHEMA-LR-NAMES should be copied into the WORKING-STORAGE SECTION; and SUBSCHEMA-CTRL, SUBSCHEMA-LR-CTRL, and SUBSCHEMA-LR-RECORDS should be copied into the LINKAGE-SECTION (except under CICS-EXEC or CICS-EXEC-AUTO, when all required components should be copied into the WORKING-STORAGE SECTION).
- The DML compiler should be executed before the teleprocessing monitor preprocessor.

TP monitor Coding Requirements

TP MONITOR	IF MODE IS	IDMS-CONTROL SECTION	WORKING-STORAGE SECTION	LINKAGE SECTION	PROCEDURE DIVISION
CICS	CICS	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-NAMES	*01 TWA 03 FILLER PIC S9(8) COMP SYNC. 03 COPY IDMS SUBSCHEMA-CTRL. 03 COPY IDMS SUBSCHEMA-RECORDS. OR **COPY IDMS SUBSCHEMA-CTRL COPY IDMS SUBSCHEMA-RECORDS. (A CICS GETMAIN must be issued for the SUBSCHEMA-CTRL and for each record being copied.)	COPY IDMS IDMS-WAIT.
	CICS-EXEC	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-CTRL.		
	CICS-EXEC-AUTO		COPY IDMS SUBSCHEMA-NAMES.		

TP MONITOR	IF MODE IS	IDMS-CONTROL SECTION	WORKING-STORAGE SECTION	LINKAGE SECTION	PROCEDURE DIVISION
			COPY IDMS SUBSCHEMA-RECORDS.		
INTERCOMM	INTERCOMM INTERCOMM-AUTO	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-NAMES.	COPY IDMS SUBSCHEMA-CTRL. COPY IDMS SUBSCHEMA-RECORDS.	
SHADOW	SHADOW SHAD-AUTOSTATUS	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-NAMES.	COPY IDMS SUBSCHEMA-CTRL. COPY IDMS SUBSCHEMA-RECORDS	
UTM	UTM UTM-AUTOSTATUS	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-NAMES.	COPY KCKBC. 05 X PIC S9 (8) COMP SYNC. 05 COPY IDMS SUBSCHEMA-CTRL. 05 COPY IDMS SUBSCHEMA-RECORDS. COPY KCPAC.	MOVE LOW-VALUES to SUBSCHEMA_CTRL before each BIND RUN-UNIT.
WESTI	WESTI-REENT WESTI-REENT-AUTO	IDMS-RECORDS MANUAL.	COPY IDMS SUBSCHEMA-NAMES.	COPY IDMS SUBSCHEMA-CTRL. COPY IDMS SUBSCHEMA-RECORDS.	

*If SUBSCHEMA-CTRL, SUBSCHEMA_RECORDS, and additional data does not exceed 4,096 bytes.

**If SUBSCHEMA-CTRL, SUBSCHEMA_RECORDS, and additional data exceeds 4,096 bytes.

Appendix G: EMPLOYEE Database Definition

This appendix contains the IDMSRPTS utility and the data structure diagram for the EMPLOYEE database from which most of the examples in this manual are taken. Both of the sample programs listed earlier in this manual access this database.

Note: For more information about the IDMSRPTS utility, see the *CA IDMS Utilities Guide*.

This section contains the following topics:

IDMSRPTS Utility Report Listings

```
 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——              DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss   1
                        SCHEMA EMPSCHM VERSION 100


RECORD NAME........ COVERAGE                  RLGTH=  36
RECORD VERSION..... 0100                    DLGTH=  20
RECORD ID.......... 0400                    KLGTH=  16
RECORD LENGTH...... FIXED                   DSTRT=  16
LOCATION MODE...... VIA SET   EMP-COVERAGE    DISPLACEMENT 0000 PAGES
WITHIN............. INS-DEMO-REGION   OFFSET    5 PGS FOR    20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          EMP-COVERAGE   MEMBER     1   2   3
          COVERAGE-CLAIMS OWNER      4
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 SELECTION-DATE-0400      DISPLAY               1   8
03 SELECTION-YEAR-0400      DISPLAY         9(4)    1   4
03 SELECTION-MONTH-0400     DISPLAY         9(2)    5   2
03 SELECTION-DAY-0400      DISPLAY         9(2)    7   2
02 TERMINATION-DATE-0400     DISPLAY               9   8
```

```
03 TERMINATION-YEAR-0400     DISPLAY         9(4)    9   4
03 TERMINATION-MONTH-0400    DISPLAY         9(2)    13   2
03 TERMINATION-DAY-0400     DISPLAY         9(2)    15   2
02 TYPE-0400           DISPLAY         X     17   1
88 MASTER-0400          COND     'M'          17
88 FAMILY-0400          COND     'F'          17
88 DEPENDENT-0400        COND     'D'          17
02 INS-PLAN-CODE-0400      DISPLAY         X(3)    18   3
88 GROUP-LIFE-0400        COND     '001'         18
88 HMO-0400           COND     '002'         18
88 GROUP-HEALTH-0400       COND     '003'         18
88 GROUP-DENTAL-0400       COND     '004'         18

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——              DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT             mm/dd/yy
hhmmss   3
                         SCHEMA EMPSCHM VERSION 100


RECORD NAME........ DENTAL-CLAIM                RLGTH= 944
RECORD VERSION..... 0100                     DLGTH= 936
RECORD ID.......... 0405                     KLGTH=  8
RECORD LENGTH...... VARIABLE                   DSTRT=  12
MINIMUM ROOT.......  132 CHARACTERS
MINIMUM FRAGMENT...  932 CHARACTERS
LOCATION MODE...... VIA SET   COVERAGE-CLAIMS   DISPLACEMENT 0000 PAGES
WITHIN............. INS-DEMO-REGION   OFFSE    5 PGS FOR    20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          COVERAGE-CLAIMS MEMBER     1
          (FRAGMENT CHAIN) INTRNL     2
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 CLAIM-DATE-0405        DISPLAY               1   8
03 CLAIM-YEAR-0405        DISPLAY         9(4)    1   4
03 CLAIM-MONTH-0405       DISPLAY         9(2)    5   2
03 CLAIM-DAY-0405        DISPLAY         9(2)    7   2
02 PATIENT-NAME-0405       DISPLAY              9  25
03 PATIENT-FIRST-NAME-0405    DISPLAY         X(10)    9  10
03 PATIENT-LAST-NAME-0405    DISPLAY         X(15)   19  15
02 PATIENT-BIRTH-DATE-0405    DISPLAY             34   8
03 PATIENT-BIRTH-YEAR-0405    DISPLAY         9(4)    34   4
03 PATIENT-BIRTH-MONTH-0405   DISPLAY         9(2)    38   2
```

```
03 PATIENT-BIRTH-DAY-0405    DISPLAY         9(2)    40   2
02 PATIENT-SEX-0405       DISPLAY         X     42   1
02 RELATION-TO-EMPLOYEE-0405   DISPLAY         X(10)   43  10
02 DENTIST-NAME-0405       DISPLAY             53  25
03 DENTIST-FIRST-NAME-0405    DISPLAY         X(10)   53  10
03 DENTIST-LAST-NAME-0405    DISPLAY         X(15)   63  15
02 DENTIST-ADDRESS-0405     DISPLAY             78  46
03 DENTIST-STREET-0405      DISPLAY         X(20)   78  20
03 DENTIST-CITY-0405       DISPLAY         X(15)   98  15
03 DENTIST-STATE-0405      DISPLAY         X(2)   113   2
03 DENTIST-ZIP-0405       DISPLAY             115   9
04 DENTIST-ZIP-FIRST-FIVE-0405  DISPLAY         X(5)   115   5
04 DENTIST-ZIP-LAST-FOUR-0405  DISPLAY         X(4)   120   4
02 DENTIST-LICENSE-NUMBER-0405  DISPLAY         9(6)   124   6
02 NUMBER-OF-PROCEDURES-0405   COMP          9(2)   130   2
02 FILLER            DISPLAY         X     132   1
02 DENTIST-CHARGES-0405     DISPLAY OCCURS 0 TO 10      133  800
  DEPENDING ON --- NUMBER-OF-PROCEDURES-0405
03 TOOTH-NUMBER-0405       DISPLAY         9(2)    1   2
03 SERVICE-DATE-0405       DISPLAY              3   8
04 SERVICE-YEAR-0405       DISPLAY         9(4)    3   4
04 SERVICE-MONTH-0405      DISPLAY         9(2)    7   2
04 SERVICE-DAY-0405       DISPLAY         9(2)    9   2
03 PROCEDURE-CODE-0405      DISPLAY         9(4)    11   4
03 DESCRIPTION-OF-SERVICE-0405  DISPLAY         X(60)   15  60
03 FEE-0405           COMP-3         S9(7)V99  75   5
03 FILLER            DISPLAY         X     80   1
```

```
 IDMSRPTS nn.n              —— SCHEMA RECORD DESCRIPTION LISTING ——
   DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss   6
                        SCHEMA EMPSCHM VERSION 100


RECORD NAME........ DEPARTMENT                 RLGTH=  72
RECORD VERSION..... 0100                     DLGTH=  56
RECORD ID.......... 0410                     KLGTH=  16
RECORD LENGTH...... FIXED                    DSTRT=  16
LOCATION MODE...... CALC USING  DEPT-ID-0410     DUPLICATES NOT ALLOWED
WITHIN............. ORG-DEMO-REGION   OFFSET    5 PGS FOR    20 PGS
DBKEY POSITIONS.... SET............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
          DEPT-EMPLOYEE  INDEX OWNER   3   4
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 DEPT-ID-0410         DISPLAY         9(4)    1   4
02 DEPT-NAME-0410        DISPLAY         X(45)    5  45
02 DEPT-HEAD-ID-0410       DISPLAY         9(4)    50   4
02 FILLER            DISPLAY         XXX    54   3

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——               DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss   7
                        SCHEMA EMPSCHM VERSION 100


RECORD NAME........ EMPLOYEE                   RLGTH= 192
RECORD VERSION..... 0100                     DLGTH= 120
RECORD ID.......... 0415                     KLGTH=  72
RECORD LENGTH...... FIXED                    DSTRT=  72
LOCATION MODE...... CALC USING  EMP-ID-0415     DUPLICATES NOT ALLOWED
WITHIN............. EMP-DEMO-REGION   OFFSET    5 PGS FOR    45 PGS
DBKEY POSITIONS.... SET............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
          DEPT-EMPLOYEE  INDEX MEMBER  3      4
          EMP-NAME-NDX   INDEX MEMBER  5
          EMP-SSN-NDX   INDEX MEMBER  6
          OFFICE-EMPLOYEE INDEX MEMBER  7      8
          EMP-COVERAGE   OWNER      9  10
          EMP-EMPOSITION  OWNER     11  12
          EMP-EXPERTISE  OWNER     13  14
          MANAGES     OWNER     15  16
          REPORTS-TO    OWNER     17  18
```

```
DATA ITEM..... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 EMP-ID-0415          DISPLAY         9(4)    1   4
02 EMP-NAME-0415         DISPLAY              5  25
03 EMP-FIRST-NAME-0415      DISPLAY         X(10)    5  10
03 EMP-LAST-NAME-0415      DISPLAY         X(15)   15  15
02 EMP-ADDRESS-0415       DISPLAY             30  46
03 EMP-STREET-0415        DISPLAY         X(20)   30  20
03 EMP-CITY-0415          DISPLAY         X(15)   50  15
03 EMP-STATE-0415         DISPLAY         X(2)    65   2
03 EMP-ZIP-0415          DISPLAY             67   9
04 EMP-ZIP-FIRST-FIVE-0415    DISPLAY         X(5)    67   5
04 EMP-ZIP-LAST-FOUR-0415    DISPLAY         X(4)    72   4
02 EMP-PHONE-0415         DISPLAY         9(10)   76  10
02 STATUS-0415           DISPLAY         X(2)    86   2
88 ACTIVE-0415           COND     '01'         86
88 ST-DISABIL-0415         COND     '02'         86
88 LT-DISABIL-0415         COND     '03'         86
88 LEAVE-OF-ABSENCE-0415     COND     '04'         86
88 TERMINATED-0415         COND     '05'         86
02 SS-NUMBER-0415         DISPLAY         9(9)    88   9
02 START-DATE-0415         DISPLAY             97   8
03 START-YEAR-0415         DISPLAY         9(4)    97   4
03 START-MONTH-0415        DISPLAY         9(2)   101   2
03 START-DAY-0415         DISPLAY         9(2)   103   2
02 TERMINATION-DATE-0415     DISPLAY             105   8
03 TERMINATION-YEAR-0415     DISPLAY         9(4)   105   4
03 TERMINATION-MONTH-0415    DISPLAY         9(2)   109   2
03 TERMINATION-DAY-0415     DISPLAY         9(2)   111   2
02 BIRTH-DATE-0415         DISPLAY             113   8
03 BIRTH-YEAR-0415         DISPLAY         9(4)   113   4
03 BIRTH-MONTH-0415        DISPLAY         9(2)   117   2
03 BIRTH-DAY-0415         DISPLAY         9(2)   119   2
```

```
 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ———              DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss   8
                        SCHEMA EMPSCHM VERSION 100


RECORD NAME........ EMPOSITION                RLGTH=  56
RECORD VERSION..... 0100                    DLGTH=  32
RECORD ID.......... 0420                    KLGTH=  24
RECORD LENGTH...... FIXED                   DSTRT=  24
LOCATION MODE...... VIA SET   EMP-EMPOSITION   DISPLACEMENT 0000 PAGES
WITHIN............. EMP-DEMO-REGION   OFFSET   5 PGS FOR     45 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          EMP-EMPOSITION  MEMBER     1   2   3
          JOB-EMPOSITION  MEMBER     4   5   6
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 START-DATE-0420        DISPLAY              1   8
03 START-YEAR-0420        DISPLAY         9(4)    1   4
03 START-MONTH-0420       DISPLAY         9(2)    5   2
03 START-DAY-0420        DISPLAY         9(2)    7   2
02 FINISH-DATE-0420       DISPLAY              9   8
03 FINISH-YEAR-0420       DISPLAY         9(4)    9   4
03 FINISH-MONTH-0420       DISPLAY         9(2)    13   2
03 FINISH-DAY-0420        DISPLAY         9(2)    15   2
02 SALARY-GRADE-0420       DISPLAY         9(2)    17   2
02 SALARY-AMOUNT-0420      COMP-3         S9(7)V99  19   5
02 BONUS-PERCENT-0420      COMP-3         SV999   24   2
02 COMMISSION-PERCENT-0420    COMP-3         SV999   26   2
02 OVERTIME-RATE-0420      COMP-3         S9V99   28   2
02 FILLER            DISPLAY         XXX    30   3
```

```
 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ———              DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss  10
                        SCHEMA EMPSCHM VERSION 100


RECORD NAME........ EXPERTISE                 RLGTH=  32
RECORD VERSION..... 0100                    DLGTH=  12
RECORD ID.......... 0425                    KLGTH=  20
RECORD LENGTH...... FIXED                   DSTRT=  20
LOCATION MODE...... VIA SET   EMP-EXPERTIS    DISPLACEMENT 0000 PAGES
WITHIN............. EMP-DEMO-REGION   OFFSET   5 PGS FOR     45 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          EMP-EXPERTISE  MEMBER     1   2   3
          SKILL-EXPERTISE INDEX MEMBER  4      5
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 SKILL-LEVEL-0425       DISPLAY         XX     1   2
88 EXPERT-0425          COND     '04'          1
88 PROFICIENT-0425        COND     '03'          1
88 COMPETENT-0425        COND     '02'          1
88 ELEMENTARY-0425        COND     '01'          1
02 EXPERTISE-DATE-0425      DISPLAY              3   8
03 EXPERTISE-YEAR-0425      DISPLAY         9(4)    3   4
03 EXPERTISE-MONTH-0425     DISPLAY         9(2)    7   2
03 EXPERTISE-DAY-0425      DISPLAY         9(2)    9   2
02 FILLER            DISPLAY         XX     11   2

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ———              DATE   TIME  PAGE
 RECDES                 DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss  10
                        SCHEMA EMPSCHM VERSION 100
```

```
RECORD NAME........ HOSPITAL-CLAIM                RLGTH= 304
RECORD VERSION..... 0100                       DLGTH= 300
RECORD ID.......... 0430                       KLGTH=  4
RECORD LENGTH...... FIXED                      DSTRT=  4
LOCATION MODE...... VIA SET   COVERAGE-CLAIMS  DISPLACEMENT 0000 PAGES
WITHIN............. INS-DEMO-REGION   OFFSET   5 PGS FOR     20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          COVERAGE-CLAIMS MEMBER     1
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 CLAIM-DATE-0430        DISPLAY               1   8
03 CLAIM-YEAR-0430        DISPLAY         9(4)    1   4
03 CLAIM-MONTH-0430       DISPLAY         9(2)    5   2
03 CLAIM-DAY-0430        DISPLAY         9(2)    7   2
02 PATIENT-NAME-0430       DISPLAY               9  25
03 PATIENT-FIRST-NAME-0430    DISPLAY         X(10)    9  10
03 PATIENT-LAST-NAME-0430    DISPLAY         X(15)   19  15
02 PATIENT-BIRTH-DATE-0430    DISPLAY              34   8
03 PATIENT-BIRTH-YEAR-0430    DISPLAY         9(4)    34   4
03 PATIENT-BIRTH-MONTH-0430   DISPLAY         9(2)    38   2
03 PATIENT-BIRTH-DAY-0430    DISPLAY         9(2)    40   2
02 PATIENT-SEX-0430       DISPLAY         X     42   1
02 RELATION-TO-EMPLOYEE-0430   DISPLAY         X(10)   43  10
02 HOSPITAL-NAME-0430      DISPLAY         X(25)   53  25
02 HOSP-ADDRESS-0430       DISPLAY              78  46
03 HOSP-STREET-0430       DISPLAY         X(20)   78  20
03 HOSP-CITY-0430        DISPLAY         X(15)   98  15
03 HOSP-STATE-0430        DISPLAY         X(2)   113   2
03 HOSP-ZIP-0430         DISPLAY             115   9
04 HOSP-ZIP-FIRST-FIVE-0430   DISPLAY         X(5)   115   5
04 HOSP-ZIP-LAST-FOUR-0430    DISPLAY         X(4)   120   4
02 ADMIT-DATE-0430        DISPLAY              124   8
03 ADMIT-YEAR-0430        DISPLAY         9(4)   124   4
03 ADMIT-MONTH-0430       DISPLAY         9(2)   128   2
03 ADMIT-DAY-0430        DISPLAY         9(2)   130   2
02 DISCHARGE-DATE-0430      DISPLAY              132   8
03 DISCHARGE-YEAR-0430      DISPLAY         9(4)   132   4
03 DISCHARGE-MONTH-0430     DISPLAY         9(2)   136   2
03 DISCHARGE-DAY-0430      DISPLAY         9(2)   138   2
02 DIAGNOSIS-0430        DISPLAY OCCURS 2    X(60)   140  120
02 HOSPITAL-CHARGES-0430     DISPLAY              260  41
03 ROOM-AND-BOARD-0430      DISPLAY              260  26
04 WARD-0430           DISPLAY              260  13
05 WARD-DAYS-0430        COMP-3         S9(5)   260   3
05 WARD-RATE-0430        COMP-3         S9(7)V99 263   5
05 WARD-TOTAL-0430        COMP-3         S9(7)V99 268   5
04 SEMI-PRIVATE-0430       DISPLAY              273  13
05 SEMI-DAYS-0430        COMP-3         S9(5)   273   3
```

```
05 SEMI-RATE-0430        COMP-3         S9(7)V99 276   5
05 SEMI-TOTAL-0430        COMP-3         S9(7)V99 281   5
03 OTHER-CHARGES-0430      DISPLAY              286  15
04 DELIVERY-COST-0430      COMP-3          S9(7)V99 286   5
04 ANESTHESIA-COST-0430     COMP-3          S9(7)V99 291   5
04 LAB-COST-0430         COMP-3         S9(7)V99 296   5

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——              DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss  12
                         SCHEMA EMPSCHM VERSION 100


RECORD NAME........ INSURANCE-PLAN               RLGTH= 140
RECORD VERSION..... 0100                      DLGTH= 132
RECORD ID.......... 0435                      KLGTH=  8
RECORD LENGTH...... FIXED                     DSTRT=  8
LOCATION MODE...... CALC USING  INS-PLAN-CODE-0435  DUPLICATES NOT ALLOWED
WITHIN............. INS-DEMO-REGION   OFFSET    1 PGS FOR    4 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 INS-PLAN-CODE-0435      DISPLAY         X(3)    1   3
88 GROUP-LIFE-0435        COND     '001'         1
88 HMO-0435           COND     '002'         1
88 GROUP-HEALTH-0435       COND     '003'         1
88 GROUP-DENTAL-0435       COND     '004'         1
02 INS-CO-NAME-0435       DISPLAY         X(45)    4  45
02 INS-CO-ADDRESS-0435      DISPLAY              49  46
03 INS-CO-STREET-0435      DISPLAY         X(20)   49  20
03 INS-CO-CITY-0435       DISPLAY         X(15)   69  15
03 INS-CO-STATE-0435       DISPLAY         X(2)    84   2
03 INS-CO-ZIP-0435        DISPLAY             86   9
04 INS-CO-ZIP-FIRST-FIVE-0435  DISPLAY         X(5)    86   5
04 INS-CO-ZIP-LAST-FOUR-0435   DISPLAY         X(4)    91   4
02 INS-CO-PHONE-0435       DISPLAY         9(10)   95  10
```

```
02 GROUP-NUMBER-0435       DISPLAY         9(6)   105   6
02 PLAN-DESCRIPTION-0435     DISPLAY              111  20
03 DEDUCT-0435          COMP-3         S9(7)V99 111   5
03 MAXIMUM-LIFE-COST-0435    COMP-3         S9(7)V99 116   5
03 FAMILY-COST-0435       COMP-3         S9(7)V99 121   5
03 DEP-COST-0435         COMP-3         S9(7)V99 126   5
02 FILLER            DISPLAY         XX    131   2

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——               DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT             mm/dd/yy
hhmmss  14
                         SCHEMA EMPSCHM VERSION 100

RECORD NAME........ JOB                     RLGTH= 324
RECORD VERSION..... 0100                     DLGTH= 300
RECORD ID.......... 0440                     KLGTH=  24
RECORD LENGTH...... FIXED (INTERNALLY VARIABLE)         DSTRT=  28
MINIMUM ROOT.......  24 CHARACTERS
MINIMUM FRAGMENT...  296 CHARACTERS
LOCATION MODE...... CALC USING  JOB-ID-0440     DUPLICATES NOT ALLOWED
WITHIN............. ORG-DEMO-REGION   OFFSET    5 PGS FOR    20 PGS
CALL PROCEDURES.... NAME.... WHEN.. FUNCTION
          IDMSCOMP BEFORE STORE
          IDMSCOMP BEFORE MODIFY
          IDMSDCOM AFTER GET
DBKEY POSITIONS.... SET............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
          JOB-TITLE-NDX  INDEX MEMBER  3
          JOB-EMPOSITION  OWNER      4   5
          (FRAGMENT CHAIN) INTRNL     6
```

```
DATA ITEM..... REDEFINES... USAGE..... VALUE..... PICTURE. STRT LGTH
02 JOB-ID-0440          DISPLAY         9(4)    1   4
02 TITLE-0440          DISPLAY         X(20)    5  20
02 DESCRIPTION-0440       DISPLAY              25  120
03 DESCRIPTION-LINE-0440     DISPLAY OCCURS 2    X(60)   25  120
02 REQUIREMENTS-0440       DISPLAY              145  120
03 REQUIREMENT-LINE-0440     DISPLAY OCCURS 2    X(60)   145  120
02 MINIMUM-SALARY-0440      DISPLAY         S9(6)V99 265   8
02 MAXIMUM-SALARY-0440      DISPLAY         S9(6)V99 273   8
02 SALARY-GRADES-0440      DISPLAY OCCURS 4    9(2)   281   8
02 NUMBER-OF-POSITIONS-0440   DISPLAY         9(3)   289   3
02 NUMBER-OPEN-0440       DISPLAY         9(3)   292   3
02 FILLER            DISPLAY         XX    295   2

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——              DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT            mm/dd/yy
hhmmss  15
                         SCHEMA EMPSCHM VERSION 100

RECORD NAME........ NON-HOSP-CLAIM               RLGTH= 1064
RECORD VERSION..... 0100                      DLGTH= 1056
RECORD ID.......... 0445                      KLGTH=  8
RECORD LENGTH...... VARIABLE                    DSTRT=  12
MINIMUM ROOT.......  248 CHARACTERS
MINIMUM FRAGMENT... 1052 CHARACTERS
LOCATION MODE...... VIA SET   COVERAGE-CLAIMS  DISPLACEMENT 0000 PAGES
WITHIN............. INS-DEMO-REGION   OFFSET   5 PGS FOR     20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          COVERAGE-CLAIMS MEMBER     1
          (FRAGMENT CHAIN) INTRNL     2
DATA ITEM..... REDEFINES... USAGE..... VALUE..... PICTURE. STRT LGTH
02 CLAIM-DATE-0445        DISPLAY               1   8
03 CLAIM-YEAR-0445        DISPLAY         9(4)    1   4
03 CLAIM-MONTH-0445       DISPLAY         9(2)    5   2
03 CLAIM-DAY-0445        DISPLAY         9(2)    7   2
02 PATIENT-NAME-0445       DISPLAY              9  25
03 PATIENT-FIRST-NAME-0445    DISPLAY         X(10)    9  10
03 PATIENT-LAST-NAME-0445    DISPLAY         X(15)   19  15
02 PATIENT-BIRTH-DATE-0445    DISPLAY             34   8
03 PATIENT-BIRTH-YEAR-0445    DISPLAY         9(4)    34   4
03 PATIENT-BIRTH-MONTH-0445   DISPLAY         9(2)    38   2
03 PATIENT-BIRTH-DAY-0445    DISPLAY         9(2)    40   2
02 PATIENT-SEX-0445       DISPLAY         X     42   1
02 RELATION-TO-EMPLOYEE-0445   DISPLAY         X(10)   43  10
02 PHYSICIAN-NAME-0445      DISPLAY             53  25
03 PHYSICIAN-FIRST-NAME-0445   DISPLAY         X(10)   53  10
```

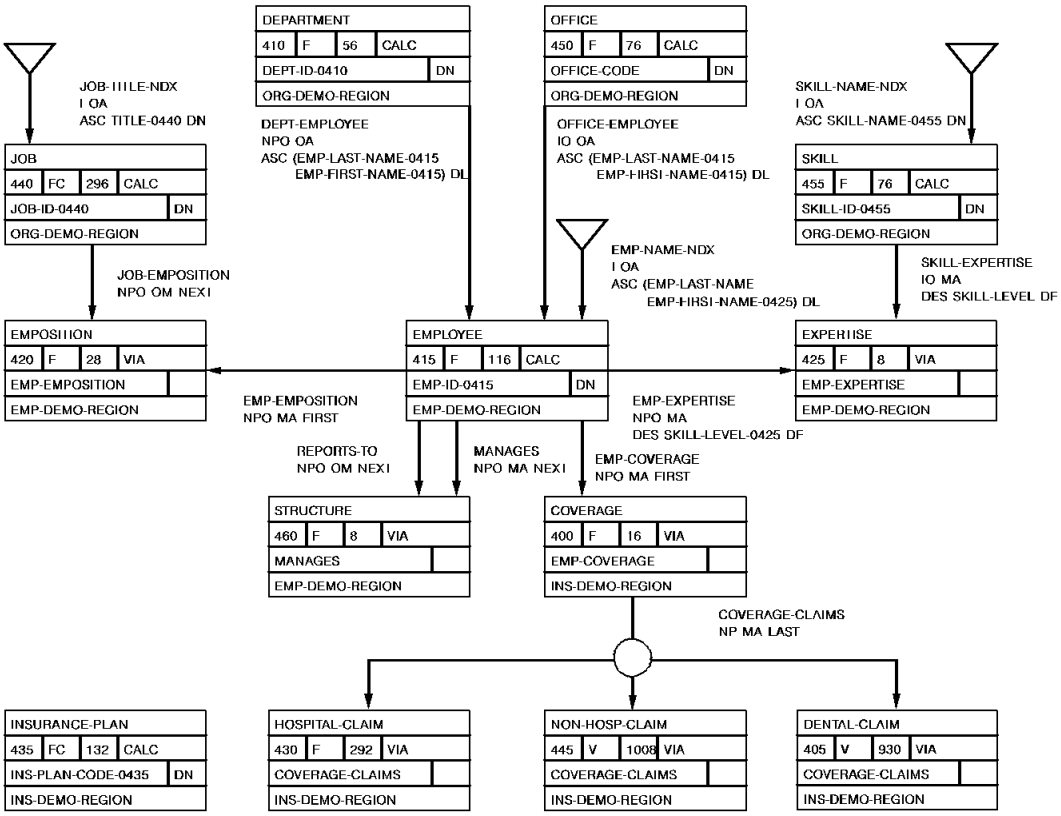
```
03 PHYSICIAN-LAST-NAME-0445   DISPLAY         X(15)   63  15
02 PHYSICIAN-ADDRESS-0445    DISPLAY             78  46
03 PHYSICIAN-STREET-0445     DISPLAY         X(20)   78  20
03 PHYSICIAN-CITY-0445      DISPLAY         X(15)   98  15
03 PHYSICIAN-STATE-0445     DISPLAY         X(2)   113   2
03 PHYSICIAN-ZIP-0445      DISPLAY             115   9
04 PHYSICIAN-ZIP-FIRST-FIVE-0445 DISPLAY         X(5)   115   5
04 PHYSICIAN-ZIP-LAST-FOUR-0445 DISPLAY         X(4)   120   4
02 PHYSICIAN-ID-0445       DISPLAY         9(6)   124   6
02 DIAGNOSIS-0445        DISPLAY OCCURS 2    X(60)   130  120
02 NUMBER-OF-PROCEDURES-0445   COMP          9(2)   250   2
02 FILLER            DISPLAY         X     252   1
02 PHYSICIAN-CHARGES-0445    DISPLAY OCCURS 0 TO 10      253  800
  DEPENDING ON -- NUMBER-OF-PROCEDURES-0445
03 SERVICE-DATE-0445       DISPLAY               1   8
04 SERVICE-YEAR-0445       DISPLAY         9(4)    1   4
04 SERVICE-MONTH-0445      DISPLAY         9(2)    5   2
04 SERVICE-DAY-0445       DISPLAY         9(2)    7   2
03 PROCEDURE-CODE-0445      DISPLAY         9(4)    9   4
03 DESCRIPTION-OF-SERVICE-0445  DISPLAY         X(60)   13  60
03 FEE-0445           COMP-3         S9(7)V99  73   5
03 FILLER            DISPLAY         XXX    78   3

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ———               DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT             mm/dd/yy
hhmmss  18
                         SCHEMA EMPSCHM VERSION 100


RECORD NAME........ OFFICE                    RLGTH=  92
RECORD VERSION..... 0100                     DLGTH=  76
RECORD ID.......... 0450                     KLGTH=  16
RECORD LENGTH...... FIXED                    DSTRT=  16
LOCATION MODE...... CALC USING  OFFICE-CODE-0450   DUPLICATES NOT ALLOWED
WITHIN............. ORG-DEMO-REGION   OFFSET    5 PGS FOR    20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
```

```
          OFFICE-EMPLOYEE INDEX OWNER   3   4
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 OFFICE-CODE-0450       DISPLAY         X(3)    1   3
02 OFFICE-ADDRESS-0450      DISPLAY               4  46
03 OFFICE-STREET-0450      DISPLAY         X(20)    4  20
03 OFFICE-CITY-0450       DISPLAY         X(15)   24  15
03 OFFICE-STATE-0450       DISPLAY         X(2)    39   2
03 OFFICE-ZIP-0450        DISPLAY              41   9
04 OFFICE-ZIP-FIRST-FIVE-0450  DISPLAY         X(5)    41   5
04 OFFICE-ZIP-LAST-FOUR-0450   DISPLAY         X(4)    46   4
02 OFFICE-PHONE-0450       DISPLAY OCCURS 3    9(7)    50  21
02 OFFICE-AREA-CODE-0450     DISPLAY         X(3)    71   3
02 SPEED-DIAL-0450        DISPLAY         X(3)    74   3

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——               DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT             mm/dd/yy
hhmmss  20
                         SCHEMA EMPSCHM VERSION 100


RECORD NAME........ SKILL                    RLGTH=  96
RECORD VERSION..... 0100                     DLGTH=  76
RECORD ID.......... 0455                     KLGTH=  20
RECORD LENGTH...... FIXED                    DSTRT=  20
LOCATION MODE...... CALC USING  SKILL-ID-0455    DUPLICATES NOT ALLOWED
WITHIN............. ORG-DEMO-REGION   OFFSET    5 PGS FOR    20 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          CALC       MEMBER     1   2
          SKILL-NAME-NDX  INDEX MEMBER  3
          SKILL-EXPERTISE INDEX OWNER   4   5
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 SKILL-ID-0455         DISPLAY         9(4)    1   4
02 SKILL-NAME-0455        DISPLAY         X(12)    5  12
02 SKILL-DESCRIPTION-0455    DISPLAY         X(60)   17  60

 IDMSRPTS nn.n
—— SCHEMA RECORD DESCRIPTION LISTING ——               DATE   TIME  PAGE
 RECDES                  DICTIONARY APPLDICT OF NODE DEFAULT             mm/dd/yy
hhmmss  22
                         SCHEMA EMPSCHM VERSION 100
```

```
RECORD NAME........ STRUCTURE                 RLGTH=  36
RECORD VERSION..... 0100                    DLGTH=  12
RECORD ID.......... 0460                    KLGTH=  24
RECORD LENGTH...... FIXED                   DSTRT=  24
LOCATION MODE...... VIA SET   MANAGES      DISPLACEMENT 0000 PAGES
WITHIN............. EMP-DEMO-REGION   OFFSET   5 PGS FOR     45 PGS
DBKEY POSITIONS.... SET.............. TYPE........ NEXT PRIOR OWNER
          MANAGES     MEMBER     1   2   3
          REPORTS-TO    MEMBER     4   5   6
DATA ITEM.......... REDEFINES... USAGE....... VALUE..... PICTURE. STRT LGTH
02 STRUCTURE-CODE-0460      DISPLAY         X(2)    1   2
88 ADMIN-0460          COND 'A'              1
88 PROJECT-0460         COND 'P1' THRU 'P9'         1
02 STRUCTURE-DATE-0460      DISPLAY              3   8
03 STRUCTURE-YEAR-0460      DISPLAY         9(4)    3   4
03 STRUCTURE-MONTH-0460     DISPLAY         9(2)    7   2
03 STRUCTURE-DAY-0460      DISPLAY         9(2)    9   2
02 FILLER            DISPLAY         XX     11   2
```

EMPLOYEE Database Structure Diagram

The data structure diagram illustrates record relationships in the EMPLOYEE database.



Appendix H: VS COBOL II Support

This appendix discusses CA IDMS support for programs compiled under the VS COBOL II compiler. It is divided into two parts:

- Features of VS COBOL II that are supported by CA IDMS
- Features of VS COBOL II that are not supported by CA IDMS

  Note: This appendix applies only to programs run in the online DC/UCF system. Except where specifically noted, it does not apply to programs run in another region (such as batch or CICS Transaction Server) even if the programs contain CA IDMS DML commands.

  Note: All the provisions of this appendix also apply to programs compiled under an LE-compliant compiler, unless otherwise noted. For more information about IBM Language Environment and LE-compliant ompilers, see Considerations for IBM Language Environment (see page 507).

Programs compiled under VS COBOL II can be run under the IBM runtime Language Environment subject to the requirements documented by IBM and the CA IDMS restrictions documented below in this appendix and in Considerations for IBM Language Environment (see page 507). IBM no longer supports programs running under the VS COBOL II runtime environment.

This section contains the following topics:

Features Supported by CA IDMS

The following COBOL II features are supported by CA IDMS:

- **Reentrancy**—Fully reentrant and non-reentrant programs are supported. The RENT compiler option must be specified if the program is reentrant. NORENT must be specified if the program is non-reentrant.

  Note: Quasi-reentrancy is not supported for VS COBOL II programs. It is strongly recommended that all COBOL II programs be compiled with the RENT option. A separate copy of each NORENT COBOL II program will be loaded for each concurrent task. CPU and storage utilization will be extremely high.

- **Residency**—Resident and nonresident programs are supported. The NORES compiler option causes all necessary VS COBOL II runtime support modules to be linked with the program. The program can then be executed without having to load any support modules. The RES option causes the runtime support modules to be brought in as needed during execution.

The following combinations of RENT and RES options are supported:

- RENT RES
- NORENT NORES
- NORENT RES

  Note: 31-bit programs require the RENT and RES options. This combination is recommended for most efficient processing. The RES option is not relevant to LE-compliant compilers, which always use this option.

  The RENT/NORES combination is not allowed by the VS COBOL II compiler.

  Do not confuse the RES compiler option with the CA IDMS RESIDENT parameter (assigned at SYSGEN or by using a DCMT command). The CA IDMS RESIDENT parameter causes the user program to be loaded into the resident pool during startup, and remains there for the duration of system execution.

- **XA support**—Full 31-bit support is provided. COBOL II programs can reside above or below the 16-meg line, and can execute in 24-bit or 31-bit mode. User data areas can reside below the 16-meg line (compiler option DATA(24)) or anywhere in the region (DATA(31)). The following table shows the default attributes assigned by the COBOL II compiler based on the combination of RES and RENT compiler options.

RMODE and AMODE Attributes

Compiler options	Default RMODE/AMODE
RES/RENT	RMODE(ANY) AMODE(ANY)
RES/NORENT	RMODE(24) AMODE(ANY)
NORES/NORENT	RMODE(24) AMODE(24)

To run a task in 31-bit mode, it must be defined with a LOCATION of ANY (at SYSGEN or at runtime using a DCMT VARY DYNAMIC PROGRAM command).

- **Static and dynamic calls**—CA IDMS supports the following types of calls provided by VS COBOL II:
  - CALL literal with NODYNAM, static (more storage, less CPU)
  - CALL identifier, dynamic (less storage, more CPU)

    To call a program dynamically you must use the call identifier format.

    A VS COBOL II program can use the COBOL CALL verb to invoke an assembler or COBOL II subprogram. The CA IDMS TRANSFER CONTROL (LINK or XCTL) must be used for invoking VS COBOL subprograms. The subprogram must be defined to the system either at SYSGEN or by using a DCMT VARY DYNAMIC PROGRAM command. The correct language must be specified, and the NONOVERLAYABLE attribute must also be specified.

A COBOL II program and all the COBOL II subprograms that it calls dynamically must be compiled with the same RES/NORES compiler option.

A dynamic call is often a more efficient way for one online VS COBOL II program to call another than the use of a TRANSFER CONTROL DML command. Note, however, that when a dynamic call is made, the DC/UCF system is not aware that the application is running in a new program. Therefore, error messages and program statistics will not reflect the call.

There are also restrictions on using static or dynamic calls when invoking an assembler subprogram. If the assembler program is not fully reentrant or if the assembler program issues any operating system SVC instructions, the program must be invoked with a DC TRANSFER control statement. Note that use of SVC instructions in an online program presents security and performance concerns. Such instructions should be avoided unless they are absolutely necessary. In most cases, DC/UCF system functions can be used instead.

Note: Also see "Performance Improvements with RHDCLEFE" in Appendix I: (see page 507).

- **Optimizer**—The COBOL II optimizer is fully supported. Service reloads do not have to be explicitly coded in the program, as is required for VS COBOL.
- **STRING/UNSTRING/INSPECT**—COBOL II verbs that require GETMAIN services are supported; this includes STRING, UNSTRING, and INSPECT.

  Note: Exercise caution with STRING, UNSTRING, and INSPECT.Use of these may increase SRB time. Commands in a VS/COBOL II environment may cause additional screening of supervisor calls resulting in some performance degradation. This concern does not apply when using VS/COBOL II in an IBM runtime Language Environment provided that RHDCLEFE is defined in the IDMS/DC Sysgen.

  For more information about RHDCLEFE, see Appendix I.
- **Compiler options**—The following compiler options that affect object code execution are supported:
  - DATA
  - OPTIMIZE
  - PFDSGN
  - RENT
  - RESIDENT
  - SSRANGE
  - TRUNC

    Note: See the discussion of the TRUNC option in the section Executing Programs (see page 25).
  - ZWB

- **Execution time options**—COBOL II has an options module (IGZEOPT) that can be assembled and link-edited to control options at execution time. The module needs to be linked with each online VS COBOL II application program. Valid macro values for parameters that affect CA IDMS performance are shown below:

```
IGZOPT SYSTYPE=OS,
    DEBUG=NO,
    STAE=NO,
    AIXBLD=NO,
    SSRANGE=YES/NO,
    SPOUT=YES/NO
```

Features Not Supported by CA IDMS

The following COBOL II features are not supported by CA IDMS:

- ENVIRONMENT and DATA DIVISION entries normally associated with file management (for example, INPUT-OUTPUT SECTION, FILE SECTION)
- I/O statements, including ACCEPT, CLOSE, DELETE, DISPLAY, OPEN, READ, REWRITE, and WRITE

  Note: DATE/TIME related ACCEPT statements are supported in release 14.1 and later for COBOL II and LE-compliant compilers.

  The debugging features FDUMP and TEST
- The sorting features SORT and MERGE
- The compiler options ADV, DYNAM, FASTSRT, GRAPHIC, and OUTDD

Appendix I: Considerations for IBM Language Environment

This section applies only to runtime support for COBOL programs that run in an online DC/UCF region. It does not apply to batch or CICS programs that access CA IDMS. It also does not apply to online COBOL programs compiled with the "old" VS COBOL compiler, prior to VS COBOL II. Online VS COBOL programs must comply with the compile and linkage restrictions described in Compiling and Executing CA IDMS Programs (see page 22). If these restrictions are observed, the LE runtime environment will not be accessed by VS COBOL programs. This section does apply to programs compiled under VS COBOL II when run in online LE runtime environment.

What is IBM Language Environment (LE)?

LE is a runtime environment that replaces the language-specific runtime environments that existed previously. For example, VS COBOL had its own runtime environment; VS COBOL II had another. CA IDMS can execute programs that are designed to use the LE runtime environment. It can also execute programs compiled with pre-LE compilers that use the LE runtime environment subject to IBM's documented restrictions.

Language Environment has had several names for different operating systems and release levels. The term "LE" will be used in this document to refer to the IBM runtime Language Environment for any of the following operating systems:

- z/VSE
- z/OS
- z/VM

Note: This section applies only to runtime support in CA IDMS/DC. It does not apply to batch or CICS programs that access CA IDMS.

How Can You Use LE with CA IDMS/DC?

To execute online programs using the LE runtime libraries, follow these steps to bring up your CA IDMS environment:

1. Ensure that the CA IDMS system has been generated with a 24-bit reentrant pool (or program pool, if no reentrant pool is generated) that is large enough to contain the IBM-supplied LE application program interface module CEEPIPI. The size of this module is approximately 100K.

2. Ensure that the CA IDMS system has been generated with an XA reentrant pool that is large enough to maintain residence for several IBM-supplied LE support modules. Allow 5 megabytes for these programs.

Include the LE runtime load libraries in the CDMSLIB loadlib concatenation before any other IBM language loadlibs you are using. For example, before COBOL II.

This section contains the following topics:

Considerations About LE Runtime

Running Pre-LE Programs

There are restrictions that apply when you run pre-LE programs in an LE runtime environment within CA IDMS/DC. *Pre-LE programs* are programs that were compiled with a non-LE compliant compiler, such as COBOL II.

Some of these restrictions are already documented in Compiling and Executing CA IDMS Programs (see page 22) and Appendix H: (see page 503). Additional restrictions for LE are:

- VS COBOL II programs have to run without storage protection unless RHDCLEFE (see "Performance Improvements with RHDCLEFE" below) is in use.
- VS COBOL II programs must be linked with an IGZEOPT module that specifies STAE=NO (see "Execution Time Options" in Appendix H: (see page 503), for more information on the use of IGZEOPT). If this restriction is not observed, a program check in a COBOL program will result in immediate termination of the program with no indication of an error. Certain other abnormal abend conditions may also go unreported. This restriction does not apply if one of the following conditions is true:
  - RHDCLEFE is in use. See "Performance Improvements with RHDCLEFE" later in this appendix for more information.
  - A special CEEDOPT or CEEROPT is in use as described later in this appendix under Runtime Options, and either or both of the following options is specified:

    ABTERMENC=((ABEND,...

    TRAP=((OFF,...

- The IBM LE support module CEEPIPI must be loaded once before any VS COBOL II program is run. This is most easily done by defining CEEPIPI as RESIDENT in the CA IDMS/DC sysgen using the following syntax.

  ```
  ADD PROGRAM CEEPIPI CONCURRENT ENABLED LANGUAGE ASSEMBLER
  NONOVERLAYABLE PROGRAM PROTECT REENTRANT RESIDENT REUSABLE .
  ```

- Restrictions mentioned in the IBM documentation (for example, the *IBM COBOL/370 Migration Guide*) apply.

  Note: Running pre-LE programs with LE runtime can degradeperformance in some circumstances. If you notice poor performance, you should consider recompiling the programs with the newer compiler or running with RHDCLEFE (see "Performance Improvements with RHDCLEFE" below). The use of RHDCLEFE also removes the necessity of forcing the load of CEEPIPI before running any VS COBOL II programs.

Running LE Programs

LE programs are programs that were compiled with an LE-compliant compiler. CA IDMS/DC supports all LE-compliant compilers supported by IBM including:

- IBM COBOL for VM
- IBM Enterprise COBOL for z/OS
- COBOL for z/VSE

For convenience, programs compiled with an LE-compliant compiler are referred to as "LE COBOL" programs below.

Running LE-Compliant Compiler Programs Under CA IDMS/DC

This section discusses Language Environment runtime options relevant to the online CA IDMS/DC environment.

Note: Also see Compiling and Executing CA IDMS Programs (see page 22) and Appendix H: (see page 503). The restrictions on VS COBOL and VS COBOL II compile and runtime options also apply to programs compiled with an LE-compliant COBOL compiler unless specifically noted below.

See Appendix A: (see page 337) for sample compile and link JCL for both batch and online programs which use CA IDMS DML statements.

Runtime Options

The IBM Language Environment provides numerous options that control how programs operate at runtime. The default values are designed to be suitable in a batch environment. Therefore, it is necessary to modify some values for applications that are to run in a DC/UCF online system.

Note: As stated in the introduction to this appendix, this appendix does not apply to programs that run in a CICS or other region, even if they access CA IDMS using DML or SQL commands. It does apply to programs that run a DC/UCF online system, which are invoked from another front-end using CA IDMS UCF (such as an ADS/O application that is accessed using UCFCICS from a CICS front-end).

The IBM Language Environment provides a number of ways to specify runtime options. Four methods are supported for CA IDMS/DC online programs:

1. Modify, assemble, and link the IBM-supplied CEEUOPT module. Link the resulting module with each application program. Product Documentation Change LI18624 contains a sample version of the CEEUOPT with values that are appropriate for most online CA IDMS applications. Also consult the section "Creating an Application-Specific Runtime Options Module" in IBM's LE Installation and Customization Manual.
2. Assemble and link a CEEUOPT module as described above. Link the resulting module with RHDCLEFE. Make sure that RHDCLEFE is defined in the DC/UCF Sysgen (as described under "Performance Improvements Using RHDCLEFE" below). This option affects only COBOL programs. This is the recommended option for all online COBOL applications.

3. Assemble and link a specialized CEEDOPT module.

   Note: This method is not available for z/OS Version 1.10 and higher. Use method 1 or method 4 for non-COBOL applications on z/OS Versin 1.10 and higher.

   If this method is chosen, special copies of the IBM modules CEEBINIT and CEEPIPI must be maintained for use with online DC/UCF systems only. Due to maintenance considerations, this method is not recommended for COBOL applications. It is needed for PL/I programs compiled with a non-LE-compliant compiler. For more information on using this method, see Product Documentation Change LI23664.

4. Assemble and link a specialized CEEROPT module.

   Note: This method is not available for z/OS Version 1.9 and lower or for VSE. Use method 1 or 3 for those operating systems.

   If this method is chosen, a CEEROPT load module can be created to override desired options. Like CEEUOPT, and unlike CEEDOPT, you only need to specify those options which are to be different from the installation default LE run-time operations. The resultant load module must be included in a load library in the CDMSLIB concatenation ahead of the default SCEERUN load library.

   Note: The CEEROPT will be loaded in a CA IDMS region only if your CEEPRMxx member specified CEEROPT(ALL). For more information on using this module, refer to IBM documentation.

Except as discussed below, the IBM-supplied default runtime options can be used with any site-specific desired modifications. Note that the MSGFILE parameter is ignored and messages are sent to the CA IDMS log file.

Recommended settings for certain parameters are as shown below. For more details on these parameters see the IBM Language Environment Customization manual.

- ABTERMENC=(RETCODE) or ABTERMENC=(ABEND): This parameter affects the action taken when an LE enclave ends with an unhandled condition of severity 2 or higher. If RETCODE code is specified, the DC task will abend with message DC128004. If ABEND is specified, the DC task will abend with a Uxxx where xxx corresponds to the hexadecimal value of the user abend code set by LE. For example, an LE user abend 4093 would result in a DC task abend with code UFFD.
- ALL31=(ON): This parameter will minimize the amount of below-the-line storage that will be allocated by LE. This parameter requires that all COBOL programs are linked with AMODE(31). It is strongly recommended that any non-conforming programs be relinked so that ALL31=(ON) can be specified.
- DEBUG=(OFF): The DEBUG runtime option cannot be used in a DC environment.
- INTERRUPT=(OFF): Attention interrupts are handled by the CA IDMS/DC system and not by LE runtime support. Application COBOL programs can test for attention interrupts using the DC-ATTN-INT condition name under LE just as with earlier COBOL runtime environments.
- POSIX=(OFF): POSIX is not supported under DC/UCF.

- RPTSTG=(OFF) or RPTSTG=(ON): Normally OFF should be specified. OFF must be specified for systems prior to release 14.1.

  The purpose of RPTSTG is to determine the storage utilization for a particular application. The report is produced at the end of a COBOL task thread and is written to the CA IDMS log file. For efficiency reasons, the termination phase of COBOL processing is normally not executed in an online DC environment. If it is necessary to obtain storage information for a particular application, optional bit 196 can be set (See "COBOL II and LE COBOL Task Management" in Optional Online COBOL Functionality (see page 521)). Note that this option adversely affects performance. Storage reports are therefore normally produced only in a test or development system.

- TERMTHDACT=(QUIET) or TERMTHDACT=(TRACE): This option controls the extent of LE runtime information that will be supplied when an application terminates. All messages will be written to the DC log file.

- TRAP=(ON) or TRAP=(OFF): If ON is specified, program checks in an LE application will result in IBM LE error-handling being put into effect. COBOL-specific and LE messages will be written to the log. After these messages are written and the COBOL thread ends abnormally, the DC task will abend with message DC128004 and a task snap will be taken.

  If OFF is specified, program checks in an LE application will result in an immediate task snap. This is similar to the result in a VS COBOL or VS COBOL II runtime environment. No LE messages related to the program check will be written. Furthermore, if any PL/I applications are included in the online system, any ON ERROR clauses will not be handled properly.

In addition to the parameters above, we strongly recommend that you use smaller values than the default ones for the various heap (ANYHEAP, BELOWHEAP, and HEAP) parameters and stack (LIBSTACK and STACK) parameters because these are allocated on a task thread basis. Storage allocation is most efficient if relatively large values are specified as sixteen bytes less than a multiple of 4096. Smaller values than 4096 should be set for some parameters to avoid wasting storage. The values shown below have been found to be suitable for most DC/UCF systems.

Even when the smallest possible storage values are chosen, the IBM Language Environment requests a substantial amount of below-the-line storage for each program invoked in an online task--particularly with older releases of LE. This storage is used for functions which are not supported in an online DC/UCF system. For this reason, DC/UCF provides optional functionality which forces all LE storage to be allocated above the 16M line for tasks which are defined as LOCATION ANY. You can enable this functionality by specifying #DEFOPT OPT00227 when compiling module RHDCOPTF.

```
ANYHEAP=(2032,4080,ANYWHERE,FREE)
BELOWHEAP=(496,496,FREE)
HEAP=(2032,4080,ANYWHERE,KEEP,2032,2032)
LIBSTACK=(496,496,FREE)
STACK=(2032,8176,ANY,KEEP)
STORAGE=(NONE,NONE,NONE,0)
THREADHEAP=(0100,0100,ANYWHERE,KEEP)
```

Supported LE Functions

CA IDMS/DC supports these LE functions:

- Math services
- National language support services
- Date and time services
- XML parsing

CA IDMS/DC also supports storage management services, but for performance reasons, they are not recommended. The storage management services are:

- CEECRHP: Create heap segment
- CEECZST: Re-allocate (change size of) heap storage
- CEEDSHP: Discard heap segment
- CEEFRST: Free heap storage
- CEEGTST: Get heap storage

Unsupported LE Functions

CA IDMS/DC does not support the following LE functions:

- CEE3PRM: Get exec parms
- CEETDLI: Call IMS
- CEETEST: Invoke debugging environment

Performance Improvements with RHDCLEFE

Beginning with Release 14.1, CA IDMS supports a more efficient method of running online VS COBOL II and LE COBOL programs under LE runtime. In order to realize this performance improvement, link RHDCLEFE and define it in the CA IDMS sysgen with the following values:

```
ADD PROGRAM RHDCLEFE
 CONCURRENT
 DYNAMIC
 ENABLED
 LANGUAGE IS ASSEMBLER
 NEW COPY IS ENABLED
 NONOVERLAYABLE
 PROGRAM
 NOPROTECT
 REENTRANT
 RESIDENT
 REUSABLE.
```

The advantages of using defining RHDCLEFE in an LE runtime environment are as follows.

- COBOL II programs can run with Storage Protect.
- If RHDCLEFE is in use, it is not necessary to link CEEUOPT with each application program.
- If a VS COBOL II or an LE COBOL program is invoked multiple times in the same task using an CA IDMS DML call (#LINK from Assembler, DC TRANSFER from COBOL or PL/I, or LINK from ADS/O), then only one LE enclave and one LE environment will be established.

  The use of RHDCLEFE can reduce the CPU usage for TRANSFER CONTROL to another COBOL program, particularly a VS COBOL II program. Without RHDCLEFE, each such invocation of a VS COBOL II program will result in the establishment and termination of both the environment and the enclave. Each such invocation of a LE COBOL program will result in the establishment and termination of the enclave.

  Note: RHDCLEFE is linked with a CEEUOPT with ALL31=(ON). As a consequence, all LE COBOL and VS COBOL II programs must be linked with AMODE(31) or AMODE(any).

Multiple-Program Enclave

This feature became available on release 15.0 service pack 3.

You can improve the performance of certain online applications that use COBOL programs under the IBM Language Environment (LE) by enabling a new optional feature which allows the use of a single LE enclave for multiple programs. The following explains the conditions under which performance can be improved and some restrictions on the programs that can utilize this new feature:

- Because of restrictions on the applications that can use the new functionality, this feature is not in effect unless MULTIPLE ENCLAVE IS ON is specified on the SYSTEM statement in the DC System Generation. In addition, module RHDCLEFE must be in use as described in "Performance Improvements with RHDCLEFE." In release 15.0, this feature is available only for z/OS operating systems.
- When MULTIPLE ENCLAVE IS OFF, each new LE program invoked within a DC online task causes the initialization of a new LE process and enclave, provided the program was invoked as a result of one of the following:
  - The DC task definition specified INVOKES PROGRAM...
  - The program was invoked using a TRANSFER CONTROL.
  - After an LE program is invoked in a given task, the same process and enclave can be reused if one of the following occurs:
  - The same program is invoked subsequently in the same task.
  - A different program is invoked from an LE COBOL program using a static CALL (CALL 'literal') or a dynamic CALL (CALL IDENTIFIER).
- When MULTIPLE ENCLAVE IS ON, a new LE process and enclave are created the first time an LE COBOL program is invoked in a task. Subsequent invocations of any COBOL program in the same task utilizes the same process and enclave even if it was invoked using TRANSFER CONTROL LINK or TRANSFER CONTROL RETURN.
- Starting an LE process and/or enclave involves considerable overhead of both storage and CPU utilization. Therefore, MULTIPLE ENCLAVE IS ON can provide significant improvement for tasks that invoke many programs using TRANSFER CONTROL RETURN or TRANSFER CONTROL LINK.

Restrictions on Using Multiple-Program Enclaves

The following restrictions apply to COBOL programs that participate in a multiple-program enclave:

- Enabled programs cannot perform a DC RETURN DML call and then be reentered using a subsequent TRANSFER. This restriction does not apply to programs that contain a DC RETURN with no subparameters because the DML compiler generates a GOBACK for this type of statement. This restriction does apply if the DC RETURN statement does have subparameters. For example, you cannot execute a "DC RETURN NEXT TASKCODE ..." statement and then reenter the same program in the same task.

- Enabled programs cannot issue a TRANSFER CONTROL NORETURN or a TRANSFER CONTROL XCTL.
- Optional bit 196 is ignored for programs that participate in a multiple-program enclave. Therefore, if MULTIPLE ENCLAVE IS ON at the system level, any program that depends on bit 196 must be exempted as described in "Exempting Programs from Multiple-Program Enclave."

Exempting Programs from Multiple-Program Enclave

You can enable multiple-program enclaves at the system level even if some programs are not eligible. An ineligible program can be exempted in one of two ways:

- Use the MULTIPLE ENCLAVE IS OFF clause of the PROGRAM statement in the DC System Generation.
- Use the MULTIPLE ENCLAVE OFF clause on the DCMT VARY PROGRAM statement or the DCMT VARY DYNAMIC PROGRAM statement.

Exempted programs can participate in the same task with eligible programs. All eligible programs share one process/enclave. Each exempted program uses its own process/enclave.

Appendix J: 18-Byte Communications Blocks

As an alternative to using the 16-byte IDMS and IDMS DC communications blocks, you can specify 18-byte blocks. This appendix describes where to specify an 18-byte communications block and contains figures showing these blocks. The difference between 16-byte blocks and 18-byte blocks is that an 18-byte block contains an additional 18-byte filler field, and the following fields are 18 bytes instead of 16 bytes:

- RECORD-NAME
- AREA-NAME
- ERROR-SET
- ERROR-RECORD
- ERROR-AREA

Note: For more information about the the fields in IDMS and IDMS DC, see Communication Blocks and Error Detection (see page 33).

Where to Specify the 18-Byte Block

For COBOL, you specify an 18-byte communications block in the SUBSCHEMA-NAMES LENGTH IS clause found in the PROTOCOL statement of ENVIRONMENT DIVISION.

Note: For more information, see ENVIRONMENT DIVISION (see page 69).

This section contains the following topics:

18-Byte IDMS Block

The following figure shows the 18-byte IDMS communications block:

		Field	Data Type	Length (bytes)	Initial Value
*	1 8	PROGRAM-NAME	Alphanumeric	8	Program Name
	9 12	ERROR-STATUS	Alphanumeric	4	'1400'
	13 16	DBKEY	Binary	4(Fullword)	0000
	17 34	RECORD-NAME	Alphanumeric	18	Spaces
	35 52	AREA-NAME	Alphanumeric	18	Spaces
	53 70	FILLER	Alphanumeric	18	Spaces
	71 88	ERROR-SET	Alphanumeric	18	Spaces
	89 106	ERROR-RECORD	Alphanumeric	18	Spaces
	107 124	ERROR-AREA	Alphanumeric	18	Spaces
**	125 128	PAGE-INFO	Binary	4(Fullword)	0000
	125 ... 224	IDBMSCOM-AREA	Alphanumeric	100	Low Values
	225 228	DIRECT-DBKEY	Binary	4(Fullword)	0000
	229 235	DATABASE-STATUS	Alphanumeric	7	Spaces
	236	FILLER	...	1	...
	237 240	RECORD-OCCUR	Binary	4(Fullword)	0000
	241 244	DML-SEQUENCE	Binary	4(Fullword)	0000
	245 300	FILLER	Alphanumeric	56	Spaces

* word aligned

** PAGE-INFO-GROUP overlays bytes 125 and 126 and PAGE-INFO-DBK-FORMAT overlays bytes 127 and 128. Both of these fields are binary datatype, each with a length of two bytes. Suggested initial values for both are 00. Together these two fields represent PAGE-INFO.

18-Byte IDMS DC Block

The following figure shows the 18-byte IDMS DC communications block:

		Field	Data Type	Length (bytes)	Initial Value
*	1 8	PROGRAM-NAME	Alphanumeric	8	Program Name
	9 12	ERROR-STATUS	Alphanumeric	4	'1400'
	13 16	DBKEY	Binary	4(Fullword)	0000
	17 34	RECORD-NAME	Alphanumeric	18	Spaces
	35 52	AREA-NAME	Alphanumeric	18	Spaces
	53 70	FILLER	Alphanumeric	18	Spaces
	71 88	ERROR-SET	Alphanumeric	18	Spaces
	89 106	ERROR-RECORD	Alphanumeric	18	Spaces
	107 124	ERROR-AREA	Alphanumeric	18	Spaces
**	125 128	PAGE-INFO	Binary	4(Fullword)	0000
	125 ... 224	IDBMSCOM-AREA	Alphanumeric	100	Low Values
	225 228	DIRECT-DBKEY	Binary	4(Fullword)	0000
	229 235	DATABASE-STATUS	Alphanumeric	7	Spaces
	236	FILLER	...	1	...
	237 240	RECORD-OCCUR	Binary	4(Fullword)	0000
	241 244	DML-SEQUENCE	Binary	4(Fullword)	0000
	245 300	FILLER	Alphanumeric	56	Spaces
	301 ... 400	DBMSCOM-AREA	Alphanumeric	100	Low Values
	401 404	SSC-ERRSTAT-SAVE	Alphanumeric	4	0000
	405 408	SSC-DMLSEQ-SAVE	Binary	4(Fullword)	0000
	409 412	SUBSCHEMA-CTRL-END	Alphanumeric	4	0000

* word aligned

** PAGE-INFO-GROUP overlays bytes 125 and 126 and PAGE-INFO-DBK-FORMAT overlays bytes 127 and 128. Both of these fields are binary datatype, each with a length of two bytes. Suggested initial values for both are 00. Together these two fields represent PAGE-INFO.

Appendix K: Optional Online COBOL Functionality

Several APARs have been written that affect the performance and/or functionality of COBOL programs in the online CA IDMS/DC system. This appendix discusses the effects of the various APARs.

Note: This discussion applies only to online programs running in a DC/UCF region. It does not apply to batch programs or to programs running in a CICS region or under control of another TP monitor, even if such programs access an IDMS database via LOCAL or CV mode.

This section contains the following topics:

COBOL II and LE COBOL Task Management

Several optional APARs have to do with the management of a COBOL II task thread or a LE COBOL process(environment) and enclave. To better understand the concept of a COBOL task thread, first consider a batch COBOL job in which IDMS is **not** involved. When a COBOL II program is first invoked, the COBOL support code causes the load of a small program called IGZCTCO. As the COBOL II runtime system is built, control information is placed in the copy of IGZCTCO that has been loaded into the address space. If the top level program (call it program A) issues a CALL IDENTIFIER to a second COBOL program (call it program B), the COBOL II support code finds the existing copy of IGZCTCO. Program B is entered using the same COBOL II environment. The first time program B is entered, its WORKING STORAGE is initialized according to any VALUE clauses coded.

If program B does a GOBACK to program A and then program A issues a second CALL IDENTIFIER to program B, program B is normally entered with the same WORKING STORAGE values left from the previous invocation. The VALUE clauses are **not** reinitialized.

In Language Environment for z/OS, the concepts of the LE process and enclave are roughly analogous to the COBOL II task thread. See IBM documentation for a more complete discussion of these concepts.

Now let us return to the discussion of COBOL II in an online DC/UCF system. When COBOL II support was first introduced for DC/UCF, every invocation of a COBOL program via a TRANSFER RETURN from another COBOL program caused a new IGZCTCO to be loaded. The COBOL II task thread was recreated. Thus if Task A invokes COBOL II program X, which does a TRANSFER CONTROL ten times to program Y, the COBOL II task thread was built eleven times -- once for program X and ten times for program Y. Moreover, if program Y terminated with a DC RETURN instead of a GOBACK, all the storage associated with each invocation was preserved until task termination. This causes serious overhead of CPU and potentially of storage utilization.

To reduce the overhead of constantly creating new COBOL II environments, the DC/UCF COBOL II support was modified to load only one copy of IGZCTCO per task. Using this method, if main program X issues a TRANSFER CONTROL ten times to program Y, the COBOL II environment is built only once. The drawback is that certain functionality is changed. In particular, WORKING STORAGE is not reinitialized each time program Y is entered. Also, recursive TRANSFER CONTROL (Program X issues TRANSFER CONTROL TO X) is not allowed. Since some existing applications depended on those features, optional APARs were developed to allow use of one method or the other. Unfortunately, the DC/UCF default methodology changed from release to release and sometimes within one release.

Note: IGZCTCO is handled differently in DC/UCF systems that are operating with an IBM Language Environment runtime system (such as LE for z/OS). COBOL II programs can be used in these systems, but prior to release 14.1, a new IGZCTCO was used for every TRANSFER to a COBOL II program.

Beginning with release 14.1, online COBOL II programs in an LE runtime environment will run most efficiently if RHDCLEFE is defined in the DC/UCF Sysgen as documented in the release 14.1 *Features Guide.* This gives functionality similar to that documented for the "single IGZCTCO" method shown below. In that case, the COBOL II program is handled as though it were compiled under LE COBOL.

The following table describes how to utilize each of the two methods for the latest maintenance of all currently supported DC/UCF releases. This table supercedes the documentation in any previous APARs or PDCs. Note that the table is divided into several sections depending on the COBOL compiler level and the runtime level.

Part 1

This part of the table contains programs compiled under COBOL II and using COBOL II runtime libraries.

Release	Method 1 (Most CPU efficient) Use single IGZCTCO per task	Method 2 (Special functionality) Use new IGZCTCO each TRANSFER
10.21PS	Default	Apply optional APAR 88-06-1105
12.01	Default (see note below)	Apply optional APAR LS12053.

Release	Method 1 (Most CPU efficient) Use single IGZCTCO per task	Method 2 (Special functionality) Use new IGZCTCO each TRANSFER
14.0 and later	Turn on optional bit 49 in RHDCOPTF.	Default.

Note: In release 12.01, prior to maintenance level 9607, it is necessary to apply APAR GO97250 to obtain the default condition shown above. With application of GO97250, optional APAR GS19348 is obsolete.

Note: Optional bit 49 is not valid in a LE/370 runtime environment.

Part 2

This part of the table contains programs compiled under COBOL II and using LE runtime libraries. RHDCLEFE is not in use.

Release	Method 1 (Most CPU efficient) Use single IGZCTCO per task	Method 2 (Special functionality) Use new IGZCTCO each TRANSFER
10.21PS and later	Not available	Default

Part 3

This part of the table contains programs compiled under COBOL II and using LE runtime libraries. RHDCLEFE is in use.

Release	Method 1 (Most CPU efficient) Reuse same process/enclave	Method 2 (Special functionality) Use new process/enclave
10.21PS	Not available	Default
12.01	Not available	Default
14.0	Not available	Default.
14.1 and later	Default	Optional bit 196.

Part 4

This part of the table contains programs compiled under LE COBOL and using LE runtime libraries.

Release	Method 1 (Most CPU efficient) Reuse same process/enclave (see first note below)	Method 2 (Special functionality) Use new process/enclave (see first note below)
10.21PS	Not available	Default
12.01	Not available	Default
14.0	Default	Optional bit 196. (see second note below)
14.1 and later	Default	Optional bit 196.

Note: When using RHDCLEFE with release 14.1 and later, the default is to preserve both the LE environment (process) and the LE enclave when invoking the same program multiple times in the same DC task. When not using RHDCLEFE, the environment is preserved for LE COBOL programs, but not the enclave.

In release 14.0, prior to maintenance level 9810, it is necessary to apply APAR LS40957 in order for optional bit 196 to have any effect. That APAR is automatically applied at level 9810 and above.

PSW Program Mask Settings

The program mask in the PSW controls whether or not certain arithmetic exceptions will cause a program check or be ignored. If the exception is ignored, significant digits of data may be lost. If the bit is on, the exception causes a program check. If the bit is off, the exception is ignored. The exceptions controlled by the program mask are as follows:

PSW bit	Exception
20	Fixed-point Overflow
21	Decimal overflow
22	Exponent underflow
23	Significance

When the CA IDMS/DC/UCF system is in system mode (i.e., code in the system nucleus is executing), the program mask is always set to B'1110'. This enables a program check for all exceptions except significance exceptions.

A program mask of B'1110' is the default for initial entry into a user mode program. Some high level languages may change the program mask. For example, some versions of COBOL change the mask to B'0000'. The DC default is to honor such a change. The DC system does that by saving the program mask when a user-mode program makes a system request (for example, an OBTAIN or a GET STORAGE). While the request is being processed, the program mask is always set to B'1110'. When the system processing is completed, the program mask is restored before return to the user-mode program which made the request.

The default program mask settings can be modified through the use of options module RHDCOPTF. One option is to force the program mask to be set to B'1110' (the system default) upon return to a user-mode program after a system request as well as upon initial entry to the program. To effect this option, set OPT00253 in RHDCOPTF. This option will cause the default mask to be in effect at all times with one exception. The exception would be during the period after the user-mode program changes the mask until the next time it makes a system request. Note that this exception does not apply to COBOL II or LE COBOL programs. The COBOL run time code will always make several requests to the DC system for storage or other resources before the actual application code is entered. This assures that the default mask will be in effect when the application code is executed.

If OPT00253 is set, option bits 148 and 184 through 188 (described below) ignored.

The value of the program mask upon initial entry to a user-mode program can also be modified as described below:

- If OPT00184 is set and OPT00253 is not set in RHDCOPTF, then the value of the program mask on initial entry to a user mode program will be set based on #DEFOPTF bits 185-188 as follows:
  - If OPT00185 is set, fixed-point overflow exceptions will result in an interrupt (program check). When it is not set, fixed-point overflows will not result in an interrupt.
  - If OPT00186 is set, decimal overflow exceptions will result in an interrupt (program check). When it is not set, decimal overflows will not result in an interrupt.
  - If OPT00187 is set, exponent underflow exceptions will result in an interrupt (program check). When it is not set, exponent underflows will not result in an interrupt.
  - If OPT00188 is set, significance exceptions will result in an interrupt (program check). When it is not set, significance exceptions will not result in an interrupt.

- If neither OPT00184 nor OPT00253 are set and OPT00148 is set, then the initial program mask will be set to binary 1010, i.e., fixed-point overflow and exponent underflow will cause an interrupt, but decimal overflow and significance exceptions will not. OPT00148 has no effect in release 16.0. The same functionality can be obtained by setting OPT00184, OPT00185, and OPT00187.

  Note: the bit settings described above affect all user mode programs, not just COBOL programs. They are presented here because the optional settings are most commonly used for specialized COBOL applications.

Loading VS COBOL Programs into XA Storage

VS COBOL II and LE COBOL programs can and normally should be linked with AMODE 31 and RMODE ANY. Old-style VS COBOL programs, which run in batch, must run with AMODE 24 and RMODE 24. However, when running online VS COBOL programs in a DC/UCF region, it is permissible to run with AMODE 31 and RMODE 24. This is the normal recommended AMODE/RMODE setting for online VS COBOL program. This allows the WORKING STORAGE for VS COBOL programs to be allocated in XA storage. Since multiple copies of WORKING STORAGE may be allocated simultaneously (when multiple tasks are running that use the same program), this feature considerably reduces the amount of below-the-line storage required.

Some sites have a large number of COBOL programs and may want to link VS COBOL programs with AMODE 31 and RMODE ANY. This allows the programs to be loaded into the 31-bit (above-the-line) PROGRAM POOL. Caution should be used before utilizing this feature. If a program that is loaded above the line issues a COBOL verb that causes an illegal SVC to be issued or if the program is compiled with illegal compile options, the entire DC/UCF region may be abended. In some cases, the entire operating system may be abended. Illegal COBOL verbs and compile options are listed in Chapter 2: (see page 17).

If online VS COBOL programs are to be linked RMODE(ANY) and run under Release 12.01 or earlier, an optional APAR must be applied. No optional APAR is required for release 14.0 and above, but the cautions listed above must be observed. The optional APARs are as follows:

Release	APAR
10.21PS (MVS)	90-09-1003
10.21PS (VSE)	Not available
12.01 (MVS)	CS82390
12.01 (VSE)	GS53516

Appendix L: Online Debugger Syntax

This section contains the following topics:

General Registers Symbols

General registers include the registers used by the program at the time of execution and the registers used by the DC/UCF system. The program status word (PSW) and register definitions are always preceded by a colon (:) and are specified by these symbols:

- **:PSW** for the current program status word
- **:Rn** for the user program register at the time of interrupt, where *n* represents the number of the register and can have a value of 0 through 15
- **:REGS** for all user program registers at the time of interrupt
- **:SRn** for a DC/UCF system register at the time of interrupt, where *n* represents the number of the register and can have a value of 0 through 15
- **:SREGS** for all DC/UCF system registers at the time of interrupt

Important! A single debug expression can reference only one general register.

DC/UCF System Symbols

Certain DC/UCF system symbols also function as debugger entities, and you can refer to them during a debugging session. A colon (:) must precede each symbol. These are the valid symbols:

:BAT

Specifies the base address table for session.

:CSA

Specifies the DC/UCF common storage area.

:DLB

Specifies the debug local block, control block required for debugging session.

:LTE

Specifies the current logical terminal element.

:PTE

Specifies the current physical terminal element.

:TCE

Specifies the current task control element.

:VECT

Specifies the vector table for debugger.

Important! A single debug expression can reference only one system entity.

Address Symbols and Markers

Symbol	Symbol Name	Designated Location
@	At sign	Absolute address
$	Dollar sign	Load address
¢	Cent sign	Address of current dialog process

User Symbols

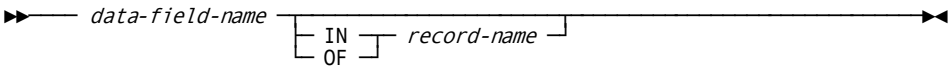
- **:DRn** for a debugger general register, where *n* represents the number of the register and can have a value of 0 through 15
- **:DREGS** for all debugger registers
- **:H1** and **:H2** for halfword 1 and halfword 2
- **:F1** and **:F2** for fullword 1 and fullword 2
- **:UCHR** for a 48-byte character area

  You can also refer to specified sections of this area:

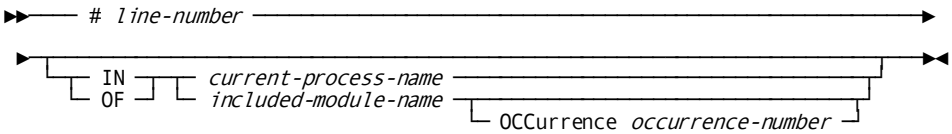
  - **:UC0**, the first 16 bytes
  - **:UC16**, the next 16 bytes
  - **:UC32**, the last 16 bytes

Program Symbols

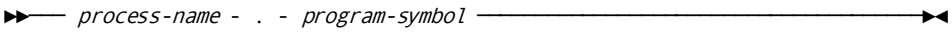
Syntax: Data Field Names



Syntax: Line Numbers



Syntax: Qualifying Program Symbols



Expression Operators

Operator	Meaning
+	Addition
-	Subtraction

Operator	Meaning
*	Multiplication
/	Division

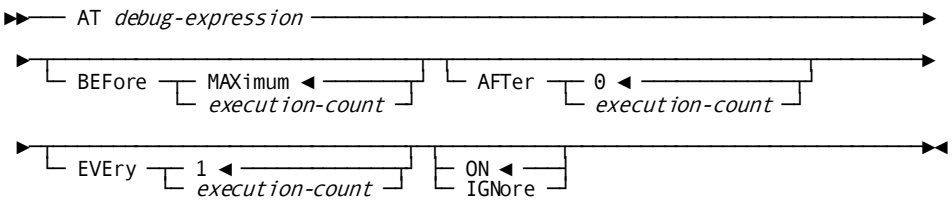
Delimiters

Delimiter	Meaning
*	Asterisk
	Blank
,	Comma
=	Equal sign
!	Exclamation point
-	Hyphen
%	Percent sign
.	Period
+	Plus sign
/	Slash

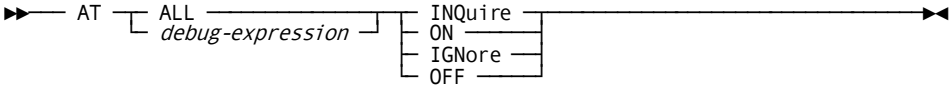
Debugger Commands

Syntax: AT

ADD Format

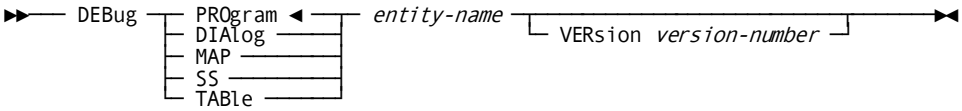


INQUIRE Format

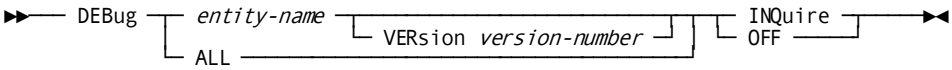


Syntax: DEBUG

ADD format

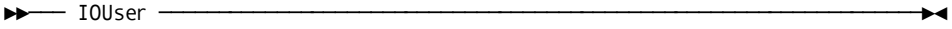


INQUIRE format



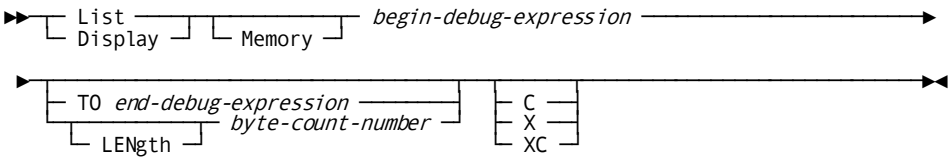
Syntax: EXIT

Syntax: IOUSER

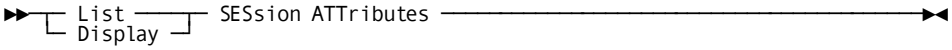


Syntax: LIST

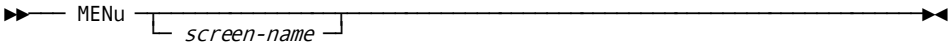
MEMORY Format



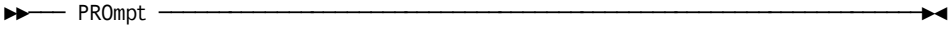
ATTRIBUTES Format



Syntax: MENU

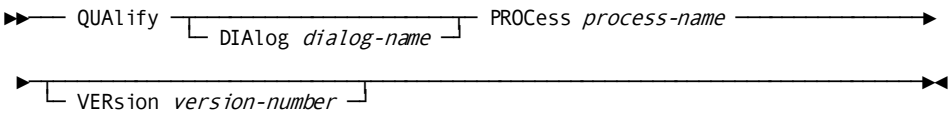


Syntax: PROMPT

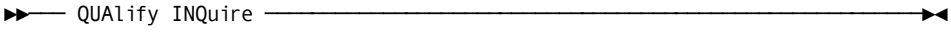


Syntax: QUALIFY

RESET Format

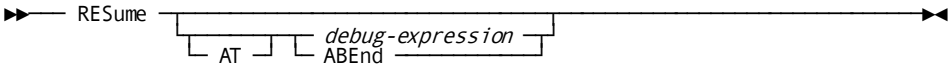


INQUIRE Format



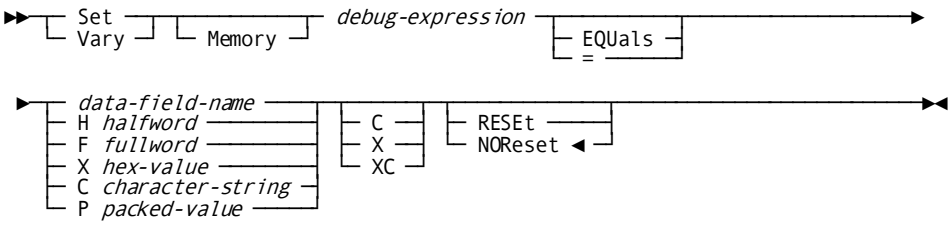
Syntax: QUIT

Syntax: RESUME

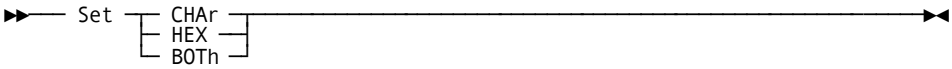


Syntax: SET

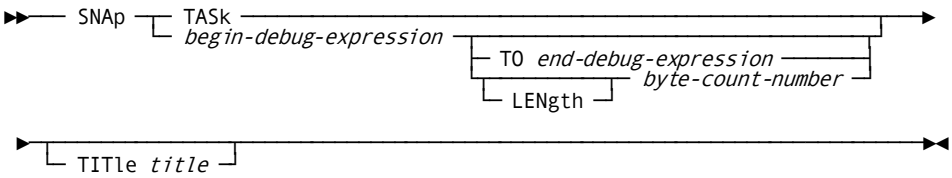
MEMORY Format



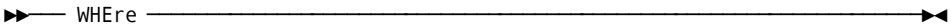
ATTRIBUTES Format



Syntax: SNAP



Syntax: WHERE



Index

K

L

M

N

P

Q

R

S

T

U