CA IDMS™ Total Transparency

Total Transparency User Guide

Release 18.5.00

CA Technologies Product References

This document references the following CA product:

- CA IDMS™/DB

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Contents

Chapter 1: Introduction

This guide provides information on converting a Total database to a CA IDMS/DB Database. Total is a product of Cincom Systems, Incorporated. CA IDMS Total Transparency is the tool you use for database conversion and runtime operations.

This guide is for database administrators converting Total databases to CA IDMS/DB databases and for application developers running Total application programs against the converted databases.

You should be familiar with CA IDMS/DB concepts and facilities before you use this document and the CA IDMS TOTAL Transparency product.

This section contains the following topics:

Syntax Diagram Conventions (see page 9)

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.

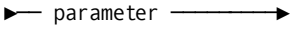
Indicates the end of a complete piece of syntax.

Indicates that the syntax continues on the next line.

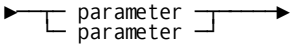
Indicates that the syntax continues on this line.

Indicates that the parameter continues on the next line.

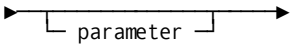
Indicates that a parameter continues on this line.



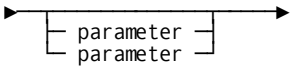
Indicates a required parameter.



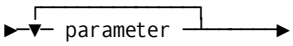
Indicates a choice of required parameters. You must select one.



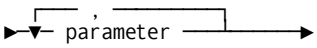
Indicates an optional parameter.



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



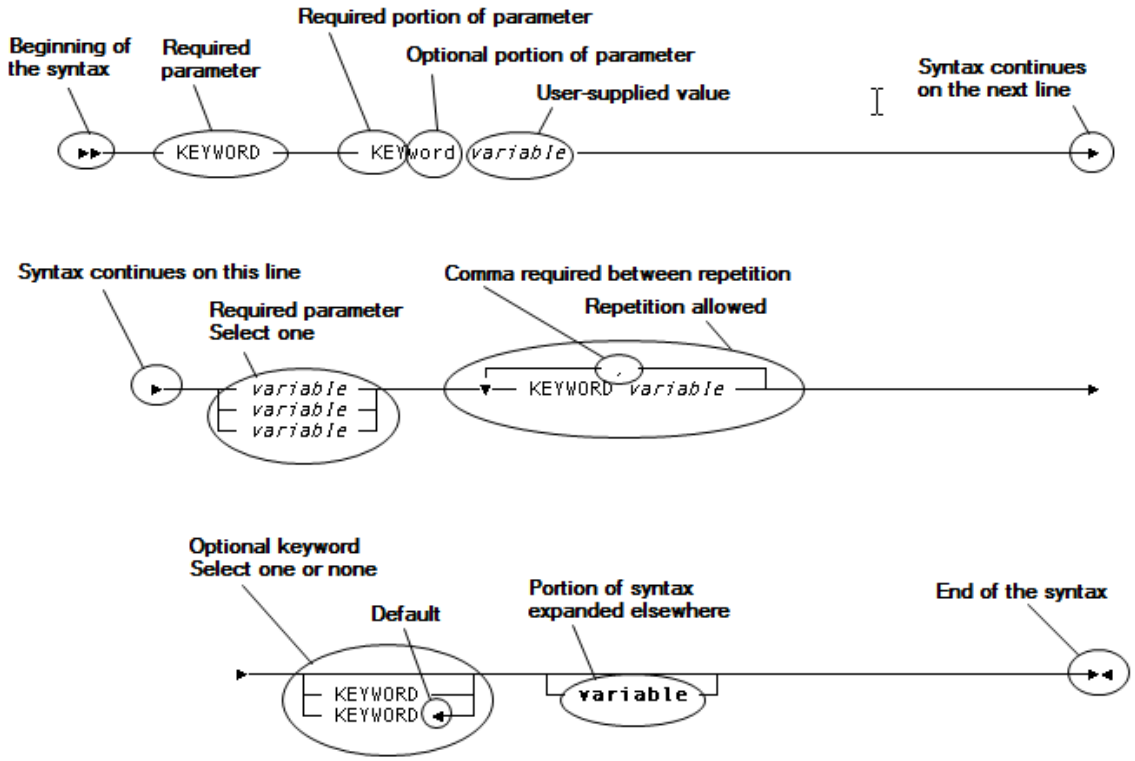
Indicates that you can repeat the parameter or specify more than one parameter.



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: Overview of the CA IDMS TOTAL Transparency

This section contains the following topics:

What Is the CA IDMS TOTAL Transparency?

The CA IDMS TOTAL Transparency is a product that helps users of the Total Database Management System convert to a CA IDMS/DB database environment. Through the transparency, Total users can:

- Convert an existing Total database to a CA IDMS/DB database
- Run existing Total application programs against the new CA IDMS/DB database

CA IDMS TOTAL Transparency as a Conversion Tool

To convert a Total database to a CA IDMS/DB database, the transparency does the following:

- Translates Total data definition language (DDL) into the logical DDL needed for a CA IDMS/DB database
- Loads the unloaded Total database to a CA IDMS/DB database

CA IDMS TOTAL Transparency as a Runtime Tool

To enable Total application programs to run against the CA IDMS/DB database, the transparency provides a runtime interface. This interface *replaces* all Total software and performs the following functions:

- Simulates the Total database processing environment to satisfy database requests issued by Total applications.
- Converts Total data manipulation language (DML) calls into CA IDMS DML calls.

- Represents CA IDMS/DB data structures as Total data structures.
- Accepts Total database requests from both batch and CICS programs. CICS programs must issue command level requests.

Operating Environments Supported

The transparency option runs in the IBM z/OS and z/VSE operating environments; Batch and CICS operations are supported.

The standard CA IDMS interface requires a z/OS or z/VSE operating system at a version level that is supported by IBM. Additionally, for CICS clients, CA IDMS Version 18 requires functionality first introduced in the following CICS versions:

- CICS Transaction Server for z/OS V2.2
- CICS Transaction Server for z/VSE V1.1.1

CICS transactions which utilize the Total transparency option should not be defined as threadsafe.

Components of the CA IDMS TOTAL Transparency

The major components of the CA IDMS TOTAL Transparency are as follows:

- Generator
- Load module
- Runtime control table
- Runtime interface

The Generator: ETOTMAIN

The generator (ETOTMAIN) is a transparency program that does the following:

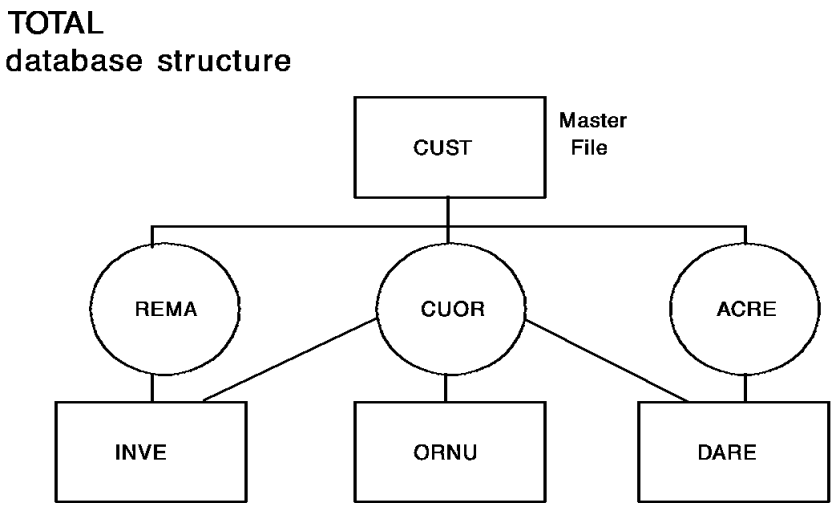
- Translates Total DDL into CA IDMS/DB DDL (schema and subschema descriptions)
- Generates a customized load module (ETOTLOAD)
- Generates a customized table (ETOTTBL) that defines the database to the runtime interface

The following table describes input to the generator.

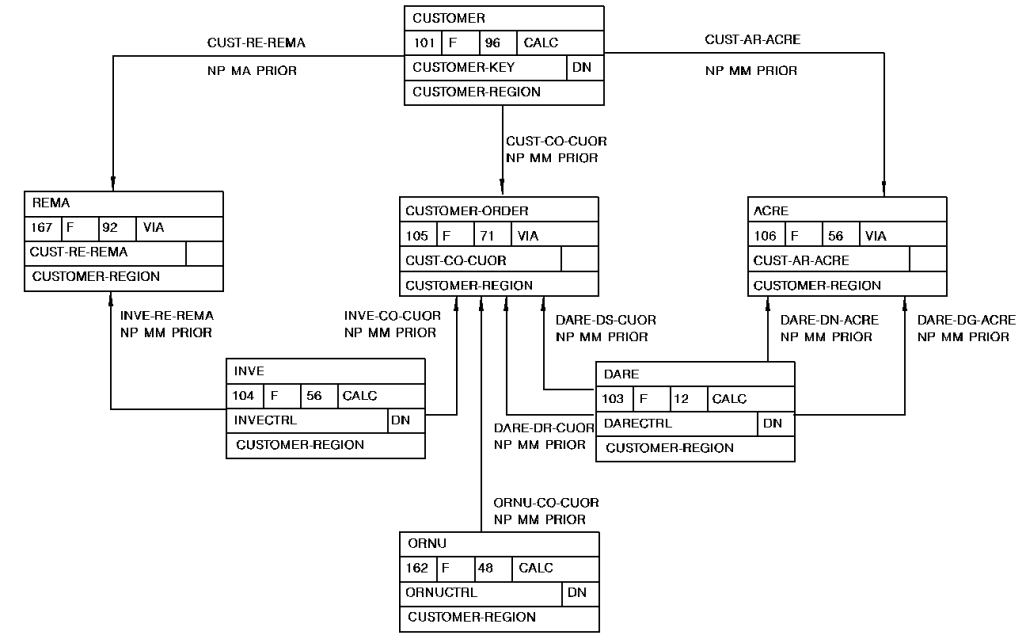
Input	Description
Total DDL	Defines the entire Total database being converted
Control statements that you prepare	Supply information about the CA IDMS/DB database being created
Loader (ETOTLOAD) skeleton containing source COBOL statements	Reads unloaded Total data and loads the CA IDMS/DB database
Runtime control table (ETOTTBL) skeleton	Creates source Assembler statements that provide interface information about the Total database referenced by Total application programs

Equivalent Total and CA IDMS/DB Data Structures

The following diagrams are of a sample Total database and the corresponding CA IDMS/DB database. Note that the CUSTOMER and CUSTOMER-ORDER CA IDMS/DB records correspond to the Total master file CUST and the CUOR variable file. Synonyms are provided to take advantage of the longer names permitted under CA IDMS/DB.



CA IDMS/DB
database structure



The Loader: ETOTLOAD

The loader (ETOTLOAD) is a customized COBOL source module output by the generator. The loader contains code to read data unloaded from the Total database and to load the corresponding CA IDMS/DB database.

The Runtime Control Table: ETOTTBL

The runtime control table (ETOTTBL) is a customized assembler source module output by the generator. Using Total DDL and user-supplied control statements, the generator copies arrays into the WORKING-STORAGE SECTION of ETOTTBL. These arrays describe Total files and their equivalent CA IDMS/DB record types and set relationships.

At runtime, ETOTTBL replaces the Total DBMOD and provides the runtime interface with the control information necessary to:

- Construct the Total records and relationships expected by the Total application program
- Reconstruct CA IDMS/DB records to be stored in the CA IDMS/DB database

The Runtime Interface

The runtime interface translates Total database calls and passes the translated calls to CA IDMS/DB.

Operation	How it works
Translate Total calls	The object module ETOTTRAN translates calls. ETOTTRAN can be link edited to the Total application. If it is not link edited, it will be loaded at runtime. You might want to link ETOTTRAN with batch programs, but dynamically load ETOTTRAN when you use online CICS applications.
Pass translated calls to CA IDMS/DB	**Total batch applications** Total batch applications use the object module ETOTBINT. ETOTBINT is link edited with the Total application and CA IDMS/DB to access the CA IDMS/DB database. The runtime control table is loaded by ETOTBINT at runtime. **Total CICS applications** Total CICS applications use the macro ETOTCINT to pass calls to program IDMSINTC. IDMSINTC, in turn, passes the calls to CA IDMS/DB. ETOTCINT must be assembled before runtime. The assembled ETOTCINT is link edited with the Total application. ETOTTRAN is link edited as part of the IDMSINTC load module.

The runtime interface uses the generated subschema to access the CA IDMS/DB database. This subschema provides access to all elements, record types, set types, and areas defined in the generated schema.

The Mixed Page Group Binds Allowed feature may not be used with CA IDMS TOTAL Transparency.

Implementing the Transparency

The transparency has three phases:

1. Data description
2. Database conversion
3. Runtime operations

Data Description Phase

In the data description phase, you do the following:

1. Select a Total database for conversion
2. Check that you have the appropriate Total DDL to describe the database selected
3. Prepare control statements; these control statements describe the *logical* CA IDMS/DB environment that results from database conversion
4. Prepare CA IDMS DDL statements that describe the *physical* CA IDMS/DB environment

You input the Total DDL and control statements in the the database conversion phase.

Note: For more information about the data description phase, see Data Description Phase (see page 29).

Database Conversion Phase

Database Conversion Programs

In the database conversion phase, you convert your Total database to a CA IDMS/DB database using the programs listed in the following table.

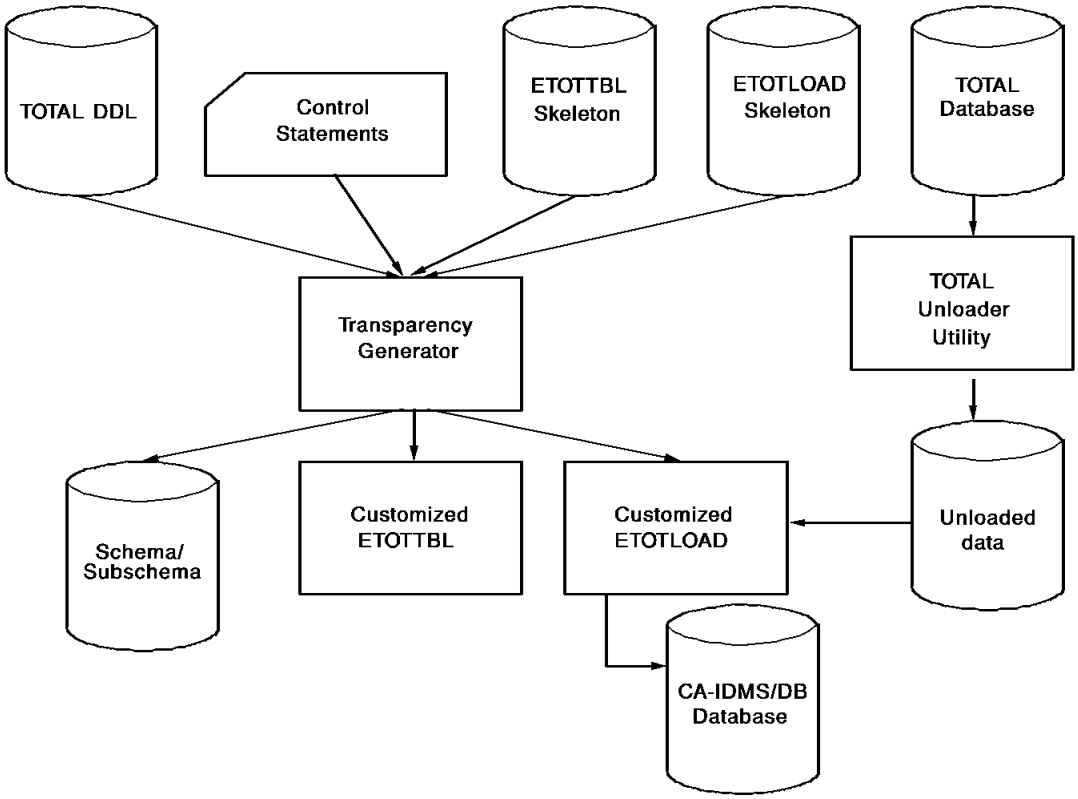
Program	Input	Ouput
Generator (ETOTMAIN)	■ User-prepared control statements ■ Total DDL ■ Skeletons for the loader (ETOTLOAD) ■ Runtime control table (ETOTTBL) modules	■ Source DDL for the schema and subschema ■ Customized load module ■ Customized runtime control table module
CA IDMS/DB schema compiler (IDMSCHEM)	Schema DDL produced by the transparency generator	Compiled schema descriptions entered in the dictionary (IDD)

Program	Input	Ouput
CA IDMS Command Facility (IDMSBCF)	Physical DDL statements that define segments, a database name table, and the DMCL **Note:** For more information about physical DDL syntax, see the *CA IDMS Database Administration Guide*. For more information about using IDMSBCF to submit physical DDL statements, see the *CA IDMS Common Facilities Guide*.	■ Compiled DMCL descriptions entered in the catalog (DDLCAT) area of the system dictionary ■ DMCL load module ■ Database name table load module
CA IDMS/DB subschema compiler (IDMSUBSC)	Subschema DDL produced by the generator	■ Compiled subschema descriptions entered in the dictionary (IDD) ■ Subschema load module
CA IDMS Command Facility (IDMSBCF)	FORMAT utility statement; use the names of the files included in the DMCL load module **Note:** For more information about the FORMAT syntax, see the *CA IDMS Utilities Guide*. For more information about using IDMSBCF to submit FORMAT, see the *CA IDMS Common Facilities Guide*.	Formatted CA IDMS/DB database
Total unload utility (CSITULOD)	Parameters and data in the Total database	Unloaded data
Customized loader (ETOTLOAD)	Unloaded data	Data in the CA IDMS/DB database

When you finish the conversion phase, the CA IDMS/DB database is available for processing. You are ready for the final transparency phase, runtime operations.

Illustration of the Database Conversion Phase

The following figure illustrates the database conversion phase.



Note: For more information about the database conversion phase, see Chapter 4, Database Conversion Phase.

Runtime Operations Phase

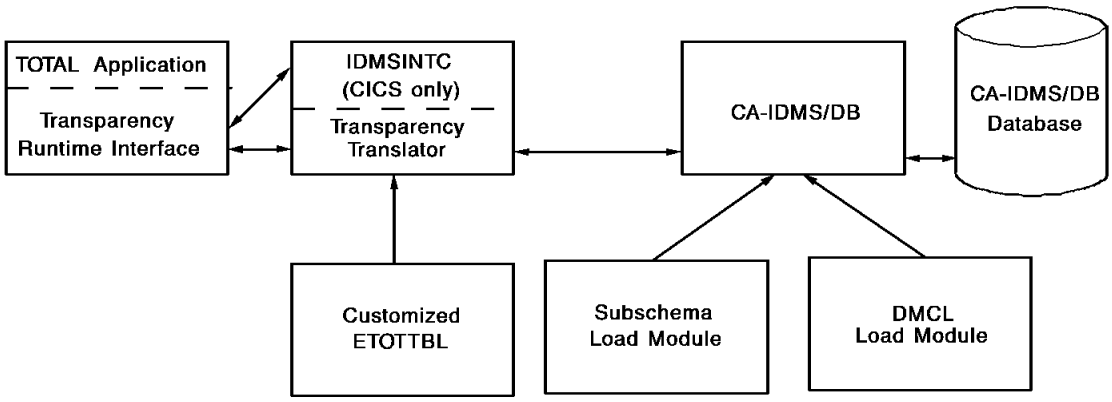
In the runtime operations phase, you relink your Total and CICS applications to run against the new CA IDMS/DB database.

Runtime operations include the following:

- Developing and running native CA IDMS/DB application programs (refer to the appropriate CA IDMS/DB documents)
- Running Total and CICS application programs by using the runtime interface

Illustration of the Runtime Operations Phase

The following figure illustrates the runtime operations phase.



Note: For more information about the runtime operations phase, see Runtime Operations Phase (see page 67).

Conversion of Total Data Structures to CA IDMS/DB

To convert a Total database to CA IDMS/DB, the transparency converts Total data structures into CA IDMS/DB data structures. This section provides information about the CA IDMS/DB equivalents of Total data structures.

Total Files Relate to CA IDMS/DB Record Types

A CA IDMS/DB record type represents a collection of similar record occurrences. Record types are defined to CA IDMS/DB by schema record descriptions.

Total Data Items Relate to CA IDMS/DB Elements

CA IDMS/DB elements are the individual units of user data that make up a record. Elements and their characteristics are defined in schema record descriptions.

Total Master File Control Keys Relate to CA IDMS/DB CALC Keys

A CA IDMS/DB CALC key is an element designated as the value within a record used to determine the location of the record in a database area.

The transparency assigns a location mode of CALC to all records derived from Total master files. The transparency assigns a location mode of VIA to all records derived from Total variable files, with the exception of records in coded variable files for which the primary linkpath is not included in the base portion of the file. Records included in these coded variable files are assigned a location mode of DIRECT.

Total Linkpath Fields Relate to CA IDMS/DB Pointers

A CA IDMS/DB pointer links the owner and member records of a CA IDMS/DB set. Note that CA IDMS/DB pointers, unlike Total linkpath fields, are maintained in a record's prefix rather than in the record itself. The transparency uses Total linkpath field information to establish the necessary pointers in the record prefix for each record. The transparency does not retain Total linkpath fields in inverted records.

Total Linkpaths Relate to CA IDMS/DB Sets

Identifies Existing Relationships

When converting a Total database to a CA IDMS/DB database, the transparency uses Total linkpath information to identify each relationship that exists among given Total files. For each such relationship found in Total DDL, the transparency defines a set in the generator-produced CA IDMS/DB schema and subschema.

Converting to a Set

When converting a linkpath to a set, the transparency does the following:

- Designates the Total master file as the owner record type
- Designates the associated Total variable file as the member record type
- Establishes appropriate pointers from the linkpath fields used to relate a master file to a variable file and to chain records in a variable file

PRIOR Set Order is Assigned

The transparency assigns a set order of PRIOR to each CA IDMS/DB set established. It assigns a set membership option of MANDATORY AUTOMATIC for the primary linkpath and a set membership option of MANDATORY MANUAL for all other CA IDMS/DB member record types that it describes in the schema.

Note: For more information about the CA IDMS/DB set order and set membership options, see the *CA IDMS Database Administration Guide*.

Records in a Total variable file are stored via the CA IDMS/DB set established to correspond to the primary linkpath for that file.

Total Relationships

A Total file definition includes not only descriptions of user data but also descriptions of any one-to-many relationships that exist with other files. This is reflected in the presence of linkpath fields and the designation of files as either master files or variable files.

Linkpath Fields are Defined

To associate a master file with a variable file, linkpath fields are defined. A linkpath field in a master record points to the first and last of a chain of related records in a variable file. A linkpath field in a variable record points to the next and prior variable record in the chain. Total maintains the one-to-many relationship as part of the data in the record.

CA IDMS/DB Relationships

While the relationships among CA IDMS/DB record types are similar in concept to those among Total files, these relationships are defined and maintained differently. Under CA IDMS/DB, a one-to-many relationship between two or more record types is expressed by a set structure. A set structure is defined and maintained apart from the record definitions.

Set is Defined for Each Relationship

For each relationship between two or more CA IDMS/DB record types, a set is defined. One record type is designated as the owner of the set and the other record type(s) is designated as the member. A given set occurrence consists of one occurrence of the owner record type and any number of occurrences of the member record type(s).

Owner and Members are Linked by Pointers

The owner and members of a set are linked by the pointers maintained in the record prefixes. The record prefix always contains a pointer linking the record to the next record in the set, and can contain pointers linking the record to the prior, last, and/or owner record in the set.

Support for Total

This section provides information on Total features supported/not supported under the CA IDMS TOTAL Transparency.

Total Features Supported

The transparency supports most Total DML statements that access and update the database. Almost all Total DML statements supported by the transparency translate directly to corresponding CA IDMS DML statements. The Total DML statements described in the following table are translated to CA IDMS, but with some variations in function. The variations are explained in the table.

Note: Total DML recovery and logging functions are not converted to CA IDMS/DB. CA IDMS/DB provides recovery utilities and journaling options that adequately replace these Total DML functions.

For this Total DML statement	CA IDMS TOTAL Transparency does the following:
CNTRL (purge)	Ignores the command
COMIT	Issues a COMMIT ALL
ENDLG	Issues a COMMIT
FREEX	Issues a COMMIT ALL
QMARK	Issues a COMMIT
QUIET	Issues a COMMIT

For this Total DML statement	CA IDMS TOTAL Transparency does the following:
SINON and OPENX	■ Issues A BIND RUN UNIT statement ■ Issues BIND statements for all CA IDMS/DB record types described in the subschema ■ Issues a READY statement for all CA IDMS/DB database areas included in the subschema After the runtime system processes a Total SINON or OPENX command, it will not reissue the CA IDMS/DB BIND/READY sequence. When a SINON command is issued, the runtime interface performs the following actions: ■ Saves the name of the requesting task for use with a subsequent OPENX command ■ Loads the runtime control table (ETOTTBL) using the table name referenced by the DBMOD parameter of the SINON statement
CLOSX and SINOF	Issues a FINISH statement FINISH releases all database areas (and therefore all database records) from program control. If a SINOF command is preceded by a CLOSX command, the runtime interface does not issue a FINISH in response to the SINOF command.
RQLOC (batch)	Accepts a key value from the Total application and returns a suitable DBKEY value. Note that for RQLOC, the module IDMSCALC is required. If IDMSCALC is not link edited to ETOTBINT, it is loaded the first time the RQLOC function is invoked.

Total Features Not Supported

The transparency's runtime interface does not support Total DML functions that are inappropriate in a CA IDMS/DB database environment. Information about unsupported functions is provided in the following table.

Unsupported Total DML statement or function	More information
ENDTO MARK1 RQLOC (CICS) RSTAT WRITD	These statements are related to recovery and logging. The runtime system returns an error for all of these statements. You can alter programs containing these statements in either of the following ways: ■ Check for the error status (FUNC) ■ Remove the statement Additionally, the logging options parameter of the SINON command and the **REST** parameter in Total DML commands are supported for retrieval only. When updating the database, these parameters are ignored. The **REST** parameter *can* be used in Total retrieval DML to indicate that the entire physical record (as defined in the DBMOD) is to be used, rather than just an element list of the record.
SKIP option of Total RDNXT and FINDX	SKIP option of Total RDNXT and FINDX (for skipping unused records)
Some OPENX options	OPENX options that allow the user to ready Total files residing in the same area in different usage modes. The CA IDMS/DB database is readied for processing at the area level and each area can contain multiple record types. All CA IDMS/DB record types within a given area are accessed in the same usage mode. This approach differs from that of the Total Database Management System, which readies the database at the file level. Since each Total file contains records of only one type, each Total record type can be accessed in a different usage mode.

Unsupported Total DML statement or function	More information
Some ADDV statements	ADDV statements issued for a coded variable record for which a record code and coded linkpath field were not defined in Total DDL. To override this restriction, you must modify the Total DDL used to generate the runtime control table prior to submitting the Total DDL to the transparency generator (see Step 2—Prepare Total DDL Statements (see page 29)). Do the following to define the coded variable file as a standard variable file: 1. Delete the Total DDL statement that defines the overlay element for the coded file 2. Define as a group item the data item designated as the overlay element for the coded file; the group item replacing the overlay element should reference all data items following the deleted statement

Chapter 3: Data Description Phase

This section contains the following topics:

Steps of the Data Description Phase

The data description phase of transparency implementation is a planning and preparatory phase. It involves the following four steps:

1. Selecting a Total database for conversion
2. Preparing Total DDL statements that describe the Total database
3. Preparing the statements that describe the *logical* CA IDMS/DB database
4. Preparing the CA IDMS DDL statements that describe the *physical* CA IDMS/DB database

Generator Input

Later, during the database conversion phase, the statements you've prepared, the skeleton loader module (ETOTLOAD), and the skeleton runtime control table (ETOTTBL) are input to the generator. The generator uses this information to produce CA IDMS/DB schema and subschema descriptions and to produce both a customized loader and a customized runtime control table.

Step 1—Select a Total Database

To convert to a CA IDMS/DB environment, you must convert several databases. For the first conversion, it is recommended that you choose a small database (or, if necessary, a subset of a larger one) as a pilot project. This will allow you to gain experience, knowledge, and confidence for the full conversion.

Step 2—Prepare Total DDL Statements

After you select the Total database you want to convert, make sure you have all of the relevant Total DDL in a file. This file is part of the input to the generator.

If you are converting an entire database, you may already have the input file you need. If you are working with part of a database, however, you must prepare the input file appropriate to your conversion.

Comments in the Total DDL

If column 1 of a Total DDL input statement is blank, the generator considers the statement to be a comment and ignores it. This allows you to retain all of the original source DDL while selectively disabling some of the statements.

Limits on the Total DDL

At installation, the generator is set up to handle Total DDL input for up to 300 files, 5900 elements, 500 linkpaths, and 500 record codes. These limits are usually adequate for initial use of the transparency. If your DDL file exceeds these limits, see Increasing Generator Input Limits (see page 83) for information on increasing the limits.

Step 3—Prepare the Physical CA IDMS/DB Database

In this step you prepare physical CA IDMS/DB DDL statements. These statements describe the *physical* component of the CA IDMS/DB database. The physical component includes:

- **Segments**—collections of files and areas
- **Database name table**—names of databases and segments
- **Device-media control language (DMCL)**—buffers, journals, identification of a database name table, identification of segments for inclusion in the database, file overrides, and area overrides.

Note: For more information about the syntax for CA IDMS/DB physical DDL statements, see the *CA IDMS Database Administration Guide*. For information about the CA IDMS Command Facility which you use to submit physical DDL statements, see the *CA IDMS Common Facilities Guide*.

Step 4—Prepare the Logical CA IDMS/DB Database

In this step you prepare generator control statements. These statements describe the *logical* component of the CA IDMS/DB database (the schema and subschema).

Detailed information for each generator control statement is presented in the next section.

The control statements and the Total DDL statements you prepared in step 2 are used to:

- Produce a complete schema description that reflects the Total database
- Produce complete subschema descriptions that reflect the Total database

- Build the loader module (ETOTLOAD); ETOTLOAD contains the information necessary to establish correspondence between the structure of the unloaded Total database and that of the CA IDMS/DB database
- Build a runtime control table (ETOTTBL); ETOTTBL replaces the Total DBMOD; ETOTTBL contains information that associates database requests in Total programs with the appropriate CA IDMS/DB data descriptions and relationships

Note: After you code the control statements you can move on to the next transparency phase (see Database Conversion Phase (see page 47)).

Generator Control Statements

This section provides a table summarizing the generator control statements and a detailed description of each statement, including syntax and parameter descriptions.

Summary of Statements

The following table describes each generator control statement and specifies whether it is required or optional.

Statement	Type	Function
SYNONYMS	Optional	Assigns synonyms to Total element and file names. If this statement is not input, the generator assigns existing Total names to the corresponding CA IDMS/DB elements and records in the schema. To simplify the pilot project, we recommend that you not use synonyms.
AREA	Optional	Assigns Total files to user-specified CA IDMS/DB areas. If this statement is not included, the CA IDMS/DB record types that correspond to Total files will all be contained in the first area named in the SCHEMA statement.
SCHEMA	Required	Provides the generator with the SCHEMA, FILE, and AREA components of the CA IDMS/DB schema description.
SUBSCHEMA	Required	Provides the generator with the subschema description. The SUBSCHEMA statement allows you to name the subschema and to include informational entries in the subschema.

Statement	Type	Function
USAGE-MODE	Optional	Specifies CA IDMS/DB ready options for database areas that the runtime interface accesses in a usage mode other than shared update.
LOAD	Optional	Specifies whether the unloaded Total data contains master file control keys and linkpath information, and specifies the logical record length of the unloaded Total data if it is other than 120 bytes. You need to include this statement only if the unloaded Total data will contain master file control keys and linkpath information, or if the logical record length of the unloaded Total data is other than 120 bytes.

Limits on Control Statements

Installation limits set on generator control statements are as follows:

- 2000 16-byte synonyms (files, records, sets)
- 1000 32-byte synonyms (elements)
- 2000 usage mode statements
- 500 schema/subschema statements

Note: For more information about increasing the limit on schema and subschema statements (up to 5000), see Increasing Generator Input Limits (see page 83).

SYNONYMS Statement

The SYNONYMS statement allows you to take advantage of the longer element, record, and set names permitted under CA IDMS/DB.

Assigns Existing Total Name

When the transparency generates schema and subschema descriptions, it assigns the existing Total name to the corresponding CA IDMS/DB name. The Total file name is assigned to the CA IDMS/DB record type. The Total data item name is assigned to the CA IDMS/DB element.

Size Limits

The following are the size limits that apply to Total and CA IDMS/DB names:

- A Total file name allows 4 characters; the corresponding CA IDMS/DB record type name allows 16 characters
- A Total data item name allows 8 characters; the corresponding CA IDMS/DB element name allows 32 characters

With the SYNONYMS statement, you can override the transparency's assignment of Total element and file names to CA IDMS/DB elements and records.

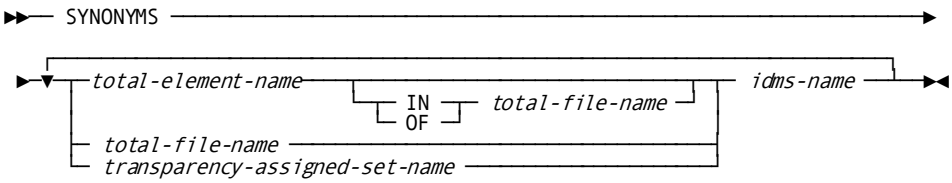
You can also use the SYNONYMS statement to override the set names that the transparency assigns to CA IDMS/DB sets established to represent relationships between Total master and variable files. The transparency derives CA IDMS/DB set names from the applicable Total master file, linkpath, and variable file names.

Example of the Transparency Assigning a Set Name

The following example shows how a CA IDMS/DB set name is derived from Total master file, linkpath, and variable file names.

```
Master file is CUST                CUST
+
Linkpath is CO                       CO
+
Variable file is CUOR            + CUOR
                                 ----------

CA IDMS/DB set name   =    CUST-CO-CUOR
```

Syntax



Parameters

SYNONYMS

Required keyword; must occupy a line by itself and begin in column 1.

total-element-name/total-file-name/transparency-assigned-set-name

Specifies the Total element or file name or the transparency-derived set name for which a synonym is to be used; this clause must begin in column 8.

total-element-name

8-character element name specified in the input Total DDL.

total-file-name

4-character file name specified in the input Total DDL.

transparency-assigned-set-name

Set name derived by CA IDMS TOTAL Transparency for a set established to correspond to a Total master file/variable file relationship.

IN/OF *total-file-name*

Identifies the Total file for which *total-element-name* is defined in the Total DDL. This parameter must be specified if *total-element-name* is not unique to a given Total file (that is, if *total-element-name* exists for more than one file defined in the Total DDL) or if *total-element-name* does not begin with the 4-character name of the file for which it is defined.

idms-name

Specifies the CA IDMS/DB name to be used in place of the name supplied by the generator. CA IDMS/DB element names must be from 1 to 32 characters long, and CA IDMS/DB record and set names must be from 1 to 16 characters long.

Example

The following is an example of the SYNONYMS control statement.

```
SYNONYMS
        CUST              CUSTOMER
        CUSTCTRL          CUSTOMER-KEY
        CUOR              CUSTOMER-ORDER
        ORNU-CO-CUOR      CUST-TO-ORDER
        SAMENAME OF DARE  SAME-NAME-OF-DARE
```

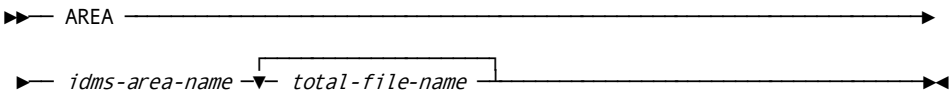
AREA Statement

The AREA statement allows you to specify the CA IDMS/DB database area(s) to which CA IDMS/DB records replacing Total files are assigned.

When generating schema record descriptions, the generator assigns each record type to the first area identified in the SCHEMA statement. The AREA statement permits you to override this default by naming specific Total files and the database areas to which corresponding CA IDMS/DB records are assigned.

Syntax

The following is the syntax for the AREA statement. You must specify the keyword AREA in column 1, *idms-area-name* in column 8, and *total-file-name* in column 12. The keyword and each variable must occupy an entire line.



Parameters

AREA

Required keyword; must occupy a line by itself and begin in column 1.

idms-area-name

Specifies the name of a CA IDMS/DB database area to which CA IDMS/DB records corresponding to subsequently named Total files are assigned. *Idms-area-name* must be from 1 to 16 characters long, must occupy a line by itself, and must begin in column 8. Additionally, *idms-area-name* must be followed by at least one Total file name and must be named in the SCHEMA statement.

total-file-name

Specifies the name of a Total file. All occurrences of the CA IDMS/DB record type that correspond to this Total file are assigned to the database area indicated by *idms-area-name*. *Total-file-name* must be the name of a Total file defined in the input Total DDL. *Total-file-name* can be repeated as required, however each entry must occupy a line by itself, and must begin in column 12.

Example

The following is an example of the AREA control statement.

```
AREA
        CUSTOMER-REGION
            CUST
            REMA
            CUOR
            ACRE
            INVE
            DARE
            ORNU
```

SCHEMA Statement

The generator SCHEMA statement describes the schema, files, and areas for CA IDMS/DB. This information is used to generate the CA IDMS/DB DDL SCHEMA, FILE, and AREA statements.

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

Composed of Substatements

The generator SCHEMA statement is composed of these substatements:

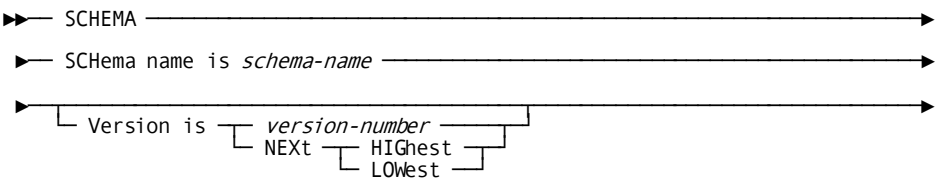
- SCHEMA—Names the schema and allows informational entries
- AREA—Names CA IDMS/DB database areas and maps them into the named database files. To describe all areas in the CA IDMS/DB database, you can add as many areas as you need in AREA substatements.

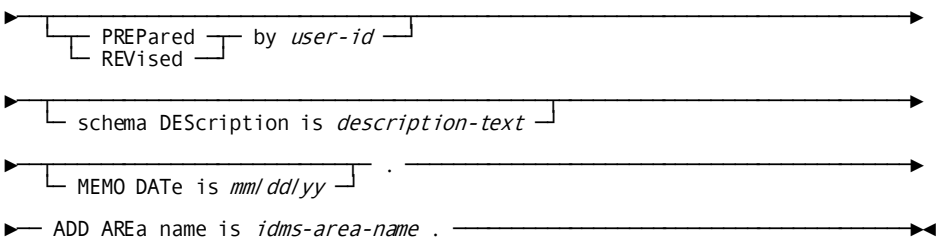
Using the information included in the SCHEMA statement and (if provided) in the SYNONYMS and AREA statements the generator produces a CA IDMS/DB schema description that reflects the definition of the Total database defined in the input Total DDL. The schema that is produced includes complete definitions of the CA IDMS/DB record types that correspond to the Total files and describes the CA IDMS/DB sets that correspond to relationships among Total files.

The generator automatically generates the schema RECORD DESCRIPTION and SET DESCRIPTION components, converting Total file definitions to CA IDMS/DB record descriptions and Total master file-variable file relationships to CA IDMS/DB set descriptions. Any entries in the SYNONYMS control statement are applied to the appropriate record, element, and set descriptions. Any entries in the AREA statement are applied to the appropriate record descriptions.

Syntax

The following is the syntax for the SCHEMA statement. You must specify the keyword SCHEMA in column 1. All other clauses must begin between columns 8 and 11.





Parameters

SCHEMA

Required keyword; must occupy a line by itself and begin in column 1.

SCHEMA NAME IS *schema-name*

Specifies the name of the schema produced by the generator. *Schema-name* must be a 1- to 8-character value. The first character must be #, $, @, or A through Z. The remaining characters can be #, $, @, A through Z, 0 through 9, or the hyphen (except as the last character or following another hyphen).

VERSION

Qualifies the schema with a version number. Version numbers must fall within the range 1 through 9999, whether specified explicitly or specified in relation to existing versions.

version-number

Specifies an explicit version number and must be an unsigned integer in the range 1 through 9999.

NEXT HIGHEST

Specifies the highest version number assigned to *schema-name* plus one. For example, if versions 3, 5, and 8 of schema ETOTSCHM exist in the dictionary, the following statement would result in version 9 of ETOTSCHM being added to the dictionary:

```
SCHEMA NAME IS ETOTSCHM VERSION IS NEXT HIGHEST.
```

Note: If NEXT is specified without HIGHEST or LOWEST, the schema compiler assumes NEXT HIGHEST.

NEXT LOWEST

Specifies the lowest version number assigned to *schema-name* minus one. For example, if versions 3, 5, and 8 of schema ETOTSCHM exist in the dictionary, the following statement would result in version 2 of ETOTSCHM being added to the dictionary:

```
SCHEMA NAME IS ETOTSCHM VERSION IS NEXT LOWEST.
```

Note: If NEXT is specified without HIGHEST or LOWEST, the schema compiler assumes NEXT HIGHEST.

PREPARED/REVISED BY *user-name*

Identifies the schema author. *User-name* can be any 1- to 32-character value. If the value includes spaces or delimiters, it must be enclosed in quotation marks. PREPARED/REVISED BY is informational only.

SCHEMA DESCRIPTION IS *description-text*

Specifies remarks concerning the schema. *Description-text* is a 1- to 40-character alphanumeric value. If it contains spaces or delimiters, it must be enclosed in quotation marks. SCHEMA DESCRIPTION is informational only.

MEMO DATE IS *mm/dd/yy*

Specifies the date on which the schema was created. MEMO DATE is informational only.

ADD AREA NAME IS *idms-area-name*

Specifies the name of a CA IDMS/DB database area. *Idms-area-name* must be a 1- to 16-character value. The characters can be #, $, @, A through Z, 0 through 9, or the hyphen (except as the first or last character or following another hyphen). At least one alphabetic or international symbol (#, $, @) is required.

Idms-area-name must not be the same as the schema name or the name of any other component (including synonyms) within the schema.

Idms-area-name is copied into DML programs and the DMCL, so do not use a keyword known to either the DMCL or the DML compiler. For a list of these keywords, see the *CA IDMS Database Administration Guide*.

Example

The following is an example of the SCHEMA control statement.

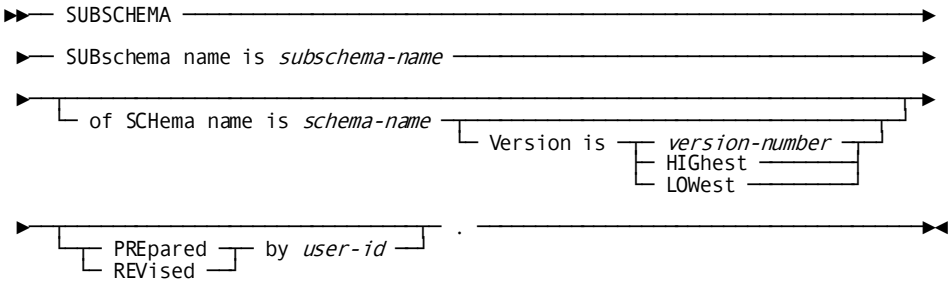
```
SCHEMA
       SCHEMA NAME IS ETOTSCHM VERSION IS 1
       MEMO DATE IS 10/19/91.

       ADD
       AREA NAME IS CUSTOMER-REGION.
```

SUBSCHEMA Statement

The SUBSCHEMA statement names the subschema, associates it with a schema, and permits informational entries. The generator copies all area, record, and set descriptions included in the schema, providing access to the entire CA IDMS/DB database as defined in the schema. The generator also appends VALIDATE and GENERATE statements to produce a subschema load module. The subschema load module thus created is used by the runtime interface to satisfy database requests issued from Total application programs.

Syntax

The following is the syntax for the SUBSCHEMA statement. All clauses must begin between columns 8 and 11, with the exception of the OF SCHEMA NAME clause, which must be coded between columns 12 and 72.



Parameters

SUBSCHEMA

Required keyword; must occupy a line by itself and begin in column 1.

SUBSCHEMA NAME IS *subschema-name*

Identifies the source description of the subschema to the data dictionary. *Subschema-name* must be a 1- to 8-character value. The first character must be #, $, @, or A through Z. The remaining characters can be #, $, @, A through Z, 0 through 9, or the hyphen (except as the last character or following another hyphen). *Subschema-name* also becomes the CSECT name of the object subschema. If the object subschema subsequently is link edited alone for dynamic loading, *subschema-name* must be the load library member name.

OF SCHEMA NAME *schema-name*

Associates the named subschema with the generator-created schema. *Schema-name* must be the name of the schema identified in the SCHEMA statement.

VERSION *version-number*

Qualifies *schema-name* with a version number. *Version-number* must be an unsigned integer between 1 and 9999.

PREPARED/REVISED BY *user-id*

Identifies the user who is preparing the subschema. PREPARED/REVISED BY is informational only.

Example

The following is an example of the SUBSCHEMA control statement.

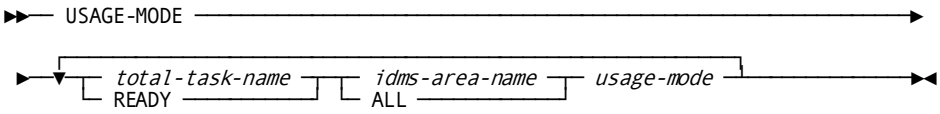
```
SUBSCHEMA
       SUBSCHEMA NAME IS ETOTSUBS OF SCHEMA ETOTSCHM.
```

USAGE-MODE Statement

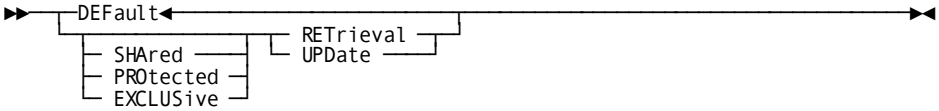
Before performing database services for a given Total application program, the runtime interface readies each area defined in the generated subschema in shared update usage mode. The optional USAGE-MODE statement allows you to override the default usage mode for areas used by the Total task associated with the application program.

Syntax

Each clause of this statement (after the keyword USAGE-MODE) must occupy a line by itself and must begin in column 8. Include as many clauses as needed.



Expansion of *usage-mode*



Parameters

USAGE-MODE

Required keyword; must occupy a line by itself and begin in column 1.

***total-task-name*/READY**

Identifies the Total tasks that access the named area in the specified usage mode.

total-task-name

Specifies the name of the Total task as it exists in the SINON command issued by the Total application program.

Total-task-name USAGE-MODE statements must precede any READY USAGE-MODE statements.

READY

Specifies that all Total tasks that do not match *total-task-name* are to be readied in the named usage mode.

Total-task-name USAGE-MODE statements must precede any READY USAGE-MODE statements.

***idms-area-name*/ALL**

Identifies the CA IDMS/DB areas affected by each USAGE-MODE statement.

idms-area-name

Identifies the CA IDMS/DB database area known to the subschema used by the runtime interface.

ALL

Specifies that the runtime interface is to issue a READY ALL DML verb, indicating to CA IDMS/DB that all areas are to be accessed in the specified usage mode. If you specify *usage-mode* (parameter explained hereafter) as DEFAULT, all areas are readied in the usage mode specified in the CA IDMS/DB subschema.

usage-mode

Identifies a valid CA IDMS/DB usage mode.

DEFault

Specifies that all areas are to be readied in the usage mode specified in the CA IDMS/DB subschema.

Note: DEFAULT is valid only if ALL is specified; it is not used with *idms-area-name*.

SHAred

Allows other run units executing concurrently under the CA IDMS/DB central version (CV) either to ready the area in shared update or shared retrieval mode (SHARED UPDATE), or to ready the area in shared update, shared retrieval, protected update, or protected retrieval mode (SHARED RETRIEVAL).

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. 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.

EXCLUSive

Prevents concurrent use of the area by any other run unit executing under the CA IDMS/DB 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.

RETrieval

Opens the area for retrieval only and allows other concurrently executing run units to open the same area in any usage mode other than one that is exclusive.

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 one that is exclusive or protected.

Usage

Mutually-Exclusive Clauses

Do not use READY ALL and READY *idms-area-name* clauses in the same USAGE-MODE statement.

Do not use *total-task-name* ALL and *total-task-name idms-area-name* clauses in the same USAGE-MODE statement.

READY ALL SHARED UPDATE

The USAGE-MODE statement READY ALL SHARED UPDATE is the same as having no USAGE-MODE statements.

Bypassing DML READY Verbs

The USAGE-MODE statement READY ALL DEFAULT causes the runtime interface to bypass issuing any DML READY verbs. The areas needed for processing will be readied as specified in the subschema.

Central Version Parameters

The SHARED, PROTECTED, and EXCLUSIVE options apply only to programs running under the CA IDMS/DB central version.

Examples

Example 1

Suppose there are two tasks associated with an ETOTTBL and you wish to open the database areas associated with each task in different usage modes. USERPRG1 uses CA-IDMS-ADBEA1 and CA-IDMS-ADBEA2; USERPRG2 uses CA-IDMS-ADBEA2 and CA-IDMS-ADBEA3. Sample statements are listed as follows:

```
USAGE-MODE
        USERPRG1        CA-IDMS-ADBEA1    RETRIEVAL
        USERPRG1        CA-IDMS-ADBEA2    PROTECTED UPDATE
        USERPRG2        CA-IDMS-ADBEA3    EXCLUSIVE UPDATE
```

The areas for USERPRG1 are readied as specified in the USAGE-MODE table; for USERPRG2, CA-IDMS-ADBEA3 is readied as specified and CA-IDMS-ADBEA2 defaults to SHARED UPDATE. All areas in the subschema not readied by specific USAGE-MODE statements will be readied in SHARED UPDATE usage mode.

Example 2

Suppose you have many CA IDMS/DB areas in the subschema associated with an ETOTTBL. The task does not require access to all of the areas, so only required areas are readied. Sample statements are listed as follows:

```
USAGE-MODE
        USERPRG1        CA-IDMS-ADBEA1    RETRIEVAL
        USERPRG1        CA-IDMS-ADBEA2    PROTECTED UPDATE
        USERPRG2        CA-IDMS-ADBEA2    SHARED UPDATE

        USERPRG2        CA-IDMS-ADBEA3    EXCLUSIVE UPDATE
        READY           ALL           DEFAULT
```

The results are the same as they are for example 1, except that any other areas in the CA IDMS/DB subschema will not be readied. Any task other than USERPRG1 or USERPRG2 will have no DML READY verb generated. The last statement in the example causes any other tasks to use the default ready mode as specified in the subschema.

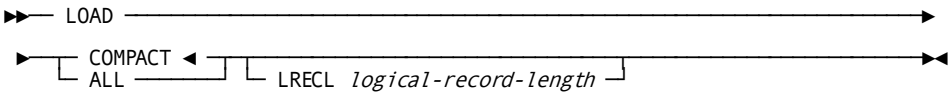
LOAD Statement

If the unloaded Total data contains master file control keys and linkpath fields, use the LOAD statement to tell the loader so that these fields can be ignored when the corresponding CA IDMS/DB database is loaded. If master file control keys and linkpath fields are not present, the LOAD statement is optional.

Unloaded Total data includes master file control keys and linkpath fields only if a means other than the CSITULOD utility is used to unload the Total database.

Additionally, the LOAD statement includes a parameter to specify the logical record length of the unloaded Total data if this value is other than 120 bytes.

Syntax



Parameters

LOAD

Required keyword; must occupy a line by itself and begin in column 1.

COMPACT/ALL

Specifies whether the unloaded Total data is to contain master file control keys and linkpath fields. Begin this clause in column 8.

COMPACT

Specifies that master records, standard variable records, and coded variable records unloaded from the Total database contain the file name in the first four bytes of the record, followed immediately by all data items. Linkpath fields are not present in an unloaded Total record, nor is the master file control key defined in Total DDL for master files.

COMPACT is the default. It is informational only and specifies that the unloaded Total data will not contain these fields.

ALL

Specifies that unloaded Total master records, standard variable records, and coded variable records contain the information shown in the following table.

Use ALL if you are using the CSITULOD utility to unload the Total database (specify COMPACT in exceptional cases only). If you use means other than CSITULOAD to unload the Total database, the contents of the unloaded Total records must conform to one of the options provided by this clause.

Record(s)	Contents
Master	The first four bytes of each unloaded master record contain the master file name, followed by four bytes containing the internal reference point, followed by the master file control key, followed by the contents of each linkpath field (eight bytes per linkpath) defined for the master file, followed by all data items defined for the record.

Record(s)	Contents
Standard variable	The first four bytes of each unloaded standard variable record contain the standard variable file name, followed by the contents of the principal linkpath key for the associated master file, followed by all data items defined for the record.
Coded variable	The first four bytes of each unloaded coded variable record contain the coded variable file name, followed by two bytes containing the record code, followed by the contents of the principal linkpath key for the associated master file, followed by all data items defined for the record.

LRECL *logical-record-length*

Indicates the largest logical record length of unloaded Total data if this length is other than 120 bytes. Do not include LRECL if the logical record length is 120. You must specify the logical record length of the largest record if you are using variable-length records. Begin this clause in column 8.

Example

The following is an example of the LOAD control statement.

```
LOAD
        ALL
```

Chapter 4: Database Conversion Phase

This section contains the following topics:

Steps Of The Database Conversion Phase

The process for converting a Total database to a CA IDMS/DB database involves the following steps:

1. Generate the data definitions and load program using the transparency generator ETOTMAIN
2. Compile the generated schema, using the schema compiler IDMSCHEM; this stores the schema description in the dictionary
3. Prepare the physical database description by:
    a. Submitting physical DDL statements to the CA IDMS Command Facility (IDMSBCF)
    b. Generating database name table and DMCL load modules
    c. Punching the database name table and DMCL load modules using the PUNCH utility statement
    d. Linking the resulting object modules to a load library
4. Prepare the subschema by:
    a. Compiling the generated subschema using the subschema compiler IDMSUBSC
    b. Punching the subschema load module
    c. Linking the subschema to a load library

5. Initialize the CA IDMS/DB database using the FORMAT utility statement
6. Unload the Total database using CSITULOD
7. Load the CA IDMS/DB database using the customized transparency loader ETOTLOAD or a user-written load program

These conversion steps are discussed in this chapter.

For more information about z/OS JCL, see z/OS Job Control Language (see page 85). For more information about z/VSE JCL, see z/VSE Job Control Language (see page 95).

Step 1: Transparency Generator (ETOTMAIN)

The first step in transparency conversion of a Total database to a CA IDMS/DB database is to execute the transparency generator ETOTMAIN.

Input to ETOTMAIN

You provide the following input to ETOTMAIN, in this order:

- Total DDL that defines the database being converted
- Control statements that describe the CA IDMS/DB database environment
- ETOTTBL skeleton
- ETOTLOAD skeleton

Output from ETOTMAIN

Output from ETOTMAIN includes:

- Schema source code
- Subschema source code
- Customized runtime control table
- Customized loader

For more information about messages issued by ETOTMAIN, see Generator Messages (see page 71).

Examples of Input and Output

Input—Total DDL

The following is an example of Total DDL statements input to the transparency generator (ETOTMAIN).

```
BEGIN-DATA-BASE-GENERATION:
DATA-BASE-NAME=CUORDABA       16:28:54 07/18/99    08/18/99

BEGIN-MASTER-DATA-SET:
DATA-SET-NAME=CUST
MASTER-DATA:
CUSTROOT=8
CUSTCTRL=6
CUSTLKCO=8
CUSTLKAR=8
CUSTLKRE=8
CUSTNAME=30
CUSTADDR=30
CUSTCIST=20
*FILLER*=5
SAMENAME=5
END-DATA:
LOGICAL-RECORD-LENGTH=128
END-MASTER-DATA-SET:

BEGIN-MASTER-DATA-SET:
DATA-SET-NAME=ORNU
MASTER-DATA:
ORNUROOT=8
ORNUCTRL=12
ORNULKCO=8
.00.ORNU0001=5
.00.ORNU0002=0
. .01.ORNU0003=2
. .01.ORNU0004=0
.   .02.ORNU0005=7
.   .02.ORNU0006=6
.     .03.ORNU0007=1
.     .03.ORNU0008=5
.   .02.ORNU0009=0
.     .03.ORNU0010=2
.     .03.ORNU0011=4
```

```
END-DATA:
LOGICAL-RECORD-LENGTH=49
END-MASTER-DATA-SET:

BEGIN-MASTER-DATA-SET:
DATA-SET-NAME=DARE
MASTER-DATA:
DAREROOT=8
DARECTRL=4
DARELKDR=8
DARELKDS=8
DARELKDN=8
DARELKDG=8
SAMENAME=6
END-DATA:
LOGICAL-RECORD-LENGTH=50
END-MASTER-DATA-SET:

BEGIN-MASTER-DATA-SET:
DATA-SET-NAME=INVE
MASTER-DATA:
INVEROOT=8
INVECTRL=6
INVELKCO=8
INVELKRE=8
INVEITDE=30
INVEITCO=5
INVEITPR=5
INVEQTOH=4
INVEQTOO=4
END-DATA:
LOGICAL-RECORD-LENGTH=78
END-MASTER-DATA-SET:

BEGIN-VARIABLE-ENTRY-DATA-SET:
DATA-SET-NAME=CUOR
BASE-DATA:
CUORCODE=2
CUORORNU=12=ORNUCTRL
ORNULKCO=8
CUORLINU=2
CUORDATA=55
RECORD-CODE=HD
CUORDRDR=4=DARECTRL
DARELKDR=8
CUORDSDS=4=DARECTRL
DARELKDS=8
CUORCUST=6=CUSTCTRL
```

```
CUSTLKCO=8
CUORTOVA=5
CUORTOIT=2
CUORTERM=10
RECORD-CODE=IT
CUORINVE=6=INVECTRL
INVELKCO=8
CUORQURE=4
CUORPRIC=5
CUORWEIG=4
RECORD-CODE=CM
CUORCOMM=55
RECORD-CODE=JG
CUORJGDR=4
DARELKDR=8=CUORJGDR
CUORJGDS=4
DARELKDS=8=CUORJGDS
END-DATA:
LOGICAL-RECORD-LENGTH=79
END-VARIABLE-ENTRY-DATA-SET:

BEGIN-VARIABLE-ENTRY-DATA-SET:
DATA-SET-NAME=ACRE
BASE-DATA:
ACRECODE=2
ACRECUST=6=CUSTCTRL
CUSTLKAR=8
ACRESENB=2
ACREDATA=45
RECORD-CODE=BL
ACREDNDN=4=DARECTRL
DARELKDN=8
ACREDGDG=4=DARECTRL
DARELKDG=8
ACREINNB=6
ACRENEAM=5
ACREGRAM=5
ACREAMPA=5
RECORD-CODE=CK
ACRECKNB=6
ACRENUMB=6
ACREAMOU=5
END-DATA:
LOGICAL-RECORD-LENGTH=63
END-VARIABLE-ENTRY-DATA-SET:
```

```
BEGIN-VARIABLE-ENTRY-DATA-SET:
DATA-SET-NAME=REMA
BASE-DATA:
REMACUST=6=CUSTCTRL
CUSTLKRE=8
REMAINVE=6=INVECTRL
INVELKRE=8
REMASENB=2
REMATEXT=78
END-DATA:
LOGICAL-RECORD-LENGTH=108
END-VARIABLE-ENTRY-DATA-SET:

END-DATA-BASE-GENERATION:
```

Output—Schema Source

The following is an example of schema source statements generated by the transparency generator, ETOTMAIN. This output is based on the previous Total DDL example input.

```
 ADD
 SCHEMA NAME IS ETOTSCHM VERSION IS 1.

 ADD
 AREA NAME IS CUSTOMER-REGION.

 ADD RECORD NAME IS CUSTOMER
     RECORD ID IS 101
     LOCATION MODE IS CALC USING CUSTOMER-KEY
                                 DUPLICATES ARE NOT ALLOWED
                                 WITHIN AREA CUSTOMER-REGION.

     02  CUSTOMER-KEY                          PIC X(6).
     02  CUSTNAME                              PIC X(30).
     02  CUSTADDR                              PIC X(30).
     02  CUSTCIST                              PIC X(20).
     02  FILLER                                PIC X(5).
     02  SAMENAME                              PIC X(5).
```

```
ADD RECORD NAME IS ORNU
    RECORD ID IS 102
    LOCATION MODE IS CALC USING ORNUCTRL
                                DUPLICATES ARE NOT ALLOWED
                                WITHIN AREA CUSTOMER-REGION.

    02  ORNUCTRL                                PIC X(12).
    02  ORNU0001                                PIC X(5).
    02  ORNU0002.
        03  ORNU0003                            PIC X(2).
        03  ORNU0004.
            04  ORNU0005                        PIC X(7).
            04  ORNU0006.
                05  ORNU0007                    PIC X(1).
                05  ORNU0008                    PIC X(5).
            04  ORNU0009.
                05  ORNU0010                    PIC X(2).
                05  ORNU0011                    PIC X(4).
    02  FILLER                                  PIC X(2).

ADD RECORD NAME IS DARE
    RECORD ID IS 103
    LOCATION MODE IS CALC USING DARECTRL
                                DUPLICATES ARE NOT ALLOWED
                                WITHIN AREA CUSTOMER-REGION.

    02  DARECTRL                                PIC X(4).
    02  SAME-NAME-OF-DARE                       PIC X(6).
    02  FILLER                                  PIC X(2).

ADD RECORD NAME IS INVE
    RECORD ID IS 104
    LOCATION MODE IS CALC USING INVECTRL
                                DUPLICATES ARE NOT ALLOWED
                                WITHIN AREA CUSTOMER-REGION.
    02  INVECTRL                                PIC X(6).
    02  INVEITDE                                PIC X(30).
```

```
    02  INVEITCO                                PIC X(5).
    02  INVEITPR                                PIC X(5).

    02  INVEQTOH                                PIC X(4).
    02  INVEQTOO                                PIC X(4).
    02  FILLER                                  PIC X(2).

ADD RECORD NAME IS CUSTOMER-ORDER


    RECORD ID IS 105
    LOCATION MODE IS VIA CUST-TO-ORDER SET
                                WITHIN AREA CUSTOMER-REGION.
    02  CUORCODE                                PIC X(2).
    02  CUORORNU                                PIC X(12).
    02  CUORLINU                                PIC X(2).
    02  CUORDATA                                PIC X(55).
    02  CUOR-RECORD-HD
                                            REDEFINES CUORDATA.
        03  CUORDRDR                            PIC X(4).
        03  CUORDSDS                            PIC X(4).
        03  CUORCUST                            PIC X(6).
        03  CUORTOVA                            PIC X(5).
        03  CUORTOIT                            PIC X(2).
        03  CUORTERM                            PIC X(10).
        03  FILLER                              PIC X(24).
    02  CUOR-RECORD-IT
                                            REDEFINES CUORDATA.
        03  CUORINVE                            PIC X(6).
        03  CUORQURE                            PIC X(4).
        03  CUORPRIC                            PIC X(5).
        03  CUORWEIG                            PIC X(4).
        03  FILLER                              PIC X(36).
    02  CUOR-RECORD-CM
                                            REDEFINES CUORDATA.
        03  CUORCOMM                            PIC X(55).
    02  CUOR-RECORD-JG
                                            REDEFINES CUORDATA.
        03  CUORJGDR                            PIC X(4).
        03  CUORJGDS                            PIC X(4).
        03  FILLER                              PIC X(47).
    02  FILLER                                  PIC X(1).

ADD RECORD NAME IS ACRE
    RECORD ID IS 106
    LOCATION MODE IS VIA CUST-AR-ACRE SET
```

```
                                WITHIN AREA CUSTOMER-REGION.

    02  ACRECODE                                PIC X(2).
    02  ACRECUST                                PIC X(6).
    02  ACRESENB                                PIC X(2).
    02  ACREDATA                                PIC X(45).
    02  ACRE-RECORD-BL
                                            REDEFINES ACREDATA.
        03  ACREDNDN                            PIC X(4).
        03  ACREDGDG                            PIC X(4).
        03  ACREINNB                            PIC X(6).
        03  ACRENEAM                            PIC X(5).
        03  ACREGRAM                            PIC X(5).
        03  ACREAMPA                            PIC X(5).
        03  FILLER                              PIC X(16).
    02  ACRE-RECORD-CK
                                            REDEFINES ACREDATA.
        03  ACRECKNB                            PIC X(6).
        03  ACRENUMB                            PIC X(6).
        03  ACREAMOU                            PIC X(5).
        03  FILLER                              PIC X(28).
    02  FILLER                                  PIC X(1).
ADD RECORD NAME IS REMA
    RECORD ID IS 107
    LOCATION MODE IS VIA CUST-RE-REMA SET
                                WITHIN AREA CUSTOMER-REGION.

    02  REMACUST                                PIC X(6).
    02  REMAINVE                                PIC X(6).
    02  REMASENB                                PIC X(2).
    02  REMATEXT                                PIC X(78).

ADD SET NAME IS CUST-TO-ORDER
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
OWNER IS ORNU                   NEXT  DBKEY POSITION IS 1
                                PRIOR DBKEY POSITION IS 2

MEMBER IS CUSTOMER-ORDER        NEXT  DBKEY POSITION IS 1
                                PRIOR DBKEY POSITION IS 2
                                MANDATORY AUTOMATIC.

ADD SET NAME IS DARE-DR-CUOR
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
```

```
OWNER IS DARE                    NEXT  DBKEY POSITION IS 1
                                 PRIOR DBKEY POSITION IS 2

MEMBER IS CUSTOMER-ORDER         NEXT  DBKEY POSITION IS 3
                                 PRIOR DBKEY POSITION IS 4
                                 MANDATORY MANUAL.

ADD SET NAME IS DARE-DS-CUOR
ORDER IS PRIOR
MODE  IS CHAIN                   LINKED TO PRIOR
OWNER IS DARE                    NEXT  DBKEY POSITION IS 3
                                 PRIOR DBKEY POSITION IS 4
MEMBER IS CUSTOMER-ORDER         NEXT  DBKEY POSITION IS 5
                                 PRIOR DBKEY POSITION IS 6
                                 MANDATORY MANUAL.

ADD SET NAME IS CUST-CO-CUOR
ORDER IS PRIOR
MODE  IS CHAIN                   LINKED TO PRIOR
OWNER IS CUSTOMER                NEXT  DBKEY POSITION IS 1
                                 PRIOR DBKEY POSITION IS 2

MEMBER IS CUSTOMER-ORDER         NEXT  DBKEY POSITION IS 7
                                 PRIOR DBKEY POSITION IS 8
                                 MANDATORY MANUAL.
ADD SET NAME IS INVE-CO-CUOR
ORDER IS PRIOR
MODE  IS CHAIN                   LINKED TO PRIOR
OWNER IS INVE                    NEXT  DBKEY POSITION IS 1
                                 PRIOR DBKEY POSITION IS 2

MEMBER IS CUSTOMER-ORDER         NEXT  DBKEY POSITION IS 9
                                 PRIOR DBKEY POSITION IS 10
                                 MANDATORY MANUAL.

ADD SET NAME IS CUST-AR-ACRE
ORDER IS PRIOR
MODE  IS CHAIN                   LINKED TO PRIOR
OWNER IS CUSTOMER                NEXT  DBKEY POSITION IS 3
                                 PRIOR DBKEY POSITION IS 4
```

```
MEMBER IS ACRE                  NEXT  DBKEY POSITION IS 1
                                PRIOR DBKEY POSITION IS 2
                                MANDATORY AUTOMATIC.

ADD SET NAME IS DARE-DN-ACRE
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
OWNER IS DARE                   NEXT  DBKEY POSITION IS 5
                                PRIOR DBKEY POSITION IS 6

MEMBER IS ACRE                  NEXT  DBKEY POSITION IS 3
                                PRIOR DBKEY POSITION IS 4
                                MANDATORY MANUAL.

ADD SET NAME IS DARE-DG-ACRE
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
OWNER IS DARE                   NEXT  DBKEY POSITION IS 7
                                PRIOR DBKEY POSITION IS 8
MEMBER IS ACRE                  NEXT  DBKEY POSITION IS 5
                                PRIOR DBKEY POSITION IS 6
                                MANDATORY MANUAL.

ADD SET NAME IS CUST-RE-REMA
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
OWNER IS CUSTOMER               NEXT  DBKEY POSITION IS 5
                                PRIOR DBKEY POSITION IS 6
MEMBER IS REMA                  NEXT  DBKEY POSITION IS 1
                                PRIOR DBKEY POSITION IS 2
                                MANDATORY AUTOMATIC.

ADD SET NAME IS INVE-RE-REMA
ORDER IS PRIOR
MODE  IS CHAIN                  LINKED TO PRIOR
OWNER IS INVE                   NEXT  DBKEY POSITION IS 3
                                PRIOR DBKEY POSITION IS 4

MEMBER IS REMA                  NEXT  DBKEY POSITION IS 3
                                PRIOR DBKEY POSITION IS 4
                                MANDATORY MANUAL.
VALIDATE.
```

Output—Subschema Source

The following is a sample of a subschema that is generated by the transparency generator, ETOTMAIN. This output is based on the previous Total DDL example input.

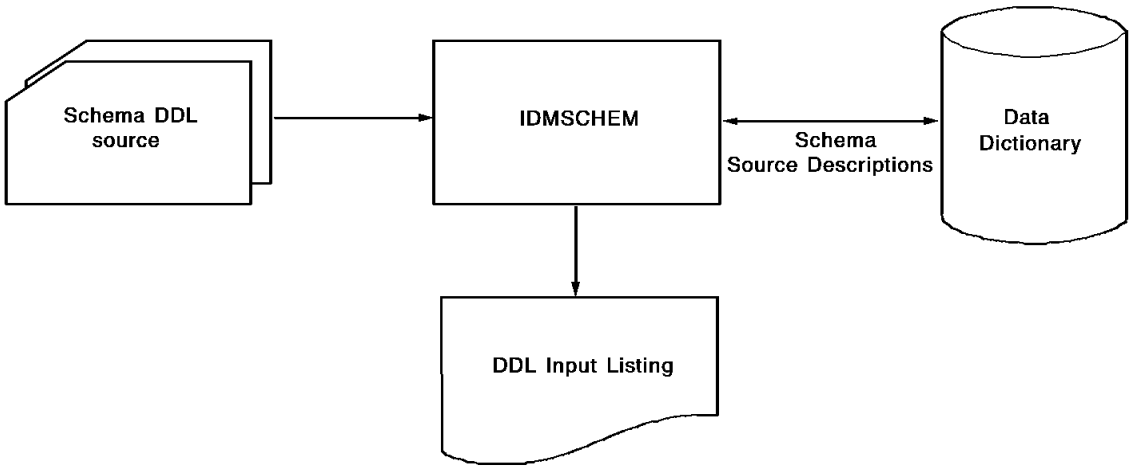
```
ADD
SUBSCHEMA NAME IS ETOTSUBS OF SCHEMA NAME ETOTSCHM.

    ADD AREA CUSTOMER-REGION.

    ADD RECORD CUSTOMER.
    ADD RECORD ORNU.
    ADD RECORD DARE.
    ADD RECORD INVE.
    ADD RECORD CUSTOMER-ORDER.
    ADD RECORD ACRE.
    ADD RECORD REMA.

    ADD SET CUST-TO-ORDER.
    ADD SET DARE-DR-CUOR.
    ADD SET DARE-DS-CUOR.
    ADD SET CUST-CO-CUOR.
    ADD SET INVE-CO-CUOR.
    ADD SET CUST-AR-ACRE.
    ADD SET DARE-DN-ACRE.
    ADD SET DARE-DG-ACRE.
    ADD SET CUST-RE-REMA.
    ADD SET INVE-RE-REMA.
    VALIDATE.
    GENERATE.
```

Step 2: Schema Preparation

To compile the schema created by the transparency generator, execute the program IDMSCHEM.

Schema Compiler Execution

The following figure shows the execution of the schema compiler.



Input to IDMSCHEM

The input to IDMSCHEM is the source schema DDL output by the generator.

Output from IDMSCHEM

Output from IDMSCHEM is as follows:

- A description of the schema stored in the dictionary
- A schema DDL input listing, including embedded warning and error messages issued by IDMSCHEM

Note: For more information about messages issued by IDMSCHEM, see the *CA IDMS Messages and Codes Guide*. For more information about how to use the extended options of the schema compiler, see the *CA IDMS Database Administration Guide*.

Step 3: Physical Database Preparation

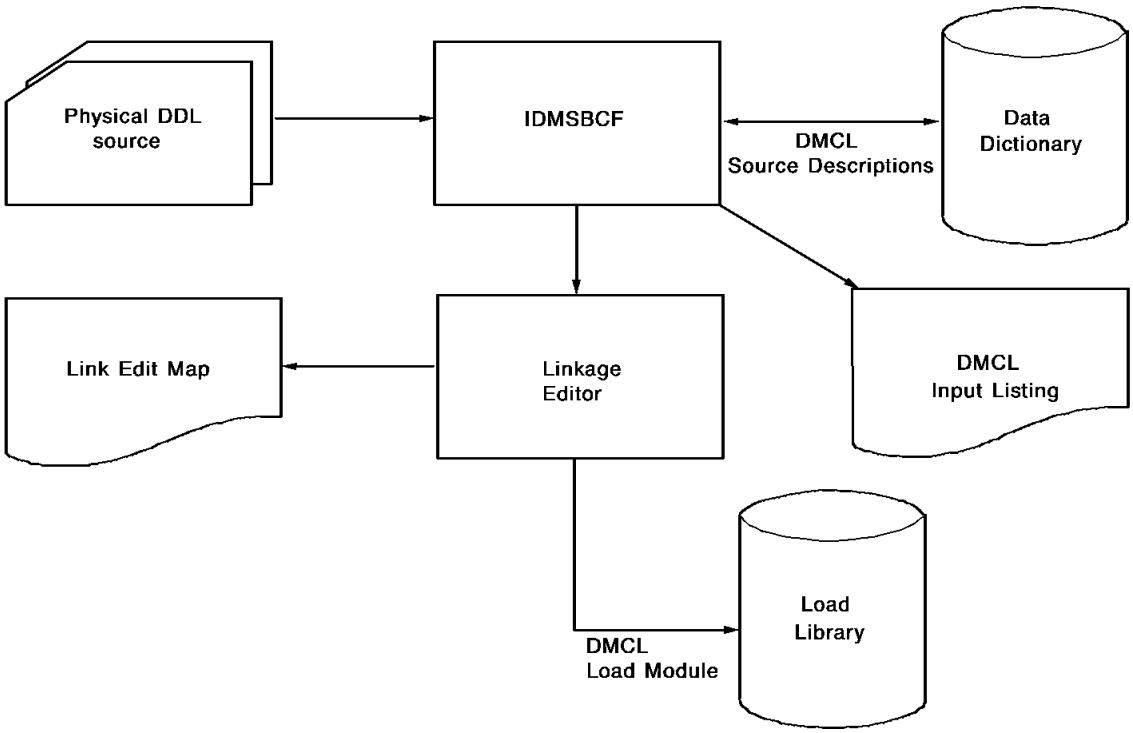
To prepare the physical database, perform these steps:

1. Submit DDL statements that describe the physical database using the CA IDMS Command Facility (IDMSBCF); physical DDL statements include the SEGMENT, DBNAME TABLE, and DMCL statements; include a GENERATE clause to generate database name table and DMCL load modules
2. Punch the database name table and DMCL load modules using the PUNCH utility statement
3. Link the resulting object modules to a load library
4. Identify the DMCL to the runtime system:
   - Central version—specify the global DMCL name in the #DCPARM macro which defines system startup parameters; incorporate the Total DMCL statements into the global DMCL using the MODIFY DMCL statement
   - Local mode—specify the DMCL name in the SYSIDMS parameter file

Note: For more information about the physical DDL statements and SYSIDMS, see the *CA IDMS Common Facilities Guide.* For more information about the CA IDMS Command Facility, see the *CA IDMS Common Facilities Guide*. For more information about #DCPARM, see the *CA IDMS System Operations Guide*.

IDMSBCF Execution

The following figure shows execution of IDMSBCF, the program you use to compile physical DDL.



Input to IDMSBCF

As input to IDMSBCF, you use the DDL statements that describe these physical components of the database:

- Segments
- Database name table (dbname table)
- DMCL

Output from IDMSBCF

Output from IDMSBCF is as follows:

- DMCL and database name table load modules
- A physical DDL input listing, including embedded warning and error messages issued by IDMSBCF (for a description of these messages, see the *CA IDMS Messages and Codes Guide*)

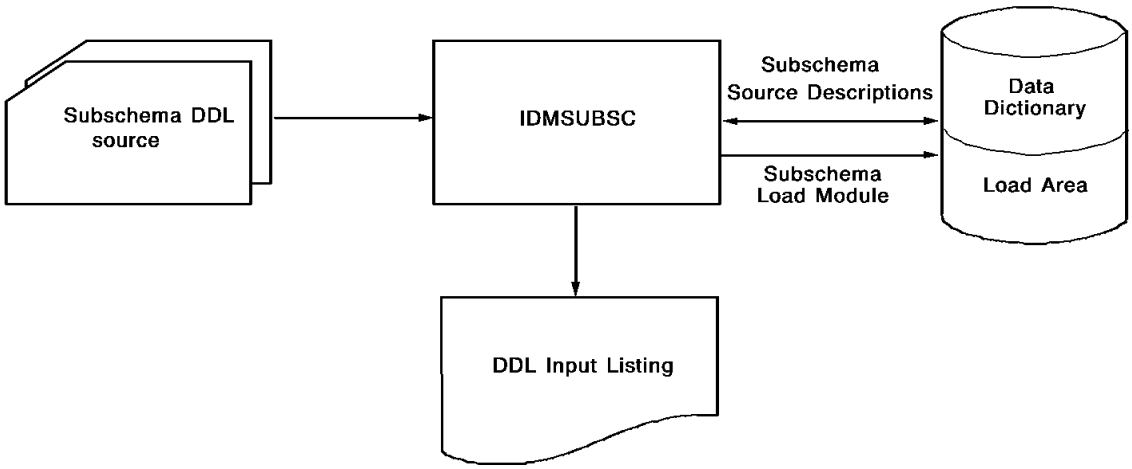
Step 4: Subschema Preparation

To prepare the subschema, you perform these steps:

1. Compile the subschema using IDMSUBSC
2. Punch a subschema load module
3. Link edit the load module to a load library

IDMSUBSC Execution

The following figure shows the execution of the subschema compiler IDMSUBSC.



Input to IDMSUBSC

Input to IDMSUBSC is the subschema DDL created by the transparency generator.

Output from IDMSUBSC

Output from IDMSUBSC is:

- A source description of the subschema stored in the dictionary, including embedded warning and error messages issued by IDMSUBSC
- A subschema load module stored in the dictionary load area (DDLDCLOD), if the source input contains a GENERATE statement; the subschema in the dictionary load area is used by applications running under the central version

Note: For more information about the IDMSUBSC messages, see the *CA IDMS Messages and Codes Guide*.

Punching the Subschema Load Module

To punch the subschema load module, you submit a PUNCH LOAD MODULE statement to the DDDL compiler (IDMSDDDL).

Output from IDMSDDDL is an object deck. z/VSE users must be sure to save this output for use in step 7 of this conversion.

Linking the Subschema Load Module

Input to the linkage editor is the object deck produced by IDMSDDDL.

Output from the linkage editor is a load module in the load library. The subschema in the load library is used by applications running in local mode and the transparency loader.

Step 5: CA IDMS/DB Database Initialization

To initialize the CA IDMS/DB database (format database pages), you submit the FORMAT utility statement through the CA IDMS Command Facility (IDMSBCF).

Note: For more information about FORMAT, see the *CA IDMS Utilities Guide*. For more information about IDMSBCF, see the *CA IDMS Common Facilities Guide*.

Step 6: Total Database Unload Utility

To unload the Total database, execute the Cincom utility, CSITULOD. Specify the appropriate parameters to preserve all pointers and unload all elements. Refer to the appropriate Total documentation for instructions on executing this utility.

If a means other than the CSITULOD utility is used to unload the Total database, ensure that the logical order of the database is preserved. Additionally, ensure that the content of all unloaded Total records conforms to that specified in the LOAD statement input to the transparency generator (see Data Description Phase (see page 29)).

Step 7: Transparency Loader (ETOTLOAD)

Compile, link edit, and execute the transparency customized loader, ETOTLOAD, or your own load program to load data into the CA IDMS/DB database. You must run the loader in local mode.

Note: For more information about the messages provided by the transparency loader, see Appendix C, Loader Messages.

The ETOTLOAD job stream consists of several steps.

Before Compiling ETOTLOAD

Review the file description (FD) of the UNLOAD-FILE and edit as necessary before you compile ETOTLOAD.

z/VSE users should also review the COBOL INPUT-OUTPUT SECTION ASSIGN clause and edit it as necessary.

Before Executing ETOTLOAD

Before executing ETOTLOAD you must change all set orders of PRIOR to NEXT. To do this, execute the schema compiler IDMSCHEM with the following input:

```
modify schema schema-name.
modify set set-name-1 order is next.
modify set set-name-2 order is next.
 .
 .
 .
modify set set-name-n order is next.
validate.
regenerate all subschemas.
```

Modify the set order for all sets in all schemas. Punch and link the subschema load modules.

After Executing ETOTLOAD

After executing the loader you must restore all set orders to PRIOR. To do this, execute the schema compiler IDMSCHEM with the following input:

```
modify schema schema-name.
modify set set-name-1 order is prior.
modify set set-name-2 order is prior.
 .
 .
 .
modify set set-name-n order is prior.
validate.
regenerate all subschemas.
```

Modify the set order for all sets in all schemas. Punch and link the subschema load modules.

Chapter 5: Runtime Operations Phase

This section contains the following topics:

Runtime Steps

Before You Begin:

For related information, see the specific appendices.

- z/OS Job Control Language (see page 85) for z/OS JCL.
- z/VSE Job Control Language (see page 95) for z/VSE JCL.
- Runtime Messages (see page 77) for a discussion of the codes. returned to the Total application program running in the transparency environment

Note: For more information about runtime operations, see the *CA IDMS System Operations Guide.*

What To Do

To execute a Total application program with the CA IDMS TOTAL Transparency runtime interface, perform the steps below.

Step 1: Assemble and Link Edit ETOTTBL Output

Assemble and link edit ETOTTBL output generated by ETOTMAIN.

Perform this step once to store the control table in the load library for use with all Total application programs. It is not repeated for each Total application program that uses the runtime interface.

Step 2: Modify the Total Application Program

Modify the Total application program to remove any Total DML functions not supported by the runtime interface (see Total Features Supported (see page 24)).

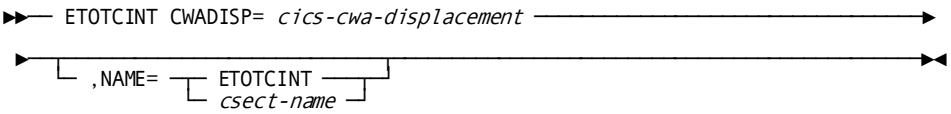
Step 3: Recompile the Total Application Program

Recompile the Total application program if it has been modified.

Step 4: Assemble the ETOTCINT Macro

Assemble the ETOTCINT macro if CICS applications will use the transparency to access the CA IDMS/DB database.

The syntax for the ETOTCINT macro used to generate the ETOTCINT module is shown below. You only need to assemble this macro once. Subsequently, it can be used with all Total CICS applications to access the CA IDMS/DB database.



Parameters

CWADISP=*cics-cwa-displacement*

Specifies the displacement, in bytes, of the transparency work area within the CICS CWA area. Specify the same value given to the CWADISP operand when you assembled the CICSOPT macro to create your CICSOPTS module.

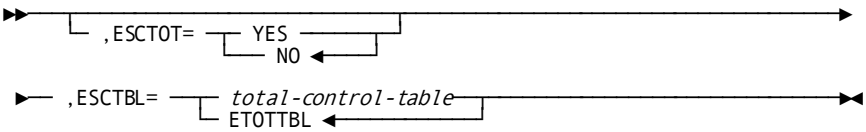
NAME=ETOTCINT/*csect-name*

Specifies the name of the generated module. The default is ETOTCINT. If specified, *csect-name* must be a 1- to 8-character alphanumeric value.

Step 5: Create Your CICS Interface Module

Most parameters for the CICSOPT macro are described in the System Operations guide. Parameters specific to the Total/T interface are described below.

Syntax



For more information about this topic, see Creating the CICS CA IDMS/DB Interface (IDMSINTC) (see page 91) for z/OS and Creating the CICS CA IDMS/DB Interface (IDMSINTC) (see page 101) for z/VSE.

Parameters

ESCTOT=YES/NO

Specifies whether the IDMSINTC interface supports TOTAL/T. YES should be specified. The default is NO.

ESCTBL=ETOTTBL/total-control-table

Specifies the name of the load module containing the control table generated by ETOTMAIN. The default is ETOTTBL.

Step 6: Link Edit the Compiled Total Application

Link edit the compiled Total application program with the following transparency and CA IDMS/DB modules:

- ETOTBINT (batch only) or ETOTCINT (CICS only)—The runtime interface module that passes translated database calls to CA IDMS/DB. ETOTBINT is supplied as an object module with the transparency; ETOTCINT is supplied as a macro that must be assembled prior to runtime.
- ETOTTRAN (batch only)—The runtime interface module (supplied in object form) that translates Total database calls to CA IDMS/DB database calls.
- IDMS (batch only)—The CA IDMS/DB module that will receive database calls passed by ETOTBINT.
- IDMSOPTI (batch only)—The (optional) CA IDMS/DB module that passes runtime information to the CA IDMS/DB central version that will handle database calls issued by the runtime interface of the transparency. IDMSOPTI is used to indicate the mode of operation.

Step 7: Execute the Total Application

Execute the Total application as per standard CA IDMS/DB runtime procedures.

Appendix A: Generator Messages

This section contains the following topics:

About Generator Messages

When the generator detects a processing error, the generator writes a message to an error report. On the report, the message follows the record that contains the error. An asterisk is printed under the first character of the entry causing the error or warning. An E, W, or F labels each message, as follows:

Label	Status	Effect on processing
E	Nonfatal error	Generator continues processing
W	Warning	Generator continues processing
F	Fatal error	Generator terminates processing

This appendix lists and describes error, warning, and fatal messages issued by the generator.

Error Messages

Message issued	Reason
BAD GROUP ELEMENT LENGTH	Error in Total DDL; the specified group-length must match the combined lengths of the individual items making up the group.
CARD BUFFER FULL (ETOTPARS)	More than 500 SYNONYM, AREA, SCHEMA, DEVICE-MEDIA, SUBSCHEMA, and USAGE-MODE statements; relink ETOTMAIN to include ETOTR002 (see Increasing Generator Input Limits (see page 83)).
IMPROPER ELEMENT NAME	Invalid Total DDL data name or keyword; entry must be *FILLER*, RECORD-CODE, or an 8-character data name.

Message issued	Reason
IMPROPER FILE NAME	Invalid file name; entry must be four characters in length and alphanumeric.
IMPROPER INTEGER	Expecting an integer; entry is nonnumeric.
IMPROPER SYNONYM	Invalid or missing CA IDMS/DB element, record, or set name in SYNONYMS control statement; entry must be alphanumeric.
IMPROPER SYNONYM SOURCE	Invalid Total element or file name or transparency set name in SYNONYMS control statement; entry must be 4, 8, or 12 characters long.
IMPROPER SYNTAX	Invalid Total DDL syntax.
INVALID AREA NAME	Invalid or missing CA IDMS/DB area name in AREA or USAGE-MODE control statement; entry must be from 1 to 16 characters long and must be alphanumeric.
INVALID LOAD LRECL	Invalid logical record length in LRECL entry of LOAD control statement; entry must be greater than or equal to 1.
INVALID LOAD SYNTAX	Invalid LOAD statement syntax; entry following keyword LOAD must be ALL, ALL., or LRECL.
INVALID SUBSCHEMA NAME	Invalid or missing CA IDMS/DB subschema name in SUBSCHEMA NAME IS entry of SUBSCHEMA control statement; entry must be from 1 to 8 characters long.
INVALID TASK NAME	Invalid Total task name in USAGE-MODE control statement; entry must be 8 characters long and must be alphanumeric.
INVALID USAGE	Invalid CA IDMS/DB usage mode in USAGE-MODE control statement; entry must specify RETRIEVAL, UPDATE, SHARED RETRIEVAL, PROTECTED RETRIEVAL, EXCLUSIVE RETRIEVAL, SHARED UPDATE, PROTECTED UPDATE, or EXCLUSIVE UPDATE.
INVALID USE OF READY	A READY ALL USAGE-MODE control statement was detected after a READY *area-name* USAGE-MODE control statement had been found, or vice versa.

Message issued	Reason
INVALID USE OF PGMNAME	A *total-task-name* USAGE-MODE control statement specifying an *idms-area-name* was detected after a *total-task-name* ALL statement had been found, or vice versa.
MISSING BEGIN-DATA-BASE-GENERATION	The beginning statement of the Total DDL file is missing.
SYMBOL-TABLE FULL	The number of files plus the number of elements in the entire DDL is greater than the table size allowed in the transparency.
UNDEFINED AREA	Unrecognized CA IDMS/DB area name in USAGE-MODE control statement; entry must be defined in SCHEMA control statement.
UNDEFINED ELEMENT	Unrecognized Total data-element name; entry must be defined in Total DDL.
UNDEFINED FILE	Unrecognized Total file name in Total DDL, SYNONYMS control statement, or AREA control statement. Any Total file name used as the first four characters of a Total file element name in Total DDL must also be defined in Total DDL; a Total file name used to qualify a Total element name in the SYNONYMS control statement must be defined in the Total DDL; a Total file name entered in the AREA control statement must be defined in the Total DDL.
UNDEFINED SET NAME	Unrecognized transparency set name in SYNONYMS control statement; entry must be the name of a CA IDMS/DB set established by the generator.

Warning Messages

Message issued	Reason
NEAREST PRIME TOO LARGE FOR HASH TABLE	Insufficient table size.

Fatal Messages

Message issued	Reason
REACHED EOF ON SKEL-FILE	Invalid or missing loader skeleton (ETOTLOAD); probable JCL error.
REACHED EOF ON DB-TABLES	Invalid ETOTTBL input; probable JCL error.

Appendix B: Loader Messages

This section contains the following topics:

Loader Messages Issued

The following messages are issued by the CA IDMS TOTAL Transparency loader.

Message issued	Reason
??? FILE NOT FOUND: INPUT: input-record-name	The unloaded Total database includes a record (*input-record-name*) that references a Total file not known to the loader. Ensure that the loader is reading the proper Total data and that the Total database was unloaded correctly.
??? STRANGE FILE TYPE	The array built into the WORKING-STORAGE SECTION of the transparency loader contains an invalid file-type field.
??? NOT ENOUGH OWNER DESCRIPTOR RECORDS	A transparency buffer limit has been exceeded.

Appendix C: Runtime Messages

This section contains the following topics:

Three Classes of Error Codes

When you process database requests from a Total application program, the transparency runtime interface returns three classes of error codes to the program, as follows:

- **Syntax errors**—codes resulting from syntax errors detected before CA IDMS/DB is called to perform the requested database service. These codes are in the form of standard Total error-status codes and reflect errors found in Total DML syntax.
- **Errors detected by CA IDMS/DB**—codes resulting from errors or possible error conditions detected by CA IDMS/DB while attempting to perform the requested database service. These codes are in the form of Total equivalents to the status codes returned to the transparency runtime interface by CA IDMS/DB.
- **Transparency errors**—codes resulting from internal transparency conditions. The runtime interface returns either a CA IDMS/DB status code or a transparency code that resembles a standard Total error-status code.

This appendix describes these three classes of codes.

Total DML Syntax Error Codes

When the transparency runtime interface receives a request from a Total application program, it checks for DML syntax errors by performing a Total error-checking routine before calling CA IDMS/DB. The runtime interface returns the results of this error-checking routine in the form of standard Total error-status codes. Refer to the appropriate Total documentation for an explanation of these codes.

Error Conditions Detected by the CA IDMS/DB

When the transparency runtime interface issues a call to CA IDMS/DB to perform a database service requested by the Total application program, CA IDMS/DB processes (or attempts to process) the request and returns a CA IDMS/DB status code to the runtime interface. The runtime interface translates this status code to an equivalent Total error-status code and returns the Total code to the requesting Total application.

Corresponding Total and CA IDMS/DB Status Codes

The following table lists Total status codes and the corresponding CA IDMS/DB status codes. Some Total status codes are issued due to situations other than the return of a CA IDMS/DB status code resulting from a CA IDMS DML call. In cases where there is no reasonable Total status code to match a CA IDMS/DB status code, the actual CA IDMS/DB status code is used as the Total status. A CA IDMS/DB status code used instead of a Total status indicates an unusual situation.

If a status code is returned that is not noted in this table, see the appropriate Total error codes manual or the *CA IDMS Messages and Codes Guide*.

Total status	CA IDMS/DB status	Description
****	0000	OK status
CICS	1468	CICS interface not started
IDMS	0000	IDMS STATISTICS CALL return code
FNOP	0301	Either area not readied or ready failed
	1201	Either area not readied or ready failed
	0208	Invalid record or set name
	0308	Invalid record or set name
	0508	Invalid record or set name
	0708	Invalid record or set name
	1108	Invalid record or set name
	1208	Invalid record or set name
	0210	Function not allowed
	0310	Function not allowed
	0510	Function not allowed
	0710	Function not allowed
	0810	Function not allowed

Total status	CA IDMS/DB status	Description
	0910	Function not allowed
	1110	Function not allowed
	1210	Function not allowed
	0323	Invalid area or parameter list
IRLC	0302	DBKEY out of page range
	1202	DBKEY out of page range
	0371	Page range not found in DMCL
	0971	Page range not found in DMCL
DUPM	0705	Duplicates not allowed
	0805	Duplicates not allowed
	1205	Duplicates not allowed
NHLD	0306	Currency not established
	0706	Currency not established
	0806	Currency not established
	1106	Currency not established
	1506	Currency not established
	1606	Currency not established
	0313	No current of run unit
	0513	No current of run unit
	0813	No current of run unit
	1613	Currency not established
	0220	Current record not the same type as the named record
	0520	Current record not the same type as the named record
	0820	Current record not the same type as the named record
	0225	Currency not established
	0825	Currency not established
	1225	Currency not established

Total status	CA IDMS/DB status	Description
LOCK	0209	Named area readied in incorrect usage mode
	0709	Named area readied in incorrect usage mode
	0809	Named area readied in incorrect usage mode
	1109	Named area readied in incorrect usage mode
	1209	Named area readied in incorrect usage mode
	0221	Area other than the named area was readied in the incorrect usage mode
	0721	Area other than the named area was readied in the incorrect usage mode
	0821	Area other than the named area was readied in the incorrect usage mode
	1121	Area other than the named area was readied in the incorrect usage mode
	1221	Area other than the named area was readied in the incorrect usage mode
	0966	Area not available for update
FULL	1211	Area full
NOIO	0318	Record not bound
	0518	Record not bound
	1218	Record not bound
RSRV	0928	Named areas previously readied
IMDL	0230	Record is owner of a nonempty set
FTYP	0331	Storage mode conflict
IOER	0970	Database or journal file will not open properly
NACT	1400	Run unit not bound
	1469	Run unit not bound
FNAV	1408	Invalid record or set name
	1508	Invalid record or set name
ICOR	1472	Insufficient for LOAD or STORE
TFUL	1473	Run unit maximum reached
ACTV	1477	Run unit bound twice

Transparency Errors

When the transparency runtime interface receives a Total application program request that it cannot process because all the transparency requirements for handling the request are not met, or when the runtime interface receives a status code from CA IDMS/DB for which there is no Total equivalent, the runtime interface issues one of the following codes:

- **IDMS status code**
- **CICS**
- **USxx**

IDMS Status Code

The runtime interface receives a CA IDMS/DB status code in response to a request for database services; a Total equivalent to this request does not exist.

Note: For more information about CA IDMS/DB status codes, see the *CA IDMS Messages and Codes Guide*.

CICS

The CICS code indicates that the interface between the central version and CICS has not been started. The transparency runtime interface has issued a call to CA IDMS/DB to process a request from a Total CICS application, and CA IDMS/DB has returned a status code of *nn*68.

Note: Minor code 68 can be issued with any major code.

US

A US status code indicates that the transparency runtime interface cannot process a DML command issued by the Total application. US status codes can result from any of the following errors in a Total DML command:

- The key needed to perform the CA IDMS/DB equivalent of a Total store command for a variable file is not provided in the data-list parameter.
- A Total store command has been issued for a coded variable file, but the CA IDMS/DB equivalent of the record code in the data area is not defined in the subschema.

- The linkpath named in a Total linkpath parameter is not valid for the record code in the data area.
- The data-list parameter in the application call to ETOTBINT or ETOTCINT is not correctly punctuated.
- ETOTTBL was not found. During SINON processing, the runtime control table (ETOTTBL), designated by the DBMOD parameter or the SINON call, could not be loaded or located.
- ETOTTRAN was not found (batch only). If ETOTTRAN was not linked during the link edit of ETOTBINT, a copy of ETOTTRAN could not be loaded or located.
- Runtime work area storage was not available. At the time the application issued a SINON call, enough runtime work area storage for processing was not available.
- RQLOC function was invoked under central version. This function is available in local mode only.
- RQLOC-FILE (record name) was not found in subschema.
- RQLOC-FILE (record name) was not found in ETOTTBL.

US Status Codes

The following table lists US status codes.

Total status	Meaning
US01	Internal hashing error—REGEN ETOTTBL
US02	Record buffer too small
US03	Set key missing
US04	Missing set relation
US05	Improper key connect
US06	Invalid record code
US07	Insufficient storage (batch)
US08	Error in load of ETOTTRAN or ETOTTBL
US09	RQLOC function invoked under central version
US10	RQLOC record or file name not found in the subschema
US99	Element table not correct for **REST**; table must be regenerated

Appendix D: Increasing Generator Input Limits

This section contains the following topics:

ETOTMAIN Input Limits

You may need to increase transparency generator input limits to accommodate large database conversions. The transparency generator (ETOTMAIN) comes in two versions. These versions differ from each other in the capacity for input to the generator.

Limits apply to:

- Total DDL statements
- Transparency generator control statements

The default installation link-edit of the transparency generator (ETOTMAIN) includes ETOTROOT, which sets lower limits on input to the transparency generator. These limits accommodate most uses of the transparency.

If you are working with larger databases and require larger limits, relink ETOTMAIN with ETOTROO2.

Note that you should *not* relink ETOTMAIN unless necessary. ETOTROO2 will increase the memory requirements of ETOTMAIN. The following tables show the default limits and optional larger limits for the two types of input to the transparency generator.

Limits on Total DDL Statements

Item	Default limit	ETOTROO2 limit
Files	300	1000
Elements	5900	9000
Linkpaths (=sets)	500	500
Record codes	500	500

Limits on Transparency Generator Control Statements

Item	Default limit	ETOTROO2 limit
16-byte synonyms (files, records, sets)	2000	2000
32-byte synonyms (elements)	1000	1000
Usage mode statements	2000	2000
Schema/subschema statements	500	5000

Appendix E: z/OS Job Control Language

This section contains the following topics:

Generate (ETOTMAIN)

Use the following JCL to execute the transparency generator (ETOTMAIN):

ETOTMAIN (z/OS)

```
//GENERATE EXEC PGM=ETOTMAIN,REGION=2048K
//STEPLIB  DD   DSN=idms.dba.loadlib,DISP=SHR
//         DD   DSN=idms.loadlib,DISP=SHR
//SYSLST   DD   SYSOUT=A
//dcmsg    DD   DSN=idms.sysmsg.ddldcmsg,DISP=SHR
//SYSIDMS  DD   *
DMCL=etotdmcl
Input other SYSIDMS parameters, as required
/*
//SYSIPT   DD   DSN=user.srclib(totalddl),DISP=SHR
//         DD   DSN=user.srclib(ctrlstmt),DISP=SHR
//         DD   DSN=yourHLQ.CAGJSRC(ETOTTBL),DISP=SHR
//         DD   DSN=yourHLQ.CAGJSRC(ETOTLOAD),DISP=SHR
//SYSPCH   DD   DSN=user.etotschm,UNIT=disk,DISP=(NEW,CATL),
                SPACE=(TRK,(4,4)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=bbbb)
//SYSPCH03 DD   DSN=user.etotsubs,UNIT=disk,DISP=(NEW,CATL),
                SPACE=(TRK,(4,4)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=bbbb)
//SYSPCH04 DD   DSN=user.etottbl,UNIT=disk,DISP=(NEW,CATLG,
                SPACE=(TRK,(4,4)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=bbbb)
//SYSPCH05 DD   DSN=user.etotload,UNIT=disk,DISP=(NEW,CATL),
                SPACE=(TRK,(4,4)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=bbbb)
```

Note: The punched output should be directed to sequential files. Do not use partitioned datasets.

idms.dba.loadlib	Dataset name of the CA IDMS/DB load library containing the DMCL and database name table load modules
idms.loadlib	Dataset name of the CA IDMS/DB load library containing CA IDMS executable modules
dcmsg	DDname of the system message area
idms.sysmsg.ddldcmsg	Dataset name of the system message area
etotdmcl	Name of the DMCL to be accessed at runtime; use the name of the global DMCL **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.
user.srclib	Dataset name of the user source library
totalddl	Name of the library member containing Total DDL
yourHLQ.CAGJSRC	Dataset name of the CA IDMS/DB source library
ctrlstmt	Name of the library member containing user-supplied control statements
user.etotschm	Dataset name of the file containing the schema source generated by ETOTMAIN. Run this output through the schema compiler (IDMSCHEM).
user.etotsubs	Dataset name of the file containing the subschema source generated by ETOTMAIN. Run this output through the subschema compiler (IDMSUBSC).
user.etottbl	Dataset name of the file containing the customized runtime control table generated by ETOTMAIN from the skeleton table, ETOTTBL. Run this output through the assembly and link edit process.
user.etotload	Dataset name of the file containing the customized loader generated by ETOTMAIN from the skeleton loader, ETOTLOAD. Run this output through the COBOL compile and link edit process.
disk	Symbolic device name of the file containing the punched output
bbbb	Block size of the file containing the punched output; must be a multiple of 80

Assembling and Link Editing ETOTTBL

Use the JCL below to assemble and link edit ETOTTBL.

ETOTTBL z/OS

```
//ASM      EXEC PGM=IEUASM,PARM='NOLOAD,DECK'
//SYSPRINT DD  SYSOUT=A
//SYSLIB   DD  DSN=yourHLQ.CAGJMAC,DISP=SHR
//         DD  DSN=zOS.maclib,DISP=SHR
//         DD  DSN=cics.maclib,DISP=SHR
//SYSUT1   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSUT2   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSUT3   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSPUNCH DD  DSN=&.&ETOTTBL.,UNIT=disk,SPACE=(80,(200,50)),
//             DISP=(NEW,PASS)
//SYSIN    DD  DSN=user.etottbl,DISP=SHR
/*
//LINKEDIT EXEC PGM=HEWL,PARM=(XREF,LET,LIST),REGION=256K
//SYSPRINT DD  SYSOUT=A
//SYSUT1   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSLMOD  DD  DSN=idms.loadlib,DISP=SHR
//SYSLIN   DD  DSN=&.&ETOTTBL.,DISP=(OLD,DELETE)
//         DD  DDname=SYSIN
//SYSIN    DD  *
 NAME etottbl(R)
/*
```

yourHLQ.CAGJMAC	Dataset name of the CA IDMS/DB macro library
cics.maclib	Dataset name of the CICS macro library
disk	Symbolic device name of the disk file
etottbl	Name of the customized transparency ETOTTBL load module, which replaces the Total DBMOD module
zOS.maclib	Dataset name of the system macro library
user.etottbl	Dataset name of the file containing the customized runtime control table generated by ETOTMAIN from the skeleton table, ETOTTBL
idms.loadlib	Dataset name of the CA IDMS/DB load library

Compiling and Link Editing ETOTLOAD

Use the following JCL to compile and link edit ETOTLOAD.

ETOTLOAD z/OS

```
//*************************************************************
//*  COBOL compile
//*************************************************************
//COMP     EXEC PGM=IKFCBL00,REGION=256K,
//         PARM='DECK,NOLOAD,NOLIB,BUF=50000,SIZE=150K,DMAP,PMAP'
//SYSPRINT DD SYSOUT=*
//SYSLIB   DD DSN=sys1.coblib,DISP=SHR
//SYSUT1   DD UNIT=disk,SPACE=(TRK,(10,5))
//SYSUT2   DD UNIT=disk,SPACE=(TRK,(10,5))
//SYSUT3   DD UNIT=disk,SPACE=(TRK,(10,5))
//SYSUT4   DD UNIT=disk,SPACE=(TRK,(10,5))
//SYSPUNCH DD DSN=&.&cob.,DISP=(NEW,PASS),UNIT=disk,
//            SPACE=(80,(400,40))
//SYSIN    DD DSN=user.etotload,DISP=SHR
//*************************************************************
//*  Link edit the object module created in the COBOL compile
//*************************************************************
//LINK     EXEC  PGM=HEWL,PARM='LIST,XREF,LET,SIZE=512K,96K)'
//SYSPRINT DD SYSOUT=*
//SYSLIB   DD DSN=sys1.coblib,DISP=SHR
//SYSUT1   DD UNIT=disk,SPACE=(TRK,(20,5))
//LIB      DD DSN=idms.loadlib,DISP=SHR
//SYSLMOD  DD DSN=idms.loadlib,DISP=SHR
//SYSLIN   DD DSN=&.&cob.,DISP=(OLD,DELETE)
//         DD DDNAME=SYSIN
//SYSIN    DD *
 MODE RMODE(24),AMODE(24)
 INCLUDE LIB(IDMSDBLU)
 INCLUDE LIB(IDMS)
 INCLUDE LIB(etotsubs)
 ENTRY etotload
 NAME etotload(R)
```

Specifying an Object Library in the LINK Step

In the LIB DD statement, you can specify a CA IDMS/DB object library rather than a load library. If you do this you must include the following statement as part of SYSIN for the LINK step:

```
INCLUDE LIB(IDMSCALC,IDMSUTIL,IDMSALIO)
```

sys1.coblib	Dataset name of file containing COBOL support modules

disk	Symbolic device name
&.&cob.	Punch file containing object code from the COBOL compile step
user.etotload	Dataset name of the file containing the customized loader generated by ETOTMAIN
idms.loadlib	Dataset name of the CA IDMS/DB library containing CA IDMS executable modules
etotsubs	Name of the subschema, as specified in the transparency generator control statements
etotload	Name of the customized load program

Loading the Database with ETOTLOAD

Use the following JCL to execute ETOTLOAD. Output from this step is processed by the FASTLOAD utility.

Note: For more information about the FASTLOAD utility statement, see the *CA IDMS Utilities Guide*.

ETOTLOAD z/OS

```
//*************************************************************
//*  Use ETOTLOAD to create the load file for FASTLOAD
//*  (unloaded Total database is converted to CA IDMS/DB format)
//*************************************************************
//DBL1     EXEC PGM=ETOTLOAD,REGION=512K
//STEPLIB  DD DSN=idms.dba.loadlib,DISP=SHR
//         DD DSN=idms.loadlib,DISP=SHR
//unload   DD DSN=total.data,DISP=SHR
//SYSIDMS  DD *
  DMCL=etotdmcl DBNAME=etotal
/*
//dcmsg    DD DSN=idms.sysmsg.ddldcmsg,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSOUD   DD SYSOUT=*
//SYSOUT   DD SYSOUT=*
//SYSLST   DD SYSOUT=*
//SYSJRNL  DD DUMMY
//RELDCTL  DD DSN=reldctl,DISP=(NEW,CATLG),UNIT=disk,
//            VOL=SER=nnnnnn,
//            DCB=(RECFM=FB,LRECL=60,BLKSIZE=1200),
```

```
//            SPACE=(TRK,(10,10),RLSE)
//SYS002   DD DSN=sortdbl1,DISP=(NEW,CATLG),UNIT=disk,
//            VOL=SER=nnnnnn,
//            DCB=(RECFM=VB,LRECL=150,BLKSIZE=1500),
//            SPACE=(TRK,(10,10),RLSE)
//SYSPCH   DD DSN=sort1,DISP=(NEW,CATLG),UNIT=disk,
//            SPACE=(TRK,1),DCB=BLKSIZE=80,VOL=SER=TECH01
```

idms.dba.loadlib	Dataset name of the CA IDMS/DB library containing the DMCL and the database name table load modules
idms.loadlib	Dataset name of the CA IDMS/DB library containing CA IDMS executable modules
unload	DDname of the file containing data unloaded from the Total database (*total.data*)
total.data	Dataset name of the file containing data unloaded from the Total database
etotdmcl	SYSIDMS parameter specifying the name of the DMCL to be accessed at runtime **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.
etotal	SYSIDMS parameter specifying the name of the database to be accessed at runtime **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.
dcmsg	DDname of the CA IDMS system message area (DDLDCMSG)
idms.sysmsg.ddldcmsg	Dataset name of the CA IDMS system message area (DDLDCMSG)
reldctl	Dataset name for the file containing a control record with information about the subschema, DMCL, and segment to be used with FASTLOAD
disk	Symbolic device name
nnnnnn	Volume serial number of the file
sortdbl1	Output file from ETOTLOAD to be used as input for FASTLOAD
sort1	Punch file for DBL1 step

Assembling the CICS Transparency Interface (ETOTCINT)

For more information about the ETOTCINT syntax, see Runtime Operations Phase (see page 67).

ETOTCINT z/OS

```
//             EXEC HLASMCL
//ASM.SYSLIB   DD  DSN=yourHLQ.CAGJSRC,DISP=SHR
//             DD  DSN=cics.maclib,DISP=SHR
//             DD  DSN=yourHLQ.CAGJMAC,DISP=SHR
//ASM.SYSIN    DD  *
ETOTCINT macro statement
 END
//LKED.SYSLMOD DD DSN=idms.loadlib(etotcint),DISP=SHR
```

yourHLQ.CAGJSRC	Dataset name of the CA IDMS/DB source library
cics.maclib	Dataset name of the CICS macro library
idms.loadlib	Dataset name of the CA IDMS/DB load library
etotcint	Name of the ETOTCINT module

Creating the CICS CA IDMS/DB Interface (IDMSINTC)

Initial Installation

When installing the CA IDMS TOTAL Transparency for the CICS environment, a CICSOPTS module will be assembled and link edited as part of module IDMSINTC. All parameters for CICSOPTS that are required for the TOTAL Transparency will be automatically generated by the CAISAG installation utility when you indicate the product is to be installed, either as part of an integrated solution or as a single product during an ADDON install. The IDMSINTC load module will include all modules specifically required to run the TOTAL Transparency.

Modifying the CICSOPTS

If you need to reassemble CICSOPTS to change any installation options, edit the source in your CUSTOM.SRCLIB member CICSOPTS and the link statements in your CUSTOME.LNKLIB member IDMSINTC.

Important! Be sure PLT entries are created to execute IDMSINTC at CICS startup.

Note: For more information about the CICSOPT macro and its parameters, see the *CA IDMS System Operations Guide*.

Batch Application Program Link Edit

Use this JCL to link edit the compiled Total application program with the ETOTBINT transparency module and the CA IDMS/DB modules IDMSOPTI and IDMS.

BATCH APPLICATION PROGRAM LINK EDIT z/OS

```
//LKEDTOTA EXEC PGM=HEWL,PARM=(XREF,LET,LIST),REGION=256K
//SYSPRINT DD  SYSOUT=A
//SYSUT1   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSLMOD  DD  DSN=idms.loadlib,DISP=SHR
//SYSLIB   DD  DSN=idms.loadlib,DISP=SHR
//userlib  DD  DSN=user.loadlib,DISP=SHR
//SYSLIN   DD  *
 INCLUDE userlib(userprog)
 INCLUDE SYSLIB(ETOTBINT)
 INCLUDE SYSLIB(IDMS)
 INCLUDE SYSLIB(IDMSOPTI)                Optional
 ENTRY userprog
 NAME userprog(R)
/*
```

idms.loadlib	Dataset name of the CA IDMS/DB load library
disk	Symbolic device name of the linkage editor work file
user.loadlib	Dataset name of the user load library containing the batch application program
userlib	DDname of the user load library containing the batch application program
userprog	Name of the Total batch application program

CICS Application Program Link Edit

Use this JCL to link edit the compiled Total application program with the ETOTCINT macro.

CICS APPLICATION PROGRAM LINK EDIT z/OS

```
//LKEDTOTA EXEC PGM=HEWL,PARM=(XREF,LET,LIST),REGION=256K
//SYSPRINT DD  SYSOUT=A
//SYSUT1   DD  UNIT=disk,SPACE=(CYL,(2,2))
//SYSLMOD  DD  DSN=idms.loadlib,DISP=SHR
//SYSLIB   DD  DSN=idms.loadlib,DISP=SHR
//         DD  DSN=cics.loadlib,DISP=SHR
//userlib  DD  DSN=user.loadlib,DISP=SHR
```

```
//SYSLIN   DD  *
 INCLUDE userlib(userprog)
 INCLUDE SYSLIB(etotcint)
 additional INCLUDE statements for CICS interface modules as required:
 ENTRY userprog
 NAME userprog(R)
```

idms.loadlib	Dataset name of the CA IDMS/DB load library
cics.loadlib	Dataset name of the Total CICS load library
disk	Symbolic device name of the linkage editor work file
etotcint	Name of the ETOTCINT module
user.loadlib	Dataset name of the user load library containing the Total CICS application program
userlib	DDname of the user load library containing the CICS application program
userprog	Name of the CICS application program

Runtime JCL

Use the following JCL to execute a Total application program under the central version.

Runtime z/OS

```
//userprog EXEC PGM=userprog
//STEPLIB  DD  DSN=idms.dba.loadlib,DISP=SHR
//         DD  DSN=idms.loadlib,DISP=SHR
//sysctl   DD  DSN=idms.sysctl,DISP=SHR
program input, as required
```

idms.dba.loadlib	Dataset name of the CA IDMS/DB load library containing the DMCL and database name table load modules
idms.loadlib	Dataset name of the CA IDMS/DB load library containing CA IDMS executable modules
idms.sysctl	Dataset name of the SYSCTL file
sysctl	DDname of the SYSCTL file
userprog	Name of the Total application program

To execute Total application programs in local mode, remove the SYSCTL DD statement and insert the following statements after the STEPLIB DD statement:

```
//userdb   DD  DSN=user.userdb,DISP=SHR
additional database file assignments, as required
//sysjrnl  DD  DSN=idms.tapejrnl,DISP=(NEW,KEEP),UNIT=tape
```

userdb	DDname of the CA IDMS/DB database file
user.userdb	Dataset name of the CA IDMS/DB database file
sysjrnl	DDname of the tape journal file
idms.tapejrnl	Dataset name of the tape journal file
tape	Symbolic device name of the tape journal file

Appendix F: z/VSE Job Control Language

This section contains the following topics:

Generate (ETOTMAIN)

The following is the JCL you use to run the transparency generator (ETOTMAIN).

ETOTMAIN (z/VSE)

```
// LIBDEF *,SEARCH=idms.sublib
// DLBL   dcmsg,'idms.sysmsg.ddldcmsg',1999/365,DA
// EXTENT SYSnnn,nnnnnn
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
*
// DLBL IDMSPCH,'user.etotschm',1,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// DLBL SYSPC03,'user.etotsubs',1,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// DLBL SYSPC04,'user.etottbl',1,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// DLBL SYSPC05,'user.etotload',1,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
*
// DLBL SYSIDMS,'#SYSIPT'
// EXEC ETOTMAIN,SIZE=448K
DMCL=etotdmcl
```

```
  FILENAME=SYSPC03 BLKSIZE=80
  FILENAME=SYSPC04 BLKSIZE=80
  FILENAME=SYSPC05 BLKSIZE=80
Input other SYSIDMS parameters, as required
/*
Total DDL source statements
User supplied control statements
ETOTTBL  source statements
ETOTLOAD source statements
/*
```

idms.sublib	The name of the CA IDMS library
dcmsg	Filename of the system message area (*ddldcmsg*)
idms.sysmsg.ddldcmsg	File ID of the CA IDMS system message area (DDLDCMSG)
SYS*nnn*	Logical unit of the volume for which the extent is effective
nnnnnn	Volume serial number
user.etotschm	Dataset name of the file containing the schema source generated by ETOTMAIN. Run this output through the schema compiler (IDMSCHEM).
user.etotsubs	Name of the file containing the subschema source generated by ETOTMAIN. Run this output through the subschema compiler (IDMSUBSC).
ssss	Starting track (CKD) or block (FBA) of the disk extent
llll	Number of tracks (CKD) or blocks (FBA) in the disk extent
nnnnnn	Volume serial number
user.etottbl	Name of the file containing the customized runtime control table generated by ETOTMAIN from the skeleton table, ETOTTBL. Run this output through the assembly and link edit process.
user.etotload	Name of the file containing the customized loader generated by ETOTMAIN from the skeleton loader, ETOTLOAD. Run this output through the COBOL compile and link edit process.
etotdmcl	SYSIDMS parameter specifying the name of the DMCL to be accessed at runtime **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.
SYSIDMS parameters	Parameters you specify to establish a runtime environment. **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

Assembling and Link Editing ETOTTBL

Use the following JCL to assemble and link edit ETOTTBL.

ETOTTBL (z/VSE)

```
// LIBDEF *,CATALOG=user.sublib
// DLBL IJSYSIN,'user.etottbl',1,SD
// EXTENT SYSIPT,nnnnnn
   ASSGN SYSIPT,DISK,VOL=nnnnnn,SHR
// OPTION CATAL,NODECK,NOSYM
 PHASE etottbl,*
// EXEC ASMA90
/*
// EXEC LNKEDT
/*
CLOSE SYSIPT,SYSRDR
```

user.sublib	The name of the user sublibrary
user.etottbl	Name of the file containing the customized runtime control table generated by ETOTMAIN from the skeleton table, ETOTTBL. Run this output through the assembly and link edit process.
nnnnnn	Volume serial number
etottbl	Name of the customized transparency ETOTTBL load module, which replaces the Total DBMOD module

Compiling and Link Editing ETOTLOAD

Use the following JCL to compile and link edit ETOTLOAD.

ETOTLOAD (z/VSE)

```
// LIBDEF *,SEARCH=idms.sublib,CATALOG=user.sublib
// DLBL IJSYSIN,'user.etotload',1,SD
// EXTENT SYSIPT,nnnnnn
   ASSGN SYSIPT,DISK,VOL=nnnnnn,SHR
// OPTION CATAL,NODECK,LIST,NOSYM,NOLISTX
 PHASE etotload,*
// EXEC FCOBOL
```

```
/*
 INCLUDE IDMSDBLU
 INCLUDE IDMS
 ENTRY etotload
/*
// EXEC LNKEDT
/*
CLOSE SYSIPT,SYSRDR
```

idms.sublib	The name of the CA IDMS library
user.sublib	The name of the user sublibrary
user.etotload	Name of the the file containing the customized loader generated by ETOTMAIN
nnnnnn	Volume serial number
etotload	Name of the customized load program **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

Loading the Database with ETOTLOAD

Use the following JCL to execute ETOTLOAD. Output from this step is processed by the FASTLOAD utility.

Note: For more information about the FASTLOAD utility statement, see the *CA IDMS Utilities Guide*.

ETOTLOAD (z/VSE)

```
*
// LIBDEF *,SEARCH=(user.sublib,idms.sublib)
// DLBL   dcmsg,'idms.sysmsg.ddldcmsg',1999/365,DA
// EXTENT SYSnnn,nnnnnn
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
*
// DLBL IDMSPCH,'sort1',0,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,1
// DLBL SYS002,'sortdb11',0,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// DLBL RELDCTL,'reldctl',0,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,5
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
*
```

```
// DLBL unload,'total.data',0,SD
// EXTENT SYSnnn,nnnnnn,,,ssss,llll
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
*
// DLBL SYSIDMS,'#SYSIPT'
// EXEC ETOTLOAD,SIZE=256K
DMCL=etotdmcl DBNAME=etotal
/*
/*
```

idms.sublib	The name of the CA IDMS library
user.sublib	The name of the user sublibrary
dcmsg	Filename of the system message area (*ddldcmsg*)
idms.sysmsg.ddldcmsg	File ID of the CA IDMS system message area (DDLDCMSG)
SYS*nnn*	Logical unit of the volume for which the extent is effective
nnnnnn	Volume serial number of the file
sort1	Punch file for DBL1 step
sortdb11	Output file from ETOTLOAD to be used as input for FASTLOAD
reldctl	File ID for the file containing a control record with information about the subschema, DMCL, and segment to be used with FASTLOAD
nnnnnn	Volume serial number
ssss	Starting track (CKD) or block (FBA) of the disk extent
llll	Number of tracks (CKD) or blocks (FBA) in the disk extent
unload	Filename of the file containing data unloaded from the Total database (*total.data*)
total.data	File ID of the file containing data unloaded from the Total database
etotdmcl	SYSIDMS parameter specifying the name of the DMCL to be accessed at runtime **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.
etotal	SYSIDMS parameter specifying the name of the database to be accessed at runtime **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

Assembling the CICS/Transparency Interface (ETOTCINT)

The following is the JCL you use to assemble the CICS/transparency interface (ETOTCINT).

Note: For more information about the ETOTCINT syntax, see the Runtime Operations Phase (see page 67).

ETOTCINT (z/VSE)

```
*
// LIBDEF *,SEARCH=(idms.sublib)
// DLBL    IJSYSPH,'user.txtfile',0
// EXTENT  SYSPCH,nnnnnn,,,ssss,llll
   ASSGN   SYSPCH,DISK,PERM,VOL=nnnnnn,SHR
// OPTION  DECK,NOLINK,NOEDECK,LIST,NORLD,NOXREF
// EXEC    ASSEMBLY
         PUNCH 'ACCESS SUBLIB=idms.sublib'
         PUNCH 'CATALOG etotcint.OBJ REPLACE=YES'
ETOTCINT macro statements
         END
/*
   CLOSE   SYSPCH,00D
// DLBL    IJSYSIN,'user.txtfile',0
// EXTENT  SYSIPT,nnnnnn
   ASSGN   SYSIPT,DISK,PERM,VOL=nnnnnn,SHR
// EXEC    LIBR,PARM='MSHP'
/*
   CLOSE   SYSIPT,SYSRDR
/*
```

idms.sublib	The name of the CA IDMS library
nnnnnn	Volume serial number
ssss	Starting track (CKD) or block (FBA) of the disk extent
llll	Number of tracks (CKD) or blocks (FBA) in the disk extent
etotcint	Name of the ETOTCINT module
user.txtfile	Intermediate work file output from the assembly step

Creating the CICS CA IDMS/DB Interface (IDMSINTC)

Initial Installation

When installing the CA IDMS TOTAL Transparency for the CICS environment, a CICSOPTS module will be assembled and link edited as part of module IDMSINTC. All parameters for CICSOPTS that are required for the TOTAL Transparency will be automatically generated by the CAIIJMP installation utility when you indicate the product is to be installed, either as part of an integrated base install or as a single product during ADDON install. The IDMSINTC phase will include all of the modules specifically required to run the TOTAL Transparency.

Modifying CICSOPTS

If you need to reassemble CICSOPTS to change any installation options, you can use the source in your CUSTOM.SRCLIB member CICSOPTS and the link statements in your CUSTOM.LNKLIB member IDMSINTC.

Important! Be sure PLT entries are created to execute IDMSINTC at CICS startup.

Note: For information about the CICSOPTS macro and its parameters, see the *CA IDMS System Operations Guide*.

Batch Application Program Link Edit

Use the JCL below to link edit a batch application program.

Batch Application Program Link Edit (z/VSE)

```
// LIBDEF *,SEARCH=(idms.sublib),CATALOG=user.sublib
// OPTION CATAL
 PHASE userprog,*
 INCLUDE userprog
 INCLUDE ETOTBINT
 INCLUDE IDMS
 INCLUDE IDMSOPTI                          Optional
 ENTRY userprog
// EXEC LNKEDT
/*
```

idms.sublib	The name of the CA IDMS library
user.sublib	The name of the user sublibrary
userprog	Name of the Total batch application program

CICS Application Program Link Edit

Use the following JCL to link edit a CICS application program.

CICS Application Program Link Edit (z/VSE)

```
// LIBDEF *,SEARCH=(idms.sublib),CATALOG=user.sublib
// OPTION CATAL
 PHASE userprog,*
 INCLUDE userprog
 INCLUDE etotcint
Additional INCLUDES for CICS interface modules, as required
 ENTRY userprog
// EXEC LNKEDT
/*
```

idms.sublib	The name of the CA IDMS library
user.sublib	The name of the user sublibrary
userprog	Name of the Total CICS application program
etotcint	Name of the ETOTCINT module

Runtime JCL

Use the following JCL to execute a Total application program under the central version.

Runtime (z/VSE)

```
// LIBDEF *,SEARCH=(user.sublib,idms.sublib)
// DLBL sysctl,'idms.sysctl',1999/365,SD
// EXTENT SYSnnn,nnnnnn
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL SYSIDMS,'#SYSIPT'
// EXEC userprog
Optional SYSIDMS parameters
/*
Program input if any
/*
```

user.sublib	The name of the user sublibrary
idms.sublib	The name of the CA IDMS library
sysctl	Filename of the SYSCTL file
idms.sysctl	File ID of the SYSCTL file

SYS*nnn*	Logical unit of the volume for which the extent is effective
nnnnnn	Volume serial number
userprog	Name of the Total application program
SYSIDMS parameters	Parameters you specify to establish a runtime environment. **Note:** For more information about the SYSIDMS parameters, see the *CA IDMS Common Facilities Guide*.

Executing in Local Mode

To execute user application programs in local mode, remove the SYSCTL statements, and insert the following statements before the EXEC *userprog* statement:

```
// DLBL  dcmsg,'idms.sysmsg.ddldcmsg',1999/365,DA
// EXTENT SYSnnn,nnnnnn
// ASSGN SYSnnn,DISK,VOL=nnnnnn,SHR
// DLBL    userdb,'user.userdb',,DA
// EXTENT   SYSnnn,nnnnnn
// ASSGN    SYSnnn,DISK,VOL=nnnnnn,SHR
Additional database file assignments, as required
// TLBL     sysjrnl,'idms.tapejrnl',,nnnnnn,,f
// ASSGN    sys009,TAPE,VOL=nnnnnn
```

dcmsg	Filename of the system message area (*ddldcmsg*)
idms.sysmsg.ddldcmsg	File name of the CA IDMS system message area (DDLDCMSG)
userdb	Filename of the user CA IDMS/DB database file
user.userdb	File ID of the user CA IDMS/DB database file
SYS*nnn*	Logical unit assignment of the user CA IDMS/DB database file
sysjrnl	Filename of the tape journal file
sys009	Logical unit assignment of the tape journal file
idms.tapejrnl	File ID of the tape journal file
nnnnnn	Volume serial number
f	File number of the tape journal file

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