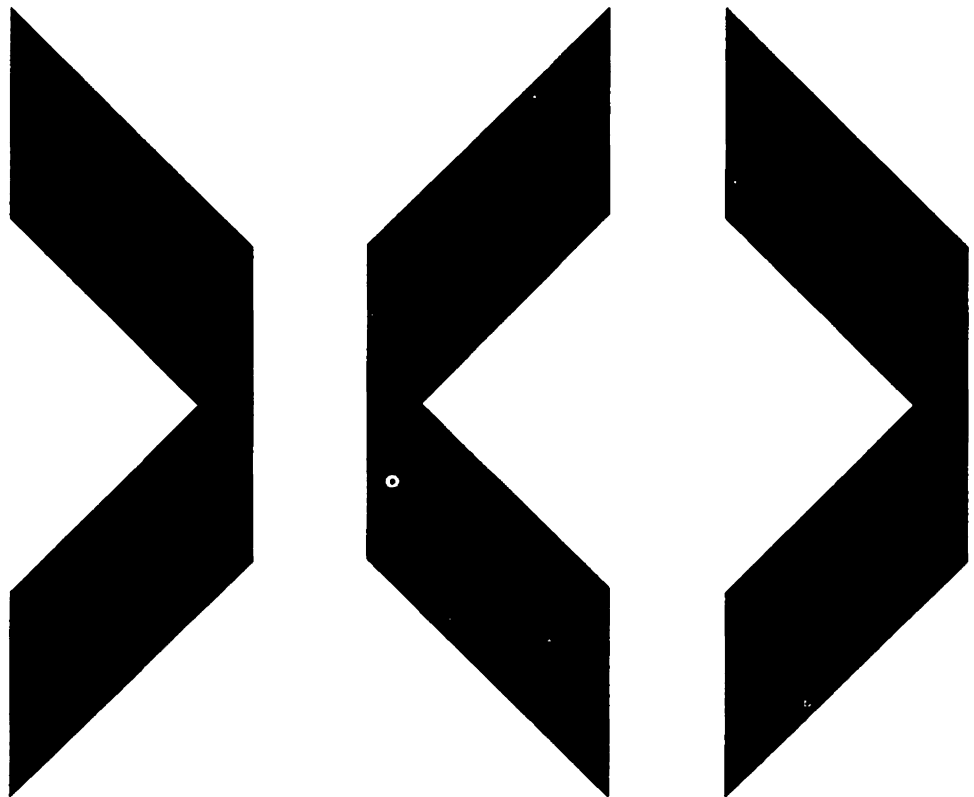




MVS/Extended Architecture DADSM Diagnosis Reference

Licensed
Program



| Second Edition (June 1987)

| This is a major revision of, and makes obsolete, LY26-3961-0.

| This edition applies to Version 2 Release 3.0 of MVS/Extended Architecture Data Facility Product, Licensed Program 5665-XA2, and to any subsequent releases until otherwise indicated in new editions or technical newsletters.

The changes for this edition are summarized under “Summary of Changes” following the preface. Specific changes are indicated by a vertical bar to the left of the change. These bars will be deleted at any subsequent republication of the page affected. Editorial changes that have no technical significance are not noted.

Changes are made periodically to this publication; before using this publication in connection with the operation of IBM systems, consult the latest *IBM System/370, 30xx, and 4300 Processors Bibliography*, GC20-0001, for the editions that are applicable and current.

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Preface

This book is designed to help you diagnose program failures in the Direct Access Device Space Management (DADSM) component. Before using this publication, you should have analyzed the program failure by following the diagnostic procedures in *MVS/Extended Architecture DADSM and Common VTOC Access Facility Diagnosis Guide*, LY26-3960.

If after following these procedures no correction is found and if you must continue working on the problem, use *this* book to help you communicate with an IBM program specialist. The program specialist will further isolate the failure.

Organization

This publication has eight parts:

- “Introduction” includes an overview of DADSM, a summary of its major functions, and a figure describing how these functions work together.
- “Program Design and Organization” describes each DADSM function and subfunction, the interface to the controlling module, the system and DADSM data areas used, and a flowchart for each function or subfunction. These flowcharts contain brief module descriptions and the logic that determines the flow of control among DADSM routines.
- “Module Directory” contains a cross-reference table to the DADSM object modules.
- “Data Areas” briefly describes each significant DADSM data area and control block.
- “Data Area Linkage” shows how the data areas are linked together.
- Appendix A, “Data Area Layouts,” lists the offset, length, name, and field description of each significant data area.
- Appendix B, “DADSM Return Codes,” lists by function each DADSM return code and explains what these return codes mean.
- “Abbreviations” defines the abbreviations used in this book.

Prerequisite Knowledge

To use this book efficiently, you need to have already made a preliminary analysis of the program failure. The information you obtained from your analysis is the prerequisite knowledge for using this book.

Required Publications

You should be familiar with the information presented in *MVS/Extended Architecture DADSM and Common VTOC Access Facility Diagnosis Guide*, LY26-3960. This book explains how to analyze program failure.

Related Publications

Within the text, references are made to the publications listed in the table below:

Short Title	Publication Title	Order Number
DADSM and CVAF Diagnosis Guide	<i>MVS/Extended Architecture DADSM and Common VTOC Access Facility Diagnosis Guide</i>	LY26-3960
Data Facility Product: Customization	<i>MVS/Extended Architecture Data Facility Product Version 2: Customization</i>	GC26-4267
DFDSS: Diagnosis Guide	<i>Data Facility Data Set Services: Diagnosis Guide</i>	SC26-3951
JES2 Data Areas	<i>MVS/Extended Architecture Data Areas (MVS/JES2)</i>	LYB8-1191
JES3 Data Areas	<i>MVS/Extended Architecture Data Areas (MVS/JES3)</i>	LYB8-1195
Open/Close/EOV Logic	<i>MVS/Extended Architecture Open/Close/EOV Logic</i>	LY26-3966
System Messages	<i>MVS/Extended Architecture Message Library: System Messages, Volumes 1 and 2</i>	GC28-1376 GC28-1377
VSAM Logic	<i>MVS/Extended Architecture VSAM Logic</i>	LY26-3970

Summary of Changes

| Release 3.0, June 1987

| New Programming Support

| The majority of DADSM code has been moved above 16Mb virtual, giving
| approximately 100K bytes of virtual storage constraint relief. Linkage assist
| modules have been added and load modules have been redefined.

| DADSM functions continue to be supported for 24-bit addressing mode callers
| without change.

| Functions other than PROTECT now support 31-bit addressing mode callers and
| their parameters above 16Mb virtual.

| A new LSPACE macro has been added. This macro may be used to:

- | • Define a parameter list for the SVC 78 (LSPACE) function which will support
| 24-bit and 31-bit addressing mode callers.
- | • Request the existing LSPACE return message area.
- | • Request the existing SMF functions.
- | • Request a new data return area format with additional volume-oriented
| information.
- | • Request the return of the format-4 DSCB's data.

| LSPACE diagnostic information has been improved.

| The PARTREL macro has been modified to accept requests for ERASE (YES,
| NO, or TEST) and TIOT (ENQ or NOENQ).

Release 1.0, April 1985

New Programming Support

The following features have been added to the DADSM component:

- A new PARTREL macro which will enable authorized users to effect a partial release of the space allocated to a data set without an associated OPEN/CLOSE.
- A modified REALLOC macro which will:
 - Support all functions of the previous REALLOC macro.
 - Enable authorized users to cause the reallocation of a data set with as many as 16 absolute extents, and an optional Format 2 (ISAM) DSCB, on a given volume with an indexed VTOC.
- SCRATCH will erase tracks for deleted data sets when requested by its caller or when a RACF-defined data set has the ERASE attribute.
- Partial Release will erase tracks for space being released when the data set is RACF defined and has the ERASE attribute.

Version 2 Publications

The Preface includes the new order numbers for Version 2. A new REALLOC macro to enable users to reallocate data sets through the DADSM partial DSCB allocate function

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Introduction

This publication provides a summary of the major functions of the direct access device space management (DADSM) component, and a brief overview of its logic and organization. It introduces the descriptions of program activities that are found in the module prologs and as comments in the code, but it is not intended to replace those descriptions. In addition, this book is not intended to show you how to modify or repair the program logic. It will, however, give you an adequate basis for communicating with an IBM program specialist about possible program failures.

If you do have a program failure, do NOT start your diagnosis of the problem by referring to this manual. You should begin diagnosis by following the instructions and procedures set forth in *DADSM and CVAF Diagnosis Guide*.

Overview of DADSM

The DADSM functions control allocation of space on direct access volumes through the volume table of contents (VTOC) of that volume. The VTOC is a data set consisting of a collection of data set control blocks (DSCBs) that describe the contents of a direct access storage device volume. There are seven types of DSCBs; each has a different purpose and is assigned a different name and format number. The VTOC and, optionally, the VTOC index, are built during volume initialization by Device Support Facilities, program number 5655-257. The VTOC and the VTOC index each reside in a single extent (that is, a contiguous data set). The VTOC's address is located in the VOLVTOC field of the IBM-defined volume label.

DADSM will use the common VTOC access facility (CVAF) macros to determine the VTOC format and to access an indexed VTOC. DADSM uses CVAF as well as channel programs to access a nonindexed VTOC.

The VTOC may have a VTOC index. The VTOC index contains space maps that replace the format-5 DSCBs of the nonindexed VTOC and manage the VTOC and VTOC index space. The VTOC index contains an index of all the format-1 and format-4 DSCBs.

The different types of DSCBs are:

- Free DSCB: format-0
- Identifier DSCB: format-1
- Index DSCB (ISAM only): format-2

- Extension DSCB: format-3
- VTOC DSCB: format-4
- Free space DSCB: format-5
- Shared extent DSCB: format-6

Each DSCB in the VTOC corresponds either to a data set or data space currently residing on the volume, or to contiguous, unassigned tracks on the volume. DSCBs are the data set labels, which describe the characteristics of the data set or data spaces as well as the tracks on which the data sets reside. DSCBs for unassigned tracks indicate the location of unassigned, contiguous tracks.

The functions performed by DADSM for controlling space allocation are:

- Allocating space for new VIO data sets, non-ISAM data sets, and VSAM data spaces (NONIALL, subfunction of the ALLOC function)
- Allocating space for new ISAM data sets (IALL, subfunction of the ALLOC function)
- Allocating additional space for non-ISAM data sets and VSAM data spaces (EXTND function)
- Rebuilding the format-5 chain and updating the format-4 DSCB (CONV function)
- Deleting a data set or VSAM data space (SCRATCH function)
- Freeing allocated but unused space (PRLSE function)
- Renaming data sets (RNAME function)
- Reading DSCBs (OBTN function)
- Calculating available space on a direct access volume (LSPACE function)
- Maintaining the system password data set (PRTCT function)
- Recovering from interrupted indexed VTOC processing (VRF function)

Allocating and Releasing Space on Direct Access Volumes

The DADSM functions that allocate (ALLOC and EXTND) and release space (SCRATCH and PRLSE) also add, delete, and modify DSCBs of the VTOC. To make space available to a new data set or to increase the space allocated to a data set, the format-5 DSCBs or VTOC indexed space maps are searched for available space. The space is allocated to the data set by writing the description of the space, called an extent, to the data set's DSCB and deleting the extent from the space available for allocation. To release space allocated to a data set, the allocate operation is reversed: The released extent is deleted from the data set's DSCB and added to the existing space available for allocation.

Components of the operating system use the DADSM functions to allocate and release space in response to data definition (DD) statements. For example, the job management (scheduler) routines call the ALLOC function to obtain space for a new data set.

VTOC-Related Service Functions

RNAME, OBTN, LSPACE, and PRTCT functions are used to read and change control information on the VTOC; they neither allocate nor release space. System macro instructions can be used to invoke these functions.

Volume Table of Contents Integrity

In an operating system with only one processor, two or more tasks may attempt to access the same VTOC simultaneously for the purpose of reading or updating (that is, adding, deleting, or modifying DSCBs) that VTOC. If more than one processor has access to the same device or devices, they may attempt to access the VTOC simultaneously.

To be sure that a VTOC is not changed while the DADSM functions are in process, the DADSM functions issue RESERVE, ENQ, and DEQ macro instructions. These macro instructions provide or release exclusive control of the VTOC for the task issuing the macro instruction. The RESERVE macro instruction is needed for systems in which two or more processors are processing concurrently, using the same data sets. These macro instructions provide exclusive control of the VTOC for the task issuing the macro instruction. Depending on the macro instruction, the “set-must-complete” option or the “release-must-complete” option may be specified in an operand of the macro instruction. The ALLOC, EXTND, SCRTCH, RNAME, PRLSE, LSPACE, and PRTCT functions of DADSM issue these macro instructions. Of these routines, only ALLOC, SCRTCH and PRLSE, use SMC=STEP in the ENQ and RESERVE macros, and RMC=STEP in the DEQ macro. The EXTND function links to the status routine (rather than issuing the ENQ macro) to obtain “step-must-complete” status, if the task that called EXTND has not already done so.

The integrated catalog facility/virtual storage access method (integrated catalog facility/VSAM) catalog management routines modify the DS4AMCAT and DS4AMTIM fields of the VTOC (format-4) DSCB. These routines also issue the RESERVE, ENQ, and DEQ macro instructions to maintain exclusive control while making modifications.

Note: When operating in an environment in which direct access storage devices are not shared among systems, the RESERVE macro instruction defaults to (acts as) an ENQ macro instruction.

Interrupted VTOC-Update Functions

If a system fails or a permanent I/O error occurs during allocation of space or during a routine that updates the VTOC, the VTOC will probably be in error. To make sure the error is recorded, the DADSM functions use the DADSM interrupt-recording facility (DIRF) when a nonindexed VTOC is being accessed. If the VTOC is an indexed VTOC, the VTOC recording facility (VRF) is used to record and recover from interrupted VTOC-update functions.

DADSM Interrupt Recording Facility (DIRF): DIRF processing is applicable only to nonindexed VTOCs and involves turning on a bit in the VTOC at entry to the DADSM function, and, if no I/O errors occur during DADSM processing, turning it off again at exit from that function.

This bit is called the DIRF bit and is bit 5 of the DS4VTOCI field of the format-4 DSCB. The SCRTCH and PRLSE functions also turn on the DIRF bit if they encounter overlapping extents in a format-5 DSCB.

When a volume has been transported from a Disk Operating System (DOS), it will have the DOS bit on (bit 0 of the DS4VTOCI field of the format-4 DSCB).

The next time an attempt is made to allocate space on a volume that has either the DOS bit or the DIRF bit set, the VTOC conversion routine (CONV) is invoked by the ALLOC or EXTND functions, whichever is attempting to allocate more space on the volume. The CONV function builds new format-5 DSCBs to represent the available space on the volume, updates the format-4 DSCB, and returns to ALLOC or EXTND to continue the allocation.

VTOC Recording Facility (VRF): VRF processing is applicable only to indexed VTOCs and records more functionally related data than DIRF. The additional data allows VRF processing to correct a specific problem rather than rebuilding the VTOC each time DADSM is interrupted. VRF is invoked by the ALLOC, SCRTCH, EXTND, PRLSE, and RNAME functions.

| Installation Exits

| The ALLOC, EXTND, SCRTCH, PRLSE, and RNAME functions call pre- and
| postprocessing installation exits. These exits, IGGPRE00 and IGGPOST0, allow
| your installation to control DASD space or reject requests based on installation
| criteria.

| For more information on installation exits, see *Data Facility Product: Customization*.

| Linkage Assist Routines

| DADSM provides seven linkage assist routines. IGG0553A is the linkage assist
| routine for the EXTND function. IGG0553A allows callers in 24-bit addressing
| mode to branch to the EXTND module, IGG05530. Callers in 31-bit addressing
| mode may call IGG05530 directly.

| IGGPEXIT is the linkage assist routine for the installation exit modules
| IGGPRE00 and IGGPOST0. IGGPEXIT is used to branch to an installation exit
| module when that module is in 24-bit addressing mode. If the module is in
| 31-addressing mode, control passes directly to the installation exit.

| The remaining five linkage assist routines are used with installation replaceable
| modules in the SCRTCH and RNAME functions. These linkage assist routines are
| always called, regardless of whether the caller is in 24- or 31-bit addressing.
| IGGDAS00, IGC0002I, and IGG029DN are used with the SCRTCH function.
| IGGDAR00 and IGC00030 are used with the RNAME function.

DADSM Recovery Routines

To avert a complete system failure when an abnormal termination condition arises in DADSM processing, the DADSM functions include a recovery function. This function is given control by the recovery/termination manager (R/TM) when an abnormal termination condition is encountered in a DADSM routine. The same recovery routine is given control when an open, close, or EOVS routine encounters an abnormal termination condition; the DADSM recovery function is therefore documented in *Open/Close/EOVS Logic*.

During the initialization of each DADSM function, the address of the recovery routine is established when virtual storage is obtained by the DADSM function. The O/C/EOVS-DADSM recovery routine load module name is IFG0RR0A. Its address is established for a DADSM routine when the IECRES GET macro is issued for a work area. The functions of the IECRES macro, the expansion of which results in a branch to the O/C/EOVS-DADSM service routine, IFG019RA, are also documented in *Open/Close/EOVS Logic*.

The DADSM recovery routine saves diagnostic information in the SYS1.LOGREC, SYS1.DUMP, and GTF data sets, and then releases any resources obtained by the DADSM function before it failed.

Functions of DADSM

Figure 1 on page 9 summarizes the major functions in DADSM. In this section, each of these functions is described in terms of its external processing environment. For each function, the following information is provided:

- **Description:** a brief description of the function
- **Results:** the processing results produced by the function
- **Calling components:** where applicable, the system components that can transmit requests to the function

In the following discussion, note that each function is identified by a function name. This name is the same as the keyword name used to identify the function in *DADSM and CVAF Diagnosis Guide*. All functions return to the caller when the requests are fulfilled.

ALLOC Function

Description	Processes requests to allocate space on a direct access storage device. The ALLOC function is invoked by an SVC 32.
Results	Updated VTOC index and/or VTOC reflecting the new contents and space available on the volume. Return code in register 15.

Calling Components	Scheduler, utilities, integrated catalog facility and VSAM catalog management, REALLOC macro, and any other caller of SVC 32.
---------------------------	---

EXTND Function

Description	Allocates additional space (extents) to sequential data sets or VSAM data spaces. EXTND is invoked when a data set requires more space than is currently allocated. EXTND can also process VSAM requests that do not include a data extent block (DEB) parameter.
--------------------	---

Results	Updated VTOC index and/or VTOC reflecting the new contents and space available on the volume. The return code is in register 13.
----------------	--

Calling Components	EOV, integrated catalog facility and VSAM catalog management, OS catalog management.
---------------------------	--

SCRTCH Function

Description	Deletes data sets and VSAM data spaces. Optionally, erases DASD tracks before releasing space. The SCRTCH function is invoked by the SCRATCH macro instruction (SVC 29).
--------------------	--

Results	Updated VTOC index and/or VTOC. The return code is in register 15. Scratch status code is in volume list. If erase processing is performed, residual user data is made unreadable.
----------------	--

Calling Components	Integrated catalog facility and VSAM catalog management, MSS, scheduler, utilities, or problem program.
---------------------------	---

PRLSE Function

Description	Releases unused space, and extents, allocated to a sequential or partitioned data set. Optionally, erases DASD tracks before releasing space. The PRLSE function may be invoked by a close issued for a data set for which a release has been specified in the DD card, or a restart from a checkpoint where a data set has been extended after the checkpoint, or an authorized user of the PARTREL macro.
--------------------	---

Results	Updated VTOC index and/or VTOC. The return code for a close or checkpoint/restart caller is in register 1. The return code for a PARTREL caller is in register 15.
----------------	--

RNAME Function

Description	Finds the DSCB for a specified data set or VSAM data space and changes its name. The RNAME function is invoked by the RENAME macro instruction (SVC 30).
Results	The updated VTOC index and/or VTOC with the new data set or VSAM data space name (after verifying that the requested name does not duplicate one already on the volume). The rename status code is in volume list. The return code is in register 15.
Calling Components	HSM, utilities, or problem program.

OBTN Function

Description	Reads a specified DSCB from the VTOC of a specified volume into the caller's work area; for suballocated VSAM data sets, obtains equivalent information from the appropriate VSAM catalog. The OBTN function is invoked by the OBTAIN macro instruction (SVC 27).
Results	The requested information is put in the caller's work area. The return code is in register 15.
Calling Components	System components, problem program, and utilities.

LSPACE Function

Description	Calculates the amount of free space on a given direct access volume. When called with a parameter list, LSPACE can calculate the fragmentation index, and report on the number of format-0 DSCBs and free VIRs. LSPACE returns this information in a data (rather than a message) format. The LSPACE function is invoked by an SVC 78.
Results	A type-19 record is written to the SMF data set, if SMF is requested and is active on the system. If the MONITOR SPACE command was issued, space information is moved to the message area provided by the caller. The message or parameter list address is in register 1. The reason code is in register 0; the return code is in register 15.
Calling Components	LSPACE macro, MSS, O/C/EOV, scheduler, SMF, problem program, and utilities.

PRTCT Function

Description	Maintains the system password data set, which controls access to data sets and associated control information. The PRTCT function is invoked by the PROTECT macro instruction (SVC 98).
Results	For add, replace, and delete operations, the password data set is updated. For list operations, the caller's 80-byte buffer contains the requested record. The return code is in register 15.
Calling Components	Utilities, problem program.

VRF Function

Description	Accesses recovery data and corrects the VTOC and VTOC index to an executable state after an interrupted VTOC update: <i>indexed VTOC only</i> . The condition that causes invocation of the VRF function is any function that detects active VRF data in the VTOC index.
Results	The recovery of interrupted update processing or the VTOC index is disabled. The return code is in register 15.
Calling Components	DADSM, DFDSS.

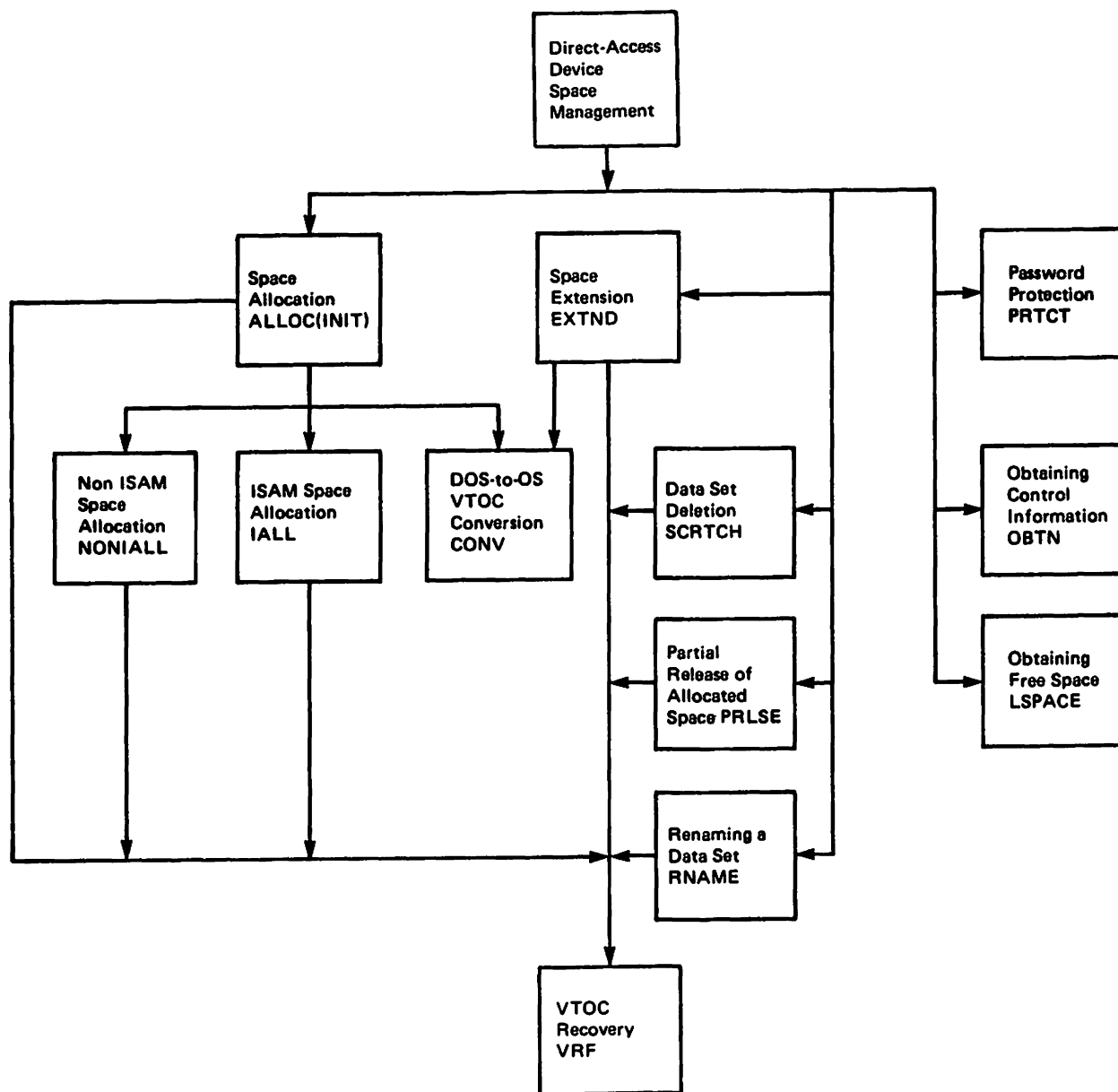


Figure 1. How Functions of DADSM Work Together

Program Design and Organization

In this section, the following information is provided for each function of DADSM:

- **Description:** a brief description of the function
- **Interface to Controlling Module:** the interface to the module that controls or oversees processing within the function
- **System and DADSM Data Areas Used:** the names of the data areas used by the function (or subfunction)
- **Program Organization:** charts showing the module-to-module flow

ALLOC Function

The allocate routines find unused space on direct access storage volumes and make that space available for new data sets. They receive control through an SVC 32. These routines create a format-1 data set control block (DSCB) for each new data set, and, in the format-1 DSCB, write descriptions of the direct access storage areas (these descriptions are called extents). Available extents are obtained by searching the format-5 DSCBs on the VTOC (for a nonindexed VTOC) or the volume pack space map (VPSM) of the VTOC index. The allocate routines are divided into four subfunctions and are described below.

INIT Subfunction

Description

The INIT subfunction verifies that space requests are properly made, performs space allocation for VIO data sets by building the virtual DSCB (VDSCB), prepares for non-VIO data set allocation, takes the preprocessing exit, and determines whether there is an indexed VTOC on the volume. If a REALLOC ALLOC=ABS request is made for a volume without indexed VTOC support, the request will fail.

Interface to Controlling Module

If register 1 has the high-order bit on, the complement of register 1 is the address of the REALLOC caller's parameter list.

For callers other than REALLOC, register 0 points to the job file control block (JFCB); however, if register 0 has the high-order bit on, register 0 points to a

partial DSCB. Register 1 points to the unit control block (UCB) for the device on which the data set is to be located or, if a VIO data set is being allocated, register 1 points to a device code. Register 2 points to a variable-length list of DSAB addresses if an ISAM data set is being allocated.

System Data Areas Used

Allocate work area

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Partial data set control block (PDSCB).

Data set control blocks (DSCB)

REALLOC parameter list

System Authorization Facility (SAF) work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 2 on page 13.

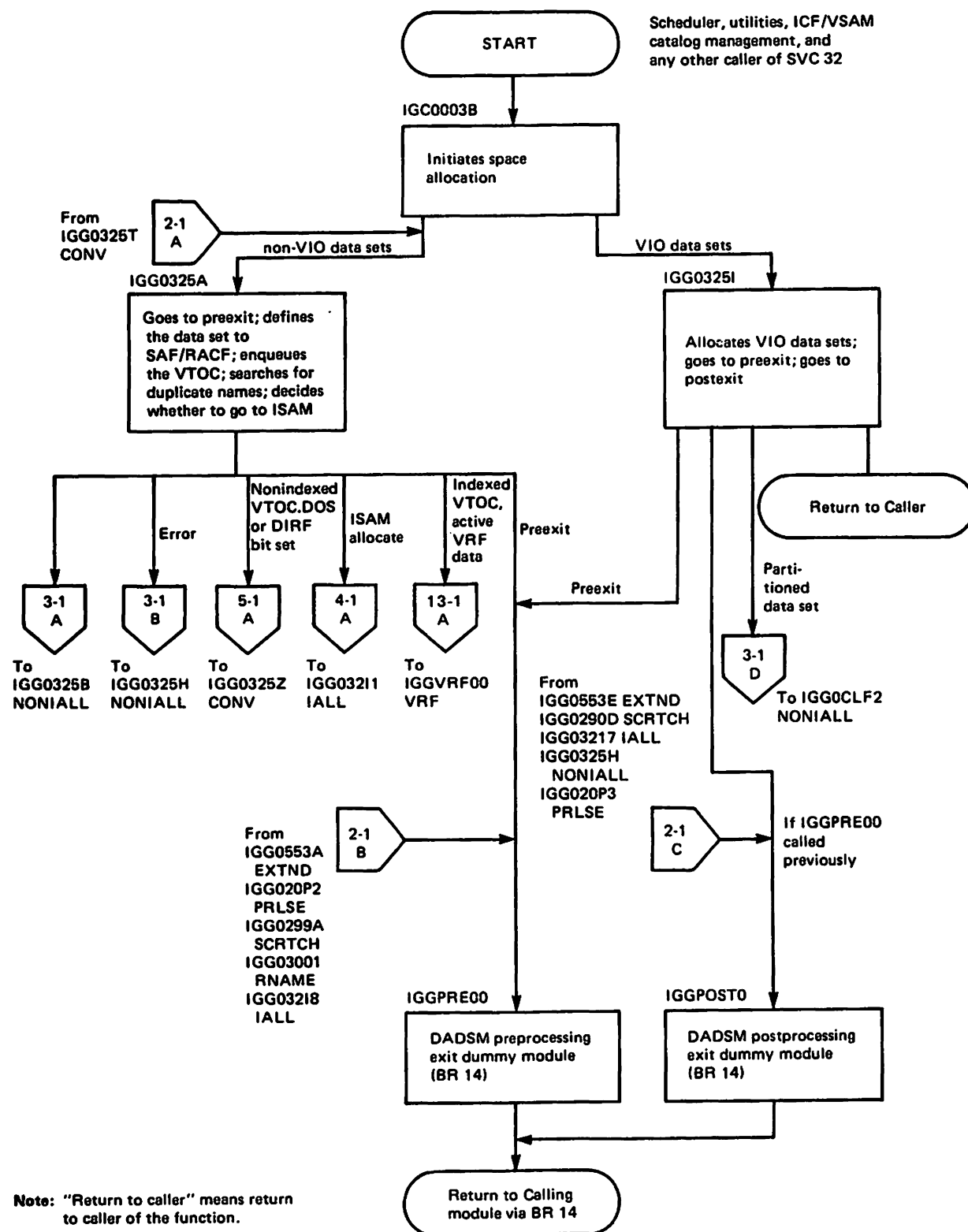


Figure 2. Allocation Initialization

NONIALL Subfunction

Description

The NONIALL subfunction converts the space requested for a data set or VSAM data space to the equivalent number of tracks, determines the type of allocation request, allocates space, and (for an indexed VTOC) adds a new entry to the index. NONIALL receives control from the INIT subfunction and allocates space for non-ISAM data sets:

- Calls SAF to verify access authority via RACF generic or discrete profile. Defines a discrete profile if the caller has requested it.
- If user labels are requested, a user-label track is allocated from the VPSM for an indexed VTOC or format-5 DSCBs for a nonindexed VTOC.
- Absolute-track allocation requests for nonindexed VTOCs locate the extent containing the specified track in the format-5 DSCB for a nonindexed VTOC or the VPSM for an indexed VTOC.
- For cylinder or track allocation requests, the extents required to fill the request are located through the format-5 DSCB for a nonindexed VTOC or the VPSM for an indexed VTOC.
- When space is needed on a volume, the VTOC is checked for enough contiguous tracks; the request is filled, using as many as five noncontiguous groups of free tracks. The appropriate DSCBs and VTOC index records are modified to reflect the assignment of the tracks.
- The data set name is added to the index for an indexed VTOC.
- Format-1 and format-3 DSCBs are built, if required.
- The VTOC index space maps are updated.
- The format-4 and format-5 DSCBs are updated for a nonindexed VTOC.
- If a REALLOC ALLOC=MOV request is made (high-order bit is on in register 1 upon entry to the INIT subfunction and the parameter list indicates ALLOC=MOV) space will be filled in as many as 16 noncontiguous groups of free tracks for any data set not cataloged in an integrated catalog facility catalog, and as many as 123 noncontiguous groups of free tracks for any VSAM data set cataloged in an integrated catalog facility catalog. Optionally, the groups will be a minimum number of tracks as specified in the parameter list passed from the caller.

- If a REALLOC ALLOC=ABS request is made (high-order bit is on in register 1 upon entry to the INIT subfunction and the parameter list indicates ALLOC=ABS) the specified volume's indexed VTOC support will be used in allocating the absolute extents requested by the caller's format 1, and (optional) format-3 DSCB parameters. The VTOC and VTOC index records will be updated using the caller's format 1, optional format 2, and optional format-3 DSCB specifications.

Interface to Controlling Module

Register 11 points to the job file control block (JFCB); however, if register 11 has its high-order bit on, register 11 points to the partial DSCB (full format-1 DSCB for REALLOC ALLOC=ABS). Register 13 points to the allocate work area.

System Data Areas Used

Allocate work area

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Partial data set control block (PDSCB).

Data set control blocks (DSCB)

REALLOC parameter list

SAF work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 3 on page 16.

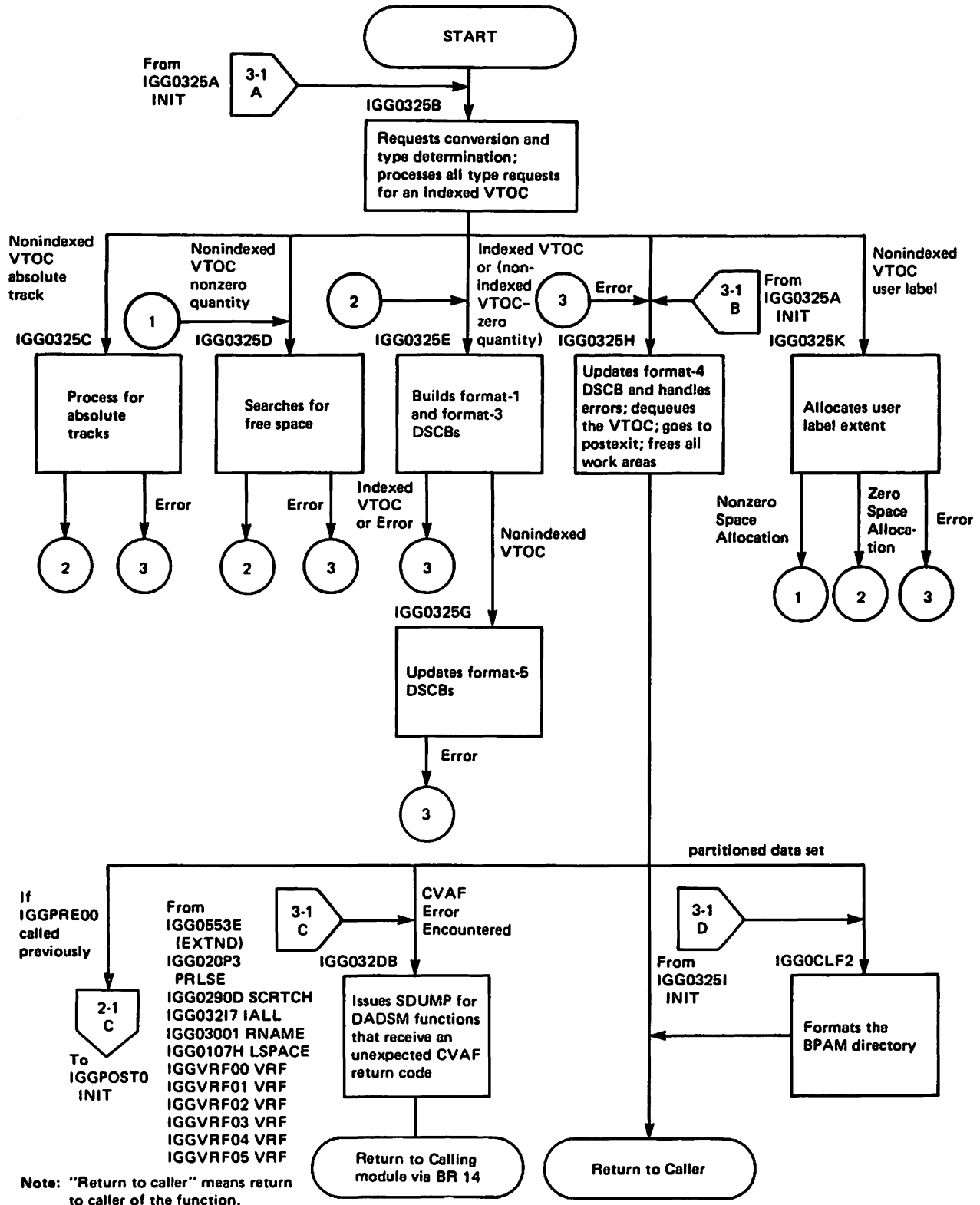


Figure 3. Non-ISAM Allocation

IALL Subfunction

Description

The IALL subfunction receives control from the INIT subfunction and allocates space for

- ISAM data sets.
- Finding available space on the volume by searching the format-5 DSCBs on the VTOC or the VPSM (for an indexed VTOC) in the VTOC index and building an extent table of the available space.
- When space is needed on a volume, the VTOC is checked for enough contiguous, available tracks to satisfy the request. If there are not enough contiguous tracks, the request is filled, using as many as five noncontiguous groups of free tracks. The appropriate DSCBs and VTOC index records are modified to reflect the assignment of the tracks.
- Adding a new DSN entry to the VTOC index (for an indexed VTOC).
- Building format-1, format-2, and format-3 DSCBs.
- Updating format-4 and format-5 DSCBs (for a nonindexed VTOC).
- Updating the VTOC index (for an indexed VTOC).

If an ISAM data set is to be allocated on more than one volume, multivolume data set initialization is performed and IALL processing begins again. IALL calls SAF to verify authority via RACF generic or discrete profile and adds the new volume to the existing discrete profile when requested by the caller.

Interface to Controlling Module

Register 11 points to the job file control block (JFCB). Register 13 points to the allocate work area.

System Data Areas Used

Allocate work area

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

SAF work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 4 on page 19.

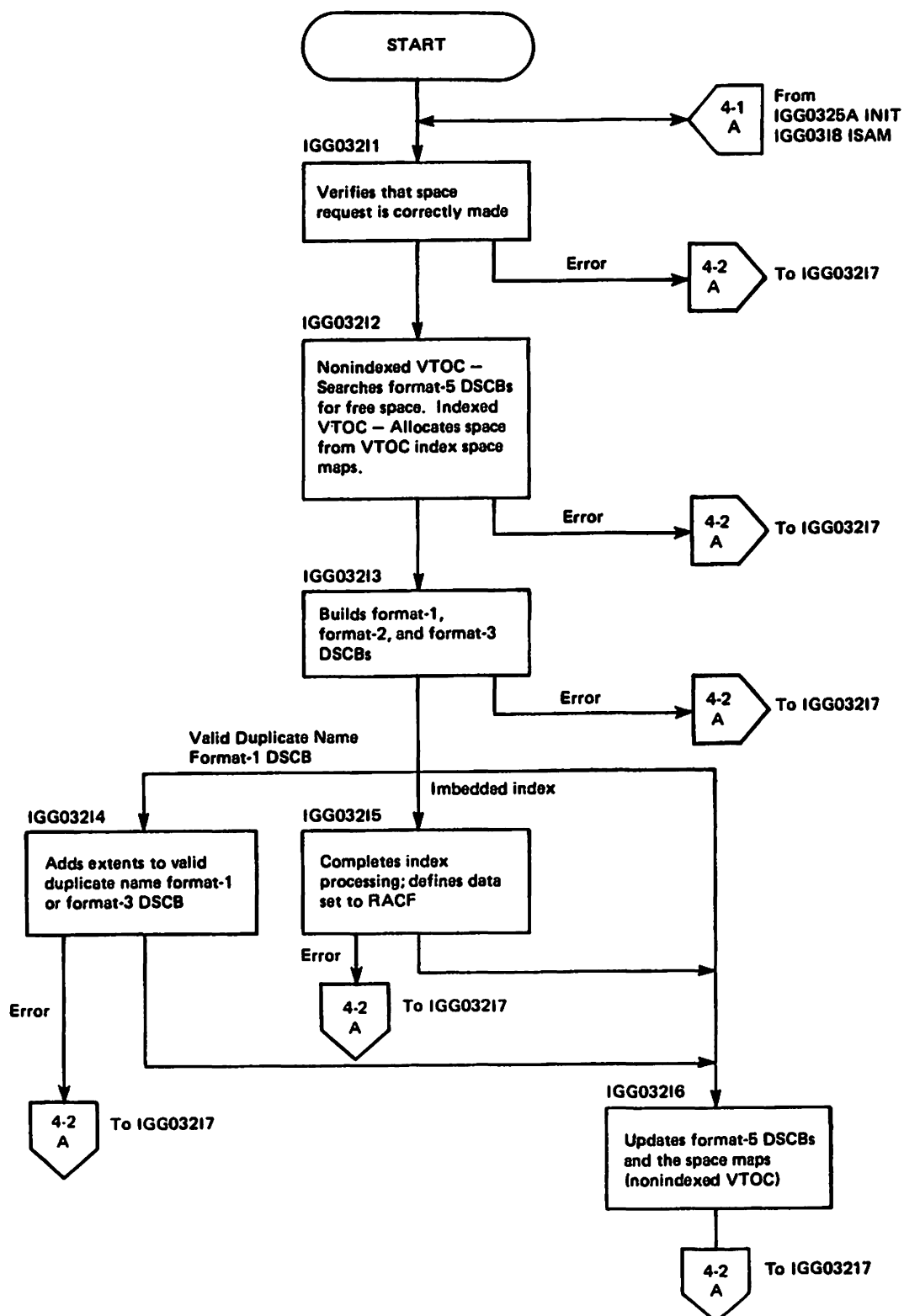


Figure 4 (Part 1 of 2). ISAM Allocation

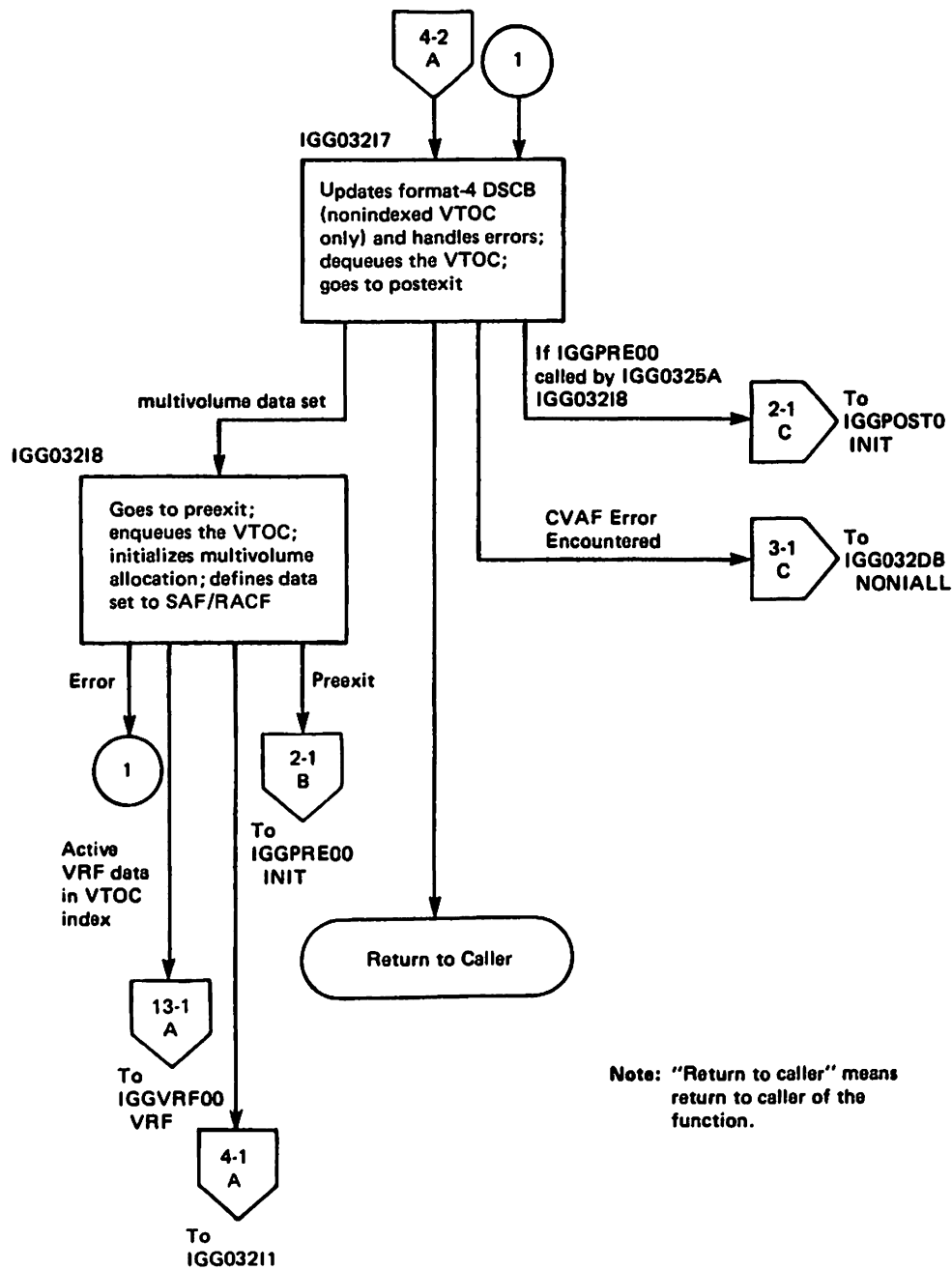


Figure 4 (Part 2 of 2). ISAM Allocation

CONV Subfunction (For Nonindexed VTOCs Only)

Description

The CONV subfunction receives control from the ALLOC INIT subfunction or the EXTND function if one of the following conditions is met:

- The volume has been processed under the DOS operating system leaving the DOS bit (DSDOSBT in field DS4VTOCI) on in the format-4 DSCB.
- The volume previously contained an indexed VTOC, but the VTOC index was disabled, leaving the DOS bit on in the format-4 DSCB.
- A permanent I/O error or system failure during DADSM processing occurred, leaving the DIRF bit (DSDIRF in field DS4VTOCI) on in the format-4 DSCB.

The procedure to reclaim and convert VTOCs involves:

- Rebuilding the format-5 DSCBs by removing format-1 and format-3 extents from total volume space.
- Writing format-5 DSCBs to the VTOC.
- Rebuilding the format-6 DSCBs from the format-1 DSCBs.
- Updating the format-4 DSCB.

Interface to Controlling Module

Register 7 points to the UCB for the volume whose VTOC is to be converted.
Register 13 points to the allocate work area.

System Data Areas Used

Allocate work area

DADSM Data Areas Used

Data set control blocks (DSCB)

Transfer control table

WTG table

Program Organization

See Figure 5 on page 23.

Deactivating Automatic VTOC Reclamation

There are situations in which you may not want to automatically convert or reclaim a VTOC that has the DIRF bit set in the format-4 DSCB. By applying a superzap, or in-storage, alteration to IGG0325Z, you can prevent the VTOC from being automatically reclaimed. The job control language and control statements for altering IGG0325Z follow:

```
//STEP01    EXEC      PGM=AMASPZAP
//SYSLIB    DD      DSN=SYS1.LPALIB,DISP=OLD
//SYSPRINT  DD      SYSOUT=A
//SYSIN     DD      *
            NAME IGG0325Z IGG0325Z
            VER  0000  0700
            REP  0000  0701
/*
```

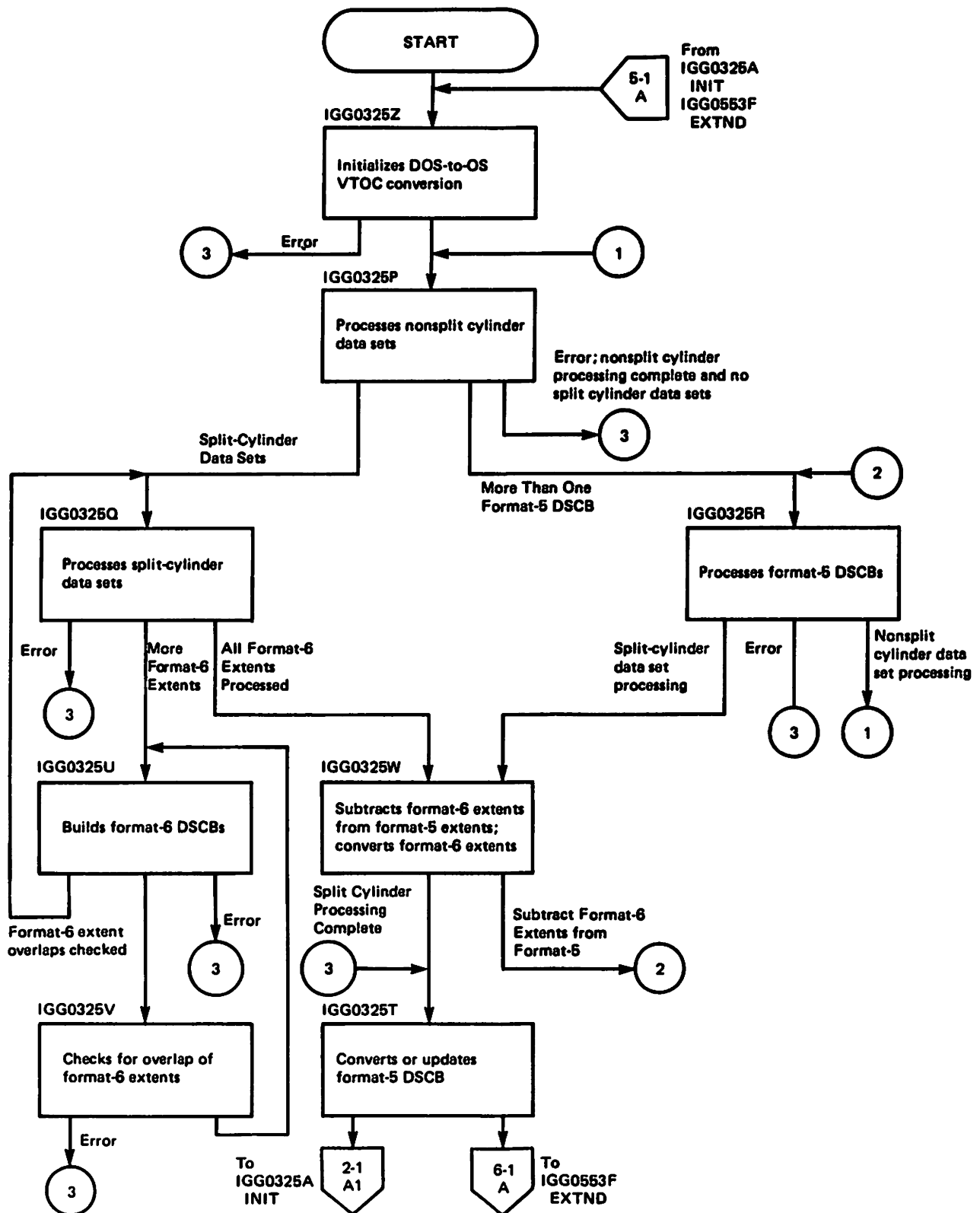


Figure 5. VTOC Conversion Routine (Nonindexed VTOC only)

EXTND Function

Description

The EXTND function initializes extension of data set allocation and proceeds as follows:

- Calculates the last track written to the data set when an extension is to be made of the current volume and determines whether the secondary space request can be filled by the tracks following the last allocated track.
- Searches format-5 DSCBs or the VPSM (for an indexed VTOC) for free extents and builds an extent table.
- When space is needed on a volume, the VTOC is checked for enough contiguous, available tracks to satisfy the request. If there are not enough contiguous tracks, the request is filled, using as many as five noncontiguous groups of free tracks. The appropriate DSCBs and VTOC index records are modified to reflect the assignment of tracks.
- Builds and/or updates the appropriate format-1 and format-3 DSCBs.
- Adds the DSN to the VTOC index if the extension is to a new volume.
- When extending onto a new volume, calls SAF to verify authority via RACF generic or discrete profile. In the case of a discrete profile, adds the new volume to the existing discrete profile.
- Updates the appropriate format-4 and format-5 DSCBs (for a nonindexed VTOC only).
- Updates the VTOC index.

Note: Data sets with indexed sequential organization or data sets beginning with "SYS1.VTOCIX" cannot be extended.

EXTND can process VSAM requests that do not include a DEB parameter.

Interface to Controlling Module

Register 4 points to the O/C/EOV work area. Register 5 points to the data extent block (DEB) of the data set to be extended. Register 10 points to the UCB for the volume. Register 13 contains the extend code.

System Data Areas Used

Extend work area

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

SAF work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 6 on page 26.

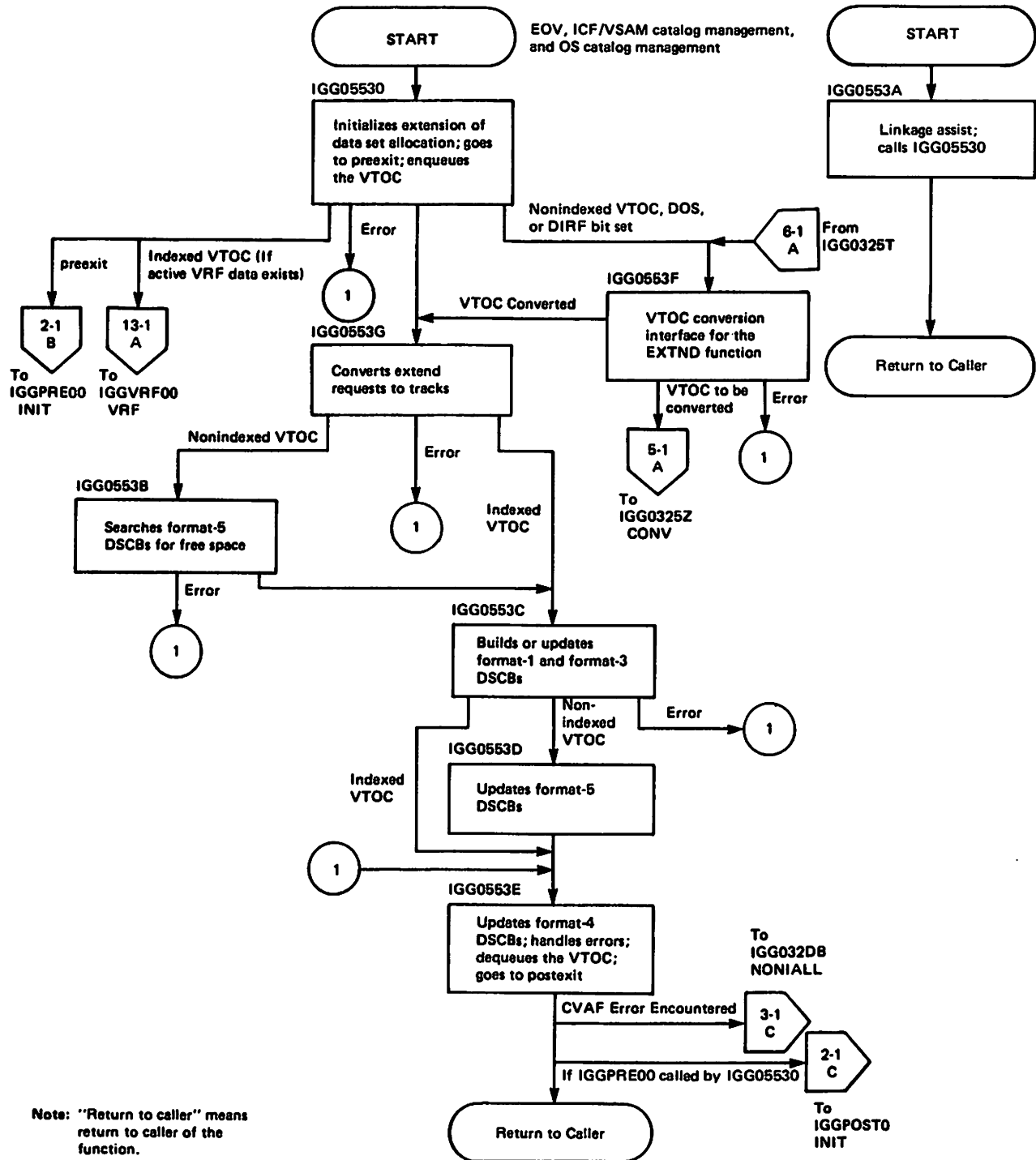


Figure 6. Extend

SCRTCH Function

Description

For each volume, the SCRTCH function does the following:

- Determines whether a volume containing the data to be scratched is mounted on a unit allocated to the job. If the volume is not mounted, SCRTCH requests that the required volume be mounted.
- Reads in format-4 (for nonindexed VTOCs only) and format-1 DSCBs for the data set to be scratched.
- Calls SAF to verify authority via RACF generic and/or discrete profiles. A discrete profile will be deleted.
- Calls SAF to determine via RACF whether data set erasure is to be performed when the caller of SCRTCH does not explicitly specify such action.
- If required, makes all DASD tracks allocated to the data set unreadable before removing DSCBs.
- Removes the format-1, format-2, and format-3 DSCBs for data sets being scratched.
- For MSS virtual volumes, relinquishes space.
- Deletes the data set name from the VTOC index.
- Updates (for a nonindexed VTOC) the format-4, format-5, and (for split-cylinder data sets) format-6 DSCBs.
- Updates the VPSM (for an indexed VTOC).

Interface to Controlling Module

Register 0 contains all zeros or points to the UCB for the device that can be used to mount volumes. Register 1 points to the scratch parameter list.

System Data Areas Used

Scratch work area

Second scratch work area

DADSM Data Areas Used

Acquire/Relinquish parameter list

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

SAF work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 7 on page 29.

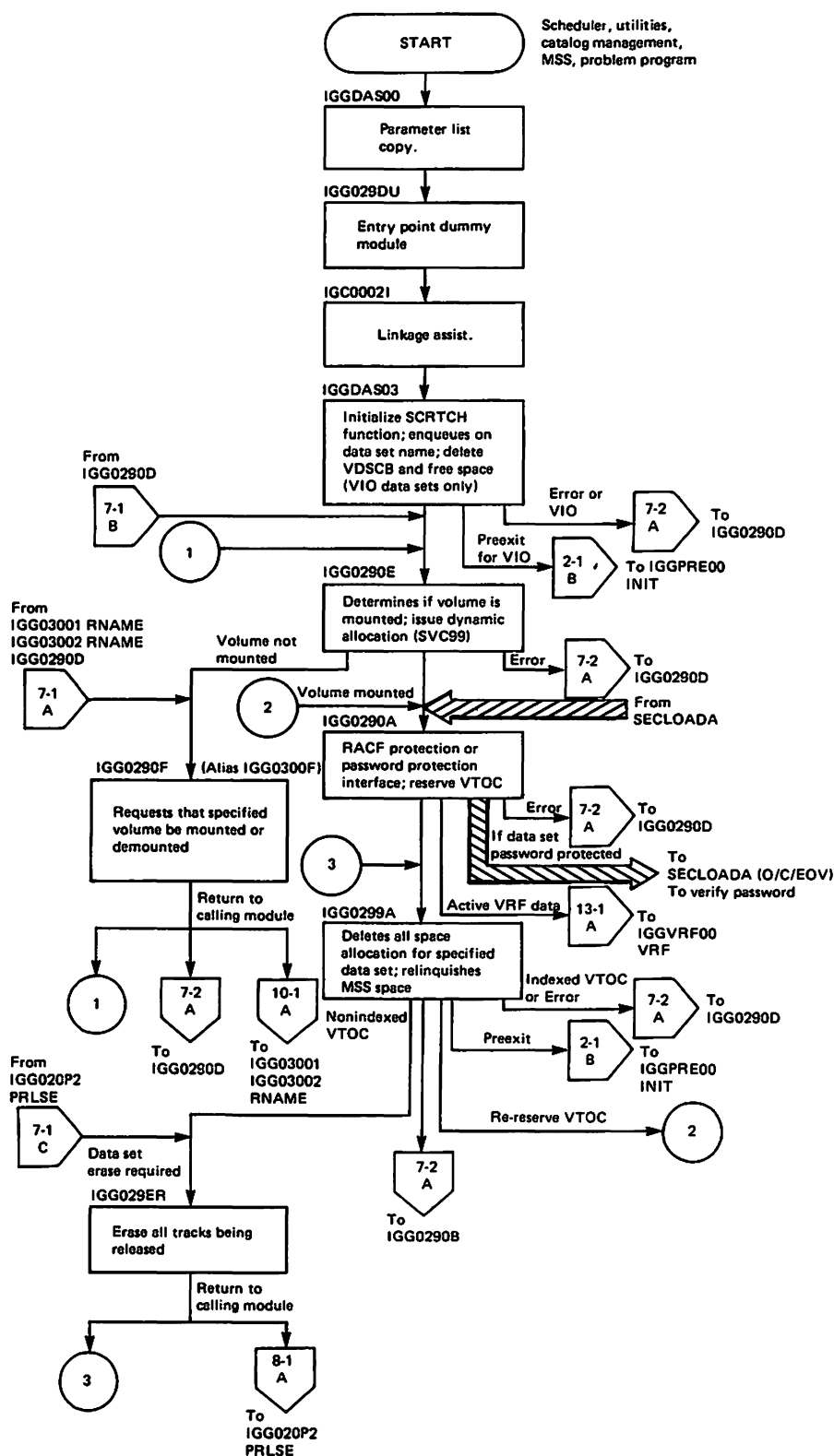


Figure 7 (Part 1 of 2). Scratch

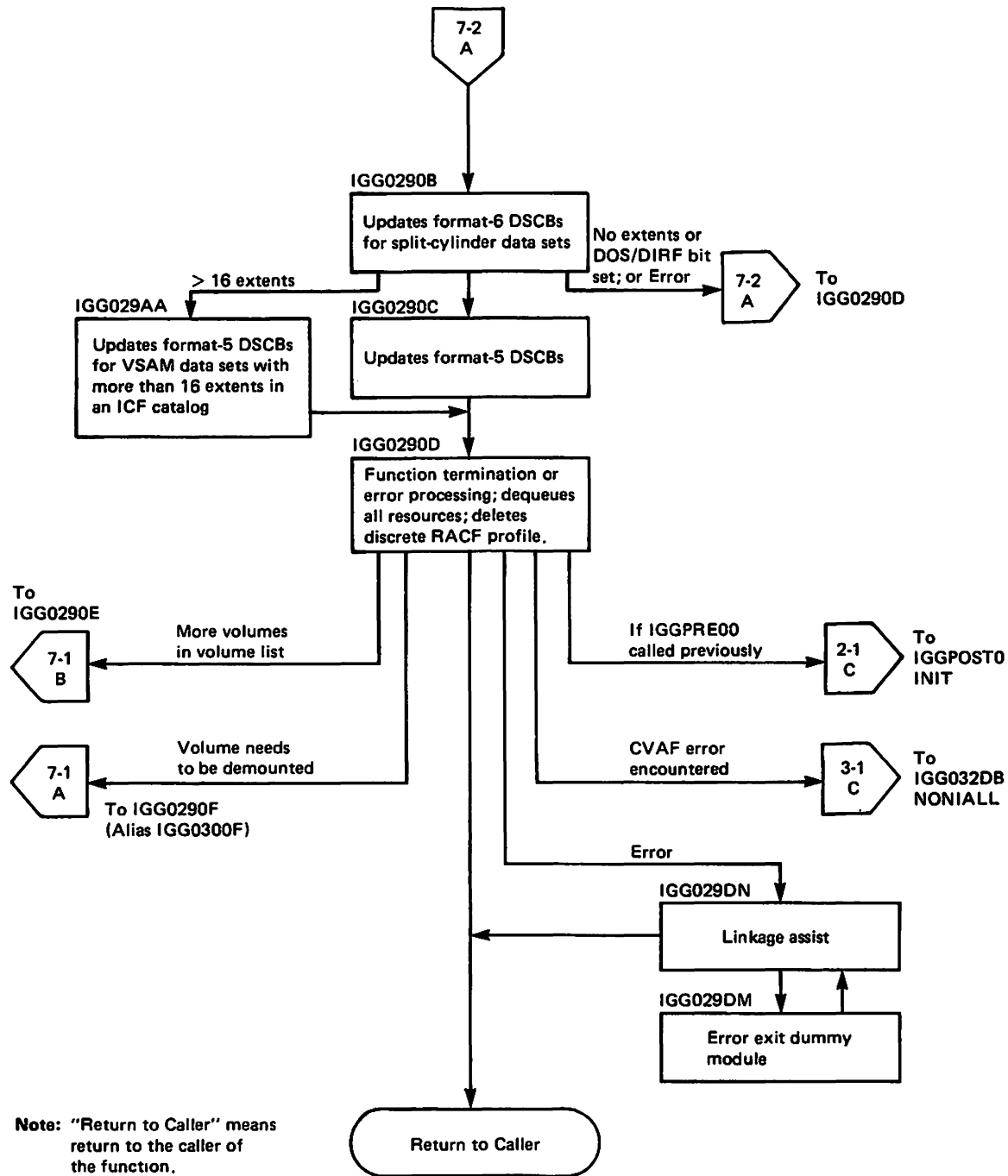


Figure 7 (Part 2 of 2). Scratch

PRLSE Function

Description

The PRLSE function deletes unused space, and extents, allocated to sequential or partitioned data sets as follows:

- Calls SAF to determine via RACF whether erasure is to be performed for released tracks when the caller of PRLSE does not explicitly specify such action.
- Reads in the format-4 DSCB, and processes the DIRF for a nonindexed VTOC, or VRF for an indexed VTOC
- If required, invokes the DADSM track erase module (IGG029ER) to make released tracks unreadable
- Updates the format-1 DSCB
- Updates or removes the format-3 DSCB
- Writes back the format-1 and format-3 DSCBs
- For MSS virtual volumes, relinquishes space
- Updates the format-4 and format-5 DSCBs (for a nonindexed VTOC)
- Updates the VPSM (for an indexed VTOC)

Interface to Controlling Module (IGG020P0)

Register 1 points to the PARTREL parameter list. Register 13 points to a standard register save area. Register 14 provides the desired return address.

Interface to Controlling Module (IGG020P1)

If register 2 contains zero, entry was made from IGG020P0. Register 3 points to a partial data control block (DCB) which points to an area for the construction of a dummy DEB. Register 4 points to a partially initialized O/C/EOV work area. Register 10 points to the UCB of the data set whose space allocation is to be reduced. Register 13 points to the partial release work area (the data set name is passed within this area).

For callers other than IGG020P0, register 2 points to the DCB for the data set whose space allocation is to be reduced. Register 4 points to the O/C/EOV work area. Register 7 points to the restart work area if entry is from restart. Register 10 points to the UCB of the data set whose space allocation is to be reduced.

System Data Areas Used

Partial release work area

DADSM Data Areas Used

Acquire/Relinquish parameter list

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

PARTREL parameter list

PARTREL partial release work area

SAF work area and parameter list

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 8 on page 33.

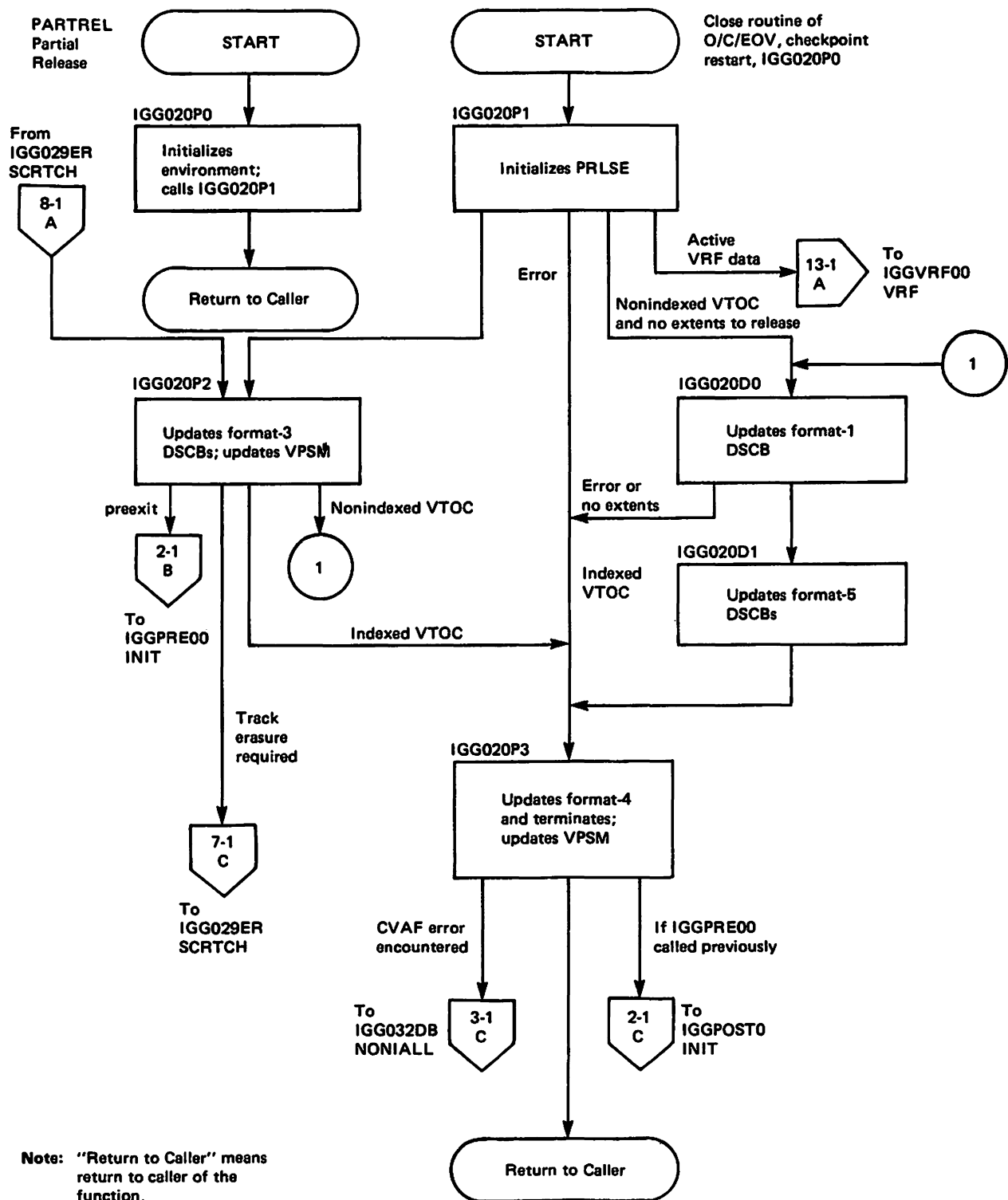


Figure 8. Partial Release

PRTCT Function

Description

The PRTCT function:

- Reads a format-1 DSCB for the PASSWORD data set from the system volume
- Adds, replaces, deletes, or lists entries in the system PASSWORD data set
- Updates the format-1 DSCB

Note: VSAM data spaces are protected using another method. See *VSAM Logic*.

Interface to Controlling Module

Register 1 points to the protect parameter list.

System Data Areas Used

Not applicable

DADSM Data Areas Used

Data set control blocks (DSCB)

Protect work area

Program Organization

See Figure 9 on page 35.

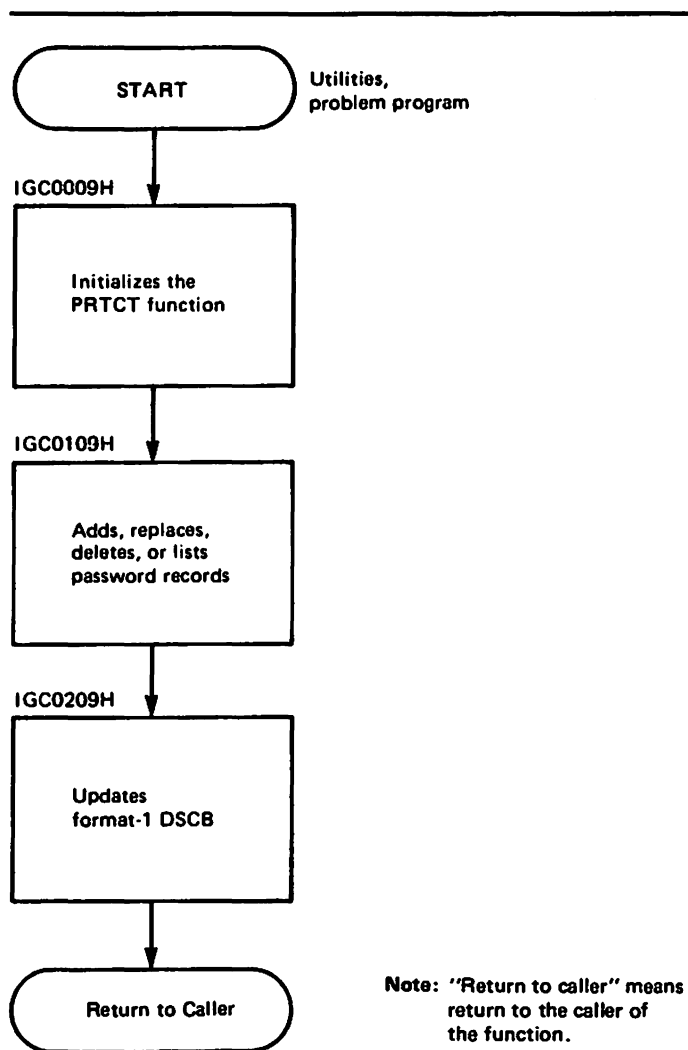


Figure 9. Protect

RNAME Function

Description

The RNAME function:

- Determines whether the volume is mounted on a unit allocated to the job; if not, RNAME requests that the required volume be mounted.
- Calls SAF to verify authority via RACF generic or discrete profiles. Renames the discrete profile when one exists.
- Deletes the old data set name from the VTOC index and adds the new data set name to the VTOC index (for an indexed VTOC only).
- Updates the format-1 DSCB with the new data set or VSAM data space name.
- Writes a type-18 SMF record, if necessary.
- Processes additional volumes.

Interface to Controlling Module

Register 0 contains all zeros or points to the UCB of the device that can be used to mount volumes. Register 1 points to the rename parameter list.

System Data Areas Used

Not applicable

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

DADSM extent table

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

Rename work area

SAF work area and parameter list

Second rename work area

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 10 on page 38.

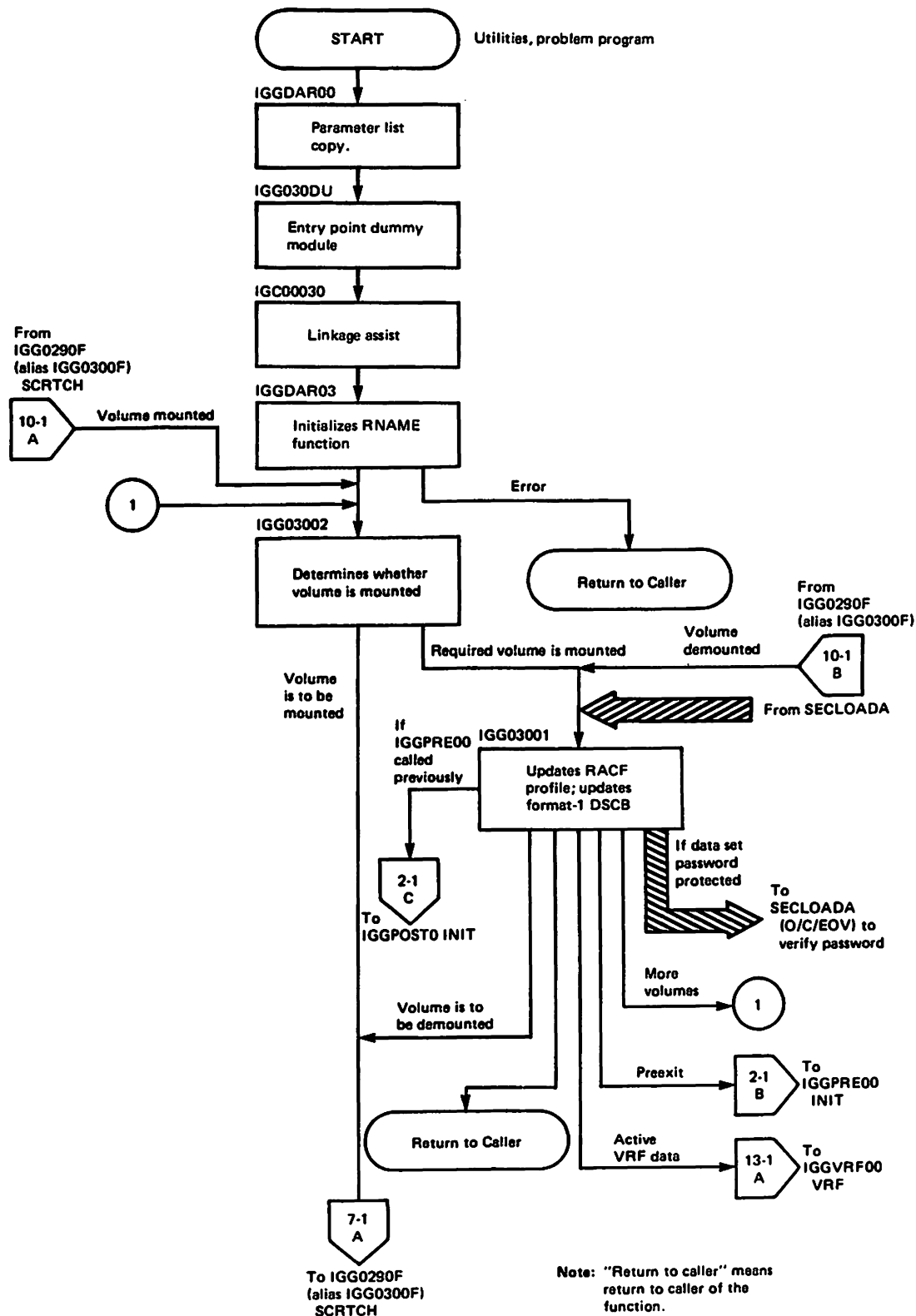


Figure 10. Rename

OBTN Function

Description

The OBTN function:

Reads one DSCB into the caller's work area, which contains either: (1) the 96-byte data portion of the format-1 DSCB (or format-4 if the data set name is 44 characters of X'04' of the named data set, along with its absolute track address (CCHHR); or (2) the 140-byte DSCB whose absolute track address is supplied; or (3) for VIO data sets, the virtual DSCB.

Interface to Controlling Module

Register 1 points to the obtain parameter list.

System Data Areas Used

Not applicable

DADSM Data Areas Used

Buffer list

CVAF parameter list

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

Obtain work area

Transfer control table

WTG table

Program Organization

See Figure 11 on page 40.

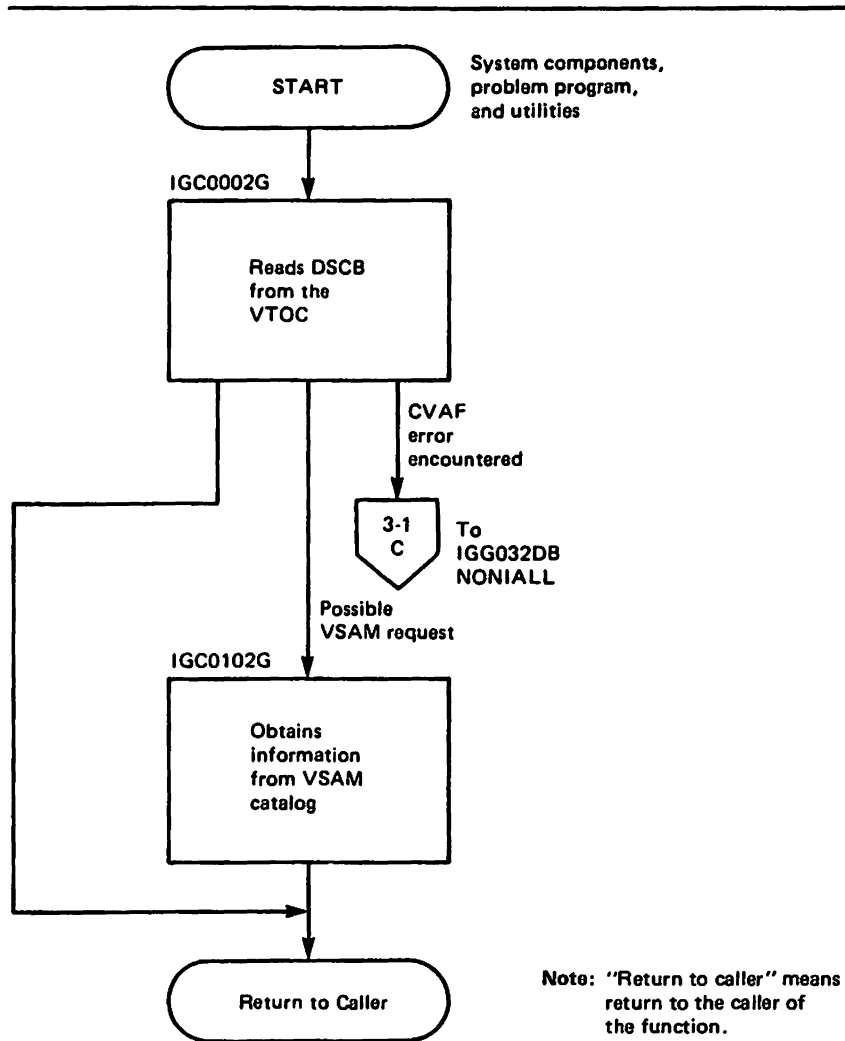


Figure 11. Obtain

LSPACE Function

Description

The LSPACE function:

- Calculates the unallocated volume space from format-5 DSCBs (for a nonindexed VTOC) or the VPSM (for an indexed VTOC).
- Optionally calculates the fragmentation index.
- Optionally reports the number of format-0 DSCBs and free VIRs.
- Optionally returns the format-4 DSCB.
- If SMF information is required, the volume label is read in and a type-19 record is constructed and written to the SMF data set.
- If the MONITOR SPACE command is in effect, space information is placed in the caller's message area.

Interface to Controlling Module

Register 0 points to the UCB of the device on which the volume is (or can be) mounted. Register 1 contains the SMF code in the high-order byte and points to the message area in the three low-order bytes.

System Data Areas Used

Not applicable

DADSM Data Areas Used

Buffer list

CVAF parameter list

DADSM preprocessing and postprocessing installation exit parameter list

Data set control blocks (DSCB)

LSPACE work area

Transfer control table

WTG table

Program Organization

See Figure 12 on page 42.

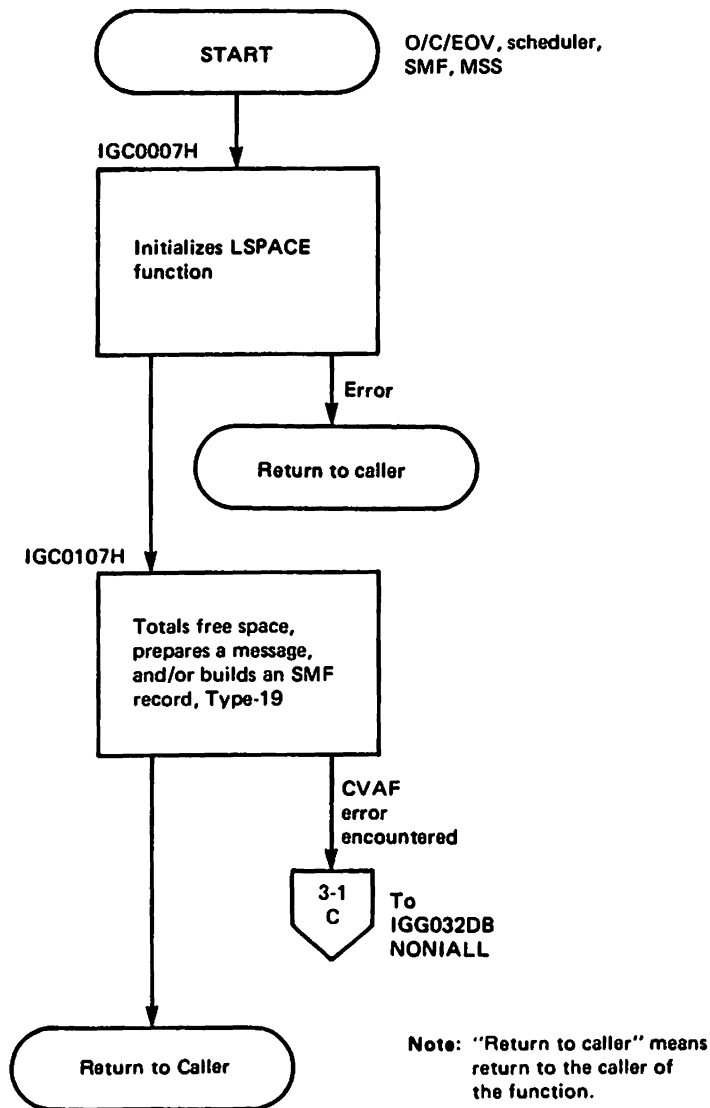


Figure 12. LSPACE

VRF Function

Description

The VRF function:

- Reads VRF data from the the VTOC index map (VIXM).
- Uses the function code (VRFCODE) in the VRF data to determine the VRF recovery routine which is invoked to recover the interrupted function (for example, function code X'03' will cause VRF recovery routine, IGGVRF03, to be given control).
- Zeros out VRF data when the updates are completed.

Note: IGGVRF00 through IGGURF05 are DADSM modules. IGGVRF06 is a DFDSS module. See *DFDSS: Diagnosis Guide*.

Interface to Controlling Module

Register 1 contains the UCB address. Register 13 contains the pointer to an 18-word register save area. The save area must be acquired with the IECRES macro.

System Data Areas Used

Not applicable

DADSM Data Areas Used

Buffer list

CVAF extent table

CVAF parameter list

Data set control blocks (DSCB)

Transfer control table

VTOC recording facility data

WTG table

Program Organization

See Figure 13 on page 44.

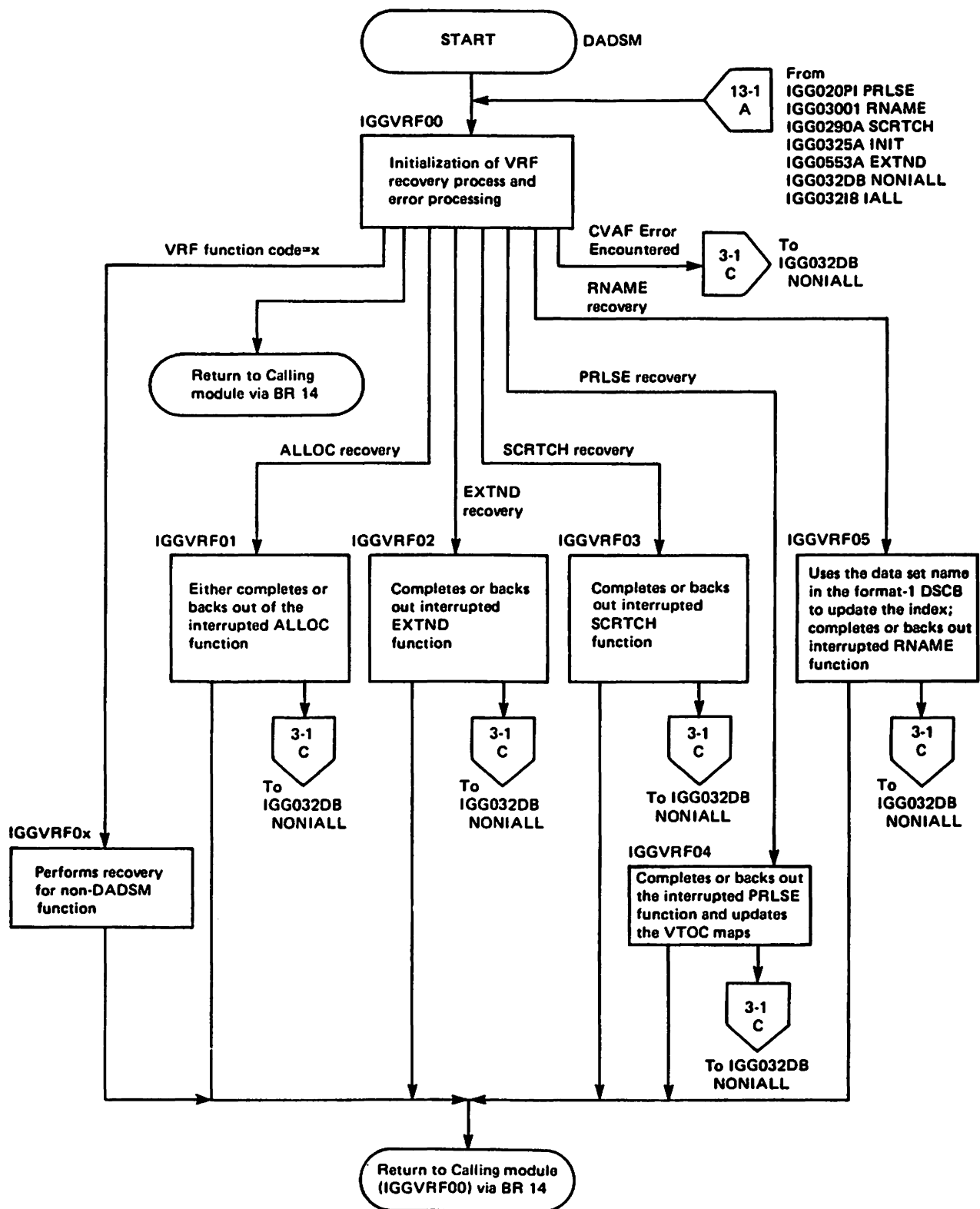


Figure 13. VRF Recovery

Module Directory

The section contains a table that lists each executable object module in DADSM, the function and subfunction to which the module belongs, and the figure number of the module flowchart in which reference to the object module can be found. The figure numbers in **boldface** indicate where the module is described in detail.

The majority of DADSM modules reside above 16Mb virtual. The remaining modules fall into two categories: modules that always reside below 16Mb virtual, IGGPEXIT, IGG19EK, and IGG553A, and the installation replaceable modules which may or may not reside above 16Mb virtual depending on how they are coded. These modules are identified by a footnote in the table below.

Module	Function	Subfunction	Figure No. (and Part No., if applicable)
IGC0002G	OBTN		11
IGC0002I ¹	SCRTCH		7-1
IGC0003B	ALLOC	INIT	2
IGC00030 ¹	RNAME		10
IGC0007H	LSPACE		12
IGC0009H	PRTCT		9
IGC0102G	OBTN		11
IGC0107H	LSPACE		12
IGC0109H	PRTCT		9
IGC0209H	PRTCT		9
IGGDAR00 ¹	RNAME		10
IGGDAR03	RNAME		10
IGGDAS00 ¹	SCRTCH		7-1
IGGDAS03	SCRTCH		7-1
IGGDATBL ²	COMMON		

¹ This module may reside above or below 16Mb virtual.

² This module is shared by more than one function.

Module	Function	Subfunction	Figure No. (and Part No., if applicable)
IGGPEXIT ²	COMMON		
IGGPOST0 ^{1 2}	COMMON		2,3,4-2,6,7-2,8
IGGPREF00 ^{1 2}	COMMON		2,4-2,6,7-1,8,10
IGGVRF00	VRP		13,2,4-2,6,7-1,8,10
IGGVRF01	VRP		13
IGGVRF02	VRP		13
IGGVRF03	VRP		13
IGGVRF04	VRP		13
IGGVRF05	VRP		13
IGG0CLF2	ALLOC	NONIALL	3,2
IGG019EK ²	COMMON		
IGG020D0	PRLSE		8
IGG020D1	PRLSE		8
IGG020P0	PRLSE		8
IGG020P1	PRLSE		8
IGG020P2	PRLSE		8
IGG020P3	PRLSE		8
IGG029AA	SCRTCH		7-1
IGG029CM ²	COMMON		
IGG029DM ¹	SCRTCH		7-2
IGG029DN	SCRTCH		7-2
IGG029DU ¹	SCRTCH		7-1
IGG029ER	SCRTCH		7-1
IGG0290A	SCRTCH		7-1
IGG0290B	SCRTCH		7-1
IGG0290C	SCRTCH		7-1
IGG0290D	SCRTCH		7-2,7-1
IGG0290E	SCRTCH		7-1
IGG0290F	SCRTCH		7-1,10
IGG0299A	SCRTCH		7-1
IGG030DU ¹	RNAME		10
IGG0300F	RNAME		7-1,10

Module	Function	Subfunction	Figure No. (and Part No., if applicable)
IGG03001	RNAME		10,7-1
IGG03002	RNAME		10,7-1
IGG032DB	ALLOC	NONIALL	3,4-2,6,7-2,8,11,12,13
IGG032I1	ALLOC	IALL	4-1,2
IGG032I2	ALLOC	IALL	4-1
IGG032I3	ALLOC	IALL	4-1
IGG032I4	ALLOC	IALL	4-1
IGG032I5	ALLOC	IALL	4-1
IGG032I6	ALLOC	IALL	4-1
IGG032I7	ALLOC	IALL	4-2,4-1
IGG032I8	ALLOC	IALL	4-2
IGG0325A	ALLOC	INIT	2,5
IGG0325B	ALLOC	NONIALL	3,2
IGG0325C	ALLOC	NONIALL	3
IGG0325D	ALLOC	NONIALL	3
IGG0325E	ALLOC	NONIALL	3
IGG0325G	ALLOC	NONIALL	3
IGG0325H	ALLOC	NONIALL	3,2
IGG0325I	ALLOC	INIT	2
IGG0325K	ALLOC	NONIALL	3
IGG0325P	ALLCC	CONV	5
IGG0325Q	ALLOC	CONV	5
IGG0325R	ALLOC	CONV	5
IGG0325T	ALLOC	CONV	5
IGG0325U	ALLOC	CONV	5
IGG0325V	ALLOC	CONV	5
IGG0325W	ALLOC	CONV	5
IGG0325Z	ALLOC	CONV	5,2,6
IGG0553A	EXTND		6
IGG0553B	EXTND		6
IGG0553C	EXTND		6
IGG0553D	EXTND		6

Module	Function	Subfunction	Figure No. (and Part No., if applicable)
IGG0553E	EXTND		6
IGG0553F	EXTND		6,5
IGG0553G	EXTND		6
IGG05530	EXTND		6

Data Areas

System Data Areas

The following data areas and control blocks used by the DADSM functions can be found in *Data Areas*, available only in microfiche.

Allocate Work Area

Mapped by: IECALLWA macro.

Chained from: Register 13 when the allocate (ALLOC) function is in control.

Storage Location: Subpool 230.

Description: Work area used by ALLOC to perform its function.

Created when: During the allocate initialization subfunction (INIT) by module IGC0003B.

Released when: When the ALLOC function exits, IGG0325H frees it.

IGG032I7 frees it if the allocation was an ISAM data set.

IGG0325I frees it if the allocation was a VIO data set.

IGG0CLF2 frees it if the allocation was a partitioned data set or a CVOL.

Extend Work Area

Mapped by: IECEXTWA macro.

Chained from: Register 11.

Storage Location: Subpool 230.

Description: Used by the extend (EXTND) function to contain control blocks for extending the data set.

Created when: By module IGG05530 during extend initialization (EXTND).

Released when: By module IGG0553E when the EXTND function is finished.

Partial Release Work Area

Mapped by: IECPRLWA macro.

Chained from: Register 11 or 13 while the partial release function (PRLSE) is in control.

Storage Location: Subpool 230.

Description: Used by partial release (PRLSE) to perform its function.

Created when: The PRLSE function initializes. IGG020P0 creates it for the PARTREL caller. IGG020P1 creates it for the close or checkpoint/restart caller.

Released when: The PRLSE function exits. IGG020P0 frees it for the PARTREL caller. IGG020P3 frees it for the close or checkpoint/restart caller.

Scratch Work Area

Mapped by: IECSCRWA macro.

Chained from: Register 13 while the scratch function (SCRTCH) is in control.

Storage Location: Subpool 230.

Description: Used by scratch (SCRTCH) to perform its function.

Created when: By module IGGDAS03 during scratch initialization (SCRTCH).

Released when: By module IGG0290D when SCRTCH finished.

Second Scratch Work Area

Mapped by: IECSCRWA macro.

Chained from: SECWAPTR in IECSCRWA.

Storage Location: Subpool 230.

Description: Used by scratch (SCRTCH) to perform its function.

Created when: During SCRTCH initialization by module IGGDAS03.

Released when: SCRTCH is finished by module IGG0290D.

DADSM Data Areas

The following work areas and control blocks either are used only by the DADSM functions, or are mapped within DADSM work areas.

Buffer List

Mapped by: ICVAFBFL macro.

Chained from: Not applicable.

Storage Location: Within the DADSM function work area and/or built dynamically by CVAF in subpool 229.

Description: The buffer list in the DADSM work area is passed to CVAF through the CVAF parameter list in order to read and write VTOC DSCBs; it is supplied to the CVAFDIR macro BUFLIST keyword. The buffer lists, built dynamically by CVAF, contain the storage locations of the VTOC index space maps and the VTOC index entry records (VIERs). All DADSM functions, except ALLOC (CONV) and PRTCT, use the buffer list.

Created when: The buffer list in the DADSM work area is created if DADSM needs to call CVAF to read or write a DSCB. The buffer lists built by CVAF are created when CVAF is called by DADSM to read the VTOC index space maps and/or search the VTOC index entry records.

Released when: The buffer list in the DADSM work area is released when the DADSM work area is released. The buffer lists built by CVAF are released when DADSM calls CVAF and specify that the VTOC index entry records and/or the VTOC index space maps are to be released. The buffer lists are also released by DADSM recovery routines at abnormal termination processing.

CVAF Extent Table

Mapped by: ICVARXNT macro.

Chained from: Not applicable.

Storage Location: Allocate, extend, scratch, and partial release work areas.

Description: Used to represent allocated or released space extents when interfacing with CVAF. The information contained in the flags field is not used by CVAF, differs for each routine, and can be determined by examining the program listing. Used by the ALLOC (INIT), EXTND, SCRTCH, PRLSE, and VRF functions.

The used-hole field is not used by CVAF, but is used by DADSM to contain the count of the number of format-1, format-2, format-3, format-5, and format-6 DSCBs added to and removed from the VTOC during allocation or releasing space.

Each extent entry contains two binary numbers: RTA1 and RTA2. RTA1 is the relative track address of the first track of an extent area; RTA2 is the relative track address of the last track of the area, plus one. A relative track address is a binary number representing the displacement of the track from the first track of the

volume. For example, the relative track address of track 7 on cylinder 0 is 7. The relative track address of track 3 on cylinder 2 is 23 (if the volume has 10 tracks per cylinder).

Created when: During ALLOC, EXTND, SCRTCH, PRLSE, and VRF function processing.

Released when: Allocate, extend, scratch, partial release, or VRF work areas are released.

CVAF Parameter List

Mapped by: ICVAFPL macro.

Chained from: Not applicable.

Storage Location: Within the DADSM function work area.

Description: A parameter list supplied to CVAF. All functions, except ALLOC (CONV) and PRTCT, use the CVAF parameter list data area.

Created when: By the DADSM function when CVAF is to be called.

Released when: By the DADSM function when its work area is released.

DADSM Extent Table

Mapped by: ICVVLSPC macro.

Chained from: Not applicable.

Storage Location: Allocate, extend, scratch, and partial release work areas.

Description: Used to represent allocated or released space extents when interfacing with CVAF. The information contained in the flags field is not used by CVAF, differs for each routine, and can be determined by examining the program listing. Used by the ALLOC (INIT), EXTND, SCRTCH, PRLSE, and VRF functions.

The used-hole field is not used by CVAF, but is used by DADSM to contain the count of the number of format-1, format-2, format-3, format-5, and format-6 DSCBs added to and removed from the VTOC during allocation or releasing space.

Each extent entry contains two binary numbers: RTA1 and RTA2. RTA1 is the relative track address of the first track of an extent area; RTA2 is the relative track address of the last track of the area, plus one. A relative track address is a binary number representing the displacement of the track from the first track of the volume. For example, the relative track address of track 7 on cylinder 0 is 7. The relative track address of track 3 on cylinder 2 is 23 (if the volume has 10 tracks per cylinder).

Created when: During ALLOC, EXTND, SCRTCH, PRLSE, and VRF function processing.

Released when: Allocate, extend, scratch, partial release, or VRF work areas are released.

DADSM Preprocessing and Postprocessing Installation

Exit Parameter List

Mapped by: IECIEXPL macro.

Chained from: Not applicable.

Storage Location: Within DADSM function work area. Subpool 230 protect key 5.

Description: The IEXPL contains data supplied to the DADSM preprocessing and postprocessing installation exits, IGGPRE00 and IGGPOST0. It also contains fields (IEXFMT1, IEXREASN), which are returned to DADSM allocate from the preprocessing exit, as well as a word (IEXRSVWD) which may be used by the preprocessing exit for passing data to the postprocessing exit. The DADSM functions ALLOC, EXTND, SCRTCH, PRLSE, and RNAME use IEXPL.

Created when: The DADSM function is to give control to the preprocessing installation exit module, IGGPRE00.

Released when: The DADSM function work area is freed.

Data Set Control Blocks

Mapped by: IECSDSL1 macro.

Chained from: DSCBs reside in the VTOC. Format-1 DSCBs are not chained from any record in the VTOC. For an indexed VTOC, the VTOC index entry with the data set name of the format-1 DSCB contains the disk address (CCHHR) of the format-1 DSCB. Format-2 DSCBs are chained from the format-1 DSCB field, DS1PTRDS. Format-3 DSCBs are chained from the format-1 or -2 DSCB fields, DS1PTRDS or DS2PTRDS. The format-4 DSCB is the first record in the VTOC; the TTR of the format-4 DSCB is in the volume label of the volume and in the UCBVTOC field of the UCB. The first format-5 DSCB is the second record in the VTOC; subsequent format-5 DSCBs are chained from the previous format-5 DSCB field, DS5PTRDS. The first format-6 DSCB is chained from the format-4 DSCB field, DS4F6PTR; subsequent format-6 DSCBs are chained from the previous format-6 DSCB field, DS6PTRDS.

Storage Location: Not applicable.

Description: A format-1 DSCB describes a data set and the first three extents. A format-2 DSCB describes the structure of an ISAM data set. A format-3 DSCB describes the 4th through the 16th extent of a data set. Additional format-3 DSCBs may be used to describe the 17th through the 123rd extent of a VSAM data set cataloged in an integrated catalog facility catalog. A format-4 DSCB describes the VTOC. A format-5 DSCB describes unallocated space on a volume which does not contain a VTOC index. A format-6 DSCB describes the extents shared by two or more data sets (split cylinder extents). A format-0 DSCB is an unused record in the VTOC. All DADSM functions use the data set control blocks (DSCBs).

Created when: The format-4 and the first format-5 DSCBs are created when the volume is initialized; for a nonindexed VTOC, subsequent format-5 DSCBs are created when the number of extents of unallocated space on the volume exceeds 26 or a multiple of 26; for example, a third format-5 DSCB is created when the number of extents goes from 51 to 54 (exceeding 2 x 26). This can occur either during allocation or release of space on the volume. The format-1, -2, and perhaps format-3 DSCBs are created when the data set is allocated; the format-3 DSCB is created when a data set requires a 4th extent. The format-6 DSCB is created when the first split cylinder data set on the volume is allocated; subsequent format-6 DSCBs are created when the number of split extents exceeds 26 or a multiple of 26. This can happen only when a new split cylinder data set is allocated. Allocation of a split-cylinder data set is no longer supported by DADSM, but the existing split-cylinder data set can be scratched. A format-0 DSCB is created in all DSCBs, except the format-4 and first format-5 DSCB when the volume is initialized. A format-0 DSCB is also created when any other DSCB (except the first two DSCBs, the format-4 and first format-5 DSCB) is not needed. Format-0, -5, and -6 DSCBs are also created by the VTOC convert routine for an OS (nonindexed) VTOC. Format-0 DSCBs also are created by the VRF recovery routines for an indexed VTOC.

Released when: A DSCB is released when a format-0 DSCB is written over it. The format-4 and first format-5 DSCBs are never released. The format-1 and -2 DSCBs are released when the data set is deleted. The format-3 DSCB is released when the data set is deleted or when the partial release function (PRLSE) reduces the number of extents from four or more to three or less. A format-5 DSCB is released when the number of extents of unallocated space drops from above a multiple of 26 to below or equal to a multiple of 26; for example, the second format-5 is released when the number of extents of unallocated space goes from 27 to 26. This can occur either during allocation or release of volume space on a nonindexed VTOC. A format-6 DSCB is released when the number of split cylinder extents drops to a multiple of 26 (for example, from 79 to 78); this happens only when a split-cylinder data set is deleted.

Extended Prefix

Mapped by: IECDSECS macro.

Chained from: Not applicable.

Storage Location: The first 80 bytes of the initial work area obtained by the DADSM₁ function.

Description: Provides a register save area and the addresses of other data areas. All DADSM functions, except PRTCT, use the extended prefix.

Created when: An extended prefix is obtained only with the initial work area obtained to process a DADSM request through the IECRES GET macro.

Released when: The DADSM work area is freed using the IECRES FREE macro.

| **LSPACE Parameter List**

| *Mapped by:* LSPACE macro

| *Chained from:* Register 1 on entry to IGC0007H.

| *Storage location:* Caller's work area.

| *Description:* A parameter list used by the LSPACE function.

| *Created when::* By any caller of LSPACE.

| *Released when:* Caller's responsibility.

LSPACE Work Area

Mapped by: IECLSPWA macro.

Chained from: Register 13 while LSPACE is in control.

Storage Location: Subpool 230.

Description: Used by the LSPACE function to read DSCBs from the VTOC of volumes for which space information is being gathered.

Created when: During LSPACE initialization by IGC0007H.

Released when: By LSPACE when LSPACE completes its function.

Obtain Work Area

Mapped by: IECOBTWA macro.

Chained from: Register 13.

Storage Location: Subpool 230.

Description: Used by the obtain function (OBTN) to read DSCBs from the VTOC.

Created when: During obtain initialization (OBTN) by IGC0002G, which issues the IECRES GET macro.

Released when: The DADSM work area is freed using the IECRES FREE macro.

Partial Data Set Control Block

Mapped by: IECPDSCB macro.

Chained from: REALLOC parameter list.

Storage Location: Caller's work area.

Description: A partial format-1 DSCB (the first 98 bytes) plus the primary space request in tracks and the number of directory blocks.

Created when: By any authorized caller of allocate (SVC 32, REALLOC).

PARTREL Parameter List

Mapped by: PARTREL macro.

Chained from: Register 1 upon entry to IGG020P0.

Storage Location: Caller's work area.

Description: A parameter list used by the PARTREL partial release (PRLSE) function.

Created when: By any authorized caller of partial release (PARTREL interface).

Released when: Caller's responsibility.

PARTREL Partial Release Work Area

Mapped by: A concatenation of IECDSECT, DCBD, and IEZDEB macros.

Chained from: Register 11 or 13.

Storage Location: Subpool 230.

Description: A single getmain area which is subdivided to provide module IGG020P1 (DADSM partial release prior to PARTREL) a valid execution environment.

Created when: By module IGG020P0 during PARTREL partial release (PRLSE) initialization.

Released when: By Module IGG020P0 when the PRLSE function is finished.

Password Data Set Record Format

Chained from: Not applicable.

Storage Location: The PASSWORD data set.

Description: The PASSWORD data set contains records with a key length of 52 bytes and a data length of 80 bytes. The first 44 bytes of the key are the data set name, left justified, and padded with blanks. The last 8 bytes of the key are the password for the data set. The first two bytes of the data are a binary counter, which is incremented when the data set is opened. The third byte of the data is a protection mode indicator set to one of four values:

- X'00' to indicate that the password is a secondary password and the protected data set is to be read only
- X'80' to indicate that the password is the control password and the protected data set is to be read only
- X'01' to indicate that the password is a secondary password and the protected data set is to be read and written

- **X'81'** to indicate that the password is the control password and the protected data set is to be read and written

Created when: The protect SVC is called to create a new entry in the PASSWORD data set.

Released when: The protect SVC is called to delete the entry in the PASSWORD data set.

Prefix to DADSM Work Areas

Mapped by: IECDSECS macro.

Chained from: Prefix to DADSM work area.

Storage Location: Precedes all work areas obtained by DADSM through the IECRES GET macro.

Description: A prefix, included with each work area, used to chain the work areas together. All DADSM functions, except PRTCT, use the prefix to DADSM work areas.

Created when: DADSM work areas are obtained using the IECRES GET macro.

Released when: The DADSM work area is freed using the IECRES FREE macro.

Protect Work Area

Mapped by: IECDSECT macro.

Chained from: Not chained from or related to the other DADSM work areas. Register 5 points to the protect work area, while protect is in control.

Storage Location: Subpool 252.

Description: Used by the PRTCT function to read from and write to the VTOC and the PASSWORD data set.

Created when: During PRTCT initialization by module IGC0009H.

Released when: By module IGC0209H when the PRTCT function is finished.

REALLOC Parameter List

Mapped by: REALLOC macro.

Chained from: Register 1 upon entry to ALLOCATE (SVC 32) when register 1's high order bit is on.

Storage Location: Caller's work area.

Description: A parameter list used by the allocate (ALLOC) function to process a partial DSCB that may require more than five extents for the

Released when: Caller's responsibility.

Recovery Routine Audit Trail

Mapped by: IECDSECS macro.

Chained from: Not applicable.

Storage Location: At the end of the first DADSM work area.

Description: Used by O/C/EOV-DADSM recovery routines in freeing resources allocated to a DADSM routine that has encountered an abnormal termination condition. This audit trail tells which resources to free. All DADSM functions, except PRTCT, use the audit trail area.

Created when: Initial DADSM work area is obtained through the IECRES GET interface.

Released when: The DADSM work area is freed.

Relinquish Parameter List

Mapped by: ICBAREL macro.

Chained from: ARHDPTR in Scratch or Partial Release work area.

Storage Location: Subpool 230.

Description: A parameter list used by Scratch and Partial Release to pass information to MSS on virtual DASD space being released.

Created when: Scratch or Partial Release determine the volume being processed is virtual DASD.

Released when: Scratch or Partial Release work areas are released.

Rename Work Area

Mapped by: IECRENWA macro.

Chained from: Register 13.

Storage Location: Subpool 230.

Description: Used by the rename function (RNAME) to read and write DSCBs.

Created when: During rename initialization (RNAME) by IGGDAR03, which issued the IECRES GET macro.

Released when: When all the volume list entries have been processed.

SAF Work Area and Parameter List

Mapped by: RACROUTE macro.

Chained from: Not applicable.

Storage Location: SAF work area and parameter list are processed in the DADSM work area.

Description: The SAF work area is a 512-byte area used by SAF. The SAF parameter list is built at the time the RACROUTE macro is issued. It contains addresses to the data set name, the volume serial number, the SAF work area, and flags.

Created when: Appears in the DADSM work area.

Released when: At the completion of the DADSM function.

Second Rename Work Area

Mapped by: IECRENEWA macro.

Chained from: SECWAPTR in IECRENEWA.

Storage Location: Subpool 230.

Description: Used by rename (RNAME) to perform its function.

Created when: During RNAME initialization by module IGC00030.

Released when: When all the volume list entries have been processed by RNAME.

Transfer Control Table

Mapped by: XCTLTABL macro.

Chained from: Not applicable.

Storage Location: Within the module expanding the XCTLTABL macro.

Description: The transfer control table is a list of module names and their entry point addresses (VCONs) that is used to transfer control (using the IECRES macro) among the DADSM modules and the close and EOVS modules that give control to and receive control from the DADSM modules. All DADSM functions, except PRTCT, use the transfer control table.

Created when: Appears at the end of each DADSM module as a result of the expansion of the XCTLTABL macro instruction.

Released when: Not applicable.

VTOC Recording Facility (VRF) Data

Mapped by: IECVRFDA macro.

Chained from: Not applicable.

Storage Location: VRF data is processed in the DADSM work area and is managed by CVAF in the VTOC index map (VIXM) in the VTOC index.

Description: VRF data is used by DADSM to record sufficient information about a DADSM request to permit any partial updates to the VTOC and VTOC index to be either backed out or completed in the event the DADSM function is interrupted. The DADSM functions (ALLOC, EXTND, SCRTCH, PRLSE, and RNAME) and DFDSS (see *DFDSS: Diagnosis Guide*) use the VRF data. Since the VIXM contains space for several consecutive copies of VRF data, the VIXM will contain a recent history of the last VTOC updates made on the volume.

Created when: VRF data is created in the DADSM work area as the DADSM function begins and before any VTOC or VTOC index updates have occurred. The VRF data is moved to the VIXM in virtual storage when DADSM calls the CVAFVRF ACCESS=WRITE macro supplying the VRF data. VRF data is written to the VTOC index and made active as the first VTOC or VTOC index update when DADSM calls the CVAFDIR macro to request that the VIXM containing active VRF data be written to the VTOC index.

Released when: VRF data in the DADSM work area is released when the DADSM work area is released. Active VRF data in the VIXM is made inactive when DADSM has completed its VTOC updates. The CVAFVRF ACCESS=WRITE macro is called by DADSM, supplying no VRF data; this makes the VRF data in the VIXM in virtual storage inactive. The last update to the VTOC or VTOC index is to write all updated VTOC index entry records and VTOC index space maps to the VTOC index, specifying that the VIXM containing no active VRF data be the last record written to the VTOC index.

WTG (Where-to-Go) Table

Mapped by: Individual DADSM work areas. See description in Appendix A, "Data Area Layouts."

Chained from: Not applicable.

Storage Location: Within the primary DADSM function's work area.

Description: Used in conjunction with the IECRES LOAD macro instruction to transfer control. All DADSM functions, except PRTCT, use the WTG table.

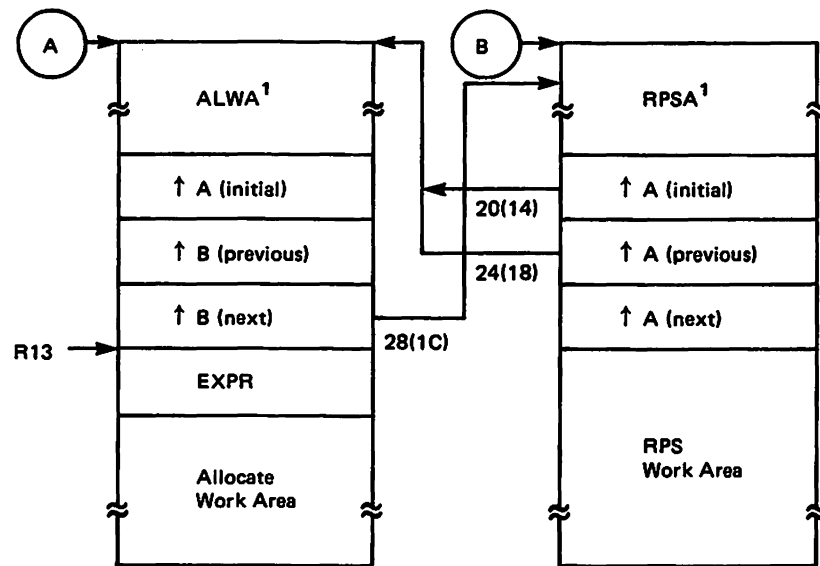
Created when: DADSM work area acquired.

Released when: DADSM work area released.

Data Area Linkages

To facilitate getting and releasing work areas, the DADSM work areas are chained together through the work area prefix (IECPREFX). In most cases, to locate all the work areas of a DADSM function, you need only know the contents of the register pointing to the work area (usually register 11 or 13) at the time a DADSM routine is executing. Register 13 contains the address of the extended prefix of a DADSM work area during most DADSM processing. This address is preceded by the prefix that contains the address of subsequently obtained work areas associated with the DADSM request. Figure 14 on page 62 is an example that shows the work area chaining that results from the following conditions: (1) an allocation request (SVC 32) is issued, and (2) there is a device that has the RPS feature.

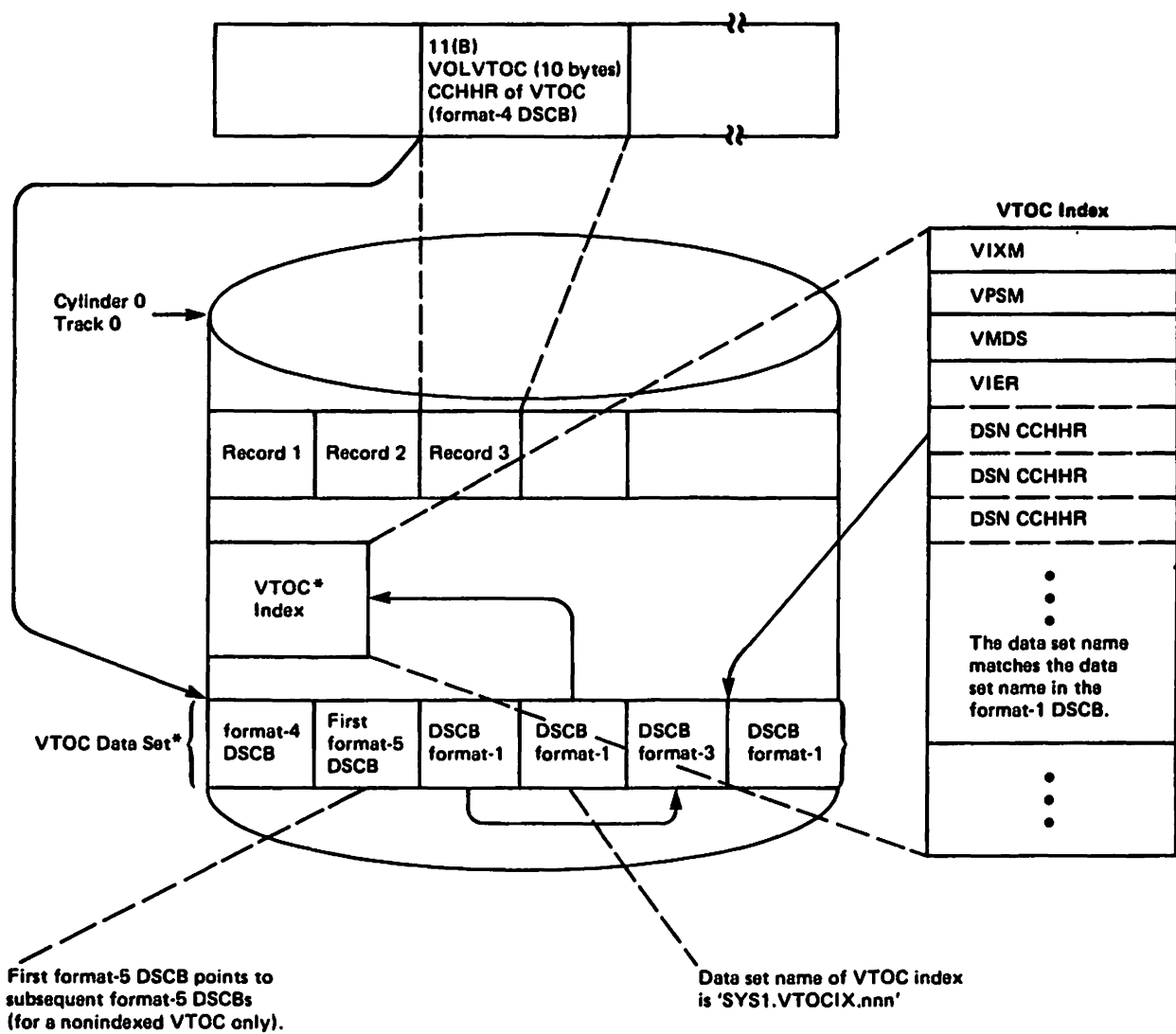
Figure 15 on page 63 shows the linkages on a DASD volume between the VTOC and VTOC index.



¹Four-character identifiers that appear in the first four bytes of each prefix. The DADSM work area identifiers are:

ALWA	Allocate work area
RPSA	RPS work area
EXWA	Extend work area
LSWA	LSPACE work area
OBWA	Obtain work area
PRWA	Partial Release work area
PRW2	PARTREL Partial Release work area
REWA	Rename work area
SCWA	Scratch work area
32DB	IGG032DB work area
CVWA	IGGVRF00 work area
CVWB	Area containing VRF data for IGGVRF00
AVWA	IGGVRF01 (Allocate recovery) work area
EVWA	IGGVRF02 (Extend recovery) work area
SVWA	IGGVRF03 (Scratch recovery) work area
PVWA	IGGVRF04 (Partial Release recovery) work area
RVWA	IGGVRF05 (Rename recovery) work area

Figure 14. Example of Data Area Linkage for an Allocation Request



* Can be located anywhere on the volume after cylinder 0, track 0.

Figure 15. VTOC and VTOC Index Linkages

Appendix A. Data Area Layouts

For quick reference, the layout of the VTOC recording facility (VRF) data area is given in Figure 16. Any additional layouts of the data areas will be available on microfiche. The offsets of the where-to-go (WTG) table are provided in Figure 17 on page 66.

Offsets				
Dec.	(Hex.)	Length	Name	Description
0	(0)	Var.	VRFDA	DADSM USE OF VTOC RECORDING FACILITY
0	(0)	4	VRFID	VRF ID IN EBCDIC 'VRF'
4	(4)	2	VRFLENG	LENGTH OF VRF DATA
6	(6)	1	VRFFCODE	FUNCTION CODE
7	(7)	1	VRFFLAG	VRF FLAG BYTE
		1... ..	VRFNEXTD	EXTEND ON NEW VOLUME
		.1... ..	VRFDSNEX	ON = VRFNDSN EXISTS AT OFFSET VRFOFEXT OFF= VRFEXTBL EXISTS AT OFFSET VRFOFEXT
		..1... ..	VRFISAME	ON = ISAM ALLOCATE WITH AN EXISTING F1 DSCB. OFF= NOT ISAM ALLOCATE WITH AN EXISTING F1 DSCB.
		...1 1111		RESERVED
8	(8)	2	VRFOFEXT	OFFSET(nn) TO VRFEXTBL OR VRFNDSN IN VRF DATA
10	(A)	1		RESERVED
11	(B)	1	VRFPREXT	NUMBER OF PRIMARY EXTENTS
12	(C)	44	VRFDSN	DATA SET NAME
56	(38)	5	VRFF1PTR	CCHHR OF F1 DSCB
61	(3D)	5	VRFF2PTR	CCHHR OF F2 DSCB (ISAM DS ONLY)
66	(42)	0	VRFHEND	END OF VRF DADA HEADER
66	(42)	5	VRFF3PTR	HEADER CCHHR OF F3 DSCB(S)

Figure 16 (Part 1 of 2). VRF Data Area

Offsets Dec.	(Hex.)	Length	Name	Description
71	(47)	5	VRFRSVD	RESERVED (EXTEND ONLY)
71	(47)	45	VRFRSVD	UP TO NINE F3 CCHHRs, FOR A TOTAL OF 10 (ALLOCATE ONLY)
nn		44	VRFNDSN	NEW DATA SET NAME (nn = VRFOFEXT IN VRF DATA)
nn		4	VRFEXTBL	DADSM EXTENT TABLE (nn = VRFOFEXT IN VRF DATA)
nn	(0)	1	VRFEXFLG	EXTENT TABLE FLAG BYTE
nn+1	(1)	1	VRFEXCNT	NUMBER OF ENTRIES (mm) IN EXTENT TABLE
nn+2	(2)	2		RESERVED
nn+4	(4)	Var.	VRFEXENT	mm RTA1/RTA2 ENTRIES

Figure 16 (Part 2 of 2). VRF Data Area

As shown in the figure below, the where-to-go (WTG) table is always located at offsets X'70' to X'7F' in the DADSM work area. It is used by macro IECRES to branch into or transfer control to other modules.

Offsets Dec.	(Hex.)	Length	Name	Description
112	(70)	4	WTGWTOPR WTO	PREFIX FOR RES WTO IECWTGTB POINTS HERE
116	(74)	8	WTGMODNM	MODULE NAME
124	(7C)	4	WTGMODEP	MODULE ENTRY POINT ADDRESS

Figure 17. DADSM Where-to-Go (WTG) Table Definition

Appendix B. DADSM Return Codes

Allocate Function

Return Code	Explanation
0 (X'0')	Successful allocation.
4 (X'4')	Data set name requested already exists on volume; initial allocation not possible under the name given.
8 (X'8')	No room available in VTOC or VTOC index.
12 (X'C')	One of the following errors was encountered: • Permanent I/O error. • Error returned by CVAF.
16 (X'10')	Requested absolute track not available.
20 (X'14')	Requested quantity not available.
24 (X'18')	Average record length greater than 65535 bytes.
28 (X'1C')	DSORG or DISP wrong in ISAM index request.
32 (X'20')	No prime area request for ISAM data set.
36 (X'24')	ISAM prime area must be requested before overflow.
40 (X'28')	Space request must begin on cylinder boundary.
44 (X'2C')	ISAM DSNAME element duplication.
48 (X'30')	Invalid REALLOC parameter list.
52 (X'34')	Invalid JFCB or partial DSCB pointer.
56 (X'38')	Directory space requested is larger than amount available on this volume.

- 60 (X'3C')** Nonindexed VTOC not supported for REALLOC ALLOC=ABS.
- 64 (X'40')** Invalid user label request.
- 68 (X'44')** Invalid UCB pointer.
- 72 (X'48')** DOS VTOC cannot be converted to an OS VTOC.
- 76 (X'4C')** No space parameter given for new data set, or zero space requested at absolute track zero.
- 80 (X'50')** Invalid request for ISAM index.
- 84 (X'54')** ISAM multivolume index not allowed.
- 88 (X'58')** ISAM DSNAME element invalid.
- 92 (X'5C')** ISAM multivolume overflow request not allowed.
- 96 (X'60')** ABSTR AND CYL requests conflict.
- 100 (X'64')** CYL and CONTIG requests conflict.
- 104 (X'68')** Invalid space subparameter.
- 108 (X'6C')** Primary space request for an ISAM data set is zero, or primary space is zero for an ABSTR request.
- 112 (X'70')** Index area request duplication.
- 116 (X'74')** User labels not supported.
- 120 (X'78')** Invalid combination of values for DSSIZE and minimum allocation unit.
- 124 (X'7C')** DSSIZE is not a multiple of the minimum allocation unit.
- 128 (X'80')** Directory space request is larger than primary request.
- 132 (X'84')** Space request must be ABSTR for DOS volume.
- 136 (X'88')** Invalid F3 DSCB pointer.
- 140 (X'8C')** ISAM index must be requested before prime area.
- 144 (X'90')** Last concatenated DD card unnecessary or invalid for this ISAM data set.
- 148 (X'94')** Overlapping extents in VTOC.
- 152 (X'98')** Overlapping DOS split cylinder extents in VTOC.
- 156 (X'9C')** DADSM allocation terminated because of possible VTOC error.

- 160 (X'A0')** ISAM allocation terminated because of possible VTOC error.
- 164 (X'A4')** Allocation terminated because of DOS stacked pack format.
- 168 (X'A8')** RACF define failed; data set profile already defined.
- 172 (X'AC')** User not authorized to define data set.
- 176 (X'B0')** Installation exit rejected the request with a return code of 8; no further volume should be attempted.
- 180 (X'B4')** Installation exit rejected the request with a return code of 4. For a nonspecific volume request; another volume may be attempted.
- 184 (X'B8')** RACF define with modeling specified and model not found.
- 188 (X'BC')** Invalid F2 DSCB pointer.

Extend Function

To EOF

Return Code	Explanation
1 (X'1')	Successful secondary allocation on the current volume.
4 (X'4')	Successful secondary allocation on the new volume.
-1 (X'-1')	Error in secondary allocation on the current volume. – Fewer than three free VTOC records (format-0 DSCBs) – Quantity not available – Too many extents (more than 16) for the data set on this volume

Return Code	Explanation
-4 (X'-4')	Error in secondary allocation on the new volume. – Duplicate name on the new volume – Fewer than three free VTOC records (format-0 DSCBs) – Quantity not available
-8 (X'-8')	Unable to convert VTOC to standard format, or a volume with the alternate tracks on cylinder 0 was encountered (DOS allocation).
-12 (X'-C')	Unable to define the new volume to RACF.
-16 (X'-10')	Permanent I/O error or unexpected CVAF error return code.
-20 (X'-14')	Installation rejected the request.

To Integrated Catalog Facility/VSAM Catalog Management

Return Code	Explanation
161 (X'A1')	Return code for integrated catalog facility catalog caller. Successful secondary allocation on the current volume.
129 (X'81')	Return code for VSAM catalog caller. Successful secondary allocation on the current volume.
-8 (X'-8')	Unable to convert the VTOC to standard format.
-16 (X'-10')	Permanent I/O error or unexpected CVAF error return code.
-20 (X'-14')	Installation exit rejected the request.
-129 (X'-81')	Return code for VSAM catalog caller. Error in secondary allocation on the new volume. – Fewer than three free VTOC records (format-0 DSCBs) – Quantity not available – Too many extents for the data space on this volume
-161 (X'-A1')	Return code for integrated catalog facility catalog caller. The reason is the same as that documented in -129 above.

To OS Catalog Management

Return Code	Explanation
2 (X'2')	Successful secondary allocation on the current volume.
-2 (X'-2')	Error in secondary allocation on the current volume. – Fewer than three free VTOC records (format-0 DSCBs) – Quantity not available – Too many extents (more than 16) for the data set on this volume
-8 (X'-8')	Unable to convert VTOC to standard format, or a volume with the alternate tracks on cylinder 0 was encountered (DOS allocation).
-16 (X'-10')	Permanent I/O error or unexpected CVAF error return code.
-20 (X'-14')	Installation rejected the request.

LSPACE Function

Return Code	Explanation
0 (X'0')	Successful LSPACE processing.
4 (X'4')	I/O error while reading DSCBs or unexpected CVAF error return code.
8 (X'8')	Last allocation on this volume made under DOS, or a DADSM function has prematurely terminated and VTOC errors may exist.
12 (X'C')	UCB address invalid. UCB not for direct access device. UCB not-ready bit is on, indicating device not ready; UCBVTOC=0, indicating volume not mounted.
	If a message area was specified, the reason associated with the return code is stored there.
16 (X'10')	Invalid message area address or SMF indicator.

Figure 18 shows additional diagnostic information returned by LSPACE. This information is returned in Register 0, and, if the return code is not 16, in the LSPACE parameter list as well.

LSPAERCD	LSPASFID	LSPASFRT	LSPASFRS	Description
16 (10)	X'01'	N/A	X'01'	Bad parm list storage key
16 (10)	X'01'	N/A	X'02'	Bad parm list ID
12 (0C)	X'01'	N/A	X'03'	Invalid LSPACE flag
12 (0C)	X'01'	N/A	X'04'	Not authorized for SMF
12 (0C)	X'01'	N/A	X'05'	Bad MSG/DATA area storage key
12 (0C)	X'01'	N/A	X'06'	Bad FMT4 Area storage key
12 (0C)	X'01'	N/A	X'07'	UCB not found
12 (0C)	X'01'	N/A	X'08'	UCB not direct access device
12 (0C)	X'01'	N/A	X'09'	UCB VTOC pointer is zero
12 (0C)	X'02'	N/A	N/A	Invalid UCB status
12 (0C)	X'03'	ENQ RETC	N/A	Failed ENQ on SYSZDMNT
08 (08)	X'04'	N/A	N/A	F5's are invalid
04 (04)	X'04'	ECB STAT	N/A	Error reading F4 & F5
04 (04)	X'05'	ECB STAT	N/A	Error reading next F5
04 (04)	X'06'	ECB STAT	N/A	Error reading volume label
04 (04)	X'80'	DIR RETC	CVSTAT	Error getting F4/Space maps
04 (04)	X'81'	DSM RETC	CVSTAT	Error getting free extents
04 (04)	X'82'	DSM RETC	CVSTAT	Error getting F0 count
04 (04)	X'83'	DSM RETC	CVSTAT	Error getting VIR count
04 (04)	X'84'	VRF RETC	CVSTAT	Error checking for VRF
00 (00)	X'00'	N/A	N/A	No problems

Figure 18. DADSM LSPACE Diagnostic Information

Abbreviation	Meaning
LSPAERCD	Return code
LSPASFID	Subfunction identifier
LSPASFRT	Subfunction return code
LSPASFRS	Subfunction reason code
N/A	Not Applicable
CVSTAT	CVSTAT field of CVAF parameter list
ENQ RETC	Return code from ENQ
DIR RETC	Return code from CVAFDIR
DSM RETC	Return code from CVAFDSM
VRF RETC	Return code from CVAFVRF
ECB STAT	ECB completion code

Obtain Function

Return Code	Explanation
0 (X'0')	Successful completion of Obtain routine.
4 (X'4')	The required volume was not mounted.
8 (X'8')	The F1 DSCB was not found in the VTOC of the specified volume.
12 (X'C')	A permanent I/O error or an invalid F1 or F4 DSCB was encountered when processing the specified volume or an unexpected CVAF error return code was encountered.
16 (X'10')	The pointer to the work area passed by the caller was invalid.
20 ('14')	The absolute address passed (seek option) was not within the boundaries of the VTOC.

Partial Release Function

Return Code	Explanation
0 (X'0')	The requested partial release was successful.
2 (X'2')	Unable to find extent in F1 DSCB.
4 (X'4')	Unable to find extent in F3 DSCB.
8 (X'8')	Another DCB is open to the data set.
12 (X'C')	Invalid parameter list.
16 (X'10')	A permanent I/O error was encountered during processing, or an unexpected CVAF error return code was encountered, or the installation exit rejected the request, or an I/O error occurred while tracks to be released were being erased.
20 (X'14')	DSN, or DSN pointer is invalid.
24 (X'18')	Invalid UCB pointer.
28 (X'1C')	Given DSORG is not supported.
32 (X'20')	No space in VTOC.

Protect Function

Return Code	Explanation
0 (X'0')	The PASSWORD data set was successfully updated.
4 (X'4')	The password of the data set name was already in the PASSWORD data set.
8 (X'8')	The password of the data set name was not in the PASSWORD data set.
12 (X'C')	A control password is required or the one supplied is incorrect.
16 (X'10')	The supplied parameter list was incomplete or incorrect.
20 (X'14')	There was an I/O error in the password data set.
24 (X'18') ¹	The PASSWORD data set was full.
28 (X'1C')	The validity check of the buffer address failed.
32 (X'20') ²	The LOCATE macro failed. LOCATE's return code is in register 1 and the number of indexes searched is in register 0.
36 (X'24') ²	The OBTAIN macro failed. OBTAIN's return code is in register 1.
40 (X'28') ²	The DSCB could not be updated.
44 (X'2C')	The PASSWORD data set does not exist.
48 (X'30') ²	Tape data set cannot be protected.
52 (X'34') ²	Data set in use.
56 (X'38') ²	The data set uses the virtual storage access method (VSAM).

Notes:

- ¹ For this return code, a message is written to the console, indicating that the PASSWORD data set is full.
- ² For these return codes, the PASSWORD data set has been updated, but the DSCB has not been flagged to indicate the protected status of the data set.

Rename Function

Return Code	Explanation
0 (X'0')	Successful completion.
4 (X'4')	No volumes containing any part of the data set were mounted, nor did register 0 contain the address of a unit that was available for mounting a volume of the data set to be renamed (this completion code is accompanied by a setting of 5 in the rename status code of each entry of the volume list).
8 (X'8')	An unusual condition was encountered on one or more of the volumes.
12 (X'C')	The volume list passed to rename was not valid (this return code is not accompanied by the setting of a rename status code in the volume list).

After the RENAME macro instruction is executed, the last byte of each 12-byte entry in the volume list indicates the following conditions:

RENAME

Status Code	Explanation
0 (X'0')	The F1 DSCB for the data set has been renamed in the VTOC on this volume.
1 (X'1')	The VTOC of this volume does not contain the F1 DSCB of the data set to be renamed.
2 (X'2')	The data set could not be renamed because the data set was password protected and the password was not supplied in the two attempts allowed, or an attempt was made to rename a VSAM data space, or an attempt was made to rename a VTOC index data set.
3 (X'3')	An F1 DSCB containing the new data set name already exists in the VTOC of this volume, or an attempt was made to rename a data set to a name starting with 'SYS1.VTOCIX'.
4 (X'4')	A permanent I/O error or an invalid F1 DSCB was encountered while trying to rename the data set on this volume, or there is no space in the index VIER for the new name, and no additional VIERS are available.
5 (X'5')	It could not be verified that this volume was mounted nor was there a unit available for mounting the volume.
6 (X'6')	The operator was unable to mount this volume. If the volume is an MSS virtual volume and is running in a JES3 environment, JES3 would not allow the volume to be mounted.

7 (X'7')	The data set was not renamed because it was currently open for processing.
8 (X'8')	The data set is defined to RACF, but either the accessor is not alter authorized to the data set or the data set is defined to RACF on multiple volumes.

Scratch Function

Return Code	Explanation
0 (X'0')	Successful scratch
4 (X'4')	No volumes containing any part of the data set were mounted, nor did register 0 contain the address of a unit that was available for mounting a volume of the data set to be scratched. (This return code is accompanied by the setting of status code 5 in all entries of the volume list.)
8 (X'8')	An unusual condition was encountered on one or more volumes This return code is not accompanied by the setting of a status code.
12 (X'C')	Issued for one of the following reasons: - Invalid parameter list address. - Invalid volume list address. - Invalid volume count. - Conflicting options (both ERASE and NOERASE) were found in the parameter list.

After the SCRATCH macro instruction is executed, the last byte of each 12-byte entry in the volume list indicates the following conditions:

Scratch Status Code	Explanation
0 (X'0')	The DSCB for the data set has been deleted from the VTOC on the volume pointed to.
1 (X'1')	The VTOC of this volume does not contain the DSCB to be deleted.
2 (X'2')	The macro instruction failed when the correct password was not supplied by the console operator or TSO terminal operator in the two attempts allowed, or the user tried to scratch a VSAM data space or a VTOC index data set.
3 (X'3')	The DSCB was not deleted because either the OVRD option was not specified or the retention cycle had not expired.

Scratch Status Code	Explanation
4 (X'4')	A permanent I/O error on an invalid F1 DSCB was encountered when processing this volume; or an unexpected CVAF error return code was encountered; or the installation exit rejected the request; or an I/O error occurred while the DASD tracks occupied by the data set were being erased when the ERASE option was specified in the scratch parameter list or when the ERASE attribute was specified for a RACF-defined data set.
5 (X'5')	It could not be verified that this volume was mounted, nor was there a unit available for mounting the volume. If one or more of the volumes was an MSS mass-storage volume, see the explanation of message IEC666I in <i>System Messages</i> .
6 (X'6')	The operator was unable to mount this volume. If this volume is an MSS virtual volume and is running in a JES3 environment, JES3 would not allow the volume to be mounted.
7 (X'7')	The DSCB was not deleted because the data set was open.
8 (X'8')	The DSCB indicates the data set is defined to RACF but either the accessor is not authorized to the data set or to the volume, or the data set is a VSAM data space.

List of Abbreviations

BPAM	Basic Partitioned Access Method	RACF	Resource Access Control Facility
CVAF	Common VTOC Access Facility	RBA	Relative byte address
CVPL	CVAF parameter list	R/TM	Recovery termination manager
DADSM	Direct Access Device Space Management	SAF	System Authorization Facility
DCB	Data control block	SMF	System management facilities
DEB	Data extent block	SVC	Supervisor call instruction
DFDSS	Data Facility Data Set Services	SVRB	Supervisor request block
DIRF	DADSM interrupt-recording facility	TTR	Track, track record
DOS	Disk Operating System	UCB	Unit control block
DSAB	Data set association block	VDSCB	Virtual data set control block
DSCB	Data set control block	VIER	VTOC index entry record
EOV	End of volume	VIO	Virtual I/O
GTF	Generalized Trace Facility	VIXM	VTOC index map
ICKDSF	Device Support Facility	VMDS	VTOC map of DSCBs
ISAM	Indexed Sequential Access Method	VPSM	Volume pack space map
JFCB	Job file control block	VRF	VTOC recording facility
MSS	Mass storage system	VSAM	Virtual Storage Access Method
PDSCB	Partial data set control block	VTOC	Volume table of contents
		WTG	Where-to-go

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