SY33-8564-3
File No. S370-30

Systems

DOS/VS Access Method Services Logic

Program Number 5745-SC-AMS

Release 34

IBM

Fourth Edition (July 1976)

This edition, SY33-8564-3, with Technical Newsletter SN24-5550, applies to Release 34 of DOS/VS, and to all subsequent releases unless otherwise indicated in new editions or technical newsletters. Changes are periodically made to the information contained herein; before using this publication in connection with the operation of IBM systems, consult the *IBM System/370 Bibliography,* GC20-0001, for the editions that are applicable and current.

This edition, SY33-8564-3, is a major revision of SY33-8564-2. Changes and additions to the text and illustrations are indicated by a vertical line to the left of the change.

Summary of Amendments

For a list of changes, see page 15.

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PREFACE

This book describes the internal logic of the routines of Access Method Services and provides diagnostic information. This information is directed to maintenance personnel and development programmers who require an in-depth knowledge of the program's design, organization, and data areas. It is not required for effective use of Access Method Services.

You should be familiar with general programming techniques, DOS/VS VSAM concepts and use, and System/370 before reading this book. If you are unfamiliar with these concepts, read:

- *DOS/VS Access Method Services User's Guide,* GC33-5382, which describes the general syntax of the Access Method Services language, the commands of this processor, and how they are used.
- *DOS/VS Data Management Guide,* GC33-5372, which describes the use of VSAM.

Other books that may be helpful to you are:

- *DOS/VS Serviceability Aids and Debugging Procedures,* GC33-5380, which describes how to analyze a main storage dump from DOS/VS.
- *DOS/VS LIOCS Volume 4, VSAM Logic,* SY33-8562, which describes the internal workings of VSAM. VSAM Catalog Management is included in this book.
- *Guide to PL/S II,* GC28-6794, which helps interpret the microfiche listings. The microfiche listings contain both the PL/S and assembly source code.

This book is divided into six chapters:

- "Introduction" describes the design philosophy of this processor, and defines terms used later in the book.
- "Method of Operation" describes how the program works. Emphasis is on the flow of data and the technology that is used rather than on the organization of modules.
- "Program Organization" shows how the processor is packaged into load modules. Relationships between the Access Method Services processor and the operating system are given.
- "Microfiche Directory" relates the information in this book to the listings found on microfiche.
- "Data Areas" describes the control blocks and other data areas that are internal to this processor.
- "Diagnostic Aids" shows how to analyze a dump of the processor and find specific modules and data areas.

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ILLUSTRATIONS

Figures

Diagrams

Summary of Amendments

DOS/VS Release 34

This revision reflects the availability of DOS/VS Release 34 and includes:

- Tape Processing Improvements
- Page Length Improvements
- User-Supplied Print Chain/Train Support

In addition, the manual has been updated to reflect maintenance-type corrections and clarifications.

Tape Processing Improvements

Options to process unlabeled tapes or to suppress rewind or to rewind/unload tapes for an OPEN, CLOSE, and EOV condition have been added to the tape processing commands.

Note for IMPORTRA and EXPORTRA: Prior to Release 34, IMPORTRA and EXPORTRA were the only tape processing commands that rewound a tape on an OPEN, CLOSE, and EOV condition. Starting with Release 34, IMPORTRA and EXPORTRA are consistent with the other tape processing commands.

Page Length Improvements

The user can now specify any value (between 30 and 99) for the number of lines to be printed on each page of SYSLST.

User-Supplied Print Chain/Train Support

Support for previously nonsupported print chains/trains (such as the KATAKANA print chain/train) is now provided.

DOS/VS Release 33

This revision reflects the availibility of DOS/VS Release 33 and includes support for:

- Catalog Recovery II (RESETCAT)
- New LISTCAT Format
- ALTER Error Checking
- CBMM Removal
- Error Message Enhancements

Each of these affects one or all of the sections in the manual: method of operation, microfiche directory, data areas, and diagnostic aids (in particular, trace and dump points, error codes and message–to–module cross reference).

In addition, the manual has been updated to reflect maintenance–type corrections and clarifications.

Catalog Recovery II (RESETCAT)

A new Access Method Services command, RESETCAT, can be used to recover catalogs. It allows a user to synchronize a catalog to the level of its owned volumes.

New LISTCAT Format

LISTCAT output is now printed in a new tabular format to improve readability.

ALTER Error Checking

Additional error checking is performed by ALTER to detect imcompatibilities between the object to be altered and the attributes specified in the command.

CBMM Removal

Control block manipulation macros for generating, modifying, testing and displaying the ACB, RPL, and EXLST control blocks are no longer used during OPEN/CLOSE processing. (Their use in GET/PUT and POINT operations was removed in the previous release.) Access Method Services now processes these VSAM control blocks directly.

Error Message Enhancements

Catalog errors were previously reported to the user through a message which contained a return code and a reason code which the user was obliged to look up in a manual. This improvement provides the user with prose messages to explain error codes from VSAM catalog management.

DOS/VS Release 31

This revision reflects the availability of DOS/VS Release 31 and includes support for:

- Alternate Indexes
- Relative Record Files
- Spanned Records
- User Catalogs
- Catalog Recovery
- Reusable Files
- Miscellaneous Enhancements

Each of these affects one or all of the sections in the manual: method of operation, microfiche directory, data areas (mostly for new or changed Function Data Table—FDTs), and diagnostic aids (in particular, trace and dump points, error codes, and message-to-module cross reference).

Alternate Indexes

Alternate indexes have been added for key-sequenced and entry-sequenced files to provide alternate paths through which to gain access to data. They change the method of operation diagrams for DEFINE CLUSTER, ALTER, DELETE, EXPORT, IMPORT and LISTCAT and add diagrams for the new commands, DEFINE ALTERNATEINDEX, DEFINE PATH, and BLDINDEX.

Relative-Record Files

The relative-record file brings to three the number of VSAM files. It changes the method of operation diagram for DEFINE CLUSTER, PRINT, REPRO and I/O Adapter.

Spanned Records

A record in a key-sequenced or entry-sequenced file is no longer limited by control-interval size, but can span control intervals. Spanned records change the method of operation diagram for DEFINE CLUSTER.

User Catalogs

User catalogs have been added for increased data integrity and for volume portability between systems. They have added a method of operation diagram for the new command, DEFINE USERCATALOG.

Catalog Recovery

The user can specify when he defines a catalog that a catalog recovery area (CRA) is to be built for it. A CRA contains information that can be used to recover a damaged catalog. Catalog recovery changes the method of operation diagrams for DEFINE MASTERCATALOG and DEFINE USERCATALOG. It adds diagrams for the new commands, LISTCRA, EXPORTRA, and IMPORTRA.

Reusable Files

Files defined as reusable can be reused without deleting and redefining them. They change the method of operation diagram for DEFINE CLUSTER.

Miscellaneous Enhancements

Relatively minor changes have been incorporated into several Access Method Services functions. DEFINE includes default key and record size values and supports an exception exit. REPRO permits copy operations into nonempty key-sequenced files. IMPORT supports import operations into empty files. EXPORT allows a variable blocksize for portable files.

INTRODUCTION

Access Method Services is that part of the operating system that performs the utility-like functions required to establish and manage VSAM (Virtual Storage Access Method) data sets. (The terms "data set" and "file" are equivalent. We have used "data set" in this book.) Access Method Services allows you to define, print, delete, or copy VSAM data sets, build alternate indexes, recover data and catalog entries in the event of a catalog failure, convert ISAM or SAM data sets into VSAM data sets, alter or list the entries in a VSAM catalog, and create portable (or backup) copies. Features of its logic are:

- The processor is organized into *executable* and *non-executable* modules. An executable module contains instructions that can be performed by the computer. A non-executable module contains nothing that can be performed by the computer. In Access Method Services all descriptive information—such as, command descriptors—and static text— such as, messages—are centralized in non-executable modules. (In Access Method Services, there is generally a one to one correspondence between modules and phases. Consequently, this publication generally discusses modules. One exception is IDCAMS. For more information on IDCAMS, see "Program Organization.")
- All external interfaces to Access Method Services are isolated in a small set of modules. Changing these modules allows this processor to run with another operating system or with access methods other than those supported by this release of Access Method Services.
- Each module serves just one purpose and is coded to most efficiently accomplish that purpose.

This book does not discuss VSAM, its concepts, or its data areas. For a discussion of VSAM, see the publication *DOS/VS LIOCS Volume 4, VSAM Logic.*

The Access Method Services processor accepts commands and sometimes input data sets or catalogs. It produces output data sets and/or printed reports. Details of the commands and the use of Access Method Services are found in *DOS/VS Access Method Services User's Guide.*

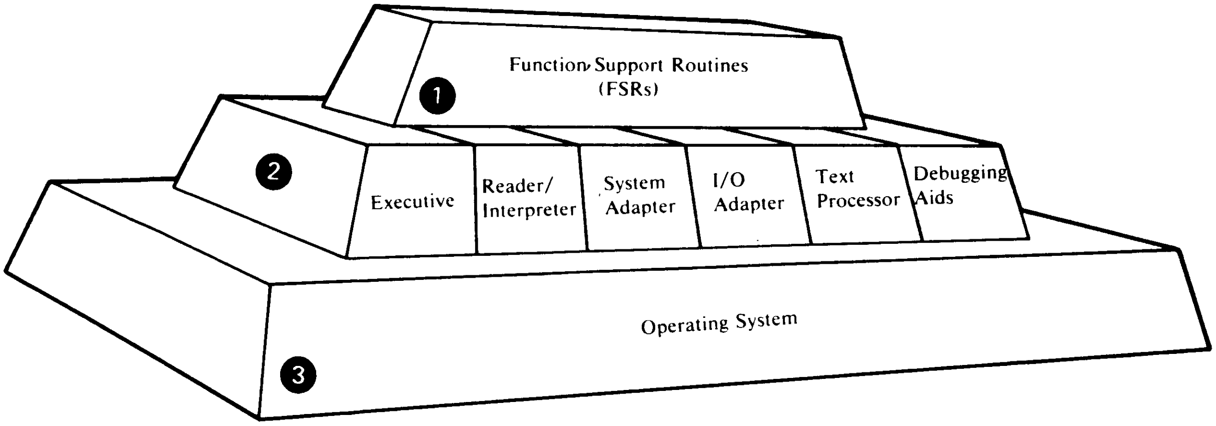
Requirements

This processor requires DOS/VS as its operating system. The processor executes as a problem program. Virtual storage requirements for the processor are found in *DOS/VS System Generation,* GC33-5377.

The Access Method Services Processor

Figure 1 describes the structure of the processor. Figures 2 through 4 describe in general how the processor functions.

Figure 1 shows the executable elements of the Access Method Services processor as they form a structure within the operating system. As shown here, six of the elements form a "substructure" that supports the remaining elements, which form a "superstructure."



1. The superstructure consists of the *FSRs* (Function Support Routines). There is one FSR for each command verb of Access Method Services. Any system interface or I/O function that is required by one of the FSRs is supplied through the substructure. The superstructure is thus insulated from the operating system by the substructure.
2. The substructure consists of the *Executive,* the *Reader/Interpreter,* the *System Adapter,* the *I/O Adapter,* the *Text Processor,* and the *Debugging Aids.* The Executive routes control between the other components of Access Method Services—specifically, between the Reader/Interpreter and the FSRs. The Reader/Interpreter translates the commands for Access Method Services into an internal form, called the FDT (Function Data Table). The System Adapter similarly provides *all* system interfaces for the processor. The I/O adapter issues *all* I/O operations at the behest of any other routine in Access Method Services. The Text Processor prepares *all* printed materials, whether simple messages or listings, that are required to fulfill a command. The Debugging Aids writes diagnostic information when requested.
3. The operating system supports the Access Method Services processor, just as the substructure supports the superstructure (the FSRs). However, the FSRs execute in total independence of the actual operating system in which Access Method Services is running. All requests for system services or I/O are made to the substructure, which receives the request and issues the appropriate request to the operating system. Thus additional access methods can be easily supported by Access Method Services, by merely augmenting the I/O Adapter appropriately. Access Method Services can be run in a different host operating system by changing the System Adapter and the I/O Adapter to match the new host.

Figure 1. The Structure of the Access Method Services Processor

Following the flow of logic reveals more of the processor than the structure of executable modules. Figure 2 and the two which follow show the sequence in which modules execute, important internal tables, and how non-executable modules are used.

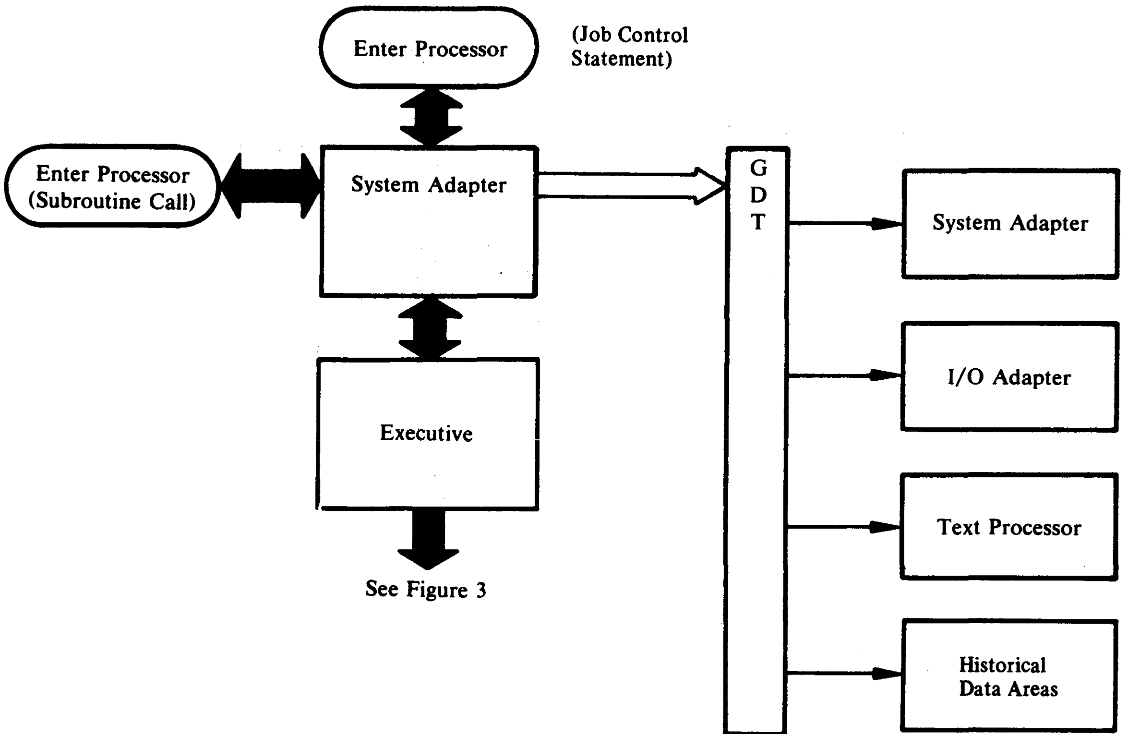


Figure 2. Initialization of Access Method Services

The System Adapter is the external entry and exit point for Access Method Services. At entry time, the *GDT* (Global Data Table) is built by the System Adapter. The GDT is always passed as a parameter when any internal module is called, and through the GDT can be found the entry point for any service supplied by the substructure. The GDT contains the addresses for the various services provided by the System Adapter, the I/O Adapter, and the Text Processor. The GDT also points to historical data areas that are built and maintained by various processor substructure modules.

Control passes from the initialization effected by the System Adapter to the Executive. Figure 3 shows this transfer of control, and details the parsing operation of the processor.

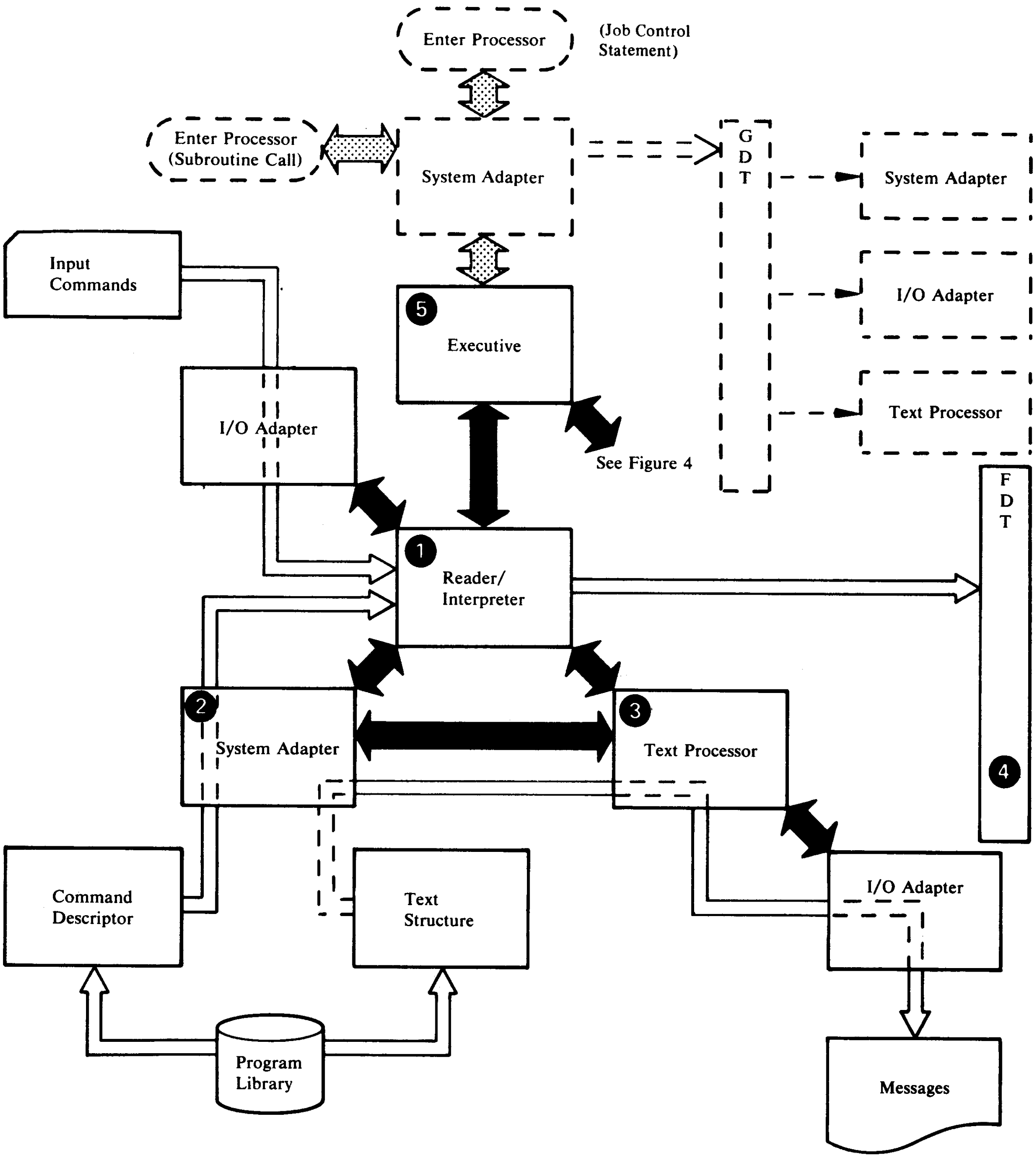
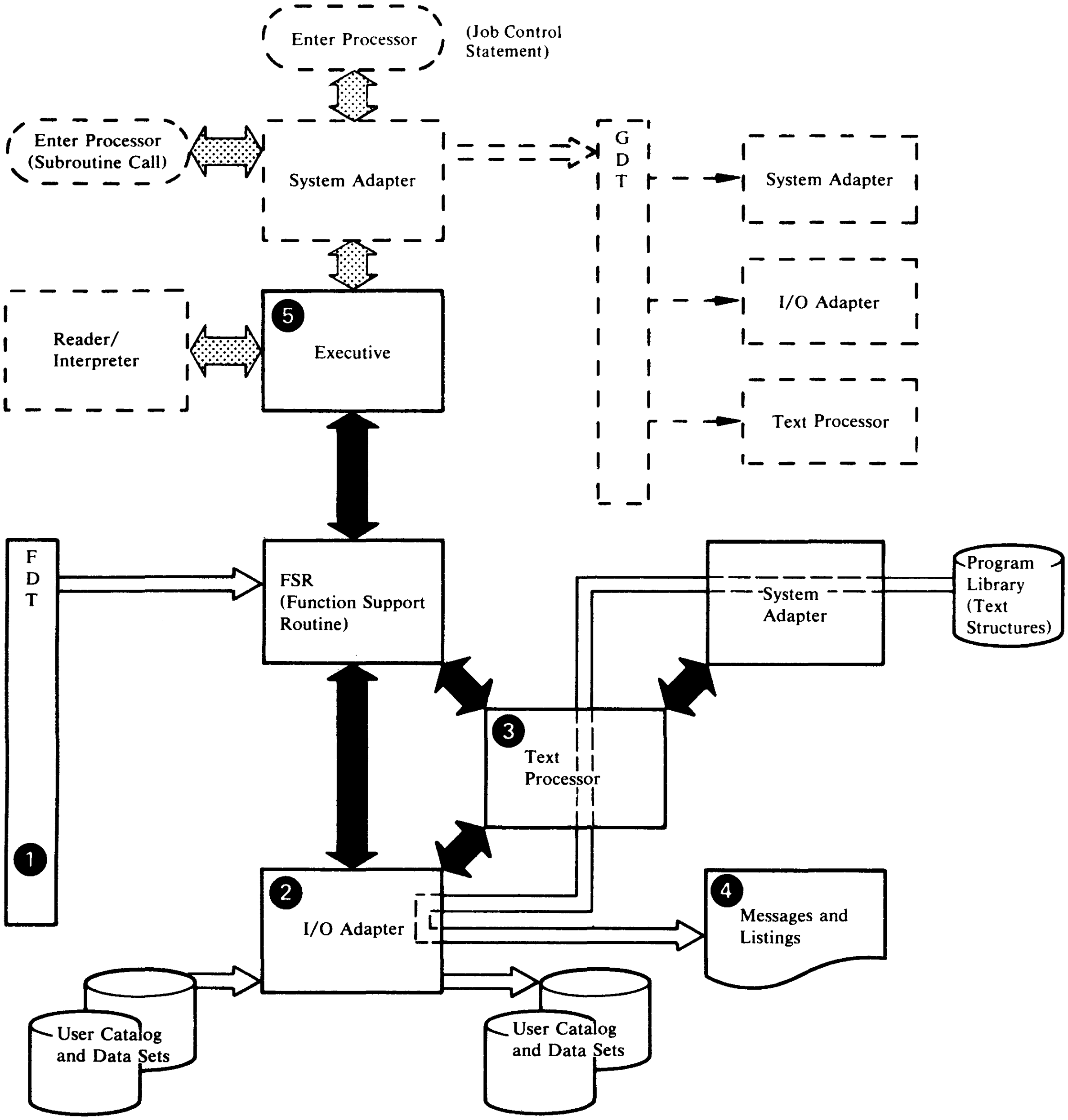


Figure 3 (Part 1 of 2). Reading and Parsing a Command

1. The Executive calls the Reader/Interpreter, which reads a command from the input stream. The I/O Adapter performs the actual read at the behest of the Reader/Interpreter; the address for the "get" service is found in the GDT.
2. To parse the command, the Reader/Interpreter compares it against a special table called a Command Descriptor. This Command Descriptor forms a non-executable phase, and is loaded from the core image library by a service of the System Adapter. There is a Command Descriptor for each possible verb to be recognized by Access Method Services. This Command Descriptor specifies each possible keyword, its permitted range of values, and any other information that is needed to parse and interpret the command.
3. As a command is parsed, certain messages may be issued. To format these messages, the Text Processor is invoked (again through the GDT). The Text Processor determines the format of printed material and the text of fixed messages by using Text Structures. These Text Structures are also non-executable phases (loaded by the System Adapter when needed), and they describe page layout, static portions of the text, headings, footings, and other details of the printed page. Once a line of message is formatted, the I/O Adapter writes the line to the print file.
4. As a command is parsed, the Reader/Interpreter builds an FDT (Function Data Table) from the values that it finds. The FDT is an encoded representation of the user's command. The FDT is passed back to the executive as the results of the parse. The Executive in turn passes the FDT to the appropriate FSR for processing.
5. Control returns to the Executive, along with the FDT and the name of the FSR needed to process this command. Figure 4 depicts the FSR in action.

Figure 3 (Part 2 of 2). Reading and Parsing a Command



1. The command at this point in time is described in the FDT. The FDT is an internal encoding of the original command, in a rigorous format with the values for all possible parameters in a prescribed order.
2. Any data sets or user catalogs required for this particular function are accessed through the I/O Adapter. The address of this service is found in the GDT.
3. Any printed output is prepared by the Text Processor, whose addresses are also found in the GDT. Static text and page layout instructions are found in the Text Structures, which are loaded by the System Adapter.
4. Finally, all output is produced by another of the services of the I/O Adapter.
5. Control returns to the Executive. If more commands remain, the Reader/Interpreter repeats its procedure, followed by the appropriate FSR. Control is routed back and forth between the Reader/Interpreter and the FSRs by the Executive in this fashion until all commands have been processed.

Figure 4. Performing a Function

Naming Conventions

The Access Method Services processor is named IDCAMS. The names of all modules that form this processor are seven or eight characters long, and begin with the characters IDC. The remaining characters of the name relate to its use. Executable modules and Command Descriptors have seven-character names, while Text Structures have eight-character names.

The modules of the processor are grouped by their functional relationship. Each of these relationships is indicated by a two-character mnemonic identifier, which appears as characters 4 and 5 of the module name. These identifiers are listed in the following table:

AL	ALTER FSR	PM	PARM FSR
BI	BLDINDEX FSR	PR	PRINT FSR
CD	Command Descriptor	RC	EXPORTRA FSR
DB	Debugging Facility	RI	Reader/Interpreter
DE	DEFINE FSR	RM	IMPORTRA FSR
DI	NonVSAM Access Method macros	RP	REPRO FSR
DL	DELETE FSR	RS	RESETCAT FSR
EX	Executive	SA	System Adapter
IO	I/O Adapter	TP	Text Processor
LC	LISTCAT FSR	TS	Text Structure
LR	LISTCRA FSR	VY	VERIFY FSR
MP	IMPORT FSR	XP	EXPORT FSR

The remaining characters of a module name indicate the function of that module. Two numeric digits are used for the name of a module and the entry point of a single-entry module. Two alphabetic characters indicate an entry point in a multiple-entry module. Thus the name "IDCPR01" is the name of the first module for the PRINT FSR, and "IDCPR01" is the only entry point to that module. "IDCSA02" is the second module for the System Adapter, and "IDCSAGS" is the entry point in that module for the "get space" service.

The last two characters of a Command Descriptor are the mnemonic identifier for the FSR for that Command Descriptor. Similarly, Text Structure names end with the FSR mnemonic identifier and a single digit (to allow for multiple Text Structures per FSR). For example the three modules for PRINT are:

IDCPR01	PRINT FSR module
IDCCDPR	PRINT Command Descriptor
IDCTSPR0	First Text Structure for PRINT

Names for processor-wide data structures and fields are six characters long. The first three characters identify the structure. The last three characters indicate the function of the field. (In this publication, the data areas are often referred to by the first three characters.) Values for a field (for example, a bit in a flag field) have names that are eight characters long. The last two characters of a value indicate the meaning of that value. For example, "IOCDSO" is a field of the I/O Communications Structure that defines the data set organization. One of its bits is named "IOCDSOAM," which means that this bit signifies a VSAM organization.

Local names used internally by only one subcomponent follow no processor-wide conventions.

Character Code Dependencies

Most of the character dependencies of this processor are isolated in the Command Descriptor modules and the Text Structure modules. For example, all input text is translated by referring to the Command Descriptor modules, and all output text is controlled by the Text Structure modules and a parameter defining the output graphics.

Most of the executable modules of the processor have no character dependencies. However, some modules of the Reader/Interpreter and the Text Processor have character dependencies. Such character dependencies are identified in the prologue of each module.

The character set used at execution time must be equivalent to that used during assembly of the character-dependent modules. The IBM-supplied version of these modules assumes EBCDIC character representations. If a different character representation is to be used during execution, then the character-dependent modules must be re-assembled.

METHOD OF OPERATION

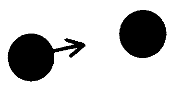
This chapter contains method of operation diagrams for each element within the substructure and superstructure of Access Method Services. Following each diagram is an extended description of the processing steps and the name of the modules and procedures used to perform each step within the diagram. Using these names, you can go either to the chapter "Microfiche Directory" or to the microfiche itself for more information.

The following legend explains the symbols used throughout this chapter.


Data flow


Flow of control, entry and exit points


Data flow when existing data has been altered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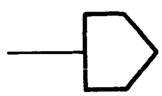
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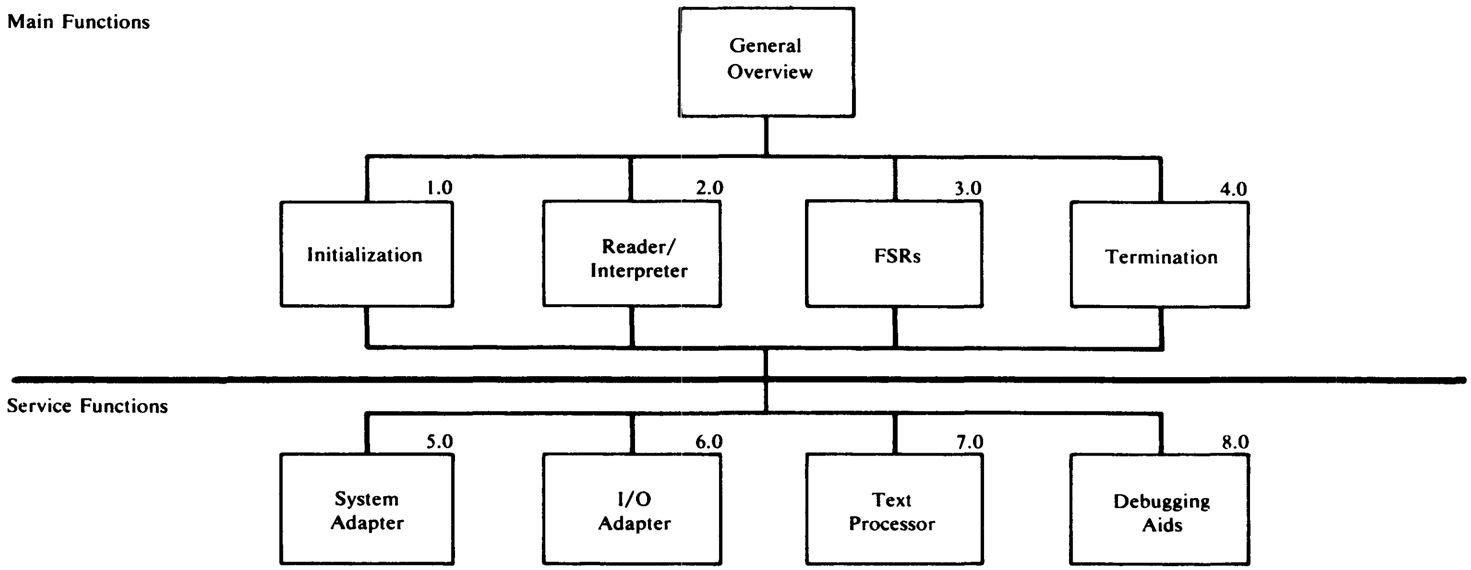
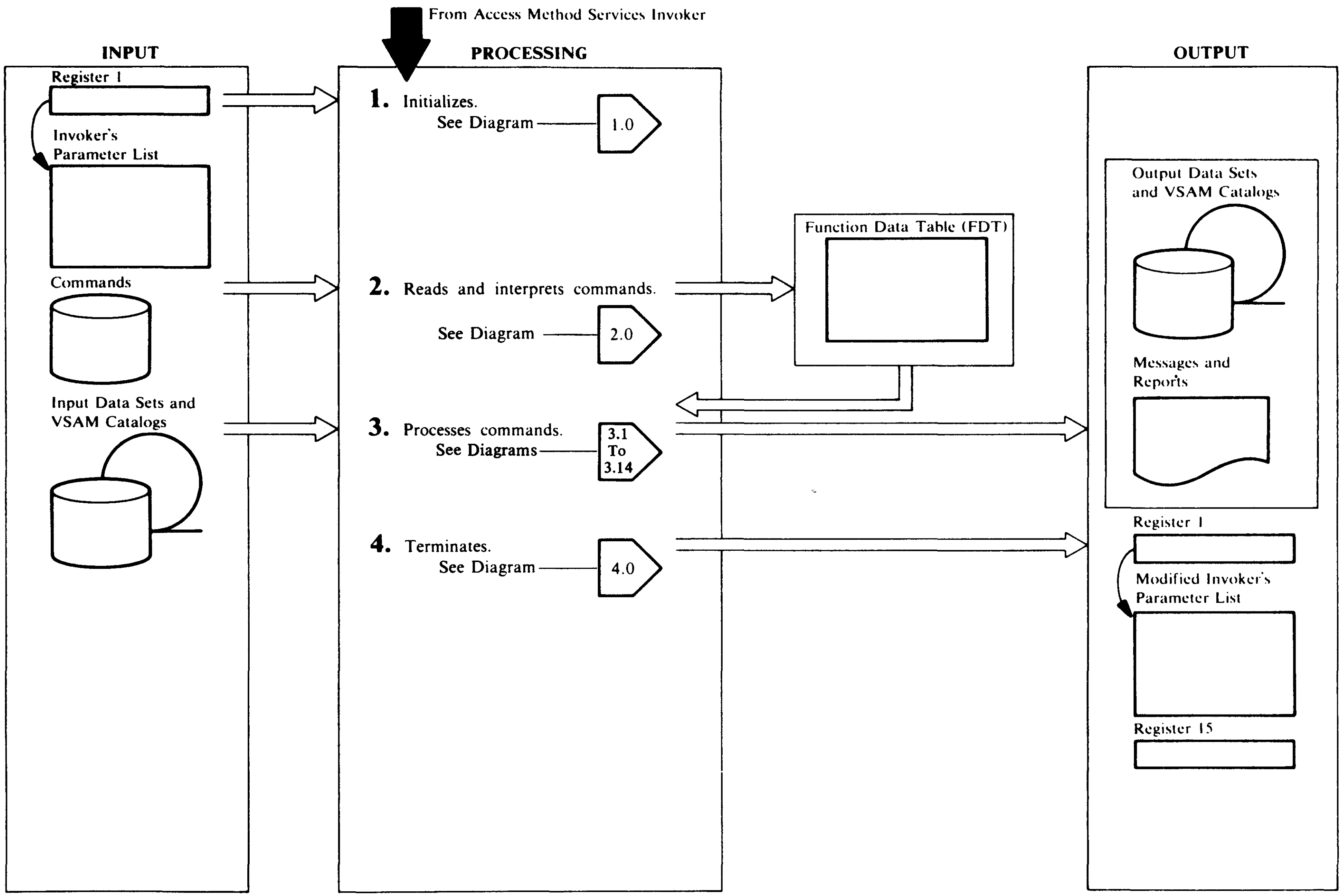
Pointer to more information

Access Method Services Visual Table of Contents



Access Method Services Overview



Initialization Visual Table of Contents

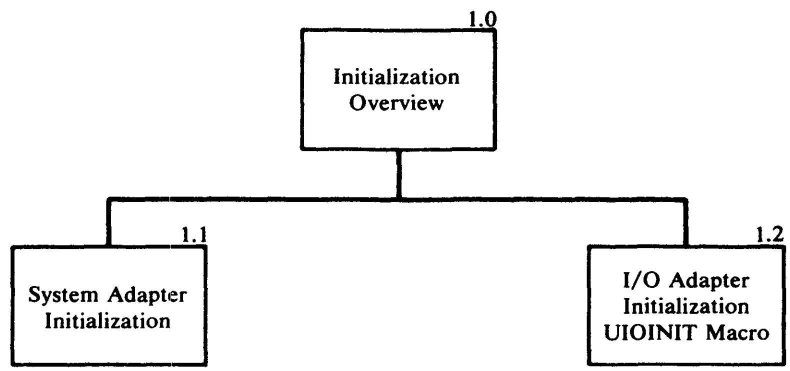


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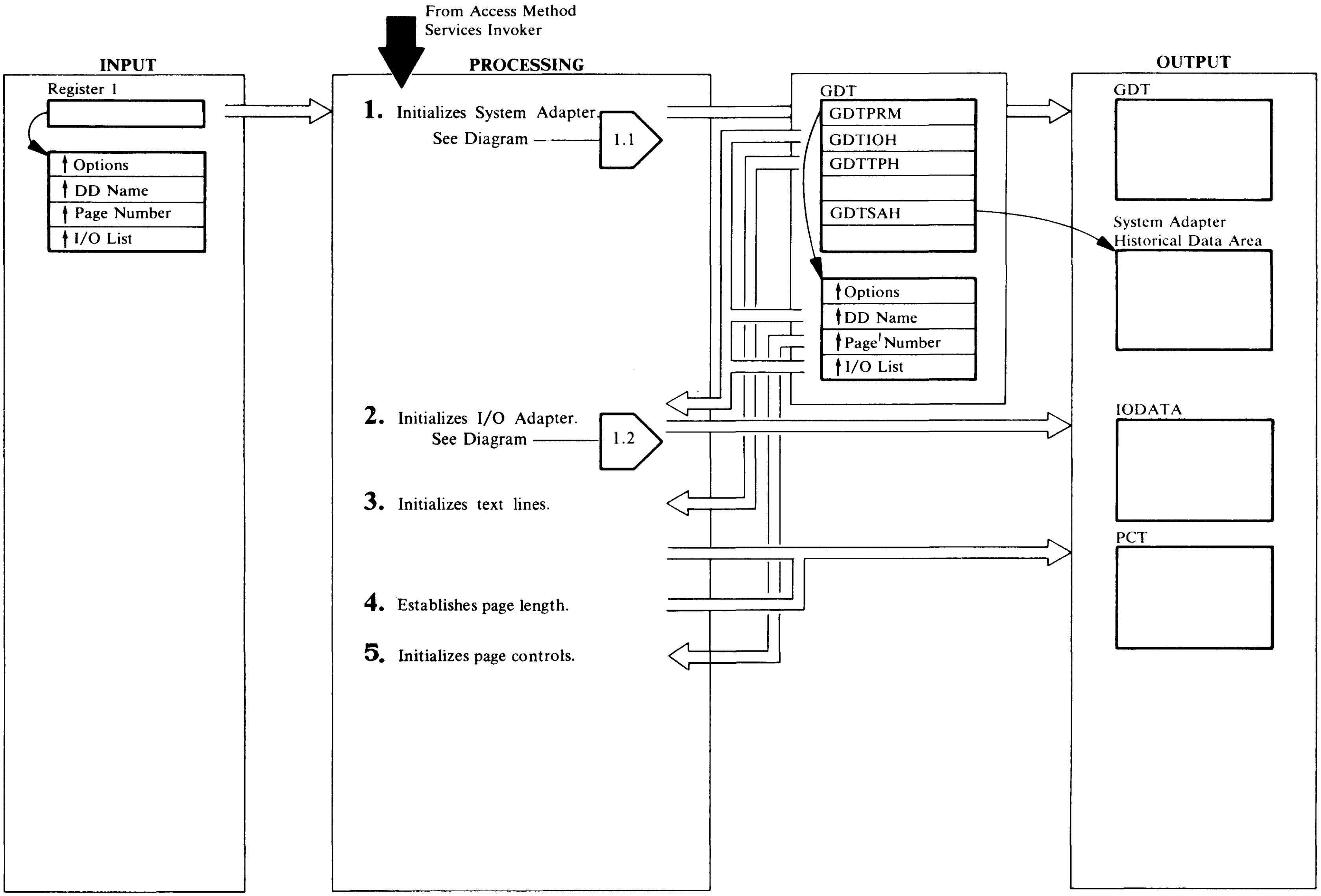
Diagram 1.0. Access Method Services Initialization Overview



Extended Description Diagram 1.0

IDCSA01

Procedure: IDCSA01

1 The System Adapter receives control from the invoker from either an EXEC statement or from a program. The System Adapter sets up the GDT, trace tables, and the System Adapter Historical Data Area. The System Adapter obtains storage for modules that are continuously used such as the System Adapter and the I/O Adapter. Diagram 1.1 shows System Adapter initialization in detail.

IDCEX02

Procedure: IDCEX02

2 IDCEX02 issues the UIOINIT macro to cause the I/O Adapter to initialize. The I/O Adapter initializes its Historical Data Area. IDCIOIT saves the addresses of alternate DD name list if supplied by the invoker. Diagram 1.2 shows I/O Adapter initialization in detail.

IDCEX02

Procedure: IDCEX02

3 IDCEX02 issues a UESTS macro instruction to set up the Print Control Table, PCT. The address for the Text Processor Historical Data Area is in the GDTTPH field of the GDT. Since GDTTPH contains zero, the text processor builds the primary PCT.

IDCEX02

Procedure: IDCEX02

4 IDCEX02 issues a COMRG macro instruction to get the address of the partition communication region. It then extracts the value of "SYSLST lines per page" from displacement 78 and uses this value in a UREST macro instruction to establish the SYSLST page depth.

IDCEX02

Procedures: IDCEX02, SCANPARM

5 If the invoker supplied a starting page number in the parameters, IDCEX02 issues a UREST macro instruction to set the page number. Control is given to the R/I to process the input as well as any parameters supplied on the EXEC statement that invoked Access Method Services.

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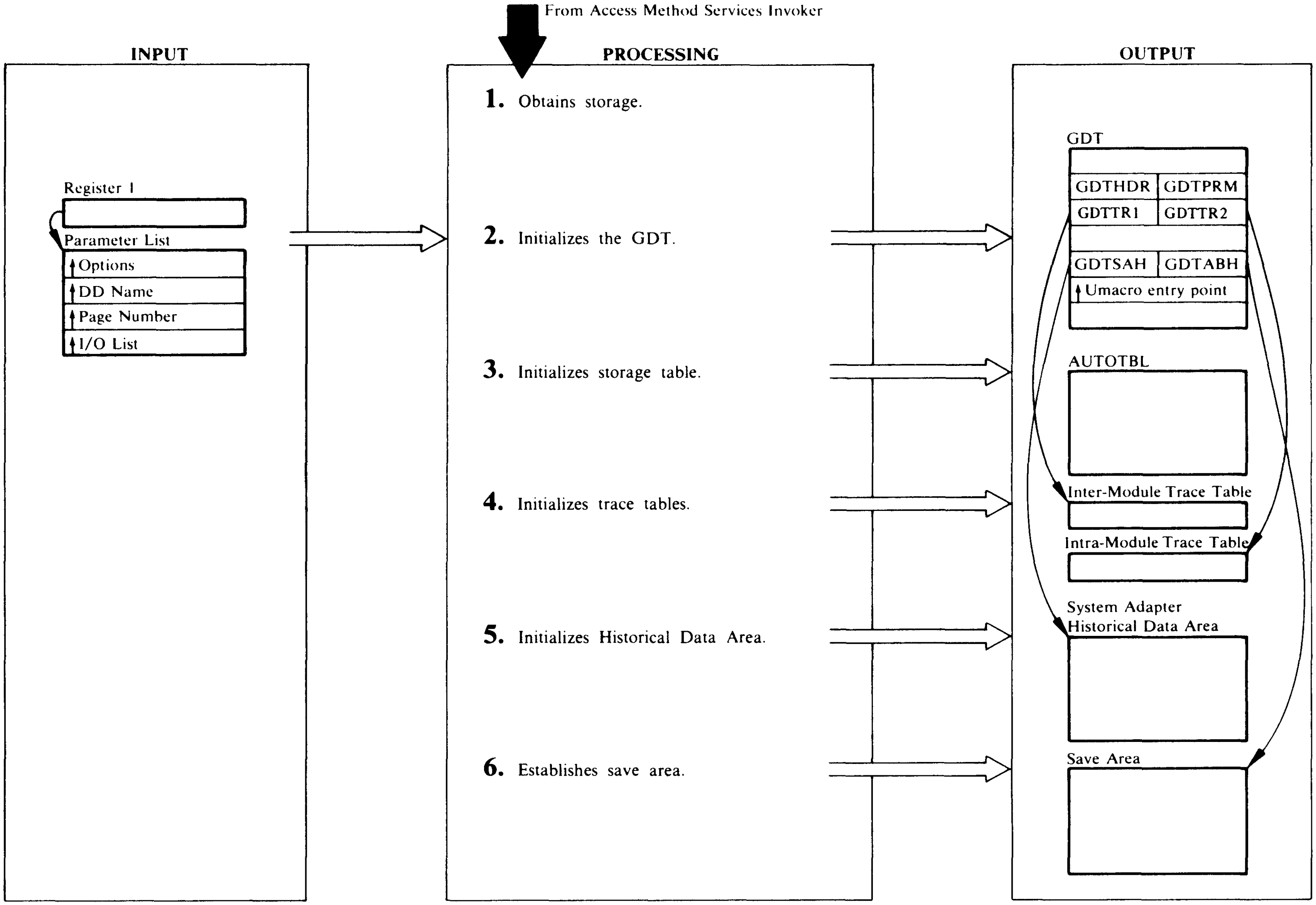
Diagram 1.1. System Adapter Initialization



Extended Description for Diagram 1.1

IDCSA01

Procedure: IDCSA01

1 IDCSA01 issues a GETVIS instruction to obtain space for the following tables:

- Global Data Table, GDT
- Inter-Module-Trace Table
- Intra-Module-Trace Table
- System Adapter Historical Data Area
- Storage Table, AUTOTBL

If the initial GETVIS fails, IDCSA01 issues an ABOR and returns to the invoker of Access Method Services.

IDCSA01

Procedure: IDCSA01

2 IDCSA01 puts the chatacters 'GDTƀ' in the first four bytes of the GDT. It puts the address of the invoker's parameter list, which is in Register 1, in the GDTPRM field of the GDT. IDCSA01 puts the address of the System Adapter Historical Data Area in GDTSAH. It also puts the address of the Inter-Module-Trace Table in GDTTR1 and the address of the Intra-Module-Trace Table in GDTTR2. IDCSA01 puts the address of the System Adapter save area in GDTABH. Additionally it puts addresses for the processor-defined macro instructions, called U-macros, in the GDT. All remaining fields of the GDT contain zeros.

IDCSA01

Procedure: IDCSA01

3 Rather than obtaining new storage each time IDCSA02, IDCSA03, IDCTP01, or IDCIO01 is called, the System Adapter issues one GETVIS macro for each module and saves the storage address in the Storage Table, AUTOTBL. When one of the modules is called, it calls the PROLOG routine that returns the address of the storage obtained for the module during System Adapter initialization. The storage address for IDCSA03, however, is kept in the GDTSPR field of the GDT because IDCSA03 contains the PROLOG routine code and needs to get its storage without using the PROLOG routine.

IDCSA01

Procedure: IDCSA01

4 IDCSA01 initializes the Inter- and Intra-Module-Trace tables to blanks. It places the characters 'ƀINTERƀƀ' and 'ƀINTRAƀƀ' before the respective tables. It also puts the characters 'SA01' in the Inter-Module-Trace Table and in the save area provided by the Access Method Services invoker.

IDCSA01

Procedure: IDCSA01

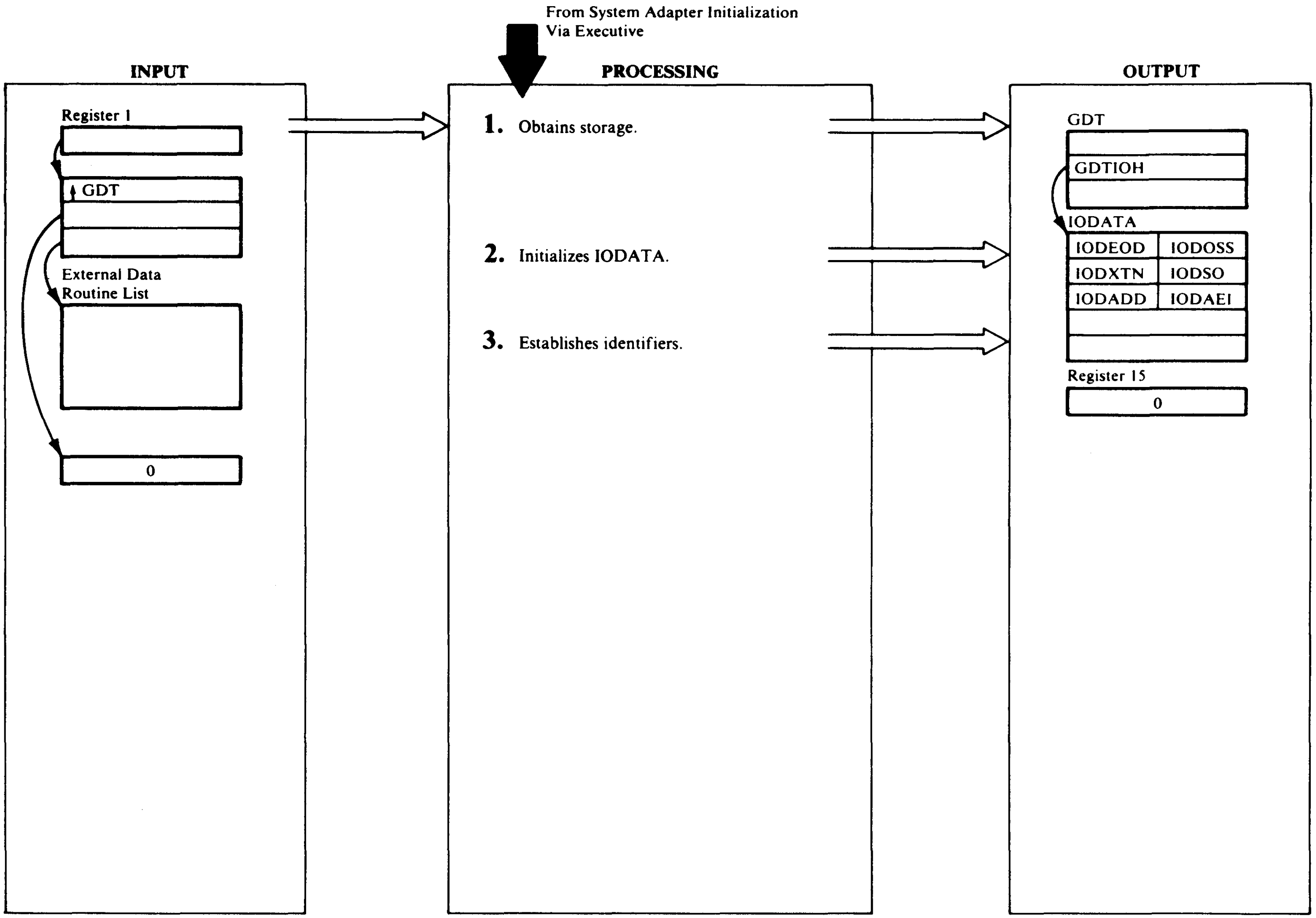
5 IDCSA01 sets the first UGPOOL storage area pointer in the System Adapter Historical Data Area to zero. It sets the last UGPOOL storage area pointer to the address of the first UGPOOL area pointer.

IDCSA01

Procedure: IDCSA01

6 The System Adapter saves the current values of its registers in a save area pointed to by the GDTABH field in the GDT. The UABORT routine uses the register values to establish addressability before processing. Control goes to Diagram 1.0, step 2.

Diagram 1.2. I/O Adapter Initialization – UIOINIT Macro



Extended Description for Diagram 1.2

IDCIO01

Procedure: IDCIOIT

1 The I/O Adapter issues a UGPOOL to obtain storage for its Historical Data Area—IODATA. IDCIOIT puts the IODATA address in the GDTIOH field in the GDT. If storage is not obtained from either UGPOOL, the I/O Adapter issues a UABORT to terminate the processor.

IDCIO01

Procedure: IDCIOIT

2 The I/O Adapter initializes IODATA. If the Access Method Services invoker supplied filenames for the system data sets, IDCIOIT puts the address of those filenames in the IODADD field of IODATA (this code is for compatibility with OS/VS; alternate filenames for system data sets cannot be used in DOS/VS). If the invoker supplied the address a list of his own I/O programs, IDCIOIT puts that address in IODXTN. IDCIOIT puts the address of the Access Method Services End-of-Data routine in IODEOD. It puts the address for a synad routine for nonVSAM input data sets in IODOSS and the address for a synad routine for nonVSAM output data sets in IODSO. It also puts the address of the End-of-Data routine for VSAM data sets in IODAEI.

IDCIO01

Procedure: IDCIOIT

3 IDCIOIT initializes the IODSID to the characters 'IO00'. The I/O Adapter uses this identifier to keep track of data sets. UOPEN gives the first data set the I/O Adapter is required to open the identification of IO01, the second IO02, and so on. The identification appears at the beginning of the storage area for each data set. IDCIOIT puts a return code of zero in Register 15 and gives control to Diagram 1.0, step 3.

Text Rearranged Only

Reader/Interpreter Visual Table of Contents

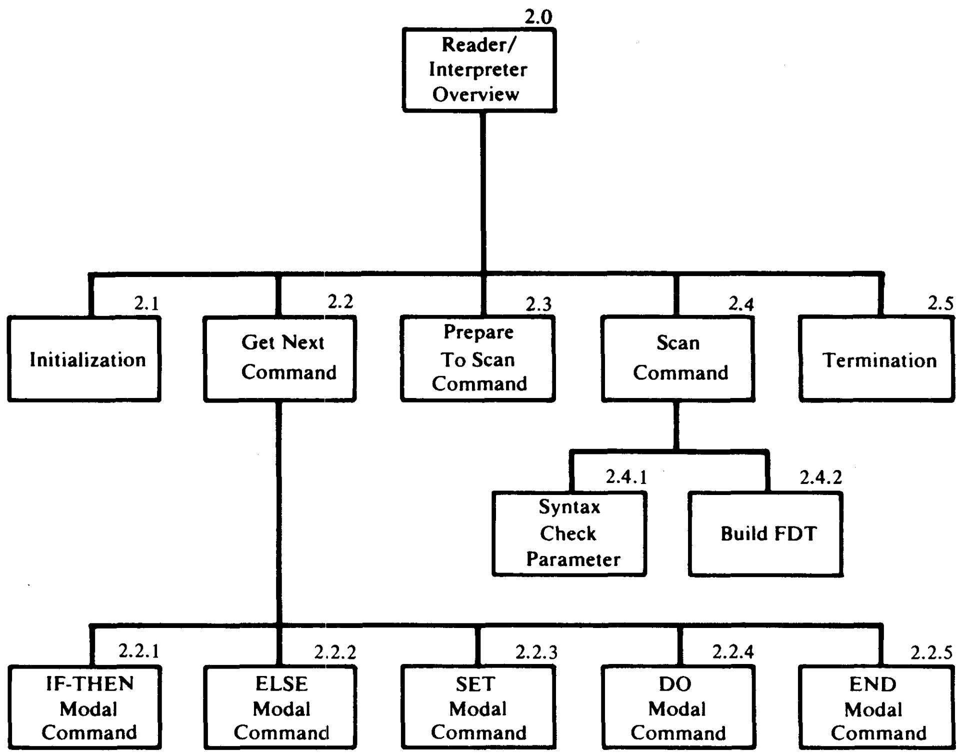
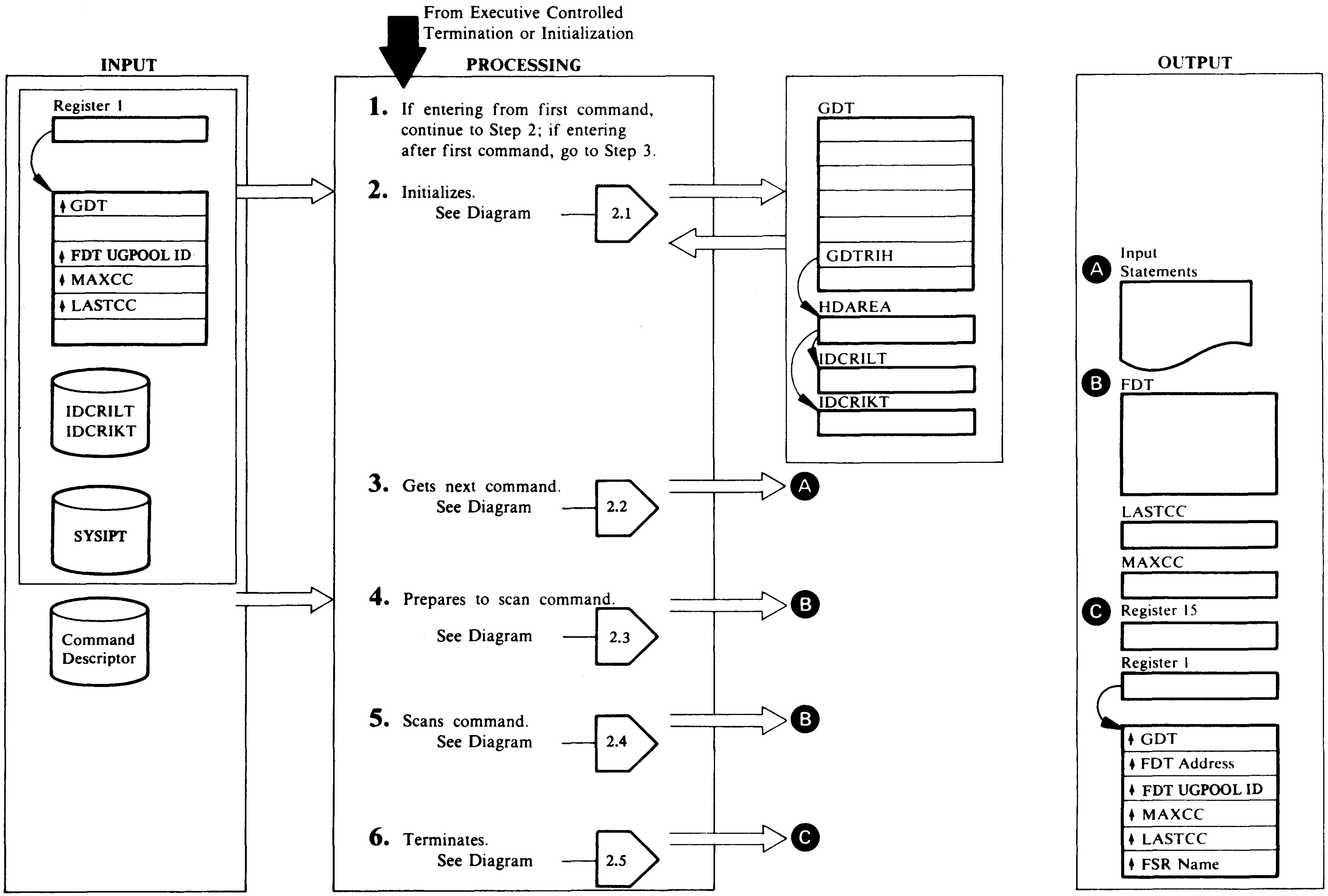


Diagram 2.0. Reader/Interpreter Overview



Extended Description for Diagram 2.0

IDCRI01

Procedure: RIINIT

1 If entrance is from Initialization, processing continues with step 2. If entrance is from Executive Controlled Termination, processing continues with step 3.

2 RIINIT initializes the Reader/Interpreter Historical Data Area, HDAREA. RIINIT loads the command descriptor name table, IDCRILT, and the modal command name table, IDCRIKT. RIINIT opens the input data set, SYSIPT, and RIINIT prepares the parameters from the EXEC statement for scanning, if they exist. Diagram 2.1 shows the initialization procedure in detail.

IDCRI01

Procedures: GETNEXT, MODALSET, MODALIF, MODLELSE

3 GETNEXT reads and processes modal commands until a functional command is encountered. The execution of the functional command depends on the results from the modal commands. However, every command is completely checked for syntax errors whether or not it is executed. Diagram 2.2 shows obtaining a command in detail.

IDCRI02

Procedure: IDCRI02

4 IDCRI02 loads the command descriptor for the functional command to be scanned. IDCRI02 initializes the Function Data Table, FDT. Diagram 2.3 shows the preparation for command scanning in detail.

IDCRI01

Procedures: SCANCMD, KWDPARM, PCSPARM, INREPEAT, BUILDFDT, CONVERT, GETSPACE, DSIDCHK, ERROR1, ERROR2

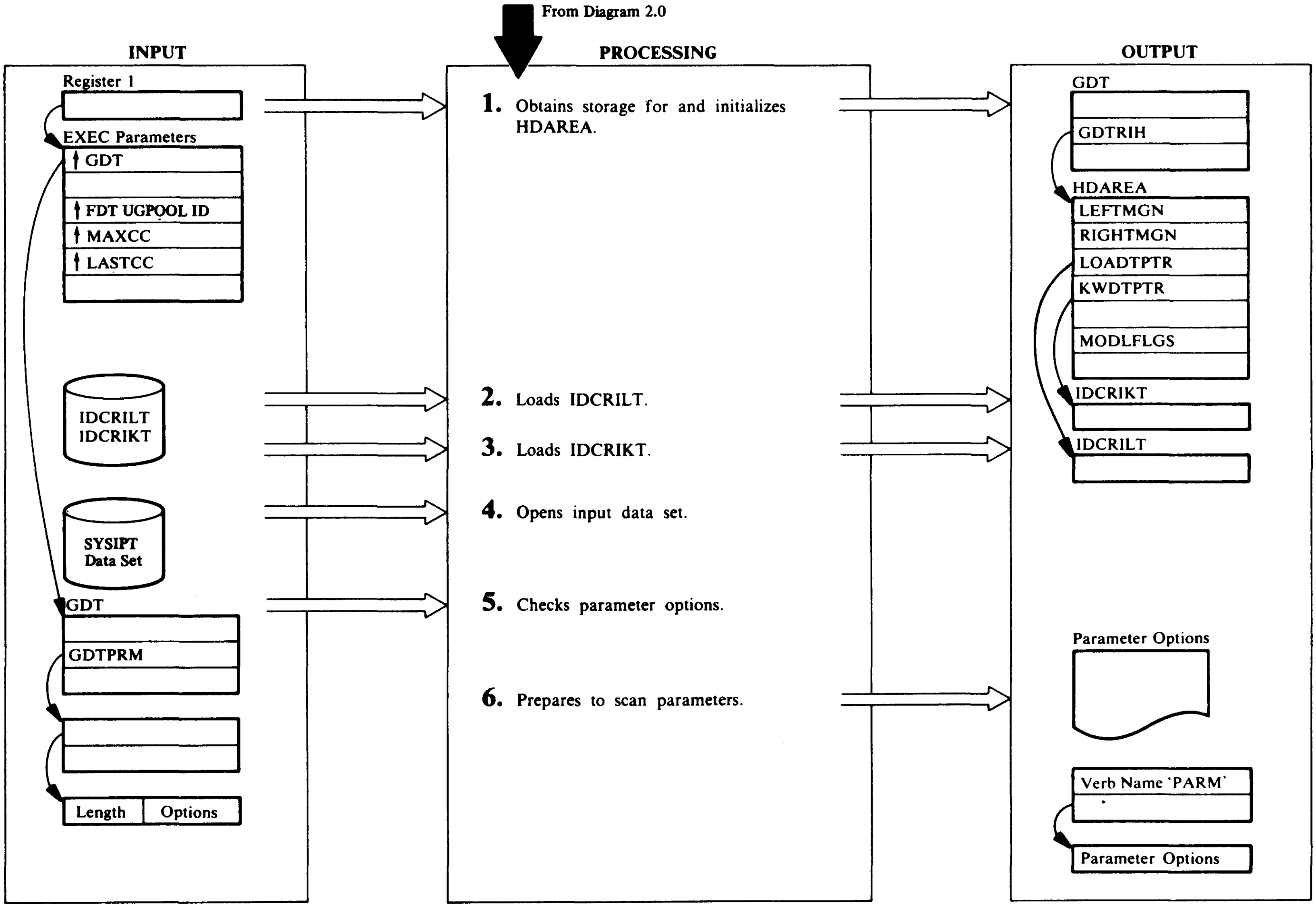
5 SCANCMD and BUILDFDT check the functional command for correctness. If the command is incorrect, ERROR1 or ERROR2 writes an error message. BUILDFDT and INREPEAT complete the FDT for correct commands. Diagram 2.4 shows the command scanning in detail.

IDCRI03

Procedure: IDCRI03

6 IDCRI03 deletes the work tables and temporary storage. If the command is to be executed, control is given to Executive Controlled Termination which gives control to the Function Support Routine, FSR, that executes the command. If the command is not to be executed due to syntax errors or due to the results of a modal expression, control returns to step 3 to get the next command. If the error is severe, control returns to Executive Controlled Termination, Diagram 4.0, with an indication that the processor cannot continue. Diagram 2.5 shows termination processing in detail.

Diagram 2.1 Reader/Interpreter Initialization



Extended Description for Diagram 2.1

IDCRI01

Procedure: RIINIT

1 RIINIT obtains storage for HDAREA and sets the left margin field to 2 and the right margin field to 72. A user changes the margins using a PARM command. RIINIT initializes the rest of HDAREA to zero. If RIINIT cannot obtain storage, control is given to Reader/Interpreter Termination, Diagram 2.5, with an indication that causes the processor to end.

IDCRI01

Procedure: RIINIT

2 RIINIT loads the command name table, IDCRILT, and places the address of IDCRILT in the LOADTPTR field in HDAREA. IDCRILT contains the name of each verb and corresponding command descriptor.

IDCRI01

Procedure: RIINIT

3 RIINIT loads the modal name table, IDCRIKT and places the address of IDCRIKT in the KWDTPTR field in HDAREA. IDCRIKT contains modal command keyword and verb name symbols, plus the length of each symbol.

IDCRI01

Procedure: RIINIT

4 RIINIT opens the input data set which has a default filename of SYSIPT. If SYSIPT cannot be opened, control is given to Reader/Interpreter termination, Diagram 2.5, with an indication that causes the processor to end.

IDCRI01

Procedure: RIINIT

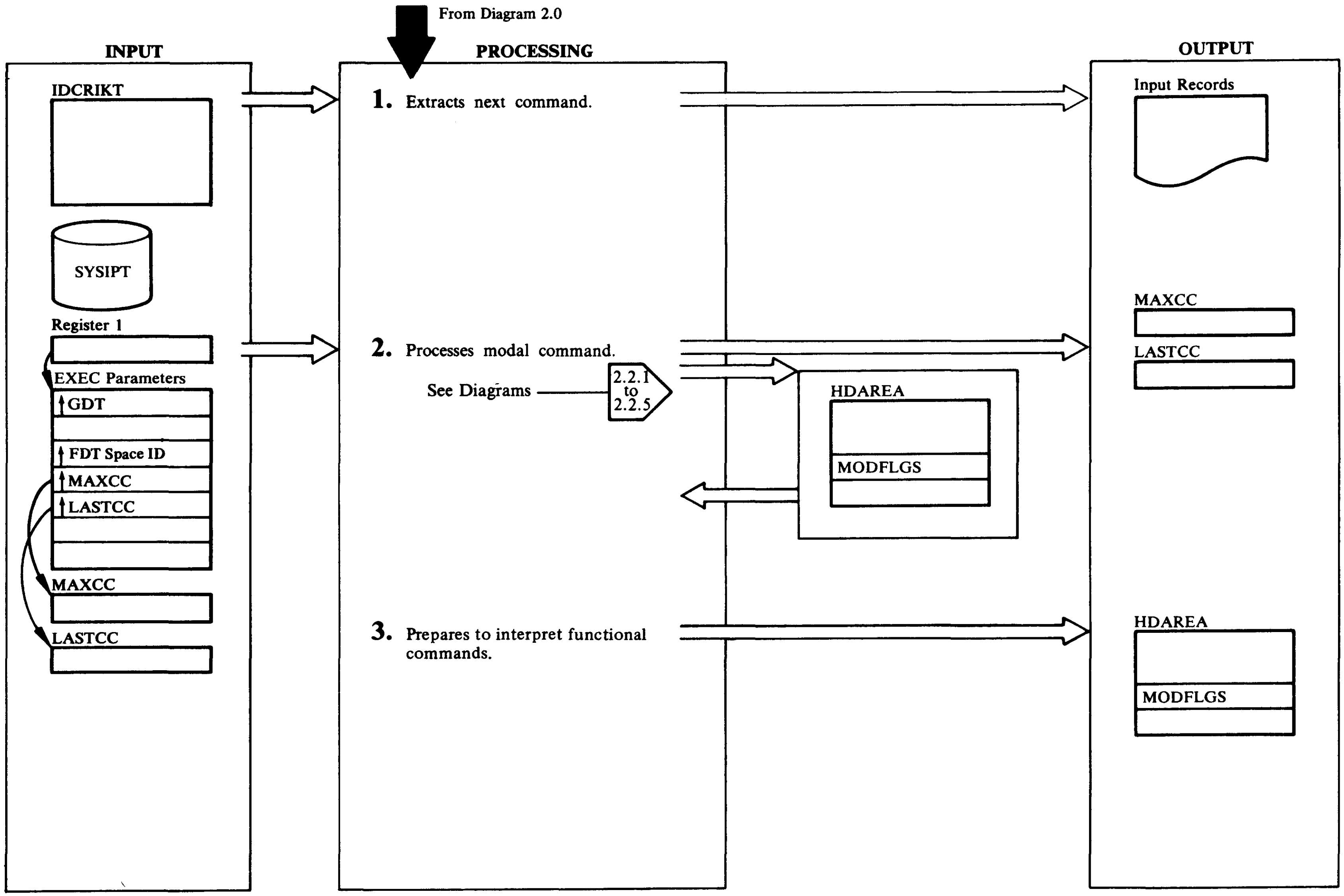
5 The Reader/Interpreter checks for parameters supplied before SYSIPT is read. The invoker may supply parameters by putting them in the EXEC job control statement. Parameters may also be supplied through the data the user provides to the processor at the time the user's program invokes Access Method Services. If parameters are supplied, the GDTPRM field of the GDT contains the address of a fullword that contains the address of the parameters. The first 2 bytes of the parameters is the total length of the parameters. If no parameters are supplied, the length field is zero.

IDCRI01

Procedure: RIINIT

6 The parameters are printed on SYSLST and are treated as the parameters for a PARM command. The symbol for PARM in IDCRIKT is supplied as the verb name and the options are scanned by the Reader/Interpreter just as though a PARM command had been encountered in SYSIPT. After the pseudo PARM command is executed by the PARM FSR, Executive Controlled Termination gives Reader/Interpreter control to read the first command. Control goes to Diagram 2.2 to get the first command.

Diagram 2.2. Reader/Interpreter Get Next Command



Extended Description for Diagram 2.2

IDCRI01

Procedures: GETNEXT, GETRECRD, NXTFIELD, NEXTCHAR

1 GETRECRD reads SYSIPT to get an input record and writes each input record on SYSLST. GETNEXT locates the verb on the input record and checks it against the symbols for the modal verbs IF, ELSE, SET, DO, and END in IDCRIKT. If a match is found, the verb is a correct modal verb and processing continues to step 2. If a match is not found, the verb is assumed to be a functional verb and processing goes to step 3.

IDCRI01

Procedures: GETNEXT, MODALIF, MODLELSE, MODALSET

2 GETNEXT sets condition codes and the MODLFLGS field in HDAREA depending on the modal command. Control returns to step 1 to get the next command. The modal commands are shown in detail in the following diagrams:

IF-THEN, Diagram 2.2.1
ELSE, Diagram 2.2.2
SET, Diagram 2.2.3
DO, Diagram 2.2.4
END, Diagram 2.2.5

IDCRI01

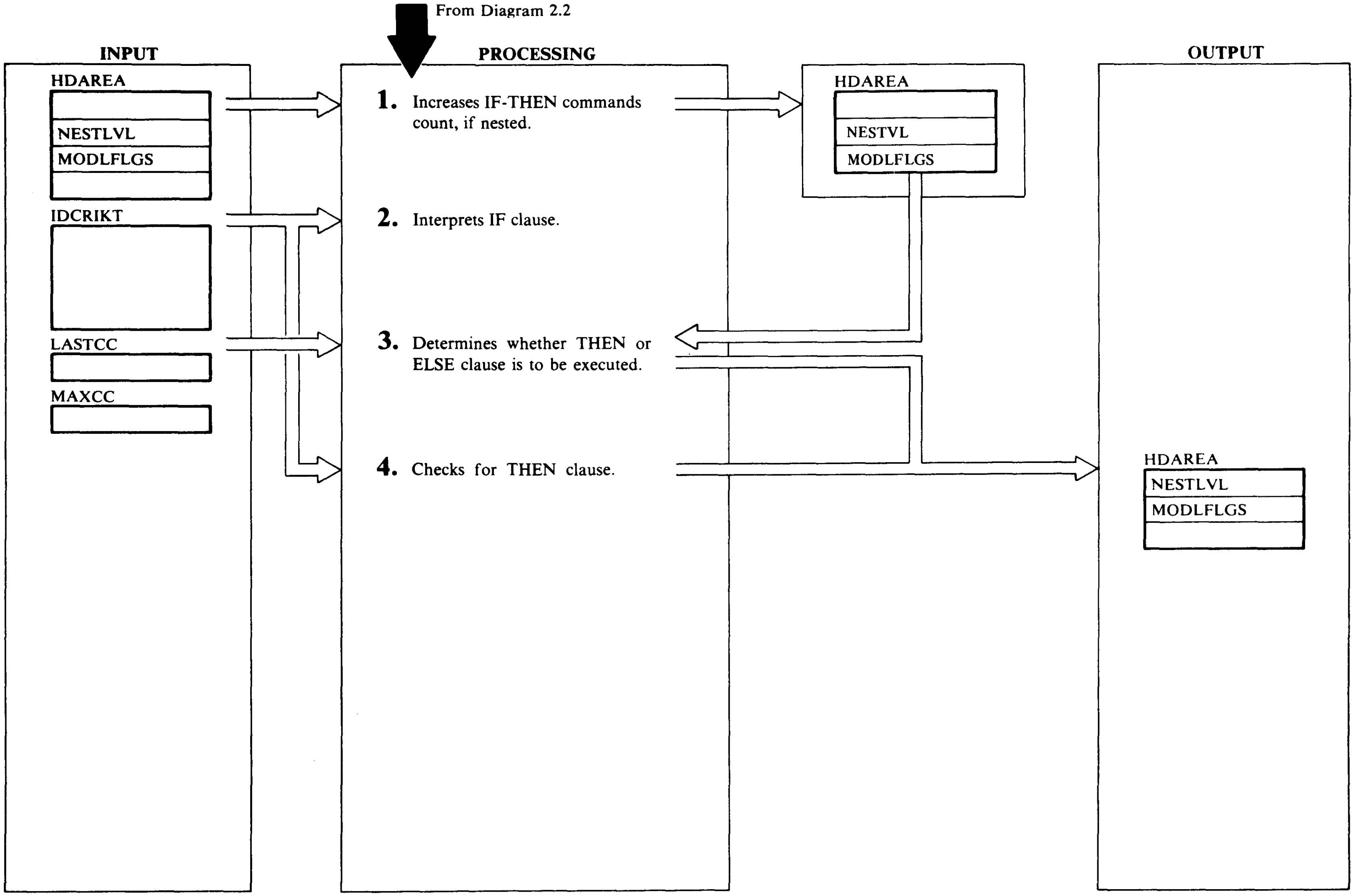
Procedure: GETNEXT

3 GETNEXT checks the MODLFLGS field in HDAREA to determine if the function command should be executed. If the functional command is not to be executed, GETNEXT sets a flag. Every command is completely checked for syntax errors whether or not it is to be executed. If the functional command finishes an IF—THEN command, GETNEXT subtracts 1 from the number of nested IF—THEN commands and sets MODLFLGS for the finished IF—THEN command to zero. The functional commands are shown in detail in the following diagrams:

ALTER, Diagram 3.1
BLDINDEX, Diagram 3.11
DEFINE, Diagram 3.2
DELETE, Diagram 3.3
EXPORT, Diagram 3.4
EXPORTRA, Diagram 3.13
IMPORT, Diagram 3.5
IMPORTRA, Diagram 3.14
LISTCAT, Diagram 3.6
LISTCRA, Diagram 3.12
PARM, Diagram 3.7
PRINT, Diagram 3.8
REPRO, Diagram 3.9
RESETCAT, Diagram 3.15
VERIFY, Diagram 3.10

Control goes to Diagram 2.4 to scan the command.

Diagram 2.2.1. Reader/Interpreter IF-THEN Modal Command



Extended Description for Diagram 2.2.1

IDCRI01

Procedure: MODALIF

1 The value in the NESTLVL field of HDAREA is used as an index to the MODLFLGS field for the current IF—THEN command and the THEN and ELSE clauses that belong to the IF—THEN. MODALIF adds 1 to the number of nested IF commands in NESTLVL. There is one set of modal flags in HDAREA for each level of IF—THEN commands. The new level of MODLFLGS is initialized to zero. To see if too many IF—THEN commands are nested, MODALIF compares the number of nested IF—THEN commands to the number permitted, 10.

When a syntax error is detected, MODALIF sets LASTCC to 16, and control is given to Reader/Interpreter termination, Diagram 2.5, to cause the Executive to terminate the processor.

IDCRI01

Procedures: MODALIF, PACKCVB, NXTFIELD, NEXTCHAR

2 MODALIF compares the characters following the IF with the symbols for LASTCC and MAXCC in IDCRIKT. MODALIF compares the operator with all possible operators (LT, GT, EQ, NE, GE, LE, =, ¬=,>, <, >=, <=). PACKCVB converts the decimal value following the operator to binary. If any errors are detected, the syntax error procedure in step 1 is followed.

IDCRI01

Procedure: MODALIF

3 MODALIF sets the THENFLAG to 1 to indicate that the THEN clause of the IF—THEN command is being processed. MODALIF compares the value of LASTCC or MAXCC with the number in the IF—THEN command and evaluates it for true or false depending upon the operator. If the result is false, MODALIF sets the SKIPFLAG in HDAREA to 1, indicating that commands in the THEN clause of the IF—THEN command are to be skipped—that is, the Reader/Interpreter is to check only the syntax of the commands in the THEN clause.

IDCRI01

Procedure: MODALIF

4 MODALIF compares the characters following the relational expression with the symbol for THEN in IDCRIKT. An error occurs if THEN does not follow IF, and the syntax error procedure in step 1 is followed. If a terminator follows the THEN keyword, there is a null THEN clause in the current IF—THEN command. Control returns to Diagram 2.2 to obtain the next command.

Diagram 2.2.2. Reader/Interpreter ELSE Modal Command

From Diagram 2.2

INPUT

HDAREA

- MODLFLGS

PROCESSING

1. Validates ELSE command.
2. Determines if commands following ELSE are to be executed.
3. Checks for completion of IF-THEN command.

OUTPUT

HDAREA

- MODLFLGS
- NESTLVL

Extended Diagram for Diagram 2.2.2

IDCRI01

Procedure: MODLELSE

1 MODLELSE sets the ELSEFLAG in HDAREA for the current IF—THEN command to 1, indicating that the ELSE clause of the IF—THEN command is being processed. The THENFLAG is turned off. An error is caused by an ELSE without a prior IF—THEN, and the syntax error procedure in step 1, Diagram 2.2.1, is followed.

IDCRI01

Procedure: MODLELSE

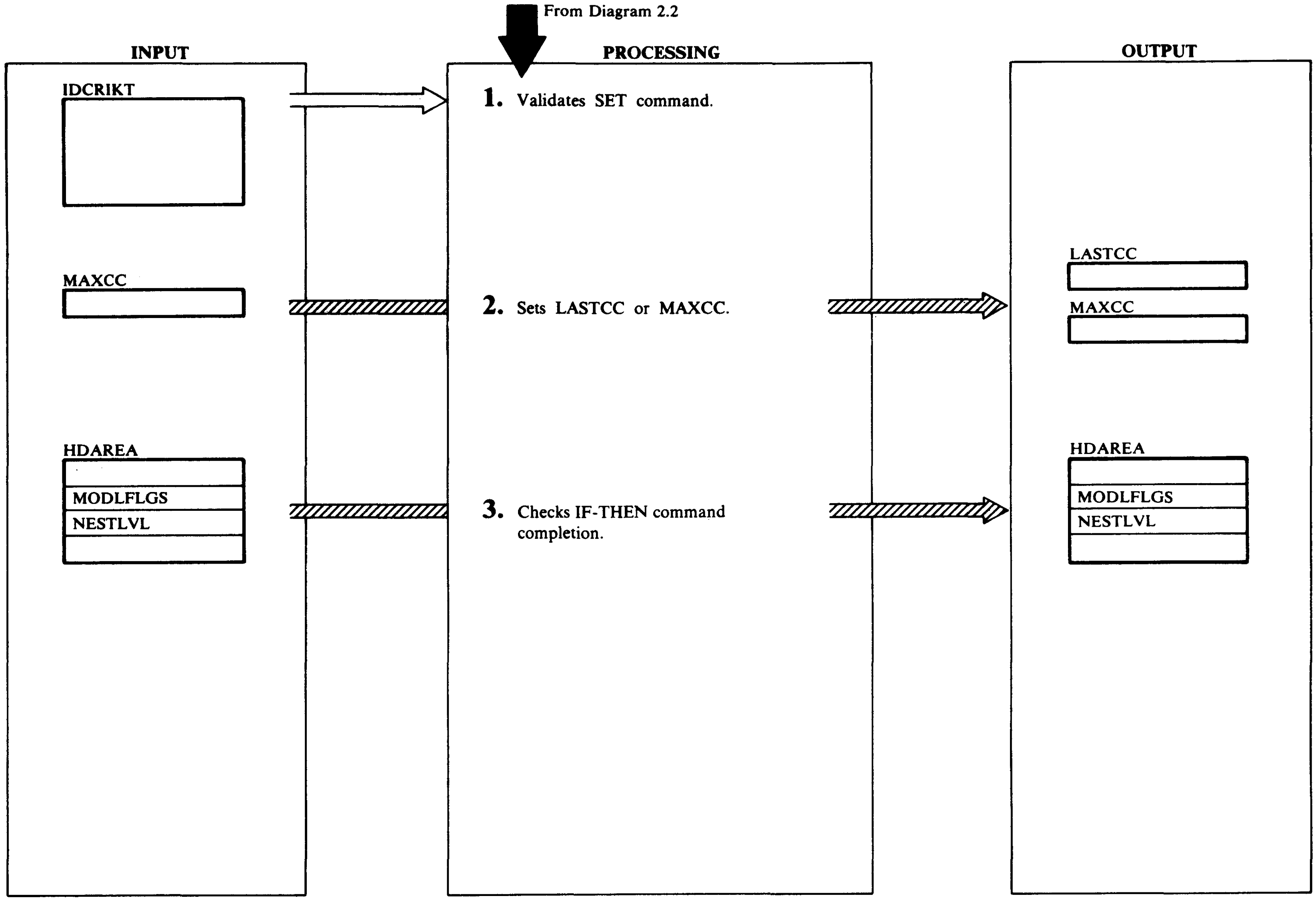
2 SKIPFLAG indicates whether the commands in the ELSE clause of the IF—THEN command should be executed or only checked for syntax errors. If SKIPFLAG is zero, the THEN clause of the IF—THEN command was executed; the ELSE clause should not be executed, and MODLELSE sets SKIPFLAG to 1. If SKIPFLAG is 1, the THEN clause of the IF—THEN command was not executed; the ELSE clause should be executed, and MODLELSE sets SKIPFLAG to zero. However, if the entire IF—THEN—ELSE command is nested within another THEN or ELSE clause that is not being executed, neither the THEN clause or the ELSE clause of the nested IF—THEN—ELSE command is executed.

IDCRI01

Procedures: MODLELSE, NXTFIELD, NEXTCHAR

3 If a terminator immediately follows ELSE, there are no commands in the ELSE clause of the current IF—THEN command. MODLELSE subtracts 1 from NESTLVL since the IF command is completed. Control is given to Diagram 2.2 to obtain the next command whether or not a terminator follows the ELSE.

Diagram 2.2.3. Reader/Interpreter SET Modal Command



Extended Description for Diagram 2.2.3

IDCRI01

Procedures: MODALSET, PACKCVB, NXTFIELD, NEXTCHAR

1 MODALSET compares the characters following SET with the symbols for LASTCC and MAXCC in IDCRIKT. MODALSET compares the operator with the symbols EQ and =. PACKCVB converts the decimal value following the operator to binary. If a syntax error is encountered, the processing in Diagram 2.2.1, step 1 is followed.

IDCRI01

Procedure: MODALSET

2 MODALSET obtains MAXCC or LASTCC and changes its value to the value specified in the SET command. If the command is SET LASTCC, MODALSET compares MAXCC and LASTCC, and the larger value is put into MAXCC. If the SET command is only being checked for syntax errors, neither MAXCC nor LASTCC is changed.

IDCRI01

Procedure: MODALSET

3 MODALSET determines that the current IF command is finished by checking that the SET command follows an ELSE keyword and that the SET command is not within a DO group. If both of these conditions are met, MODALSET subtracts 1 from NESTLVL in HDAREA, and returns control to Diagram 2.2 to obtain the next command.

Diagram 2.2.4. Reader/Interpreter DO Modal Command

From Diagram 2.2

INPUT

HDAREA

NESTLVL
NULLDO
MODLFLGS

PROCESSING

1. Determines if DO is part of an IF-THEN command.

2. Processes DO command within IF-THEN command.

- **a.** Immediately following THEN or ELSE.
- **b.** Not immediately following THEN or ELSE.

OUTPUT

HDAREA

NESTLVL
NULLDO
MODLFLGS

Extended Description for Diagram 2.2.4

IDCRI01

Procedures: GETNEXT, NXTFIELD, NEXTCHAR

1 If a DO command is not part of an IF—THEN command, control returns to Diagram 2.2 to obtain the next command. If a DO command is part of an IF—THEN command, processing continues to step 2.

IDCRI01

Procedures: MODALIF, MODELSE, NXTFIELD, NEXTCHAR, GETNEXT

2 a. If a DO command is part of an IF—THEN command and immediately follows a THEN or ELSE keyword, MODALIF or MODLELSE sets DOFLAG to 1. Control returns to Diagram 2.2 for the first command of the DO group.

b. If a DO command is part of an IF—THEN command, but it does not immediately follow a THEN or ELSE keyword, the DO command is unnecessary. GETNEXT increases the NULLDO field in HDAREA by 1, and control returns to Diagram 2.2 for the first command of the unnecessary DO group.

Diagram 2.2.5. Reader/Interpreter END Modal Command

From Diagram 2.2

INPUT

HDAREA

MODLFLGS
NULLDO

PROCESSING

1. Determines if END is part of an IF-THEN command.

2. Processes END command within IF-THEN command:

a. When paired with an unneccessary DO command.

b. When paired with a necessary DO command.

OUTPUT

HDAREA

MODLFLGS
NULLDO

Extended Description for Diagram 2.2.5

IDCRI01

Procedure: GETNEXT

1 GETNEXT checks the NESTLVL field in HDAREA; if NESTLVL contains a zero, no IF—THEN command is being processed and control returns to Diagram 2.2 to obtain the next command. If NESTLVL contains a value other than zero, processing continues with step **2**

IDCRI01

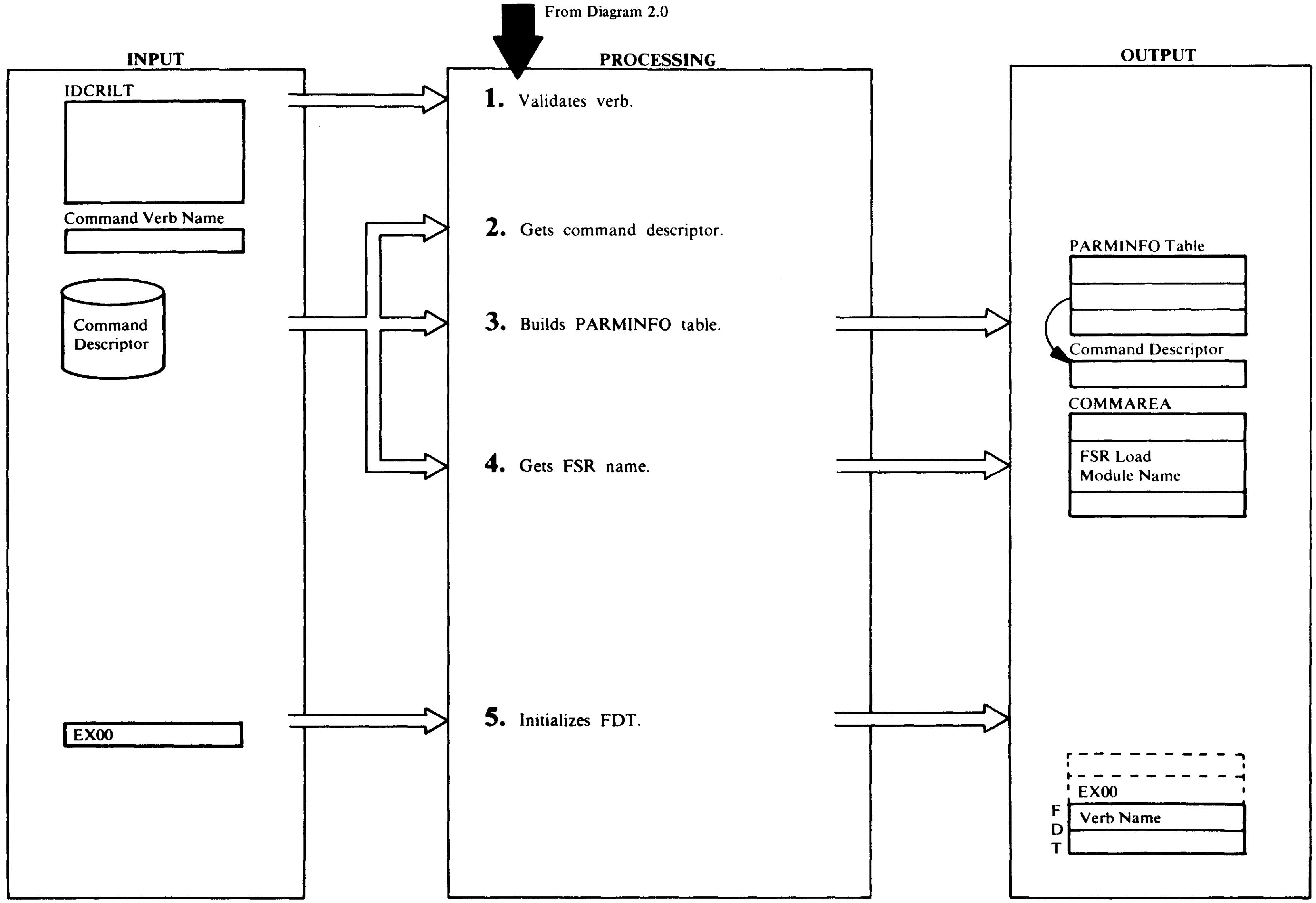
Procedure: GETNEXT

2 An END encountered during the processing of an IF—THEN command must be paired with a DO command. If a DO command has not been found in the current IF—THEN command, the END is processed as a syntax error as in Diagram 2.2.1, step 1.

a. If the END command is paired with an unnecessary DO command, GETNEXT subtracts 1 from the count in the NULLDO field in HDAREA. Control returns to Diagram 2.2 to obtain the next command.

b. If an END is paired with a necessary DO command, GETNEXT sets the DOFLAG for the current IF—THEN command to zero. An IF—THEN command is completed if the END is paired with a necessary DO that followed an ELSE. GETNEXT subtracts 1 from the count of nested IF—THEN commands in NESTLVL. Control returns to Diagram 2.2 to obtain the next command.

Diagram 2.3 Reader/Interpreter Prepare to Scan Command



Extended Description for Diagram 2.3

IDCRI02
IDCRI01

Procedures: IDCRI02, ERROR2

1 Reader/Interpreter Initialization, Diagram 2.1, gives control to this section only if parameters were present before SYSIPT was read. Otherwise, control comes from Diagram 2.2. IDCRI02 compares the verb name with the valid functional verb names in IDCRILT. If a match is found, IDCRI02 obtains the name of the verb's command descriptor from the table. If a match is not found, the verb is invalid, and ERROR2 prints a message on SYSLST. The remainder of the command is ignored, and control is given to Reader/Interpreter termination, Diagram 2.5

IDCRI02

Procedure: IDCRI02

2 IDCRI02 uses the command descriptor name to load the command descriptor. A command descriptor is a load module describing all the parameters the command may have. Access Method Services defines a parameter as:

- Positional data—positional parameters cannot have subparameters.
- Keyword with or without data—keyword parameters may have subparameters.

Data is a constant or list of constants.

Some examples of parameters are:

- *entryname* . . . in DELETE is a positional parameter.
- VOLUMES (111111) is one parameter with a keyword VOLUMES and data of "111111".
- VOLUMES (111111, 222222) is one parameter with keyword VOLUMES and data of "111111" and "222222". (111111, 222222) is a list of constants. Each constant is the same thing—that is a volume serial number.
- KEYS (5, 40) is three parameters—KEYS, *length* with value 5, and *offset* with value 40. KEYS is a keyword while *length* and *offset* are each positional parameters. (*length, offset*) is not a list of constants because the second item, *offset,* is different from the first, *length. length* and *offset* are subparameters of KEYS.
- KEYRANGES ((5, 40), (50, 60), (70, 80)) is three parameters—KEYRANGES, *lowkey*, and *highkey*. The subparameters of KEYRANGES, *lowkey* and *highkey*, are repeated. In Access Method Services each repetition of a parameter must be enclosed in parentheses. Since *lowkey* and *highkey* are positional parameters, they must always be in the same relative position. They are repeated as a pair to maintain their position.

IDCRI02
IDCRI01

Procedures: IDCRI02, SETFLAG

3 The command descriptor contains an identification number for each parameter the command is permitted to have. Since the sections of the command descriptor that describe the parameters are in no set order, IDCRI02 builds the PARMINFO Table to access information in the order of the parameter identification number. The PARMINFO Table consists of several sections. In the Descriptor Pointer section the first pointer in the array points to the Command Descriptor section that describes parameter with identification number 1. The second pointer points to the Command Descriptor section that describes parameter with identification number 2, and so on. The PARMFLAG section contains one entry for each parameter identification possible in the command. PARMFLAG is used to keep track of which parameters have been found. When a parameter is found, SETFLAG sets the indicator for the parameter in PARMFLAG.

In Access Method Services, a subparameter is a parameter that modifies another parameter. For example, in DEFINE SPACE (VOL ...), VOL is a subparameter of SPACE. In this document the parameter that the subparameter modifies is called its superparameter. In this example, SPACE is the superparameter of VOL. A superparameter, then, is a parameter that is modified by other parameters. For each subparameter, IDCRI02 puts the number of its superparameter in the PARMINFO Table in the Superparameter ID section that the R/I uses to determine the relationship among parameters.

IDCRI02

Procedure: IDCRI02

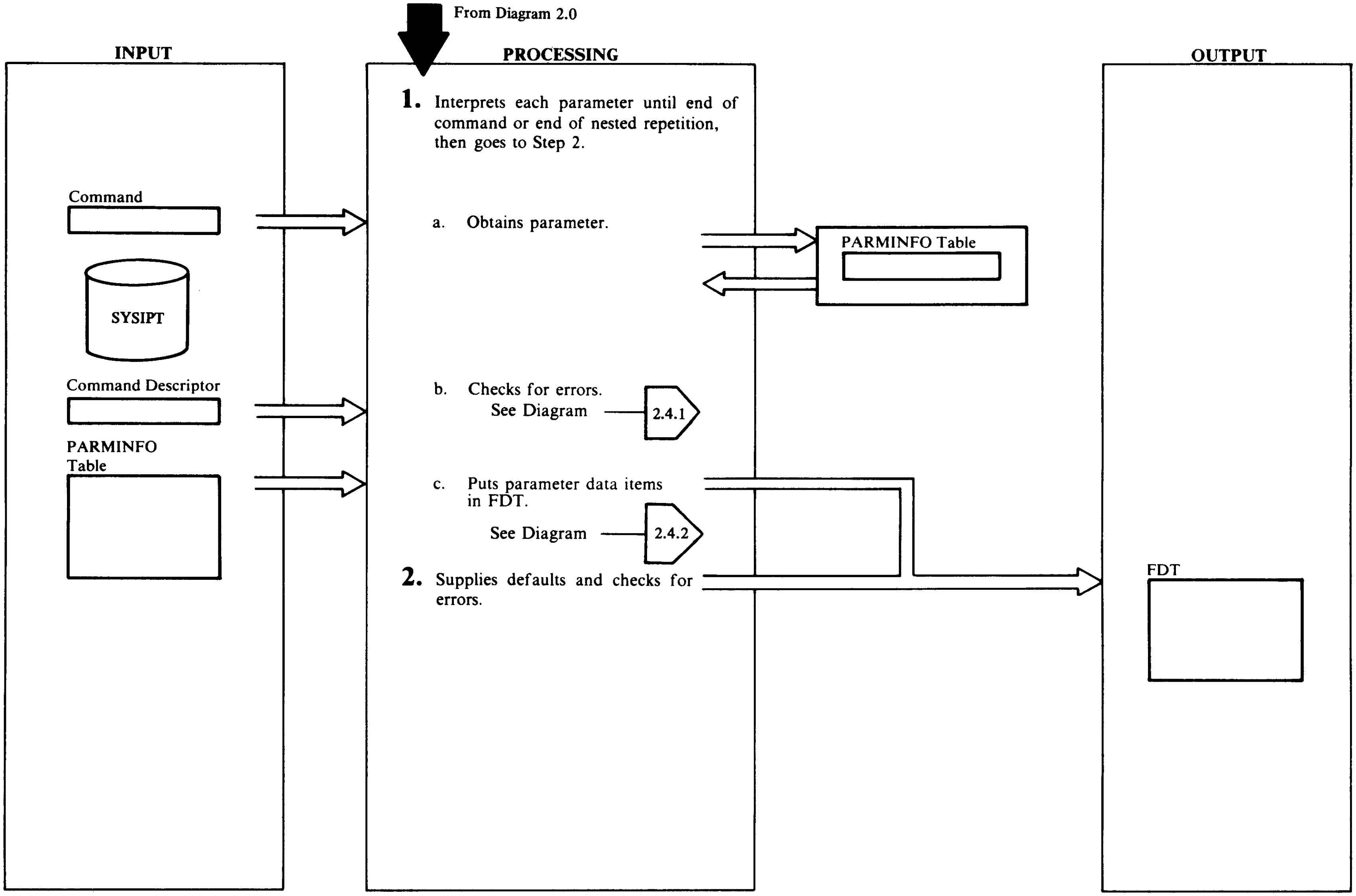
4 IDCRI02 obtains the FSR load module name from the command descriptor and places the name in the FSRLNAME field in COMMAREA. The Executive uses the FSR load module name to load the FSR that executes the command.

IDCRI02

Procedure: IDCRI02

5 IDCRI02 obtains storage for the Function Data Table, FDT. The verb uses 8 bytes of storage, and each parameter uses 4 additional bytes. IDCRI02 obtains more storage for the FDT if any parameter is repeated. The amount of storage for repeated parameters is calculated from the command descriptor. Because IDCRI02 uses a UGPOOL macro instruction to obtain storage, the identifier EX00 precedes the FDT. IDCRI02 initializes the FDT to zero and places the verb name in the first 8 bytes. The FDT contains the information from the command that an FSR needs to execute the command. The FDT is the interface between the R/I and the FSRs and consists of a primary array of addresses, one secondary array of addresses for each repeated parameter, and encoded data from the command.

Diagram 2.4 Reader/Interpreter Scan Command



Extended Description for Diagram 2.4

IDCRI01

Procedures: BUILDFDT, CONVERT, DSIDCHK, NAMESCAN, SCANCMD, KWDPARM, POSPARM, INREPEAT, GETDATA, GETSIMPL, GETQUOTD, ERROR1, ERROR2, NXTFIELD, NEXTCHAR, GFTRECRD

1 If the Reader/Interpreter is processing a specified parameter, processing continues with step 1a. If the Reader/Interpreter is processing the end of a command or the end of a repeated parameter, processing continues with step 2. A parameter set is a parameter repeated as a group. Each repeated parameter set is treated separately from the command and from other repeated parameter sets. PARMFLAG for the parameters in a repetition is reset to zero for each group of repeated parameters in order to start the processing again for the new repeated group of parameters.

a. SCANCMD extracts a parameter from the input record in storage. If the entire parameter is not in storage, GETRECRD reads SYSIPT until all the parameter is in storage.

b. SCANCMD checks the parameter for syntax errors based upon the information for the parameter in the command descriptor. If errors are found, ERROR1 or ERROR2 writes a message to SYSLST and sets LASTCC to 12. The rest of the command is skipped, and control is passed to R/I termination.

c. As SCANCMD scans the command, BUILDFDT encodes the command into the FDT in order to describe the command to the FSR that will execute it. The data items are checked for additional errors (errors are processed as described in step 1.b). Parameter scanning continues one parameter at a time until the end of a repeated parameter list is reached or until the command terminator is found. For positional parameters and data belonging to keywords, BUILDFDT checks to ensure that a string does not exceed the allowed length, that a number is not out of range, and that there are not too many elements in a list.

IDCRI01

Procedures: DEFAULTS, SETDELT, NEEDNOTS

2 The PARMINFO Table is used to access the description of each parameter. If a repeated group of parameters or a command is incomplete, default values are supplied to the FDT. The defaults, which are in the command descriptor, are always supplied whenever an input parameter is omitted, unless the defaults conflict with the input parameters. DEFAULTS and SETDFLT check to ensure that the combination of defaults supplied for the command is meaningful, that is, no parameters that are syntactically correct but logically incorrect. PARMFLAG and the command descriptor are used to make inter-parameter checks for missing keywords and mutually exclusive keywords. If command scanning is not complete, control returns to step 1 to obtain the next parameter.

Diagram 2.4.1 Reader/Interpreter Syntax Check Parameter

From Diagram 2.4

INPUT

Command

Command Descriptor

PROCESSING

1. Gets parameter number.

2. Indicates parameter is found.

3. Checks constant for errors.

4. Prepares to scan subparameters.

Parameter Number

OUTPUT

PARMINFO Table

FDTTBL

Extended Description for Diagram 2.4.1

IDCRI01

Procedures: SCANCMD, KWDPARM

1 The identification number is found differently for positional and keyword parameters. For a positional parameter, SCANCMD obtains the number of the parameter from the subparameter ID number list in the current superparameter's descriptor. For a keyword parameter, KWDPARM compares the keyword to every possible keyword permitted in the current level of parameter processing. When a match is found, KWDPARM saves the ID number of the keyword.

IDCRI01

Procedure: SETFLAG

2 SETFLAG uses the ID number of the parameter as an index to the FDT. SETFLAG puts the address of the FDT field in the same FDT field—the FDT field points to itself—to indicate that the parameter has been found. If the parameter has data, the FDT field will be changed later to the address of the data. Also, SETFLAG sets the PARMFLAG value to 1 for this parameter to indicate the parameter has been found in the command.

IDCRI01

Procedures: GETDATA, CONVERT, PACKCVB, DSIDCHK, ERROR2

3 If the parameter is a constant in the case of positional parameters, or if a constant is associated with the parameter in the case of a keyword parameter, GETDATA checks the constant for syntax errors. If an error is encountered, ERROR2 issues a message on SYSLST and sets LASTCC to 12. In Access Method Services, a constant is one of the following:

- dsname/password
- dsname(membername)/password
- dname/password
- 'character string'
- character string
- X'hexadecimal digits'
- decimal digits
- B'binary digits'

A list of constants is several constants in the same format following each other. A constant or a list of constants may belong to one parameter.

IDCRI01

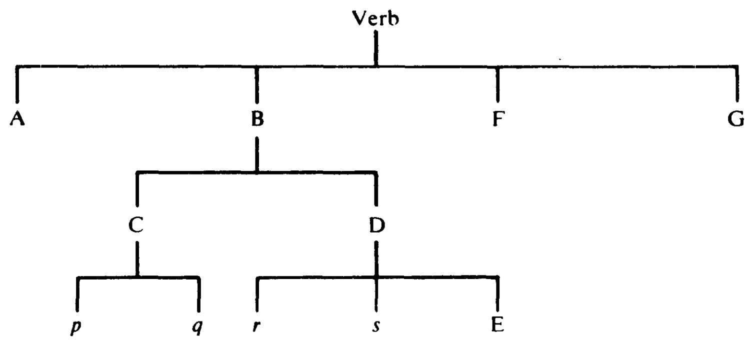
Procedure: SCANCMD

4 If the keyword parameter has subparameters associated with it, SCANCMD processes the subparameters next. For example, if the following command is specified:

VERB A(*x*) B(C(*p q*) D(*r s* E(*x*))) F G(*x*)

A, B, C, D, E, F, and G are keyword parameters. *p*, *q*, *r*, and *s* are positional parameters. *x* represents data.

The command has the following structure for scanning:



The structure is in levels of parameter dependency. The verb is on level zero. Parameters A, B, F, and G are on level one. When the R/I scans level one and finds parameter B, the scanning begins one level lower with parameters C and D on level two. When parameter C is found, the scan again moves one level lower to scan the C subparameters. At the end of the C subparameters, the scan returns to level two to scan the next parameter on level two. At the end of the D subparameters, there are no more parameters on level two, and the scan returns to level one for parameter F. In other words, the parameters are processed in the same order that they appear on the input statement. R/I keeps the level number of the parameter being scanned in PARMLVL. R/I keeps the ID number of the superparameter for the level being scanned in SUPERID. R/I keeps the ID number of the parameter being scanned in PARMID.

Diagram 2.4.2 Reader/Interpreter Build FDT

From Diagram 2.4

INPUT

Command Descriptor

FDT

- Verb
- List of addresses

PROCESSING

1. Determines type of parameter:

- Non-repeated parameter, Step 2.
- Repeated parameter, Step 3.

2. Puts address in FDT primary vector for non-repeated parameter.

3. Puts address in FDT array for repeated parameter.

OUTPUT

FDT

FDTTBL

- Verb

Data or Count and Data

Array of Addresses

Data or Count and Data

Extended Description for Diagram 2.4.2

IDCRI01

Procedures: PACKCVB, CONVERT, GETSPACE, MORESPACE

1 The parameter type determines how it is encoded into the FDT. If the parameter cannot be repeated, processing continues with step 2; if the parameter can be repeated, processing continues with step 3. Refer to Diagram 2.3 for a definition of parameter.

2 A non-repeated parameter is one of the following:

- A keyword with no data and no repeated subparameters
- A keyword with no data and repeated subparameters
- A positional or keyword parameter with a single constant as data
- A positional or keyword parameter with a list of constants as data

Each category is encoded differently into the FDT as follows in the same order as above:

- The address in the FDT points to itself
- The address in the FDT points to a fullword containing the number of subparameter repetitions
- The address in the FDT points to the single constant
- The address in the FDT points to a halfword containing the number of constants and immediately preceding the list of constants

Character string constants are not changed, but PACKCVB and CONVERT convert numbers and hexadecimal strings to binary before the address is put in the FDT. If a list of constants is found, GETSPACE obtains space for the list when the first constant is processed. MORESPACE obtains additional space, if necessary. In the R/I listings, the word *scaler* is interchangable with the word *constant*. Control returns to Diagram 2.4 for the next parameter.

IDCRI01

Procedures: SCANMD, INREPEAT, DEFAULTS, NEEDNOTS

3 Each repeated parameter—positional or keyword— is one of two repetition types.

Repetition Type 1

The repeated parameter is not embedded in another repeated parameter. The *objectname* parameter in the IMPORT command has type 1 repetition.

Repetition Type 2

The repeated parameter is embedded within another repeated parameter. The *lowkey* parameter in the IMPORT command has type 2 repetition.

The maximum number of repetitions for a parameter is in the command descriptor for the parameter. The R/I uses the repetition type to insert the addresses of the data associated with the parameter in a secondary FDT array of addresses. The address of the array is put in the primary FDT. For each repetition type the FDT array is different.

Repetition Type 1

The array is one-dimensional and contains one address for each possible occurrence of the parameter.

Repetition Type 2

The array is two-dimensional. There is one row for each possible occurrence of the type 1 or outer parameter. There is one column for each possible occurrence of the type 2 or inner parameter.

Consider a command in the following format:

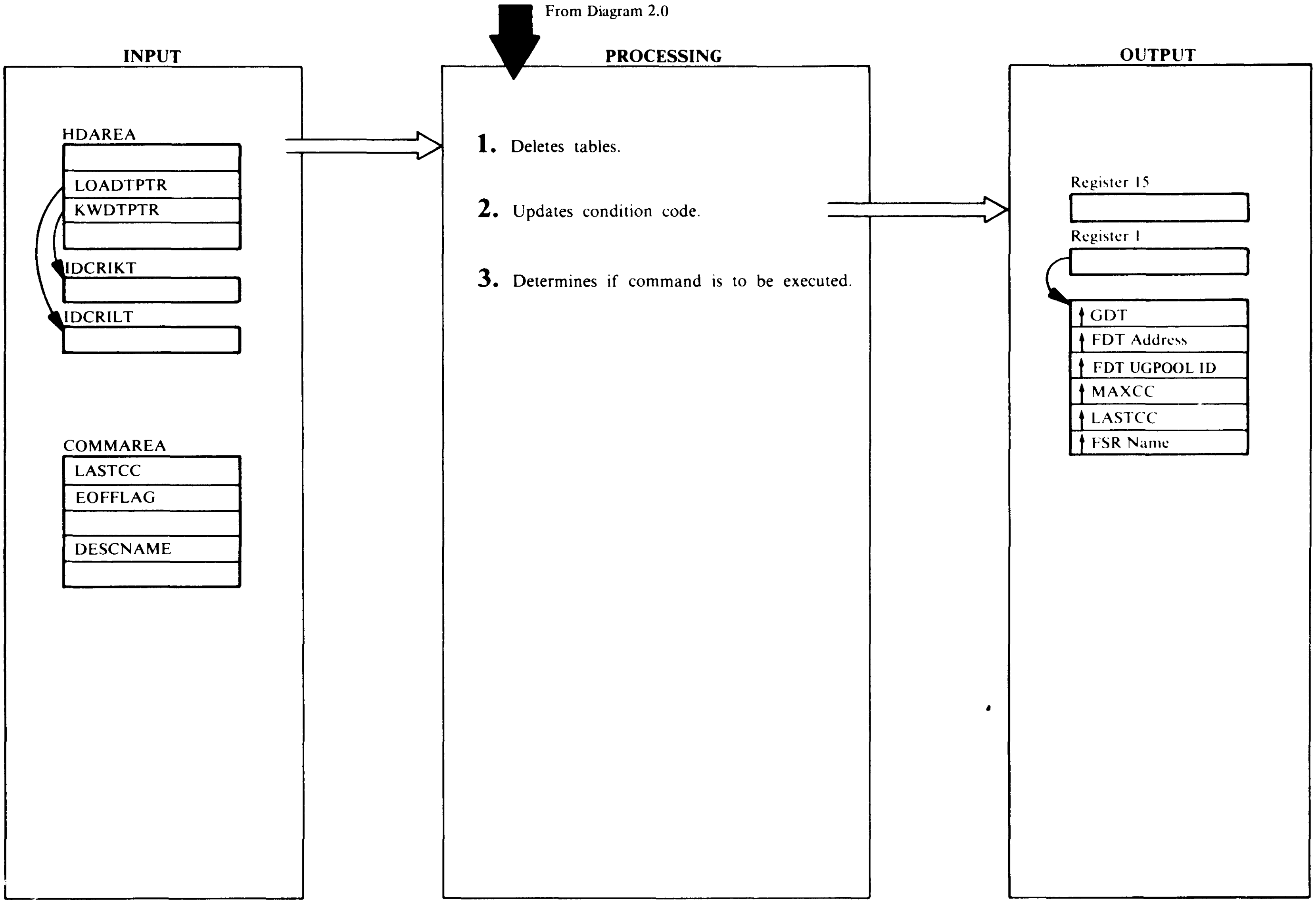
VERB A((B(C D((*x* *y*) ...)) E) ...) F

The type 1 parameters are B, C, D, and E because the entire parameter (B(C D((*x* *y*) ...)) E) can be repeated, but it is not embedded in another repeated parameter.

The type 2 parameters are *x* and *y* because (*x* *y*) can be repeated, and it is embedded in another repeated parameter. A one dimensional array is built for each type 1 parameter, B, C, D, and E, but a two dimensional array is built for each type 2 parameter, *x* and *y*.

The data from each repetition of a parameter is treated as in step 2, but instead of putting the data address in the primary FDT array, R/I puts the address in the secondary array of addresses for the parameter. In the R/I listings, repetition type is called *repeatedness nesting*. Refer to the examples of FDT in the *Data Areas* chapter. Control returns to Diagram 2.4 for the next parameter.

Diagram 2.5 Reader/Interpreter Termination



Extended Description for Diagram 2.5

IDCRI03

Procedure: IDCRI03

1 IDCRI03 deletes the command descriptor table for the current command and temporary storage. If end-of-file or a severe error is encountered, IDCRI03 deletes the command name table (IDCRILT), the modal name table (IDCRIKT), and HDAREA.

IDCRI03

Procedure: IDCRI01, IDCRI03

2 If end-of-file is encountered on SYSIPT, IDCRI03 sets a flag in COMMAREA and IDCRI01 puts a nonzero value in register 15, indicating that the Executive is not to call the R/I again. If end-of-file has not been encountered and no severe errors were found, IDCRI01 sets register 15 to zero. If an error causes the R/I to terminate all processing, IDCRI03 prints an error message on SYSLST. IDCRI03 sets MAXCC to 16 which indicates that the Executive is not to call the R/I again.

IDCRI03
IDCRI01

Procedure: IDCRI03, IDCRI01

3 If the command had errors or was being scanned only for syntax errors due to a modal expression, IDCRI03 releases the FDT and gives control to Diagram 2.2 to get the next command from SYSIPT. If the command is to be executed or severe errors were encountered, IDCRI01 gives control to Executive Controlled Termination Diagram 4.1.

Function Support Routine (FSR) Visual Table of Contents

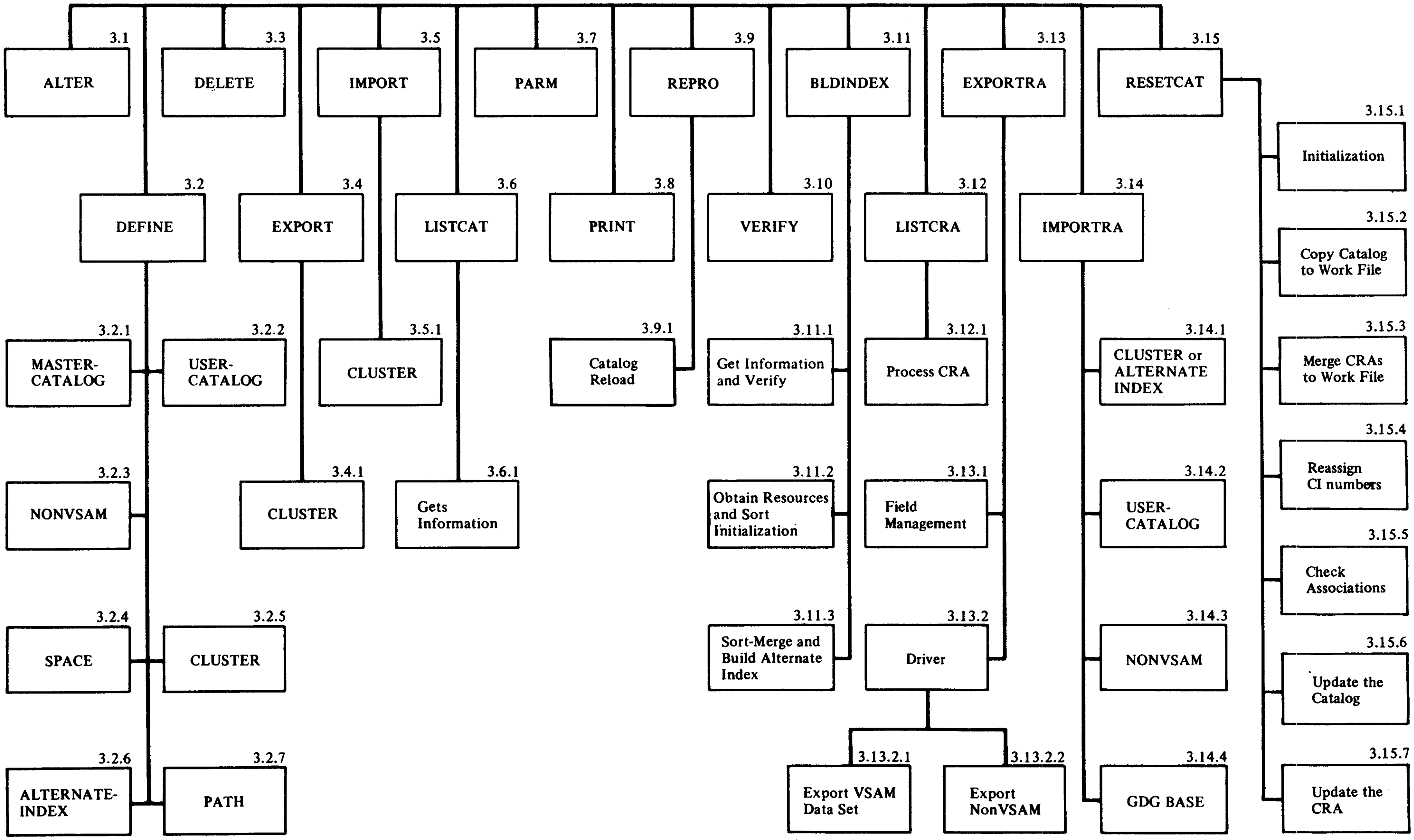
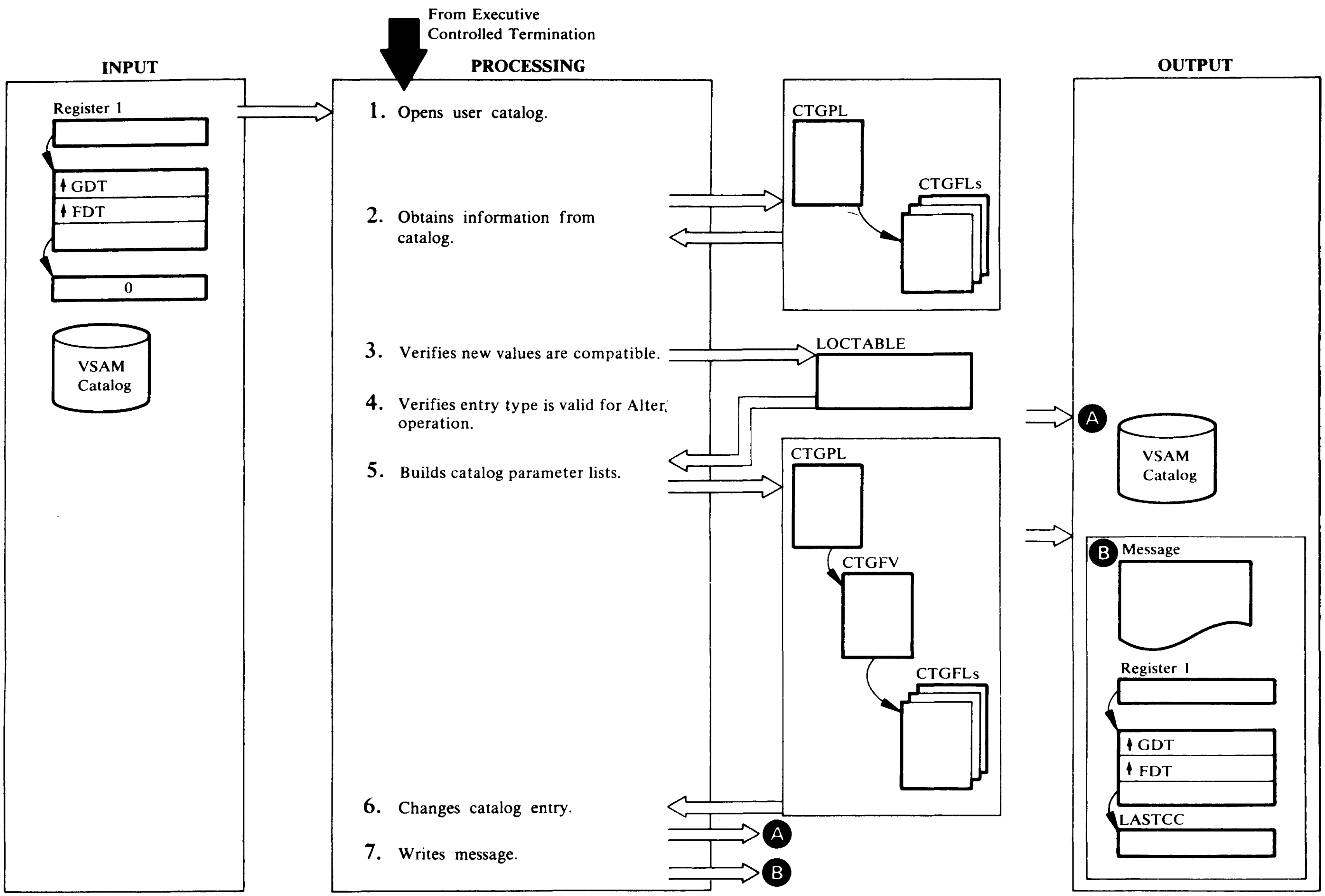


Diagram 3.1. ALTER FSR



Extended Description for Diagram 3.1

IDCAL01

Procedure: IDCAL01

1 First, IDCAL01 gets storage for the catalog parameter list. If a VSAM catalog is specified on the ALTER command, IDCAL01 builds an OPNAGL and issues a UOPEN to open the catalog. UOPEN returns the address of the catalog ACB. If the open is not successful, the ALTER command is terminated, and control goes to Step 7. If the return code from UOPEN is zero, IDCAL01 compares the data set name returned from UOPEN (in IOCDSN) to that specified in the CATALOG parameter. If the compare is unequal, a message is written, the command is terminated and control goes to Step 7.

IDCAL01

Procedure: LOCATPRC

2 Due to the arrangement of information in a VSAM catalog, in order to change part of a field the entire field must be retrieved and changed. If only NEWNAME, OWNER | NULLIFY OWNER, TO | FOR | NULLIFY RETENTION, BUFFERSIZE, EXCEPTIONEXIT | NULLIFY EXCEPTIONEXIT, NOUPGRADE | UPDATE | NOUPDATE, or ADDVOLUMES | REMOVEVOLUMES is specified, control goes to Step 5. LOCATPRC builds a CTGPL and CTGFLs which reference the PASSWALL, DSATTR, AMDSBCAT, RGATTR, NAMEDS, HURBADS, ENTYPE and CATACB catalog fields. This initial locate performed in LOCATPRC is termed the *primary* locate.

A test is built to limit the number of associations returned for NAMEDS to a maximum of five. Refer to the list in Step 5 for the contents of the catalog fields obtained with a particular CTGFL. LOCATPRC issues a UCATLG macro to retrieve the information from the catalog. If the return code is zero, LOCATPRC uses the returned information to build a table, LOCTABLE. If the return code is 40, the work area for VSAM is too small. LOCATPRC increases the work area and reissues the UCATLG. If the return code is any other non-zero number, the ALTER command is terminated and control goes to Step 7.

IDCAL01

Procedure: CHECKPRC

3 Following the primary locate, IDCAL01 will invoke CHECKPRC if any of the following parameters were specified: UPGRADE, KEYS, RECORDSIZE, UNIQUEKEY. CHECKPRC will perform further verification of these parameters which will, in most cases, require additional locates (called 'secondary' locates). Password processing for the primary and secondary locates and for the Alter function itself is handled as follows:

If KEYS and/or RECORDSIZE are not specified:

a. On the primary locate, if a password is supplied, reference it from the CPL. Set the verify master password bit.

b. If UPGRADE is specified, a secondary locate for the data HURBADS is required. If a password is supplied, reference it from the CPL. Turn off the verify master password bit. The password (which is that of the cluster level) will be verified as being read level or higher.

c. On the Alter, if a password is supplied, reference it from the CPL. Turn off the verify master password bit. Password verification will be as in prior release (master password of catalog or entry being altered).

If KEYS and/or RECORDSIZE are specified:

a. On the primary locate, if a password is supplied, reference it from the CPL. Set the verify master password bit.

b. On the secondary locates, if a password is supplied, reference it from the CPL. Turn off the verify master password bit. Turn on the bypass verification bit. No verification will take place and the requested information will be returned.

c. On the Alter, processing is as described in b above.

If UPGRADE was specified, CHECKPRC will verify that the ENTYPE is a G (alternate index). If UPGRADE was specified, CHECKPRC will verify that the high-used RBA is zero. This latter check will require a locate of the data HURBADS. If UNIQUEKEY was specified when the attribute was previously NONUNIQUEKEY, CHECKPRC will verify that the high-used RBA of the data object is zero and that the data object is associated with an alternate index. If any of these error checks fail, a message is printed and processing is terminated.

The major portion of the new CHECKPRC procedure will perform the validity checking required to alter the KEYS and/or RECORDSIZE values of an empty data set. This checking will require the following secondary locates, based on the ENTYPE returned from the primary locate:

ENTYPE	Locates	Fields Requested
D	1-C or G association	NAMEDS (a maximum of three associations)
	2-I association C or G	AMDSBCAT
C	1-D association	AMDSBCAT, HURBADS, NAMEDS, ENTYPE, DSATTR, PASSWALL
	2-I association	AMDSBCAT
G	1-D association	AMDSBCAT, HURBADS, NAMEDS, ENTYPE, DSATTR, PASSWALL
	2-I association	AMDSBCAT
R	1-D association of AIX or cluster	AMDSBCAT, HURBADS, NAMEDS, ENTYPE, DSATTR, PASSWALL
	2-I association of AIX or cluster	AMDSBCAT

If the ENTYPE is none of the above, CHECKPRC will return to IDCAL01 with a terminating condition code. The LOCATE for the index AMDSBCAT will be issued only for a KSDS. CHECKPRC will also verify that the HURBADS is zero. If not, CHECKPRC will return to IDCAL01 with a terminating condition code. If the object being altered is a relative record data set, CHECKPRC will verify that the average and maximum record size specified are equal and, if not, will return to IDCAL01 with a terminating condition code. If the ENTYPE returned in the primary locate is C, G or R, CHECKPRC will save the control interval number of the data component which is to be altered.

After retrieval of the appropriate AMDSBCATs, the following check will be made of the new average and maximum recordsizes and/or new key values.

a. Data Object

AMDRKP + AMDKEYLN $\leq$ AMDLRECL

or, if the object has the spanned attribute,

AMDRKP + AMDKEYLN ≤ AMDCINV - D.H.R.S

b. DATA object

AMDCINV ≥ AMDRKP + AMDKEYLN + D.R.H.S & AMDCIPCA * (AMDCINV - D.R.H.S) ≥ AMDLRECL

c. Index AMDCINV ≥ max (x,y) where:

X = I.R.H.S + (2 * (AMDKEYLN + 2)) + (3 * AMDCIPCA) + D.R.H.S

Y = I.R.H.S + (8 * AMDCIPCA) + (2 * SQRT (AMDCIPCA)) + D.R.H.S.

I.R.H.S = index record header size = 24

D.R.H.S = data record header size = 7 if non-spanned

D.R.H.S = data record header size = 10 if spanned

If any of these relationships do not hold, CHECKPRC will return to IDCAL01 with a terminating condition code.

If this is an alteration of an ESDS the index validity check will not be performed. If this is an alteration of an alternate index, the AMDRKP is a fixed value of X'05'. If relative key position is specified, it applies to the position of the alternate key within the base cluster record.

If the object being altered is a alternate index and the KEYS parameter was specified, a further check must be made which requires retrieving the AMDSB of the base cluster's data component. The table below shows the locates which CHECKPRC will issue based on the ENTYPE returned from the primary locate.

ENTYPE	Locates	Fields Requested
D	1-C association of G retrieved in secondary locate	NAMEDS (the first association)
	2-D association of C	AMDSBCAT (the first association)
G	1-C association retrieved in primary locate	NAMEDS
	2-D association of C	AMDSBCAT
R	1-D association of base cluster retrieved in primary locate	AMDSBCAT

Using the base cluster's data AMDSB, CHECKPRC will verify the following:

AIX AMDAXRKP + AIX AMDKEYLN ≤ base cluster AMDLRECL

or, if the base cluster has the spanned attribute,

AIX AMDAXRKP + AIX AMDKEYLN ≤ base cluster AMDCINV-D.R.H.S

where D.R.H.S = 10

If either of these conditions are not true, CHECKPRC will return to IDCAL01 with a terminating error.

Assuming no terminating errors have been found, CHECKPRC will now set the appropriate return code to IDCAL01 indicating what situation was encountered. The return code will eventually be passed back to the caller, and a message written. The table below shows the return code value which will be set:

	New values are equal to previous values	**New values are not equal to previous values**
Previous KEYS KEYS and/or RECORDSIZE values were default values	4	0
Previous KEYS and/or RECORDSIZE values were not default values	4	12

If the return code is 0, the alter will be performed. If the return code is 4, KEYS and RECORDSIZE will not be altered but alters will be performed for any other parameters specified. A return code of 12 is treated as a terminating condition code. If the verification of the new values fails, the return code is 12.

Control is returned to IDCAL01.

IDCAL01

Procedures: PARAMCHK

4 If only NEWNAME, OWNER | NULLIFY (OWNER), TO | FOR | NULLIFY (RETENTION), EXCEPTIONEXIT, NOUPGRADE, UPDATE | NOUPDATE, or BUFFERSPACE is specified, control goes to step 5. Otherwise, IDCAL01 passes control to the internal procedure PARAMCHK. PARAMCHK verifies that the parameters specified on the ALTER command are valid for the entry type of the object to be altered. The WRITECHECK | NOWRITECHECK, INHIBIT | NOINHIBIT, and SHAREOPTIONS parameters are only allowed for data or index objects. The ERASE|NOERASE, FREESPACE and UNIQUEKEY|NONUNIQUEKEY parameters are only allowed for data objects. If PARAMCHK detects an error, control goes to step 7, otherwise, control goes to step 5.

IDCAL01

Procedure: ALTERPRC

5 ALTERPRC uses the data from the ALTER command in the FDT and LOCTABLE. ALTERPRC builds a

CTGPL, a CTGFV, and several CTGFLs in order to change information in the catalog. Only fields that are specified in the ALTER command are changed in the catalog. If information in a field is not being changed, the CTGFL for the field is not built. The following table lists the data areas that pass information to VSAM and the keywords whose data is passed.

Data Area	**Keyword Data**
CTGPL	NEWNAME address FILE address ADDVOLUMES address REMOVEVOLUMES address
BUFSIZE CTGFL	BUFFERSPACE
DESTEXDT CTGFL	TO | FOR NULLIFY RETENTION
DSATTR CTGFL	ERASE | NOERASE SHAREOPTIONS UNINHIBIT | INHIBIT
OWNERID CTGFL	OWNER NULLIFY OWNER
PASSWALL CTGFL	MASTERPW CONTROLPW UPDATEPW READPW CODE ATTEMPTS AUTHORIZATION NULLIFY for any keywords just listed
AMDSBCAT CTGFL	FREESPACE WRITECHECK | NOWRITECHECK KEYS RECORDSIZE-maximum UNIQUEKEY | NONUNIQUEKEY
EXCPEXIT CTGFL	EXCEPTIONEXIT NULLIFY EXCEPTIONEXIT
RGATTR CTGFL	UPGRADE | NOUPGRADE UPDATE | NOUPDATE
LRECL CTGFL	RECORDSIZE-average

If KEYS or RECORDSIZE was specified, CHECKPRC has saved the control interval number of the data component being altered. This number is moved to the CPL and is used instead of the data component name for faster access.

Prior to IDCAL01 issuing the UCATLG macro the CTGFVTYP field will be set to G if UPGRADE/NOUPGRADE is specified.

CTGFVTYP will be set to R if UPDATE/NOUPDATE is specified.

IDCAL01

Procedure: IDCAL01

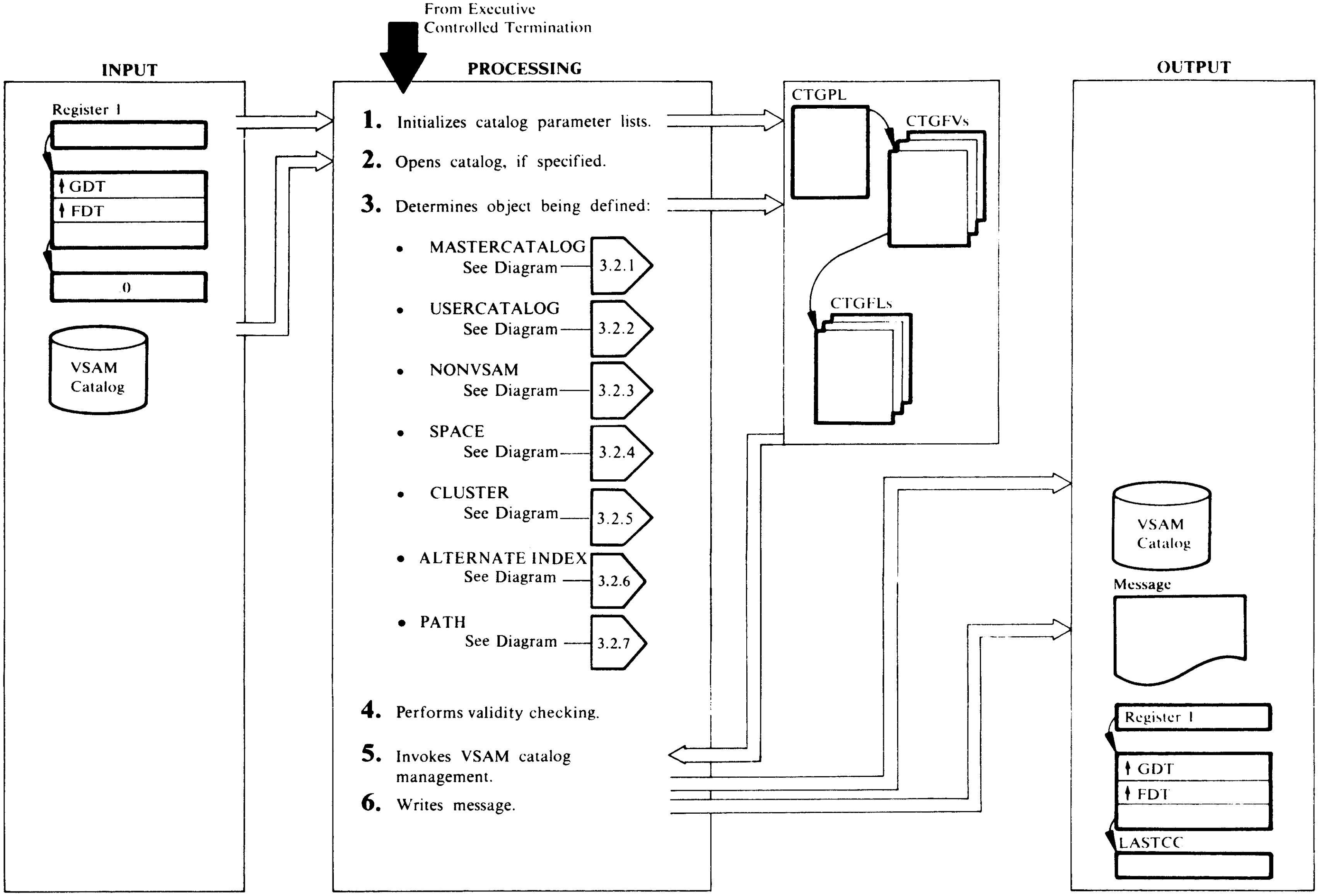
6 IDCAL01 issues a UCATLG macro to change the catalog entry. If the return code from UCATLG is nonzero, an error conversion table is built and a call is made to UERROR. UERROR will handle printing of the error message. If KEYS is specified for a KSDS or an alternate index, a second UCATLG macro is issued to change the catalog entry of the associated index object. If the return code is nonzero, it builds an error conversion table and calls UERROR. UERROR will handle the printing of the error message.

IDCAL01

Procedure: IDCAL01

7 ICDAL01 also writes a message with LASTCC to SYSLST. If IDCAL01 opened a VSAM catalog, it closes the catalog with a UCLOSE macro. Control goes to Executive Controlled Termination.

Diagram 3.2. DEFINE FSR



Extended Description for Diagram 3.2

IDCDE01

Procedure: IDCDE01

1 IDCDE01 issues a UGPOOL macro to obtain core for a CTGPL, four CTGFVs and two work areas. One work area is used by catalog management during its processing. The second is used by catalog management to return the volume serial of the recovery volume for the object defined if the catalog is recoverable. The CTGPL, CTGFVs and CTGFLs are used to pass information to VSAM catalog management. The CTGFVs are found through the CTGPL, and the CTGFLs are found through the CTGFVs. Refer to the *DOS/VS LIOCS Volume 4: VSAM Logic,* SY33-8562, for more information on the CTGPL, CTGFV, and CTGFL. Refer to the *Diagnostic Aids* chapter for an illustration of the DEFINE FSR work area. The characters CATPLIST preceed the CTGPL. A call is made to IECDE02 to establish addressability for IDCDE02 to declarations common to all DEFINE modules. If a *catname* is supplied with a CATALOG parameter, IDCDE01 puts the address of the *catname* and the *password* in the CTGPL.

IDCDE01

Procedure: IDCDE01

2 If the CATALOG parameter specifies a *dname,* IDCDE01 opens the catalog with a UOPEN macro. If the return code from UOPEN is zero, IDCDE01 compares the data set name returned from UOPEN (in IOCDSN) to that specified in the CATALOG parameter. If the compare is unequal, a message is written and control goes to Step 6. The I/O Adapter returns the address of the ACB for the catalog in the IOCSTR. IDCDE01 puts the address of the ACB in the CTGPL. IDCDE01 puts the address of the catalog ACB in the same CTGPL field where the address of the *catname* was placed. The ACB is used instead of the name for faster catalog access by VSAM catalog management. If the return code from the UOPEN is non-zero, a message is written with a UPRINT macro and control goes to step 6. Otherwise, IDCDE01 calls IDCDE03 to format the catalog parameter list.

IDCDE03

Procedure: IDCDE03

3 IDCDE01 determines the type of DEFINE by testing for the following keywords: CLUSTER, MASTERCATALOG, USERCATALOG, NONVSAM, SPACE, ALTERNATEINDEX, PATH. The types of DEFINE are shown in detail in the following diagrams:

MASTERCATALOG see Diagram 3.2.1
USERCATALOG see Diagram 3.2.2
SPACE see Diagram 3.2.3
NONVSAM see Diagram 3.2.4
CLUSTER see Diagram 3.2.5
ALTERNATEINDEX see Diagram 3.2.6.
PATH see Diagram 3.2.7.

IDCDE01

Procedure: INTGCHK

4 INTGCHK performs validity checking to insure:

KSDS, ESDS, RRDS, and AIX

- Space parameters have been properly specified.
- Volumes have been specified in both DATA and INDEX FVTs.
- If KEYLENGTH and KEY POSITION (in Data AMDSB) have not been specified supply defaults: length=64, relative key position=0.
- If average and maximum recordsize have not been specified, specify defaults: average for non-spanned=4089, average for spanned=4086, maximum for non-spanned=4089, maximum for spanned=32,600
- If UNIQUE is specified insure CTGFVIND has been set and build null volume FVT.
- If an ESDS, KSDS or AIX has the REUSABLE attribute make sure it is not unique nor have KEYRANGES been specified.
- If AMDRRDS indicates an RRDS, insure that the average and maximum LRECL are equal.
- If the data AMDSB indicates an RRDS, insure that it does not also indicate spanned.
- If record size is greater than 32,761 (maximum CI size), insure that it has the spanned attribute.
- If KEYRANGES is specified, ensure key values do not exceed maximum key length.

SPACE

- Space parameters have been properly specified.

IDCDE01

Procedure: IDCDE01

5 IDCDE01 invokes VSAM catalog management by issuing a UCATLG macro. If a list of names or a list of volume serial numbers is returned, the list is written with a UPRINT macro. If the return code from UCATLG is non-zero, IDCDE01 builds an error conversion table and invokes UERROR. UERROR will handle printing of the error message.

If a recovery volume serial is returned, it is printed with a UPRINT macro.

IDCDE01

Procedures: IDCDE01

6 If a catalog was opened in step 2, IDCDE01 closes the catalog with a UCLOSE macro. A message with LASTCC is written with a UPRINT macro. IDCDE01 calls FREESTG to free all automatic storage for CSECT IDCDE02. IDCDE01 issues a UFPOOL to free all the storage obtained for the DEFINE FSR. Control goes to Executive Controlled Termination.

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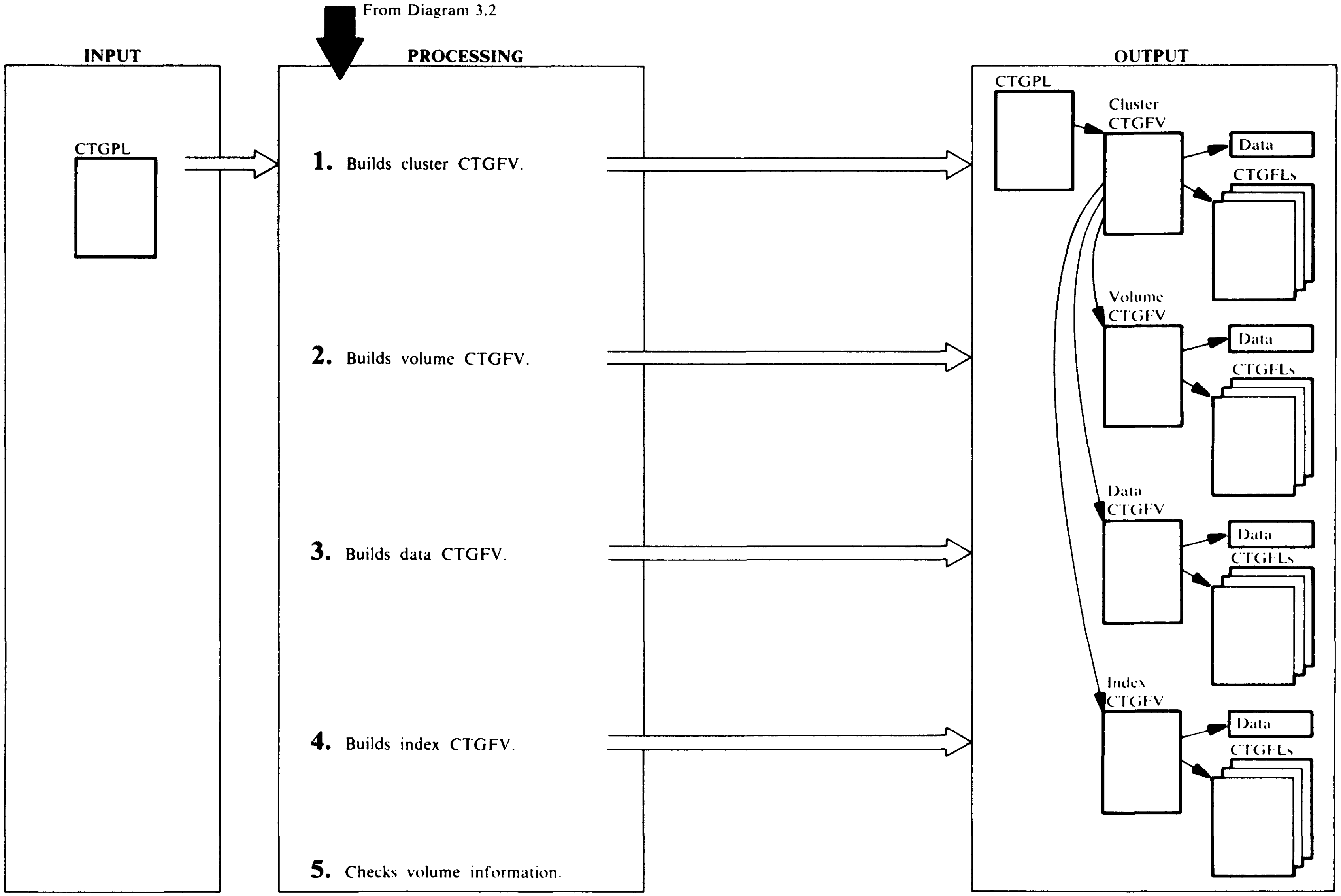
Diagram 3.2.1. DEFINE FSR – DEFINE MASTERCATALOG

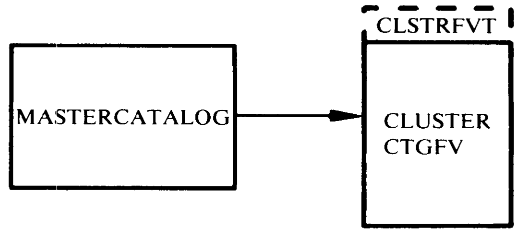


Extended Description for Diagram 3.2.1

IDCDE02, IDCDE03

Procedures: CTLGPROC, ALLCPROC, NAMEPROC, PROTPROC

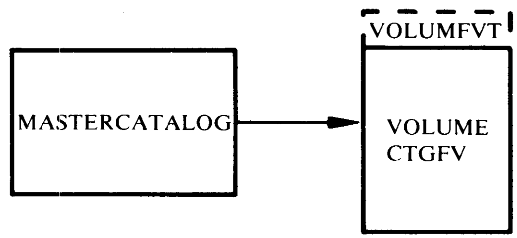
1 In the DEFINE MASTERCATALOG command, you specify information under three main keywords: MASTERCATALOG, DATA, and INDEX. The DEFINE FSR builds a CTGFV to describe the cluster, data and index components of the mastercatalog as well as building a volume CTGFV. Information specified under MASTERCATALOG goes in the CLUSTER and VOLUME CTGFVs; information under DATA goes in the DATA CTGFV; and information under INDEX goes in the INDEX CTGFV. If not enough information is specified under DATA or INDEX to build the DATA or INDEX CTGFV, information from MASTERCATALOG completes the DATA or INDEX CTGFV. If information is duplicated under DATA or INDEX and under MASTERCATALOG—like WRITECHECK—information from DATA or INDEX overrides the information from MASTERCATALOG in the DATA or INDEX CTGFV. The exception is space information from TRACKS, CYLINDERS, or RECORDS. Space information is never copied from MASTERCATALOG to the DATA and INDEX CTGFVs. CTLGPROC sets the identification of CLSTRFVT in the 8 bytes before the CLUSTER CTGFV. An "M" is set in the CTGTYPE field in the CTGPL to indicate that a master catalog is being defined. CTLGPROC puts the address of the *objectname* from NAME in the CLUSTER CTGFV. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. ALLCPROC sets the address of the recovery volume serial work area in the CTGFVWKA field of the cluster FVT. NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. NAMEPROC also builds a DSETEXDT CTGFL with the information from TO | FOR. PROTPROC builds a PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds a OWNERID CTGFL with information from OWNER.



IDCDE02, IDCDE03

Procedures: CTLGPROC, ALLCPROC

2 The DEFINE FSR builds a VOLUME CTGFV with information specified under MASTERCATALOG. CTLGPROC sets the identification of VOLUMFVT in the 8 bytes preceding the VOLUME CTGFV. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, or CYLINDERS, or RECORDS. ALLCPROC puts the address of *volser* from VOLUME and the address of *dname* from FILE in the VOLUME CTGFV.



IDCDE02, IDCDE03

Procedures: CTLGPROC, NAMEPROC, KEYPROC, ALLCPROC

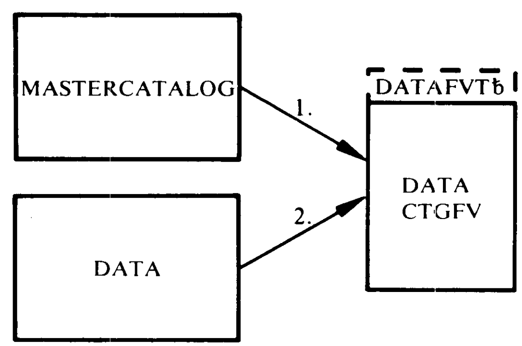
3 CTLGPROC sets the identification of DATAFVT in the 8 bytes preceding the DATA CTGFV. The DEFINE FSR builds the DATA CTGFV with information specified under MASTERCATALOG and under DATA. If information is duplicated under MASTERCATALOG and under DATA, the information in DATA overrides information from MASTERCATALOG. The DEFINE FSR first puts the information from MASTERCATALOG in the DATA CTGFV; second, information from DATA is put in the DATA CTGFV overriding anything already in the DATA CTGFV.

First, the information under MASTERCATALOG is put in the DATA CTGFV as follows:

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. KEYPROC builds a AMDSBCAT CTGFL, but no information is put in yet. ALLCPROC puts the address of the *volser* from VOLUME and the address of *dname* from FILE in the DATA CTGFV. WRITECHECK | NOWRITECHECK is put in the AMDSBCAT CTGFL. ALLCPROC builds a BUFSIZE CTGFL with information from BUFFERSPACE. ALLCPROC builds a DSATTR CTGFL for data set attributes and, in addition, sets the Recoverable or Not Recoverable indicator in DSATTR. In the listings this is called the implicit pass.

Second, the information under DATA is put in the DATA CTGFV as follows:

ALLCPROC builds a SPACPARM CTGFL for primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. ALLCPROC initializes the Recoverable/Not Recoverable flag in the DSATTR CTGFL. If WRITECHECK | NOWRITECHECK is specified under DATA, it is overridden in the AMDSBCAT CTGFL. If BUFFERSPACE is specified under DATA, ALLCPROC builds a BUFSIZE CTGFL or modifies the existing one. In the listings this is called the explicit pass.



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IDCDE02, IDCDE03

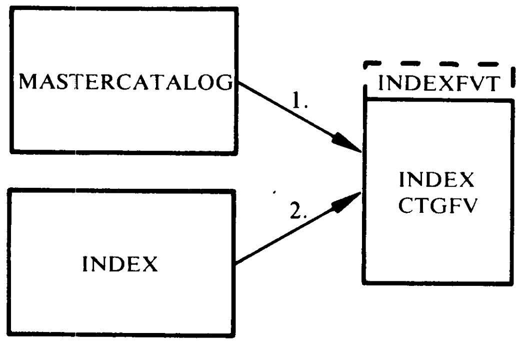
Procedures; CTLGPROC, NAMEPROC, KEYPROC, ALLCPROC

4 CTLGPROC sets the identification of INDEXFVT in the 8 bytes preceding the INDEX CTGFV. The DEFINE FSR builds the INDEX CTGFV with information specified under MASTERCATALOG and under INDEX. If information is duplicated under MASTERCATALOG and under INDEX, the information in INDEX overrides information from MASTERCATALOG. The DEFINE FSR first puts the information form MASTERCATALOG in the INDEX CTGFV; second, information from INDEX is put in the INDEX CTGFV overriding anything already in the INDEX CTGFV. First, the information under MASTERCATALOG is put in the INDEX CTGFV as follows:

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. KEYPROC builds a AMDSBCAT CTGFL, but no information is put in yet. ALLCPROC puts the address of the *volser* from VOLUME and the address of *dname* from FILE in the INDEX CTGFV. WRITECHECK | NOWRITECHECK is put in the AMDSBCAT CTGFL. ALLCPROC builds a DSATTR CTGFL for data set attributes. In the listings this is called the implicit pass.

Second, the information under INDEX is put in the INDEX CTGFV as follows:

ALLCPROC builds a SPACPARM CTGFL for primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. WRITECHECK | NOWRITECHECK is overridden in the AMDSBCAT CTGFL. ALLCPROC initializes the Recoverable/Not Recoverable flag in the DSATTR CTGFL. In the listings this is called the explicit pass.



IDCDE01

Procedure: INTGCHK

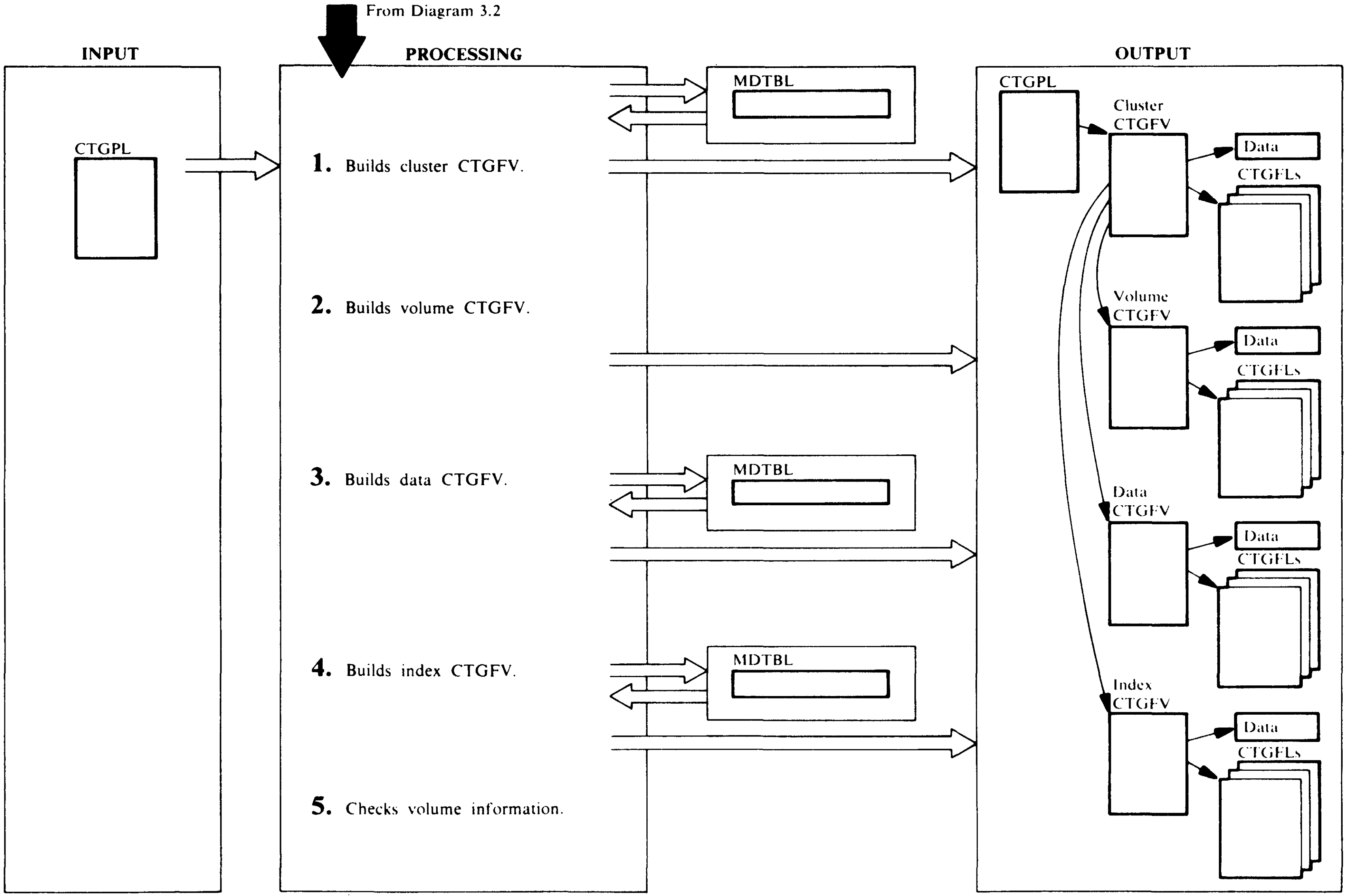
5 For MASTERCATALOG four CTGFV's have been built: one for cluster information, data information, index information, and volume information. A SPACPARM CTGFL must be specified on the CTGFV for volume information. In addition, INTGCHK checks the other three CTGFVs for a SPACPARM CTGFV. The following table shows the possible CTGFVs where a SPACPARM CTGFL may have been built (in addition to the VOLUME CTGFV) and the action INTGCHK takes.

SPACPARM CTGFL

Cluster	**Data**	**Index**	**Action**
X	X	X	IDCDE01 erases the SPACPARM CTGFL from the CLUSTER CTGFV.
X	X		IDCDE01 erases the SPACPARM CTGFL from the CLUSTER CTGFV.
X		X	This is an error; IDCDE01 terminates the DEFINE.
X			OK; no action.
none	none	none	This is an error; IDCDE01 terminates the DEFINE.

The SPACPARM CTGFL is checked for a *dname* from FILE. Control goes to Diagram 3.2, step 4. If an error occurs, INTGCHK writes a message and control goes to step 6.

Diagram 3.2.2. DEFINE FSR – DEFINE USERCATALOG



Extended Description for Diagram 3.2.2

IDCDE02, IDCDE03

Procedures: CTLGPROC, NAMEPROC, MODELPRC, PROTPROC, ALLCPROC

1 In the DEFINE USERCATALOG command, you specify information under three main keywords: USERCATALOG, DATA, and INDEX. The DEFINE FSR builds a CTGFV to describe the cluster, data and index components of the usercatalog as well as building a VOLUME CTGFV. Information specified under USERCATALOG goes in the CLUSTER and VOLUME CTGFVs; information under DATA goes in the DATA CTGFV; and information under INDEX goes in the INDEX CTGFV. If not enough information is specified under DATA or INDEX to build the DATA or INDEX CTGFV, information from USERCATALOG completes the DATA or INDEX CTGFV. If information is duplicated under DATA or INDEX and under USERCATALOG—like WRITECHECK—information from DATA or INDEX overrides the information from USERCATALOG in the DATA or INDEX CTGFV. The exception is space information from TRACKS, CYLINDERS, or RECORDS. Space information is never copied from the cluster.

If a MODEL is specified, the information in the command overrides the information in the MODEL. The MODEL has one catalog entry to describe its cluster, one entry for its data, and one entry for its index. The information in the MODEL's cluster catalog entry is used to build the CLUSTER CTGFV; information in the MODEL's data catalog entry is used to build the DATA CTGFV; and information in the MODEL's index entry is used to build the INDEX CTGFV. The order of precedence when modeling is shown below where 1 has the highest precedence:

CLUSTER CTGFV

1. USERCATALOG parameters
2. Cluster object of model

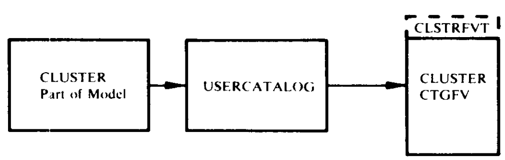
DATA CTGFV

1. DATA parameters
2. USERCATALOG parameters
3. Data object of model

INDEX CTGFV

1. INDEX parameters
2. USERCATALOG parameters
3. Index object of model

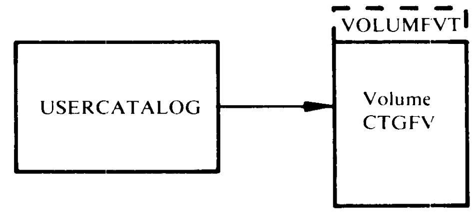
CTLGPROC sets the identification of CLSTRFVT in the 8 bytes before the CLUSTER CTGFV. A U is put in the CTGTYPE field of the CTGPL to indicate that a user catalog is being defined. CTLGPROC puts the address of the *objectname* from NAME in the CLUSTER CTGFV. CTLGPROC checks for a MODEL keyword. If MODEL is specified, MODELPRC issues a UCATLG macro to retrieve information from the modeled catalog. The information from the cluster catalog entry of the modeled catalog is put in a table, MDLTABL, and the Control Interval number for the data and index entries of the modeled catalog are saved. MDLTABL contains an address and the length of each field of information returned from the UCATLG. In building the CLUSTER CTGFV, information is obtained from MDLTABL and is then overlaid by the information specified in the USERCATALOG parameters. NAMEPROC builds a DSETEXDT CTGFL with the information from TO | FOR. PROTPROC builds a PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds a OWNERID CTGFL with *ownerid* from OWNER. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, and RECORDS. NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. ALLCPROC sets the address of the recovery volume serial work area in the CTGFVWKA field of the cluster FVT.



IDCDE02, IDCDE03

Procedures: CTLGPROC, ALLCPROC

2 The DEFINE FSR builds a VOLUME CTGFV with information specified under USERCATALOG. No information is taken from a MODEL for the VOLUME CTGFV. CTLGPROC sets the identification of VOLUMFVT in the 8 bytes preceding the VOLUME CTGFV. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. ALLCPROC puts the address of *volser* from VOLUMES and the address of *dname* from FILE in the VOLUME CTGFV.



IDCDE02, IDCDE03

Procedures: CTLGPPROC, NAMEPROC, KEYPROC, ALLCPROC, MODELPRC

3 CTLGPROC sets the identification of DATAFVT in the 8 bytes preceding the DATA CTGFV. The DEFINE FSR builds the DATA CTGFV with the information specified in USERCATALOG parameters. This information is then overlaid by the information specified in the DATA parameters.

Two passes are performed. On the first pass, called the implicit pass, the following occurs:

If MODEL is not specified, the DATA CTGFV is built with information specified in the USERCATALOG parameters.

If MODEL is specified, MODELPRC uses the saved Control Interval number for the data entry of the modeled catalog to get information from the data entry. The information from the data entry of the modeled catalog is put in MDLTABL. The DATA CTGFV is built with information from MDLTABL and is then overlaid by the information specified in USERCATALOG parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. KEYPROC builds a AMDSBCAT CTGFL, but no information is put in yet. ALLCPROC puts the address of the *volser* from VOLUME and the address of *dname* from FILE in the DATA CTGFV. WRITECHECK | NOWRITECHECK is put in the AMDSBCAT CTGFL. ALLCPROC builds a BUFSIZE CTGFL with information from BUFFERSPACE. ALLCPROC builds a DSATTR

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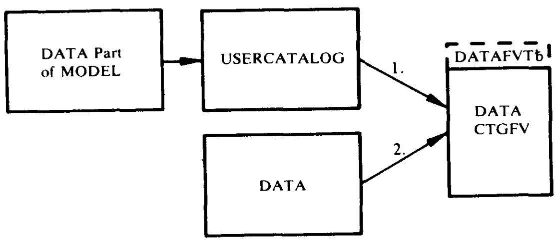
On the second pass, called the explicit pass, the information in the DATA CTGFV from the implicit pass is overlaid by the information specified in the DATA parameters.

If a DSETCRDT CTGFL does not exist, NAMEPROC builds one. Normally, a DSETCRDT CTGFL does exist. ALLCPROC builds a SPACPARM CTGFL for primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. If WRITECHECK | NOWRITECHECK is specified undet DATA, it is overridden in the AMDSBCAT CTGFL. If BUFFERSPACE is specified under DATA, ALLCPROC builds a BUFSIZE CTGFL or modifies the existing one. ALLCPROC initializes the Recoverable/Not Recoverable flag in the DSATTR CTGFL.



IDCDE02, IDCDE03

Procedures: CTLGPROC, NAMEPROC, KEYPROC, ALLCPROC, MODELPRC

4 CTLGPROC sets the identification of INDEXFVT in the 8 bytes preceding the INDEX CTGFV. The DEFINE FSR builds the INDEX CTGFV with the information specified in USERCATALOG parameters which is overlaid by the information specified in the INDEX parameters. Two passes are performed. On the first pass, called the implicit pass, the following occurs:

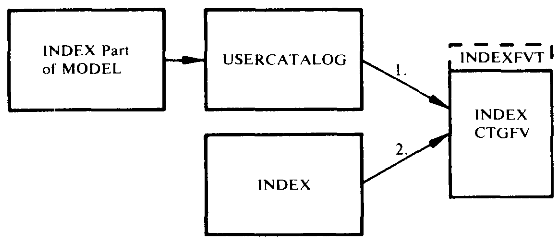
If MODEL is not specified, the INDEX CTGFV is built with information specified in USERCATALOG parameters.

If MODEL is specified, MODELPRC uses the saved Control Interval number for the index entry of the modeled catalog to get information from the index entry. The information from the index entry of the modeled catalog is put in MDLTABL. The INDEX CTGFV is built with information from MDLTABL and then overlaid by the information specified in the USERCATALOG parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. KEYPROC builds a AMDSBCAT CTGFL, but no information is put in yet. ALLCPROC puts the address of the *volser* from VOLUME and the address of *dname* from FILE in the INDEX CTGFV. WRITECHECK | NOWRITECHECK is put in the AMDSBCAT CTGFL. ALLCPROC builds a DSATTR CTGFL for data set attributes.

On the second pass, called the explicit pass, the information in the INDEX CTGFV from the implicit pass is overlaid by the information specified in the INDEX parameters.

ALLCPROC builds a SPACPARM CTGFL for primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. WRITECHECK NOWRITECHECK is overridden in the AMDSBCAT CTGFL.



IDCDE01

Procedure: INTGCHK

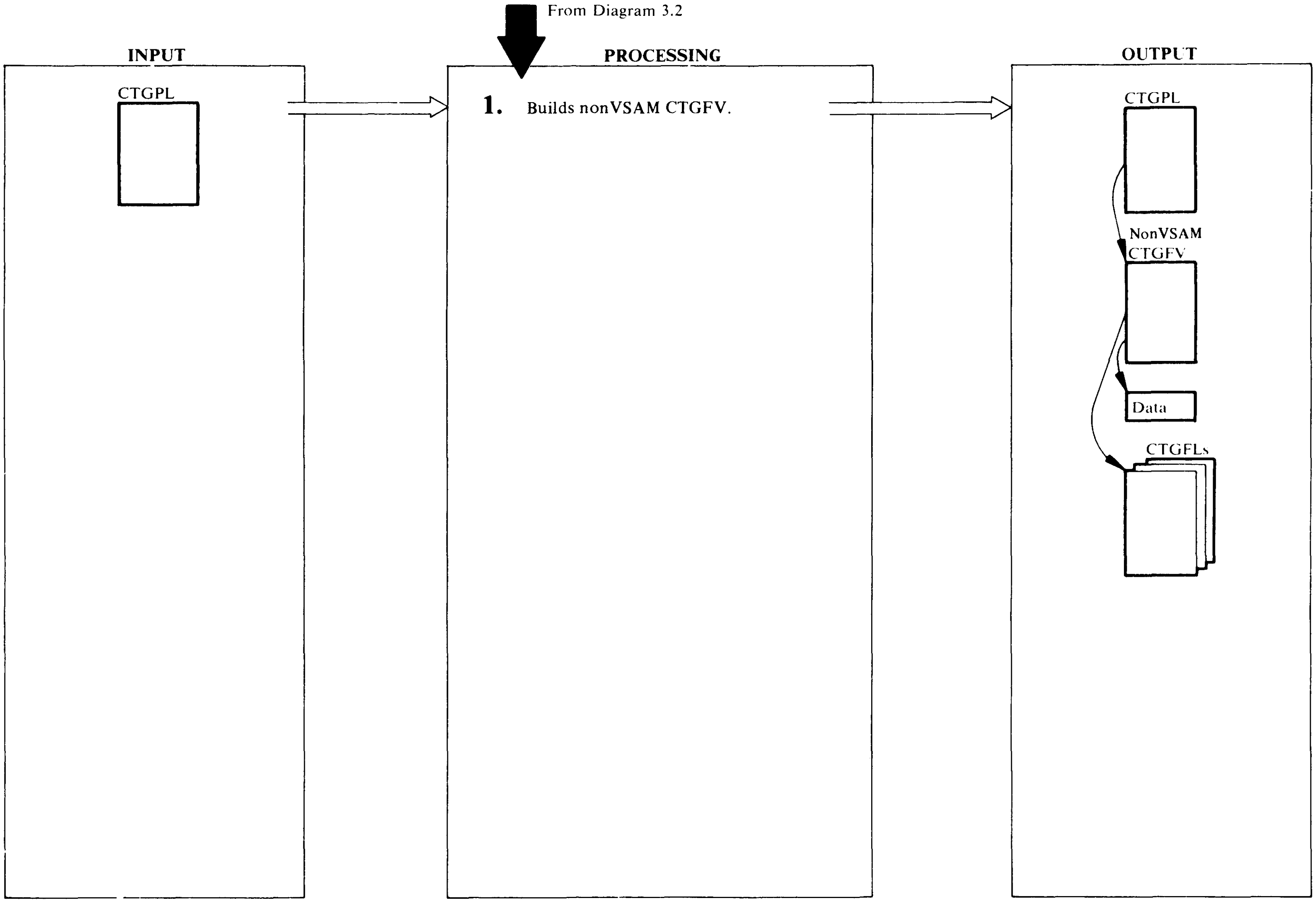
5 For USERCATALOG four CTGFVs have been built - one for cluster information, data information, index information, and volume information. A SPACPARM CTGFL must be specified on the CTGFV for volume information. In addition, INTGCHK checks the other three CTGFVs for a SPACPARM CTGFV. The following table shows the possible CTGFVs (in addition to the VOLUME CTGFV) where a SPACPARM CTGFL may have been built and the action INTGCHK takes:

SPACEPARM CTGFL

Cluster	Data	Index	Action
X	X	X	IDCDE01 erases the SPACPARM CTGFL from the CLUSTER CTGFV.
X	X		IDCDE01 erases the SPACPARM CTGFL from the CLUSTER CTGFV.
X		X	This is an error; IDCDE01 terminates the DEFINE.
X			OK; no action.
none	none	none	This is an error; IDCDE01 terminates the DEFINE.

The SPACPARM CTGFL is checked for a *dname* from FILE. Control goes to Diagram 3.2, step 4. If an error occurs, INTGCHK writes a message and control goes to Diagram 3.2, step 5.

Diagram 3.2.3. DEFINE FSR–DEFINE NONVSAM



Extended Description for Diagram 3.2.3

IDCDE02, IDCDE03

Procedures: NVSAMPRC, ALLCPROC, PROTPROC, NAMEPROC

1 NVSAMPRC sets the identification of NVSAMFVT in the 8 bytes preceding the area that is usually used for a CLUSTER CTGFV. NVSAMPRC puts the address of the NONVSAM CTGFV in the CTGFVT field of the CTGPL. NAMEPROC puts the address of *objectname* from NAME in the NONVSAM CTGFV. ALLCPROC puts the address of *volser* from VOLUMES in the NONVSAM CTGFV. ALLCPROC builds a DEVTYPE CTGFL for information from DEVICETYPES. If FILESEQUENCENUMBERS is specified, ALLCPROC puts the address of *numbers* from FILESEQUENCENUMBERS in the NONVSAM CTGFV. ALLCPROC sets the address of the recovery volume serial work area in the CTGFVWKA field. Control goes to Diagram 3.2, step 4.

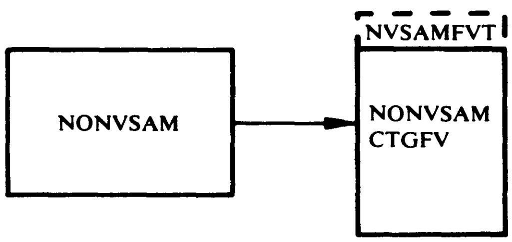
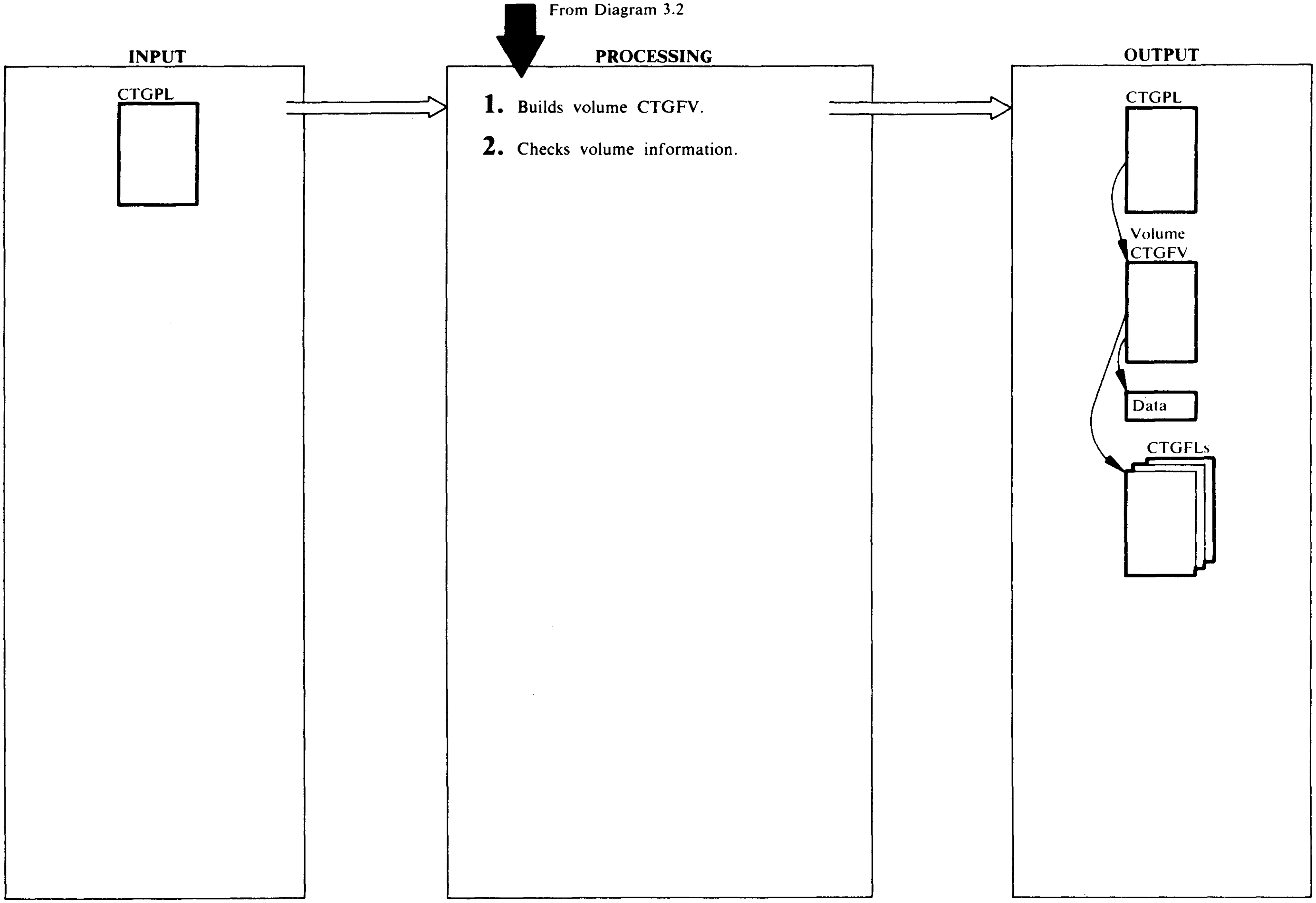


Diagram 3.2.4. DEFINE FSR – DEFINE SPACE

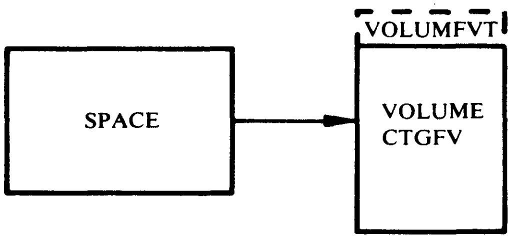


Extended Description for Diagram 3.2.4

IDCDE02, IDCDE03

Procedures: DSPACPRC, ALLCPROC

1 DSPACPRC sets the identification of VOLUMFVT in the 8 bytes preceding the VOLUME CTGFV. The address of the VOLUME CTGFV is put in the CTGPL in the field named CTGFVT because the VOLUME CTGFV is the only CTGFV for a DEFINE SPACE. ALLCPROC puts the address of the *volser* from VOLUMES and the address of *dname* from FILE in the VOLUME CTGFV. ALLCPROC builds a SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. If RECORDS is specified, ALLCPROC builds a LRECL CTGFL with information from RECORDSIZE. ALLCPROC sets the address of the recovery volume serial work area in the CTGFVWKA field of the volume FVT.

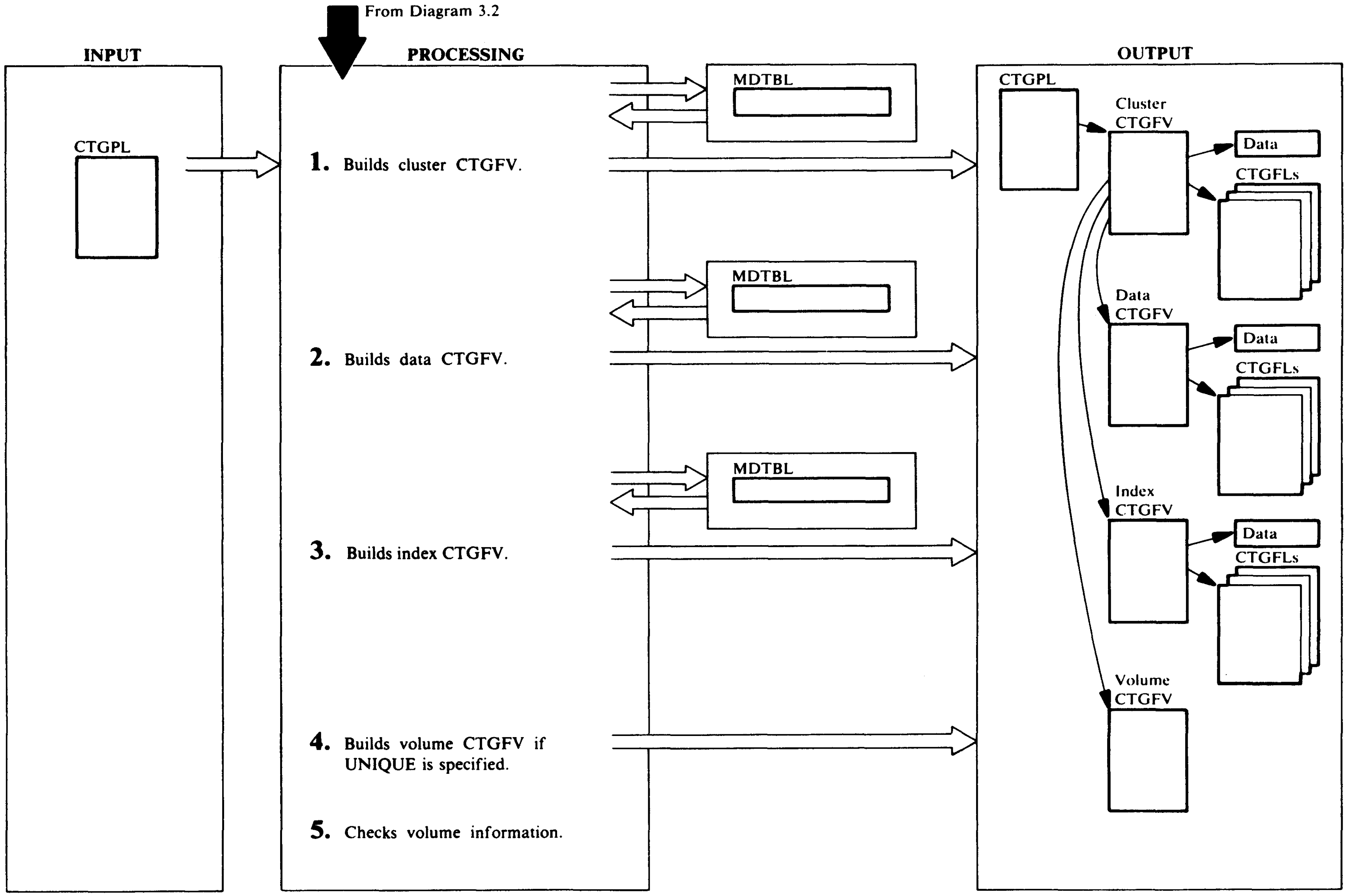


IDCDE01

Procedures: INTGCHK

2 For DEFINE SPACE only a VOLUME CTGFV is built. INTGCHK checks the VOLUME CTGFV to be sure a SPACPARM CTGFL is present. If the space is in units of records, the VOLUME CTGFV must contain the address of a LRECL CTGFL. INTGCHK checks to be sure that a FILE keyword is encoded in the VOLUME CTGFV. Control goes to Diagram 3.2, step 4.

Diagram 3.2.5. DEFINE FSR – DEFINE CLUSTER



Extended Description for Diagram 3.2.5

IDCDE02, IDCDE03

Procedures: DSETPROC, NAMEPROC, MODELPRC, PROTPROC, ALLCPROC

1 In the DEFINE CLUSTER command, you specify information under three main keywords: CLUSTER, DATA, and INDEX. The DEFINE FSR builds a CTGFV to describe the cluster, data, and index components of the cluster as well as building a VOLUME CTGFV if UNIQUE is specified. Information specified under CLUSTER goes in the CLUSTER CTGFV; information under DATA goes in the DATA CTGFV; and information under INDEX goes in the INDEX CTGFV. Nothing is put in the VOLUME CTGFV. If not enough information is specified under DATA or INDEX to build the DATA or INDEX CTGFV, information from CLUSTER completes the DATA or INDEX CTGFV. If information is duplicated under DATA or INDEX and under CLUSTER—like WRITECHECK—information from DATA or INDEX overrides the information from CLUSTER in the DATA or INDEX CTGFV. The exception is space information from TRACKS, CYLINDERS, or RECORDS, or CANDIDATE. Space information is never copied from CLUSTER.

If MODELs are specified, the information in the command overrides the information in a MODEL. A MODEL has one catalog entry to describe its cluster, one entry for its data, and one entry for its index, if the MODEL is a keyed sequence data set. The information in a MODEL's cluster catalog entry is used to build the CLUSTER CTGFV; information in a MODEL's data entry is used to build the DATA CTGFV; and information in the MODEL's index entry is used to build the INDEX CTGFV. The order of precedence when modeling is shown below where 1 takes the highest precedence:

CLUSTER CTGFV

1. CLUSTER parameters
2. Cluster object of CLUSTER model

DATA CTGFV

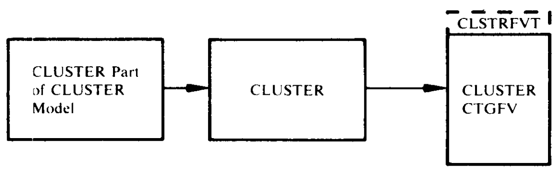
1. DATA parameters
2. DATA model
3. CLUSTER parameters
4. Data object of CLUSTER model

INDEX CTGFV

1. INDEX parameters
2. INDEX model
3. CLUSTER parameters
4. Index object of CLUSTER model

If MODEL is specified, MODELPRC issues a UCATLG to retreive information from the modeled VSAM data set. The information from the cluster catalog entry of the modeled data set is put in a table, MDLTABL, and the Control Interval number for the data and index entries of the modeled data set are saved. MDLTABL contains an address and the length of each field of information returned from the UCATLG. In building the CLUSTER CTGFV, information is obtained from MDLTABL is then overlaid by information specified in the CLUSTER parameters.

DSETPROC sets the identification of CLSTRFVT in the 8 bytes before the CLUSTER CTGFV. DSETPROC also sets the address of the recovery volume serial work area in the CTGFVWKA field. NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. NAMEPROC puts the address of *objectname* from NAME in the CLUSTER CTGFV. NAMEPROC builds a DSETEXDT CTGFL with the information from TO | FOR. PROTPROC builds a PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds a OWNERID CTGFL with information from OWNER. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS.



IDCDE02, IDCDE03

Procedures: DSETPROC, NAMEPROC, KEYPROC, MODELPRC, ALLCPROC, PROTPROC

2 DSETPROC sets the identification of DATA FVT in the 8 bytes preceding the DATA CTGFV. The DEFINE FSR builds the DATA CTGFV with the information specified in CLUSTER parameters. This information is then overlaid by the information specified in the DATA parameters. Two passes are performed. On the first pass, called the implicit pass, the following occurs:

If MODEL is not specified, the DATA CTGFV is built with information specified in the CLUSTER parameters.

If MODEL is specified under CLUSTER and MODEL is not specified under DATA, MODELPRC uses the saved Control Interval number for the data entry of the modeled data set to get information from the data entry. The information from the data entry of the modeled data set is put in MDLTABL. The DATA CTGFV is built with information from MDLTABL and is then overlaid by the information specified in CLUSTER parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. NAMEPROC also builds an EXCPEXIT CTGFL with exception exit information. KEYPROC builds a AMDSBCAT CTGFL, and ALLCPROC builds a DSATTR CTGFL, but no information is put in them yet. KEYPROC puts the *length* and *offset* from KEYS in the AMDSBCAT CTGFL. If no key values are specified, KEYPROC sets up default values. In addition, KEYPROC sets an indication in the AMDSB if SPANNED has been specified. KEYPROC also puts the address of *(lowkey highkey)...* from KEYRANGES in the DATA CTGFV. If NUMBERED has been specified, KEYPROC sets AMDRRDS in the AMDSB field. This FPL is being built by KEYPROC. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the DATA CTGFV. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. ALLCPROC also builds a BUFSIZE CTGFL with information from BUFFERSPACE. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
cipercent and *capercent* from FREESPACE
size from CONTROLINTERVALSIZE
WRITECHECK | NOWRITECHECK
maximum from RECORDSIZE

PROTPROC puts ERASE | NOERASE and *crosspartition crosssystem* from SHAREOPTIONS in the DSATTR CTGFL.

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Protection information is obtained only from the MODEL via MDLTABL in order to provide different protection at the CLUSTER and DATA. PROTPROC builds a PASSWALL CTGFL with protection information from the MODEL as well as an OWNERID CTGFL with owner information from the MODEL. PROTPROC sets the appropriate bit of the ATTR1 field of the DSATTR field to indicate REUSE | NOREUSE.

On the second pass, called the explicit pass, the following occurs:

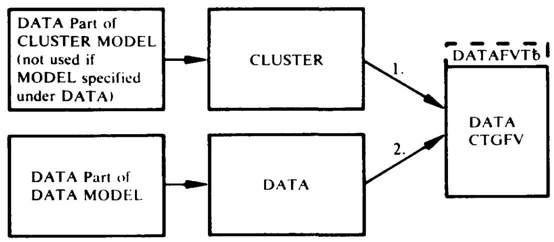
If MODEL is not specified under DATA the information specified in the DATA parameters overlays the information placed in the DATA CTGFV on the implicit pass.

If MODEL is specified under DATA, MODELPRC issues a UCATLG to get information from the data catalog entry of the modeled data set. The information from the data entry of the modeled data set is put in MDLTABL. The information in MDLTABL overlays the information placed in the DATA CTGFV on the implicit pass. Finally, the information in the DATA CTGFV is overlaid with the information specified in the DATA parameters.

NAMEPROC puts the address of *objectname* from NAME in the DATA CTGFV. Using a pointer to the name of the EXCEPTIONEXIT routine, NAMEPROC builds and initializes the EXCPEXIT FPL and references it in the FVT field CTGFVEXT. KEYPROC sets the AMDSPAN flag of AMDATTR in the AMDSB to indicate the SPANNED | NONSPANNED option. KEYPROC puts *length* and *offset* from KEYS in the AMDSBCAT CTGFL. KEYPROC puts the address of *(lowkey highkey)...* range list from KEYRANGES in the DATA CTGFV. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the DATA CTGFV. Note: the volume serial list is not merged with any other volume serial list. ALLCPROC also builds or modifies the SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS; the LRECL CTGFL with *average* from RECORDSIZE; and the BUFSIZE CTGFL with *size* from BUFFERSPACE. PROTPROC builds or modifies the PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds or modifies the OWNERID CTGFL with *ownerid* from OWNER. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
cipercent and *capercent* from FREESPACE
size from CONTROLINTERVALSIZE
WRITECHECK | NOWRITECHECK
maximum from RECORDSIZE

UNIQUE | SUBALLOCATION and SPEED | RECOVERY are put in the DSATTR CTGFL. ERASE | NOERASE and *crosspartition crosssystem* from SHAREOPTIONS are put in the DSATTR CTGFL.



IDCDE02, IDCDE03

Procedures: DSETPROC, NAMEPROC, KEYPROC, ALLCPROC, MODELPROC, IXOPPROC, PROTPROC

3 An INDEX CTGFV is built if any of the following are true:

INDEXED is specified
NONINDEXED or NUMBERED is not specified
The MODEL under CLUSTER is an indexed data set

In the listings an *indexed* data set is called a KSDS for Key Sequence Data Set. A *non-indexed* data set is called an ESDS for Entry Sequence Data Set.

DSETPROC sets the identification of INDEXFVT in the 8 bytes preceding the INDEX CTGFV. The DEFINE FSR builds the INDEX CTGFV with the information specified in the CLUSTER parameters, which is overlaid by the information specified in the INDEX parameters. Two passes are performed. On the first pass, called the implicit pass, the following occurs:

If MODEL is not specified, the INDEX CTGFV is built with information specified in CLUSTER parameters.

If MODEL is specified under CLUSTER and MODEL is not specified under INDEX, MODELPRC uses the saved Control Interval number for the index entry of the modeled data set to get information from the index entry. The information from the index entry of the modeled data set is put in MDLTABL. The INDEX CTGFV is built with information from MDLTABL and is then overlaid by the information specified in the CLUSTER parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. NAMEPROC also puts the address of *objectname* from NAME in the INDEX CTGFV. Using a pointer to the name of the EXCEPTIONEXIT routine, NAMEPROC builds and initializes the EXCPEXIT FPL and references it in the FVT field CTGFVEXT. KEYPROC builds a AMDSBCAT CTGFL, and ALLCPROC builds a DSATTR CTGFL, but no information is put in them yet. IMBED | NOIMBED in the AMDSBCAT CTGFL. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the INDEX CTGFV. ALLCPROC also builds a SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
WRITECHECK | NOWRITECHECK
size from CONTROLINTERVALSIZE

UNIQUE | SUBALLOCATION is put in the DSATTR CTGFL. Record size is not indicated because it is always fixed length for the index of a VSAM data set.

Protection information is obtained only from the MODEL via MDLTABL in order to provide different protection at the CLUSTER and INDEX. PROTPROC builds a PASSWALL CTGFL with protection information from the MODEL as well as a OWNERID CTGFL with owner information from the MODEL. PROTPROC sets the appropriate bit of the ATTR1 field of the DSATTR field to indicate REUSE | NOREUSE.

On the second pass, called the explicit pass, the following occurs:

If MODEL is not specified under INDEX the information specified in the INDEX parameters overlays the information placed in the INDEX CTGFV on the implicit pass.

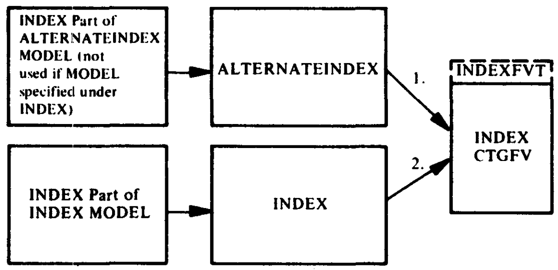
If MODEL is specified under INDEX, MODELPRC issues a UCATLG to get information from the index catalog entry of the modeled data set. The information from the index entry of the modeled data set is put in MDLTABL. The information in MDLTABL overlays the information placed in the INDEX CTGFV on the implicit pass. Finally, the information in the INDEX CTGFV is overlaid with the information sp specified in the INDEX parameters.

NAMEPROC puts the address of *objectname* from NAME in the INDEX CTGFV. Using a pointer to the name of the EXCEPTIONEXIT routine, NAMEPROC builds and initializes the EXCPEXIT FPL if specified under INDEX. IXOPPROC puts REPLICATE | NOREPLICATE and IMBED | NOIMBED in the AMDSBCAT CTGFL. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the INDEX CTGFV. ALLCPROC also builds or modifies the SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. PROTPROC builds or modifies the PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds or modifies the OWNERID CTGFL with *ownerid* from OWNER. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
WRITECHECK | NOWRITECHECK
size from CONTROLINTERVALSIZE

The following is put in the DSATTR CTGFL:

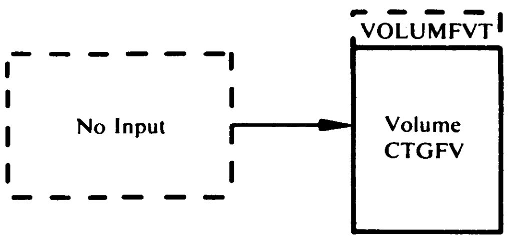
UNIQUE | SUBALLOCATION
ERASE | NOERASE
crosspartition crosssystem from SHAREOPTIONS



IDCDE03

Procedures: DSETPROC, IDCDE01

4 If UNIQUE is specified, a null VOLUME CTGFV is built. DSETPROC puts the identification VOLUMFVT in the 8 bytes preceding the VOLUME CTGFV. The VOLUME CTGFV is not initialized because VSAM uses the VOLUME CTGFV for a work area.



IDCDE01

Procedure: INTGCHK

5 For a VSAM data set two or three CTGFVs have been built—one each for cluster, data, and index information. If a VOLUME CTGFV has been built, it does not have any information in it because VSAM uses it for a work space. The following table shows the possible places where a SPACPARM CTGFL may have been built and the action INTGCHK takes.

For an INDEXED data set:

SPACPARM CTGFL

Cluster	**Data**	**Index**	**Action**
X	X	X	This is an error; IDCDE01 terminates the DEFINE.
X	X		This is an error; IDCDE01 terminates the DEFINE.
X		X.	This is an error; IDCDE01 terminates the DEFINE.
	X	X	OK; no action.
X			OK; no action.
	X		OK; no action.
		X	This is an error; IDCDE01 terminates the DEFINE.
none	none	none	This is an error; IDCDE01 terminates the DEFINE.

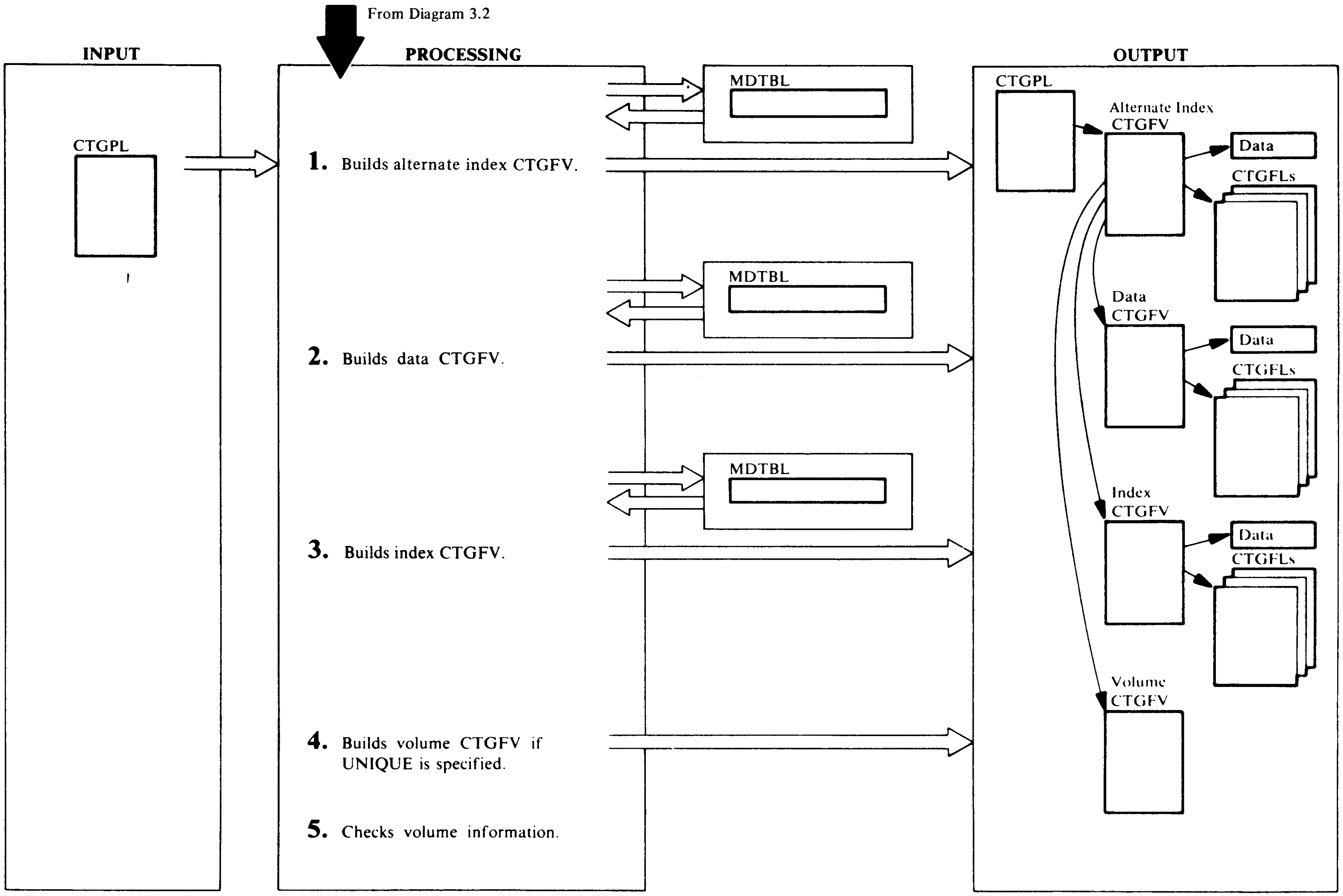
For an NONINDEXED data set:

SPACEPARM CTGFL

Cluster	**Data**	**Action**
X	X	This is an error; IDCDE01 terminates the DEFINE.
X		OK; no action.
	X	OK; no action.
none	none	This is an error; IDCDE01 terminates the DEFINE.

INTGCHK checks the data CTGFV to be sure that Logical Record Length is specified with a LRECL CTGFLS. If not, one is built with a default average recordsize. Control goes to Diagram 3.2, step 4.

Diagram 3.2.6. DEFINE FSR – DEFINE ALTERNATE INDEX



Extended Description for Diagram 3.2.6

IDCDE02, IDCDE03

Procedures: AIXPROC, NAMEPROC, MODELPRC, PROTPROC, ALLCPROC

1 In the DEFINE AIX command, you specify information under three main keywords: AIX, DATA, and INDEX. The DEFINE FSR builds a CTGFV to describe the alternate index, data, and index components of the alternate index as well as building a VOLUME CTGFV if UNIQUE is specified. Information specified under ALTERNATEINDEX goes in the ALTERNATEINDEX CTGFV; information under DATA goes in the DATA CTGFV; and information under INDEX goes in the INDEX CTGFV. Nothing is put in the VOLUME CTGFV. If not enough information is specified under DATA or INDEX to build the DATA or INDEX CTGFV, information from ALTERNATEINDEX completes the DATA or INDEX CTGFV. If information is duplicated under DATA or INDEX and under ALTERNATEINDEX—like WRITECHECK—information from DATA or INDEX overrides the information from ALTERNATEINDEX in the DATA or INDEX CTGFV. The exception is space information from TRACKS, CYLINDERS, or RECORDS. Space information is never copied from ALTERNATEINDEX.

If MODELs are specified, the information in the command overrides the information in a MODEL. A MODEL has one catalog entry to describe its alternate index, one entry for its data, and one entry for its index. The information in a MODEL's alternate index catalog entry is used to build the ALTERNATEINDEX CTGFV; information in a MODELS's data entry is used to build the DATA CTGFV; and information in the MODEL's index entry is used to build the INDEX CTGFV. The order of precedence when modeling is shown below where 1 takes the highest precedence:

ALTERNATEINDEX CTGFV

1. ALTERNATEINDEX parameters
2. Cluster object of ALTERNATEINDEX

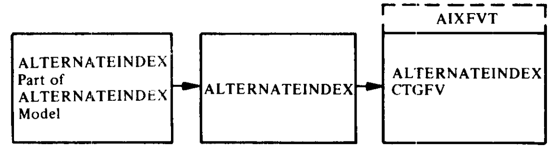
DATA CTGFV

1. DATA parameters
2. DATA model
3. ALTERNATEINDEX parameters
4. Data object of ALTERNATEINDEX model

INDEX CTGFV

1. INDEX parameters
2. INDEX model
3. ALTERNATEINDEX parameters
4. Index object of ALTERNATEINDEX model.

AIXPROC sets the identification of AIXFVT in the 8 bytes before the ALTERNATEINDEX CTGFV. AIXPROC checks for a MODEL keyword under ALTERNATEINDEX. If MODEL is specified, MODELPRC issues a UCATLG to retrieve information from the modeled alternate index. The information from the alternate index catalog entry of the modeled data set is put in a table, MDLTABL, and the control interval number for the data and index entries of the modeled data set are saved. MDLTABL contains an address and the length of each field of information returned from the UCATLG. In building the ALTERNATEINDEX CTGFV, information is obtained from MDLTABL and is then overlaid with information specified in the ALTERNATEINDEX parameters. NAMEPROC issues a UTIME macro to get the creation date which is put in an DSETCRDT CTGFL. NAMEPROC puts the address of *objectname* from NAME in the CLUSTER CTGFV. The call to NAMEPROC for initialization of the alternate index level sets up a pointer to the related name and its password, if any, in the CTGFV. ALLCPROC will set the address of the recovery volume serial work area in the CTGFVWKA field of the alternate index (G) FVT. NAMEPROC builds a DSETEXDT CTGFL with the information from TO | FOR. PROTPROC builds a PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds an OWNERID CTGFL with information from OWNER. The call to PROTPROC in the initialization of the AIX FVT includes an indication as to whether UPGRADE or NOUPGRADE has been specified. PROTPROC builds a RGATTR FPL and initializes it depending upon the information passed by AIXPROC. If neither of these parameters was specified, a default of UPGRADE is set in RGATTR. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS.



IDCDE02, IDCDE03

Procedures: AIXPROC, NAMEPROC, KEYPROC, MODELPRC, ALLCPROC, PROTPROC

2 AIXPROC sets the identification of DATAFVT in the 8 bytes preceding the DATA CTGFV. The DEFINE FSR builds the DATA CTGFV with the information specified in ALTERNATEINDEX parameters. This information is then overlaid by the information specified in the DATA parameters. Two passes are performed. On the first pass, called the implicit pass, the following occurs:

If MODEL is not specified, the DATA CTGFV is built with the information specified in the ALTERNATEINDEX parameters.

If MODEL is specified under ALTERNATEINDEX and MODEL is not specified under DATA, MODELPRC uses the saved control interval number for the data entry of the modeled data set to get information from the data entry. The information from the data entry of the modeled data set is put in MDLTABL.

The DATA CTGFV is built with information from MDLTABL and is then overlaid by the information specified in ALTERNATEINDEX parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in an DSETCRDT CTGFL. The calls to NAMEPROC in the initialization of the DATA FVT for an alternate index includes a pointer to the name of the EXCEPTIONEXIT routine; NAMEPROC builds and initializes the EXCPEXIT FPL and references it in the FVT field CTGFVEXT. KEYPROC builds an AMDSBCAT CTGFL, and ALLCPROC builds a DSATTR CTGFL, but no information is put in them yet.

KEYPROC puts the *length* and *offset* from KEYS in the AMDSBCAT CTGFL. If no key values have been specified, KEYPROC sets up defaults. KEYPROC also puts the address of *(lowkey highkey)...* from KEYRANGES in the DATA CTGFV. The calls to KEYPROC in the construction of the DATA FVT of

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an AIX includes an indication of UNIQUEKEY/NONUNIQUEKEY. KEYPROC initializes the AMDUNQ flag in the AMDSB to indicate the appropriate condition. KEYPROC sets the AMDRKP field to a fixed value of X'05' and the AMDAXRKP field to the value specified for relative key position. KEYPROC sets the AMDSPAN flag in the AMDSB since all alternate indexes have the spanned attribute. The AMDSB FPL is built by KEYPROC. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the DATA CTGFV. ALLCPROC builds a SPACPARM CTGFL with the primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. ALLCPROC also builds a BUFSIZE CTGFL with information from BUFFERSPACE. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
cipercent and *capercent* from FREESPACE
size from CONTROLINTERVALSIZE
WRITECHECK | NOWRITECHECK
maximum from RECORDSIZE

PROTPROC puts ERASE | NOERASE, REUSE | NOREUSE *crosspartition crosssystem* from SHAREOPTIONS in the DSATTR CTGFL.

Protection information is obtained only from the MODEL via MDLTABL in order to provide different protection at the ALTERNATEINDEX and DATA. PROTPROC builds a PASSWALL CTGFL with protection information from the MODEL as well as a OWNERID CTGFL with owner information from the MODEL.

On the second pass, called the explicit pass, the following occurs:

If MODEL is not specified under DATA, the information specified in the DATA parameters overlays the information placed in the DATA CTGFV on the implicit pass.

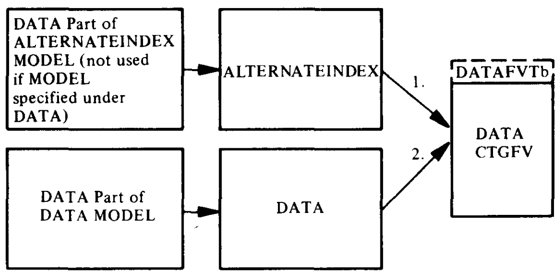
If MODEL is specified under DATA, MODELPRC issues a UCATLG to get information from the data catalog entry of the modeled alternate index. The information from the data entry of the modeled alternate index is put in MDLTABL. The information in MDLTABL overlays the information placed in the DATA CTGFV on the implicit pass. Finally, the information in the DATA CTGFV is overlaid with the information specified in the DATA parameters.

NAMEPROC puts the address of *objectname* from NAME in the DATA CTGFV. KEYPROC puts *length* and *offset* from KEYS in the AMDSBCAT CTGFL. KEYPROC puts the address of *(lowkey highkey)...* from KEYRANGES in the DATA CTGFV. ALLCRPOC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the DATA CTGFV. Note: the volume serial list is not merged with any other volume serial list. ALLCPROC also builds or modifies the SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS; the LRECL CTGFL with *average* from RECORDSIZE; and the BUFSIZE CTGFL with *size* from BUFFERSPACE. PROTPROC builds or modifies the PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION.

PROTPROC also builds or modifies the OWNERID CTGFL with *ownerid* from OWNER. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
cipercent and *capercent* from FREESPACE
size from CONTROLINTERVALSIZE
WRITECHECK | NOWRITECHECK
maximum from RECORDSIZE

UNIQUE | SUBALLOCATION and SPEED | RECOVERY are put in the DSATTR CTGFL. ERASE | NOERASE, REUSE | NOREUSE, and *crosspartition crosssystem* from SHAREOPTIONS are put in the DSATTR CTGFL.



IDCDE02, IDCDE03

Procedures: AIXPROC, NAMEPROC, KEYPROC, ALLCPROC, MODELPROC, IXOPPROC, PROTPROC

3 An INDEX CTGFV is always built for an alternate index.

AIXPROC sets the identification of INDEXFVT in the 8 bytes preceding the INDEX CTGFV. The DEFINE FSR builds the INDEX CTGFV with the information specified in ALTERNATEINDEX parameters, which is overlaid by the information specified in the INDEX parameters. Two passes are performed. On the first pass, called the implicit pass, the following occurs:

If MODEL is not specified, the INDEX CTGFV is built with the information specified in ALTERNATEINDEX parameters.

If MODEL is specified under CLUSTER, and MODEL is not specified under INDEX, MODELPRC uses the saved control interval number for the index entry of the modeled alternate index to get information from the index entry. The information from the index entry of the modeled alternate index is put in MDLTABL. The INDEX CTGFV is built with information from MDLTABL and then overlaid by the information specified in the ALTERNATEINDEX parameters.

NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. The calls to NAMEPROC in the initialization of the DATA and INDEX FVTs for an alternate index includes a pointer to the name of the EXCEPTIONEXIT routine; NAMEPROC builds and initializes the EXCPEXIT FPL and references it in the FVT field CTGFVEXT. KEYPROC builds an AMDSBCAT CTGFL, and ALLCPROC builds a DSATTR CTGFL, but no information is put in them yet. IXOPPROC puts REPLICATE | NOREPLICATE and IMBED | NOIMBED in the AMDSBCAT CTGFL. ALLCPROC puts the address of the *dname* from FILE and the address of *volser* from VOLUMES in the INDEX CTGFV. ALLCPROC also builds a SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
WRITECHECK | NOWRITECHECK
size from CONTROLINTERVALSIZE

UNIQUE | SUBALLOCATION is put in the DSATTR CTGFL. Record size is not indicated because it is always fixed length for the index of an alternate index.

Protection information is obtained only from the MODEL via MDLTABL in order to provide different protection at the ALTERNATEINDEX and INDEX. PROTPROC builds a PASSWALL CTGFL with protection information from the MODEL as well as a OWNERID CTGFL with owner information from the MODEL.

On the second pass, called the explicit pass, the following occurs:

If MODEL is not specified under INDEX, the information specified in the INDEX parameters overlays the information placed in the INDEX CTGFV on the implicit pass.

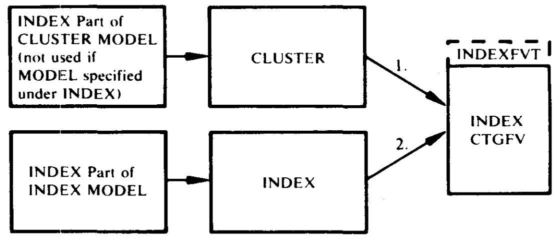
If MODEL is specified under INDEX, MODELPRC issues a UCATLG to get information from the index catalog entry of the modeled alternate index. The information from the index entry of the modeled alternate index is put in MDLTABL. The information in MDLTABL overlays the information placed in the INDEX CTGFV on the implicit pass. Finally, the information in the INDEX CTGFV is overlaid with the information specified in the INDEX parameters.

NAMEPROC puts the address of *objectname* from NAME in the INDEX CTGFV. IXOPPROC puts REPLICATE | NOREPLICATE and IMBED | NOIMBED in the AMDSBCAT CTGFL. ALLCPROC puts the address of *dname* from FILE and the address of *volser* from VOLUMES in the INDEX CTGFV. ALLCPROC also builds or modifies the SPACPARM CTGFL with primary and secondary space information from TRACKS, CYLINDERS, or RECORDS. PROTPROC builds or modifies the PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds or modifies the OWNERID CTGFL with *ownerid* from OWNER. The following is put in the AMDSBCAT CTGFL:

ORDERED | UNORDERED
WRITECHECK | NOWRITECHECK
size from CONTROLINTERVALSIZE

The following is put in the DSATTR CTGFL:

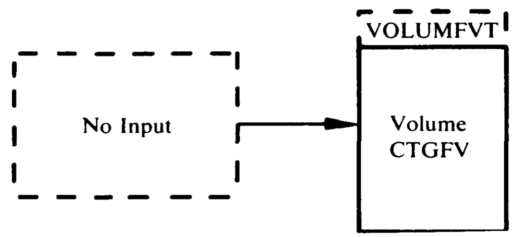
UNIQUE | SUBALLOCATION
ERASE | NOERASE
REUSE | NOREUSE
crosspartition crosssystem from SHAREOPTIONS



IDCDE03

Procedures: AIXPROC

4 If UNIQUE is specified, a null VOLUME CTGFV is built. AIXPROC puts the identification VOLUMFVT in the 8 bytes preceding the VOLUME CTGFV. The VOLUME CTGFV is not initialized because VSAM uses the VOLUME CTGFV for a work area.



IDCDE01

Procedure: INTGCHK

5 For an alternate index two or three CTGFVs have been built—one each for alternate index, data, and index information. If a VOLUME CTGFV has been built, it does not have any information in it because VSAM uses it for a work space. The following table shows the possible places where a SPACPARM CTGFL may have been built and the action INTGCHK takes.

SPACPARM CTGFL

Alternate Index	Data	Index	Action
X	X	X	This is an error; IDCDE01 terminates the DEFINE.
X	X		This is an error; IDCDE01 terminates the DEFINE.
X		X	This is an error; IDCDE01 terminates the DEFINE.
	X	X	OK; no action.
X			OK; no action.
	X		OK; no action.
		X	This is an error; IDCDE01 terminates the DEFINE.
none	none	none	This is an error; IDCDE01 terminates the DEFINE.

INTGCHK checks the data CTGFV to be sure that logical record length is specified with a LRECL CTGFL. If not, an LRECL CTGFL is built with the default average recordsize. Control goes to Diagram 3.2, step 4.

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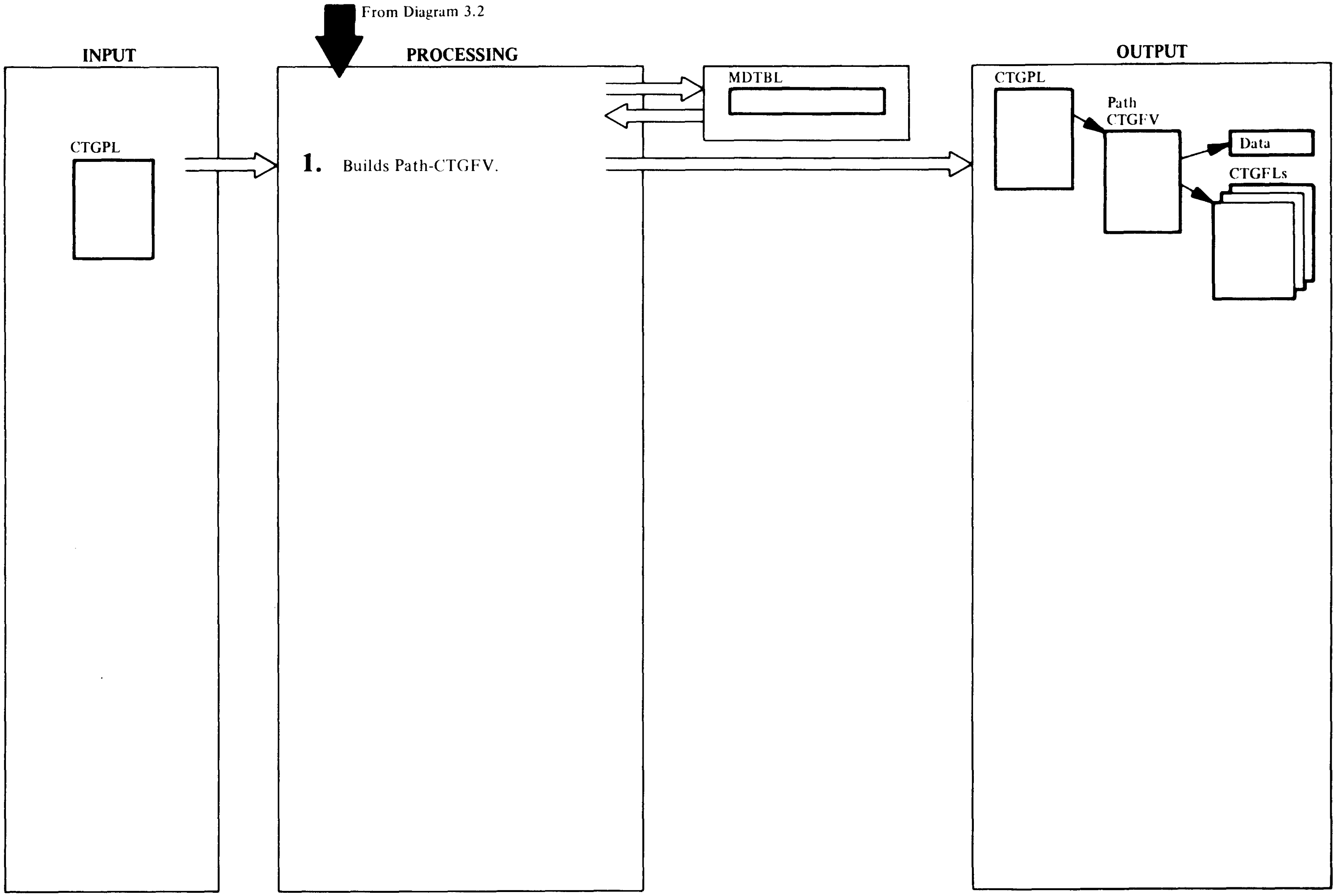
Diagram 3.2.7. DEFINE FSR – DEFINE PATH



Extended Description for Diagram 3.2.7

IDCDE02, IDCDE03

Procedures: PATHPROC, NAMEPROC, MODELPRC PROTPROC, ALLCPROC

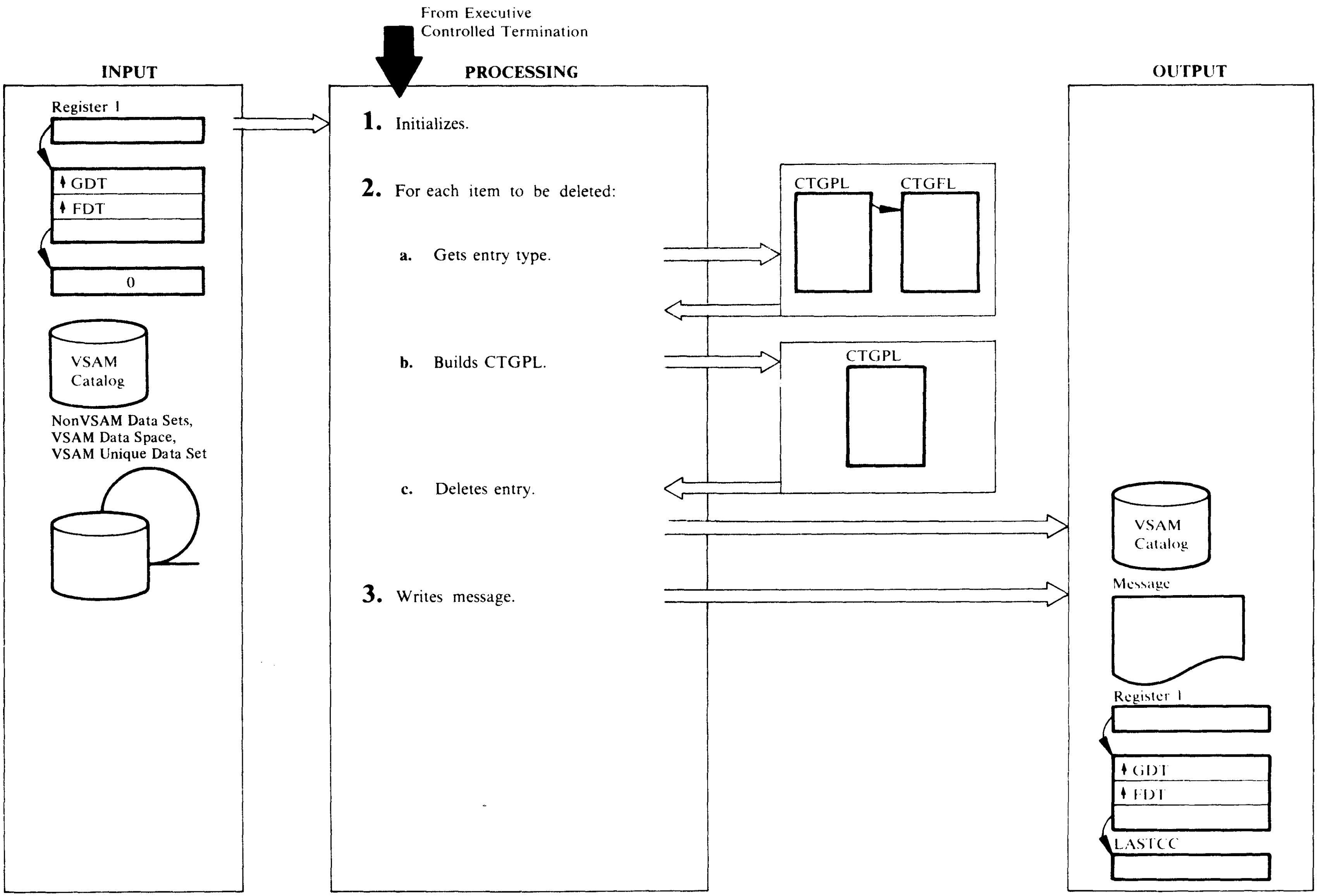
1 In the DEFINE PATH command, you specify information under one main keyword: PATH. The DEFINE FSR builds a CTGFV to describe the path. Information specified under PATH goes in the PATH CTGFV.

If MODEL is specified, the information in the command overrides the information in a model. A model has one catalog entry to describe its path. The information in a model's path catalog entry is used to build the PATH CTGFV.

PATHPROC checks for a MODEL keyword under PATH. If MODEL is specified, MODELPRC issues a UCATLG to retrieve information from the modeled VSAM data set. The information from the path catalog entry of the modeled data set is put in a table, MDLTABL. MDLTABL contains an address and the length of each field of information returned from the UCATLG. In building the PATH FVT, information is obtained from MDLTABL and is then overlaid by information specified in the PATH parameters.

PATHPROC sets the identification of PATHFVT in the 8 bytes before the PATH CTGFV. NAMEPROC issues a UTIME macro to get the creation date which is put in a DSETCRDT CTGFL. NAMEPROC puts the address of *objectname* from NAME in the PATH CTGFV. NAMEPROC is supplied with the address necessary to reference the PATHENTRY name and places its address in CTGFVNAM. The password of the PATHENTRY is referenced from CTGFVPWD. NAMEPROC builds a DSETEXDT CTGFL with the information from TO | FOR, PROTPROC builds a PASSWALL CTGFL with information from MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, and AUTHORIZATION. PROTPROC also builds an OWNERID CTGFL with information from OWNER. The call to PROTPROC in the construction of the PATH FVT includes the UPDATE | NOUPDATE indication for a path. PROTPROC builds the RGATTR FPL and references it in the PATH FVT field CTGFVUPG. If neither of these parameters was specified, a default of UPDATE is set in the RGATTR. ALLCPROC sets the address of the recovery volume serial work area in the CTGFVWKA field of the PATH FVT. The CTGFVTYP field of the PATH FVT is set to R.

Diagram 3.3. DELETE FSR



Extended Description For Diagram 3.3

IDCDL01

Procedure: CATOPEN

1 If a CATALOG is specified, CATOPEN builds an OPNAGL and issues a UOPEN to open the catalog. If the catalog does not open, CATOPEN prints an error message and the DELETE command is terminated. If the return code from UOPEN is zero, CATOPEN compares the data set name returned by UOPEN (in IOCDSN) to the name specified in the CATALOG parameter. If the compare is unequal, a message is written and the DELETE command is terminated.

IDCDL01

Procedures: FINDTYPE, BUILDCPL, CATCALL, MORESP, IDCDL01

2 The following steps are performed for each *entryname* to be deleted. Control goes to step 3 to terminate the command when all *entrynames* have been deleted or a serious error is encountered.

a. If the entry type is not specified in the command, FINDTYPE builds a CTGPL and CTGFL in which VSAM returns the entry type. FINDTYPE initializes the CTGPL and CTGFL once for the entire DELETE command, and they are used over and over for each *entryname*. FINDTYPE issues a UCATLG macro to locate the entry type. If the return code is non-zero, FINDTYPE builds an error conversion table and invokes the UERROR macro to print a message, but the rest of the DELETE command is processed.

PARAMCHK checks for invalid or insufficient parameters which were not checked by the Reader/Interpreter. The Reader/Interpreter cannot do all the necessary parameter checking if the user has not specified the entry type or if the entry type is NONVSAM. If there is an invalid parameter, PARAMCHK writes an error message, but the rest of the DELETE command is processed.

b. BUILDCPL builds a CTGPL to delete the entry. BUILDCPL initializes the CTGPL once for the entire DELETE command, and it is used over and over for each *entryname*. BUILDCPL puts the following information in the CTGPL: the address of the *entryname*, the address of the *dname*, type of entry if specified on the command, PURGE | NOPURGE, ERASE | NOERASE, FORCE | NOFORCE, SCRATCH | NOSCRATCH, address of a *password* if specified, and the address of the catalog name or ACB address if CATALOG is specified. BUILDCPL also puts the address of a work area needed by VSAM in the CTGPL. The work area passed to catalog management is set initially to a size large enough to contain twelve names. BUILDCPL puts the address of the entry name and the address of the entry password in the CTGPL. If the entry type is nonVSAM and neither SCRATCH or NOSCRATCH is specified, BUILDCPL sets SCRATCH in the CTGPL. If the entry was located from the catalog, BUILDCPL puts the entry type in the CTGPL.

c. CATCALL deletes the *entryname* by issuing a UCATLG macro with the CTGPL built by BUILDCPL. If the return code is zero, VSAM has returned a list of deleted objects. CATCALL writes the name of each deleted object in the entry with a UPRINT macro. Control is given to step 2. If the return code is 160, the entry type is SPACE and the space was deleted, but the volume entry in the catalog could not be removed because there are still some VSAM data sets on the volume. This is not a DELETE error so the condition code to the user is zero, but CATCALL writes an explanatory message.

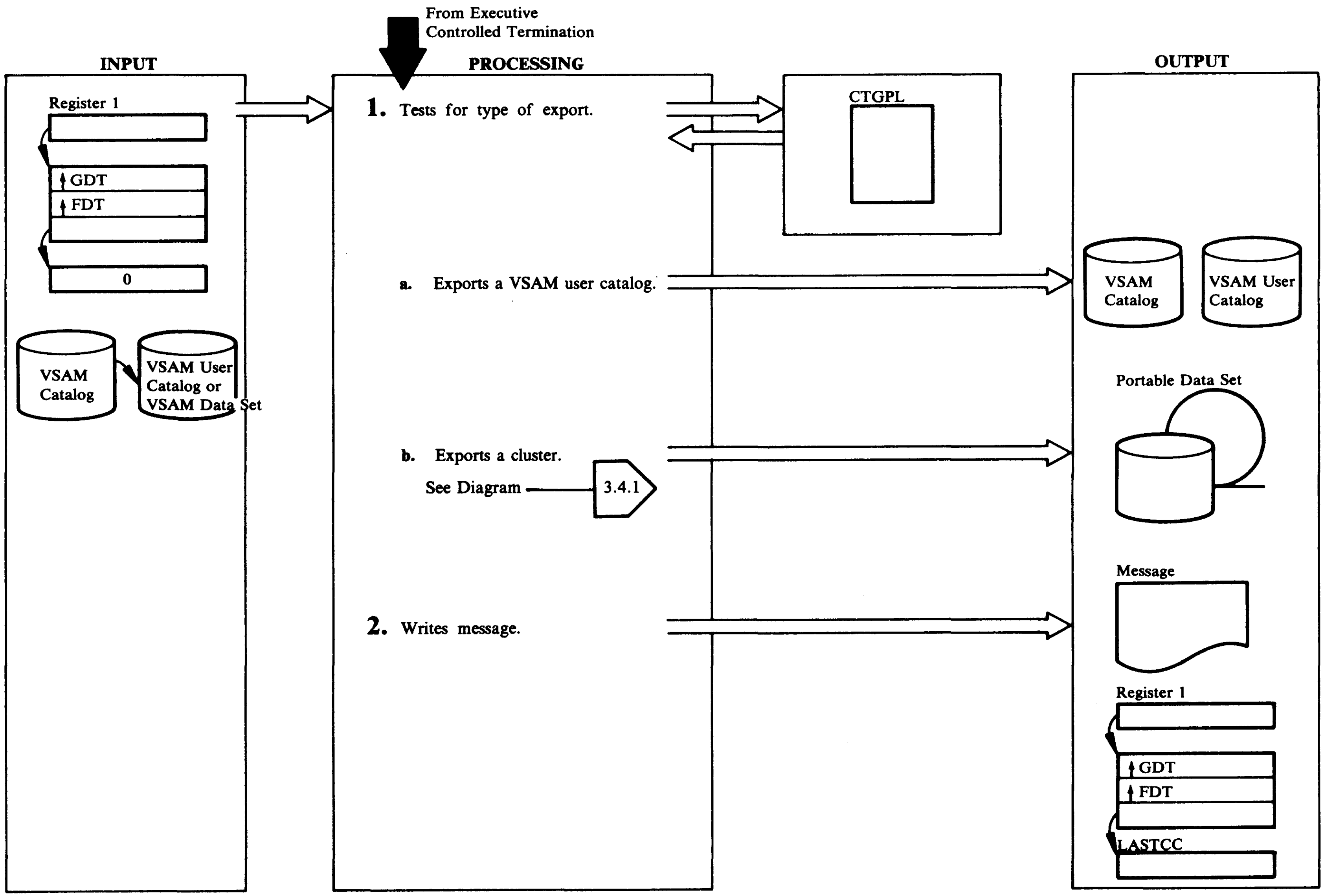
A return code of 40 indicates that insufficient space remains in the work area to contain the names associated with the next structure segment to be deleted (e.g. an alternate index with its associated data, index and path names). Catalog management services has placed in the work area the names of those objects successfully deleted thus far, plus a factor indicating the amount of space necessary for the next structure. Should catalog give a return code of 40, CATCALL calls MORESP. MORESP sets the CTGOVRID bit to 1 and the CTGERASE bit to 0 to prevent CMS from reerasing the object being deleted. MORESP prints the names of those entries deleted thus far and calculates whether the current work area size can contain the next segment to be deleted. If enough space is available, the work area is reset to zero; otherwise the current work area is freed with a UGPOOL call (provided that it is not PL/S automatic storage) and a large enough work area obtained with a UGPOOL call. If the return from UGPOOL is nonzero, a message is written and control returns to Step 2 for the next entry. Otherwise, MORESP reissues the UCATLG macro with the same entry name. This process continues until the entire structure has been deleted or a terminating error occurs. If the return code from UCATLG is not 40 or 160 an error message is printed by building an error conversion table and invoking the UERROR macro.

IDCDL01

Procedures: CLEANUP, IDCDL01

3 If a catalog was opened by CATOPEN, CLEANUP closes the catalog with a UCLOSE macro. IDCDL01 prints a message with LASTCC. Control goes to Executive Controlled Termination, Diagram 4.0.

Diagram 3.4. EXPORT FSR



Extended Description for Diagram 3.4

IDCXP01

Procedures: IDCXP01, DELTPROC, LOCPROC, CTLGPROC, OPENPROC, PUTPROC, CLUSPROC

1 IDCXP01 tests the FDT for DISCONNECT in the EXPORT command. Step 1.a is done if DISCONNECT is specified, or step 1.b is done if DISCONNECT is not specified.

a. DELTPROC builds a CTGPL to delete the user catalog entry in the VSAM catalog. DELTPROC issues a UGPOOL for a work area in which VSAM puts deleted names. If a *password* is supplied, LOCPROC puts it in the CTGPL. CTLGPROC deletes the user catalog entry by issuing a UCATLG macro with the CTGPL. If the return code is 40, the work area addressed from the CTGPL is too small. The former work area is released with a UFPOOL, and the returned size of the work area needed is used with a UGPOOL to get another work area. If the new work area is obtained, another UCATLG macro is issued. If the return code from the first UCATLG is non-zero and not 40, or if the return code from the second UCATLG is non-zero, an error message is written by building an error conversion table and issuing the UERROR macro.

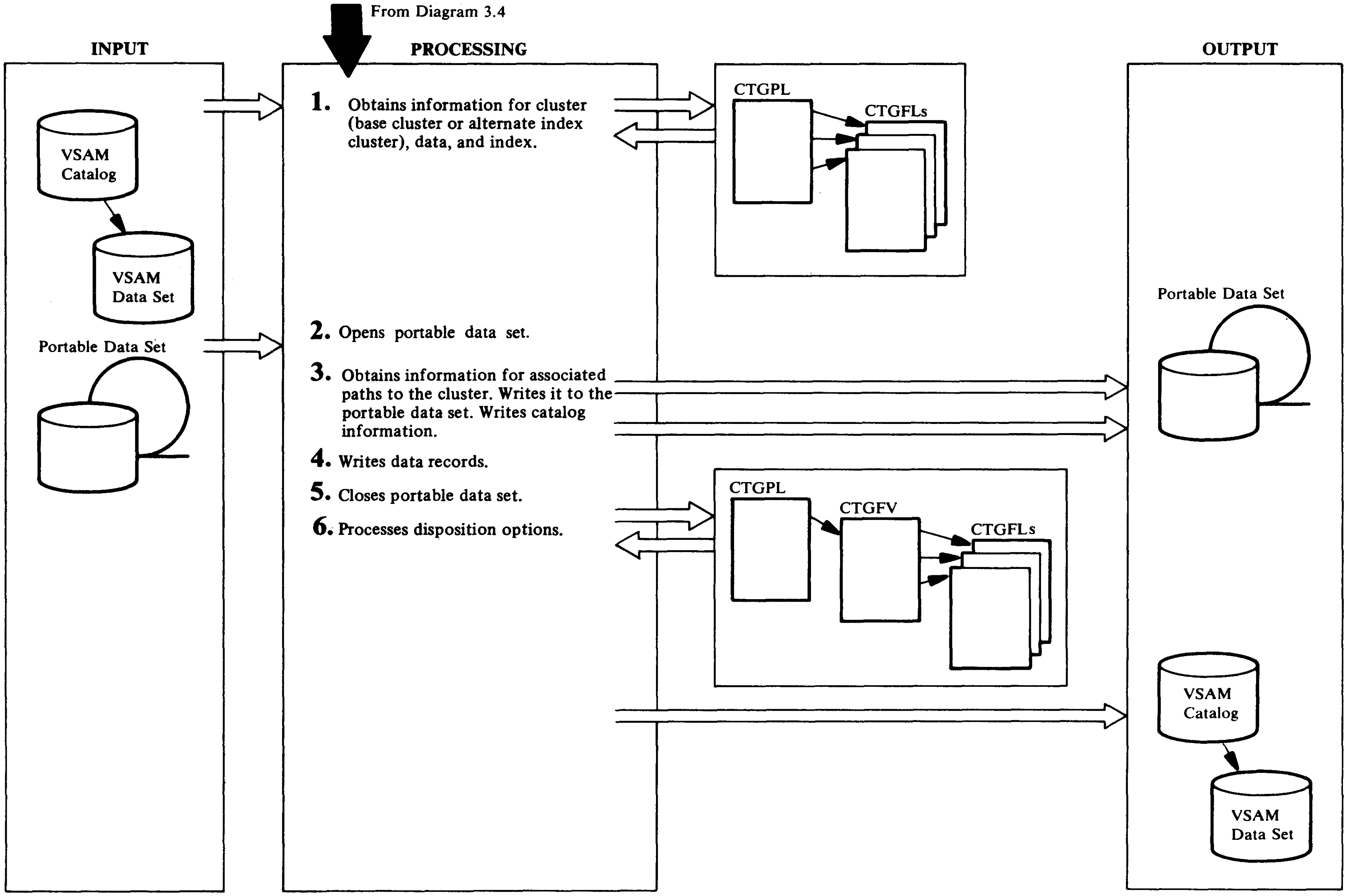
b. LOCPROC gets catalog information about the cluster or alternate index, data, index, and path entries for the VSAM data set. OPENPROC opens the portable data set for output. PUTPROC writes catalog information and data records on the portable data set. CLUSPROC closes the portable data set and processes the disposition options, TEMPORARY | PERMANENT. Refer to *Appendix A* for a description of the portable data set. Diagram 3.4.1 shows exporting a cluster or alternate index in detail.

IDCXP01

Procedure: IDCXP01

2 IDCXP01 writes a message with LASTCC. Messages listing the exported catalog or VSAM data set are written. IDCXP01 closes any open data sets with the UCLOSE macro. Control goes to Executive Controlled Termination, Diagram 4.0.

Diagram 3.4.1. EXPORT FSR – CLUSTER



Extended Description for Diagram 3.4.1

IDCXP01

Procedures: LOCPROC, CTLGPROC, IDCXP01, CLUSPROC

1 For the cluster or alternate index entry of the VSAM data set, LOCPROC builds a CTGPL and CTGFLs to retrieve information from the VSAM catalog. One CTGFL is built for each of the following pieces of information:

Entry type
Entry name
Data set attributes
Data set owner
Data set creation date
Data set expiration date
Password
Password prompting
Password attempts
User module name
User module area
Space infomation
Buffer size
Logical record length
Low key on volume
High key on volume
AMDSB control block
Exception exit
Alternate index and path attributes
Type and name of associated objects
Catalog ACB

CTLGPROC issues a UCATLG with the CTGPL and CTGFLs to retrieve the information from the catalog. If the work area is too small, CTLGPROC will enlarge it and reissue the UCATLG. If the LOCATE fails for a reason other than the work area is too small, an error message is written by building an error conversion table and issuing the UERROR macro. This processing occurs for all UCATLG requests issued by CTLGPROC. CLUSPROC tests to be sure that the type of catalog entry is a cluster or an alternate index. If it is not, an error message is written and the VSAM data set is not exported. Information is requested on all the fields even if the information is not available in the cluster or alternate index entry because VSAM ignores requests for fields that do not apply for this entry.

LOCPROC builds a CTGPL and CTGFLs for the data entry of the VSAM data set. CTGFLs are built for each piece of information in the above list except the last two, type and name of data and index entry, and Catalog ACB. The Control Interval of the data entry is used to find the data entry. CTLGPROC issues a UCATLG with the CTGPL and CTGFLs to retrieve the information from the catalog. If the work area is too small, CTLGPROC enlarges it and reissues the UCATLG. The returned information is saved. After the retrieval of the data and index information, the data set attributes are examined to determine if either of these objects has been flagged as not usable. If so, an error message is written and the VSAM data set is not exported.

The processing in the above paragraph is repeated for the index entry.

CLUSPROC determines if the object being exported is an alternate index. If so, LOCPROC builds a CTGPL and CTGFLs for the base cluster associated with the alternate index. CTFGLs are built for entry type and entry name. CTLGPROC issues a UCATLG to retrieve this information. The entry name will be written to the portable data set as the related name.

IDCXP01

Procedure: OPENPROC

2 OPENPROC builds an OPNAGL and issues a UOPEN to open the portable data set for output. User specified tape label and rewind options are placed in the OPNAGL for UOPEN processing. If the return code is non-zero, an error message is written and the VSAM data set is not exported. Refer to *Appendix A* for a description of the portable data set.

IDCXP01

Procedures: CLUSPROC, PUTPROC, CONTRBL

3 CONTRBL constructs a dictionary for each CTGPL. The CTGFLs contain information returned by VSAM. If a fixed length field has no information, VSAM puts all binary ones in the CTGFL where the information would have been. If a variable length field has no information, VSAM puts zeros in the two byte length field that preceeds the field in the CTGFL where the information would have been. If INHIBITTARGET is specified, a flag is set in the portable data set so IMPORT can process INHIBITTARGET. PUTPROC writes the dictionary followed by the information from the CTGFLs. If the length of the dictionary or catalog information is greater than the logical record length for the portable data set, PUTPROC writes the dictionary or catalog information in segments. PUTPROC writes the records with a UPUT macro. Refer to *Appendix A* for the format of the portable data set. After the catalog information pertaining to the cluster or alternate index and associated data and index objects has been written to the portable data set, CLUSPROC obtains information regarding all paths which have been defined over the object being exported. For the first path association LOCPROC builds a CTGPL and CTGFLs to retrieve the information from the VSAM catalog. CTGFLs are built for the same pieces of information as for the data and index objects. CTLGPROC issues a UCATLG to retrieve the information which is then written to the portable data set. In addition, the name of the cluster or alternate index being exported and its password are written to the portable data set as the PATHENTRY name and PATHENTRY password. CONTRBL is called to construct the portability record. CLUSPROC retrieves information for all the remaining path associations and then writes it to the portable data set using the same CTGPL and CTGFLs which were set up for the first path association. Prior to calling CTLGPROC for each, the work area is cleared and the control interval number of the next associated path is placed in the CTGPL.

IDCXP01

Procedures: RECPROC, LOCPROC, OPENPROC

4 RECPROC opens the VSAM data set with a UOPEN macro and issues a UCOPY to copy all the records to the portable data set. RECPROC issues a UCLOSE to close the VSAM data set. Following a successful open, RECPROC compares the data set name returned by UOPEN to that specified by the caller as the entry name in the EXPORT command. If the compare is unequal, LOCPROC builds a CTGPL and CTGFLs to perform a LOCATE on the name returned by UOPEN. CTGFLs are built for ENTYPE and NAMEDS. CTLGPROC issues a UCATLG macro. If the ENTYPE returned is not that of a path, an error message is written and the command is terminated. If the ENTYPE is that of a path, a second LOCATE is performed using the control interval number of the pathentry object. A CTGFL is built for ENTNAME by LOCPROC and a UCATLG macro issued by CTLGPROC. If the name returned is not equal to the entry name specified in the EXPORT command, a message is written and the command terminated.

When exporting a relative record data set, the relative record number of each record written to the portable data set is placed by UCOPY in a 4-byte area immediately preceding the record itself. OPENPROC

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triggers this processing by setting the Export/Import flag in the OPNAGL of the input data set.

IDCXP01

Procedure: CLUSPROC

5 CLUSPROC issues a UCLOSE to close the portable data set.

IDCXP01

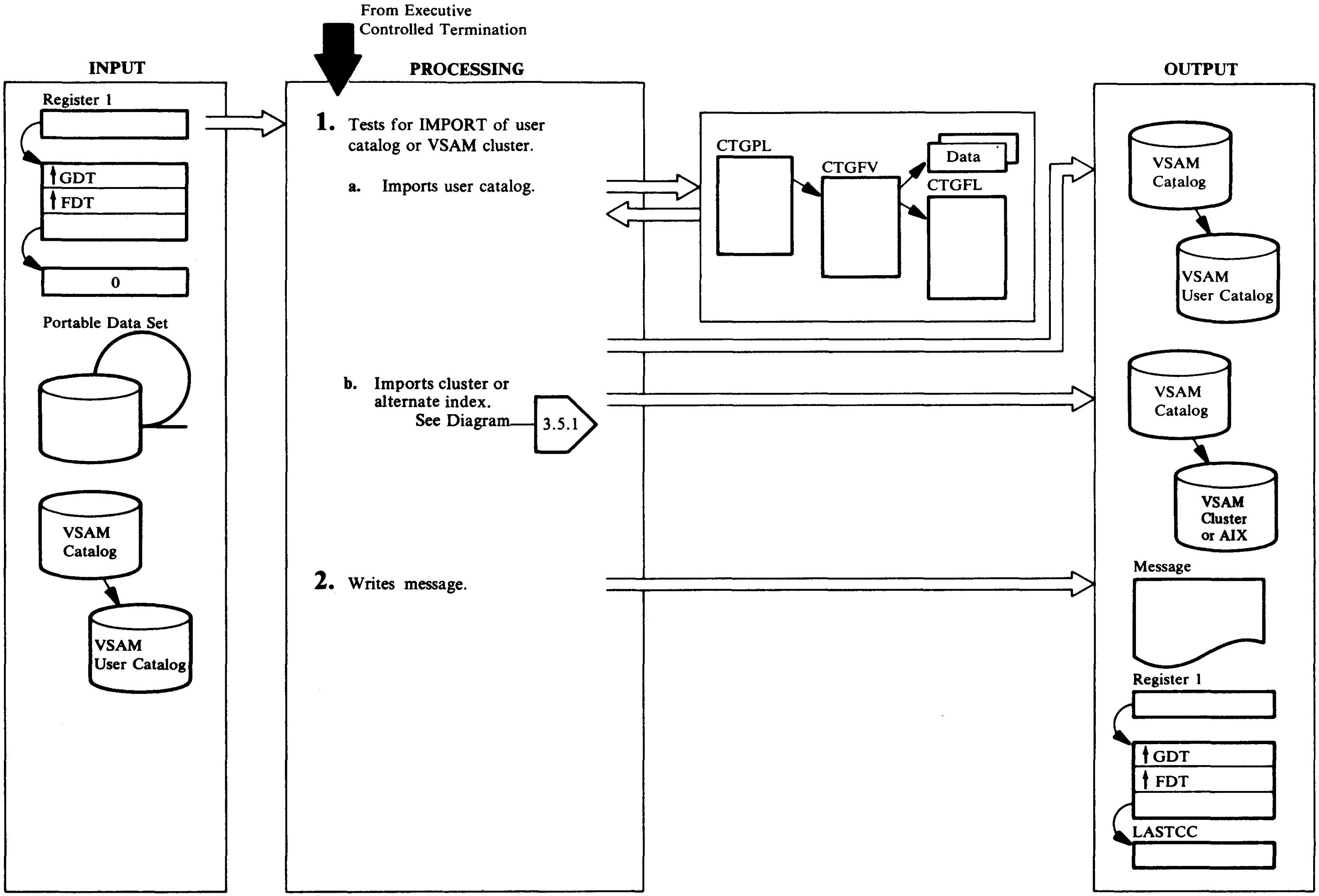
Procedures: DELTPROC, CLUSPROC, CTLGPROC, ALTRPROC, MORESP

6 If PERMANENT is specified, DELTPROC builds a CTGPL. If ERASE or PURGE is specified DELTPROC sets up the proper flags in the CTGFL. DELTPROC issues a UCATLG macro to delete the VSAM data set from the VSAM catalog. If the DELETE fails, an error message is written by building an error conversion table and issuing the UERROR macro. The names of all deleted entries are printed. If the VSAM catalog return code is 40, MORESP is called to get a larger work area and to finish deleting the object.

If TEMPORARY is specified, the temporary export field must be turned on in the catalog entry. ALTRPROC modifies the existing CTGPLs, builds a CTGFV, and modifies the existing CTGFLs for the fields that need to be changed in the VSAM catalog. The temporary export flag and, if INHIBITSOURCE is specified, the inhibit update flag is set in the DSATTR CTGFL. An ENTNAME CTGFL for the *entryname* is also built. ALTRPROC places the address of the dname specified in the INFILE parameter in the CTGFV for catalog recovery purposes.

CTLGPROC issues one UCATLG for the data entry and one UCATLG for the index entry if it exists. The data set attributes field does not appear at the cluster or alternate index entry. Control returns to Diagram 3.4, step 2.

Diagram 3.5. IMPORT FSR



Extended Description for Diagram 3.5

IDCMP01

Procedures: OPENPROC, IDCMP01, CLUSPROC, FVTPROC, CPLPROC, CNCTPROC, LVLRPROC, CTLGPROC, RECPROC, ALTRPROC

1 IDCMP01 tests the FDT for the CONNECT keyword in the IMPORT command to determine if a VSAM data set or a VSAM catalog is being imported. If CATALOG is specified, it is not opened because the catalog is assumed to be the job catalog or master catalog and the operating system has opened it. If CONNECT is specified, a VSAM user catalog is being imported, and step 1.a is done. If CONNECT is not specified, a VSAM data set is being imported, and step 1.b is done.

a. The following is repeated for every *objectname* in OBJECTS. (More than one user catalog can be imported with one IMPORT command.) CNCTPROC builds a CPL and an FVT for the connect operation. LVLRPROC builds a DEVTYPE CTGFL from the DEVICETYPES in the command. LVLRPROC builds a volume list from VOLUMES and puts the address of the volume list in the CTGFV. CNCTPROC puts the address of the *objectname* from OBJECTS in the CTGFV. If no *objectname* is specified, an error message is written, and the catalog is not imported. The operation type field in the CTGFV is set to 'A' to indicate a catalog connect. CNCTPROC issues a UCATLG to connect the catalog. If the return code is non-zero, an error message is written by building an error conversion table and issuing the UERROR macro. When all the catalogs have been connected, control goes to step 2.

b. OPENPROC opens the portable data set. CLUSPROC writes the time of export with a UPRINT macro. CLUSPROC uses the catalog information in the portable data set to "define" the VSAM data set. OPENPROC opens the VSAM data set and RECPROC copies the data records from the portable data set to the VSAM data set. If INHIBITTARGET was specified when the VSAM data set was exported, ALTRPROC alters the catalog entry for the VSAM data set. Refer to *Appendix A* for the format of the portable data set.

IDCMP01

Procedure: IDCMP01

2 IDCMP01 writes a message with LASTCC. Control goes to Executive Controlled Termination.

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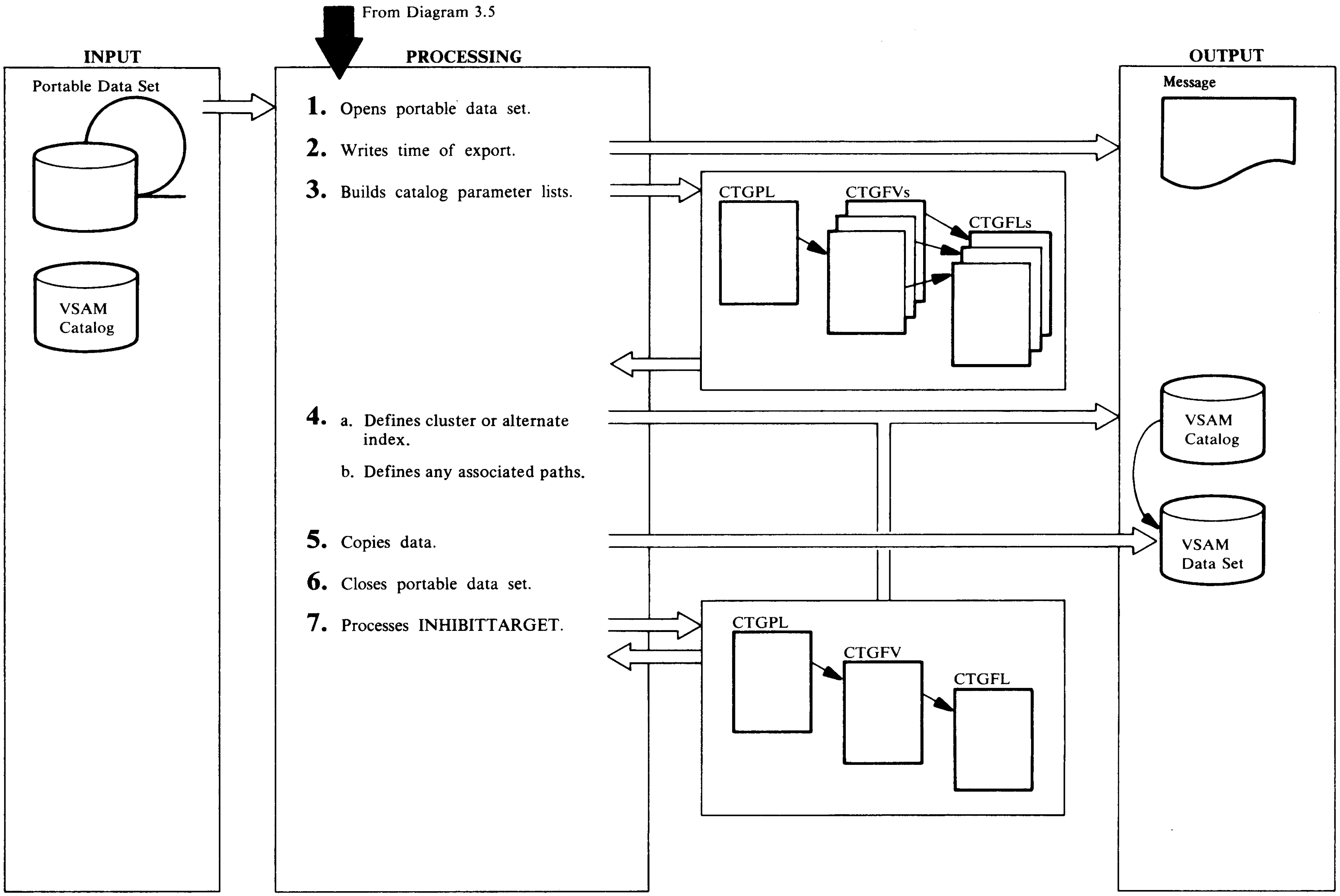
Diagram 3.5.1. IMPORT FSR – CLUSTER



Extended Description for Diagram 3.5.1

IDCMP01

Procedures: OPENPROC, IDCMP01

1 OPENPROC builds an OPNAGL and issues a UOPEN to open the portable data set. User specified tape label and rewind options are placed in the OPNAGL for UOPEN processing. The portable data set was created by an EXPORT command and contains catalog information and data records for the VSAM data set that was exported. Refer to *Appendix A* for the format of a portable data set. If the return code is non-zero, IDCMP01 writes a message. If the portable data set is open, IDCMP01 issues a UCLOSE to close the data set, and the IMPORT command is terminated.

IDCMP01

Procedures: CLUSPROC, MSGPROC

2 CLUSPROC gets the first record of the portable data set which contains the time the portable data set was created by the EXPORT FSR. MSGPROC writes the time with a UPRINT macro.

IDCMP01

Procedures: CLUSPROC, CPLPROC, FVTPROC, BFPLPROC, BPASPROC, IUNIQPRC, LVLRPROC, RANGPROC

3 The information for catalog parameter lists comes from three places, the portable data set's copy of the previous catalog entry, the IMPORT command, and both the portable data set and the IMPORT command.

a. CLUSPROC via CPLPROC builds a CTGPL for a define operation. CLUSPROC issues a UGET macro to read the first catalog record in the portable data set. The catalog record contains the size of the data record that follows. FVTPROC builds from 2 to 3 CTGFVs, one each for the cluster or alternate index entry and its associated data and index entries. BFPLPROC builds CTGFLs with information from the portable data set. The exception is the PASSWALL CTGFL which is built by BPASPROC. If the exported VSAM data set was UNIQUE, IUNIQPRC builds a CTGFV for volume information. No data is put in the volume CTGFV. If the object being imported is an alternate index, the related name (given in the RELATE parameter) is passed via the alternate index (G) FVT. A work area for the return of the catalog recovery volume serial number, if any, is passed via the cluster or alternate index FVT.

b. CLUSPROC puts the address of the dname from OUTFILE on the IMPORT command in the cluster CTGFV. LVLRPROC puts the address of the *volser* ... list from VOLUMES in the CTGFV for the *objectname* in the OBJECTS parameter. Information about VOLUMES is available in the portable data set if not given in the OBJECTS parameter.

c. If ORDERED | UNORDERED is specified for a particular *objectname*, CLUSPROC changes the AMDSBCAT CTGFL for the *objectname*. If KEYRANGES is specified for the index object, RANGPROC builds a list of key ranges and puts the address of the key range list in the CTGFV. If NEWNAME is specified for a particular object, CLUSPROC puts the address of the new name in the particular CTGFV. Data from the IMPORT command overrides data from the portable data set.

IDCMP01

Procedures: CTLGPROC, CPLPROC, CLUSPROC, DELTPROC, DUPNPROC

4 a. CTLGPROC issues a UCATLG macro to define the VSAM data set. If the return code is 40, the work area for VSAM catalog management is increased and the UCATLG is reissued. If the return code is 8, a duplicate cluster name exists on the VSAM catalog. CPLPROC builds a CTGPL to locate the catalog entry to determine if the duplicate cluster had a temporary EXPORT done against it or if it is an empty data set. DUPNPROC builds DSATTR, HURBADS and AMDSBCAT CTGFLs to obtain the data set attribute information, the high-used RBA and the AMDSB control block of the data component. If the temporary export flag is not on in either the data or index or the data set is not empty, the IMPORT is not done. If the data set is empty, a check is made to ensure that the data set organization, key length and relative key position in the catalog entry are the same as those which were exported. If any of these factors are different, a message is written and the IMPORT is not done. The maximum LRECL of the cataloged entry is then compared to that of the data set exported. Unless it is greater than or equal to the maximum LRECL of the data set exported, the IMPORT is terminated. Otherwise, control goes to step 4.b. If the temporary export flag is on, CPLPROC builds a CTGPL to delete the duplicate VSAM data set. If ERASE | NOERASE or PURGE | NOPURGE is specified, CPLPROC puts the information in the CTGPL so that VSAM will take the appropriate action. DELTPROC issues a UCATLG macro to delete the object. Then CTLGPROC reissues the UCATLG macro to define the VSAM data set. If the return code from the UCATLG macro is zero, control goes to step 5. If a recovery volume serial is returned for the define, a UPRINT macro is issued to print it. If the return code is non-zero CTLGPROC issues an error message by building an error conversion table and invoking the UERROR macro.

b. If the cluster or alternate index exported had any associated paths defined over it, the catalog entries for these paths were also exported. CLUSPROC processes the catalog information for each path in a manner similar to that described in step 3.a. The PATHENTRY name and password, if any, are passed for the path (R) FVT. The only subparameter of the OBJECTS parameter allowed for path objects is NEWNAME. If any other subparameter is specified, a new IMPORT message is written and that path is not defined. CTLGPROC issues a UCATLG macro to define each path. If the return code from UCATLG is nonzero, a message is written by building an error conversion table and invoking UERROR. However, the IMPORT is not terminated.

IDCMP01

Procedures: OPENPROC, RECPROC

5 OPENPROC builds an OPNAGL and issues a UOPEN to open the newly defined VSAM data set. If a password is specified via the OUTFILE parameter, this password is passed to UOPEN for use in building the ACB. Otherwise, the exported master password, if any, is used. RECPROC issues a UCOPY to copy the data from the portable data set to the newly defined VSAM data set.

When importing a relative record data set, the relative record number of each record on the portable data set is contained in a 4-byte area immediately preceding the record itself. UCOPY processing uses this relative record number in writing the records to the output data set. OPENPROC sets the Export/Import flag in the OPNAGL of the output data set to indicate to UCOPY that this is to be done.

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Following a successful open, RECPROC compares the name specified via the OUTFILE parameter to the name of the object exported. If the compare is unequal, RECPROC builds a CTGPL and CTGFLs and issues a UCATLG macro to locate the entry type and associations of the name specified via OUTFILE. If the entry type returned is that of a path, RECPROC builds a CTGPL and CTGFL and issues a UCATLG macro to locate the entry name of the pathentry association (alternate index or cluster) and compares the name returned from the Locate to the name of the object exported. If the verification fails, a message is written and the IMPORT is not done.

IDCMP01

Procedure: CLUSPROC

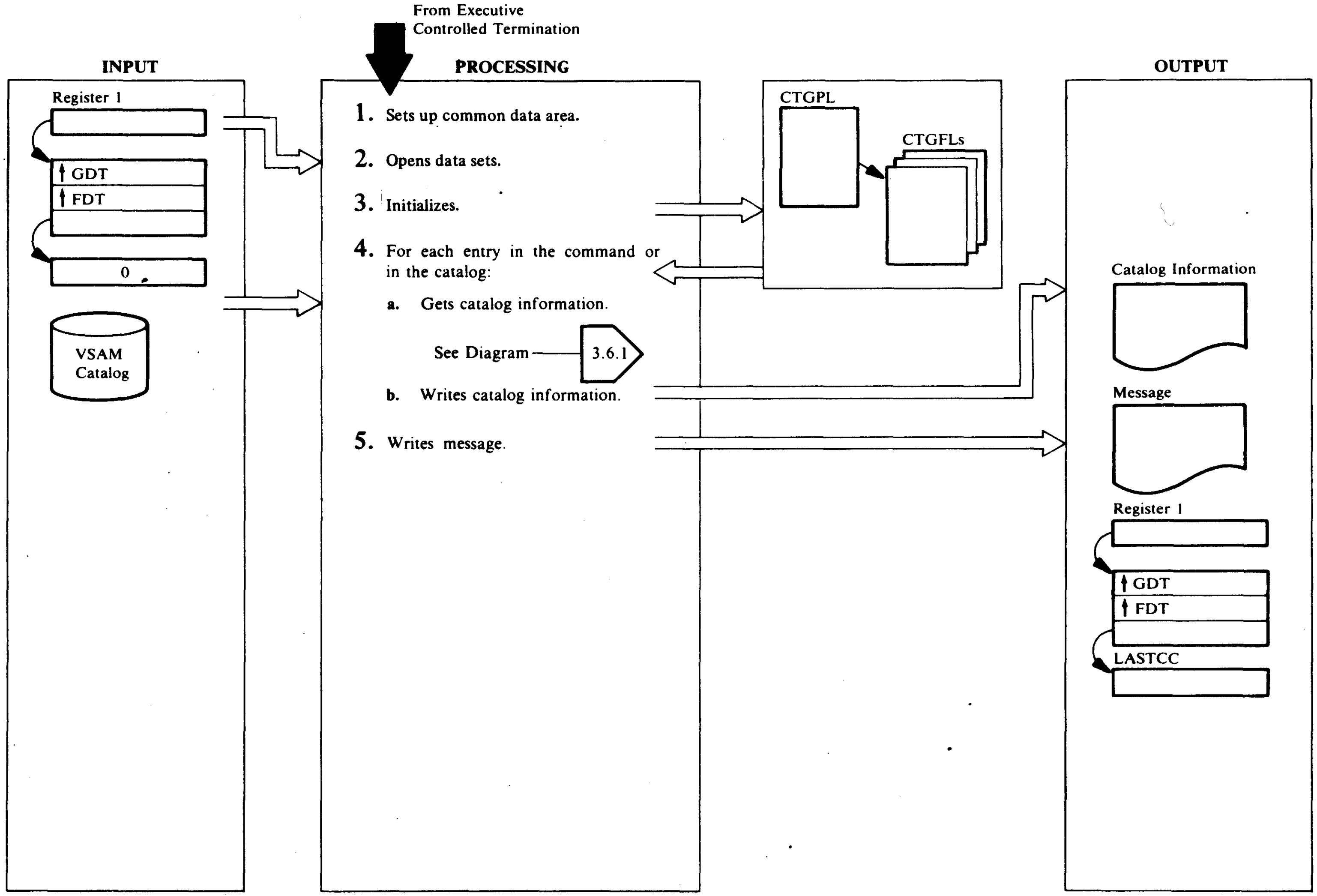
6 CLUSPROC issues a UCLOSE to close the portable data set.

IDCMP01

Procedures: ALTRPROC, CPLPROC

7 If INHIBITTARGET was specified when the VSAM data set was exported, the catalog entry must be altered. ALTRPROC places the address of *dname* specified in the OUTFILE parameter in the CTGFV for catalog recovery purposes. ALTRPROC builds a CTGFV and a DSATTR CTGFL for the data set attributes field with INHIBITTARGET specified. CPLPROC builds a CTGPL to alter the VSAM data set. CTLGPROC issues a UCATLG macro to alter the VSAM data set to inhibit the VSAM data set. If the VSAM data set has an index component, the same steps are repeated to alter the index component to INHIBITTARGET. Control goes to Diagram 3.5, step 2.

Diagram 3.6. LISTCAT FSR



Extended Description for Diagram 3.6

IDCLC01, IDCLC02

Procedures: IDCLC01, IDCLC02

1 Before processing the catalog entries, IDCLC01 links to IDCLC02. IDCLC02 establishes addressibility and initializes an array of 4-byte pointers to point to several different work areas. These work areas are common work areas used by both IDCLC01 and IDCLC02. They are used to store pointers and variables and reside in IDCLC02's automatic storage. The address of the array of pointers is passed back to IDCLC01 in register 15.

IDCLC01

Procedure: INITPROC

2 If OUTFILE is specified, INITPROC builds an OPNAGL and issues a UOPEN to open the alternate output data set. By opening the alternate file first, any LISTCAT error messages appear on the alternate file. If CATALOG is specified with *dname* as well as a *catname*, INITPROC builds an OPNAGL and issues a UOPEN for the *catname* and requests that the ACB be returned. INITPROC compares the catalog name returned by the UOPEN macro to the *catname* from the CATALOG parameter in the LISTCAT command. If the catalog names do not match, the LISTCAT command terminates and control goes to step 5. If a *dname* is not specified, but a *catname* is, INITPROC puts the address of the *catname* in the CTGPL to make VSAM open the catalog. If CATALOG is not specified in the LISTCAT command, INITPROC puts the address of 44 blanks in the CTGPL to make VSAM find the catalog and open it.

IDCLC01

Procedure: INITPROC

3 INITPROC issues a UGPOOL macro to obtain storage for the CTGPL, CTGFLs, work areas, and DARGLIST. INITPROC puts the address of a work area for VSAM in the CTGPL. The returned catalog ACB from the UOPEN is put in the CTGPL. Also if *password* is specified in CATALOG, the address of the *password* is put in the CTGPL. INITPROC determines the number of catalog fields to be obtained for each catalog entry by the specification of NAME, VOLUMES, ALLOCATION, or ALL. Catalog fields are obtained by control blocks named CTGFLs. The table following this description shows the CTGFLs that are used for each type of catalog entry.

If NAME is specified, INITPROC initializes CTGFLs 2 through 4. For VOLUMES, INITPROC initializes 2 through 10. For ALLOCATION, INITPROC initializes 2 through 14. For ALL, INITPROC initializes 2 through 28. INITPROC adds the DSATTR to the end of the NAME, VOLUME, and ALLOCATION list if NOTUSABLE is specified. If more than one entry type is being listed or if NOTUSABLE is specified, INITPROC adds the MULTITYP CTGFL to the beginning of the list of CTGFLs.

IDCLC01, IDCLC02

Procedures: ENTPROC, LOCPROC, RTEPROC, CDIPROC, AUPROC, VPROC, FPLPROC, ANSVPROC

4 If ENTRIES is specified, catalog information is found on each *entryname* in the command. If ENTRIES is not specifed, catalog information is found for each entry in the catalog.

a. LOCPROC issues a UCATLG to locate the catalog information for an entry. If a required password is not supplied, VSAM returns the entry type and entry name fields in a work area instead of through the CTGFLs. The catalog ACB is returned the first time information is successfully located in the catalog. LOCPROC saves the catalog ACB and removes the CATACB CTGFL from the list of CTGFLs to be used to locate information on other catalog entries. Diagram 3.6.1 shows getting catalog information in detail.

b. RTEPROC test the entry type of the catalog entry. If the type is PATH, ALTERNATEINDEX, CLUSTER, DATA, or INDEX, CDIPROC formats the information and writes it with a UPRINT macro. If the type is NONVSAM or USERCATALOG, AUPROC formats the information and writes it with a UPRINT macro. If the type is SPACE, VPROC formats the information and writes it with a UPRINT macro.

Note: Information written for a SPACE entry does not come directly from the catalog because LISTCAT has a special interface with VSAM for all LISTCAT requests. VSAM manipulates information in the catalog to provide the special interface to LISTCAT. If the entry type is a cluster or alternate index, RTEPROC determines whether an association of the object—that is a data, index, or path entry—is to be listed. If it is, FPLPROC reinitializes the CTGFLs. ANSVPROC retrieves the information about the data, index, or path via the control interval rather than by name. Control returns to 4a to locate information about the data, index, or path. FPLPROC reinitializes the CTGFLs for the next catalog entry. If the type is not valid, RTEPROC writes a message. Control goes to step 4a for the next entry. Refer to *DOS/VS Access Method Services User's Guide* a sample listing of LISTCAT output.

IDCLC01, IDCLC02

Procedure: IDCLC01, FREESTG

5 IDCLC01 writes a summary of the entries listed and suppressed due to incorrect passwords. If INITPROC opened a VSAM catalog, IDCLC01 issues a UCLOSE to close the VSAM catalog. If an alternate output file was opened by INITPROC, IDCLC01 issues a UCLOSE to close the file. Any storage obtained during the processing of the LISTCATALOG command is released with a UFPOOL macro. IDCLC01 then calls FREESTG (in IDCLC02) to free the automatic storage acquired by IDCLC02. IDCLC01 then writes a message containing LASTCC. Control goes to Executive Controlled Termination, Diagram 4.0.

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CTGFLs Used for Each Type of Catalog Entry

CTGFL Name	Entry Type CLUSTER	DATA	INDEX	NONVSAM	USER CATALOG	SPACE	ALTER NATE INDEX	PATH	Data in CTGFLs
1. MULTITYPE									Identifies multiple catalog types to be listed.
2. ENTYPE	X	X	X	X	X	X	X	X	Entry type.
3. ENTNAME	X	X	X	X	X	X	X	X	Entry name.
4. NAMEDS	X	X	X				X	X	CI number and entry type of each association.
5. DSETEXDT	X	X	X	X			X	X	Data set expiration date.
6. DSETCRDT	X	X	X	X			X	X	Data set creation date.
7. OWNERID	X	X	X	X			X	X	Data set owner.
8. RELCRA	X	X	X	X			X	X	VSAM release and catalog recovery information.
9. CATVOL		X	X	X	X				Volume information for data set.
10. VOLDVCHR						X			Volume device character.
11. SPACPARM		X	X						Primary and secondary allocation.
12. HURBADS		X	X						High used RBA.
13. HARBADS		X	X						High allocated RBA.
14. ENTVOL		X	X						Physical description of data set.
15. VOLTSTMP						X			Volume time stamp.
16. SYSEXTDS						X			System allowed extents.

CTGFLs Used for Each Type of Catalog Entry—continued

CTGFL Name	Entry Type CLUSTER	DATA	INDEX	NONVSAM	USER CATALOG	SPACE	ALTER NATE INDEX	PATH	Data in CTGFLs
17. NODSPACE						X			Number of data space on volume.
18. NODSET						X			Number of data sets on volume.
19. SPACEHDR						X			Characteristics and statistics of data space.
20. DSDIRECT						X			Data Set directory for a data space.
21. DSPDSCRP						X			Physical description of data space.
22. PASSWALL	X	X	X				X	X	Password (security) information.
23. AMDSBCAT		X	X						AMDSB control block.
24. DSATTR		X	X						Data set attributes.
25. BUFSIZE		X	X						Minimum buffer size.
26. LRECL		X	X						Logical record size.
27. RGATTR							X	X	AIX and PATH attributes.
28. EXCPEXIT		X	X						Exception exit module name.
29. CATACB									Catalog ACB address.

Diagram 3.6.1. LISTCAT FSR – Gets Information

From Diagram 3.6

INPUT

CTGPL

CTGFLs

VSAM Catalog

PROCESSING

1. Initializes:

- ENTRIES.
- No ENTRIES.

CTGPL

CTGFLs

2. Locates information.

3. Checks:

- ENTRIES.
- No ENTRIES.

OUTPUT

Extended Description for Diagram 3.6.1

IDCLC01

Procedures: ENTPROC, GNXTPROC

1 If ENTRIES is specified, control goes to 1a. If ENTRIES is not specified, control goes to 1b.

a. ENTPROC puts the address of the *entryname* in the CTGPL. If only SPACE information is to be listed, ENTPROC treats the *entryname* as a six character volume serial number and extends it to 44 characters by padding on the right with binary zeros. ENTPROC puts the address of the volume serial number in the CTGPL. If *password* is supplied with CATALOG, ENTPROC puts the address of the *password* in the CTGPL. If there is no *password* supplied with CATALOG, and there is a *password* specified with the *entryname*, ENTPROC puts the address of the *password* in the CTGPL. If there is no *entryname* to be listed, control goes to Diagram 3.6, step 5.

b. GNXTPROC sets the CTGPL to indicate that each catalog entry is to be located by the catalog index rather than by a specific name. For the first entry, GNXTPROC puts the address of 44 blanks in the CTGPL as a starting key in the catalog search for the first catalog entry. After the first entry, GNXTPROC adds one to the key—which is the previously retrieved entry name—to make the new key higher in the collating sequence than the old key.

IDCLC02

Procedure: LOCPROC

2 LOCPROC issues a UCATLG macro with the CTGPL and CTGFLs to locate catalog information about the entry.

IDLCL01

Procedures: ENTPROC, GNXTPROC

3 If ENTRIES is specified, control goes to 3a. If ENTRIES is not specified, control goes to 3b.

a. ENTPROC compares the type of entry information returned to the type of information requested in the LISTCAT command. If the entry type matches the type requested in the command, or the entry is a cluster or an alternate index, control goes to Diagram 3.6, step 4b. If the entry type does not match the type requested in the command and the entry is not a cluster or an alternate index, or the entry is a cluster or an alternate index and the type specified is not data, index, or path, ENTPROC writes a message, but does not list the entry. If NOTUSABLE was requested and the retrieved entry is a data or index entry, a check is made to determine if the entry has been marked as unusable. If the entry has been marked as unusable, control goes to Diagram 3.6, step 4b; otherwise, control goes to Diagram 3.6, step 4a for the next *entryname* in the LISTCAT command. If the UCATLG return code is non-zero, ENTPROC also writes a message. Control goes to Diagram 3.6, step 4a for the next *entryname* in the LISTCAT command.

b. GNXTPROC saves the name of the retrieved entry to use as a key in locating information for the next entry in the catalog. If the return from the UCATLG macro is zero, control goes to Diagram 3.6, step 4b. If the return code from UCATLG indicates password verification failure or lack of workspace, GNXTPROC writes a message and control goes to Diagram 3.6, step 4a for the next entry in the catalog. GNXTPROC checks for end-of-file and unrecoverable errors. When end-of-file or an unrecoverable error is encountered, control goes to Diagram 3.6, step 5 to terminate the LISTCAT command.

Diagram 3.7. PARM FSR

From Executive
Controlled Termination

INPUT

Register 1

↑ GDT
↑ FDT

0

PROCESSING

1. Processes TEST options:

- OFF.
- TRACE, AREAS, and FULL.

2. Processes MARGINS option.

3. Processes GRAPHICS option.

4. Prints message.

OUTPUT

TEST Options
Data Area

HDAREA

LEFTMGN
RIGHTMGN

Message

Register 1

↑ GDT
↑ FDT

LASTCC

Extended Description for Diagram 3.7

IDCPM01

Procedures: TESTPARM, TESTSAVE

1 If the address of the dump routine is in GDTDBG, a TEST option is currently in effect. TESTPARM frees the Debugging Aids Historical Data Area whose address is in GDTDBH, and it sets GDTDBH to zero.

   a. If the TEST keyword is followed by OFF, TESTPARM deletes the dump routine, IDCDB01, whose address is in GDTDBG, and it sets GDTDBG to zero. Control goes to step 2.

   b. If the TEST keyword is followed by TRACE, AREAS, or FULL, TESTPARM issues a UGSPACE macro to obtain a new Test Option Data Area. TESTSAVE puts the information from the FDT in the new Test Option Data Area. If GDTDBG is zero, TESTPARM issues the ULOAD macro to load dump routine. TESTPARM puts the address of the dump routine in GDTDBG. Although the trace tables record execution since Access Method Services invocation, the earliest time a trace table or dump can be printed is in the Executive prior to the second call to the Reader/Interpreter. This is because the TEST option is not on until the PARM command has been completed.

IDCPM01

Procedure: MARGPARM

2 MARGPARM checks the margins for validity. The left margin must be less than the right margin. If the margins are invalid, MARGPARM sets the left margin to 2 and the right margin to 72, the Access Method Services default margins. MARGPARM puts the margin values in the first two halfwords of the Reader/Interpreter Historical Data Area.

IDCPM01

Procedure: GRPHPARM

3 GRPHPARM puts the GRAPHICS parameter (CHAIN or TABLE) in a Text Processor Print Control Argument list. GRPHPARM issues a UREST macro for the Text Processor to use the new chain or table with Access Method Services output. The CHAIN parameter specifies one of several graphic character sets available. However, the CHAIN parameter does not specify a particular physical type chain. The TABLE parameter specifies a module in the core image library.

IDCPM01

Procedure: IDCPM01

4 IDCPM01 prints a message containing LASTCC. Control goes to Executive Controlled Termination.

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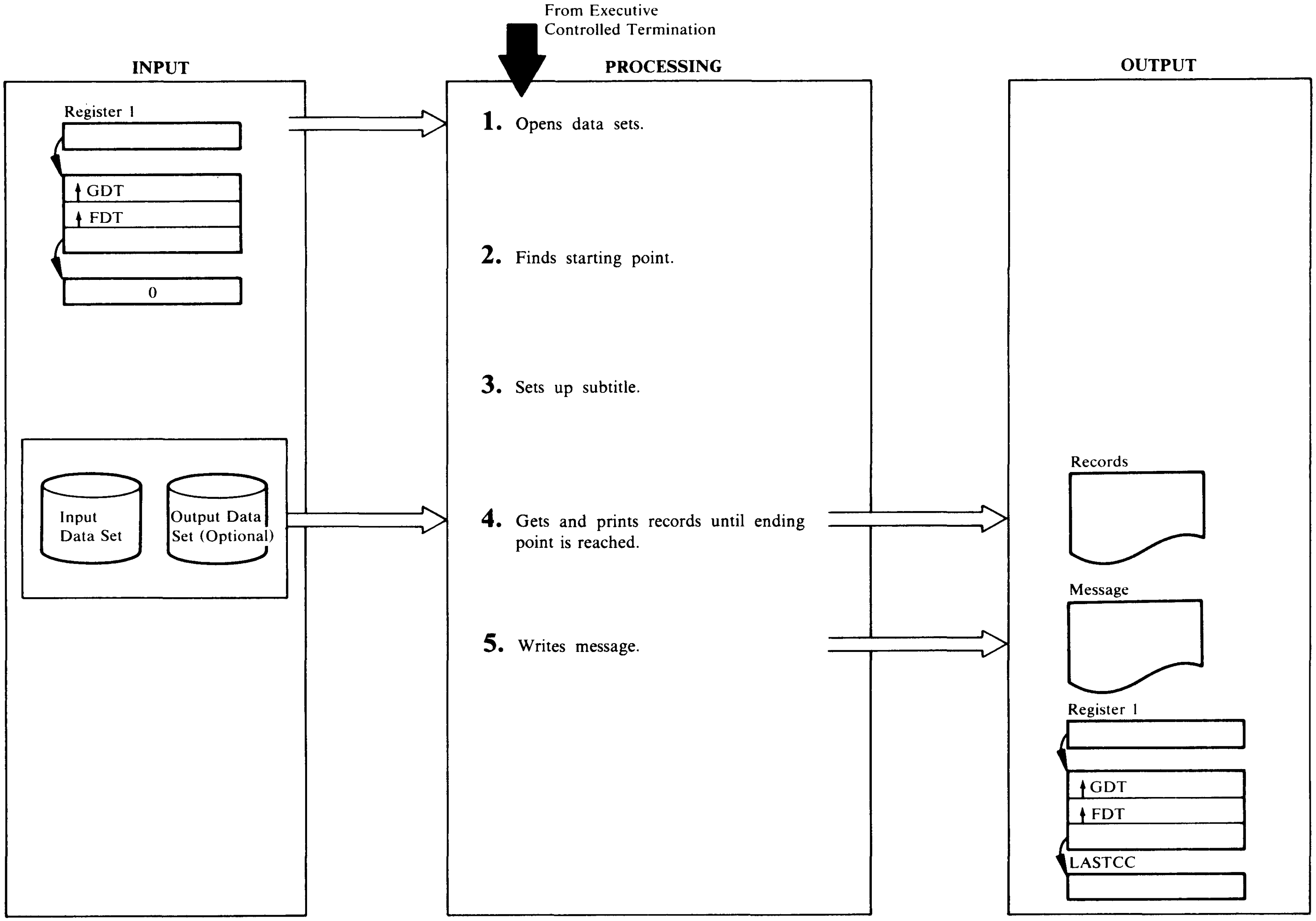
Diagram 3.8. PRINT FSR



Extended Description for Diagram 3.8

IDCPR01

Procedure: IDCPR01

1 IDCPR01 builds an OPNAGL for the input data set. If the PRINT command specifies a FROMKEY or TOKEY parameter, IDCPR01 opens the data set for key sequence record retrieval. If FROMADDRESS or TOADDRESS is specified, IDCPR01 opens the data set for sequential record retrieval. If the PRINT command specifies FROMNUMBER or TONUMBER, IDCPR01 opens the data set for keyed sequential record retrieval. IDCPR01 puts any ENVIRONMENT parameters in the OPNAGL. The input data set can be a VSAM catalog. IDCPR01 issues a UOPEN macro to open the input data set. If an output data set is specified with the OUTDDVAL keyword, IDCPR01 builds an OPNAGL and issues a UOPEN for the output data set. If the return code from a UOPEN macro is non-zero, IDCPR01 writes a message and terminates the PRINT command.

IDCPR01

Procedure: DELIMSET

2 DELIMSET performs additional validity checking to verify that From/To parameters are consistent with data set organization. If the parameter is invalid, an error message is written. Checks are made for invalid use of

FROMADDRESS | TOADDRESS with RRDS and FROMNUM | TONUM with KSDS

If FROMNUMBER is specified, DELIMSET issues a UPOSIT macro to position to the starting relative record number. If SKIP is specified for a VSAM relative record data set, DELIMSET issues a UPOSIT to position to the next relative record number beyond the skip count. A VSAM relative record data set is printed in relative record number order.

If FROMKEY is specified, DELIMSET issues a UPOSIT macro to position to the starting key. If FROMADDRESS is specified, DELIMSET issues a UPOSIT macro to position to the starting address. If SKIP is specified, DELIMSET issues as many UGET macros as there are records to skip. The way the data set is opened determines how the records are skipped. Any data set opened as an ESDS causes records to be printed in chronological order. A keyed data set opened as a KSDS causes records to be printed in key-sequence order. If no starting point is specified, the starting point is the first record in the input data set.

IDCPR01

Procedure: TEXTPSET

3 TEXTPSET formats a subtitle line with static text and the input data set name from t! , IOCSTR. TEXTPSET issues a UPRINT macro to get the static text and insert it into the buffer in which the subtitle line is being built. No printing is done with this UPRINT macro. TEXTPSET issues a UESTA macro to give the subtitle to the Text Processor.

IDCPR01

Procedure: IDCPR01

4 The following steps are repeated until the ending point in the input data set is found. If TOKEY is specified, IDCPR01 calculates the key location in the record from information in the IOCSTR. Retreiving records stops when the key in the input record is higher than the value in TOKEY. If TOADDRESS is specified, printing stops when the Relative Byte Address returned by the UGET macro equals the value supplied by TOADDRESS. If COUNTVAL is specified, printing stops when the number of records printed equals the number supplied by COUNTVAL. If TONUMBER is specified, retrieving and printing stops when the relative record number of the input record is higher than the TONUMBER value. If COUNT is specified for a VSAM relative record data set, printing stops when the number of valid relative record slots printed plus the number of invalid slots bypassed exceeds the value supplied by COUNT. If no ending point is specified, printing stops when the last record of the input data set is printed.

a. IDCPR01 issues a UGET to obtain a logical record. If the return code from the UGET macro is non-zero, IDCPR01 checks the return code for a recoverable error. The recoverable errors are duplicate keys, records out of sequence, invalid length records, and I/O errors in the data of a VSAM data set. After a non-recoverable error or 4 recoverable errors, printing stops.

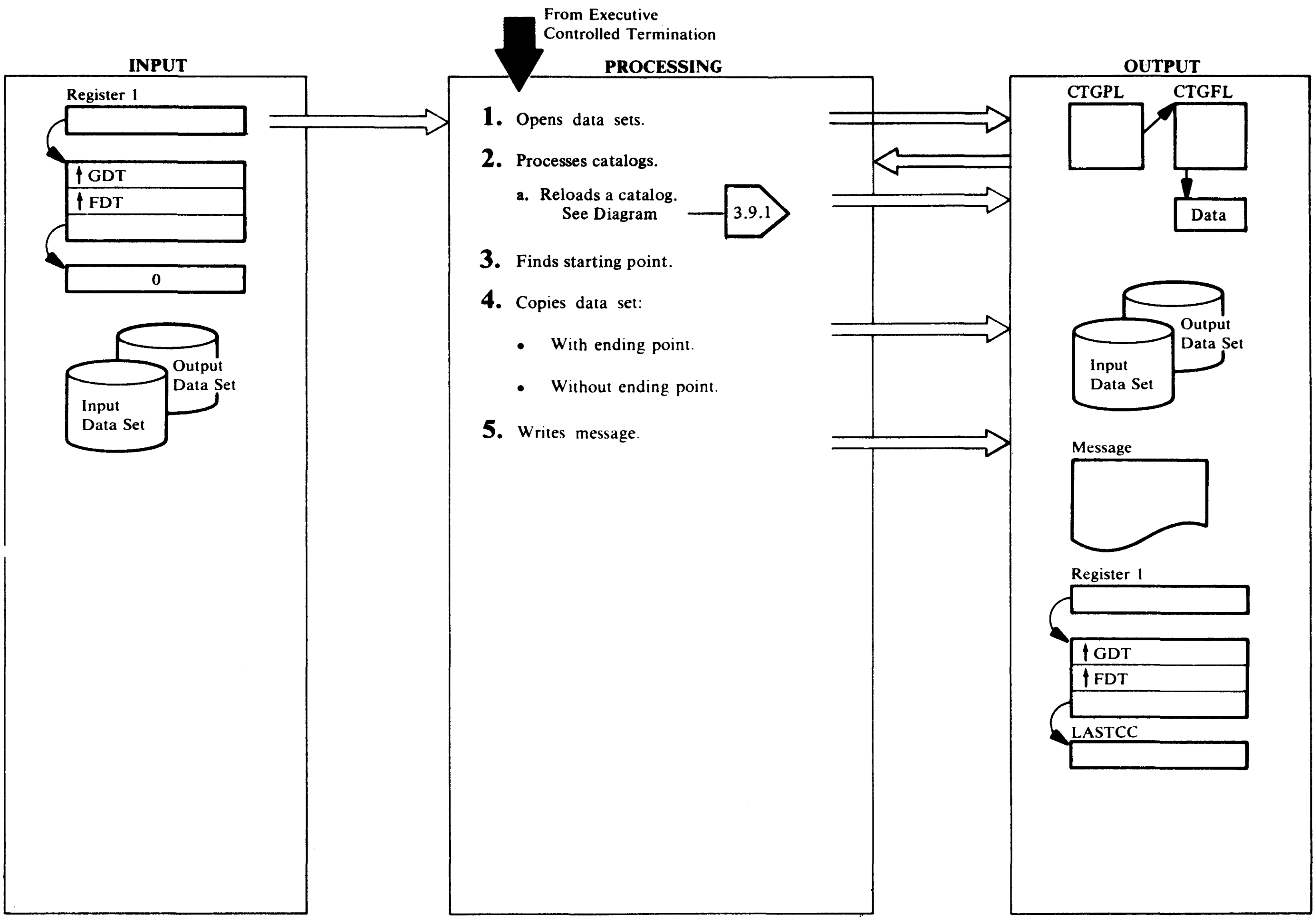
b. IDCPR01 issues a UPRINT to print the logical record just obtained. A minimum of 3 lines is printed for each logical record from the input data set. The first line printed contains the record identification: key, address, sequence number (nonVSAM except ISAM) or relative record number. The relative record number is printed for a relative record data set and indicates the slot number. Unused slots will be indicated by missing numbers. The second line is blank. The third and following lines contain the logical record from the input data set. The format of the logical records depends on whether HEX, CHARACTER, or DUMP was specified in the command. If an output data set is specified with the OUTDDVAL keyword, IDCPR01 prints the records on that output data set. If the return code from the UPRINT macro is 12 or greater, IDCPR01 will terminate processing: there is no checking for recoverable errors.

IDCPR01

Procedure: IDCPR01

5 IDCPR01 writes a message with LASTCC to SYSLST IDCPR01 issues a UCLOSE macro to close the input data set and any output data set other than SYSLST SYSLST is not closed. Control returns to Executive Controlled Termination

Diagram 3.9. REPRO FSR



Extended Description for Diagram 3.9

IDCRP01

Procudures: IDCRP01

1 IDCRP01 builds an OPNAGL for the input data set. If FROMKEY or TOKEY is specified, IDCRP01 opens the input data set for key sequence processing. If FROMADDRESS or TOADDRESS is specified, IDCRP01 opens the input data set for sequential record retrieval. If FROMNUMBER or TONUMBER is specified, IDCRP01 opens the input data set for key sequence processing. IDCRP01 also builds an OPNAGL for the output data set, and it puts any ENVIRONMENT parameters in the OPNAGL. If REUSE or REPLACE is specified, IDCRP01 sets the OPNAGL for the output data set to reflect these parameters. UOPEN will open the output data set with the reset option. IDCRP01 issues one UOPEN macro that opens both the input and output data sets. If the return code from the UOPEN macro is non-zero, IDCRP01 writes a message on SYSLST an terminates the REPRO command. Following the open of both data sets, IDCRP01 checks for a nonrelative-record input data set together with a nonempty relative record output data set. If this error condition is detected, a message is written on SYSLST and the REPRO command is terminated.

IDCRP01

Procedures: VERIFYC, CATRELOD, TRUENAME, CATRANS, CNVRTCI, CATCOMP

2 If neither the input nor the output are VSAM data sets, processing continues with step 3. Each VSAM data set is checked and verified to see if it is a catalog. If the output data set is not a catalog, processing continues with step 3. If the output data set is a catalog, the catalog reload switch, CATRELSW, is set on. The REPRO command is checked to see if beginning or ending delimiters were specified. If any were specified, a message is issued, processing is set for termination, and control goes to step 5. If no delimiters were specified, a catalog reload function is assumed, a message is issued, and the reload function is initiated. See Diagram 3.9.1.

IDCRP01

Procedure: DELIMSET

3 DELIMSET performs additional validity checking to verify that From/To parameters are consistent with input data set organization. If the parameter is invalid, an error message is written. Checks are made for invalid use of FROMADDRESS | TOADDRESS with relative-record data set and FROMNUM | TONUM with key-sequenced data set. If FROMKEY is specified, DELIMSET issues a UPOSIT macro to position to the starting key. If FROMADDRESS is specified, DELIMSET issues a UPOSIT macro to position to the starting address. If FROMNUMBER is specified, DELIMSET issues a UPOSIT macro to position to the starting relative record number. If SKIP is specified for a VSAM relative-record data set, DELIMSET issues a UPOSIT macro to position to the next relative-record number beyond the skip count. If SKIP is specified for a key-sequenced or entry-sequenced data set, DELIMSET issues as many UGET macros as there are records to skip. The way the data set is opened determines how the records are skipped. Any input data set opened as an ESDS causes records to be read in chronological order. A keyed data set opened as a KSDS causes records to be read in key-sequence order. If no starting point is specified, the starting point is the first record in the input data set.

When copying from a non-relative-record data set into an empty relative-record data set, records are copied into consecutive relative-record locations. When copying from one relative-record data set to another, records are placed in the same slot in the output data set as they were in the input data set.

IDCRP01

Procedure: IDCRP01

4 a. If an ending point other than the end of the input data set is specified by the TOKEY, TOADDRESS, or COUNT keywords, the following steps are repeated until the ending point is found. If TOKEY is specified, IDCRP01 calculates the key location in the record from information in the IOCSTR. Retrieving records stops when the key in the input record is higher than the value in TOKEY. If TOADDRESS is specified, copying stops when the Relative Byte Address returned by the UGET macro equals the value supplied by TOADDRESS. If COUNTVAL is specified, copying stops when the number of records copied equals the number supplied by COUNTVAL. If TONUMBER is specified, copying stops when the relative-record number of the input record is higher than the TONUMBER value. If COUNT is specified for a VSAM relative-record data set, copying stops when the number of valid relative-record slots copied plus the number of invalid slots bypassed exceeds the value supplied by COUNT.

- IDCRP01 issues a UGET macro to obtain a logical record from the input data set. If the return code from the UGET is non-zero, It also checks the return code for a recoverable error. The recoverable errors are duplicate keys, records out of sequence, invalid length records, and I/O errors in the data of a VSAM data set. After a non-recoverable error or 4 recoverable errors, copying stops.
- IDCRP01 issues a UPUT to write the logical record to the output data set. If the return code from the UPUT macro is non-zero, IDCRP01 checks the return code for a recoverable error. After a non-recoverable error or 4 recoverable errors, copying stops.

b. If no ending point is specified in the REPRO command, IDCRP01 issues a UCOPY macro to copy the input data set to the last record.

IDCRP01

Procedure: IDCRP01

5 IDCRP01 writes a message with LASTCC to SYSLST. It also closes the input and output data sets with one UCLOSE macro. Control returns to Executive Controlled Termination.

Diagram 3.9.1 REPRO FSR – Catalog Reload

From Diagram 3.9

INPUT

Input Data Set (Source)

VSAM Catalog (Target)

PROCESSING

1. Issues starting message.

2. Compares the target catalog and source data set.

3. Reads and copies the source records into the target catalog.

4. Updates the target catalog's control record (CCR).

5. Returns to Diagram 3.9, step 5.

OUTPUT

VSAM Catalog (Target)

Extended Description for Diagram 3.9.1

IDCRP01

Procedure: IDCRP01

1 The message says that catalog reload had begun.

IDCRP01

Procedure: CATRELOD

2 Additional checks are made at this time by using data from the first 10 records of the input and output data sets. If the data set names do not match, a message is issued, processing is set for termination, and further checks are made. Termination also occurs if the input data set record format does not match a VSAM catalog record format, if there is insufficient space in the output data set, and if the volume serial numbers or the device types do not match. Messages are issued for the corresponding errors.

IDCRP01

Procedures: CATRELOD, SORSREAD, TARGREAD, GETPAIR, DUMPIT, TRUENAME, CATRANS, CONVRTCI, CATCOMP

3 When all the checks are satisfied, the unloaded catalog is copied into the output data set. Each record is read from the input data set and translated. It is then compared to the target catalog.

- If a record existed on both backup and target catalogs, the translated backup updates the target.
- If a record existed only on the backup, then this record is inserted into the target catalog.
- If a record existed only on the target catalog, then it is processed in one of two ways.

  a. If the target record is a true name record, then it is deleted.

  b. If the target record is a low key range record, then it is made a catalog free record and placed on the free chain.
- In both cases where the keys are not equal, differences in true name entries between the backup and target catalogs are checked.

  a. If a target name record exists without a corresponding backup or vice versa, then a message is printed indicating this, provided that not more than 100 messages have been issued. A warning return code of 4 is attached to the message

  b. At the 101th discrepancy, a message is issued saying that comparison is terminated. The only discrepancies to be printed afterwards will be for volume entries.

IDCRP01

Procedure: CATRELOD

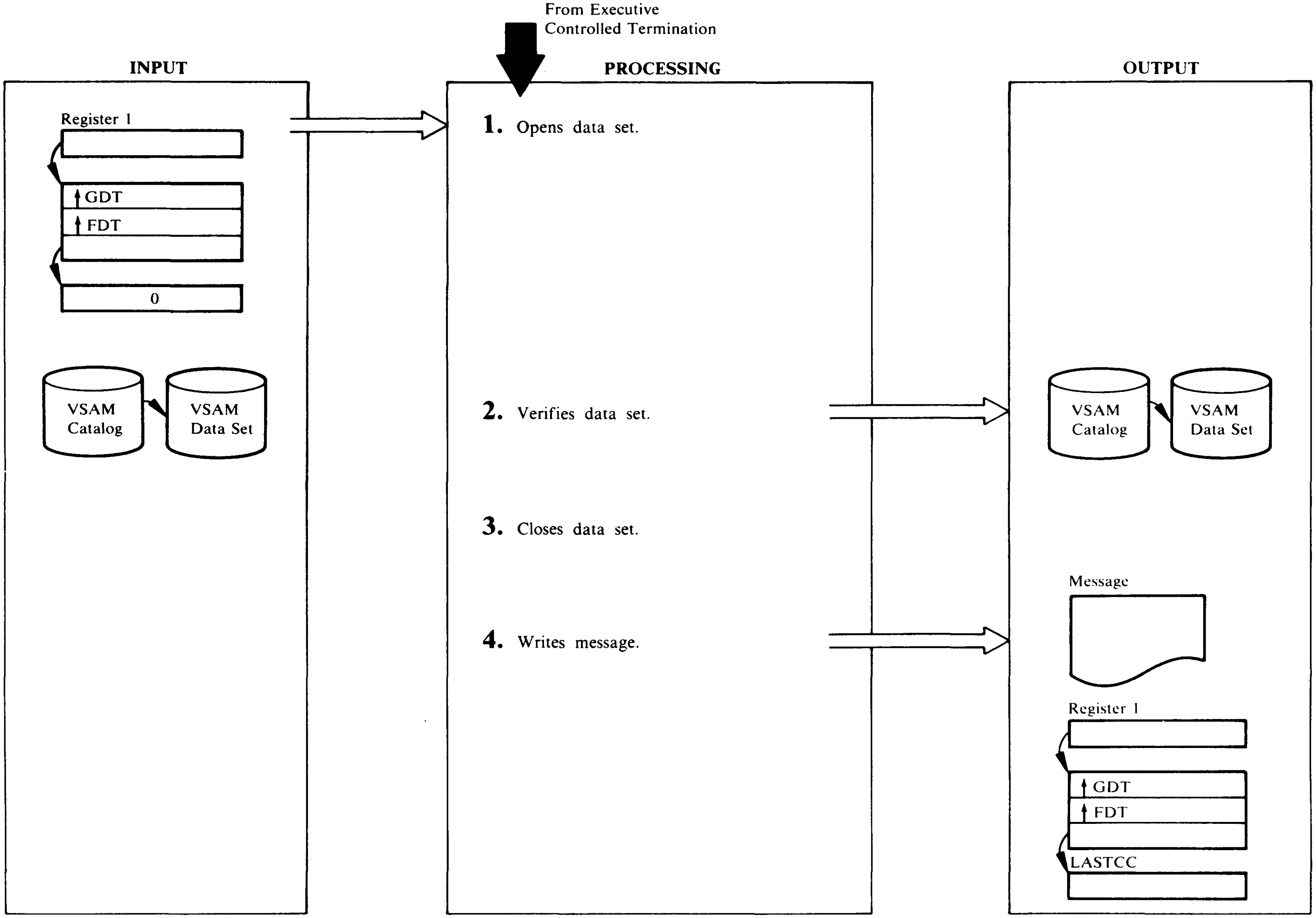
4 After both backup and target records have been processed sequentially by key to the end-of-file, one more record needs to be updated.

- The catalog free chain pointers are counted and updated. The RBA fields are cleared so they will be correct for the next open of the catalog and the updated record is written back.

The number of records copied is the number of backup records read if catalog reload has taken place; otherwise, it is the number of output records written.

5 Control passes to Step 5, Diagram 3.9, step 5, to print final messages.

Diagram 3.10. VERIFY FSR



Extended Description for Diagram 3.10

IDCVY01

Procedures: OPENPROC, IDCVY01

1 OPENPROC builds an OPNAGL to open the VSAM data set specified by FILE for control interval update processing. A UOPEN macro is issued to open the data set. If the open was not successful, LASTCC is set to 12 and control goes to step 4.

IDCVY01

Procedure: IDCVY01

2 IDCVY01 issues a UVERIFY macro to verify the data set.

IDCVY01

Procedure: TERMPROC

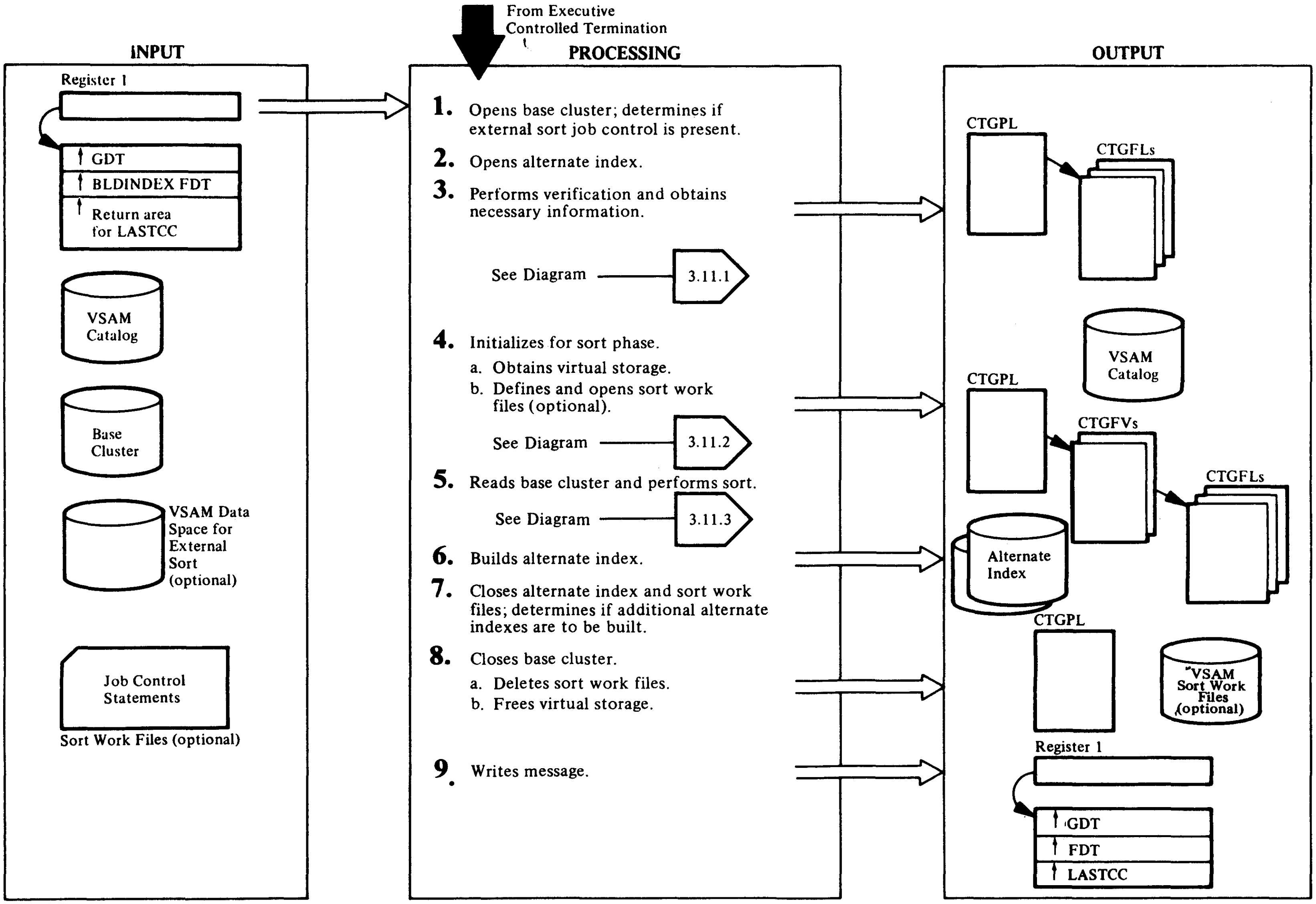
3 TERMPROC issues a UCLOSE macro to close the data set. If the close was not successful, LASTCC is 4.

IDCVY01

Procedure: IDCVY01

4 IDCVY01 prints a message containing LASTCC. Control goes to Executive Controlled Termination, Diagram 4.0.

Diagram 3.11. BLDINDEX FSR



Extended Description for Diagram 3.11

IDCBI01

Procedures: OPNPROC, JCPROC

1 IDCBI01 calls OPENRPOC to build an OPNAGL and issue a UOPEN to open the base cluster for input. OPENPROC indicates the INFILE dname in the OPNAGL. OPENPROC indicates input processing in the OPNAGL. UOPEN processing determines if the base cluster is a KSDS or an ESDS and sets a flag in the IOCSTR returned to OPENPROC following the open. This flag will be used by BLDINDEX to determine if alternate index records are to contain prime key pointers or RBA pointers. UOPEN also sets the RPL to keyed sequential processing for a KSDS or addressed sequential processing for an ESDS. If the return code from UOPEN is nonzero, OPENPROC returns to IDCBI01 with LASTCC set to 12 and the BLDINDEX command is terminated.

OPENPROC checks the high-used RBA of the base cluster returned in the IOCSTR. If the high-used RBA is zero, OPENPROC issues a message returns to IDCBI01 with LASTCC set to 12 and the BLDINDEX command is terminated.

IDCBI01 calls JCPROC to determine if job control for an external sort has been provided. BLDINDEX will always perform an internal sort if enough virtual core has been provided by the caller. Otherwise, if the caller has provided appropriate job control, BLDINDEX will perform an external sort using two VSAM entry sequenced data sets. Job control consists of DLBL/EXTENT cards with the following specifications:

Filename	-	As provided via the WORKFILES parameter, or defaulted to IDCUT1 and IDCUT2
File-ID	-	Required
Volume Serial Numbers	-	Required; must specify volume(s) containing VSAM data space accessable via a currently available catalog.
Access Method	-	'VSAM' required

If the caller has specified the WORKFILES parameter, JCPROC issues a UIOINFO specifying the first dname of that parameter. Otherwise, the UIOINFO specifies a default dname of IDCUT1. The UIOINFO requests a return of the data set name and volume serial number(s). If the return code from UIOINFO is zero, JCPROC issues another UIOINFO requesting the same information for the second dname specified via WORKFILES or the default dname of IDCUT2 if WORKFILES has not been specified. If both UIOINFOs are successful, JCPROC saves the pointers to the information obtained.

IDCBI01

Procedures: MAINPROC, OPENPROC

2 Steps 2 through 7 are performed for each alternate index specified in the OUTFILE parameter.

IDCBI01 calls MAINPROC to control the building of the alternate index. MAINPROC calls OPENPROC to build an OPNAGL and issue a UOPEN for the alternate index. OPENPROC sets a flag in the OPNAGL to indicate that only the alternate index is to be opened. OPENPROC indicates the OUTFILE dname in the OPNAGL. The OPNAGL specifies keyed sequential output processing and specifies open with reset. If the alternate index is nonempty and was defined with the reusable attribute, VSAM OPEN will reset it to an empty condition. If the return code is nonzero OPENPROC sets LASTCC to 8 and returns to MAINPROC where control is passed to Step 7.

IDCBI01

Procedures: MAINPROC, LOCPROC

3 In order to accomplish validity checking and obtain required information, MAINPROC calls LOCPROC to issue VSAM catalog locates. See Diagram 3.11.1.

On return from LOCPROC, the following information has been obtained to be used in subsequent processing:

Type of base cluster (KSDS or ESDS)	-	returned from UOPEN of base cluster; also in data AMDSB.
Position and length of prime key (if base cluster is a KSDS)	-	in base cluster data AMDSB control block.
Length of alternate index record	-	in alternate index data AMDSB.
Length of alternate key	-	in alternate index data AMDSB control block.
Position of alternate key in base cluster record	-	in alternate index AMDSB control block.
Unique or nonunique key indicator	-	in alternate index AMDSB control block.
Number of records in the base cluster	-	in base cluster AMDSB control block.

IDCBI01

Procedures: MAINPROC, INITPROC

4 MAINPROC calls INITPROC to obtain resources for building the alternate index. Resources consist of virtual storage for buffers and work areas, virtual storage for the sort and defined and opened sort work files if it is determined that such are required. See Diagram 3.11.2.

IDCBI01

Procedures: MAINPROC, CNTLPROC

5 MAINPROC calls CNTLPROC to read the base cluster and control the sort-merge process. See Diagram 3.11.3.

IDCBI01

Procedures: CNTLPROC, BLDPROC, MERGPROC

6 If an internal sort was performed, CNTLPROC passes each sort record to BLDPROC to build and write the alternate index records. Otherwise, CNTLPROC calls MERGPROC to perform the merge passes and build the alternate index. See Diagram 3.11.3 for BLDPROC and MERGPROC processing.

IDCBI01

Procedure: FINPROC

7 IDCBI01 calls FINPROC to perform cleanup from the alternate index just built. FINPROC tests for an alternate index and sort work files and issues a UCLOSE for any of those data sets which are open. If BLDINDEX processing encounters any errors, FINPROC issues an appropriate message. Catalog error messages are issued by building an error conversion table and invoking the UERROR macro. FINPROC also issues a UFPOOL to free the sort core, buffers and work areas used in building this alternate index. A message indicating the success or failure of the alternate index build is written. The setting of LASTCC determines the message to be written. If LASTCC from the current build is higher than the maximum value from previous builds, it is saved. LASTCC is cleared for subsequent builds. If the caller of the BLDINDEX has specified multiple alternate indexes, control returns to Step 2.

IDCBI01

Procedures: TERMPROC, DELTPROC

8 IDCBI01 calls TERMPROC to perform final cleanup. TERMPROC issues a UCLOSE to close the base cluster. If sort work files exist, DELTPROC is called to build a CTGPL to delete them.

A UCATLG macro is issued by DELTPROC to delete each sort work file. TERMPROC issues a UFPOOL to free all remaining core obtained via UGPOOL.

IDCBI01

Procedure: TERMPROC

9 TERMPROC writes a termination message with the maximum LASTCC encountered. Control returns to Executive controlled termination via IDCBI01.

Diagram 3.11.1. BLDINDEX FSR – Get Information and Verify

From Diagram 3.11

INPUT

VSAM Catalog

PROCESSING

1. Obtains information regarding the base cluster.
2. Obtains information regarding the alternate index.
3. Verifies the alternate index-base cluster relationship.

OUTPUT

CTGPL

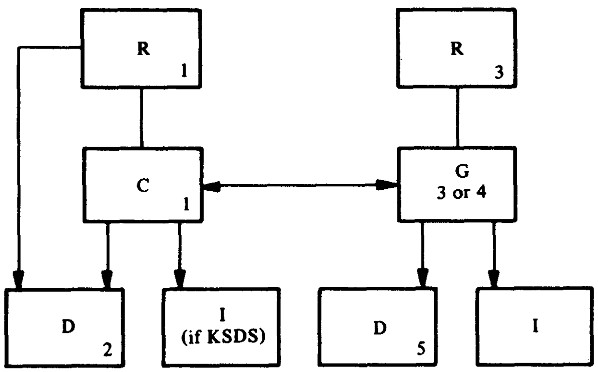
CTGFLs

Extended Description for Diagram 3.11.1

IDCBI01

Procedures: LOCPROC, CATPROC

1 The caller of BLDINDEX may specify the alternate index and base cluster names or a path to either. The diagram below shows the relationship of the various objects involved:



R = Path
C = Cluster
G = Alternate Index
D = Data
I = Index

The number in each box indicates which of the locates described below retrieves information for that object. The purpose of this series of locates is:

a. to retrieve the data AMDSB control block of the alternate index and base cluster, and

b. to verify that the alternate index specified by the caller does indeed relate to the base cluster specified.

If the caller specified a path over the alternate index via OUTFILE, an additional locate will be required to reach the G object will be required (Locate 4).

The building of the CTGPL and CTGPLs and the issuance of the UCATLG is actually done by CATPROC. LOCPROC makes successive calls to CATPROC to perform these functions. On each entry to CATPROC, the CTGPL and CTGFLs are rebuilt for the specific locate being processed. LOCPROC calls CATPROC for locates 1 and 2 only on the first alternate index being built since these locates are against the base cluster. Appropriate information is saved.

Locate 1

Locate 1 retrieves the associations of the name specified via INFILE. CATPROC builds a CTGPL for a locate operation. CTGFLs are built for:

ENTYPE	-	Entry Type
NAMEDS	-	Type and control interval number of the first three associations
CATACB	-	Catalog ACB

The entry name used in this locate is the file ID specified by the caller in the job control pointed to by the INFILE parameter. If the return code from catalog is nonzero, LOCPROC sets a locate error condition, sets LASTCC to 12 and returns control to MAINPROC. MAINPROC returns to IDCEI01 where control is passed to Step 7 (Diagram 3.11). **Note:** This same type of error processing follows all subsequent locates except that LASTCC is set to 8 for locates 3, 4, and 5.

If the Entry Type returned by catalog management is an R (path), LOCPROC tests that the first association is a C (base cluster). If the Entry Type is not an R, it must be a C. Otherwise LOCPROC issues a message, sets LASTCC to 12 and returns control to MAINPROC.

Locate 2

CATPROC builds a CTGPL and CTGFLs to retrieve the base cluster data AMDSB.

CTGPL:	Entry "name" is the control interval number of the base cluster's data object (D) returned in Locate 1.		
CTGFL:	ENTYPE	-	Entry Type
	NAMEDS	-	Type and control interval number of the first three objects associated with the data object
	AMDSBCAT	-	AMDSB control block

The catalog ACB returned from Locate 1 is used in this and all subsequent locates.

LOCPROC saves the first control interval number returned for NAMEDS which is the control interval number of the base cluster object. LOCPROC also moves the AMDSB control block to its own work area.

IDCBI01

Procedure: LOCPROC, CATPROC

2 *Locate 3*

Locate 3 is essentially the same as Locate 1 (minus the catalog ACB address) except that the name specified via OUTFILE is used. If the entry type returned by catalog management is an R (path), LOCPROC tests that the first association is a G (alternate index). If the entry type is not an R, it must be a G. Otherwise, LOCPROC issues a message, sets LASTCC to 8 and returns control to MAINPROC.

Locate 4

If the Entry Type from Locate 3 was an R. CATPROC builds a CTGPL and CTGFL to retrieve the alternate index associations.

CTGPL:	Entry"name" used is the control interval number of the alternate index (G) associated with the path (R) returned in Locate 3.
ENTYPE:	Entry type
CTGFL:	NAMEDS—Type and control interval number of the first three objects associated with the alternate index. The entry type returned by catalog management must be a G. Otherwise, LOCPROC issues a message, sets LASTCC to 8, and returns control to MAINPROC.

IDCBI01

Procedures: LOCPROC, CATPROC

3 LOCPROC must now verify that the alternate index specified by the caller is in fact related to the base cluster specified. LOCPROC compares the control interval number of the base cluster saved from Locate 2 of the control interval number of the third association returned from Locate 3 or 4. This should be, for an alternate index, the control interval number of the related base cluster. If the CI numbers are not equal LOCPROC issues a message, sets LASTCC to 8 and returns control to MAINPROC.

Locate 5

Locate 5 is the same as Locate 2 for the alternate index data AMDSB control block.

Control returns to Diagram 3.11 where control will be passed to Step 4 or Step 7 depending on the setting of LASTCC.

Diagram 3.11.2. BLDINDEX FSR – Obtain Resources and Sort Initialization

From Diagram 3.11

INPUT

Job control statements

Sort Work Files (optional)

PROCESSING

1. Determines requirements for sort.
2. Obtains virtual storage.
3. Defines and opens sort work files (optional).

OUTPUT

CTGPL

CTGFVs

CTGFLs

VSAM data sets for sort work files

Extended Description for Diagram 3.11.2

IDCBI01

Procedures: INITPROC

1 INITPROC issues a UGPOOL macro to obtain virtual core for buffers and work areas, consisting of 1 2K buffer (to be used for output if an external sort is performed), the area required for the CPL/FVT/FPL complex to define the sort work files and the alternate index record output buffer. The first two areas are obtained at this time, even though they may not be used, so that if it is necessary to perform an external sort it will not fail due to lack of virtual storage. If the UGPOOL fails, INITPROC sets LASTCC to 8, issues a message and returns control to IDCBI01, Step 7 (via MAINPROC).

INITPROC calculates the requirements for both an internal sort and an external sort. If an external sort is performed, the records being sorted are blocked into a block 2048 bytes in length, using a logical record length of 2041 bytes. Blocking and deblocking of sort records within the 2041-byte logical record is accomplished by BLDINDEX. The formulas used to determine sort work size are:

Sort Record Size = Alternate Index Key Length + Prime Key Length (KSDS) or 4 (ESDS)

$$\text{Number of Records per Block} = \frac{\textbf{2041}}{\text{Sort Record Size}}$$

$$\text{Total number of 2K Blocks} = \left\{\frac{\textbf{\# of Records in Base Cluster}}{\text{\# of Records per Block}}\right\} + 1$$

During the first phase of either an internal or external sort, the records being sorted are packed contiguously into a record sort area (RSA). The RSA size is always in increments of 2K so that it can be later used as an input buffer area during the merge phase of an external sort. The initial size of the RSA is calculated as

Number of Records in Base Cluster * Sort Record Size

and rounded up to the nearest multiple of 2K. This size is then adjusted as follows:

a. If the RSA size is less than 4K, it is set at 4K. The number of records in the base cluster is obtained from a statistic maintained in the base cluster AMDSB control block. If this statistic is in error (which can happen if a system failure occurs during a close), it may be necessary to go into an external sort. In this case, space for two input buffers is required.

b. If the EXTERNALSORT parameter has been specified by the caller of BLDINDEX, the RSA size is set at 32K—the minimum amount of storage which will be used for an external sort during the merge phase.

IDCBI01

Procedures: INITPROC

2 In addition to virtual storage for the RSA, virtual storage for the table (called the "heap") which drives the first phase of the sort is required. This is a table of 4-byte pointers. The amount required is calculated as follows:

$$\text{RSA Capacity} = \frac{\textbf{RSA Size}}{\text{Sort Record Size}}$$

Heap Size = RSA Capacity * 4

INITPROC issues a UGPOOL for the RSA size plus the heap size. If the UGPOOL fails, the initially calculated RSA size could not be obtained and it will be necessary to perform an external sort. The maximum amount of core used for an external sort is 100K, the minimum 32K. If the maximum amount cannot be obtained, an attempt is made to obtain an intermediate RSA of 60K. INITPROC sets the RSA size to the next lower plateau—100K, 60K, 32K—and loops back to the start of Step 2. If the UGPOOL fails at the lowest plateau (32K), INITPROC sets LASTCC to 8, issues a message and returns control to IDCBI01, Step 7 (via MAINPROC).

IDCBI01

Procedures: INITPROC, DEFPROC, DELTPROC, OPENPROC

3 If virtual storage was successfully obtained but the amount obtained for the RSA was less than the originally calculated required amount, INITPROC calls DEFPROC to define and open two sort work files to be used during the merge phase of an external sort.

DEFPROC checks to determine that the caller of BLDINDEX did provide external sort job control. If job control was not provided, DEFPROC sets LASTCC to 8, issues a message, and returns to its caller.

DEFPROC determines if large enough sort work files exist from a previous sort and, if so, bypasses the define process.

If external sort work files exist but are not large enough, DEFPROC calls DELTPROC to build a CTGPL to delete each sort work file (specifying the PURGE option).

If sort work files are to be defined, DEFPROC builds a CTGPL, a cluster CTGFV, a data CTGFV and the required CTGFLs to define the first external sort work file. DEFPROC issues a UTIME macro in order to provide the creation date in the define operation. The cluster FVT references the file-ID and the data FVT references the volume serial numbers obtained via UIOINFO from the sort work job control statements. Space allocation is in records: primary, the number of 2K blocks calculated by INITPROC; secondary, 10% of primary. The data set attributes specified are: ESDS, nowritecheck, unordered, speed, suballocation, noerase, reuse, default shareoptions, control interval size of 2048, logical record length of 2041.

DEFPROC issues a UCATLG macro to define the first work file, makes the necessary changes to the FVTs and issues a UCATLG for the second work file. DEFPROC next calls OPENPROC to build OPNAGL and open the two data sets just defined. The OPNAGLs specify sequential output using control interval processing with user buffers. If the define or open for either of the sort work files fails, DEFPROC sets a define error condition, sets LASTCC to 8 and returns control to INITPROC. If both sort work files are successfully defined and opened, DEFPROC returns to INITPROC with a flag indicating that an external sort is to be performed. INITPROC returns control to Diagram 3.11 where control will be passed to Step 5 or Step 7 depending on the setting of LASTCC.

Diagram 3.11.3. BLDINDEX FSR – Sort-Merge and Build Alternate Index

From Diagram 3.11

INPUT

Base Cluster

VSAM Data Sets for Sort Work Files (optional)

PROCESSING

1. Initializes for sort phase.
2. Reads base cluster, places records in record sort area, internally sorts, writes initial strings if record sort area cannot contain all records (optional).
3. Performs merge passes (optional).
   a. Initializes for each pass.
   b. Merges strings.
4. Builds alternate index.

OUTPUT

VSAM Data Sets for Sort Work Files (optional).

Alternate index

Extended Description Diagram 3.11.3

IDCBI01

Procedure: CNTLPROC

1 CNTLPROC initializes factors which will be used during the sort-merge including pointers to the record sort area (RSA), and the table of pointers which is used during the sort. CNTLPROC also initializes the output buffer with an RDF and CIDF in the event an external sort is performed (the sort work files are processed in control interval mode with user buffers).

IDCBI01

Procedures: CNTLPROC, SORTPROC, BLDPROC, SPILPROC, DEFPROC

2 In a loop CNTLPROC reads each base cluster record and passes it to SORTPROC. SORTPROC performs the function of building the sort records from the base cluster record, placing each record in the RSA and updating the table of pointers (called the'heap') to the records in the RSA. The heap is sorted when the RSA has reached capacity and/or when the last base cluster record has been processed.

Each sort record is formed by concatenating the prime key of the base cluster (KSDS) or its RBA (ESDS) to the alternate key.

Alternate Key	**Prime Key (KSDS) or RBA (ESDS)**

If the base cluster record is not long enough to contain the alternate key, SORTPROC issues a warning message and sets the current condition code to 4.

The heap sort consists of two phases. The first phase builds the heap into a tree of nodes having a parent-child relationship. Each parent node has two child nodes and the parent represents a key higher than either of the two children. At the end of the first phase the node at the top of the tree represents the highest key. The second phase removes the top node, places it at the bottom, reduces the heap by 1 and adjusts the parent-child relationships of the remaining nodes. This loop continues until the top of the heap represents the lowest key.

If enough virtual core was available to contain all the sort records, the sorting takes place after the last base cluster record has been read, after which CNTLPROC passes each record to BLDPROC to build and write the alternate index records (see Step 4). Otherwise, sorting takes place each time the RSA is filled. After the heap is sorted, if the sort was caused by the RSA reaching capacity before end-of-file on the base cluster, SORTPROC calls SPILPROC to write out the records in the RSA in a string of 2K blocks to the external sort work file.

SPILPROC determines if sort work files have already been defined and opened by INITPROC and, if not calls DEFPROC to perform that function. Normally, SPILPROC will find sort work files already defined and opened. However, if the statistic contained in the base cluster AMDSB control block as to the number of records in the base cluster was erroneously low and the calculated virtual storage for the sort was obtained, INITPROC will not have initialized sort work files. SPILPROC blocks the sort records into the 2K output buffer and issues a UPUT macro to write it. This is performed in a loop until all sort records in the RSA have been written out.

CNTLPROC calls SORTPROC under the following conditions:

- After each base cluster record has been read. The address of the record is contained in the IOCSTR of the base cluster.
- At end-of-file on the base cluster.

IDCBI01

Procedures: CNTLPROC, MERGPROC, BLDPROC

3 After all base cluster records have been read, if the RSA was not large enough to contain all sort records, merge passes must be performed using the two external sort work files. SPILPROC has written out the first strings during the sort phase. During this phase the external sort work file is in create mode. The data set was opened with MACRF=CNV, UBF, OUT, SEQ. PUTs are issued with OPTCD=CNV, SEQ, NUP. Control intervals are written in physical sequence. At the end of the sort phase, CNTLPROC issues a UCLOSE macro to close the output sort work file followed by UOPEN to reopen it. This is necessary to get out of create mode. The second open specifies MACRF=CNV, UBF, DIR, UPD. Subsequently all PUTs will be issued with OPTCD=CNV, DIR, UPD.

CNTLPROC then calls MERGPROC to control the merge passes. MERGPROC performs the function of merging strings of sort records originally built by SPILPROC using the two external sort work files. The order of merge is normally 16 or less using an area of 32K (the original RSA) for input buffers. In one case, the order of merge will be 2. That is, when the statistic of the number of records in the base cluster AMDSB was so erroneously low that an RSA of 4K was obtained.

In general, the merge is accomplished in the following manner (assuming a 16-way merge) -

- Reading the first 2K block of the first n strings to be merged, where n is 16 if there are 16 or more input strings or where n is the total number of input strings if less than 16.
- Using the first record of each string, build an array in the form of a tree. The tree is made of nodes with a single node at the top. Each parent node has two child nodes and the tree is built so that the record represented by the parent node is lower in value than either child. As the tree-add loop starts, the size of the tree is increased by 1 thus leaving an empty slot at the bottom. The parent of the empty slot is established and if the new record is higher

than the parent, it goes into the empty slot at the bottom. However, if the new record is lower, the parent is moved down leaving an empty slot. The parent of the new empty slot is established and the process continues until the new record is found to be higher than the parent at which time it goes into the empty child slot. If the parent is moved from the top of the tree, the new record goes there and the process stops.

- Output the lowest record on the tree. This output will be to BLDPROC (see Step 4) if this is the last or only merge pass or to the output string if this is not the last merge pass.
- Update the tree filling the slot left empty from the step above.
- Get the next record from the same string as the previous lowest record. Output it if it is lower than the current lowest, otherwise add it to the tree.
- Continue this process until all records in all input strings currently being processed have been output.
- Loop until all input strings for this merge pass have been output.
- If more merge passes are required, make the previous output file the next input file and vice versa and repeat the merge passes until the number of input strings is equal to or less than the order of merge.

IDCBI01

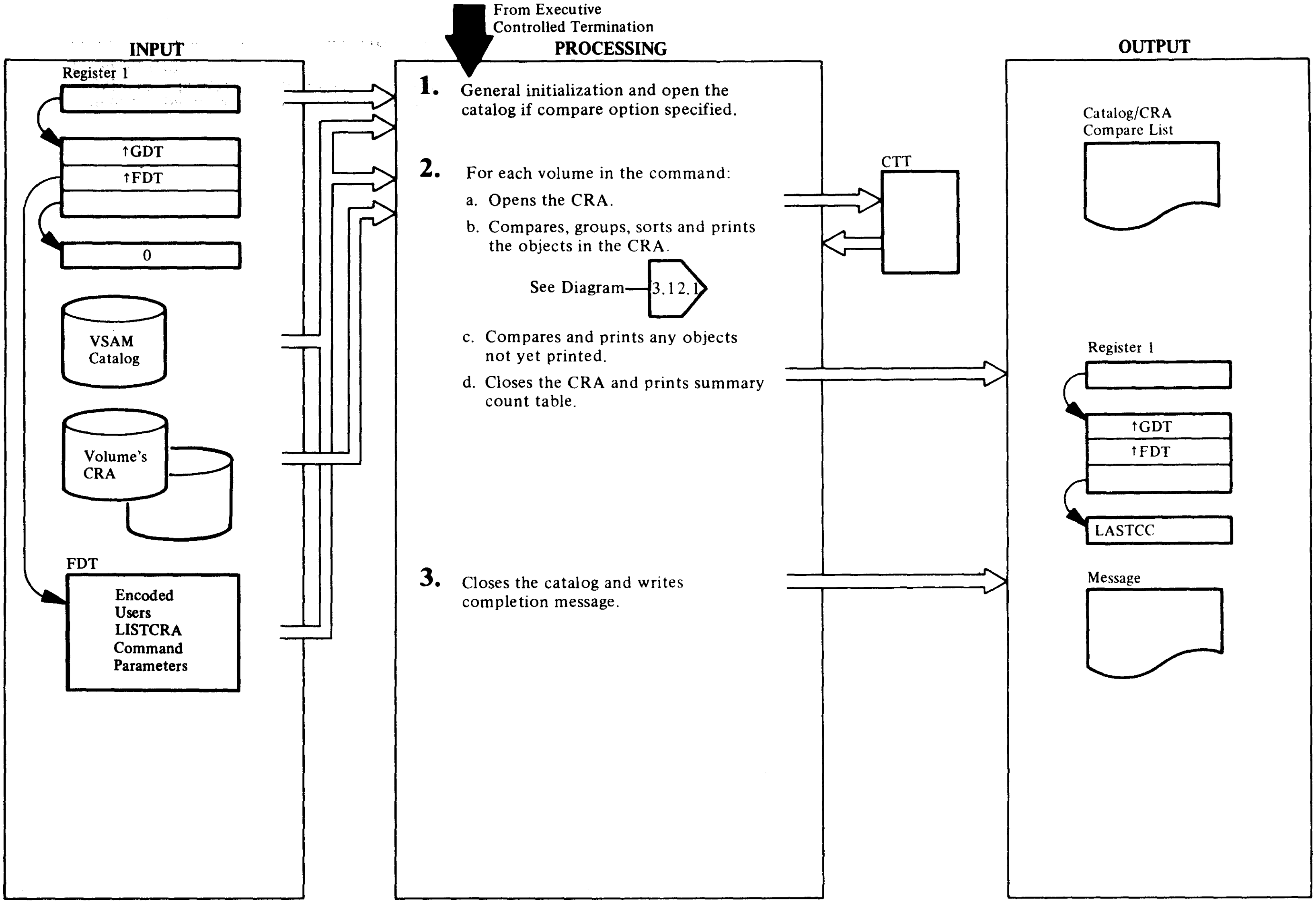
Procedures: BLDPROC

4 BLDPROC is called either from CNTLPROC (if an internal sort was performed) or MERGPROC (on the last merge pass of an external sort). In either case, BLDPROC is passed sorted records one at a time.

On the first entry to BLDPROC, the IOCSTR for the alternate index is initialized as well as the static portion of the alternate index record. On all subsequent entries, the alternate key of the sort record passed to BLDPROC is compared to the key of the alternate index record being built. If these keys are unequal, the alternate index record is to be written out. BLDPROC determines if the record was too short to contain all the prime key or RBA pointers and, if so, issues a warning message containing the number of excess pointers and sets the current condition code to 4. The record is written with a UPUT macro and the buffer reset for the next record. Before moving the prime key or RBA from the sort record to the alternate index record, BLDPROC checks if the alternate index was defined with the UNIQUEKEY attribute. If so and if the new prime key or RBA is not the first for this alternate index record, BLDPROC issues a warning message and sets the current condition code to 4. Only the first prime key or RBA is placed in the alternate index record. BLDPROC also checks that the record is long enough to contain the new prime key or RBA and, if not, increments an excess pointer counter. If all checks prove successful, the new prime key or RBA is moved to the alternate index record.

After CNTLPROC passes the last sort record to BLDPROC (internal sort) or receives control back from MERGPROC (external sort), CNTLPROC calls BLDPROC one more time to write out the last alternate index record. Control is then returned to IDCBI01 via MAINPROC—Diagram 3.11, Step 7.

Diagram 3.12. LISTCRA FSR



Extended Description for Diagram 3.12

IDCLR01

Procedures: AATOPLR, INITLZE, CATOPEN, ERROR

1 Routine addresses, the UOPEN argument list and the UIOINFO option byte are initialized in the work area. If the COMPARE option was specified, a UOPEN is issued for the catalog specified on the control cards. If the OPEN is successful, a UVERIFY is issued and the catalog name is obtained using Access Method Services field management (IDCRC04) and compared to the catalog named specified on the control cards. If there is a match, the volume serial is obtained via IDCRC04 and the catalog is locked out from other users of the system. If the COMPARE option was not specified or the OPEN of the catalog failed, the no compare indicator is set.

IDCLR01, IDCLR02, IDCRC04

Procedures: AATOPLR, CRAOPEN, PRTVOL, INTSORT, MEMSORT, DOVSAM, PRTVSAM, DOOTHR, PRTOTHR, PRTFIFO, GETPRT, PRTCMP, CLENCRA, SUMIT

2 For each of the CRAs specified by a job control card, the following is repeated:

a. The UOPEN parameter list is set up with the *dname* and the master catalog password and the UOPEN and UVERIFY are issued for the CRA. If they are successful and there is a match on the owning catalog name, the volume serial is obtained from the CRA via IDCRC04 and a UREST is issued to print a subtitle for this CRA. The entire CRA is read to build the CI translate table (CTT) in space gotten by UGPOOL.

b. The CRA volume record and its extensions are optionally compared to the corresponding catalog entry and printed by PRTVOL. The VSAM objects are then sorted into alphabetical order, optionally compared to corresponding catalog entries and printed by INTSORT, MEMSORT, DOVSAM, and PRTVSAM. Next, the nonVSAM objects are sorted, compared, and printed by INTSORT, MEMSORT, DOOTHR, and PRTOTHR. See Diagram 3.12.1.

c. If either sort fails for lack of memory (from b. above), the objects are compared and/or printed in the order they appear in the CRA by PRTFIFO. Records already processed by the above procedures are skipped. If the object is a VSAM object, PRTVSAM is called and if it is a not, PRTOTHR is called.

d. GETPRT is used to get the CRA copy of any other records, and the catalog record, if compare. These are printed and compared by PRTCMP. When all objects have been processed, the CRA is closed by CLENCRA and a summary is printed by SUMIT.

IDCLR01

Procedures: AATOPLR, CLEANUP

3 The UCLOSE macro is issued to close the catalog data set and the UDEQ is issued to release the system lockout from the catalog. The completion code message is printed and the UFPOOL macro is issued to free storage. Control is returned to the caller.

Diagram 3.12.1. LISTCRA FSR – Process CRA

From Diagram 3.12

INPUT	PROCESSING	OUTPUT
CTT VSAM Catalog CRA	**1.** Prints optionally compares volume records. a. Reads CRA and catalog volume records and extensions. b. Prints volume record and time stamps. **2.** Processes VSAM entries: a. Alphabetizes VSAM entries. b. Prints and optionally compares each entry and associated records and extensions. **3.** Processes nonVSAM entries: a. Alphabetizes nonVSAMs. b. Prints and optionally compares each entry and associated records and extensions.	Catalog/CRA Compare List CTT

Extended Description for Diagram 3.12.1

IDCLR01, IDCLR02, IDCRC04

Procedures: PRTVOL, SUMIT, GETPRT, VERTEXT, INTVEXT, TCICTCR, BLDVEXT, PRTMCWD, UPRINT, UIOINFO, PRTTIME

1 a. PRTVOL uses GETPRT to read the CRA volume record and IDCRC04 to extract the identifying fields and, if compare, the equivalent information is gotten from the catalog in the same manner. If compare is specified, information is compared and, if not equal, the record is printed and the severest miscompared field is identified by PRTMCWD. If compare is not specified, all records are printed. Horizontal extension records are processed and vertical extension records are checked by VERTEXT and handled in the same way.

b. The time stamps from the CRA volume record and on the CRA volume and, if compare, in the catalog records are printed by PRTTIME.

IDCLR01, IDCLR02, IDCRC04

Procedures: INTSORT, MEMSORT, DOVSAM, PRTVSAM, GETPRT, VERTEXT, INTVEXT, TCICTCR, BLDVEXT, ADDASOC, INTASOC, PRTMCWD, UPRINT, PRTAAXV, PRTOJVL, CKEYRNG, SUMIT

2 a. The sort of the VSAM entries is initialized by INTSORT which scans the CTT counting the number of VSAM entries, gets storage via UGPOOL for a sort table, initializes dummy first and last entries and then loops through the CTT entries calling IDCRC04 to extract the entry names to be sorted. The MEMSORT procedure orders the entries by adding forward and backward chain pointers to alphabetize.

b. If compare was specified, the following procedure is passed through twice, the first time comparing only. When a miscompare is detected the procedure is restarted printing everything. From the entries in the sort table an association table is built containing the control intervals of all associated entries. Passing through this table all associated records are printed. For base cluster's AIX associations, only the entries' volumes are printed (to assist in recovery). The horizontal extension records are printed as are the vertical extension records. Throughout, the names of significant items are noted if they miscompared and these are printed.

IDCLR01, IDCLR02, IDCRC04

Procedures: INTSORT, MEMSORT, DOOTHR, PRTOTHR, GETPRT, VERTEXT, INTVEXT, TCICTCR, BLDVEXT, SUMIT, PRTMCWD, UPRINT, PRTOJAL, INTASOC

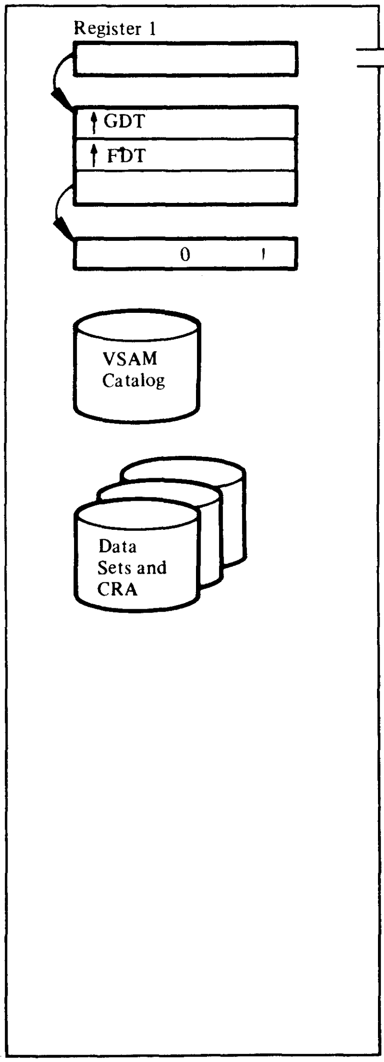
3 a. The logic and procedures used here are the same as are used in 2a with the exception that nonVSAM entries in the CTT are sorted.

b. The logic and procedures used here are the same as used in Step 2b except that nonVSAM entries are handled.

For all of the steps above, GETPRT uses UGET to read the CRA record and the catalog record, if compare. IDCRC04 is used to extract all necessary fields from the records. These are printed and optionally compared by PRTCMP and PRTDMP (if the dump format was specified) and PRTDMPC (if compare was also specified). PRTOJVL is used to print the objects' volume.

Diagram 3.13 EXPORTRA FSR

INPUT



From Executive Controlled Termination

PROCESSING

1. Initializes and builds the CRV.

a. Initialization.

b. Build the CRV.

2. For each CRA specified:

a. Opens the CRA.

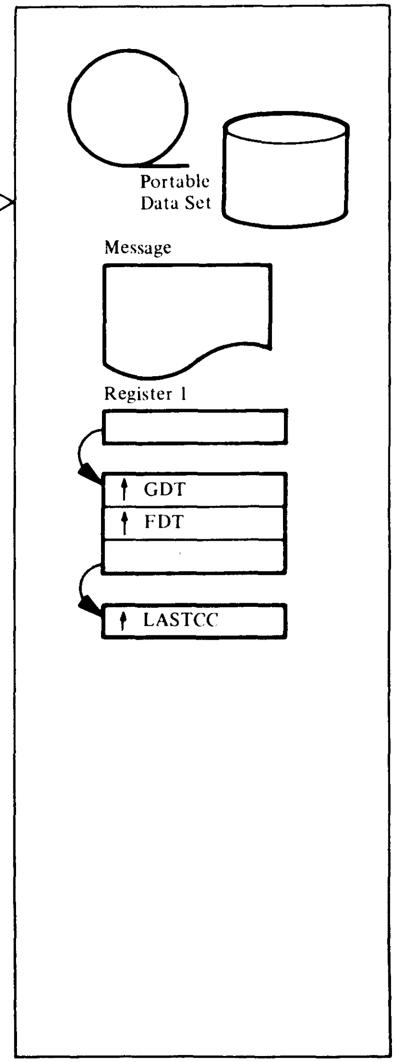
b. Checks the name chain.

See Diagram 3.13.1

c. Exports the name chain.

See Diagram 3.13.2

OUTPUT



Extended Description for Diagram 3.13

IDCRC01

Procedure: INIT, SUBSP, BUILDCRV, BUILDNAM, MESSAGE

1 a. SUBSP is called which issues a UGPOOL to obtain storage for the blocks associated with the name chain. This storage is allocated into small blocks to be used later. Storage is then obtained for the buffer pool VGO space, the CRV, the ACC and the VTT.

b. Each CRA volume is read for the following information: UIOINFO is used to obtain the volume serial numbers and device types which are placed in the CRV. BUILDNAM is called to build the name chain. This procedure calls SUBSP to get a block of storage to be anchored to the CRV. The name pointer is placed in the block as it is read from the CRA.

IDCRC01, IDCRC02, IDCRC03, IDCRC04

Procedures: OPENCRA, OPEN, TIMESTMP, SCANCRA, NAMETABL, DIRECT, EXTRACT, ERRCK, MESSAGE, COMPNAME, CKCATNM, CKNAMES, DUPNAMCK, SYNCH, OBJVOLCK, CRAOPEN, EXPORTDR, OPENCRA, MESSAGE, ERROR

2 a. OPENCRA initializes the buffer pool pointer required by field managment (IDCRC04). It then calls OPEN which opens the CRA for direct processing and checks it for the correct owning catalog. OPENCRA then issues the UIOINFO macro to get the CRA volume timestamp and place them into the VTT. It then calls SCANCRA to build the catalog CI numbers and places them in the CTT and calls NAMETABL which places the record type and name pointer in the name block. If entries were specified, the name block is marked if a match is found with the input. OPENCRA then calls DIRECT which calls EXTRACT which interfaces with IDCRC04 to obtain the directory information from tthe CRA record. ERRCK calls MESSAGE if an error occurred in this procedure. For IDCRC04 see Diagram 3.13.1.

b. CKNAMES is called to gather the passwords for the VSAM data sets using EXTRACT, collect the association CI numbers for the VSAM data sets using EXTRACT, determine the largest LRECL for the data sets using EXTRACT, and flagging any object names if they are invalid for this system. DUPNAMCK is called to loop through all the names in the chain checking for duplicates. If one is found, it is marked so that it will not be exported. A message is written indicating the duplicate name. SYNCH is called which checks each entry on the name chain for a CI number, checks the VSAM data sets for a data entry and if there is a data volume index, OBJVOLCK is called which matches the volume serials in the VGOs and VTT, matching the CI and timestamp. If at any time there was an error, ERROR is called to write a message and determine if the process can continue.

c. EXPORTDR is called which closes the CRA as a data set and opens it as a catalog, then calls MESSAGE to write the "exporting CRA" message. It checks the name chain for the CRA for null entries and nonmatches and marks them not exportable. It initializes the export table and calls IDCRC02 to export the entries. ENVIRONMENT parameters are obtained from the FDT and placed in the export table. See Diagram 3.13.2 for a description of IDCRC02. When the Export Driver returns, then the completion or error message is printed and processing continues with the next CRA.

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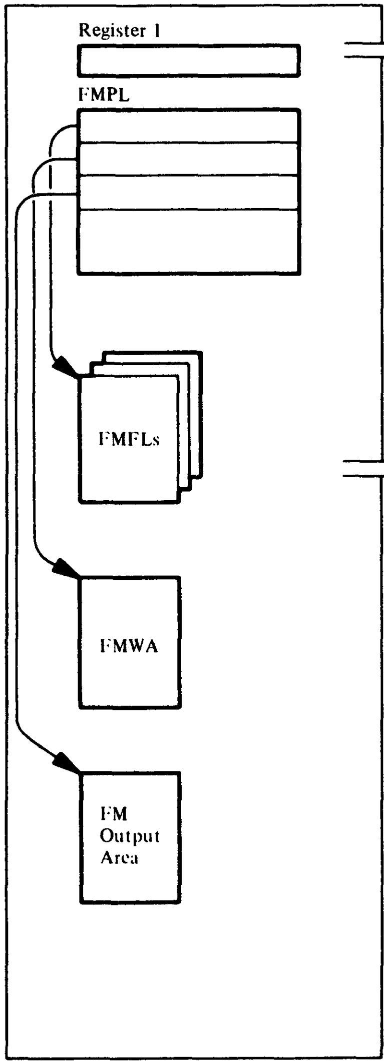
Diagram 3.13.1. EXPORTRA FSR – Field Management

From Diagram 3.13

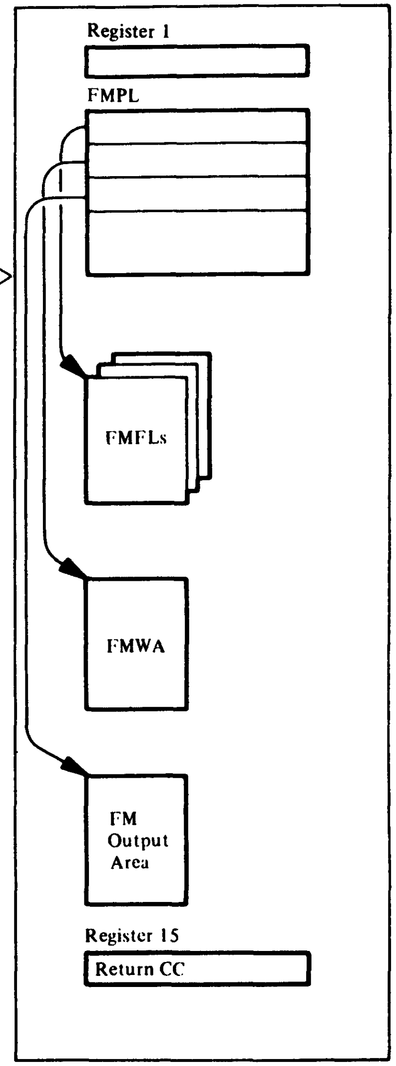
INPUT



PROCESSING

1. Initializes module.
2. Converts alphabetic field names to internal codes.
3. For each RELREPNO:
   a. Handles any test fields to see if information is as expected.
   b. Places the field in the output area.

OUTPUT



Extended Description for Diagram 3.13.1

IDCRC04

Procedure: IDCRC04

1 IDCRC04 is a service routine used by EXPORTRA and LISTCRA to compare and extract data from catalog and CRA records. Upon entry from either IDCRC01 or IDCLR01 it sets up addressability to the work area and initializes the current CI number in the work area for the callers get routine (either IDCRC03 or IDCLR02).

IDCRC04

Procedures: PSCNC, PTRNS

2 PSCNC is called which loops through each field management field list and calls PTRNS which compresses the name into a 4-character ID and places it into the FMFT along with its corresponding dictionary information and supplied group code. The tables are chained according to like group code.

IDCRC04, IDCLR02, IDCRC03

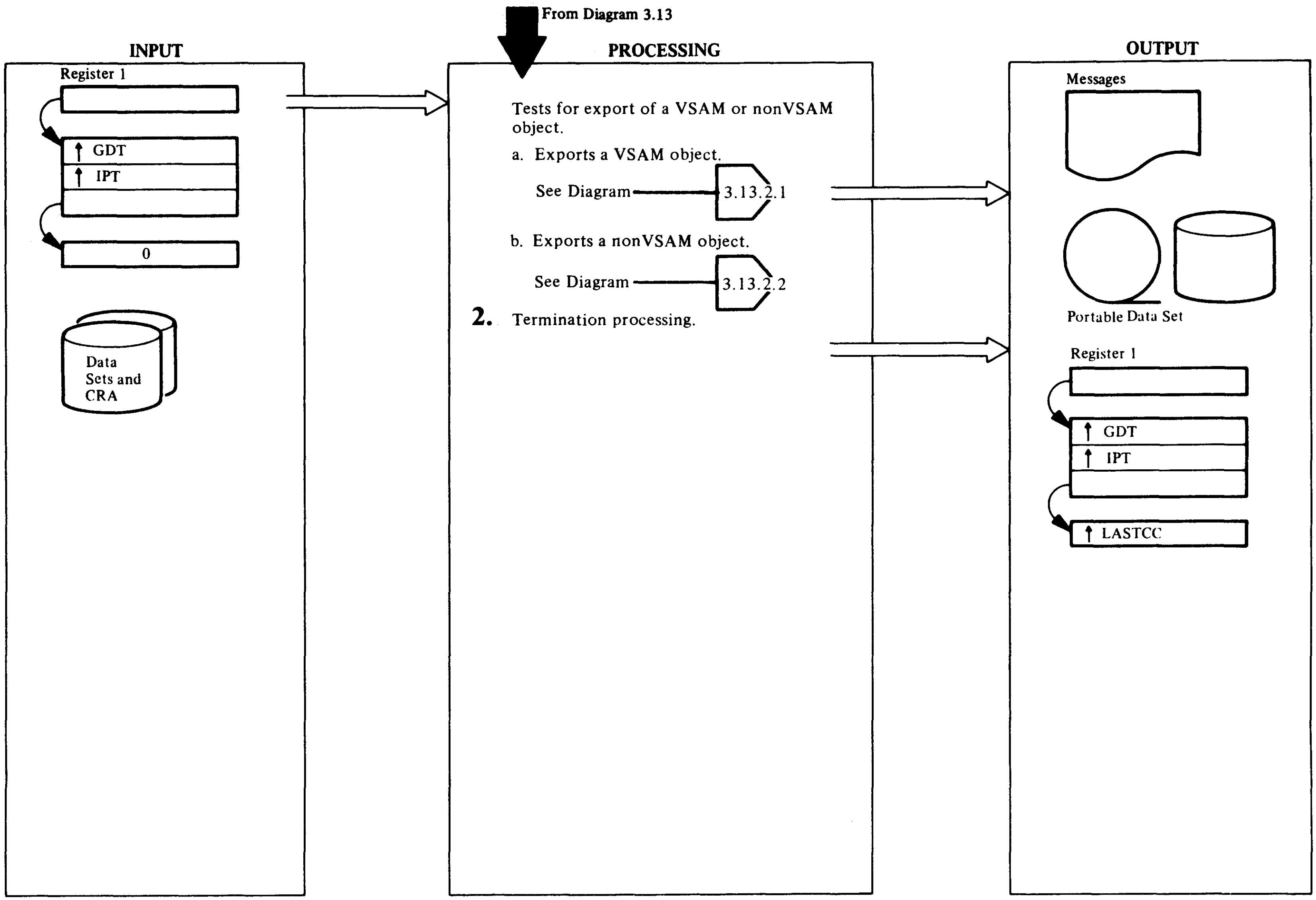
Procedures: PSCNF, PTSTS, PGVAL, PGREC, PCKLC, PEXPT, PLNRV, PTCMP, PLOC2, PGREP, PSHIN

3 PSCNF is called to process these field tables. It first processes the test field and then the one it is looking for so it may place the data in the output area.

a. The field lists are tested by looping through all the CI numbers (PGVAL), interfacing with the callers get record routine, either IDCRC03 or IDCLR02 to obtain addressability to the block containing a CI number (PGREC). It then locates the catalog fields within a given record by insuring the requested field actually exists in the group occurrence data (PCKLC) then sets up the address and length of extension pointers as requested via the RELREPNO specified on entry (PEXPT) and extracts the data from the found field and indicates its length (PLNRV). After the data is found, it is compared by PTCMP with the input data and a match or mismatch is indicated.

b. PLOC2 is the highest-level procedure for placing the data in the output area. This procedure is called by PSCNF if the FMFT is not a test FMFT. It calls PGREP to find the highest non-deleted RELREPNO with the desired group code and saves the address and length of the field which is checked by PGREC. PSHIN checks for enough space in the output area and, if there, moves the field to the output area or moves Fs if non-existent. PGVAL and its subprocedures described above are used to find the fields requested and, after found, PSHIN moves the data to the output area.

Diagram 3.13.2. EXPORTRA FSR – Driver



Extended Description for Diagram 3.13.2

IDCRC02

Procedures: OPENPROC, CLUSPROC, SAVEPROC, RECPROC, PUTPROC, NVSMPROC, ADSPROC, ALSPROC

1 IDCRC02 tests the input parameter list for export of a VSAM or nonVSAM object. OPENPROC opens the portable data set for output. ENVIRONMENT parameters from the export table are placed in the OPNAGL for UOPEN processing. If the object to be exported is a VSAM object then step 1.a is done; if it is a nonVSAM object, then step 1.b is done.

a. CLUSPROC gets catalog information for the cluster, data, index and paths from the CRA. SAVEPROC holds the control records containing the catalog information until catalog processing is completed, then writes them to the portable data set. OPENPROC opens the cluster data for input. RECPROC copies the data to the portable data set. PUTPROC writes a software end-of-file to the portable data set.

b. NVSMPROC gets catalog information for the nonVSAM object from the CRA. ALSPROC gets catalog information for any aliases connected with the nonVSAM object. SAVEPROC holds the control records containing catalog information until catalog processing is completed, then writes them to the portable data set.

IDCRC02

2 IDCRC02 tests return codes from CLUSPROC, NVSMPROC, and GDGPROC. If any alias or path is not exportable, a warning message is issued. The portable data set is then closed if it is the last request or if a severe error occurred.

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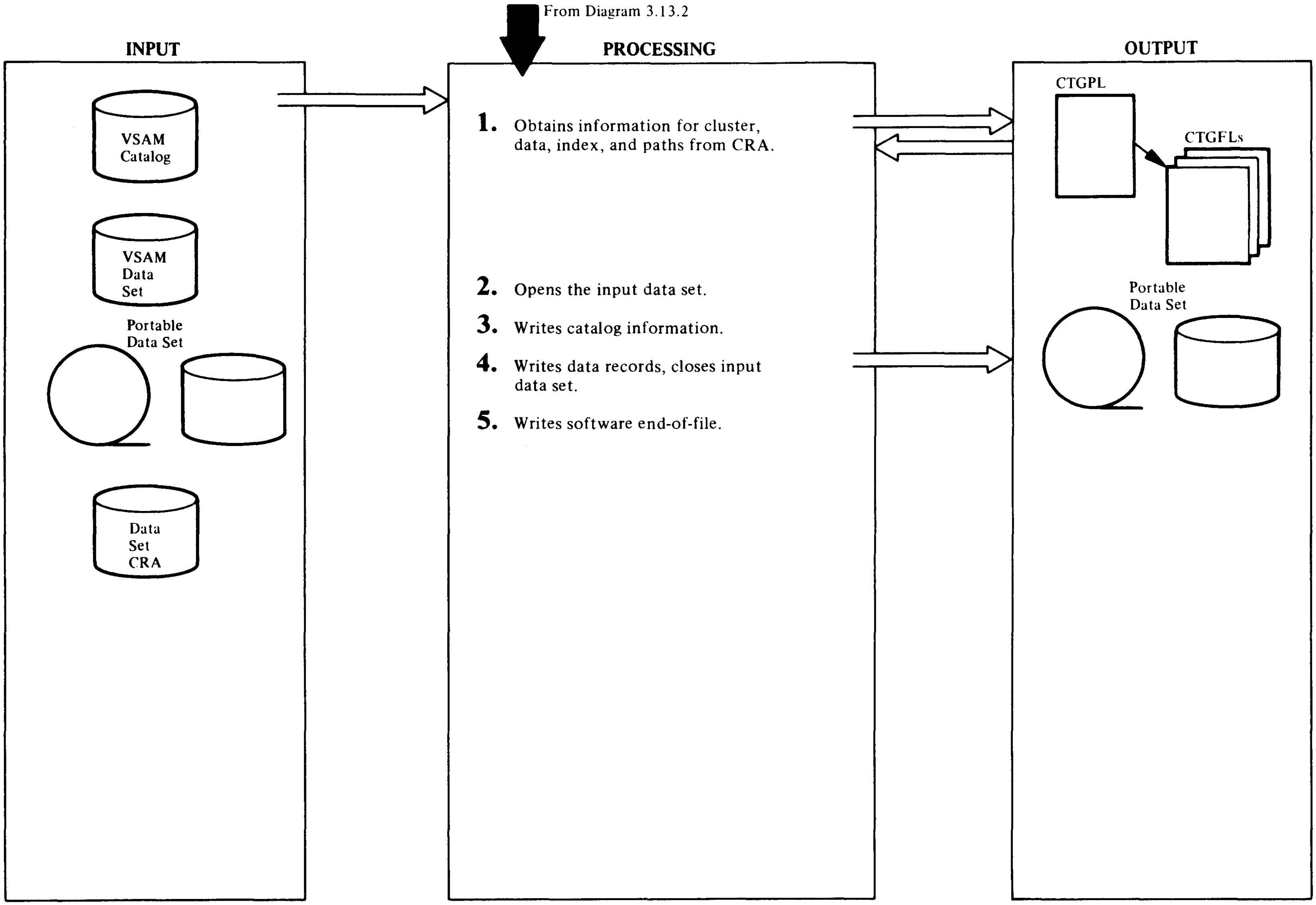
Diagram 3.13.2.1. EXPORTRA FSR – Export VSAM Data Set



Extended Description for Diagram 3.13.2.1

IDCRC02

Procedures: CTLGPROC, CLUSPROC, LOCPROC

1 For the cluster entry of the VSAM data set, LOCPROC builds a CTGPL and CTGFLs to retrieve information from the CRA. A CTGFL is built for the following catalog fields:

ENTYPE, ENTNAME, DSATTR, OWNERID, DSETCRDT, DSETEXDT, BUFSIZE, LRECL, SPACPARM, PASSWORD, PASSATMP, USVRMDUL, USERAREC, LOKEYV, HIKEYV, VOLSER, AMDSBCAT, EXCPEXIT, RCATTR, NAMEDS and CATACB.

CTLGPROC issues a UCATLG with the CTGPL and CTGFLs to retrieve the information from the CRA. CLUSPROC validity checks the catalog entry type and named fields. LOCPROC builds a CTGPL and CTGFLs for the data and index components of the VSAM cluster. CTLGPROC issues a UCATLG to obtain the same catalog information as obtained for the cluster except for the NAMEDS and CATACB fields. Path associations, if present, are processed with the same type of CTGPL and CTGFLs as used for data and index.

IDCRC02

Procedure: OPENPROC

2 OPENPROC opens the VSAM data set for input and verifies the open.

IDCRC02

Procedure: PUTPROC

3 Control records containing catalog information for the cluster, data, index, and paths are written to the portable data set after catalog processing for the object to be exported has been completed.

IDCRC02

Procedure: RECPROC

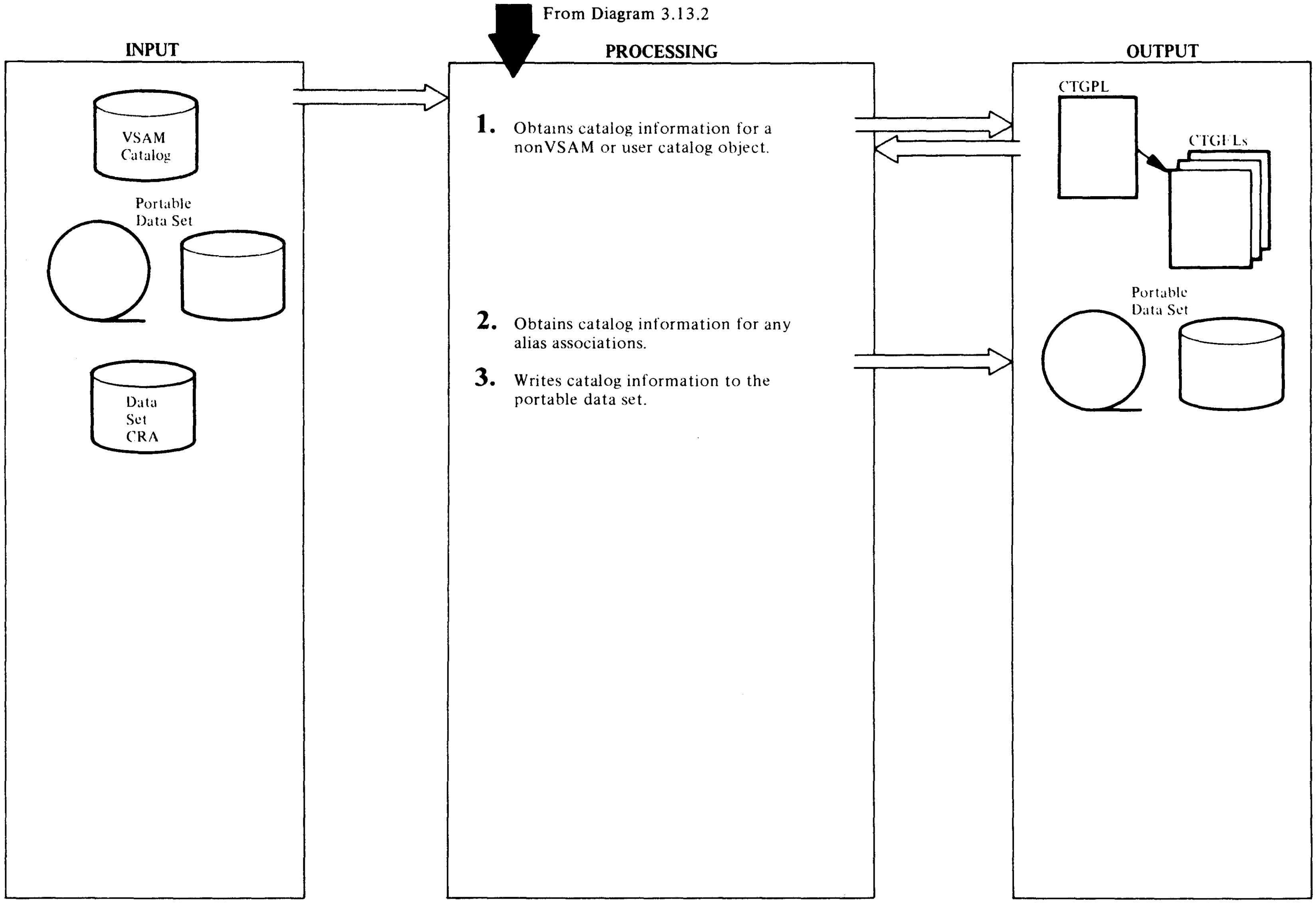
4 RECPROC copies the data to the portable data set and closes the input data set.

IDCC02

Procedure: CLUSPROC

5 CLUSPROC writes a software end-of-file on the portable data set.

Diagram 3.13.2.2. EXPORTRA FSR – Export NonVSAM



Extended Description for Diagram 3.13.2.2

IDCRC02

Procedures: LOCPROC, CTLGPROC

1 LOCPROC builds a CTGPL and multiple CTGFLs for a nonVSAM or user catalog object to retrieve catalog information. A CTGFL is built for each of the following fields:

ENTYPE, ENTNAME, VOLSER, DEVTYP, NAMEDS, CATACB

CTLGPROC issues a UCATLG with the CTGPL and CTGFLs to retrieve the information from the catalog, and to validity check the ENTYPE and NAMEDS fields.

IDCRC02

Procedures: LOCPROC, CTLGPROC

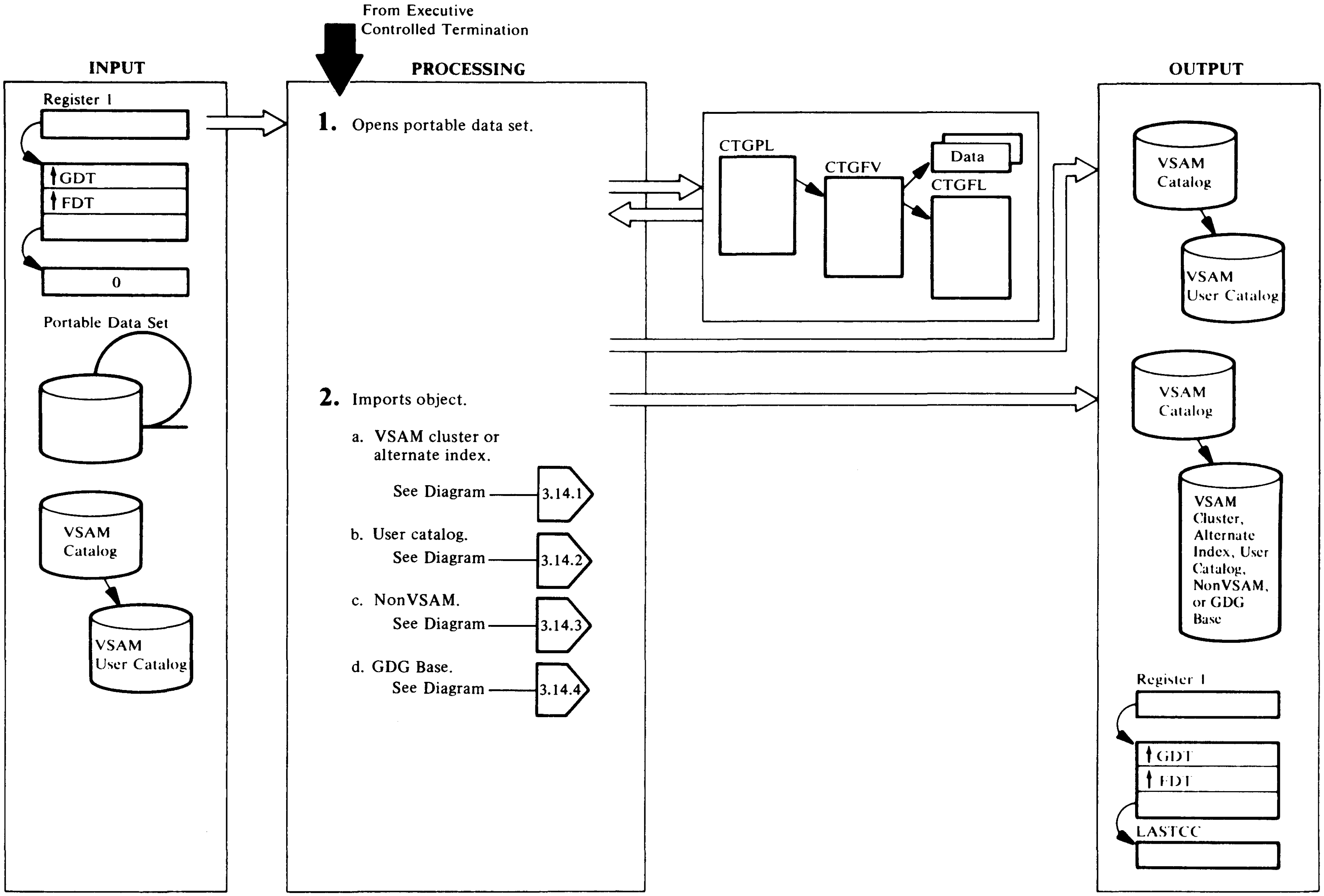
2 LOCPROC builds a CTGPL and multiple CTGFLs for any alias associations. A CTGFL is built for ENTYPE and ENTNAME catalog fields. CTLGPROC issues a UCATLG to obtain the catalog information.

IDCRC02

Procedures: NVSMPROC, ALSPROC

3 NVSMPROC and ALSPROC write control records containing the catalog information to the portable data set after catalog processing is completed.

Diagram 3.14. IMPORTRA FSR



Extended Description for Diagram 3.14

IDCRM01

Procedure: IDCRM01, OPENPROC

1 IDCRM01 issues a UIOINFO to obtain the data set name coded on the DLBL job control statement associated with the INFILE parameter. OPENPROC builds an OPNAGL and issues a UOPEN to open the portable data set. User specified tape label and rewind options are placed in the OPNAGL for UOPEN processing. OPENPROC then issues a UGET to get the first record of the portable data set, which contains the record size of the data set. If the record size is larger than the record size used to open the portable data set, a special UCLOSE is issued which reallocates sufficient space for the record size. An actual close of the portable data set is not done.

IDCRM01

Procedures: CLUSPROC, UCATPROC, NVSMPROC, CLUSPROC, GDGPROC

2 For each item on the portable data set, IDCRM01 reads a timestamp record and prints a message indicating the time and data of the EXPORTRA operation. On the basis of the timestamp record, one of CLUSPROC, UCATPROC, NVSMPROC, or GDGPROC is called to actually import the object. If the read for a timestamp record should fail, IDCRM01 assumes that an end-of-file has been found on the portable data set and passes control to Executive Controlled Termination.

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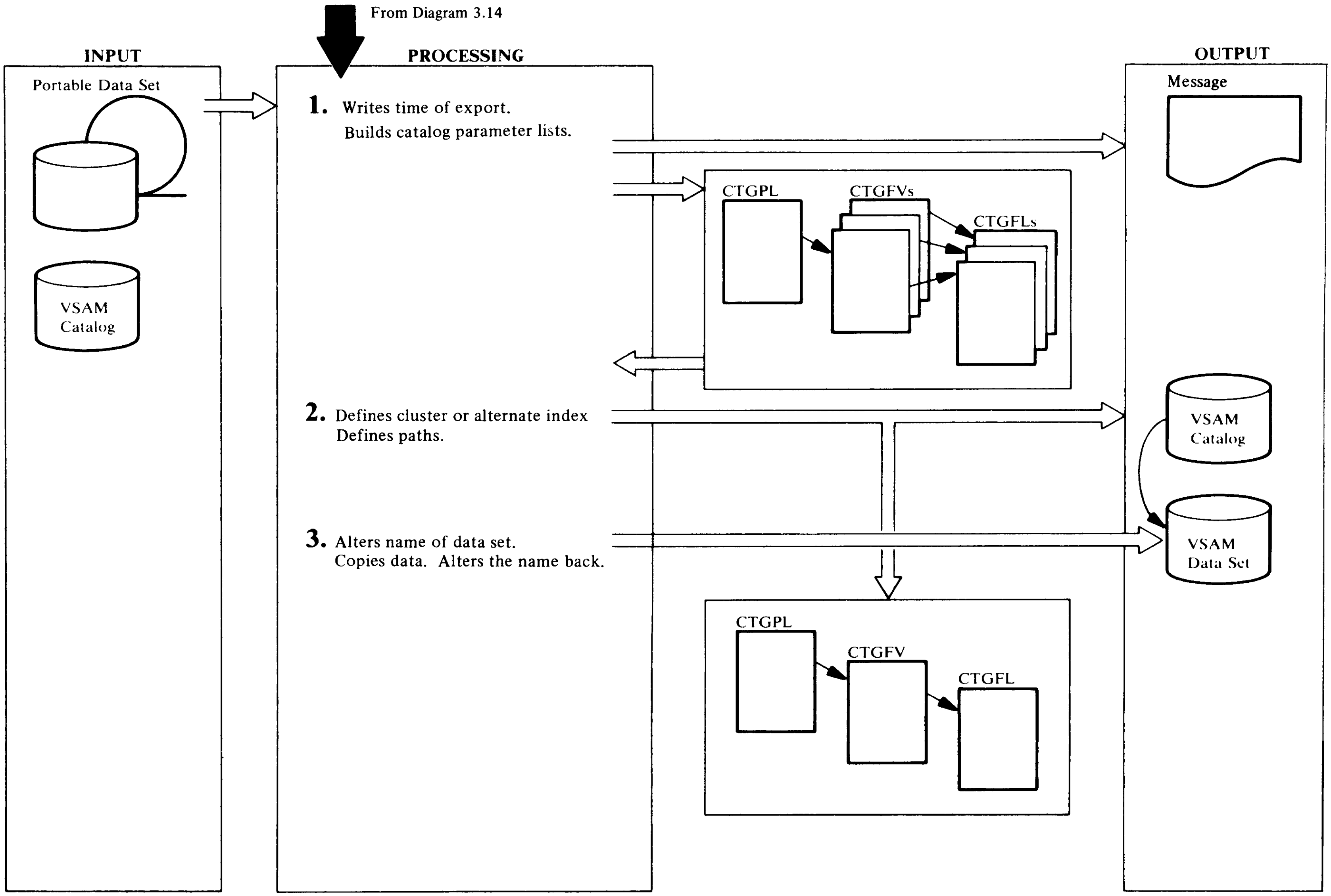
Diagram 3.14.1. IMPORTRA FSR – CLUSTER or ALTERNATE INDEX



Extended Description for Diagram 3.14.1

IDCRM01

Procedures: CLUSPROC, CPLPROC, GETPROC, FVTPROC, BFPLPROC, BPASPROC, IUNIQPRC

1 CLUSPROC via CPLPROC builds a CTGPL for a define operation. CLUSPROC issues a UGET macro to read the catalog control records and calls GETPROC to read the catalog data records. Control records are read for the cluster or alternate index and their data and index, if any, components. CLUSPROC then calls FVTPROC to build two or three FVTs. FVTPROC in turn calls BFPLPROC to build FPLs for the catalog information on the portable data set. BPASPROC builds an FPL for security information. If the data or index component was originally defined as unique, IUNIQPRC builds a null volume FVT for each unique component. The OBJECTS list is scanned for volume information about the object to be defined; if found, such information overrides that found on the portable data set. The OBJECTS list is also scanned for FILE information. If found, a pointer to the dname is passed in the component's FVT.

IDCRM01

Procedures: CTLGPROC, DELTPROC

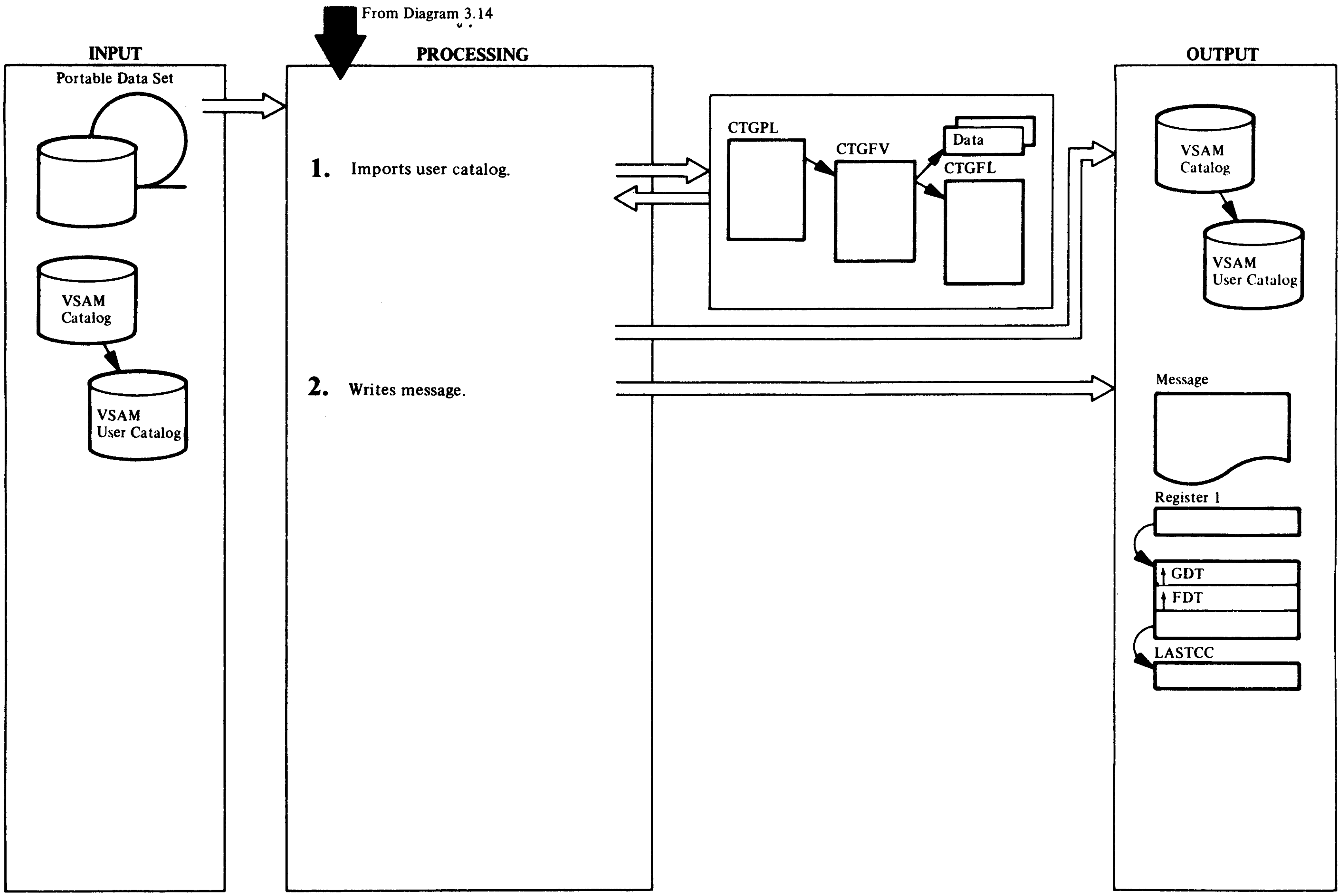
2 CTLGPROC issues a UCATLG macro to invoke VSAM catalog management. If VSAM issues a return code of 8, DELTPROC issues a UCATLG to delete the object from the catalog. Should this operation fail or should the original define fail with a return code other than 8, an error conversion table is built for a delete function. UERROR is called and control is passed to IDCRM01 for the next object.

IDCRM01

Procedure: ALTRPROC

3 ALTRPROC renames the VSAM object to be loaded to the dummy name returned by the UIOINFO. A UOPEN macro is issued to open the VSAM object, and UCOPY is used to copy data records from the portable data set to the VSAM object. UCLOSE closes the VSAM object, and ALTRPROC alters the name of the object just loaded back to that under which it was defined. Processing returns to Diagram 3.14, step 2, for the next item on the portable data set.

Diagram 3.14.2. IMPORTRA FSR – USERCATALOG



Extended Description for Diagram 3.14.2

IDCRM01

Procedures: CPLPROC, UCATPROC, GETPROC, LVLRPROC, NFVTPROC, CTLGPROC, CPLPROC, DELTPROC

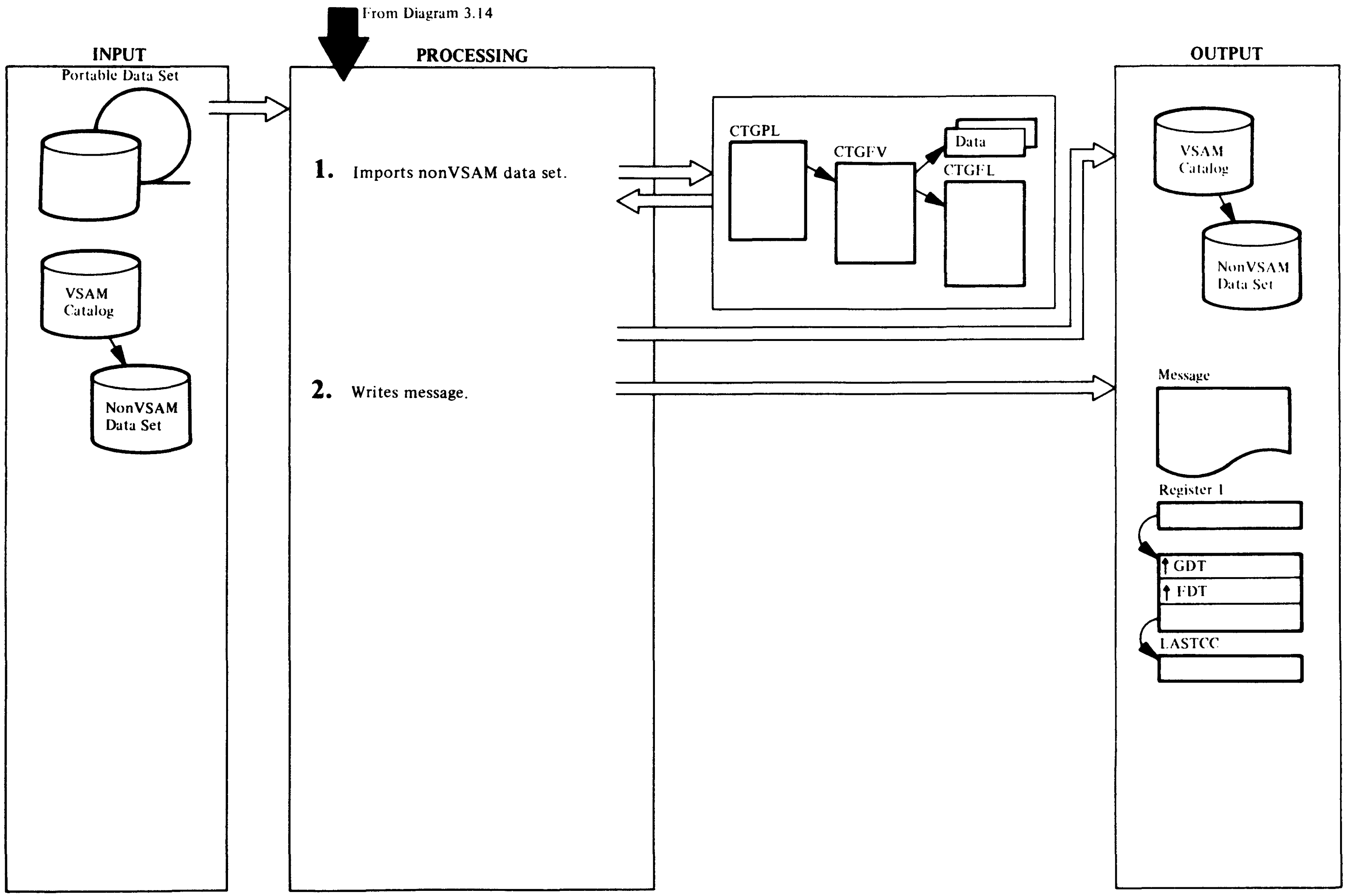
1 CPLPROC builds a CPL to be used to connect the user catalog pointer. UCATPROC then issues a UGET to get the catalog control record and calls GETPROC to obtain the catalog data record. LVLRPROC builds a DEVTYPE FPL and a volume serial list on the basis of information supplied on the portable data set or furnished through the OBJECTS parameter. NFVTPROC builds an FVT for the define. CTLGPROC issues a UCATLG macro to connect the user catalog. If the VSAM catalog return code is 8, then CPLPROC builds a CPL to do a disconnect operation, and DELTPROC actually invokes catalog to perform this operation. Should this succeed, a second attempt is made to connect the user catalog.

IDCRM01

Procedure: ALISPROC

2 For each alias item on the portable data set, ALISPROC prints a message indicating that aliases are not processed in DOS/VS. Control then returns to Diagram 3.14, step 2, for the next item on the portable data set.

Diagram 3.14.3. IMPORTRA FSR – NONVSAM



Extended Description for Diagram 3.14.3

IDCRM01

Procedures: CPLPROC, NVSMPROC, GETPROC, LVLRPROC, NFVTPROC,CTLGPROC, CPLPROC, DELTPROC

1 CPLPROC builds a CPL to be used to connect the user catalog pointer. NVSMPROC then issues a UGET to get the catalog control record and calls GETPROC to obtain the catalog data record. LVLRPROC builds a DEVTYPE FPL and a volume serial list on the basis of information supplied on the portable data set or furnished through the OBJECTS parameter. NFVTPROC builds an FVT for the define. CTLGPROC issues a UCATLG macro to define the nonVSAM data set. If the VSAM catalog return code is 8, then CPLPROC builds a CPL to do a delete operation, and DELTPROC actually invokes catalog to perform this operation. Should this succeed, a second attempt is made to define the nonVSAM data set.

IDCRM01

Procedure: ALISPROC

2 For each alias item on the portable data set, ALISPROC prints a message indicating that aliases are not processed in DOS/VS. Control then returns to Diagram 3.14, step 2, for the next item on the portable data set.

Diagram 3.14.4. IMPORTRA – GDG BASE

From Diagram 3.14

INPUT	PROCESSING	OUTPUT
Portable Data Set VSAM Catalog VSAM User Catalog	**1.** Writes a warning message.	Message Register 1 ↑GDT ↑FDT LASTCC

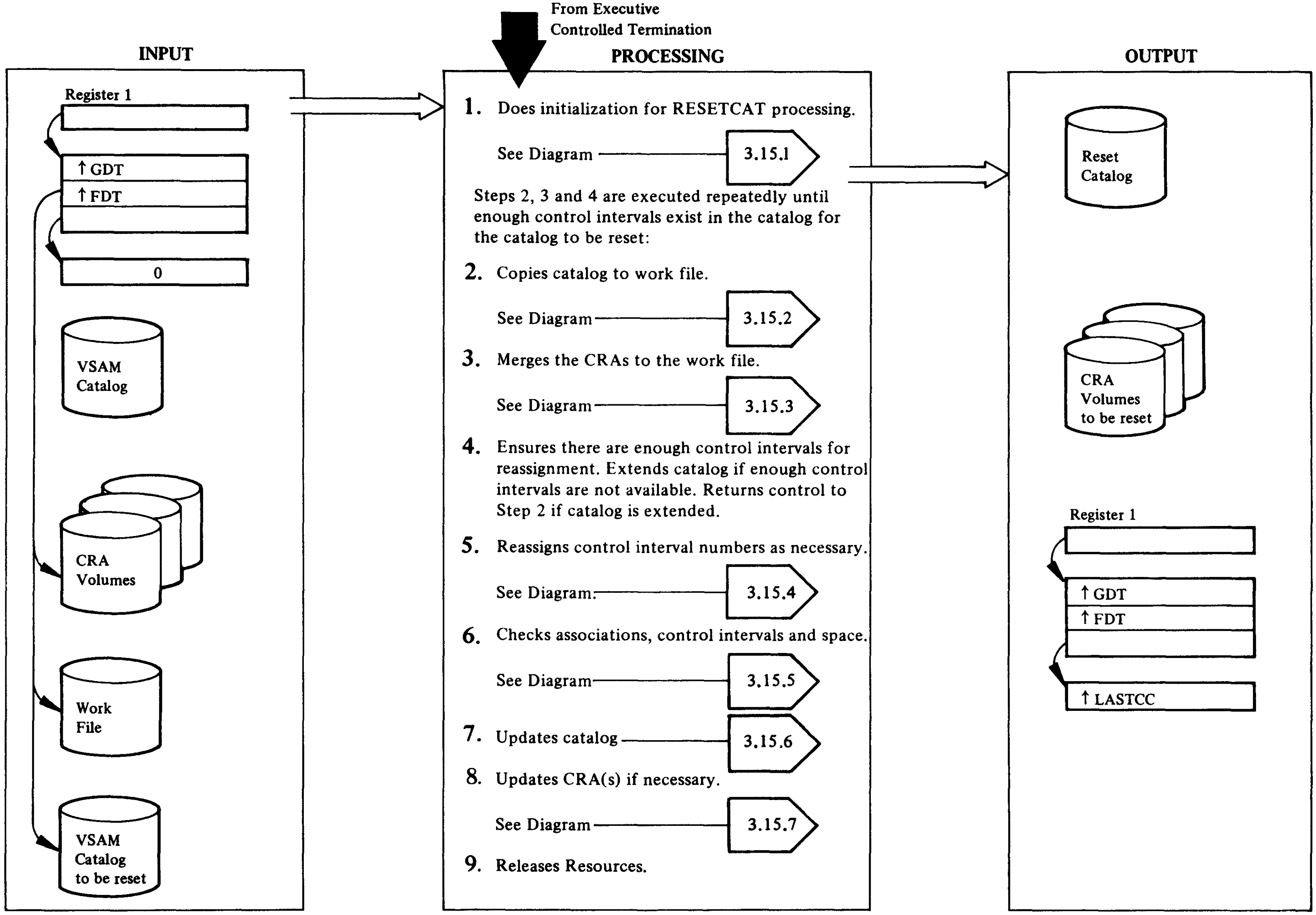
Extended Description for Diagram 3.14.4

IDCRM01

Procedures: GDGPROC

1 GDGPROC issues a warning message indicating that GDG bases cannot be defined in DOS/VS. It then issues successive UGETs until an end-of-file indication is found.

Diagram 3.15 RESETCAT FSR



Extended Description for Diagram 3.15

IDCRS01, IDCRS06

Procedure: INIT, DSOPEN, CATINIT, WFDEF

1 INIT is the first procedure called by RESETCAT. It uses the UGPOOL macro to obtain work areas common to all of RESETCAT, and initializes them. The catalog to be reset is opened, verified and validity checked. Next, exclusive control over the catalog is obtained via the UENQ macro. The catalog in which the work file will be defined is also opened and then the work file is defined and opened. An entry in the RESVOL table is created for each CRA volume identified by the CRAFILES parameter. Finally, INIT builds the CIXLT table. The CIXLT table is used to translate a catalog control interval number into a work file relative record number.

The following three steps, Steps 2,3, and 4 form an iterative loop. These three steps are executed repeatedly until the catalog to be reset has enough control intervals.

IDCRS01, IDCRS05, IDCRS06

Procedure: COPYCAT, BLDVLST, SCNRLST, DSCLOSE

2 COPYCAT performs the initial load of the work file from the catalog to be reset. The CIXLT table built by INIT maps every catalog DATA control interval number (CIN) to a relative record number (RRN) slot in the work file. It also indicates whether the control interval is for the low key range (LKR) or high key range (HKR) portions of the catalog. LKR records from the catalog are written to the work file as normal RRDS records. HKR records are also written to the work file, however, for each HKR record written, a flag is set indicating that that control interval will later be reassigned. Dummy records (formatted control intervals with no data in them) are written to the work file to represent that portion of the catalog which extends from the first unformatted free control interval to the LKR high allocated control interval. A table (VOLSERTB) is built from all volume records read from the catalog. Free records and records which belong to a CRA specified for reset are maintained on an "available" chain and an "available" count is kept for these records. When processing is completed, the work file is closed.

IDCRS01, IDCRS05, IDCRS06

Procedures: MERGECRA, DSOPEN, SCNRLST, CKERR, PROCCRA, VOLCHK, DSCLOSE

3 MERGECRA merges each reset CRA into the work file. Each CRA is opened. The cluster record is read and the catalog name is verified. The PROCCRA procedure is called to merge the CRA records into the work file and the VOLCHK procedure is called to perform the volume consistency check.

IDCRS01, IDCRS05, IDCRS06, IDCRS07

Procedures: ENSURECI, DSCLOSE, CATEOV, CKERR, DSOPEN, CATINIT

4 ENSURECI ensures that there are enough free control intervals for reassignment. If the number of control intervals to be reassigned are less than or equal to the number of control intervals available, a flag, RSENUFCI is set, indicating that enough control intervals are available for reassignment. However, if the control intervals to be reassigned are greater than the number available, ENSURECI forces the extension of the catalog by performing the following:

The catalog is closed by calling DSCLOSE. Next, all storage obtained during COPYCAT processing is freed by issuing UFPOOL. The highest formatted work file relative record number is saved in RSWFHURR and CATEOV is called to extend the catalog by writing free records into the catalog until the catalog has been extended and sufficient control intervals are available for the reset operation. If CATEOV returns with an error condition, CKERR is called to terminate RESETCAT processing.

After the catalog is successfully extended, DSOPEN is called to re-open and verify the catalog. CATINIT is called to re-establish the catalog's geometry by building the CI to RRN translate table (CIXLT).

IDCRS01, IDCRS05

Procedures: REASSIGN, ADDUPCR

5 The REASSIGN procedure performs control interval (CIN) reassignment. The invalid and duplicate records on the reassign chain are assigned to valid CINs from the available chain. Each record on the reassign chain is read and an "available" record from the available chain is found. The reassign record is copied to the "available" record buffer; the CIN is changed to reflect the CIN of the "available" record. If there is a pointer to a duplicate record (DUPPTR), it is copied from the reassign record's processing field. The "available" record is then updated to reflect the reassigned record. The record whose DUPPTR points to the reassigned record's relative record number is found by following the duplicate record chain. The DUPPTR of this record is changed to reflect the "available" record's CIN. This record is then updated.

IDCRS02, IDCRS03

Procedures: ASSOC, PROCTYPE, VERDSDIR, PROCVOL

6 The ASSOC procedure controls the checking of all control interval numbers (CIN) in all records being reset. This includes CINs in associations and data set directories. ASSOC also controls the checking for any space conflicts of VSAM data sets.

IDCRS01, IDCRS05, IDCRS07

Procedures: UPDCAT, CKERR, ADDUPCR, ENTNMCK, SCNRLST, RENAMEP, UPDCCR, CRAUPCHN, DELTN, ADDTN

7 UPDCAT updates the catalog from the work file. At this point, any records in the work file which do not match the catalog, must be written to the catalog. Each valid work file record is read and if the "update catalog" flag is on, the record is written to the catalog low key range (LKR). True names are deleted from and added to the catalog high key range (HKR) as necessary. If the "update CRA" flag is on, the control interval of the work file record is placed on the CRA update chain. The free record chain is rebuilt.

IDCRS01, IDCRS05, IDCRS06

Procedures: UPDCRA, SCNRLST, DSOPEN, DSCLOSE, CKERR

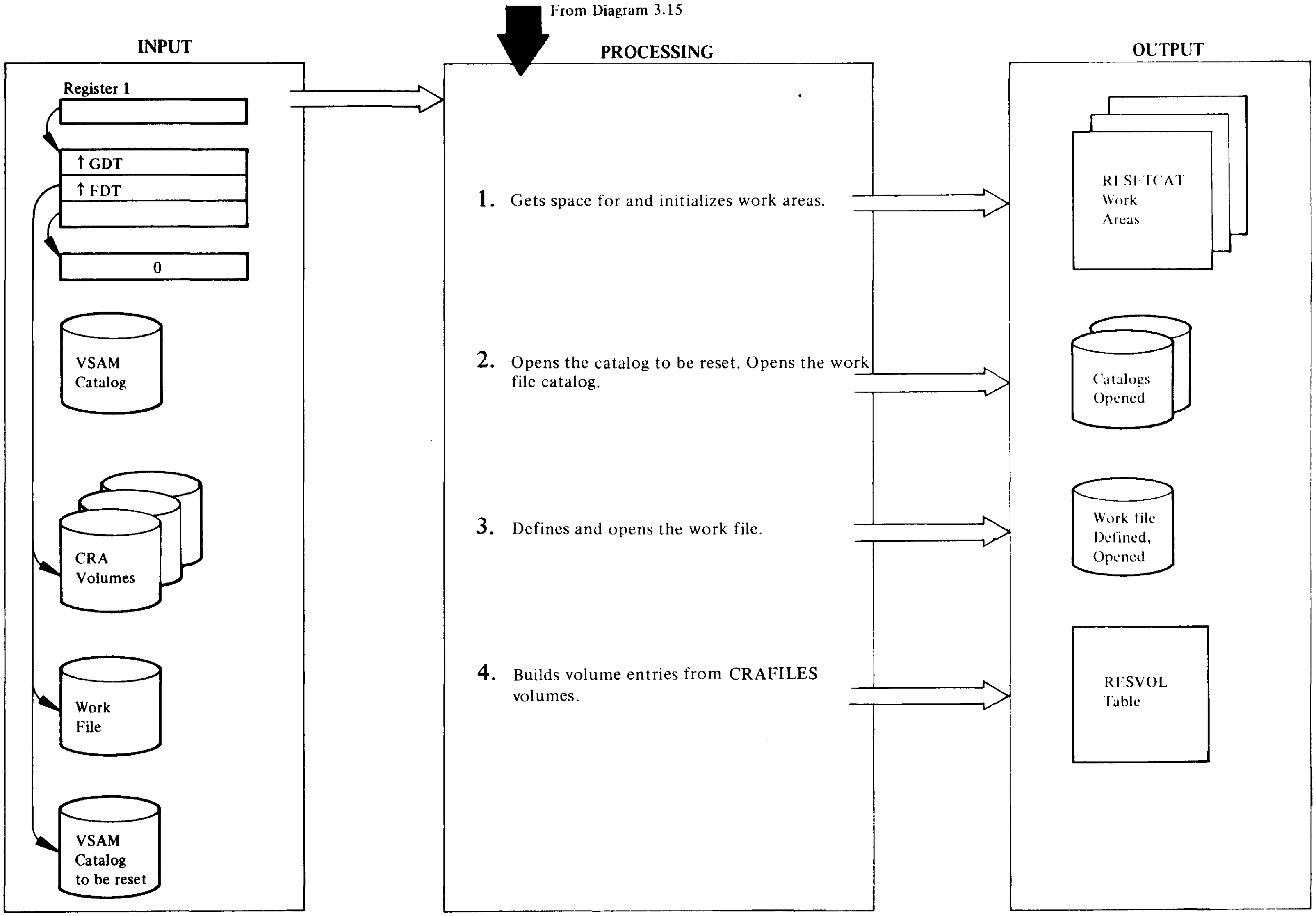
8 UPDCRA updates CRAs from the work file. Each entry in RESVOL (a table containing an entry for each volume whose CRA is required in the reset operation) is obtained. If there are any updates to be made in the CRA, it is opened, updated, and closed. If any free records are placed in the CRA, the CCR record is updated.

IDCRS01, IDCRS05

Procedures: WRAPUP, CLEANUP, CKERR

9 If RESETCAT processing is successfully completed, WRAPUP is the last procedure called. WRAPUP ensures that all resources obtained by RESETCAT are freed, it prints the message that processing is complete and then returns control to the system.

Diagram 3.15.1 RESETCAT FSR – Initialization



Extended Description for Diagram 3.15.1

IDCRS01

Procedures: INIT

1 INIT issues the UGPOOL macro to obtain storage for the following work areas:

- CRA user buffer
- Record Management control blocks (GRAB, BUFFER)
- IKQMDADS parameter list
- Control blocks for Catalog Management LOCATE macro (CPLs and FPLs)

The FDT is checked to see if IGNORE is specified, if so, a flag, (RSIGNORE) is set in RSWORK. After obtaining the above storage, INIT formats the RESETCAT record management control blocks. Control blocks (CPL and FPL) of Catalog management are also formatted along with certain portions of the main work area.

IDCRS01, IDCRS05, IDCRS06

Procedures: INIT, DSOPEN, CKERR

2 DSOPEN is called to open the catalog to be reset. Validity checks are made on the catalog to ensure that it is recoverable. CKERR is called if these checks fail.

Exclusive use of the catalog is ensured by issuing the UENQ macro to obtain exclusive use of the ENQ name of the catalog (R*volser*). If it is determined that the catalog is in use by someone else, CKERR is called.

DSOPEN is called to perform a VERIFY operation on the catalog, the high used RBA of the catalog is adjusted if necessary.

UGPOOL is issued to obtain storage for the CIXLT table.

IDCRS01, IDCRS05, IDCRS06

Procedures: INIT, RECMGMT, WFDEF, DSOPEN, CKERR

3 RECMGMT is called (with the GETRCD option) to get control interval zero (CI=0) from the catalog. The high allocation data CI is computed (HARBADS/512) and saved in RSCAHACI.

The primary and secondary extents of the work file are computed as follows:

Primary=no. of records currently allocated in the catalog.

$$\text{Secondary} = \frac{(\text{MAXCI}*2 - \text{primary}) + 125}{126}$$

where MAXCI = Largest CI number possible for a catalog.

DSOPEN is called to open the catalog into which the work file is to be defined.

The WFDEF procedure is called to define the work file. If it is found that the work file is defined in the catalog being reset, CKERR is called.

DSOPEN is now called to open the work file.

IDCRS01, IDCRS05, IDCRS06

Procedures: INIT, CKERR, CATINIT

4 The RESVOL table is constructed consisting of an entry for each CRA volume supplied by the invoker of RESETCAT with the CRAFILES parameter. Each entry consists of fields for volume serial number, device type and the file name of the DLBL statement. A pointer, RSVOLALL points to the first entry in the table and each entry is chained to the next. A flag indicates the last 'ALL' entry which is followed by the 'NONE' entries.

If CRAFILES is specified, the volume serial number of the CRA is obtained via the UIOINFO macro. The volume serial number of the CRA is inserted in RESVOL entry. If the catalog volume serial number is specified, its RESVOL entry is positioned as the first entry in the list.

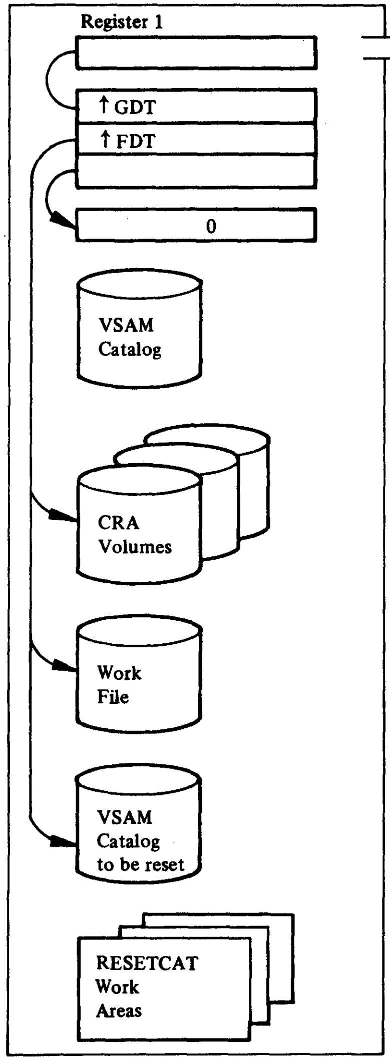
If no CRA is specified, CKERR is called to flag an error condition.

CATINIT is called to build the CIXLT table. The CIXLT maps the catalog control intervals to the work file relative record numbers. There is an entry in CIXLT for each catalog extent.

Diagram 3.15.2 RESETCAT FSR – Copy catalog to work file.

From Diagram 3.15

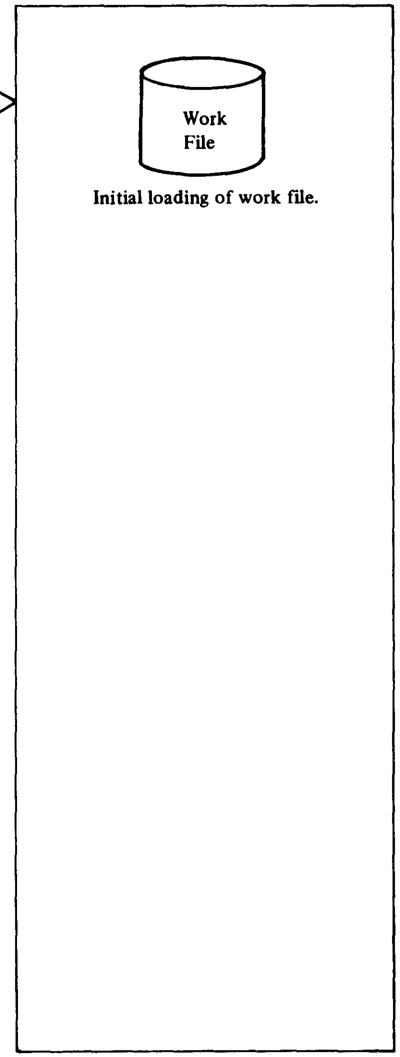
INPUT



PROCESSING

1. Checks catalog extents.
2. Processes high key range extents.
3. Processes low key range extents - - formatted records.
4. Processes unformatted records.
5. Closes the work file.

OUTPUT



Extended Description for Diagram 3.15.2

IDCRS01

Procedures: COPYCAT

1 The COPYCAT procedure obtains each entry from CIXLT and examines it to see if the first control interval number in the entry is greater than the catalog low key range (LKR) high allocated control interval. If so, it indicates COPYCAT processing is complete and control returns to the main procedure, IDCRS01.

Another test is made to see if all 127 entries have been processed, if so, control returns to main line IDCRS01 processing.

2 If the CIXLT entry represents a high key range (HKR) extent, a flag is set indicating that this is an "invalid" record in the work file. A dummy record is formatted and written to the work file as follows:

- If the relative record number (RRN) is greater than the high formatted relative record number in the work file, RECMGMT (ADDRCD) is called to add the record to the work file.
- If the RRN is not greater, RECMGMT (UPDRCD) is called to update the record in the work file.

3 If the CIXLT entry represents a LKR extent, the record is processed as a formatted record. If the CI of the record is less than the next free unformatted catalog CI, then GETRCD of the RECMGMT procedure is called to read the record from the catalog. The catalog record is moved to the work file buffer. If the record happens to be a free record (not currently used in the catalog), it is placed on the available chain. The count of available records is incremented. If it is not a free record and if it is a volume record, then a VOLSERTB entry consisting of volume serial number and CI number is formatted. BLDVLST is called to add this entry to the VOLSERTB table. In order to check to see if the record is also on a CRA specified for reset, SCNRLST is called. If it is a CRA record, a flag is set indicating that the record is to be deleted. The record is placed on the available chain and the available count is incremented. LKR records are written to the work file as follows:

- If the RRN is greater than the high formatted RRN, ADDRCD is called to add the record to the work file.
- if the RRN is not greater, then UPDRCD is called to update the record in the work file.

4 If the CI of the record is equal to or greater than the next free unformatted CI in the catalog, then the "update catalog" flag is set in the work file processing field and a dummy free record is formatted. The dummy record is placed on the available chain and the available count is incremented. If the CI of the record is equal to or greater than the End of Volume unformatted free CI, then the "invalid" flag is set in the work file processing field. A dummy record is formatted. The unformatted dummy record is written to the work file as follows:

- If the RRN is greater than the high formatted RRN, then ADDRCD is called to add the record to the work file.
- If the RRN is not greater, UPDRCD is called to update the record in the work file.

IDCRS01, IDCRS06

Procedures: COPYCAT, DSCLOSE

5 The "work file created" flag is tested, if it is off, DSCLOSE is called to close the work file.

Diagram 3.15.3 RESETCAT FSR – Merge CRA(s) to the work file.

From Diagram 3.15

INPUT

CRA Volumes

Work File

RESETCAT Work Areas

PROCESSING

1. Opens the work file.

Steps 2 through 5 are executed repeatedly for each entry in the RESVOL Table.

2. Opens the CRA.
3. Merges CRA records into work file.
4. Closes the CRA.
5. Performs volume consistency check.

OUTPUT

Work file with merged CRA records.

Extended Description of Diagram 3.15.3

IDCRS01, IDCRS06

Procedures: MERGECRA, DSOPEN

1 The "work file open" flag is tested to see if the work file is already open, if off, DSOPEN is called to open the work file.

Steps 2 through 5 form an inerative loop. These four steps are executed repeatedly for each entry in the RESVOL table.

2 The SCNRLST procedure is called to obtain an entry from the RESVOL table indicating the volume serial number of a CRA specified for the reset operation. If SCNRLST finds that all entries are processed and if the "termination" flag is on, CKERR is called to print an error message and terminate processing. If SCNRLST successfully returns a CRA volume serial number, DSOPEN is called to open this CRA. If open fails, flags are set to terminate processing and to bypass the volume consistency check. If the open is successful, RECMGMT (with GETRCD option) is called to read the CRA cluster record (CI=2). If the CRA entry name is not for the catalog being reset, then CKERR is called to print an error message. Flags are set to terminate processing and to bypass the volume consistency check.

IDCRS01

Procedures: MERGECRA, PROCCRA

3 PROCCRA is called to merge CRA records into the work file.

Beginning with the volume record, each CRA record is read and merged. The CIN of the volume record is updated/added to VOLSERTB, so that Volume records may be located later. The work file record corresponding to the catalog control interval (CATCI) of each CRA record (except CRA free records) is read. If the work file record is free or available, the CRA record replaces it. If the work file record has already been replaced or if the work file record does not belong to a reset CRA, the CRA record is written to the overflow area and maintained on the duplicate chain for that CATCI. Records written to the overflow or "invalid" areas of the work file are placed on the "reassign chain" and a "reassign count" is kept for these records. Each time a free or available work file record is replaced, the "available" count is decremented.

IDCRS01, IDCRS06

Procedures: MERGECRA, DSCLOSE

4 If the "CRA open " flag is set, DSCLOSE is called to close the CRA. If close fails, flags are set to terminate processing and to bypass the volume consistency check.

IDCRS01, IDCRS03

Procedures: MERGECRA, VOLCHK, DADSM

5 If the flag to bypass the volume consistency check is not on, VOLCHK is called to perform the volume consistency check.

VOLCHK ensures that there is a one to one correspondence between each VSAM data space on a volume (format 1 DSCB in the VTOC) and each space header in the volume record for that volume. This is done by calling the DADSM procedure to read each DSCB in the VTOC and then comparing the VSAM-owned DSCB with the corresponding volume record space header. If a format 1 DSCB does not have a corresponding space header, the format 1 DSCB is scratched by calling DADSM. If a space header refers to a non-existent format 1 DSCB, the space header is deleted. If the extents in a space header are not identical to the extents in the corresponding format 1 DSCB, the extents in the space header are corrected.

Diagram 3.15.3.1 RESETCAT FSR – DADSM Functions

From Diagram 3.15.3

INPUT

Register 1

Name of function to be performed

IKQMDADS Parameter List

PROCESSING

1. Checks if DADSM module (IDCDI20) is already loaded.
2. If not loaded, issues CDLOAD to load IDCDI20.
3. Calls IDCDI20 to perform the required DADSM function.
4. Returns.

OUTPUT

IDCDI20 Loaded

Appropriate DADSM function performed

Extended Description for Diagram 3.15.3.1

IDCRS01, IDCDI20

Procedures: DADSM

1 The DADSM procedure is called by RESETCAT procedures to perform all DADSM functions.

2 If the module IDCDI20 is not already loaded, CDLOAD is issued to load it. If CDLOAD fails, processing is terminated via the UABORT macro.

3 Control is passed to IDCDI20 to perform the required DADSM function. Input to IDCDI20 consists of the IKQMDADS parameter list and the name of the function desired. The IKQMDADS paramter list contains the volume serial number and the logical unit block (LUB) number of the volume being accessed. Valid names of DADSM functions to be performed are as follows:

ALL00 — Allocate data spaces

COV00 — Check for overlapping extents

POP00 — Build a DSCB

RDS00 — Read a DSCB

REN00 — Rename

SCR00 — Scratch

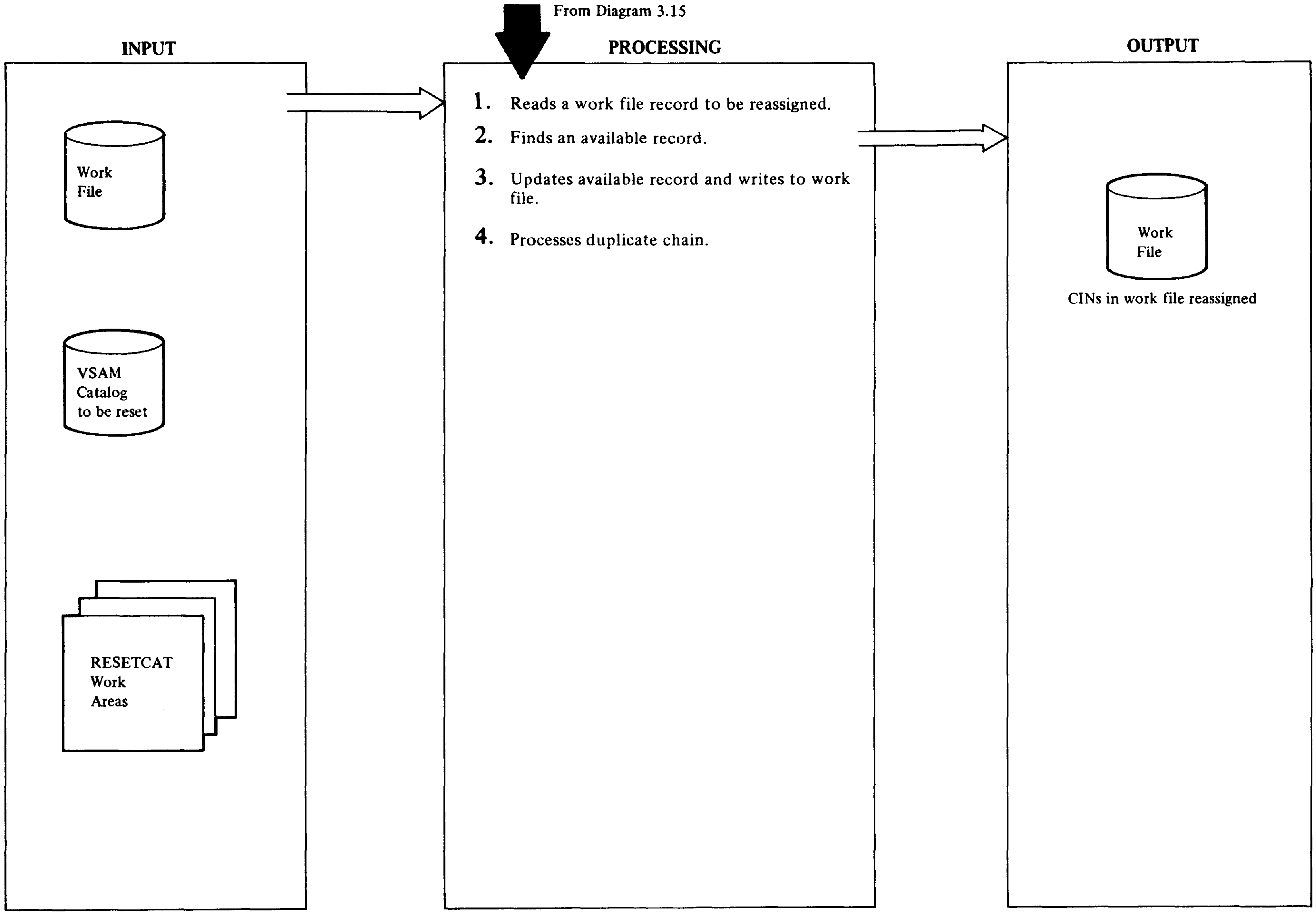
VTC00 — OPEN/CLOSE the VTOC

WDS00 — Write a DSCB

For more information on the IKQMDADS parameter list and the DOS DADSM routines which perform the above functions, see *DOS/VS LIOCS Volume 4: VSAM Logic*.

4 Control returns to the caller of DADSM.

Diagram 3.15.4 RESETCAT FSR – Reassign CI numbers



Extended Description of Diagram 3.15.4

IDCRS01, IDCRS06

Procedures: REASSIGN, RECMGMT

1 Before it reassigns any records, the REASSIGN procedure determines whether any records need to be reassigned. If the reassign count is zero, it means no records need to be reassigned. Control is returned to mainline IDCRS01 processing. Control is also returned if all records on the reassign chain have been read.

RECMGMT (with GETRCD option) is called to read the next record on the reassigning chain. The reassign chain pointer is saved.

IDCRS01, IDCRS06

Procedures: REASSIGN, RECMGMT

2 The next record on the available chain is read via GETRCD. The available chain pointer is saved. If the "replaced from CRA" flag is set, then this record cannot be used, so the next record on the available chain is read until an available record is found.

IDCRS01, IDCRS06

Procedures: REASSIGN, ADDUPCR, RECMGMT

3 The reassign record is moved to the available record buffer. The reassign DUPPTR is copied to the available DUPPTR. Two flags, "replaced from CRA" and "update catalog", are set. ADDUPCR procedure is called to perform CRA update processing. A flag indicating that the record is reassigned is set.

RECMGMT (with the UPDRCD option) is called to write the update available record to the work file.

IDCRS01, IDCRS06

Procedures: REASSIGN, RECMGMT

4 The relative record number (RRN) of the reassigned record is saved. RECMGMT (GETRCD) is called to read the record pointed to by the catalog control interval of the reassigned record or the DUPPTR. If the DUPPTR does not point to the RRN of the reassigned record, then the next record on the duplicate record chain is read. When the record is found, the DUPPTR is updated to point to the CI of the available record. RECMGMT (UPDRCD) is called to write the record back to the work file.

Diagram 3.15.5 RESETCAT FSR — Check Associations

From Diagram 3.15

INPUT

Work File

RESETCAT Work Areas

PROCESSING

1. Processes all LKR records in the work file:

   a. Reads a work file record.

   b. Calls PROCTYPE for CRA records and entry types C, B, A, U or X.

   c. Verifies data set directories for D and I entry types.

2. Processes all reset volumes. For each reset volume:

   a. Reads the volume record from the work file.

   b. Calls PROCVOL to process the volume record.

OUTPUT

Work File

Extended Description for Diagram 3.15.5

IDCRS02, IDCRS06

Procedures: ASSOC, RECMGMT, PROCTYPE, VERDSDIR

1a Each work file record is read sequentially up to the high allocated catalog control interval. Each record is checked to see if the "associations checked" flag is on. If it is, control goes to step 2.

b If the flag is not on and if the record is from a CRA being reset, then for each C,B,A,U or X record, the PROCTYPE procedure is called to process control interval numbers.

For a given catalog entry type, PROCTYPE controls the process of scanning a catalog record for control interval numbers. It determines which other records which along with the given record are a part of a set of records. It verifies all control interval numbers in the entire set of records. Control interval numbers are also corrected if necessary.

c VERDSDIR is called to check data set directories if the entry type is D or I. The VERDSDIR procedure verifies the data set directory entries for VSAM data sets which are not on reset volumes. It specifically looks for multivolume VSAM data sets where the primary volume is not a reset volume but a secondary volume is a reset volume. VERDSDIR changes work file records to correct error conditions, namely it marks a volume group occurrence (VGO) unusable when no data set directory exists for that data set.

IDCRS02, IDCRS06

Procedures: ASSOC, RECMGMT

2a For each reset volume, the volume record is read from the work file via RECMGMT (GETRCD).

IDCRS02, IDCRS06

Procedures: ASSOC, RECMGMT, PROCTYPE, VERDSDIR

2b The PROCVOL procedure is called to process the volume record.

PROCVOL controls the checking of space conflicts for each volume record. PROCVOL calls PROCTYPE to find and verify each control number in a volume record and its extensions. PROCVOL verifies and, if necessary, corrects the volume space bit map.

Diagram 3.15.6 RESETCAT FSR – Update the Catalog

From Diagram 3.15

INPUT

Work file

VSAM Catalog to be reset

RESETCAT Work Areas

PROCESSING

1. Reads a work file record.
2. Reads a catalog record.
3. Writes a record to the catalog low key range (LKR) and rebuilds the free chain.
4. Processes true names.
5. Writes a record to the work file.
6. Renames duplicate true names.
7. Updates catalog control record (CCR)

OUTPUT

VSAM Catalog to be reset

Records added and/or deleted from the catalog.

Extended Description for Diagram 3.15.6

IDCRS01, IDCRS05, IDCRS06

Procedures: UPDCAT, CKERR, RECMGMT

1 UPDCAT ensures that all CRAs required for updating are available by checking the "update CRA unavailable" flag (RSBADVOL). If the check shows that a CRA is not available, the CKERR routine is called to print a message and terminate RESETCAT processing.

Each catalog extent in the work file is processed by checking each entry in CIXLT. If the extent represents a HKR, it is ignored. Only LKR extents are considered. For each LKR extent, RECMGMT (GETRCD) is called to read a work file LKR record.

IDCRS01, IDCRS06

Procedures: UPDCAT, RECMGMT, ENTNMCK

2 For each work file record read the "update catalog" flag (RSWUPCAT) is tested and if the flag indicates the catalog should be updated, the corresponding catalog record is read via the GETRCD routine.

IDCRS01, IDCRS06

Procedures: UPDCAT, ADDUPCR, RECMGMT

3 After each catalog record is read, the "association checked" flag (RSWASSCK) is tested. If it is not on, the ADDUPCR routine is called to prepare for update CRA processing. The ENTNMCK procedure is called to determine if the catalog record has a true name; if there is a true name, a flag is set and the true name is saved. Next, ENTNMCK is called again to see if the work file record has a true name. If it does, a flag is set.

If the record is free or the "association checked" flag is off, a deleted free work file record is formatted in the catalog buffer and placed on the free chain, otherwise the work file record is moved to the catalog LKR buffer. If the control interval number of the record is greater than or equal to the first unformatted free control interval, RECMGMT (ADDRCD) is called to add the record to the LKR. If the CIN is less than the first unformatted free CIN, the UPDRCD option of RECMGMT is called to update the catalog record.

IDCRS01, IDCRS05, IDCRS06

Procedures: UPDCAT, RECMGMT, DELTN, ADDTN

4 If the catalog record has a true name and the work file record does not (or has a true name different from the catalog), then the true name is deleted from the catalog HKR by calling DELTN, provided the CIN is correct.

If the work file record has a true name and the catalog record does not (or has a true name different from the work file), ADDTN is called to write a true name record. If ADDTN indicates a duplicate record exists, the work file record is placed on the true name chain for a future rename operation (see Step 6). The "write work file" (RSUCTWWF) flag is set.

IDCRS01, IDCRS05, IDCRS06

Procedures: UPDAT, SCNLST, RECMGMT, CRAUPCHN

5 UPDCAT checks to see if the "update CRA" flag (RSUPCRA) is on. If it is, the SCNRLST routine is called to scan the RESVOL table for the CRA volume serial number. Next, the work file record is placed on the CRA update chain for this CRA volume by the CRAUPCHN procedure. The "write work file" flag is set.

If the "write work file" flag (RSUCTWWF) is on, UPDRCD is called to update the work file record with the true name chain pointer and/ or the CRA update pointer.

IDCRS01, IDCRS06, IDCRS07

Procedures: UPDCAT, RECMGMT, RENAMEP, ADDTN

6 After all the catalog LKR extents have been processed, the true name chain is checked. If the chain is not empty, the GETRCD routine of RECMGMT is called to read a work file record on the true name chain. The ADDTN routine is called to add the true name to the catalog HKR. If a duplicate name is detected, then the RENAMEP procedure is called to assign a new name to the true name.

IDCRS01, IDCRS06

Procedures: UPDCAT, RECMGMT, UPDCCR

7 The GETRCD routine of RECMGMT is called to read the CCR (control interval number 3). The following items in the CCR are updated by UPDCCR:

- First unformatted free record
- Count of deleted free records
- Control interval number of first deleted free record
- High RBA maintained in the CCR

After the above items are changed, RECMGMT (with UPDRCD option) is called to write the updated CCR back to the catalog.

Diagram 3.15.7 RESETCAT FSR – Updates the CRA

From Diagram 3.15

INPUT

RESETCAT Work Areas and Control Blocks

Work File

PROCESSING

1. Updates the CRA if necessary.

   a. Opens the CRA.

   b. Reads a work file record.

   c. Writes a CRA record.

   d. Closes the CRA.

OUTPUT

CRA Volumes updated if necessary.

Extended Description for Diagram 3.15.7

IDCRS01, IDCRS05, IDCRS06

Procedures: UPDCRA, SCNRLST, RECMGMT, CKERR

1a The SCNRLST routine is called to obtain a CRA volume serial number entry from the RESVOL table. A check is made to see if this CRA needs to be updated by checking if the CRA update chain is empty. If the open is successful, the "CRA open" flag is set, if not, the "termination" flag is set.

1b Each record in the CRA update chain is read from the work file RECMGMT (GETRCD). The control interval number of the next record in the chain is saved. If the record just read happens to be a free record, the CRA CCR record needs to be updated. If the CCR has not been read already, RECMGMT (GETRCD) is called to read it. The deleted free record count in the CCR is incremented, and the record is placed on the CRA free chain.

1c The record read from the work file is moved to the CRA buffer. Control interval information is inserted and RECMGMT (UPDRCD) is called to write an updated record in the CRA.

After all records in the CRA update chain have been processed for a specific CRA, RECMGMT (UPDRCD) is called to write the updated CCR record back to the CRA.

1d DSCLOSE is called to close the CRA. If the close fails, the "termination" flag is checked. If it is set, CKERR is called to print an error message and terminate RESETCAT processing. If the termination flag is not set, control returns to the caller.

Termination Visual Table of Contents

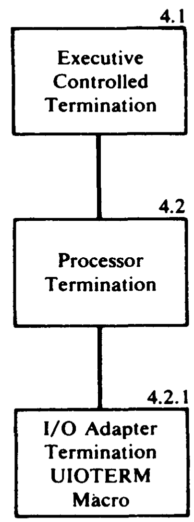


Diagram 4.1. Executive Controlled Termination

From Reader/Interpreter (R/I) or an FSR

INPUT	PROCESSING	OUTPUT
MAXCC	**1.** Updates MAXCC. If entrance is from R/I, processing continues with Step 2; if entrance is from an FSR, processing continues with Step 3.	MAXCC
Register 1: GDT, FDT, FDT ID, MAXCC, LASTCC, FSR Name	**2.** Determines if FSR is to be called.	Register 1: GDT, FDT, 0
Register 1: GDT, FDT, FSR Code	**3.** Releases FDT.	
	4. Sets defaults in Print Control Tables.	GDT, GDTTPH, PCT 1
SYSIPT	**5.** Determines if processor is to be terminated. See Diagram 4.2	

Extended Description for Diagram 4.1

IDCEX01

Procedure: MAIN

1 IDCEX01 compares the LASTCC code returned by the FSR or the R/I with MAXCC and puts the greater number in MAXCC. If control is from the R/I, MAXCC has already been properly set by IDCRI01. If entrance is from the R/I, processing continues with step 2; if entrance is from an FSR, processing continues with step 3.

IDCEX01

Procedure: MAIN

2 If MAXCC is less than 16 or an end-of-file has not been reached on SYSIPT, IDCEX01 gives control to an FSR. The R/I passes the FSR name to IDCEX01. If MAXCC is greater than or equal to 16 or an end-of-file has been reached on SYSIPT, processing continues with step 5.

IDCEX01

Procedure: CALLFSR

3 IDCEX01 releases storage for the FDT using a UFPOOL macro. The pool identification is EX00, and the FDT is the only data in the pool.

IDCEX01

Procedure: CALLFSR

4 IDCEX01 sets the Print Control Table to Access Method Services default values by issuing a URESET macro instruction.

IDCEX01

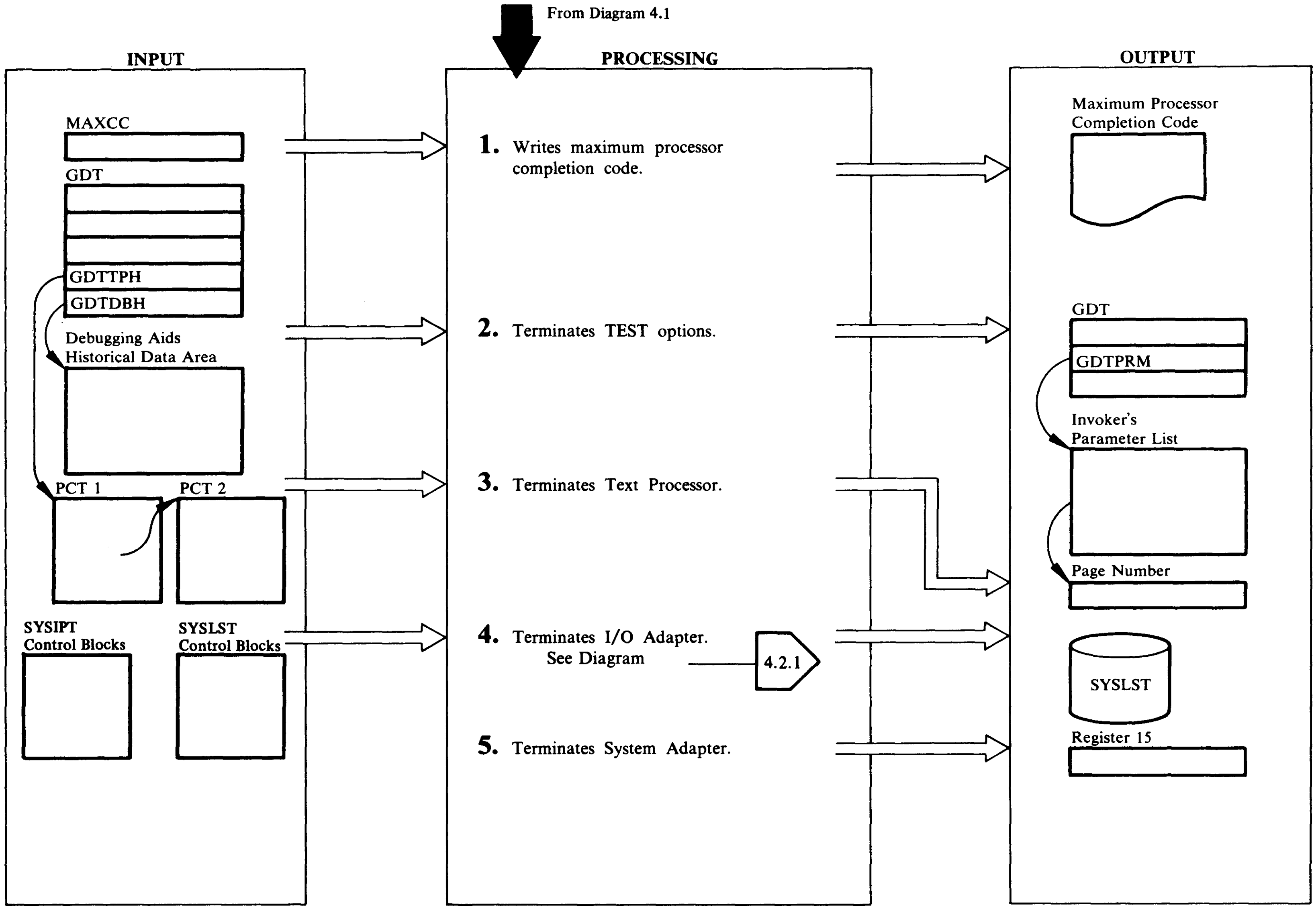
Procedure: MAIN

5 The processor has terminated if one of the following conditions is met:

- The R/I has detected end-of-file on SYSIPT. In this case, the R/I puts a non-zero value in Register 15.
- An error has occurred so that processing cannot continue, and MAXCC contains a value greater than or equal to 16.

If one of these conditions is met, control is given to Processor Termination, Diagram 4.2. If neither of the two conditions is met, control is given to the R/I, Diagram 2.0, to obtain the next command.

Diagram 4.2. Processor Termination



Extended Description for Diagram 4.2

IDCEX03

Procedure: IDCEX03

1 IDCEX03 prints a message of the maximum processor condition code, MAXCC by using a UPRINT macro.

IDCEX03

Procedure: IDCEX03

2 If TEST options were specified on a PARM command or on the EXEC statement that invoked Access Method Services, IDCPM01 has loaded the Debug Module, IDCDB01. IDCEX03 sets GDTDBG, the address of the Debug Module, to zero after deleting the Debug Module by issuing the UDELETE macro. The address of the Debugging Aids Historical Data Area is in GDTDBH. IDCEX03 frees the debugging aids historical data area used by the UDUMP macro. It also sets GDTDBH to zero after the area is freed.

IDCEX03

Procedures: IDCEX03, SCANPARM

3 IDCEX03 terminates the Text Processor by issuing a URESET macro. If the invoker of Access Method Services wants the last page number returned, IDCEX03 passes the address of the invoker's page number field to the URESET macro.

IDCEX03

Procedure: IDCEX03

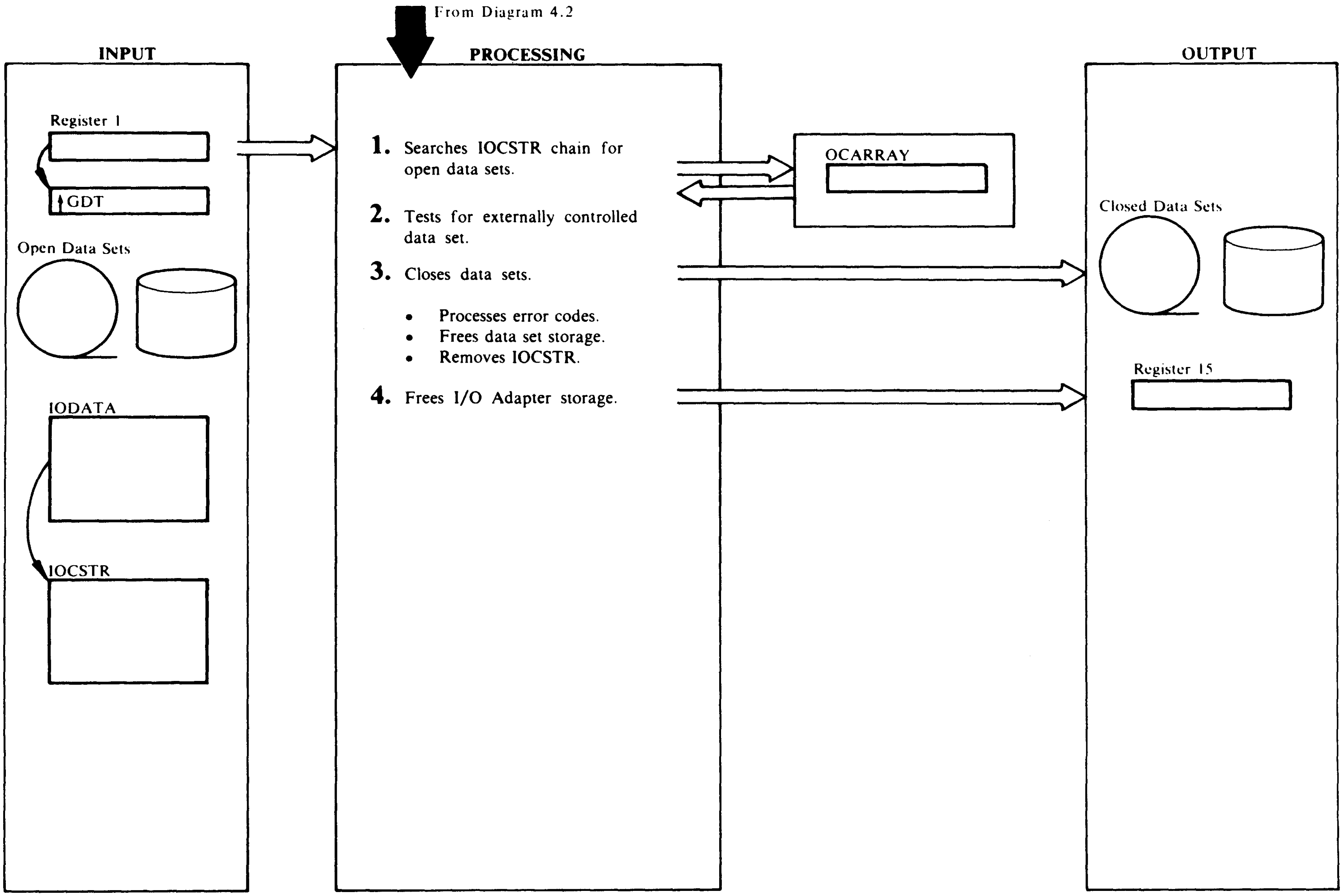
4 IDCEX03 terminates the I/O Adapter by issuing a UIOTERM macro. Diagram 4.2.1 shows I/O Adapter termination in detail.

IDCSA01

Procedure: IDCSA01

5 IDCSA01 terminates the System Adapter by freeing the storage for IDCSA02, IDCSA03, IDCTP01, and IDCIO01. The Storage Table, AUTOTBL, contains the storage addresses for IDCSA02, IDCTP01, and IDCIO01. The GDT contains the storage address for IDCSA03. IDCSA01 also frees the Inter-Module-Trace Table, the Intra-Module-Trace Table, the System Adapter Historical Data Area, and the GDT. When the System Adapter receives control, Register 15 contains MAXCC. IDCEX01 copied MAXCC into Register 15 for the Access Method Services invoker. Control returns to the invoker.

Diagram 4.2.1. I/O Adapter Termination – UIOTERM Macro



Extended Description for Diagram 4.2.1

IDCIO01

Procedure: IDCIO01

1 IDCIO01 sets up a loop to close all open data sets, and sets the *close all* option in OCARRAY that permits SYSIPT and SYSLST to be closed.

IDCIO02

Procedure: CLOSERTN

2 CLOSERTN examines the IOCSTR chain for the address of IOCSTRs to close. For a nonVSAM data set, CLOSERTN sets the address of a SYNAD routine in the DCB to zero and puts the address of a CLOSE exit routine in the DCB. If the data set is not open, IOCFLGOP = 1, CLOSERTN determines if it is externally controlled. If so, CLOSERTN passes arguments to the external routine. This check is made for up to the first four IOCSTRs in the IOCSTR chain. Normally, only the SYSIPT and SYSLST IOCSTRs are in the chain at termination.

IDCIO02

Procedure: CLOSERTN

3 CLOSERTN issues a CLOSE macro with the address of up to four DCBs or ACBs. If an ABEND occurs during the closing of a nonVSAM data set, the operating system close routine gives control to a CLOSE exit routine which sets a flag in IOCSTRN that will cause the I/O Adapter to print an error message. The message is written after control returns from the CLOSE SVC. Closing continues with the next data set. The following steps are performed for each data set:

- For VSAM data sets, CLOSERTN issues a SHOWCB macro to return the ACB error code. If the ACB error code is not zero, BLDOCMSG writes a message. However, since SYSLST is the first data set closed, BLDOCMSG issues a UABORT macro. No test is made for nonVSAM data sets.
- For VSAM data sets, CLOSERTN checks the IOCSEX to see if there are any VSAM control blocks to free. When any length of the ACB, RPL, or EXLST is non-zero, ENVFREE issues a FREEMAIN macro to release the control block. For open nonVSAM data sets, ENVFREE issues a FREEVIS to free any buffers obtained by the operating system open routines.
- CLOSERTN saves the address of the closed data set's IOCSTR and the address of the next IOCSTR in the chain. CLOSERTN issues a UFPOOL macro to free storage obtained for the closed data set. CLOSERTN searches the IOCSTR chain until the IOCSTR that points to the IOCSTR of the closed data set is found. CLOSERTN replaces the address of the closed data set's IOCSTR with the address of the next IOCSTR in the chain.

IDCIO01

Procedure: IDCIOCL

4 Processing returns to step 1 until all data sets have been closed. When all data sets are closed, the IOCSTR chain no longer exists. CLOSERTN issues a UFPOOL macro to free storage obtained by the I/O Adapter. The only storage remaining to be freed is IODATA and the message area for VSAM data sets. IDCIOCL puts a return code in Register 15. Control then returns to the module that issued the UIOTERM macro.

System Adapter Visual Table of Contents

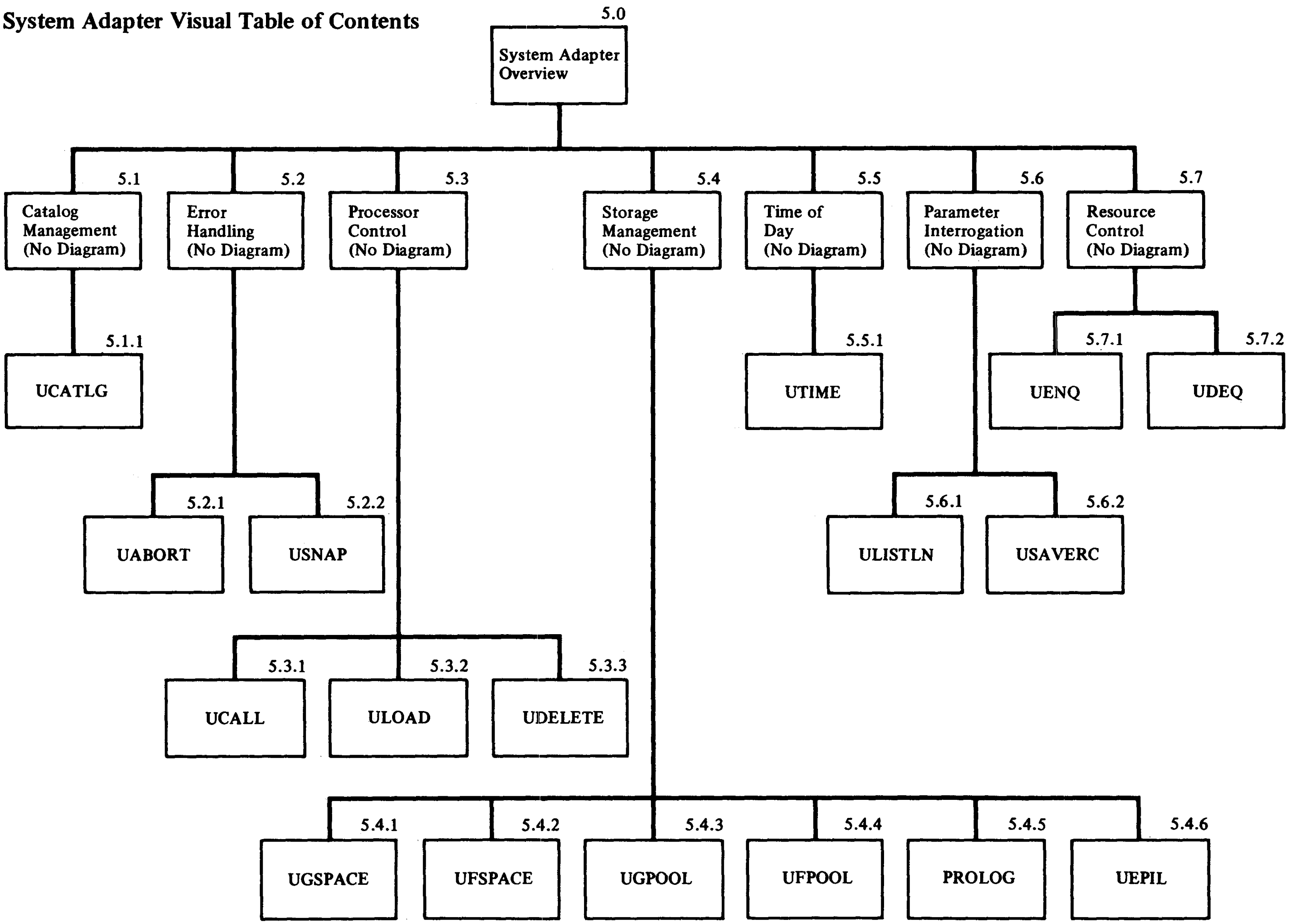


Diagram 5.0. System Adapter Overview

From Module Issuing Umacro

INPUT

Register 1

Umacro Argument List

PROCESSING

1. Issues macro to perform request:

a. Catalog management. See Diagram 5.1.1

b. Error handling. See Diagrams 5.2.1 5.2.2

c. Processor control. See Diagrams 5.3.1 to 5.3.3

d. Storage management. See Diagrams 5.4.1 to 5.4.6

e. Time of day. See Diagram 5.5.1

f. Parameter interrogation. See Diagrams 5.6.1 5.6.2

g. Resource Control See Diagrams 5.7.1 5.7.2

2. Sets return code.

OUTPUT

Register 1

System Macro Argument List

Register 15

Extended Description for Diagram 5.0

IDCSA01, IDCSA02, IDCSA03, IDCSA05, IDCSA08

Procedures: IDCSA01, IDCSA02, IDCSA03, IDCSA05, IDCSA08

1 The System Adapter and the I/O Adapter insulate the rest of the processor from the operating system. Whenever the processor wants a service that requires an operating system dependent macro, like GETVIS, the processor calls the System Adapter with a Umacro. Different versions of the System Adapter and I/O Adapter supply code for different operating systems. Except for the System Adapter and the I/O Adapter, the Access Method Services modules are oblivious to the operating system. System macros in the listings indicate the operating system the listing represents.

Types of services provided by the System Adapter:

a. Whenever information is to be added, deleted, or retrieved from the VSAM catalog, a UCATLG macro is issued. Although the VSAM CATLG macro has the same parameters in OS/VS and DOS/VS, the general code is different. The VSAM CATLG macro must be in a program that is assembled under the right operating system. Diagram 5.1.1 shows the UCATLG macro in detail.

b. Error handling is accomplished with UABORT and USNAP. For errors, when processing cannot continue, a UABORT is issued to print an error message and a dump and return control to the operating system. If the error condition is due to no space available, only an error message is printed; no dump is printed. For debugging information, a USNAP is issued to print the partition and return control to the Access Method Services module that issued the USNAP. Diagrams 5.2.1 and 5.2.2 show the UABORT and USNAP macros in detail.

c. Inter-processor module control is accomplished with UCALL and ULOAD. UCALL loads a module and gives control to it. It is used to transfer control from one module to another within Access Method Services. ULOAD just loads a module. It is mainly used for non-executable modules like static text structures. UDELETE does not take any action in DOS. Diagrams 5.3.1 through 5.3.3 show the UCALL, ULOAD, and UDELETE macros in detail.

d. Storage management is performed with three types of macros:

1. UGSPACE and UFSPACE, shown in Diagrams 5.4.1 and 5.4.2.
2. UGPOOL and UFPOOL, shown in Diagrams 5.4.3 and 5.4.4.
3. PROLOG and UEPIL, shown in Diagrams 5.4.5 and 5.4.6.

The first type is used to obtain large amounts of storage. The caller must remember the address of the storage, and must issue a UFSPACE to release the storage.

The second type is used for small amounts of storage. The caller does not need to remember the address of each piece because all the pieces can be released with one UFPOOL at the end of the program.

The third type is used to bypass PL/S-generated GETMAIN and FREEMAIN macros. In a re-entrant enviroment, PL/S generates a GETMAIN macro for all data areas defined in the program, but a GETMAIN doesn't work on DOS. Each Access Method Services routine includes code at the beginning of the routine to replace the GETMAIN. This is the PROLOG code. Control is transferred to the System Adapter that issues the appropriate operating system macro to obtain storage. Instead of issuing a PL/S return statement, that uses FREEMAIN, all routines issue a UEPIL macro. The UEPIL macro gives control to the System Adapter. The System Adapter frees storage and gives control to the routine that called the routine that issued the UEPIL. The PL/S-generated code to free storage and to return control is never executed.

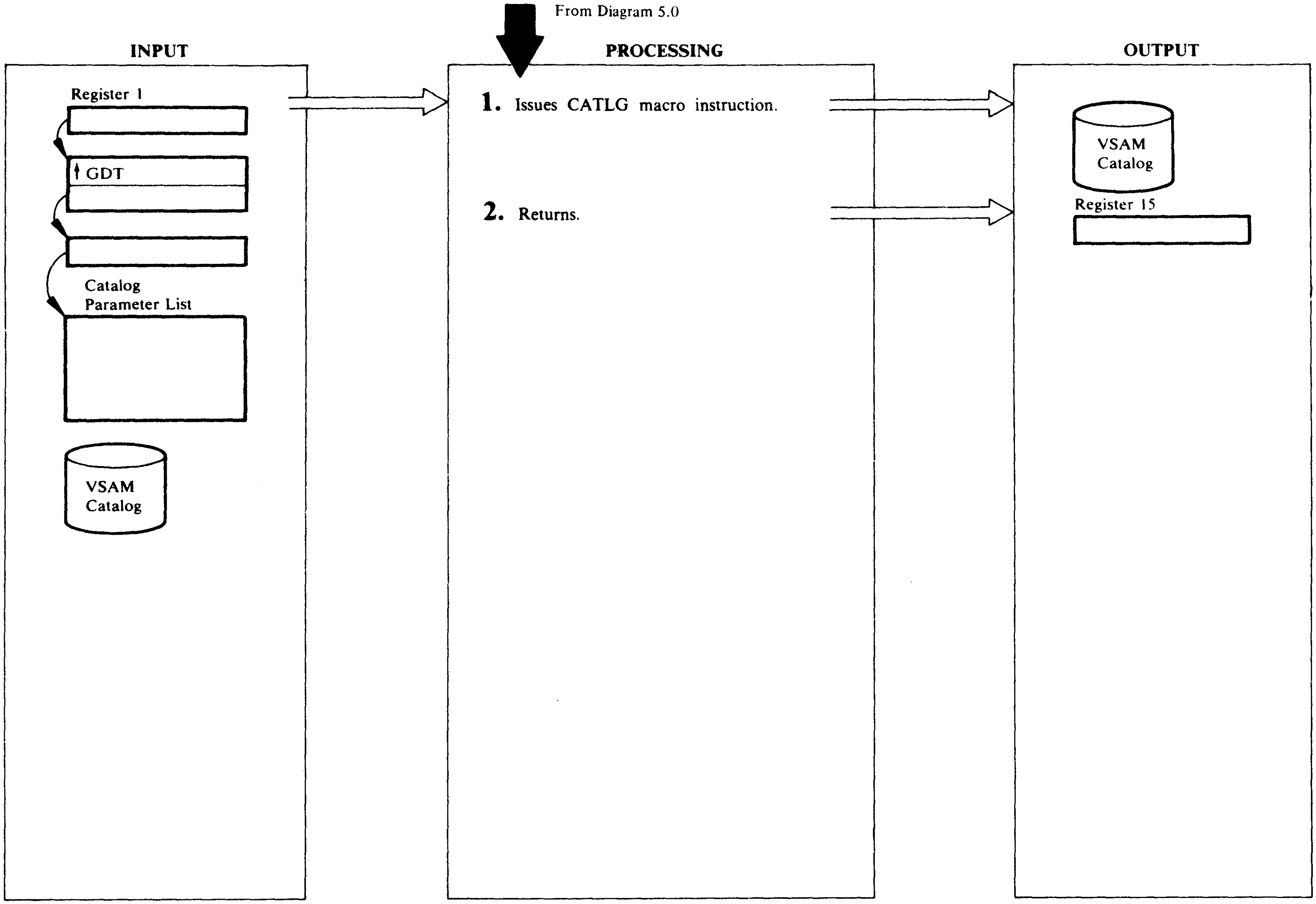
e. The time of day is obtained with a UTIME macro, shown in Diagram 5.5.1. Several data formats for the time and date are allowed.

f. Parameter interrogation is performed by the ULISTLN and the USAVERC macros, shown in Diagrams 5.6.1 and 5.6.2.

g. Control of a resource is achieved with a UENQ macro. The resource may be released with a UDEQ macro. See Diagrams 5.7.1 and 5.7.2.

2 At the end of most Umacros, a return code is put in register 15, and control returns to the module that issued the Umacro. The exceptions are UABORT, UCALL, and UEPIL.

Diagram 5.1.1. UCATLG Macro



Extended Description for Diagram 5.1.1

IDCSA02

Procedure: IDCSA02

1 IDCSA02 passes the catalog parameter list to VSAM with a CATLG macro.

IDCSA02

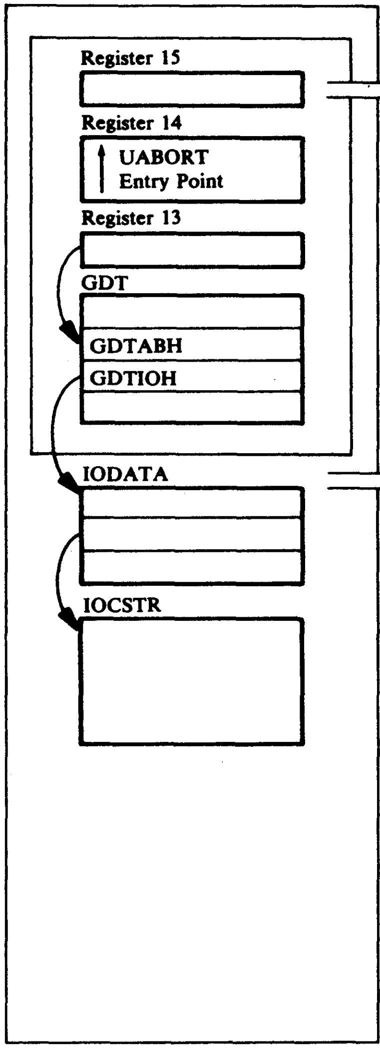
Procedure: IDCSA02

2 IDCSA02 puts the return code from VSAM in register 15 and returns control to the module that issued the UCATLG macro.

Diagram 5.2.1. UABORT Macro

From Diagram 5.0

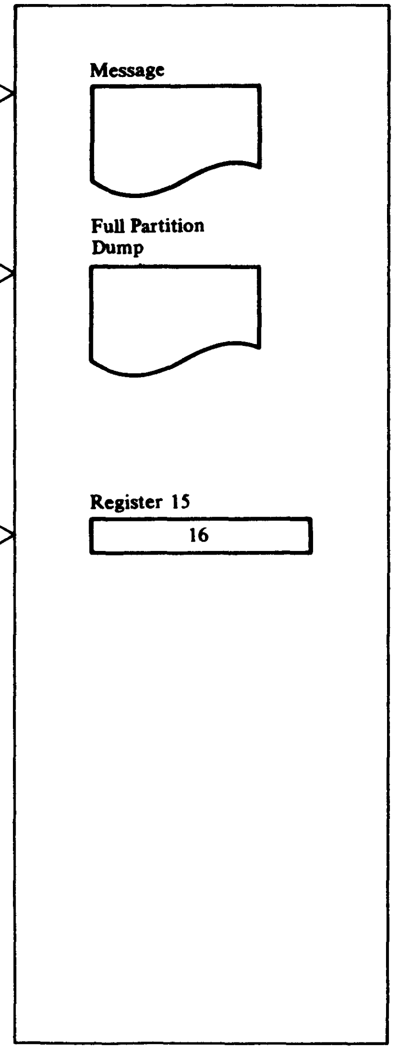
INPUT



PROCESSING

1. Establishes addressability.
2. Prints message.
3. Prints full partition dump.
4. Closes all open data sets.
5. Returns to invoker of Access Method Services.

OUTPUT



Extended Description for Diagram 5.2.1

IDCSA01

Procedure: IDCSA01

1 The UABORT routine uses the registers saved in the save area pointed to by GDTABH to establish addressability. This is done so the UABORT routine can access storage areas obtained by the System Adapter and remain reentrant.

IDCSA01

Procedure: IDCSA01

2 UABORT issues an EXCP to write a message to the programmer.

IDCSA01

Procedure: IDCSA01

3 The UABORT routine issues the PDUMP macro and takes a full partition dump unless the UABORT code indicates a no-space-available condition, in which case no dump is issued. The partition beginning and ending addresses for the PDUMP are obtained from the partition boundary box. The UABORT code is in register 15 in the dump.

IDCSA01

Procedure: IDCSA01

4 GDTIOH provides the address of the IODATA. The address of the IOCSTR chain is IODIOC. The UABORT routine goes through the chain of IOCSTRs and tests each one to determine if it is open. The DTF, for nonVSAM data sets, or the ACB, for VSAM data sets, is checked to determine if the data set is open or closed. If the data set is open, IDCSA01 issues a CLOSE macro to close the data set. The processing continues until the end of the chain is reached.

IDCSA01

Procedure: IDCSA01

5 If Access Method Services was invoked through job control, IDCSA01 issues a CANCEL macro to cancel the job. If Access Method Services was invoked through a subroutine call, IDCSA01 returns control to the invoker with a code of 16 in register 15 to indicate that a catastrophic error has occurred.

Diagram 5.2.2 USNAP Macro

From Diagram 5.0

INPUT

Register 1

GDT

Identification

PROCESSING

1. Issues PDUMP macro instruction.

2. Returns.

OUTPUT

Full Partition Dump

Identification

Extended Description for Diagram 5.2.2

IDCSA02

Procedure: IDCSA02

1 IDCSA02 issues a COMRG macro to determine the partition identification key (PIK). The partition beginning and ending addresses for PDUMP are obtained from the partition boundary box. IDCSA01 then issues a PDUMP macro for a full partition dump.

IDCSA02

Procedure: IDCSA02

2 IDCSA02 returns control to the module that issued the USNAP macro.

Diagram 5.3.1. UCALL Macro

From Diagram 5.0

INPUT

Register 1

GDT

Addresses of data to be passed to called module

Name of Module to Call

AUTOTBL

PROCESSING

1. Issues CDLOAD macro.

2. Frees storage.

3. Rearranges arguments in calling module.

4. Gives control to loaded module.

OUTPUT

Loaded Module

Register 1

GDT

Addresses of data from calling module

Register 15

Extended Description for Diagram 5.3.1

IDCSA02

Procedure: IDCSA02

1 IDCSA02 loads the program named by the UCALL macro with a CDLOAD macro.

IDCSA02

Procedure: IDCSA02

2 IDCSA02 checks the AUTOTBL for the number of outstanding storage requests for IDCSA02. The number is in the STATUS section for IDCSA02. If the number is greater than one, storage other than the storage addressed in the AUTOBL has been obtained for IDCSA02. The amount of storage is in the PL/S generated variable @SIZDATD and the address is in register 11. IDCSA02 issues a FREEVIS and the number in STATUS is decreased by one. If the number in STATUS is one, a FREEVIS is not issued because the storage is saved for the next time IDCSA02 is given control. The status is reduced by one.

IDCSA02

Procedure: IDCSA02

3 IDCSA02 copies the address of the GDT from the first parameter in the calling program to the second parameter in the calling program. IDCSA02 puts the address of the second parameter in the calling program, now the address of the GDT, in register 1. Register one now points to a contiguous list of parameters for the called program.

IDCSA02

Procedure: IDCSA02

4 IDCSA02 puts the address of the called program into register 15. IDCSA02 restores all registers, except 1 and 15, from the calling program's save area and gives control to the called program.

Diagram 5.3.2. ULOAD Macro

From Diagram 5.0

INPUT

Register 1

↑GDT

Address of Fullword

Fullword

Name of Module to Load

PROCESSING

1. Issues CDLOAD macro.
2. Puts loaded program address in parameter list.
3. Returns.

OUTPUT

Loaded Module

Register 1

↑GDT

Address of Loaded Module

Name of Module to Load

Extended Description for Diagram 5.3.2

IDCSA02

Procedure: IDCSA02

1 IDCSA02 issues a CDLOAD macro using the name of the program given to the ULOAD macro.

IDCSA02

Procedure: IDCSA02

2 IDCSA02 puts the address of the loaded program in the calling program at the address specified with the third parameter.

IDCSA02

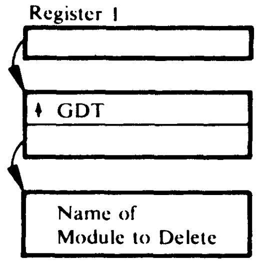
Procedure: IDCSA02

3 IDCSA02 returns control to the module that issued the ULOAD macro.

Diagram 5.3.3. UDELETE Macro

From Diagram 5.0

INPUT



PROCESSING

1. Deletes module.

2. Returns.

OUTPUT

Extended Description for Diagram 5.3.3

IDCSA02

Procedure: IDCSA02

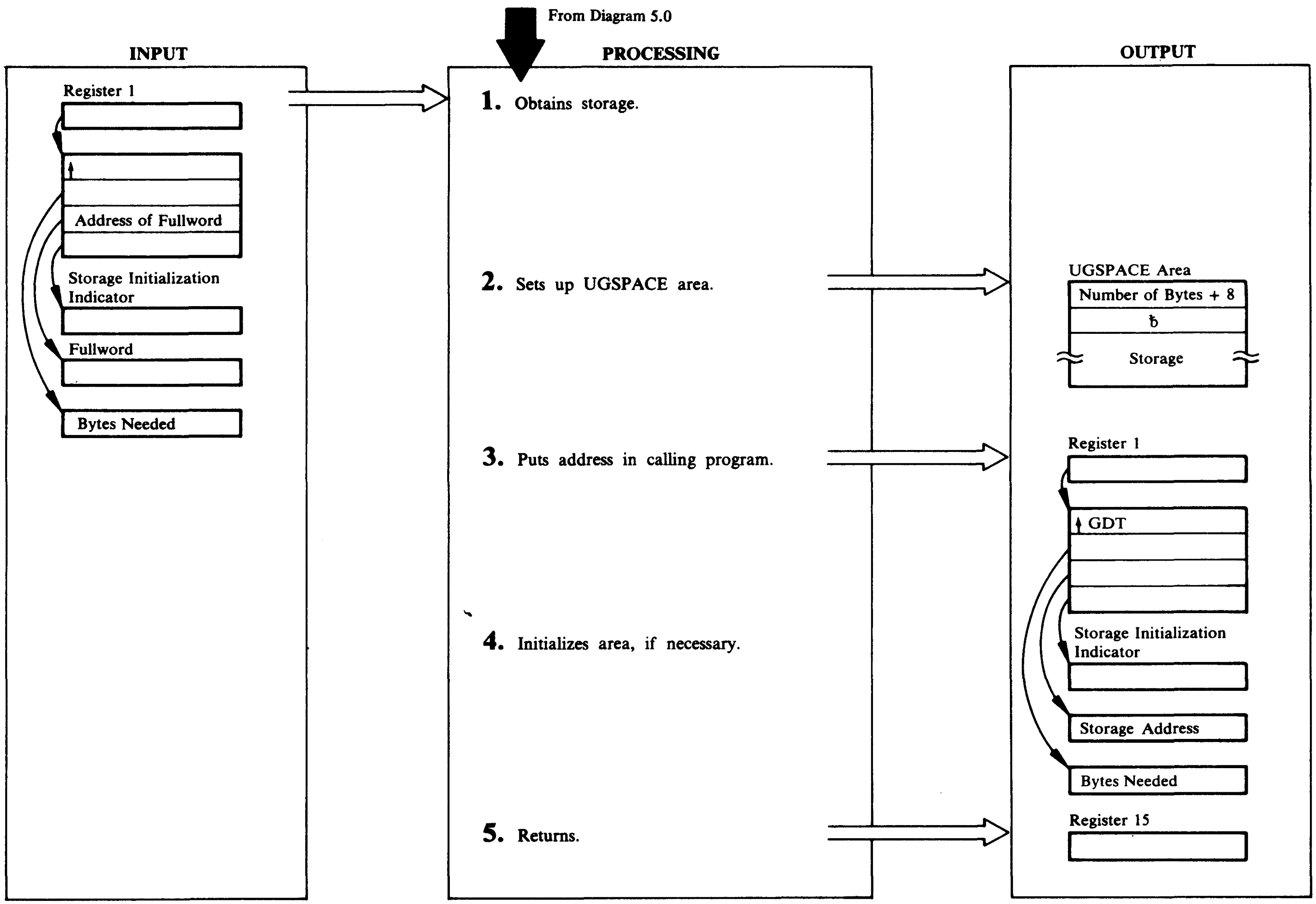
1 IDCSA02 does not delete the module but lets the system paging mechanism delete the module when necessary.

IDCSA02

Procedure: IDCSA02

2 IDCSA02 returns control to the module that issued the UDELETE macro.

Diagram 5.4.1. UGSPACE Macro



Extended Description for Diagram 5.4.1

IDCSA02

Procedure: IDCSA02

1 IDCSA02 issues a GETVIS for the number of bytes requested plus 8 for the UGSPACE area that proceeds each storage area. If the return code from the GETVIS is nonzero, the address of the storage area is set to zero and control is given to step 5. If the return code is zero, control is given to step 2.

IDCSA02

Procedure: IDCSA02

2 IDCSA02 puts the number of bytes in the storage area plus 8 in the first word of the UGSPACE area. IDCSA02 sets the second word blank to distinguish a UGSPACE area from a UGPOOL area.

IDCSA02

Procedure: IDCSA02

3 IDCSA02 puts the address of the storage area, not the UGSPACE area, in the calling program at the address specified by the third parameter.

IDCSA02

Procedure: IDCSA02

4 If SETZERO or SETBLANK was specified as the fourth parameter, IDCSA02 sets the storage area to zeros or blanks, respectively. If SETZERO or SETBLANK was not specified, the storage area is not changed.

IDCSA02

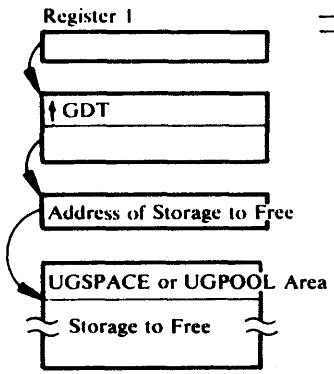
Procedure: IDCSA02

5 IDCSA02 puts a return code in register 15 and returns control to the module that issued the UGSPACE macro.

Diagram 5.4.2. UFSPACE Macro

From Diagram 5.0

INPUT



PROCESSING

1. Checks for UGSPACE or UGPOOL area. If UGSPACE, continues to Step 2; if UGPOOL, goes to Step 3.
2. Calculates address.
3. Calculates address and removes area from chain.
4. Frees storage.
5. Returns.

OUTPUT

Extended Description for Diagram 5.4.2

IDCSA02

Procedure: IDCSA02

1 The address of the area to free is used by IDCSA02 to determine if the area was obtained with a UGSPACE or a UGPOOL. If the fullword at the address minus 4 contains blanks, the area was obtained with a UGSPACE.

IDCSA02

Procedure: IDCSA02

2 If the storage area was obtained with UGSPACE, a UGSPACE area preceeds the area. The length of the area to free is at the first word in the UGSPACE area. The address of the area to free is calculated by subtracting 8 from the area address.

IDCSA02

Procedure: IDCSA02

3 If the storage area was obtained with a UGPOOL, a UGPOOL area preceeds the storage. The length of the area to free is at the third word of the UGPOOL area. The address of the area to free is calculated by subtracting 16 from the area address. The forward and backward chains are updated to remove this area from the chain. If this is the last area in the chain, the address of the last area in the chain in GPLAST in the System Adapter Historical Data area is updated by IDCSA02.

IDCSA02

Procedure: IDCSA02

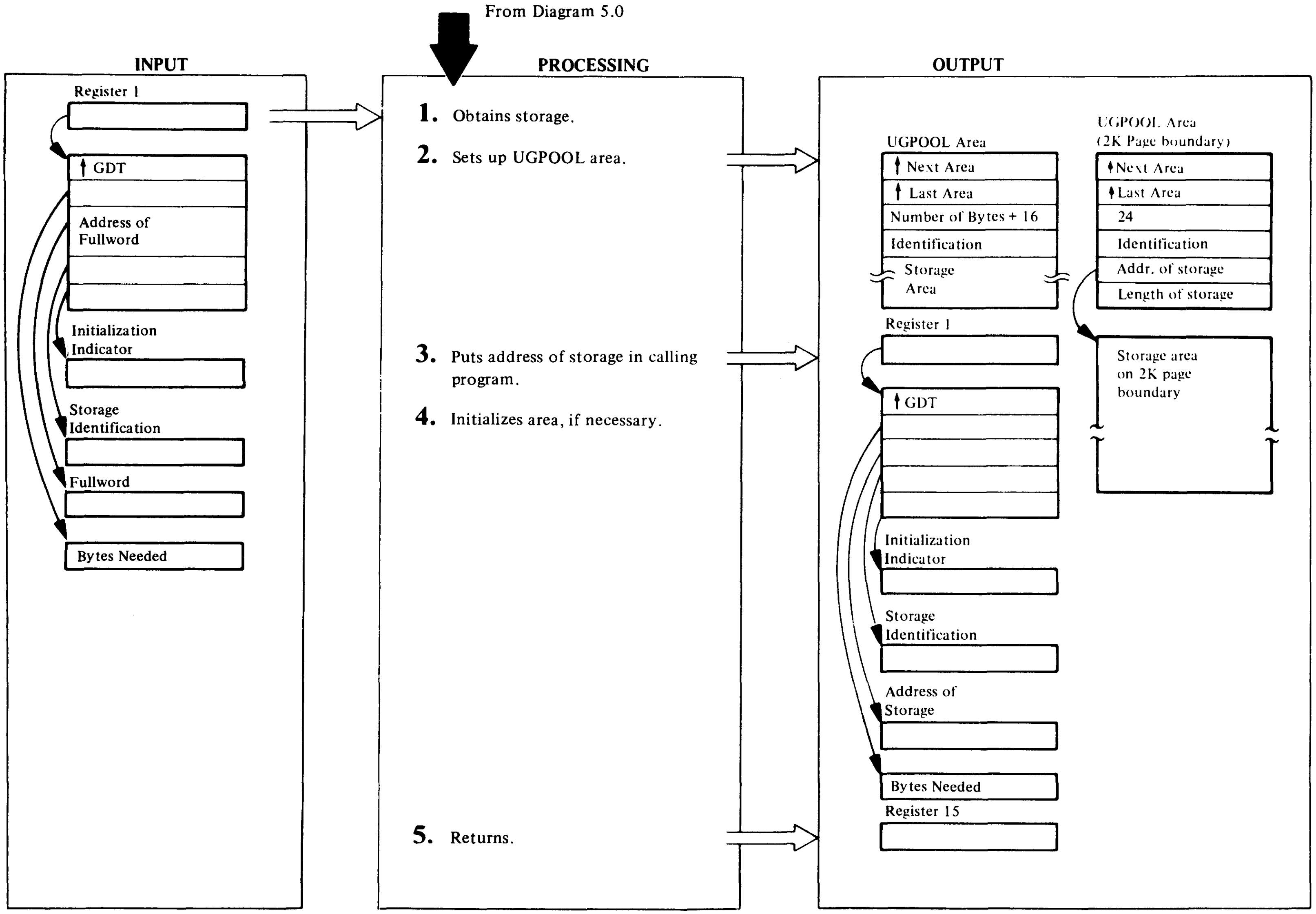
4 A FREEVIS macro is issued to release the storage plus its UGSPACE or UGPOOL area.

IDCSA02

Procedure: IDCSA02

5 IDCSA02 returns control to the module that issued the UFSPACE macro.

Diagram 5.4.3. UGPOOL Macro



Extended Description for Diagram 5.4.3

IDCSA02

Procedure: IDCSA02

1 If the UGPOOL storage identification specifies 'PG' as the third and fourth characters, IDCSA02 issues a GETVIS for the number of bytes requested starting on a 2K page boundary. The address and length is saved. A second GETVIS is issued by IDCSA02 for a 24-byte area. The address and length of the first area obtained are placed in the fifth and sixth words of the 24-byte area. Otherwise, a GETVIS is issued for the number of bytes requested plus 16 for the UGPOOL area. If the return code from the GETVIS is nonzero, the storage address in the calling program is set to zero and control is given to step 5, unless the GETVIS was for a 24-byte 'xxPG' storage area, in which case the space obtained on a 2K page boundary must be freed. A FREEVIS macro is issued to free the space and then the storage address in the calling program is set to zero and control is given to step 5. If the return code from the GETVIS is zero, control is given to step 2.

IDCSA02

Procedure: IDCSA02

2 The new storage area is chained to the other storage areas obtained with UGPOOL. The head of the chain is in GPFIRST and the tail is in GPLAST in the System Adapter Historical Data Area. The new storage area is chained by IDCSA02 to the tail of the list. IDCSA02 sets the forward chain pointer to zero. The backward chain pointer contains the address of the next to last area. The number of bytes in the storage area is the number of bytes requested plus 16 for the UGPOOL area. The identification from the calling module is put in the fourth word of the UGPOOL area. GPLAST is set to the address of the new storage area. The 24-byte area obtained for a 'xxPG' storage area is treated in the same manner as all other UGPOOL areas and chained into the UGPOOL storage area chain. The number of bytes is 24.

IDCSA02

Procedure: IDCSA02

3 IDCSA02 puts the address of the storage area, not the UGPOOL area, in the calling program at the address specified by the third parameter.

IDCSA02

Procedure: IDCSA02

4 If SETZERO or SETBLANK was specified as the fifth parameter, IDCSA02 sets the storage area to zeros or blanks, respectively. If neither SETZERO or SETBLANK is specified, the storage is not changed.

IDCSA02

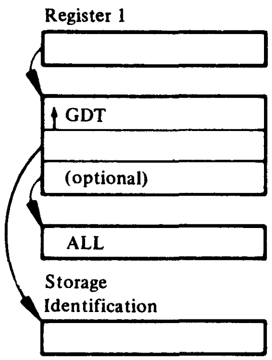
Procedure: IDCSA02

5 IDCSA02 puts a return code in register 15 and returns control to the module that issued the UGPOOL macro.

Diagram 5.4.4. UFPOOL Macro

From Diagram 5.0

INPUT



PROCESSING

1. Finds areas to free.
2. Removes matching areas from chain and frees storage.
3. Returns to Step 2 until end of list.
4. Returns.

OUTPUT

Extended Description for Diagram 5.4.4

IDCSA02

Procedure: IDCSA02

1 IDCSA02 examines the list of UGPOOL areas addressed from GPFIRST to find a match between the storage identifier supplied by the calling program and the identifier in the UGPOOL area. If the calling program specifies ALL as the third parameter, just the first two bytes of the identifiers are compared so that every storage area that matches is freed. If ALL is not specified, IDCSA02 compares four bytes of the identifiers to find the storage areas to be released.

IDCSA02

Procedure: IDCSA02

2 If a match is found, IDCSA02 removes the UGPOOL area from the chain and releases the UGPOOL area with its storage area with a FREEVIS macro. If the storage identification is 'xxPG', the address and length of the area to be freed is in the fifth and sixth words of the area in the UGPOOL storage chain. IDCSA02 issues a FREEVIS for this area. The 24-byte area in the UGPOOL chain is then freed in the normal manner.

IDCSA02

Procedure: IDCSA02

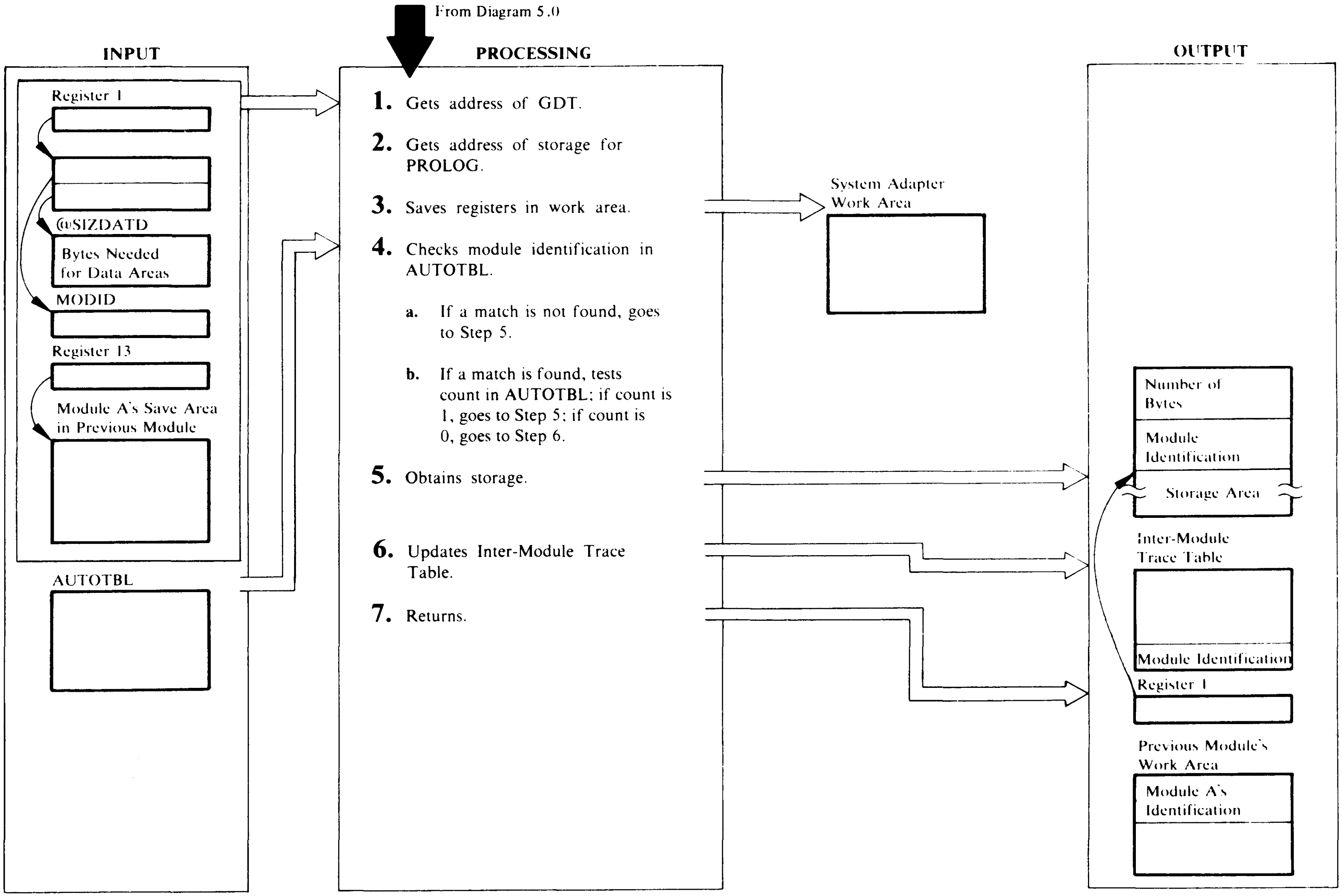
3 If the end of the chain has not been reached, IDCSA02 compares the next UGPOOL area. The entire list is searched for matching identifiers regardless of whether ALL is specified or not. IDCSA02 returns control to step 2 until the end of the chain is reached.

IDCSA02

Procedure: IDCSA02

4 IDCSA02 returns control to the module that issued the UFPOOL macro.

Diagram 5.4.5 PROLOG Macro



1. Gets address of GDT.
2. Gets address of storage for PROLOG.
3. Saves registers in work area.
4. Checks module identification in AUTOTBL.
   - a. If a match is not found, goes to Step 5.
   - b. If a match is found, tests count in AUTOTBL; if count is 1, goes to Step 5; if count is 0, goes to Step 6.
5. Obtains storage.
6. Updates Inter-Module Trace Table.
7. Returns.

Extended Description for Diagram 5.4.5

IDCSA03

Procedure: IDCSA03

1 The address of the GDT is the first parameter in the call to every Access Method Services module except the call to PROLOG. As an example, let's assume module A gives control to module B. The first thing module B does is store registers in the save area in module A. The second thing module B does is obtain storage for the data in module B. PL/S generates a GETMAIN macro instruction to obtain the storage. But GETMAIN doesn't work on DOS. A call to the PROLOG routine is substituted for the GETMAIN when module B is compiled on VS. So, instead of doing a GETMAIN, module B calls PROLOG to get storage for module B's data areas. At the time module B gets control, register 1 contains the address of a parameter list. By convention within Access Method Services, the first parameter in the parameter list is always the address of the GDT. When PROLOG gets control, register 13 contains the address of the save area in module A. IDCSA03 uses this address to get the address of the GDT.

IDCSA03

Procedure: IDCSA03

2 The address of the storage area PROLOG uses for its data areas is in GDTSPR. IDCSA03 uses this address to establish addressability to the data areas in PROLOG.

IDCSA03

Procedure: IDCSA03

3 Module B's registers are saved in PROLOG because module B doesn't have a save area yet. IDCSA03 chains together the save area in module A and the save area used for module B's registers in PROLOG.

IDCSA03

Procedure: IDCSA03

4 IDCSA03 compares the module identifications in AUTOTBL with the 4 character module identification module B passes as the first parameter to PROLOG. If IDCSA03 does not find a match, control goes to step 5. If a match is found, and module B is IDCSA02, IDCI001, or IDCTP01, IDCSA01 may have already obtained storage for it. AUTOTBL contains the address of storage already obtained for IDCSA02, IDCTP01, and IDCIO01. IDCSA03 examines the number of times module B has been called. If the number is zero, module B is not using the storage whose address is in AUTOTBL. IDCSA03 does not do a GETVIS and IDCSA03 gives to module B the storage from AUTOTBL for module B's data areas. IDCSA03 adds one to the number of times the module is called. If the count is greater than zero, the storage in AUTOTBL is already in use so IDCSA03 must do a GETVIS. One is added to the number of times the module is called.

IDCSA03

Procedure: IDCSA03

5 If module B did not get storage from AUTOTBL, IDCSA03 issues a GETVIS. for the number of bytes needed. PL/S-2 always puts the number of bytes in a constant called @SIZDATD which is the second parameter to PROLOG. IDCSA03 issues a GETVIS for the number of bytes in @SIZDATD plus 8 for header information. If the return code from GETVIS is nonzero, IDCSA03 issues a UABORT macro. IDCSA03 puts the total length of the storage area in the first word of the header. IDCSA03 puts Module B's identification from MODID in the second word of the header.

IDCSA03

Procedure: IDCSA03

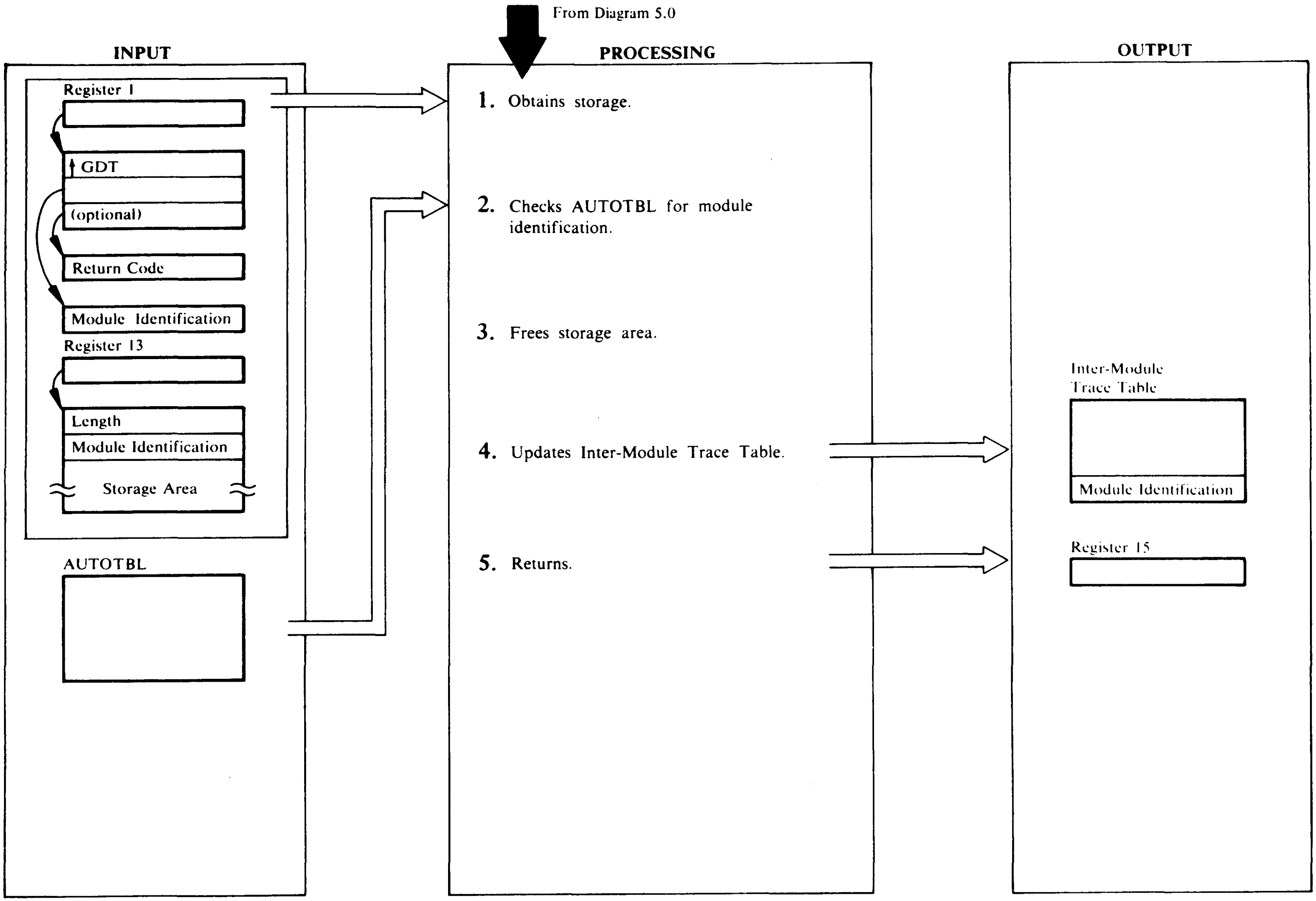
6 IDCSA03 adds module B's identification from MODID to the end of the Inter-Module-Trace table. The first, oldest entry in the table is removed.

IDCSA03

Procedure: IDCSA03

7 IDCSA03 puts module B's module identification in the first word of module A's save area. IDCSA03 restores the registers, with the exception of register one, from the work area in PROLOG to be as they were when module B gave control to PROLOG. Register one contains the address of the storage module B uses for its data area. IDCSA03 returns control to module B.

Diagram 5.4.6. UEPIL Macro



Extended Description for Diagram 5.4.6

IDCSA03

Procedure: IDCSA03

1 Let's assume module A gives control to module B. Module B completes its processing and is ready to return control to module A. When module B is compiled on VS, PL/S generates a FREEMAIN for exit code. Rather than having one version of all modules for VS and another for DOS, each module - with a very few exceptions - issues a UEPIL macro to return control. See the chapter "Diagnostic Aids" for an illustration of save areas. The UEPIL bypasses the PL/S generated FREEMAIN and allows the same module to operate on more than one operating system. When module B is ready to return control to module A, module B issues a UEPIL. UEPIL gets the address of the storage it is to use for data areas from GDTSPR. IDCSA03 saves the address of module B's storage area which is in register 13. IDCSA03 saves the address of module A's save area, which is obtained from module B's save area, and IDCSA03 sets the forward chain in module A's save area to zero.

IDCSA03

2 IDCSA03 compares module B's module identification against the module identifications in AUTOTBL. If a match is not found, control is given to step 3. If IDCSA03 finds a match, the number of times the module has been called is compared to one. If the number is one, IDCSA03 will not issue a FREEVIS but reduces, by one, the number of times the module has been called. If the number is greater than one, IDCSA03 has acquired storage other than storage from the AUTOTBL and this storage must be released. IDCSA03 subtracts one from the number of times the module has been called.

IDCSA03

Procedure: IDCSA03

3 IDCSA03 subtracts eight from the address of module B's storage area to get the address of the header information. IDCSA03 issues a FREEVIS with the length of the storage area as specified in the first word of the header.

IDCSA03

Procedure: IDCSA03

4 IDCSA03 puts the address of module A's save area in register 13. IDCSA03 removes the oldest module identification entry in the Inter-Module-Trace table. IDCSA03 adds module A's module identification to the end of the Inter-Module-Trace table. IDCSA03 obtains module A's module identification from the first word of the save area where module A saved registers when it was given control.

IDCSA03

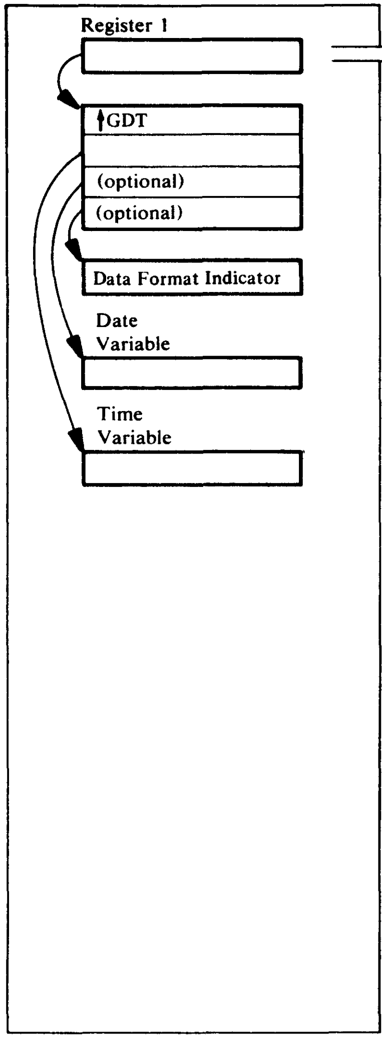
Procedure: IDCSA03

5 IDCSA03 restores all registers, except register 15, from module A's save area. Register 15 contains the return code from module B, if module B provides it, or zero. IDCSA03 returns control to module A.

Diagram 5.5.1. UTIME Macro

From Diagram 5.0

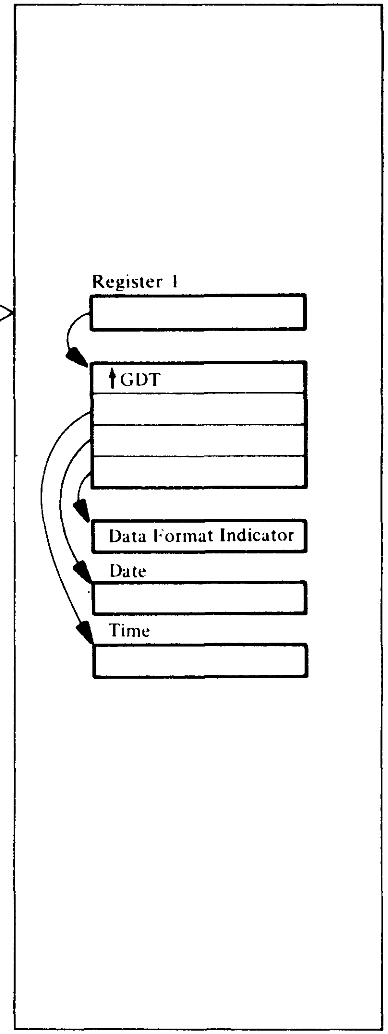
INPUT



PROCESSING

1. Does initialization.
2. Checks data format indicator.
3. Issues TIME macro.
4. Adjusts days per month.
5. Formats time and date, if specified.
6. Returns.

OUTPUT



Extended Description for Diagram 5.5.1

IDCSA02

Procedure: IDCSA02

1 IDCSA02 calculates the number of arguments passed to UTIME. IDCSA02 passes the input parameter list and a variable containing the number of arguments to IDCSA05.

IDCSA05

Procedure: IDSCA05

2 If the caller incorrectly specifies the data format indicator, IDCSA05 issues a UABORT macro.

IDCSA05

Procedure: IDSCA05

3 If the caller specifies FORMAT, IDCSA05 specifies a GETTIME macro. If CLOCK is specified, IDCSA05 issues a STCK instruction. If the caller does not indicate the data format, IDCSA05 issues a COMRG macro.

IDCSA05

Procedure: IDCSA05

4 IDCSA05 adjusts the number-of-days-per-month table for leap years. If the year returned by the GETTIME macro is divisible by four, IDCSA05 sets the number of days in February to 29.

IDCSA05

Procedure: IDCSA05

5 If the caller specifies FORMAT, IDCSA05 formats the time as HH:MM:SS, where HH is hours, MM is minutes, and SS is seconds. The data is in decimal digits. If the date was requested and format specified, IDCSA05 formats the date as MM/DD/YY, where MM is the month, DD is the day, and YY is the year. The data is in decimal digits.

If CLOCK is specified, IDCSA05 returns the time from the time-of-day clock in microseconds. If the date is requested and no data format is indicated, or CLOCK is specified, IDCSA05 returns the date in packed-decimal format, 00YYDDDF, where YY is the year, DDD is the day, and F is the sign digit.

IDCSA05, IDCSA02

Procedure: IDCSA05, IDCSA02

6 IDCSA05 moves the time and date to the calling program at the addresses specified by parameters two and three. IDCSA05 returns control to IDCSA02, which returns control to the module that issued the UTIME macro.

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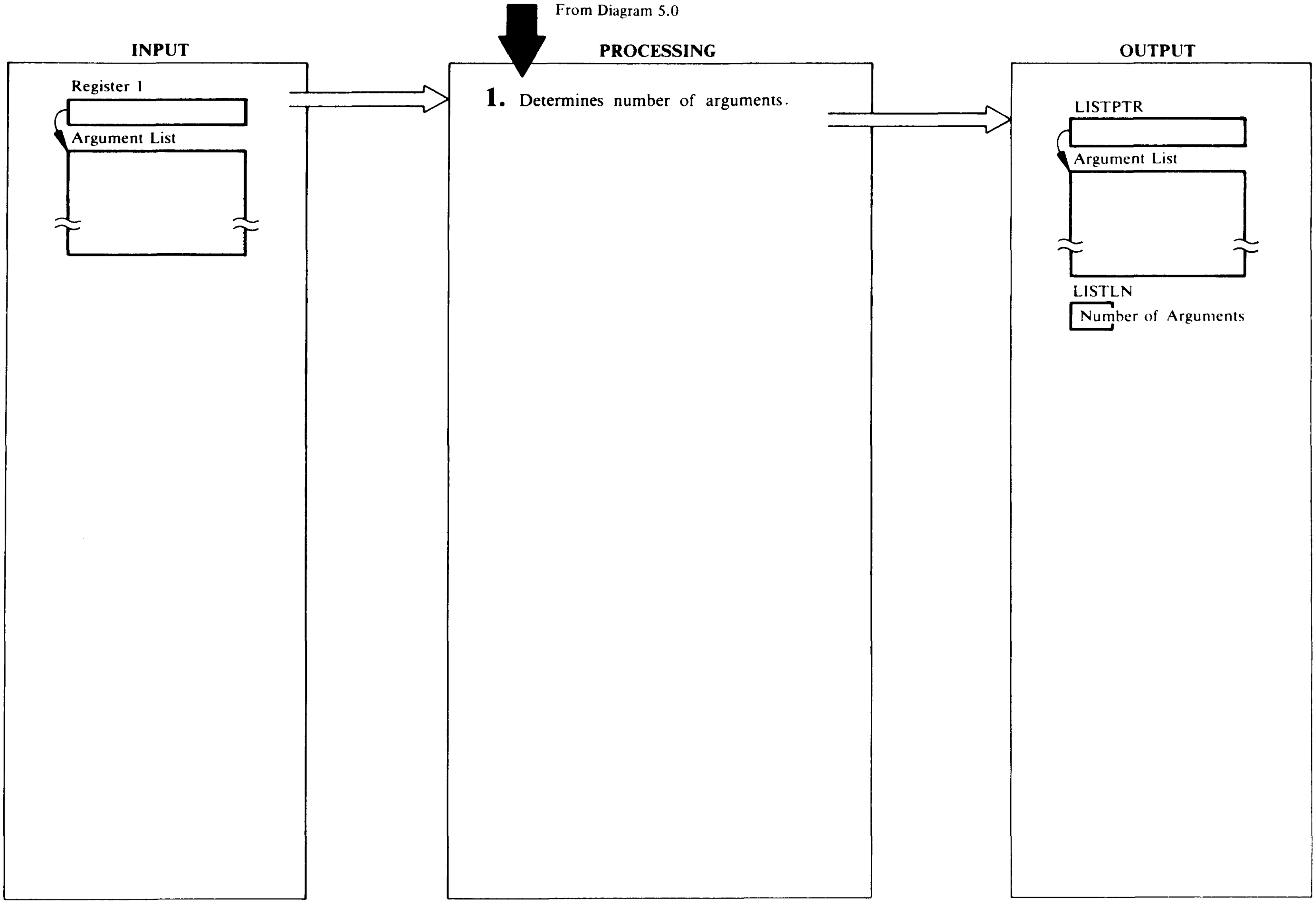
Revised April 29, 1977
By TNL SN24-5550

Diagram 5.6.1. ULISTLN Macro



Extended Description for Diagram 5.6.1

1 Unlike most Umacros ULISTLN generates in-line code that performs the function rather than a Branch to another module. The code stores the address of the parameter list in register 1 in a fullword named LISTPTR. The code seaches the argument list looking for the end of the list. The last argument in the list has a high order bit of one. The number of arguments in the list is put in a byte named LISTLN. If the end of the argument list is not found after 255 arguments, the search stops and LISTLN contains 255. Control continues with the next instruction in the program.

Diagram 5.6.2. USAVERC Macro

From Diagram 5.0

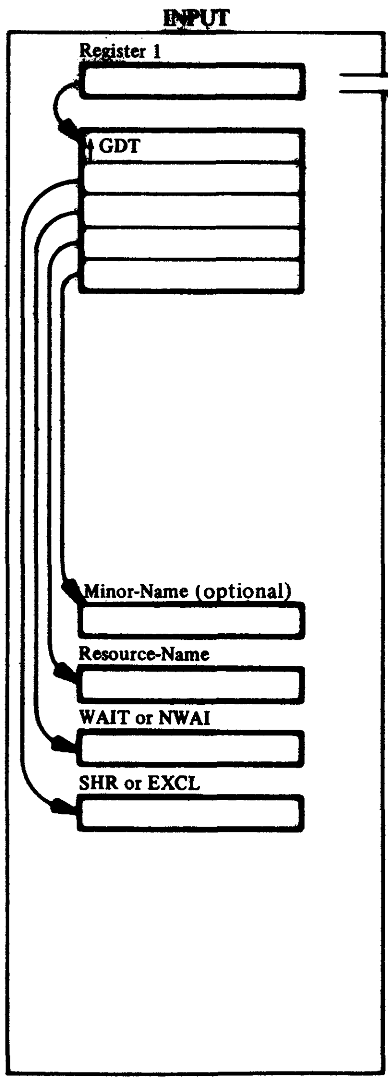
INPUT	PROCESSING	OUTPUT
Register 15	**1.** Copies contents of Register 15.	TESTRC

Extended Description for Diagram 5.6.2

1 Unlike most Umacros USAVERC generates in-line code that performs the function rather than generating a Branch to another module. The code copies the contents of register 15 which must be named RTNREG to a halfword named TESTRC. Control continues with the next instruction in the program.

Diagram 5.7.1. UENQ Macro

From Diagram 5.0



PROCESSING

1. Checks validity of input parameters.
2. Issues USE macro with caller's parameters.
3. Returns.

OUTPUT

Extended Description for Diagram 5.7.1

IDCSA08

Procedure: IDCSA08

1 IDCSA08 verifies that the caller's input parameters are valid. The second parameter may be either SHR or EXCL, the third parameter, WAIT or NOWAIT. Any other keyword results in a UABORT with a code of 40. The fourth parameter, if specified, is ignored.

IDCSA08

Procedure: IDCSA08

2 Depending on the above options required by the caller (SHR EXCL, WAIT NOWAIT), the appropriate USE macro is issued.

IDCSA08

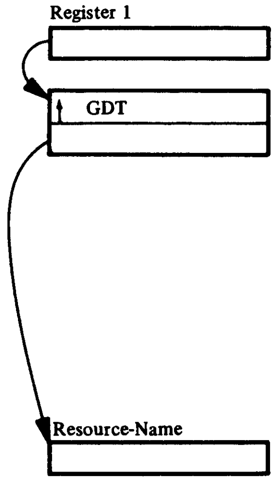
Procedure: IDCSA08

3 IDCSA08 sets the return code to zero if the WAIT option was specified by the caller; otherwise IDCSA08 sets the return code to that returned by the USE macro. IDCSA08 returns control to the module that issued the UENQ macro.

Diagram 5.7.2. UDEQ Macro

From Diagram 5.0

INPUT



PROCESSING

1. Issues RELEASE macro.
2. Returns.

OUTPUT

Extended Description for Diagram 5.7.2

IDCSA08

Procedure: IDCSA08

1 IDCSA08 issues a RELEASE macro to release control of the resource.

IDCSA08

Procedure: IDCSA08

2 IDCSA08 returns contol to the module that issued the UDEQ macro.

I/O Adapter Visual Table of Contents

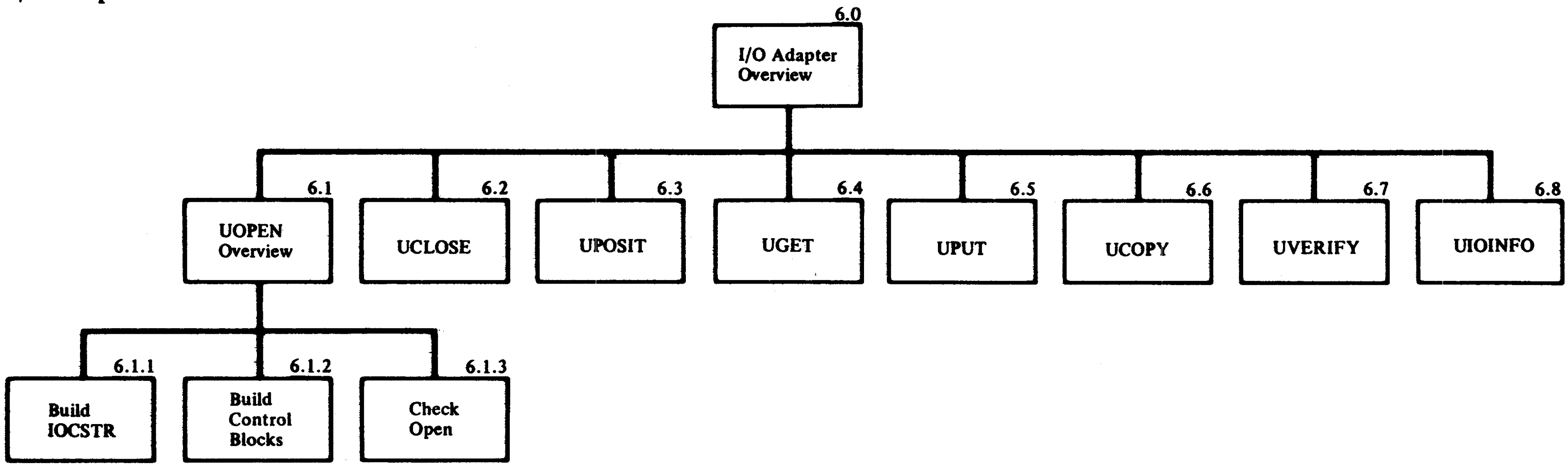
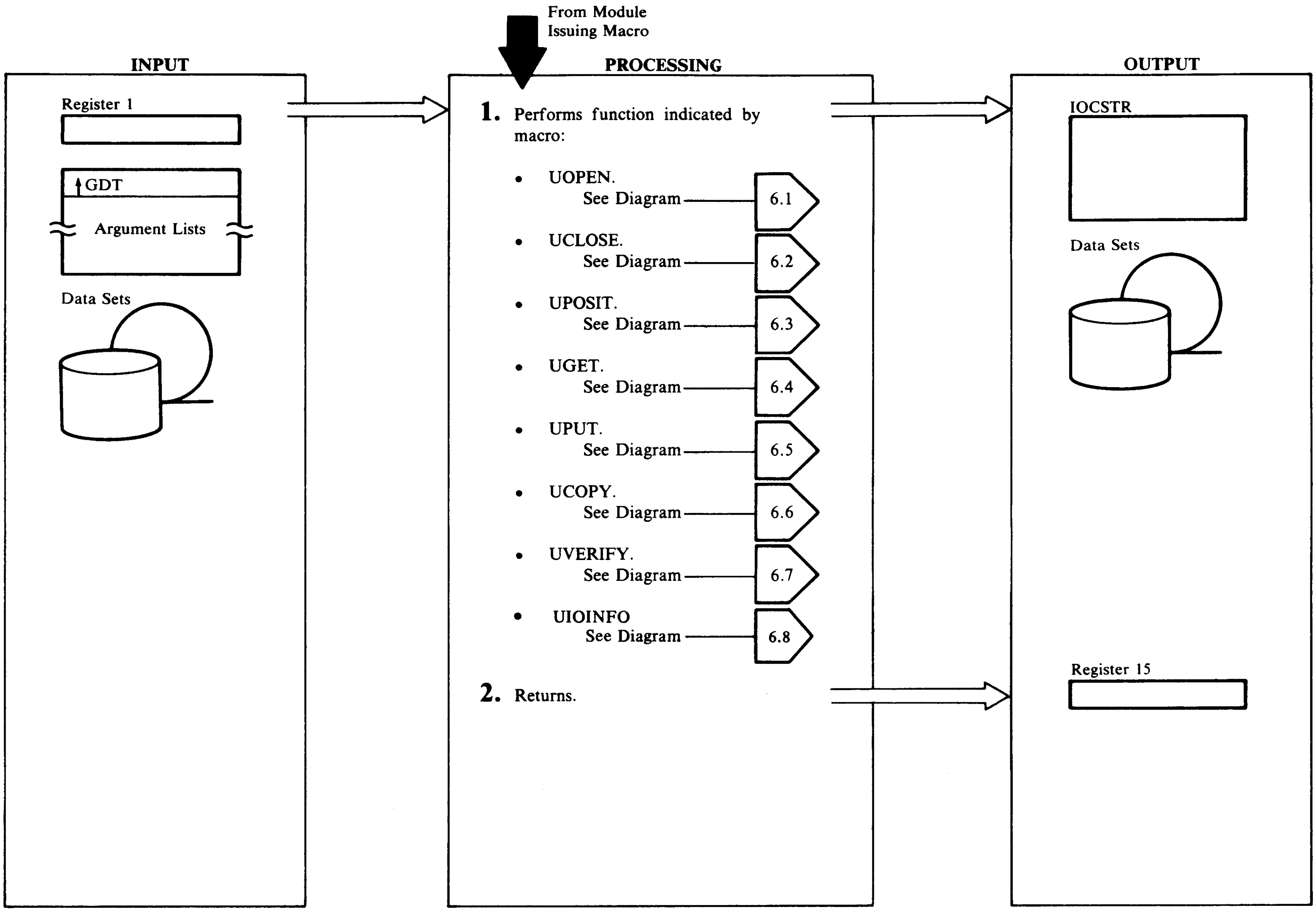


Diagram 6.0. I/O Adapter Overview



Extended Description for Diagram 6.0

IDCIO01

Procedure: IDCIO01

1 The type of I/O processing depends upon the Umacro issued:

- The UOPEN macro opens from one to four data sets.
- The UCLOSE macro closes from one to four data sets that were opened by the I/O Adapter. SYSIPT and SYSLST are not closed with this macro, but at processor termination with the UIOTERM macro. This is done to consolidate termination work.
- The UPOSIT macro is used to position to a record in a data set on a direct access device. The type of positioning depends upon the data set organization:

  For VSAM data sets, the positioning may be by key, relative byte address (RBA), or relative record number.

  For ISAM data sets, the positioning is by key only.
- The UGET macro is used to obtain a record from a data set opened with a UOPEN macro. If the data set is being processed with keys - ISAM or indexed VSAM - the key is returned with the record. If the data set is being processed with control intervals - VSAM with block processing - a control interval is returned. If a relative-record data set (RRDS) is being processed, a relative record number is returned. Only if the VSAM data set is opened for update processing may the record be modified in the buffer. Data sets opened for update processing must be processed with a UGET followed by a UPUT on the same record just obtained. This is true regardless of whether or not the record has been changed. A UPUT must be issued after each UGET, for UPDATE, even if it is the last UGET before the data set is closed. Update processing is used when the REPLACE option has been specified for the REPRO function.
- The UPUT macro is used to write records to a data set that was opened with the UOPEN macro. Multiple records can be written with one UPUT. If the data set is VSAM opened for block processing, the record must be a control interval. A UPUT must be issued for each UGET on a VSAM data set opened for update.
- The UCOPY macro copies one data set to another data set if both data sets have been opened with the UOPEN macro. The input data set may be positioned to a starting point with the UPOSIT macro before the copy takes place. The UCOPY copies all records from the input data set starting at the beginning record and continuing until end-of-file or a terminating error. If the output data set has records before the UCOPY, the following applies:

  a. If the data set is VSAM with records in keyed sequential or relative record format, the input records are merged with the existing records.

  b. If the data set is VSAM with entry sequential record format, the input records are added after the existing records.

  c. If the data set is nonVSAM, the input records are written over the existing records. The existing records are lost. ISAM data sets cannot be used for output for UCOPY.
- The UVERIFY macro insures that the address for the end-of-file for the VSAM data set in the VSAM catalog is the same as the end-of-file address on the I/O device. If the two addresses are not identical, the VSAM catalog changes to match the I/O device. The data set must be VSAM opened for control interval output processing. A return code from the UOPEN macro indicates that the data set may need verification. The FSR should ignore the return code form UOPEN and issue the UVERIFY in all cases except where a zero IOCSTR address is returned from UOPEN. At UOPEN, VSAM just checks the VSAM catalog for information about the data set; it does not check the physical data set. If the UOPEN returns a code saying that there is no data in the data set, the physical data set may or may not have data.
- The UIOINFO macro is used to obtain information concerning a data set. The macro analyzes an option byte passed by the caller to determine what kind of information is required. The types of information which may be requested are:

  Data-set name
  Volume serial list
  Device type
  Time stamp

  The caller may provide UIOINFO with a work area into which the requested information should be placed or he may provide an UGPOOL ID. In the latter case UIOINFO obtains the required amount of storage. (The caller is responsible for freeing this storage.)

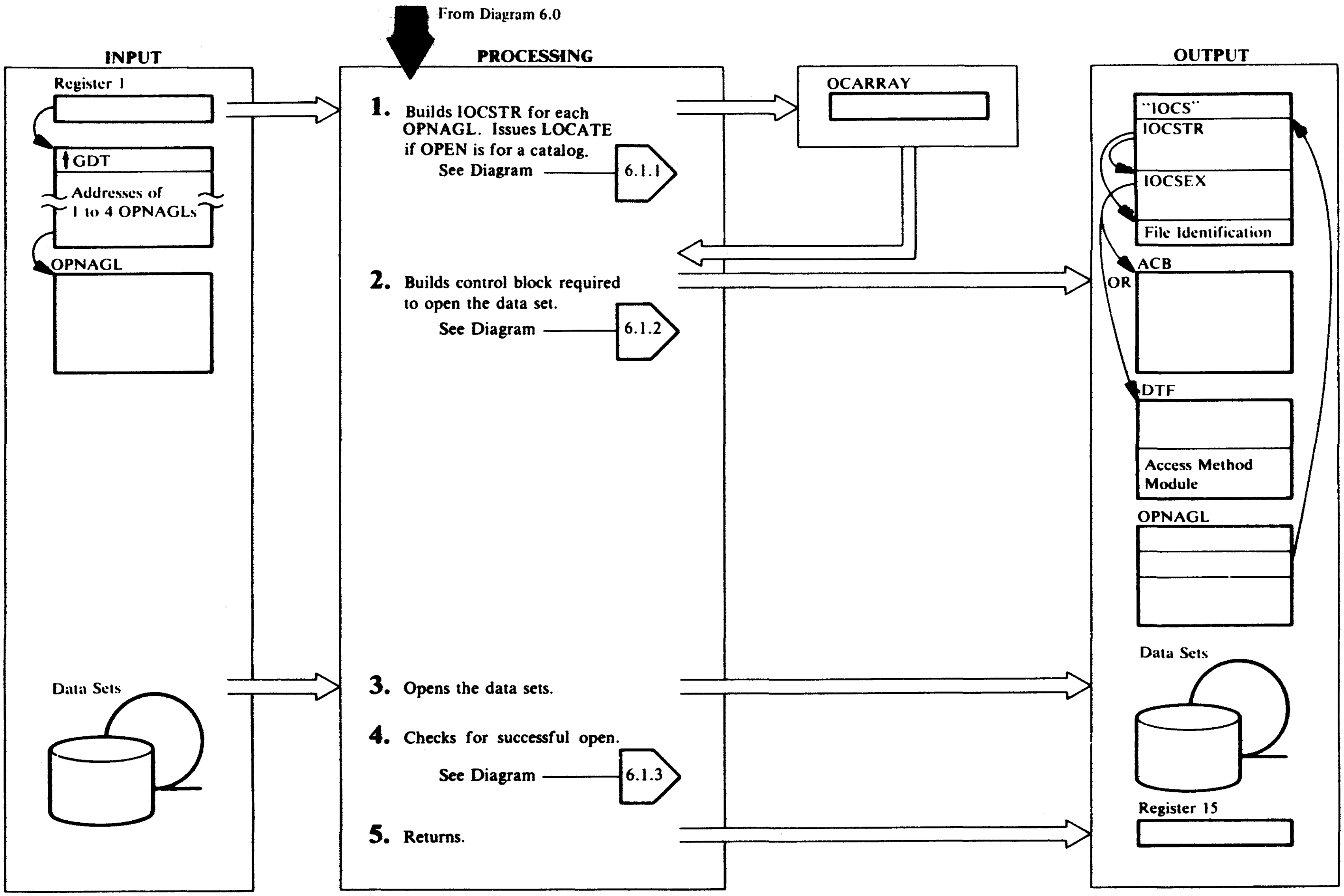
  The data requested is formatted into the return area and control is returned to the caller.

IDCIO01

Procedure: IDCIO01

2 A return code is put in register 15. If the return code is nonzero, error messages are written. Control returns to the module that issued the Umacro.

Diagram 6.1. UOPEN Macro



Extended Description for Diagram 6.1

IDCIO01, IDCIO02

Procedures: IDCIOOP, OPENRTN, DSDATA

1 IDCIOOP builds an internal array (OCARRAY) to describe the open to be performed. The rest of step 1 and all of step 2 are repeated for each open argument list (OPNAGL) that the calling module give to the UOPEN macro via register 1. OPENRTN increments the identifier in IODSID by 1 to form a unique identifier for the data set. OPENRTN uses the identifier in a UGPOOL macro to obtain storage for an IOCSTR and IOCSEX for the data set and file identification save area. OPENRTN puts the IOCSTR into the chain of IOCSTRs addressed from IODIOC in the I/O Adapter Historical Data Area, IODATA. DSDATA loads the VSAM IKQVLAB routine with a CDLOAD macro. The FILENAME and the address of a work area are passed as arguments. IKQVLAB reads the LABEL CYLINDER and returns information about the file in the work area. DSDATA saves the FILE ID and file organization. If the OPNAGL indicates that the open is for a catalog recovery area (CRA), the DSDATA routine generates a data set name for the CRA, namely, CATALOG.RECOVERY.AREA.VOL.xxxxxx where xxxxxx is the volume serial number of the CRA's first extent.

If the OPNAGL indicates that the open is for a catalog, OPENRTN issues a catalog Locate requesting the return of the catalog ACB address. Control is then passed to step 5.

If the open is not for a catalog, control is passed to Step 2.

IDCIO02

Procedures: BUILDACB, BUILDDBK

2 If the data set organization is VSAM, BUILDACB builds an EXLIST and an ACB control block. BUILDACB puts the addresses and length of the control blocks in the IOCSEX. If the data set organization is nonVSAM, BUILDDBK loads a module containing a DTF control block and the Access Method Module required to process the data set. BUILDDBK uses a table of module names and data set characteristics to find the right module to load. BUILDDBK updates the DTF with information from the OPNAGL. BUILDDBK uses a UGPOOL macro to obtain storage for subsequent GET/PUT operations. If the record format is spanned, one storage area is obtained, otherwise, two storage areas are obtained. The address of the ACB or DTF is put in IOCCBA in the IOCSEX.

IDCIO02

Procedure: OPENRTN

3 OPENRTN issues one OPEN macro for each ACB or DTF built in step 2. There are no exit routines. If OPEN detects an abend condition, OPEN abends.

IDCIO02

Procedures: OPENRTN, CKNONOP, BUILDRPL

4 OPENRTN and CKNONOP test each data set for a successful open. If the data set is VSAM, OPENRTN tests the results of the OPEN. If the data set is sequential nonVSAM, CKNONOP checks the open flags in the DTF. No checking is done on ISAM or device independent data sets. If the data set opened successfully, OPENRTN and CKNONOP set IOCMSGOP in the IOCSTR and IOCFLGOP in the IOCSEX. If address or control interval processing is not specified in the OPNAGL for a VSAM data set, OPENRTN determines if the data set has an index. A second test is performed to determine if the data set is a Relative Record data set (RRDS). For all VSAM data set, OPENRTN obtains data set information and BUILDRPL builds a RPL to process the VSAM data set. For an ISAM data set, CKNONOP issues a SETL macro to position to the first record. CKNONOP obtains data set information from the ISAM DTF and saves it in the IOCSTR.

IDCIO02, IDCIO01

Procedures: OPENRTN, DSDATA, BUILDACB, BUILDRPL, CKNONOP, IDCIOOP

5 If any errors occurred, any of the procedures that check for error conditions sets a nonzero return code in register 15. IDCIOOP returns control to the module that issued the UOPEN macro.

Diagram 6.1.1. UOPEN Macro – Build IOCSTR

From Diagram 6.1

INPUT

IODATA
- IODXTN

External Data Set List

Label Cylinder

PROCESSING

1. Checks if request is to open SYSIPT or SYSLST.
2. Obtains storage for IOCSTR.
3. Calls external routine if data set is externally controlled.
4. Obtains data set identification and data set type.
5. Issues LOCATE if OPEN is for a catalog.

OUTPUT

Data Identifier
- "IOCS"
- IOCSTR
- IOCSEX
- File Identification

Extended Description for Diagram 6.1.1

IDCIO02

Procedure: OPENRTN

1 OPENRTN tests the OPNAGL for an open request for SYSIPT or SYSLST. SYSIPT is tested in two ways:

- SYSIPT is the Dname in the OPNAGL.
- OPNTYPSI flag in OPNAGL is on.

SYSLST is tested in two ways:

- SYSLST is the Dname in the OPNAGL.
- OPTYSO flag in OPNAGL is on.

If the file is SYSIPT, OPENRTN checks IODICS for an address of an IOCSTR already built for SYSIPT. If an IOCSTR is built, SYSIPT is already open (or an open was attempted), and OPENRTN returns the address of the IOCSTR for SYSIPT in the area addressed by OPNIOC in the OPNAGL. No further processing is done on SYSIPT. If the data set is SYSLST, OPENRTN checks IODOCS for an address of an IOCSTR already built for SYSLST. If an IOCSTR is built, SYSLST is already open and OPENRTN returns the address of the IOCSTR for SYSLST in the adrea addressed by OPNIOC in the OPNAGL. No further processing is done on SYSLST.

If the data set is not open, continue to Step 2.

IDCIO02

Procedures: OPENRTN, PRINTMSG

2 OPENRTN increments by 1 the file identifier in IODSID to form a unique identifier for the data set. OPENRTN issues a UGPOOL macro with the file identifier to obtain storage for the IOCSTR plus 4 bytes for the characters 'IOCS', the IOCSEX, and the *file id*. *file id* is the name of the data set. **Note:** the file identifier that the I/O Adapter creates is different from the *file id*. If storage is not available, PRINTMSG writes a message. OPENRTN chains the new IOCSTR to the last IOCSTR in the chain. If the data set is SYSIPT or SYSLST, OPENRTN saves the address of the IOCSTR in the IODATA. OPENRTN checks the requested processing of the data set specified in OPNOPT in OPNAGL for input, update, or output, and copies it into the IOCSTR. Input is the default. The OPNAGL is used to pass information to the I/O Adapter in requesting a data set be opened. Information from the OPNAGL is placed in the IOCSTR and IOCSEX which are then used by the I/O Adapter to control processing of the data set once it is opened. The cross reference at the end of this Extended Description shows how OPNAGL information is transposed into the IOCSTR and IOCSEX.

IDCIO02

Procedure: OPENRTN

3 If the invoker of Access Method Services supplied a list of TLBL/DLBL names that he wants to control, the address of the list is in IODXTN. If a list exists, OPENRTN compares each entry in the list with the Dname in OPNDDN in OPNAGL. If a match is found, OPENRTN puts the address of the external routine in IOCXAD. OPENRTN also builds a parameter list for the external routine and puts the address of the first parameter in the list in IOCXPM. OPENRTN then gives control to the external routine to do the open. For lack of any information about the external data set, OPENRTN sets the IOCSTR to indicate the data set is nonVSAM with variable length records and logical record length of 32,760. This does not restrict the type of data sets that can be externally controlled. It is just to make the data set appear as something to the FSR that requests the data set be used. If a data set is not externally controlled, control continues with step 4.

IDCIO02

Procedures: DSDATA, PRINTMSG

4 If the data set is not SYSIPT or SYSLST, information must be obtained. DSDATA issues a CDLOAD macro to load IKQVLAB, the VSAM Read Label Cylinder module. If the return code from CDLOAD is non-zero, DSDATA issues a UABORT macro. If the return code is 12 (indicating insufficient storage), DSDATA sets the UABORT code to 28, otherwise DSDATA sets the UABORT code to 64. DSDATA gives control to IKQVLAB. If the return code is nonzero, PRINTMSG writes a message and the UOPEN for the data set terminates. If the return code is zero, IKQVLAB placed information about the data set in a work area. Data set organization and *file id* are set in the IOCSTR and IOCSEX. For SYSIPT and SYSLST the *file id* is assumed to be the FILENAME and the data set organization is assumed to be physical sequential with record size of 80 for SYSIPT and 121 for SYSLST. If the OPNAGL specifies device type of 2400, the data set is assumed to be a tape and the information returned by IKQVLAB is from a TLBL statement. If the device type is not 2400, DSDATA checks the DLBL for ISAM or VSAM. If neither ISAM or VSAM is specified, the data set is assumed to be physical sequential nonVSAM. For all data sets, DSDATA puts the *file id* in the file identification area addressed from the IOCSTR. If the OPNAGL indicates that a catalog recovery area is being opened, DSDATA sets VSAM data set organization in the IOCSTR. If the OPNAGL indicates that a catalog recovery area is being opened, DSDATA generates a data-set name for the CRA. The name generated is: 'CATALOG.RECOVERY.AREA.VOL.xxxxxx ', where xxxxxx is the volume serial number for the first CRA extent.

IDCIO02

Procedures: OPENRTN, PRINTMSG

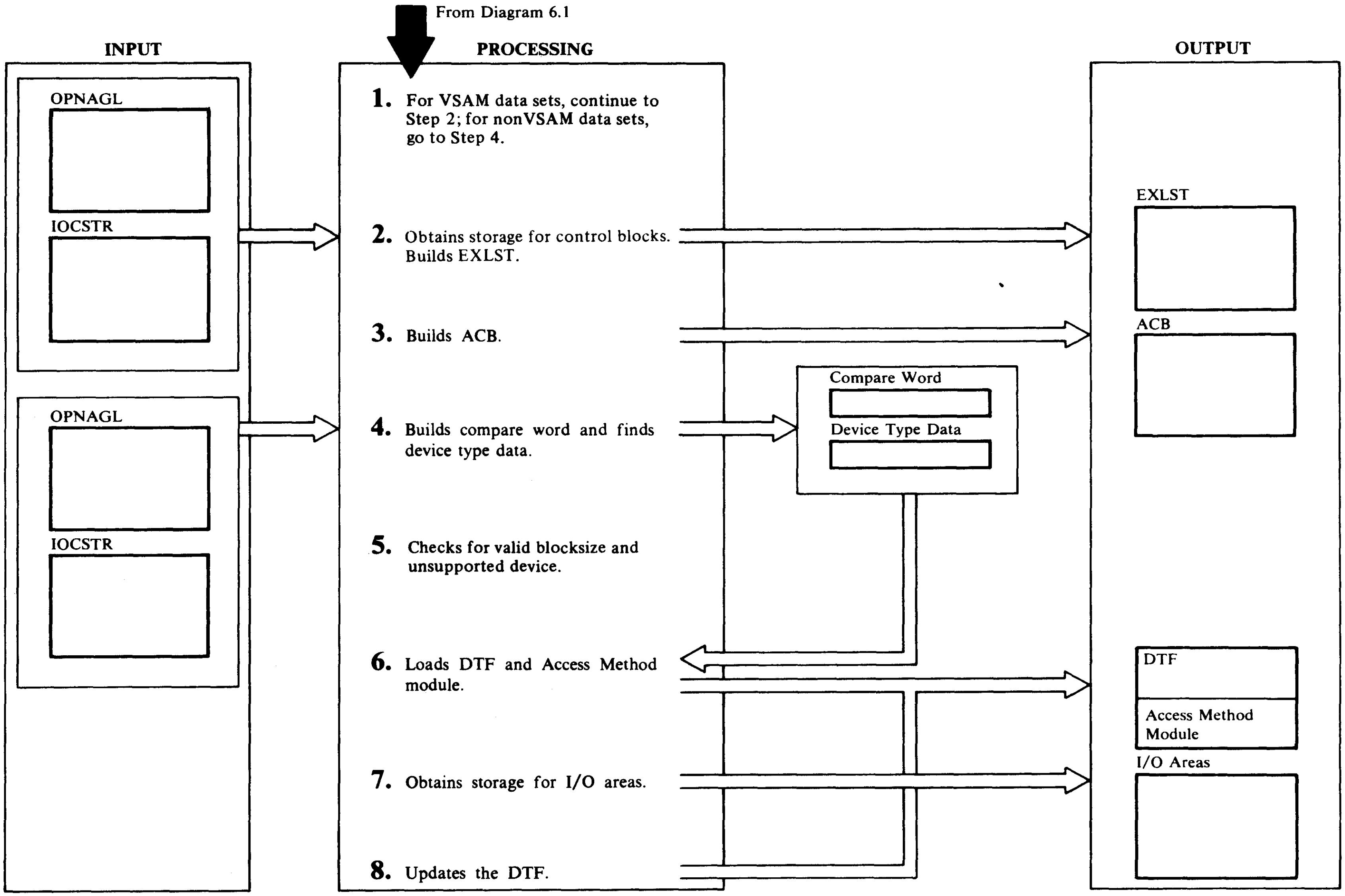
5 If the data set to be opened is a VSAM catalog, as indicated by IOCINFCT, a VSAM Locate is issued via the System Adapater UCATLG macro. OPENRTN builds a CTGPL and one CTGFL. The name used in the Locate (pointed to by CTGCAT and CTGENT) is the name as returned from IKQVLAB and contained in LABDSN. CTGPSWD is set equal to OPNPWA if a password has been specified via the OPNPWA field. The address of the catalog *dname* passed in OPNDDN is placed in CTGDDUC. The CTGFL requests the return of the catalog ACB address, CATACB. If the return code is nonzero, PRINTMSG writes a message. For all VSAM catalogs, control passes to the final phase of UOPEN for VSAM data sets.

OPNAGL IOCSTR/IOCSEX Cross Reference Table

OPNAGL	IOCSTR/IOCSEX	Description
OPNOPTIN	IOCMACIN = '1'	Input processing
OPNOPTOT	IOCMACOT = '1'	Output processing
OPNOPTUP	IOCMACUP = '1'	Update processing
OPNOPTBK	IOCMACBK = '1'	Control Interval processing
OPNOPTKS	IOCMACCR = '0'	Keyed processing
OPNOPTCR	IOCMACCR = '1'	Addressed processing
OPNOPTDR	IOCMACDR = '1'	Direct processing
OPNOPTSK	IOCMACSK = '1'	Skip sequential processing
OPNMODRS	Not required	Open reusable data set with reset
OPNMODAX	Not required	Open alternate index of path only
OPNMODUB	IOCMODUB = '1'	User buffers
OPNMODRP	IOCMODRP = '1'	Replace processing
OPNTYPXM	IOCMODXM = '1'	Export/Import
OPNTYPCI	IOCINFCT = '1'	Open catalog
OPNTYPRA	IOCRCVRA = '1'	Open catalog recovery area
OPNTYPRV	IOCRCVXM = '1'	Recovery bit for VSAM

If OPNOPTBK or OPNOPTKS is not specified, IOCMACCR is set to '1'.

Diagram 6.1.2. UOPEN Macro – Build Control Blocks



Extended Description for Diagram 6.1.2

IDCIO02

Procedure: BUILDACB

1 For VSAM data sets continue to step 2; for nonVSAM data sets go to step 4.

IDCIO02

Procedure: BUILDACB

2 BUILDACB issues a UGPOOL to obtain storage for the three VSAM control blocks: EXLST, ACB, and RPL. If OPNSTRNO is 0, BUILDACB obtains storage for one RPL; otherwise the value of OPNSTRNO determines the number of RPLs required. If the return code from UGPOOL is non-zero, BUILDACB sets an error condition and terminates UOPEN processing.

BUILDACB first builds an EXLST control block issuing the EXLST macro. Only the EODAD exit will be taken if GETVSAM encounters an end-of-file. LERAD and SYNAD exits are specified, however, but they are set inactive. BUILDACB puts the pointer to the EODAD exit routine into the exit list. BUILDACB puts the address and length of the EXLST control block in IOCEXA and IOCEXL respectively.

IDCIO02

Procedure: BUILDACB

3 BUILDACB builds an ACB control block by issuing the ACB macro. The ACB macro generates IN, SEQ, ADDR for the MACRF field. These attributes are overriden with information contained in the IOCSTR/IOCSEX or OPNAGL.

Bit Referenced	ACB MACRF =
IOCMACOT = '1'	OUT
IOCMACUP = '1'	OUT
IOCMACBK = '1'	CNV
IOCMACCR = '0'	KEY
IOCMACDR = '1'	DIR
IOCMACSK = '1'	SKP
IOCMODUB = '1'	UBF
OPNMODAX = '1'	AIX
OPNMODRS = '1'	RST

In DOS, the CATALOG OPEN option is never specified since catalogs are opened as described in step 5, Diagram 6.1.1.

BUILDACB requests address processing if the data set organization (indexed or non-indexed) is not known.

If the type of processing is set in the OPNAGL, BUILDACB uses it. The VSAM open routine will fill in the correct organization, if the specified organization is wrong. If the organization is not specified, address is set as the default because VSAM defaults to indexed and gives an error if the data set is not indexed. BUILDACB puts each password in an array of passwords to save the passwords until OPEN time and puts a pointer to the password in the ACB.

If IOCRCVRA='1', BUILDACB specifies the CRA=UCRA option for opening a catalog recovery area. Also, if IOCRCVRA='1', the third parameter passed to UOPEN is not an address of an OPNAGL; rather it is an address passed by EXPORTRA. The contents of this address must be inserted into the ACBUAPTR field of the ACB.

If the value of OPNSTRNO is greater than 1, BUILDACB moves the value of OPNSTRNO to the ACB. The address and length of the ACB are put in IOCCBA and IOCCBL, respectively. If OPNMODRC in the OPNAGL is 1, BUILDACB puts the address of the ACB in IOCCBP.

IDCIO02

Procedure: BUILDDBK

4 A nonVSAM data set cannot be opened as a catalog or opened for update. If either of these two conditions exist, BUILDDBK does not build control blocks for the data set. BUILDDBK builds a compare word, COMPWORD with data set organization, open options and record format. It saves the blocksize, record size, and the length of the required I/O areas. The information is in the OPNAGL, IOCSTR, and IOCSEX. The Access Method Module uses the I/O areas. The length of the I/O area is the blocksize plus 8.

IDCIO02

Procedure: BUILDDBK

5 BUILDDBK compares the device type specified in the OPNAGL against the table of allowable devices, DEVTABLE. When a match is found, the track length, constants used to determine the number of fixed length blocks per track, and the device code defined inthe DTF are saved. If a device type is not specified in the OPNAGL, '2314ƀƀƀƀ' is used as a default. The data set is not opened and an error message is written if the following conditions are found:

- Blocksize in OPNAGL is less than 1.
- Record size in OPNAGL is greater than 32,767.
- Record format is fixed and blocksize is not a multiple of recordsize.
- A non-supported device is specified.

IDCIO02

Procedure: BUILDDBK

6 BUILDDBK compares COMPWORD against a table of allowable data set characteristics and corresponding load module names, DOSACC. When a match is found, the length of the load module is used to obtain storage for the load module with a UGSPACE macro. BUILDDBK loads the module with a LOAD macro that puts it in the storage just obtained. The load modules are named IDCDL*xx* where *xx* is 01 through 15 and contain one or two DTFs along with the Access Method Modules needed to processs the data set.

IDCIO02

Procedures: BUILDDBK, PRINTMSG

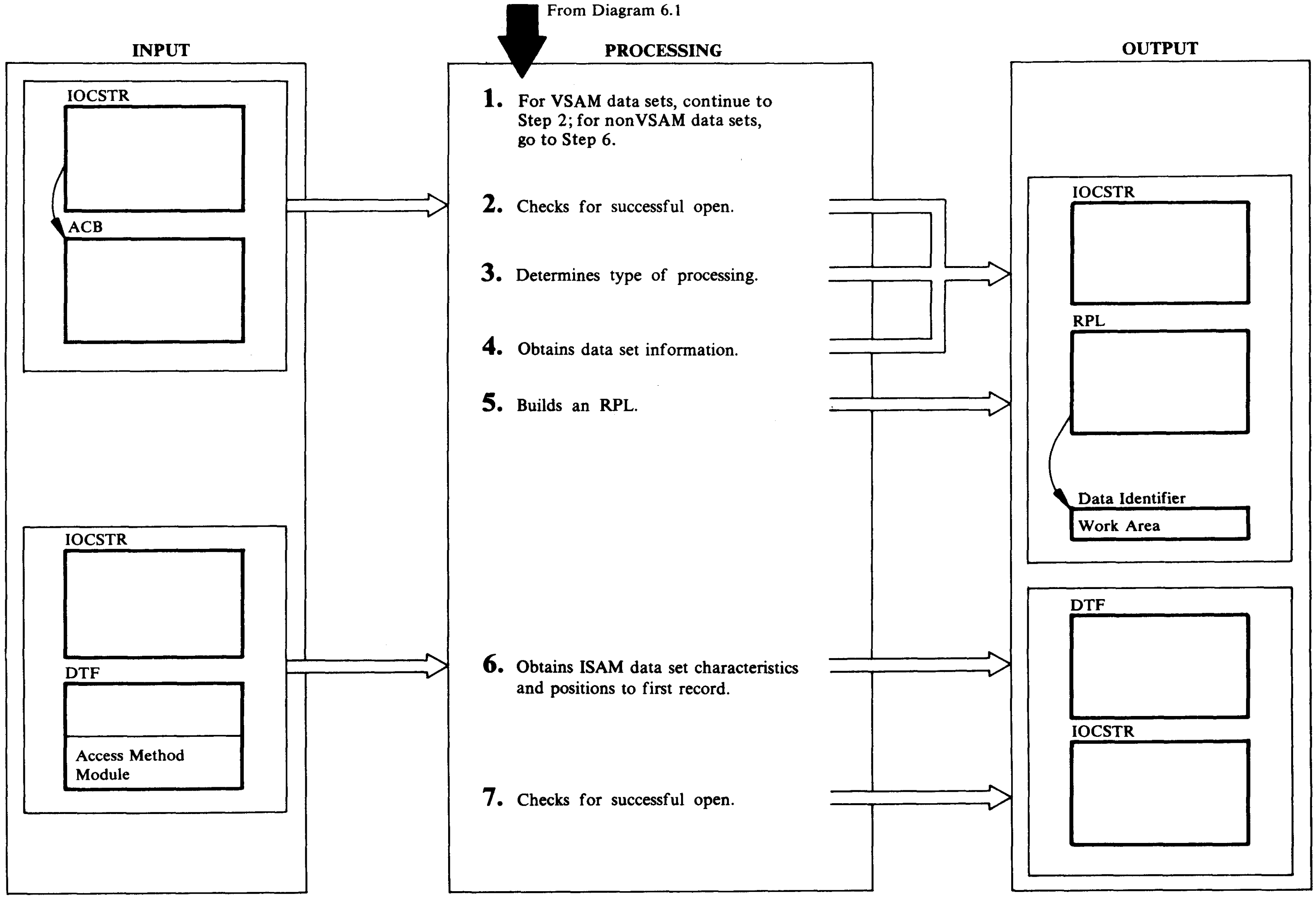
7 BUILDDBK issues a UGPOOL macro to obtain storage for the I/O areas. The Access Method Module uses the I/O areas as buffers. BUILDDBK puts the address of the storage in IOCWKA. If BUILDDBK finds no match in DOSACC or cannot obtain storage, the data set is not opened and PRINTMSG writes a message. If BUILDDBK cannot obtain storage for the load module, it issues a UABORT macro.

IDCIO02

Procedure: BUILDDBK

8 BUILDDBK updates the DTF with data set characteristics from the OPNAGL. Data set characteristics are record format, record size, blocksize, and device type. BUILDDBK updates the CCWs with the length of the data to get or put and the address of an I/O area.

Diagram 6.1.3. UOPEN Macro – Check Open



Extended Description for Diagram 6.1.3

IDCIO02

Procedure: OPENRTN

1 For VSAM data sets continue to step 2; for nonVSAM data sets go to step 6.

IDCIO02

Procedure: OPENRTN

2 OPENRTN checks the ACBOPEN flag if the open was successful. If the open was successful, OPENRTN sets flags in the IOCSTR and IOCSEX to indicate that the data set can be used and that it must be closed when finished.

IDCIO02

Procedures: OPENRTN

3 OPENRTN makes another check to determine if the opened object is a path. If a path has been opened, keyed processing is assumed. If REPLACE processing has been specified for a path, PRINTMSG writes an error message. If the open object is not a path, the IOCSTR does not specify control interval or address processing, the type of processing is determined by checking the index portion of the file. If there is an index portion, keyed processing will be used. If there is no index portion, the type of processing is set to address processing. OPENRTN next checks the ACB to see if the data set is RRDS, if so, OPENRTN sets IOCMACCR='0' (keyed) and IOCMACRR='1'. Thus, for a

KSDS	IOCMACCR = 0,	IOCMACRR = 0
ESDS	IOCMACCR = 1,	IOCMACRR = 0
RRDS	IOCMACCR = 0,	IOCMACRR = 1

IDCIO02

Procedures: OPENRTN, PRINTMSG

4 OPENRTN obtains the ACB error code, logical record length or control interval, high-used RBA, key length, and relative key position. If the data set did not open, only the error code, not the data, is obtained, and PRINTMSG writes a message. If the data set opened successfully, OPENRTN moves the ACB information to the IOCSTR.

IDCIO02

Procedures: BUILDRPL, PRINTMSG, OPENRTN

5 For any VSAM data set that is open, BUILDRPL builds a request parameter list (RPL) by issuing the RPL macro. Input work areas are required if the data set is opened for input or update processing. BUILDRPL issues a UGPOOL macro with the file identification to obtain storage for the maximum length record or one control interval for control interval processing. If IOCMODUB='1', the BUILDRPL procedure of IDCIO02 will not issue a UGPOOL to obtain storage for an I/O area for input or update processing. In subsequent UGET requests the FSR will indicate his own buffers in IOCWORK.

If IOCMODXM='1' and IOCMACRR='1', indicating EXPORT/IMPORT and RRDS, BUILDRPL will get an extra four bytes for the work area (IOCWKA) if the data set is input (IOCMACIN='1'). This extra four bytes will be utilized in later UCOPY processing for exporting a relative record data set. The work area address specified for the RPL is the input work area plus 4 (IOCWKA+4). If no space is available for the work area, BUILDRPL sets an error return code, PRINTMSG writes a message, and OPENRTN turns off the open flag in the IOCSTR.

BUILDRPL generates an RPL via the RPL macro and initializes the RPL with the address of the ACB, options, work area address, and maximum length of a data record. If IOCMACRR='1', the OPTCD will indicate 'KEY'. If the RRDS is to be processed for output, IOCMACOT='1' or IOCMACUP='1', OPTCD will indicate 'SKP'. This will cause output RRDS to be processed in skip sequential mode.

The RPL macro generates KEY, SEQ, NUP for the OPTCD field. These attributes are overridden with information indicated in IOCSTR/IOCSEX as follows:

IOCSTR/IOCSEX	RPL OPTCD =
IOCMACUP='1'	UPD
IOCMACDR='1'	DIR
IOCMACSK='1'	SKP
IOCMACCR='1'	ADR
IOCMACBK='1'	CNV

The length of the RPL times ACBSTRNO is stored in IOCRPL. If ACBSTRNO is greater than 1, the first RPL is copied to each additional RPL area.

IDCIO02

Procedures: CKNONOP, PRINTMSG

6 For ISAM data sets, CKNONOP obtains the true file block length, key length and relative key position from the DTF after the file is open. If the true block length is greater than the block length in the OPNAGL, PRINTMSG writes an error message, and CKNONOP turns off the open flag in IOCSTR. This is an error condition because ISAM open routines build their own CCW with the real data set characteristics obtained from the DSCB. If the I/O area for the data set is not large enough for a physical block, the block will overlay storage not belonging to the I/O Adapter. If the true block length is equal or less than the value in the DTF, CKNONOP puts the values from the DTF in the IOCSTR. CKNONOP issues a SETL macro to position to the first record in the data set.

IDCIO02

Procedure: CKNONOP

7 CKNONOP checks the DTF open flags for sequential data sets. There are no open flags for ISAM or device independent data sets like SYSIPT and SYSLST. If the open flags are set for a sequential data set or tape data set, CKNONOP sets flags in the IOCSTR and IOCSEX. CKNONOP always sets open flags for ISAM and device independent data sets. If the DTF open flag is not set for a sequential data set, PRINTMSG writes an error message, and CKNONOP sets an error return code.

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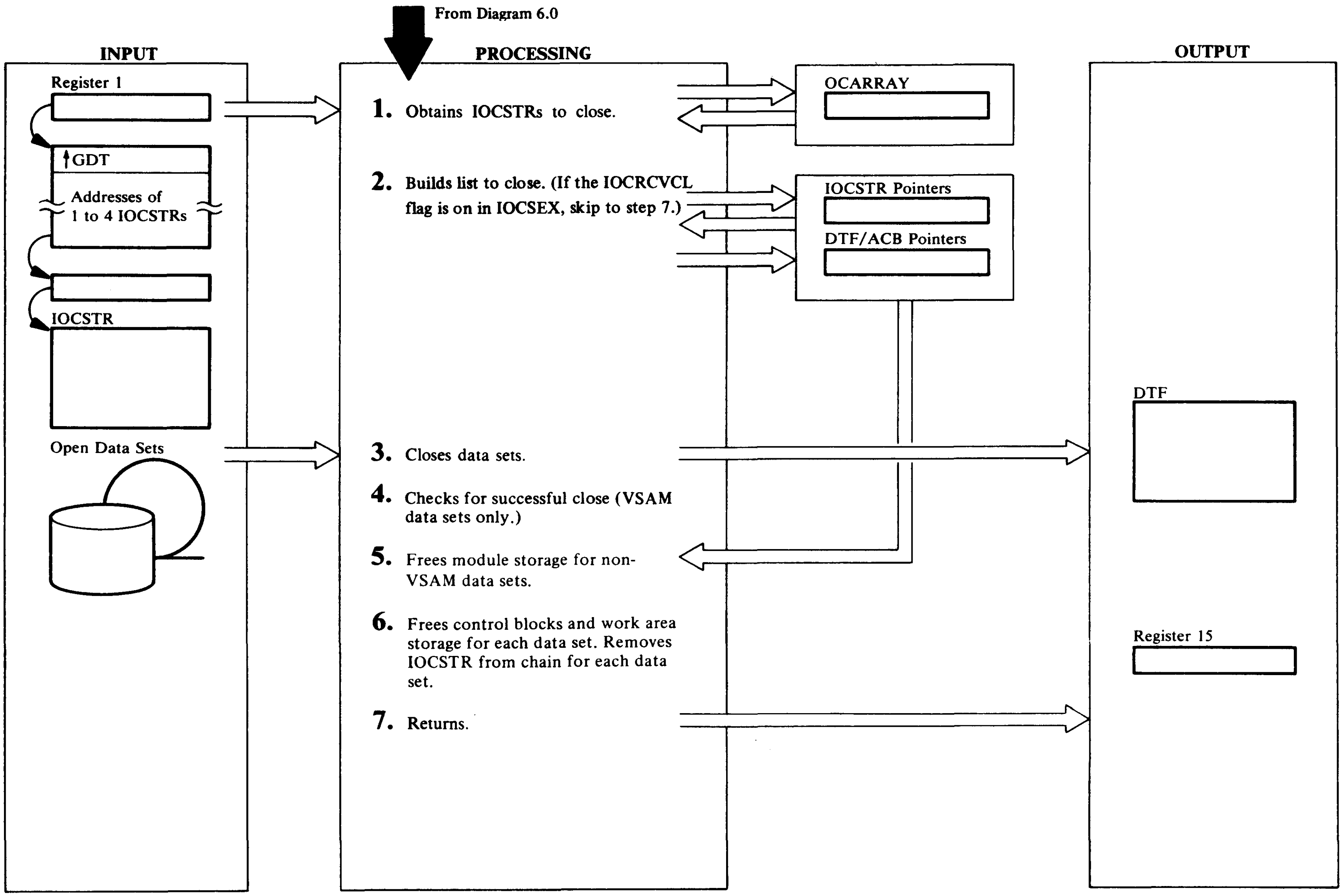
Diagram 6.2. UCLOSE Macro



Extended Description for Diagram 6.2

IDCIO01

Procedure: IDCIOCL

1 IDCIOCL puts the addresses of IOCSTRs in OCARRAY. Even if the address is zero it is put in OCARRAY. The address will be zero if a UOPEN was issued against a data set, but the IOCSTR could not be built. IDCIOCL sets the type of operation to "Close" in OCATYP in OCARRAY.

IDCIO02

Procedure: CLOSERTN

2 Only a maximum of four data sets are closed with any one UCLOSE macro. CLOSERTN examines OCARRAY for the addresses of IOCSTRs to close. If the address of an IOCSTR is not zero and CLOSE ALL is not requested, CLOSERTN checks the data set for SYSIPT and SYSLST. If the data set is SYSIPT or SYSLST, CLOSERTN does not close the data sets because they are needed until processor termination.

If a UCLOSE macro is issued for tape processing and the IOCRCVCL bit is on in IOCSEX, the work area pointed to by IOCWKA is freed via UFSPACE. Next, a work area whose size is specified in IOCTRN is obtained via UGPOOL and the address is returned in IOCWKA. Control then passes to step 7 (a data set close is not done when the IOCRCVCL bit is on). This allows reallocation of the record work area after the file is opened. If IOCINFCT='1', indicating a close of a VSAM catalog, CLOSERTN merely frees up the control blocks associated with this catalog that were obtained by I/O Adapter. The issuer of the UCLOSE macro is given an RCOK return code. For any other nonzero IOCSTR, CLOSERTN saves the address. And, if the DTF or ACB is opened, CLOSERTN saves the address of the control block in preparation for closing. If the data set is not open, IOCFLGOP=0, CLOSERTN makes a check to determine if it is externally controlled. If it is externally controlled, CLOSERTN passes arguments to the external routine. CLOSERTN continues the above checking until:

- IDCIO01 specifies CLOSE ALL in OCARRAY and CLOSERTN has checked all IOCSTR addresses in OCARRAY. This happens during I/O termination.
- IDCIO01 does not specify CLOSE ALL in OCARRAY and CLOSERTN has checked all IOCSTR addresses in OCARRAY.

IDCIO02

Procedure: CLOSERTN

3 For up to four open DTFs or ACBs, CLOSERTN issues a CLOSE macro for each open DTF or ACB. The return code from the CLOSE macro is saved. If an abend occurs, no exits are taken; CLOSE abends.

IDCIO02

Procedures: CLOSERTN, PRINTMSG

4 For VSAM data sets, CLOSERTN checks the ACB error code. If the ACB error code is nonzero, PRINTMSG writes a message. No tests are made for nonVSAM data sets or user catalogs.

IDCIO02

Procedure: ENVFREE

5 For nonVSAM data sets, ENVFREE issues a FREEVIS macro to release the storage used for the IDCDI*xx* module where *xx* is from 01 to 15. For VSAM data sets the storage for the ACB, RPL, and exit list is freed in step 6 along with the IOCSTR and all other storage having the same IOCSID.

IDCIO02

Procedure: CLOSERTN

6 CLOSERTN saves the address of the IOCSTR that was closed and the address of the next IOCSTR in the chain after the IOSTR for the closed data set. CLOSERTN issues a UFPOOL to free all storage obtained for the data set that is closed. CLOSERTN passes the IOCSID field to UFPOOL which identifies all storage obtained for the data set. CLOSERTN seaches the IOCSTR chain until the IOCSTR is found that points to the closed IOCSTR. CLOSERTN replaces the address of the closed IOCSTR with the address of the next IOCSTR in the chain.

IDCIO01

Procedure: IDCIOCL

7 IDCIOCL puts a return code in register 15 and returns control to the module that issued the UCLOSE.

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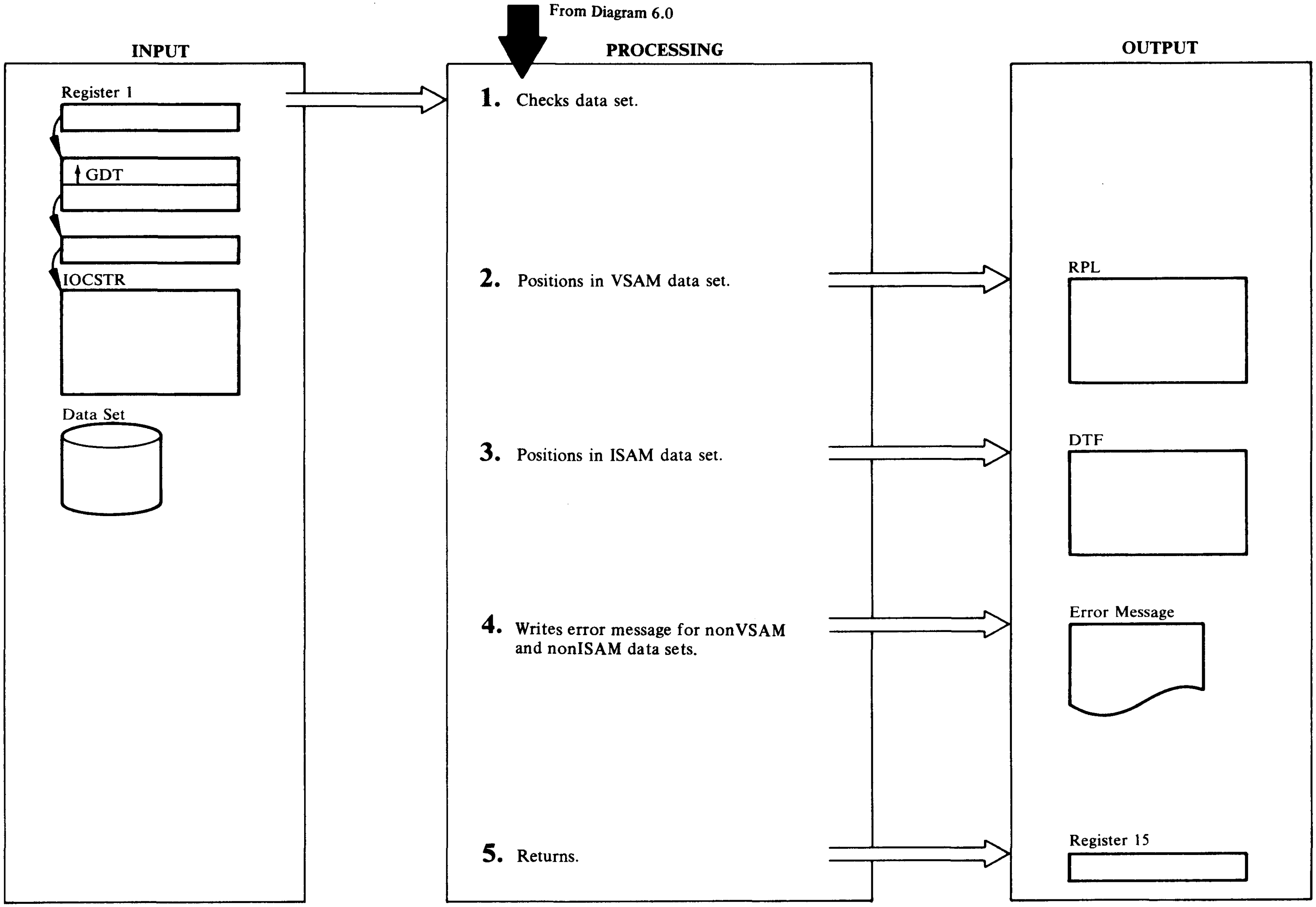
Diagram 6.3. UPOSIT Macro



Extended Description for Diagram 6.3

IDCIO03

Procedure: IDCIO03

1 If the IOCSTR address is zero or the data set is not open (IOCMSGOP=0), IDCIO03 issues a UABORT macro. If the data set is open for processing (IOCMSGOP=1), and the data set is externally controlled (IOCFLFEX=1), IDCIO03 returns control, with a return code of zero, to the module that issued the UPOSIT. No provision is made for positioning in externally controlled data sets.

IDCIO03

Procedures: PTAMDS, PRINTMSG

2 For VSAM data sets, PTAMDS inserts the POINT argument in the RPL. VSAM uses the POINT argument in the RPL to position to the requested record. If the data set is open for adddress processing, PTAMDS puts the address of the Relative Byte Address (RBA) in the RPLARG field of the RPL. If the data set is RRDS (IOCMACRR='1'), the RPLARG field is set to contain the address of the relative record number which is contained in IOCREL. If control interval processing is specified (IOCMACBK='1'), the RPLARG field is set to contain the address of the RBA which is contained in IOCRBA. Otherwise, PTAMDS puts the address of the key in IOCKYA into the RPLARG field. If the length of the key of the requested record is greater than the key length for the data set, PRINTMSG writes an error message and PTAMDS does not position to the requested record. PTAMDS expands every key to 256 bytes by adding binary zeros on the right. PTAMDS inactivates the end-of-data routine in the EXLIST control block. This is done to prevent the end-of-data routine from getting control if the record positioned to is beyond the end of the data set. If the end-of-data routine receives control, an abend would occur. PTAMDS issues the POINT macro to position to the record with the key or the next higher key. PTAMDS re-activates the end-of-data exit routine. If the return code from the POINT macro is 12, an I/O error has occurred and a message is written. PRINTMSG prints the error message. If the return code from the POINT macro is 8, a logic error has occurred and PTAMDS checks the logical error. If the results indicate that no record was found or repositioning beyond end-of-file, PTAMDS sets a return code of "no record found." For all other logic errors, PRINTMSG writes a message containing the return code unless the suppress message flag, IOCMSGSM has been set by the caller.

IDCIO03

Procedure: PTISDS

3 For an ISAM data set, PTISDS does not position the record if the length of the key supplied is greater than the key length for the data set. For valid key lengths, PTISDS does the positioning. PTISDS expands the key to 256 bytes by padding on the right with binary zeros. PTISDS issues an ESETL macro because a SETL was issued when the data set was opened. PTISDS issues a SETL macro to position to the record with the key or next higher key. If the postioning is beyond the end of the data set, the SETL routine sets a flag in the DTF. If this flag is on, PTISDS returns a code of "no record found." If the flag is not on, positioning was successful and PTISDS returns a code of zero.

IDCIO03

Procedures: PRINTMSG, IDCIO03

4 If the data set is nonVSAM and not ISAM, PRINTMSG writes an error message. If an error is detected, IDCIO03 turns off the open for processing idiciator, IOCMSGOP, so that no more I/O operations except close are permitted against the file.

IDCIO01

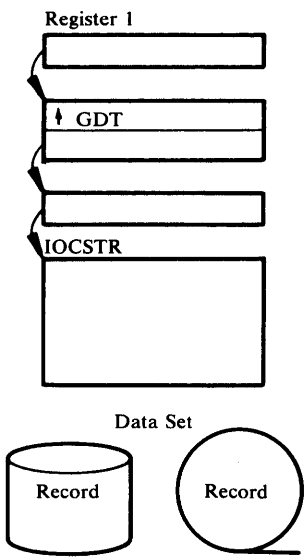
Procedure: IDCIOPO

5 IDCIOPO puts a return code in register 15 and returns control to the module that issued the UPOSIT.

Diagram 6.4. UGET Macro

From Diagram 6.0

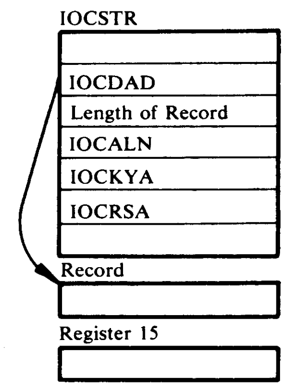
INPUT



PROCESSING

1. If entrance is from any module except UCOPY, control goes to Step 2; if entrance is from UCOPY, control goes to Step 3.
2. Checks data set.
3. Transfers control for externally controlled data set.
4. Gets record and puts its address in IOCSTR.
   - VSAM records.
   - NonVSAM records.
5. Returns.

OUTPUT



Extended Description for Diagram 6.4

1 If entrance is from any module except UCOPY, control goes to step 2. If entrance is from UCOPY, control goes to step 3.

IDCIO01

Procedure: IDCIOGT

2 If the address of the IOCSTR is zero or the file is not open for processing, (IOCMSGOP=0), IDCIOGT issues a UABORT macro to terminate processing. If end-of-file has previously been encountered, (IOCFLGEF=1), on an input data set, IDCIOGT returns control to the module that issued the UGET. This check allows more than one module to issues UGETs on the same data set and both modules will get end-of-file indications by a return code.

IDCIO01

Procedure: GETEXT

3 If the data set is externally controlled, GETEXT passes an argument list to the external routine so the external routine can perform the I/O operation. GETEXT tests the return code from the external routine. If the return code is zero, GETEXT moves the address and length of the data record just read to the IOCSTR and GETEXT increments the count of successful UGETs. If the return code is end-of-file, GETEXT sets the end-of-file flag in the IOCSTR and GETEXT sets the return code to end-of-file. If the return code is 12, indicating that no more I/O operations can be performed against the data set, GETEXT turns off the open for processing flag (IOCMSGOP). For any other return code, GETEXT sets a return code of 4. IDCIOGT returns control to the module that issued the UGET.

IDCIO01

Procedures: GETVSAM, CHANGE, VSAMERR, PRINTMSG, GETNONVS, IROSEOD, IRSISYN, IRAMEOD

4 For VSAM data sets continue with 4.a, for nonVSAM data sets go to 4.b.

a. If any of the IOCSTR change processing flags are set, indicating a change in processing modes, the CHANGE procedure makes the appropriate change in the RPL. The following IOCSTR settings specified by the issuer of UGET are reflected in the RPL:

IOCSTR	RPL OPTCD =
IOCCHPSQ	SEQ
IOCCHPDR	DIR
IOCCHPSK	SKP
IOCCHPKS	KEY
IOCCHPCR	ADR
IOCCHPBK	CNV
IOCCHPKG	KGE
IOCCHPKE	KEQ
IOCCHPUP	UPD
IOCCHPNU	NUP

The CHANGE procedure will set all change processing flags to '0', and the IOCSTR will be changed to reflect the new processing option.

If the data set is RRDS, (IOCMACRR='1'), RPLARG is set to the address of IOCREL so that VSAM will return the relative record number to UGET.

If user buffer is specified (IOCMODUB='1'), the caller has placed the address of the input work area in IOCWORK. This address will be placed in the RPL work area field.

For OPTCD=CNV or ADR with DIR or SKP, the caller has placed an RBA in IOCRBA. The address of IOCRBA will be placed in the RPLARG field. In this situation, the RBA will not be moved to IOCRBA following the GET.

For OPTCD=KEY with DIR or SKP, the caller has placed the address of the key in IOCKYA and its length in IOCKYL. RPLARG is set equal to IOCKYA and RPLKEYLN is set equal to IOCKYL.

GETVSAM issues a GET macro in the move mode, specifing the address of the RPL built when the data set was opened. If end-of-file is encountered, the VSAM EODAD exit routine, IRAMEOD, sets the end-of-file flag in the IOCSTR and sets the return code to indicate end-of-file. GETVSAM tests the return code from GET. If the return code is nonzero, an error code has been placed in the RPL. If the return code is zero, the VSAM GET routine has read the record or control interval. GETVSAM moves the record address, record length, and RBA from the RPL to the IOCSTR. If the data set is being processed by key, GETVSAM places the address of the key in the record just read in the IOCSTR. If the return code from the GET is nonzero, VSAMERR obtains the error code from the RPL and PRINTMSG writes the message. The call to VSAMERR by UGET to print logical error messages is bypassed if the suppress messages flag, IOCMSGSM, has been set by the UGET caller.

b. For nonVSAM data sets, GETNONVS issues a GET specifying the DTF address. For spanned records the address of the work area for the data set which was obtained when the data set was opened, is given the the GET macro. The GET routine puts the complete record in the work area. GETNONVS gets the length of variable length records from the Record Descriptor Word (RDW). If the input IOCSEX indicates a catalog recovery area for import (IMPORTRA), the GETNONVS routine strips off the 4-byte header record prepended to it when the record was exported via EXPORTRA (see UPUT Diagram 6.5). For nonspanned records register 8 has been specified as the IOREG in the DTF. For undefined records the length is found in the RECLEN register defined in the DTF. The GET routine puts the address of the record in register 8.
For ISAM data sets with fixed unblocked records, the key is returned preceeding the data; however, register 8 has the address of the data. GETNONVS subtracts the key length from the data address to get the address of the key. If an error or end-of-file occurs attempting an ISAM GET, the GET routine sets flags in the DTF. GETNONVS tests the flags. If end-of-file has occurred, GETNONVS sets a return code. If an error has occurred, PRINTMSG writes a message and GETNONVS sets a return code. If no errors or no end-of-file has occurred, GETNONVS assumes the GET is successful and the record address and record length are set in IOCDAD and IOCDLN, respectively. GETNONVS puts the address of the key in IOCKYA.
For non-ISAM data sets, if an error or end-of-file occurs, the EODAD exit routine, IROSEOD, or SYNAD exit routine, IRSISYN, gets control. If end-of-file occurs, IRSOEOD sets a return code. If an error has occurred, PRINTMSG writes a message and IRSISYN sets a return code. If no errors or no end-of-file has occurred, GETNONVS assumes the GET is successful and the record address and record length are set in IOCDAD and IOCDLN, respectively.

IDCIO01

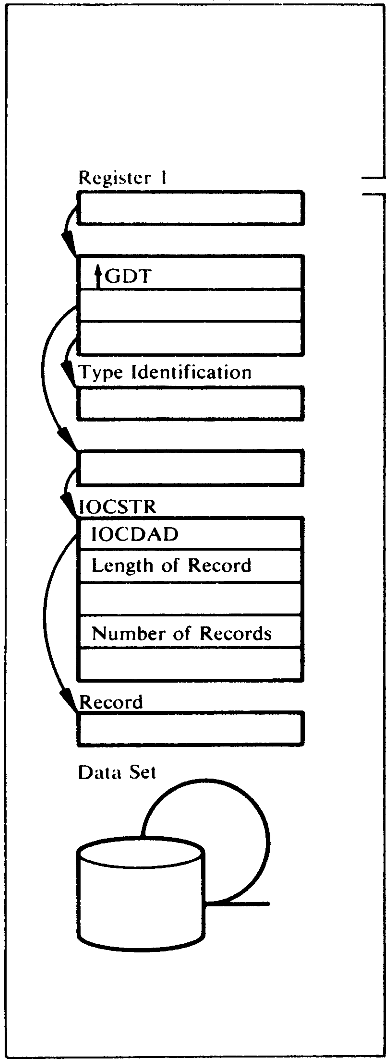
Procedure: IDCIOGT

5 IDCIOGT puts a return code in register 15 and returns control to the module that issued the UGET.

Diagram 6.5. UPUT Macro

From Diagram 6.0

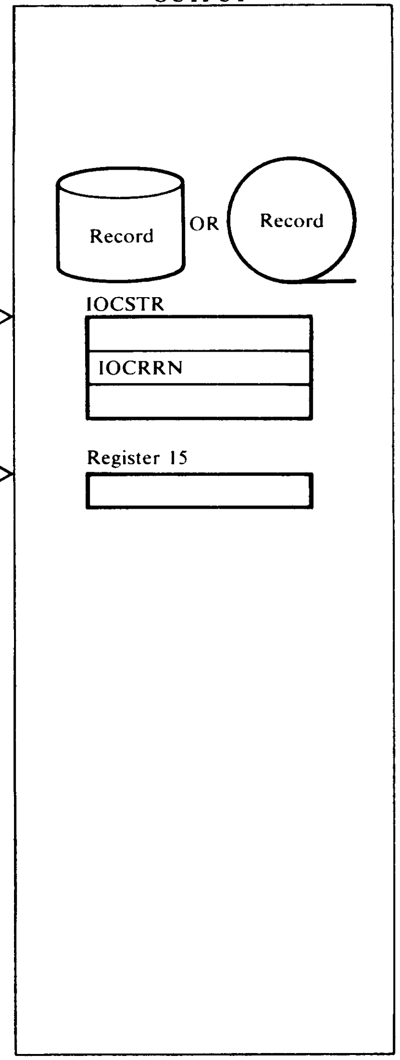
INPUT



PROCESSING

1. If entrance is from any module except UCOPY, continue to Step 2; if entrance is from UCOPY, go to Step 3.
2. Checks for multiple requests.
3. Transfers control for externally controlled data set.
4. Writes the record.
   - VSAM records.
   - NonVSAM records.
5. Returns.

OUTPUT



Extended Description for Diagram 6.5

1 If entrance is from any module except UCOPY, control goes to step 2. If entrance is from UCOPY, control goes to step 3.

IDCIO01

Procedure: IDCIOPT

2 IDCIOPT uses the type identification to determine whether or not the record is a message. An omitted identification or an identification of zero indicates a data record. A nonzero value indicates a message is to be written. If the address for the IOCSTR is zero or the open for processing flag, IOCMSGOP, is off, IDCIOPT issues a UABORT macro. If IOCPNM is zero, only one record is written with UPUT and the length of the record is assumed to be in IOCDLN. If IOCPNM is nonzero, one or more records are written with this UPUT. IOCDLN contains the total length of all the records, and each record is preceeded by a two byte length field for that record. IDCIOPT sets IOCPNM to one if it was initially zero. For multiple records, IDCIOPT puts the length of the first record in IOCDLN and IDCIOPT puts the address of the data for the first record in IOCDAD.

IDCIO01

Procedure: PUTEXT

3 If the data set is externally controlled, PUTEXT constructs an arguments list. PUTEXT gives control to the external routine addressed in IOCXDAD. If the return code from the external routine is zero, PUTEXT increments the number of successful UPUTs. If the return code is 12, PUTEXT turns off the open for processing flag (IOCMSGOP) so that no processing can be done against this data set. PUTEXT returns control to step 2 for the next record.

IDCIO01

Procedures: PUTVSAM, CHANGE, VSAMERR, PRINTMSG, PUTNONVS, IRSOSYN, PUTREP

4 For VSAM data sets continue with 4.a, for nonVSAM data sets go to 4.b.

a. PUTVSAM checks to see if IOCMACER is set by the caller of UPUT, if so, PUTVSAM issues the ERASE macro with a pointer to the RPL. In this case, a UGET for update must previously have been issued by the caller. If IOCMACEN is set by the UPUT caller, PUTVSAM issues the ENDREQ macro with a pointer to the RPL.

If any IOCSTR flag indicating a change in processing modes, has been set by the caller, CHANGE makes the appropriate change in the RPL. The following IOCSTR settings specified by the issuer of UPUT are reflected in the RPL:

IOCSTR	**RPL OPTCD=**
IOCCHPSQ	SEQ
IOCCHPDR	DIR
IOCCHPSK	SKP
IOCCHPCR	ADR
IOCCHPBK	CNV
IOCCHPKG	KGE
IOCCHPKE	KEQ
IOCCHPUP	UPD
IOCCHPNU	NUP

CHANGE will set all change processing flags to '0', and the IOCSTR will be changed to reflect the new processing option.

PUTVSAM puts the record length and address in the RPL.

If IOCMACRR='1', indicating a PUT to an RRDS, the RPLARG field in the RPL is set to the address of IOCREL. If OPTCD=CNV,DIR, RPLARG field is set to the address of IOCRBA.

If user buffers are specified, (IOCMODUB=1), the output area address in the RPL is obtained from IOCWORK rather than IOCDAD.

PUTVSAM issues a PUT macro to write the record. The record may be a logical record or a control interval. If the return code from the PUT is zero, PUTVSAM increments the number of successful UPUTs in IOCRRN. If the return code is nonzero, VSAMERR obtains the error code from the RPL. If the error code indicates a logic error, VSAMERR determines if it is a duplicate record or a record-out-of-sequence, PRINTMSG writes the appropriate message. Otherwise, the error is assumed to be an I/O error, and PRINTMSG writes a message. The call to VSAMERR by UPUT to print logical error messages is bypassed if the suppress messages flag, IOCMSGSM, has been set by the UPUT caller.

PUTVSAM will provide replace processing under the following conditions:

- A return code from PUT indicating a logical error (08)
- RPL feedback code indicating duplicate record.
- Replace processing specified by caller (IOCMODRP=1)

In the PUTREP routine, IOCWKA is checked to determine if an input work area exists. If not, a UGPOOL is issued to obtain an input work area. The RPL is modified to permit update processing. A GET for update is issued followed by a PUT. The IOCSTR for the PUT will reference the address of the original PUT record in IOCDAD. After the PUT, the RPL is reset for no update processing.

If the return code for an I/O error is greater than 4, VSAMERR turns off the open for processing flag (IOCMSGOP). PUTVSAM returns control to step 2 for the next record.

b. PUTNONVS checks the length of the record against the IOCTRN to be sure that the record can be written. If the length is too long, PRINTMSG writes an error message and control returns to step 2 for the next record. For the SYSLST data set, PUTNONVS compares the record length to the maximum and truncates the record if it is longer than the maximum. The record is processed according to the record format.

- For spanned records, PUTNONVS constructs a Record Descriptor Word (RDW) in the first four bytes of the work area. PUTNONVS moves the record to the work area making one spanned logical record. The address of the work area will be specified in the PUT macro.

  If the output IOCSEX indicates export of a catalog recovery area (IOCRCVM='1'), a 4-byte header must be prepended to each record of the portable data set. The header consists of 4 bytes of binary zeros. However, if the data-length (IOCDLN) and the data pointer (IOCDAD) in the IOCSTR are both zero, then the 4-byte "header" is written as a software end-of-file and consist of X'00008000'.
- For variable blocked records, PUTNONVS checks to be sure the block will fit in the IO AREA being used as the buffer. If the block is too long, PUTNONVS issues the TRUNC macro to write the current buffer and to start processing in the other I/O area.
- For variable records, PUTNONVS constructs a RDW in the first four bytes of the area in the

buffer and PUTNONVS moves the record following the RDW.

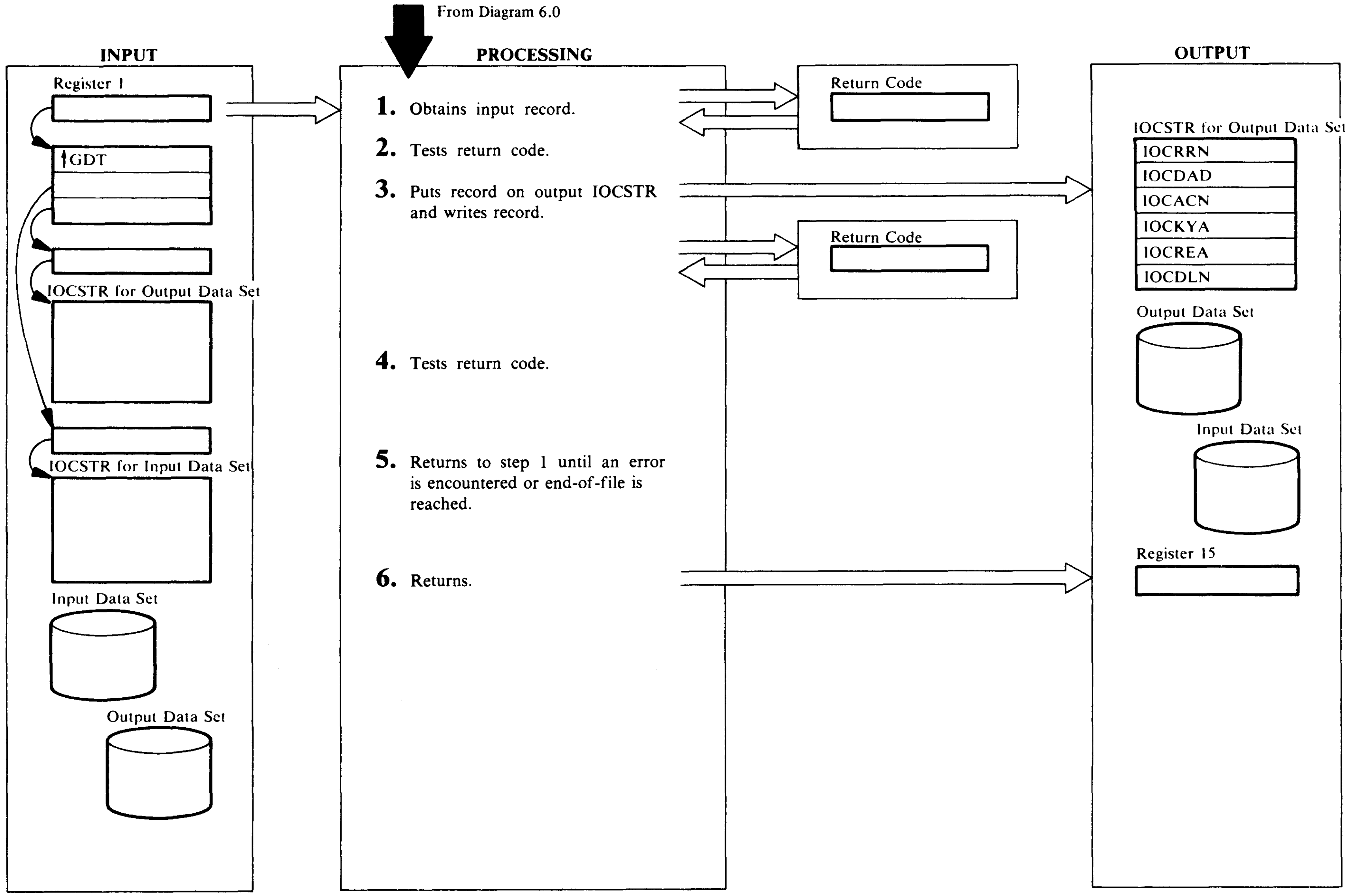
PUTNONVS issues a PUT macro. The address of the next area is returned by the PUT macro—except for spanned records—and is saved. If the records are variable blocked, PUTNONVS saves the number of bytes remaining in the current area. If an I/O error is detected during the PUT macro, IRSOSYN sets error data. PRINTMSG writes the message. IRSOSYN turns off the open for processing flag, IOCMSGOP. If there are no errors, PUTNONVS increments the count of successful UPUTs in IOCRRN. PUTNONVS can use device independent, magnetic tape, or sequential disk DTF processing. PUTNONVS returns control to step 2 for the next record.

IDCIO01

Procedure: IDCIOPT

5 When all the records have been written, IDCIOPT puts a return code in register 15 and returns control to the module that issued the UPUT macro.

Diagram 6.6. UCOPY Macro



Extended Description for Diagram 6.6

IDCIO01

Procedure: IDCIOCO

1 IDCIOCO obtains a record from the input data set by calling procedures used for a UGET macro. The UGET procedure returns control to this point in the UCOPY routine. Arguments to the UGET procedures are set up just as though a UGET had been issued.

IDCIO01

Procedures: IDCIOCO, PRINTMSG

2 IDCIOCO tests the return code from the UGET procedures. If the return code is zero, the UGET procedure read the record successfully. If the output IOCSTR indicates RRDS (IOCMACRR=1) and the input IOCSTR indicates nonRRDS (IOCMACRR=0), an incremental counter is maintained. This counter is incremented by one each time a record is successfully retrieved from the nonRRDS. This count is placed in the output IOCREL prior to UPUTing the record.

If the return code indicates end-of-file, control goes to step 6. If the return code indicates an error, IDCIOCO increments the number of errors for UCOPY. If the UGET routine has set a message, PRINTMSG writes it. Processing continues with the next input record if the number of errors is less than four, and the open for processing flag (IOCMSGOP) is on. If the number of errors is 4 or IOCMSGOP is off, IDCIOCO turns off IOCMSGOP and UCOPY quits.

IDCIO01

Procedure: IDCIOCO

3 IDCIOCO moves the length and address of the record just read from the input IOCSTR to the output IOCSTR. If the input and output IOCSTR both indicate RRDS, IOCREL is moved from the input IOCSTR to the output IOCSTR before issuing the UPUT. This will result in exact recreation of the correlation between the relative record number in the input and output RRDS.

If the input IOCSTR indicates IOCMACRR='1' and the input IOCSEX indicates IOCMODXM='1', this is an EXPORT of an RRDS. It is required that the relative record number be carried in the portable data set. The relative record returned in IOCREL when the record is retrieved is placed in the 4-byte field immediately preceding the record. The RRDS record plus the 4-byte field is then written to the portable data set.

If the output IOCSTR indicates IOCMACRR='1' and the output IOCSEX indicates IOCMODXM='1', this is an IMPORT of an RRDS. Records retrieved from the portable data set have the relative record number prepended to the RRDS record. This relative record number is moved to the output IOCREL. The address of the beginning of the RRDS record is set to its logical beginning (the address of the retrieved record +4) and the length of the record to be written is reduced by 4 bytes.

IDCIOCO writes the record by calling the same procedures used for the UPUT macro. IDCIOCO sets up the arguments to the procedures just as though a UPUT macro has been issued. The UPUT procedure returns control to this point in the UCOPY routine.

IDCIO01

Procedure: IDCIOCO

4 IDCIOCO tests the return code from the UPUT procedures. If the return code is zero, the UPUT procedure wrote the record successfully. If the return code indicates an error, IDCIOCO increments the number of errors for the UCOPY.

IDCIO01

Procedures: PRINTMSG, IDCIOCO

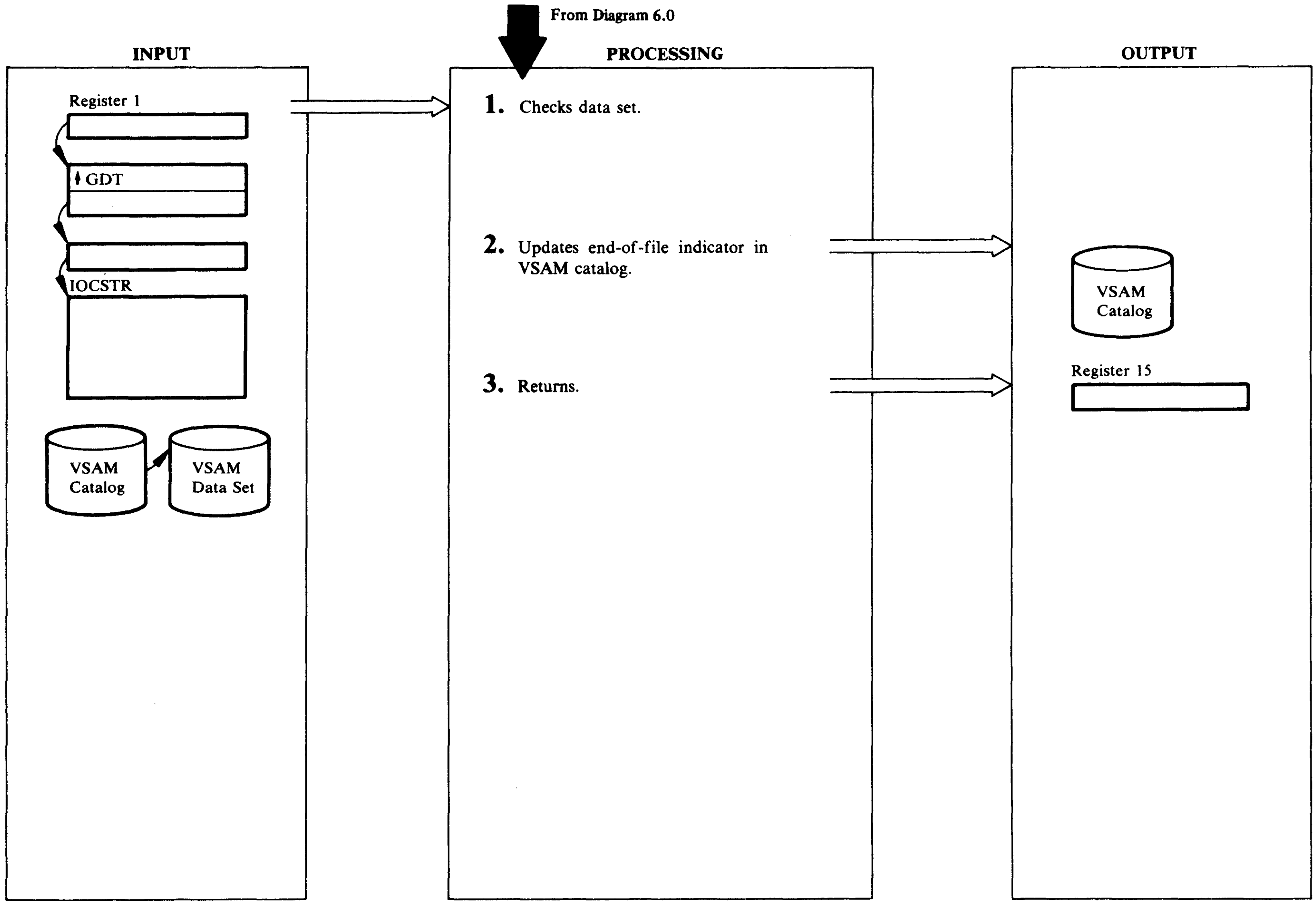
5 Control goes to step 1 for the next record. Processing continues if the number of errors is less than four, and IOCMSGOP is on. PRINTMSG writes a message if the message has been formatted. If the number of errors is 4, IDCIOCO truns off IOCMSGOP and UCOPY quits.

IDCIO01

Procedure: IDCIOCO

6 IDCIOCO puts a return code in register 15, and returns control to the module issuing the UCOPY.

Diagram 6.7. UVERIFY Macro



Extended Description for Diagram 6.7

IDCIO01

Procedure: IDCIOVY

1 The second argument is assumed to be a valid IOCSTR address. The UVERIFY does not continue if:

- The file is not VSAM.
- No RPL has been built for a VSAM file.
- The VSAM file is not open.

No error message is written for the last two conditions because message have been written at open.

IDCIO01

Procedure: IDCIOVY

2 IDCIOVY issues a VERIFY macro.

IDCIO01

Procedures: VSAMERR, PRINTMSG, IDCIOVY

3 If the return code is not zero, VSAMERR obtains the error code from the RPL. If the error is a logic error, PRINTMSG writes a message. If the error is an I/O error, PRINTMSG writes an error message. If the error code returned in the RPL is not 4, which indicates that the error occurred in the data, VSAMERR turns off the open for processing flag (IOCMSGOP). IDCIOVY puts a return code in register 15 and returns control to the module that issued the UVERIFY.

Diagram 6.8. UIOINFO Macro

From Diagram 6.0

INPUT

Register 1

- GDT
- Option byte
- Return area pointer
- Caller-supplied data
- UGPOOL storage ID

Direct address

Tape

PROCESSING

1. Obtains information requested.
2. Obtains storage for return area if not supplied by caller.
3. Formats requested information into return area.

OUTPUT

Register 1

- GDT
- Option byte
- Return area pointer
- Caller-supplied data
- UGPOOL storage ID

Extended Description for Diagram 6.8

IDCIO03

Procedure: DSINFO

1 UIOINFO analyzes the option byte passed by the caller and determines what kind of information is required. Data set name, volume serial list and Logical Unit Blocks (LUB) require that UIOINFO obtain job control information. This is also true of device type. UIOINFO issues CDLOAD to load IKQVLAB, the VSAM read label cylinder module, and then gives control to IKQVLAB. The work area passed to IKQVLAB is that of the existing work area in IDCIO02's automatic storage. If the return code from IKQVLAB is nonzero, UIOINFO sets a return code and returns control to the calling procedure. If the return code from CDLOAD was non-zero, DSINFO issues a UABORT macro. If the return code is 12 (insufficient storage was available), DSINFO sets the UABORT code to 28; otherwise, DSINFO sets the UABORT code to 64.

If device type information is requested, UIOINFO issues a CDLOAD macro for IKQVDTPE and passes control to it providing a pointer to the label information is returned from IKQVLAB.

If time stamp information is requested, UIOINFO issues $$BJIB00 to bypass file protection. It then issues EXCP to read the address of the VTOC and then the Format 4 DSCB. When the time stamps are obtained from the Format 4 DSCB, $$BJIBFF is issued to enable file protection.

IDCIO03

Procedure: DSINFO

2 All of the information that UIOINFO obtains in Step 1 is placed in IDCIO02's automatic storage work area. During this process UIOINFO calculates the actual length of the data to be passed back to the caller. The caller can either pass a return area to UIOINFO or pass a UGPOOL ID. If the caller passes a return area, UIOINFO determines if it is large enough (the length is contained in bytes 0 and 1 of the return area). If not, UIOINFO places the total size needed in bytes 2 and 3 of the return area, sets a return code, and passes control back to the caller.

If the caller has passed a UGPOOL ID, UIOINFO issues a UGPOOL macro for the required amount of storage with the storage identification passed by the caller. In this case the caller is responsible for freeing this storage.

IDCIO03

Procedure: DSINFO

3 UIOINFO formats the requested information into the return area and passes control back to the caller.

Text Processor Visual Table of Contents

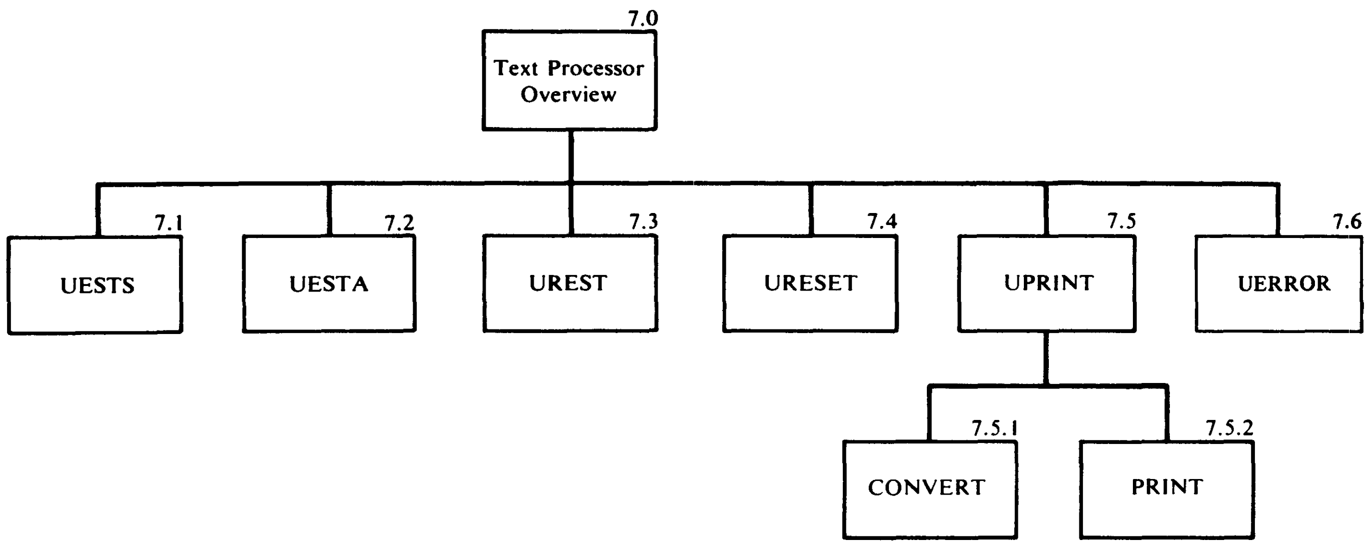
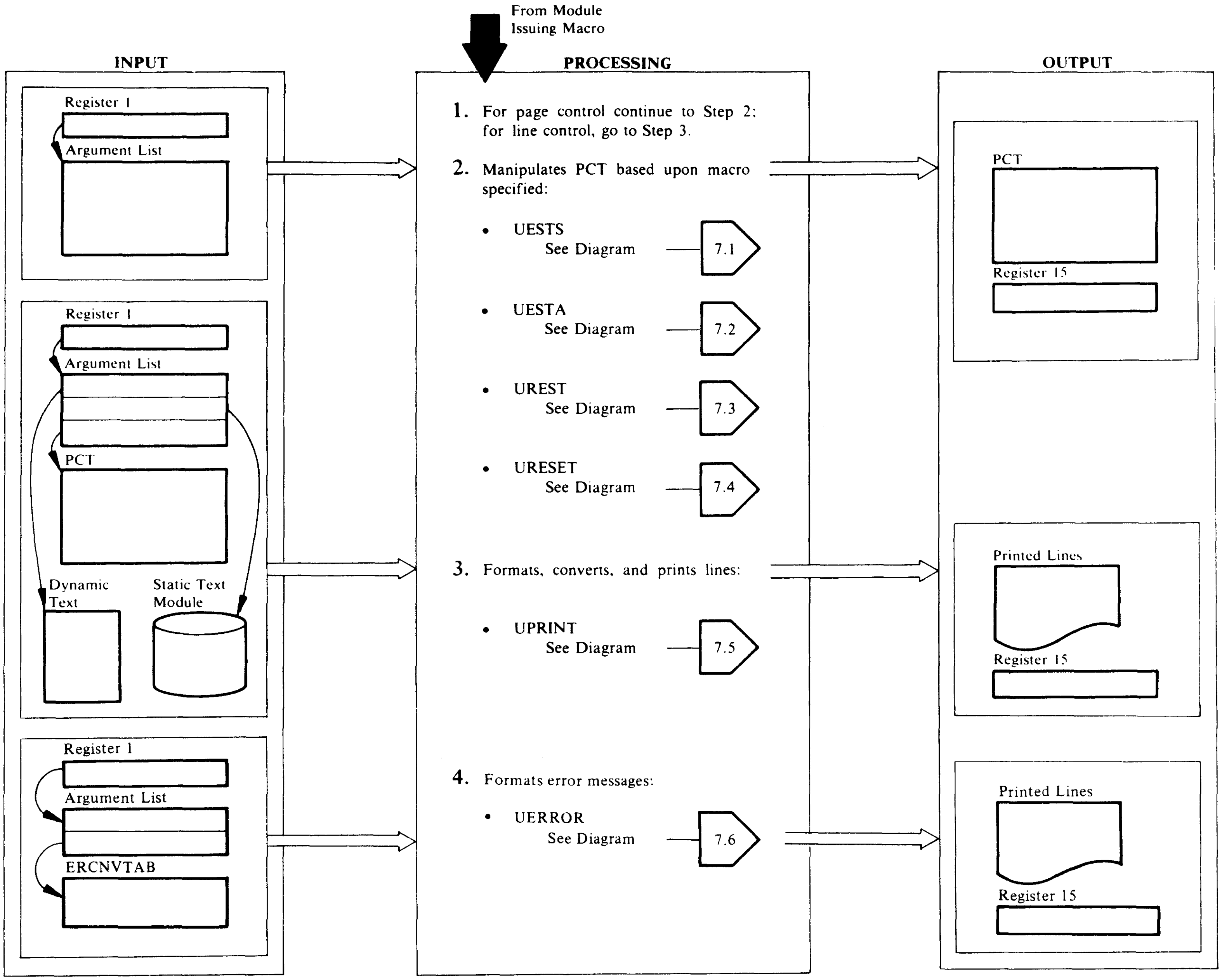


Diagram 7.0. Text Processor Overview



Extended Description for Diagram 7.0

IDCTP01

Procedure: IDCTP01

1 For page control continue with step 2; for line control go to step 3.

2 The page control macros use the argument list to change the Print Control Table, PCT. The page control macros are:

UESTS, which establishes the PCT with data from a static text module.

UESTA, which establishes the PCT with data from storage.

UREST, which changes the PCT after a UESTS or UESTA macro has been issued.

URESET, which sets Access Method Services defaults in the PCT.

Each page printed by Access Method Services has three sections:

1 0 to 3 subtitles

2 Header line
Data line

3 0 to 3 footing lines

The title section contains the main title line and from zero to three subtitle lines. All lines in the title section are printed at the top of each page. The main title line is the first line on each page followed by subtitle lines. The header and data section contains any header and data lines. The header lines are kept in static text modules and are printed on page overflow conditions The footing sections contains from zero to three lines printed at the bottom of each page. At least one vertical space precedes them. More vertical spaces can appear depending upon the control characters in the first footing line. A new page results from any of the page control macros, a page eject on a line, or a request to print a line that would cause more lines on a page than specified. If there is not enough space on a page for all the header lines and one data line, none are printed. A page is ejected, and title and header lines are printed on the next page. Footing lines are always printed on each page. Vertical spacing is done before the line is printed.

The page control macros give the facility to change the following items in the PCT:

Item	**Default**	**Limits**
Main title line	1	1
Page number location	107	1 to line width minus field length
Time-of-day location	75	1 to line width minus 8 for field length
Date location	91	1 to line width minus 8 for field length
Subtitle line	no subtitles	0 to 3 lines
Footing line	no footing	0 to 3 lines
Line width	120	133 maximum
Page depth	54	999 maximum
Default vertical space character	1 vertical space	1, 2, 3, or vertical spaces
Translate table for print chain	standard tables	

3 The UPRINT macro formats data within a line, converts data to a printable form, and prints the line or lines. IDCTP01 uses the PCT to format the line and the page. The line to be printed is described by two kinds of input: static text and dynamic text. Static text is unchanging data and format structures that reside in a module referred to as a static text module. Dynamic text is any changing data and format structures that reside in storage. Format structures, FMTLIST, describe how the line is to be formatted. The types of formatting are:

Vertical spacing
Inserting data into a line
Extracting fields from a block of data in storage
Extracting data from a static text module
Defining default data
Repeating any of the above actions

The types of conversion are:

Binary to hexadecimal
Binary to hexadecimal with apostrophe
Binary to dump
Binary to decimal
Packed decimal to unpacked decimal
EBCDIC, no translation

The types of vertical spacing are:

Absolute spacing

The line is printed at a given line number on the page. If data has been printed at that line number, the page is ejected, and the line is printed at the first data line number on the next page. If the line number is within the title section or header lines, the line is printed at the line number immediately following the header lines. If the line number is within the footing section, the page is ejected, and the line is printed immediately following the header lines on the next page.

Relative spacing

The line is printed at a number of vertical spaces counted from the last printed line. If there is not enough room on the page to print the line, the page is ejected, and the line is printed after the title section and header lines on the following page.

Eject

The line is printed after the title section and header lines on the following page.

4 The UERROR macro formulates prose messages for the return and reason codes caused by catalog errors. It instigates multilevel message requests to the UPRINT macro. Formatting and printing of the multilevel message is handled by the UPRINT macro.

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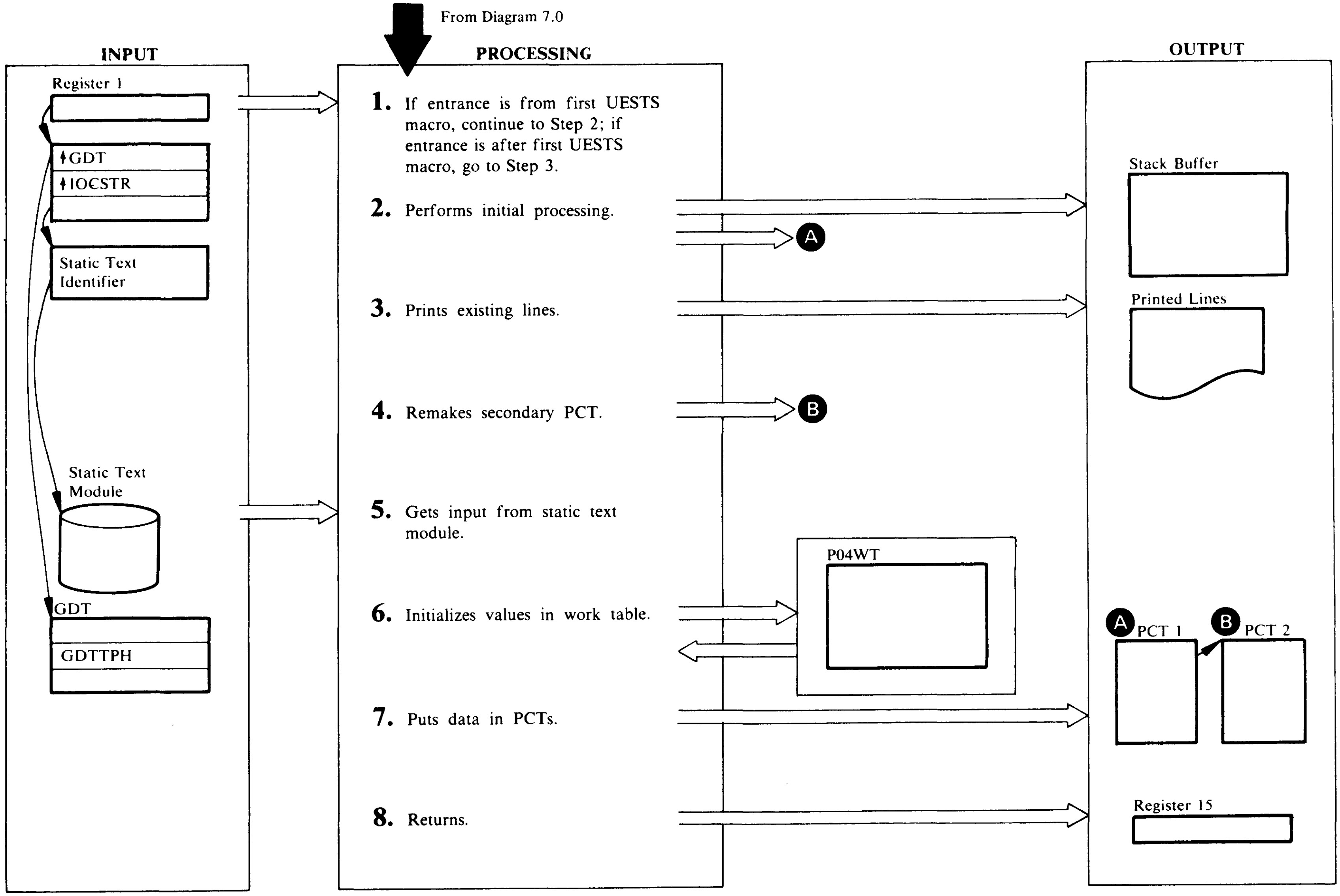
Revised April 29, 1977
By TNL SN24-5550

Diagram 7.1. UESTS Macro



Extended Description for Diagram 7.1

IDCTP04, IDCTP01

Procedures: ESTSCONT, INITPCT, STACKPUT

1 If entrance is from the first UESTS macro, processing continues with step 2. If entrance is after the first UESTS macro has been issued, processing continues with step 3.

2 ESTSCONT passes control to INITPCT which tests the GDTTPM to determine if this is the first UESTS macro issued. If GDTTPH in the GDT is not zero, a PCT already exists, and control is given to step 3. The first time a UESTS macro is issued the GDTTPH is zero, which means that no PCT exists. When no PCT exists, INITPCT obtains and initializes a PCT. INITPCT issues a UGSPACE macro for the primary PCT. UGSPACE puts the address of the primary PCT in GDTTPH. (The GDT refers to the PCT as the Text Processor Historical Data Area.) The Text Processor (TP) uses two Print Control Tables—a primary PCT and a secondary PCT. Each PCT has the same fields. The primary PCT contains default values. INITPCT creates it during processor initialization, and deletes it at processor termination. It exists throughout Access Method Services processing. The secondary PCT contains current values which are different from the default values in the primary PCT. INITPCT creates it and deletes it many times during Access Method Services processing. The address of the secondary PCT is in the primary PCT. When the Text Processor uses a PCT, if the secondary PCT exists, it is used instead of the primary PCT.

Rather than writing each line as it is completed, the Text Processor saves time by putting completed lines in an area of storage called the stack buffer. When the stack buffer is full, STACKPUT writes it. ESTSCONT issues a UGSPACE macro for storage for the stack buffer and puts the address of the stack buffer in the fields PCTBUF and PCTBNL in the primary PCT. ESTSCONT opens the System output data set with a UOPEN macro. Control is given to step 4.

IDCTP04

Procedure: STACKFL

3 Because controls governing the writing like page depth and line width are changing, the lines formatted under the current control values must be written before the controls change. STACKFL writes the stack buffer with a UPUT macro.

IDCTP04

Procedure: INITPCT

4 Prior to making any changes INITPCT gives control to STACKFL to flush the stack buffer. If a secondary PCT exists—that is PCTSPP in the primary PCT is not zero—INITPCT releases the secondary PCT with a UFPOOL macro. INITPCT copies some data from the secondary PCT to the primary PCT before the secondary PCT is freed. INITPCT issues a UGPOOL macro for a secondary PCT. INITPCT sets the identification, PCTIDN, in the secondary PCT to 'PCT2', and sets the PCTSPP field to zero.

IDCTP05

Procedure: IDCTP05

5 If a static text module is used once, it is likely that it will be used again on the next call to the Text Processor. Rather than loading and deleting a static text module each time it is used, the static text module is kept in storage until a different static text module is needed. The address of the static text module in storage is kept in PCTSTM in the PCT. The static text identification passed by the calling program to the Text Processor as input is used to reference the appropiate module. IDCTP05 concatenates the first three bytes of the static text identification with 'IDCTS' to form the module name. IDCTP05 compares the module name to the name of the static text module in storage in PCTSTM. If the names don't match, IDCTP05 deletes the static text module in storage with a UDELETE macro, and IDCTP05 loads the requested static text module with a ULOAD macro. IDCTP05 puts the name of the loaded module in PCTSTM and the address of the module in the field PCTSME in the PCT. If a secondary PCT exists, it is used; otherwise the primary PCT is used.

IDCTP05 uses the low-order byte of the static text identification as an index to obtain the correct static text entry. IDCTP05 copies the entry from the static text module into storage that IDCTP05 obtains with a UGSPACE macro. This is done so the static text entry is available if the static text module is deleted.

IDCTP04

Procedure: P04SETUP

6 P04SETUP puts data from the static text entry into a work table. P04SETUP uses the work table to make the input from UESTS, UESTA, and UREST into the same format.

IDCTP04

Procedure: PCTSETUP

7 PCTSETUP forces a page overflow so the next line will start on a new page. If no secondary PCT exists, PCTSETUP initializes the primary PCT with the minimum values needed to control a page, which are:

- A translate table for a print chain
- A page number increment
- A line number where the first line is printed
- A line number where the last line is printed

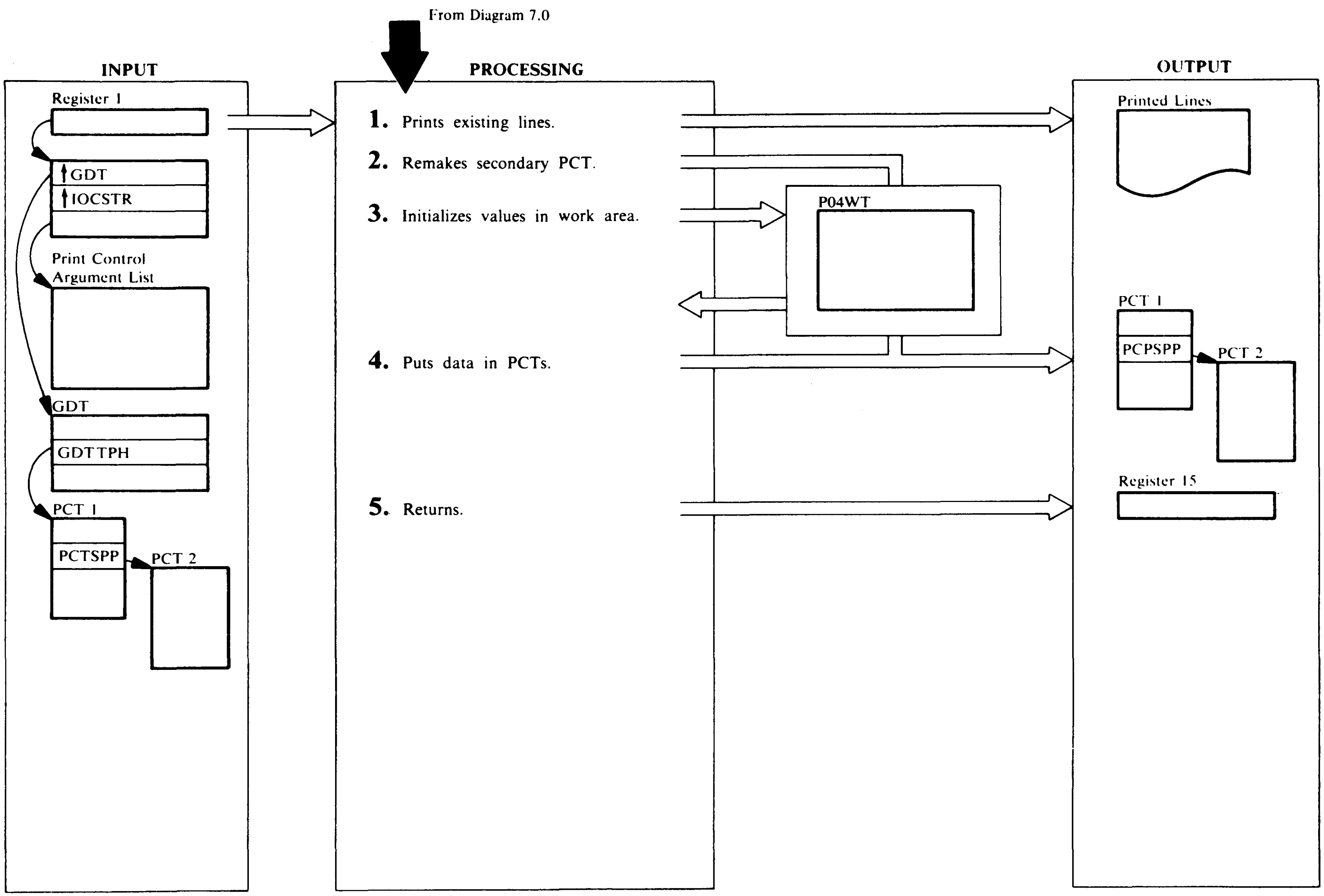
For initializing either the primary PCT or the secondary PCT, PCTSETUP verifies the input data and puts it into the appropiate PCT.

IDCTP04

Procedure: ESTSCONT

8 ESTSCONT deletes the storage for the static text entry with a UFSPACE macro. ESTSCONT puts a return code in register 15, and control returns to the module that issued the UESTS macro.

Diagram 7.2. UESTA Macro



Extended Description for Diagram 7.2

IDCTP04

Procedures: ESTACONT, INITPCT

1 ESTACONT determines if a primary PCT exists. ESTACONT invokes INITPCT to get storage for the PCT. ESTACONT then invokes P04SETUP to build the work table; ESTACONT then invokes PCTSETUP which initializes the PCT. Because controls governing the writing (like page depth and line width) are changing, the lines formatted under the current control values must be written before the control values change. INITPCT writes the stack buffer with a UPUT macro.

IDCTP04

Procedure: INITPCT

2 If a secondary PCT exists—that is PCTSPP in the primary PCT is not zero—INITPCT releases the secondary PCT with a UFPOOL macro. INITPCT issues a UGPOOL macro for a new secondary PCT. INITPCT sets the identification, PCTIDN, in the secondary PCT to 'PCT2', and INITPCT sets the PCTSPP field to zero. UGPOOL puts the address of the new secondary PCT in the field PCTSPP in the primary PCT. INITPCT copies all the data in the primary PCT into the secondary PCT. INITPCT copies some data from the secondary PCT to the primary PCT before the secondary PCT is deleted.

IDCTP04

Procedure: P04SETUP

3 P04SETUP puts data from the input into a work table. PCTSETUP uses the work table to make the input from UESTS, UESTA, and UREST into the same format.

IDCTP04

Procedure: PCTSETUP

4 PCTSETUP forces a page overflow so the next line will start on a new page. If no secondary PCT exists, PCTSETUP first initializes the primary PCT with the minimum values needed to control a page which are:

- A translate table for a print chain
- A page number increment
- A first page number
- A line number where the first line is printed
- A line number where the last line is printed

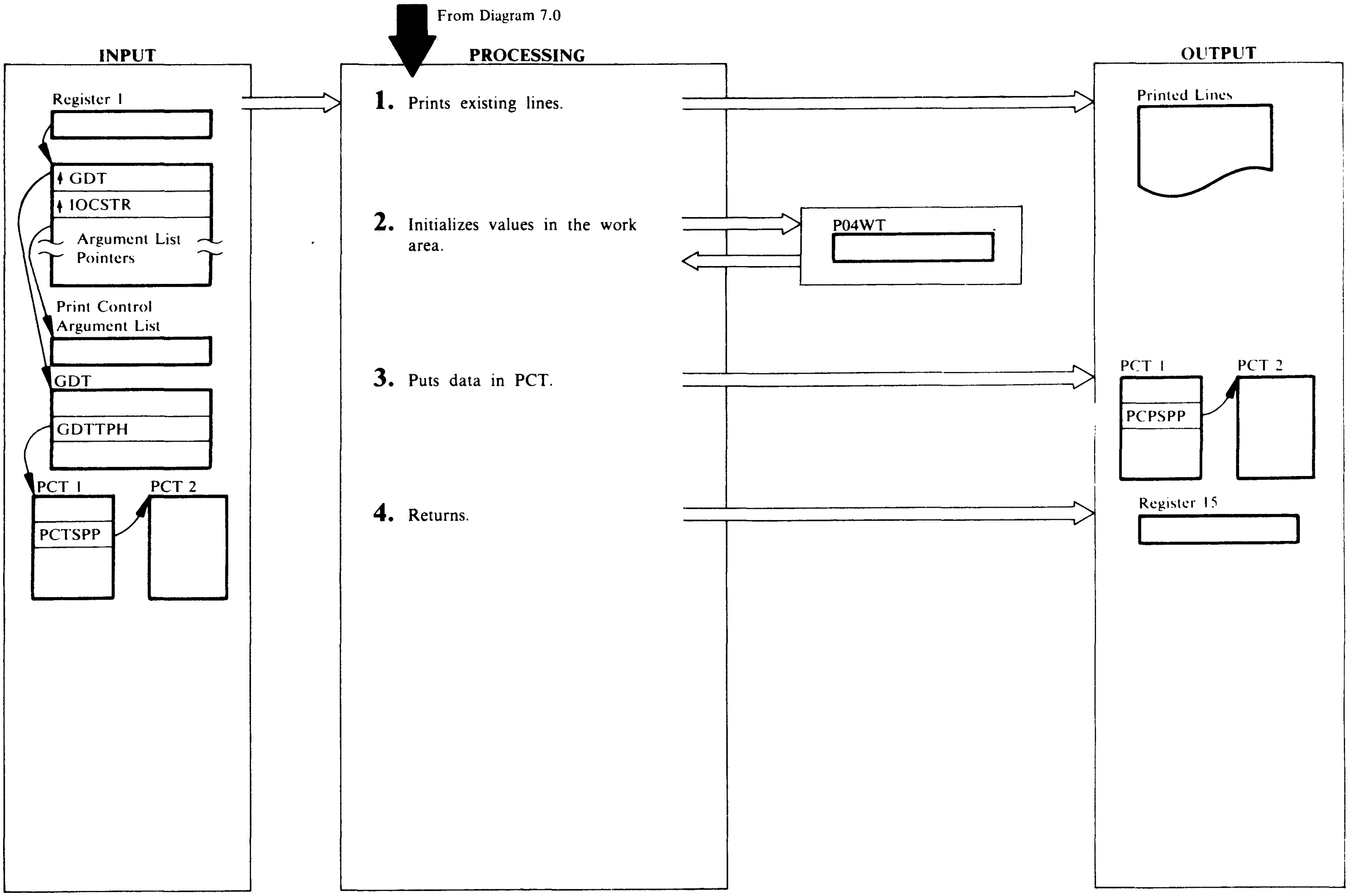
For initializing either the primary PCT or the secondary PCT, PCTSETUP verifies the data in the work table and puts it into the appropiate PCT.

IDCTP04

Procedure: ESTACONT

5 ESTACONT puts a return code into register 15, and control returns to the module that issued the UESTA macro.

Diagram 7.3. UREST Macro



Extended Description for Diagram 7.3

IDCTP04

Procedures: RESTCONT, STACKFL

1 A primary PCT must exist. If it does not, RESTCONT issues a UABORT macro. Because controls governing the writing (like page depth and line width) are changing, the lines formatted under the current control values must be written before the control values change. STACKFL writes the stack buffer with a UPUT macro.

IDCTP04

Procedure: P04SETUP

2 P04SETUP puts data from the input into a work table, P04WT. PCTSETUP uses the work table to make the input from UESTS, UESTA, and UREST into the same format.

IDCTP04

Procedures: RESTCONT, PCTSETUP

3 The UREST macro allows the user to change any combination of the following:

- Subtitle lines
- Footing lines
- Line width
- Page depth
- Default space character
- Translate table
- Starting page number

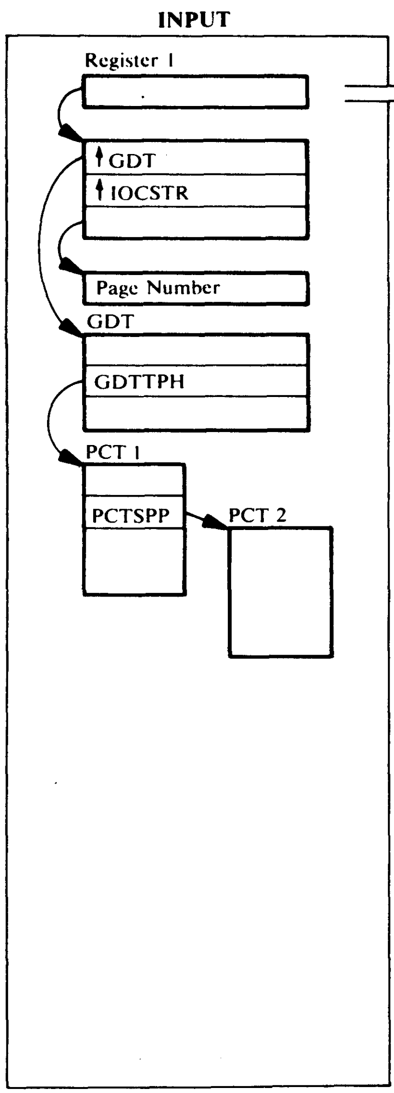
A value of zero in any of the parameter lists causes the item to be reset to the Access Method Services default. RESTCONT evaluates the input parameter list. If the secondary PCT exists, PCTSETUP modifies it. Otherwise, PCTSETUP modifies the primary PCT.

IDCTP04

Procedure: RESTCONT

4 RESTCONT puts a return code into register 15, and control returns to the module that issued the UREST macro.

Diagram 7.4. URESET Macro



From Diagram 7.0

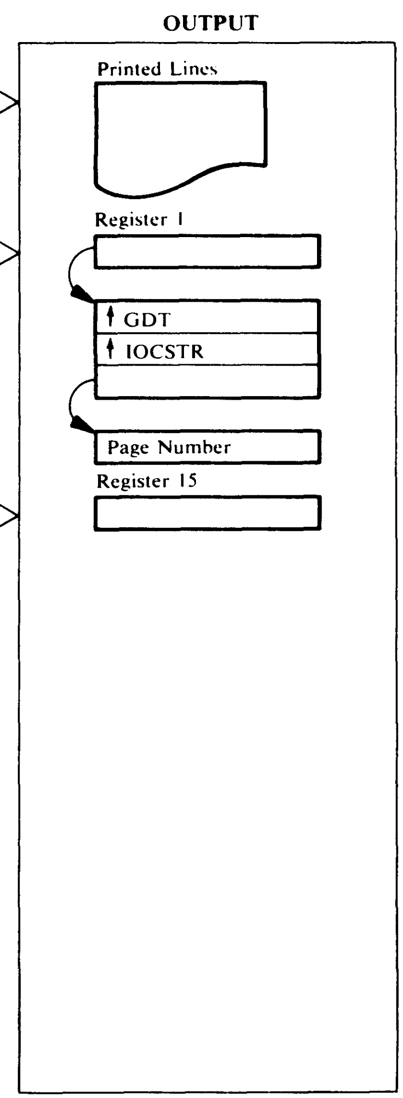
PROCESSING

1. Prints existing lines.

2. Returns last page number.

3. Frees secondary PCT and subpool.

4. Returns.



Extended Description for Diagram 7.4

IDCTP04

Procedures: RESETCON, STACKFL

1 A primary PCT must exist. If it does not, RESETCON issues a UABORT macro. If a secondary PCT exists, RESETCON forces a page overflow so the next line will begin on a new page. Because controls governing the writing (like page depth and line width) are changing, the lines formatted under the current control values must be written before the control values change. STACKFL writes the stack buffer with a UPUT macro.

IECTP04

Procedure: RESETCON

2 If the invoker of Access Method Services requested that the last page number be passed, RESETCON converts the current page number to binary and places it in the invoker's parameter list.

IDCTP04

Procedure: RESETCON

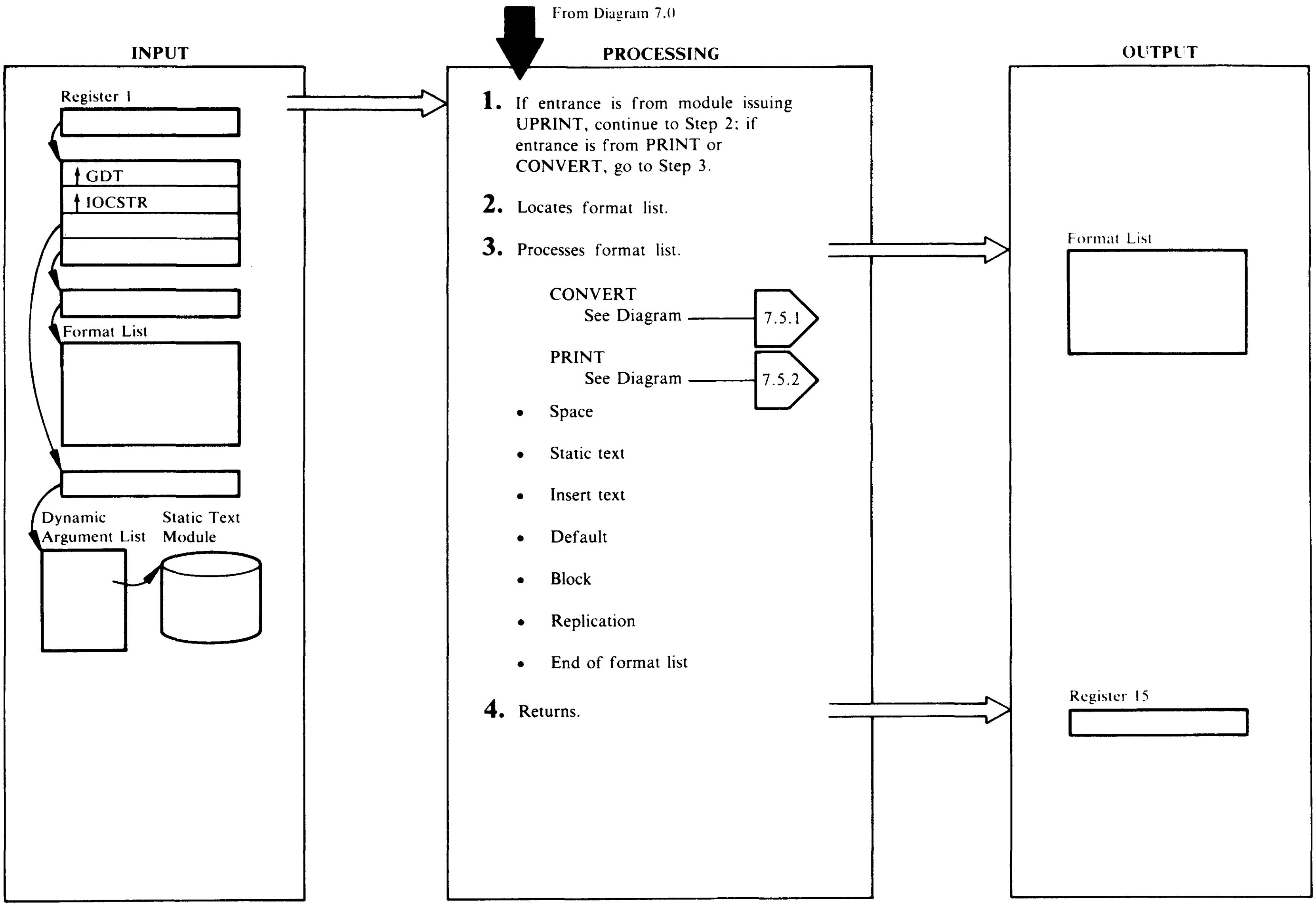
3 Before the secondary PCT is deleted, RESETCON copies some data into the primary PCT. One UFPOOL macro releases the secondary PCT, subtitle lines, footing lines, and any static text entries addressed from the secondary PCT in PCTSQP because everything was obtained with subpool identification 'TP01'. RESETCON sets the address of the secondary PCT to zero in the primary PCT in PCTSPP. This resets all page control values to the values contained in the primary PCT.

IDCTP04

Procedure: RESETCON

4 RESETCON puts a return code into register 15, and control returns to the module that issued the URESET macro.

Diagram 7.5. UPRINT Macro



Extended Description for Diagram 7.5

1 If entrance is from a module issuing a UPRINT macro, continue with step 2; if entrance is from PRINT, Diagram 7.5.2, or CONVERT, Diagram 7.5.1, go to step 3.

IDCTP01, IDCTP05

Procedures: IDCTPPR, IDCTP05

2 The format list, FMTLIST, and Print Control Table, (PCT), must be found. If a secondary PCT exists, IDCTPPR uses it; otherwise, IDCTPPR uses the primary PCT. The format list, FMTLIST, can be in one of three locations:

- In the FSR
- In a list of static text entries chained from the PCT
- In a static text module

If the format list is in the FSR, DARGSTID in the Dynamic Argument List, DARGLIST, is zero. The calling program gives the address of the FMTLIST to UPRINT as the fourth argument.

IDCTPPR compares the static text identification in DARGSTID against the static text identification of each entry addressed from the Print Control Table in field PCTSQP. If a match is found, IDCTPRR uses that FMTLIST in the static text entry as input to UPRINT. If a match is not found, IDCTPRR must obtain the FMTLIST from a static text module.

IDCTP05 concatenates the name of the static text module in DARGSMOD with the characters 'IDCTS' and compares it with the name of the static text module in storage. The name of the static text module currently in storage is kept in PCTSTM in the PCT. If the names do not match, IDCTP05 deletes the module named in PCTSTM with a UDELETE macro, and IDCTP05 loads the module named in DARGSMOD with a ULOAD macro. IDCTP05 puts the name and address of the newly loaded module in the PCT. IDCTP05 finds the particular static text entry by using DARGSENT as an index to the static text module. IDCTP05 copies everything in the static text entry after the length field and puts the static text identification and the address of the next entry in the list at the beginning of each entry on the list. IDCTP05 then chains the copy into the list of static text entries addressed from PCTSQP so it will be readily available when it is used again. See "Text Structure" in the chapter "Diagnostic Aids" for a discussion of static text entries.

IDCTP01

Procedures: IDCTPPR, SPACE, STATIC, INSERT, BLOCK, REDO

3 IDCTPPR takes action on the format list substructures in FMTLIST depending upon the structure type. The line buffer is a work area where each line is formatted. IDCTPPR processes substructures in order of their appearance in the FMTLIST. If the high order bit in FMTFLGS is on, this substructure is the last in the FMTLIST. If there is formatted data in the line buffer, IDCTPPR calls LINEPRT to write the line. (See diagram 7.5.2.) IDCTPPR sets a return code in register 15, and control returns to the module that issued the UPRINT macro.

Types of substructures:

- Space

  If this is the first substructure in the FMTLIST, SPACE saves the spacing type character from the FMTLIST for LINEPRT, and control returns to Step 2 for the next substructure. If the space substructure is not the first substructure in the FMTLIST, SPACE transfers control to PRINT. After control returns from PRINT, the new spacing type character is saved for the next line. (For more information on PRINT, see diagram 7.5.2.) Control returns to Step 2 for the next substructure.

- Static text

  STATIC passes the address of the input data, length of input data, type of conversion, position in the output line, and length of output field to IDCTPPR. (See diagram 7.5.1.)

- Insert data

  INSERT compares the insert reference number in FMTRFNO against every DARGINS field in the Dynamic Data List. If the same number is found in DARGINS, INSERT gives the following information to CVPSTRM: the length in DARGINL, the address in DARGDTM, the type of conversion from FMTCNVF, the output field length from FMTOLEN, and the position for the field in the output line from FMTOCOL. (See diagram 7.5.1.) If the same number is not found in any DARGINS, INSERT ignores the insert-data substructure, and control returns to Step 2 for the next substructure. If the next substructure is a default-text substructure, INSERT processes the default structure.

- Default text

  If a default-text substructure does not immediately follow an insert substructure that does not have a matching reference number in DARGINS, INSERT ignores the default-text substructure, and control returns to Step 2 for the next substructure. INSERT uses the default-text substructure instead of a matching DARGINS to describe input for an insert-data substructure. INSERT takes the values for input and output from the default-text substructure only. Nothing is taken from the insert substructure. Control is given to IDCTPPR. (See diagram 7.5.1.)

- Block format

  BLOCK obtains input information from DARGDBP and DARGILP. BLOCK adds the offset count in FMTIOFF to the address in DARGDBP to get the address of the input data. If the input length in FMTILEN is zero or 32,767, BLOCK uses the input length in DARGILP. If the length in FMTOLEN is zero or 32,767, the output length is the length of the converted input data. All this data is given to IDCTPPR. (See diagram 7.5.1.)

- Replication

  REDO compares the reference number in FMTRFNO against every DARGREP field. If the same number is not found, REDO ignores the replication substructure and control returns to Step 2 for the next substructure. If the same number is found in DARGREP, REDO uses the count in DARGPCT for loop control to set up the number of times the following substructures are repeated. REDO obtains the number of substructures to repeat from FMTRBC. At the end of each time through the substructures REDO prints a line because the output positions for each field are unchanging. (See diagram 7.5.2.) REDO saves the value in FMTRIO and adds to each address of block data in the substructures being repeated.

IDCTP01

Procedure: IDCTPPR

4 IDCTPPR puts a return code in register 15 and returns control to module that issued the UPRINT macro.

Diagram 7.5.1. UPRINT Macro – CONVERT

From Diagram 7.5

INPUT

Format List

Dynamic Argument List

Line Buffer

PROCESSING

1. Converts data according to type of conversion.

- Binary to hexadecimal.
- Binary to hexadecimal with apostrophe.
- Binary to dump.
- Binary to decimal.
- Packed decimal to unpacked decimal.
- EBCDIC (no translation).

2. Puts field in line buffer in correct output column.

3. Prints line buffer, if full.

See Diagram 7.5.2

4. Returns.

OUTPUT

Line Buffer

Extended Description for Diagram 7.5.1

IDCTP01

Procedures: CONVERT, BHCONV, BHDCONV, BDCONV, PUPCONV, EBCDIC

1 CONVERT checks the conversion type from FMTCNVT and converts the field accordingly. Output fields can overlap. When a line of conversion is finished, LINEPRT prints the line. (See diagram 7.5.2.)

Control returns to the caller in diagram 7.5. (See diagram 7.5.) Types of conversion:

Binary to hexadecimal

BHCONV converts bytes of binary data to their equivalent printable hexadecimal. BHCONV prints two characters for each byte. The maximum input length is 32,767. If the length of the converted data is greater than the length of the output field, BHCONV truncates the data on the right. If the length of the converted data is less than the length of the output field, BHCONV does not change the remaining fields to the right. If the converted data extends beyond one line, BHCONV continues the data on the next line.

Binary to hexadecimal with apostrophe

BHCONV converts bytes of binary data to their equivalent printable hexadecimal. BHCONV prints two characters for each byte. The output is preceded by a 'X' and followed by 'a'. The maximum input length is ((line width - starting position)/2) - 3. If the length of the converted data is greater than the length of the output field, BHCONV truncates the data on the right. If the length of the converted data is less than the length of the output field, BHCONV does not change remaining fields to the right of the trailing apostrophe. If the converted data extends beyond one line, BHCONV truncates the data on the right.

Binary to dump

BHDCONV converts bytes of binary data to their equivalent printable hexadecimal. BHDCONV prints two characters for each byte. This type of conversion forces the output to begin on a new line. IDCTPPR is called to put the current line in the stack buffer prior to calling CONVERT (See diagram 7.5.2.) BHDCONV formats the output line like a standard ABEND dump with relative addresses on the left of the page, eight segments in the center, and a 32 byte EBCDIC translation with non-printable characters replaced by periods on the right of the page. The output starts in column one and BHDCONV uses 32 bytes of input per line. The maximum input length is 32,767.

Binary to decimal

BDCONV converts bytes of binary data to their equivalent packed decimal, then calls PUPCONV for further conversion to unpacked decimal. Sign suppression, leading zero suppression and left alignment can be used. The input length is one to four bytes, and the maximum output length is 16 bytes including the sign. If the length of the converted number is greater than the length of the output field, BDCONV truncates the number on the left. If the converted number extends beyond one line, PUPCONV truncates the number on the right.

Packed decimal to unpacked decimal

PUPCONV converts bytes of packed decimal data to their equivalent printable unpacked decimal. Sign suppression, leading zero suppression and left alignment can be used. Eight bytes is the maximum input length, and 16 bytes including sign is the maximum output length. If the length of the converted number is greater than the length of the output field, PUPCONV truncates the number on the left. If the converted number extends beyond one line, PUPCONV truncates the number on the right.

EBCDIC, no translation

EBCDIC assumes the input is in printable EBCDIC and no conversion is done. If align right is specified, the EBCDIC character string is aligned to the right in the print field. The print column specified is added to the print field length to determine the last printable position. Unwanted blanks following a nonblank character can be eliminated by specifying blank suppression on the following field. If blank suppression is specified on an EBCDIC field, EBCDIC moves that field left into the prior EBCDIC field so there is only one blank between the two fields. Blank suppression can be specified only on fields that immediately follow EBCDIC fields. The maximum input length is 32,767. If the output extends beyond one line, EBCDIC prints additional lines.

IDCTP01

Procedure: CONVERT, BHCONV, BHICONV, BDCONV, PUPCONV, EBCDIC

2 The conversion routines put the converted data in the correct column. FMTOCOL in the FMTLIST specifies the output column. If blank suppression is on (FMTCNVF=X'0010'), the output column is in PCTAPC in the PCT, and FMTOCOL is an offset from the output column in PCTAPC. In this case, the conversion routines find the output column by adding the value in PCTAPC to the value in FMTOCOL. The output column for each field is calculated separately from other fields. Output fields may overlap due to specification of output columns in FMTOCOL.

IDCTP01

Procedures: CONVERT, BHCONV, BHDCONV, PUPCONV, EBCDIC

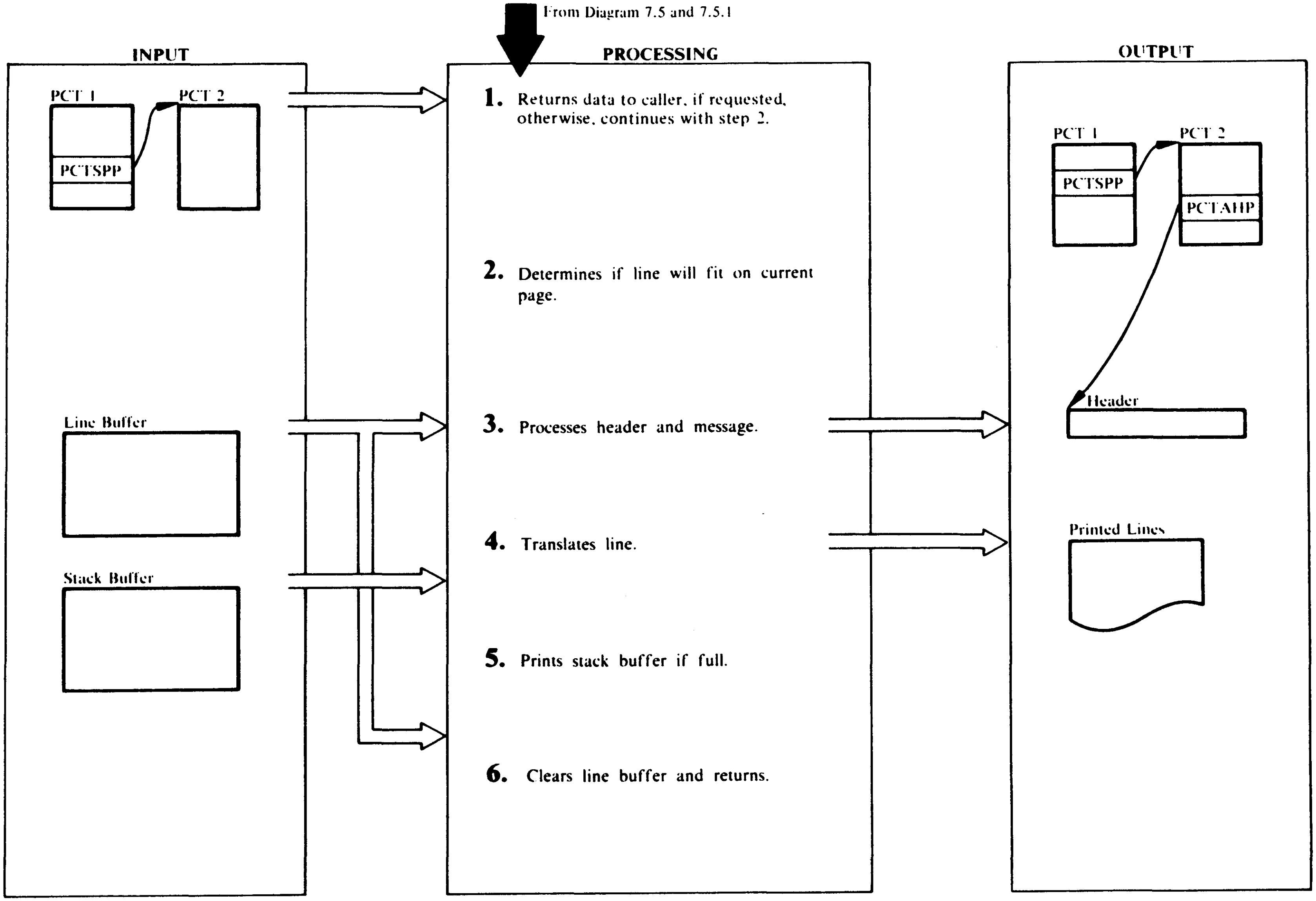
3 When the line buffer is full or a new line is to start, the conversion routines call LINEPRT to print the line. See Diagram 7.5.2.

IDCTP01

Procedures: CONVERT, BHCONV, BHDCONV, PUPCONV, EBCDIC

4 When all the data specified by the FMTLIST substructure is converted, control returns to the caller in Diagram 7.5.

Diagram 7.5.2. UPRINT Macro – PRINT



Extended Description for Diagram 7.5.2

IDCTP01

Procedures: LINEPRT, LINERET

1 LINEPRT tests the return area pointer in the argument list for zero. If it is not zero, procedure LINERET places the formatted line in the return area without checking for or setting page-related data such as carriage control, headings, etc. Only as many characters are returned as allowed by the return area length.

IDCTP01

Procedures: LINEPRT, STACKPUT

2 LINEPRT tests the print data set supplied with the UPRINT macro to determine if it is a change from the current print file. If the print data sets are changing, STACKPUT writes the stack buffer with a UPUT macro. Then LINEPRT puts the page number and next line number for the new print data set in PCTCPN and PCTNLI respectively. LINEPRT puts the page number and next line number for the old print data set in PCTSPN and PCTSNL for the standard print data set or in PCTAPN and PCTANL for an alternate print data set. LINEPRT compares the current line number from PCTNLI with the pagesize in PCTPPD to determine if the current line with its spacing will fit on the current page. If the line will not fit, LINEPRT ejects a page, and LINEPRT prints all title lines on the new page. If the vertical spacing is more than three lines, LINEPRT writes blank lines until the line number is within three lines of the line number where the line is to be written and the spacing character can handle spacing.

IDCTP01

Procedure: LINEPRT

3 LINEPRT tests the flags in the static text entry to determine if this static text entry describes a header line or a message.

a. If it is a header line, LINEPRT puts the address of the translated header line in PCTAHP so it can be written again when a page overflows as well as when they are first given to the Text Processor. Unless all header lines, spaces, and one data line will fit on a page, a page overflow occurs, and LINEPRT ejects a page. The number is in HSDP in the static text entry. A UGPOOL is done for storage for the kept header line. Once a header is given to UPRINT, it can only by removed by another header, UESTS, UESTA, or URESET macro.

b. If it is a message line, LINEPRT writes the stack buffer with a UPUT macro.

IDCTP01

Procedure: LINEPRT

4 LINEPRT translates the formatted line using the translate table supplied for the print chain and addressed from PCTTRP. The CHAIN or TABLE parameter of the PARM command determines the translate table. In Access Method Services translate tables, all non-printable bit combinations are changed to periods.

IDCTP01

Procedures: LINEPRT, STACKPUT

5 LINEPRT puts the translated line preceded by a two byte length field in the stack buffer. When the stack buffer is full, STACKPUT issues a UPUT against the entire buffer. Lines in the stack buffer are in variable format with as many trailing blanks removed as possible. The minimum line size is 10 bytes. If the line is a message, STACKPUT issues a UPUT against the message alone. This is done because all messages go to the standard SYSLST data set. STACKPUT passes an identification number with the UPUT macro. The identification number for all data lines is zero and for messages is the message number. Therefore, STACKPUT must issue a separate UPUT for each message. If an alternate data set is being processed, there is no way to keep messages for the standard data set until ready to print, because there is only one stack buffer.

IDCTP01

Procedure: LINEPRT

6 LINEPRT fills the line buffer with blanks and control returns to the caller, FORMAT or CONVERT.

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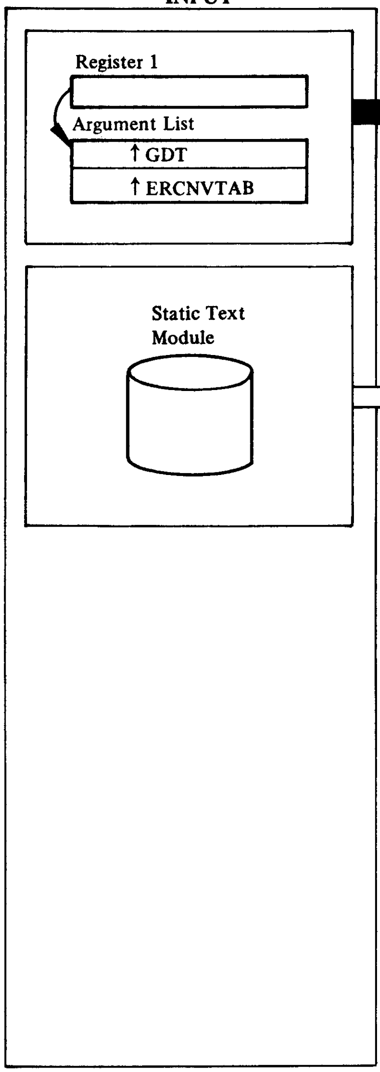
Revised April 29, 1977
By TNL SN24-5550

Diagram 7.6 UERROR MACRO

From Module Issuing UERROR Macro

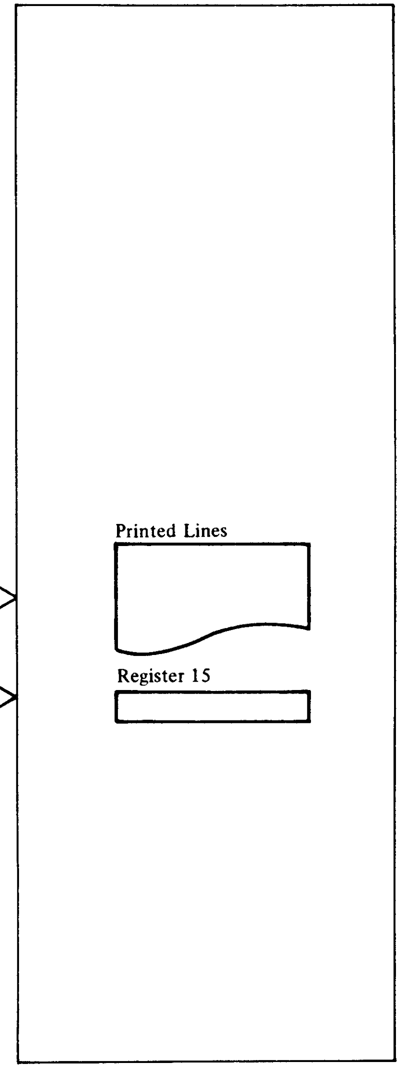
INPUT



PROCESSING

1. Determine type of error to be converted.
   - Catalog Error
2. Retrieve verbal text description of catalog return code.
3. Initialize DARGLIST to print primary and secondary message pair.
4. UPRINT.
5. Return to invoker.

OUTPUT



Extended Description for Diagram 7.6

IDCTP06

Procedure: IDCTP06

1 The Error Conversion Table (ERCNVTAB) indicates the type of error to be converted. The only allowable error is a catalog error.

IDCTP06

Procedure: CATERCNV

2 Retrieve the verbal text description from the UERROR static text module (IDCTSTP6). CATERCNV uses the numeric catalog error code to index the appropriate verbal text entry in the static text module. The UPRINT macro is used to return the verbal text.

IDCTP06

Procedure: CATERCNV

3 The DARGLIST is initialized to print the primary and secondary message pair. In a batch environment, both messages are issued to the SYSLST data set.

IDCTP06

Procedure: IDCTP06

4 Print the message pair via the Text Processor UPRINT macro.

IDCTP06

Procedure: IDCTP06

5 Control is returned to the issuer of the UERROR macro.

Debugging Aids Visual Table of Contents

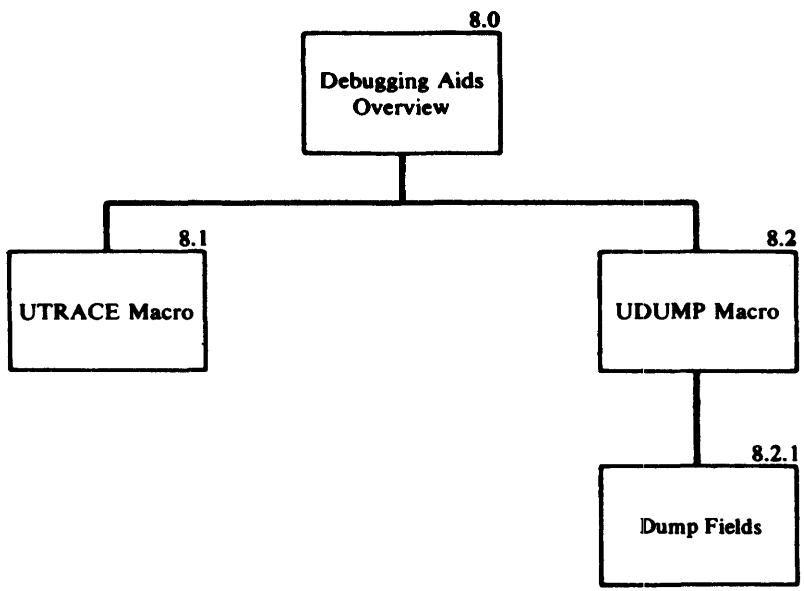


Diagram 8.0. Debugging Aids Overview

From Procedure Issuing Macro

INPUT

Intra-Module Trace Table

Register 1

Argument List

PROCESSING

1. Updates Intra-Module Trace Table.

   See Diagram 8.1

2. Dumps information based on options specified:

   See Diagram 8.2

   - TRACE
   - AREAS
   - FULL

OUTPUT

Intra-Module Trace Table

Trace Tables

Trace Tables and Selected Areas

Trace Tables and Full Region Dump

Extended Description for Diagram 8.0

IDCDB01

Procedure: IDCDB01

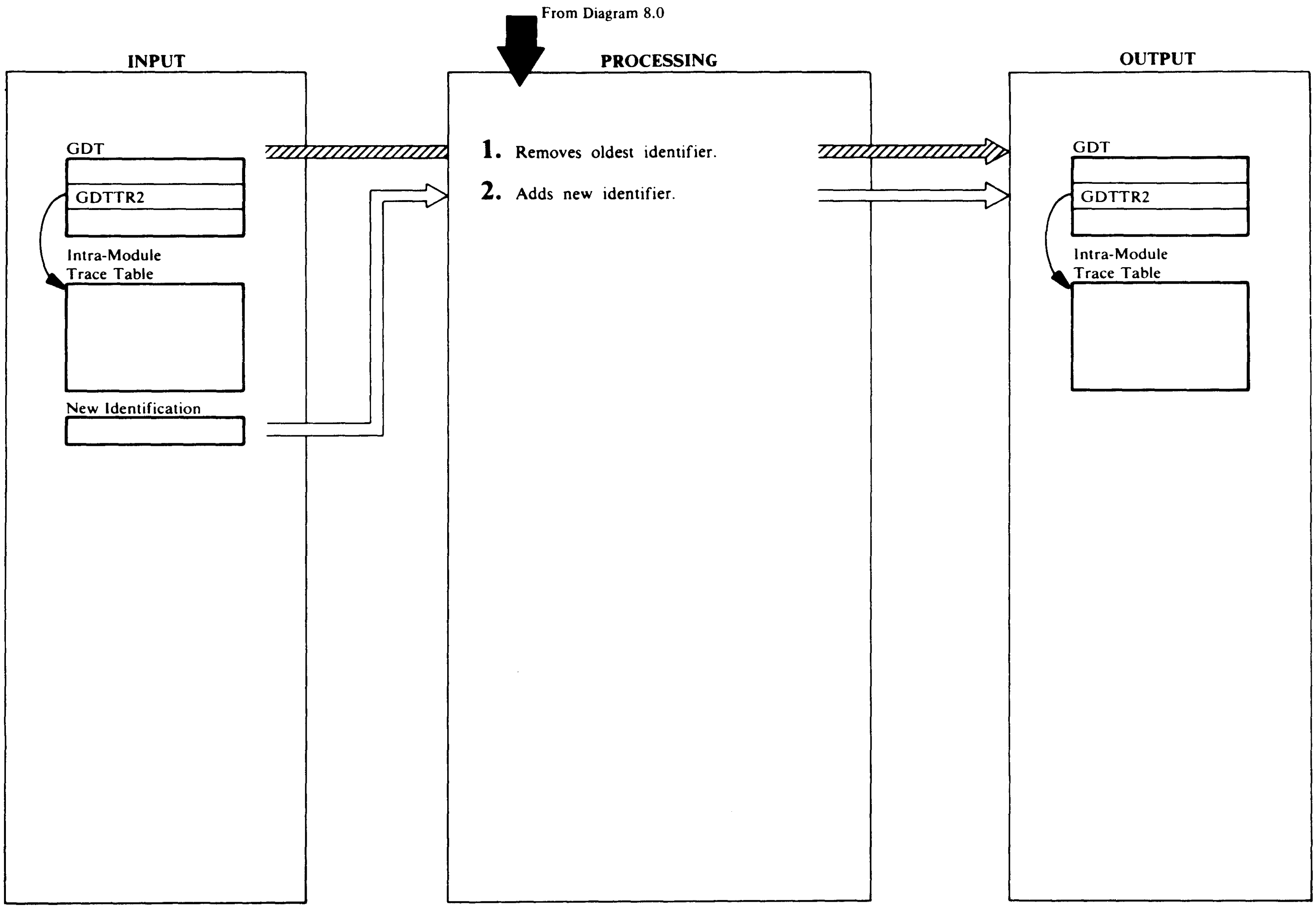
1 When a module issues a UTRACE macro instruction, the PL/S compiler generates inline code that updates the Intra-Module Trace Table. Diagram 8.1 shows the UTRACE macro instruction in detail. Processing continues with the statement following the UTRACE macro.

2 The output of the UDUMP macro instruction depends upon the TEST keyword options specified either in the PARM command or from the EXEC statement.

- If TRACE is specified, UDUMP prints the Inter- and Intra-Module Trace Tables each time a UDUMP macro is executed.
- If AREAS is specified, UDUMP prints the Inter- and Intra-Module Trace Tables and items given to the UDUMP macro only for the areas specified.
- If FULL is specified, UDUMP prints Inter- and Intra-Module Trace Tables and a full region dump only for the dump identifiers specified.

Diagram 8.2 shows the UDUMP macro instruction in detail. Control returns to the module issuing the UDUMP macro.

Diagram 8.1. UTRACE Macro



Extended Description for Diagram 8.1

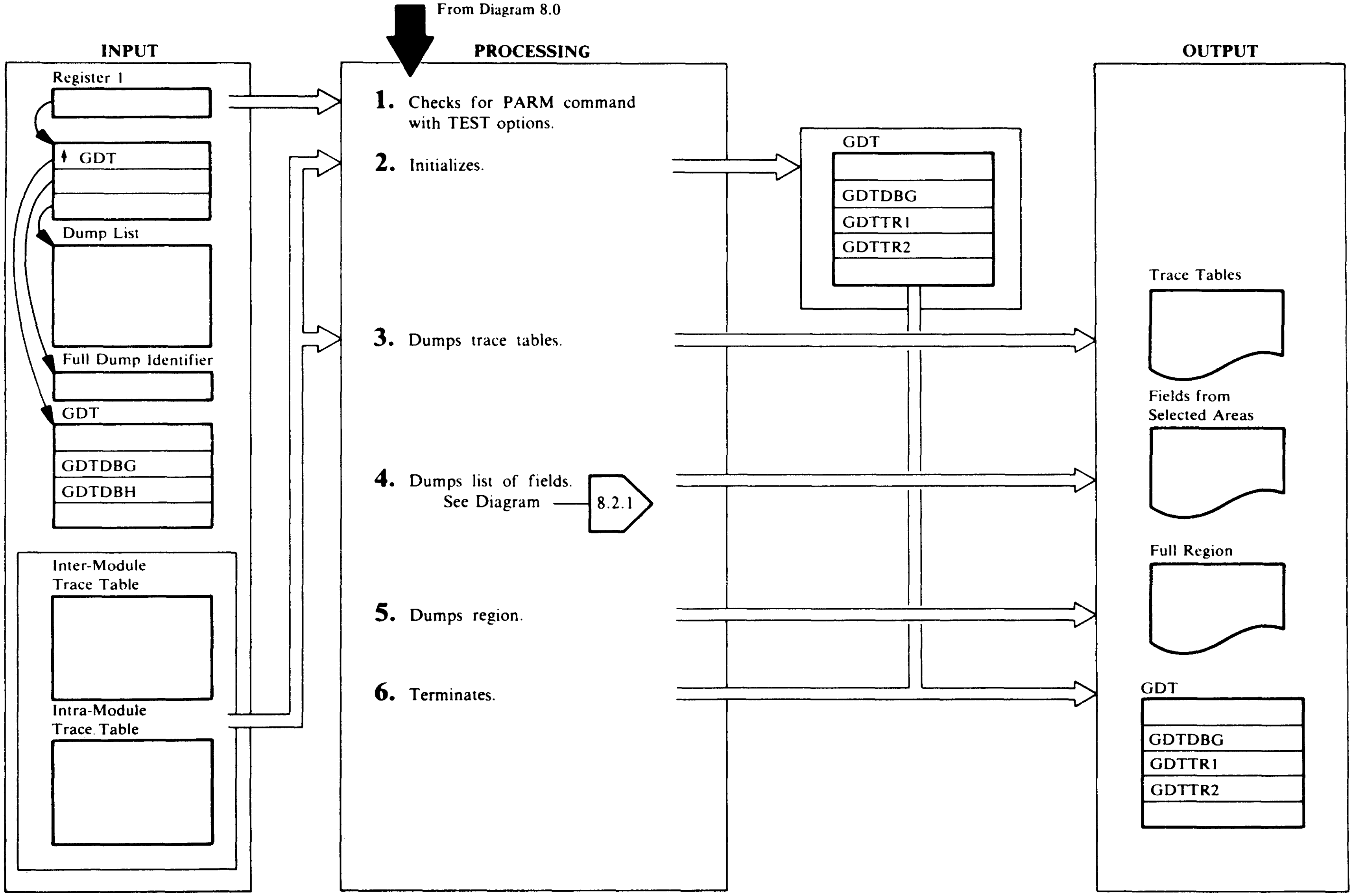
IDCDB01

Procedure: IDCDB01

1 The inline code generated by the UTRACE macro gets the address of the Intra-Module-Trace Table from the GDTTR2 field in the GDT. The inline code shifts the Intra-Module-Trace Table left so that the oldest identifier at the beginning of the table is lost.

2 The module provides the UTRACE macro with the new identifier to add to the Trace Table. The generated inline code puts the new identifier at the end of the Trace Table. The new identifier is 4 bytes long; the first two characters are characters 4 and 5 of the module name; the last two characters are assigned by the module. The identifier may either be four characters in quotes or the address of four characters. Control continues with the next instruction.

Diagram 8.2. UDUMP Macro



Extended Description for Diagram 8.2

IDCPM01

Procedure: IDCPM01

1 The PARM command with the TEST keyword must be specified in order for any dumping to take place, or the TEST keyword must be specified in the PARM field of the EXEC statement. The PARM FSR, IDCPM01, has loaded the dump routine, IDCDB01, and has put the address of the dump routine in the GDTDBG field in the GDT, if dumping is to take place. If GDTDBG is nonzero, control goes to Step 2. If GDTDBG is zero, the dump routine is not loaded and no dumping takes place; control returns to the module issuing the UDUMP macro.

IDCDB01

Procedure: IDCDB01

2 IDCDB01 obtains the calling module identifier from the last entry in the Inter-Module Trace Table. It issues a UTRACE macro to put the caller's module identification in the Intra-Module Trace Table. Both the Inter-Module and the Intra-Module Trace Tables are saved so that the trace tables will not be updated during the dumping operation and the information in the trace tables at the time the UDUMP was issued is preserved. IDCDB01 turns off the TEST options by saving the address of the dump routine and setting GDTDBG to zero. This prevents any dumps during the processing of the current dump operation. IDCDB01 also issues a ULISTLN macro to get the number of arguments passed via the UDUMP macro. If there are three arguments, IDCDB01 has received a list of items to dump.

IDCDB01

Procedure: IDCDB01

3 IDCDB01 uses the Test Option Data Area, whose address is in GDTDBH, to determine whether or not to print the trace tables. The trace tables are printed if any one of the following conditions is present:

- TESTRACE contains a nonzero value, indicating that the trace tables are to be printed each time UDUMP is executed.
- IDCDB01 compares the calling module identifier from the Inter-Module Trace Table with the module identifiers in the AREANAME. If a match is found, it prints the trace tables.
- IDCDB01 compares the full dump identifier provided by the module issuing the UDUMP macro with the full dump identifiers in FDUMPID. If a match is found, it prints the trace tables.

IDCDB01
IDCDB02

Procedures: IDCDB01, IDCDB02

4 If three arguments are given to the UDUMP macro, the third is a list of areas to be dumped. IDCDB02 converts and prints each item in the list. If the calling module identifier from the Inter-Module Trace Table matches a name in AREANAME, IDCDB01 invokes IDCDB02 to process the list. Otherwise, the list is ignored. Diagram 8.2.1 shows dumping fields in detail.

IDCDB01

Procedure: IDCDB01

5 IDCDB01 compares the full dump identifier provided by the module issuing the UDUMP macro with full dump identifiers in FDUMPID. If no match is found, processing continues with step 6. IDCDB01 adds 1 to REALBEG and checks the number with FDUMPBEG to determine if the current pass is within the dumping range. If it is, IDCDB01 compares REALCNT with FDUMPCNT to determine if all the dumps requested have been given. If they have not, IDCDB01 adds 1 to SNAPID and issues a USNAP macro to dump the region. UPRINT writes a message stating the full dump identifier (SNAPID).

IDCDB01

Procedure: IDCDB01

6 IDCDB01 puts the address of the trace tables in GDTTR1 and GDTTR2 and resets the TEST options by placing the address of the dump routine in GDTDBG. Control returns to the module that issued the UDUMP macro.

Diagram 8.2.1. UDUMP Macro – Dump Fields

From Diagram 8.2

INPUT

Dump List

PROCESSING

1. Gets type of dump list entry:

- **a.** Array Header
- **b.** Individual Field
  - Hexadecimal
  - Bit String
  - Character
  - Fixed Binary
- **c.** Dump List Terminator

2. Prints data lines.

OUTPUT

Printed Data Lines

Extended Description for Diagram 8.2.1

IDCDB02

Procedures: ARRAYHDR, IDCDB02, NAMEFLD, ITEMDUMP, HCONVERT, BCONVERT, CCONVERT, FCONVERT

1 IDCDB02 processes each entry in the Dump List until the end of the list is reached.

a. If the type in the Dump List is 'A'. the entry is an Array Header. If there is any formatted dump data in the line, ARRAYHDR issues a UPRINT to print the line. Each array begins on a new line, and an Array Header cannot occur within the elements of another array. If an Array Header does occur within the elements of another array, UPRINT prints an error message, the Array Header is ignored, and the following field entries are processed as though the Array Header had not been in the Dump List. A UPRINT macro prints the name of the array from the Dump List. ARRAYHDR obtains the looping array control from the Dump List. The number of bytes in each input element of the array is used to address the elements of the array.

b. If the type in the Dump List is H, B, C, or F, NAMEFLD formats the name of each field in the line. If the field is part of an array, NAMEFLD adds a subscript of the element number to the field name. NAMEFLD also checks the input data type and converts and formats the data as follows:

- Type H
  HCONVERT converts hexadecimal data to printable form and prints 2 characters per byte of input; each four bytes of input is converted and followed by a blank.
- Type B
  BCONVERT converts bit string data to printable form and prints eight characters followed by a blank per byte of input. The printed output is enclosed in quotes.
- Type C
  CCONVERT converts character input to printable form and prints one character per byte of input. The printed output is an unbroken string of characters enclosed in quotes.
- Type F
  FCONVERT converts fixed binary data to printable decimal. Leading zeros are suppressed. If the input is 2 or 4 bytes long, FCONVERT prints a sign; no sign is printed if the input is 1 or 3 bytes long.

c. If the first byte of the dump list entry is X'FF'. IDCDB02 terminates processing of the list. Control returns to the main dump routine, IDCDB01.

IDCDB02

Procedure: ITEMDUMP

2 IDCDB02 logically divides the page into four columns. A maximum of four different fields may be printed on a line. Each printed field is preceded by its name from the Dump List entry and an equal sign. As soon as one line of data is formatted, a UPRINT macro prints the line.

PROGRAM ORGANIZATION

This chapter describes the organization of the Access Method Services processor: the physical packaging of routines into load modules.

The final authorities for any program are the compiler and assembly listings for that program. This chapter complements those listings, and assumes that they are at hand. You should have them available for any in-depth analysis. This chapter directs you to a specific module of the processor; the listings for that module provide further detail. The next chapter, "Microfiche Directory," can help you relate the listings to this book.

Overall Organization

The processor consists of executable modules, organized into seven general areas, and non-executable modules (Command Descriptors and Text Structures). As described in the "Introduction," six of these areas form a substructure that provides services and control for the remaining area. This substructure is made up of the Executive, the System Adapter, the I/O Adapter, the Text Processor, the Reader/Interpreter, and Debugging Aids. The seventh area consists of the Function Support Routines (FSRs), of which there are currently fifteen, one for each verb supported by the processor.

Several modules are link-edited together into one phase (named IDCAMS), which is loaded when the processor is invoked.

This phase is the *root phase* and consists of:

IDCEX01	Executive main routine
IDCIO01	I/O Adapter main routine
IDCSA01	System Adapter initialization/termination routine
IDCSA02	System Adapter services routine
IDCSA03	System Adapter prologue/epilogue routine
IDCTP01	Text Processor main routine
IDCSA08	System Adapter services routine

The following phases are loaded when required using CDLOAD and remain loaded until termination:

IDCEX02	Executive initialization, called by IDCEX01
IDCEX03	Executive termination, called by IDCEX01
IDCIO02	I/O Adapter Open/Close, called by IDCIO01
IDCIO03	I/O Adapter positioning and UIOINFO processing, called by IDCIO01
IDCSA05	System Adapter time routine, called by IDCSA02
IDCTP04	Text Processor page control, called by IDCTP01
IDCTP05	Text Processor Text Structure loading, called by IDCTP01 or IDCTP04
IDCTP06	Text Processor error message processor called by IDCTP01
IDCDB01	Dump routine, called by any routine
IDCDB02	Symbolic dump, called by IDCDB01

The following phases are loaded by the system when their services are required:

IDCDI01	SYSLST DTF and put phase
IDCDI02	SYSIPT DTF and get phase
IDCDI03	Fixed and fixed blocked sequential access method SDDTF and get phase
IDCDI04	Fixed and fixed blocked sequential access method SDDTF and put phase
IDCDI05	Variable and variable blocked sequential access method SDDTF and get phase
IDCDI06	Variable and variable blocked sequential access method SDDTF and put phase
IDCDI07	Undefined sequential access method SDDTF and get phase
IDCDI08	Undefined sequential access method SDDTF and put phase
IDCDI09	Spanned and spanned block sequential access method SDDTF and get phase
IDCDI10	Spanned and spanned block sequential access method SDDTF and put phase
IDCDI11	Fixed and fixed blocked sequential access method MTDTF and get/put phase
IDCDI12	Variable and variable blocked sequential access method MTDTF and get/put phase
IDCDI13	Spanned and spanned blocked sequential access method MTDTF and get/put phase
IDCDI14	Undefined sequential access method MTDTF and get/put phase
IDCDI15	Fixed and fixed blocked indexed sequential access method ISDTF and get phase
IDCDI20	DADSM requests for RESETCAT.

The FSRs and the Reader/Interpreter are alternately called by the Executive (IDCEX01) to perform their duties. The Reader/Interpreter is entered at IDCRI01 and loads IDCRILT and IDCRIKT when needed. The FSRs are named as follows:

IDCAL01	ALTER
IDCBI01	BLDINDEX
IDCDE01	DEFINE
IDCDL01	DELETE
IDCXP01	EXPORT
IDCMP01	IMPORT
IDCLC01	LISTCAT
IDCLR01	LISTRCRA
IDCPM01	PARM
IDCPR01	PRINT
IDCRC01	EXPORTRA
IDCRM01	IMPORTRA
IDCRP01	REPRO
IDCRS01	RESETCAT
IDCVY01	VERIFY

System Macros and Services Used by Access Method Services

All requests for services from the operating system are issued by either the System Adapter or the I/O Adapter. The following lists all system and I/O macros issued by the processor, along with the issuing module's name and the label at the point of issue. These labels all begin with "L" contain a mnemonic for the macro, and end with a single digit. Thus they are easy to locate with the cross-reference table of the listing.

The adapters provide the services in the following list to the rest of the processor. Non-system services are also provided by the adapters and by the Text Processor. Services are represented in the listings by a call to the appropriate service-module entry point.

System and I/O Macros Used by Access Method Services

Macro	Module	Label
CANCEL	IDCSA01	LCANCEL1, LCANCEL2
CATLG	IDCSA02	LCATLG1
CCB	IDCSA01	LCCB1, LCCB2
	IDCIO03	LCCB1
CDLOAD	IDCIO02, IDCIO03	LCDLOAD1
	IDCSA01	LCDLD1
	IDCSA02	LCDLD2, LCDLD3
	IDCRS07	—
CLOSE	IDCIO02, IDCSA01	LCLOSE1
COMRG	IDCSA05	LCOMRG1, LCOMRG2
	IDCSA02	LCOMRG3
	IDCSA01	LCOMRG4
	IDCEX02	LCOMRG5
DIMOD	IDCDI01, IDCDI02	
DTFDI	IDCDI01, IDCDI02	LDTFDI1
DTFIS	IDCDI15	LDTFIS1
DTFMT	IDCDI11	LDTFMT1, LDTFMT2
	IDCDI12	LDTFMT1, LDTFMT2
	IDCDI13	LDTFMT1, LDTFMT2
	IDCDI14	LDTFMT1, LDTFMT2
DTFSD	IDCDI03, IDCDI04	LDTFSD1
	IDCDI05, IDCDI06	LDTFSD1
	IDCDI07, IDCDI08	LDTFSD1
	IDCDI09, IDCDI10	LDTFSD1
ENDREQ	IDCRP01	
EOJ	IDCSA01	LEOJ1
ERASE	IDCRP01	
EXCP	IDCIO03	LEXCP1, LEXCP2
	IDCSA01	LEXCP, LEXCP2, LEXCP3
FREEVIS	IDCIO02	LFREEV1, LFREEV2
		LFREEV3, LFREEV4
	IDCSA03	LFREEV1, LFREEV2
	IDCSA01	LFREEV5, LFREEV6
		LFREEV7, LFREEV8
		LFREEV9
	IDCSA02	LFREEV11, LFREEV13
		LFREEV14, LFREEV15
	IDCDI20	—
GET	IDCIO01	LGET1, LGET2
		LGET3, LGET4

System and I/O Macros Used by Access Method Services

Macro	Module	Label
GETIME	IDCSA05	LGETIME1, LGETIME2
GETVIS	IDCSA03	LGETV1
	IDCSA01	LGETV3, LGETV10
	IDCSA02	LGETV5, LGETV6
		LGETV7, LGETV8
	IDCIO02	LGETV1
	IDCDI20	—
ISMOD	IDCDI15	
LOAD	IDCSA02	LLDD2, LLDD3
	IDCIO02	LLOAD1
MTMOD	IDCDI11, IDCDI12	
	IDCDI13, IDCDI14	
OPEN	IDCIO02	LOPEN1
PDUMP	IDCSA02	LPDUMP1
	IDCSA01	LPDUMP2
POINT	IDCIO03	LPOINT1
PUT	IDCIO01	LPUT1, LPUT2
		LPUT3, LPUT4
RELEASE	IDCSA08	LRLSE1
SDMODFI	IDCDI03	
SDMODFO	IDCDI04	
SDMODUI	IDCDI07	
SDMODUO	IDCDI08	
SDMODVI	IDCDI05, IDCDI09	
SDMODVO	IDCDI06, IDCDI10	
SETL	IDCIO02, IDCIO03	LSETL1
TRUNC	IDCIO01	LTRUNC1
USE	IDCSA08	LUSE1, LUSE2, LUSE3, LUSE4
VERIFY	IDCIO01	LVRFY1
WAIT	IDCIO03	LWAIT1, LWAIT2
	IDCSA01	LWAIT1, LWAIT2, LWAIT3

The Global Data Table (GDT) contains a branch vector to the various entry points in the adapters which provide these services. A routine obtains a service by loading the appropriate entry points address into a register and performing a BALR. Standard linkage is used: register 1 points to a list of argument addresses, register 13 points to a save area, register 14 contains the return address, and register 15 contains the entry point address. The exception is the call to SAABT: register 1 is not used, register 13 contains the address of a save area in the System Adapter, register 14 contains the address of SAABT and register 15 contains an abort code.

Services Provided for Processor Modules

The following is a list of the services provided by the adapters and the Text Processor, the appropriate module name in each case, and the entry point name. Calls to the services are generated by macros defined by Access Method Services. The macros are collectively called Umacros. The listings contain only the calling sequence and not the Umacro. This publication discusses the Umacros in order to combine the calling sequence with the service performed as a function. The rightmost column lists the arguments that may be included with each of these Umacros. These arguments represent the addresses of the named items. When the argument is preceded by the symbol ↑, then it is the address of a fullword pointer to the named item. Brackets ([ ]) indicate an optional argument.

Internal Services Provided for Processor Modules

Service	Module	Entry Point	Description	Arguments
PROLOG	IDCSA03	IDCSAPR	Initialize a routine on entry; get storage.	module identification size of storage for module
UABORT	IDCSA01	SAABT	Handle unrecoverable error condition while processing.	UABORT code (in register 15)
UCALL	IDCSA02	IDCSACL	Load (if necessary) an executable module and and pass control to it.	GDT entry point name [list of arguments for called module]
UCATLG	IDCSA02	IDCSACA	Catalog request.	GDT ↑catalog parameter list
UCLOSE	IDCIO01	IDCIOCL	Close one or more data sets.	GDT OPNAGL[...]
UCOPY	IDCIO01	IDCIO01	Copy a data set.	GDT ↑input IOCSTR ↑output IOCSTR
UDELETE	IDCSA02	IDCSADE	No operation in DOS/VS.	GDT module name
UDEQ	IDCSA08	IDCSADQ	Release control of a resource	GDT resource name
UDUMP	IDCDB01	IDCDB01	Print diagnostic output and storage dump.	GDT Dump Identifier [↑symbolic dump list]
UENQ	IDCSA08	IDCSANQ	Gain control of a resource	GDT 'SHR' | 'EXCL' 'NOWAIT' | 'WAIT' resource name
UEPIL	IDCSA03	IDCSAEP	Free storage on exit from a routine.	GDT module identifier [return code]
UERROR	IDCTP06	IDCTPER	Verbalize catalog error messages.	GDT ERCNVTAB
UESTA	IDCTP01	IDCTPEA	Establish a PCT (print control table) from information in storage.	GDT alternate IOCSTR or zero for SYSPRINT PCARG
UESTS	IDCTP01	IDCTPES	Establish a PCT (print control table) from information in Text Structures.	GDT alternate IOCSTR or zero for SYSPRINT Text Structure identification

Internal Services Provided for Processor Modules

Service	Module	Entry Point	Description	Arguments
UFPOOL	IDCSA02	IDCSAFP	Release a named pool of storage.	GDT pool identification ["ALL"]
UFSPACE	IDCSA02	IDCSAFS	Release unnamed storage.	GDT address of storage to free
UGET	IDCIO01	IDCIOGT	Read a record.	GDT ↑IOCSTR
UGPOOL	IDCSA02	IDCSAGP	Allocate a named pool of storage and optionally initialize it.	GDT size of storage to obtain return storage address pool identification ["SETZERO" | "SETBLANK"]
UGSPACE	IDCSA02	IDCSAGS	Allocate unnamed storage, and optionally initialize it.	GDT size of storage to obtain return storage address ["SETZERO" | "SETBLANK"]
UIOINFO	IDCIO01	IDCIOSI	Return file-ID, volume serial numbers, and/or device type information about a given filename.	GDT option flags ↑work area filename [pool identification]
UIOINIT	IDCIO01	IDCIOIT	Initialize the I/O Adapter.	GDT [↑zero] [↑external routine list]
UIOTERM	IDCIO01	IDCIOTM	Close all data sets that were opened with UOPEN and free all storage still used by the I/O Adapter.	GDT
ULISTLN	Inline	None	Copies the contents of register 1 into a fullword named LISTPTR and puts the number of arguments addressed by register 1 in a byte named LISTLN.	
ULOAD	IDCSA02	IDCSALD	Load (if necessary) a module; do not pass control to it.	GDT module name returned loaded module address
UOPEN	IDCIO01	IDCIOOP	Open one or more data sets.	GDT OPNAGL[...]
UPOSIT	IDCIO01	IDCIOPO	Position to a logical record.	GDT ↑IOCSTR
UPRINT	IDCTP01	IDCTPPR	Format (and usually write) one or more lines.	GDT alternate IOCSTR or zero for SYSPRINT ↑DARGLIST [↑FMTLIST]
UPUT	IDCIO01	IDCIOPT	Write a record.	GDT ↑IOCSTR [ID code]
URESET	IDCTP01	IDCTPRE	Re-initialize PCT (print control table) for the next function.	GDT alternate IOCSTR or zero for SYSPRINT invoker's page number field

Internal Services Provided for Processor Modules

Service	Module	Entry Point	Description	Arguments
UREST	IDCTP01	IDCTPRS	Modify an existing PCT (print control table).	GDT alternate IOCSTR or zero for SYSPRINT arg1 arg2 argn
USAVERC	Inline code	None	Copies the low order half of register 15 into a halfword named TESTRC.	
USNAP	IDCSA02	IDCSASN	Call for a dump of the partition.	GDT SNAP dump-ID number
UTIME	IDCSA02	IDCSATI	Get date and time of day.	GDT field for returned time [field for returned date] ["FORM" | "KLOK"]
UTRACE	Inline	None code	Adds the current identification to the Inter-Module Trace Table.	
UVERIFY	IDCIO01	IDCIOVR	Issue VSAM VERIFY macro.	GDT ↑IOCSTR

Processor Invocation

Invocation of the Access Method Services processor is via standard DOS/VS job control (// EXEC IDCAMS, SIZE=AUTO), or via a subroutine call. Entry and exit to the Access Method Services processor occurs through IDCSA01, a module of the System Adapter. For a subroutine call, you must load phase IDCAMS which occupies 27,000 bytes and branch to the load address plus six. Standard linkage is used; that is, register 1 points to the argument list, register 13 points to a save area, register 14 contains the return address, and register 15 contains the entry point address. On return from the Access Method Services processor to a subroutine caller, all registers except register 15 are restored. Register 15 contains the value of MAXCC (see the section: "Processor Condition Codes" below.)

The argument list, as shown in Figure 5, can be a maximum of four fullword addresses pointing to strings of data. The last address in the list contains a "1" in the sign field. The first three possible strings of data begin with a two-byte length field. A null element in the list can be indicated by either an address of zeros or a length of zero.

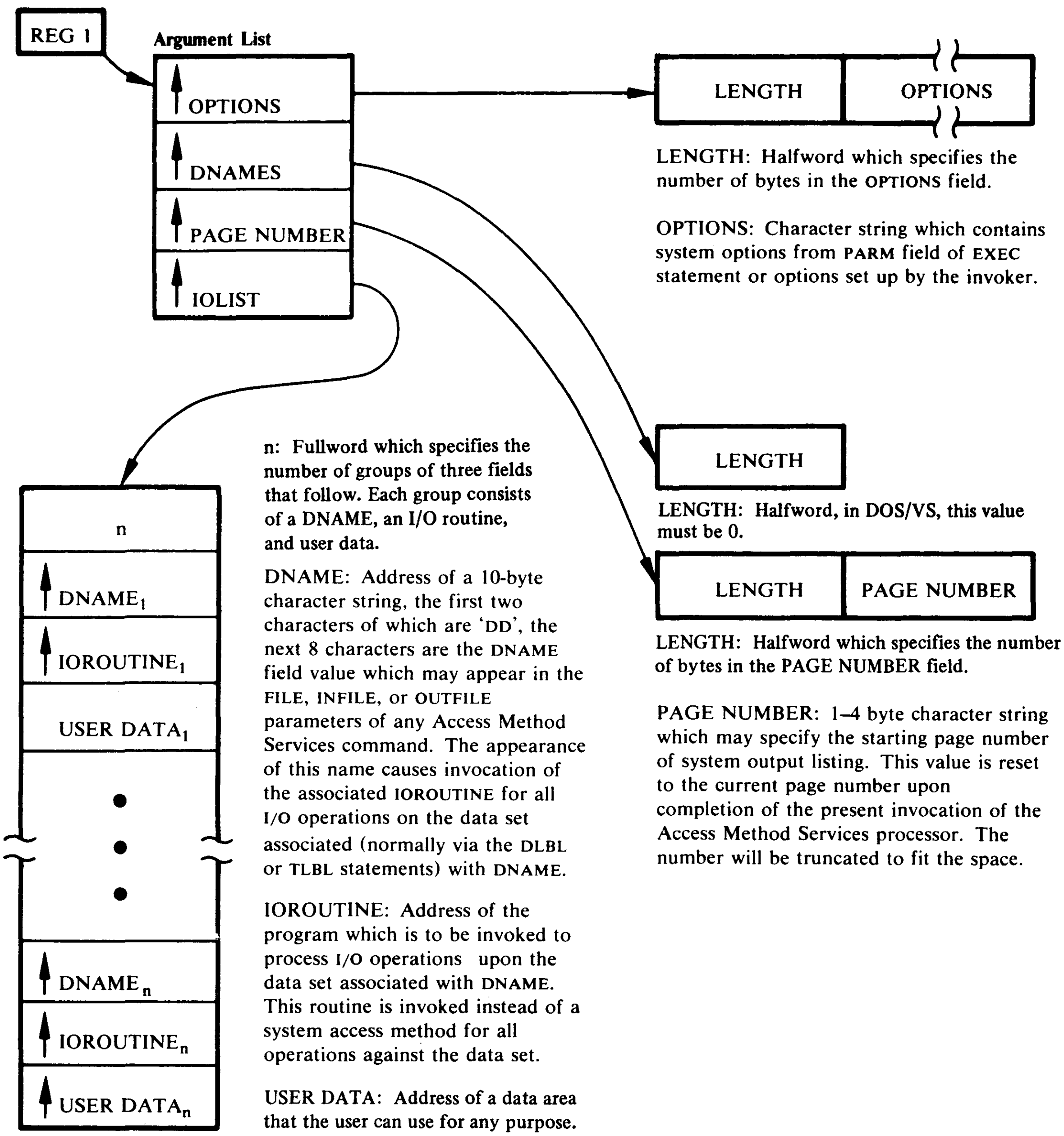


Figure 5. Argument List for Processor Invocation

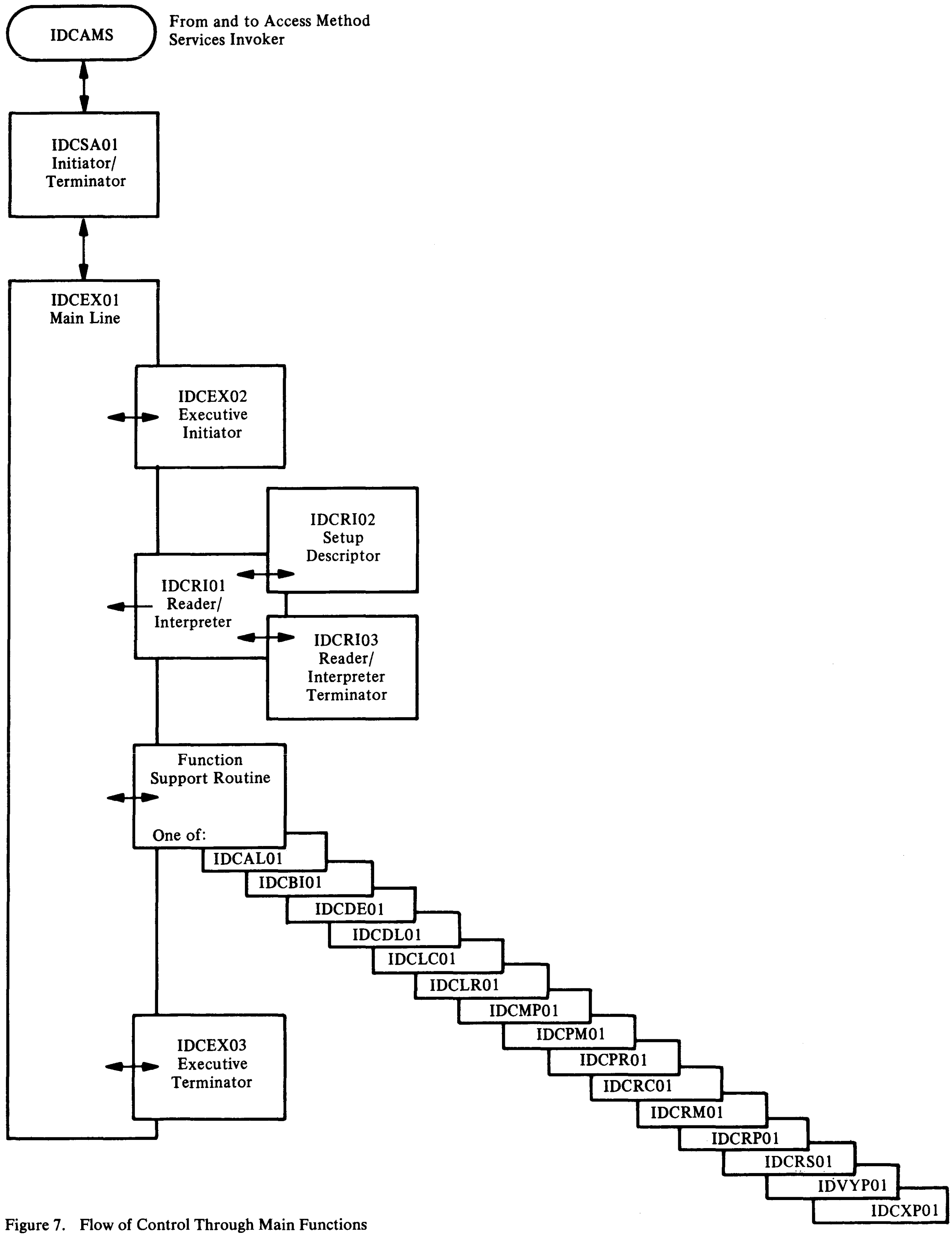


Figure 7. Flow of Control Through Main Functions

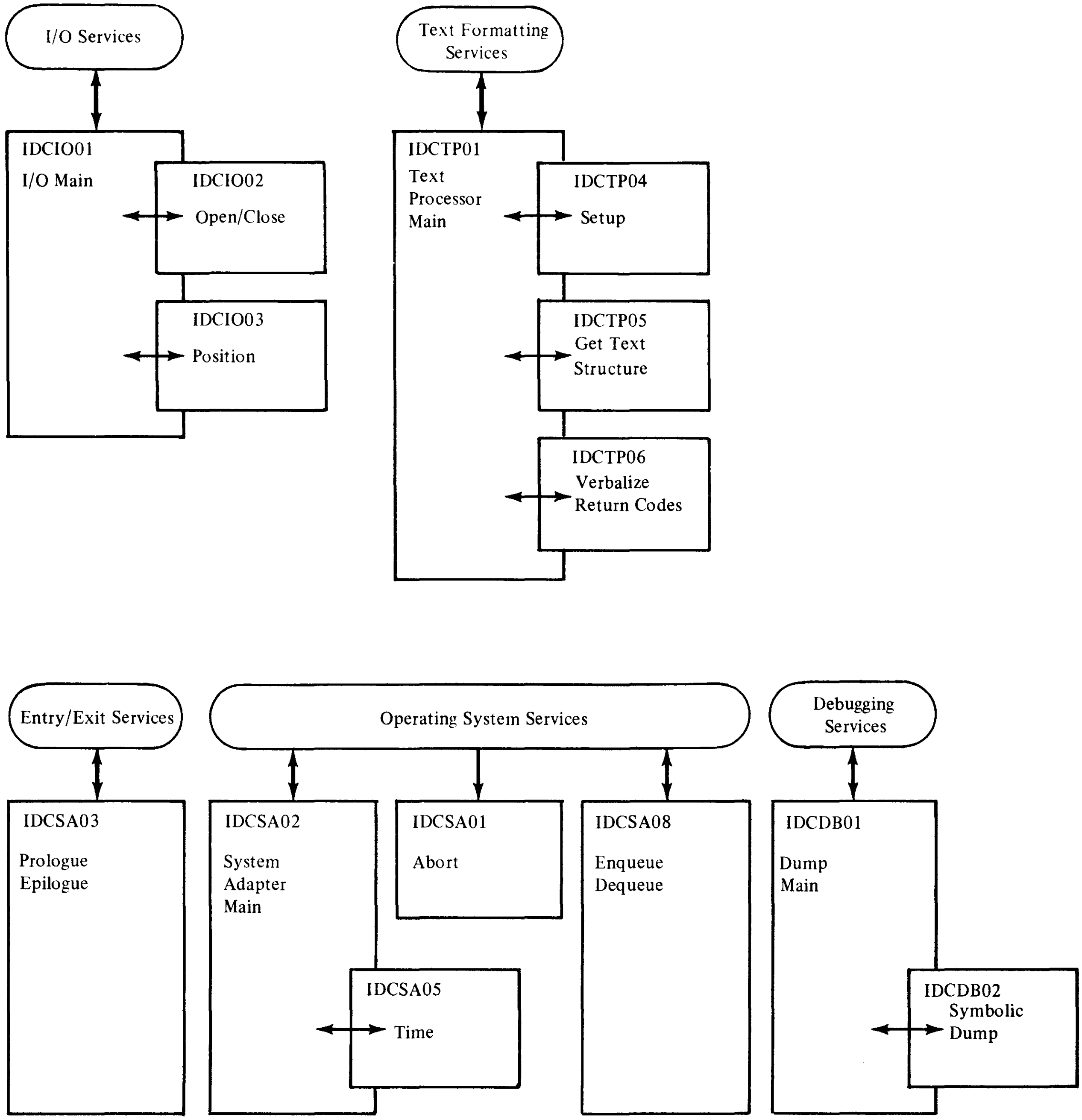


Figure 8. Flow of Control Through Services

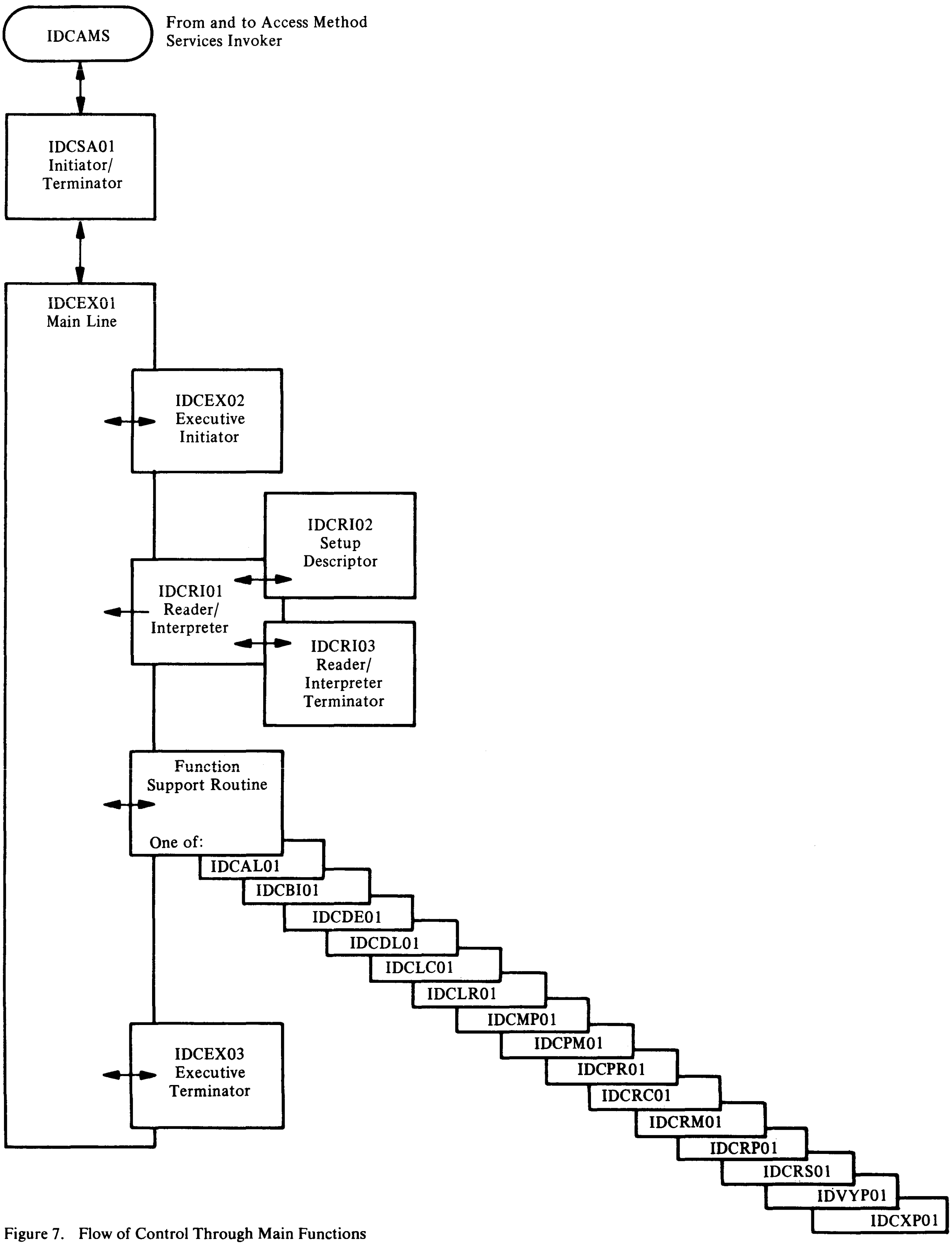


Figure 7. Flow of Control Through Main Functions

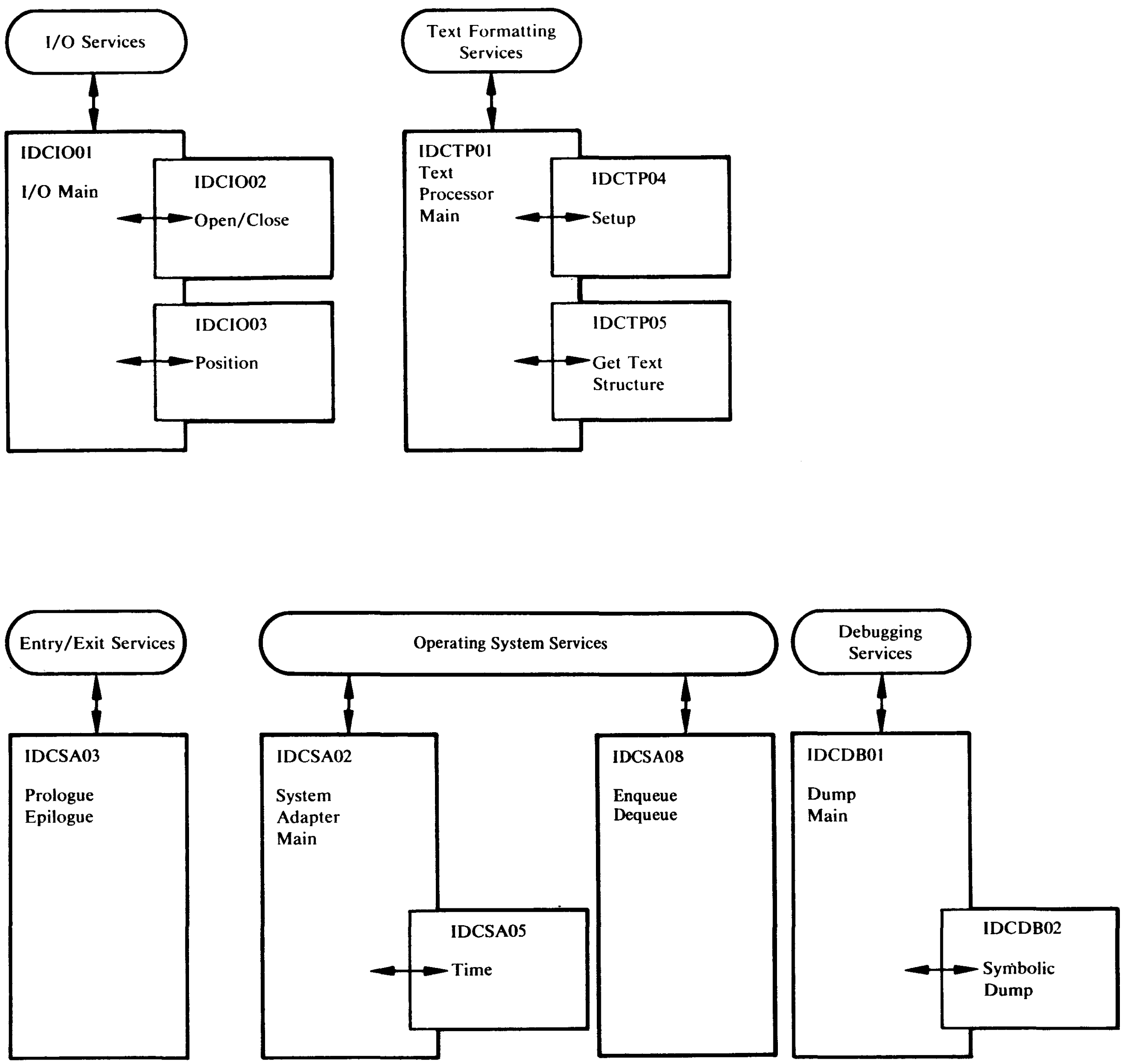


Figure 8. Flow of Control Through Services

MICROFICHE DIRECTORY

This chapter contains a directory to the microfiche listings for all modules of the processor. This directory describes the contents of each module by function and label, allowing you to quickly find any desired code.

The processor is written in PL/S, a high-level, IBM proprietary system language. Listings that are produced for microfiche consist of the PL/S source code, a cross-reference and attribute table, and the assembly code. See the IBM publication *Guide to PL/S II,* GC28-6794, for a more detailed explanation of PL/S and its listings.

Each module is designed with no explicit GOTOs or branches. All conditional phrases are contained within IF-THEN-ELSE clauses and DO-WHILE clauses of PL/S. All loops are controlled by DO statements. Extensive use of closed subroutines (procedures) is made.

The microfiche for each module begins with the PL/S portion, which contains all commentary and is the most readable form of the program. All major data areas are defined at the beginning of the listing. IF-THEN-ELSE clauses and DO-loops are indented to denote levels of logic. The cross-reference and attribute table shows each use of each data area. The assembly listing is keyed back to the PL/S source statement numbers.

The listings are extensively commented. Each module begins with a prologue commentary that lists all standard information for that module. Throughout the listing, additional comments are boxed and structurally indented to make them easy to find. Each internal procedure has a small prologue to further describe its function.

Note: The listings use CPL, FVT, and FPL instead of CTGPL, CTGFV, and CTGFL, respectively. See *DOS/VS LIOCS Volume 4, VSAM Logic* for a description of these data areas.

In the following tables, the module name appears in the first (leftmost) column. The second column contains an entry-point label, the label of an internal procedure (subroutine), or the label of data used externally—that is, by another module. The third column differentiates between entry points (EP), procedures (PR), and data used externally (DE).

CSECT/Load Module Name	Label	Use	Description
IDCAL01			ALTER FSR; modify an existing catalog entry. Translate the encoded command parameters into the necessary catalog parameter lists and call IDCSACA for a catalog request (UCATLG macro).
	IDCAL01	EP	Only entry point to this module.
	LOCATPRC	PR	Locates catalog fields which must be altered in context. Procedure only locates those fields which contain multiple attributes. Thus, since the user may wish to change only one of several attributes, the original field must serve as the basis for alteration.
	ALTERPRC	PR	Builds the VSAM catalog management interface for the alter request.
	CHECKPRC	PR	Does validity checking on certain attributes to ensure compatibility between old values and new values.
	INDEXPROC	PR	If KEYS has been specified on the ALTER command, INDEXPRC builds the parameter list to alter the associated index object.
	PARAMCHK	PR	Verifies that parameters specified on the command are valid for the type of object to be altered.
IDCAMS		EP	Root phase for Access Method Services; consists of IDCSA01, IDCSA02, IDCSA03, IDCEX01, IDCIO01, and IDCTP01. See the directory for these modules for further description.
IDCBI01			BLDINDEX FSR; build one or more alternate indexes over a defined, nonempty base cluster.
	IDCBI01	EP	Only entry point to this module.
	OPENPROC	PR	Opens the data sets required by the BLDINDEX FSR—base cluster, alternate index and, optionally, sort work files—by issuing UOPEN.
	JCPROC	PR	Issues the UIOINFO macro to determine if caller supplied sort work job control; obtains data set name and volume serial.
	MAINPROC	PR	Controls the build process for one alternate index by calling OPENPROC, LOCPROC, INITPROC, CNTLPROC.
	FINPROC	PR	Closes alternate index, sort work files, and issues alternate index final status message.
	TERMPROC	PR	Closes base cluster, frees resources, and prints termination message.
	LOCPROC	PR	Controls sequence of catalog locates to obtain information regarding base cluster and alternate index; verifies relationship.
	CATPROC	PR	Constructs CPL and FPLs for catalog locate and calls VSAM catalog management via UCATLG.
	DEFPROC	PR	Constructs CPL, FVTs and FPLs and calls VSAM catalog management to define sort work files; opens defined files.
	DELTPROC	PR	Constructs CPL and calls VSAM catalog management to delete sort work files.

CSECT/Load Module Name	Label	Use	Description
IDCBI01 (continued)	INITPROC	PR	Determines resources required for building alternate index and obtains core for work areas and sorting.
	CNTLPROC	PR	Controls actual build by reading base cluster and calling SORTPROC and MERGPROC or BLDPROC to perform sort-merge and write alternate index records.
	SORTPROC	PR	Constructs sort records; performs the entire internal sort or the initial sort phase of an external sort.
	SPILPROC	PR	Writes out initial strings to first sort work file in an external sort.
	BLDPROC	PR	Builds and writes the alternate index records from the sequenced sort records.
	MERGPROC	PR	Performs the merge passes of an external sort.
IDCCDAL			Command Descriptor for ALTER verb.
IDCCDBI			Command Descriptor for BLDINDEX verb.
IDCCDDE			Command Descriptor for DEFINE verb.
IDCCDDL			Command Descriptor for DELETE verb.
IDCCDLC			Command Descriptor for LISTCAT verb.
IDCCDLR			Command Descriptor for LISTCRA verb.
IDCCDMP			Command Descriptor for IMPORT verb.
IDCCDPM			Command Descriptor for PARM verb.
IDCCDPR			Command Descriptor for PRINT verb.
IDCCDRC			Command Descriptor for EXPORTRA verb.
IDCCDRM			Command Descriptor for the IMPORTRA verb.
IDCCDRP			Command Descriptor for the REPRO verb.
IDCCDRS			Command Descriptor for the RESETCAT verb.
IDCCDVY			Command Descriptor for VERIFY verb.
IDCCDXP			Command Descriptor for EXPORT verb.
IDCDB01			Debug module (UDUMP macro).
	IDCDB01	EP	Only entry point to this module.
IDCDB02			Debug module (symbolic dump).
	IDCDB02	EP	Only entry point to this module.
	ARRAYHDR	PR	Processes any array header elements (TYPE="A") occurring in the dump list.
	ITEMDUMP	PR	Processes any individual dump list elements.
	NAMEFLD	PR	Inserts the symbolic name of the dump element into the proper position of the output line.
	HCONVERT	PR	Converts the value of the current dump item to hexadecimal representation.
	BCONVERT	PR	Converts the value of the current dump item to binary representation.
	CCONVERT	PR	Converts the value of the current dump item to character representation.
	FCONVERT	PR	Converts the value of the current dump item to fixed-integer representation.

CSECT/Load Module Name	Label	Use	Description
IDCDE01			DEFINE FSR; define a new VSAM data set as a cataloged object.
	IDCDE01	EP	Only entry point to this module.
	INTGCHK	PR	Performs validity checking on completed catalog parameter list.
IDCDE02			Common processing routines for all define types.
	IDCDE02	EP	Initializes registers and obtains storage.
	NAMEPROC	EP	Initializes the data set creation and expiration dates in the CTGFL and the object name in the CTGFV.
	ALLCPROC	EP	Initializes several allocation and option related parameters in the CTGFL and CTGFV.
	KEYPROC	EP	Initializes the record management control block and the key range "pseudo-field" in the CTGFL.
	IXOPPROC	EP	Initializes index options.
	PROTPROC	EP	Initializes the security combination and owner identification fields and the SHAREOPTIONS and ERASE | NOERASE flags in the CTGFL.
	MODELPRC	PR	Handles the retrieval of model objects to be used in defining components of VSAM user catalogs and data sets.
	FREESTG	EP	Frees automatic storage for IDCDE02 CSECT.
IDCDE03			Routes control to proper routine.
	IDCDE03	EP	Calls proper procedure to construct parameter list for the different object types.
	CTLGPROC	PR	Oversees the construction of the VSAM CTGPL, CTGFV, and CTGFL for defining a VSAM master or user catalog.
	DSETPROC	PR	Oversees the construction of VSAM key sequenced and entry sequenced data sets.
	AIXPROC	PR	Oversees the construction of the VSAM catalog interface for defining alternate index data sets.
	PATHPROC	PR	Oversees the construction of the VSAM catalog interface for defining paths.
	DSPACPRC	PR	Oversees the construction of the VSAM catalog interface for defining VSAM data spaces.
	NVSAMPRC	PR	Oversees the construction of the VSAM catalog interface for defining a nonVSAM data set into a VSAM catalog.
IDCDI01			SYSLST DTF and put phase.
IDCDI02			SYSIPT DTF and get phase.
IDCDI03			Fixed and fixed blocked sequential access method SD DTF and get phase.
IDCDI04			Fixed and fixed blocked sequential access method SDDTF and put phase.
IDCDI05			Variable and variable blocked sequential access method SDDTF and get phase.
IDCDI06			Variable and variable blocked sequential access method SDDTF and put phase.

CSECT/Load Module Name	Label	Use	Description
IDCDI07			Undefined seqeuntial access method SDDTF and get phase.
IDCDI08			Undefined sequential access method SDDTF and put phase.
IDCDI09			Spanned and spanned block sequential access method SDDTF and get phase.
IDCDI10			Spanned and spanned block sequential access method SDDTF and put phase.
IDCDI11			Fixed and fixed blocked sequential access method MTDTF and get/put phase.
IDCDI12			Variable and variable blocked sequential access method MTDTF and get/put phase.
IDCDI13			Spanned and spanned blocked sequential access method MTDTF and get/put phase.
IDCDI14			Undefined sequential access method MTDTF and get/put phase.
IDCDI15			Fixed and fixed blocked indexed sequential access method DTF and get phase.
IDCDI20			DADSM requests for RESETCAT.
IDCDL01			DELETE FSR; delete a catalog entry from the VSAM catalog.
	IDCDL01	EP	Only entry point to this module.
	CATOPEN	PR	Opens the user catalog if required.
	FINDTYPE	PR	Locates the entry to be deleted in order to determine its type when type is not specified in command.
	PARAMCHK	PR	Checks for invalid type specification and other command parameter errors.
	BUILDCPL	PR	Constructs the CTGPL from parameters specified in the DELETE command and indicated in the FDT.
	CATCALL	PR	Calls VSAM catalog management to delete a single catalog entry.
	MORESP	PR	Obtains a larger catalog work area and reinvokes catalog management.
	CLEANUP	PR	Performs termination functions and closes the user catalog, if required.
IDCEX01			Main-line for Executive; routes control through processor.
	IDCEX01	EP	Only entry point to this module; entered from IDCSA01.
	MAIN	PR	Flip-flop control between Reader/Interpreter and FSR required for each command.
	CALLRI	PR	Invoke Reader/Interpreter to parse the next command.
	CALLFSR	PR	Invoke FSR named by the result of parse by Reader/Interpreter.
IDCEX02			Executive, initialize the processor.
	IDCEX02	EP	Only entry point to this module.
	SCANPARM	PR	Scan processor invocation parameter list.

CSECT/Load Module Name	Label	Use	Description
IDCEX03			Executive, terminate processing.
	IDCEX03	EP	Only entry point to this module.
	SCANPARM	PR	Scan invoker's parameter list to return next available page number.
IDCIO01			Supply all I/O services to the remainder of the processor. At each of the following entry points, IDCIO01 converts the service request to the appropriate system macros and issues those macros.
	IDCIOIT	EP	First call to I/O Adapter: initialize the adapter for subsequent calls.
	IDCIOOP	EP	Open 1 to 4 data sets (UOPEN macro), by calling IDCIO02.
	IDCIOTM	EP	Close any data sets still open (UIOTERM macro).
	IDCIOCL	EP	Close 1 to 4 data sets (UCLOSE macro), by calling IDCIO02.
	IDCIOPO	EP	Position to a specific record in a data set (UPOSIT macro), by calling IDCIO03.
	IDCIOSI	EP	Obtain various pieces of information about data set.
	IDCIOGT	EP	Read a record (UGET macro).
	IDCIOPT	EP	Write a record (UPUT macro).
	IDCIOVY	EP	Verify data set (UVERIFY macro).
	IDCIOCO	EP	Copy a data set (UCOPY macro).
	CHANGE	PR	Handles change of processing modes for RPL.
	GETEXT	PR	Call an external routine to get a data record.
	GETVSAM	PR	Get a logical record from a VSAM data set.
	IRAMEOD	PR	End-of-data-set exit routine for VSAM data sets.
	GETNONVS	PR	Get a logical record from a nonVSAM data set.
	IROSEOD	PR	End-of-data-set exit routine for nonVSAM data sets.
	PUTEXT	PR	Call a user-supplied routine for output.
	PUTVSAM	PR	Put a logical record to a VSAM data set.
	PUTNONVS	PR	Put a logical record to a nonVSAM data set.
	PUTREP	PR	Handle PUT (Replace) processing.
	VSAMERR	PR	Build VSAM error message argument list.
	BLDAMSG	PR	Prepare an error message.
	PRINTMSG	PR	Print a message.
	IDCIOS1	DE	Amount of storage IDCIO01 needs. Used by IDCSA01.
	IRSISYN	PR	Exit routine for I/O errors when attempting a GET on a nonVSAM, nonISAM data set.
	IRSOSYN	PR	Exit routine for I/O errors when attempting a PUT on a nonVSAM, nonISAM data set.
IDCIO02			Open/Close routine This routine can open or close 1 to 4 data sets with one call.
	IDCIO02	EP	Only entry point to this module.

CSECT/Load Module Name	Label	Use	Description
IDCIO02 (continued)	OPENRTN	PR	Open a data set.
	CKNONOP	PR	Check that a nonVSAM data set was opened successfully.
	CLOSERTN	PR	Close data sets that were opened by the I/O Open routine.
	ENVFREE	PR	Free storage used for a data set; system areas, buffers, control blocks, DTF, and access load module.
	DSDATA	PR	Issue CDLOAD and read label cylinder.
	BUILDRPL	PR	Build RPL for VSAM data set and get input workareas for buffers.
	BUILDACB	PR	Build ACB and EXLST for VSAM data set to be opened.
	BUILDDBK	PR	Load DTF and access module and modify DTF for a nonVSAM data set to be opened.
	BLDOCMSG	PR	Set up an error message.
	PRINTMSG	PR	Call Text Processor to print error message.
IDCIO03			Perform POINT, SETL and UIOINFO operations.
	IDCIO03	EP	Only entry point to this module.
	PTAMDS	PR	Point to VSAM logical record.
	PTISDS	PR	SETL to ISAM logical record.
	BLDAMSG	PR	Prepare error message.
	PRNTMSG	PR	Print message.
	DSINFO	PR	Find volume/data set information.
IDCLC01			LISTCAT FSR; produces a listing of all or part of a VSAM catalog. This module initializes and manages the routing of VSAM catalog entries.
	IDCLC01	EP	Only entry point to this module.
	INITPROC	PR	Interrogates the FDT and initializes the catalog and DADSM parameter lists and workareas.
	GNXTPROC	PR	Manages the request for all or a specified subset of the catalog entry types in alphameric sequence.
	ENTPROC	PR	Manages the request for specific entries from the catalog.
	RTEPROC	PR	Routes control to the appropriate formatting procedure. Then routes control for formatting the associated data sets in a cluster or alternate index grouping.
IDCLC02			This module locates, formats, and lists the VSAM catalog entries.
	IDCLC02	EP	This entry point is used to establish addressability, acquire automatic storage and initialize the common data area pointers.
	FREESTG	EP	Issues a UEPIL umacro to free the automatic storage acquired by IDCLC02.
	FPLPROC	EP	Re-initializes the string of CTGFLs prior to each catalog locate request, by using SAVEAREA copy stored at the original CTGFL-build time.

CSECT/Load Module Name	Label	Use	Description
IDCLC02 (continued)	LISTPROC	EP	Issues the Text Processor macro UPRINT and zeros out the Dynamic Data Area Argument List upon exiting.
	AUPROC	EP	Repetitively builds the Text Processor Dynamic Data Argument List for formatting and listing the VSAM catalog fields for nonVSAM or user catalog entry. Repeatedly invokes LISTPROC to print the data.
	LOCPROC	EP	Issues VSAM catalog locate request and obtains additional catalog work space if required. After the first successful locate, sets the catalog ACB information in the CTGPL and establishes the LISTC subtitle with the catalog name.
	CDIPROC	EP	Formats the VSAM catalog data for cluster, alternate index, data, index, and path associations. Issues the locate request to obtain associated data set names for listing the cluster-data set-index-path and alternate index-data set-index-path associations. Builds the Text Processor argument list and invokes LISTPROC to print the data.
	VPROC	EP	Repetitively builds the Text Processor Dynamic Data Argument List for formatting and listing the VSAM catalog fields for a volume record entry. Repeatedly invokes LISTPROC to print the data.
	ERRPROC	EP	Completes the Dynamic Data Argument List with either an Access Method Services or catalog return code, when required. Issues the UPRINT macro to list the informational or error messages. Issues UERROR macro to list VSAM catalog (SVC26) error messages. Zeros out the Dynamic Data Argument List upon return to the caller.
	ANSVPROC	EP	Retrieves the list of associated C.I. numbers and types from the work area and creates a save area copy.
IDCLR01	AATOPLR	EP	Only entry point to this module—Top control segment.
	ADDASOC	PR	Add an association to association table.
	BUFSHUF	PR	Moves record from last (general) buffer to "home" buffer for this record type.
	BLDVEXT	PR	Builds the vertical extension table.
	CATOPEN	PR	Opens the catalog data set and ENQs on it.
	CKEYRNG	PR	Checks the data object for key range. If yes, prints high key.
	CLEANUP	PR	Closes the catalog and DEQs from it and prints condition codes.
	CLENCRA	PR	Closes the CRA and frees storage associated.
	CRAOPEN	PR	Opens the CRA and calls the procedure to build the CTT.
	CTTBLD	PR	Reads CRA control record, gets storage for CTT, scans CRA, and builds CTT. Controls sequential dump.

CSECT/Load Module Name	Label	Use	Description
IDCLR01 (Continued)	DOOTHR	PR	Goes through SORTTBL forward chain containing nonVSAM names and calls PRTOTHR to print the objects.
	DOVSAM	PR	Goes through SORTTBL forward chain containing VSAM names and calls PRTVSAM to print them.
	ERROR	PR	Using entry subscript for error table, prints the error message, continues or aborts according to last condition code.
	GETPRT	PR	Gets copy of CRA record, calls IDCRC04 to obtain fields requested and, if COMPARE, gets the catalog record.
	INITLZE	PR	Initializes switches, adapter parameter list, IDCRC04 parameter list, opens the alternate output file, and gets table space.
	INTASOC	PR	Initializes an association table for a base object.
	INTSORT	PR	Gets storage for sort table, builds the entries in it from the CTT for the object type specified.
	INTVEXT	PR	Initializes VEXTTBL by calling IDCRC04 requesting extension pointers and places them in the table.
	MEMSORT	PR	Adds forward and backward pointers in sort table.
	PRTAAXV	PR	Prints associated AIXs volumes.
	PRTCMP	PR	Prints and/or compares information in CRA for one entry.
	PRTDMP	PR	Prints unformatted CRA record. If compare, calls PRTDMPC to print corresponding catalog information and underscore miscompares.
	PRTDMPC	PR	Prints unformatted catalog record corresponding to CRA record being printed. The miscompares are underscored.
	PRTFIFO	PR	Print CRA without sorting using the same procedures as if sorting.
	PRTMCWD	PR	Prints miscompare message indicating most severe fields in error.
	PRTOJAL	PR	Print alias(s) associated with an object.
	PRTOJVL	PR	Print volumes and high keys associated with an object.
	PRTOTHR	PR	Print and/or compare all nonVSAM objects and their extensions.
	PRTTIME	PR	Print time stamps of volumes after converting them to MM/DD/YY HH/MM/SS.
	PRTVOL	PR	Print and/or compare volume record and its extensions.
	PRTVSAM	PR	Print and/or compare VSAM structures and associated records.
	SUMIT	PR	Sum or print number of objects processed.
	TCICTCR	PR	Translate control interval from catalog to CRA.
	VERTEXT	PR	Loops through the VERTEXT and extensions and prints them.

CSECT/Load Module Name	Label	Use	Description
IDCLR02		EP	Formats the buffer pool and reads CRA and catalog records.
IDCMP01			IMPORT FSR; reconstruct a VSAM cluster or alternate index from a portable copy that was created by IDCXP01. Any associated. paths are also recreated IDCSACA is called (UCATLG macro) to add the necessary entries to the VSAM catalog, and a UCOPY macro is issued to copy the data set by logical records. When the input data set is a catalog, no copy is performed; instead the catalog is connected by a call to IDCSACA.
	IDCMP01	EP	Only entry point to this module.
	CLUSPROC	PR	Reads catalog and data records from the portable volume. Uses catalog information plus information from the command to perform a catalog define for the cluster or alternate index. Copies data into the object after successful definition in the catalog.
	CNCTPROC	PR	Connects one or more user catalogs.
	DUPNPROC	PR	This procedure is called when a duplicate entry name is found in the catalog when trying to define the data set to be imported. A locate will be performed to see if the entry has the temporary export flag set in the attributes field. If so, a delete is then performed so that the imported data set may be defined.
	CPLPROC	PR	Constructs a CTGPL to be used for a catalog define, alter, delete, or locate operation.
	IUNIQPRC	PR	Checks the DSATTR field in the CTGFV to see if the cluster being defined is a unique data set. If so, a null space (volume) CTGFV must be supplied for catalog define.
	ALTRPROC	PR	Constructs a CTGPL and CTGFV to be employed by the catalog alter interface.
	LVLRPROC	PR	Constructs CTGFL for DEVTYPE lists and constructs list of volume serial numbers.
	CTLGPROC	PR	Invokes the VSAM catalog management to perform the operation indicated in the CTGPL.
	DELTPROC	PR	Deletes any temporarily exported data sets found by DUPNPROC.
	OPENPROC	PR	Performs all opens required for opening a VSAM object or user catalog for input or opening the portable volume for output.
	RANGPROC	PR	Processes all information dealing with key ranges.
	BFPLPROC	PR	Constructs a CTGFL from dictionary and workarea information.
	RECPROC	PR	Copies the data from the portable data set to the VSAM object being imported. The VSAM object is opened by OPENPROC. The UCOPY macro is employed to perform the copy. The UCLOSE macro is employed to close the object.
	MVDAPROC	PR	Moves data from one location in virtual storage to another as specified by input arguments.

CSECT/Load Module Name	Label	Use	Description
IDCMP01 (Continued)	MSGPROC	PR	Uses the Text Processor interface to list messages.
	FVTPROC	PR	Constructs CTGFVs and CTGFLs from information in the dictionary.
	BPASPROC	PR	Constructs PASSWALL CTGFL and moves information into PASSWALL.
	GETPROC	PR	Gets a data record and moves it into a buffer. Reconstructs the original record if it has been segmented.
IDCPM01			PARM FSR; establish or change the processor parameters. Processor parameters (TEST, MARGINS, and GRAPHICS) can be established through the PARM field of the EXEC card. This FSR provides an alternate way to set these options. The results of changing TEST appear in the area whose address is in GDTDBH. The results of changing MARGINS appear as the first two halfwords in the area whose address appears in GDTRIH, and GRAPHICS is recorded in the PCT.
	IDCPM01	EP	Only entry point to this module.
	TESTPARM	PR	Resets the previous test option if necessary. Processes new test option. Obtains and initializes the Test Option Data Area.
	TESTSAVE	PR	Extracts the specified test parameters from the FDT and places them in the Test Option Data Area to be used by the Access Method Services dump routine.
	MARGPARM	PR	Processes the input command source margins specified. The left and right margin values are placed into the Reader/Interpreter Historical Data Area to be used by the Reader/Interpreter when processing subsequent command input.
	GRPHPARM	PR	Determine graphics option chosen and issue UREST macro to establish the specified translate table.
IDCPR01			PRINT FSR; print the contents of a data set in EBCDIC, hexadecimal, or dump format. Page layout is established with a call to IDCTPEA (UESTA macro) and lines of data are printed by calling IDCTPPR (UPRINT macro).
	IDCPR01	EP	Only entry point to this module.
	TEXTPSET	PR	Communicates the page layout and record layout for the listing to the Text Processor.
	DELIMSET	PR	Establishes the boundaries for printing a subset of the input data set.
IDCRC01		EP	This is the highest level of control and the only entrypoint to this module. The function loops through the CRAs opening them, writes them and their associated objects to the portability data set and closes them.
	BUILDCRV	PR	Obtains space for CRV, ACC, and VTT, obtains volume and device type information on CRAs.,

CSECT/Load Module Name	Label	Use	Description
IDCRC01 (Continued)			and constructs the name chain for all entries in the CRAs
	BUILDNAM	PR	Builds the name chain extension block of storage.
	CHKCATNM	PR	Reads a CRA record and checks the owning catalog, then issues an ENQ on the owning catalog.
	CKNAMES	PR	Gathers passwords for VSAM data sets, collects the association CI numbers and determines the largest logical record length.
	COMPNAME	PR	Compresses the blanks from the right of the object name and places it in the space obtained in the procedure SUBSP.
	DIRECT	PR	Gets space and reads in the directory.
	DUPNAMCK	PR	Scans the name chain for duplicate names and prints message if one is found.
	ERRCK	PR	If an error is considered severe, the catalog is closed and the error message is printed.
	EXPORTDR	PR	Prints start of export of CRA message, calls IDCRC02 to export and prints completion message.
	EXTRACT	PR	Sets up the FMPL and calls IDCRC04 to extract data fields from CRA records.
	INIT	PR	Calls SUBSP to obtain storage and then initializes the buffer pool.
	MESSAGE	PR	Handles the printing of all messages.
	NAMETABL	PR	Checks the name on the CRA record and if it is a cluster, AIX, nonVSAM or catalog connector, it builds the name into the name chain.
	OBJVOLCK	PR	Checks the time stamp and CI on the volumes with that of the CRA for each object.
	OPEN	PR	Builds the OPNAGL and issues the open for the CRA. It then checks the owning catalog name for the major owning catalog.
	OPENCRA	PR	Calls procedures to open the CRA, get its time stamp, build the name table and the directory entry.
	SCANCRA	PR	Reads the catalog record, gets storage for CTT and loops all CRA records putting CI numbers in the CTT and calls NAMETABL to build the name table.
	SUBSP	PR	Handles the obtaining and allocation of small pieces of storage associated with the name table from one large block.
	SYNCH	PR	Checks the entire name chain for entries specified in the input. It also checks for valid associations, CIs, and volumes.
	TERM	PR	Dequeues from owning catalog, closes the portability data set, and releases storage.
	TIMESTMP	PR	Reads the volume time stamp using UIOINFO and places it in the volume timestamp table.

CSECT/Load Module Name	Label	Use	Description
IDCRC02			Creates a portable data set of VSAM clusters, catalog information for nonVSAM, and associated aliases.
	IDCRC02	EP	Only entry point to this module.
	ALSPROC	PR	Obtains catalog information for alias associations of nonVSAM data sets.
	ASOCPROC	PR	Obtains catalog information for generation data sets associated with generation data groups.
	CLUSPROC	PR	Obtains catalog information and data for VSAM clusters.
	CONTROL	PR	Builds control records containing catalog information.
	CTLGPROC	PR	Invokes catalog management with a CTGPL for Locate.
	LOCPROC	PR	Builds a CTGPL and multiple CTGFLs for catalog locates.
	MVDAPROC	PR	Moves data in storage from one location to another and clears work area storage.
	NVSMPROC	PR	Gets catalog information for nonVSAM data sets.
	OPENPROC	PR	Opens the VSAM cluster for input and the portable data set for output.
	PRNTPROC	PR	Prints messages for association errors.
	PUTPROC	PR	Writes a control record containing catalog information to the portable data set.
	RECPROC	PR	Copies the data for a VSAM cluster to the portable data set.
	SAVEPROC	PR	Saves control records containing catalog information until processing for that object's catalog information is complete and then writes all records to the portable data set.
IDCRC03		EP	Handles format of buffer pool and reading of catalog or CRA records.
IDCRC04		EP	This is the only entry point to this module.
	PCKLC	PR	Insures the requested catalog field exists in a group occurrence being processed.
	PEXPT	PR	Sets up address and length of extension pointers as per argument passed.
	PGREC	PR	Obtains addressability to the desired CI block.
	PGREP	PR	Finds highest non-deleted RELREPNO with desired group code.
	PGVAL	PR	Find the field and extract the requested data.
	PLNRV	PR	Locate non-replicated values
	PLOCZ	PR	Locate field and dictionary information.
	PLVAL	PR	Locate fixed or variable length field in physical record and group occurrence.
	PSCNC	PR	Loops through all FMFLs to convert names to internal notation.
	PSCNF	PR	Moves requested data to area specified by caller.
	PSHIN	PR	Inserts the data found into requested field.

CSECT/Load Module Name	Label	Use	Description
IDCRC04 (Continued)	PTCMP	PR	Compares sub-fields between input data and "found" data.
	PTRNS	PR	Format and build compressed name table, insure group codes if special name obtained from caller.
	PTSTS	PR	Tests for existence of field and if there, places dictionary information into work area.
IDCRI01			Consists of CSECTs IDCRI01, IDCRI02, and IDCRI03. IDCRI01 is the Reader/Interpreter main-line routine. Its functions are: 1. On first entry only, load a table of Command Descriptor phase names and a table of modal command verbs, initialize the Reader/Interpreter Historical Data Area, and obtain PARM options input if it exists in the PARM field of the EXEC statement. 2. Scan the input stream for a command verb. 3. Handle modal commands (IF, ELSE, DO, END, and SET) to determine which command to process next. 4. Having found a function command verb, invoke IDCRI02 to find and load the appropriate Command Descriptor module and initialize the FDT. 5. Scan parameter set, using the Command Descriptor, to check syntax and semantics and to build FDT. 6. Invoke IDCRI03 for clean-up activity following each function command, and return to IDCEX01 if the function command is to be executed—that is, if it contains no syntax or semantic errors detectable by the Reader/Interpreter.
	IDCRI01	EP	Only entry point to this module.
	RIINIT	PR	Initialize Reader/Interpreter processing.
	SCANCMD	PR	Control command scanning and FDT building.
	GETNEXT	PR	Get next function command verb name and pointer to its parameter set. Intepreter modal commands.
	MODALSET	PR	Process SET modal command.
	MODALIF	PR	Process IF modal command.
	MODLELSE	PR	Process ELSE modal command.
	BYPASTRM	PR	Prepare to obtain next verb name.
	KWDPARM	PR	Process a keyword after searching the Command Descriptor for its match.
	POSPARM	PR	Process a positional parameter.
	GETDATA	PR	Set up to extract constant or list of constants.
	GETSIMPL	PR	Extract an unquoted constant.
	GETQUOTD	PR	Extract a constant from within apostrophes.
	BUILDFDT	PR	Place constants into FDT (converting if needed).

CSECT/Load Module Name	Label	Use	Description
IDCRI01 (continued)	CONVERT	PR	Convert EBCDIC to binary, decimal, or hexadecimal.
	DSIDCHK	PR	Check data set name item for adherence to naming conventions.
	GETSPACE	PR	Allocate space for an FDT element.
	MORSPACE	PR	Allocate additional space for a list of constants in an FDT element.
	INREPEAT	PR	End of repetition of a subparameter list has occurred; prepare for another of the subparameter list repetitions.
	DEFAULTS	PR	Add defaults to parameters explicitly specified.
	ERRSETUP	PR	Make special preparations to print semantic error message.
	NEEDNOTS	PR	Check parameters to ensure that certain semantic requirements have not been violated. Check for mutually exclusive parameters, and required parameters.
	SKIPCMD	PR	Bypass remainder of current command.
	SETFLAG	PR	Flag that a particular parameter was found in the input or was implied by defaults.
	PACKCVB	PR	Convert EBCDIC string to fullword binary number.
	NXTFIELD	PR	Extract next field from the input stream.
	SCANSEP	PR	Scan past the next syntactic separator (comma, blanks, and/or comments).
	NEXTCHAR	PR	Extract the next character of the input stream.
	GETRECRD	PR	Read the next input record and print it.
	SCANENDS	PR	Find left and right scanning limits of command text in the input record just read.
	DSPLCALC	PR	Calculate offset into an array of pointers or counts.
	ERROR1	PR	Process an error whose message is static.
	ERROR2	PR	Process an error that requires variable data to be inserted into the message.
IDCRI02			Search the table of Command-Descriptor phases for the name of the phase that corresponds to the current command, and then load that phase. Initialize the FDT.
	IDCRI02	EP	Only entry point to this module.
IDCRI03			Reader/Interpreter function command termination. Free working space and delete unneeded phases.
	IDCRI03	EP	Only entry point to this module.
IDCRIKT			Modal command verb and keyword table, used by the Reader/Interpreter.
IDCRILT			Load Module Name Table for Command Descriptors Used by the Reader/Interpreter.
IDCRM01		EP	Only entry point to this module.
	ALISPROC	PR	Reads data records and checks for allowable type in the DOS system.

CSECT/Load Module Name	Label	Use	Description
IDCRM01 (Continued)	ALTRPROC	PR	Constructs the CPL and FVT to be used to alter the names of the objects.
	BFPLPROC	PR	Constructs the skeleton FPL or constructs the FPL from the dictionary and work area information passed by EXPORTRA on the portable volume.
	BPASPROC	PR	Constructs passwall FPL.
	CLUSPROC	PR	Reads catalog and data records from the portability volume and defines the object copy.
	CPLPROC	PR	Constructs the catalog parameter list to be used for UCATLG operations.
	CTLGPROC	PR	Invokes VSAM catalog management to perform operation indicated in CPL.
	DELTPROC	PR	Performs all delete operations using catalog management.
	FVTPROC	PR	Constructs FVT and FPLs from information in dictionary passed as an argument.
	GETPROC	PR	Gets a data record via UGET, reconstructs it and places it in the buffer.
	GDGPROC	PR	If this procedure is called in DOS, it writes an error message.
	IUNIQPRC	PR	Checks to see if data set being defined is a unique data set. Indicates that the unique data set is being imported as suballocated.
	LVLRPROC	PR	Constructs the FPL from the DEVICETYPES parameter or LISTVOLS from the RANGES parameter.
	MVDAPROC	PR	Moves data from one location in storage to another as specified by input arguments.
	NFVTPROC	PR	Constructs the FVT and FPLs for nonVSAM objects.
	NVSMPROC	PR	Reads catalog and data records from the portability data set and performs the define of nonVSAM entries.
	OPENPROC	PR	Performs all opens of VSAM objects for output or the portability data set for input.
	RANGPROC	PR	Processes key range information building the RANGES list.
	RECPROC	PR	Copy data from portability data set to VSAM cluster.
	UCATPROC	PR	Reads catalog and data records from portable volume and performs a define of user catalog pointers and aliases.
IDCRP01			REPRO FSR; copy a SAM, ISAM, or VSAM data set to a SAM or VSAM data set; unload or reload catalogs. Data set types are determined at open time, when IDCIOOP is called (UOPEN macro). When records are skipped at the beginning, a series of UGETs is issued until the required record is reached. When records are skipped at the end, a series of UGETs and UPUTs is issued.

CSECT/Load Module Name	Label	Use	Description
IDCRP01 (continued)			When the copy is to the end of the data set, then a single call is made to IDCIOCP (UCOPY macro), which copies the data set from the first record to be copied through the end of the data set. The UPOSIT macro is employed to position to a FROMKEY or FROMADDRESS starting point.
	IDCRP01	EP	Only entry point to this module.
	DELIMSET	PR	Establishes the boundaries for copying a subset of the input data set.
	CATRELOD	PR	Checks for sufficient space, matching names for target and backup catalogs, and for agreement with volume serial number and device types.
	SORSREAD	PR	Reads a record from the backup catalog during a catalog reload.
	TARGREAD	PR	Reads a record from the target catalog during a catalog reload.
	GETPAIR	PR	Reads a record from both the backup and target catalogs for the initial checking performed before a catalog reload begins.
	DUMPIT	PR	Activated by the PARM test function in order to trace all I/O for catalog record.
	TRUENAME	PR	Maps the RBA boundaries of the backup truename ranges.
	CATRANS	PR	Locate and translate control interval numbers from source catalog to target catalog.
	CNVRTCI	PR	Converts control interval numbers from source catalog values to target catalog values.
	CATCOMP	PR	Indicates differences in truename entries between backup and target catalogs.
	VERIFYC	PR	Opens a data set for control interval processing in order to compare the end-of-data-set and end-of-key-range information stored in the VSAM catalog with the true data in the data set. Reopens the data set for normal keyed processing.
IDCRS01			RESETCAT FSR; synchronize a catalog with the CRA (s) of its owned volume.
	IDCRS01	EP	Only entry point to this module.
	AERROR	PR	Exit if not enough storage is available to establish automatic storage for RESETCAT modules.
	CATINIT	PR	Initialize RESETCAT's description of the catalog.
	CLEANUP	PR	Ensure all resources are freed.
	COPYCAT	PR	Copy the catalog to the workfile.
	INIT	PR	Perform the main initializations of RESETCAT.
	MERGECRA	PR	Merge and reset CRA into the workfile.
	PROCCRA	PR	Process the records of the current CRA.
	REASSIGN	PR	Perform control interval reassignment.
	UPDCAT	PR	Update the catalog from the workfile.

CSECT/Load Module Name	Label	Use	Description
IDCRS01 (Continued)	UPDCRA	PR	Update the CRAs from the workfile.
	WRAPUP	PR	Handle clean-up operations after successful RESETCAT processing.
IDCRS02			Performs various checking functions.
	ASSOC	PR	Does association checking.
	CINALTER	PR	Alter control interval numbers in catalog records.
	LOCDIT	PR	Locates a specific control interval number in a catalog record.
	PROCCI	PR	Ensure that a control interval number is in the list of control interval numbers for records being processed.
	PROCTYPE	PR	Scan a catalog record for control interval numbers.
	SCANCI	PR	Scan record for control intervals.
	SETCI	PR	Update the workfile to reflect new control interval numbers for reassigned CINs.
	VERA	PR	Verify aliases for nonVSAM and GDG associations.
	VERC	PR	Verify associations for clusters.
	VERDSDIR	PR	Verify initial space claims.
	VERCI	PR	Verify associations on a set of records.
	VERG	PR	Verify associations for alternate indexes.
	VERR	PR	Verify associations for PATHs.
	VERU	PR	Verify associations for users catalogs.
	VERX	PR	Verify the alias chain.
IDCRS03			Contains procedures for controlling space.
	CATRCDSU	PR	Establish base record offsets for catalog low key range records.
	CHKBITS	PR	Compare bits in the bit map.
	CHKDSDIR	PR	Check a data set directory entry against a data or index component.
	CHKUNQ	PR	Check extents for unique data spaces.
	GETFIT	PR	Get a free entry in tables for ASSOC procedure.
	GETNEXTE	PR	Translate an index into a table into a virtual address.
	GETTAB	PR	Get and initialize a table for ASSOC procedure.
	MARKUNUS	PR	Mark a volume group occurrence (VGO) unusable.
	PROCVOL	PR	Resolve space conflicts.
	SETBMAP	PR	Check space conflicts for data or index type catalog entries.
	VERB	PR	Verify associations for GDG base records.
	VLNRESET	PR	Verify space requested from objects being reset against non-reset volumes.
	VLRESET	PR	Verify space requested from objects being reset against reset volumes.

CSECT/Load Module Name	Label	Use	Description
IDCRS03 (continued)	VOLCHK	PR	Volume consistency routine.
IDCRS04			Performs field management processing.
	DELGO	PR	Delete a group occurrence.
	FIND	PR	Locate requested information from a set of catalog records.
	MODGO	PR	Modify a group occurrence.
IDCRS05			Association processing.
	ADDTN	PR	Add a true name to the catalog.
	ADDUPCR	PR	Prepare for update CRA processing.
	BLDRLST	PR	Add an entry to the reset volume table.
	BLDVLST	PR	Add an entry to the volume serial table.
	CKERR	PR	Print an error message.
	CRAUPCHN	PR	Add a workfile record to a specific "update CRA" chain.
	DELTN	PR	Delete a true name from the catalog.
	ENTNMCK	PR	Determine if a catalog record has a valid entry name.
	GENNAME	PR	Generate a true name.
	GETVIA	PR	Get a record by control interval number via a specific CRA.
	SCNRLST	PR	Obtain the next CRA volser entry.
	SCNVLST	PR	Scan the list of volumes.
IDCRS06			Handles I/O functions; defines and deletes the workfile.
	DSCLOSE	PR	Close a VSAM data set.
	DSOPEN	PR	Open a VSAM data set.
	RECMGMT	PR	Perform I/O requests.
	WFDEF	PR	Define the workfile for RESETCAT processing.
	WFDEL	PR	Delete the workfile.
IDCRS07			This module contains system dependent code designed specifically for RESETCAT functions.
	CATEOV	PR	Extend the catalog.
	CNVTCCHH	PR	Convert CCHH to TTnn.
	DADSM	PR	Process all DADSM functions.
	ENSURECI	PR	Ensure that there are enough control intervals for reassignment.
	EOVPANCI	PR	Format catalog free records until the catalog is extended.
	EOVPCCCR	PR	Update and write the CCR.
	EOVPCHAC	PR	Get the high allocated control interval numbers for the Low Key Range (LKR) and High Key Range (HKR) of the catalog.
	EOVPRBAP	PR	Build a table of high RBA field pointers for record management control blocks.
	EOVPRCCR	PR	Read the catalog control record (CCR) and update the high allocated control intervals in the record management control blocks.

CSECT/Load Module Name	Label	Use	Description
IDCRS07 (Continued)	EOVPWFLR	PR	Write a deleted free record to the catalog.
	EOVPXIO	PR	Perform I/O for the catalog.
	RENAMEP	PR	Rename duplicate true name entries.
	UPDCCR	PR	Update the catalog control record (CCR).
IDCSA01			Entry and exit module for the Access Method Services processor. Interface between the operating system and the processor. Create the GDT and call IDCEX01.
	IDCSA01	EP	Entry point for DOS Job Control invocation.
	IDCSAS1	EP	Entry point for subroutine call invocation. It is six bytes beyond IDCSA01.
	PRNTERR	PR	Print an error message using EXCP.
	GETCORE	PR	Issue GETVIS to allocate storage.
IDCSA02			Supply all system services to the remainder of the processor, except prologue and epilogue At each of the following entry points, IDCSA02 converts the service request to the appropriate system macros, and issues those macros.
	IDCSACL	EP	Load an executable module and branch to it (UCALL macro).
	IDCSALD	EP	Load a module but do not branch to it (ULOAD macro).
	IDCSADE	EP	Not functional in DOS/VS.
	IDCSAGS	EP	Get space, a request for non-pooled storage (UGSPACE macro).
	IDCSAFS	EP	Free space, release pooled or non-pooled storage (UFSPACE macro).
	IDCSAGP	EP	Get pool, a request for pooled storage (UGPOOL macro).
	IDCSAFP	EP	Free pool, release pooled storage (UFPOOL macro).
	IDCSATI	EP	Get date and time of day by calling IDCSA05 (UTIME macro).
	IDCSACA	EP	Issue the VSAM CATLG macro (UCATLG macro).
	IDCSASN	EP	Provide core dump (USNAP macro).
	COREINIT	PR	Initialize an area of storage to binary zeros or blanks.
	IDCSAS2	DE	Amount of storage IDCSA02 needs Used by IDCSA01.
IDCSA03			Prologue and epilogue for all routines This module is called at entry to and exit from all other modules.
	IDCSAPR	EP	Prologue entry point, acquire storage.
	IDCSAEP	EP	Epilogue entry point (UEPIL macro), release storage.
	GETCORE	PR	Get requested amount of storage.
	IDCSAS3	DE	Amount of storage IDCSA03 needs Used by IDCSA01.

CSECT/Load Module Name	Label	Use	Description
IDCSA04			Phase table containing load status information of other phases. Used by the System Adapter.
IDCSA05			Get date and time of day (invoked by IDCSA02).
	IDCSA05	EP	Only entry point to this module.
IDCSA08			Acquire control of a resource. Release control of a resource.
IDCTP01			Text Processor: provide formatting for printed output. Each of the following entry points represents a service provided by the Text Processor. This module includes all conversion routines and controls the printing of each line of output text.
	IDCTPES	EP	Establish a PCT from static text (UESTS macro).
	IDCTPEA	EP	Establish a PCT from storage (UESTA macro).
	IDCTPER	EP	Establish linkage to error message processor (UERROR).
	IDCTPRS	EP	Modify an existing PCT (UREST macro).
	IDCTPRE	EP	Re-initialize Text Processor for the next function (URESET macro).
	IDCTPPR	EP	Print one or more lines (UPRINT macro).
	SPACE	PR	Set up line spacing.
	REDO	PR	Initiate replication.
	STATIC	PR	Set up static text.
	BLOCK	PR	Set up block data.
	INSERT	PR	Routine to insert data into predefined format, or use static text when an insert is missing and default data is called for.
	CONVERT	PR	Converts data and sets it into the print line.
	BHCONV	PR	Convert binary data to hexadecimal characters or hex-apostrophe representation.
	BHDCONV	PR	Convert binary data to hex-dump format.
	EBCDIC	PR	Sets up transfer of EBCDIC characters to a print line.
	PUPCONV	PR	Convert packed-decimal data to unpacked-decimal characters.
	BDCONV	PR	Convert binary data to packed-decimal data, and call PUPCONV for conversion to unpacked-decimal characters.
	IDCTPS1	DE	Amount of storage IDCTP01 needs. Used by IDCSA01.
	ERROR	PR	Process error condition.
	STACKPUT	PR	Buffers data lines. Does a UPUT on the line when the stack is full, a message is to be printed, or the print file is changed.
	LINERET	PR	Returns formatted lines to the caller.
	LINEPRT	PR	Controls title lines, headings, spacing; translates data lines; and calls STACKPUT.

CSECT/Load Module Name	Label	Use	Description
IDCTP04			Initialize and modify PCT; set up all page controls, define headings and footings, and define format of page.
	IDCTP04	EP	Only entry point to this module.
	ESTSCONT	PR	Get space for PCT and initialize it (UESTS macro).
	ESTACONT	PR	Get space for PCT and initialize it from storage parameters (UESTA macro).
	P04SETUP	PR	Set up working table for PCT initialization.
	RESTCONT	PR	Initialize working table for modifying existing PCT (UREST macro).
	PCTSETUP	PR	Verify and initialize elements of PCT.
	RESETCON	PR	Re-initialize Text Processor for next function, return page number, and clear PCT.
	INITPCT	PR	Get and initialize PCT.
	STACKFL	PR	Print lines in stack buffer.
IDCTP05			Read Text Structures into storage for use by either IDCTP01 or IDCTP04.
	IDCTP05	EP	Only entry point to this module.
IDCTP06			Formats error messages for any FSR.
	IDCTP06	EP	Only entry point to this module.
IDCTSAL0			Text Structure for ALTER messages.
IDCTSBI0			Text Structure for BLDINDEX message.
IDCTSDE0			Text Structure for DEFINE messages.
IDCTSDL0			Text Structure for DELETE messages.
IDCTSEX0			Text Structure for Executive routines messages.
IDCTSIO0			Text Structure for I/O Adapter routines messages.
IDCTSLC0			Text Structure for LISTCAT listing.
IDCTSLC1			Text Structure for LISTCAT messages.
IDCTSLR0			Text Structure for LISTCRA listing.
IDCTSLR1			Text Structure for LISTCRA messages.
IDCTSMP0			Text Structure for IMPORT and IMPORTRA messages.
IDCTSPR0			Text Structure for PRINT listings and PRINT/REPRO messages.
IDCTSRC0			Text Structure for EXPORTRA messages.
IDCTSRI0			Text Structure for Reader/Interpreter routines messages.
IDCTSRS0			Text structure for RESETCAT messages.
IDCTSTP0			Text Structure for Text Processor routines; contains print chain definitions.
IDCTSTP1			Text Structure for Text Processor routines messages.
IDCTSTP6			Text Structure for UERROR messages.
IDCTSUV0			Text Structure for any routine (universal messages).
IDCTSXP0			Text Structure for EXPORT messages.

CSECT/Load Module Name	Label	Use	Description
IDCVY01			VERIFY FSR; check a VSAM data set against its catalog entries and correct any discrepancies that may be found, by calling IDCIOVR (UVERIFY macro).
	IDCVY01	EP	Only entry point to this module.
	OPENPROC	PR	Opens the VSAM data set to be verified.
	TERMPROC	PR	Closes the VSAM data set that was verified.
IDCXP01			EXPORT FSR; create a portable copy of a VSAM cluster or alternate index. Copy is done by issuing a UCOPY macro. When the input data set is a catalog, no copy is performed. Instead, the catalog is disconnected by a call to IDCSACA.
	IDCXP01	EP	Only entry point to this module.
	CLUSPROC	PR	Gets catalog information and data for a cluster object and calls CONTRBL to write all the information to a portable volume. Processes the disposition options. If it is a permanent option, the cluster will be deleted. If it is a temporary option, the temporary export flag is turned on by issuing a catalog alter.
	DSCTPROC	PR	Disconnects a user catalog.
	LOCPROC	PR	Builds a CTGPL and multiple CTGFLs for use by catalog locate. CTGFLs used to locate catalog information to be exported.
	CTLGPROC	PR	Invokes the VSAM catalog management to perform the operation indicated in the CTGPL.
	OPENPROC	PR	Performs all opens required for opening a VSAM cluster for input or opening the portable volume for output.
	ALTRPROC	PR	Constructs the CTGPL and CTGFV for a catalog alter operation so that the data set attributes catalog field (DSATTR) can be modified.
	DELTPROC	PR	Constructs a CTGPL for a catalog delete operation so that a cluster or alternate index can be deleted or a user catalog disconnected. Invokes VSAM catalog management to delete clusters or alternate indexes.
	PUTPROC	PR	Writes a catalog record to the portable volume.
	RECPROC	PR	Copies the data from the VSAM cluster to be exported to the portable data set, record by record.
	MVDAPROC	PR	Copies data from one part of virtual storage to another or, optionally, zeros out part of virtual storage.
	CONTRBL	PR	Writes catalog information to a portable volume.
	MORESP	PR	Obtains a larger work area for VSAM catalog management and reinvokes catalog.

DATA AREAS

The data areas in this chapter are described in four columns, which are interpreted as follows:

Offset: The numeric address of the field relative to the beginning of the area. The first number is the offset in decimal, followed (in parentheses) by the hexadecimal equivalent.

Bytes and Bit Pattern: The size (number of bytes) of the field and its alignment relative to the fullword boundary. A *v* indicates variable length.

Examples:

4	A four-byte field beginning on a word boundary.
. . 3	A three-byte field beginning on a halfword boundary and running into the next word.

This column also shows the bit patterns of a byte when they are significant (as in a flag byte). When the column is used to show the state of the bits (0 or 1) in a flag byte, it is shown as follows:

....	The eight bit positions (0-7) in a byte. For ease of scanning, the high-order (leftmost) four bits are separated from the low-order four bits.
x...	A reference to bit 0.
1...	Bit 0 is on.
0...	Bit 0 is off.
.... ..xx	A reference to bits 6 and 7.

Bit settings that are significant are shown and described. Bit settings that are not shown are considered to be reserved and set to zero.

Field Name: A name that identifies the field and appears in the assembly listings. A sub-field or value name is indented from the field's name. An * indicates the field is not named.

Description: Content, Meaning, Use: A description of the use of the field.

Buffer Pool Control Block (BUFS)

The Buffer Pool Control Block is used by EXPORTRA to control I/O buffers. It is passed from IDCRC01 through field management (IDCRC04) to IDCRC03.

Created by	Modified by	Used by	Size
IDCRC01	IDCRC03	IDCRC03	28

Buffer Pool Control Block Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	BUFPOOL	Address of first buffer.
4 (4)	4	BUFPL	Address of chain of buffers.
8 (8)	4	BUFIOCS	Address of the IOCSTR.
12 (C)	4	BUFGDT	Address of the GDT.
16 (10)	4	BUFCTT	Address of the CTT
20 (14)	4	BUFWKARA	Address of the work area.
24 (18)	2	BUFSIZE	Size of buffer pool.
26 (1A)	.2	BUFSWS	Indicator Flags.
	1...	BUFORMAT	1=Buffer pool formatted
			0=Buffer pool not formatted
	.xxx xxxx	*	Reserved.
	xxxx xxxx	*	Reserved.

Command Descriptor

There is a Command Descriptor for each verb supported by this processor. The Command Descriptor is a load module that contains directions for parsing the command, performing semantic checking, and building an FDT from the commands. The name of the load module for each verb is found in a directory, which is itself a load module named IDCRILT. IDCRILT is loaded upon the first entry to IDCRI01.

The name of each load module and the corresponding verb, as supplied by IBM, is as follows:

IDCCDAL	ALTER	IDCCDRC	EXPORTRA	IDCCDPM	PARM
IDCCDBI	BLDINDEX	IDCCDMP	IMPORT	IDCCDPR	PRINT
IDCCDDE	DEFINE	IDCCDRM	IMPORTRA	IDCCDRP	REPRO
IDCCDDL	DELETE	IDCCDLC	LISTCAT	IDCCDRS	RESETCAT
IDCCDXP	EXPORT	IDCCDLR	LISTCRA	IDCCDVY	VERIFY

Each Command Descriptor consists of a series of variable-length entries. The first entry is always the verb-data entry, which names the FSR load module to use. Subsequent entries define default values, syntactic and semantic requirements, the structure of all possible parameters, and the structure of the FDT to be built from this command.

Created by	Modified by	Used by	Size
IBM-Supplied	None	IDCRI01	Variable

Verb Data Area

A Command Descriptor always begins with the Verb Data Area. This data area names the FSR for this command, gives the total number of parameters, and provides offsets to other data areas in the Command Descriptor.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	4	DESCID	Descriptor identification, contains the last four letters of the Command Descriptor module name. For example, 'CDAL' for the Alter Command Descriptor, IDCCDAL.
4(4)	2	PCLDSPL1	Not used in DOS/VS.
6(6)	..2	VDATALEN	Number of halfwords in Verb Data Area (used to compute the address of the first Parameter Data Area).
6(6)	2	PARMCNT	Number of Parameter Data Areas in this Command Descriptor.
10(A)	..2	MAXID	Largest parameter ID number that is used in this Command Descriptor.
12(C)	8	LOAD NAME	Load module name of FSR that processes this command.
20(14)	1	POSDSPL	Number of halfwords from the beginning of the Verb Data Area to Positional Parameter appendage of the Verb Data Area.
21(15)	.1	DGRPDSPL	Number of halfwords from the beginning of the Verb Data Area to Default Parameter appendage of the Verb Data Area.
22(16)	..1	VNGRPDSP	Number of halfwords from the beginning of the Verb Data Area to Needed Parameters appendage of the Verb Data Area.
23(17)	...1	NTGRPDSP	Number of halfwords from the beginning of the Verb Data Area to Incompatible Parameters appendage of the Verb Data Area.

Positional Parameter Appendage

This appendage contains the parameter ID number of each positional parameter that is not a subparameter of other parameters. This appendage may follow the Verb Data Area or any Verb Data Area appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	VPOSCNT	Number, *n*, of ID numbers that follow:
2(2)	2x*n*	VPOSID*n*	List of ID numbers for positional parameters.

Default Parameter Appendage

This appendage contains the parameter ID number of each default parameter. The parameter IDs are grouped into arrays. The first parameter in each array is the default if none of the parameters in that array is supplied in the command. This appendage may follow the Verb Data area or any Verb Data Area appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	DGRPTOT	Number of arrays that follow.
Each array contains:			
	2	DGRPCNT	Number, *n*, of ID numbers that follow:
	2x*n*	DGRPID*n*	List of ID numbers.

Needed Parameters Appendage

This appendage contains the parameter ID number of any necessary parameter that is not a subparameter of another parameter. The parameter IDs are grouped into arrays. At least one of the parameters in each array must be supplied through the command. This appendage may follow the Verb Data Area or any Verb Data Area appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	VNGRPTOT	Number of arrays that follow:
Each array contains:			
	2	VNGRPCNT	Number, *n*, of ID numbers that follow:
	2x*n*	VNGRPID*n*	List of ID numbers.

Incompatible Parameters Appendage

This appendage contains the parameter ID numbers for each parameter in groups of incompatible parameters. The parameter IDs are grouped into arrays. Only one parameter in each array may be supplied through the command.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	NTGRPTOT	Number of arrays that follow:
Each array contains:			
	2	NTGRPCNT	Number, *n*, of ID numbers that follow:
	2x*n*	NTGRPID*n*	List of ID numbers.

Parameter Data Area

The Parameter Data Area follows the Verb Data Area, and describes the syntax and subparameters of a parameter. Usually there is one Parameter Data Area for each parameter. However, one Parameter Data Area can describe several parameters if the parameters have the same syntax and data.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	1	PDEFLEN	Number of halfwords in this Parameter Data Area including appendages.
1(1)	3	OCCURNUM	Number of times this parameter can be repeated in the command.
4(4)	1	IDDSPL	Number of halfwords from the beginning of this Parameter Data Area to the ID Appendage.
5(5)	1	KWDDSPL	Number of halfwords from the beginning of this Parameter Data area to the Keyword Appendage.
6(6)	1	NOTDSPL	Number of halfwords from the beginning of this Parameter Data area to the Conflicting Parameters Appendage.
7(7)	1	NGRPDSPL	Number of halfwords from the beginning of this Parameter Data area to the Necessary Parameters Appendage.
8(8)	1	PDEDSPL	Number of halfwords from the beginning of this Parameter Data area to the Prompt Appendage.
9(9)	1	KWDGRPID	Not used in DOS/VS.
10(A)	1	*	Reserved.
11(B)	1	FLAGS	Flags:
	1...	SCLRDATA	Indicates the user supplies data with this parameter.
	.1..	LEVEL1	Indicates this parameter is not a subparameter.
	..1.	REPEATED	Indicates the user may repeat the subparameters of this parameter.
	...1.	SCALAR	Indicates the user supplies a single constant with this parameter.
	.... 1...	LIST	Indicates the user may supply several "like" constants with this parameter.
	.... .1..	DEFAULT	Indicates this parameter has a default value.
	.... ..1.	SUBLIST	Indicates this parameter has subparameters.
	x	*	Reserved.

No Constant Appendage

This appendage follows the above section if the parameter has subparameters. In other words, if SUBLIST=1, this appendage immediately follows the FLAGS field described above.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
12(C)	2	PCLDSPL2	Not used in DOS/VS.
14(E)	1	SUBDSPL	Number of halfwords from the beginning of this Parameter Data Area to the Subparameter Appendage.
15(F)	1	REPMAX	Maximum times this parameter's subparameters may be repeated in the command.

Constant Appendage

This appendage follows the basic Parameter Data area if the parameter has constants. In other words, if SCLRDATA=1 this appendage immediately follows the FLAGS field described above.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
12(C)	4	HIVALUE	The greatest value a number constant may have.
16(10)	4	LOWVALUE	The least value a number constant may have.
20(14)	1	MAXLNGTH	The maximum length of the constant after any conversion.
21(15)	1	LISTMAX	Maximum number of times this constant may be repeated in a list of subparameters.
22(16)	1	*	Reserved.
23(17)	1	CFLAG	Flags:
	1...	NUMBER	Indicates the constant is a number.
	.1..	ANYSTRNG	Indicates the constant is a character string.
	..1.	DSNAM	Indicates the constant is a data set name.
	...1	GENERIC	Not used in DOS/VS.
	.... 1...	VOLID	Indicates a volume serial number may replace a data set name.
	.... .1..	USERID	Not used in DOS/VS.
	.... ..1.	PWORDOPT	Indicates the character string or data set name may be followed by a password.
	x	*	Reserved.

Default Data Appendage

This appendage follows the Constant Appendage if the parameter data has a default constant. In other words, if DEFAULT=1, this appendage immediately follows the CFLAGS field described above.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
24(18)	1	DEFLTLEN	Length of following field.
25(19)	*v*	DEFLTVAL	Default constant as it would appear in the command.

ID Appendage

This appendage contains the offset from the beginning of the primary Parameter Data List, PDL, to the Parameter Data Entry, PDE, for each parameter this Parameter Data Area describes. This appendage may follow any other Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	IDCOUNT	Number of sets of two fields that follow. There is a set of fields for each parameter.
Each set contains:			
	2	IDNUM	Parameter ID number.
	2	PDEOFST1	Not used in DOS/VS.

Keyword Appendage

This appendage contains every keyword for each parameter this Parameter Data Area describes. This appendage may follow any other Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	1	KWDCOUNT	Number of sets of fields that follow. There is a set of two fields for each keyword.
Each set contains:			
0(0)	1	KWDLEN	Length of the following keyword.
1(1)	*v*	KWDITEM	Keyword.

Conflicting Parameters Appendage

This appendage contains the parameter ID of each parameter tha may not appear with the parameters this Parameter Data Area describes. This appendage may follow any Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	NOTCOUNT	Number *n* of parameter IDs that follow.
2(2)	2x*n*	NOTID*n*	List of IDs of conflicting parameters.

Necessary Parameters Appendage

This appendage contains the parameter IDs of parameters that must appear with the parameters this Parameter Data Area describes. The parameters are grouped into arrays. One parameter in each array must appear. This appendage may follow any other Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	NGRPTOT	Number of arrays that follow:
Each array contains:			
0(0)	2	NGRPCNT	Number, *n*, of ID numbers that follow.
	2x*n*	NGRPID*n*	List of parameter ID numbers for necessary parameters.

Prompt Appendage

This appendage although it can be present in DOS/VS, is not used. It contains an offset from the beginning of the prompt PDL to the PDE for prompting information needed by parameters this Parameter Data Area describes. This appendage may follow any other Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	PDECNT	Number of sets of fields that follow.
Each set contains:			
	2	PDEPRMID	Not used.
	2	PDEPCLID	Not used.
	2	PDEOFST2	Not used.

Subparameter Appendage

This appendage contains all the subparameter IDs. This appendage may follow any other Parameter Data appendage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	SUBCOUNT	Number of sets of fields that follow. There is a set of two fields for each subparameter.
Each set contains:			
	2	PARMTYPE	Identifies this subparameter as positional, 'P', or keyword, 'K'.
	2	SUBID	Subparameter ID.

Command Descriptor Phase Table—IDCRILT

IDCRILT contains a table of all verbs accepted by the processor and the Command Descriptor phase names that are required to parse them.

Created by	Modified by	Used by	Size
IBM-Supplied	None	IDCRI02	258

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	2	LNAMECNT	Number of table entries.
2(2)	16×*n*		*n* table entries.
	8	TBIVERB	Verb character string.
	8	TBILNAME	Corresponding Command Descriptor phase name.

CRA Access Parameter List

The CRA Access Parameter List provides VSAM catalog management with information necessary to access the CRA as a catalog. It is pointed to by the ACB when the UCRA bit in the ACB is on for the OPEN of a CRA by EXPORTRA. The CRA Access Parameter List consists of three control blocks. The ACB points directly to the ACC (Access Method Services/Catalog Communication Table) which in turn points to the CTT (CRA Access Translate Table) and the VTT (CRA Volume Timestamp Table).

Created by	Modified by	Used by	Size
IDCRC01	None	VSAM Catalog Management	Variable

Access Method Services/Catalog Communication Table (ACC) Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	ACCTRANT	Address of the CRA Access Translate Table (CTT).
4 (4)	1	*	Reserved.
5 (5)	.3	ACCDSNCI	Control Interval number used when LOCATEs are performed via true names.
8 (8)	4	ACCVOLTT	Address of the Volume Timestamp Table.

CRA Access Translate Table (CTT) Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	CTTENTNO	Number of entries in the table.
4 (4)	4xn	CTTENTRY	Variable number (n) of 4-byte entries.
	1	CTTENTYP	Type of CRA record.
	.3	CTTCATCI	Catalog control interval number of the CRA control interval for this entry.

CRA Volume Timestamp Table (CTT) Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	VTTENTNO	Number of entries in the table.
4 (4)	14xn	VTTENTRY	Variable number (n) of 14-byte entries.
	6	VTTVOLSR	Volume serial number for the timestamp of this entry.
	8	VTTTMSTP	The timestamp that is in the format 4 DSCB on this volume.

Dump List

The Dump List tells the UDUMP macro which areas to dump. The Dump List consists of entries that describe the individual fields. If one or more fields are to be repeated, they can be described as an array where each group of fields is an element in the array. In such cases, the array is preceded by a Dump List entry called an array header. The array header causes the fields to be repeated. The end of the Dump List is indicated by an entry called the dump list terminator.

Individual entries are printed as *name=data*. Each field in an array is printed as *name(n)=data*. The array name is printed before the array elements. All arrays start on a new line.

Created by	Modified by	Used by	Size
All routines	IDCDB01	IDCDB02	Variable

Individual Field Entry

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	DMPIMNM	Name to be printed with the field. The name is aligned left and padded with blanks.
8 (8)	4	DMPITMPT	Address of field to be dumped.
12 (C)	2	DMPITMLN	Number of bytes to dump. For hexadecimal, bit, or character strings the number is from 1 to 256. For fixed binary, the number is from 1 to 4.
14 (E)	. . 1 .	DMPITMTP	Type of data in field: H Hexadecimal printed as two characters per byte. B Bit string printed as eight characters per byte. C Character printed as one character per byte. F Fixed binary printed as a signed number for halfwords or fullwords or as an unsigned number for one or three bytes. Leading zeros are suppressed.
15 (F)	. . . 1	*	Reserved.

Array Header Entry

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	DMPARYNM	Name to be printed at the start of the array. The name is aligned left and padded with blanks.
8 (8)	2	DMPARYSZ	Number of bytes in each input element of the array. The number can be from 1 to 32,767.
10 (A)	. . 2	DMPARYIC	Number of following individual items that are in the array. The number can be from 1 to 32,767.
12 (C)	2	DMPARYEX	Number of times to repeat the individual fields. The number can be from 1 to 99.
14 (E)	. . 1 .	DMPARYTP	Array header type—contains A.
15 (F)	. . . 1	*	Reserved.

Dump List Terminator Entry

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	DMPTRM	End of dump list indicator—contains X'FF'.

Dynamic Data List—DARGLIST

The dynamic data argument list describes variable data to be printed. It is always an argument for a print request (UPRINT macro).

Created by	**Modified by**	**Used by**	**Size**
Calling routine	None	IDCTP01	Variable

Offset	**Bytes and Bit Pattern**	**Field Name**	**Description: Content, Meaning, Use**
0 (0)	4	DARGDBP	Contains the address of block of data referred to by format list or zero.
4 (4)	4	DARGRETP	Zero if printing is to occur; nonzero if no printing is to occur. If nonzero, contains the address of the area in which the formatted print lines are to be returned from the Text Processor (and not printed). Data will be returned to the specified location. The data is truncated to the length (DARGRETL) of the provided area if necessary. Spacing control characters are not returned.
8 (8)	4	DARGSTID	Zero if a format list is also passed as a parameter. If nonzero, contains the Text Structure identification (STID) for static text element to be used as the format list.
Each DARGSTID contains:			
	3	DARGSMOD	Last three characters of the text-structure module name.
	. . . 1	DARGSENT	Static text entry.
12 (C)	2	DARGILP	Length of block whose address is in DARGDBP.
14 (E)	. . 2	DARGCNT	Number of insert and replication elements contained in DARGARY.
16 (10)	2	DARGRETL	Length of the return-data area (that is, DARGRETP).
18 (12)	. . 1	DARGIND	Offset to add to the print column in the format list (FMTOCOL).
19 (13)	. . . 1	*	Reserved.
20 (14)	8×*n*	DARGARY	Group array. The following fields are repeated *n* times, where n *n* = DARGCNT.
	2	DARGINS	Insert reference number.
		DARGREP	Replication reference number.
	. . 2	DARGINL	Input data length of the field pointed to by DARGDTM.
		DARGPCT	Replication count, number of times to replicate a series of format substructures (FMTLIST).
	4	DARGDTM	Dynamic data pointer, address of field to use for this insert. This field is not used for replication structures.

ERCNVTAB

Error Conversion Table

The Error Conversion Table is passed whenever a UERROR macro is issued. It contains the information necessary to convert numeric error codes into prose messages.

Created by	Modified by	Used by	Size
All routines	None	IDCTP06	32

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	ERTYPE	Type of error code to be converted.
	1...	ERCATLG	VSAM Catalog management error.
	.1..	EROSCAT	OS/VS Catalog error. Not used in DOS/VS.
1 (1)	.1	EROPER	VSAM Catalog operation being performed when error occurred. Only one operation type allowed per UERROR invocation.
	1...	ERCATLC	CMS Locate.
	.1..	ERCATDE	CMS Define.
	..1.	ERCATDL	CMS Delete.
	...1	ERCATAL	CMS Alter.
2 (2)	..1	EROSOPER	OS/VS Catalog operation being performed. Not used in DOS/VS.
3 (3)	...1		Reserved.
4 (4)	4		Reserved.
8 (8)	4		Reserved.
12 (C)	4	ERDSNM	Address of data set name or volume serial number associated with the Catalog Management request. The data set name is contained in a 44 byte field padded with blanks; the volume serial number is contained in a 44 byte field padded with binary zeros.
16 (10)	4	ERCATRC	VSAM Catalog Management return code.
20 (14)	4	ERCPLPT	Address of Catalog Parameter List (CTGPL) issued that resulted in error condition.
24 (18)	4		Reserved.
28 (1C)	4		Reserved.

Field Management Parameter List—FMPL

The Field Management Parameter List is passed whenever module IDCRC04 is called within EXPORTRA and LISTCRA. It contains information and pointers which enable IDCRC04 to extract data from records within the catalog or CRA.

Created by	Modified by	Used by	Size
IDCRC01 IDCLR01	IDCRC04	IDCRC04	Variable

Field Management Parameter List Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMPLFLNO	Number of FMFL pointers.
1 (1)	.3	FMPLBCIN	Control interval number of the base record.
4 (4)	4	FMPLGRTN	Address of the GET routine.
8 (8)	4	FMPLWKAR	Address of the field management work area.
12 (C)	4	FMPLUPTR	Value passed to user GET routine at Input/Output processing time.
16 (10)	1	FMPLRTCD	Return code from a call to IDCRC04.
17 (11)	.1	*	Reserved.
18 (12)	..2	FMPLENTH	Length of the output area provided by caller.
20 (14)	4	FMPLOAR	Address or the output area.
24 (18)	4xn	FMPLFMFL	Array of variable number (n) of 4-byte FMFL pointers.

Field Management Field List (FMFL) Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMFLDLNO	Number of length/data pairs passed by caller.
1 (1)	.1	FMFLTSTC	Compare test condition code.
2 (1)	..1	FMFLGRPC	Field group code supplied by caller.
3 (1)	...1	FMFLINDS	FMFL indicator flags.
	xxxx xxx.	*	Reserved.
	1	FMFLSUCC	Bit indicating success of test. 0=test is successful. 1=test is unsuccessful.
4 (4)	4	FMFLWKAR	Work area for field management.
8 (8)	4	FMFLDNAM	Pointer to 8-byte field name.
12 (C)	4	FMFLTCHN	Address of next test FMFL.
16 (10)	8xn	FMFLDATA	Variable number (n) of Length/Data pointer pairs.
	4.	FMFLENTH	4-byte length of supplied data.
	.4	FMFLADDR	4-byte address of supplied data.

Format List—FMTLIST

The format list defines the format of printed output. This list consists of several substructures, each identified by its flag byte. Format lists exist in the Text Structures, where they are referenced by STID numbers (Static Text Identifiers). Optionally, they may be passed as an argument of the UPRINT macro, in which case the DARGLIST argument does not furnish a STID.

Created by	Modified by	Used by	Size
Calling routine	None	IDCTP91	Variable

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flags:
	1...	FMTEOLF	End of structure.
	.1..	FMTSCF	Space control.
	..1.	FMTIDF	Insert data.
	...1	FMTBDF	Block data.
	.... 1...	FMTREPF	Replication.
	.... .1..	FMTSTF	Static text.
	.... ..1.	FMTDFF	Default data.
	1	FMTHDF	Header line.

Interpretation of each substructure of the format list depends on the value of FMTFLGS. Each of the possible substructures is shown below.

Spacing

The spacing substructure of the format list specifies the line spacing or carriage control to use while printing. The default spacing is used only when a line is not immediately preceded by a spacing substructure. A spacing substructure imbedded in an entry causes printing of the previously formatted data and signals the start of a new line.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'40'.
1 (1)	. 1	*	Reserved.
2 (2)	. . 2	FMTSPF	Space factor: if FMTSPT is equal to "A", this is the absolute line number to use for printing this line. If FMTSPT is equal to "R", this is the number of spaces to take before printing. Page overflow results in printing on the first line of the next page.
4 (4)	1	FMTSPT	Spacing type: "A" signifies absolute line number in FMTSPF, and "R" signifies relative line number. "E" signifies page eject.
5 (5)	. 1	*	Reserved.

Insert Data

The insert-data substructure refers to data defined in the dynamic data argument structure, and identified by reference number. This represents variable data to be inserted into the printed line.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'20' or X'A0'. (X'A0' also denotes end-of-structure.)
1 (1)	. 1	*	Reserved.
2 (2)	. . 2	FMTRFNO	Insert reference number: identification number for dynamic data insert that defines the input data to be used for formatting.
4 (4)	2	*	Reserved.
6 (6)	. . 2	FMTOCOL	Print line column for beginning of this field, or (if FMTBS is equal to one) the offset from the column indicated by field PCTAPC.
8 (8)	2	FMTOLEN	Output field length. If FMTOLEN is equal to zero or 32,767, then the full, converted input length is used.
10 (A)	. . 1	FMTCNVF	Flags to define conversion and formatting to be done:
	1...	FMTBH	Byte to printable, hexadecimal representation.
	.1..	FMTBHA	Byte to hexadecimal, preceded by X' and followed by a single quote.
	..1.	FMTBHD	Standard dump format. FMTOCOL and FMTOLEN are ignored.
	...1	FMTBD	Binary to unpacked decimal characters.
	.... 1...	FMTPU	Packed to unpacked decimal characters.
11 (B)	. . . 1	FMTCNVF (cont.)	Conversion flags (continued).
	1...	FMTZS	Suppress leading zeros by replacing with blanks.
	.1..	FMTAL	Aligned left; the high-order nonzero digit is put in first print column as specified by FMTCOL.
	..1.	FMTSS	Suppress signs.
	...1	FMTBS	Suppress all trailing blanks but one of the preceding field; add the offset in FMTOCOL to the value in PCTAPC for the print column.
	....1...	FMTAR	Align EDCDIC character strings to the right. The print column is added to the print field length to determine the last printable position.

Default Text

The default-text substructure is only used when it immediately follows an insert-data substructure. When examining the insert structure, the value in DARGINS is compared to the value in FMTRFNO. If the values are not equivalent, the next format structure is examined to determine whether it is a default structure. If the flag FMTDFF is on in this next structure, the structure is used. In all other cases, it is skipped over.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'02' or X'82'. (X'82' also denotes end-of-structure.)
1 (1)	. 1		Reserved.
2 (2)	. . 2	FMTILEN	Length of the default text.
4 (4)	2	FMTIOFF	Offset from the beginning of the format structures to the default text (which follows the format structures).
6 (6)	. . 2	FMTOCOL	Print line column, same as for insert substructure.
8 (8)	2	FMTOLEN	Output field length, same as for insert substructure.
10 (A)	. . 2	FMTCNVF	Conversion flags, same as for insert substructure.

Block Format

The block format substructure of the format list defines a block of variable data from which fields are extracted for printing.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'10' or X'90'. (X'90' also denotes end-of-structure.)
1 (1)	. 1		Reserved.
2 (2)	. . 2	FMTILEN	Length of the input field. If FMTILEN is zero or if FMTILEN is greater than DARGILP minus FMTIOFF, then the input length in DARGILP is used.
4 (4)	2	FMTIOFF	Offset from the beginning of the input data block at which this field begins. The beginning of the data block is in DARGDBP.
6 (6)	. . 2	FMTOCOL	Print line column, same as for insert substructure.
8 (8)	2	FMTOLEN	Output field length, same as for insert substructure.
10 (A)	. . 2	FMTCNVF	Conversion flags, same as for insert substructure.

Replication

The replication substructure defines substructures of the format list that are to be repeated. The replication substructure always precedes the first substructure to be repeated.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'08'. (May not have end-of-list flag on.)
1 (1)	. 1	*	Reserved.
2 (2)	. . 2	FMTRFNO	Reference number to identify the dynamic argument that contains the replication count.
4 (4)	2	FMTRBC	Number of substructures that follow that are to be replicated.
6 (6)	. . 2	FMTRIO	Offset to add to all offsets contained in block-format substructures being replicated, to access the input fields. fields.

Static Text

The static text substructure defines data from the Text Structures to be placed in the printed line.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	FMTFLGS	Flag byte: X'04' or X'84'.
1 (1)	. 1	*	Reserved.
2 (2)	. . 2	FMTSTL	Length of static text field.
4 (4)	2	FMTSTO	Offset to static text which follows format structures.
6 (6)	. . 2	FMTOCOL	Print line column, same as for insert substructure.
8 (8)	2	FMTOLEN	Output field length, same as for insert substructure.
10 (A)	..2	FMTCNVF	Conversion flags, same as for insert substructure.

Function Data Table—FDT

The Function Data Table is an encoded representation of a command. The Reader/Interpreter parses a command and constructs the FDT from information found in that command. All defaults are resolved; no conflicts are allowed among the values of an FDT.

The FDT is not one structure, but rather several small structures that are pointed to by a primary vector of addresses, called the FDTTBL. For a parameter that appears in a repeated subparameter list, a secondary vector results. Figure 9 shows this vector and illustrates the various small structures to which it points.

The FDT primary vector, FDTTBL, is variable in length. It consists of the command's verb as an 8-byte EBCDIC string, followed by a variable number of fullword pointers. The number of pointers depends on the specific command. There is one pointer per parameter defined in the Command Descriptor. If a pointer is reserved or is not used because the respective parameter has not been specified, the pointer contains zero.

The FDTTBL points to data areas in one of three formats depending upon the input provided by the parameter. If there is more than one data field, an array of data fields is generated. The array is preceded by a count of the array elements. The count is in a fullword for an array of Number Data Areas and in a halfword for an array of any other data areas. The array consists of one element for each data field supplied as input to the parameter. Every element in the array has the same format—one of the three formats shown below. In the following formats the last 3 characters of the field name are as shown. The first characters may vary and are indicated by *.

Created by	Modified by	Used by	Size
IDCRI01 IDCRI04	None	FSR	Variable

Number Data Area

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	4	*VAL	Contains the input number in fixed-point binary.

String Data Area

For a character string or hexadecimal string with or without a password the format is:

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	1	*PLN	Number of characters in the following password. This field does not exist if a password is not allowed with the string.
1(1)	8	*PAS	Password, if supplied, left-justified and padded with blanks. This field does not exist if a password is not allowed with the string.
9(9)	1	*LEN	Number of characters in the following field.
10(A)	*v*	*VAL	Character string left-justified and padded with blanks. The string does not contain delimiters. Double apostrophes are converted to single apostrophes and hexadecimal input is converted to EBCDIC.

Data Set Name or Data Area

For a data set name or generic data set name all with or without a password and member name, the format is:

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	1	*PLN	Number of characters in the following password.
1(1)	8	*PAS	Password, if supplied, left-justified and padded with blanks.
9(9)	1	*POS	This byte is reserved in DOS/VS.
10(A)	1	*FLG	Flag byte:
	1...	*FUQ	This flag is not used in DOS/VS.
11(B)	1	*MLN	This byte is reserved in DOS/VS.
12(C)	8	*MEM	This field is reserved in DOS/VS.
20(14)	1	*LEN	Number of characters in the following field.
21(15)	*v*	*VAL	Data set name or generic data set name in EBCDIC.

The FDT primary vector is variable in length.

FDTs for Specific Commands

The FDT for each command is shown in two different ways in the following sections. First, there is a table relating the pointers to the parameters in the command. Any omitted fields in this table contain zero. Second there is the FDT description as it is used by the FSR for the command.

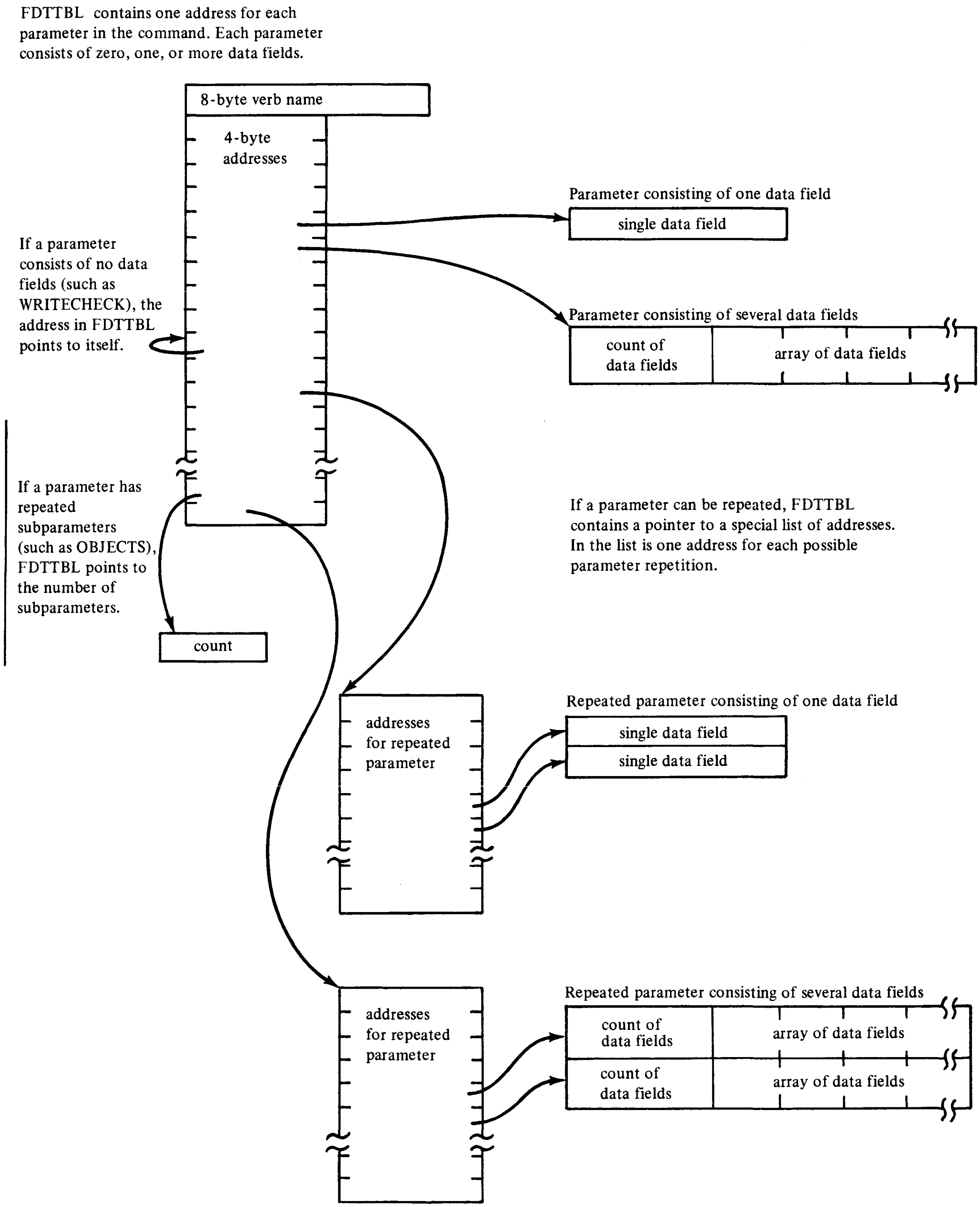


Figure 9. FDT (Function Data Table)

ALTER FDT

Offset	*Content*	
0 (0)	*A L T E*	*R* ƀ ƀ ƀ
8 (8)	↑*entryname/password*	↑CATALOG
16 (10)	↑*catname/password*	↑*dname*
24 (18)	↑NEWNAME	↑FILE
32 (20)	0	↑MASTERPW
40 (28)	↑CONTROLPW	↑UPDATEPW
48 (30)	↑READPW	↑CODE
56 (38)	↑ATTEMPTS	↑AUTHORIZATION
64 (40)	↑*entrypoint*	↑*string*
72 (48)	0	↑TO
80 (50)	↑FOR	↑OWNER
88 (58)	↑ERASE	↑NOERASE
96 (60)	↑SHAREOPTIONS	0
104 (68)	↑NULLIFY	↑MASTERPW
112 (70)	↑CONTROLPW	↑UPDATEPW
120 (78)	↑READPW	0
128 (80)	↑FREESPACE	↑*cipercent*
136 (88)	↑*capercent*	↑WRITECHECK
144 (90)	↑NOWRITECHECK	↑BUFFERSPACE
152 (98)	↑ADDVOLUMES	↑REMOVEVOLUMES
160 (A0)	0	↑INHIBIT
168 (A8)	↑UNINHIBIT	↑OWNER
176 (B0)	↑CODE	↑RETENTION
184 (B8)	↑AUTHORIZATION	↑*entrypoint*
192 (C0)	↑STRING	↑*crosspartition*
200 (C8)	↑*crosssystem*	0
208 (D0)	0	0
216 (D8)	0	0
224 (E0)	↑EXCEPTIONEXIT	↑KEYS

Offset	Content	
232 (E8)	↑*length*	↑*offset*
240 (F0)	↑RECORDSIZE	↑*average*
248 (F8)	↑*maximum*	↑UNIQUEKEY
256 (100)	↑NONUNIQUEKEY	↑UPGRADE
264 (108)	↑NOUPGRADE	↑UPDATE
272 (110)	↑NOUPDATE	↑EXCEPTIONEXIT

ALTER FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—ALTERƀƀƀ.
8 (8)	4	ENTRY	Address of information supplied through the *entryname/password* parameter.
12 (C)	4	CAT	Address of this pointer itself if the CATALOG parameter has been supplied.
16 (10)	4	CATLG	Address of information supplied through the *catname/password* subparameter of the CATALOG parameter.
20 (14)	4	CATDN	Address of the information supplied through the *dname* subparameter of the CATALOG parameter.
24 (18)	4	NEWNM	Address of information supplied through the NEWNAME parameter.
28 (1C)	4	INPDD	Address of information supplied through the FILE parameter.
32 (20)	4	*	Reserved—contains zeros.
36 (24)	4	MASTR	Address of information supplied through the MASTERPW parameter.
40 (28)	4	CNTVL	Address of information supplied through the CONTROLPW parameter.
44 (2C)	4	UPDAT	Address of information supplied through the UPDATEPW parameter.
48 (30)	4	READ	Address of information supplied through the READPW parameter.
52 (34)	4	CODNM	Address of information supplied through the CODE parameter.
56 (38)	4	ATTP	Address of information supplied through the ATTEMPTS parameter.
60 (3C)	4	AUTH	Address of this pointer itself if the AUTHORIZATION parameter has been supplied.
64 (40)	4	USVR	Address of information supplied through the *entrypoint* subparameter of the AUTHORIZATION parameter.

Offset	Bytes and Bit Pattern	Field Name	Description
68 (44)	4	USAR	Address of information supplied through the *string* subparameter of the AUTHORIZATION parameter.
72 (48)	4	*	Reserved—contains zeros.
76 (4C)	4	TO	Address of information supplied through the TO parameter.
80 (50)	4	FOR	Address of information supplied through the FOR parameter.
84 (54)	4	OWNER	Address of information supplied through the OWNER parameter.
88 (58)	4	ERASE	Address of this pointer itself if the ERASE parameter has been supplied.
92 (5C)	4	NERAS	Address of this pointer itself if the NOERASE parameter has been supplied.
96 (60)	4	SHARE	Address of this pointer itself if the SHAREOPTIONS parameter has been supplied.
100 (64)	4	*	Reserved—contains zeros.
104 (68)	4	NULLF	Address of this pointer itself if the NULLIFY parameter has been supplied.
108 (6C)	4	NMSTR	Address of this pointer itself if the MASTERPW subparameter of the NULLIFY parameter has been supplied.
112 (70)	4	NCNTV	Address of this pointer itself if the CONTROLPW subparameter of the NULLIFY parameter has been supplied.
116 (74)	4	NUPDT	Address of this pointer itself if the UPDATEPW subparameter of the NULLIFY parameter has been supplied.
120 (78)	4	NREAD	Address of this pointer itself if the READPW subparameter of the NULLIFY parameter has been supplied.
124 (7C)	4	*	Reserved—contains zeros.
128 (80)	4	FSPAC	Address of this pointer itself if the FREESPACE parameter has been supplied.
132 (84)	4	FSPCI	Address of information supplied through the *cipercent* subparameter of the FREESPACE parameter.
136 (88)	4	FSPCA	Address of information supplied through the *capercent* subparameter of the FREESPACE parameter.
140 (8C)	4	WRTCK	Address of this pointer itself if the WRITECHECK parameter has been supplied.
144 (90)	4	NWTCK	Address of this pointer itself if the NOWRITECHECK parameter has been supplied.

Offset	Bytes and Bit Pattern	Field Name	Description
148 (94)	4	BUFSZ	Address of information supplied through the BUFFERSPACE parameter.
152 (98)	4	ADDVL	Address of information supplied through the ADDVOLUMES parameter.
156 (9C)	4	REMVL	Address of information supplied through the REMOVEVOLUMES parameter.
160 (A0)	4	*	Reserved—contains zeros.
164 (A4)	4	INHIB	Address of this pointer itself if the INHIBIT parameter has been supplied.
168 (A8)	4	UNHIB	Address of this pointer itself if the UNINHIBIT parameter has been supplied.
172 (AC)	4	NOWNR	Address of this pointer itself if the OWNER subparameter of the NULLIFY parameter has been supplied.
176 (B0)	4	NCDNM	Address of this pointer itself if the CODE subparameter of the NULLIFY parameter has been supplied.
180 (B4)	4	NRETN	Address of this pointer itself if the RETENTION subparameter of the NULLIFY parameter has been supplied.
184 (B8)	4	NAUTH	Address of this pointer itself if the AUTHORIZATION subparameter of the NULLIFY parameter has been supplied.
188 (BC)	4	NMDNM	Address of this pointer itself if the MODULE subparameter of the AUTHORIZATION parameter has been supplied.
192 (C0)	4	NSTRG	Address of this pointer itself if the STRING subparameter of the AUTHORIZATION parameter has been supplied.
196 (C4)	4	SHAR1	Address of information supplied through the crossregion subparameter of the SHAREOPTIONS parameter.
200 (C8)	4	SHAR2	Address of information supplied through the crosssystem subparameter of the SHAREOPTIONS parameter.
204 (CF)	20	*	Reserved–contains zeros.
224 (E0)	4	EEXT	Address of information supplied through the *mname* subparameter of the EXCEPTIONEXIT parameter.
228 (E4)	4	KEY	Address of this pointer itself if the KEYS parameter has been supplied.
232 (E8)	4	KEYLN	Address of information supplied through the *length* subparameter of the KEYS parameter.

Offset	Bytes and Bit Pattern	Field Name	Description
236 (EC)	4	KEYPS	Address of information supplied through the *offset* subparameter of the KEYS parameter.
240 (F0)	4	RECSZ	Address of this pointer itself if the RECORDSIZE parameter has been supplied.
244 (F4)	4	AREC	Address of information supplied through the *average* subparameter of the RECORDSIZE parameter.
248 (F8)	4	MREC	Address of information supplied through the *maximum* subparameter of the RECORDSIZE parameter.
252 (FC)	4	UNQK	Address of this pointer itself if the UNIQUEKEY parameter has been supplied.
256 (100)	4	NUNQK	Address of this pointer itself if the NONUNIQUEKEY parameter has been supplied.
260 (104)	4	UPG	Address of this pointer itself if the UPGRADE parameter has been supplied.
264 (108)	4	NUPG	Address of this pointer itself if the NOUPGRADE parameter has been supplied.
268 (10C)	4	UPD	Address of this pointer itself if the UPDATE parameter has been supplied.
272 (110)	4	NUPD	Address of this pointer itself if the NOUPDATE parameter has been supplied.
276 (114)	4	NEEXT	Address of this pointer itself if the EXCEPTIONEXIT subparameter of the NULLIFY parameter has been supplied.

BLDINDEX FDT

Offset	*Content*	
0 (0)	*B L D I*	*N D E X*
8 (8)	↑INFILE	0
16 (10)	↑OUTFILE	0
24 (18)	↑CATALOG	↑WORKFILES
32 (20)	↑*dname1*	↑*dname2*
40 (28)	↑EXTERNALSORT	↑INTERNALSORT

BLDINDEX FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description, Content, Meaning, Use
0 (0)	8	FDTVERB	Verb–BLDINDEX
8 (8)	4	IFILE	Address of informationsupplied through the INFILE parameter.
12 (C)	4	*	Reserved–contains zeros.
16 (10)	4	OFILE	Address of information supplied through the OUTFILE parameter.
20 (14)	4	*	Reserved–contains zeros.
24 (18)	4	CAT	Address of information supplied through the *catname/password* subparameter of the CATALOG parameter.
28 (1C)	4	WFILE	Address of this pointer itself if the WORKFILES parameter has been supplied.
32 (20)	4	WFLE1	Address of information supplied through the *dname1* subparameter of the WORKFILES parameter.
36 (24)	4	WFLE2	Address of information supplied through the *dname2* subparameter of the WORKFILES parameter.
40 (28)	4	ESORT	Address of this pointer itself if the EXTERNALSORT parameter has been supplied.
44 (2C)	4	ISORT	Address of this pointer itself if the INTERNALSORT parameter has been supplied.

DEFINE FDT

There are seven illustrations relating the pointers of the FDT to the FSR parameters in the following order: alternate index, cluster, master catalog, nonVSAM, path, space, and user catalog.

DEFINE ALTERNATEINDEX

Offset	*Content*	
0 (0)	*D E F I*	*N E* ƀ ƀ
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
56 (38)	0	↑ALTERNATEINDEX
1352 (548)	0	↑NAME
1360 (550)	↑MODEL	↑*entryname/password*
1368 (558)	↑*catname/password*	↑*dname*
1376 (560)	↑MASTERPW	↑CONTROLPW
1384 (568)	↑UPDATEPW	↑READPW
1392 (570)	↑CODE	↑ATTEMPTS
1400 (578)	↑AUTHORIZATION	↑*entrypoint*
1408 (580)	↑*string*	↑TO
1416 (588)	↑FOR	↑OWNER
1424 (590)	↑SHAREOPTIONS	↑*crosspartition*
1432 (598)	↑*crosssystem*	↑ERASE
1440 (5A0)	↑NOERASE	↑KEYS
1448 (5A8)	↑*length*	↑*offset*
1456 (5B0)	↑REPLICATE	↑NOREPLICATE
1464 (5B8)	↑IMBED	↑NOIMBED
1472 (5C0)	↑FILE	↑VOLUMES
1480 (5C8)	↑KEYRANGES	↑*lowkey*
1488 (5D0)	↑*highkey*	↑ORDERED
1496 (5D8)	↑UNORDERED	↑SUBALLOCATION
1504 (5E0)	↑UNIQUE	↑TRACKS
1512 (5E8)	↑*primary*	↑*secondary*
1520 (5F0)	↑CYLINDERS	↑*primary*
1528 (5F8)	↑*secondary*	↑RECORDS
1536(600)	↑*primary*	↑*secondary*

Offset	*Content*	
1544 (608)	↑RECORDSIZE	↑*average*
1552 (610)	↑*maximum*	↑WRITECHECK
1560 (618)	↑NOWRITECHECK	↑SPEED
1568 (620)	↑RECOVERY	↑FREESPACE
1576 (628)	↑*cipercent*	↑*capercent*
1584 (630)	↑BUFFERSPACE	↑CONTROLINTERVALSIZE
1592 (638)	↑RELATE	↑EXCEPTIONEXIT
1600 (640)	↑REUSE	↑NOREUSE
1608 (648)	↑UNIQUEKEY	↑NONUNIQUEKEY
1616 (650)	↑UNIQUEKEY	↑NONUNIQUEKEY
1624 (658)	↑UPGRADE	↑NOUPGRADE

DEFINE CLUSTER

Offset	*Content*	
0 (0)	*D E F I*	*N E ƀ ƀ*
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
24 (18)	0	↑CLUSTER
32 (20)	0	↑DATA
40 (28)	↑INDEX	0
72 (48)	↑NAME	0
88 (58)	0	↑NAME
96 (60)	↑NAME	↑INDEXED
104 (68)	↑NONINDEXED	0
112 (70)	↑MODEL	↑*entryname/password*
120 (78)	↑*catname/password*	↑*dname*
128 (80)	↑MODEL	↑*entryname/password*
136 (88)	↑*catname/password*	↑*dname*
144 (90)	↑MODEL	↑*entryname/password*
152 (98)	↑*catname/password*	↑*dname*
160 (A0)	0	↑MASTERPW
168 (A8)	↑MASTERPW	↑MASTERPW
176 (B0)	0	↑CONTROLPW
184 (B8)	↑CONTROLPW	↑CONTROLPW
192 (C0)	0	↑UPDATEPW
200 (C8)	↑UPDATEPW	↑UPDATEPW
208 (D0)	0	↑READPW
216 (D8)	↑READPW	↑READPW
224 (E0)	0	↑CODE
232 (E8)	↑CODE	↑CODE
240 (F0)	0	↑ATTEMPTS
248 (F8)	↑ATTEMPTS	↑ATTEMPTS
256 (100)	0	↑AUTHORIZATION
272 (110)	↑AUTHORIZATION	↑*entrypoint*
280 (118)	↑*string*	↑AUTHORIZATION

Offset	Content	
288 (120)	↑*entrypoint*	↑*string*
296 (128)	0	↑TO
304 (130)	0	↑FOR
312 (138)	0	↑OWNER
320 (140)	↑OWNER	↑OWNER
328 (148)	↑SHAREOPTIONS	↑*crosspartition*
336 (150)	↑*crosssystem*	↑SHAREOPTIONS
344 (158)	↑*crosspartition*	↑*crosssystem*
352 (160)	↑SHAREOPTIONS	↑*crosspartition*
360 (168)	↑*crosssystem*	↑ERASE
368 (170)	↑NOERASE	↑ERASE
376 (178)	↑NOERASE	↑KEYS
384 (180)	↑*length*	↑*offset*
392 (188)	↑KEYS	↑*length*
400 (190)	↑*position*	↑REPLICATE
408 (198)	↑NOREPLICATE	↑REPLICATE
416 (1A0)	↑NOREPLICATE	↑IMBED
424 (1A8)	↑NOIMBED	↑IMBED
432 (1B0)	↑NOIMBED	0
440 (1B8)	↑FILE	0
448 (1C0)	↑FILE	↑FILE
456 (1C8)	0	↑VOLUMES
472 (1D8)	↑VOLUMES	↑VOLUMES
480 (1E0)	↑KEYRANGES	↑*lowkey*
488 (1E8)	↑*highkey*	↑KEYRANGES
496 (1F0)	↑*lowkey*	↑*highkey*
512 (200)	↑ORDERED	↑UNORDERED
520 (208)	↑ORDERED	↑UNORDERED
528 (210)	↑ORDERED	↑UNORDERED
536 (218)	↑SUBALLOCATION	↑SUBALLOCATION
544 (220)	↑SUBALLOCATION	↑UNIQUE
552 (228)	↑UNIQUE	↑UNIQUE

Offset	Content	
560 (230)	0	↑TRACKS
576 (240)	↑CYLINDERS	0
584 (248)	0	↑RECORDS
600 (258)	0	↑TRACKS
608 (260)	↑CYLINDERS	↑RECORDS
616 (268)	↑*primary*	↑*secondary*
624 (270)	↑TRACKS	↑CYLINDERS
632 (278)	↑RECORDS	↑*primary*
640 (280)	↑*secondary*	0
648 (288)	↑RECORDSIZE	0
656 (290)	↑*average*	↑*maximum*
664 (298)	↑RECORDSIZE	↑*average*
672 (2A0)	↑*maximum*	0
680 (2A8)	↑WRITECHECK	0
688 (2B0)	↑NOWRITECHECK	↑WRITECHECK
696 (2B8)	↑NOWRITECHECK	↑WRITECHECK
704 (2C0)	↑NOWRITECHECK	↑SPEED
712 (2C8)	↑RECOVERY	↑SPEED
720 (2D0)	↑RECOVERY	↑FREESPACE
728 (2D8)	↑*cipercent*	↑*capercent*
736 (2E0)	↑FREESPACE	↑*cipercent*
744 (2E8)	↑*capercent*	0
752 (2F0)	↑BUFFERSPACE	↑BUFFERSPACE
760 (2F8)	↑CONTROLINTERVALSIZE	↑CONTROLINTERVALSIZE
768 (300)	↑CONTROLINTERVALSIZE	0
1024 (400)	0	↑*entrypoint*
1032 (408)	↑*string*	0
1048 (418)	0	↑EXCEPTIONEXIT
1056 (420)	↑EXCEPTIONEXIT	↑EXCEPTIONEXIT
1064 (428)	↑NUMBERED	↑REUSE
1072 (430)	↑REUSE	↑REUSE
1080 (438)	↑NOREUSE	↑NOREUSE

Offset	Content	
1088 (440)	↑NOREUSE	↑SPANNED
1096 (448)	↑SPANNED	↑NONSPANNED
1104 (450)	↑NONSPANNED	0
1208 (4B8)	0	↑*primary*
1216 (4C0)	↑*secondary*	0
1248 (4E0)	0	↑*primary*
1256 (4E8)	↑*secondary*	0
1288 (508)	0	↑*primary*
1296 (510)	↑*secondary*	0
1320 (528)	0	↑*primary*
1328 (530)	↑*secondary*	↑*primary*
1336 (538)	↑*secondary*	↑*primary*
1344 (540)	↑*secondary*	↑*primary*
1352 (548)	↑*secondary*	

DEFINE MASTERCATALOG

Offset	*Content*	
0 (0)	*D E F I*	*N E ƀ ƀ*
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	↑MASTERCATALOG
32 (20)	0	↑DATA
40 (28)	↑INDEX	0
64 (40)	0	↑NAME
88 (58)	0	↑NAME
96 (60)	↑NAME	0
160 (A0)	↑MASTERPW	0
176 (B0)	↑CONTROLPW	0
192 (C0)	↑UPDATEPW	0
208 (D0)	↑READPW	0
224 (E0)	↑CODE	0
240 (F0)	↑ATTEMPTS	0
256 (100)	↑AUTHORIZATION	0
264 (108)	↑*entrypoint*	↑*string*
296 (128)	↑TO	0
304 (130)	↑FOR	0
312 (138)	↑OWNER	0
432 (1B0)	0	↑FILE
456 (1C8)	↑VOLUMES	0
560 (230)	↑TRACKS	0
568 (238)	0	↑CYLINDERS
584 (248)	↑RECORDS	0
600 (258)	0	↑TRACKS
608 (260)	↑CYLINDERS	↑RECORDS
616 (268)	↑*primary*	↑*secondary*
624 (270)	↑TRACKS	↑CYLINDERS
632 (278)	↑RECORDS	↑*primary*
640 (280)	↑*secondary*	0
672 (2A0)	0	↑WRITECHECK

Offset	Content	
680 (2A8)	0	↑NOWRITECHECK
688 (2B0)	0	↑WRITECHECK
696 (2B8)	↑NOWRITECHECK	↑WRITECHECK
704 (2C0)	↑NOWRITECHECK	0
744 (2E8)	0	↑BUFFERSPACE
752 (2F0)	0	↑BUFFERSPACE
1104 (450)	0	↑RECOVERABLE
1112 (458)	0	↑RECOVERABLE
1120 (460)	↑NOTRECOVERABLE	0
1128 (468)	↑NOTRECOVERABLE	0
1200 (4B0)	0	↑*primary*
1208 (4B8)	↑*secondary*	0
1240 (4D8)	0	↑*primary*
1248 (4E0)	↑*secondary*	0
1280 (500)	0	↑*primary*
1288 (508)	↑*secondary*	0
1320 (528)	0	↑*primary*
1328 (530)	↑*secondary*	↑*primary*
1336 (538)	↑*secondary*	↑*primary*
1344 (540)	↑*secondary*	↑*primary*
1352 (548)	↑*secondary*	

DEFINE NONVSAM

Offset	Content	
0 (0)	*D E F I*	*N E* ƀ ƀ
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
48 (30)	↑NONVSAM	0
80 (50)	↑NAME	0
464 (1D0)	0	↑VOLUMES
504 (1F8)	↑DEVICETYPES	↑FILESEQUENCENUMBER
1128 (468)	0	↑FILE
1352 (548)	0	

DEFINE PATH

Offset	*Content*	
0 (0)	*D E F I*	*N E* ƀ ƀ
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
64 (40)	↑PATH	0
1640 (668)	0	↑NAME
1648(570)	↑MODEL	↑*entryname/password*
1656 (578)	↑*catname/password*	↑*dname*
1664 (680)	↑MASTERPW	↑CONTROLPW
1672 (688)	↑UPDATEPW	↑READPW
1680 (690)	↑CODE	↑ATTEMPTS
1688 (698)	↑AUTHORIZATION	↑*entrypoint*
1696 (6A0)	↑*string*	↑TO
1704 (6A8)	↑FOR	↑OWNER
1712 (6B0)	↑FILE	↑UPDATE
1720 (6B8)	↑NOUPDATE	↑PATHENTRY

DEFINE SPACE

Offset	*Content*	
0 (0)	*D E F I*	*N E* ƀ ƀ
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
40 (28)	0	↑SPACE
440 (1B8)	0	↑FILE
464 (1BE)	↑VOLUMES	0
568 (238)	↑TRACKS	0
576 (240)	0	↑CYLINDERS
592 (250)	↑RECORDS	0
640 (280)	0	↑CANDIDATE
648 (288)	0	↑RECORDSIZE
1008 (3F0)	↑*average*	↑*maximum*
1216 (4C0)	0	↑*primary*
1224 (4C8)	↑*secondary*	0
1272 (4F8)	0	↑*primary*
1280 (500)	↑*secondary*	0
1296 (510)	0	↑*primary*
1304 (518)	↑*secondary*	0
1352 (548)	0	

DEFINE USERCATALOG

Offset	*Content*	
0 (0)	*D E F I*	*N E* ƀ ƀ
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	0
24 (18)	↑USERCATALOG	0
32 (20)	0	↑DATA
40 (28)	↑INDEX	0
104 (68)	0	↑MODEL
600 (258)	0	↑TRACKS
608 (260)	↑CYLINDERS	↑RECORDS
616 (268)	↑*primary*	↑*secondary*
624 (270)	↑TRACKS	↑CYLINDERS
632 (278)	↑RECORDS	↑*primary*
640 (280)	↑*secondary*	0
688 (2B0)	0	↑WRITECHECK
696 (2B8)	↑NOWRITECHECK	↑WRITECHECK
704 (2C0)	↑NOWRITECHECK	0
752 (2F0)	0	↑BUFFERSPACE
792 (318)	0	↑NAME
800 (320)	↑MASTERPW	↑CONTROLPW
808 (328)	↑UPDATEPW	↑READPW
816 (330)	↑CODE	↑ATTEMPTS
824 (338)	↑AUTHORIZATION	↑*entrypoint*
832 (340)	↑*string*	↑TO
840 (348)	↑FOR	↑OWNER
848 (350)	↑FILE	↑VOLUMES
856 (358)	↑TRACKS	↑CYLINDERS
864 (360)	↑RECORDS	0
872 (368)	0	↑WRITECHECK
880 (370)	↑NOWRITECHECK	↑BUFFERSPACE
1016 (3F8)	↑*entrypoint*	↑*catname/password*
1024 (400)	↑*dname*	0

Offset	*Content*	
1112 (458)	↑RECOVERABLE	↑RECOVERABLE
1120 (460)	0	↑NOTRECOVERABLE
1128 (468)	↑NOTRECOVERABLE	0
1256 (4E8)	0	↑*primary*
1264 (4F0)	↑*secondary*	0
1304 (518)	0	↑*primary*
1312 (520)	↑*secondary*	0
1320 (528)	0	↑*primary*
1328 (530)	↑*secondary*	↑*primary*
1336 (538)	↑*secondary*	↑*primary*
1344 (540)	↑*secondary*	↑*primary*
1352 (548)	↑*secondary*	

DEFINE FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—DEFINEbb.
8 (8)	4	CAT	Address of this pointer itself if the CATALOG parameter has been supplied.
12 (C)	4	CATLG	Address of information supplied through the *catname/password* subparameter of the CATALOG parameter.
16 (10)	4	CATDN	Address of information supplied through the *dname* subparameter of the CATALOG parameter.
20 (14)	4	MCAT	Address of this pointer itself if the MASTERCATALOG parameter has been supplied—that is, if you are defining a master catalog.
24 (18)	4	UCAT	Address of this pointer itself if the user catalog parameter is supplied—that is, if you are defining a user catalog.
28 (1C)	4	CLST	Address of this pointer itself if the CLUSTER parameter is supplied—that is if you are defining a cluster.
32 (20)	4	*	Reserved—contains zeros.
36 (24)	4	DATAA	Address of this pointer itself if the DATA parameter is supplied.
40 (28)	4	INDEX	Address of this pointer itself if the INDEX parameter is supplied.
44 (2C)	4	SPACE	Address of this pointer itself if the SPACE parameter is supplied—that is, if you are defining a VSAM data space.
48 (30)	4	ALIEN	Address of this pointer itself if the NONVSAM parameter is supplied—that is, if you are defining a nonVSAM data set.
52 (34)	8	*	Reserved—contains zeros.
60 (3C)	4	AIX	Address of this pointer itself is the ALTERNATEINDEX parameter is supplied—that is, if you are defining an alternate index.
64 (40)	4	PATH	Address of this pointer itself if the PATH parameter is supplied—that is, if you are defining a path.
68 (44)	4	METRY	Address of information supplied through the NAME parameter if NAME is supplied under MASTERCATALOG.
72 (48)	4	CETRY	Address of information supplied through the NAME parameter if NAME is supplied under CLUSTER.
76 (4C)	4	*	Reserved—contains zeros.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
80 (50)	4	AETRY	Address of information supplied through the NAME parameter if NAME is supplied under NONVSAM. 84 (54)8*Reserved—contains zeros.
92 (5C)	4	DETRY	Address of information supplied through the NAME parameter if NAME is supplied under DATA.
96 (60)	4	IETRY	Address of information supplied through the NAME parameter if NAME is supplied under INDEX.
100 (64)	4	CINDX	Address of this pointer itself if INDEXED is supplied under CLUSTER.
104 (68)	4	CNIDX	Address of this pointer itself if NOINDEXED is supplied under CLUSTER.
108 (6C)	4	UMODL	Address of this pointer itself if MODEL is supplied under USERCATALOG.
112 (70)	4	CMODL	Address of this pointer itself if the MODEL parameter is supplied under CLUSTER.
116 (74)	4	CENAM	Address of information supplied through the *entryname/password* subparameter of MODEL if MODEL is supplied under CLUSTER.
120 (78)	4	CMDCT	Address of information supplied through the *catname/password* subparameter of MODEL if MODEL is supplied under CLUSTER.
124 (7C)	4	CMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under CLUSTER.
128 (80)	4	DMODL	Address of this pointer itself if the MODEL parameter is supplied under DATA.
132 (84)	4	DENAM	Address of information supplied through the *entryname/password* subparameter of MODEL if MODEL is supplied under DATA.
136 (88)	4	DMDCT	Address of information supplied through the *catname/password* subparameter of MODEL if MODEL is supplied under DATA.
140 (8C)	4	DMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under DATA.
144 (90)	4	IMODL	Address of this pointer itself if MODEL is supplied under INDEX.
148 (94)	4	IENAM	Address of information supplied through the *entryname/password* subparameter of MODEL if MODEL is supplied under INDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
152 (98)	4	IMDCT	Address of information supplied through the *catname/password* subparameter of MODEL if MODEL is supplied under INDEX.
156 (9C)	4	IMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under INDEX.
160 (A0)	4	MMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under MASTERCATALOG.
164 (A4)	4	CMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under CLUSTER.
168 (A8)	4	DMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under DATA.
172 (AC)	4	IMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under INDEX.
176 (B0)	4	MCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under MASTERCATALOG.
180 (B4)	4	CCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under CLUSTER.
184 (B8)	4	DCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under DATA.
188 (BC)	4	ICINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under INDEX.
192 (C0)	4	MUPDT	Address of information supplied through the UPDATEPW if UPDATEPW is supplied under MASTERCATALOG.
196 (C4)	4	CUPDT	Address of information supplied through the UPDATEPW if UPDATEPW is supplied under CLUSTER.
200 (C8)	4	DUPDT	Address of information supplied through the UPDATEPW if UPDATEPW is supplied under DATA.
204 (CC)	4	IUPDT	Address of information supplied through the UPDATEPW if UPDATEPW is supplied under INDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
208 (D0)	4	MREAD	Address of information supplied through the READPW parameter if READPW is supplied under MASTERCATALOG.
212 (D4)	4	CREAD	Address of information supplied through the READPW parameter if READPW is supplied under CLUSTER.
216 (D8)	4	DREAD	Address of information supplied through the READPW parameter if READPW is supplied under DATA.
220 (DC)	4	IREAD	Address of information supplied through the READPW parameter if READPW is supplied under INDEX.
224 (E0)	4	MCODE	Address of information supplied through the CODE parameter if CODE is supplied under MASTERCATALOG.
228 (E4)	4	CCODE	Address of information supplied through the CODE parameter if CODE is supplied under CLUSTER.
232 (E8)	4	DCODE	Address of information supplied through the CODE parameter if CODE is supplied under DATA.
236 (EC)	4	ICODE	Address of information supplied through the CODE parameter if CODE is supplied under INDEX.
240 (F0)	4	MATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under MASTERCATALOG.
244 (F4)	4	CATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under CLUSTER.
248 (F8)	4	DATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under DATA.
252 (FC)	4	IATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under INDEX.
256 (100)	4	MAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under MASTERCATALOG.
260 (104)	4	CAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under CLUSTER.
264 (108)	4	MEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under MASTERCATALOG.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
268 (10C)	4	MSTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under MASTERCATALOG.
272 (110)	4	DAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under DATA.
276 (114)	4	DEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under DATA.
280 (118)	4	DSTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under DATA.
284 (11C)	4	IAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under INDEX.
288 (120)	4	IEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if the AUTHORIZATION parameter is supplied under INDEX.
292 (124)	4	ISTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if the AUTHORIZATION parameter is supplied under INDEX.
296 (128)	4	MTO	Address of information supplied through the TO parameter if TO is supplied under MASTERCATALOG.
300 (12C)	4	CTO	Address of information supplied through the TO parameter if TO is supplied under CLUSTER.
304 (130)	4	MFOR	Address of information supplied through the FOR parameter if FOR is supplied under MASTERCATALOG.
308 (134)	4	CFOR	Address of information supplied through the FOR parameter if FOR is supplied under CLUSTER.
312 (138)	4	MOWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under MASTERCATALOG.
316 (13C)	4	COWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under CLUSTER.
320 (140)	4	DOWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under DATA.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
324 (144)	4	IOWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under INDEX.
328 (148)	4	CSHAR	Address of this pointer itself if the SHAREOPTIONS parameter is supplied under CLUSTER.
332 (14C)	4	CSHR1	Address of information supplied through the *crosspartition* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under CLUSTER.
336 (150)	4	CSHR2	Address of information supplied through the *crosssystem* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under CLUSTER.
340 (154)	4	DSHAR	Address of this pointer itself if the SHAREOPTIONS parameter is supplied under DATA.
344 (158)	4	DSHR1	Address of information supplied through the *crosspartition* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under DATA.
348 (15C)	4	DSHR2	Address of information supplied through the *crosssystem* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under DATA.
352 (160)	4	ISHAR	Address of this pointer itself if the SHAREOPTIONS parameter is supplied under INDEX.
356 (164)	4	ISHR1	Address of information supplied through the *crosspartition* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under INDEX.
360 (168)	4	ISHR2	Address of information supplied through the *crosssystem* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under INDEX.
364 (16C)	4	CERAS	Address of this pointer itself if the ERASE parameter is supplied under CLUSTER.
368 (170)	4	CNERS	Address of this pointer itself if the NOERASE parameter is supplied under CLUSTER.
372 (174)	4	DERAS	Address of this pointer itself if the ERASE parameter is supplied under DATA.
376 (178)	4	DNERS	Address of this pointer itself if the NOERASE parameter is supplied under DATA.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
380 (17C)	4	CKEY	Address of this pointer itself if the KEYS parameter is supplied under CLUSTER.
384 (180)	4	CKYLN	Address of information supplied through the *length* subparameter of KEYS if KEYS is supplied under CLUSTER.
388 (184)	4	CKYPS	Address of information supplied through the *offset* subparameter of KEYS if KEYS is supplied under CLUSTER.
392 (188)	4	DKEY	Address of this pointer itself if the KEYS parameter is supplied under DATA.
396 (18C)	4	DKYLN	Address of information supplied through the *length* subparameter of KEYS if KEYS is supplied under DATA.
400 (190)	4	DKYPS	Address of information supplied through the *offset* subparameter of KEYS if KEYS is supplied under DATA.
404 (194)	4	CREPL	Address of this pointer itself if the REPLICATE parameter is supplied under CLUSTER.
408 (198)	4	CNREP	Address of this pointer itself if the NOREPLICATE parameter is supplied under CLUSTER.
412 (19C)	4	IREPL	Address of this pointer itself if the REPLICATE parameter is supplied under INDEX.
416 (1A0)	4	INREP	Address of this pointer itself if the NOREPLICATE parameter is supplied under INDEX.
420 (1A4)	4	CIMBD	Address of this pointer itself if the IMBED parameter is supplied under CLUSTER.
424 (1A8)	4	CNIBD	Address of this pointer itself if the NOIMBED parameter is supplied under CLUSTER.
428 (1AC)	4	IIMBD	Address of this pointer itself if the IMBED parameter is supplied under INDEX.
432 (1B0)	4	INIBD	Address of this pointer itself if the NOIMBED parameter is supplied under INDEX.
436 (1B4)	4	MINDD	Address of information supplied through the FILE parameter if FILE is supplied under MASTERCATALOG.
440 (1B8)	4	CINDD	Address of information supplied through the FILE parameter if FILE is supplied under CLUSTER.
444 (1BC)	4	SINDD	Address of information supplied through the FILE parameter if FILE is supplied under SPACE.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
448 (1C0)	4	DINDD	Address of information supplied through the FILE parameter if FILE is supplied under DATA.
452 (1C4)	4	IINDD	Address of information supplied through the FILE parameter if FILE is supplied under INDEX.
456 (1C8)	4	MVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under MASTERCATALOG.
460 (1CC)	4	CVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under CLUSTER.
464 (1D0)	4	SVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under SPACE.
468 (1D4)	4	AVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under NONVSAM.
472 (1D8)	4	DVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under DATA.
476 (1DC)	4	IVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under INDEX.
480 (1E0)	4	CRANG	Address of a count of subparameters supplied through the KEYRANGES parameter if KEYRANGES is supplied under CLUSTER.
484 (1E4)	4	CRGLOPTR	Address of information supplied through the *lowkey* subparameter of KEYRANGES if KEYRANGES is supplied under CLUSTER.
488 (1E8)	4	CRGHIPTR	Address of information supplied through the *highkey* subparameter of KEYRANGES if KEYRANGES is supplied under CLUSTER.
492 (1EC)	4	DRANG	Address of a count of subparameters supplied through the KEYRANGES parameter if KEYRANGES is supplied under DATA.
496 (1F0)	4	DRGLOPTR	Address of information supplied through the *lowkey* subparameter of KEYRANGES if KEYRANGES is supplied under DATA.
500 (1F4)	4	DRGHIPTR	Address of information supplied through the *highkey* subparameter of KEYRANGES if KEYRANGES is supplied under DATA.
504 (1F8)	4	ADEVT	Address of information supplied through the DEVICETYPES parameter if DEVICETYPES is supplied under NONVSAM.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
508 (1FC)	4	AFSNO	Address of information supplied through the FILESEQUENCENUMBER parameter if FILESEQUENCENUMBER is supplied under NONVSAM.
512 (200)	4	CORDR	Address of this pointer itself if the ORDERED parameter is supplied under CLUSTER.
516 (204)	4	CUORD	Address of this pointer itself if the UNORDERED parameter is supplied under CLUSTER.
520 (208)	4	DORDR	Address of this pointer itself if the ORDERED parameter is supplied under DATA.
524 (20C)	4	DUORD	Address of this pointer itself if the UNORDERED parameter is supplied under DATA.
528 (210)	4	IORDR	Address of this pointer itself if the ORDERED parameter is supplied under INDEX.
532 (214)	4	IUORD	Address of this pointer itself if the UNORDERED parameter is supplied under INDEX.
536 (218)	4	CSUBA	Address of this pointer itself if the SUBALLOCATION parameter is supplied under CLUSTER.
540 (21C)	4	DSUBA	Address of this pointer itself if the SUBALLOCATION parameter is supplied under DATA.
544 (220)	4	ISUBA	Address of this pointer itself if the SUBALLOCATION parameter is supplied under INDEX.
548 (224)	4	CUNIQ	Address of this pointer itself if the UNIQUE parameter is supplied under CLUSTER.
552 (228)	4	DUNIQ	Address of this pointer itself if the UNIQUE parameter is supplied under DATA.
556 (22C)	4	IUNIQ	Address of this pointer itself if the UNIQUE parameter is supplied under INDEX.
560 (230)	4	MTRKS	Address of this pointer itself if the TRACKS parameter is supplied under MASTERCATALOG.
564 (234)	4	CTRKS	Address of this pointer itself if the TRACKS parameter is supplied under CLUSTER.
568 (238)	4	STRKS	Address of this pointer itself if the TRACKS parameter is supplied under SPACE.
572 (23C)	4	MCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under MASTERCATALOG.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
576 (240)	4	CCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under CLUSTER.
580 (244)	4	SCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under SPACE.
584 (248)	4	MRCDS	Address of this pointer itself if the RECORDS parameter is supplied under MASTERCATALOG.
588 (24C)	4	CRCDS	Address of this pointer itself if the RECORDS parameter is supplied under CLUSTER.
592 (250)	4	SRCDS	Address of this pointer itself if the RECORDS parameter is supplied under SPACE.
596 (254)	8	*	Reserved—contains zeros.
604 (25C)	4	DTRKS	Address of this pointer itself if the TRACKS parameter is supplied under DATA.
608 (260)	4	DCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under DATA.
612 (264)	4	DRCDS	Address of this pointer itself if the RECORDS parameter is supplied under DATA.
616 (268)	4	DTKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under DATA.
620 (26C)	4	DTKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under DATA.
624 (270)	4	ITRKS	Address of this pointer itself if the TRACKS parameter is supplied under INDEX.
628 (274)	4	ICYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under INDEX.
632 (278)	4	IRCDS	Address of this pointer itself if the RECORDS parameter is supplied under INDEX.
636 (27C)	4	ITKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under INDEX.
640 (280)	4	ITKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under INDEX.
644 (284)	4	SCAND	Address of this pointer itself if the CANDIDATE parameter is supplied under SPACE.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
648 (288)	4	CRSIZ	Address of this pointer itself if the RECORDSIZE parameter is supplied under CLUSTER.
652 (28C)	4	SRSIZ	Address of this pointer itself if the RECORDSIZE parameter is supplied under SPACE.
656 (290)	4	CARSZ	Address of information supplied through the *average* subparameter of RECORDSIZE if RECORDSIZE is supplied under CLUSTER.
660 (294)	4	CMRSZ	Address of information supplied through the *maximum* subparameter of RECORDSIZE if RECORDSIZE is supplied under CLUSTER.
664 (298)	4	DRSIZ	Address of this pointer itself if the RECORDSIZE parameter is supplied under DATA.
668 (29C)	4	DARSZ	Address of information supplied through the *average* subparameter of RECORDSIZE if RECORDSIZE is supplied under DATA.
672 (2A0)	4	DMRSZ	Address of information supplied through the *maximum* subparameter of RECORDSIZE if RECORDSIZE is supplied under DATA.
676 (2A4)	4	MWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under MASTERCATALOG.
680 (2A8)	4	CWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under CLUSTER.
684 (2AC)	4	MNWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under MASTERCATALOG.
688 (2B0)	4	CNWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under CLUSTER.
692 (2B4)	4	DWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under DATA.
696 (2B8)	4	DNWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under DATA.
700 (2BC)	4	IWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under INDEX.
704 (2C0)	4	INWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under INDEX.
708 (2C4)	4	CSPED	Address of this pointer itself if the SPEED parameter is supplied under CLUSTER.
712 (2C8)	4	CRECV	Address of this pointer itself if the RECOVERY parameter is supplied under CLUSTER.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
716 (2CC)	4	DSPED	Address of this pointer itself if the SPEED parameter is supplied under DATA.
720 (2D0)	4	DRECV	Address of this pointer itself if the RECOVERY parameter is supplied under DATA.
724 (2D4)	4	CFSPC	Address of this pointer itself if the FREESPACE parameter is supplied under CLUSTER.
728 (2D8)	4	CCIFS	Address of information supplied through the *cipercent* subparameter of FREESPACE if FREESPACE is supplied under CLUSTER.
732 (2DC)	4	CCAFS	Address of information supplied through the *capercent* subparameter of FREESPACE if FREESPACE is supplied under CLUSTER.
736 (2E0)	4	DFSPC	Address of this pointer itself if the FREESPACE parameter is supplied under DATA.
740 (2E4)	4	DCIFS	Address of information supplied through the *cipercent* subparameter of FREESPACE if FREESPACE is supplied under DATA.
744 (2E8)	4	DCAFS	Address of information supplied through the *capercent* subparameter of FREESPACE if FREESPACE is supplied under DATA.
748 (2EC)	4	MBFSZ	Address of information supplied through the BUFFERSPACE parameter if BUFFERSPACE is supplied under MASTERCATALOG.
752 (2F0)	4	CBFSZ	Address of information supplied through the BUFFERSPACE parameter if BUFFERSPACE is supplied under CLUSTER.
756 (2F4)	4	DBFSZ	Address of information supplied through the BUFFERSPACE parameter if BUFFERSPACE is supplied under DATA.
760 (2F8)	4	CCINV	Address of information supplied through the CONTROL-INTERVALSIZE parameter if CONTROL- INTERVALSIZE is supplied under CLUSTER.
764 (2FC)	4	DCINV	Address of information supplied through the CONTROL-INTERVALSIZE parameter if CONTROL- INTERVALSIZE is supplied under DATA.
768 (300)	4	ICINV	Address of information supplied through the CONTROL-INTERVALSIZE parameter if CONTROL- INTERVALSIZE is supplied under INDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
772 (302)	24	*	Reserved—contains zeros.
796 (31C)	4	UETRY	Address of information supplied through the NAME parameter if NAME is supplied under USERCATALOG.
800 (320)	4	UMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under USERCATALOG.
804 (324)	4	UCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under USERCATALOG.
808 (328)	4	UUPDT	Address of information supplied through the UPDATEPW parameter if UPDATEPW is supplied under USERCATALOG.
812 (32C)	4	UREAD	Address of information supplied through the READPW parameter if READPW is supplied under USERCATALOG.
816 (330)	4	UCODE	Address of information supplied through the CODE parameter if CODE is supplied under USERCATALOG.
820 (334)	4	UATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under USERCATALOG.
824 (338)	4	UAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under USERCATALOG.
828 (33C)	4	UEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under USERCATALOG.
832 (340)	4	USTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under USERCATALOG.
836 (344)	4	UTO	Address of information supplied through the TO parameter if TO is supplied under USERCATALOG.
840 (348)	4	UFOR	Address of information supplied through the FOR parameter if FOR is supplied under USERCATALOG.
844 (34C)	4	UOWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under USERCATALOG.
848 (350)	4	UINDD	Address of information supplied through the FILE parameter if FILE is supplied under USERCATALOG.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
852 (354)	4	UVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under USERCATALOG.
856 (358)	4	UTRKS	Address of this pointer itself if the TRACKS parameter is supplied under USERCATALOG.
860 (35C)	4	UCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under USERCATALOG.
864 (360)	4	URCDS	Address of this pointer itself if the RECORDS parameter is supplied under USERCATALOG.
868 (364)	8	*	Reserved—contains zeros.
876 (36C)	4	UWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under USERCATALOG.
880 (370)	4	UNWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under USERCATALOG.
884 (374)	4	UBFSZ	Address of information supplied through the BUFFERSPACE parameter if BUFFERSPACE is supplied under USERCATALOG.
888 (378)	120	*	Reserved—contains zeros.
1008 (3F0)	4	SARSZ	Address of information supplied through the *average* subparameter of RECORDSIZE if RECORDSIZE is supplied under SPACE.
1012 (3F4)	4	SMRSZ	Address of information supplied through the *maximum* subparameter of RECORDSIZE if RECORDSIZE is supplied under SPACE.
1016 (3F8)	4	UENAM	Address of information supplied through the *entrypoint* subparameter of MODEL if MODEL is supplied under USERCATALOG.
1020 (3FC)	4	UMDCT	Address of information supplied through the *catname/password* subparameter of MODEL if MODEL is supplied under USERCATALOG.
1024 (400)	4	UMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under USERCATALOG.
1028 (404)	4	CEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under CLUSTER.
1032 (408)	4	CSTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under CLUSTER.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1036 (4DC)	16	*	Reserved—contains zeros.
1052 (41C)	4	CEEXT	Address of information supplied through the EXCEPTIONEXIT parameter if EXCEPTIONEXIT is supplied under CLUSTER.
1056 (420)	4	DEEXT	Address of this pointer itself if the EXCEPTIONEXIT parameter is supplied under DATA.
1060 (424)	4	IEEXT	Address of this pointer itself if the EXCEPTIONEXIT parameter is supplied under INDEX.
1064 (428)	4	CNUMD	Address of information supplied through the NUMBERED parameter if NUMBERED is supplied under CLUSTER.
1068 (42C)	4	CRUS	Address of information supplied through the REUSE parameter if REUSE is supplied under CLUSTER.
1072 (430)	4	DRUS	Address of this pointer itself if the REUSE parameter is supplied under DATA.
1076 (434)	4	IRUS	Address of this pointer itself if the REUSE parameter is supplied under INDEX.
1080 (438)	4	CNRUS	Address of information supplied through the NOREUSE parameter if NOREUSE is supplied under CLUSTER.
1084 (43C)	4	DNRUS	Address of this pointer itself if the NOREUSE parameter is supplied under DATA.
1088 (440)	4	INRUS	Address of this pointer itself if the NOREUSE parameter is supplied under INDEX.
1092 (444)	4	CSPND	Address of information supplied through the SPANNED parameter if SPANNED is supplied under CLUSTER.
1096 (448)	4	DSPND	Address of this pointer itself if the SPANNED parameter is supplied under DATA.
1100 (44C)	4	CNSPD	Address of information supplied through the NONSPANNED parameter if NONSPANNED is supplied under CLUSTER.
1104 (450)	4	DNSPD	Address of this pointer itself if the NONSPANNED parameter is supplied under DATA.
1108 (454)	4	MRVBL	Address of information supplied through the RECOVERABLE parameter if RECOVERABLE is supplied under MASTERCATALOG.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1112 (458)	4	URVBL	Address of information supplied through the RECOVERABLE parameter if RECOVERABLE is supplied under USERCATALOG.
1116 (45C)	4	DRVBL	Address of this pointer itself if the RECOVERABLE parameter is supplied under DATA.
1120 (460)	4	MNRVL	Address of information supplied through the NOTRECOVERABLE parameter if NOTRECOVERABLE is supplied under MASTERCATALOG.
1124 (464)	4	UNRVL	Address of information supplied through the NOTRECOVERABLE parameter if NOTRECOVERABLE is supplied under USERCATALOG.
1128 (468)	4	DNRVL	Address of this pointer itself if the NOTRECOVERABLE parameter is supplied under DATA.
1132 (46C)	4	AINDD	Address of information supplied through the *dname* subparameter of FILE if FILE is supplied under NONVSAM.
1136 (470)	68	*	Reserved—contains zeros.
1204 (4B4)	4	MTKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under MASTERCATALOG.
1208 (4B8)	4	MTKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under MASTERCATALOG.
1212 (4BC)	4	CTKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under CLUSTER.
1216 (4C0)	4	CTKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under CLUSTER.
1220 (4C4)	4	STKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under SPACE.
1224 (4C8)	4	STKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under SPACE.
1228 (4CC)	4	UTKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under USERCATALOG.
1232 (4D0)	4	UTKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under USERCATALOG.
1236 (4D4)	8	*	Reserved—contains zeros.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1244 (4DC)	4	MCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under MASTERCATALOG.
1248 (4E0)	4	MCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under MASTERCATALOG.
1252 (4E4)	4	CCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under CLUSTER.
1256 (4E8)	4	CCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under CLUSTER.
1260 (4EC)	4	UCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under USERCATALOG.
1264 (4F0)	4	UCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under USERCATALOG.
1268 (4F4)	8	*	Reserved—contains zeros.
1276 (4FC)	4	SCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under SPACE.
1280 (500)	4	SCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under SPACE.
1284 (504)	4	MRCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under MASTERCATALOG.
1288 (508)	4	MRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under MASTERCATALOG.
1292 (50C)	4	CRCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under CLUSTER.
1296 (510)	4	CRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under CLUSTER.
1300 (514)	4	SRCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under 1241.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1304 (518)	4	SRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under 1241.
1308 (51C)	4	URCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under USERCATALOG.
1312 (520)	4	URCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under USERCATALOG.
1316 (524)	8	*	Reserved—contains zeros.
1324 (52C)	4	DCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under DATA.
1328 (530)	4	DCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under DATA.
1332 (534)	4	DRCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under DATA.
1336 (538)	4	DRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under DATA.
1340 (53C)	4	ICLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under INDEX.
1344 (540)	4	ICLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under INDEX.
1348 (544)	4	IRCPR	Address of information supplied through the *primary* subparameter of RECORDS if CYLINDERS is supplied under INDEX.
1352 (548)	4	IRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if CYLINDER is supplied under INDEX.
1356 (54C)	4	GETRY	Address of information supplied through the NAME parameter if NAME is supplied under ALTERNATEINDEX.
1360 (550)	4	GMODL	Address of this pointer itself if MODEL is supplied under ALTERNATEINDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1364 (554)	4	GENAM	Address of information supplied through the *entryname/password* subparameter of MODEL if MODEL is supplied under ALTERNATEINDEX.
1368 (558)	4	GMDCT	Address of information supplied through the *CATNAME/password* subparameter of MODEL if MODEL is supplied under ALTERNATEINDEX.
1372 (55C)	4	GMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under ALTERNATEINDEX.
1376 (560)	4	GMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under ALTERNATEINDEX.
1380 (564)	4	GCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under ALTERNATEINDEX.
1384 (568)	4	GUPDT	Address of information supplied through the UPDATEPW parameter if UPDATEPW is supplied under ALTERNATEINDEX.
1388 (56C)	4	GREAD	Address of information supplied through the READPW parameter if READPW is supplied under ALTERNATEINDEX.
1392 (570)	4	GCODE	Address of information supplied through the CODE parameter if CODE is supplied under ALTERNATEINDEX.
1396 (574)	4	GATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under ALTERNATEINDEX.
1400 (578)	4	GAUTH	Address of this pointer itself if the AUTHORIZATION parameter is supplied under ALTERNATEINDEX.
1404 (57C)	4	GEPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if the AUTHORIZATION parameter is supplied under ALTERNATEINDEX.
1408 (580)	4	GSTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under ALTERNATEINDEX.
1412 (584)	4	GTO	Address of information supplied through the TO parameter if TO is supplied under ALTERNATEINDEX.
1416 (588)	4	GFOR	Address of information supplied through the FOR parameter if FOR is supplied under ALTERNATEINDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1420 (58C)	4	GOWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under ALTERNATEINDEX.
1424 (590)	4	GSHAR	Address of this pointer itself if the SHAREOPTIONS parameter is supplied under ALTERNATEINDEX.
1428 (594)	4	GSHR1	Address of information supplied through the *crosspartition* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under ALTERNATEINDEX.
1432 (598)	4	GSHR2	Address of information supplied through the *crosssystem* subparameter of SHAREOPTIONS if SHAREOPTIONS is supplied under ALTERNATEINDEX.
1436 (59C)	4	GERAS	Address of this pointer itself if the ERASE parameter is supplied under ALTERNATEINDEX.
1440 (5A0)	4	GNERS	Address of this pointer itself if the NOERASE parameter is supplied under ALTERNATEINDEX.
1444 (5A4)	4	GKEY	Address of this pointer itself if the KEYS parameter is supplied under ALTERNATEINDEX.
1448 (5A8)	4	GKYLN	Address of information supplied through the *length* subparameter of KEYS if KEYS is supplied under ALTERNATEINDEX.
1452 (5AC)	4	GKYPS	Address of information supplied through the *offset* subparameter of KEYS if KEYS is supplied under ALTERNATEINDEX.
1456 (5B0)	4	GREPL	Address of this pointer itself if the REPLICATE parameter is supplied under ALTERNATEINDEX.
1460 (5B4)	4	RNREP	Address of this pointer itself if the NOREPLICATE parameter is supplied under ALTERNATEINDEX.
1464 (5B8)	4	GIMBD	Address of this pointer itself if the IMBED parameter is supplied under ALTERNATEINDEX.
1468 (5BC)	4	GNIBD	Address of this pointer itself if the NOIMBED parameter is supplied under ALTERNATEINDEX.
1472 (5C0)	4	GINDD	Address of information supplied through the FILE parameter if FILE is supplied under ALTERNATEINDEX.
1476 (5C4)	4	GVSER	Address of information supplied through the VOLUMES parameter if VOLUMES is supplied under ALTERNATEINDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1480 (5C8)	4	GRANG	Address of a count of subparameters supplied through the KEYRANGES parameter if KEYRANGES is supplied under ALTERNATEINDEX.
1484 (5CC)	4	GRGLOPTR	Address of information supplied through the *lowkey* subparameter of KEYRANGES if KEYRANGES is supplied under ALTERNATEINDEX.
1488 (5D0)	4	GRGHIPTR	Address of information supplied through the *highkey* subparameter of KEYRANGES if KEYRANGES is supplied under ALTERNATEINDEX.
1492 (5D4)	4	GORDR	Address of this pointer itself if the ORDERED parameter is supplied under ALTERNATEINDEX.
1496 (5D8)	4	GUORD	Address of this pointer itself if the UNORDERED parameter is supplied under ALTERNATEINDEX.
1500 (5DC)	4	GSUBA	Address of this pointer itself if the SUBALLOCATION parameter is supplied under ALTERNATEINDEX.
1504 (5E0)	4	GUNIQ	Address of this pointer itself if the UNIQUE parameter is supplied under ALTERNATEINDEX.
1508 (5E4)	4	GTRKS	Address of this pointer itself if the TRACKS parameter is supplied under ALTERNATEINDEX.
1512 (5E8)	4	GTKPR	Address of information supplied through the *primary* subparameter of TRACKS if TRACKS is supplied under ALTERNATEINDEX.
1516 (5EC)	4	GTKSC	Address of information supplied through the *secondary* subparameter of TRACKS if TRACKS is supplied under ALTERNATEINDEX.
1520 (5F0)	4	GCYLD	Address of this pointer itself if the CYLINDERS parameter is supplied under ALTERNATEINDEX.
1524 (5F4)	4	GCLPR	Address of information supplied through the *primary* subparameter of CYLINDERS if CYLINDERS is supplied under ALTERNATEINDEX.
1528 (5F8)	4	GCLSC	Address of information supplied through the *secondary* subparameter of CYLINDERS if CYLINDERS is supplied under ALTERNATEINDEX.
1532 (5FC)	4	GRCDS	Address of this pointer itself if the RECORDS parameter is supplied under ALTERNATEINDEX.
1536 (600)	4	GRCPR	Address of information supplied through the *primary* subparameter of RECORDS if RECORDS is supplied under ALTERNATEINDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1540 (604)	4	GRCSC	Address of information supplied through the *secondary* subparameter of RECORDS if RECORDS is supplied under ALTERNATEINDEX.
1544 (608)	4	GRSIZ	Address of this pointer itself if the RECORDSIZE parameter is supplied under ALTERNATEINDEX.
1548 (60C)	4	GARSZ	Address of information supplied through the *average* subparameter of RECORDSIZE if RECORDSIZE is supplied under ALTERNATEINDEX.
1552 (610)	4	GMRSZ	Address of information supplied through the *maximum* subparameter of RECORDSIZE if RECORDSIZE is supplied under ALTERNATEINDEX.
1556 (614)	4	GWCK	Address of this pointer itself if the WRITECHECK parameter is supplied under ALTERNATEINDEX.
1560 (618)	4	GNWCK	Address of this pointer itself if the NOWRITECHECK parameter is supplied under ALTERNATEINDEX.
1564 (61C)	4	GSPED	Address of this pointer itself if the SPEED parameter is supplied under ALTERNATEINDEX.
1568 (620)	4	GRECV	Address of this pointer itself if the RECOVERY parameter is supplied under ALTERNATEINDEX.
1572 (624)	4	GFSPC	Address of this pointer itself if the FREESPACE parameter is supplied under ALTERNATEINDEX.
1576 (628)	4	GCIFS	Address of information supplied through the *cipercent* subparameter of FREESPACE if FREESPACE is supplied under ALTERNATEINDEX.
1580 (62C)	4	GCAFS	Address of information supplied through the *capercent* subparameter of FREESPACE if FREESPACE is supplied under ALTERNATEINDEX.
1584 (630)	4	GBFSZ	Address of information supplied through the BUFFERSPACE parameter if BUFFERSPACE is supplied under ALTERNATEINDEX.
1588 (634)	4	GCINV	Address of information supplied through the CONTROLINTERVALSIZE parameter if CONTROLINTERVALSIZE is supplied under ALTERNATEINDEX.
1592 (638)	4	GREL	Address of information supplied through the RELATE parameter if RELATE is supplied under ALTERNATEINDEX.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1596 (63C)	4	GEEXT	Address of information supplied through the EXCEPTIONEXIT parameter if EXCEPTIONEXIT is supplied under ALTERNATEINDEX.
1600 (640)	4	GRUS	Address of information supplied through the REUSE parameter if REUSE is supplied under ALTERNATEINDEX.
1604 (644)	4	GNRUS	Address of information supplied through the NOREUSE parameter if NOREUSE is supplied under ALTERNATEINDEX.
1608 (648)	4	GUNQK	Address of information supplied through the UNIQUEKEY parameter if UNIQUEKEY is supplied under ALTERNATEINDEX.
1612 (64C)	4	GNUQK	Address of information supplied through the NONUNIQUEKEY parameter if NONUNIQUEKEY is supplied under ALTERNATEINDEX.
1616 (650)	4	DUNQK	Address of information supplied through the UUNIQUEKEY parameter if UNIQUEKEY is supplied under DATA.
1620 (654)	4	DNUQK	Address of information supplied through the NONUNIQUEKEY parameter if NONUNIQUEKEY is supplied under DATA.
1624 (658)	4	GUPG	Address of information supplied through the UPGRADE parameter if UPGRADE is supplied under ALTERNATEINDEX.
1628 (65C)	4	GNUPG	Address of information supplied through the NOUPGRADE parameter if NOUPGRADE is supplied under ALTERNATEINDEX.
1632 (660)	12	*	Reserved—contains zeros.
1644 (66C)	4	RETRY	Address of information supplied through the NAME parameter if NAME is supplied under PATH.
1648 (670)	4	RMODL	Address of this pointer itself if the MODEL parameter is supplied under PATH.
1652 (674)	4	RENAM	Address of information supplied through the *entryname/password* subparameter of MODEL if MODEL is supplied under PATH.
1656 (678)	4	RMDCT	Address of information supplied through the *catname/password* subparameter of MODEL if MODEL is supplied under PATH.
1660 (67C)	4	RMDNM	Address of information supplied through the *dname* subparameter of MODEL if MODEL is supplied under PATH.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
1664 (680)	4	RMSTR	Address of information supplied through the MASTERPW parameter if MASTERPW is supplied under PATH.
1668 (684)	4	RCINT	Address of information supplied through the CONTROLPW parameter if CONTROLPW is supplied under PATH.
1672 (688)	4	RUPDT	Address of information supplied through the UPDATEPW parameter if UPDATEPW is supplied under PATH. 1676 (68C)4RHEADAddress of information supplied through the READPW parameter if READPW is supplied under PATH.
1680 (690)	4	RCODE	Address of information supplied through the CODE parameter if CODE is supplied under PATH.
1684 (694)	4	RATTP	Address of information supplied through the ATTEMPTS parameter if ATTEMPTS is supplied under PATH.
1688 (698)	4	RAUTH	Address of information supplied through the AUTHORIZATION parameter if AUTHORIZATION is supplied under PATH.
1692 (69C)	4	REPNM	Address of information supplied through the *entrypoint* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under PATH.
1696 (6A0)	4	RSTRG	Address of information supplied through the *string* subparameter of AUTHORIZATION if AUTHORIZATION is supplied under PATH.
1700 (6A4)	4	RTO	Address of information supplied through the TO parameter if TO is supplied under PATH.
1704 (6A8)	4	RFOR	Address of information supplied through the FOR parameter if FOR is supplied under PATH.
1708 (6AC)	4	ROWNR	Address of information supplied through the OWNER parameter if OWNER is supplied under PATH.
1712 (6B0)	4	RINDD	Address of information supplied through the FILE parameter if FILE is supplied under PATH.
1716 (6B4)	4	RUPD	Address of information supplied through the UPDATE parameter if UPDATE is supplied under PATH.
1720 (6B8)	4	RNUPD	Address of information supplied through the NOUPDATE parameter if NOUPDATE is supplied under PATH.
1724 (6BC)	4	RPENT	Address of information supplied through the PATHENTRY parameter if PATHENTRY is supplied under PATH.

DELETE FDT

Offset	Content	
0 (0)	*D E L E*	*T E* ƀ ƀ
8 (8)	↑*entryname/password*	↑CATALOG
16 (10)	↑*catname/password*	↑*catdd*
24 (18)	↑FILE	↑PURGE
32 (20)	↑NOPURGE	↑ERASE
40 (28)	↑NOERASE	0
48 (30)	↑CLUSTER	↑SPACE
56 (38)	↑USERCATALOG	↑MASTERCATALOG
64 (40)	↑NONVSAM	↑SCRATCH
72 (48)	↑NOSCRATCH	0
80 (50)	0	0
88 (58)	↑ALTERNATEINDEX	↑PATH
96 (60)	↑FORCE	↑NOFORCE

DELETE FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—DELETEƀƀ.
8 (8)	4	NTRY	Address of information supplied through the *entryname/password* parameter.
12 (C)	4	CATLG	Address of this pointer itself if the CATALOG parameter has been supplied.
16 (10)	4	CAT	Address of information supplied through the *catname/password* subparameter of the CATALOG parameter.
20 (14)	4	CATDD	Address of the ddname associated with the catalog.
24 (18)	4	INDD	Address of information supplied through the FILE parameter.
28 (1C)	4	PURGE	Address of this pointer itself if the PURGE parameter has been supplied or defaulted.
32 (20)	4	NOPUR	Address of this pointer itself if the NOPURGE parameter has been supplied.
36 (24)	4	ERASE	Address of this pointer itself if the ERASE parameter has been supplied.
40 (28)	4	NOERA	Address of this pointer itself if the NOERASE parameter has been supplied.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
44 (2C)	4	*	Reserved—contains zeros.
48 (30)	4	CLUST	Address of this pointer itself if the CLUSTER parameter has been supplied.
52 (34)	4	SPACE	Address of this pointer itself if the SPACE parameter has been supplied.
56 (38)	4	UCAT	Address of this pointer itself if the USERCATALOG parameter has been supplied.
60 (3C)	4	MCAT	Address of this pointer itself if the MASTERCATALOG parameter has been supplied.
64 (40)	4	ALIEN	Address of this pointer itself if the NONVSAM parameter has been supplied.
68 (44)	4	SCR	Address of this pointer itself if the SCRATCH parameter has been supplied.
72 (48)	4	NSCR	Address of this pointer itself if the NOSCRATCH parameter has been supplied.
76 (4C)	12	*	Reserved--contains zeros.
88 (58)	4	AIX	Address of this pointer itself if the ALTERNATE INDEX parameter has been supplied.
92 (5C)	4	PATH	Address of this pointer itself if the PATH parameter has been supplied.
96 (60)	4	FRC	Address of this pointer itself if the FORCE parameter has been supplied.
100 (64)	4	NFRC	Address of this pointer itself if the NOFORCE parameter has been supplied.

EXPORT FDT

Offset	*Content*	
0 (0)	*E X P O*	*R T ƀ ƀ*
8 (8)	↑*entryname/password*	↑INFILE
16 (10)	↑OUTFILE	↑*dname*
24 (18)	↑ENVIRONMENT	↑TEMPORARY
32 (20)	↑PERMANENT	↑INHIBITSOURCE
40 (28)	↑INHIBITTARGET	↑ERASE
48 (30)	↑NOERASE	↑PURGE
56 (38)	↑NOPURGE	↑DISCONNECT
64 (40)	↑NOINHIBITSOURCE	↑NOINHIBITTARGET
72 (48)	0	0
80 (50)	0	↑PRIMEDATADEVICE
88 (58)	↑BLOCKSIZE	↑STDLABEL
96 (60)	↑NOLABEL	↑NOREWIND
104 (68)	↑REWIND	↑UNLOAD

EXPORT FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—EXPORTƀƀ.
8 (8)	4	ENT	Address of information supplied through the entryname/password parameter.
12 (C)	4	INDD	Address of information supplied through the INFILE parameter.
16 (10)	4	OUT	Address of this pointer itself if the OUTFILE parameter has been supplied.
20 (14)	4	OUTDD	Address of information supplied through the dname subparameter of the OUTFILE parameter.
24 (18)	4	ENVIR	Address of this pointer itself if the ENVIRONMENT parameter has been supplied.
28 (1C)	4	TEMP	Address of this pointer itself if the TEMPORARY parameter has been supplied.
32 (20)	4	PERM	Address of this pointer itself if the PERMANENT parameter has been supplied.
36 (24)	4	INHBS	Address of this pointer itself if the INHIBITSOURCE parameter has been supplied.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning,
40 (28)	4	IFILEPTR	Address of an array of pointer pointer points to the *dname* subparameter of the INFILE subparameter, i.e., the *dname* used for a CRA if ALL was sp for that CRA.
44 (2C)	4	MRPW	Address of information suppli through the *password* subpara the MASTERPW parameter.
48 (30)	4	ENVIR	Address of this pointer itself if ENVIRONMENT parameter l supplied.
52 (34)	4	PDEV	Address of information suppli through the PRIMEDATADE subparameter of the ENVIRONMENT parameter.
56 (38)	4	OUTDD	Address of information suppli through the *dname* subparame the OUTFILE parameter.
60 (3C)	4	ENTNMPTR	Address of an array of pointer pointer points to the *entrynam* subparameter of the ENTRIE subparameter, i.e., all of the e names in each CRA specified.
64 (40)	4	ENTDNPTR	Address of an array of pointer pointer points to the *dname* subparameter of the ENTRIE subparameter to be used to ex associated entry name in ENTNMPTR.
68(44)	4	BLKSZ	Address of information suppli through the BLOCKSIZE subparameter of the ENVIRONMENT parameter.
72 (48)	4	OSLBL	Address of this pointer itself if STDLABEL subparameter of ENVIRONMENT parameter l supplied (or defaulted.)
76 (4C)	4	ONLBL	Address of this pointer itself if NOLABEL subparameter of tl ENVIRONMENT parameter l supplied.
80 (50)	4	ONREW	Address of this pointer itself if NOREWIND subparameter ol ENVIRONMENT parameter l supplied (or defaulted.)
84 (54)	4	OREW	Address of this pointer itself if REWIND subparameter of the ENVIRONMENT parameter l been supplied.
88 (58)	4	OUNLD	Address of this pointer itself if UNLOAD subparameter of th ENVIRONMENT parameter supplied.

IMPORT FDT

Offset	*Content*	
0(0)	*I M P O*	*R T ƀ ƀ*
8 (8)	↑INFILE	↑OUTFILE
16 (10)	↑OBJECTS	↑*objectname*
24 (18)	↑NEWNAME	↑FILE
32 (20)	↑VOLUMES	↑KEYRANGES
40 (28)	↑DEVICETYPE	↑ORDERED
48 (30)	↑UNORDERED	↑*lowkey*
56 (38)	↑*highkey*	↑CONNECT
64 (40)	↑*dname*	↑ENVIRONMENT
72 (48)	↑PURGE	↑NOPURGE
80 (50)	↑ERASE	↑NOERASE
88 (58)	↑BLOCKSIZE	↑PRIMEDATADEVICE
96 (60)	↑RECORDSIZE	0
104 (68)	0	↑STDLABEL
112 (70)	↑NOLABEL	↑NOREWIND
120 (78)	↑REWIND	↑UNLOAD
128 (80)	0	0
136 (88)	↑CATALOG	

IMPORT FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—IMPORTƀƀ.
8 (8)	4	IN	Address of this pointer itself if the INFILE parameter has been supplied.
12 (C)	4	OUTDD	Address of information supplied through the OUTFILE parameter.
16 (10)	4	OBJTS	Address of the count of objects supplied through the OBJECTS parameter.
20 (14)	4	OBJNMPTR	Address of information supplied through the objectname subparameter of the OBJECTS parameter.
24 (18)	4	NEWNMPTR	Address of information supplied through the NEWNAME subparameter of the OBJECTS parameter.
28 (1C)	4	OBJFLPTR	Address of information supplied through the FILE subparameter of the OBJECTS parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
32 (20)	4	LISTVPTR	Address of information supplied through the VOLUMES subparameter of the OBJECTS parameter.
36 (24)	4	RANGEPTR	Address of the count of keyranges supplied through the KEYRANGES subparameter of the OBJECTS parameter.
40 (28)	4	DEVTPTR	Address of the information supplied through the DEVICETYPE subparameter of the OBJECTS parameter.
44 (2C)	4	ORDPTR	Address of information supplied through the ORDERED subparameter of the OBJECTS parameter.
48 (30)	4	UNORDPTR	Address of information supplied through the UNORDERED subparameter of the OBJECTS parameter.
52 (34)	4	LOWKYPTR	Address of information supplied through the lowkey subparameter of the KEYRANGES parameter.
56 (38)	4	HIKEYPTR	Address of information supplied through the highkey subparameter of the KEYRANGES parameter.
60 (3C)	4	CON	Address of this pointer itself if the CONNECT parameter has been supplied.
64 (40)	4	INDD	Address of information supplied through the dname subparameter of the INFILE parameter.
68 (44)	4	ENV	Address of information supplied through the ENVIRONMENT parameter.
72 (48)	4	PRG	Address of this pointer itself if the PURGE parameter has been supplied.
76 (4C)	4	NPRG	Address of this pointer itself if the NOPURGE parameter has been supplied.
80 (50)	4	ERAS	Address of this pointer itself if the ERASE parameter has been supplied.
84 (54)	4	NERAS	Address of this pointer itself if the NOERASE parameter has been supplied.
88 (58)	4	BLKSZ	Address of information supplied through the BLOCKSIZE subparameter of the ENVIRONMENT parameter.
92 (5C)	4	PDEV	Address of information supplied through the PRIMEDATADEVICE subparameter of the ENVIRONMENT parameter.
96 (60)	4	RCSZE	Address of information supplied through the RECORDSIZE subparameter of the ENVIRONMENT parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
100 (64)	36	*	Reserved—contains zeros.
108 (6C)	4	ISLBL	Address of this pointer itself if the STDLABEL subparameter of the ENVIRONMENT parameter has been supplied (or defaulted).
112 (70)	4	INLBL	Address of this pointer itself if the NOLABEL subparameter of the ENVIRONMENT parameter has been supplied.
116 (74)	4	INREW	Address of this pointer itself if the NOREWIND subparameter of the ENVIRONMENT parameter has been supplied (or defaulted.)
120 (78)	4	IREW	Address of this pointer itself if the REWIND subparameter of the ENVIRONMENT parameter has been supplied.
124 (7C)	4	IUNLD	Address of this pointer itself if the UNLOAD subparameter of the ENVIRONMENT parameter has been supplied.
136 (88)	4	CAT	Address of information supplied through the CATALOG parameter.

IMPORTRA FDT

Offset	Content	
0 (0)	*I M P O*	*R T R A*
8 (8)	↑INFILE	↑OUTFILE
16 (10)	↑OBJECTS	↑*object name*
24 (18)	↑FILE	0
32 (20)	↑VOLUMES	0
40 (28)	↑DEVICETYPE	0
48 (30)	0	0
56 (38)	0	0
64 (40)	↑*dname*	↑ENVIRONMENT
72 (48)	0	0
80 (50)	0	0
88 (58)	↑BLOCKSIZE	↑PRIMEDATADEVICE
96 (60)	0	0
104 (68)	0	↑STDLABEL
112 (70)	↑NOLABEL	↑NOREWIND
120 (78)	↑REWIND	↑UNLOAD
128 (80)	0	0
136 (88)	↑CATALOG	

IMPORTRA FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb—IMPORTRA.
8 (8)	4	IN	Address of this pointer itself if the INFILE parameter has been supplied.
12 (C)	4	OUTDD	Address of information supplied through the OUTFILE parameter.
16 (10)	4	OBJTS	Address of the count of objects supplied through the OBJECTS parameter.
20 (14)	4	OBJNMPTR	Address of information supplied through the *name* subparameter of the OBJECTS parameter.
24 (18)	4	OBJFLPTR	Address of information supplied through the FILE subparameter of the OBJECTS parameter.
28 (1C)	4	*	Reserved—contains zeros.
32 (20)	4	LISTVPTR	Address of information supplied through the VOLUMES subparameter of the OBJECTS parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
36 (24)	4	*	Reserved—contains zeros.
40 (28)	4	DEVTPTR	Address of information supplied through the DEVICETYPE subparameter of the OBJECTS parameter.
44 (2C)	20	*	Reserved—contain zeros.
64 (40)	4	INDD	Address of information supplied through the *dname* subparameter of the INFILE parameter.
68 (44)	4	ENV	Address of information supplied through the ENVIRONMENT parameter.
72 (48)	16	*	Reserved—contains zeros.
88 (58)	4	BLKSZ	Address of information supplied through the BLOCKSIZE subparameter of the ENVIRONMENT parameter.
92 (5C)	4	PDEV	Address of information supplied through the PRIMEDATADEVICE subparameter of the ENVIRONMENT parameter.
96 (60)	40	*	Reserved—contains zeros.
108 (6C)	4	ISLBL	Address of this pointer itself if the STDLABEL subparameter of the ENVIRONMENT parameter has been supplied (or defaulted.)
112 (70)	4	INLBL	Address of this pointer itself if the NOLABEL subparameter of the ENVIRONMENT parameter has been supplied.
116 (74)	4	INREW	Address of this pointer itself if the NOREWIND subparameter of the ENVIRONMENT parameter has been supplied (or defaulted.)
120 (78)	4	IREW	Address of this pointer itself if the REWIND subparameter of the ENVIRONMENT parameter has been supplied.
124 (7C)	4	IUNLD	Address of this pointer itself if the UNLOAD subparameter of the ENVIRONMENT parameter has been supplied.
136 (88)	4	CAT	Address of information supplied through the CATALOG parameter.

LISTCAT FDT

Offset	Content	
0 (0)	*L I S T*	*C A T* ƀ
8 (8)	↑CATALOG	↑OUTFILE
16 (10)	↑ENTRIES	0
24 (18)	↑CLUSTER	↑DATA
32 (20)	↑INDEX	↑SPACE
40 (28)	↑NONVSAM	↑USERCATALOG
48 (30)	↑*catname/password*	↑*dname*
56 (38)	0	↑NAME
64 (40)	↑ALL	↑VOLUME
72 (48)	↑ALLOCATION	0
80 (50)	0	0
88 (58)	0	↑ALTERNATEINDEX
96 (60)	↑PATH	↑NOTUSABLE

LISTCAT FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—LISTCATb̸.
8 (8)	4	CAT	Address of this pointer itself if the CATALOG parameter has been supplied.
12 (C)	4	OUTDD	Reserved—contains zeros.
16 (10)	4	ENT	Address of information supplied through the ENTRIES parameter.
20 (14)	4	*	Reserved—contains zeros.
24 (18)	4	CLUST	Address of this pointer itself if the CLUSTER parameter has been supplied.
28 (1C)	4	DATUM	Address of this pointer itself if the DATA parameter has been supplied.
32 (20)	4	INDEX	Address of this pointer itself if the INDEX parameter has been supplied.
36 (24)	4	SPACE	Address of this pointer itself if the SPACE parameter has been supplied.
40 (28)	4	ALIEN	Address of this pointer itself if the NONVSAM parameter has been supplied.
44 (2C)	4	UCAT	Address of this pointer itself if the USERCATALOG parameter has been supplied.
48 (30)	4	CATNM	Address of information supplied through the catname/password subparameter of the CATALOG parameter.
52 (34)	4	CATDD	Address of information supplied through the *dname* subparameter of the CATALOG parameter.
56 (38)	4	*	Reserved—contains zeros.
60 (3C)	4	NAME	Address of this pointer itself if the NAME parameter has been supplied.
64 (40)	4	FALL	Address of this pointer itself if the ALL parameter has been supplied.
68 (44)	4	VOL	Address of this pointer itself if the VOLUME parameter has been supplied.
72 (48)	4	ALLOC	Address of this pointer itself if the ALLOCATION parameter has been supplied.
76 (4C)	16	*	Reserved—contain zeros.
92 (5C)	4	AIX	Address of this pointer itself if the ALTERNATEINDEX parameter has been supplied.
96 (60)	4	PATH	Address of this pointer itself if the PATH parameter has been supplied.
100 (64)	4	NUSE	Address of this pointer itself if the NOTUSABLE parameter has been supplied.

LISTCRA FDT

Offset	Content	
0 (0)	*L I S T*	*C R A ƀ*
8 (8)	↑INFILE	↑COMPARE
16 (10)	↑NOCOMPARE	↑DUMP
24 (18)	↑NAME	↑CATALOG
32 (20)	↑*catname/password*	↑*dname*
40 (28)	↑MASTERPW	

LISTCRA FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—LISTCRAƀ.
8 (8)	4	IFILE	Address of information supplied through the *dname* subparameter of the INFILE parameter.
12 (C)	4	CMPR	Address of this pointer itself if the COMPARE parameter has been supplied.
16 (10)	4	NCMPR	Address of this pointer itself if the NOCOMPARE parameter has been supplied.
20 (14)	4	DUMP	Address of this pointer itself if the DUMP parameter has been supplied.
24 (18)	4	NAME	Address of this pointer itself if the NAME parameter has been supplied.
28 (1C)	4	CAT	Address of this pointer itself if the CATALOG parameter has been supplied.
32 (20)	4	CATNM	Address of information supplied through the *catname/password* subparameter of the CATALOG parameter.
36 (24)	4	CATDN	Address of information supplied through the *dname* subparameter of the CATALOG parameter.
40 (28)	4	MRPW	Address of information supplied through the *password* subparameter of the MASTERPW parameter.

PARM FDT

Offset	*Content*	
0 (0)	*P A R M*	b b b b
8 (8)	↑TEST	↑OFF
16 (10)	↑TRACE	↑AREAS
24 (18)	↑FULL	↑*dumpid*
32 (20)	↑*count1*	↑*count2*
40 (28)	↑GRAPHICS	↑CHAIN
48 (30)	↑TABLE	↑MARGINS
56 (38)	↑*leftmargin*	↑*rightmargin*
64 (40)	↑AN	↑HN
72 (48)	↑PN	↑QN
80 (50)	↑RN	↑SN
88 (58)	↑TN	

PARM FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—PARMbbbb.
8 (8)	4	TEST	Address of this pointer itself if the TEST parameter has been supplied.
12 (C)	4	TOFF	Address of this pointer itself if the OFF parameter has been supplied.
16 (10)	4	TRACE	Address of this pointer itself if the TRACE parameter has been supplied.
20 (14)	4	AREA	Address of information supplied through the AREAS parameter.
24 (18)	4	FULL	Address of information supplied through the FULL parameter.
28 (1C)	4	FIDPTR	Address of information supplied through the dumpid subparameter of the FULL parameter.
32 (20)	4	BEGINPTR	Address of information supplied through the count1 subparameter of the FULL parameter.
36 (24)	4	COUNTPTR	Address of information supplied through the count2 subparameter of the FULL parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
40 (28)	4	GRAPH	Address of this pointer itself if the GRAPHICS parameter has been supplied.
44 (2C)	4	CHAIN	Address of information supplied through the CHAIN parameter.
48 (30)	4	TABLE	Address of information supplied through the TABLE parameter.
52 (34)	4	MARG	Address of this pointer itself if the MARGINS parameter has been supplied.
56 (38)	4	LMARG	Address of information supplied through the left margin subparameter of the MARGINS parameter.
60 (3C)	4	RMARG	Address of information supplied through the right margin subparameter of the MARGINS parameter.
64 (40)	4	CHNAN	Address of information supplied through the AN subparameter of the CHAIN parameter.
68 (44)	4	CHNHN	Address of information supplied through the HN subparameter of the CHAIN parameter.
72 (48)	4	CHNPN	Address of information supplied through the PN subparameter of the CHAIN parameter.
76 (4C)	4	CHNQN	Address of information supplied through the QN subparameter of the CHAIN parameter.
80 (50)	4	CHNRN	Address of information supplied through the RN subparameter of the CHAIN parameter.
84 (54)	4	CHNSN	Address of information supplied through the SN subparameter of the CHAIN parameter.
88 (58)	4	CHNTN	Address of information supplied through the TN subparameter of the CHAIN parameter.

PRINT FDT

Offset	Content	
0 (0)	*P R I N*	*T ƀ ƀ ƀ*
8 (8)	↑INFILE	0
16 (10)	↑FROMKEY	↑FROMADDRESS
24 (18)	↑SKIP	↑TOKEY
32 (20)	↑TOADDRESS	↑COUNT
40 (28)	↑*dname/password*	0
48 (30)	0	↑HEX
56 (38)	↑CHARACTER	↑DUMP
64 (40)	0	↑ENVIRONMENT
72 (48)	↑RECORDFORMAT	↑BLOCKSIZE
80 (50)	↑RECORDSIZE	0
88 (58)	↑HINDEXDEVICE	↑PRIMEDATADEVICE
96 (60)	↑FIXUNB	↑FIXBLK
104 (68)	↑VARUNB	↑VARBLK
112 (70)	↑SPNUNB	↑SPNBLK
120 (78)	↑UNDEF	↑FROMNUMBER
128 (80)	↑TONUMBER	↑STDLABEL
136 (88)	↑NOLABEL	↑NOREWIND
128 (80)	↑REWIND	↑UNLOAD

PRINT FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—PRINTƀƀƀ.
8 (8)	4	INDN	Address of this pointer itself if the INFILE parameter has been supplied.
12 (C)	4	OUTDD	Reserved—contains zeros.
16 (10)	4	FMKYC	Address of information supplied through the FROMKEY parameter.
20 (14)	4	FMRBA	Address of information supplied through the FROMADDRESS parameter.
24 (18)	4	SKIP	Address of information supplied through the SKIP parameter.
28 (1C)	4	TOKYC	Address of information supplied through the TOKEY parameter.
32 (20)	4	TORBA	Address of information supplied through the TOADDRESS parameter.
36 (24)	4	COUNT	Address of information supplied through the COUNT parameter.
40 (28)	4	INPDD	Address of information supplied through the dname/password subparameter of the INFILE parameter.
44 (2C)	8	*	Reserved—contains zeros.
52 (34)	4	FHEX	Address of this pointer itself if the HEX parameter has been supplied.
56 (38)	4	FCHAR	Address of this pointer itself if the CHARACTER parameter has been supplied.
60 (3C)	4	FDUMP	Address of this pointer itself if the DUMP parameter has been supplied.
64 (40)	4	*	Reserved—contains zeros.
68 (44)	4	IENV	Address of this pointer itself if the ENVIRONMENT parameter has been specified.
72 (48)	4	IRFMT	Address of this pointer itself if the RECORDFORMAT subparameter of the ENVIRONMENT parameter has been supplied.
76 (4C)	4	IBKSZ	Address of information supplied through the BLOCKSIZE subparameter of the ENVIRONMENT parameter.
80 (50)	4	IRCSZ	Address of information supplied through the RECORDSIZE subparameter of the ENVIRONMENT parameter.
84 (54)	4	*	Reserved—contains zeros.
88 (58)	4	IHDEV	Address of information supplied through the HINDEXDEVICE subparameter of the ENVIRONMENT parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
92 (5C)	4	IPDEV	Address of information supplied through the PRIMEDATADEVICE subparameter of the ENVIRONMENT parameter.
96 (60)	4	IFUNB	Address of this pointer itself if the FIXUNB subparameter of the ENVIRONMENT parameter has been supplied.
100 (64)	4	IFBLK	Address of this pointer itself if the FIXBLK subparameter of the ENVIRONMENT parameter has been supplied.
104 (68)	4	IVUNB	Address of this pointer itself if the VARUNB subparameter of the ENVIRONMENT parameter has been supplied.
108 (6C)	4	IVBLK	Address of this pointer itself if the VARBLK subparameter of the ENVIRONMENT parameter has been supplied.
112 (70)	4	ISUNB	Address of this pointer itself if the SPNUNB subparameter of the ENVIRONMENT parameter has been supplied.
116 (74)	4	ISBLK	Address of this pointer itself if the SPNBLK subparameter of the ENVIRONMENT parameter has been supplied.
120 (78)	4	IUNDF	Address of this pointer itself if the UNDEF subparameter of the ENVIRONMENT parameter has been supplied.
124 (7C)	4	FMNUM	Address of information supplied through the FROMNUMBER parameter.
128 (80)	4	TONUM	Address of information supplied through the TONUMBER parameter.
132 (84)	4	ISLBL	Address of this pointer itself if the STDLABEL subparameter of the ENVIRONMENT parameter has been supplied (or defaulted.)
136 (88)	4	INLBL	Address of this pointer itself if the NOLABEL subparameter of the ENVIRONMENT parameter has been supplied.
140 (8C)	4	INREW	Address of this pointer itself if the NOREWIND subparameter of the ENVIRONMENT parameter has been supplied (or defaulted.)
144 (90)	4	IREW	Address of this pointer itself if the REWIND subparameter of the ENVIRONMENT parameter has been supplied.
148 (94)	4	IUNLD	Address of this pointer itself if the UNLOAD subparameter of the ENVIRONMENT parameter has been supplied.

REPRO FDT

Offset	*Content*	
0 (0)	*R E P R*	*O ƀ ƀ ƀ*
8 (8)	↑INFILE	↑OUTFILE
16 (10)	↑FROMKEY	↑FROMADDRESS
24 (18)	↑SKIP	↑TOKEY
32 (20)	↑TOADDRESS	↑COUNT
40 (28)	↑*dname/password*	↑*dname/password*
48 (30)	0	0
56 (38)	↑FROMNUMBER	↑TONUMBER
64 (40)	0	↑ENVIRONMENT
72 (48)	↑RECORDFORMAT	↑BLOCKSIZE
80 (50)	↑RECORDSIZE	0
88 (58)	↑HINDEXDEVICE	↑PRIMEDATADEVICE
96 (60)	↑FIXUNB	↑FIXBLK
104 (68)	↑VARUNB	↑VARBLK
112 (70)	↑SPNUNB	↑SPNBLK
120 (78)	↑UNDEF	0
128 (80)	0	↑ENVIRONMENT
136 (88)	↑RECORDFORMAT	↑BLOCKSIZE
144 (90)	↑RECORDSIZE	0
152 (98)	↑HINDEXDEVICE	↑PRIMEDATADEVICE
160 (A0)	↑FIXUNB	↑FIXBLK
168 (A8)	↑VARUNB	↑VARBLK
176 (B0)	↑SPNUNB	↑SPNBLK
184 (B8)	↑UNDEF	0
192 (C0)	0	0
200 (C8)	↑REPLACE	↑NOREPLACE
208 (D0)	↑REUSE	↑NOREUSE
216 (D8)	↑STDLABEL	↑NOLABEL
224 (E0)	↑NOREWIND	↑REWIND
232 (E8)	↑UNLOAD	↑STDLABEL
240 (F0)	↑NOLABEL	↑NOREWIND
248 (F8)	↑REWIND	↑UNLOAD

REPRO FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—REPROƀƀƀ.
8 (8)	4	INDN	Address of this pointer itself if the INFILE parameter has been supplied.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
12 (C)	4	OUTDN	Address of this pointer itself if the OUTFILE parameter has been supplied.
16 (10)	4	FMKYC	Address of information supplied through the FROMKEY parameter.
20 (14)	4	FMRBA	Address of information supplied through the FROMADDRESS parameter.
24 (18)	4	SKIP	Address of information supplied through the SKIP parameter.
28 (1C)	4	TOKYC	Address of information supplied through the TOKEY parameter.
32 (20)	4	TORBA	Address of information supplied through the TOADDRESS parameter.
36 (24)	4	COUNT	Address of information supplied through the COUNT parameter.
40 (28)	4	INPDD	Address of information supplied through the dname/password subparameter of the INFILE parameter.
44 (2C)	4	OUTDD	Address of information supplied through the dname/password subparameter of the OUTFILE parameter.
48 (30)	8	*	Reserved—contains zeros.
56 (38)	4	FMNUM	Address of this pointer itself if the FROMNUMBER parameter has been supplied.
60 (3C)	4	TONUM	Address of this pointer itself if the TONUMBER parameter has been supplied.
64 (40)	4	*	Reserved—contains zeros.
68 (44)	4	IENV	Address of this pointer itself if the ENVIRONMENT subparameter of the INFILE parameter has been supplied.
72 (48)	4	IRFMT	Address of this pointer itself if the RECORDFORMAT subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
76 (4C)	4	IBKSZ	Address of information supplied through the BLOCKSIZE subparameter of the ENVIRONMENT parameter for the input data set.
80 (50)	4	IRCSZ	Address of information supplied through the RECORDSIZE subparameter of the ENVIRONMENT parameter for the input data set.
84 (54)	4	*	Reserved—contains zeros.
88 (58)	4	IHDEV	Address of information supplied through the HINDEXDEVICE subparameter of the ENVIRONMENT parameter for the input data set.
92 (5C)	4	IPDEV	Address of information supplied through the PRIMEDATADEVICE subparameter of the ENVIRONMENT parameter for the input data set.
96 (60)	4	IFUNB	Address of this pointer itself if the FIXUNB subparameter of the ENVIRONMENT parameter has been supplied for the input data set.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
100 (64)	4	IFBLK	Address of this pointer itself if the FIXBLK subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
104 (68)	4	IVUNB	Address of this pointer itself if the VARUNB subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
108 (6C)	4	IVBLK	Address of this pointer itself if the VARBLK subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
112 (70)	4	ISUNB	Address of this pointer itself if the SPNUNB subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
116 (74)	4	ISBLK	Address of this pointer itself if the SPNBLK subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
120 (78)	4	IUNDF	Address of this pointer itself if the UNDEF subparameter of the ENVIRONMENT parameter has been supplied for the input data set.
124 (7C)	8	*	Reserved—contains zeros.
132 (84)	4	OENV	Address of this pointer itself if the ENVIRONMENT subparameter of the OUTFILE parameter has been supplied.
136 (88)	4	ORFMT	Address of this pointer itself if the RECORDFORMAT subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
140 (8C)	4	OBKSZ	Address of information supplied through the BLOCKSIZE subparameter of the ENVIRONMENT parameter for the output data set.
144 (90)	4	ORCSZ	Address of information supplied through the RECORDSIZE subparameter of the ENVIRONMENT parameter for the output data set.
148 (94)	4	*	Reserved—contains zeros.
152 (98)	4	OHDEV	Address of information supplied through the HINDEXDEVICE subparameter of the ENVIRONMENT parameter for the output data set.
156 (9C)	4	OPDEV	Address of information supplied through the PRIMEDATADEVICE subparameter of the ENVIRONMENT parameter for the output data set.
160 (A0)	4	OFUNB	Address of this pointer itself if the FIXUNB subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
164 (A4)	4	OFBLK	Address of this pointer itself if the FIXBLK subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
168 (A8)	4	OVUNB	Address of this pointer itself if the VARUNB subparameter of the ENVIRONMENT parameter has been supplied for the output data set.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
172 (AC)	4	OVBLK	Address of this pointer itself if the VARBLK subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
176 (B0)	4	OSUNB	Address of this pointer itself if the SPNUNB subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
180 (B4)	4	OSBLK	Address of this pointer itself if the SPNBLK subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
184 (B8)	4	OUNDF	Address of this pointer itself if the UNDEF subparameter of the ENVIRONMENT parameter has been supplied for the output data set.
188 (BC)	8	*	Reserved—contains zeros.
196 (C4)	4	IDUMY	Reserved—contains zeros.
200 (C8)	4	REP	Address of this pointer itself if the REPLACE parameter has been supplied.
204 (CC)	4	NREP	Address of this pointer itself if the NOREPLACE parameter has been supplied.
208 (D0)	4	RUS	Address of this pointer itself if the REUSE parameter has been supplied.
212 (D4)	4	NRUS	Address of this pointer itself if the NOREUSE parameter has been supplied.
216 (D8)	4	ISLBL	Address of this pointer itself if the STDLABEL subparameter of the INFILE parameter has been supplied (or defaulted.)
220 (DC)	4	INLBL	Address of this pointer itself if the NOLABEL subparameter of the INFILE parameter has been supplied.
224 (E0)	4	INREW	Address of this pointer itself if the NOREWIND subparameter of the INFILE parameter has been supplied (or defaulted.)
228 (E4)	4	IREW	Address of this pointer itself if the REWIND subparameter of the INFILE parameter has been supplied.
232 (E8)	4	IUNLD	Address of this pointer itself if the UNLOAD subparameter of the INFILE parameter has been supplied.
236 (EC)	4	OSLBL	Address of this pointer itself if the STDLABEL subparameter of the OUTFILE parameter has been supplied (or defaulted.)
240 (F0)	4	ONLBL	Address of this pointer itself if the NOLABEL subparameter of the OUTFILE parameter has been supplied.
244 (F4)	4	ONREW	Address of this pointer itself if the NOREWIND subparameter of the OUTFILE parameter has been supplied (or defaulted.)
248 (F8)	4	OREW	Address of this pointer itself if the REWIND subparameter of the OUTFILE parameter has been supplied.
252 (FC)	4	OUNLD	Address of this pointer itself if the UNLOAD subparameter of the OUTFILE parameter has been supplied.

RESETCAT FDT

Offset	*Content*	
0 (0)	*R E S E*	*T C A T*
8 (8)	↑CATALOG	↑*catname/password*
16 (10)	↑*dname*	↑MASTERPW
24 (18)	↑WORKFILE	↑WORKCAT
32 (20)	↑IGNORE	↑NOIGNORE
40 (28)	↑CRAFILES *count*	↑*dname*
48 (30)	↑ALL	↑NONE
56 (38)	↑RESERVED	↑RESERVED
64 (40)	↑RESERVED	↑*dname/password*
72 (48)	↑*wcatname/password*	↑WCAT *dname*

RESETCAT FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb - RESETCAT
8 (8)	4	CAT	Address of this parameter itself if the CATALOG parameter has been supplied.
12 (C)	4	CATNM	Address of the information supplied through the *catname/password* subparameter of the CATALOG parameter.
16 (10)	4	CATDN	Address of information supplied through the *dname* subparameter of the CATALOG parameter.
20 (14)	4	MRPW	Address of information supplied through the *password* subparameter of the MASTERPW parameter.
24 (18)	4	WFDN	Address of this parameter itself if the WORKFILE parameter is supplied.
28 (1C)	4	WCATP	Address of this parameter itself if the WORKCAT parameter is supplied.
32 (20)	4	IGN	Address of this parameter itself if the IGNORE parameter is supplied.
36 (24)	4	NIGN	Address of this parameter itself if the NOIGNORE parameter is supplied.
40 (28)	4	CFILE	Count of the number of CRAs that are specified through the CRAFILES parameter.
44 (2C)	4	CRADNPTR	Address of an array of pointers. Each pointer points at a *dname* for the CRA it relates to in the order that they appear in the CRAFILES parameter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
48 (30)	4	ALLPPTR	Address of an array of pointers. Each pointer points to itself if ALL was specified for the related CRA in the CRAFILES parameter.
52 (34)	4	NONEPTR	Address of an array of pointers. Each pointer points to itself if NONE was specified for the related CRA in the CRAFILES parameter.
56 (38)	4	*	Reserved.
60 (3C)	4	*	Reserved.
64 (40)	4	*	Reserved.
68 (44)	4	WFILE	Address of the information supplied by the *dname/password* subparameter of the WORKFILE parameter.
72 (48)	4	WCAT	Address of the information supplied by the *catname/password* subparameter of the WORKCAT parameter.
76 (4C)	4	WCATD	Address of information supplied through the *dname* subparameter of the WORKCAT parameter.

VERIFY FDT

Offset	*Content*							
0 (0)	*V*	*E*	*R*	*I*	*F*	*Y*	ƀ	ƀ
8 (8)	↑FILE							

VERIFY FDT Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	FDTVERB	Verb aligned left and padded with blanks—VERIFYƀƀ.
8 (8)	4	IN	Address of information supplied through the FILE parameter.

Global Data Table—GDT

The GDT is the directory for the services and data areas of the processor. It contains a branch vector for the services provided by the System Adapter, the I/O Adapter, and the Text Processor. It also points to the invoker's parameter list, trace tables, and historical tables. The GDT is always the first parameter passed to any routine. The GDT is contained in the storage associated with module IDCSA01.

Created by	Modified by	Used by	Size
IDCSA01	All service routines	All routines	188

Global Data Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	GDTHDR	Global Data Table header; contains 'GDTb̸'.
4 (4)	4	GDTPRM	Address of parameter list from invoker of the processor. (See "Processor Invocation" in "Program Organization" for details.)
8 (8)	4	GDTTR1	Address of Inter-Module Trace Table.
12 (C)	4	GDTTR2	Address of Intra-Module Trace Table.
16 (10)	4	GDTDBH	Address of Debugging-Aids historical area. (See also "TEST Option data area."
20 (14)	4	GDTSTH	Reserved.
24 (18)	4	GDTRIH	Address of Reader/Interpreter historical area.
28 (1C)	4	GDTTPH	Address of Text Processor historical area, the primary Print Control Table (PCT).
32 (20)	4	GDTSAH	Address of System Adapter historical area.
36 (24)	4	GDTIOH	Address of I/O Adapter historical area.
40 (28)	4	GDTDBG	Address of entry point for dump routine, IDCDB01, (UDUMP macro).
44 (2C)	4	GDTSTC	Reserved.
48 (30)	4	GDTPRT	Address of entry point to print, IDCIOPR, (UPRINT macro).
52 (34)	4	GDTESS	Address of entry point to establish PCT from Text Structure, IDCTPES, (UESTS macro).
56 (38)	4	GDTESA	Address of entry point to establish PCT from storage, IDCTPEA, (UESTA macro).
60 (3C)	4	GDTRST	Address of entry point to modify PCT, IDCTPRS, (UREST macro).
64 (40)	4	GDTRES	Address of entry point to reset PCT, IDCTPRE, (URESET macro).
68 (44)	4	GDTCAL	Address of entry point to call, IDCSACL, (UCALL macro).
72 (48)	4	GDTGSP	Address of entry point

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
76 (4C)	4	GDTFSP	Address of entry point to free storage, IDCSAFS, (UFSPACE macro).
80 (50)	4	GDTGPL	Address of entry point to get storage, IDCSAGP, (UGPOOL macro).
84 (54)	4	GDTFPL	Address of entry point to free storage, IDCSAFP, (UFPOOL macro).
88 (58)	4	GDTLOD	Address of entry point to load module, IDCSALD, (ULOAD macro).
92 (5C)	4	GDTDEL	Address of entry point to delete module, IDCSADE, (UDELETE macro).
96 (60)	4	GDTPRL	Address of entry point for prologue, IDCSAPR.
100 (64)	4	GDTEPL	Address of entry point for epilogue, IDCSAEP, (UEPIL macro).
104 (68)	4	GDTTIM	Address of entry point for time, IDCSATI, (UTIME macro).
108 (6C)	4	GDTIIO	Address of entry point for I/O initialization, IDCIOIT, (UIOINIT macro).
112 (70)	4	GDTTIO	Address of entry point for I/O termination, IDCIOTM, (UIOTERM macro).
116 (74)	4	GDTRIP	Reader/Interpreter name pointer.
120 (78)	4	GDTTOH	I/O Adapter data pointer.
124 (7C)	4	GDTOPN	Address of entry point to open data sets, IDCIOOP, (UOPEN macro).
128 (80)	4	GDTCLS	Address of entry point to close data sets, IDCIOCL, (UCLOSE macro).
130 (84)	4	GDTGET	Address of entry point to get a logical record, IDCIOGT, (UGET macro).
134 (88)	4	GDTPUT	Address of entry point to put a logical record, IDCIOPT, (UPUT macro).
140 (8C)	4	GDTPOS	Address of entry point to position to a logical record, IDCIOPO, (UPOSIT macro).
144 (90)	4	GDTCPY	Address of entry point to copy logical records, IDCIOCO, (UCOPY macro).
148 (94)	4	GDTCAT	Address of entry point for manipulating VSAM catalog, IDCSACA, (UCATLG macro).
152 (98)	4	GDTABT	Address to abort, SAABT in IDCSA02, (UABORT macro).
156 (9C)	4	GDTABH	Address of UABORT register save area.
160 (A0)	4	*	Reserved.
164 (A4)	4	GDTSNP	Address of entry point to snap dump, IDCSASN, (USNAP macro).
168 (A8)	4	GDTSPR	Address of IDCSA03's storage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
172 (AC)	4	GDTVFY	Address of entry point to VERIFY data set, IDCIOVY (UVERIFY macro).
176 (B0)	4	GDTENQ	Address of entry point to UENQ macro.
180 (B4)	4	GDTDEQ	Address of entry point to DEQ macro.
184 (B8)	4	GDTIFO	Address of entry point to UIOINFO macro.
188 (BC)	4	GDTERR	Address of entry point to UERROR macro.

Input Parameter Table—IPT

The Input Parameter Table is a parameter list passed by IDCRC01 to IDCRC02 within EXPORTRA. It is an array of five pointers. Each object pointed to is described after the IPT pointers.

Created by	Modified by	Used by	Size
IDCRC01	IDCRC02	IDCRC02	20

Input Parameter Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning Use
0 (0)	4		Address of control block describing the object to be exported.
4 (4)	4		Address of control block describing the output (portable) data set.
8 (8)	4		Address of the input data set name.
12 (C)	4		Address of the output data set name.
16 (10)	4		Address of the environment parameter.

Description of control block describing object to be exported.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning Use
0 (0)	1	OBJTYP	Type of object.
1 (1)	3	OBJVAL	The catalog control interval number of the entrys.
4 (4)	4	RESINP	Reserved
8 (8)	1	OBJPLN	Password length.
9 (9)	8	OBJPAS	Password

Description of control block describing output (portable) data set.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning Use
0 (0)	4	OUTLEN	Maximum record length of data component.
4 (4)	4	SAVOIOCS	Pointer to output IOCS.
8 (8)	4	USBKSZ	User supplied output blocksize.
12 (C)	4	RESOUTP	Reserved.
16 (10)	1	OUTFLGS	Status of output data set.
	1...	OPNFLG	This flag is on if output data set is open.
	.1..	ENDFLG	This flag is on if this is the last request.
	..1.	EMPTYDS	This flag is on if the object contains no data records.
	...x xxxx	*	Reserved.
17 (11)	1	ENVOPTNS	Output label and rewind options from the ENVIRONMENT parameter.
	1...	STDLABEL	Standard label option.
	.1..	NOLABEL	No label option.
	..1.	NOREWIND	No rewind option.
	...1	UNLOAD	Unload option.
	 xxxx		Reserved.

The third pointer in the IPT points to an 8-byte input dname.

The fourth pointer in the IPT points to an 8-byte output dname.

The fifth pointer in the IPT points to an 8-byte field describing the prime data device (PDEV subparameter).

I/O Adapter Historical Area—IODATA

The I/O Adapter historical area is pointed to by GDTIOH. It is built on the first call to the I/O Adapter (UIOINIT macro), and contains information that is common to all modules of the I/O Adapter.

Created by	Modified by	Used by	Size
IDCIO01	IDCIO01	IDCIO01 IDCIO02	68

I/O Adapter Historical Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	IODIOC	First IOCSTR in chain.
4 (4)	4	IODMSG	Reserved—contains zeros.
8 (8)	4	IODADD	Address of the alternate DD list.
12 (C)	4	IODXTN	Address of the external I/O routine list.
16 (10)	4	IODSID	Identifier:
	2 . .	IODMID	Module identifier.
	. . 2	IODINC	Pool identifier.
20 (14)	12	*	Reserved.
32 (20)	4	IODEOD	Address of end-of-data routine for nonVSAM data sets.
36 (24)	4	IODOSS	NonVSAM input SYNAD routine address.
40 (28)	4	IODOSO	NonVSAM output SYNAD routine address.
44 (2C)	4	IODICS	Address of Access Method Services system-input IOCSTR.
48 (30)	4	IODOCS	Address of the Access Method Services system-output IOCSTR.
52 (34)	4	*	Reserved.
56 (38)	4	*	Reserved.
60 (3C)	4	IODAEI	Address of VSAM EODAD routine.
64 (40)	4	*	Reserved.

Input/Output Communications Structure—IOCSTR

An IOCSTR exists for each open data set, or for any on which an open has been attempted. It contains all information about the data set that may be required by the processor. An IOCSTR is built at open time, and a pointer to the IOCSTR is returned to the requester of the open, in the OPNIOC field of the OPNAGL. A UGPOOL area immediately precedes the IOCSTR. The UGPOOL area contains the identifier assigned to the data set by the I/O Adapter. All other requests for I/O service include this IOCSTR as one of the parameters for the request.

Created by	Modified by	Used by	Size
IDCIO02	All routines	All routines	68

Input/Output Communications Structure Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
−4 (−4)	4	*	Always contains 'IOCS'.
0 (0)	4	IOCDAD	Address of data area.
4 (4)	4	IOCDLN	Length of data record.
8 (8)	4	IOCTRN	Transmission length: LRECL for logical processing or control interval for block processing.
12 (C)	1	IOCKYL	Key length in bytes.
13 (D)	3	IOCRKP	Relative key position, value assumes VSAM or ISAM meaning.
16 (10)	1	IOCDSO	Data set organization:
	1...	IOCDSOAM	VSAM data set.
	.1..	IOCDSOPS	NonVSAM sequential data set.
	..1.	IOCDSOIS	Indexed sequential (ISAM) data set.
	...1	IOCDSOPO	Partitioned data set.
17 (11)	. 1	IOCRFM	NonVSAM record format:
	1...	IOCRFMFX	Fixed-length records.
	.1..	IOCRFMVR	Variable-length records, not spanned.
	..1.	IOCRFMUN	Undefined-length records.
	...1	IOCRFMSF	Spanned records.
	.... 1...	IOCRFMBK	Blocked records.
18 (12)	... 1	IOCMAC	Macro form used:
	1...	IOCMACIN	Input processing.
	.1..	IOCMACOT	Output processing.
	..1.	IOCMACUP	Update processing.
	...0	IOCMACCR	Keyed sequence.
	...1		Entry sequence.
	.... 0...	IOCMACBK	Logical records.
	.... 1...		Blocks or control intervals.
	.... .0..	IOCMACDR	Sequential processing.
	.... .1..		Direct processing.
19 (13)	. . . 1	IOCMAC2	
	1...	IOCMACSK	Skip sequential processing.
	.1..	IOCMACAS	Asynchronous processing (OS/VS only).
	..1.	IOCMACRR	Relative record processing.
	...1	IOCMACCP	Change processing.
	....1...	IOCMACEN	PUT—ENDREQ processing.
	.... .1..	IOCMACPA	Reprocessing flag.
	......1.	IOCMACER	PUT—ERASE processing
	1	*	Reserved.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
20 (14)	1	IOCCHP	Change processing modes.
	1...	IOCCHPSQ	Change to sequential.
	.1..	IOCCHPDR	Change to direct.
	..1.	IOCCHPSK	Change to skip sequential.
	...1	IOCCHPKS	Change to keyed.
	.... 1...	IOCCHPCR	Change to addressed.
	.... .1..	IOCCHPBK	Change to control interval.
	.... ..1.	IOCCHPUP	Change to update.
	1	IOCCHPNU	Change to no update.
21 (15)	. 1	IOCMSG	Message flags:
	1.......	IOCHPKE	Change to key equal.
	.1......	IOCHPKG	Change to greater than or equal.
	..1.	IOCMSGOP	Data set is open.
	...1	IOCMSGOE	VSAM OPEN error.
	.... 1...	IOCMSGCE	VSAM CLOSE error.
	.... .1..	IOCMSGAE	VSAM action error.
	......1.	IOCMSGSM	Suppress logical error messages.
22 (16)	6	IOCVOLSR	Volume serial number of opened data set.
28 (1C)	4	IOCHURBA	High-used RBA.
32 (20)	4	IOCDSN	Address of data set name.
The data set name usually follows the IOCSTR extension.			
36 (24)	4	IOCCBP	Control block address.
40 (28)	4	IOCRBA	Record RBA (VSAM).
44 (2C)	4	IOCKYA	Address of key.
48 (30)	2	IOCPTL	Length of key supplied for position request.
50 (32)	. . 2	IOCPNM	Number of stacked puts.
52 (34)	4	IOCRRN	Relative record number.
56 (38)	4	IOCWORK	Address of input work area.
60 (3C)	4	IOCREL	Relative record number.
64 (40)	4	IOCEXT	IOCSTR extension address.

IOCSTR Extension—IOCSEX

The IOCSTR Extension is built immediately after the IOCSTR. However, for flexibility and to make the IOCSTR easily extensible, field IOCEXT points to the IOCSEX.

Created by	Modified by	Used by	Size
IDCIO02	IDCIO01	IDCIO01	45

IOCSTR Extension Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	IOCCBA	Address of ACB or DTF.
4 (4)	4	IOCRPL	Address of VSAM RPL.
8 (8)	2	IOCCBL	Length of ACB or DTF.
10 (A)	. . 2	IOCLRP	Length of RPL.
12 (C)	4	IOCWKA	Address of input work area.
At decimal displacements 16 and 20, one of the two following sets of fields appears:			
16 (10)	4	IOCXAD	External routine address.
16 (10)	4	IOCEXA	VSAM exit list address.
20 (14)	4	IOCXPM	External routine parameter address.
20 (14)	2	IOCEXL	VSAM exit list length.
22 (16)	. . 2		Reserved.
The data area then continues as follows.			
24 (18)	4	IOCNIO	Address of next IOCSTR in chain.
28 (1C)	4	IOCSID	Storage pool identifier.
32 (20)	1	IOCFLG	Extension flags:
	1...	IOCFLGEX	Externally controlled data set.
	.1..	IOCFLGDF	Data set is defined.
	..1.	IOCFLGEF	End-of-file on external data set.
	...1	IOCFLGIO	SYSLST or SYSIPT.
	.... 1...	IOCFLGOP	Data set is open.
	.... .1..	IOCFLGOE	Reserved.
	.... ..1.	IOCFLGSP	Access Method Services system-print data set.
33 (21)	. 1	IOCDEV	Device type flags:
	1...	IOCDEVDA	Direct access.
	.1..	IOCDEVMT	Magnetic tape.
	..1.	IOCDEVUR	Reserved.
34 (22)	. . 1	IOCINF	Information flags:
	1...	IOCINFPT	Reserved.
	.1..	IOCINFAE	Reserved.
	..x.	IOCINFND	Reserved.
	...x	IOCINFQX	Reserved.
	.... 1...	IOCINFAC	ANSI control character.
	.... .1..	IOCINFDO	DOS/VS data set.
	.... ..1.	IOCINFCT	Opened as a catalog.
	x	IOCINFR1	Reserved.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
35 (23)	. . . 1	IOCMOD	Additional information flags:
	1...	IOCMODPD	Reserved—contains zero.
	.1..	IOCMODRR	Return RPL address.
	.... 1...	IOCMODUB	User buffering.
	.... .1..	IOCMODXM	Export/import.
	.... ..1.	IOCMODRP	Replace processing.
	1	IOCMODEX	Exclusive control.
36 (24)		IOCDLM	Address of DOS/VS load module.
40 (28)		IOCDNM	Module length.
42 (2A)		IOCVLN	Length of DOS/VS variable blocked remainder.
44 (2C)	1	IOCRCV	Flags for recovery.
	1...	IOCRCVXM	Recovery bit for VSAM.
	.1..	IOCRCVRA	Open CRA.
	..1.	IOCRCVCL	Skip close.
	...x xxxx	*	Reserved—contains zero.

Inter-Module Trace Table

The Inter-Module Trace Table contains information on the flow of control between modules. The table is pointed to by GDTTR1. The oldest identifier is at the beginning of the table. The latest identifier is at the end of the table. Each time a UPROL or UEPIL macro is issued the oldest identifier is removed and the new identifier is added at the end. A UPROL adds the identifier of the current module. A UEPIL adds the identifier of the module to which control is being returned. The UDUMP macro prints the table on SYSLST.

Created by	Modified by	Used by	Size
IDCSA01	UEPIL UPROL macros	IDCDB01	100

Inter-Module Trace Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
−6 (−6)	6	*	Table identification 'INTERƀ'.
0 (0)	100	*	Inter-Module Trace Table with 20 entries.
Each entry contains the following:			
	4	*	Identifier provided by module issuing UEPIL or UPROL macros. The identifier is the last four characters of the module name.
	1	*	Blank 'ƀ'.

Intra-Module Trace Table

The Intra-Module Trace Table contains information on the flow of control within modules. The table is pointed to by GDTTR2. The oldest identifier is at the beginning of the table. The latest identifier is at the end of the table.

Created by	Modified by	Used by	Size
IDCSA01	UTRACE macro	IDCDB01	100

Intra-Module Trace Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
−6 (−6)	6	*	Table identification 'INTRAƀ'.
0 (0)	100	*	Intra-Module Trace Table with 20 entries.
Each entry contains the following:			
	4	*	Identifier provided by module issuing UTRACE. The first two characters are the mnemonic identifier which are characters 4 and 5 of the module name. For example, EX refers to the Executive.
	1	*	Blank 'ƀ'.

Modal Verb and Keyword Symbol Table—IDCRIKT

Load module IDCRIKT contains the Modal Verb and Keyword Symbol Table, which acts as the "Command Descriptor" for the modal commands.

Created by	Modified by	Used by	Size
IBM-Supplied	None	IDCRI01	90

Modal Verb and Keyword Symbol Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	PARMSMLN	Length of PARM character string.
1 (1)	. 9	PARMSYM	PARM character string.
10 (A)	. . 1	SETSMLN	Length of SET character string.
11 (13)	. . . 9	SETSYM	SET character string.
20 (14)	1	IFSMLN	Length of IF character string.
21 (15)	. 9	IFSYM	If character string.
30 (1E)	. . 1	THENSMLN	Length of THEN character string.
31 (1F)	. . . 9	THENSYM	THEN character string.
40 (28)	1	ELSESMLN	Length of ELSE character string.
41 (29)	. 9	ELSESYM	ELSE character string.
50 (32)	. . 1	DOSMLN	Length of DO character string.
51 (33)	. . . 9	DOSYM	DO character string.
60 (3C)	1	ENDSMLN	Length of END character string.
61 (30)	. 9	ENDSYM	END character string.
70 (46)	. . 1	LSTCCLN	Length of LASTCC character string.
71 (47)	. . . 9	LSTCCSYM	LASTCC character string.
80 (50)	1	MAXCCLN	Length of MAXCC character string.
81 (51)	. 9	MAXCCSYM	MAXCC character string.

Open Argument List—OPNAGL

The OPNAGL defines a request to open a data set. The address of the OPNAGL is passed as a parameter to the I/O Adapter from any routine that requires the open function.

Created by	Modified by	Used by	Size
Routine that requests an open	IDCIO02	IDCIO02	48

Open Argument List Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	OPNOPT	Open options (determine data set usage).
	1...	OPNOPTIN	Input data set.
	.1..	OPNOPTOT	Output data set.
	..1.	OPNOPTUP	Update mode of processing.
	...1	OPNOPTBK	Block processing.
	.... 1...	OPNOPTKS	Keyed processing.
	.... .1..	OPNOPTCR	Addressed processing.
	.... ..1.	OPNOPTDR	Direct processing.
	1	OPNOPTSK	Skip sequential processing.
1 (1)	. 1	OPNRFM	NonVSAM output record format Required.
	1...	OPNRFMFX	Fixed.
	.1..	OPNRFMVR	Variable.
	..1.	OPNRFMUN	Undefined.
	...1	OPNRFMSF	Spanned.
	.... 1...	OPNRFMBK	Blocked.
2 (2)	. . 1	OPNTYP	Data set type:
	1...	OPNTYPSI	System input (SYSIPT) is to be opened. OPNIOC is the only other required field.
	.1..	OPNTYPSO	System output (SYSLST) is to be opened. OPNIOC is the only other required field.
	..1.	OPNTYPCI	Catalog to be opened.
	...1	OPNTYPXM	Export/import.
	.... 1...	OPNTYPRA	Catalog recovery area.
	.... .1..	OPNTYPEX	Exclusive control.
	.... ..1.	OPNTYPRV	VSAM recovery processing.
	1	OPNTYPSY	Reserved. Not used in DOS/VS
3 (3)	. . . 1	OPNMOD	Open modifiers.
	1...	OPNMODPD	Reserved—contains zero.
	.1..	OPNMODAC	Reserved—contains zero.
	..1.	OPNMODRC	Return control block address.
	...1	OPNMODRR	Return RPL address.
	.... 1...	OPNMODAX	Open alternate index.
	.... .1..	OPNMODRS	Open with reset.
	.... ..1.	OPNMODUB	User buffering.
	1	OPNMODRP	Replace processing.
4 (4)	4	OPNIOC	Address of pointer of IOCSTR. This field is always present. After a successful open, the pointer contains the address of the IOCSTR built by the I/O Adapter.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
8 (8)	4	OPNDDN	Address of eight-byte D name (not present when SYSIPT or SYSLST is being opened but required at all other times). The D name is the TLBL/DLBL name with one blank on the right.
12 (C)	4	OPNPWA	Address of an optional eight-byte password, used only with VSAM data sets.
16 (10)	4	OPNDSN	Reserved—contains zeros.
20 (14)	4	OPNCBP	Reserved—contains zeros.
24 (18)	4	OPNDEVDT	Address of device that nonVSAM data set resides on.
28 (1C)	4	OPNDEVIX	Address of device that ISAM index data set resides on.
32 (20)	4	OPNREC	Logical record length, optional.
36 (24)	4	OPNBLK	Block size, optional.
40 (28)	1	OPNKYL	Reserved.
41 (29)	. 1	OPNDSO	Data set organization.
	1...	OPNDSOAM	VSAM data set.
	.1..	OPNDSOPS	NonVSAM data set.
	..1.	OPNDSOIS	ISAM data set.
	...1	OPNDSOPO	Partitioned data set.
42 (2A)	. . 1	OPNOPT2	Second option byte.
	1...	OPNOPTAS	Asynchronous processing (OS/VS only).
	.xx.		Reserved.
	...0	OPNOPTRW	Rewind option.
	...1		No rewind option.
	.... 0...	OPNOPTUL	No unload option.
	.... 1...		Unload option.
	.... .0..	OPNOPTSL	No label option.
	.... .1..		Standard label option.
43 (2B)	. . . 1	OPNSTRN0	Number of strings.
44 (2C)	4	OPNVOL	Pointer to volume serial number.

Open Close Address Array—OCARRAY

The Open Close Address Array is used to pass the address of the OPNAGL or IOCS for up to four data sets at once from IDCIO01 to IDCIO02. It is used within the I/O Adapter.

Created by	Modified by	Used by	Size
IDCI001	None	IDCI002	20

Open Close Address Array Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	OCATYP	Type of operation: 1 – open, 2 – close.
1 (1)	. 1	OCAOPT	Options:
	1...	OCAOPTCA	Close all open data sets.
2 (2)	. . 1	OCANUM	Number of data sets to open.
	. . . 1	*	Reserved.
4 (4)	4	OCADDR(1)	Address of OPNAGL for open or address of IOCSTR for close.
8 (8)	4	OCADDR(2)	Address of OPNAGL for open or address of IOCSTR for close.
12 (C)	4	OCADDR(3)	Address of OPNAGL for open or address of IOCSTR for close.
16 (10)	4	OCADDR(4)	Address of OPNAGL for open or address of IOCSTR for close.

Phase Table

The Phase Table is a phase (IDCSA04) loaded by IDCSA01 at initialization time. This phase contains an entry for each of the other phases within the Access Method Services system, excluding phase IDCAMS, IDCSA04, and the DTFs. Each entry contains phase status information that is needed for loading the particular phase during Access Method Services execution; only if the CDLOAD anchor table is full. One such entry is described below; the total size of all entries is 768.

Created by	Modified by	Used by	Size
IBM-Supplied	IDCSA02 IDCSA03	IDCSA02 IDCSA03	768

Phase Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	8	PLANAME	Name of phase this entry describes.
8 (8)	4	PLAADDR	Address of phase or 0 if not loaded via phase table.
12 (C)	1	PLAUSE	Number of requests to load this phase.
13 (E)	3	PLALN	Phase size in hex.

Positioning Argument List—OPRARG

OPRARG contains the address of the IOCSTR defining the data set to be positioned. It is used within the I/O Adapter.

Created by	Modified by	Used by	Size
IDCIO01	None	IDCIO03	12

Positioning Argument List Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	1	OPRTYP	Type of operation: 1 indicates POINT or SETL and 3 indicates UIOINFO.
1 (1)	1	OPRPNO	Total number of parameters passed to UIOINFO.
2 (2)	. 2	*	Reserved.
4 (4)	4	OPRICS	Address of input IOCSTR (the data set to be positioned).
8 (8)	4	OPROCS	Address of output IOCSTR.

Print Control Argument List—PCARG

The Print Control Argument List is used to build a PCT (Print Control Table). This list is an argument of the UESTS macro or the UESTA macro, used to establish a PCT. The list is in a static text module or in storage.

Created by	Modified by	Used by	Size
Calling Routine	None	IDCTP04	33

Print Control Argument List Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	PCMTLP	If PCARG is in a static text module, this is an offset from the beginning of the PCARG to a main title line, fully-formatted. If PCARG is in storage, this is the address of a main title line, fully-formatted.
4 (4)	4	PCSTLP	If PCARG is in a static text module, this is an offset from the beginning of the PCARG to one, two, or three contiguous, fully-formatted lines for the subtitle. If PCARG is in storage, this is the address of subtitle lines. The first byte of each line contains the spacing character (0, 1, 2, or 3), and the number of lines is found in PCSTLC.
8 (8)	4	PCFLP	If PCARG is in a static text module, this is an offset from the beginning of the PCARG to one, two, or three contiguous, fully-formatted footing lines. If PCARG is in storage, this is the address of footing lines. The first byte of each line contains the spacing character (0, 1, 2, or 3), and the number of lines is found in PCFLC.
12 (C)	4	PCPCP	If PCARG is in a static text module, this is an offset from the beginning of the PCARG to a 256-byte print chain translate table. If PCARG is in storage, this is the address of a 256-byte print chain translate table.
16 (10)	2	PCPNL	Print column number where the page number field begins.
18 (12)	. . 2	PCPTL	Time field location.
20 (14)	2	PCPDL	Date field location.
22 (16)	. . 2	PCMTLC	Number of lines at PCMTLP.
24 (18)	2	PCSTLC	Number of lines at PCSTLP.
26 (1A)	. . 2	PCFLC	Number of lines at PCFLP.
28 (1C)	2	PCLW	Print line width.
30 (1E)	. . 2	PCPD	Page depth.
32 (20)	1	PCDSC	Default space character, used when space character is not given; invalid, or on overflow. Valid values are 1, 2, or 3.

Print Control Table—PCT

The Print Control Table contains the current page specifications for printing: page width and depth, pointers to heading and footing lines, etc. One PCT, called the *primary* PCT, contains the default values established at processor initialization time. An optional PCT, called the *secondary* PCT, contains page specifications that are unique to a particular FSR, and is cleared between commands. Both PCTs have the same format.

Created by	Modified by	Used by	Size
IDCTP04	IDCTP05 IDCTP01	IDCTP01	108

Print Control Table Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	PCTIDN	Identification field: the primary PCT contains "PCT1" in this field; the secondary PCT contains "PCT2".
4 (4)	4	PCTFLG	Action flags:
	1...	PCTH1F	A new header is being entered. This bit is set by IDCTP05 and reset by IDCTP01 as soon as the first header line is printed.
	.1..	PCTH2F	More than one header line is to be saved. This bit is set when the first line is printed by IDCTP01 and reset when the last line has been printed. The count in PCTHLC controls this bit.
	..1.	PCTHAF	A header has been set up. This bit is set by IDCTP03.
	...1	PCTLLM	Last line was a message.
	.... 1...	PCTAPF	Alternate print file flag.
8 (8)	4	PCTSPP	Address of secondary PCT. This field is ignored in the secondary PCT.
12 (C)	4	PCTIOC	Address of IOCSTR to be used with UPUT macro.
16 (10)	2	PCTCPN	Current page number on active data set.
18 (12)	. . 2	PCTNLI	Next absolute line number on the current page of active data set.
20 (14)	4	PCTIOS	Address of IOCSTR for SYSLST.
24 (18)	2	PCTSPN	Current page number on standard data set.
26 (1A)	. . 2	PCTSNL	Next absolute line number on the current page of standard data set.
28 (1C)	4	PCTIOP	Address of IOCSTR for alternate print data set.
32 (20)	2	PCTAPN	Current page number on alternate data set.
34 (22)	. . 2	PCTANL	Next absolute line number on the current page of alternate data set.
36 (24)	8	PCTSTM	Name of the Static Text module presently in virtual storage.
44 (2C)	4	PCTSME	Entry point for Static Text module presently in virtual storage.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
48 (30)	4	PCTSQP	Address of queue of format structures that are retained until the completion of the function or the issuance of a URESET.
52 (34)	4	PCTAHP	Address of the last header line that was used, needed on an overflow.
56 (38)	4	PCTMLP	Address of main title lines, already fully formatted.
60 (3C)	4	PCTSLP	Address of subtitle lines, already fully formatted.
64 (40)	4	PCTTRP	Address of translate table.
68 (44)	4	PCTPLW	Print line width for the output device.
72 (48)	2	PCTMLC	Number of main title lines.
74 (4A)	. . 2	PCTSLC	Number of subtitle lines.
76 (4C)	4	PCTFLP	Address of footing lines, already fully formatted.
80 (50)	2	PCTFLC	Number of footing lines.
82 (52)	. . 1	PCTHLC	Number of heading lines.
83 (53)	. . . 1	PCTHSC	Total number of lines consumed by the currently active header and the first data line.
84 (54)	2	PCTPNL	Page number location in the main title line.
86 (56)	. . 2	PCTPMN	Signals that this is a message. Before writing a message it contains −1. During writing a message it contains the message number.
88 (58)	2	PCTAPC	"Floating" print column number, used with blank suppression.
90 (5A)	. . 2	PCTPPD	Total number of lines and spaces that may be printed on one page.
92 (5C)	2	PCTDSC	Default space count, used for overflow or in place of an invalid spacing request.
94 (5E)	2	PCTPNI	Page number increment, added to PCTCPN at each page eject.
96 (60)	2	PCTFDL	Absolute line number for the first data line on each page.
98 (62)	. . 2	PCTLDL	Absolute line number of the last data line.
100 (64)	2	PCTFLN	Absolute line number for the first footing line.
102 (66)	. . 2	PCTLNM	Lines in print stack.
104 (68)	4	PCTBUF	Buffer address.
108 (6C)	4	PCTBNL	Address in buffer for next line.

Reader/Interpreter Communication Area—COMMAREA

The COMMAREA is only used within the Reader/Interpreter to pass information between the phases of the Reader/Interpreter.

Created by	Modified by	Used by	Size
IDCRI01	IDCRI01 IDCRI02 IDCRI03	IDCRI01 IDCRI02 IDCRI03	55

Reader/Interpreter Communication Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	RECRDPTR	Address of the beginning of the record currently being scanned.
4 (4)	4	FDTADDR	Address of the primary pointer vector for the FDT.
8 (8)	4	DESCPTR	Address of the Command Descriptor currently being used.
12 (C)	4	WORKPTR	Address of local work area.
16 (10)	2	RISTATUS	Internal error code for the Reader/Interpreter; set to nonzero if an error is discovered.
18 (12)	2	SCANINDX	Offset into the current record of the last character that was extracted.
20 (14)	2	SCNLIMIT	Location of the final character in the current record that may be scanned.
22 (16)	2	LASTCC	Last processor condition code.
24 (18)	2	MAXCC	Maximum processor condition code.
26 (1A)	8	FSRLNAME	FSR phase name to be invoked if this command is executed.
34 (22)	4	POOLID	Storage area identification code for all space used for the FDT.
38 (26)	8	VERBNAME	Verb from the current input command.
46 (2E)	8	DESCNAME	Module name for the current Command Descriptor.
54 (36)	1	*	Miscellaneous flags:
	1...	GOODCMD	Current command is valid; have Executive invoke the FSR.
	.1..	EOFOK	End of input stream may legitimately occur.
	..1.	OPTSFLAG	Current command came from parameter options specified by the invoker of Access Method Services.
	...1	SCANONLY	Current command is being scanned only for syntax errors.
	.... 1...	SKIPPAST	Current command has just been bypassed.

Reader/Interpreter Historical Area—HDAREA

The Reader/Interpreter Historical Area is created and initialized on the first call to the Reader/Interpreter. It contains information that must be saved across commands, such as input source margins and table locations.

Created by	Modified by	Used by	Size
IDCRI01	IDCRI01 IDCRI02 IDCPM01	IDCRI01 IDCRI02	46

Reader/Interpreter Historical Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	LEFTMGN	Leftmost column to use in the input statement. Default to column 2.
2 (2)	. . 2	RIGHTMGN	Rightmost column to use in the input statement. Default to column 72.
4 (4)	4	LOADTPTR	Address of the Command Descriptor module table, IDCRILT.
8 (8)	4	KWTBLPTR	Address of modal command verb table, IDCRIKT.
12 (C)	4	ADDRIOCS	Address of IOCSTR for input data set.
16 (10)	1	NESTLVL	IF-THEN nesting level where current command appears.
17 (11)	. 2×n	MODLFLGS^{n}	Modal flags. A set of modal flags is used for each level of IF-THEN nesting. n is the number in NESTLVL.
Each set contains the following:			
	1	NULLDO	Number of unneeded "DO" commands for which no matching "END" commands have been encountered at the current NESTLVL.
	.1	*	Flags:
	1...	DOFLAG	Current command is part of a "DO" group.
	.1..	THENFLAG	Current commands are associated with a true "IF" condition.
	..1.	ELSEFLAG	Current commands are associated with a false "IF" condition.
	...1	SKIPFLAG	Current commands are to be only checked for proper syntax.

System Adapter Historical Area—SAHIST

The System Adapter's historical area is pointed to by the field GDTSAH. It contains information that is shared between System Adapter modules.

Created by	Modified by	Used by	Size
IDCSA01	IDCSA02 IDCSA03	IDCSA02 IDCSA03	16

System Adapter Historical Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	GPFIRST	First UGPOOL storage area pointer.
4 (4)	4	GPLAST	Last UGPOOL storage area pointer.
8 (8)	4	AUTOPTR	Address of AUTOTBL.
12 (C)	4	PLAPTR	Address of phase table.

TEST Option Data Area

The TEST Option Data Area is used to gather debugging information requested by a PARM command with TRACE, AREAS, or FULL options. The TEST Options Data Area is three tables. The first table, TESTDATA, is present if any PARM command with TRACE, AREAS, or FULL has been executed. The address of TESTDATA is in GDTDBH.

The second table, AREADATA, exists if a PARM command with an AREAS option has been executed. If AREADATA exists, it immediately follows TESTDATA.

The third table, FULLDATA, exists if a PARM command with a FULL option has been executed. If FULLDATA exists, it immediately follows AREADATA, or if AREADATA does not exist, FULLDATA immediately follows TESTDATA.

Created by	Modified by	Used by	Size
IDCPM01	IDCPM01 IDCDB01	IDCPM01 IDCDB01	Variable

TEST Option Data Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
TESTAREA:			
0 (0)	4	AREAPTR	Address of areas identifier table, AREADATA. Zero indicates the table does not exist.
4 (4)	4	FULLPTR	Address of full dump table FULLDATA. Zero indicates the table does not exist.
8 (8)	2 . .	SNAPID	Number of last full region dump.
10 (A)	. . 2	TESTRACE	A nonzero value means print the trace tables each time a UDUMP macro is issued. A zero value means print the trace tables only for modules specified in AREAS and FULL options.
AREADATA:			
0 (0)	4	AREAINDX	Number of entries in areas identification table. One entry exists for each area identifier specified in the PARM command.
4 (4)	2xj	AREADUMP	Areas identifier table containing j entries.
Each entry contains the following:			
	2	AREANAME	Two character module identifier where information is gathered. If there is an odd number of area names, two bytes are added to the end of the table.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
FULLDATA:			
0 (0)	4	FULLINDX	Number of entries in Full Region Dump Table. One entry exists for each full dump.
4 (4)	12xk	FULLDUMP	Full Region Dump Table containing k entries.
Each entry contains the following:			
	4	FDUMPID	Four character module identifier where dump is taken.
	2 . .	FDUMPBEG	Number of the pass through the dump point when dumping is to begin—between 1 and 32,767.
	. . 2	FDUMPCNT	Number of dumps to take— between 1 and 32,767.
	2 . .	REALBEG	Current number of passes through this dump point.
	. . 2	REALCNT	Number of dumps already taken at this dump point.

Text Structure

Text Structures are load modules that contain text (messages and static text items) and format information to use while preparing printed output. This information can be default page dimensions or layout, message text, headings for listings, and similar directions that are used by the Text Processor. There are 18 Text Structure modules, as named in the following table along with the function associated with each. Some FSRs use Text Structures from other FSRs.

IDCTSAL0	ALTER	IDCTSMP0	IMPORT/IMPORTRA
IDCTSBI0	BLDINDEX	IDCTSPR0	PRINT/REPRO
IDCTSDE0	DEFINE	IDCTSRC0	EXPORTRA
IDCTSDL0	DELETE	IDCTSRI0	Reader/Interpreter
IDCTSEX0	Executive	IDCTSRS0	RESETCAT
IDCTSIO0	I/O Adapter	IDCTSTP0	Text Processor (print chains)
IDCTSLC0	LISTCAT	IDCTSTP1	Text Processor (messages)
		IDCTSTP6	UERROR
IDCTSLC1	LISTCAT (messages)	IDCTSUV0	Universal (any module)
IDCTSLR0	LISTCRA	IDCTSXP0	EXPORT
IDCTSLR1	LISTCRA (messages)		

A Text Structure consists of an index and text entries. The index is simply a list of halfword displacements from the beginning of the Text Structure to the beginning of the text entry being indexed. The Text Structure identification number is used as the index number. A halfword count of the number of entries precedes the index.

Note: An index entry of -1 indicates that the corresponding text entry is nonexistent.

All text entries contain heading fields and one of the following:

- A format list as described under FMTLIST immediately followed by any static text such as messages referenced by the format list.
- A print control argument list as described under PCARG immediately followed by any static text such as title lines and translate tables referenced by the print control argument list.
- Character code tables which support the GRAPHICS parameter of the PARM command.

Created by	Modified by	Used by	Size
IBM-Supplied	None	IDCTP01 IDCTP05	Variable

Text Structure Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	INDEX	Number (n) of entries in this index.
2 (2)	2xn	INDEX*n*	Offset to the appropriate text entry.

Text Entry Description

The following description shows only the header fields of each text entry. For the remainder of the description, see FMTLIST or PCARG. The text entry begins at offset $2 \times n + 2$ from the beginning of the Text Structure module.

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	TXT^n	Length in bytes of the text entry that follows (not including these header fields).
2 (2)	2	FLG^nA	Flag byte:
	1...		Message entry.
	.1..		Header entry.
	..1.		Secondary message entry.
The following two fields only exist if this is a text entry for a header line:			
4 (4)	2	$HDLI^n$	The number of printable header lines.
6 (6)	2	$HDSP^n$	The number of page lines occupied by header lines, intervening blank lines, and the first line of printed data.

UGPOOL Area

When the UGPOOL Umacro is used, an area of storage is allocated to the user and this area is linked into a chain with other areas allocated by UGPOOL. Each such area is preceded by 16 bytes, as shown here.

Created by	Modified by	Used by	Size
IDCSA02	None	IDCSA02	16

UGPOOL Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	GPFORWRD	Address of next UGPOOL area.
4 (4)	4	GPBACK	Address of last UGPOOL area.
8 (8)	4	GPLEN	Number of bytes requested plus 16.
12 (C)	4	GPID	Area identification code.

The storage area in the UGPOOL chain for an 'xxPG' storage identification has the following format:

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	GPFORWRD	Address of next UGPOOL area.
4 (4)	4	GPBACK	Address of last UGPOOL area.
8 (8)	4	GPLEN	Length of this area = 24 (X'00000018')
12 (C)	4	GPID	Area identification code.
16 (10)	4	GPADRPG	Address of 'xxPG' storage area.
20 (14)	4	GPLENPG	Length of 'xxPG' storage area.

UGSPACE Area

When the UGSPACE Umacro is used, an area of storage is allocated for the user of the Umacro. Each such area is preceded by eight bytes of control information, as shown here.

Created by	Modified by	Used by	Size
IDCSA02	None	IDCSA02	8

UGSPACE Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	4	GSLEN	Number of bytes requested plus 8.
4 (4)	4	GSID	ƀƀƀƀ for UGSPACE area.

UIOINFO—Option Byte and Return Area

The UIOINFO option byte is used by an FSR to indicate the type of data to be retrieved by the UIOINFO macro. The data retrieved is passed back by UIOINFO in the return area.

UIOINFO Option Byte Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	1	IOINFOPT	
	1...	IOINFDVT	Retrieve 8-byte device type.
	.1..	IOINFVOL	Retrieve up to five volume serial numbers.
	..1.	IOINFDSN	Retrieve 44-byte data set name.
	...1	IOINFSUP	Suppress error message.
	.... 1...	IOINFTMS	Retrieve format-4 time stamp.
	.....1..	IOINFOPT	Retrieve up to five Logical Unit Blocks.

UIOINFO Return Area Description

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0(0)	4		Header. Bytes: 0-1 Length of entire area (including header). 2-3 Length of all data returned (including header).

Data returned for each type of information requested is placed consecutively in the work area. The format for the different types of information is shown below:

Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
48		Data set name. Bytes: 0-1 Identifier—X'0001'. 2-3 Length of data returned. 4-47 Data set name.
n		Volume serial number list (variable). Bytes: 0-1 Identifier—X'0002'. 2-3 Length of data returned. 4-9 First volume serial number. . . . . . . n+1-n+6 Last volume serial number.
12		Device type. Bytes: 0-1 Identifier—X'0003'. 2-3 Length of data returned. 4-7 Device type code. 8-11 Maximum block size for device.

Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
20		Time stamp.
		Bytes:
		0-1 Identifier—X'0004'.
		2-3 Length of data returned.
		4-11 New time stamp.
		12-19 Old time stamp.
n		Logical Unit Block (LUB) List (variable)
		Bytes:
		0-1 Identifier—X'0005'
		2-3 Length of data returned.
		4-5 First LUB
		. .
		. .
		. .
		(n+1)-(n+2) Last LUB

UREST Arguments

Any combination of the following structures can be passed to UREST as arguments. The UREST macro changes default items in the Print Control Table. The structures determine which items UREST will change.

PCRST—Change Subtitle Lines

Created by	Modified by	Used by	Size
All routines	None	IDCTP01	Variable

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRSST	Structure identifier; contains '**ST**'.
2 (2)	. . 2	PCRSTLC	Number of subtitle lines provided. The maximum is three.
4 (4)	4	PCRSTLP	Address of from one to three contiguous, fully formatted subtitle lines. The number of bytes in each line is the line width plus one for the spacing character. The spacing character is first in each line and must be 1, 2, or 3.

PCRLWS—Change Line Width

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRLWT	Structure identifier; contains '**LW**'.
2 (2)	. . 2	PCRLW	New line width in decimal.

PCRPDS—Change Page Depth

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRPDT	Structure identifier; contains '**PD**'.
2 (2)	. . 2	PCRPD	New page depth in decimal.

PCRFTS—Change Footing Lines

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRFT	Structure identifier; contains '**FT**'.
2 (2)	. . 2	PCRFLC	Number of footing lines provided. The maximum is three.
4 (4)	4	PCRFLP	Address of from one to three contiguous, fully formatted footing lines. The number of bytes in each line is the line width plus one for the spacing character. The spacing character is first in each line and must be 0, 1, 2, or 3.

PCRDSCS—Change Default Spacing Character

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRDSCT	Structure identifier; contains '**SC**'.
2 (2)	. . 1	PCRDSC	New default space character. Must be the character 1, 2, or 3.

PCRPCS—Change Translate Table

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRPCT	Structure identifier; contains '**PC**'.
2 (2)	. . 2	PCRPCC	If the request is for a print chain provided by Access Method Services, this field contains the characters for the print chain identification as in the **GRAPHICS** parameter of the **PARM** command. Otherwise, it contains zero.
4 (4)	4	PCRPCP	Address of a load module name. The load module consists solely of a 256-byte translate table. If the request is for a standard print chain, this field contains zero.

PCRINP—Change Initial Page Number

Offset	Bytes and Bit Pattern	Field Name	Description: Content, Meaning, Use
0 (0)	2	PCRPNT	Structure identifier; contains '**PN**'.
2 (2)	. . 2	*	Reserved.
4 (4)	4	PCRPNP	Address of page number field. The first two bytes of the page number field contain the number (from 1 to 4 in binary) of following bytes that contain the page number. The page number is one to four bytes in EBCDIC.

DIAGNOSTIC AIDS

This chapter explains the diagnostic aids provided for Access Method Services, explains how to find key areas in a dump, and offers suggestions for isolating different types of problems. Before attempting to diagnose a problem with the aids in this chapter, you should be familiar with the *Debugging Guide* pertinent to your operating system. This *Guide* and other publications that may be helpful are listed in the preface to this book.

Four major diagnostic aids are provided by the processor:

- Trace tables, which provide a trace of the flow of control between phases and CSECTs and within phases and CSECTs.
- Dump points, which provide the facility to dump selected areas of virtual storage and take a full region dump.
- The Test option, which you can set to print out the trace tables or to obtain dumps at selected points.
- ABORT codes and full partition dumps, which are produced when the processor detects an unrecoverable condition.

Trace Tables

The processor maintains two trace tables during each execution: the Inter-Module Trace Table, which records the flow of control *between* phases and CSECTs, and the Intra-Module Trace Table, which records the flow of control *within* phases and CSECTs.

You can find the trace tables in any full partition dump, or you can print them using the Test option. The section "Reading a Dump" in this chapter explains how to find the tables in a dump; the section " Test Option" in this chapter explains how to print them.

Inter-Module Trace Table

The Inter-Module Trace Table begins with the characters INTER and contains the IDs of the last twenty phases and CSECTs that had control. The IDs are the last four characters of the phase or CSECT name. For example, if the trace looks like this:

```
INTER ... SA01 EX01 RI01 RI02
```

then you know that IDCRI02 had control at the time of the dump.

The Inter-Module Trace Table is updated by the System Adapter not only as each phase or CSECT is entered, but also upon return from a phase or CSECT. Thus, if RI01 calls TP01 which calls IO01 and then returns back to RI01, the trace table looks like this:

```
INTER ... RI01 TP01 IO01 TP01 RI01
```

Intra-Module Trace Table

The Intra-Module Trace Table begins with the characters INTRA and contains the last twenty trace points encountered within phases and CSECTs. Each phase and CSECT has trace points placed at key locations, for example, at the start of procedures.

The IDs of the trace points consist of four characters: the first two characters are the mnemonic identifier of the phase or CSECT being traced, and the last two characters identify a specific point within the phase or CSECT. (The mnemonic identifiers are listed in the section "Naming Conventions" in the chapter "Introduction".)

The section "Trace and Dump Points to Module Cross Reference" in this chapter contains a list of all the trace points, identifies the phase or CSECT and procedure in which the trace point occurs, and explains the situation at the trace point. For example, if the Intra-Module Trace Table looks like this:

```
INTRA . . . SAGS IOOP SACL SAGP
```

by referring to this list, you would know that the last trace point encountered was at the start of the routine in CSECT IDCSA02 that processes a UGPOOL macro request.

For the period of time the Test option is set, the dumping routine (IDCDB01) places dump points in the Intra-Module Trace Table; thus, the trace table contains all the dump points encountered as well as the trace points. All the dump points you may find in the Intra-Module Trace Table, in addition to the trace points are explained in the section "Trace and Dump Points to Module Cross Reference" in this chapter.

Trace points within a phase or CSECT can be found by examing the microfiche listings for occurrences of the UTRACE macro; the UTRACE macro sets the trace IDs into the trace table. The expansion of the UTRACE macro for trace ID DLLC looks like this:

```
OLDERID2=NEWERID2;
NEWID2='DLLC'
```

Dump Points

Each module has built-in dump points that invoke diagnostic dumping routines if the Test option is in effect. The dump points, set up by the UDUMP macro, have been placed at key locations in each module (for example, around calls to other processor and non-processor modules). Each dump point specifies the information that can be dumped at that point. Some dump points allow symbolic dumping of selected areas of virtual storage (for example, parameter lists or return codes); all dump points allow dumping of the full region and printing of the trace tables.

Dump points can be found by examining microfiche listings for occurrences of the UDUMP macro. The expansion of the UDUMP macro for the dump point DLVL looks like this:

```
IF GDTDBG = NULLPTR
  THEN;
  ELSE
    CALL IDCB010(GDTTBL, 'DLVL');
```

Only the trace tables and the full region can be dumped at this point because only two parameters, the GDTTBL and the dump ID, are passed to the dumping routine.

The section "Module to Dump Points Cross Reference" in this chapter contains a list of all the dump points within each module, indicates what information can be dumped and explains the situation at the dump point. The section "Test Option" in this chapter explains how to take a full region dump.

Dumping Selected Areas of Virtual Storage

Certain Access Method Services modules have the dumping of selected areas of virtual storage built in. Dumping of these selected areas occurs at a dump point as described above. The areas dumped vary with each dump point and are identified with descriptive codes. The list in the section "Module to Dump Points Cross Reference" in this chapter indicates which modules contain dumps of selected areas and the footnotes to that list describe the areas dumped.

Dump points at which selected areas are printed can be found by examining the microfiche listings for occurrences of the UDUMP macro. The expansion is as described above for a full region dump except that the address of a parameter list describing the areas to be dumped is passed to the dumping routing as a third parameter.

Dumping of selected areas can occur with or without a full region dump in addition, as described in the section "Test Option" in this chapter.

Test Option

You can use the Test option to activate the printing of diagnostic output at selected points within Access Method Services. The Test option is controlled by the TEST keyword as explained in the following section "TEST Keyword".

The Test option provides you with the ability to print:

- The Inter-Module and Intra-Module Trace Tables. The format and interpretation of these tables are described in the section "Trace Tables" in this chapter.
- Selected areas of virtual storage. The facility for dumping selected areas of virtual storage is described in the section "Dump Points" in this chapter.
- Full region dump. The facility for taking a full region dump is described in the section "Dump Points" in this chapter.

Each variation of the Text option provides an additional level of information. The possible variations are: (1) print the trace tables only; (2) print the trace tables and selected areas of virtual storage; (3) print the trace tables and selected areas of virtual storage and take a full region dump.

TEST Keyword

You can enter the TEST keyword either in the PARM field of the EXEC card that invokes the processor, or on a PARM command. By using the PARM command, you can turn the Test option on and off or change the Test option for different function commands.

The format of the TEST keyword and its subparameters is:

PARM TEST({[TRACE]
AREAS(*ID-list* **)...)]**
[FULL((*dumplist* **)...)] |**
[OFF]})

where the subparameters are defined as follows:

TRACE specifies that the inter-module and intra-module trace tables are to be printed at every dump point encountered.

AREAS names the modules for which selected areas are to be printed, *in addition* to the trace tables. The trace tables are printed at each dump point encountered within the named modules; if a dump point specifies selected areas to be dumped, these areas are printed also. *ID-list* is a string of two-character mnemonic identifiers separated by commands and/or blanks. The mnemonic identifiers are listed in the section "Naming Conventions" in the chapter "Introduction". The mnemonic identifier, however, for the dump points within System Adapter dump points is ZZ. The maximum number of identifiers is 10. For example, AREAS(EX,PR) specifies that selective dumping is to occur in the Executive modules and the PRINT FSR.

FULL names the dump points at which full region dumps are to be produced, *in addition* to the selected areas and the trace tables. The trace tables and selected areas are produced each time the dump point is encountered; a full region dump is produced as specified in *dumplist*. *dumplist*consists of a string of triplets enclosed in parentheses. The maximum number of triplets is 10. Each triplet is of the form:

(*ident* **[** *begin* **[** *count* **]])**

where the arguments of the triplet are defined as follows:

ident is a four-character dump point. The dump points are identified in UDUMP macros and are listed in the module to Dump Points Cross Reference list.

begin specifies the iteration through the named dump point at which you wish the full region dump to be produced. For example, a *begin* value of 2 specifies that a full region dump is not to be produced until the second encounter of the dump point. The default value is 1, and the maximum is 32,767.

count specifies the number of times the full region dump is to be produced, once the value of *begin* has been satisfied. The default value is 1, and the maximum is 32,767.

For example, FULL((EX1F,4,2),(AL01)) specifies that one full region dump is to be produced the fourth time that point EX1F is encountered, another full region dump is to be produced the fifth time the point is encountered, and one full region dump is to be produced the first time that point AL01 is encountered. Trace tables and any selected areas are to be printed each time dump points EX1F and AL01 is encountered.

OFF turns off the Test option. No further dumping of trace tables, selected areas, or region will occur until another PARM command specifies one of the other subparameters. This subparameter must occur alone; it may not be coded with any other subparameter of the TEST keyword.

Each time a PARM command is specified, the TEST parameters override the TEST parameters in effect from the previous PARM command.

Figure 10 shows a section of the output from the command:

```
PARM TEST (  FULL (LCTP,2,1) )
```

The trace tables and the selected area, DARGLIST, are printed each time the dump point LCTP is encountered. A full region dump is produced the second time that dump point LCTP is encountered.

How to Use the Test Option

If a problem occurs and you have no idea which modules are involved, run the job again with the TRACE keyword. From the Inter-Module Trace Table you should be able to tell the modules involved. The TRACE keyword, however, produces a large amount of output.

If you suspect which modules are involved, you can rerun the job with the AREAS keyword and specify the identifiers of several suspected modules. You will obtain trace output for only the specified modules.

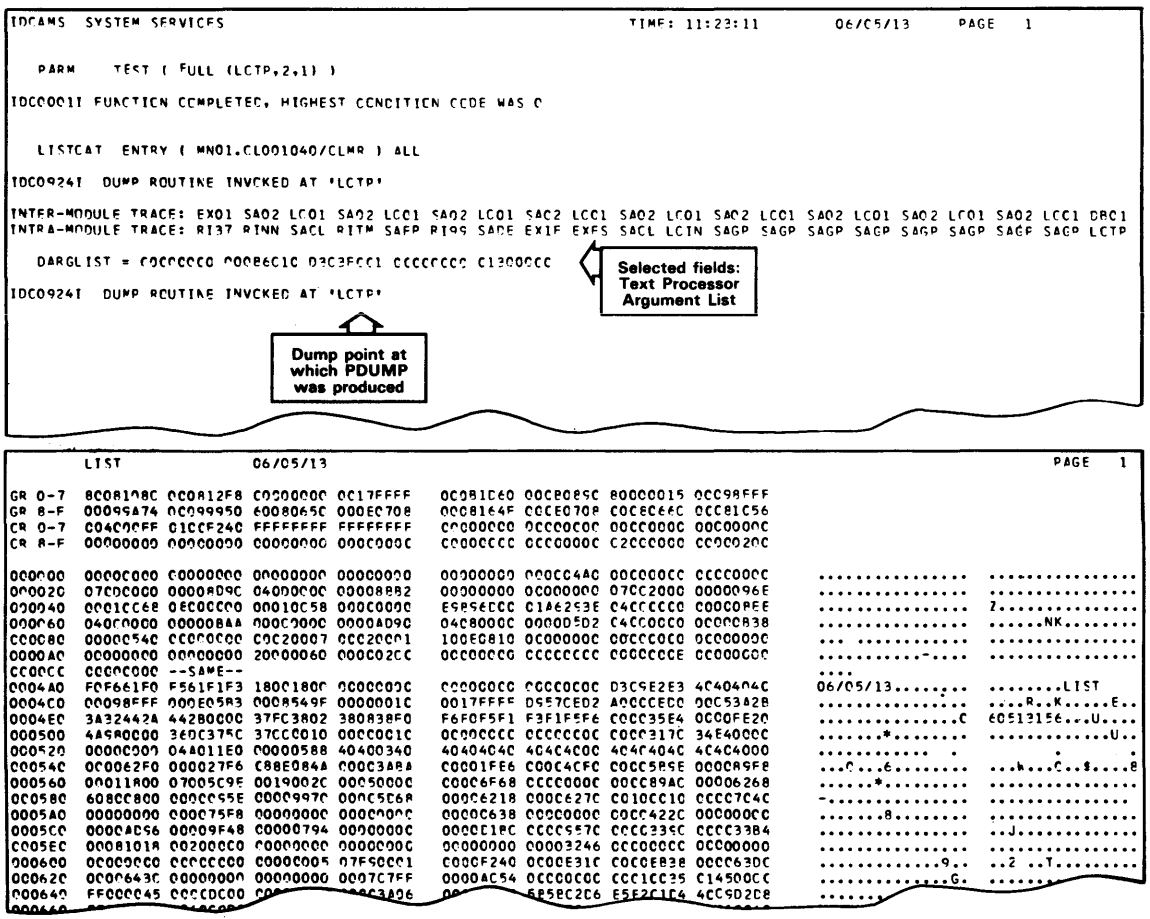


Figure 10. Example of Test Option Output

Once you know the procedure within a module that has caused the problem, select the dump points at which uou would like a full dump (using the Module to Dump Points Cross Reference list or by examining the microfiche for dump points), and rerun the job with the FULL keyword. The AREAS and FULL keywords can be used in combination to obtain trace tables and selected areas throughout several modules, but a full region dump only at selected points.

Trace and Dump Points to Module Cross Reference

The following list contains all trace and dump points, identifies the containing module and procedure and explains the situation at the trace or dump point. When the test option is set, both the trace and dump points are placed in the Intra-Module Trace Table. The trace tables are printed with all variations of the Test option as explained in the section "TEST Keyword".

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
AL01	IDCAL01	IDCAL01	dump	Before calling the catalog to alter an object.
			trace	Start of ALTER FSR.
AL02	IDCAL01	IDCAL01	dump	End of ALTER FSR.
AL03	IDCAL01	LOCATPRC	dump	After calling the catalog to locate an object.
AL04	IDCAL01	IDCAL01	dump	Before issuing ALTER request for index object if KEYS specified.
AL31	IDCAL01	LOCATPRC	trace	Start of procedure that locates the entry to be altered.
AL41	IDCAL01	ALTERPRC	trace	Start of procedure that builds the catalog parameter list.
AL51	IDCAL01	CHECKPRC	trace	Entry to CHECKPRC.
			dump	After locating data component of the alternate index for which UPGRADE has been specified.
AL52	IDCAL01	CHECKPRC	dump	After locating associated cluster or alternate index of the data object specified on ALTER command.
AL53	IDCAL01	CHECKPRC	dump	After locating associated index component.
AL54	IDCAL01	CHECKPRC	dump	After locating the data component of the path's base cluster.
AL55	IDCAL01	CHECKPRC	dump	After locating the cluster component of the alternate index's base cluster.
AL56	IDCAL01	CHECKPRC	dump	After locating the data component of the alternate index's base cluster.
AL61	IDCAL01	INDEXPRC	dump	On entry to INDEXPRC.
AL81	IDCAL01	PARAMCHK	trace	On entry to PARAMCHK procedure.
BIB1	IDCBI01	BLDPROC	trace	First entry to procedure that builds and writes the alternate index records.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
BIC1	IDCBI01	CNTLPROC	trace	Start of procedure that controls reading base cluster, sorting and writing alternate index.
BIC2	IDCBI01	CNTLPROC	dump	After completion of sort if an internal sort; after completion of sort phase and before merge passes if an external sort.
BIDL	IDCBI01	DELTPROC	trace	Start of procedure that deletes sort work files.
			dump	After return from UCATLG to delete each sort work file.
BID1	IDCBI01	DEFPROC	trace	Start of procedure that defines sort work files.
BID2	IDCBI01	DEFPROC	dump	After return from UCATLG to define each sort work file.
BIF1	IDCBI01	FINPROC	trace	Start of procedure that closes alternate index and prints status message.
BII1	IDCBI01	INITPROC	trace	Start of procedure that obtains resources for building alternate index.
BII2	IDCBI01	INITPROC	dump	After obtaining or failing to obtain sort core.
BIJ1	IDCBI01	JCPROC	trace	Start of procedure that issues UIOINFO to obtain sort work file job control data.
BIJ2	IDCBI01	JCPROC	dump	After return from each call to UIOINFO.
BIL1	IDCBI01	LOCPROC	trace	Start of procedure that controls catalog locates to obtain information about the base cluster and alternate index.
BIL2	IDCBI01	CATPROC	dump	After return from UCATLG for each locate request.
BIM1	IDCBI01	MERGPROC	trace	Start of procedure that performs the merge passes of an external sort.
BIM2	IDCBI01	MERGPROC	trace	Start of each merge pass of an external sort.
BIM3	IDCBI01	MERGPROC	dump	After the tree of nodes has been initialized for each merge pass of an external sort.
BIM4	IDCBI01	MERGPROC	dump	After processing one set of strings during the merge pass of an external sort.
BIP1	IDCBI01	OPENPROC	trace	Start of procedure that opens data sets.
BIP2	IDCBI01	OPENPROC	dump	After return from UOPEN to open a data set.
BISP	IDCBI01	SPILPROC	trace	Start of procedure that writes out a sorted string in the sort phase of an external sort.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
BISR	IDCBI01	SORTPROC	dump	Before sorting the records in the record sort area.
BI01	IDCBI01	IDCBI01	trace	Start of BLDINDEX FSR.
BI02	IDCBI01	MAINPROC	trace	Start of procedure that controls building of one alternate index.
BI03	IDCBI01	MAINPROC	dump	After return from procedure which locates information about the base cluster and alternate index.
BI04	IDCBI01	MAINPROC	dump	After the alternate index has been built; before close.
CP14	IDCRP01	VERIFYC	trace	When either the source or target catalog cannot be verified during a reload.
DB2A	IDCDB02	ARRAYHDR	trace	Start of procedure that processes an array header dump element.
DB2B	IDCDB02	BCONVERT	trace	Start of procedure the converts a dump item to binary representation.
DB2C	IDCDB02	CCONVERT	trace	Start of procedure that converts a dump item to character representation.
DB2F	IDCDB02	FCONVERT	trace	Start of procedure that converts a dump item to fixed representation.
DB2H	IDCDB02	HCONVERT	trace	Start of procedure that converts a dump item to hex representation.
DB2I	IDCDB02	ITEMDUMP	trace	Start of procedure that processes an individual dump list element.
DB2N	IDCDB02	NAMEFLD	trace	Start of procedure that processes the dump element symbolic name.
DE01	IDCDE01	IDCDE01	dump	Before calling the catalog to define an object.
DE02	IDCDE01	IDCDE01	dump	End of DEFINE FSR, before completion message is issued.
DE03	IDCDE02	MODELPRC	dump	After calling the catalog to locate a model object.
DE04	IDCDE02	MODELPRC	dump	End of procedure that built the model table.
DE11	IDCDE01	IDCDE01	trace	Start of DEFINE FSR.
DE20	IDCDE03	IDCDE03	trace	On entry to IDCDE02 module.
DE21	IDCDE03	CTLGPROC	trace	Start of procedure that defines a master or user catalog.
DE22	IDCDE03	DSETPROC	trace	Start of procedure that defines a VSAM data set.
DE23	IDCDE03	DSPACPRC	trace	Start of procedure that defines a data space.
DE24	IDCDE03	NVSAMPRC	trace	Start of procedure that defines a nonVSAM data set.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
DE25	IDCDE03	AIXPROC	trace	Start of procedure that defines an alternate index.
DE26	IDCDE03	PATHPROC	trace	Start of procedure that defines a path.
DE30	IDCDE02	IDCDE02	trace	Entry to IDCDE02.
DE31	IDCDE02	NAMEPROC	trace	Start of procedure that builds CTGFLs with name and date information.
DE32	IDCDE02	ALLCPROC	trace	Start of procedure that builds CTGFLs for allocation information.
DE33	IDCDE02	KEYPROC	trace	Stat of procedure that builds CTGFLs for key range and AMDSBCAT information.
DE34	IDCDE02	PROTPROC	trace	Start of procedure that builds CTGFLs for protection information.
DE35	IDCDE02	IXOPPROC	trace	Start of procedure that initializes index fields in the AMDSBCAT.
DE36	IDCDE02	MODELPRC	trace	Start of procedure that locates the model object entry.
DE37	IDCDE02	FREESTG	dump	End of DEFINE FSR.
DLBC	IDCDL01	BUILDCPL	trace	Start of procedure that builds the CTGPL for the delete request.
DLBG	IDCDL01	IDCDL01	dump	Start of DELETE FSR.
DLCL	IDCDL01	CLEANUP	trace	Start of procedure that closes the user catalog.
DLCT	IDCDL01	CATCALL	trace	Start of procedure that calls the catalog with a delete request.
DLLC	IDCDL01	FINDTYPE	trace	Start of procedure that locates the type of the entry to be deleted.
DLMS	IDCDL01	MORESP	trace	Entry to MORESP.
DLND	IDCDL01	IDCDL01	dump	End of DELETE FSR, before data sets are closed and the completion message is issued.
DLOP	IDCDL01	CATOPEN	trace	Start of procedure that opens the user catalog.
DLPC	IDCDL01	PARAMCHK	trace	Start of procedure that checks for invalid parameters.
DLVL	IDCDL01	FINDTYPE	dump	Before and after calling the catalog to locate the entry type.
DLVS	IDCDL01	CATCALL	dump	Before and after calling the catalog to delete an entry.
DLVT	IDCDL01	MORESP	dump	Either side of UCATLG macro in MORESP.
EXFS	IDCEX01	CALLFSR	dump	Before each call to an FSR.
EXIF	IDCEX01	CALLFSR	trace	Before each call to an FSR.
EXIM	IDCEX01	MAIN	trace	Before calling the Reader/Interpreter for the first time.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
EXIR	IDCEX01	CALLRI	trace	Before each call to the Reader/Interpreter.
EXMN	IDCEX01	IDCEX01	dump	All Reader/Interpreter and FSR processing is complete.
EXRI	IDCEX01	CALLRI	dump	Before each call to the Reader/Interpreter.
EX2X	IDCEX02	SCANPARM	trace	Before processing the caller's parameter list.
EX3S	IDCEX03	SCANPARM	trace	Before processing the caller's parameter list.
IOAC	IDCIO02	BUILDACB	dump	After ACB and EXLST have been built, at end of procedure.
			trace	Start of procedure that builds the ACB and EXLST.
IOCL	IDCIO01	IDCIOCL	trace	Start of routine that closes data set.
IOCP	IDCIO01	IDCIOCO	trace	Start of routine that copies a data set.
IODC	IDCIO02	BUILDDBK	trace	Start of procedure that builds a DTF.
IODS	IDCIO02	DSDATA	dump	After obtaining file information from the label cylinder.
IOEG	IDCIO01	GETEXT	dump	End of procedure that gets a record from the user routine.
			trace	Start of procedure that gets a record from the user routine.
IOEP	IDCIO01	PUTEXT	dump	After control returns from an external user routine.
			trace	Before record is passed to an external user routine.
IOE2	IDCIO01	GETNONVS	trace	Start of end-of-file routine for a nonVSAM data set.
IOGR	IDCI001	PUTREP	dump	After the GET for update.
IOGT	IDCIO01	IDCIOGT	trace	Beginning of routine that gets a data record from a data set.
IOIF	IDCIO03	DSINFO	trace	Entry to UIOINFO processing.
IOIT	IDCIO01	IDCIOIT	trace	Start of initialization routine.
IOI1	IDCIO03	DSINFO	dump	After return from IKQVDTPE.
IOOP	IDCIO01	IDCIOOP	trace	Start of routine that opens data sets.
IOOT	IDCIO03	PTISDS	trace	Before SETL macro is issued.
IOPL	IDCIO01	PUTREP	trace	Entry to PUT (Replace) routine.
IOPO	IDCIO01	IDCIOPO	trace	Start of routine that positions to a data record in an opened VSAM or ISAM data set.
	IDCIO03	IDCIO03	dump	After positioning is complete, before returning control to IDCIOPO.
IOPR	IDCIO01	PUTREP	dump	After the PUT for update.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
IOPT	IDCIO01	IDCIOPT	trace	Start of routine that writes data records to an opened data set.
IORP	IDCIO02	BUILDRPL	dump	After RPL is built, at end of procedure.
IOS2	IDCIO01	GETNONVS	trace	Start of SYNAD routine for nonVSAM read error.
IOS4	IDCIO01	PUTNONVS	trace	Start of SYNAD routine for nonVSAM put error.
IOTM	IDCIO01	IDCIOTM	trace	Start of termination routine that closes all data sets and frees space.
IOUO	IDCIO01	IDCIOSI	trace	Entry to UIOINFO entry processing.
IOVE	IDCIO01	GETVSAM	trace	Start of end-of-file exit routine for a VSAM file.
IOVG	IDCIO01	GETVSAM	dump	End of procedure that gets a record or control interval from a VSAM data set.
			trace	Before the GET macro is issued for a VSAM data set.
IOVP	IDCIO01	PUTVSAM	dump	End of procedure that writes a VSAM record.
			trace	Before the PUT macro is issued for a VSAM data set.
IOVR	IDCIO01	VSAMERR	dump	After detection of a VSAM I/O error.
IOVT	IDCIO03	PTAMDS	trace	Start of procedure that positions to a VSAM record or control interval.
IOVY	IDCIO01	IDCIOVY	dump	After VERIFY macro is issued.
			trace	After VERIFY macro is issued.
IO02	IDCIO03	DSINFO	dump	After formatting work area.
IO1C	IDCIO02	CLOSERTN	dump	Before CLOSE macro is issued.
IO1O	IDCIO02	OPENRTN	dump	Before OPEN macro is issued.
IO2C	IDCIO02	CLOSERTN	dump	At completion of all UCLOSE processing.
IO2P	IDCIO01	PUTNONVS	dump	After writing a spanned record.
			trace	After writing a spanned record.
IO20	IDCIO02	OPENRTN	dump	After OPEN macro is issued.
IO21	IDCIO02	OPENRTN	dump	At completion of all UOPEN processing.
LCAL	IDCLC02	LOCPROC	dump	After calling the catalog to locate an entry.
LCAU	IDCLC02	AUPROC	trace	Start of procedure that formats catalog fields for a nonVSAM or user catalog entry.
LCBL	IDCLC02	LOCPROC	dump	Before calling the catalog to locate an entry.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
LCCL	IDCLC02	CDIPROC	trace	Start of procedure that formats catalog fields for a cluster, data, or index entry.
LCEN	IDCLC01	ENTPROC	trace	Before retrieving each entry in a list of entries.
LCER	IDCLC02	ERRPROC	trace	Start of procedure that issues messages.
LCFP	IDCLC02	FPLPROC	trace	Start of procedure that reinitializes CTGFLs for each locate request.
LCIN	IDCLC01	INITPROC	trace	Start of procedure that initializes the catalog parameter list and work areas.
LCLT	IDCLC02	LISTPROC	trace	Start of procedure that prints catalog data.
LCMG	IDCLC02	ERRPROC	dump	Before UPRINT macro is issued to print a message.
LCNX	IDCLC01	GNXTPROC	trace	Before retrieving each entry when processing a full catalog.
LCRT	IDCLC01	RTEPROC	trace	Start of procedure that directs the retrieved entry to the proper formatting procedure.
LCR2	IDCLC01	RTEPROC	trace	Start of section of procedure that processes associations of a cluster, or AIX
LCSA	IDCLC02	ANSVPROC	trace	Start of procedure that retrieves the list of types and CI numbers.
LCTP	IDCLC02	LISTPROC	dump	Before UPRINT macro is issued to print catalog data.
LCVL	IDCLC02	VPROC	trace	Start of procedure that formats catalog fields of a space entry.
LCWA	IDCLC02	LOCPROC	dump	After calling the catalog to locate an entry.
LC02	IDCLC02	IDCLC02	dump	When IDCLC02 is called the first time to establish addressability.
LC98	IDCLC02	FREESTG	dump	End of LISTCAT FSR, before freeing storage in IDCLC02.
LC99	IDCLC01	IDCLC01	dump	End of LISTCAT FSR, before freeing storage in IDCLC01.
LRAA	IDCLR01	AATOPLR	dump	Entry point for IDCLR01
LRAD	IDCLR01	ADDASOC	dump	Start of procedure that adds an association to the association table.
LRBL	IDCLR01	BLDVEXT	dump	Start of procedure that builds virtual extension table.
LRBU	IDCLR01	BUFSHUF	dump	Start of procedure that moves a record to its "home" buffer.
LRCA	IDCLR01	CATOPEN	dump	Start of procedure that prepares to open the catalog.
LRCK	IDCLR01	CKEYRNG	dump	Start of procedure that checks for keyrange.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
LRCR	IDCLR01	CRAOPEN	dump	Start of procedure that opens the CRA.
LRCT	IDCLR01	CTTBLD	dump	Start of procedure that builds CI translate table.
LRC1	IDCLR01	CLEANUP	dump	Start of procedure that cleans up before exit.
LRC2	IDCLR01	CLENCRA	dump	Start of procedure that closes the CRA and prints the completion message.
LRDO	IDCLR01	DOOTHR	dump	Start of procedure that controls printing nonVSAM information.
LRDV	IDCLR01	DOVSAM	dump	Start of procedure that controls printing VSAM information.
LRER	IDCLR01	ERROR	dump	Start of procedure that handles errors.
LRGE	IDCLR01	GETPRT	dump	Start of procedure that gets and print records.
LRIA	IDCLR01	INTASOC	dump	Start of procedure that initializes association tables.
LRIN	IDCLR01	INITLZE	dump	Start of procedure that initializes the FSR.
LRIS	IDCLR01	INTSORT	dump	Start of procedure that initializes the sort table.
LRIV	IDCLR01	INTVEXT	dump	Start of procedure that initializes the virtual extension table.
LRME	IDCLR01	MEMSORT	dump	Start of procedure that sorts the entries in sort table.
LRPA	IDCLR01	PRTAAXV	dump	Start of procedure that prints associated AIXs and volumes.
LRPC	IDCLR01	PRTCMP	dump	Start of procedure that prints and compares information.
LRPD	IDCLR01	PRTDMP	dump	Start of procedure that prints dump if specified.
LRPE	IDCLR01	PRTDMPC	dump	Start of procedure that prints dump of catalog record and underscores miscompares.
LRPF	IDCLR01	PRTFIFO	dump	Start of procedure that prints CRA in order of CI number.
LRPJ	IDCLR01	PRTOJAL	dump	Start of procedure that prints an object's aliases.
LRPK	IDCLR01	PRTOJVL	dump	Start of procedure that prints an object's volumes.
LRPM	IDCLR01	PRTMCWD	dump	Start of procedure that prints miscompare words.
LRPO	IDCLR01	PRTOTHR	dump	Start of procedure that prints nonVSAM objects.
LRPT	IDCLR01	PRTTIME	dump	Start of procedure that prints timestamps.
LRPV	IDCLR01	PRTVSAM	dump	Start of procedure that prints VSAM structures.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
LRPW	IDCLR01	PRTVOL	dump	Start of procedure that prints volume records.
LRSM	IDCLR01	SUMIT	dump	Start of procedure that prints number of entries processed.
LRTC	IDCLR01	TCICTCR	dump	Start of procedure that translates the catalog CI to the CRA.
LRVE	IDCLR01	VERTEXT	dump	Start of procedure that handles vertical extension records.
LRZY	IDCLR01	ERROR	dump	After error message has been printed.
LRZZ	IDCLR01	ERROR	dump	After error that forced an ABORT of this execution.
LR02	IDCLR02	IDCLR02	dump	Entry point for module that gets a record for Recovery Field management routine.
MPBF	IDCMP01	FPLPROC	trace	Start of procedure that constructs a CTGFL.
MPBG	IDCMP01	IDCMP01	trace	Start of IMPORT FSR.
MPCP	IDCMP01	CLUSPROC	trace	Start of procedure that imports a cluster or alternate index.
MPCT	IDCMP01	CLUSPROC	trace	Before processing information from the portable data set to define a cluster or alternate index.
MPDC	IDCMP01	DELTPROC	dump	After the first UCATLG.
MPDD	IDCMP01	DELTPROC	dump	After the second UCATLG.
MPDL	IDCMP01	DELTPROC	trace	Entry to DELTPROC.
MPDN	IDCMP01	DUPNPROC	trace	Start of procedure to process a duplicate entry found in the catalog.
MPFN	IDCMP01	IDCMP01	dump	End of IMPORT FSR, prior to closing data sets.
MPFV	IDCMP01	FVTPROC	trace	Start of procedure that constructs a CTGFV and CTGFLs.
MPLV	IDCMP01	LVLRPROC	trace	Start of procedure that constructs CTGFLs for device and volume information.
MPMG	IDCMP01	MSGPROC	trace	Start of procedure that issues messages.
MPOP	IDCMP01	OPENPROC	trace	Start of procedure that opens either the portable data set or the newly defined data set.
MPPS	IDCMP01	BPASPROC	trace	Start of procedure that constructs the PASSWALL CTGFL for protection information.
MPPT	IDCMP01	CLUSPROC	trace	After imported cluster or alternate index has been successfully defined and the contents of the portable data set copied into the new cluster or alternate index.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
MPSP	IDCMP01	CTLGPROC	trace	Start of procedure that calls the catalog to locate, alter, or define an entry.
MPUC	IDCMP01	CNCTPROC	trace	Start of procedure that connects a user catalog.
MPUQ	IDCMP01	IUNIQPRC	trace	After a data or index has been found to be unique.
MPZZ	IDCMP01	CTLGPROC	dump	Before and after calling the catalog to locate, alter, or define an entry.
PMGP	IDCPM01	GRPHPARM	trace	Start of procedure that processes the graphics option.
PMMG	IDCPM01	MARGPARM	trace	Start of procedure that processes the margins option.
PMTP	IDCPM01	TESTPARM	trace	Start of procedure that initializes the TEST option.
PMTS	IDCPM01	TESTSAVE	trace	Start of procedure that initializes the Test Option Data Area.
PR01	IDCPR01	IDCPR01	dump	End of PRINT FSR.
PR11	IDCPR01	IDCPR01	trace	Start of PRINT FSR.
PR18	IDCPR01	IDCPR01	trace	Before termination processing.
PR21	IDCPR01	TEXTPSET	trace	Start of procedure that sets up the text processor interface.
PR31	IDCPR01	DELIMSET	trace	Start of procedure that establishes the beginning and ending delimiters of the data set to be printed.
RC01	IDCRC02	IDCRC02	trace	Start of main procedure.
RC02	IDCRC02	IDCRC02	dump	Start of main procedure.
RC03	IDCRC02	IDCRC02	trace	Return in main procedure from procedures which processed catalog information for objects. Start of termination processing.
RC04	IDCRC02	IDCRC02	dump	Return in main procedure from procedures which processed catalog information for objects. Start of termination processing.
RC05	IDCRC02	CLUSPROC	trace	Start of procedure which processes VSAM objects.
RC06	IDCRC02	CLUSPROC	dump	Start of procedure which processes VSAM objects.
RC07	IDCRC02	CLUSPROC	trace	Before routine which calls LOCPROC for data and index processing.
RC09	IDCRC02	CLUSPROC	trace	Start build of timestamp information for portability data set.
RC11	IDCRC02	CLUSPROC	trace	Start of processing for path associations for VSAM objects.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RC13	IDCRC02	LOCPROC	trace	Start of procedure which builds CPL and FPL's for catalog locate functions.
RC15	IDCRC02	CTLGPROC	trace	Start of procedure which issues catalog locates.
RC16	IDCRC02	CTLGPROC	dump	Start of procedure which issues catalog locates.
RC17	IDCRC02	OPENPROC	trace	Start of procedure to open input and output data sets.
RC19	IDCRC02	PUTPROC	trace	Start of procedure which writes control records to the output data set.
RC21	IDCRC02	RECPROC	trace	Start of procedure which copies the data from the input data set to the output data set.
RC23	IDCRC02	MVDAPROC	trace	Start of procedure which moves control record information in core and clears work areas in core.
RC25	IDCRC02	CONTRBL	trace	Start of procedure which builds control record information.
RC27	IDCRC02	NVSMPROC	trace	Start of procedure which processes nonVSAM objects.
RC28	IDCRC02	NVSMPROC	dump	Start of procedure which processes nonVSAM objects not associated to GDG's.
RC29	IDCRC02	NVSMPROC	trace	Before timestamp processing for nonVSAM objects not associated to GDG's.
RC31	IDCRC02	SAVEPROC	trace	Start of procedure which saves control record information and writes control information to the output data set.
RC33	IDCRC02	ALSPROC	trace	Start of procedure which processes catalog information for alias associations for nonVSAM objects.
RC35	IDCRC02	GDGPROC	trace	Start of procedure which processes catalog information for GDG's.
RC36	IDCRC02	GDGPROC	dump	Start of procedure which processes catalog information for GDG's.
RC37	IDCRC02	GDGPROC	trace	Before build of timestamp information for GDG's.
RC39	IDCRC02	ASOCPROC	trace	Start of procedure which processes catalog information for nonVSAM objects associated with GDG's.
RC40	IDCRC02	ASOCPROC	dump	Start of procedure which processes catalog information for nonVSAM objects associated with GDG's.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RC42	IDCRC02	PRNTPROC	trace	Start of procedure which prints error messages for associations.
RC79	IDCRC01	TERM	both	Before special processing to terminate request (closing output data set).
RC80	IDCRC01	INIT	both	Before initializing to begin processing.
RC81	IDCRC01	BUILDCRV	both	Before building the CRV.
RC82	IDCRC01	EXPORTDR	both	Before looping down name chain to call IDCRC02 to export data sets.
RC83	IDCRC01	SYNCH	both	Before scanning the name chain for a CRA to check it.
RC84	IDCRC01	OBJVOLCK	both	Before checking synchronization of an entry across multiple volumes.
RC85	IDCRC01	DUPNAMCK	both	Before checking the name chain for duplicates.
RC86	IDCRC01	BUILDNAM	both	Before constructing a block for the name chain.
RC87	IDCRC01	COMPNAME	both	Before compressing a name for the name list.
RC88	IDCRC01	SUBSP	both	Before allocating space for the name chain.
RC89	IDCRC01	MESSAGE	both	Before printing any message from IDCRC01.
RC90	IDCRC01	EXTRACT	both	Before using internal Field Management to get information from CRA.
RC91	IDCRC01	OPENCRA	both	Before opening or closing or CRA and doing all other work (e.g. Build CTT).
RC92	IDCRC01	OPEN	both	Before the opening of the CRA.
RC93	IDCRC01	CKCATNM	both	Before checking owning catalog name of CRA being opened.
RC94	IDCRC01	TIMESTMP	both	Before obtaining format 4 timestamp for CRA being opened.
RC95	IDCRC01	SCANCRA	both	Before scanning CRA to build the CTT table.
RC96	IDCRC01	ERRCK	both	After opening a CRA.
RC97	IDCRC01	NAMETABL	both	Before marking or adding a name to the name chain.
RC98	IDCRC01	DIRECT	both	Before obtaining the directory for a volume.
RC99	IDCRC01	CKNAMES	both	Before gathering information on name in name list from CRA.
RIBT	IDCRI01	BYPASTRM	dump	Start of procedure that bypasses the remainder of the current modal or null command.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RICV	IDCRI01	CONVERT	dump	Start of procedure that converts a constant from EBCDIC to binary or hexadecimal.
RIDC	IDCRI01	DSPLCALC	dump	Start of procedure that calculates the position within a secondary FDT vector in which to place an FDT pointer.
RIDF	IDCRI01	DEFAULTS	dump	Start of procedure that adds default parameters to the FDT.
RIEX	IDCRI01	IDCRI01	dump	Start of Reader/Interpreter phase.
RIE1	IDCRI01	ERROR1	dump	Start of procedure that issues a message without inserted text.
RIE2	IDCRI01	ERROR2	dump	Start of procedure that issues a message with inserted text.
RIGN	IDCRI01	GETNEXT	dump	Start of procedure that scans the input command.
RIGQ	IDCRI01	GETQUOTD	dump	Start of procedure that scans a quoted constant.
RIGR	IDCRI01	GETRECRD	dump	Start of procedure that obtains the next input record.
RIID	IDCRI01	DSIDCHK	trace	Check restrictions on a data set name and place in FDT.
RIIR	IDCRI01	INREPEAT	dump	Start of procedure that scans a repeated parameter set.
RIMC	IDCRI01	MORSPACE	dump	Start of procedure that allocates more FDT space for a list of constants.
RIME	IDCRI01	MODLELSE	dump	Start of procedure that scans an ELSE modal command.
RIMI	IDCRI01	MODALIF	dump	Start of procedure that scans an IF modal command.
RIMS	IDCRI01	MODALSET	dump	Start of procedure that scans a SET modal command.
RINN	IDCRI01	NEEDNOTS	dump	Start of procedure that checks the input command for conflicting or missing parameters.
RINS	IDCRI01	NAMESCAN	dump	Start of procedure that checks data set names.
RIPC	IDCRI01	PACKCVB	dump	Start of procedure that converts a decimal constant into a binary fullword.
RIPP	IDCRI01	POSPARM	dump	Start of procedure that scans a positional parameter.
RISC	IDCRI01	SCANCMD	dump	Start of procedure that scans the input command parameters.
RISD	IDCRI02	IDCRI02	dump	Start of phase that prepares to scan a command parameter set.
RISE	IDCRI01	SCANENDS	dump	Start of procedure that checks the input record for a continuation delimiter and determines the scanning limits of the record.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RISF	IDCRI01	SETFLAG	dump	Start of procedure that notes the occurrence of a parameter in the FDT.
RISK	IDCRI01	SKIPCMD	dump	Start of procedure that bypasses the remainder of a function command.
RIST	IDCRI01	SETDFLT	dump	Start of procedure that puts parameter defaults in the FDT.
RITM	IDCRI03	IDCRI03	dump	Start of phase that performs command termination functions.
RI01	IDCRI01	SCANCMD	trace	Start of scanning for a parameter.
RI02	IDCRI01	SCANCMD	trace	Scanning a first-level parameter.
RI03	IDCRI01	SCANCMD	trace	Scanning a subparameter.
RI04	IDCRI01	GETNEXT	trace	Modal command other than ELSE within an IF.
RI05	IDCRI01	GETNEXT	trace	Found a functional command.
RI09	IDCRI01	KWDPARM	trace	Found a keyword subparameter.
RI11	IDCRI01	GETDATA	trace	Start of extracting a scalar value.
RI12	IDCRI01	GETDATA	trace	Extract a character string.
RI16	IDCRI02	IDCRI02	trace	Prior to loading the command descriptor.
RI17	IDCRI02	IDCRI02	trace	Beginning of the code sequence to build the PARMINFO table.
RI24	IDCRI01	CONVERT	trace	Start converting a binary number.
RI27	IDCRI01	CONVERT	trace	Start converting a hexadecimal number.
RI30	IDCRI01	CONVERT	trace	Change converted digits into a binary fullword.
RI35	IDCRI01	INREPEAT	trace	Loop to reset parameter occurrence flags for possible parameters in the sublist.
RI36	IDCRI01	INREPEAT	trace	End of last repeated sublist.
RI44	IDCRI01	SETDFLT	trace	Found that default is allowable; ready to put in FDT.
RI45	IDCRI01	SETDFLT	trace	Move a defaulted unquoted constant to FDT.
RI49	IDCRI01	NXTFIELD	trace	Extract a filed from input (verb, keyword, or scalar).
RI50	IDCRI01	NXTFIELD	trace	Extract a keyword field.
RI51	IDCRI01	NXTFIELD	trace	Extract a quoted scalar.
RI56	IDCRI01	NEXTCHAR	trace	End-of-file already found in input.
RI57	IDCRI01	NEXTCHAR	trace	Extract first character of a new command.
RI59	IDCRI01	NEXTCHAR	trace	End-of-file found while looking for next character.
RI60	IDCRI01	SCANENDS	trace	Skip leading blanks and comments if preceding record indicated continuation.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RI61	IDCRI01	SCANENDS	trace	Bypass a leading comment.
RI62	IDCRI01	SCANENDS	trace	Bypass leading blanks.
RI66	IDCRI01	DSPLCALC	trace	Calculate displacement into the FDT for a parameter in a first-level repeated parameter list.
RI99	IDCRI03	IDCRI03	trace	End of IDCRI03.
RMAL	IDCRM01	ALISPROC	trace	Entry to ALISPROC.
RMAT	IDCRM01	ALTRPROC	trace	Entry to ALTRPROC.
RMBF	IDCRM01	BFPLPROC	trace	Entry to BFPLPROC.
RMBG	IDCRM01	IDCRM01	trace	Entry to IDCRM01.
RMCE	IDCRM01	CLUSPROC	trace	Exit from CLUSPROC.
RMCL	IDCRM01	CPLPROC	dump	After the CPL has been built.
RMCP	IDCRM01	CLUSPROC	trace	Entry to CLUSPROC.
RMCT	IDCRM01	CLUSPROC	trace	Begin reading of cluster or alternate index information from the portable data set.
RMDC	IDCRM01	DELTPROC	dump	After the first UCTALG in DELTPROC.
RMDD	IDCRM01	DELTPROC	dump	After the second UCATLG in DELTPROC.
RMDL	IDCRM01	DELTPROC	trace	Entry to DELTPROC.
RMDN	IDCRM01	NVSMPROC	trace	Duplicate nonVSAM entry found.
RMDU	IDCRM01	UCATPROC	trace	Duplicate user catalog found.
RMDV	IDCRM01	CLUSPROC	trace	A duplicate VSAM entry has been found.
RMEL	IDCRM01	IDCRM01	trace	End of the loop for importing objects.
RMEV	IDCRM01	CLUSPROC	trace	End of cluster or alternate index define sequence.
RMFN	IDCRM01	IDCRM01	dump	Termination of IDCRM01.
RMFV	IDCRM01	FVTPROC	trace	Entry to FVTPROC.
RMGD	IDCRM01	GDGPROC	trace	Entry to GDGPROC.
RMLV	IDCRM01	LVLRPROC	trace	Entry to LVLPROC.
RMOP	IDCRM01	OPENPROC	trace	Entry to OPENPROC.
RMNF	IDCRM01	NFVTPROC	trace	Entry to NFVTPROC.
RMNV	IDCRM01	NVSMPROC	trace	Entry to NVSMPROC.
RMPL	IDCRM01	CPLPROC	trace	Entry to CPLPROC.
RMPS	IDCRM01	BPASPROC	trace	Entry to BPASPROC.
RMPT	IDCRM01	CLUSPROC	trace	Beginning of path definition sequence.
RMRG	IDCRM01	RANGPRC	trace	Entry to RANGPROC.
RMSP	IDCRM01	CTLGPROC	trace	Entry to CTLGPROC.
RMUC	IDCRM01	UCATPROC	trace	Entry to UCATPROC.
RMUQ	IDCRM01	IUNIQPRC	trace	A unique data or index component has been detected.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RMZZ	IDCRM01	CTLGPROC	dump	Before and after the UCATLG in CTLGPROC.
RPCI	IDCRP01	CNVRTCI	dump	On exit from procedure that translates control interval numbers on the backup catalog.
RPD1	IDCRP01	CATRELOD	dump	At the end of all reload error checking before any updates have been done to the target catalog.
RPTU	IDCRP01	TRUENAME	dump	On exit from procedure, having built truename range table.
RPT1	IDCRP01	CATRELOD	trace	Start of procedure that performs catalog reload.
RPT2	IDCRP01	TRUENAME	trace	Start of procedure that maps the RBA boundaries of the backup truename ranges.
RPT3	IDCRP01	CATRANS	trace	On entry to procedure that locates control interval numbers to be translated.
RPT4	IDCRP01	CNVRTCI	trace	On entry to procedure that converts control interval numbers from the backup catalog.
RPT5	IDCRP01	CATCOMP	trace	On entry to procedure that compares truename records.
RPT6	IDCRP01	VERIFYC	trace	On entry to procedure that issues VERIFY against a catalog.
RP01	IDCRP01	IDCRP01	dump	End of REPRO FSR.
RPIO	IDCRP01	DUMPIT	dump	After read or write to backup or target catalog.
RP12	IDCRP01	IDCRP01	trace	After all data sets have not been opened successfully.
RP13	IDCRP01	IDCRP01	trace	Start of loop that copies the data set by issuing UGET and UPUT macros.
RP18	IDCRP01	IDCRP01	trace	After all records have been copied to output data set.
RP21	IDCRP01	DELIMSET	trace	Start of procedure that sets up the beginning and ending delimiters of the input data set.
RSAD	IDCRS05	ADDUPCR	trace	Upon entry to routine which updates the CRA for a particular record.
RSAE	IDCRS01	AERROR	trace	On entry to routine that exists if enough storage is not available to establish automatic storage required for RESETCAT modules.
RSAS	IDCRS02	ASSOC	trace	On entry to routine that initiates association checking.
RSAT	IDCRS05	ADDTN	trace	On entry to routine that adds a true name to the catalog.
RSA1	IDCRS02	ASSOC	dump	At end of procedure that initiates association checking.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RSA2	IDCRS05	ADDUPCR	dump	At end of procedure that prepares for update CRA processing.
RSBR	IDCRS05	BLDRLST	trace	On entry to routine that adds an entry to the reset volume table.
RSBV	IDCRS05	BLDVLST	trace	On entry to routine that adds an entry to the volume serial table.
RSB1	IDCRS05	BLDVLST	dump	End of procedure that adds an entry to the volume serial table.
RSB2	IDCRS05	BLDRLST	dump	At end of procedure that adds an entry to the reset table.
RSCA	IDCRS02	CINALTER	trace	On entry to routine that alters control interval numbers in catalog records.
RSCC	IDCRS07	CNVTCCHH	trace	On entry to routine that converts CCHH to TTnn.
RSCE	IDCRS07	CATEOV	trace	On entry to routine that extends the catalog.
RSCH	IDCRS03	CHKDSDIR	trace	On entry to routine that checks a data set directory entry against a DATA or INDEX component.
RSCI	IDCRS01	CATINIT	trace	On entry to routine that initializes RESETCAT's description of the catalog.
RSCK	IDCRS05	CKERR	trace	On entry to routine that prints a message if one is associated with the error message given.
RSCL	IDCRS01	CLEANUP	trace	On entry to routine that ensures all RESETCAT resources are free.
RSCO	IDCRS01	COPYCAT	trace	On entry to procedure that copies the catalog to the workfile.
RSCR	IDCRS05	CRAUPCHN	trace	On entry to routine that adds a workfile record to a specific "update CRA" chain.
RSCU	IDCRS03	CATRCDSU	trace	On entry to routine that establishes base record offsets for catalog low key range records.
RSC1	IDCRS01	CATINIT	dump	End of procedure that builds CIN to RRN table.
RSC2	IDCRS01	COPYCAT	dump	End of procedure that copies the catalog to the workfile.
RSC3	IDCRS01	CLEANUP	dump	Before freeing the resources used by RESETCAT.
RSC4	IDCRS05	CKERR	dump	Before RESETCAT FSR is terminated due to an error.
RSC7	IDCRS07	CATEOV	dump	At conclusion of routine that extends the catalog.
RSDA	IDCRS07	DADSM	trace	On entry to routine that processes all DADSM functions.
RSDC	IDCRS06	DSCLOSE	trace	On entry to procedure that closes a VSAM data set.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RSDE	IDCRS04	DELGO	trace	On entry to routine that deletes a group occurrence.
RSDO	IDCRS06	DSOPEN	trace	On entry to procedure that opens VSAM data sets.
RSDT	IDCRS05	DELTN	trace	On entry to procedure that deletes a true name from the catalog.
RSD1	IDCRS06	DSOPEN	dump	End of procedure that opens a VSAM data set.
RSD2	IDCRS06	DSCLOSE	dump	End of procedure that closes a VSAM data set.
RSD3	IDCRS04	DELGO	dump	End of procedure that deletes a group occurrence.
RSD4	IDCRS07	DADSM	dump	At conclusion of routine that processes all DADSM functions.
RSEN	IDCRS05	ENTNMCK	trace	On entry to routine that determines if a catalog record has a valid entry name.
RSES	IDCRS01	ENSURECI	trace	On entry to routine that ensures there are enough free CIs for reassignment.
RSE1	IDCRS05	ENTNMCK	dump	End of procedure that determines if a record has a true name.
RSE2	IDCRS01	ENSURECI	dump	A start of procedure prior to ensuring enough free CIs.
RSFI	IDCRS04	FIND	trace	On entry to routine that locates requested information from a set of catalog records.
RSF1	IDCRS04	FIND	dump	End of routine that finds one or all group occurrences.
RSGE	IDCRS05	GENNAME	trace	On entry to routine that generates a true name.
RSGF	IDCRS03	GETFIT	trace	On entry to routine that gets a free entry in tables for ASSOC.
RSGN	IDCRS03	GETNEXTE	trace	On entry to routine that translates an index into a table into a virtual address.
RSGT	IDCRS03	GETTAB	trace	On entry to routine that gets and initializes a table for ASSOC.
RSGV	IDCRS03	GETVIA	trace	On entry to routine that gets a record by control interval number via a specific CRA.
RSG1	IDCRS03	GETVIA	dump	End of procedure that locates records in the workfile.
RSIN	IDCRS01	INIT	trace	On entry to routine which performs the main initializations for RESETCAT.
RSI1	IDCRS01	INIR	dump	End of procedure that initializes data areas and obtains resource.
RSME	IDCRS01	MERGCRA	trace	On entry to routine that merges each reset CRA into the workfile.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RSMO	IDCRS04	MODGO	trace	On entry to procedure that modifies a group occurrence.
RSMU	IDCRS03	MARKUNUS	trace	On entry to routine that marks a Volume Group Occurrence (VGO) unusable.
RSM1	IDCRS01	MERGECRA	dump	End of procedure that merges and resets CRA into the workfile.
RSM2	IDCRS04	MODGO	dump	End of procedure that modifies a group occurrence.
RSPC	IDCRS02	PROCTYPE	trace	On entry to routine that scans a catalog record for CINs.
RSPI	IDCRS02	PROCCI	trace	On entry to routine that ensures a CIN is in the list of CINs for records being processed.
RSPR	IDCRS01	PROCCRA	trace	On entry to routine that processes the records of the current CRA.
RSPV	IDCRS03	PROCVOL	trace	On entry to routine that resolves space conflicts.
RSP1	IDCRS01	PROCCRA	dump	End of procedure that merges the records of a reset CRA into the workfile.
RSP2	IDCRS03	PROCVOL	dump	Before freeing resources used by PROCVOL routine.
RSP3	IDCRS02	PROCTYPE	dump	After processing a set of records for associations.
RSP4	IDCRS02	PROCCI	dump	End of procedure that ensures that a CIN is in the list of CINs.
RSRC	IDCRS06	RECMGMT	trace	On entry to routine that performs all I/O operations for RESETCAT.
RSRE	IDCRS01	REASSIGN	trace	On entry to routine that performs control interval reassignment.
RSRN	IDCRS07	RENAMEP	trace	On entry to routine that renames duplicate true name entries.
RSR1	IDCRS01	REASSIGN	dump	End of procedure that assigns new CINs to records on the reassign chain.
RSR2	IDCRS06	RECMGMT	dump	End of procedure that performs all I/O requests.
RSR4	IDCRS07	RENAMEP	dump	Before freeing resources used by the RENAMEP procedure.
RSSB	IDCRS03	SETBMAP	trace	On entry to routine that checks space conflicts for D or I type catalog entries.
RSSC	IDCRS02	SCANCI	trace	On entry to routine that scans records for control intervals.
RSSE	IDCRS02	SETCI	trace	On entry to routine that updates the workfile to reflect new CINs for reassigned CINs.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RSSR	IDCRS05	SCNRLST	trace	On entry to routine that obtains the next CRA volser entry for reset.
RSST	IDCRS03	SETBITS	trace	On entry to routine that maps extents to a bit map.
RSSV	IDCRS05	SCNVLST	trace	On entry to routine that scans through the list of volumes.
RSS2	IDCRS02	SETCI	dump	End of procedure that updates the workfile records from the associations tables.
RSS3	IDCRS03	SETBITS	dump	At end of procedure that sets up a single bit map.
RSS5	IDCRS05	SCNVLST	dump	End of procedure that locates an entry in the volume serial table.
RSS6	IDCRS05	SCNRLST	dump	End of procedure that locates an entry in the reset volume table.
RSUA	IDCRS03	UNALLOC	trace	On entry to routine which unallocates suballocated space from temporary space maps.
RSUC	IDCRS01	UPDCRA	trace	On entry to routine which updates the CRAs from the workfile.
RSUP	IDCPS01	UPDCAT	trace	On entry to routine which updates the catalog from the workfile.
RSUR	IDCRS07	UPDCCR	trace	On entry to procedure which updates the CCR for the catalog.
RSU1	IDCRS01	UPDCAT	dump	End of procedure that updates the catalog from the workfile.
RSU2	IDCRS01	UPDCRA	dump	End of procedure that updates the CRAs from the workfile.
RSVB	IDCRS03	VERB	trace	On entry to routine which verifies associations for GDG base records.
RSVC	IDCRS02	VERC	trace	On entry to routine which verifies associations for clusters.
RSVE	IDCRS02	VERDSDIR	trace	On entry to routine which verifies that data set directory entries for VSAM data sets not on reset volumes.
RSVG	IDCRS02	VERG	trace	On entry to routine which verifies associations for AIXs.
RSVN	IDCRS03	VLNRESET	trace	On entry to routine which verifies space requested from objects being reset against non-reset volumes.
RSVO	IDCRS01	VOLCHK	trace	On entry to volume consistency routine (VOLCHK).
RSVP	IDCRS02	VERR	trace	Upon entry to routine which verifies associations for PATHs.
RSVR	IDCRS02	VERCI	trace	On entry to routine which checks validity of each CIN found in a set of records.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
RSVS	IDCRS03	VLRESET	trace	On entry to routine which verifies space requested against reset volumes.
RSVU	IDCRS02	VERU	trace	On entry to routine which verifies associations for user catalogs.
RSVX	IDCRS02	VERX	trace	On entry to routine which verifies alias associations.
RSV1	IDCRS03	VOLCHK	dump	End of procedure that checks Format 1 DSCBs against space headers.
RSV2	IDCRS02	VERDSDIR	dump	After verifying initial space claims.
RSV3	IDCRS02	VERCI	dump	After verifying associations on a set of records.
RSV4	IDCRS03	VERB	dump	Before freeing resources used by procedure which verifies GDG data sets.
RSWF	IDCRS06	WFDEF	trace	Upon entry to routine which defines an RRDS as a workfile for RESETCAT processing.
RSWL	IDCRS06	WFDEL	trace	On entry to routine which deletes the workfile.
RSWR	IDCRS01	WRAPUP	trace	On entry to routine which handles clean up operations after successful RESETCAT processing.
RSW2	IDCRS06	WFDEF	dump	Before the UCATLG work area is freed.
RSW3	IDCRS06	WFDEL	dump	End of procedure that deletes the workfile.
RS00	IDCRS01	IDCRS01	dump	End of RESETCAT FSR.
RS01	IDSCR01	IDCRS01	trace	Upon entry to main RESETCAT module.
SAAB	IDCSA01	SAABT	dump	In UABORT routine when a dump is not to be printed for a "no space available" condition.
SACA	IDCSA02	IDCSA02	trace	Start of routine that processes UCATLG macro.
SACL	IDCSA02	IDCSA02	trace	Start of routine that processes UCALL macro.
SADE	IDCSA02	IDCSA02	trace	Start of routine that processes UDELETE macro.
SADQ	IDCSA08	IDCSA08	trace	Start of routine that processes UDEQ macro.
SAEP	IDCSA01	PRNTERR	trace	Entry to routine which prints an error message via EXCP.
SAFP	IDCSA02	IDCSA02	trace	Start of routine that processes UFPOOL macro.
SAFS	IDCSA02	IDCSA02	trace	Start of routine that processes UFSPACE macro.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
SAGP	IDCSA02	IDCSA02	trace	Start of routine that processes UGPOOL macro.
SAGS	IDCSA02	IDCSA02	trace	Start of routine that processes UGSPACE macro.
SALD	IDCSA02	IDCSA02	trace	Start of routine that processes ULOAD macro.
SANQ	IDCSA08	IDCSA08	trace	Start of routine that processes UENQ macro.
SASN	IDCSA02	IDCSA02	trace	Start of routine that processes USNAP macro.
SATI	IDCSA02	IDCSA02	trace	Start of routine that processes UTIME macro.
SA05	IDCSA05	IDCSA05	trace	Before the TIME macro is issued.
TPCC	IDCTP01	IDCTP01	trace	Before the call to the CONVERT routine is issued.
TPEA	IDCTP06	IDCTP06	dump	Start of UERROR procedure.
TPEB	IDCTP06	IDCTP06	dump	Before a converted UERROR message is printed.
TPER	IDCTP01	ERROR	dump	Start of procedure that prints a text processor error message.
TPE1	IDCTP06	IDCTP06	trace	Start of UERROR procedure.
TPE2	IDCTP06	CATERCNV	trace	Entry point to routine that converts catalog error messages to prose.
TPIN	IDCTP01	IDCTPPR	dump	At end of phase; the format structure for a UPRINT macro has been processed.
TPSI	IDCTP01	IDCTPPR	dump	After initialization of text processor parameters.
TP2I	IDCTP01	CONVERT	dump	Start of procedure that converts data to a printable form.
TP2N	IDCTP01	CONVERT	dump	End of procedure that converts data to a printable form.
TP3I	IDCTP01	LINEPRT	dump	Start of procedure that formats pages and prints titles, headings, footings, and other lines requested.
TP3N	IDCTP01	LINEPRT	dump	End of procedure that prints lines.
TP4A	IDCTP04	ESTACONT	dump	End of procedure that processes the UESTA macro.
TP4R	IDCTP04	RESTCONT	dump	End of procedure that processes UREST macro.
TP4S	IDCTP04	ESTSCONT	dump	End of procedure that processes UESTS macro.
TP5E	IDCTP05	IDCTP05	trace	Start of procedure that gets a static text module.
TP5I	IDCTP05	IDCTP05	dump	Start of phase that loads the static text phase.
TP5N	IDCTP05	IDCTP05	dump	End of phase that loads the static text phase.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
VYBG	IDCVY01	IDCVY01	dump	Start of VERIFY FSR.
VYCL	IDCVY01	TERMPROC	trace	Start of procedure that closes the data set that was verified.
VYND	IDCVY01	IDCVY01	dump	End of VERIFY FSR.
VYOP	IDCVY01	OPENPROC	trace	Start of procedure that opens the VSAM data set to be verified.
VYST	IDCVY01	IDCVY01	trace	Start of VERIFY FSR.
XPAO	IDCXP01	CLUSPROC	trace	Before retrieving from the catalog the entries associated with the cluster or alternate index being exported.
XPAP	IDCSP01	ALTRPROC	trace	Start of procedure that modifies the CTGPL to set the temporary export flag on.
XPBG	IDCXP01	IDCXP01	trace	Start of EXPORT FSR.
XPCP	IDCXP01	CLUSPROC	trace	Before retrieving the catalog entry for the object to be exported.
XPCR	IDCXP01	CONTRBL	trace	Before constructing control records for the portable data set.
XPCW	IDCXP01	CONTRBL	trace	Before writing control records to the portable data set.
XPDP	IDCXP01	DELTPROC	trace	Start of procedure that sets up the CTGPL to delete a cluster or alternate index or disconnect a user catalog.
XPED	IDCXP01	IDCXP01	trace	End of EXPORT FSR.
XPFN	IDCXP01	IDCXP01	dump	End of EXPORT FSR, before data sets are closed and space freed.
XPLP	IDCXP01	LOCPROC	trace	Start of procedure that builds the CTGPL and CTGFLs for a locate request.
XPMS	IDCXP01	MORESP	trace	Entry to MORESP.
XPOP	IDCXP01	OPENPROC	trace	Start of procedure that opens either the portable data set or the cluster or alternate index to be exported.
XPPM	IDCXP01	CLUSPROC	trace	Before processing the permanent or temporary export option.
XPPP	IDCXP01	PUTPROC	trace	Start of procedure that writes a record to the portable data set.
XPRP	IDCXP01	RECPROC	trace	Entry to RECPROC.
XPSP	IDCXP01	CTLGPROC	trace	Start of procedure that calls the catalog for a locate, alter, or delete request.
XPTM	IDCXP01	CLUSPROC	trace	Before calling the procedure to alter the CTGPL to set the temporary export flag.
XPUC	IDCXP01	DSCTPROC	trace	Start of procedure that disconnects a user catalog.

Trace and Dump Points to Phase or CSECT Cross Reference

Trace or Dump Point	Phase or CSECT	Procedure	Type	Situation at Dump or Trace Point
XPWC	IDCXP01	CLUSPROC	trace	Before writing the catalog information to the portable data set.
XPZX	IDCXP01	MORESP	dump	Just after the UCATLG macro.
XPZY	IDCXP01	DELTPROC	dump	Just after the UCATLG macro.
XPZZ	IDCXP01	CTLGPROC	dump	After calling the catalog to locate, alter, or delete an entry.
XP01	IDCXP01	IDCXP01	dump	Start of EXPORT FSR.
ZZCA	IDCSA02	IDCSA02	dump	Before and after CATLG macro is issued to invoke catalog management routines.

Module to Dump Points Cross Reference

The dump points, set up by UDUMP macros, have been placed at key locations in each phase and CSECT, for example, around calls to other processor and non-processor phases or CSECTs. Each dump point specifies the information that can be dumped at that point. Some dump points allow symbolic dumping of selected fields, for example, parameter lists or return codes; all dump points allow dumping of the full partition and printing of the trace tables.

The following list contains the dump points within each phase or CSECT and procedure, indicates what information can be dumped at each point (either a full dump or selected areas), and explains the situation at the dump point. As explained in the section, "TEST Keyword" in this chapter, full region dumps are taken at all dump points in this list. Selected areas can be printed with either the AREAS or FULL variation of the Test option. Details of the selected areas are given in the footnotes following the list.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCAL01	CHECKPRC	AL51	dump	After locating data component of the alternate index for which UPGRADE has been specified.
		AL52	dump	After locating associated cluster or the alternate index of the data object specified on ALTER command.
		AL53	dump	After locating associated index component.
		AL54	dump	After locating the data component of the path's base cluster.
		AL55	dump	After locating the cluster component of the alternate index's base cluster.
		AL56	dump	After locating the data component of the alternate index's base cluster.
	IDCAL01	AL01	dump	Before calling the catalog to alter an object.
		AL02	dump	End of ALTER FSR.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCAL01 (Continued)		AL04	dump	Before issuing ALTER request for index objects if KEYS specified.
	INDEXPRC	AL61	dump	On entry to INDEXPRC.
	LOCATPRC	AL03	dump	After calling the catalog to alter an object.
IDCBI01	CATPROC	BIL2	dump	After return from UCATLG for each locate request.
	CNTRLPRC	BIC2	dump	After completion of sort if an internal sort. After completion of sort phase and before merge passes if an external sort.
IDCBI01	DEFPROC	BID2	dump	After return from UCATLG to define each sort work file.
IDCBI01	DELTPROC	BIDL	dump	After return from UCATLG to delete each sort work file.
	INITPROC	BII2	dump	After obtaining or failing to obtain sort storage.
	JCPROC	BIJ2	dump	After return from each call to UIOINFO.
	MAINPROC	BI03	dump	After return from procedure which locates information about the base cluster and alternate index.
		BI04	dump	After the alternate index has been built, before CLOSE.
	MERGPROC	BIM3	dump	After the tree has been initialized for each merge pass of an external sort.
		BIM4	dump	After processing one set of strings during the merge pass of an external sort.
	OPENPROC	BIP2	dump	After return from UOPEN to open a data set.
	SORTPROC	BISR	dump	Before sorting the records in the record sort area.
IDCDE01	IDCDE01	DE01	dump	Before calling the catalog to define an object.
		DE02	dump	End of DEFINE FSR, before completion message is issued.
IDCDE02	MODELPRC	DE03	dump	After calling the catalog to locate a model object.
		DE04	dump	End of procedure that built the model table.
	FREESTG	DE37	dump	End of DEFINE FSR.
IDCDL01	CATCALL	DLVS	dump	Before and after calling the catalog to delete an entry.
	FINDTYPE	DLVL	dump	Before and after calling the catalog to locate the entry type.
	IDCDL01	DLBG	dump	Start of DELETE FSR.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCDL01 (Continued)		DLND	dump	End of DELETE FSR, before data sets are closed and the completion message is issued.
	MORESP	DLVT	dump	Before and after the UCATLG macro in MORESP.
IDCEX01	CALLFSR	EXFS	dump	Before each call to an FSR.
	CALLRI	EXRI	dump	Before each call to the Reader/Interpreter.
IDCEX01	IDCEX01	EXMN	dump	All Reader/Interpreter FSR processing is complete.
IDCIO01	GETEXT	IOEG	dump	End of procedure that gets a record from the user routine.
	GETVSAM	IOVG	dump	End of procedure that gets a record or control interval from a VSAM data set.
	IDCIOVY	IOVY	dump	After VERIFY macro is issued.
	PUTEXT	IOEP	dump	After control returns from an external user routine.
	PUTREP	IOGR	dump	After the GET for update.
		IOPR	dump	After the PUT for update.
	PUTVSAM	IOVP	dump	End of procedure that writes a VSAM record.
	VSAMERR	IOVR	dump	After detection of a VSAM I/O error.
IDCIO02	BUILDACB	IOAC	dump	After ACB and EXLST have been built, at end of procedure.
	BUILDRPL	IORP	dump	After RPL is built, at end of procedure.
	CLOSERTN	IO1C	dump	Before CLOSE macro is issued.
		IO2C	dump	At end of all UCLOSE processing.
	DSDATA	IODS	dump	After obtaining file information from the label cylinder.
	OPENRTN	IO1O	dump	Before OPEN macro is issued.
		IO20	dump	After OPEN macro is issued.
		IO21	dump	At end of all UOPEN processing.
IDCIO03	DSINFO	IOI1	dump	After return from IKQVDTPE.
		IO02	dump	After formatting the work area.
	IDCIO03	IOPO	dump	After positioning is complete, before returning control to IDCIOPO.
IDCLC01	IDCLC01	LC99	dump	End of LISTCAT FSR, before freeing storage in IDCLC01.
IDCLC02	ERRPROC	LCMG	selected areas 1	Before UPRINT macro is issued to print a message.
	FREESTG	LC98	dump	End of LISTCAT FSR, before freeing storage in IDCLC02.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCLC02 (Continued)	IDCLC02	LC02	dump	When IDCLC02 is called the first time to establish addressability.
	LISTPROC	LCTP	selected areas 2	Before UPRINT macro is issued to print catalog data.
	LOCPROC	LCAL	selected areas 3	After calling the catalog to locate an entry.
		LCBL	selected areas 4	Before calling the catalog to locate an entry.
		LCWA	selected areas 5	After calling the catalog to locate an entry.
IDCLR01	AATOPLR	LRAA	dump	Entry point for IDCLR01.
	ADDASOC	LRAD	dump	Start of procedure that adds an association to the association table.
	BLDVEXT	LRBL	dump	Start of procedure that builds vertical extension tables.
	BUFSHUF	LRBU	dump	Start of procedure that moves a record to its "home" buffer.
	CATOPEN	LCRA	dump	Start of procedure that prepares to open the catalog.
	CKEYRNG	LRCK	dump	Start of procedure that checks for keyrange.
	CLEANUP	LRC1	dump	Start of procedure that cleans up before exit.
	CLENCRA	LRC2	dump	Start of procedure that closes the CRA and prints completion message.
	CRAOPEN	LRCR	dump	Start of procedure that opens the CRA.
	CTTBLD	LRCT	dump	Start of procedure that builds CI translate table.
	DOOTHR	LRDO	dump	Start of procedure that controls printing nonVSAM information.
	DOVSAM	LRDV	dump	Start of procedure that controls printing VSAM information.
	ERROR	LRER	dump	Start of procedure that handles errors.
		LRZY	dump	After error message has been printed.
		LRZZ	dump	After error that forced an ABORT of this execution.
	GETPRT	LRGE	dump	Start of procedure that gets and prints records.
	INITLZE	LRIN	dump	Start of procedure that initializes the FSR.
	INTASOC	LRIA	dump	Start of procedure that initializes association tables.
	INTSORT	LRIS	dump	Start of procedure that initializes the sort table.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
	INTVEXT	LRIV	dump	Start of procedure that initializes the vertical extension table.
	MEMSORT	LRME	dump	Start of procedure that sorts the entries in sort table.
	PRTAAXV	LRPA	dump	Start of procedure that prints associated AIXs and volumes.
	PRTCMP	LRPC	dump	Start of procedure that prints and compares information.
	PRTDMP	LRPD	dump	Start of procedure that prints dump if specified.
	PRTDMPC	LRPE	dump	Start of procedure that prints dump of catalog record and underscores miscompares.
	PRTFIFO	LRPF	dump	Start of procedure that prints CRA in order of CI number.
	PRTMCWD	LRPM	dump	Start of procedure that prints miscompare words.
	PRTOJAL	LRPJ	dump	Start of procedure that prints an objects aliases.
	PRTOJVL	LRPK	dump	Start of procedure that prints an object's volumes.
	PROTHR	LRPO	dump	Start of procedure that prints nonVSAM objects.
	PRTTIME	LRPT	dump	Start of procedure that prints timestamps.
	PRTVOL	LRPW	dump	Start of procedure that prints volume records.
	PRTVSAM	LRPV	dump	Start of procedure that prints VSAM structures.
	SUMIT	LRSM	dump	Start of procedure that prints number of entries processed.
	TCICTCR	LRTC	dump	Start of procedure that translates the catalog CI to the CRA.
	VERTEXT	LRVE	dump	Start of procedure that handles vertical extension records.
IDCLR02	IDCLR02	LR02	dump	Entry point for module that gets a record for Recovery Field management routine.
IDCMP01	CTLGPROC	MPZZ	dump	Before and after calling the catalog to locate, alter, or define an entry.
	DELTPROC	MPDC	dump	After the first UCATLG.
		MPDD	dump	After the second UCATLG.
	IDCMP01	MPFN	dump	End of IMPORT FSR, prior to closing data sets.
IDCPR01	IDCPR01	PR01	dump	End of PRINT FSR.
IDCRC01	CKNAMES	RC99	dump	Before gathering information on name in name list from CRA.
	DIRECT	RC98	dump	Before obtaining a directory for a volume.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCRC01 (Continued)	NAMETABL	RC97	dump	Before marking or adding a name to the name chain.
	ERRCK	RC96	dump	After opening a CRA.
	SCANCRA	RC95	dump	Before scanning CRA to build the CTT table.
	TIMESTMP	RC94	dump	Before obtaining format 4 timestamp for CRA being opened.
	CKCATNM	RC93	dump	Before checking owning catalog name of CRA being opened.
	OPEN	RC92	dump	Before the opening of the CRA.
	OPENCRA	RC91	dump	Before opening or closing a CRA and doing all other work (e.g. Build CTT).
	EXTRACT	RC90	dump	Before using internal Field Management to get information from CRA.
	MESSAGE	RC89	dump	Before printing any message from IDCRC01.
	SUBSP	RC88	dump	Before allocating space for the name chain.
	COMPNAME	RC87	dump	Before compressing a name for the name list.
	BUILDNAM	RC86	dump	Before constructing a block for the name chain.
	DUPNAMCK	RC85	dump	Before checking the name chain for duplicates.
	OBJVOLCK	RC84	dump	Before checking Sync. of entry across multiple volumes.
	SYNCH	RC83	dump	Before scanning the name chain for a CRA to check it.
	EXPORTDR	RC82	dump	Before looping down name chain to call IDCRC02 to export data sets.
	BUILDCRV	RC81	dump	Before building the CRV.
	INIT	RC80	dump	Before initializing to begin processing.
	TERM	RC79	dump	Before special processing to terminate request (closing output data set.)
IDCRC02	ASOCPROC	RC40	dump	Start of procedure which processes nonVSAM objects associated with GDG's
	CLUSPROC	RC06	dump	Start of procedure which processing VSAM objects.
	CTLGPROC	RC16	dump	Start of procedure which issues catalog locates.
	GDGPROC	RC36	dump	Start of procedure which processes GDG objects.
	IDCRC02	RC02	dump	Start of main procedure.
	IDCRC02	RC04	dump	Before termination processing.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
	NVSMPROC	RC28	dump	Start of procedure which processes nonVSAM objects not associated with GDG's.
IDCRI01	BYPASTRM	RIBT	dump	Start of procedure that bypasses the remainder of the current modal or null command.
	CONVERT	RICV	dump	Start of procedure that converts a constant from EBCDIC to binary or hexadecimal.
	DEFAULTS	RIDF	dump	Start of procedure that adds default parameters to the FDT.
	DSPLCALC	RIDC	dump	Start of procedure that calculates the position within a secondary FDT vector in which to place an FDT pointer.
	ERROR1	RIE1	dump	Start of procedure that issues a message without inserted text.
	ERROR2	RIE2	dump	Start of procedure that issues a message with inserted text.
	GETNEXT	RIGN	dump	Start of procedure that scans the input command.
	GETQUOTD	RIGQ	dump	Start of procedure that scans a quoted constant.
	GETRECRD	RIGR	dump	Start of procedure that obtains the next input record.
	IDCRI01	RIEX	dump	Start of Reader/Interpreter module.
	INREPEAT	RIIR	dump	Start of procedure that scans a repeated parameter set.
	MODALIF	RIMI	dump	Start of procedure that scans an IF modal command.
	MODALSET	RIMS	dump	Start of procedure that scans a SET modal command.
	MODLELSE	RIME	dump	Start of procedure that scans an ELSE modal command.
	MORSPACE	RIMC	dump	Start of procedure that scans an FDT space for a list of constants.
	NAMESCAN	RINS	dump	Start of procedure that checks data set names.
	NEEDNOTS	RINN	dump	Start of procedure that checks the input command for conflicting or missing parameters.
	PACKCVB	RIPC	dump	Start of procedure that converts a decimal constant into a binary fullword.
	POSPARM	RIPP	dump	Start of procedure that scans a positional parameter.
	SCANCMD	RISC	dump	Start of procedure that scans the input command parameters.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCRI01 (Continued)	SCANENDS	RISE	dump	Start of procedure that checks the input record for a continuation delimiter and determines the scanning limits of the record.
	SETDFLT	RIST	dump	Start of procedure that puts P defaults in the FDT.
	SETFLAG	RISF	dump	Start of procedure that notes the occurrence of a parameter in the FDT.
	SKIPCMD	RISK	dump	Start of procedure that bypasses the remainder of a function command.
IDCRI02	IDCRI02	RISD	dump	Start of module that prepares to scan a command parameter set.
IDCRI03	IDCRI03	RITM	dump	Start of module that performs command termination functions.
IDCRM01	CPLPROC	RMCL	dump	After the CPL has been built.
	CTLGPROC	RMZZ	dump	Before and after the UCATLG in CTLGPROC.
	DELTPROC	RMDC	dump	After the first UCATLG in DELTPROC.
		RMDD	dump	After the second UCATLG in DELTPROC.
	IDCRM01	RMFN	dump	Termination of IDCRM01.
IDCRP01	IDCRP01	RP01	dump	End of REPRO FSR.
	CATRELOD	RPD1	dump	At the end of all reload error checking before any updates have been done to the target catalog.
	CNVRTCI	RPCI	selected areas 6	On exit from procedure that translates control interval numbers on the backup catalog.
	DUMPIT	RPIO	selected areas 7	After read or write to backup or target catalog.
	TRUENAME	RPTU	selected areas 8	On exit from procedure having built truename range table.
IDCRS01	CATINIT	RSC1	dump	End of procedure that builds CIN to RRN table.
	COPYCAT	RSC2	dump	End of procedure that copies the catalog to the workfile.
	CLEANUP	RSC3	dump	Before freeing the resources used by RESETCAT.
	ENSURECI	RSE2	dump	At start of procedure prior to ensuring enough free control intervals
	INIT	RSI1	dump	End of procedure that initializes data area and obtains resources.
	MERGECRA	RSM1	dump	End of procedure that merges and resets CRA into the workfile.
	PROCCRA	RSP1	dump	End of procedure that merges the records of a reset CRA into the workfile.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCRS01 (continued)	REASSIGN	RSR1	dump	End of procedure that assigns new control interval numbers to records on the reassign chain.
	UPDCAT	RSU1	dump	End of procedure that updates the catalog from the workfile.
	UPDCRA	RSU2	dump	End of procedure that updates the CRA from the workfile.
	IDSCR01	RS00	dump	End of RESETCAT FSR.
IDCRS02	ASSOC	RSA1	dump	End of procedure that ititiates association checking.
	PROCTYPE	RSP3	dump	After processing a set of records for associations.
	PROCCI	RSP4	dump	End of procedure that ensures that a contol interval number is in the list of control interval numbers.
	SETCI	RSS2	dump	End of procedure that updates the workfile records from the associations tables.
	VERDSDIR	RSV2	dump	After verifying initial space claims.
	VERCI	RSV3	dump	After verifying associations on a set of records.
IDCRS03	GETVIA	RSG1	dump	End of procedure that locates records in the workfile.
	PROCVOL	RSP2	dump	Before freeing resources used by PROCVOL routine.
	SETBITS	RSS3	dump	At end of procedure that sets up a single bit map.
	VOLCHK	RSV1	dump	End of procedure that checks Format 1 DSCBs against space headers.
	VERB	RSV4	dump	Before freeing resources used by procedure which verifies GDG data sets.
IDCRS04	DELGO	RSD3	dump	End of procedure that deletes a group occurrence.
	FIND	RSF1	dump	End of routine that finds one or all group occurrences.
	MODGO	RSM2	dump	End of procedure that modifies a group occurrence.
IDCRS05	ADDUPCR	RSA2	dump	End of procedure that prepares for update CRA processing.
	BLDVLST	RSB1	dump	End of procedure that adds an entry to the volume serial table.
	BLDRLST	RSB2	dump	End of procedure that adds an entry to the reset volume table.
	CKERR	RSC4	dump	Before RESETCAT terminates due to an error.
	ENTNMCK	RSE1	dump	End of procedure that determines if a record has a true name.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	Procedure	Dump Point	Type	Situation at Dump Point
IDCRS05 (Continued)	SCNVLST	RSS5	dump	End of procedure that locates an entry in the volume serial table.
	SCNRLST	RSS6	dump	End of procedure that locates an entry in the reset volume table.
IDCRS06	DSOPEN	RSD1	dump	End of procedure that opens a VSAM file.
	DSCLOSE	RSD2	dump	End of procedure that closes a VSAM file.
	RECMGMT	RSR2	dump	End of procedure that performs all I/O requests.
	WFDEF	RSW2	dump	Before the UCATLG work area is freed.
	WFDEL	RSW3	dump	End of procedure that deletes the workfile.
IDCRS07	CATEOV	RSC7	dump	At conclusion of routine that extends the catalog.
	DADSM	RSD4	dump	At conclusion of routine that processes all DADSM functions.
	RENAMEP	RSR4	dump	Before freeing resources used by the RENAMEP procedure.
IDCSA01	SAABT	SAAB	dump	In UABORT routine, when a dump is not to be printed for a "no space available" condition.
IDCSA02	IDCSA02	ZZCA	dump	Before and after CATLG macro is issued to invoke catalog management routines.
IDCTP01	CONVERT	TP2I	dump	Start of procedure that converts data to a printable form.
		TP2N	dump	End of procedure that converts data to a printable form.
	ERROR	TPER	dump	Start of procedure that prints a text processor error message.
	IDCTPPR	TPS1	dump	After initialization of text processor parameters.
		TPIN	dump	At end of phase; the format structure for a UPRINT macro has been processed.
	LINPRT	TP3I	dump	Start of procedure that formats pages and prints titles, headings, footings, and other lines requested.
		TP3N	dump	End of procedure that prints lines.
IDCTP04	ESTACONT	TP4A	dump	End of procedure that processes the UESTA macro.
	ESTSCONT	TP4S	dump	End of procedure that processes the UESTS macro.
	RESTCONT	TP4R	dump	End of procedure that processes the UREST macro.
IDCTP06	IDCTP06	TPEA	dump	Start of UERROR procedure.
		TPEB	dump	Before a converted UERROR message is printed.

Phase or CSECT to Dump Points Cross Reference

Phase or CSECT	**Procedure**	**Dump Point**	**Type**	**Situation at Dump Point**
IDCTP05	IDCTP05	TP5I	dump	Start of phase that loads the static text phase.
		TP5N	dump	Start of phase that loads the static text phase.
IDCVY01	IDCVY01	VYBG	dump	Start of VERIFY FSR.
		VYND	dump	End of VERIFY FSR.
IDCXP01	IDCXP01	XPFN	dump	End of EXPORT FSR, before data sets are closed and space freed.
		XP01	dump	Start of EXPORT FSR.
	CTLGPROC	XPZZ	dump	After calling the catalog to locate, alter, or delete an entry.
	DELTPROC	XPZY	dump	Just after the UCATLG macro.
	MORESP	XPZX	dump	Just after the UCATLG macro.

Selected Area Footnotes:

The following list describes the selected areas pointed at the specified dump points. On the printed output, the area title precedes each area dumped.

Dump Point	**Area Title**	**Area Description**
1. LCMG	ERRDARG	Text processor argument list (DARGLIST) used for printing messages
2. LCTP	DARGLIST	Text processor argument list (DARGLIST) used for printing the catalog area
3. LCAL	CATRC	VSAM catalog return code
	CTGENT	VSAM locate key (either the entryname or the CI number)
	CTGPSWD	User supplied password
	CTGPL	VSAM catalog parameter list
	CTGFL array FPL (1) . . . FPL (nn)	VSAM field parameter list. Note: The number of FPLs (nn) varies with the amount of catalog information requested (i.e., NAME, HISTORY, VOL, etc.)
	MULTIFPL	VSAM field parameter list if a special function FPL is required
4. LCBL	Same as LCAL	
5. LCWA	CTGWKAPT	Workarea address of VSAM returned cataloged fields
	CTGWKA array WKA (1) WKAEND	VSAM returned catalog fields Note: This workarea is dumped as an array of 256 byte blocks and the last block less than 256 bytes is indicated as WKAEND.
6. RPCI	OLDCI#	CI number of backup catalog record to be converted
	NEWCI#	Converted CI number in the target catalog (i.e., OLDCI# converted to NEWCI#)

Dump Point	Area Title	Area Description
7. RPIO	DLOUTREC	A record in the high key range of the target catalog which was deleted because it did not exist in the backup catalog
	FUPOTREC	A record in the low key range of the target catalog which was converted to a free record because it did not exist in the backup catalog
	INSOTREC	A record which was inserted into the target catalog because it existed in the backup catalog but not in the target catalog
	UPOUTREC	A record which was used to update the target catalog because the same record existed in both the backup and the target catalogs
	RDCCREC	Catalog control record of the target catalog before it was updated
	UPCCREC	Catalog control record of the target catalog after it was updated with results of the reload operation
	RDINPREC	A record from the backup catalog before any action is taken
	RDOUTREC	A record from the target catalog before any action is taken
	2ND-HALF	The second half of the record printed just above
8. RPTU	SORSTABL	A table which maps the extents of the high key range of the backup catalog. Each entry maps one extent and contains: Word 1 - High RBA of the extent Word 2 - Number of CI's in the extent The table is used to convert a CI number in the backup catalog to the appropriate CI number for the target catalog (see 'RPCI' above).
	TARGTABL	Same as SORSTABL for the target catalog

ABORT Codes

Whenever an unrecoverable error is detected by the processor, the routine that detects the error issues a UABORT macro. The System Adapter then issues message IDC4999I on SYSLST giving the ABORT code and, with the exception of code 28 and code 68, produces a full partition PDUMP with the ABORT code in register 15; the ABORT code indicates the type of error that occurred.

The following list identifies the ABORT codes set by the processor and the phase or CSECT and procedure that sets each ABORT code. The list also explains the situation that caused the ABORT condition.

ABORT Codes

ABORT Code	Phase or CSECT	Procedure	Situation that Caused ABORT
24(18)	IDCTP01	IDCTP01	The pointer to the Print Control Table in the GDT is not set.
	IDCTP04	IDCTP04	The pointer to the Print Control Table in the GDT is not set.
28(1C)	IDCIO01	IDCIOIT	Storage was not available for the I/O Adapter historical area and message area.
	IDCIO02	BLDOCMSG	A message that sufficient storage was not avilable could not be issued because the SYSLST data set is not open.
		BUILDDBK	Storage was not available to load the phase that contains the DTF and access method routines (IDCDIxx).
	IDCSA01	GETCORE	Storage was not available for the automatic storage required for IDCSA02, IDCSA03, IDCIO01, or IDCTP01.
	IDCSA02	IDCSA02	The CDLOAD Anchor Table was full and storage was not available to load the phase requested by a UCALL or ULOAD macro.
	IDCSA02	IDCSA02	The CDLOAD Anchor Table was not full but storage was not available for CDLOAD to load the phase.
	IDCSA03	GETCORE	Storage was not available for the automatic storage required by a phase.
	IDCTP01	LINEPRT	Storage not available for new header line.
	IDCTP01	ERROR	Storage not available to save Conversion Table (CVPSTRU).
	IDCTP05	IDCTP05	Storage not available for static text entry.
	IDCTP04	ESTSCONT	Storage not available for Print Line Stack Buffer.
	IDCTP04	PCTSETUP	Storage not available for Print Chain Translate Table.
	IDCTP04	PCTSETUP	Storage not available for primary or secondary Print Control Table.
	IDCTP04	PCTSETUP	Storage not available for sub-title line or footing line change.
32(20)	IDCIO01	IDCIOGT	The pointer to the IOCSTR is zero, or the open flag in the IOCSTR is not set, indicating that the data set to be accessed has not been opened successfully.
		IDCIOPT	The pointer to the IOCSTR is zero, or the open flag in the IOCSTR is not set, indicating that the data set to be accessed has not been opened successfully.

ABORT Codes

ABORT Code	Phase or CSECT	Procedure	Situation that Caused ABORT
	IDCIO03	IDCIO03	The pointer to the IOCSTR is zero, or the open flag in the IOCSTR is not set, indicating that the data set to be accessed has not been opened successfully.
36(24)	IDCIO02	BLDOCMSG	The SYSLST data set could not be opened, or the SYSLST data set has already been closed and a message cannot be issued.
	IDCTP01	STACKPUT	An attempt to write to the output data set has failed.
40(28)	IDCIO01	IDCIOCL	The length of the UCLOSE argument list is invalid. The length must be greater than 1 and less than 6.
		IDCIOOP	The length of the UOPEN argument list is invalid. The length must be greater than 1 and less than 6.
		IDCIOPT	The length of the UPUT argument list is invalid. The length must be greater than 1 and less than 4.
		IDCIOSI	The length of the UIOINFO argument list is invalid. The length must be greater than three and less than 6.
	IDCSA02	IDCSA02	The argument list of a UGSPACE, UGPOOL, or UFPOOL macro is invalid.
	IDCSA05	IDCSA05	The argument list for the UTIME macro is invalid.
	IDCSA08	IDCSA08	The argument list of a UENQ is invalid.
52(34)	IDCSA02	IDCSA02	The phase to be loaded (because the CDLOAD Anchor Table is full) was not found in the Phase Table.
64(40)	IDCSA01	IDCSA01	The CDLOAD macro failed loading phase IDCSA04 which contains the Phase Table.
	IDCSA02	IDCSA02	The CDLOAD macro failed loading a phase, and the reason is not that the CDLOAD Anchor Table is full or that no storage was available for CDLOAD to load the phase.
68(44)	IDCSA01	IDCSA01	The initial GETVIS for IDCSA01's automatic storage failed.
72(48)	IDCRS05	CKERR	An internal RESETCAT error occurred. This situation should not occur in a working program.

You can find UABORT macros by examining the microfiche listings. The expansion of a UABORT macro for an ABORT code of 60 looks like this:

```
RESPECIFY(REG13,REG14,REG15) RSTD;
REG15 = 60;
REG14 = GDTABT;
REG13 = GDTABH;
GEN(BR    REG14);
RESPECIFY(REG13,REG14,REG15)UNRSTD;
```

Reading a Dump

This section describes how to find phases and data areas belonging to the processor in a full partition dump, either a PDUMP or a system dump.

PDUMPs are produced by the processor on two different occasions. If the Test option is set and the FULL keyword is specified, the processor produces as many PDUMPs as requested, at the points requested. The processor prints a message following each such PDUMP to identify the point at which the dump was produced. If an ABORT condition occurs, the processor again produces a PDUMP except in the case of ABORT conditions 28 and 68. An ABORT PDUMP can be distinguished from a system dump because there is no system error message and the ABORT dump is preceded by message IDC4999I giving the ABORT condition code.

All executable phases, CSECTs, and certain data areas belonging to the processor are preceded by an EBCDIC character string to identify it. Phases and CSECTs are preceded by their full name, for example, IDCTP01 b̸. (The date of compilation, in character form, follows the name.) Data areas are preceded by a four-byte identifier, either specific to the data area, or for the storage area in which it is built. For example, the Global Data Table is preceded by the characters GDT b̸. The FDT is built in storage owned by the Executive, and it is found in the storage areas preceded by the characters EX00.

How to Find Processor Phases

The System Adapter normally loads phases using the CDLOAD macro. Thus, you can use the Anchor Table to find where each phase has been loaded.

If, however, the Anchor Table is full, the System Adapter obtains storage for the phase to be loaded using the GETVIS macro and loads the phase into this area. You can find where these phases have been loaded from the Phase Table. The fourth word of the System Adapter historical area points to the Phase Table; however, the Phase Table normally follows the Global Data Table and the trace tables in a dump. The section "Data Areas" shows the format of the Phase Table.

Figure 11, Part 2, shows how the Phase Table appears in a dump. You can tell that no phases have been loaded using the Phase Table because all the phase addresses contain zeros.

How to Find the Module and Registers at Time of the Dump

The best way to determine which phase or CSECT caused the dump and to find the registers of that phase or CSECT varies according to the type of dump you have.

In a system dump, standard methods explained in your operating system's *Debugging Guide* should be used.

In a PDUMP caused by an ABORT condition, the last entry in the Inter-Module Trace Table identifies the phase or CSECT that issued the UABORT macro. Register 15 of the registers at the top of the dump contains the ABORT code set in the UABORT macro. Once you know the ABORT code and the phase or CSECT that issued the UABORT macro, you can use Figure 11 to determine the internal procedure that issued the UABORT macro and the situation that caused the procedure to issue the macro. The last entry in the Intra-Module Trace Table may be a trace point within the phase or CSECT that issued the UABORT macro.

The registers at the time that the UABORT macro was issued are not saved by the processor and cannot be found in a dump.

If you have a PDUMP produced at a dump point, the trace tables printed after the dump tell you at what point the dump occurred. The next to the last ID in the Inter-Module Trace Table identifies the phase or CSECT that called the dumping routine; the last ID in the Intra-Module Trace Table identifies the exact dump point at which the dump was produced. You can use the trace tables printed after the dump to trace the flow of control before the dump point. These trace tables are better to use for this purpose than the trace tables in the dump because the printed trace tables do not contain all the trace points encountered while producing the dump. The trace tables in the dump have been filled with dump-related trace points.

You can find the registers at the time the UDUMP macro was issued in the save area where IDCDB01 saved the caller's registers. Register 13 at the top of the dump points to IDCDB01's save area. The first word of this save area contains the characters DB01; the word immediately preceding the previous save area in the save area chain contains the ID of the phase or CSECT that issued the UDUMP macro.

Figure 11, Part 1 illustrates how to find the phase or CSECT that caused the dump and its registers in a PDUMP produced through the Test option. In this example, module IDCSA02 called for a dump at the dump point 'ZZCA'. Module IDCDB01 saved the registers of module IDCSA02 in the latter's save area.

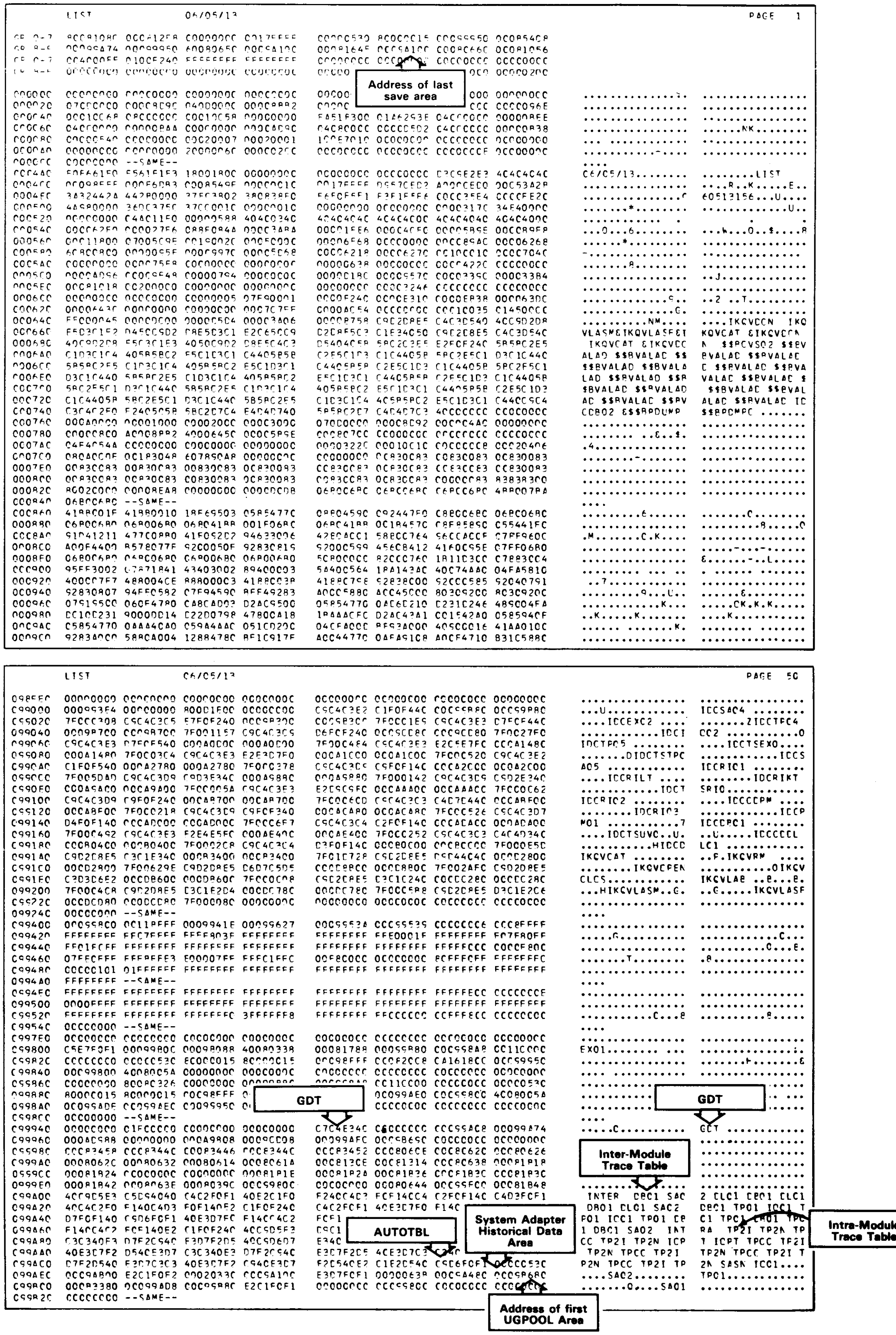


Figure 11 (Part 1 of 5). Sample Dump

```
      LIST            06/05/13                                                                          PAGE  51

C99880  C9C4C3E2 C1F0F54C C0C0000C 000003C0   C9C4C3C5 E7FCF240 00C0C000 00000250   IDCSAC5 ........  IDCEXC2 .......&
C99RA0  C9C4C3C5 E7F0F340 0000C0CC C00CC270   C5C4C3C5 D6FCF24C CCCOCOCC 0C0C2900   IDCEXC3 ........  IDCICO2 ........
C99P             :34C 0000000C 000C07F0   C9C4C3C4 C2FCF14C COC000CC CCOC04EC   IDCICC3 .......C  IDCCPC1 ........
C99E             :24C C00C0C0C CCCC09F0   C5C4C3C5 C9FCF14C CCCCCOCC 000C5FCC   IDCDPC2 .......C  IDCRIC1 ........
C99C             :240 00000000 000C0700   C9C4C3D5 C9FCF34C COCCCCCC 000005A0   IDCRIO2 ........  IDCRIO3 ........
C99C20  C9C4C3D9 C5D3F34C COOCCOCC 000C0190   C5C4C3C5 C5C2E34C CCCCCOCC 0CCCOCAC   IDCRILT ........  IDCRIKT ........
C99C40  C9C4C3E3 D7FCF440 00C0000C CC0C1190   C9C4C3E3 D7F0F54C C0000000 000004F0   IDCTPO4 ........  IDCTPO5 ........
099C60  C9C4C3E3 E2F4E5FC C0000000 000C02A0   C9C4C3E3 E2C4C3FC CCCOCCCC CCCCC25C   IDCTSUVO........  IDCTSCLC.......&
C99C80  C9C4C3E3 E2C5E7F0 C000000C 00000400   C9C4C3E3 E2E3D7F0 C000CCC0 0C0000C0C   IDCTSEXO........  IDCTSTPC........
099CA0  C9C4C3E3 E2C3C3FC 000C0000 C00C12AC   C5C4C3E3 E2C3C3F1 CCCCCCCC 000004AC   IDCTSLCO........  IDCTSLC1........
099CCC  C9C4C3E3 E2D4D7F0 C0000000 00000590   C9C4C3E3 E2E7D7FC C000000C 0000028C   IDCTSMPO........  IDCTSXPO........
C99CE0  C9C4C3E3 E2E3D7F1 C000C00C 0CCC01E0   C9C4C3E3 E2C7C9FC CCCCCCCC 0C0C0460   IDCTSTP1........  IDCTSPRC.......-
099D00  C9C4C3E3 E2C9D6FC C0000000 00CC070C   C5C4C3E3 E2D9C5FC CCCOCOCC 0CCCOCRO   IDCTSICO........  IDCTSRIC........
C99D20  C9C4C3E3 E2C1D3F0 COCOCOOC 000C01C0   C9C4C3E3 E2C4C5FC COCCCCCC 0CCCC60C   IDCTSALO........  IDCTSDEC........
C99D40  C9C4C3C3 C4C4D340 0000000C 0CCC0320   C9C4C3C3 C4C4C540 COCCCCC0 000022CC   IDCCCDL ........  IDCCCDE ........
099D60  C9C4C3C3 C4D7C940 00000000 C00C04D0   C5C4C3C3 C4C9C74C CCCCCCCC 0C0C071C   IDCCDPR ........  IDCCCRF ........
099D80  C9C4C3C3 C4D7D44C 00000000 00000270   C9C4C3C3 C4C1D34C 0CC000C0 000006F0   IDCCDPM ........  IDCCCAL .......C
C99DA0  C9C4C3C3 C4E7D74C 00000000 00000370   C5C4C3C3 C4C4C74C CCCOCCC0 0000042C   IDCCCXF ........  IDCCCMP ........
099DC0  C9C4C3C3 C4E5E840 0000000C 00000100   C9C4C3C3 C4C3C34C CCCOCOC0 0000028C   IDCCDVY ........  IDCCCLC ........
C99DE0  C9C4C3C4 C5FCF14C C00C00CC 0CCC47FC   C9C4C3C3 C3FCF14C CCCOCCCC 0C0C490C   IDCDEC1 .......C  IDCLCC1 ........
C99E00  C9C4C3C4 D3FCF140 00000000 0C0C0EB0   C5C4C3C7 D5FCF140 CCCCCCCC C0000BAC   IDCDLC1 ........  IDCPRO1 ........
C99E20  C9C4C3D9 D7FCF140 C000000C 00000B00   C9C4C3E7 C7FCF140 COCCCCCC 0C0C200C   IDCRPC1 ........  IDCXFC1 ........
099E40  C9C4C3D4 D7FCF140 000000CC C0CC3700   C9C4C3C1 D3FCF140 0CCCC0CC 0C001960   IDCMPC1 ........  IDCALO1 .......-
099E60  C9C4C3D7 D4F0F140 00000000 C0000750   C5C4C3E5 E8FCF14C CCCOCCCC CCCC03EC   IDCPMO1 .......&  IDCVYO1 ........
C99E8C  F0F0F0F0 F0F0F0FC C00C0000 0000000C   0000000C 0CC00C0C CCCCCOC0 00000000   00000000........  ................
099EA0  0000CC00 --SAME--                                                              ....
C99F0C  00C000C0 000E0408 0000000C 0000C03C   0C00C0CC 0CCCCCCC CCCCCCCC CCCC0000   ................  ................
C99F20  0C000000 --SAME--                                                              ....
C99F6C  00000000 A0081444 0009SAC8 00C99B8C   0CC99FAE CCC9555C CCC812C7 0008115C   ...........C....  ........&...P...*
099F80  00095AE4 0009A050 0000000?2 00081193   00099950 000B0660 00C95FC0 4008134C   ...U...&........  ...&........ ...
C99FA0  0009A048 0C09A050 0009A048 0C09A05C   C000CC18 0C000C02 COCOCCCC 00000000   .......&.......&  ................
C99FCC  00C0C000 --SAME--                                                              ....
C99FE0  00C00C00 0C0C0000 C000000C 0000000C   0009A7E0 0C0COCOC CCCCCCCC CCCC000C   ................  ................
09A000  0C00000C 000000C0 C0000000 0000000C   CCCOCCCC CCCCCCOC CCCCCOC0 C000000C   ................  ................
                                                                                       ....
                  338 00CE0408   CCCEC7CC 0CC9A7C8 C4C2FCF1 40E2C1FC   ................  .......CDBC1 SAC
                  140 C4D3F0F1   4CC4C2FC F14CC4D3 FCF140E2 C1F0F240   2 DLC1 DBO1 CLC1   CPC1 CLO1 SAO2
                  3C6 FCF140E3   C7F0F14C C5C6FCF1 40E3D7FC F14CC4C2   CPC1 TPO1 ICC1 T  FC1 ICC1 TPO1 CB
                  )F1 40E3D7FC   F14CC4C2 FCF14000 E2C1FCF2 0C0AD990   C1 TPO1 CBO1 TPO  1 CBC1 .SAO2..R.
                  390 80000015   00098FFF 0CC81193 COC9555C 6CC8065C   .......-........  ...........&-..&
C9A0E0  000E0408 0008164F C0000000 00000000   0C000000 0C000000 COCOCOCC 0C000000   ................  ................
C9A100  C4C2FCF1 CCCB1A88 C00EC4C8 6CC80FC8   CCCACACC CCC99P8C COC9A1E8 0C0000CC   CPC1.......-..C  ...........Y....
C9A120  0C000000 000B1C60 000B089C 80000015   C0098FFF 0C081193 COC99950 7CC8065C   .......-........  ...........&...&
C9A14C  0CC9A1C0 0C08164F C0000000 0CCC0C0C   COCOCCCC C000CC00 0CCCCCCC 0C000000   ................  ................
09A160  00000000 --SAME--                                                              ....
C9A1AC  8008CD1A C000000C C00C00F4 0009A1E8   0C080752 0C000CE4 COC8C8CC CCC8089C   ...........4...Y  .......L........
C9A1C0  00099950 0C0A7C17 000812DC 00C99950   60C80650 0009A10C 0008164F 0009A2B4   ...&...........&  -..&............
C9A1EC  0CC9A280 000812CC 00095950 80081193   BCC9A2PE CCCA2361 EC09C752 8CC9A2CC   ............&....  ......./..G.....
C9A20C  COCOC000 --SAME--                                                              ....
09A24C  00C8C9D8 0C08C9EC C000C000 0000000C   CCC00CCC CCCCOCCC COCOCOCC 0CC0000C   ...Q............  ................
C9A26C  00000000 --SAME--                                                              ....
C9A28C  CCCCCCE0 CCCCCCCC CC00C000 0000000C   COCOCCC0 CC000C0C CCCCCCC0 00C81CEC   ................  ................
09A2A0  800ACF1B 000AF77E 800A8575 000B088C   000BC890 0CC00CE4 COCOC000 00000C00   ......7.........  .......U........
C9A2CC  03D9C9E3 D440E2C1 C6D740D9 C9E9F94C   E2C1C4C5 4CC5E7F1 C64CC5E7 C6E24CE2   .RITM SAFP RIS9   SADE EXIF EXFS S
```

Phase Table

Save area where DB01 saved caller's registers (SA02); registers are those of CSECT that called for dump

```
      LIST            C6/05/13                                                                          PAGE  53

C9AD A0  0000C000 --SAME--                                                              ....
C9AF0C  00C000C0 CCOCCCOC CC00000C 0C0C0000   CCCOCOCC 0C099950 COC832EC 8CC9AEF6   ................  ........&.......6
09AE20  000832DC 800832D6 C07900CC C00C000C   00C00CCC 0CCCCCOC COCOCOCC 0000000C   .......C........  ................
C9AE4C  CCCCC0C0 --SAME--                                                              ....
C9AE6C  00000C0C C0C0C0CC C009A7D8 000SA7EC   CCCOCOCC 0CCCOCOC CCCOCCCC 0C0000OC   ..........O.....  ................
C9AE80  00000000 00000000 0000000C 000C000C   C0000CCC 0CC9FC94 8CCA96CC 0CCC000C   ................  ................
C9AEAC  0C0COCOC CCCCOCCC C000C000 00C0000C   0CC9AF88 CCCCCCCC CCCCCCCC CCCC000C   ................  ................
C9AEC0  C0C0C000 0C790CC0 C000C044 000C0C0C   CCC9AA66 CCCCOCCC CCCOOCCC 0C00000C   ................  ................
C9AEE0  00000000 00000000 00000000 C000000C   0CCOCCCC 0CCOCCOC CCCCCCCC 0CCCC4D3   ................  ...............DL
C9AF00  D3C34CC4 D3E5D340 E2C1C3C1 40E9E9C3   C14CE9E9 C3C14CC4 C3E5C340 C4D3D7C3   LC CLVL SACA ZZC  A ZZCA CLVL CLPC
09AF20  40C4C3C2 C340C4C3 C3E340C4 D3E5E24C   E2C1C3C1 4CE9E9C3 C14CE3D7 C3C34CE3    CLBC CLCT CLVS   SACA ZZCA TPCC T
09AF40  D7F2C940 E3D7F2D5 40E3C7C3 C34CE3C7   F2C940E3 C7F2C540 C9C6C7E3 4CCCOCCC   P2I TP2N TPCC TP  2I TP2N ICPT ...
09AF60  01000100 800A                 0C0C   0CCCOCC0 00000000 COCCCOCC 0COCOCOC   ................  ................
09AF80  000C0CC0 000C                 0000C   C9C6FCCC CCCOOCCC COCOCCCC CCCCOCCC   ................  ICC.............
C9AFAC  CCCCC000 --SA                                                              ....
09AFE0  00CCCCC0 CCCC                 0C0C   0C000CC0 CCCCOCCC CCCCCCC0 CC0000CC   ................  ................
C9B00C  00000000 000C                 0000   0000000C 0COCOCOC 0CC000CC 0CC0000C   ................  ................
09B02C  CCCCCCC0 --SAME--                                                              ....
C9B080  0000024F C5E7F0F1 C4D3F0F1 0CC9980C   CC0B1A88 4CCE19FE CCCBCCCC 00C99P8C   ....EXC1DLC1....  .... ...........
09B0AC  0C098190 00000000 C0000000 00000530   8C000C15 8C000015 COC98FFF 0CC820C8   ................  ...............H
C9BCC0  0A161BCC CCC9955C CC098088 40C817A4   00C99950 CCCCOCCC COCOCCCC 000C0C0C   .......&.... ...  ...&............
09B0                                COC9B18C   C00C0CC0 0C081A9C COCCC53C 8C0C0C15   ................  ................
C9B1                                CA161                    9B088 40C817A4 CCCCOCCC   ...........F....  ...&... ........
09B1                                CCCC0                    9B18C CCC00000 0C00000C   ................  ................
C9B1                                00098                    618CC CCCCCCCC CCC9BC88   ................  ...F............
09B1                                0000C                    0000C COC99B80 0009B1BC   ................  ...F............
C9B180  00000CC0 00000000 0000053C 800CCC15   8C0C0C15 0CC98FFF CCC82CC8 CA1618CC   ................  ...........F....
C9B1A0  00000000 0009B088 400817A4 00099950   00099950 000B081C B0C9B262 00C9B26C   ........ ......&  ...&...........-
09B1C0  0009B262 B009B2C7 0C00000C 0CCC003C   CC000CC0 CC000000 CCC000C0 0C0000CC   .......G........  ................
C9B1EC  00C00000 --SAME--                                                              ....
C9B240  00C0C0C0 000C0000 C0000000 0000000C   0CCCC                    :81C CCCCOCOC   ................  ................
09B260  00C0C0C0 0C0000D9 C9D7D740 D9C9E2C6   40D9C                    40C9 C9F4F94C   .......RIPP RISF   RI11 RI12 RI49
09B280  E2C1C7D7 40D9C9F1 F240D9C9 F4F94CC9   C9FCF14C D9C9C4C6 40D9C9F3 F74CD9C9   SAGP RI12 RI49 R  IO1 RIDF RI37 RI
C9B2AC  F4F440D9 C9F2C64C D9C9D5D5 40E2C1C3   D340C9C9 E3C440E2 C1C6D740 D9C9F9F9   44 RISF RINN SAC  L RITM SAFP RI99
09B2C0  40E2C1C4 C5408CC9 C4C3C4D3 F0F1400C   0000C0C0 0CCCCCCC CCCCCOCC 0C0000CC    SADE .IDCCLO1 .  ................
C9B2FC  CCOCCC00 --SAME--                                                              ....
C9B300  47F0F016 10C9C4C3 C5E7F0F2 404040F7   F34BFCF1 FCCC9CEC COCCC5CC 580CC174   .CC..IDCEX02   7  3.010.........A.
C9B320  58F10000 58FF0060 070041EC C01C051F   0009B49E CCC9B49C 18B15CDC 8CC49801   .1....-.........  ..........&.....
C9B340  0C1450B0 0C0818DB C700B05B B05BC203   BC481CC0 1BAA4CA0 B0F445EC C0E458AC   ..&.....P.....K.  ...... ..4...U..
09B360  B04850A0 B04C413C BCE8503C B05C413C   BCEC503C BC54928C BC5458FC AC6C411C   ..&......Y&..&..  ..&........O....
09B380  B04CC5EF D207B050 C16858A0 B04850A0   B04C58FC A034411C BC4CC5EF 1222478C   ....K..&A.....&.  ...C............
C9B3AC  C0BAC201 B158C17C 5020B15C 58A0B048   50A0BC4C 41FCC170 50FCB050 41F0B158   ..K...A.&..*....  &....CA.&C.&.C..
09B3C0  50F0B054 92B0B054 58F0A03C 411CBC4C   C5EF4CFC BCF458AC BC4850AC B04C41FC   &C.......O......  .. O.4....&....O
C9B3EC  C18250F0 BC5C41F0 B0F450FC B054928C   BC5458FC A064411C B04CC5EF 47F0C152   A.&O.&.O.4&O....  ...O.........OA.
C9B400  9CE1D0CC 9C3CD020 58A0B048 5830AC0C   D25EBCF9 3005C25E 30C0BCF9 D203305F   ................  K..S..K....SK...
09B420  C17E1B33 5030B0EB 5030BCEC 18235BA0   A0C419A3 47ECC144 918CA0CC 4710C144   A...&..Y&.......  .......A.......A.
09B44C  D203B0E8 A0C4918C A0044710 C144582C   A0C8918C AC08471C C144C2C3 BCECACOC   K..Y........A...  ........A.K.....
09B460  98E1C90C 983CDC2C C7FE47FC C14458DC   D0C458CC C17418 1B 411100C0 CA0A98EC   ...........OA...  ....A...........
C9B480  C00CC7FE 0009848C 0009B4A4 00000C0C   C00CC16C 0CCCCCCC D7C5C5E7 F2E2C5E7   ................  ...-....PNEX2SEX
09B4AC  F0F20000 C5E7FC01 C0C0C00C 00000000   00C0C000 0CC000C0 COCOCC00 00000000   02..EXC.........  ................
C9B4C0  0C000C00 00000000 00C00000 C00CCCCC   CCCCCCCC CCCCCCCC COCCC1C3 D3C6D6C9   ................  ..........ALLFCR
C9B4E0  D4C203D5 D2E9C5D9 C6000000 00000000   0C00C000 00000C0C COCOCCCC 0CCC000C   MBLNKZERC.......  ................
C9B5C0  00000168 C5E7FCF2 E3D7F0F1 CCC9BC88   C0C99FCC 7CC9839C COC8344C 00C99B8C   ....EXC2TPC1....  ........... ....
09B520  0C09B554 00000000 0009B5F4 000C053C   8C0C0C15 8CCC0C15 CCC98FFF 0CC820C8   ...........4....  ...............H
```

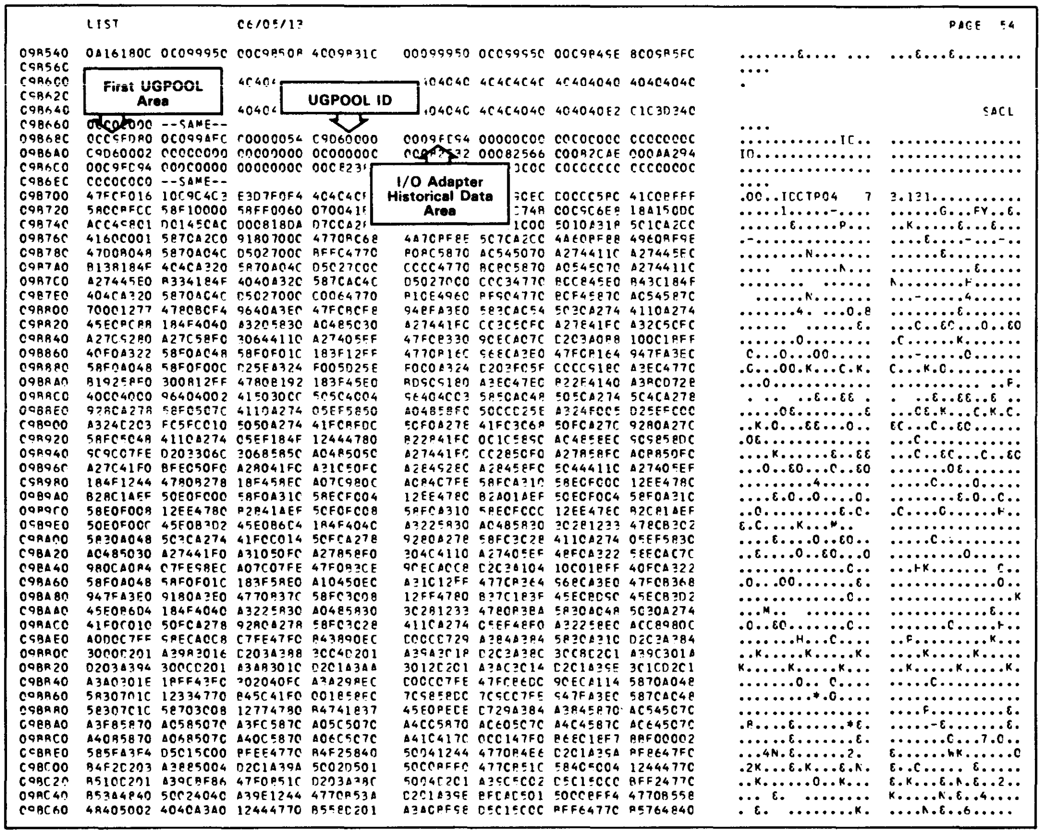
Save area where DL01 saved EX01's registers

Address of parameter list; second word in list contains address of FDT

Parameter List from IDCEX01

Address of FDT

Figure 11 (Part 2 of 5). Sample Dump



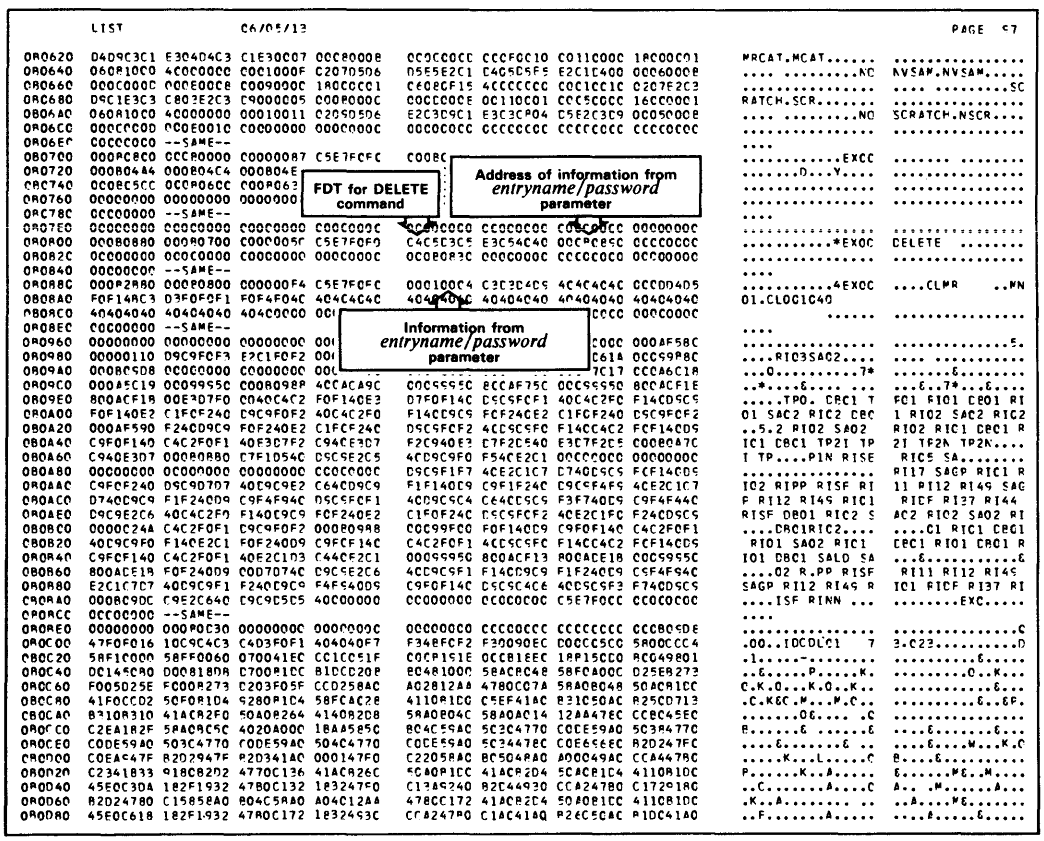


Figure 11 (Part 3 of 5). Sample Dump

```
        LIST             06/05/13                                                                                 PAGE  99

0B1460   47B0C850 58A0B264 92D4A012 58A0BC4C   58A0A040 12AA478C C8665BA0 B26492C1    ..H&.....M......   ... ....F......A
0B1480   AC125BA0 B04C5BA0 A03412AA 4780C87C   58A0B264 92F5AC12 59A0BC4C 58ACAC1C    ..............H.   .....V..........
0B14A0   12AA4780 C8925BA0 B2649620 AC011BAA   5BFCBC4C 59A0FC48 477CC8BC 59ACF04C    ....F...........   .C....C...H...C
0B14C0   4780C8BC 58A0B264 96024001 58ACBC4C   58ACAC24 12AA4780 C8C65BA0 B2649644    ..H.............   ........FF.....
0B14E0   AC015BA0 BC4C5BA0 A02B12AA 4780C8DC   58A0B264 96C4AC01 1BAA5BFC BC4C59AC    ..............F.   ...........0....
0B1500   F0144770 C5985BE0 B2649602 E00C58FC   FC1019FA 47ECC9C4 41A0F016 50ACE0C8    0...I..........0   C.....I...C.&...
0B1520   47FCC918 58ACB238 41A0A018 581CB264   5CA01CC8 58ACBC4C 58ACAC1C 12AA478C    .CI.............   &...............
0B1540   C93C48F0 A00012FF 4780C93C 41A0A002   5B10B264 50AC1C18 58ACB264 41FCB328    I..C......I.....   ....&........C..
0B1560   50F0A00C 58F0BC4C 5810F00B 48FC1C0C   45F0CC9F 47CCC962 D21BB4CC AC0C47FC    &0...C....C..0..   .C....I.K......0
0B1580   C97C5BA0 B264D21B A000B40C 58A0B04C   58F0AC34 12FF4780 C9B4C72A B410B41C    I.....K.........   .C.......I.P.....
0B15A0   9200B41C 58FCB13B 48F0F00C 4CFCCCA6   58A0A0C8 1EAF5EAC CCB8D205 B41CA0CC    .....C...CC..C..   ...........K.....
0B15C0   41A0B41C 5810B264 50A01004 47FCC9D8   58A0B13B 4EACAC0C 4CA0CCA6 58FCBC4C    ........&....0IC   .............0..
0B15E0   5810FC08 5E1CCCB8 41AA100C 5810B264   5CA01CC4 1EAA5BFC B2645EAC FC1E477C    ..0.............   &......C....C...
0B1600   CA165BF0 B13B48EC E0004CE0 CCA65B90   BC4C5B9C 5CCB411E 50CC5E10 CCAC49AC    ................   ................
0B1620   10004780 CA165E90 CCB041AE 90005040   FC1B91B0 B2C2477C CA465BAC B2645BFC    ..............&.   C.....K.........0
0B1640   B13CD200 AC12F00C 58F0B04C 5BECF04B   12EE4770 CA4695C1 F0CC4770 CA469602    ..K...C.........   ........AC.......
0B1660   A0019BEC D00C07FE 47F0CC1C 90ECB14C   5BA0BC4E 58FCACCC D25FB273 FCC5D25E    ..........0......   ......0..K...C.K.
0B168C   F000B273 D203F05F CCFED78A B328B328   D2C1B328 CCA85BAC A02B12AA 47BCCAA2    C...K.C....P.....   K...............
0B16A0   58A0B048 50ACB1D0 41FCCCF2 50FCB1D4   92B0B1C4 58F0AC2B 4110B1D0 C5EF5BAC    ....&.....C.2&C.M   ...M.C..........
0B16C0   B0485CA0 B1D041F0 B26450FC B1D458FC   A0944110 B1CCC5EF 40FCB27C 58ACBC48    ..&....0..&C.M.C   ........ 0......
0B16E0   58A0A028 12AA478C CAFC5BA0 BC4850AC   B1D041F0 CCF250FC B1C492EC B1D458FC    ..............&.   ...0.2&C.M...M.0
0B1700   AC284110 B1D005FF 48A0B27C 12AA4780   CB6A49AC CCAA477C CB2C5BAC B2504130    ................   .............&..
0B172C   B41C5030 A000D201 A00CCC9F D202A00B   CCCC92C5 ACCB1B22 47FCCB4C 58ACB25C    ..&...K......K...   ..........0. ...&
0B1740   413CB270 5C3CA0CC D2C1A00C CC9AD202   A0C8CCCF 9207A00B 41200008 58A0B048    ....&...K......K.   ................
0B1760   50ACB1D0 4130CCBC 5030B1D4 413CB250   5C3CB1D8 52ECB1D8 58FCAC30 411CB1DC    &........&..M...&   &..C...C.C......
0B1780   05EF47F0 CB6C1B22 48A0B32A 12AA4780   CBFE180A 4BCCCC9C 8ECC002C 5CCCCCCC    ...0............   ................
0B17A0   1B415BA0 B25CD202 AC0BCCCC 9201AC0B   4130C0C1 47FCCBFB 58A0B250 1B534C5C    .....&K.........   ......0.8...&...&
0B17C0   CCC241F5 B2FF50F0 A0004115 B2FF5EF5   1CC0477C CBC4D201 A0CCCCAC 47F0CBCE    .P.5..&0.......V   .....DK.......0..
0B17E0   58ACB250 D2C1ACOC CCC25BAC BC4850A0   B1C0415C CCBC5C50 B1C4415C B25C5C5C    ...&K....B....&.   ...&..&&.M.&.&&&
0B1800   B1DB9280 B1DB5BF0 A03C4110 B1DC05FF   4A3CCC9B 193447CC CB9C1BF2 58F0B14C    .C...0.0........   ...........2....
0B1820   980CB154 07FE98EC B14C07FE 47FCCC92   90ECB154 58ACBC4E 58FCACCC D25EB273    .............C..   ..........0..K...
0B1840   FC05D25E FC00B273 D2C3F05F CCF65BF0   B04C5BFC F01412FF 47BCCC70 5CACB1DC    0.K.C...K.C..6.C   ...CC........&...
0B1860   413CB238 503CB1D4 92B0B1D4 58FCACBC   4110B1CC C5EF1F2F 12224780 CC7C41FC    ....&..M...M.C..   ................0
0B1880   0C045BE0 B1949B0C B19C07FF 1BFF5BF0   B1945BCC B19CC7FE 58FCB194 07FE5BDC    ................   ................
0B18AC   D0C45B00 CCC41B1B 41110000 CA0A98EC   D00CC7FE CCC10C02 CCC4CCC6 CC070008    .....C..........   ................
0B[ 8-byte header      ]B00A0 FFFFFFCA FFFFFFCC   FFFFFFC4 FFFFFFD6 C0CCC000 CCCC0C2D    ................   ...M...C........
0B[ for IDCDL01's      ]:11(  [ Save area where ]4D3   C2C7C4C3 C5C4C4C3 D6C7C4C3 C3C3C4D3    ...../..DLCUVCCL   BGCLNDCLCFCLLCCL
0B[ automatic          ]3C:   [ SA02 saved      ]4D3   E5F2C4C3 C3C3C5C5 E3E8C7C5 4040C4C3    VLDLPCDLBCDLCTDL   VSDLCLENTYPE  CL
0B[ storage area       ]00(   [ DL01's registers]00C   00C00000 00CC0C0C CCCCCCCC 0CCC000C    C1..............   ................
0B                      AM!                                                                 ....
0B                      00(                     1D3   D3C6C6C9 C4C2C3C5 C2E9C5C9 D600000C    ..............AL   LFCRMBLNKZERC...
0B1A6C   000CC000 --SAME--                                                                  ....
0B1A80   CCCCC450 C4D3F0F1 F2C1F0F2 000980B8   C0C9A1CC 7C0B16C8 C0CBC63E 0C099B8C    ...&DLC1SAC2....   .......C........
0B1AA0   000B1C58 00000000 0000000C 000B1C6C   C00BC89C 8C000015 000C8FFF CCC82CC8    ..............-   ................H
0B1AC0   CA161B0C C0C9995C C00B1A88 400B0C1C   00C9995C 0CCB0B1C 80C9B262 CCCC0CCC    .......&.... ...   ...&............
0B1A                                                                                        ....
0B1B[ Address of parameter list;          ]0C0000   800BCC44 0CC000C0C CCC99B8C 0CCB1C58    ................   ................
0B1B[ second word in list points to       ]0B0890   80000015 00C98FFF C0CB2CC8 0A16180C    ...........-....   ...........H....
0B1B[ word containing address of          ]CB1CF4   CCCB1C5C CCCCCCCC CCCCCCCC C0C0000C    ...*.... ......4   ...*............
0B1B[ CTGPL                               ]0B1C58   000000CC 0CCCCC0C C0CB1D6C 000B089C    ................   ............-....
0B1B                                      0A1618CC   C0CB1C5C 000E1AB8 40CBCC1C 0CCB1C5C    ...........H....   ...*.... ......*
0B1BC0   000B1CF4 000B1D5C 0C0C0000 0000000C   CCC0000C ACCBCDB2 CCCCC000 CCC99B8C    ...4...*........   ................
0B1BE0   000B1C58 0CC0000C0 C000C0C0 000B1C6C   00CB089C 8C000C15 00C98FFF CCCE2CC8    ..............-   ................H
0B1C00   0A16180C 000B1D5C C0CB1A88 4CCBCC1C   0C0C0CCC 0CC0000C 00CCC000 0000000C    .......*.... ...   ................
```

```
        LIST             06/05/13                                                                                 PAGE 100

0B1C20   00000000 --SAME--                                                                  ....
0B1C40   00000000 00000000 0000C[ Address of ]000CC 0C0C0CCC 00C9995C 0CCB1CEC       ...............    ...........&....
0B1C60   00CC0000 --SAME--         [ CTGPL      ]                                            ....
0B1CC0   CC0CCCC0 0CCC0000 C0000000 000C0C0C   CCCCCCCC CCCCCC0C C0CB1D98 CC[ Pointer to    ] .........    ................
0B1CE0   CC000000 00000000 00000000 000B1D78   000000C0 0CC10C00 C0C0C0D9 C9[ address of    ] .........    ...........RINN
0B1D00   E2C1C3D3 40D9C9E3 D440E2C1 C6D74CD9   C9F9F94C E2C1C4C5 40C5E7F1 C6[ CTGPL         ] TM SAFP R    I99 SADE EXIF EX
0B1D20   C6E240E2 C1C3D340 C4D3C2C7 40C4D3C2   C74CC4D3 D3C34CC4 D3E5D34C E2                   CLBG CLB    G CLLC CLVL SACA
0B1D40   40E5E5C3 C140E9E9 C3C140C4 D3E5D34C   C4C3C7C3 40C4C3C2 C34CCCBC C3                   ZCA DLVL    DLFC DLBC ..C...
0B1D60   01000000 002C0100 000B1916 0C0C000C   CCCCCCC1 000B1CB4 C6CCB1CC 000B089E    ................   ................
0B1D80   0CC000C0 000B1CB0 1800C300 0000000C   000B0894 0CCB1D6C CCCCCCCC CCCCC0C0C    ..........C.....   .......-........
0B1DA0   CC0CCCC0 C0000000 0000000C 00000000   0C8BC0C0 0C0C0C[ CTGPL ]100C            ................   ................
0B1DC0   C0C00000 --SAME--                                                                  ....
0B1E00   0000C24A C4C2F0F1 0C000000 000B1A88   C0099FC8 CCCCC                  00C0    ....DBC1........   ................
0B1E20   00CC0000 --SAME--                                                                  ....
0B1E40   00000000 000C000C C0000000 0CCC000C   CCC9995C 8CCB1EEE CCCCCCCC 00099950    ................   ...&...........&
0B1E60   800ADE1B 000C0000 C0000000 0000000C   00C0C0CC CC0C0C0C 0C0C0C0C C0C0000C    ................   ................
0B1E80   C0C00000 --SAME--                                                                  ....
0B1EA0   00CB1C5C 0CC00000 C000000C CCC00000   0C00C0CC 0CCCCC0C C0CCCCCC CCCC000C    ...*............   ................
0B1EC0   C00C0000 --SAME--                                                                  ....
0B1EE0   000CCCC0 0CCB213C C0CC0CCC CCCCCC0C   CCC0CCCC CCCC0C00 C0CCCCCC 0CCB1C58    ................   ................
0B20C0   0000C24A C4C2F0F1 E3D7F0F1 0009A100   00099F00 700ADC8C C0C83458 0CC99B8C    ....DB01TP01....   ................
0B2020   0CCB205C 0CCB20E4 C0CADA00 000B1D6C   00CB1CEC 8C0CCC15 C0C98FFF CCC81193    ...*...U.......-   ................
0B2040   00099950 00099950 C00B2008 60CADA1C   00C9995C 8CC81193 8CC9A2BC 0009995C    ...&..:&....-...   ...&...........&
0B2060   8C0ACF1B 800B20E4 0040C4C2 F0F14009   C9F0F140 C4C2F0F1 40D9C9F0 F140E2C1    .......U. DBC1 R   IC1 DBC1 RI01 SA
0B2080   F0F240D9 C9F0F340 C4C2F0F1 40D9C9F0   F340E2C1 F0F240D9 C9F0F340 E2C1F0F2    C2 RIC3 DB01 RIO   3 SAC2 RIC3 SAC2
0B20A0   0CC9A1EC F34CD9C9 F0F140C5 E7F0F14C   C4C2F0F1 40C5E7F0 F140E2C1 F0F240C4    ....3 RI01 EX01    DBC1 EXC1 SA02 D
0B20C0   D3F0F140 C4C2F0F1 40D9C9F4 F940E2C1   C7D740C9 C9F1F240 D9C9F4F9 40D9C9F0    LC1 DBC1 RI49 SA   GP RI12 RI49 RIC
0B20E0   F14CD9C9 000B223C C9F3F74C D9C9F4F4   40D9C9E2 C64CD9C9 CCCCC0CC 0009A1E8    1 RI....I37 RI44    RISF RI.......Y
0B2100   0001E3D4 40E2D9C9 F0F140D9 C9C4C640   D9C9F3F7 40D9C9F4 F44CD9C9 E2C64CD9    ..TM SRIC1 RIDF    RI37 RI44 RISF R
0B2120   C9D5D540 E2C1C3D3 40D9C9E3 D440E2C1   C6D740D9 C9F9F940 E2C1C4C5 40C5E7F1    INN SACL RITM SA   FP RI99 SADE EXI
0B2140   C640C5E7 C6E240E2 C1C3D34C C4D3C2C7   40C4D3C2 C74CC4D3 D3C340C4 D3E5D34C    F EXFS SACL CLBG    CLBG CLLC CLVL
0B2160   E2C1C3C1 40E2C1F0 F240D9C9 F0F340C4   C2F0F140 D9C9F0F3 40E2C1F0 F240D9C9    SACA SA02 RIC3 D   BC1 RI03 SA02 RI
0B2180   F0F340E2 C1F0F240 D9C9F0F3 40D9C9F0   F14CC5E7 F0F14CC4 C2F0F14C C5E7F0F1    C3 SA02 RI03 RIO   1 EXC1.DB01 EX01
0B21A0   40E2C1F0 F240C4D3 F0F140C4 C2F0F14C   C4D3F0F1 40C4C2F0 F140C4D3 F0F140E2     SA02 CL01 DB01    CL01 DBC1 CLC1 S
0B21C0   C1F0F240 C4C2F0F1 40D9C9F0 F140D9C9   C4C640D9 C9F3F740 D9C9F4F4 40D9C9E2    A02 DBC1 RI01 RI   DF RI37 RI44 RIS
0B21E0   C640D9C9 D5D540E2 C1C3D340 D9C9E3D4   40E2C1C6 D740D9C9 F9F940E2 C1C4C54C    F RINN SACL RITM    SAFP RI99 SADE
0B2200   C5E7F1C6 40C5E7C6 E240E2C1 C3D340C4   D3C2C740 C4D3C2C7 40C4D3D3 C340C4D3    EXIF EXFS SACL D   LBG CLBG CLLC CL
0B2220   E5D34CF2 C1C3C14C E9E9C3C1 40C0B00C   000B21C9 0C0C0000 C5E7F00A 0C64000C    VL SACA ZZCA ...   ...I....EXC.....
0B2240   00C00000 --SAME--                                                                  ....
0B2280   C0CCC338 F2C1F0F3 C0000000 0009A48C   00000000 0CC00C0C 00CCCCCC C0C0000C    ....SAC3........   ................
0B22A0   00C000C0 --SAME--                                                                  ....
0B2380   00C00000 C00C0000 C0000338 C0CCCCCC   CCCCC0CC 0CCCCC0C CCCCCCCC 0CCC000C    ................   ................
0B23A0   0CCCC0C0 --SAME--                                                                  ....
0B2400   C000C228 E3D7F0F5 E2C1F0F2 CCC9A48C   C0C99F00 60CACFCC C0CBC62C 0C099B80    ....TPC5SAC2....   ....-...........
0B2420   00CB2460 000B20E4 C0C9CD08 00CA16DA   000000C8 0CCC0C0C 00C98FFF 0009A89C    ...-...U........   ................
0B2440   CCC99950 0CC99950 C0CB2408 60CA0D1C   00099950 0CCB2238 00CB537A 8C09A89C    ...&...&....-...   ...&............
0B2460   00099950 0CCA1136 800A112C 800E537A   E3D7F0F1 C040E2C1 C4C540C5 E7F1C64C    ...&............   TPC1. SADE EXIF
0B2480   C5E7C6E2 40E2C1C3 D340C4D3 C2C740C4   D3C2C740 C4D3D3C3 40C4D3E5 D340E2C1    EXFS SACL CLBG D   LBG CLLC DLVL SA
0B24A0   C3C14CE9 E9C3C14C C0C0C0CC C0C0000C   CCCCCCCC 0CC000C0C C0C0C000 C000000C    CA ZZCA ........   ................
0B24C0   00000000 --SAME--                                                                  ....
0B2500   00CB2B90 000B0010 FFFFFF46 0000000C   000C0CC9 C9F3F740 D9C9F4F4 40D9C9E2    ...............    ...RI37 RI44 RIS
0B2520   C640D9C9 D5D540E2 C1C3D340 D9C9E3D4   40E2C1C6 D740D9C9 F9F940E2 C1C4C540    F RINN SACL RITM    SAFP RI99 SADE
0B2540   C5E7F1C6 40C5E7C6 E240E2C1 C3D340C4   D3C2C740 C4D3C2C7 40C4D3D3 C34CC4D3    EXIF EXFS SACL C   LBG CLBG CLLC CL
0B2560   E5D340E2 C1C3C140 E9E9C3C1 40E2C1C3   D3400000 00000000 0C0C0CCC 0C000000    VL SACA ZZCA SAC   L ..............
```

Figure 11 (Part 4 of 5). Sample Dump

```
        LIST              06/05/13                                                                              PAGE 215

178FE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
179000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
179020  00000000 --SAME--                                                           ....
1797E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
179800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
179820  00000000 --SAME--                                                           ....
179FE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17A000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17A020  00000000 --SAME--                                                           ....
17A7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17A800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17A820  00000000 --SAME--                                                           ....
17AFE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17B000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17B020  00000000 --SAME--                                                           ....
17B7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17B800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17B820  00000000 --SAME--                                                           ....
17BFE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17C000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17C020  00000000 --SAME--                                                           ....
17C7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17C800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17C820  00000000 --SAME--                                                           ....
17CFE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17D000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17D020  00000000 --SAME--                                                           ....
17D7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17D800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17D820  00000000 --SAME--                                                           ....
17DFE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17E000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17E020  00000000 --SAME--                                                           ....
17E7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17E800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17E820  00000000 --SAME--                                                           ....
17EFE0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17F000  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17F020  00000000 --SAME--                                                           ....
17F7E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17F800  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   ................  ................
17F820  00000000 --SAME--                                                           ....
17FFE0  00000000 00000000 00000000 00000                  0000 00000000 00000000   ................  ................

INTER-MODULE TRACE: CP01 EX01 SA02 CL01 C              SA02 DBC1 SAC2 DB01 SAC2 CL01 DBC1 DL01 CB01 CLC1 SAC2 CB01
INTRA-MODULE TRACE: SAFP RI99 SADE EX1F E              CLLC CLVL SACA ZZCA ZZCA CLVL DLPC DLBC CLCT CLVS SACA ZZCA

IDC0925I  SNAP DUMP 001 PRODUCED AT DUMP POINT 'ZZCA'

IDC0924I  DUMP ROUTINE INVOKED AT 'ZZCA'

INTER-MODULE TRACE: SAC2 CL01 CBC1 CLC1 CBC1 CL01 SA02 CBC1 SA02 CBC1 SAC2 CL01 CBC1 CL01 DBC1 DL01 SAC2 CBC1 SAC2 CBC1
INTRA-MODULE TRACE: RI99 SADE EX1F EXFS SACL CLPG CLPG CLLC CLVL SACA ZZCA ZZCA CLVL DLPC DLBC CLCT CLVS SACA ZZCA ZZCA

IDC3007I VSAM CATALOG RETURN-CODE IS 56
IDC0551I **ENTRY MN01.CLC01040 NOT DELETED

IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 8
```

Dump point at which dump was produced

CSECT that called for dump

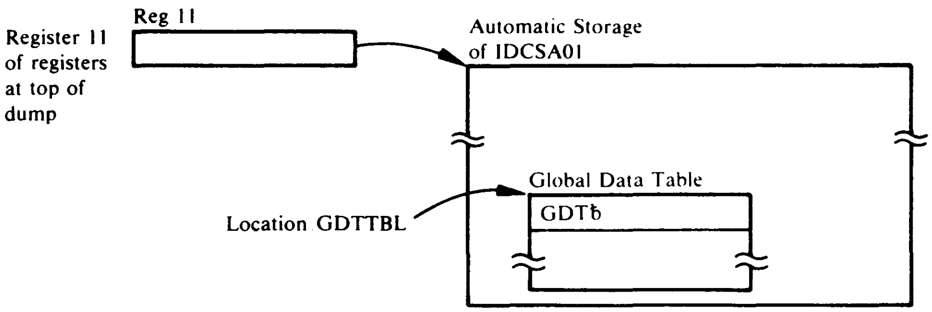
Figure 11 (Part 5 of 5). Sample Dump

How to Find the GDT

The Global Data Table (GDT) is preceded by the identifier GDTƀ, (see Figure.11, Part 1) so you may be able to find it by scanning down the right side of the dump. The GDT follows right after the first phase (IDCAMS) of the processor and the Anchor Table. A more systematic way of finding the GDT depends upon the type of dump you have. Figure 12 shows the two methods of finding the GDT and is referred to in the following paragraphs.

In a PDUMP produced as the result of an ABORT condition, you must use Method 1 shown in Figure 12. The GDT is contained in the System Adapter's (IDCSA01) automatic storage area. Register 11 of the registers at entry to PDUMP points to the automatic storage area of IDCSA01. The GDT is at location GDTTBL in the storage area; you must examine the microfiche listing for IDCSA01 to find the offset of location GDTTBL. Add the offset of location GDTTBL to the contents of register 11 to obtain the address of the GDT.

Method 1.



Method 2.

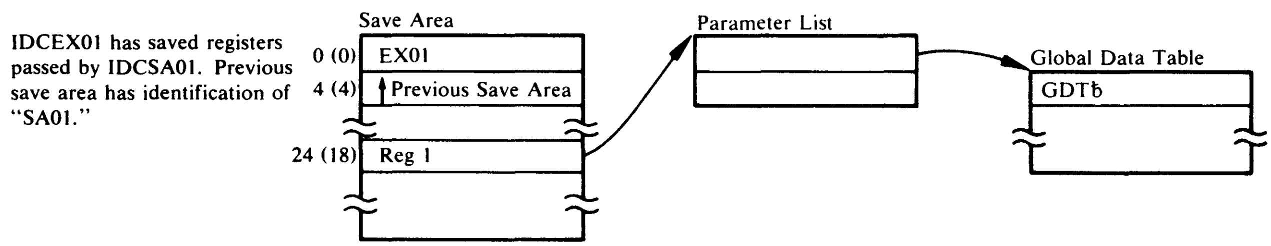


Figure 12. How to Find the GDT

In a system dump, if the dump occurred after the call to IDCSA01 but before IDCSA01 calls IDCEX01, then you must again use Method 1. Add the contents of register 11 of the registers at the top of the dump to the offset of GDTTBL, to find the GDT.

If the system dump occurred after IDCSA01 called IDCEX01, use Method 2 shown in Figure 12. The address of the GDT was passed as a parameter from IDCSA01 to IDCEX01. You must find the save area where IDCEX01 saved the registers belonging to IDCSA01. The first word of this save area contains EX01. Register 1 in this save area contains the address of a parameter list. The first word in the parameter list contains the address of the GDT.

In a PDUMP produced as a result of the Test option, you can most easily find the GDT using Method 2. Find the save area where IDCEX01 saved the registers belonging to IDCSA01. Register 1 in this save area contains the address of a parameter list. The first word in the parameter list contains the address of the GDT.

The GDT is the "anchor" for all areas of the processor. In the GDT are found pointers to the trace tables, to the historical areas, and to the entry points of the System Adapter, the I/O Adapter, and the Test Processor.

Figure 11, Part 1 shows the GDT as it appears in a dump.

How to Find Save Areas

The first word of the standard save area for processor phases and CSECTs contains the ID of the phase or CSECT that saved its caller's registers in that save area. (The ID is the last four characters of the phase or CSECT name.) For example, if the first word of the save area contains DE01, then you would know that IDCDE01 saved its caller's registers in this area. The remainder of the save area is set up following standard register saving conventions. Each module's save area is contained in the first 18 fullwords of the module's automatic storage area.

Figure 11, part 2 shows a save area as it appears in a dump. The start of the save area chain is normally the psuedo save area built by the System Adapter. This is a three-word area which immediately follows the System Adapter Historical Data Area. The first word contains the identifier "SA01". The third word contains a pointer to the next save area. The forward chain is formed from the third word of each save area.

How to Find the Trace Tables

The trace tables can easily be found once you have found the GDT. The third word of the GDT (including the GDT identifier) points to the Inter-Module Trace Table; the fourth word of the GDT points to the Intra-Module Trace Table.

Several areas in a dump may look as if they contain the trace tables; however, these areas may simply be areas used in constructing the trace tables.

Figure 11, Part 1 shows how the trace tables appear in a dump. Note that the last (twentieth) trace point in the Intra-Module Trace Table is SASN. IO01 is not part of the trace table. Also note that if, in the Inter-Module Trace Table, the sequence SA02 SA02 occurs, the second SA02 is really the ID for IDCIO02.

How to Find the FDT

You can find the Function Data Table (FDT) for an FSR after the FSR has received control by finding the save area in which the FSR saved the registers belonging to IDCEX01. The first word of this save area contains the ID of the FSR, for example, PR01 for the PRINT FSR. The previous save area in the save area chain contains EX01 in the first word. Register 1 in the save area where the FSR saved registers contains the address of a parameter list. The second word of that parameter list contains the address of the FDT.

All FDTs are built by the Reader/Interpreter in a UGPOOL storage area obtained by the Executive; the UGPOOL area has an ID of EX00. The first two words of the FDT contain the name of the command.

Figure 11, Part 3 shows how an FDT looks in a dump. Part 2 of Figure 11 shows the register belonging to IDCEX01 and saved by IDCDL01. Register 1 points to the parameter list. Part 4 of Figure 11 shows the parameter list and Part 3 shows the FDT.

How to Find Automatic Storage Areas

The automatic storage area for a phase or CSECT is that storage area obtained whenever the phase or CSECT is entered; dynamic storage areas, on the other hand, are those storage areas obtained by the phase or CSECT as it is executing. All automatic storage areas, as well as dynamic storage areas, are obtained by the System Adapter.

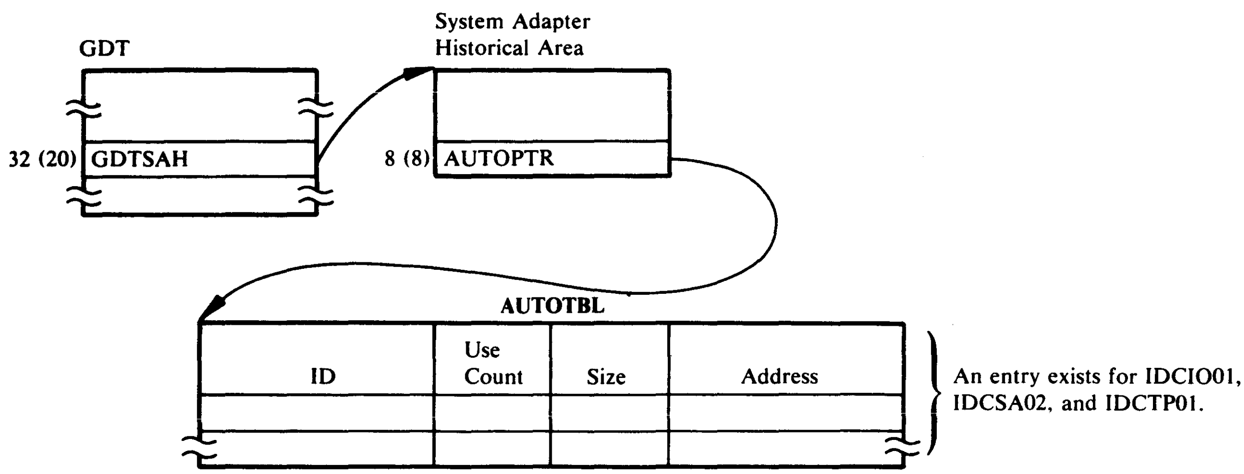
The automatic storage area for most processor phases and CSECTs is preceded by an eight-byte header. The first four bytes contain the number of bytes in the automatic storage area (including the eight-byte header), and the last four bytes contain the phase or CSECT ID. However, for commonly called CSECTs, namely, IDCIO01, IDCSA02, IDCSA03, and IDCTP01, no header precedes the storage area, unless the CSECT has been called recursively. On recursive calls (that is, the CSECT has been called again within the original call), the storage area that is obtained is preceded by an eight-byte header.

The best way to find the automatic storage area for a phase or CSECT depends upon the phase or CSECT.

The address of the automatic storage area for CSECT IDCSA03 is kept in the GDT.

The addresses of the automatic storage areas for CSECTs IDCIO01, IDCSA02, and IDCTP01 are kept by the System Adapter in the AUTOTBL. Figure 13 shows the format of the AUTOTBL and how to find it. However, if one of these CSECTs has been called recursively, indicated by a use count in the AUTOTBL greater than one, another automatic storage area has been obtained. You must find the second and third storage areas using the CSECT's data register or save area register as explained in the next paragraphs.

Figure 11, Part 1, shows how the System Adapter Historical Area and AUTOTBL appear in a dump.



Field	*Number of Bytes*	*Contents*
ID	4	CSECT ID
Use Count	2	Number of automatic storage areas obtained for the CSECT: 0 – no storage area being used 1 – the storage area whose address is in this table is the only storage area being used >1 – another storage area has been obtained for the CSECT
Size	2	Number of bytes in automatic storage area
Address	4	Address of automatic storage area

Figure 13. Format of AUTOTBL

To find the automatic storage area for any phase or CSECT, you can examine the microfiche listings to find which register has been used by the compiler as the data register. This register points to the automatic storage area.

For all processor phases and CSECTs, the first item in the automatic storage area is the save area. Thus, you can also use register 13, which contains the address of the save area, to find the automatic storage area belonging to that phase or CSECT. Alternatively, you can follow the save area chain as explained in the section "How to Find Save Areas"

Figure 14 shows the automatic storage area for IDCEX01. IDCEX01 has called IDCDL01; therefore, IDCDL01 has saved the registers belonging to IDCEX01 in the save area.

Figure 11, Part 4 shows an automatic storage area as seen in a dump.

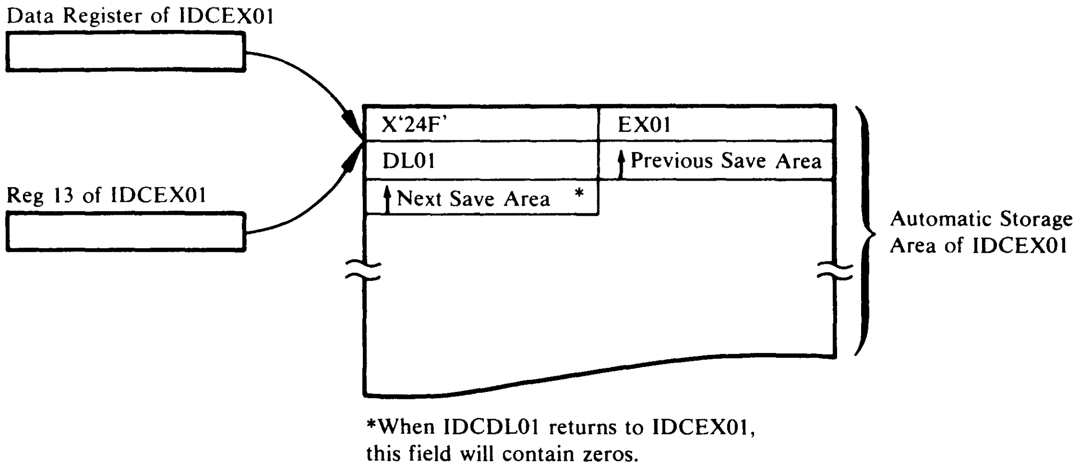


Figure 14. Example of an Automatic Storage Area

How to Find Dynamic Storage Areas

A phase or CSECT obtains storage areas dynamically by issuing either a UGSPACE or a UGPOOL macro.

To find a storage area obtained via a UGSPACE macro, you must examine the microfiche listings to see where the phase or CSECT has saved the address of that particular storage area. To find a storage area obtained via a UGPOOL macro, you can again examine the microfiche listings or you can follow the UGPOOL storage chain maintained by the System Adapter.

Figure 15 shows how to find the chain of UGPOOL areas from the System Adapter's historical area.

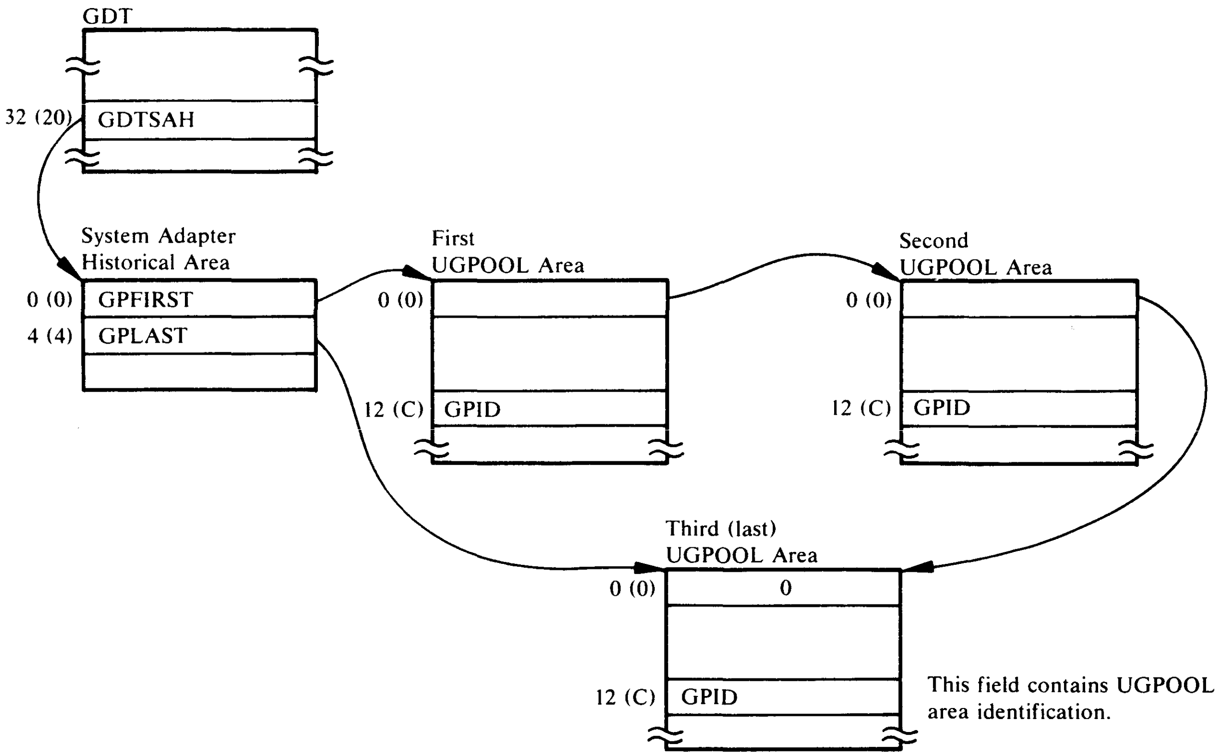


Figure 15. UGPOOL Area Chain

UGPOOL ID List

The following list contains the UGPOOL IDs used by different phases and CSECTs when they obtain storage. The list of UGPOOL areas also contains the name of the internal procedure that issues the UGPOOL macro, and the contents stored in the UGPOOL area.

Figure 11 shows the UGPOOL chain as it appears in a dump. Part 1 of Figure 11 shows the start of the chain in the GDT. Part 3 of Figure 11 shows a portion of the chain.

Contents of UGPOOL Areas

Phase or CSECT	**UGPOOL ID**	**Procedure**	**Contents of UGPOOL Area**
IDCAL01	AL00	ALTERPRC	One of the following: PASSWALL field or volume list.
		IDCAL01	CTGPL, CTGFV, and CTGFLs.
		LOCATPRC	Catalog work area for locate requests.
		INDEXPRC	CTGPL, CTGFV, and CTGFL to alter index KEY field.
IDCBI01	BI01	JCPROC	Area obtained by UIOINFO to contain sort work file data set name and volume serial list; passed back to JCPROC.
	BIPG	INITPROC	One 2048 byte buffer, followed by area for define CPL FVTs and FPLs, followed by alternate index record output buffer; area starts on page boundary.
	BIPG	INITPROC	Record sort area followed by table which controls the sort.

Contents of UGPOOL Area

Phase or CSECT	UGPOOL ID	Procedure	Contents of UGPOOL Area
IDCDE01	DE00	IDCDE01	CTGPL and CTGFVs.
IDCDE02	DE00	ALLCPROC	One of the following: volume list, file sequence list, device type list, DSATTR, or CTGFLs.
		KEYPROC	One of the following: MADSBCAT CTGFL and IDAAMDSB field, or key range list.
		MODELPROC	One of the following: CTGPL and CTGFLs used to locate a model object, or catalog locate work area.
		NAMEPROC	Creation and expiration date and EXCEPTION EXIT CTGFLs.
		PROTPROC	PASSWALL CTGFL, OWNERID CTGFL, PASSWALL field, RGATTR FPL, RGATTR, and User Authorization Record.
IDCDL01	DL01	MORESP	Larger VSAM catalog management services work area if necessary.
IDCIO01	IO00	IDCIOIT	I/O Adapter historical area.
	IOnn	PUTREP	Work area where VSAM moves records during GET. The UGPOOL ID is the same as the ID for the associated IOCSTR.
IDCIO02	IOnn	BUILDACB	ACB, RPL and EXLST for a VSAM data set. The UGPOOL ID is the same ID as the associated IOCSTR.
		BUILDDBK	IOAREA for nonVSAM files. The UGPOOL ID is the same as the ID for the associated IOCSTR.
		BUILDRPL	Work area where VSAM moves records during GET. The UGPOOL ID is the same as the ID for the associated IOCSTR.
		CKNONOP	Work area used to assemble a nonVSAM spanned record. The UGPOOL ID is the same as the ID for the associated IOCSTR.
	IOnn	OPENRTN	IOCS prefix, IOCSTR, IOCSEX, and file ID. Each data set that is opened is assigned a unique UGPOOL ID, starting with IO01; the next data set that is opened is assigned an ID of IO02. All areas associated with this data set have the same UGPOOL IDs.
IDCIO03		DSINFO	Area in which data set name, volume serial numbers, device type, and/or format-4 time stamp is returned to the caller if an area is not supplied by the caller. The UGPOOL ID is supplied by the caller.
IDCLC01	LC00	INITPROC	Main CTGPL used for all locate requests except when locating the entry names of associated entries. This area also contains a save area for the CTGPL.
	LC01	INITPROC	All CTGFLs, followed by the CTGFL save area.
	LC02	INITPROC	Catalog work area referenced by the main CTGPL.
	LC03	INITPROC	CTGPL used to locate entry names of associated entries; this area also contains a save area for the CTGPL.

Contents of UGPOOL Area

Phase or CSECT	UGPOOL ID	Procedure	Contents of UGPOOL Area
IDCLC01 (Continued)	LC04	INITPROC	Catalog work area referenced by the CTGPL used to locate entry names of associated entries of cluster or alternate index.
	LC05	INITPROC	String of control interval numbers and types of associated entries of a cluster or alternate index.
	LC06	INITPROC	Text processor argument list.
	LC07	INITPROC	Abbreviations used in catalog listing, loaded from static text phase.
	LC11	INITPROC	String of control interval numbers and types of associated entries of a data, index, or path.
IDCLC02	LC08	LOCPROC	Larger catalog work area. UGPOOL LC02 is released.
	LC09	ANSVPROC	Larger area for string of control interval numbers and types of associated entries. UGPOOL LC05 or LC11 is released.
IDCLR01	LR01	ADDASOC	Association table extension area.
		BLDVEXT	Vertical extension table extension area.
		INITLZE	Space for ASSOCTBL, ASSOCTB2 and VEXTTBL.
		INTASOC	Association table extension area.
	LR02	CTTBLD	CI translate table (CTT).
	LR03	INITLZE	Input/output buffers.
	LR04	INSORT	Sort table.
IDCMP01	MP01	BFPLPROC	Obtain one or two FPLs.
		BPASPROC	PASSWALL CTGFL.
		CLUSPROC	Buffer to read data records from the portable data set.
		CTLGPROC	Larger catalog work area.
		DELTPROC	Larger VSAM catalog management services work area if necessary.
		LVLRPROC	One of the following: volume list for define, or DEVTYPES CTGFL.
		RANGPROC	Range list.
		FVTPROC	FVT and pointers to FPLs.
IDCRC01	RC50	OPEN	Storage for OPNAGL.
	RC51	SUPSP	Name table storage.
	RC52	DIRECT	Buffer for directory record.
	RC54	SCANCRA	CRA translate table.
IDCRC02	RC02	IDCRC02	Control record output buffer.
		ALSPROC	Control record output buffer.
		ASOCPROC	Control record output buffer.
		CLUSPROC	Control record output buffer.
		CTLGPROC	Catalog work area.
		GDGPROC	Control record output buffer.
		LOCPROC	CPL, FPL, and work area for catalog.

Contents of UGPOOL Area

Phase or CSECT	UGPOOL ID	Procedure	Contents of UGPOOL Area
IDCRC02 (Continued)		NVSMPROC	Control record output buffer.
		SAVEPROC	Input record save area.
IDCRI01	EX00	GETSPACE	FDT—data substructures.
		MORSPACE	FDT—data list substructures.
		SCANCMD	FDT—secondary pointer vectors.
	RInn	INREPEAT	FDT—temporary space for secondary pointer vectors. nn is the ID of the parameter associated with the secondary pointer vector.
IDCRI02	EX00	IDCRI02	Reader/Interpreter tables and FDT.
	RInn	IDCRI02	FDT—temporary space for secondary pointer vectors. nn is the ID of the parameter associated with the secondary pointer vector.
IDCRM01	RM01	ALISPROC	Catalog data record buffer.
		BFPLPROC	Obtain one or two FPLs.
		BPASPROC	Contain PASSWALL field information.
		CLUSPROC	Buffer area for data record containing catalog locate area. Also volume list.
		CPLPROC	Catalog parameter list.
		CTLGPROC	Larger catalog work area.
		DELTPROC	Larger catalog work area.
		FVTPROC	FVT and pointers to FPLs.
		LVLRPROC	Volume serial list. DEVTYP FPL and associated device type lists. List of FILESEQUENCE numbers and associated FPL.
		NFVTPROC	FVT and total number of FPLs.
		NVSMPROC	Buffer for data record.
		RANGPROC	Storage for range list.
		UCATPROC	Storage for data record.
IDCRS01	RS01	IDCRS01	Automatic storage modules IDCRS01 - IDCRS07.
	RS01	INIT	Work area used for Umacro parameter lists, record access blocks, IKQMDADS parameter list and control interval translate table.
	RS03	INIT	Area obtained by UIOINFO for catalog data set information.
	RSPG	INIT	CRA user buffer.
IDCRS03	RS03	VOLCHK	UIOINFO return area and DSCB read in area.
	RS10	GETTAB	Tables obtained as needed for association checking.
	RS11	PROCVOL	Work areas used for bit maps.
	RS12	VERB	Work area used for GDG association checking.
IDCRS04	RS04	NINIT	Work area used for FIND processing.
	RS04	NXPND	Extension to FIND work area.
IDCRS05	RS01	BLDRLST	RESVOL table.
	RS02	BLDVLST	VOLSERTB table.

Contents of UGPOOL Area

Phase or CSECT	UGPOOL ID	Procedure	Contents of UGPOOL Area
IDCRS06	RS03	WFDEF	Work area used for UCATLG parameter list to define the workfile, area obtained by UIOINFO for workfile data set information.
IDCRS07	RS03	RENAMEP	UIOINFO return area and work area.
		RENMBK	UIOINFO return area and work area.
		RENMSETV	DADSM work area for RENAME.
IDCTP01	TP03	LINEPRT	Header line.
IDCTP04	TP01	INITPROC	Secondary Print Control Table.
		PCTSETUP	One of the following: Print Control Table, sub-title lines, or footing lines.
IDCTP05	TP01	IDCTP05	Entry from a static text format structure.
IDCXP01	XP01	ALTRPROC	CTGFV and CTGFLs for catalog alter request.
		CONTRBL	Output buffer for control records.
		CTLGPROC	Larger catalog work area.
		DELTPROC	CTGPL for catalog delete request.
		LOCPROC	One of the following: CTGPL and CTGFLs for catalog locate request, or catalog work area for locate request.

Sample Dump

The dump in Figure 11 was obtained through the Test option at the ZZCA dump point. The commands that were specified are:

```
PARM TEST( FULL( ZZCA,3,1 ) )
DELETE   MN01.CL001040/CLMR
```

Various fields within the dump are marked; these fields are discussed more fully in this chapter.

Debugging a Catalog Problem

There may be a problem within Catalog Management routines or within Access Method Services routines that invoke Catalog Management if one of the following situations occurs: a system error occurs within Catalog Management routines, the return code from the catalog indicates a non-user error, or the printed output from the catalog is incorrect. To determine whether the problem exists in Access Method Services or in Catalog Management, you must examine the argument lists passed between the processor and Catalog Management.

This section explains how to obtain a dump that contains the Catalog Management argument lists and how to find the argument lists within the dump.

To determine whether the argument lists passed between the processor and Catalog Management are correct, see the section "Method of Operation" in this book and the book *DOS/VS LIOCS Volume 4: VSAM Logic* which is listed in the preface to this book. The section "Method of Operation" explains what argument lists are passed to Catalog Management by each FSR; *DOS/VS LIOCS Volume 4: VSAM Logic* explains the contents of the argument lists and also explains the arguments that are returned by Catalog Management.

Obtaining a Dump For a Catalog Problem

If you do not have a system dump within Catalog Management, you can use the Test option to obtain a dump within Access Method Services before and after the call to Catalog Management.

The list of Phase or CSECT to Dump Cross Reference contains all the dump points within the processor; you can specify these dump points on the FULL option of the TEST keyword to obtain a full partition dump. Most FSRs that issue a UCATLG macro to call Catalog Management have dump points before and after the macro. In addition, the System Adapter routine that issues the CATLG macro has a dump point before and after the macro.

Some FSRs have unique dump points around different types of calls to Catalog Management. For example, IDCDL01 has dump points DLVL around the call to locate the entry type and dump points DLVS around the call to delete the entry. Some FSRs have the same dump point around all calls to Catalog Management, for example, IDCMP01. Some FSRs have dump points at which you can obtain selected fields in addition to a full partition dump, for example, dump points LCBL and LCAL in IDCLC01.

The System Adapter dump point ZZCA can always be used, for any FSR, to obtain dumps before and after a call to Catalog Management.

To determine at which iterations of a dump point you wish a full region dump, you must determine how many calls to Catalog Management have been made by the FSR before the call that caused the problem. You can either use the following list or rerun the job with the AREAS option.

Instead of using the Sequence of Catalog Calls Made by FSRs, you can rerun the job with the AREAS option of the TEST keyword to determine which iteration of a dump point you need to use. For example, if you wish to use dump point ZZCA to obtain a dump, rerun the job with the following Test option:

```
PARM TEST( AREAS( ZZ ) )
```

From the trace output you can see how many times dump point ZZCA was encountered before the problem occurred.

The following list summarizes the sequence of calls each FSR makes to Catalog Management. For example, assume that the LISTCAT FSR, IDCLC01, while listing all the information for a KSDS cluster entry, listed the cluster name under the index entry incorrectly. Referring to the list, you would know that the call to the catalog that retrieved that name was the seventh call the LISTCAT FSR made to Catalog Management.

Sequence of Catalog Calls Made by FSRs

FSR	Sequence of calls to catalog management
IDCAL01	1. A call to open the catalog if the dname subparameter of the CATALOG parameter was specified.

2. A call to locate catalog fields if one of the following fields is being nullified or altered: MASTERPW, CONTROLPW, UPDATEPW, READPW, CODE, ATTEMPTS, AUTHORIZATION, ERASE | NOERASE, SHAREOPTIONS, FREESPACE, WRITECHECK | NOWRITECHECK, UNINHIBIT | INHIBIT,UPGRADE, UNIQUEKEY, NONUNIQUEKEY, KEYS, or RECORDSIZE.

If UPGRADE was supplied:

1. A call to locate the associated data component of the alternate index to verify that it is empty.
2. A call to alter the alternate index entry.

If RECORDSIZE was supplied for the data object:

1. A call to locate the cluster or alternate index associated with the data object.
2. A call to locate the index associated with the cluster or alternate index related to the data object.
3. A call to alter the data entry.

If RECORDSIZE was supplied for the cluster or alternate index object:

1. A call to locate the associated data object.
2. A call to locate the associated index object.
3. A call to alter the data entry.

If RECORDSIZE was supplied for the path object:

1. A call to locate the data object of the related alternate index or cluster.
2. A call to locate the index object of the related alternate index cluster. or cluster.
3. A call to alter the data entry.

If KEYS was supplied for the data object:

1. A call to locate the cluster or alternate index associated with the data object.
2. A call to locate the index associated with the cluster or alternate index related to the data object.
3. A call to locate the alternate index's base cluster, if the data object is associated with an alternate index.
4. A call to locate the data object of the base cluster.
5. A call to alter the data entry.
6. A call to alter the related index object key values.

If KEYS was supplied for the cluster object:

1. A call to locate the associated data object.
2. A call to locate the associated index object.
3. A call to alter the data entry.
4. A call to alter the related index object key values.

Sequence of Catalog Calls Made by FSRs

FSR	Sequence of calls to catalog management
	If KEYS was supplied for the alternate index object: 1. A call to locate the associated data object. 2. A call to locate the associated index object. 3. A call to locate the base cluster object. 4. A call to locate the base cluster's data object. 5. A call to alter the data entry. 6. A call to alter the related index object key values. If KEYS was supplied for the path object: 1. A call to locate the data object of the related alternate index or cluster. 2. A call to locate the index object of the related alternate index or cluster. 3. A call to locate the base cluster's data object, if the path is related to an alternate index. 4. A call to alter the related entr's data object. If KEYS was supplied: 1. A call to alter the related index object's key values.
IDCBI01	1. A call to locate the catalog ACB, entry type and associations of the name specified for the base cluster—may be the base cluster itself or a path over the base cluster. 2. A call to locate the AMDSB of the base cluster's data component. 3. A call to locate the entry type and associations of the name specified for the alternate index—may be the alternate index itself or a path over the alternate index. 4. If locate 3 returned a path over the alternate index, a call to locate the entry type and associations of the alternate index. 5. A call to locate the AMDSB of the alternate index's data component. If an external sort is performed: 1. Two calls to define each sort work file. 2. Two calls to delete each sort work file.
IDCDE01	1. A call to open the catalog if the dname subparameter of the CATALOG parameter was specified. 2. A call to define the entire entry.
IDCDE02	1. A call to open the catalog specified if the MODEL parameter was specified with the dname. subparameter. This call occurs prior to the first locate for cluster, data or index described in 3. 2. One or more calls to locate each object that is modeled, as follows: threecalls if the MODEL keyword is specified in the cluster parameter list for a KSDS cluster; two calls if the MODEL keyword is specified in the cluster parameter list for an ESDS cluster or in both the data and index parameter lists; one call if the MODEL keyword is specified in a data parameter list or an index parameter list only.
IDCDL01	1. A call to open the catalog if the dname subparameter of the CATALOG parameter was specified.

Sequence of Catalog Calls Made by FSRs

FSR	Sequence of calls to catalog management
	For each entry: 1. A call to locate the entry type, if the type was not specified on the command. 2. A call to delete the entire entry. 3. An iterative series of calls to delete any remaining parts of a structure as necessary.
IDCLC01	1. A call to open the catalog if the dname subparameter of the CATALOG parameter was specified. For each cluster entry: 1. A call to locate the cluster entry. 2. A call to locate the name of the data entry associated with the cluster entry. 3. A call to locate the name of the index entry associated with the cluster entry, only for KSDS clusters. 4. Repetitive calls to locate the names of the alternate indexes and paths associated with the cluster entry (if any exist). 5. A call to locate the data entry. 6. A call to locate the name of the cluster entry associated with the data entry. 7. A call to locate the index entry, only for KSDS clusters. 8. A call to locate the name of the cluster entry associated with the index entry. 9. Repetitive calls to locate the path entries (if any exist). 10. Repetitive calls to locate the cluster, data, and index (for key-sequenced files) associated with the path entries. For each alternate index entry: 1. A call to locate the alternate index entry. 2. A call to locate the name of the data entry associated with the alternate index entry. 3. A call to locate the name of the index entry associated with the alternate index entry. 4. A call to locate the name of the cluster entry associated with the alternate index entry. 5. Repetitive calls to locate the names of the paths associated with the alternate index entry (if any exist). 6. A call to locate the data entry. 7. A call to locate the name of the alternate index entry associated with the data entry. 8. A call to locate the index entry. 9. A call to locate the name of the alternate index entry associated with the index entry. 10. Repetitive calls to locate the path entries (if any exist). 11. Repetitive calls to locate the alternate index, data and index (of alternate index), and data and index (of cluster) associated with the path entries.

Sequence of Catalog Calls Made by FSRs

FSR	Sequence of calls to catalog management
	For each data entry: 1. A call to locate the data entry. 2. A call to locate the name of the cluster or alternate index entry associated with the data entry. For each index entry: 1. A call to locate the index entry. 2. A call to locate the name of the cluster or alternate index entry associated with the index entry. For each path entry: 1. A call to locate the path entry. 2. For a path over a cluster, a call to locate the name of the cluster, and data and index (of cluster) associated with the path entry. 3. For a path over an alternate index, a call to locate the name of the alternate index, data and index (of alternate index), and data and index (of cluster) associated with the path entry. For each nonVSAM entry: 1. A call to locate the nonVSAM entry. For each space entry: 1. A call to locate the space entry. 2. One or more calls to locate each file ID in a space entry, for example, three calls if three data sets are defined in the data space. For each user catalog entry: 1. A call to locate the user catalog entry.
IDCLR01	1. A call to open the catalog if the dname subparameter of the CATALOG parameter was specified.
IDCMP01	1. A call to define the cluster or alternate index. 2. A call to locate the cluster entry, if the previous define failed bacause of a duplicate entry in the catalog.. 3. A call to locate the data entry, only for a duplicate cluster entry. 4. A call to locate the index entry, only for a duplicate KSDS cluster entry or alternate index entry and if the temporary export flag is not set in the data entry. 5. A call to delete the entry, if there is a duplicate nonempty entry. 6. An iteractive series of calls to delete any remaining parts of a structure as necessary. 7. A call to define the cluster again, if there was a duplicate entry. 8. A call to delete the defined entry, if an error occurred copying data into the defined entry. 9. An iterative series of calls to delete any remaining parts of a structure as necessary. 10. A call to alter the data entry, if the INHIBITTARGET keyword was specified at export time. 11. A call to alter the index entry, if the INHIBITTARGET keyword was specified at export time for a KSDS cluster or an alternate index.

Sequence of Catalog Calls Made by FSRs

FSR	Sequence of calls to catalog management
IDCRC01	1. A call to locate the cluster entry. 2. A call to locate the data entry. 3. A call to locate the index entry only for a KSDS cluster or an alternate index.
IDCRM01	1. A call to define the object. 2. A call to delete the object if a duplicate name is indicated following the first call to catalog. 3. A series of calls to catalog to delete the remainder of the structure. 4. A call to define the object if a duplicate name was found. 5. A call to alter the name of the object if it is a VSAM entry to the dummy name specified on the OUTFILE ddcard. 6. A call to alter the name of the object back to its original name if the previous call was exported. 7. A call to delete the object defined if import fails after the define. 8. A series of calls to catalog to delete the remainder of the structure.
IDCRP01	For VSAM data sets: 1. A call to identify the INFILE data set type. 2. A call to identify the OUTFILE data set type.
IDCRS01	1. A call to locate the catalog data set name. 2. A call to locate the catalog volume serial number and timestamp. 3. A call to locate the catalog ACB and data attributes. 4. A call to locate the ACB of the catalog in which the workfile was defined.
IDCRS06	1. A call to define the workfile. 2. A call to delete the workfile.
IDCXP01	1. A call to locate the cluster or alternate index entry. 2. A call to locate the data entry. 3. A call to locate the index entry, only for a KSDS cluster or an alternate index. 4. A call to locate the related base cluster name if the object being exported is an alternate index. 5. A series of iterative calls to locate catalog information about the path objects associated with the object. 6. A call to alter the data entry, if TEMPORARY, INHIBITSOURCE, or INHIBITTARGET was specified on the command. 7. A call to alter the index entry, if TEMPORARY, INHIBITSOURCE, or INHIBITTARGET was specified on the command, and the object is a KSDS cluster or an alternate index. 8. A call to delete the entry if PERMANENT was specified on the command. 9. A series of iterative calls to the delete any remaining parts of the structure.

How to Find Catalog Management Argument Lists

The Catalog Parameter List (CTGPL) is the one argument list always passed between Access Method Services and Catalog Management. The CTGPL may point to a catalog work area, a CTGFV, or one or more CTGFLs. Thus, once you find the CTGPL, you can find all the Catalog Management argument lists.

The best way to find the CTGPL in a dump depends upon the type of dump you have: a system dump within Catalog Management, a PDUMP taken at a dump point within an FSR, or a PDUMP taken at the ZZCA dump point in the System Adapter.

In a system dump within Catalog Management, register 1 of the registers saved when Catalog Management was entered contains the address of the CTGPL.

In a PDUMP taken at a dump point within an FSR, the address of the CTGPL is stored at location CTGPLPTR in the FSR's automatic storage area. You must examine the microfiche listings to determine the offset of location CTGPLPTR in the automatic storage area.

In a PDUMP taken at dump point ZZCA within the System Adapter, the address of the CTGPL is again stored at location CTGPLPTR in the FSR's automatic storage area. However, the address of the CTGPL is also passed as an argument from the FSR to IDCSA02 when the UCATLG macro is issued. Figure 16 shows how to find the address of the CTGPL using register 1 at entry to IDCSA02. Register 1 contains the address of a parameter list. The second word of the parameter list points to a full word that contains the address of the CTGPL.

In addition to the CTGPL, Catalog Management returns to the processor a code in register 15 that indicates the result of the catalog request. The best way to find the return code in a dump again depends upon the type of dump you have: a PDUMP taken at a dump point within an FSR, or a PDUMP taken at dump point ZZCA.

In a PDUMP taken at a dump point within an FSR, you must examine the microfiche listings to determine where the FSR has stored the return code. However, any nonzero return code is always printed by the FSR in a subsequent message.

In a PDUMP taken at a dump point within the System Adapter, the catalog return code is stored at location TESTRC in IDCSA02's automatic storage area. You must examine the microfiche listings to determine the offset of TESTRC in the automatic storage area.

Some FSRs have headings before the storage areas that contain the Catalog Management argument lists. These headings may help you find the Catalog Management argument lists in a dump. Figure 17 shows the DEFINE FSR's storage area that contains the argument lists set up for a define request.

IDCSA02 has saved registers passed by FSR.
Previous save area has FSR's identification.

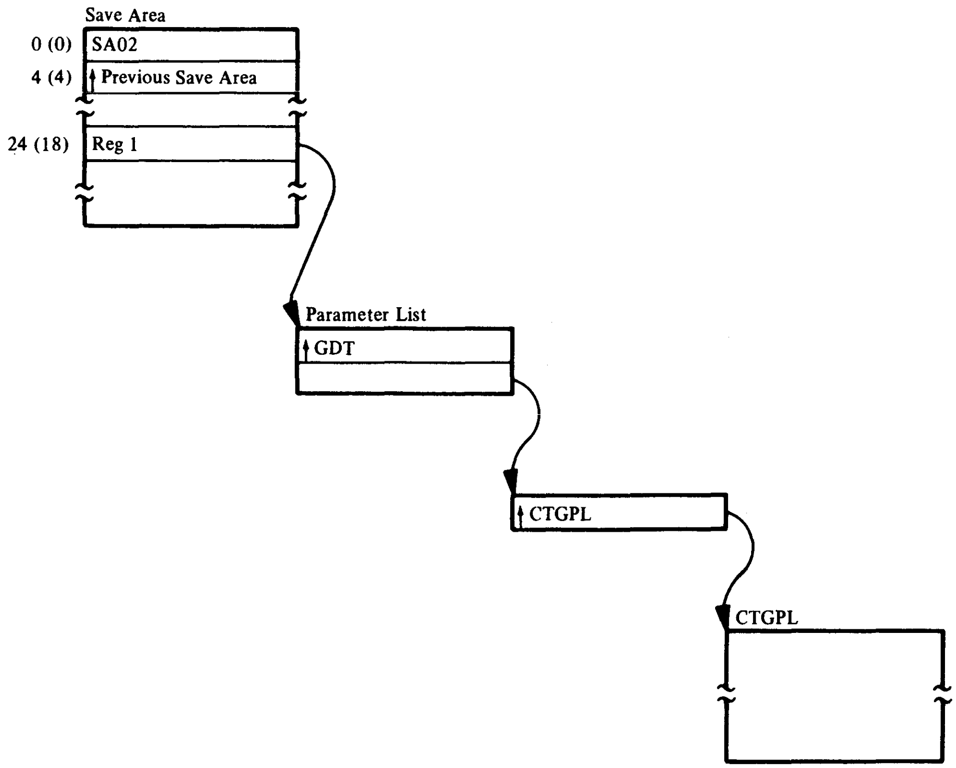
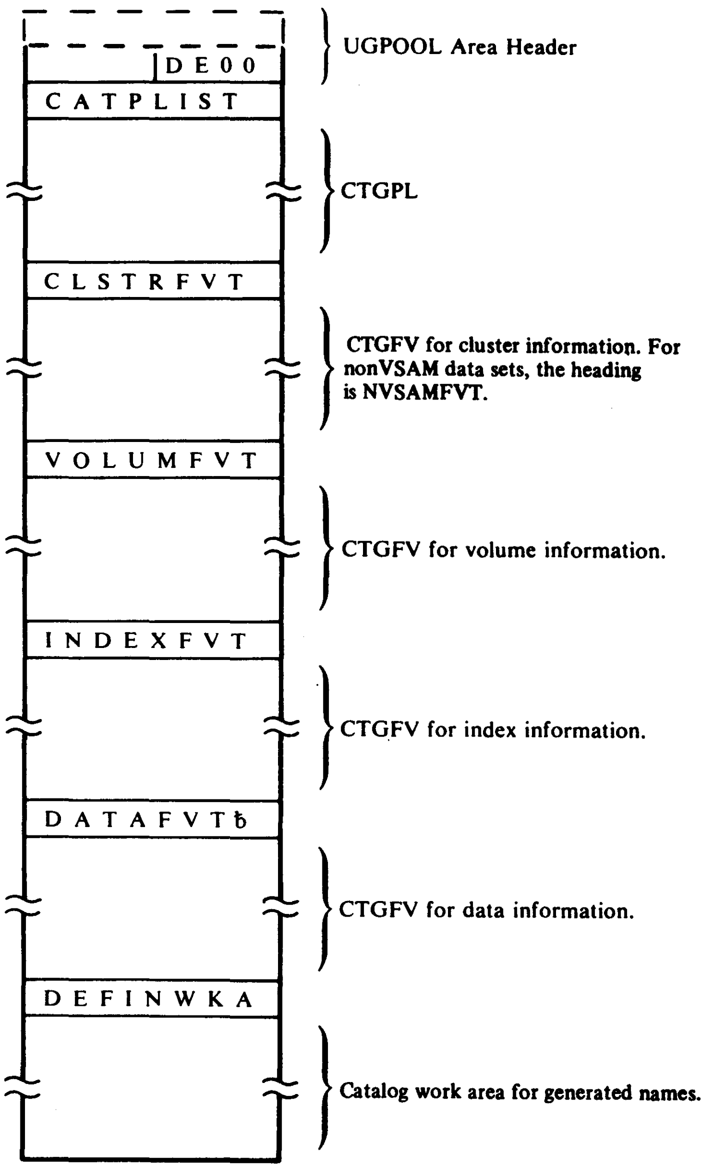


Figure 16. How to Find the CTGPL



If any of the above CTGFVs are not set up for a define request, the heading and CTGFV area contains zeros.

Figure 17. Catalog Argument Lists in Storage Area of DEFINE FSR

Debugging a Formatting Problem

If data is misformatted, the problem may be in the parameters given to the UPRINT macro. The UPRINT parameters are: (1) the address of the GDT; (2) the address of an alternate IOCSTR or zero; (3) the address of and a DARGLIST data area in storage; and (4) the address of a FMTLIST data area, if it is in storage. If the FMTLIST is in a static text module, the fourth parameter is zero and the DARGLIST contains information to find the FMTLIST. The DARGLIST and the FMTLIST control the formatting of the data. The DARGLIST in general contains information about the input data within the FMTLIST. The FMTLIST controls the order of formatting by the placement of the substructures. Refer to the "Data Areas" chapter for a detailed description of the GDT, IOCSTR, DARGLIST, and FMTLIST. Problems are most likely to occur between the DARGLIST and the FMTLIST. The examples show how the Text Processor uses the DARGLIST and FMTLIST to format the data. With each example is a flowchart with blocks keyed to the FMTLIST substructure.

Example I

A module wants to space one line then print data starting in column 10. The data is in the module's storage rather than in a static text module.

The output is:

70 characters of data starting in column 10

In the module's storage is:

- the data to be printed
- a DARGLIST
- a FMTLIST

The data is:

Offset	Name	Contents	Comments
0	*any,* INFO for example	70 characters of EBCDIC data	

The DARGLIST is:

Offset	Name	Contents	Comments
0	DARGDBP	INFO	Address of the block of data to be printed.
4	DARGRETP	0	The line is to be printed rather than just formatted and returned to the module without printing.
8	DARGSTID	0	No static text module is used—the FMTLIST and data are in the module's storage.
12	DARGILP	70	Number of characters to print.
14	DARGCNT	0	No insert or replication substructures occur in the FMTLIST.
16	DARGRETL	0	Since no data is returned, the length of the return area whose address is in DARGRETP.

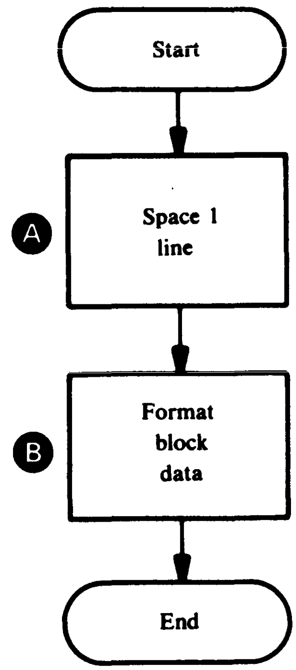
Offset	Name	Contents	Comments
18	DARGIND	0	Indicates printing is to start in the column indicated in FMTLIST. No DARGARY is defined because no insert or replication substructures are used in the FMTLIST.

The FMTLIST is:

	Offset	Name	Contents	Comments
A	0	FMTFLGS	X'40'	Identifies these 6 bytes as a spacing substructure.
	1	*none*	0	Unused.
	2	FMTSPF	1	Space one line.
	4	FMTSPT	C'R'	Space the number of lines in FMTSPR relative to the last line printed.
	5	*none*	0	Unused.
B	6	FMTFLGS	X'90'	Identifies these 12 bytes as a block substructure and the end of the FMTLIST.
	7	*none*	0	Unused.
	8	FMTILEN	70 or 0	If 70 is specified, it is used as the length of the data. If 0 is specified, the length of the converted data is used as the length to print. Since no conversion is being done in this example, the result is the same if 70 or 0 is specified.
	10	FMTIOFF	0	Get the data starting with the first byte.
	12	FMTOCOL	10	Place the data in output column 10.
	14	FMTOLEN	70	Number of bytes to print. 0 would give the same result since no conversion is being done.
	16	FMTCNVF	0	No conversion is being done on the data addressed by DARGDBP.

Discussion: The spacing substructure causes one line to be spaced.

The next substructure is identified as a block data substructure. The address of the block of data is in DARGDBP. No conversion is to be done on the data. The Text Processor moves the 70 bytes in the next line.



Example II

A module wants to space 2 lines, print a header, space 2 more lines, and print all of a block of data no matter how many lines the block of data takes with single spacing between subsequent lines. The header is in static text module IDCTSAL0 at entry X'03'. The block of data is in the module. Also, if there is no record number for the header, the module wants to print the word UNKNOWN.

The output is:

(1 blank line)
RECORD NUMBER 002
(1 blank line)
xxxxxxx converted data for as many lines as necessary

The module has in its storage:

- the data for the record number in the header, in this example X'02'
- the block of data to convert and print
- a DARGLIST

Already existing in a static text module is:

- a FMTLIST
- text for the header, in this example the characters 'RECORDƀNUMBER'

The data is:

Offset	Name	Contents	Comments
0	*any*, RECNUM for example	one byte with the value X'02'	
1	*any*, DUMPIT for example	2000 bytes of binary data	The binary data will be converted to printable hexadecimal.

The DARGLIST is:

Offset	Name	Contents	Comments
0	DARGDBP	DUMPIT	Address of the block of data to convert.
4	DARGRETP	0	The lines are to be printed rather than just formatted and returned to the module without printing.
8	DARGSTID	C'AL0', X'03'	Static text identification to locate the FMTLIST—the FMTLIST IDCTSAL0 at entry 3.
12	DARGILP	2000	The length of DUMPIT.
14	DARGCNT	1	One insert data appears in DARGARY.
16	DARGRETL	0	The length of the converted data is used as the number of bytes to print.
18	DARGIND	0	Printing starts in the column indicated in FMTLIST.
19	*none*	0	Unused.
20	DARGARY	*none*	DARGARY is the name of the rest of DARGLIST.
20	DARGINS	4	This number is matched with a insert substructure in FMTLIST.
22	DARGINL	1	The number X'02' occupies one byte.
24	DARGDTM	RECNUM	Address of the number X'02' in the module.

At entry X'03' in static text module IDCTSAL0 is:

Offset	Name	Contents	Comments
0	TXT	71	Length of the FMTLIST and the data that follows the FMTLIST. 2 FLG0This static text entry is for data not a message or header.
A 4	FMTFLGS	X'40'	Identifies these 6 bytes as a spacing substructure.
5	*none*	0	Unused.
6	FMTSPF	2	Space 2 lines.
8	FMTSPT	C'R'	Space the lines relative to the last printed line.
9	*none*	0	Unused

	Offset	Name	Contents	Comments
B	10	FMTFLGS	X‘04’	Identifies these 10 bytes as a static text substructure—the data is immediately after the FMTLIST.
	11	*none*	0	Unused.
	12	FMTSTL	13	Number of bytes in C‘RECORDƀNUMBER’.
	14	FMTSTO	54	Number of bytes the data C‘RECORDƀNUMBER’ is from the first substructure in FMTLIST.
	16	FMTOCOL	1	The data C‘RECORDƀNUMBER’ is to be printed in column 1.
	18	FMTOLEN	0	0 indicates the output length is the same as the input length for this data.
C	20	FMTFLG	X‘20’	Identifies these 12 bytes as an insert substructure.
	21	*none*	0	Unused.
	22	FMTRFNO	4	This number is matched with the number in DARGINS in order to get the address of the data X‘02’.
	24	*none*	0	Unused.
	26	FMTOCOL	15	The data X‘02’ is printed in column 15.
	28	FMTOLEN	3	The converted data is to take up 3 columns.
	30	FMTCNVF	X‘1000’	The data X‘02’ is to be converted from byte to zoned decimal.
D	32	FMTFLGS	X‘02’	Identifies these 8 bytes as a default text substructure.
	33	*none*	0	Unused.
	34	FMTILEN	7	Number of bytes in the data C‘UNKNOWN’.
	36	FMTIOFF	67	Number of bytes the data C‘UNKNOWN’ is from the first substructure in FMTLIST.
	38	FMTOCOL	15	The data C‘UNKNOWN’ is printed in column 15.
E	40	FMTFLGS	X‘40’	Identifies these 6 bytes as a spacing substructure.
	41	*none*	0	Unused.
	42	FMTSPF	2	Space 2 lines.
	44	FMTSPT	C‘R’	The 2 lines are spaced relative to the last printed line.
	45	*none*	0	Unused.
F	46	FMTFLGS	X‘90’	Identifies these 12 bytes as a block data substructure and the last substructure in FMTLIST.

Offset	Name	Contents	Comments
47	*none*	0	Unused.
48	FMTILEN	0	Zero means use the length of the block data in DARGILP.
50	FMTIOFF	0	Start at the first byte of the block data.
52	FMTOCOL	1	Start the block of data in output column 1.
54	FMTOLEN	0	Zero means print the block data until the input is exhausted no matter how many lines it takes.
56	FMTCNVF	X'8000'	Convert the block of data from binary to printable hexadecimal.
58	*any*	C'RECORDƀNUMBER'	Data for the second substructure.
71	*any*	C'UNKNOWN'	Data for the default text substructure.

Discussion:

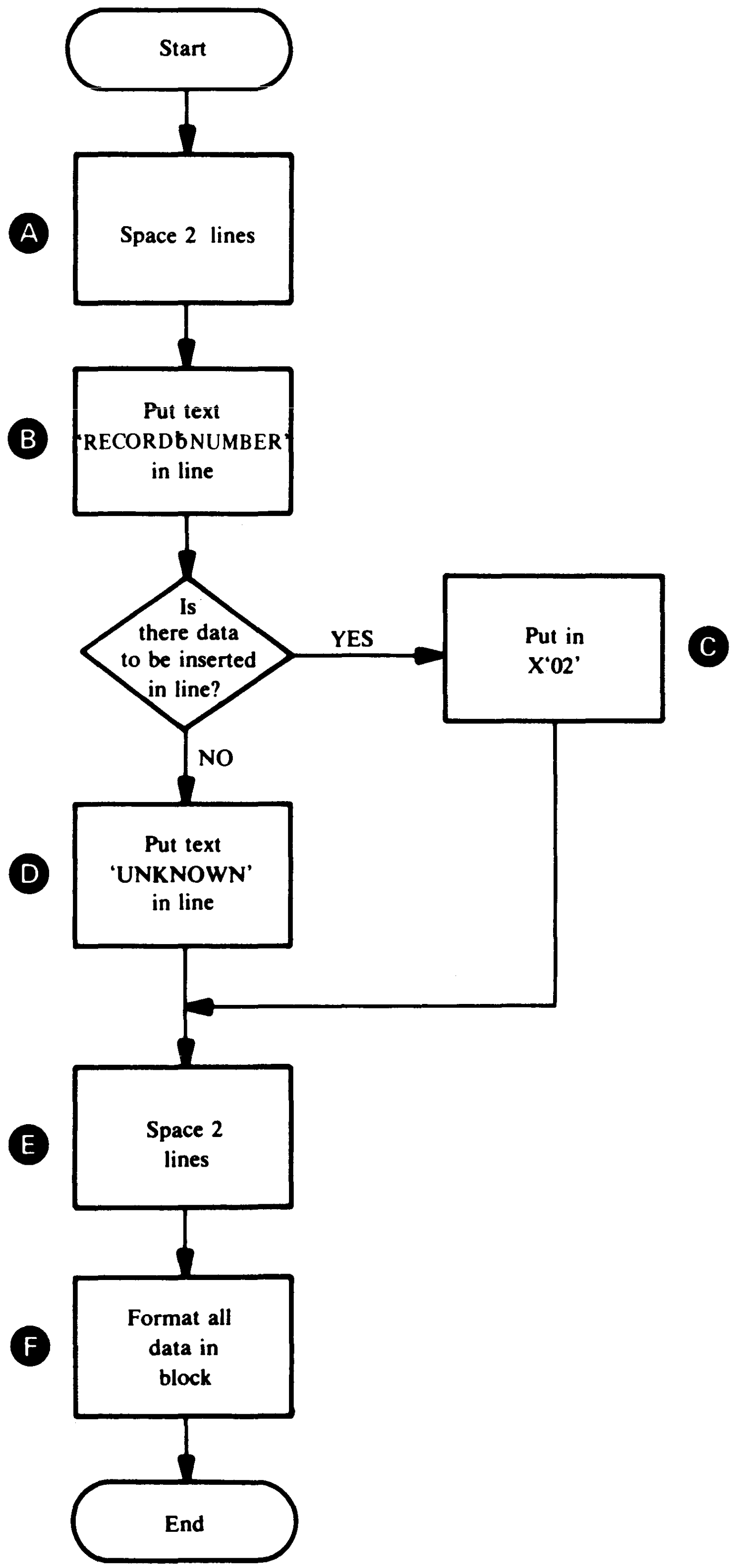
The first spacing substructure causes 2 lines to be spaced.

The static text 'RECORDƀNUMBER' is put in the next line.

The insert number in the insert substructure is matched with the insert number in DARGLIST. The number X'02' from the module is converted to zoned decimal and placed in column 15.

The next spacing substructure causes 2 more lines to be spaced.

The block data substructure causes the data addressed by DARGDBP to be converted to printable hexadecimal until all the bytes in DARGILP have been converted and printed. If the module wants to print the same lines again but with a different record number and different block data, only DARGDBP, and DARGDTM need to be changed. If there had not been a reference number 4 in DARGLIST the data C'UNKNOWN' will be printed instead of the record number '002'. This allows more freedom for the module to vary the output just by changing insert reference numbers in the DARGLIST.


Start
A
Space 2 lines
B
Put text
'RECORDbNUMBER'
in line
Is
there data
to be inserted
in line?
YES
Put in
X'02'
C
NO
D
Put text
'UNKNOWN'
in line
E
Space 2
lines
F
Format all
data in
block
End

Example III

A module wants to space 3 lines then print repeating fields on different lines so the output would appear as:

(2 blank lines)				
field A	*Field B*	*X'field C1'*	*field D1*	*field E1*
		X'field C2'	*field D2*	*field E2*

The module has in storage:

- all the data to be printed
- a DARGLIST
- a FMTLIST

The data is:

Offset	Name	Contents	Comments
0	A	four bytes of EBCDIC data	
4	B	four bytes of packed decimal data	
8	C1	two bytes of binary data	
10	D1	two bytes of binary data	
12	E1	one byte of EBCDIC data	
13	C2	two bytes of binary data	
15	D2	two bytes of binary data	
17	E2	one byte of EBCDIC data	

The DARGLIST is:

Offset	Name	Contents	Comments
0	DARGDBP	A	
4	DARGRETP	0	The lines are to be printed rather than just formatted and returned to the module.
8	DARGSTID	0	No static text module is used.
12	DARGILP	18	Number of bytes from field A through field E2.
14	DARGCNT	1	There is one repetition substructure in the FMTLIST.
16	DARGRETL	0	The length of the converted data is used as the number of bytes to print.
19	*none*	0	Unused.
18	DARGIND	0	Printing starts in column indicated in FMTLIST.
20	DARGREP	7	Number that is matched with a repetition substructure in FMTLIST.
22	DARGPCT	2	The group of fields identified by repetition substructure 7 in FMTLIST is to be printed twice.

The FMTLIST is:

	Offset	Name	Contents	Comments
A	0	FMTFLGS	X'40'	Identifies these 6 bytes as a spacing substructure.
	1	*none*	0	Unused.

	Offset	Name	Contents	Comments
	2	FMTSPF	3	Space 3 lines.
	4	FMTSPT	C'R'	Space the lines relative to the last printed line.
	5	*none*	0	Unused.
B	6	FMTFLGS	X'10'	Identifies these 12 bytes as a block data substructure.
	7	*none*	0	Unused.
	8	FMTILEN	4	Number of bytes in field A.
	10	FMTIOFF	0	Field A begins zero bytes from the block of data whose address is in DARGDBP.
	12	FMTOCOL	1	Print field A starting in column 1.
	14	FMTOLEN	4	Number of bytes the converted field A occupies in the printed line.
	16	FMTCNVF	0	No conversion is done on field A.
C	18	FMTFLGS	X'10'	Identifies these 12 bytes as a block data substructure.
	19	*none*	0	Unused.
	20	FMTILEN	4	Number of bytes of storage field B occupies.
	22	FMTIOFF	4	Field B starts 4 bytes from the block of data whose address is in DARGDBP.
	24	FMTOCOL	10	Print field B starting in column 10.
	26	FMTOLEN	10	Number of bytes the converted field B occupies in the printed line.
	28	FMTCNVF	X'0880'	Convert field B from packed decimal to unpacked decimal with zero suppression.
D	30	FMTFLGS	X'08'	Identifies these 8 bytes as a replication substructure.
	31	*none*	0	Unused.
	32	FMTRENO	7	Matched with a number in DARGLIST to find the number of iterations.
	34	FMTRBC	3	The data identified in the next 3 substructures is to be repeated.
	36	FMTRIO	5	The number of bytes from field C1 to field C2 in storage. This number is added to the address of the first field each time the field is repeated.
E	38	FMTFLGS	X'10'	Identifies these 12 bytes as a block data substructure for fields C1 and C2.
	39	*none*	0	Unused.

Offset	Name	Contents	Comments
40	FMTILEN	2	Number of bytes fields C1 and C2 each occupy in storage.
42	FMTIOFF	8	Number of bytes from field A to field C1.
44	FMTOCOL	22	Print fields C1 and C2 starting in column 22.
46	FMTOLEN	7	Number of bytes the converted fields C1 and C2 each occupy in the printed line.
48	FMTCNVF	X'4000'	Convert fields C1 and C2 from binary to printable hexadecimal enclosed in *X'data'*.
F 50	FMTFLGS	X'10'	Identifies these 12 bytes as a block data substructure for fields D1 and D2.
51	*none*	0	Unused.
52	FMTILEN	2	Number of bytes fields D1 and D2 each occupy in storage.
54	FMTIOFF	10	Number of bytes from field A to field D1.
56	FMTOCOL	31	Print fields D1 and D2 starting in column 31.
58	FMTOLEN	6	Number of bytes the converted fields D1 and D2 each occupy in the printed line.
60	FMTCNVF	X'1000'	Convert fields D1 and D2 from binary to printable decimal.
G 62	FMTFLGS	X'90'	Identifies these 12 bytes as a block data substructure for fields E1 and E2 and the last substructure in the FMTLIST
63	*none*	0	Unused.
64	FMTILEN	1	Number of bytes fields E1 and E2 each occupy in storage.
66	FMTIOFF	12	Number of bytes from field A to field E1.
68	FMTOCOL	39	Print fields E1 and E2 each starting in column 39.
70	FMTOLEN	1	Number of bytes the converted fields E1 and E2 each occupy in the printed line.
72	FMTCNVF	X'0000'	No conversion is done on fields E1 and E2.

Discussion:

The first spacing substructure causes 3 lines to be spaced.

The block data substructures for fields A and B describe the location of A and B within the block addressed in DARGDBP. Field A is not converted. Field B is converted from packed decimal to zoned decimal and leading zeros are replaced with blanks.

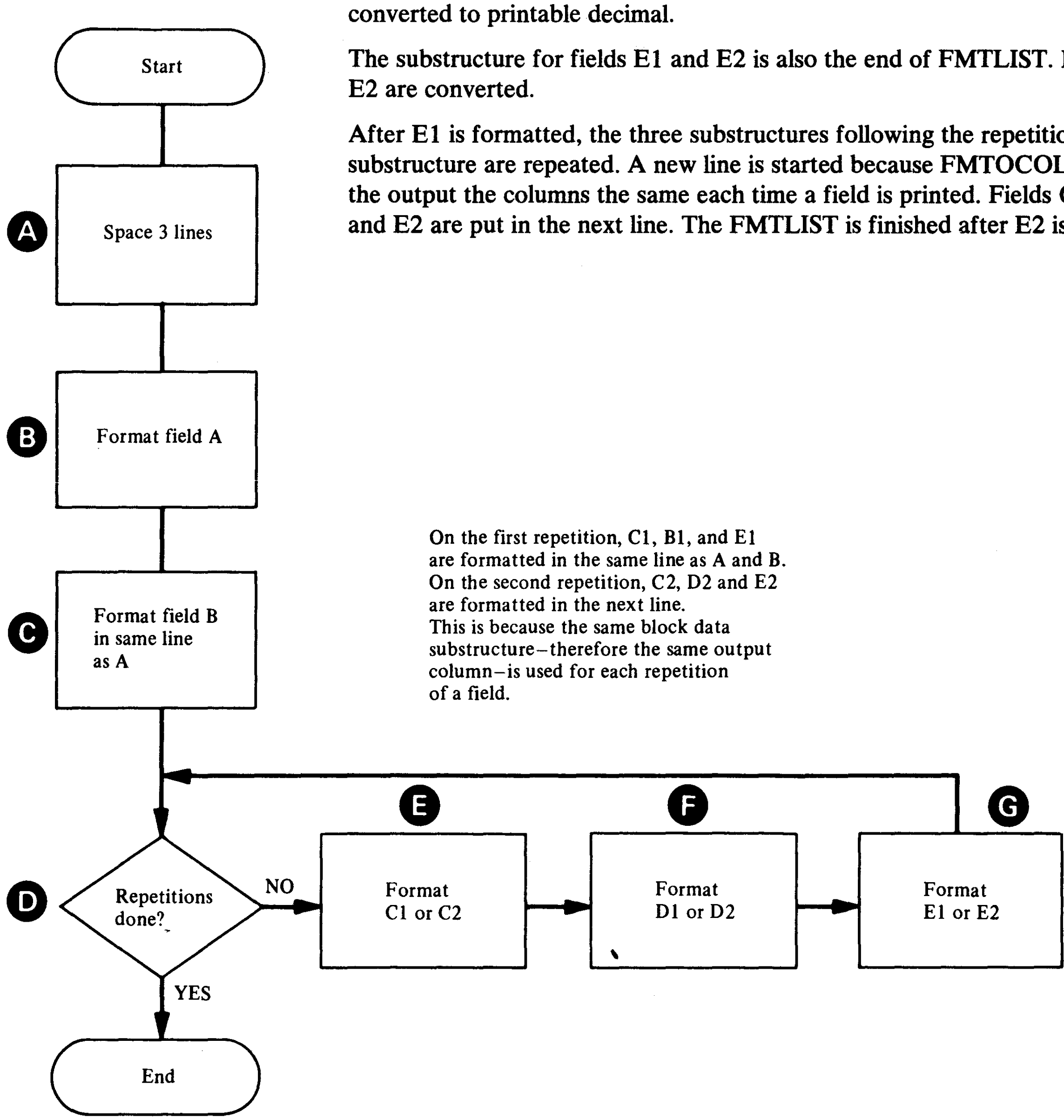
The replication substructure number is matched with an identification number in DARGREP. When a match is found, the DARGPCT immediately after DARGREP tells how many times to repeat the substructures. If the module wants to use the same FMTLIST and print another group of fields C, D, and E, only DARGPCT needs to be changed. The replication substructure tells how many substructures to repeat and an offset that is used to find the group of fields being repeated. On the first repetition the offset is not used, on the second it is added once; on the third repetition it is added twice.

The next substructure describe C1 and C2. On the first repetition the value in FMTIOFF is added to the value in DARGDBP to find field C1. To find field C2, FMTIOFF and FMTRIO in the repetition substructure are added to DARGDBP. Each time a group of substructures is repeated a new line is printed because the output columns for each substructure do not change. For example, in order to print both C1 and C2 in column 22, a new line must be printed. Both C1 and C2 are converted to printable hexadecimal preceded by X' and followed by a single quote.

Fields D1 and D2 are described by the next substructure. D1 and D2 are converted to printable decimal.

The substructure for fields E1 and E2 is also the end of FMTLIST. E1 and E2 are converted.

After E1 is formatted, the three substructures following the repetition substructure are repeated. A new line is started because FMTOCOL keeps the output the columns the same each time a field is printed. Fields C2, D2, and E2 are put in the next line. The FMTLIST is finished after E2 is printed.



Obtaining a Dump For a Text Processor Problem

If you do not have an system dump within the Text Processor routines or an ABORT snap dump within the Text Processor, you can use the Test option to obtain a dump. You may want to obtain a dump within the routine that invoked the Text Processor or within the Text Processor itself.

The Phase or CSECT to Dump Points Cross Reference contains all the dump points within the processor; you can specify these dump points on the FULL option of the TEST keyword to obtain a full partition dump.

The Text Processor has dump points before and after it converts data to printable form. You should use these dump points if there is an error in converting the data.

How to Find Text Processor Argument Lists

If you suspect a problem within the Text Processor, the two structures you should locate in a dump are the Print Control Table (PCT) and the Dynamic Data Argument List (DARGLIST). The PCT and the DARGLIST are described in the section "Data Areas" in this book. The eighth word of the GDT contains the address of the PCT; the address of the DARGLIST is the third parameter passed to IDCTP01 for a print request (UPRINT macro).

Two other structures that you may find helpful to locate in a dump are the queue of format structures and the print buffer.

Figure 18 shows the queue of format structures maintained by the Text Processor. There is an entry in the queue for each format structure that has been used by the current function. Each entry in the queue contains the four-byte text structure ID specified in the DARGLIST. The first three bytes contain the last three characters of the text-structure phase name; the fourth byte contains the entry number of the format structure within the text-structure phase.

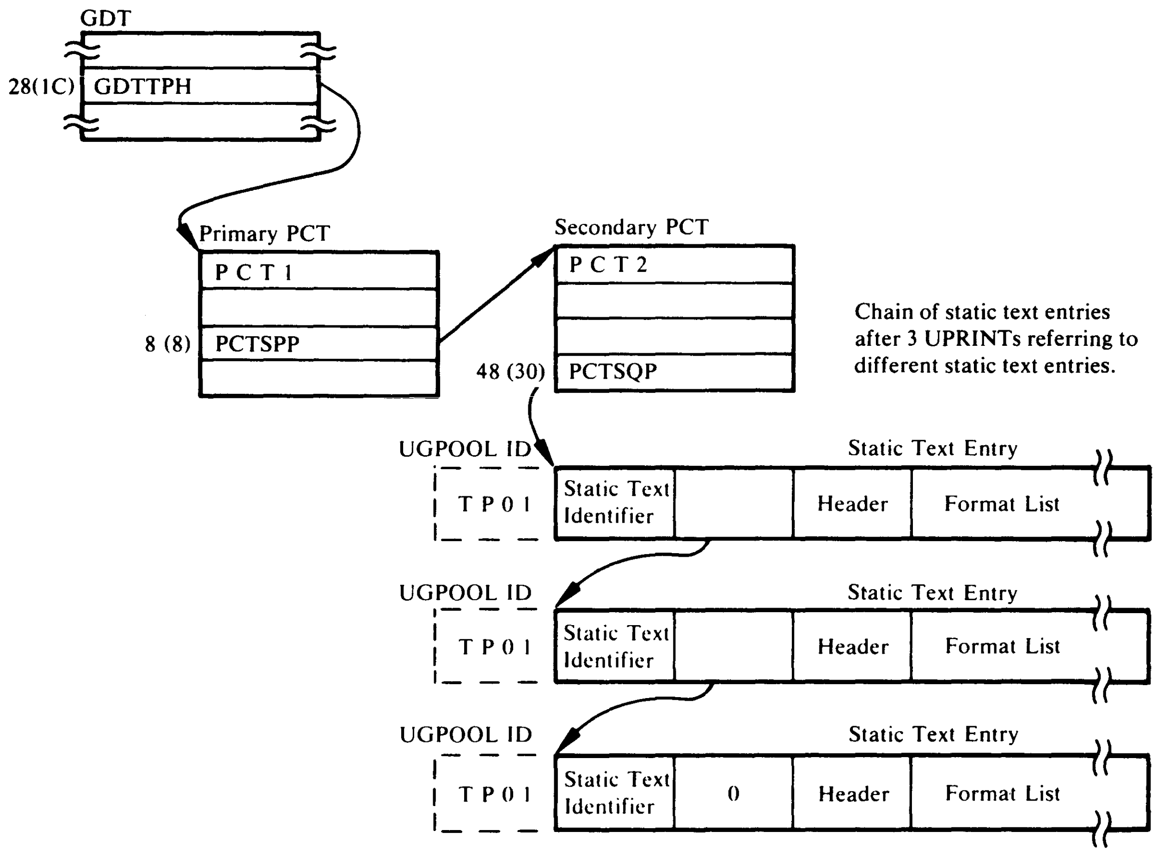


Figure 18. Text Processor Format Structure Queue

Figure 19 shows the print buffer maintained by the Text Processor. It contains the records, other than messages, that have not been printed. The records to be printed are kept in the print buffer until the buffer becomes full or a message must be printed. The primary and secondary PCTs contain the address of the first record in the buffer and the address of the next empty space in the buffer. If both addresses are equal, the buffer is empty.

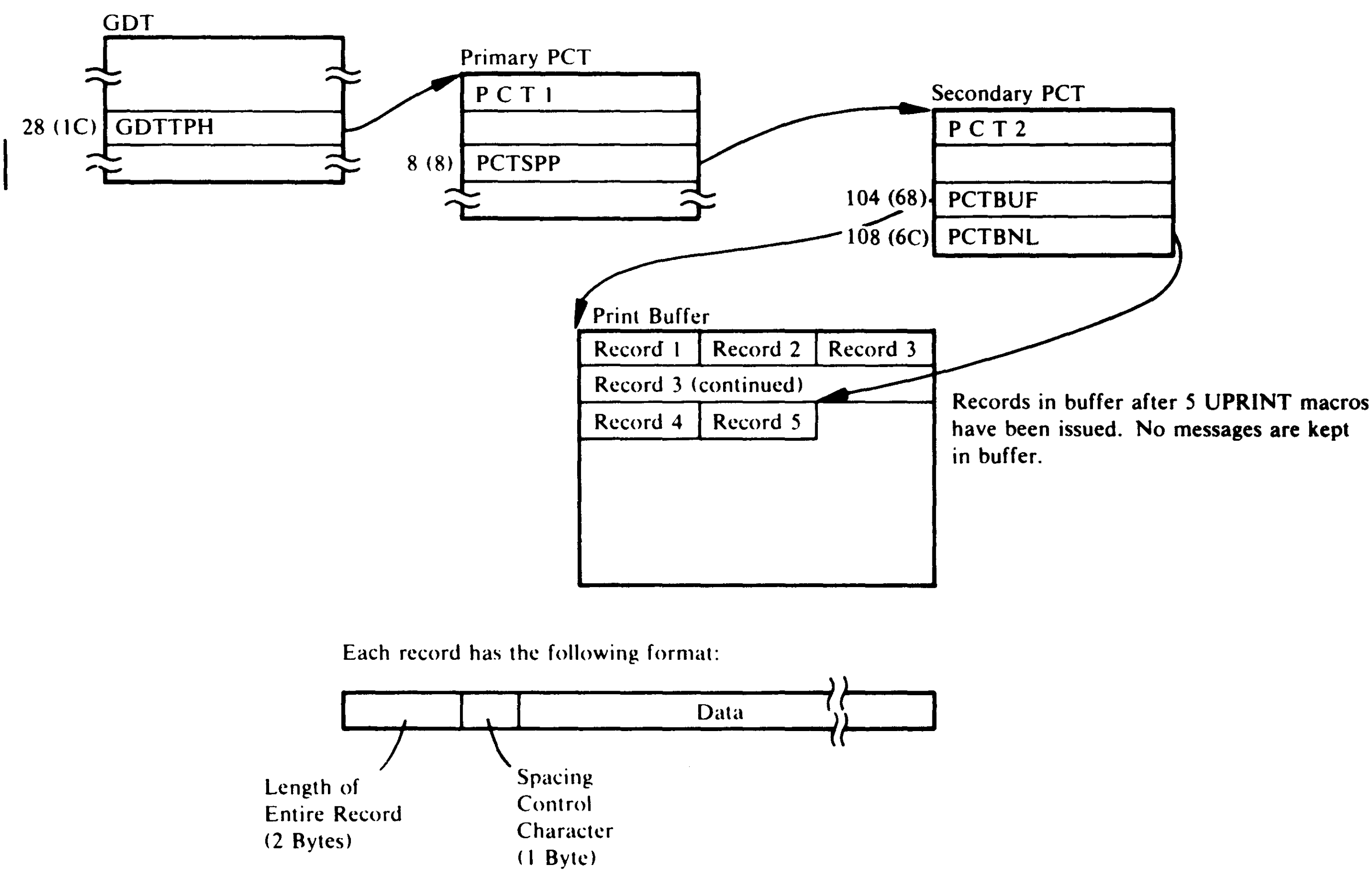


Figure 19. Text Processor Print Buffer

Debugging an I/O Problem

There may be an I/O problem within system I/O routines or within Access Method Services if an ABORT condition occurs in the I/O Adapter or if a system error occurs within the system I/O routines. To determine whether the problem exists in the routines that invoke the I/O Adapter, in the I/O Adapter itself, or in the system I/O routines, you must examine the argument lists passed between the I/O Adapter and the invoking routines, and the I/O Adapter and the system I/O routines.

This section explains how to obtain a dump that contains the I/O argument lists and how to find the argument lists in a dump.

Obtaining a Dump for an I/O Problem

If you do not have a system dump within system I/O routines or an ABORT PDUMP within the I/O Adapter, you can use the Test option to obtain a dump. You may want to obtain a dump within the routine that invoked the I/O Adapter or within the I/O Adapter itself.

The Phase or CSECT to Dump Points Cross Reference contains all the dump points within the processor; you can specify these dump points on the FULL option of the TEST keyword to obtain a full partition dump.

The I/O Adapter has dump points before and after it issues the OPEN macro (dump points IO1O and IO20) and before it issues the CLOSE macro (dump point IO1C). You should use these dump points if there is an error opening or closing data sets. The I/O Adapter has a dump point (IOVR) after issuing a VSAM I/O request which returns a non-zero return code. You should use this dump point if you wish to obtain a dump in a VSAM I/O error situation.

How to Find I/O Argument Lists

The Input/Output Communications Structure (IOCSTR), which is constructed for each data set that has been opened, contains pointers to most of the control blocks used by the system I/O routines. The IOCSTR is also the argument list that is passed between the I/O Adapter and the routines that invoke the I/O Adapter, except for the initial open request. Thus, once you find the IOCSTR, you can find most of the other arguments passed between the I/O Adapter and other routines. The section "Data Areas" in this book explains the format of the IOCSTR.

Figure 20 shows the chain of IOCSTRs constructed for all opened data sets; however, the data sets may not have been opened successfully. The I/O Adapter historical area contains a pointer to the start of the chain.

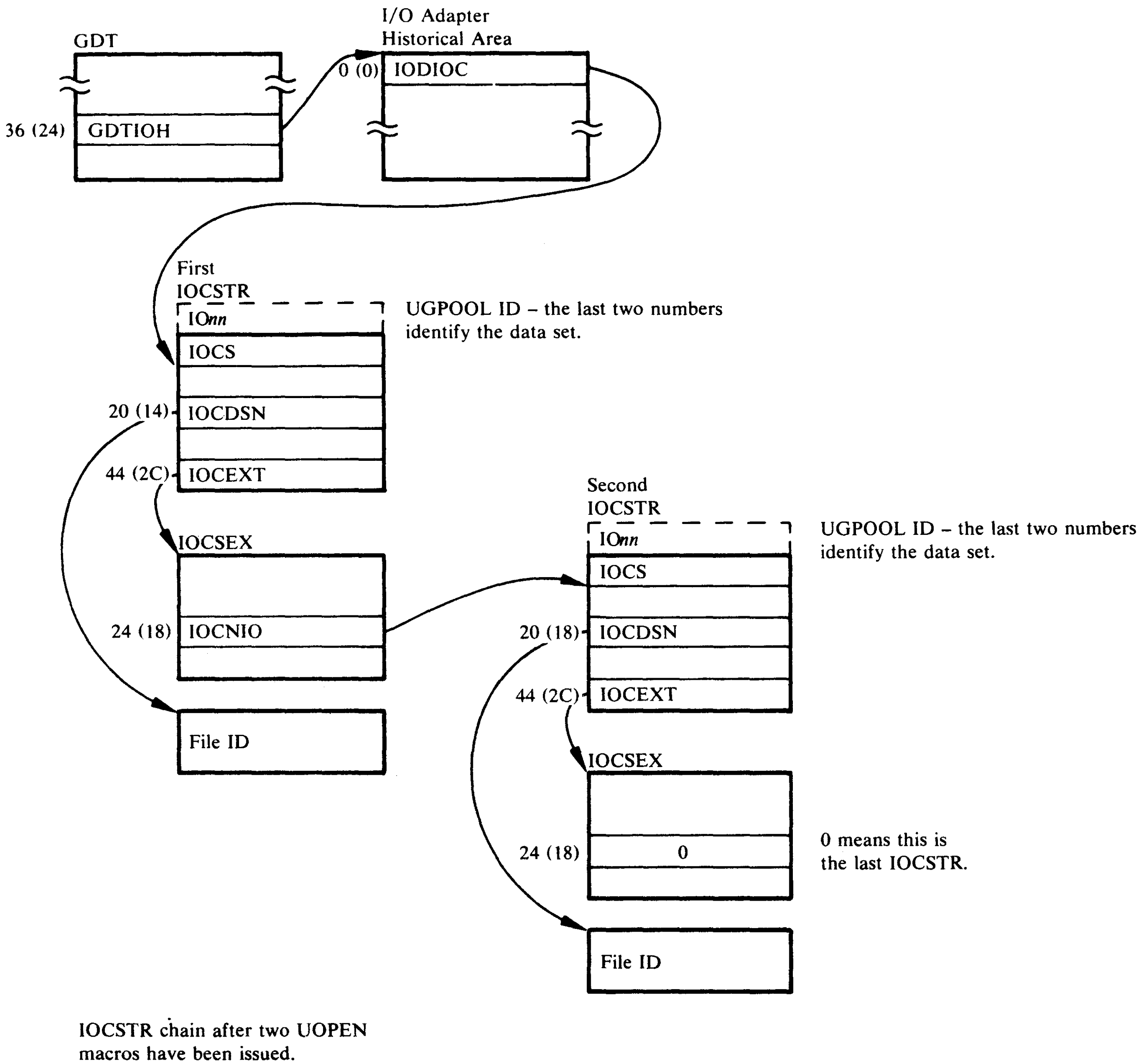


Figure 20. IOCSTR Chain

You can find the address of the IOCSTR for a particular I/O request by finding the parameter list passed to IDCIO01 by the invoking routine. Register 1 of the registers saved by IDCIO01 contains the address of a parameter list. The second word of the parameter list contains the address of the IOCSTR. The third, fourth, and fifth words may also contain addresses of additional IOCSTRs.

Open Argument Lists

Figure 21 shows how the I/O control blocks are connected before an OPEN macro is issued. The IOCSTR addresses can be found from the IOCSTR chain as shown in Figure 18. The IOCSBLT table, which contains pointers to the IOCSTRs for the data sets being opened, can be found at location

IOCSBLT in IDCIO01's automatic storage area. The OPENLIST table, which contains pointers to the DTFs and ACBs for the data sets being opened, can be found at location OPENLIST in IDCIO01's automatic storage area.

In a system dump within the system open routine, register 0 points to a word that contains either the address of the ACB or the address of the DTF.

UGET and UPUT Argument Lists

This section contains some examples of input and output from the UGET and UPUT macros. These examples may be helpful in determining whether the IOCSTR and records for a UPUT request have been passed correctly to the I/O Adapter, and whether the IOCSTR and records for a UGET request have been returned correctly by the I/O Adapter.

Figure 22 shows the IOCSTRs and records passed to the I/O Adapter via a UPUT macro.

Figure 23 shows the IOCSTRs and data returned by the I/O Adapter after a UGET macro is processed.

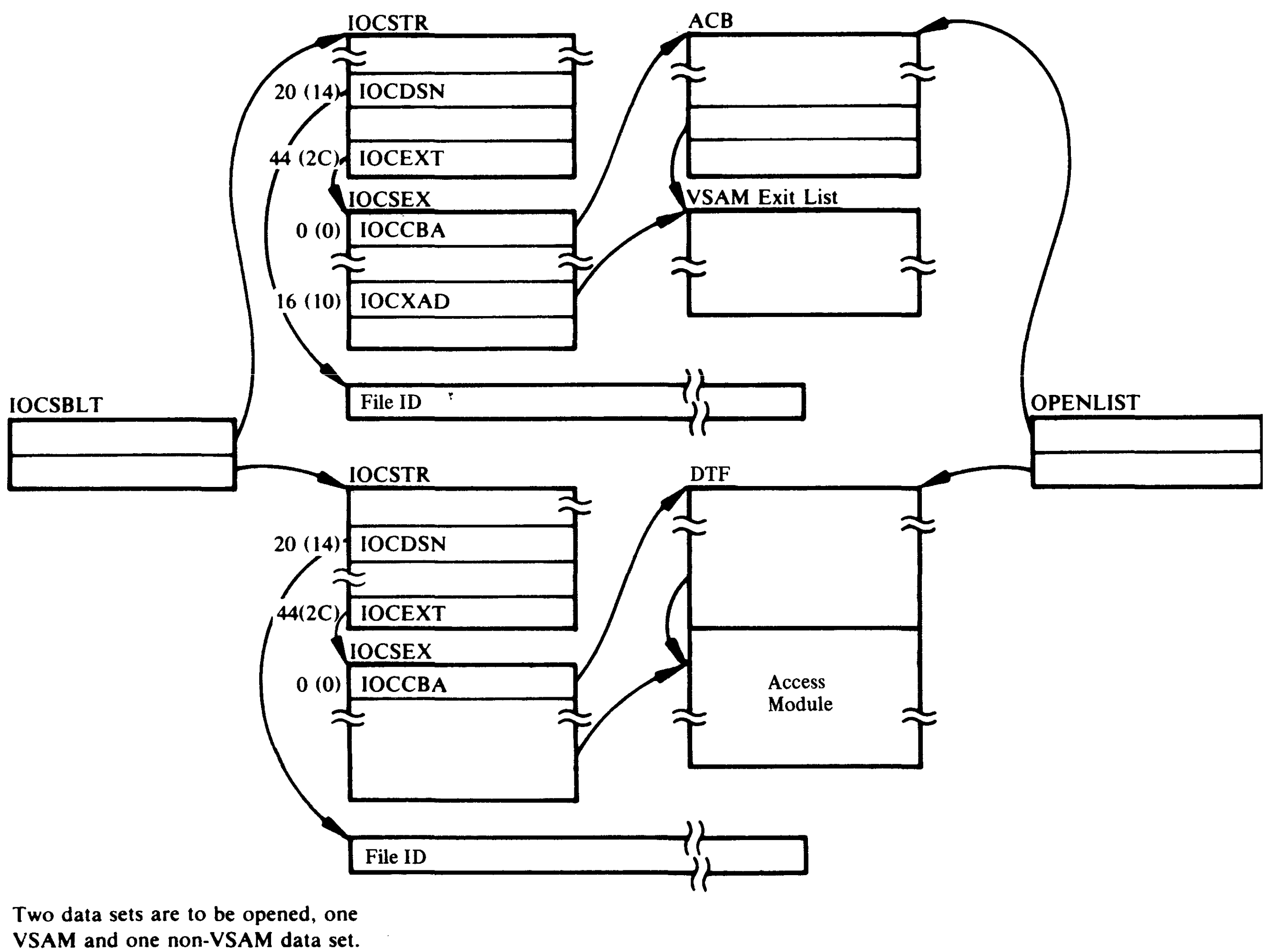
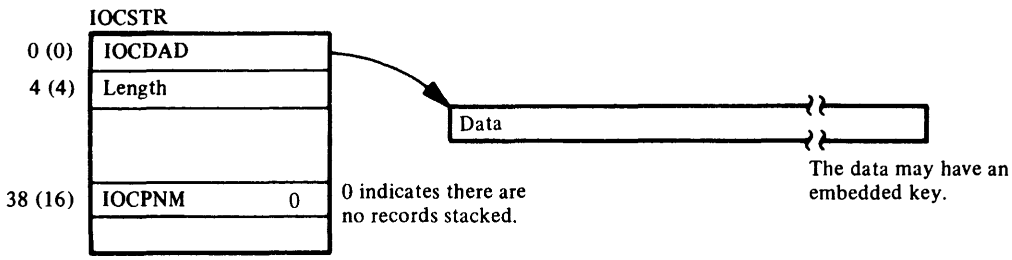


Figure 21. I/O Control Blocks Before OPEN

Example 1. VSAM or NonVSAM Data Set – Single Record Passed via UPUT



Example 2. VSAM or NonVSAM Data Set – Multiple Records Passed via UPUT

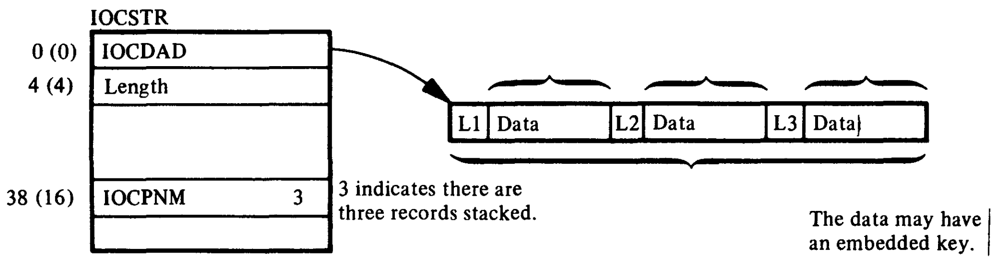


Figure 22. Input to UPUT Macro

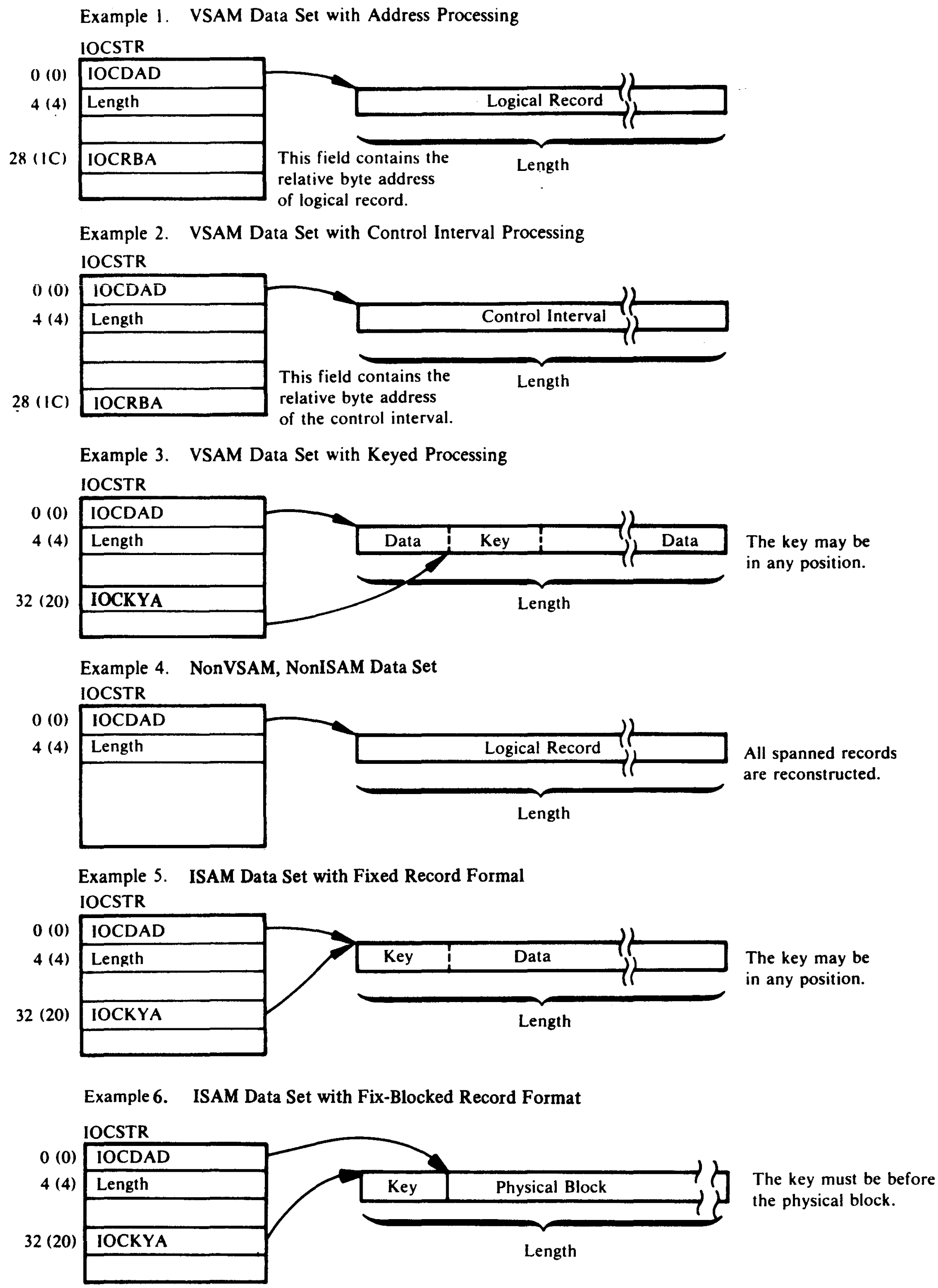


Figure 23. Output from UGET Macro

Messages

The following list shows all the messages printed by the processor. For each message, the following information is listed: the text-structure identifier used internally by the processor to identify the message; the module that causes the message to be printed; the procedure within that module that detects the situation that causes the message to be printed; and the situation that causes the message to be printed. After the text is the entry within the text structure.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC0001I	UVO-1	IDCAL01	IDCAL01	Function was completed without a severe error.
		IDCBI01	TERMPROC	Function was completed without an error or without a severe error in processing the base cluster.
		IDCDE01	IDCDE01	Function was completed without a severe error.
		IDCDL01	IDCDL01	Function was completed without a severe error.
		IDCLC01	IDCLC01	Function was completed without a severe error. All or part of the desired catalog listing was generated.
		IDCLR01	CLEANUP	Function was completed without a severe error.
		IDCMP01	IDCMP01	Function was completed without a severe error.
		IDCPM01	IDCPM01	Function was completed without a severe error.
		IDCPR01	IDCPR01	Function was completed without error, or (1) an end-of-file was reached in the input data set before the ending delimiter specified by the user, or (2) a recoverable I/O error occurred while retrieving or printing a record, or (3) an error occurred closing data sets.
		IDCRC01	EXITTHE	Function was completed without a severe error.
		IDCRM01	IDCRM01	Function was completed without a severe error.
		IDCRP01	IDCRP01	Function was completed without error, or (1) an end-of-file was reached in the input data set before the ending delimiter specified by the user, or (2) a recoverable I/O error occurred while copying a record, or (3) an error occurred closing data sets.
		IDCRS01	WRAPUP	Function was completed without a severe error.
		IDCVY01	IDCVY01	Function was completed without a severe error.
		IDCXP01	IDCXP01	Function was completed without a severe error.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC0002I	UV0-2	IDCEX03	IDCEX03	Access Method Services completed processing.
IDC0005I	UV0-5	IDCPR01	IDCPR01	Printing of records is completed.
		IDCRP01	IDCRP01	Copying of records is completed.
IDC0204I	RI0-5	IDCRI03	IDCRI03	The preceding command was scanned for syntax-checking purposes only.
IDC0206I	RI0-7	IDCRI01	SCANSEP	An extra comma was found between parameters.
IDC0222I	RI0-23	IDCRI01	NXTFIELD	A semicolon was found within a quoted constant.
IDC0233I	RI0-34	IDCRI01	SCANCMD	Too many closing parentheses were found at the end of a command or subparameter list.
IDCO234I	RI0-35	IDCRI01	INREPEAT	Too few parentheses were found at the end of a command.
			SCANCMD	Too few parentheses were found at the end of a command.
IDC0508I	DE0-9	IDCDE01	IDCDE01	Define of the data set is completed.
		IDCMP01	CLUSPROC	Define of the data set being imported is completed.
		IDCRM01	CLUSPROC	Define of the data set is completed.
IDC0509I	DE0-10	IDCDE01	IDCDE01	Define of the data set is completed.
		IDCMP01	CLUSPROC	Define of the data set being imported is completed.
		IDCRM01	CLUSPROC	Define of the data set is completed.
IDC0510I	DE0-11	IDCDE01	IDCDE01	Define of the VSAM catalog is completed.
IDC0511I	DE0-12	IDCDE01	IDCDE01	Define of the data space is completed.
IDC0512I	DE0-13	IDCDE01	IDCDE01	Define of the data set is completed.
IDC0520I	DE0-21	IDCDE01	IDCDE01	The message identifies the recovery volume serial number.
		IDCMP01	CLUSPROC	The message identifies the recovery volume serial number.
		IDCRM01	CLUSPROC	The message identifies the recovery volume serial number.
IDC0526I	AL0-1	IDCAL01	IDCAL01	Alter of the data object is completed.
IDC0550I	DL0-1	IDCDL01	CATCALL MORESP	The catalog returned the name and type of a successfully deleted entry in the catalog work area.
		IDCMP01	DELTPROC	The object with the same name as the object being imported was deleted successfully from the catalog.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC0550I (Continued)			DELTPROC	The object being imported was deleted successfully from the catalog after an error occurred copying data into the object.
		IDCRM01	DELTPROC	The object with the same name as the object being imported was deleted successfully from the catalog.
			DELTPROC	The object being imported was deleted successfully from the catlog after an error occurred copying data into the object.
		IDCXP01	DELTPROC MORESP	The object being exported was deleted successfully from the catalog.
IDC0551I	DL0-8	IDCDL01	IDCDL01	A catalog object was not deleted because of a catalog locate error, a command parameter error, or a catalog delete error.
		IDCXP01	DELTPROC MORESP	The object being exported could not be deleted from the catalog. The catalog return code indicates the reason.
IDC0555I	DL0-5	IDCDL01	CATCALL	The volume entry was not deleted although empty space on the volume was deleted successfully. The catalog return code was 160.
IDC0571I	PR0-19	IDCRP01	IDCRP01	Reloading of a catalog was initiated.
IDC0594I	XP0-5	IDCXP01	CLUSPROC	The portable data set was created successfully.
IDC0603I	MP0-11	IDCMP01	CLUSPROC	The user catalog was connected successfully.
IDC0604I	MP0-12	IDCMP01	CLUSPROC	The first record of the portable data set contained the timestamp written at the time of export.
		IDCRM01	IDCRM01	The first record of a group of associated objects on the portable data set contained the timestamp written at the time of the export.
IDC0611I	MP0-2	IDCMP01	CLUSPROC	The name of the object being imported already exists in the catalog. If NEWNAME is specified, an entry with that name already exists.
IDC0626I	MP0-26	IDCRM01	CLUSPROC UCATPROC NVSMPROC	The object named has been successfully imported.
IDC0652I	BI0-13	IDCBI01	FINPROC	The alternate was built with no errors.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC0665I	LR1-16	IDCLR01	CLENCRA	Informational message stating the number of entries that did not compare.
IDC0669I	RC0-14	IDCRC01	IDCRC01	Informational message stating the CRA from which the entries are processed.
IDC0670I	RC0-15	IDCRC01	EXPORTDR	Informational message stating that data set is on portability data set.
IDC0672I	RC0-17	IDCRC01	CKCATNM	Informational message stating the catalog name for which CRA's are being processed.
IDC0674I	RC0-20	IDCRC01	EXPORTDR	Secondary message containing the object name for which the export driver was called.
			SYNCH	Object named was invalid in the CRA in comparison with the data set.
			DUPNAMCK	Object name appeared twice in the CRA.
			CKNAMES	Object named was not of a type DOS supports.
IDC0676I	RC0-5	IDCRC01	TERM	Informational message stating that the portability data set was created successfully.
IDC0874I	LR1-5	IDCLR01	INTSORT	Space could not be obtained for the sort table. The objects are printed first in, first out.
IDC0877I	LR1-8	IDCLR01	CLENCRA	Informational message stating the number of objects that did not compare.
IDC0888I	RC0-23	IDCRC01	EXPORTDR	Informational message stating that the exported entry contained no data.
IDC0922I	EX0-5	IDCDB02	ITEMDUMP	An invalid dump item was specified in the dump argument list.
IDC0923I	EX0-6	IDCDB02	ARRAYHDR	Invalid array header parameters were specified in the dump argument list.
IDCO924I	EX0-7	IDCDB01	IDCDB01	The dump routine was invoked through a UDUMP macro.
IDC0925I	EX0-8	IDCDB01	IDCDB01	A dump was requested through a UDUMP macro.
IDC1502I	DE0-5	IDCDE02	MODELPRC	Security information was suppressed when a model object was retrieved from the catalog.
IDC1543I	AL0-18	IDCAL01	CHECKPRC	New KEY/RECORDSIZE values equal to old default values.
IDC1544I	AL0-19	IDCAL01	CHECKPRC	New KEY/RECORDSIZE values equal to old non-default values.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC1561I	LC1-2	IDCLC02	ANSVPROC	The UGPOOL request for a larger catalog work area failed. More space was required to process cluster associations.
			LOCPROC	The UGPOOL request for a larger catalog work area failed. A catalog entry required more space.
IDC1562I	LC1-3	IDCLC01	ENTPROC	Only space entries were requested; however, an entry in the entry list is greater than six characters.
IDC1564I	LC1-5	IDCLC01	RTEPROC	An entry retrieved from the catalog is not a type that can be listed.
IDC1565I	LC1-6	IDCLC01	ENTPROC	An entry retrieved from the catalog and specified in the user's entry list is not one of the types requested by the user.
IDC1566I	LC1-8	IDCLC01	ENTPROC	Either (1) the correct password was not supplied for a cluster entry and so the data and index association information could not be processed, or (2) the correct password was not supplied for an entry and the user requested more information than merely entry names, or (3) another type of catalog locate error occurred.
			GNXTPROC	Either the correct password was not supplied for an entry and the user requested more information than merely entry names, or another type of catalog locate error occurred.
			RTEPROC	Either (1) the correct password was not supplied for a cluster entry, and, even though the user requested only entry names, the names of the data and index association were not returned by the catalog, or (2) the correct password was not supplied for a data or index entry associated with a cluster entry, and field information other than entry names was not returned by the catalog, or (3) a non-supported entry type was returned from the catalog.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC1567I	LC1-9	IDCLC01	RTEPROC	Retrieval of a data or index entry associated with a cluster entry was attempted, using the control interval number of the associated entry contained in the cluster entry. However, the entry could not be found in the catalog.
		IDCLC02	CDIPROC	Retrieval of a data or index entry associated with a cluster entry was attempted, using the control interval number of the associated entry contained in the cluster entry. However, the entry could not be found in the catalog.
			VPROC	Retrieval of the data set names associated with a data space was attempted using the control interval number of the associated entry contained in the data space. However, the entry could not be found in the catalog.
IDC1574I	PR0-22	IDCRP01	CATCOMP	More than 100 true name entries failed a comparison test during catalog reload. Processing continues but comparison does not.
IDC1575I	PR0-23	IDCRP01	CATCOMP	A true name record existed on a backup or target catalog without a corresponding record on the backup or target catalog.
IDC1595I	XP0-6	IDCXP01	CLUSPROC	Passwords were suppressed when the object to be exported was retrieved from the catalog.
IDC1623I	MP0-23			This message is no longer supported.
IDC1644I	BI0-5 BI0-17	IDCBI01	SORTPROC	The base cluster record identified in the message was too short to contain the entire alternate key.
IDC1645I	BI0-6 BI0-8	IDCBI01	BLDPROC	Multiple occurrances of the same alternate key have been encountered in building an alternate index defined with the UNIQUEKEY attribute.
IDC1646I	BI0-7	IDCBI01	BLDPROC	The alternate index record identified in the message was too short to contain all the base cluster pointers.
IDC1653I	BI0-14	IDCBI01	FINPROC	The alternate index was built but nonterminating errors were encountered.
IDC1661I	RC0-6	IDCRC01	EXPORTDR	Informational message stating that the data set exported was out-of-synch.
IDC1662I	RC0-7	IDCRC01	EXPORTDR	Informational message stating that the data set was not exported and was out-of-synch.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC1663I	RC0-8	IDCRC02	CLUSPROC	Catalog field could not be located for a path to a VSAM cluster.
IDC1664I	RC0-9	IDCRC02	NVSMPROC	An OS/VS catalog has been connected to a DOS system and contains nonsupported objects.
IDC1667I	RC0-12	IDCRC01	OBJVOLCK	Volumes are out of synch because data set is not on both volumes.
IDC1678I	RC0-2	IDCRC01	EXPORTDR	An error occurred while processing an association for an object being exported.
IDC1679I	RC0-4	IDCRC01		The timestamps or CI of a multivolume data set were not equal.
IDC1870I	LR1-1	IDCLR01	GETPRT	An I/O error occurred while reading the CRA.
		IDCLR02	IDCLR02	An I/O error occurred while reading the CRA.
IDC1871I	LR1-2	IDCLR01	GETPRT	An I/O error occurred while reading the catalog.
		IDCLR02	IDCLR02	An I/O error occurred while reading the catalog.
IDC1875I	LR1-15	IDCLR01	TCICTCR	The CI from the catalog record could not be found in the CTT table therefore it could not be translated.
IDC1878I	LR1-9	IDCLR01	CATOPEN	IDCRC04 encountered an error while searching for the catalog name in the cluster record of the catalog.
			CKEYRNG	IDCRC04 encountered an error while searching for the high key value in a given CRA record.
			CRAOPEN	IDCRC04 encountered an error while searching for either the owning catalog name or the volume serial in the CRA record.
			CTTBLD	IDCRC04 encountered an error while searching for the entry type of the catalog CI in the CRA record.
			GETPRT	IDCRC04 encountered an error while searching for the entry type or the entry name in the CRA record.
			INTASOC	IDCRC04 encountered an error while searching for the associated entry type or entry name fields in the CRA records.
			INTSORT	IDCRC04 encountered an error while searching for the name in a given CRA record.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
			INTVEXT	IDCRC04 encountered an error while searching for the extension pointer in a given CRA record.
			PRTCMP	IDCRC04 encountered an error while searching for the used length field in a given CRA record.
IDC1878I	LR1-9	IDCLR01	PRTDMP	IDCRC04 encountered an error while searching for the used length field in a given CRA record.
			PRTOJVL	IDCRC04 encountered an error while searching for the volume information or high key value in a given CRA record.
			PRTVOL	IDCRC04 encountered an error while searching for the volume timestamp information in a given catalog or CRA record.
IDC1880I	LR1-11	IDCLR01	PRTVOL	Timestamp for the format-4 record could not be read for the CRA volume.
IDC1885I	LR1-17	IDCLR01	PRTMCWD	IDCRC04 encountered an error while searching for mismatched fields in a given CRA record. The CRA record had previously been read and had indicated that mismatches existed.
IDC1887I	RC0-22	IDCRC01	SCANCRA	I/O error encountered on a CRA record.
			TIMESTAMP	Volume timestamp could not be obtained.
IDC1927I	EX0-12	IDCPM01	MARGPARM	Margin values specified are invalid.
IDC2035I	TP6-3	IDCTP06	IDCTP06	An error was detected in the information transmitted in the error conversion table when attempting to convert a numeric error code to a prose message.
IDC2552I	DL0-2	IDCDL01	PARAMCHK	The type of the entry to be deleted was retrieved from the catalog, but the type is not one the user is allowed to delete.
IDC2553I	DL0-3	IDCDL01	PARAMCHK	The type of the entry to be deleted was retrieved from the catalog, but the type conflicts with the erase option.
IDC2554I	DL0-4	IDCDL01	PARAMCHK	The entry to be deleted is a nonVSAM entry and the scratch option is set by default; however, the user did not specify the FILE parameter.
IDC2556I	DL0-6, DL0-7	IDCDL01	MORESP	No storage is available for a larger catalog work area.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC2563I	LC1-4	IDCLC02	AUPROC	The allocation request conflicts with a nonVSAM or user catalog entry specified in the entry list.
			VPROC	The allocation request conflicts with a space (volume) entry specified in the entry list.
		IDCLC01	INITPROC	Either the allocation request conflicts with the type specification of cluster, alternate index, path space, nonVSAM, or user catalog, or the volume request conflicts with the type specification of cluster, alternate index or path.
IDC2616I	MP0-16	IDCMP01	CLUSPROC	A path import operation failed.
		IDCRM01	CLUSPROC	A path import operation failed.
IDC2618I	MP0-18	IDCMP01	CLUSPROC	An invalid object's subparameter was found.
IDC2620I	MP0-20	IDCRM01	ALISPROC	A recovery portable data set being imported contains objects not definable in DOS/VS.
			GDGPROC	A recovery portable data set being imported contains objects not definable in DOS/VS.
IDC2621I	MP0-21	IDCRM01	CLUSPROC UCATPROC NVSMPROC	The object named could not be imported.
IDC2640I	BI0-1	IDCBI01	LOCPROC	The file identified via OUTFILE is not an alternate index.
IDC2642I	BI0-3	IDCBI01	LOCPROC	The alternate index identified in the message is not related to the base cluster identified via INFILE.
IDC2647I	BI0-8	IDCBI01	INITPROC	Storage was not available to obtain buffers and work areas.
IDC2648I	BI0-9	IDCBI01	JCPROC FINPROC	DLBL statements for sort work files are either missing or in error.
IDC2649I	BI0-10	IDCBI01	DEFPROC	A sort work area was obtained smaller than that required and job control for sort work files was missing or in error.
IDC2650I	BI0-11	IDCBI01	DEFPROC	An internal sort could not be completed and job control for sort work files was missing or in error.
IDC2651I	BIO-12	IDCBI01	DEFPROC	Define of sort work files failed.
IDC2654I	BI0-15	IDCBI01	FINPROC	The alternate index was not built due to severe errors.
IDC2655I	BI0-16	IDCBI01	CATPROC	Catalog information was not returned for a locate request.
IDC2656I	BI0-19	IDCBI01	CATPROC	A VSAM catalog locate failed with a nonzero return code.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC2660I	RC0-3	IDCRC01	CKNAMES	The object named is from an OS/VS volume and is of a type that is not supported in DOS.
		IDCRC02	CLUSPROC	The object named is from an OS/VS volume and contains associations not supported in DOS.
			GDGPROC	An OS/VS catalog which contains generation data groups which are not supported in DOS has been connected to a DOS system.
			NVSMPROC	The object named was not a nonVSAM data set or a user catalog.
IDC2666I	RC0-11	IDCRC01	SYNCH	The selected entry was not found in the selected CRA.
IDC2668I	RC0-13	IDCRC01	OBJVOLCK	A required volume was not supplied in the CRA keyword.
IDC2671I	RC0-16	IDCRC01	CKCATNM	The CRA has a different name than the others being processed.
IDC2673I	RC0-19	IDCRC01	BUILDCRV	Required information about the volume could not be obtained.
IDC2675I	RC0-21	IDCRC01	CKNAMES	The same name was found in more than one CRA.
IDC2677I	RC0-1	IDCRC01	EXPORTDR	The data set was not exported because of the error indicated in previous messages.
IDC2872I	LR1-3	IDCLR01	CRAOPEN	The catalog specified in the input for compare was not the owning catalog found in the CRA.
IDC2873I	LR1-4	IDCLR01	CATOPEN	Catalog could not be opened, therefore the compare option was ignored.
			CRAOPEN	The CRA opened belongs to a catalog other that the one specified in the compare.
IDC2876I	LR1-6	IDCLR01	CRAOPEN	A verify was issued after opening a CRA and it failed.
IDC2879I	LR1-10	IDCLR01	CATOPEN	IDCRC04 could not find the catalog name from the cluster record or the volume serial of the catalog so it could not lock out all other usage of the CRA while it is being listed.
IDC2882I	LR1-13	IDCLR01	CTTBLD	LISTCRA encountered an error reading the catalog control record.
IDC2884I	LR1-7	IDCLR01	CATOPEN	A verify was issued after opening a catalog and it failed.
IDC2886I	RC0-18	IDCRC01	ERRCK	CRA can not be opened because of some errors encountered.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC2950I	TP1-1	IDCTP01	IDCTP01	Either (1) no format list or static text identification was passed as input, or (2) no valid bits in FMTFLGS were turned on, or (3) the input or output length specified was less than 1.
IDC2951I	TP1-2	IDCTP01	IDCTP01	The output column specified is not within the print line.
IDC2952I	TP1-3	IDCTP01	BDCONV	For binary to decimal conversions, the input data length was more than 4 or the converted length was more than 16.
			PUPCONV	For packed to unpacked conversions, the converted length was more than 15, or the input data length was more than 8.
IDC2953I	TP1-4	IDCTP01	REDO	A REDO structure is nested.
IDC2954I	TP1-6	IDCTP05	IDCTP05	The requested static text entry was not in the specified module.
IDC2955I	TP1-7	IDCTP01	PUPCONV	An invalid packed decimal field was passed by the caller.
IDC3003I	UV0-3	IDCAL01	IDCAL01	The VSAM catalog could not be opened, or another severe error occurred.
		IDCBI01	TERMPROC	Either (1) a severe error was encountered in processing the base cluster, or (2) the EXTERNALSORT parameter was specified but the job control for sort files was missing or in error.
		IDCDE01	IDCDE01	The VSAM catalog to contain the defined object could not be opened, or another severe error occurred.
		IDCDE02	MODELPRC	The VSAM catalog containing the model project could not be opened.
		IDCDL01	CATOPEN	The VSAM catalog could not be opened.
		IDCLC01	IDCLC01	A severe error occurred. Listing of the catalog was not attempted or terminated if begun.
		IDCMP01	IDCMP01	A severe error occurred.
		IDCPR01	IDCPR01	Either (1) an error occurred opening the input or alternate output data sets, or (2) a unrecoverable error occurred while retrieving or printing a record, or (3) more than three I/O errors occurred while retrieving records.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3003I (continued)			TEXTPSET	The static text subtitle line could not be retrieved.
			DELIMSET	An incompatible use of delimiters was found during a data set print operation.
		IDCRC01	EXITTHE	Function was not completed because a severe error was encountered.
		IDCRM01	IDCRM01	A severe error occurred.
		IDCRP01	IDCRP01	Either (1) an error occurred opening the input or output data sets, or (2) a unrecoverable error occurred while copying the data set, (3) more than three I/O errors occurred while copying the data set, (4) an error occurred while attempting a catalog reload, or (5) a nonrelative record input data set did not have a non-empty relative record output data set.
			DELIMSET	An incompatible use of delimiters was found during a data set copy operation.
		IDCRS05	CKERR	A severe error occurred which prevented further processing.
		IDCVY01	IDCVY01	The VSAM data set to be verified could not be opener, or the verify was not successful.
		IDCXP01	IDCXP01	A severe error occurred.
IDC3004I	UV0-4	IDCAL01	ALTERPRC	Storage was not available for one of the following: the volume list or the PASSWALL field.
			IDCAL01	Storage was not available for the CTGPL, CTGFV, and CTGFLs.
			INDEXPRC	Storage was not available for the index parameter list if KEYS was specified.
			LOCATPRC	Storage was not available for the catalog work area.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3004I (Continued)		IDCDE01	IDCDE01	Storage was not available for the CTGPL and CTGFV.
		IDCDE02	ALLCPROC	Storage was not available for one of the following: CTGFLs, the volume list, the file sequence list, or the device type list.
			KEYPROC	Storage was not available for one of the following: the AMDSBCAT CTGFL and the AMDSBCAT field, or the key range list.
			MODELPRC	Storage was not available for the catalog parameter list or the catalog work area.
			NAMEPROC	Storage was not available for the CTGFLs.
			PROTPROC	Storage was not available for the CTGFLs needed to set up the protection attributes.
		IDCIO01	PUTREP	Storage was not available for the input work area.
		IDCIO02	BUILDACB	Storage was not available for the ACB or the EXLST.
			BUILDDBK	Storage was not available for the required I/O areas.
			BUILDRPL	Storage was not available for the input work area or the RPL.
			CKNONOP	No storage is available for the input work area required to process spanned, nonVSAM records.
			DSDATA	No space available to read the Label Cylinder.
			OPENRTN	Storage was not available for the IDCSTR.
		IDCLC01	INITPROC	Storage was not available for one of the following: catalog parameter lists, catalog work areas, or the static text used in the catalog listing.
		IDCLR01	ADDASOC	Storage was not available for the association table extension.
			BLDVEXT	Storage was not available for the VEXTTBL extension.
			CTTBLD	Storage was not available for the CI translate table.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3004I (Continued)			INITLZE	Storage was not available for the initial ASSOCTBL and VEXTTBL.
			INTASOC	Storage was not available for the association table extension.
		IDCMP01	FPLPROC	Storage was not available for CTGFLs.
			BPASPROC	Storage was not available for the PASSWALL field.
			CLUSPROC	Storage was not available for the catalog work area.
			CPLPROC	Storage was not available for the CTGPL.
			CTLPROC	Storage was not available for the catalog work area.
			DELTPROC	Storage was not available for the catalog work area.
			FVTPROC	Storage was not available for the CTGFV.
			LVLPROC	Storage was not available for one of the following: the catalog work area, CTGFLs, or volume serial lists.
		IDCPM01	TESTPARM	Storage was not available for the Test Option Data Area.
		IDCRC01	IDCRC01	Storage was not available for one of the tables required by EXPORTRA.
		IDCRC02	CLUSPROC	Storage was not available for the control record output buffer.
			CTLGPROC	Storage was not available for the catalog work area.
			IDCRC02	Storage was not available for the output buffer area.
			LOCPROC	Storage was not available for the CPL, FPL and the catalog work area.
			NVSMPROC	Storage was not available for the control record output buffer.
			SAVEPROC	Storage was not available for the input record save area.
		IDCRI01	GETSPACE	Storage was not available for The FDT.
			IDCRI02	Storage was not available for one of the following: work space or the FDT.
			INREPEAT	Storage was not available for the FDT.
			RIINIT	Storage was not available for the Reader/Interpreter Historical Data Area.
			SCANCMD	Storage was not available for the FDT.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3004I (Continued)		IDCRM01	ALISPROC	Storage was not available for the catalog data record buffer.
			BFPLPROC	Storage was not available for the FPLs.
			BPASPROC	Storage was not available for the PASSWALL information.
			CLUSPROC	Storage was not available for the buffer area or volume list.
			CPLPROC	Storage was not available for the catalog parameter list.
			CTLGPROC	Storage was not available for the catalog parameter list.
			DELTPROC	Storage was not available for the catalog work area.
			FVTPROC	Storage was not available for the FVT or FPLs.
			LVLRPROC	Storage was not available for the volume serial list, the device types list, or the file sequence number list.
			NFVTPROC	Storage was not available for the FVT or FPLs.
			NVSMPROC	Storage was not available for the control record buffer.
			RANGPROC	Storage was not available for the range list.
			UCATPROC	Storage was not available for the data record.
		IDCRS01	IDCRS01	Storage was not available for automatic storage for modules IDCRS02 – IDCRS07.
			INIT	Storage was not available for any one of the following: the record access buffers (RAB), the CRA user buffer, record management and umacro work area, catalog management work area, IKQMDADS parameter list, the CIXLT table, the UIOINFO return area.
		IDCRS03	GETTAB	Storage was not available for the association work area.
		IDCRS03	PROCVOL	Storage was not available for the space bit map.
		IDCRS03	VERB	Storage was not available for the GDG level difference string work area.
		IDCRS04	NINIT	Storage was not available for the FIND work area.
		IDCRS04	NXPND	Storage was not available to expand the FIND work area.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3004I (continued)		IDCRS05	BLDRLST	Storage was not available for the RESVOL table.
		IDCRS05	BLDVLST	Storage was not available for the VOLSERTB.
		IDCRS06	WFDEF	Storage was not available for the CPL, FPL, and DEFINE work area.
		IDCRS07	RENMSETV	Storage was not available for the RENAME volume list.
		IDCXP01	ALTRPROC	Storage was not available for the CTGFV.
			CLUSPROC	Storage was not available for the control record output buffer.
			CTLGPROC	Storage was not available for the second catalog work area obtained when the first work area was too small.
			DELTPROC	Storage was not available for the CTGPL or the catalog work area.
			LOCPROC	Storage was not available for the CTGPL or the catalog work area.
			MORESP	Storage was not available for the catalog work area.
IDC3006I	UV0-6	IDCPR01	DELIMSET	Beginning positioning failed.
		IDCRP01	DELIMSET	Beginning positioning failed.
IDC3007I	(See note at end of list)	IDCAL01	IDCAL01	The catalog return code was nonzero for an alter request.
			CHECKPRC	The catalog return code was nonzero for a locate request.
			LOCATPRC	The catalog return code was nonzero for a locate request.
		IDCBI01	FINPROC	The catalog return code was nonzero for a locate request against the base cluster or alternate index, or for a define request for external sort work files.
		IDCDE01	IDCDE01	The catalog return code was nonzero for a define request.
		IDCDE02	MODELPRC	The catalog return code was nonzero for a request to locate a model object.
		IDCDL01	CATCALL	The catalog return code was nonzero for a delete request. This message is not issued for a return code of 160, however, because 160 indicates a normal condition.
			FINDTYPE	The catalog return code was nonzero for a locate request.
			MORESP	The catalog return code was nonzero for a delete request.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3007I (Continued)		IDCLC02	LOCPROC	The catalog return code was nonzero for a locate request.
		IDCMP01	CTLGPROC	The catalog return code was nonzero.
			DELTPROC	The catalog return code was nonzero for a delete request.
		IDCRC02	CTLGPROC	The catalog return code was nonzero for a locate request.
		IDCRM01	CTLGPROC	The catalog return code was nonzero for a define or alter request.
			DELTPROC	The catalog return code was nonzero for a delete request.
		IDCRS01	INIT	The catalog return code was non-zero for a locate request.
		IDCRS06	WFDEF	The catalog return code was non-zero when defining the workfile.
			WFDEL	The catalog return code was non-zero when deleting the workfile.
		IDCXP01	CTLGPROC	The catalog return code was nonzero for a delete, alter, or locate request.
			DELTPROC	The catalog return code was nonzero for a delete request.
			MORESP	The catalog return code was nonzero for a delete request.
IDC3009I	(See note at end of list)	IDCAL01	IDCAL01	The catalog return code was nonzero for an alter request.
			CHECKPRC	The catalog return code was nonzero for a locate request.
			LOCATPRC	The catalog return code was nonzero for a locate request.
		IDCBI01	FINPROC	The catalog return code was nonzero for a locate request against the base cluster or alternate index, or for a define request for external sort work files.
		IDCDE01	IDCDE01	The catalog return code was nonzero for a define request.
		IDCDE02	MODELPRC	The catalog return code was nonzero for a request to locate a model object.
		IDCDL01	CATCALL	The catalog return was nonzero for a delete request. This message is not issued for a return code of 160, however, because 160 indicates a normal condition.
			FINDTYPE	The catalog return code was nonzero for a locate request.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3009I			MORESP	The catalog return code was nonzero for a delete request.
			LOCPROC	The catalog return code was nonzero for a locate request.
		IDCLC02	LOCPROC	The catalog return code was nonzero for a locate request.
		IDCMP01	CTLGPROC	The catalog return code was nonzero.
			DELTPROC	The catalog return code was nonzero for a delete request.
		IDCRC02	CTLGPROC	The catalog return code was nonzero for a locate request.
		IDCRM01	CTLGPROC	The catalog return code was nonzero for a define or alter request.
			DELTPROC	The catalog return code was nonzero for a delete request.
		IDCRS01	INIT	The catalog return code was non-zero for a locate request.
		IDCRS06	WFDEF	The catalog return code was non-zero when defining the workfile.
			WFDEL	The catalog return code was non-zero when deleting the workfile.
		IDCXP01	CTLGPROC	The catalog return code was nonzero for a delete, alter, or locate request.
			DELTPROC	The catalog return code was nonzero for a delete request.
			MORESP	The catalog return code was nonzero for a delete request.
IDC3010I	UV0-11	IDCAL01	IDCAL01	The file identified in the DLBL statement does not match that given in the CATALOG parameter.
		IDCDE01 IDCDE02	IDCDE01 MODELPRC	The file identified in the DLBL statement does not match that given in the CATALOG parameter.
		IDCDL01	CATOPEN	The file identified in the DLBL statement does not match that given in the CATALOG parameter.
		IDCLC01	INITPROC	The file identified in the DLBL statement does not match that given in the CATALOG parameter.
IDC3010I		IDCMP01	RECPROC	The file identified in the OUTFILE parameter does not match the name given in the IMPORT command or any paths over it.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3010I (Continued)		IDCXP01	RECPROC	The file identified in the INFILE parameter does not match that given in the EXPORT command or any paths over it.
IDC3012I	TP6-9	IDCTP06	CATERCNV	Verbalization of catalog return code 8. The entry name supplied by the user is not in the specified catalog.
IDC3013I	TP6-10	IDCTP06	CATERCNV	Verbalization of catalog return code 8. The file name supplied by the user is already in the catalog.
IDC3014I	TP6-11	IDCTP06	CATERCNV	An error occurred during a VSAM catalog operation.
IDC3016I	TP6-12	IDCTP06	CATERCNV	Verbalization of catalog return code 4. An error occurred while a VSAM catalog was being opened or closed or the user catalog specified by the command cannot be found.
IDC3017I	TP6-13	IDCTP06	CATERCNV	Verbalization of catalog return code 20. The catalog or the catalog recovery area (CRA) is full.
IDC3018I	TP6-14	IDCTP06	CATERCNV	Verbalization of catalog return code 56. The maximum number of attempts to supply the correct password was exceeded by the operator, or the user-specified verification routine failed to authorize use of the file.
IDC3019I	TP6-15	IDCTP06	CATERCNV	Verbalization of catalog return code 60. Invalid catalog action request for the entry named.
IDC3020I	TP6-16	IDCTP06	CATERCNV	Verbalization of catalog return code 68. Either an attempt was made to extend a unique VSAM file, or a specified volume either cannot accommodate an initial allocation, or cannot be extended when required.
IDC3021I	TP6-17	IDCTP06	CATERCNV	Verbalization of catalog return code 72. Either an illegal system symbolic unit was assigned or no system symbolic unit was assigned.
IDC3022I	TP6-18	IDCTP06	CATERCNV	Verbalization of catalog return code 80. The object specified in the RELATE parameter of a DEFINE command does not exist, or is improper for the type of object being defined.
IDC3023I	TP6-19	IDCTP06	CATERCNV	Verbalization of catalog return code 84. An attempt to delete an entry failed because its expiration date has not been reached, and the PURGE option was not specified.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3024I	TP6-21	IDCTP06	CATERCNV	Verbalization of catalog return code 148. A volume owned by another catalog was specified.
IDC3025I	TP6-22	IDCTP06	CATERCNV	Verbalization of catalog return code 156. A volume does not contain a data space with sufficient room for allocation of another VSAM file.
IDC3026I	TP6-23	IDCTP06	CATERCNV	Verbalization of catalog return code 172. A DEFINE operation specified the name of a file with the UNIQUE attribute, but there is already a file on the volume with the same name.
IDC3027I	TP6-24	IDCTP06	CATERCNV	Verbalization of catalog return code 176. During the definition of a data space, an attempt was made to perform a VSAM allocate function, but there was no space in the VTOC for an additional DSCB.
IDC3028I	TP6-25	IDCTP06	CATERCNV	Verbalization of catalog return code 184. The catalog is currently open and cannot be deleted.
IDC3029I	TP6-26	IDCTP06	CATERCNV	Verbalization of catalog return code 192. The maximum logical record length specified is greater than 32,761 for a nonspanned file.
IDC3030I	TP6-27	IDCTP06	CATERCNV	Verbalization of catalog return code 196, 200. The data component control interval size specified is greater than 32,767; or the index component control interval size is greater than the maximum block size of the index device.
IDC3031I	TP6-28	IDCTP06	CATERCNV	Verbalization of catalog return code 204. The KEY specification extends beyond the end of the maximum logical record.
IDC3032I	TP6-29	IDCTP06	CATERCNV	Verbalization of catalog return code 208. The buffersize specified during a DEFINE operation is too small to contain the minimum number of control intervals for the VSAM file being defined.
IDC3033I	TP6-30	IDCTP06	CATERCNV	Verbalization of catalog return code 248. This condition arises when a function requires a volume that is not owned by the referenced VSAM catalog.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3044I	TP6-39	IDCTP06	CATERCNV	Verbalization of catalog return code 16. The CYLINDER parameter was specified in the DEFINE command but the extents found on the corresponding DLBL/EXTENT statements do not start or end on a cylinder boundary.
IDC3045I	TP6-40	IDCTP06	CATERCNV	Verbalization of catalog return code 152. An attempt was made to delete a non-empty VSAM catalog.
IDC3046I	TP6-41	IDCTP06	CATERCNV	Verbalization of catalog return code 100. An attempt was made to define a unique file on a volume that does not contain a catalog recovery area (CRA).
IDC3047I	TP6-42	IDCTP06	CATERCNV	Verbalization of catalog return code 216. A space allocation attempt failed because the new extent specified in a EXTENT statement overlapped the volume table of contents (VTOC), an existing file or other extents specified in the DLBL statement.
IDC3048I	TP6-43	IDCTP06	CATERCNV	Verbalization of catalog return ocde 240. A DLBL or EXTENT statement is missing or in error or a system logical unit error was detected.
IDC3190I	AL0-24	IDCAL01	PARAMCHK	One of the parameters specified on the command is invalid for the entry type.
IDC3200I	RI0-1	IDCRI01	SCANCMD	The number of positional parameters found (PPARMCNT) exceeds the number defined in the descriptor for the current subparameter list (SUBCOUNT).
IDC320I	RI0-2	IDCRI01	BUILDFDT	The input constant length (UNITINDX) exceeds the maximum length defined by the descriptor.
			CONVERT	The input constant length (UNITINDX) exceeds the maximum length defined by the descriptor.
			NXTFIELD	The input constant length (UNITINDX) exceeds the maximum length that the Reader/Interpreter can handle (UNITMAX).
			PACKCVB	The input constant length (UNITINDX) exceeds the maximum length defined by the descriptor.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3202I	RI0-3	IDCRI01	ERROR1	The remainder of a command was bypassed due to an error in it.
			ERROR2	The remainder of a command was bypassed due to an error in it.
IDC3203I	RI0-4	IDCRI01	DSIDCHK	A data set name does not have the correct syntax.
IDC3205I	RI0-6	IDCRI01	SCANCMD	The closing parentheses of a subparameter list was found before any parameters were found in the list or an opening parentheses was found before any keyword was found.
IDC3207I	RI0-8	IDCRI01	ERROR1	A severe error occurred. The condition code is set to 16, and the Reader/Interpreter will terminate processing.
			ERROR2	A severe error occurred. The condition code is set to 16, and the Reader/Interpreter will terminate processing.
IDC3208I	RI0-9	IDCRI01	KWDPARM	A keyword parameter, defined as having a subfield, does not have a left parentheses following the keyword.
IDC3209I	RI0-10	IDCRI01	KWDPARM	A keyword's subfield does not have a closing parenthesis following it.
			POSPARM	A list of constants is not delimited on the right by a closing parenthesis.
IDC3210I	RI0-11	IDCRI01	INREPEAT	The next repetition of a repeated subparameter list does not begin with a left parenthesis.
IDC3211I	RI0-12	IDCRI01	KWDPARM	The descriptor does not define the input keyword as part of the current parameter list.
			NXTFIELD	An input keyword exceeds the maximum allowable length for a keyword.
IDC3212I	RI0-13	IDCRI01	POSPARM	A positional parameter that is not defined as a list begins with a left parenthesis.
IDC3213I	RI0-14	IDCRI01	SETFLAG	An internal table (PARMFLAG) indicates that the keyword just found was found previously in this command.
IDC3214I	RI0-15	IDCRI01	GETDATA	A numeric constant begins with a B or X, but an apostrophe does not follow directly after this character.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3216I	RI0-17	IDCRI01	ERROR1	The remainder of a command, being scanned for syntax-checking purposes only, was bypassed due to an error in it.
			ERROR2	The remainder of a command, being scanned for syntax-checking purposes only, was bypassed due to an error in it.
IDC3217I	RI0-18	IDCRI01	GETQUOTD	A password-delimiting slash appears following a constant that does not allow a password.
			GETSIMPL	A password-delimiting slash appears following a constant that does not allow a password.
IDC3218I	RI0-19	IDCRIO1	INREPEAT	The number of sublist repetitions (REPCOUNT) for the current repeated sublist exceeds the maximum repetitions allowed (REPMAX) for this parameter according to the descriptor.
IDC3219I	RI0-20	IDCRI01	IDCRI02	The input verb name does not match any name in IDCRILT.
IDC3220I	RI0-21	IDCRI01	CONVERT	A numeric constant contains a invalid digit.
			PACKCVB	A numeric constant contains an invalid digit.
IDC3221I	RI0-22	IDCRI01	CONVERT	A numeric constant has a value outside the value range specified in the descriptor for this parameter.
			PACKCVB	A numeric constant is too large to fit into a binary fullword.
IDC3223I	RI0-24	IDCRI01	BUILDFDT	The number of constants found in a list (SCLRCNT) exceeds the number allowed (LISTMAX).
IDC3225I	RI0-26	IDCRI01	NEEDNOTS	A parameter always required for this command is missing, or parameter required when another parameter is coded is missing.
IDC3226I	RI0-27	IDCRI01	NEEDNOTS	An input parameter conflicts with some other input parameter.
IDC3300I	IO0-1	IDCIO02	BLDOCMSG	An error occurred during open of a data set.
IDC3301I	IO0-2	IDCIO02	BLDOCMSG	An error occurred during close of a data set.
IDC3302I	IO0-3	IDCIO01	BLDAMSG	An error occurred while accessing a data set.
		IDCIO03	BLDAMSG	An error occurred while accessing a data set.
		IDCRS06	RECERR	A logical I/O error occurred while processing a CRA, catalog or the work file.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3303I	IO0-4	IDCIO02	BUILDDBK	The data set to be opened for update processing is not a VSAM data set.
IDC3304I	IO0-5	IDCIO02	DSDATA	A Job Control statement specified for file to OPEN was not found.
IDC3305I	IO0-6	IDCIO02	DSDATA	An attempt was made to open an ISAM data set for output.
IDC3306I	IO0-7	IDCIO02	BUILDDBK	Cannot open an ISAM file for address processing.
			DSDATA	The data set to be opened for physical sequential processing is an ISAM data set.
IDC3307I	IO0-8	IDCIO02	BUILDDBK	The data set to be opened for keyed processing is not a VSAM or ISAM data set.
IDC3308I	IO0-10	IDCIO01	VSAMERR	A record with the same key or relative record number as the input record already exists in the output data set.
IDC3309I	IO0-12	IDCIO01	PUTNONVS	The length for a record to be written is invalid.
			PUTVSAM	Length invalid for RRDS.
IDC3310I	IO0-13	IDCIO03	PTAMDS	The key provided is longer than the key length of the data set.
			PTISDS	The key provided is longer than the key length of the data set.
IDC3311I	IO0-14	IDCIO03	IDCIO03	The data set to be positioned is not a VSAM or ISAM data set.
IDC3312I	IO0-15	IDCIO02	CKNONOP	The DTF OPEN flag was not set by the system OPEN routines for magnetic tape or for a sequential disk file.
IDC3314I	IO0-17	IDCIO01	VSAMERR	The record to be written has a lower key than the last record in the data set.
IDC3315I	IO0-44	IDCIO02	BUILDDBK	The record length exceeds 32767.
IDC3316I	IO0-19	IDCIO02	BUILDDBK	The data set to be opened is not a VSAM catalog.
IDC3317I	IO0-20	IDCIO01	VSAMERR	Physical error detected in a VSAM file.
		IDCIO02	DSDATA	I/O attempting to read the Label Cylinder.
		IDCIO03	PTAMDS	Physical error detected by VSAM POINT routines.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3318I	IO0-21	IDCIO02	BUILDDBK	(1) Invalid environment or DLBL/TLBL parameters specified, (2) the blocksize is less than one, (3) the blocksize is invalid for a fixed length record format file, or (4) the blocksize is invalid for a variable length record format file. CKNONOP The blocksize specified for an ISAM file is less than the file's true blocksize.
			DSDATA	Invalid parameters specified on the DLBL/TLBL statement.
IDC3320I	IO0-23	IDCIO02	BUILDDBK	1. Invalid device type specified for prime data. 2. Invalid device type specified for high level index of an ISAM file. 3. Tape device specified as the high level index of an ISAM file.
IDC3321I	IO0-24	IDCIO02	CKNONOP	An open ABEND error was detected.
			ENVFREE	A close ABEND error was detected.
IDC3322I	IO0-25	IDCIO01	IDCIOVY	The data set to be verified is not a VSAM data set.
IDC3323I	IO0-34	IDCIO02	OPENCAT	A user catalog open error occurred.
IDC3324I	IO0-36	IDCIO02	OPENCAT	A user catalog open error has occurred and problem determination information has been returned by catalog management.
IDC3325I	IO0-45	IDCIO01	IRSISYN	The blocksize specified for the portable data set is different than that of the portable data set.
IDC3326I	IO0-46	IDCIO02	OPENRTN	The REPLACE option has been specified for output through a path.
IDC3327I	IO0-47	IDCIO01	VSAMERR	Duplicate record in the upgrade set.
IDC3350I	IO0-11	IDCIO03	PTAMDS	An I/O error occurred during a VSAM POINT operation.
		IDCIO01	VSAMERR	An I/O error occurred in the VSAM access method.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3351I	IO0-9	IDCIO01	VSAMERR	An error was detected by a VSAM macro. The error was not a duplicate record or a record out of sequence.
		IDCIO02	CLOSERTN	The ACB was not closed successfully.
			OPENRTN	The ACB was not opened successfully.
		IDCIO03	PTAMDS	A logical error occurred during a VSAM point operation.
		IDCRS06	RECERR	A logical I/O error occurred while processing a CRA, catalog or the work file.
IDC3500I	DE0-3	IDCDE01	IDCDE01	The object parameter list supplied by the user is incorrect.
IDC3501I	DE0-4	IDCDE02	MODELPRC	The entry type of an model object is not the same as that of the object being defined, or the entry type of a model object conflicts with the specification of INDEXED, NONINDEXED or NUMBERED.
IDC3503I	DE0-1	IDCDE02	ALLCPROC	The number of elements in the volume list does not match the number of elements in the file sequence list.
IDC3504I	DE0-2	IDCDE02	KEYPROC	The length of the key range list retrieved from a model exceeded the space allotted for the list by IDCDE01.
IDC3505I	DE0-6	IDCDE01	IDCDE01	Space allocation was incorrectly specified for a VSAM catalog, data set, or data space.
IDC3506I	DE0-7	IDCDE01	IDCDE01	Volumes were not specified for a VSAM data set.
IDC3507I	DE0-8	IDCDE01	IDCDE01	The record size was required but not specified for a VSAM data set or data space.
IDC3513I	DE0-14	IDCDE01	IDCDE01	A file name was not specified with the UNIQUE attribute.
IDC3514I	DE0-15	IDCDE02	KEYPROC	The key ranges specified by the user overlap.
		IDCMP01	RANGPROC	The key ranges specified by the user overlap.
IDC3515I	DE0-16	IDCDE02	ALLCPROC	The average record size exceeds the maximum record size.
IDC3516I	DE0-17	IDCDE01	IDCDE01	Key length and position were not specified for a key sequenced data set.
IDC3517I	DE0-18	IDCDE02	ALLPROC	Unequal record sizes were specified for a relative record data set.
IDC3518I	DE0-19	IDCDE01	IDCDE01	REUSE cannot be specified with UNIQUE or KEYRANGES.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3519I	DE0-20	IDCDE01	IDCDE01	A REUSE conflict exists between data and index.
IDC3521I	DE0-22	IDCDE01	IDCDE01	A RECORDSIZE greater than 32761 was specified for a nonspanned data set.
IDC3522I	DE0-23	IDCDE01	IDCDE01	SPANNED cannot be specified for a relative record data set.
IDC3524I	DEO-25	IDCDE01	INTGCHK	Key range values are longer than key length.
		IDCDE02	KEYPROC	Key ranges are not in ascending order.
IDC3525I	AL0-23	IDCAL01	CHECKPRC	The password supplied is insufficient to alter key values.
IDC3527I	AL0-3	IDCAL01	LOCATPRC	The entry retrieved from the catalog was an invalid type for alter requests, or required fields could not be located.
IDC3528I	AL0-4	IDCAL01	LOCATPRC	Passwords were suppressed when the object ot be altered was retrieved from the catalog.
IDC3537I	AL0-12	IDCAL01	CHECKPRC	UNIQUEKEY or UPGRADE was specified for a nonalternate index.
IDC3538I	AL0-13	IDCAL01	CHECKPRC	UNIQUEKEY or UPGRADE was specified for a nonempty alternate index.
IDC3539I	AL0-14	IDCAL01	CHECKPRC	KEYS or RECORDSIZE was specified for a nonempty object.
IDC3540I	AL0-15	IDCAL01	CHECKPRC	A conflict between the control interval and KEYS or RECORDSIZE exists.
IDC3541I	AL0-16	IDCAL01	CHECKPRC	A conflict exists between the alternate index and the base cluster.
IDC3542I	AL0-17	IDCAL01	CHECKPRC	Unequal record sizes were specified for a relative record data set.
IDC3545I	AL0-20	IDCAL01	CHECKPRC	Invalid values were specified for KEYS or RECORDSIZE.
IDC3546I	AL0-21	IDCAL01	CHECKPRC	Invalid value specified for KEYS.
IDC3547I	AL0-22	IDCAL01	CHECKPRC	KEYS or RECORDSIZE is invalid with entry type.
IDC3570I	PR0-18	IDCRP01	IDCRP01	Delimiters were specified for a catalog reload.
IDC3572I	PR0-20	IDCRP01	CATRELOD	Target catalog is too small to contain the backup catalog during catalog reload.
IDC3573I	PR0-21	IDCRP01	CATRELOD	Either the catalog name, the volume serial number, or the device type did not match during a catalog reload.
IDC3582I	PR0-14	IDCRP01	IDCRP01	The organization of the input data set is incompatible with that of the output data set.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3583I	PR0-17	IDCRP01	DELIMSET	Invalid delimiters were specified for a data set copy operation.
		IDCPR01	DELIMSET	Invalid delimiters were specified for a data set copy operation.
IDC3590I	XP0-1	IDCXP01	CLUSPROC	The INFILE parameter was not specified.
IDC3591I	XP0-2	IDCXP01	CLUSPROC	The OUTFILE parameter was not specified.
IDC3592I	XP0-3	IDCXP01	CLUSPROC	The object retrieved from the catalog for export is not a cluster or an alternate index.
IDC3593I	XP0-4	IDCXP01	CLUSPROC	The catalog did not return the entry type, data component name, or LRECL when the object to be exported was located.
		IDCRC01	SYNCH	No data association could be found.
		IDCRC02	CLUSPROC	Either (1) the catalog did not return the entry type, data component name, or LRECL when the object to be exported was located, or (2) the entry type was not a cluster or alternate index.
			CONTRBL	The catalog did not return the entry type, data component name or LRECL when the object to be exported was located.
			NVSMPROC	The catalog did not return the entry type, or data component name when the object to be exported was located.
IDC3596I	XP0-7	IDCXP01	CLUSPROC	The data set to be exported has been marked as not usable.
IDC3600I	MP0-3	IDCMP01	CLUSPROC	The INFILE parameter was not specified.
IDC3601I	MP0-4	IDCMP01	CLUSPROC	The OUTFILE parameter was not specified.
IDC3602I	MP0-9	IDCMP01	IDCMP01	Import of the data set failed after a successful define.
		IDCRM01	IDCRM01	Import of the data set failed after a successful define.
IDC3606I	MP0-1	IDCMP01	CLUSPROC	The portable data set's first record was not valid.
		IDCRM01	IDCRM01	Opens of the portable data set failed.
			ALISPROC	A catalog control record for an alias entry was not read.
			CLUSPROC	There was no volume list from the input area.
			NVSMPROC	A catalog control record from the portable data set was not read.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC3606I (Continued)			OPENPROC	Header flags were not set properly in the first record.
			UCATPROC	A catalog control record for a user catalog was not read.
IDC3607I	MP0-13	IDCMP01	DUPNPROC	The temporary flag is not set in the catalog entry with the same name as the object being imported. If NEWNAME is specified, the temporary flag is not set in the entry with the new name.
IDC3608I	MP0-10	IDCMP01	CNCTPROC	The VSAM catalog could not connect the user catalog.
IDC3609I	MP0-5	IDCMP01	CLUSPROC	The VOLUMES parameter was not specified.
		IDCRM01	CLUSPROC	No volume information was available.
IDC3610I	MP0-6	IDCMP01	CNCTPROC	The device list was not specified for connect of a user catalog.
IDC3612I	MP0-8	IDCMP01	DUPNPROC	The catalog entry with the same name as the object being imported is not a cluster or alternate index.
IDC3613I	MP0-14	IDCMP01	CLUSPROC	The open of the portable data set was not successful.
		IDCRM01	IDCRM01	The open of the portable data set was not successful.
IDC3614I	MP0-7	IDCMP01	CLUSPROC	The object names specified by the user do not match the object names found in the portable data set.
IDC3615I	MP0-15	IDCMP01	RECPROC	The data set name on the OUTFILE JCL statement does not agree with the name found in the portable data set or, if NEWNAME is specified, the new name for the data set, or the name specified is not the name of path over the object to be imported.
IDC3617I	MP0-17	IDCMP01	DUPNPROC	The attributes of a predefined data set conflict with those of the data set to be imported.
IDC3619I	MP0-19	IDCRM01	ALTRPROC	The catalog return code was nonzero when attempting to rename a catalog entry.
IDC3624I	MP0-24	IDCRM01	IDCRM01	The UIOINFO issued to obtain the output data set name failed.
IDC3641I	BI0-2	IDCBI01	LOCPROC	The file identified in INFILE is not a base cluster.
IDC3643I	BI0-4	IDCBI01	OPENPROC	The base cluster is empty.
IDC3883I	LR1-14	IDCLR01	ERROR	More than 50 errors occurred while trying to complete the LISTCRA.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC4227I	RI0-28	IDCRI01	GETNEXT	An ELSE command appears without a matching IF-THEN command (THENFLAG is not on with DOFLAG off).
IDC4228I	RI0-29	IDCRI01	GETNEXT	An END command appears without a matching DO command (DOFLAG is off).
IDC4229I	RI0-30	IDCRI01	MODAIIF	An IF command relational expression does not follow the required format.
IDC4230I	RI0-31	IDCRI01	MODALSET	A SET command assignment expression does not follow the required format.
IDC4232I	RI0-33	IDCRI01	MODALIF	A THEN keyword does not appear in an IF command.
IDC4236I	RI0-37	IDCRI01	IDCRI03	End-of-file occurred, but EOFOK flag is off, indicating that end-of-file occurred in the middle of a command.
IDC4237I	RI0-38	IDCRI01	MODALIF	The current IF command nesting level (NESTLVL) exceeds the maximum level allowed (IFNSTMAX).
IDC4999I		IDCSA01	PRNTERR	UABORT error message printed via EXCP. See "ABORT Codes" section for ABORT codes.
IDC01002I	RS0-3	IDCRS01	INIT	Informational message indicating the catalog to be reset and the timestamp on the volume.
IDC01011I	RS0-12	IDCRS01	PROCCRA	Informational message indicating the CRA to be reset and the timestamp on the volume.
IDC01037I	RS0-47	IDCRS01	UPDCAT	Informational message indicating that RESETCAT processing has been completed for the indicated catalog.
IDC11003I	RS0-4	IDCRS06	RECMGMT	IGNORE was specified and an I/O error was encountered.
IDC11015I	RS0-16	IDCRS06	RECMGMT	IGNORE was specified and an I/O error was encountered.
IDC11022I	RS0-48 RS0-22	IDCRS06 IDCRS02	PROCTYPE PROCTYPE	An object contains a dependency on a record that does not exist.
IDC11023I	RS0-24 RS0-23	IDCRS02 IDCRS02	VERA VERC VERG VERR VERC VERG	An entry is chained to a record of a type different than anticipated or the object noted consists of an imcomplete set of records. If the control interval number of the expected association is not given then no association for that object exists in the base record; an association for that type is required for the entry name noted.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC11029I	RS0-31	IDCRS03	VLNRESET VLRESET	The suballocated data space has been corrected to reflect what is on the volume. This correction occurs if entries are deleted by RESETCAT or space stated as suballocated is not suballocated (that is, the space map is incorrect on entry to RESETCAT).
IDC11031I	RS0-33	IDCRS03	CHKUNQ	The unique data or index component has less space described than the data space. Informational message to indicate that space exists which is not in use.
IDC11033I	RS0-35	IDCRS03	CHKUNQ VLNRESET	A unique file, on a volume not being reset has no corresponding DATA or INDEX component.
IDC11036I	RS0-46	IDCRS03	CHKDSDIR	The file named may have invalid space information. The extents occupied by the named file are not in conflict with any other VSAM file or with the system; however, a self-checking field failed to check.
IDC11040I	RS0-38	IDCRS03	VOLCHK	The VSAM Format 1 DSCB did not have a corresponding header in the volume record. Therefore, the catalog does not account for the space allocated to the file.
IDC11041I	RS0-39	IDCRS03	VOLCHK	The extents in the space header for the data space noted were not identical to the extents in the corresponding Format 1 DSCB.
IDC11042I	RS0-40	IDCRS03	VOLCHK	The space header for the data space referred to a nonexistent Format 1 DSCB.
IDC11043I	RS0-41	IDCRS03	VOLCHK	The timestamp for the volume record did not match the timestamp in the VTOC.
IDC11044I	RS0-42	IDCRS03	VOLCHK	The attempt to scratch the file for the reason stated in message IDC11040I failed.
IDC21009I	RS0-10	IDCRS01 IDCRS03	INIT MARKUNUS	A multivolume file existed on a volume prior to reset.
IDC21020I	RS0-21	IDCRS05 IDCRS07	ADDUPCR RENMSETV	A volume needed for the reset was not specified in a CRAFILES parameter.
IDC21024I	RS0-25	IDCRS02	VERX	The alias chain for a USERCATALOG or NONVSAM entry is invalid.
IDC21025I	RS0-26	IDCRS03	VERB	The records associating the GDG file with the GDG base are in error.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC21026I	RS0-27	IDCRS02	SETCI	A previous message indicated an error which resulted in this entry being deleted from the catalog.
IDC21027I	RS0-28	IDCRS03 IDCRS03	VLNRESET VLRESET	The CRA extents or catalog extents have no matching extents in any data space.
IDC21030I	RS0-32	IDCRS03	MARKUNUS	The entry noted claims space on volume. That space is not allocated to that entry.
IDC21032I	RS0-34	IDCRS02 IDCRS03	VERCI VERB	An object of the type specified was defined over the entry named as *entryname*. However, the records describing the object could not be found. Therefore, an object of the type specified was deleted from the given *entryname's* description. No name for the deleted object is given because the record with its name cannot be found.
IDC21034I	RS0-36	IDCRS03	VLNRESET VLRESET	The space map, which indicates what space is available for suballocation on a volume, is not the correct length in the catalog.
IDC21045I	RS0-43	IDCRS07	RENAMEP	An attempt was made to reset an object which bears the same name as some other object in the catalog.
IDC21046I	RS0-44	IDCRS07	RENAMEP	An attempt was made to reset a unique object into a catalog which contains an object of the same name.
IDC21047I	RS0-45	IDCRS07	RENAMEP	An attempt was made to reset a unique object into a catalog which contained an object of the same name.
IDC31000I	RS0-1	IDCRS01	INIT	The catalog specified for reset is not a recoverable catalog.
IDC31004I	RS0-5	IDCRS06	WFDEF	DEFINE failed for the workfile.
IDC31005I	RS0-6	IDCRS01	INIT	The workfile was defined in the catalog to be reset.
IDC31006I	RS0-7	IDCRS07	CATEOV	A physical I/O error when accessing the catalog was encountered while the catalog was being extended.
IDC31007I	RS0-8	IDCRS07	CATEOV	A logical I/O error was encountered while extending the catalog.
IDC31008I	RS0-9	IDCRS01	INIT	An error was encountered when trying to access the file specified in the CATALOG parameter.
IDC31010I	RS0-11	IDCRS01	MERGECRA	The CRA was specified for reset, but it belongs to a catalog other than the catalog to be reset.

Messages to Module Cross Reference

Message	STID	Module	Procedure	Situation That Caused Message
IDC31012I	RS0-13	IDCRS06	RECMGMT	The workfile relative record number limit has been exceeded.
IDC31013I	RS0-14	IDCRS01	MERGECRA	A preceding message indicates that either Open failed for the CRA, Close failed for the CRA, or the CRA does not belong to the catalog to be reset.
IDC31014I	RS0-15	IDCRS06	WFDEL	DELETE failed for the workfile.
IDC31016I	RS0-17	IDCRS01	INIT	The CRAFILES parameter specified no CRA with the ALL option; therefore, no volume was specified for reset.
IDC31017I	RS0-18	IDCRS01	INIT	Some other task is open to the catalog requested to be reset.
IDC31018I	RS0-19	IDCRS01	UPDCAT	RESETCAT required a volume that could not be allocated.
IDC31019I	RS0-20	IDCRS01	INIT	The CRAFILES parameter specified the same volume serial number more than once via *dnames*.
IDC31035I	RS0-37	IDCRS01 IDCRS03	UPDCAT VLNRESET	In a CRA, either the volume record for the *volser* indicated does not exist or one of its secondary records does not exist.
IDC31038I	RS0-49	IDCRS01	UPDCRA	Either Open or Close failed for the CRA.
IDC31039I	RS0-50	IDCRS01 IDCRS06	INIT WFDEF	The DLBL job control statement named in a CATALOG, CRAFILES, WORKCAT, or WORKFILE parameter cannot be found.
IDC31048I	RS0-51	IDCRS03	VOLCHK	Error accessing the VTOC.

Note: The listed procedures call UERROR to issue the IDC3007I and IDC3009I messages. UERROR issues the messages as follows:

Message	STID	Module	Procedure
IDC3007I	TP6-1	IDCTP06	IDCTP06
IDC3009I	TP6-2	IDCTP06	IDCTP06

APPENDIX A: PORTABLE DATA SETS CREATED BY THE EXPORT COMMAND

When a VSAM cluster or alternate index is exported via the Access Method Services EXPORT command, catalog information needed to define the VSAM data set plus all the records from the data component are written to a nonVSAM set called the portable data set. The following list shows the attributes of the portable data set.

Attribute of Portable Data Sets

Attribute	Value
LRECL	The larger of: (a) Maximum VSAM data set record size +4 (b) 264 (for nonRRDSs) or 268 (for RRDSs).
BLKSIZE	As specified by the user. The default is 2048.
RECFM	VBS
DSORG	PS
DEVTYPE	Tape or disk.

The portable data set contains two *major* types of records: control records and data records. Control records contain one of two types of information: a time stamp or a dictionary. Data records also contain one of two types of information: a catalog work area or a data record from the data component of the cluster or alternate index exported. Figure 24 shows the general layout of control records and data records in the portable data set. The types of records and the types of information within those records are explained in this appendix.

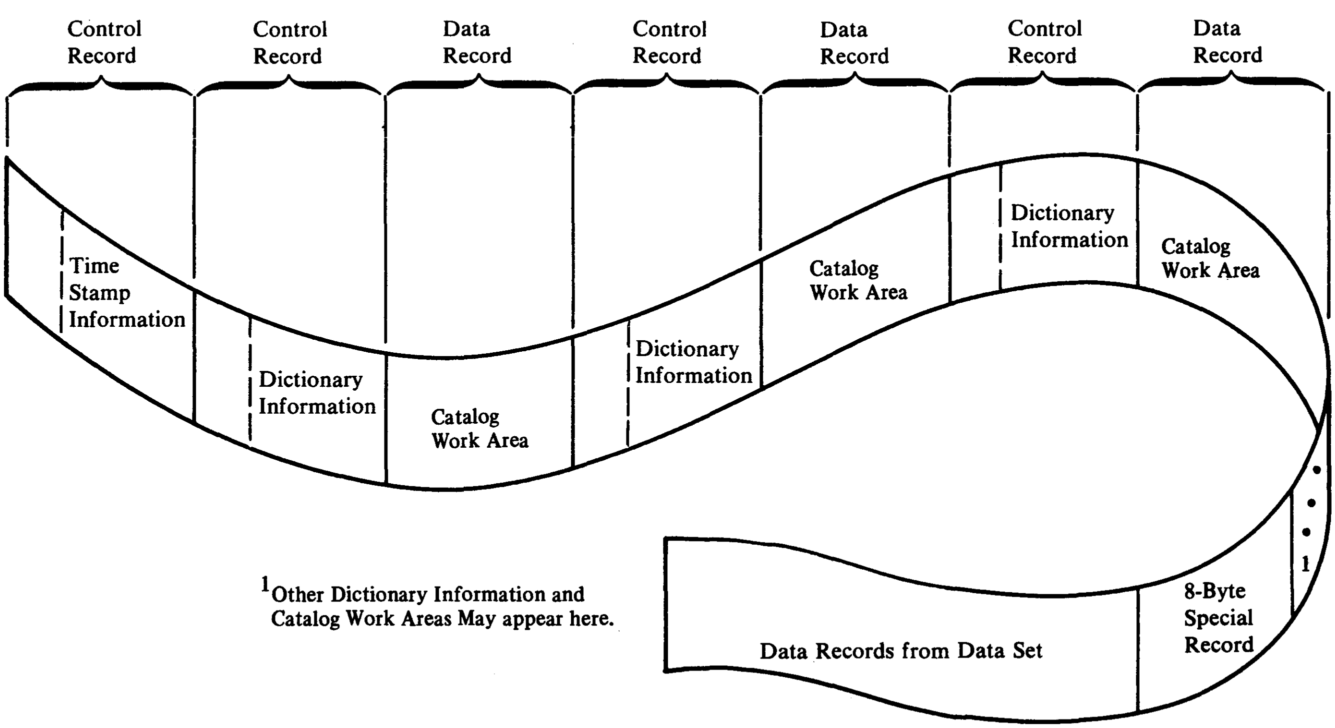


Figure 24. Layout of Control Records and Data Records in the Portable Data Set

Control Records

Control records all have the same general format as shown in Figure 25. The first four bytes of each control record contain header information. The next four bytes contain associated data. The remainder of the record contains the time stamp or dictionary information.

Control Record Containing Time Stamp Information

The first record on every portable data set is a control record that contains time stamp information, as well as other fields. The format of this record is shown in Figure 26.

The first two bytes of the header contain the length of this control record. The next two bytes indicate that this control record contains time stamp information. There is no associated data, and those four bytes are reserved.

0	4	8
Header	Associated Data	Variable Data—Time Stamp or Dictionary

Figure 25. General Format of Control Records

0	2	3	4	8 … 27
001C	X'FF'	X'FF'	Reserved	Time Stamp and Other Information
$\underbrace{\hphantom{xxxxxxxxxxxx}}_{\text{Header}}$			$\underbrace{\hphantom{xxxx}}_{\text{Associated Data}}$	$\underbrace{\hphantom{xxxx}}_{\text{Variable Data}}$

Figure 26. Control Record Containing Time Stamp Information

The format of the time stamp information is:

Displacement[1]	Description
8 (8)	Number of cluster components and paths being exported.
9 (9)	Flags: Bit — Meaning When Set 0 — 1 indicates a unique data set; 0 indicates a non-unique data set 1 — 1 indicates an inhibited target; 0 indicates a non-inhibited target 2 — 1 indicates path associations are present. 0 indicates no paths are present. 3 — If bit 2 is 1: 1 indicates that the base object has both data and index components. 0 indicates that the base object has only a data component.
10 (A)	Access Method Services release number in EBCDIC
11 (B)	Reserved
12 (C)	Time of EXPORT in EBCDIC, in the form hh.mm.ss, where hh is the number of hours, mm the number of minutes, and ss the number of seconds.
20 (14)	Date of EXPORT in EBCDIC, in the form mm/dd/yy, where mm is the month in digits, dd the day, and yy the year.

[1] The displacement is from the beginning of the control record.

Control Records Containing Dictionary Information

A control record containing dictionary information is written for the cluster or alternate index being exported and for each component within that cluster or alternate index. In addition, one control record is written for each path association of the object being exported. These records in essence describe the data record containing the catalog work area which follows. The format of control records containing dictionary information is shown in Figure 27.

The first two bytes of the header contain the length of this control record. The next two bytes indicate that this record contains dictionary information and the type of component that the associated catalog work area information describes. The type of component is indicated by 'C' for cluster, 'D' for data, 'I' for index, 'G' for alternate index, or 'R' for path.

The associated data portion of the control record contains the length of the associated catalog work area (two bytes) and the number of records into which the associated catalog work area is broken (2 bytes).

0	2	3	4	6	8
00D4	X'FF'	Type	Length of Catalog Work Area	Number of Records for Catalog Work Area	Dictionary and Other Information
Header			Associated Data		Variable Data

Figure 27. Control Record Containing Dictionary Information

The variable data portion of the control record contains the dictionary information. This portion of the control record begins with a four-byte field that contains the number of entries in the dictionary. The entries themselves follow. Each entry consists of a pair of four-byte fields. The first four bytes contain the length of the associated catalog field in the catalog work area. (Remember, the catalog work area information is in a data record immediately following one of these control records.) The second four bytes contain the displacement of that field within the associated data record. If an associated catalog field contains no information, both four-byte fields in the dictionary entry contain zeros. The dictionary entries always point to the associated fields in the order shown in the following list.

Order of Associated Catalog Fields

Order	Associated Field in Catalog Work area	Description
1	ENTYPE	Component type.
2	ENTNAME	Component name.
3	DSATTR	Data set attributes.
4	OWNERID	Data set owner.
5	DSETCRDT	Data set creation date.
6	DSETEXDT	Data set expiration date.
7	BUFSIZE	Minimum buffer size.
8	LRECL	Logical record size.
9	SPACEPARM	Primary and secondary space.
10	PASSWORD	Four eight-character passwords.
11	PASSPRMT	Password prompting code name.
12	PASSATMP	Maximum number of attempts for password.
13	USVRMDUL	User security verification module.
14	USERAREC	User authorization record.
15	LOKEYV	Low key on volume.
16	HIKEYV	High key on volume.
17	VOLSER	Volume serial numbers.
18	AMDSBCAT	AMDSB, from which the remaining fields are taken.
19	AMDATTR	Attributes.
20	AMDRKP	Relative key position.
21	AMDKEYLN	Key length.
22	AMDCINV	Control interval size.
23	AMDLRECL	Maximum record size.
24	AMDPCTCA	Percent of free control intervals in control area.
25	AMDPCTCI	Percent of free bytes in control intervals.
26	AMDATTR3	Attributes.
27	AMDAXRKP	Position of alternate key in base cluster record.
28	EXCPEXIT	Exception exit.
29	RGATTR	Alternate index or path attributes.
30	RELATE | PATHENTRY	Alternate index related name or pathentry name.
31	PASSREL	Master password of pathentry component.

Data Records

Data records contain one of two types of information: the catalog work area or data records from the data component.

Data Records Containing Catalog Work Area

Following each control record that contains dictionary information there is a data record that contains the catalog work area for a given component. The format of these records is shown in Figure 28.

The first two bytes of each record contain the total possible length of the catalog work area. The next two bytes contain the length of the work area used for this component. Following these first four bytes are the fields from the catalog work area. The order of these fields is basically as described in the preceding topic. If there is no information for one of the fields, the field is completely omitted.

Figure 29 shows the relationship of the dictionary and catalog work area information.

Data Records Containing Data Records From the Data Component

Following all of the control records and data records that contain dictionary information is a special record which marks the beginning of the data records from the data component. This special record is eight bytes in length. The record always has the format shown in Figure 30.

Following this special record are all of the data records from the data component being exported.

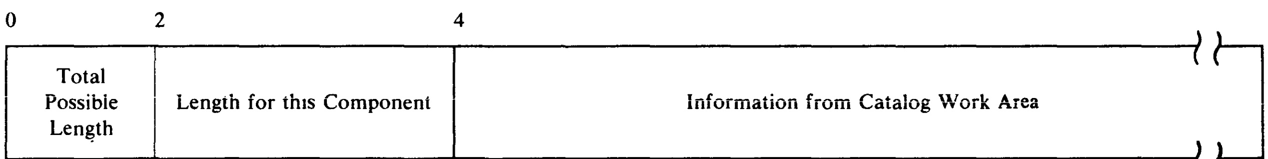


Figure 28. Data Record Containing Catalog Work Area

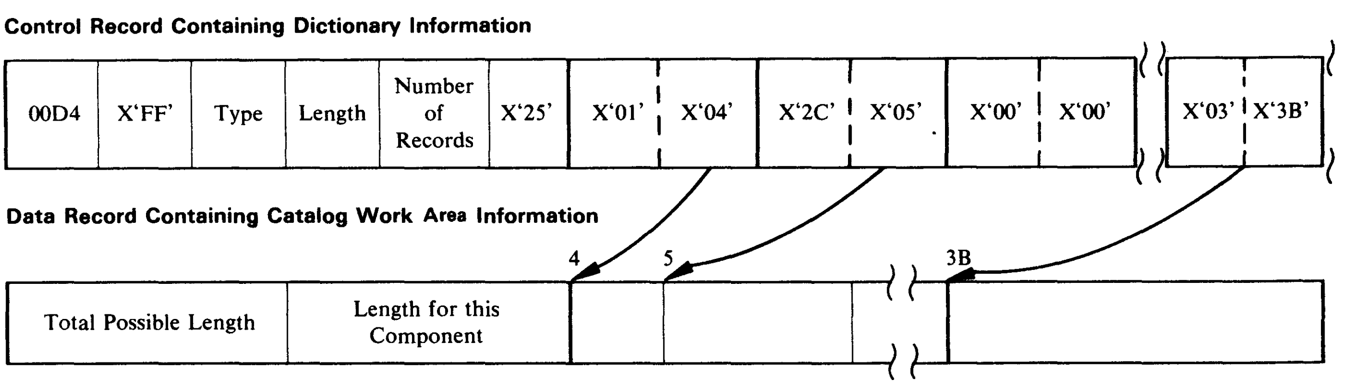


Figure 29. Relationship of Dictionary and Catalog Work Area Information

0	2	3
X'0008'	01	Reserved

Figure 30. Special Record at Beginning of Data Records from the Data Component

APPENDIX B: PORTABLE DATA SETS CREATED BY THE EXPORTRA COMMAND

When the EXPORTRA command of Access Method Services executes, it produces a portable data set which contains catalog information obtained from a CRA (Catalog Recovery Area) and data records for VSAM clusters and alternate indexes, and also catalog information for user catalog pointers. In addition, portable data sets created by EXPORTRA (referred to as recovery portable data sets in this appendix) on OS/VS systems may contain catalog information for nonVSAM, alias, and generation data group (GDG) base objects. The following list shows the attributes of the portable data set.

Attribute	**Value**
LRECL	The larger of: (a) Maximum VSAM data set record size + 8 (b) 268 (for nonRDs) or 272 (for RRDs)
BLKSIZE	As specified by the user (the default is 2048)
RECFM	VBS
DSORG	PS
DEVTYPE	(Tape or disk)

Each record of the recovery portable data set has a special 4-byte header added that precedes the record itself. Information for unrelated objects on the recovery portable data set is separated by one or more software ends of file. These ends of file are special records that consist only of the 4-byte header. Only Figure 31 indicates that this particular type of header precedes each data record; the other figures do not show it.

The recovery portable data set contains two *major* types of records: control records and data records. Control records contain one of two types of information: a time stamp or a dictionary. Data records also contain one of two types of information: a catalog work area or a data record from the data component of the cluster exported. Figure 31 shows the general layout of control records and data records in the recovery portable data set. The types of records and the types of information within those records are explained in this appendix.

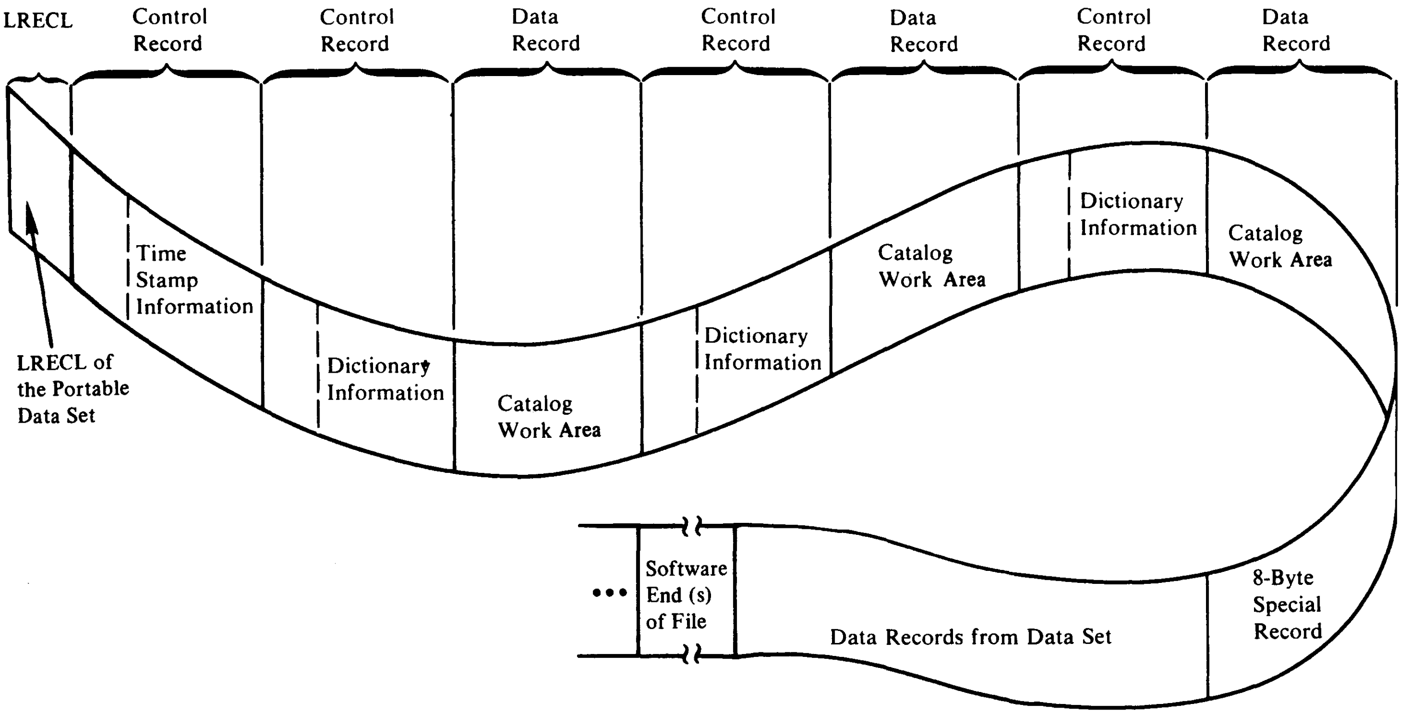


Figure 31. Layout of Control Records and Data Records in the Recovery Portable Data Set

Control Records

Control records all have the same general format as shown in Figure 32. The first four bytes of each control record contain header information. The next four bytes contain associated data. The remainder of the record contains the time stamp, dictionary information, or logical record length.

Control Record Containing the Logical Record Length

The first record of every recovery portable data set is a control record containing the logical record length of the portable data set itself. The format of this record is shown in Figure 33.

Control Record Containing Time Stamp Information

The first record for each item on the recovery portable data set is a control record that contains time stamp information, as well as other fields. The format of this record is shown in Figure 34.

0	4	8
Header	Associated Data or Logical Record Length	Variable Data–Time Stamp or Dictionary

Figure 32. General Format of Control Records

0	2	3	4	8
0008	X'FF'		LRECL	

Figure 33. Control Record Containing the Logical Record Length

The first two bytes of the header contain the length of this control record. The next two bytes indicate that this control record contains time stamp information. There is no associated data, and those four bytes are reserved.

The format of the time stamp information is:

Displacement[1]	**Description**
8(8)	The maximum number of components associated with this item.
9(9)	Flags:

Bit	*Meaning When Set*
0	1 indicates a unique data set 0 indicates a nonunique data set
1	1 indicates an inhibited target 0 indicates a noninhibited target
2	1 indicates path associations are present. 0 indicates no paths are present.
3	If bit 2 is 1: 1 indicates that the base object has both data and index components. 0 indicates that the base object has only a data component.
4	1 always 1 for a recovery portable data set.
5	1 indicates a nonVSAM object. 0 indicates an object other than a nonVSAM.
6	1 indicates a GDG base object. 0 indicates an object other than a GDG base.
7	1 indicates a user catalog pointer. 0 indicates a pointer for an object other than a user catalog.

10(A)	Access Method Services release number in EBCDIC
11(B)	Reserved
12(C)	Time of export in EBCDIC, in the form hh.mm.ss, where hh is the number of hours, mm the number of minutes, and ss the number of seconds.
20(14)	Date of export in EBCDIC, in the form mm/dd/yy, where mm is the month in digits, dd the day, and yy the year.

[1] **The displacement is from the beginning of the control record.**

0	2	3	4	8	27
001C	X'FF'	X'FF'	Reserved	Time Stamp and Other Information	
Header			Associated Data	Variaole Data	

Figure 34. Control Record Containing Time Stamp Information

Control Records Containing Dictionary Information

A control record containing dictionary information is written for each object being exported and for each component associated with that object. These records in essence describe the data record containing the catalog work area which follows. The general format of control records containing dictionary information is shown in Figure 35.

The first two bytes of the header contain the length of this control record. The next two bytes indicate that this record contains dictionary information and the type of component that the associated catalog work area information describes. The type of component is indicated by 'C' for cluster, 'D' for data, 'I' for index, 'G' for alternate index, 'R' for path, 'A' for nonVSAM, 'B' for GDG base, 'X' for alias, or 'U' for user catalog pointer.

The associated data portion of the control record contains the length of the associated catalog work area (2 bytes) and the number of records into which the associated catalog work area is broken (2 bytes).

The variable data portion of the control record contains the dictionary information. This portion of the control record begins with a four-byte field that contains the number of entries in the dictionary. The entries themselves follow. Each entry consists of a pair of four-byte fields. The first four bytes contain the length of the associated catalog field in the catalog work area. (Remember, the catalog work area information is in a data record immediately following one of these control records.) The second four bytes contain the displacement of that field within the associated data record. If an associated catalog field contains no information, both four-byte fields in the dictionary entry contain zeros.

The number of dictionary entries and their order depends upon the type of object being described. Dictionary formats are described for each possible kind of item in the following list.

Order of Associated Catalog Fields

Cluster or Alternate Index

Order	**Associated Field in Catalog Work Area**	**Description**
1	ENTYPE	Component type.
2	ENTNAME	Component name.
3	DSATTR	Data set attributes.
4	OWNERID	Data set owner.
5	DSETCRDT	Data set creation date.
6	DSETEXDT	Data set expiration date.

0	2	3	4	6	8
00D4	X'FF'	Type	Length of Catalog Work Area	Number of Records for Catalog Work Area	Dictionary and Other Information
Header			Associated Data		Variable Data

Figure 35. Control Record Containing Dictionary Information

7	BUFSIZE	Minimum buffer size.
8	LRECL	Logical record size.
9	SPACEPARM	Primary and secondary space.
10	PASSWORD	Four eight-character passwords.
11	PASSPRMT	Password prompting code name.
12	PASSATMP	Maximum number of attempts for password.
13	USVRMDUL	User security verification module.
14	USERAREC	User authorization record.
15	LOKEYV	Low key on volume.
16	HIKEYV	High key on volume.
17	VOLSER	Volume serial numbers.
18	AMDSBCAT	AMDSB from which the next 9 fields are taken.
19	AMDATTR	Attributes.
20	AMDRKP	Relative key position.
21	AMDKEYLN	Key length.
22	AMDCINV	Control interval size.
23	AMDLRECL	Maximum record size.
24	AMDPCTCA	Percent of free control intervals in control area.
25	AMDPCTCI	Percent of free bytes in control intervals.
26	AMDATTR3	Attributes
27	AMDAXRKP	Position of alternate index key in base cluster record.
28	EXCPEXIT	Exception exit.
29	RGATTR	Alternate index or path attributes.
30	RELATE | PATHENTRY	Alternate index related name or path entry name.
31	PASSREL	Master password of path entry component.

NonVSAM

1	ENTYPE	Entry type.
2	ENTNAME	Entry name.
3	VOLSER	Volume serial numbers.
4	DEVTYP	Device types.
5	FILESEQ	File sequence numbers.
6	OWNERID	Data set owner.
7	DSETCRDT	Data set creation date.
8	DSETEXDT	Data set expiration date.

User Catalog Pointers

1	ENTYPE	Entry type.
2	ENTNAME	Entry name.
3	VOLSER	Volume serial numbers.
4	DEVTYP	Device types.

Aliases

1	ENTYPE	Entry type.
2	ENTNAME	Entry name.

Order of Associated Catalog Fields

Order	Associated Field in Catalog Work Area	Description
GDG Bases		
1	ENTYPE	Entry type.
2	ENTNAME	Entry name.
3	GDGLIMIT	GDG limit value.
4	GDGATTR	GDG attributes.
5	OWNERID	Data set owner.
6	DSETCRDT	Data set creation date.
7	DSETEXDT	Data set expiration date.

Data Records

Data records contain one of two types of information: the catalog work area or data records from the data component of a VSAM cluster.

Data Records Containing Catalog Work Area

Following each control record that contains dictionary information there is a data record that contains the catalog work area for a given component. The format of these records is shown in Figure 36.

The first two bytes of each record contain the total possible length of the catalog work area. The next two bytes contain the length of the work area used for this component. Following these first four bytes are the fields from the catalog work area. The order of these fields is basically as described in the preceding topic. If there is no information for one of the fields, the field is completely omitted.

Figure 37 shows the relationship of the dictionary and catalog work area information.

Data Records Containing Data Records From the Data Component

For a VSAM cluster or alternate index, following all of the control records and data records that contain dictionary information is a special record which marks the beginning of the data records from the data component. This special record is eight bytes in length. The record always has the format shown in Figure 38.

Following this special record are all of the data records from the data component being exported.

0	2	4
Total Possible Length	Length for this Component	Information from Catalog Work Area

Figure 36. Data Record Containing Catalog Work Area

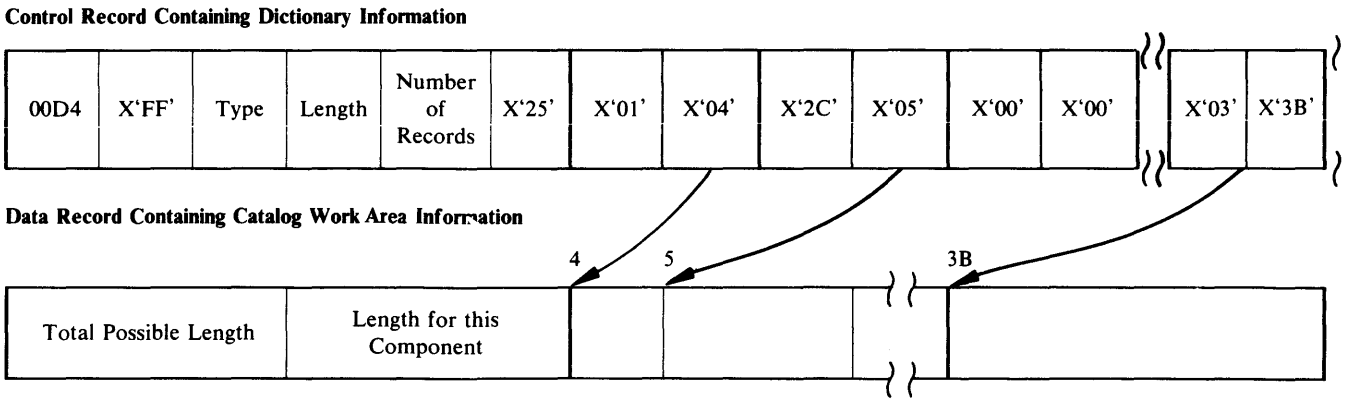


Figure 37. Relationship of Dictionary and Catalog Work Area Information

0	2	3
X'0008'	01	Reserved

Figure 38. Special Record at Beginning of Data Records from the Data Component

Associated Objects for User Catalog Pointers, NonVSAMs, and GDGs

The aliases of a user catalog pointer or a nonVSAM are exported as associated objects. Similarly, the nonVSAMs that belong to a GDG base are exported as associated objects of the GDG; these nonVSAMs may, in turn, have aliases. An item and its associated objects are preceded by one time stamp control record and followed by one software end of file.

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DOS/VS Access Method Services Logic

This Technical Newsletter, a part of Release 34 of DOS/VS, provides replacement pages for your publication. These pages remain in effect for subsequent DOS/VS releases unless specifically altered. Pages to be replaced are:

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A technical change to the text or to an illustration is indicated by a vertical line to the left of the change.

Summary of Amendments

This revision reflects the availability of DOS/VS Release 34 and includes:

- Tape Processing Improvements
- Page Length Improvements
- User-Supplied Print Chain/Train Support

In addition, the manual has been updated to reflect maintenance-type corrections and clarifications. (See page 15 for additional detail of changes.)

Note: *Please insert this page in your publication to provide a record of changes.*

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