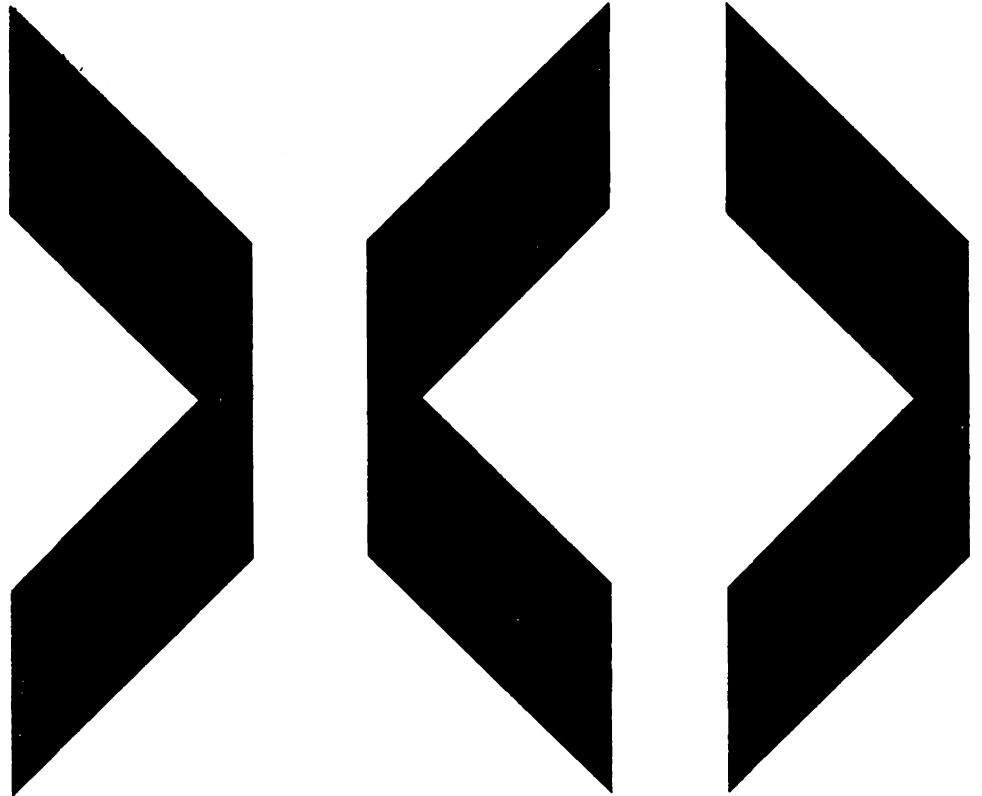




**MVS/Extended Architecture
Checkpoint/Restart Supervisor
Call Logic**

Licensed
Program



Second Edition (June 1987)

This is a major revision of, and makes obsolete, LY26-3957-0.

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 describes the logic of the MVS/Extended Architecture Supervisor Call (MVS/XA SVC) routines that take a checkpoint, and restart a job at a checkpoint. It allows programming systems representatives and system programmers to maintain checkpoint/restart routines.

ORGANIZATION

This publication has six parts:

- "Introduction" describes the checkpoint/restart routines in general terms and briefly tells what they do.
- "Method of Operation" describes the operations performed by checkpoint/restart routines, and the input to and output from those operations.
- "Program Organization" gives the flow of control between the modules of checkpoint/restart, and describes the major operations performed by each module.
- "Module Directory" lists each checkpoint/restart module, and refers to a diagram in "Program Organization" or "Method of Operation" that describes each module.
- "Diagnostic Aids" lists the messages, message codes, and return codes generated by checkpoint/restart modules.
- "Abbreviations" lists the abbreviations used in this book and their meanings.

PREREQUISITE KNOWLEDGE

A general understanding of how a user requests that a checkpoint be taken and restarts a job is prerequisite knowledge for understanding the information in this book.

REQUIRED PUBLICATIONS

You should be familiar with the information presented in the following publications:

- MVS/Extended Architecture Checkpoint/Restart User's Guide, GC26-4139
- MVS/Extended Architecture VSAM Logic, LY26-3970

RELATED PUBLICATIONS

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

Short Title	Publication Title	Order Number
ACF/TCAM Diagnosis Reference	<u>Advanced Communications Function for, TCAM Version 2 Diagnosis Reference</u>	LY30-3052
Checkpoint/Restart User's Guide	<u>MVS/Extended Architecture Checkpoint/Restart User's Guide</u>	GC26-4139
Data Areas-JES2	<u>MVS/Extended Architecture Data Areas (MVS/JES2)</u>	LJB8-1191
Data Areas-JES3	<u>MVS/Extended Architecture Data Areas (MVS/JES3)</u>	LJB8-1195
System Logic Library	<u>MVS/Extended Architecture System Logic Library, Volumes 1 through 16</u>	SY28-1208 through LY28-1270
VIO Logic	<u>MVS/Extended Architecture VIO Logic</u>	LY26-3900
VSAM Logic	<u>MVS/Extended Architecture VSAM Logic</u>	LY26-3970

SUMMARY OF CHANGES

| RELEASE 3.0, JUNE 1987

| ENHANCEMENTS

| The chapter "Method of Operations" has been updated to support VSAM 31-bit control blocks.

RELEASE 1.0, APRIL 1985

ENHANCEMENTS

- The chapter "Data Areas" on page 58 has been added to describe the data areas unique to checkpoint/restart.
- Support for the IBM 3480 Magnetic Tape Subsystem has been added.
- Messages described in "Diagnostic Aids" on page 92 have been enhanced to simplify problem diagnosis.

VERSION 2 PUBLICATIONS

The Preface includes new order numbers for Version 2.

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INTRODUCTION

Checkpoint/restart is a technique for recording information about a job at programmer-designated checkpoints so that the job can be restarted at one of these checkpoints, or at the beginning of a job step. This book documents the logic of those routines. Restart of a job at a step is performed by scheduler termination routines, which are documented in System Logic Library.

When the system is loaded, checkpoint/restart modules are taken from SYS1.LPALIB and loaded into the link pack area. These modules are paged into real storage for execution as they are needed.

OVERVIEW OF CHECKPOINT PROCESSING

The user takes a checkpoint by coding the CHKPT macro in the program. (Checkpoint/Restart User's Guide shows how to code the CHKPT macro.) Execution of the CHKPT macro causes the checkpoint routines to save the contents of the user's region, and all the information necessary to restart the user's program. This information is saved in a data set (called the checkpoint data set) that resides on one or more tape or direct access volumes. The user must provide a DD statement for the checkpoint data set, and may, optionally, provide a DCB macro for the checkpoint data set.

OVERVIEW OF RESTART PROCESSING

The user can request that a job be restarted without being resubmitted (called automatic restart), or can resubmit the job for restart (called deferred restart). Automatic restarts must be authorized by the operator; deferred restarts take place without operator authorization when a job is resubmitted.

Automatic and deferred restart can take place from a checkpoint, or from the beginning of a job step. They are requested in the following manner:

Type of Restart	How Requested
Automatic checkpoint restart	CHKPT macro (RD=NC or RNC must not be specified in the RD parameter)
Automatic stop restart	RD parameter in the JOB or EXEC statement (RD=R or RNC must be specified)
Deferred checkpoint restart	RESTART parameter in the JOB statement and a SYSCHK DD statement in the resubmitted deck
Deferred step restart	RESTART parameter in the JOB statement in the resubmitted deck must be specified

Checkpoint/Restart User's Guide shows how to code these parameters and statements.

Restart routines re-create the environment that existed when a checkpoint was taken. They open the checkpoint data set and, using the information that was saved in it when the checkpoint was taken, restore the user's region and task control information. They then position any user data sets that were open when the checkpoint was taken.

METHOD OF OPERATION

This section consists of method of operation diagrams. These diagrams describe the major operations performed by checkpoint and restart modules, and the data that is input to, and output from, those operations.

The operations described in each diagram are further amplified in the adjoining "Notes to Diagram..." These notes tie the operations to a specific module, and, where possible, to a label in that module.

Diagram 1 is a table of contents for the method of operation diagrams. It shows, at the highest level, each operation performed by checkpoint/restart, and directs you to the specific diagram documenting the operation. Diagrams 2 and 8 show the major operations performed by checkpoint (Diagram 2) and restart (Diagram 8), respectively, and the data that is input to, and output from, those operations. Following is an explanation of the graphic symbols used in the method of operation diagrams.

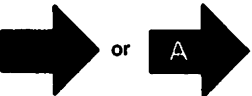
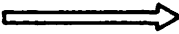






Control flow	Data flow
 <p>Entry point to diagram. The second type of arrow is used when a diagram has more than one entry point.</p>	 <p>Input to or output from a processing step</p>
 <p>Flow of control</p>	 <p>Modification of data</p>
 <p>On-page connector; number represents number of processing step receiving control</p>	 <p>Testing of, or reference to, data</p>
 <p>Off-page connector; number is number of diagram where processing resumes</p>	 <p>On-page connector; used to indicate input to or output from a processing step</p>

DIAGRAM 1. CHECKPOINT/RESTART TABLE OF CONTENTS

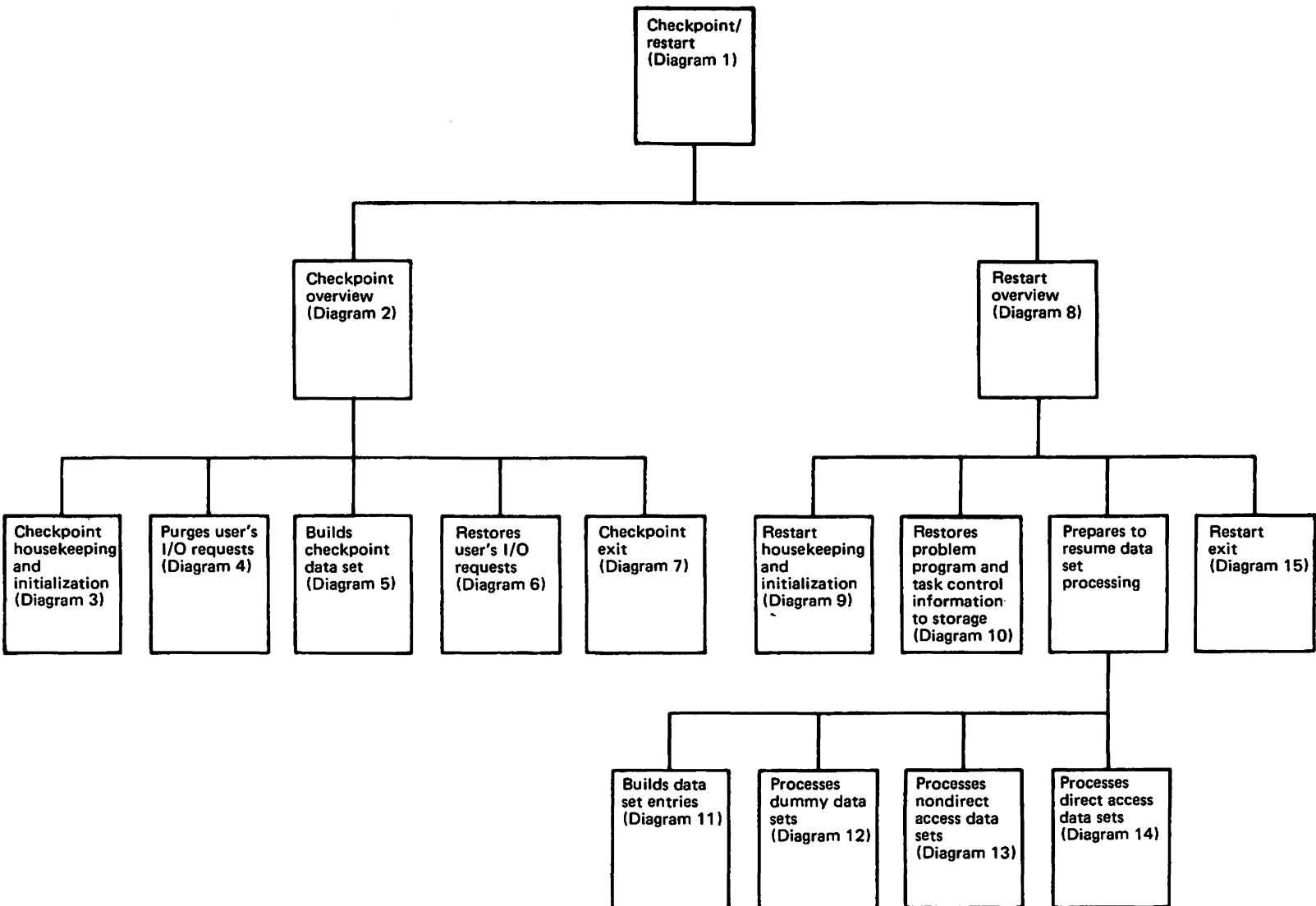
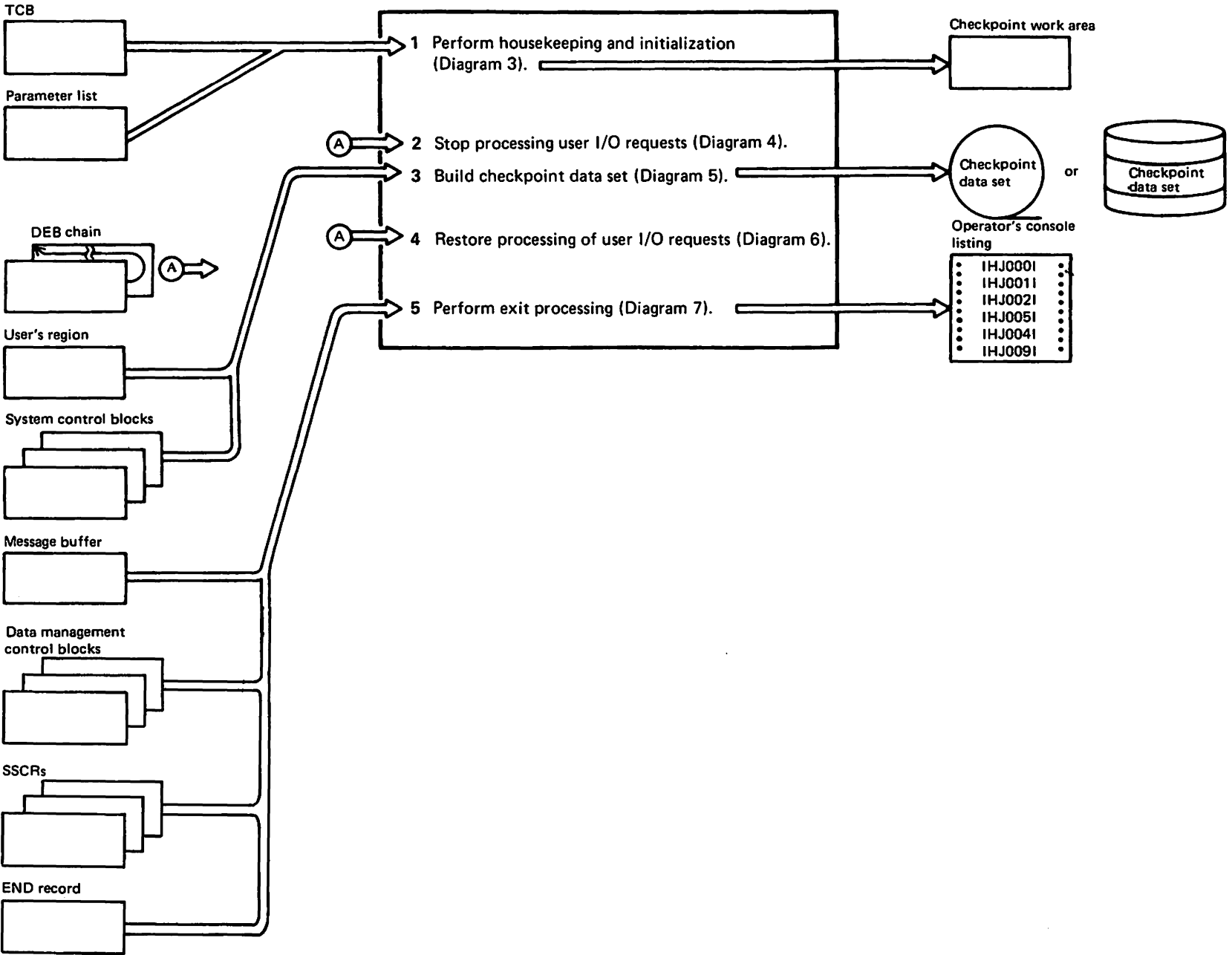


DIAGRAM 2. OVERVIEW OF CHECKPOINT PROCESSING

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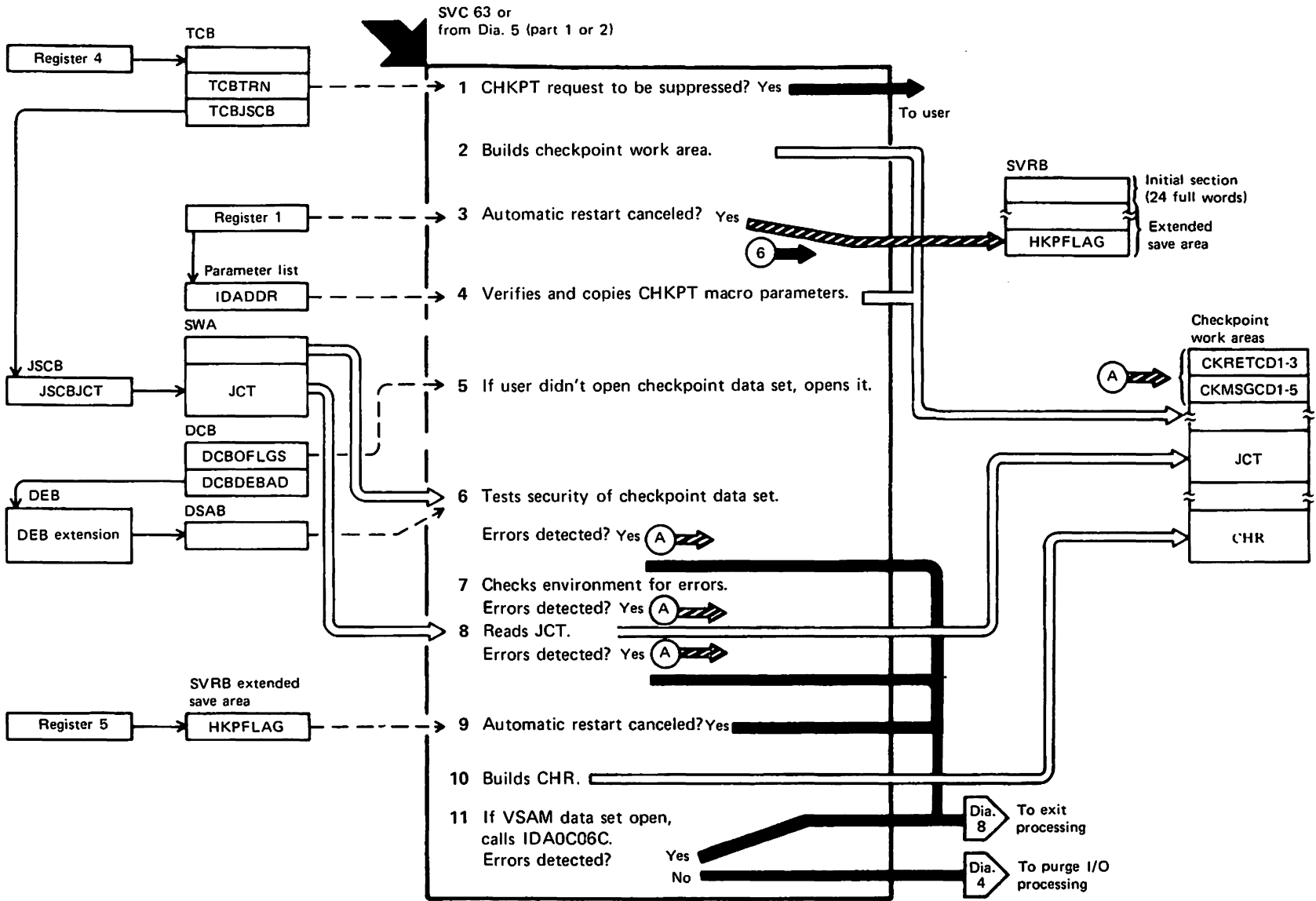


DIAGRAM 3. CHECKPOINT HOUSEKEEPING AND INITIALIZATION

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Notes to Diagram 3

IGC0006C

- 1 Determines whether the user requested that checkpoints be suppressed (RD=NC or RNC coded on user's JOB or EXEC statement). If so, returns to user.
- 2 Issues an unconditional GETMAIN to obtain space in subpool 229 for checkpoint's protected work areas.

Establishes an ESTAE environment and points the recovery routine pointer to IHJACP50.

If any of the errors listed in the chapter on "Diagnostic Aids" were detected, an abend S43F or S53F is issued (see IHJCES00 for abend handling).

Issues conditional GETMAINS to obtain space for checkpoint's buffers (subpool 229) and a work area for QMNGRIO requests (subpool 230). Then initializes all work areas.

If the job is V=R, issues a PGSER to fix checkpoint's buffers.

Loads module IHJGLU00.
- 3 If the user request is to cancel automatic restarts, passes control to IHJACP02 (IGC0206C).
- 4 Verifies the user's parameter lists and copies them to checkpoint's work areas.

Gets and initializes space for a DDNAME table (subpool 229) and a DCB (subpool 252), as appropriate.

If a DDNAME is provided by the user that is different from a DDNAME provided for a previous request, closes the DCB for the previous DDNAME. Else, if it is not already open, opens it.

- 5 If the DCB for the checkpoint data set is open, issues a DEBCHK to verify the DEB address. Else, opens it.

- 6 Checks the security of the checkpoint data set.

IHJACP01 (IGC0106C)

- 7 Continues to check for environment errors or conditions which might prevent a successful restart if this checkpoint is taken.

If any resources (requests made via the ENQ macro) are being held, sets indicators in checkpoint's work area such that a warning message (IHJ005I) will be issued instead of a successful checkpoint message (IHJ004I).

IHJACP02 (IGC0206C)

- 8 Sets up the QMNGRIO parameter list with TTR of JCT (gotten from JSCB). Reads the JCT into a checkpoint work area via a call to IHJGLU00, which issues the QMNGRIO macro.

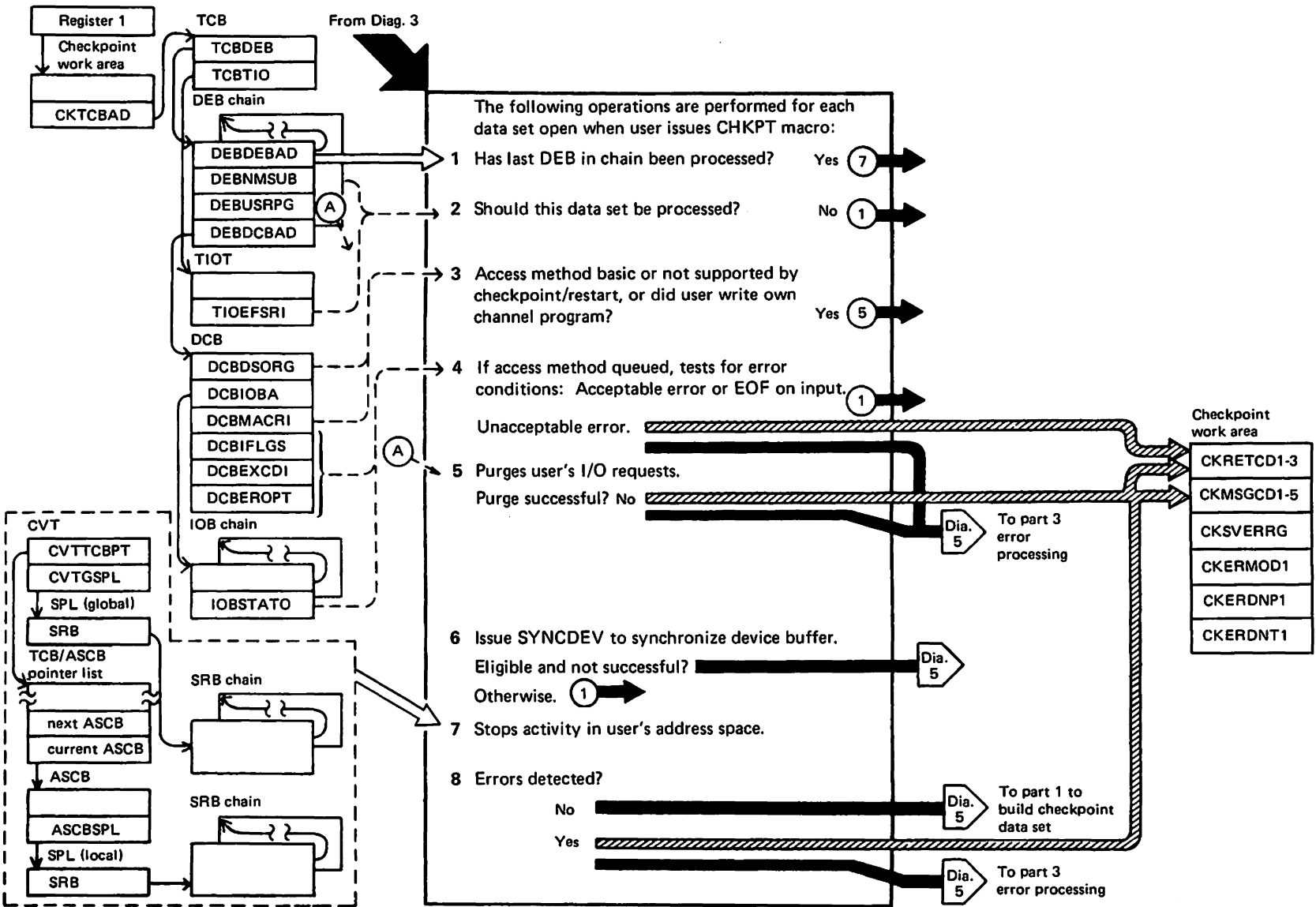
- 9 If the user canceled automatic restart (this request made via CANCEL parameter in CHKPT macro), gives control to IHJACP50 (IGC0006C).

- 10 Updates the JCTNRCKP field in the JCT, which indicates the number of checkpoints taken.

If the user didn't supply a checkid, generates one.

Moves the checkid into the checkpoint header record (CHR) build area and builds remainder of CHR.

- 11 If any VSAM data sets are open, calls the VSAM checkpoint routine, IDA0C06C. (See VSAM Logic.) If IDA0C06C indicates an error, saves the error information and issues an abend S43F. Otherwise, passes control to IGC0506C.



Notes to Diagram 4

IGC0506C

- 1 Changes the recovery routine pointer to point to IGC0N06C.

Tests whether the DEB just processed is the last DEB in the chain (DEBDEBAD contains 0). If so, continues processing at step 6.

- 2 Examines the DEB and its associated DSAB and TIOT DD entry to determine whether the DEB is for any of the following types of data sets: TCAM, VSAM, subsystem, dummy, ISAM (using the compatibility interface). If so, skips processing of this data set, gets the address of the next DEB in the chain, and continues processing at step 1.

- 3 Checks the DCBDSORG field to determine whether the access method being used is supported by checkpoint/restart. If the access method is not supported, continues processing at step 5.

Checks the DCBMACRF field to determine whether the user is using the basic access method. If so, continues processing at step 5.

- 4 For queued access methods, checks DCBIFLGS and DCBEXCD1 for errors.

If errors are posted, determines (from DCBEROPT field) if the errors are acceptable.

If the errors are acceptable, skips processing of this data set, gets the address of the next DEB, and continues processing at step 1.

If the errors are not acceptable, tests the IOB for EOF on input. If EOF was reached, skips processing of this data set and continues processing at step 1.

If EOF was not reached, sets the appropriate codes in checkpoint's work area and issues an abend S53F.

- 5 Sets up a purge parameter list containing the addresses of the DEB and the DEBUSRPG field. Sets the option field in the parameter list to quiesce active I/O, and posts the results of the purge operation.

Issues the PURGE macro (SVC 16). Checks register 15 and the PPLCC field in the parameter list to determine whether the purge was successful. If not, sets the appropriate codes in checkpoint's work area and issues abend S53F.

- 6 Issues the SYNCDEV macro. The SYNCDEV service routines will synchronize the device if it is eligible.

If the access method was basic, gets the address of the next DEB and continues processing at step 1. If the access method was queued, rechecks for errors (as in step 4). If processing can continue, gets the address of the next DEB and continues processing at step 1.

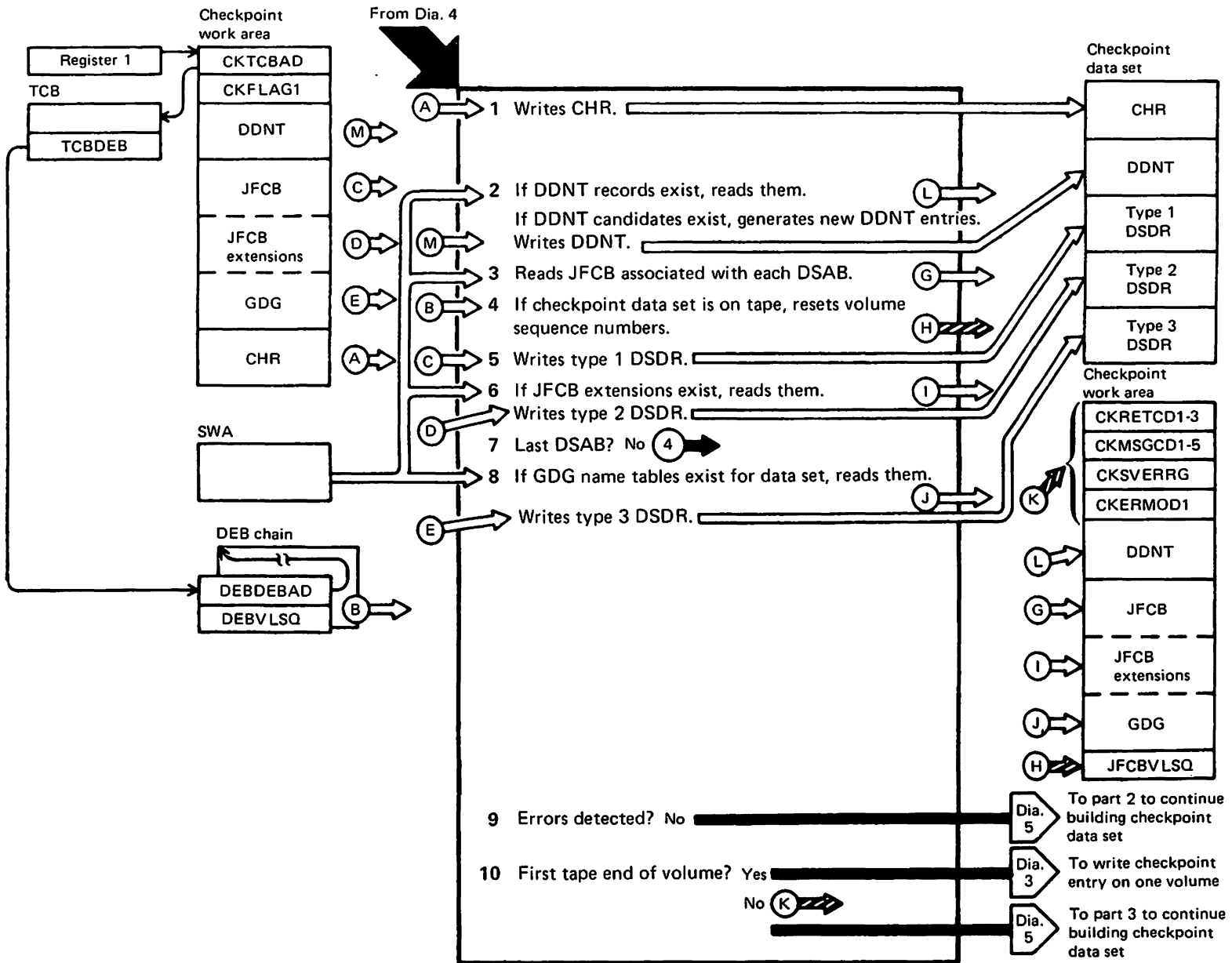
- 7 Issues the STATUS macro to stop dispatching of routines for which an SRB exists. Gets the dispatcher lock.

Searches the SRB chains for SRBs associated with the user's address space. If any are found, releases the dispatcher lock and issues the STATUS macro to start dispatching of routines associated with these SRBs. Continues processing at the beginning of this step to repeat this process. (Additional SRBs may have been added to the SRB chain after the dispatcher lock was released.) When all global SRBs associated with the user's address space have been processed, releases the dispatcher lock.

Then, after all SRBs have been processed, issues the STATUS macro so the routines associated with any future SRBs for the user's address space can be dispatched.

- 8 If no errors were detected, exits to IHJACP20 (IGC0A06C). Else, exits to IGC0N06C.

DIAGRAM 5 (PART 1 OF 3). BUILDING CHECKPOINT DATA SET



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Notes to Diagram 5 (Part 1 of 3)

IHJACP20 (IGCOA06C)

- 1 If the checkpoint data set is on tape, saves the volume sequence number (VOLSEQNO in DEB) in the checkpoint work area. If the checkpoint data set is on a direct access device, saves the number of extents (DEBNMEXT in DEB) in the checkpoint work area. This information is used later to test for EOVS.

Initializes the DECB (used in writing the CHR).

Calls IHJGLU00 to write the CHR.

IHJACP25 (IGCOD06C)

- 2 Determines whether the SWA contains any DDNT records. (A DDNT record consists of a series of entries—up to 21—each entry identifying a data set that's been dynamically deallocated since the beginning of the job step.) If so, reads the DDNT records into the checkpoint work area and then writes them to the checkpoint data set (except the last DDNT record).

Examines the JSCBOPTS field to determine whether any DDNT candidates exist. (A DDNT candidate is an entry waiting to be put in the DDNT record. This condition arises because the scheduler only updates DDNT records at intervals.) If DDNT candidates exist, issues the QMNGRIO macro to read each SIOT on the SIOT chain. Examines the SIOTBYT1 field in each SIOT to determine whether it represents a DDNT candidate. If so, the candidate is made an entry in the current DDNT record in the checkpoint work area. When the record is filled, it gets written to the checkpoint data set, and a new record is established in the checkpoint work area. When all SIOTs have been examined, writes the last DDNT record to the checkpoint data set.

- 3 Prepares to read in the JFCB(s) for each data set on the user's DSAB chain when the CHKPT macro was issued.

For each DSAB, accesses the DD entry in the user's TIOT (pointed to by the DSABTIOT field) to get the TTR of the JFCB associated with the DSAB. Stores the TTR in the SMNGRIO parameter list. Then issues the QMNGRIO macro to read in the JFCB.

- 4 If the checkpoint data set is on tape, determines whether the JFCBVLSQ field in the JFCB equals 0. If so, sets the JFCBVLSQ field equal to the volume sequence number in the DEBVLSQ field of the DEB. If JFCBVLSQ is not equal to 0, sets JFCBVLSQ equal to DEBVLSQ - 1 + JFCBVLSQ. This information is used at restart time to position the checkpoint data set.

- 5 For each data set on the DSAB chain when the user issued the CHKPT macro, moves the data set's JFCB and UCBTYP field to the buffer in the checkpoint work area. Issues the QMNGRIO macro to read each SIOT (pointed to by the DSABSIOT field) on the SIOT chain. Moves the DD name and other selected fields from the SIOT into the buffer in the checkpoint work area. Moves the DEBVLSQ field into the DSDR buffer. When the buffer is full, writes this information to the checkpoint data set as a type 1 data set descriptor record (DSDR).

- 6 If the JFCB associated with the data set being processed has extensions, reads the JFCB extensions into the buffer in the checkpoint work area. Each time the buffer is full, writes its contents to the checkpoint data set as a type 2 DSDR.

- 7 When the last JFCB has been processed, determines whether processing associated with the last DSAB has been completed. If not, continues processing at step 6.

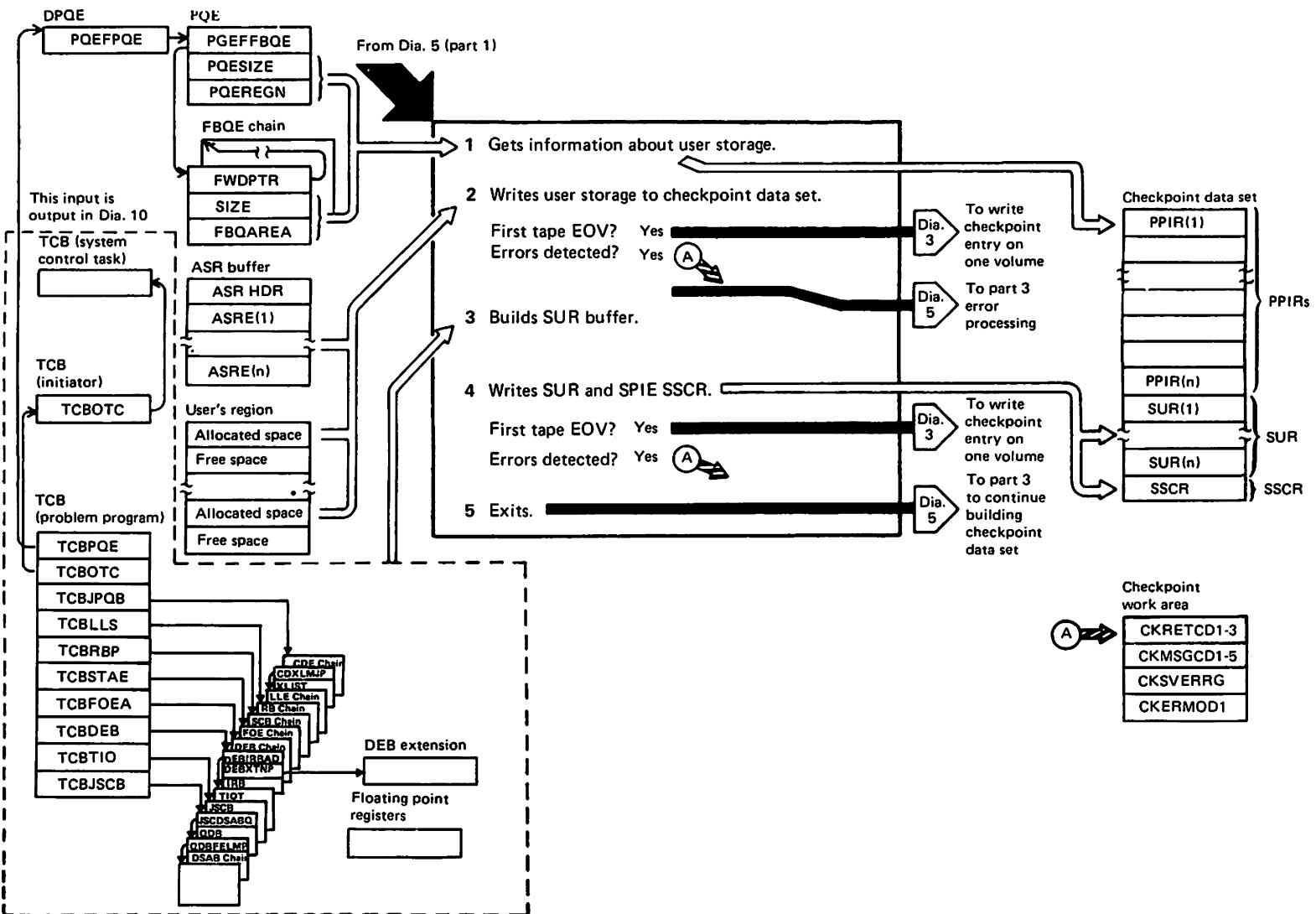
- 8 When the last DSAB has been processed, determines whether generation data group (DGD) name tables exist for any of the user's data sets. If so, reads them into the buffer in the checkpoint work area. Each time the buffer is full, writes its contents to the checkpoint data set as a type 3 DSDR.

- 9 If no errors have been detected, gives control to IHJQCP30.

- 10 If errors were detected, sets the appropriate error codes (see "Diagnostic Aids") and issuesabend S53F.

If EOVS occurred for the first time on tape, gives control to IHJACP02 (IGCO206C) to attempt to write a complete checkpoint entry on one volume. (A tape checkpoint entry must be contained on one tape volume.)

DIAGRAM 5 (PART 2 OF 3). BUILDING CHECKPOINT DATA SET



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Notes to Diagram 5 (Part 2 of 3)

IHJQCP30

- 1 Issues VSMLIST macro to obtain information about the user's storage allocation.
- 2 Uses the information from the VSMLIST macro to construct PPIR records, and calls IHJGLU00 to write them to the checkpoint data set. The storage contents written is only that in user subpools (including subpools 251 and 252) that have been GETMAINED for or by the user.

If any errors occur, puts the appropriate codes into checkpoint's work area and issues abend S53F.

If EOV occurred for the first time on tape, gives control to IGC0206C to attempt to write a complete checkpoint entry on one volume. (A tape checkpoint entry must be contained on one tape volume.)

IHJQCP31 (IGC0G06C)

- 3 Builds the following SUR records in the checkpoint data set buffers, and calls IHJGLU00 to write the buffers to the data set as each buffer is filled:

- PSA. The first 128 bytes of the PSA contain addresses used to detect a changed nucleus at restart.
- CVT and its extensions. The CVT and its extensions contain addresses used to detect a changed nucleus at restart.
- PVT. The PVT contains addresses used to detect a changed nucleus at restart.
- SCVT. The SCVT contains addresses used to detect a changed nucleus at restart.
- SVC Table. The first 146 entries of the SVC table contain addresses used to detect a changed nucleus at restart.
- SVT. The SVT contains addresses used to detect a changed nucleus at restart.
- The JOB pack area CDE queue.

The CDEs and their associated extend lists are checkpointed. The order is as follows:

Major CDE
Extent list (if any)
Minor CDE (if any)
Major CDE
Extent list (if any)
Minor CDE (if any)
Major CDE
etc.

- The problem program load list element (LLE) queue.
- The TCB and its extension.
- The request block (RB) queue, which include XSBs and, for SVRBs, includes MBCBs.
- SCB control blocks.
- FOE control blocks.

If an EOV occurred for the first time on tape, gives control to IGC0206C to attempt to write a complete checkpoint entry on one volume. (A tape checkpoint entry must be contained on one tape volume.)

IHJQCP32 (IGC0H06C)

- 4 Builds the following SUR records in the checkpoint buffers, and calls IHJGLU00 to write the buffers to the checkpoint data set as each buffer is filled:

- User's checkpoint DCB (if provided).
- User's registers, general and floating point.
- TIOT.
- DEBs and their associated control blocks as follows:
 - IRBs (if present)
 - DEB extension (if present)
 - SAMB (if present)
 - Purge I/O restore list (PIRL) (if present)
 - EPCBs (if present)
- Note table is built using the DCB address and, by issuing the note macro with TYPE=ABS operand, the note value is obtained.
- Selected DSAB information.
- SPIE SSCRs. If IEAVSPIE provides SPIE/ESPIE data to be checkpointed, two or more SSCR records are checkpointed. The first record shows how many records follow.

If an EOV occurred for the first time on tape, gives control to IGC0206C to attempt to write a complete checkpoint entry on one volume. (A tape checkpoint entry

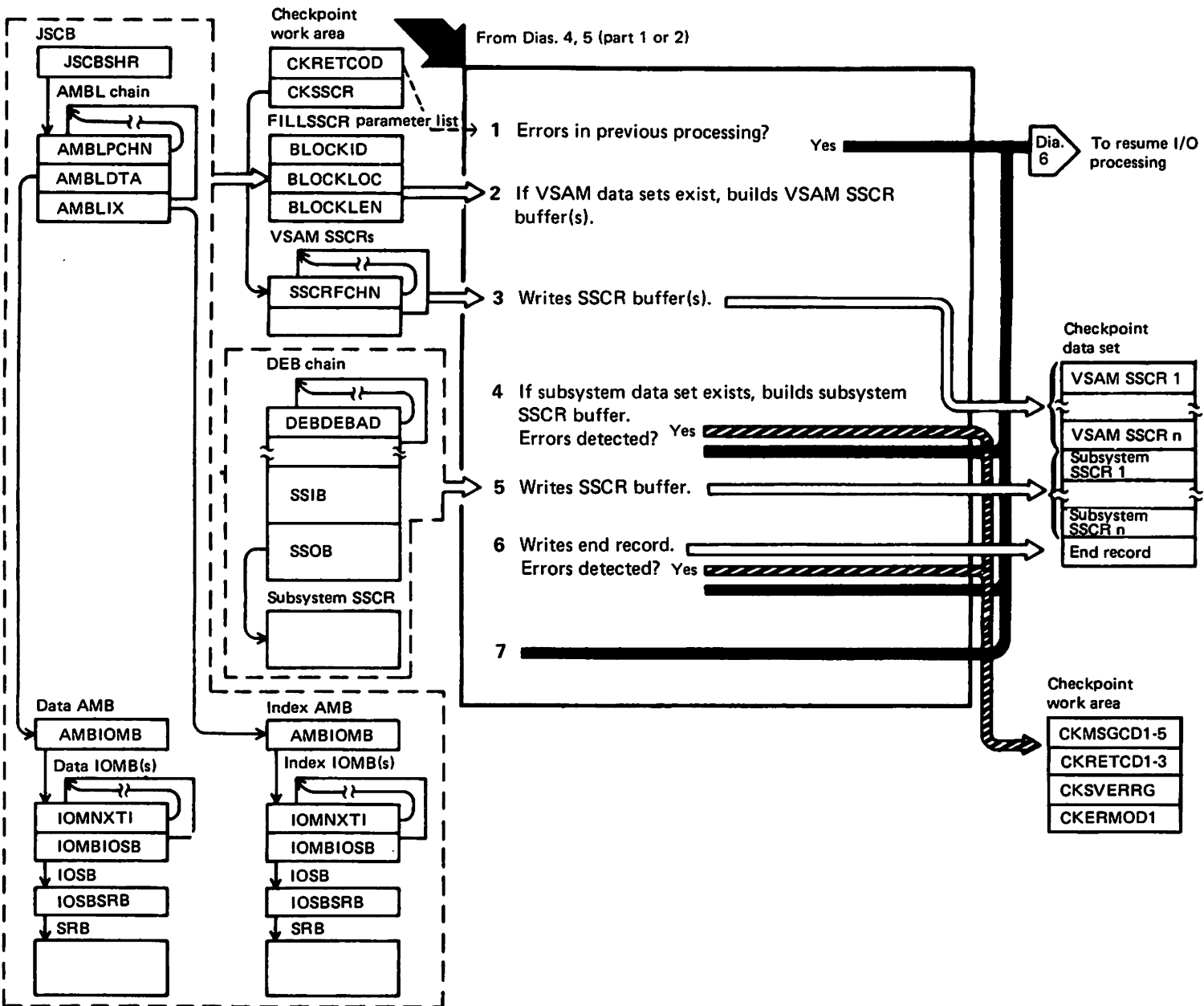
must be contained on one tape volume.)

5 Exits to IGC0N05B.

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DIAGRAM 5 (PART 3 OF 3). BUILDING CHECKPOINT DATA SET



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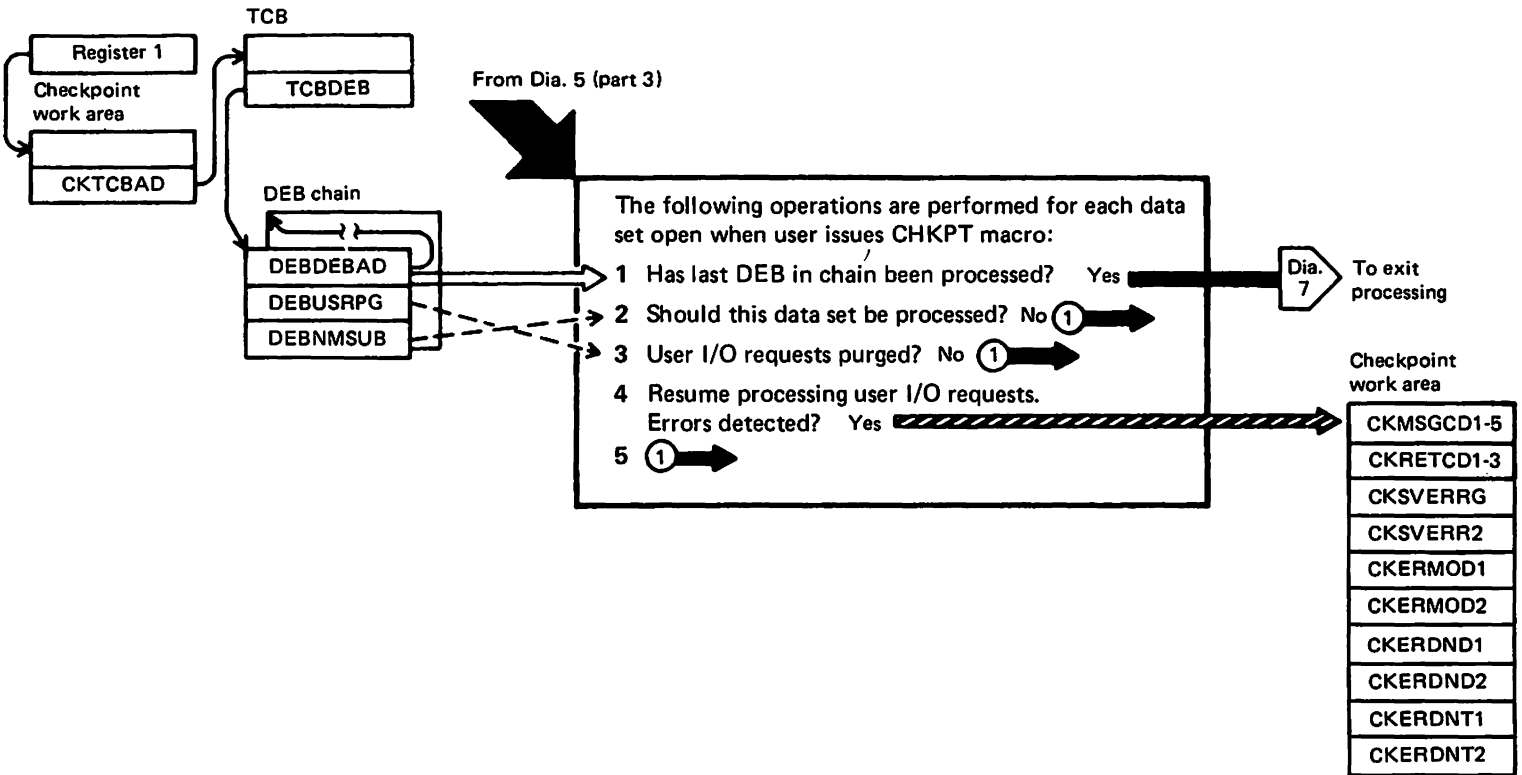
Notes to Diagram 5 (Part 3 of 3)

IGCON06C

- 1 Determines whether an error occurred in previously executed processing. If so, continues processing at step 1 in diagram 6.
- | 2 If any VSAM data sets exist, calls VSAM module IDA0I96C. See VSAM Logic.
- 3 If VSAM SSCR records were generated by IDA0I96C, calls IHJGLU00 to write each VSAM SSCR on the SSCR chain to the checkpoint data set. Then frees the storage allocated to all SSCRs on the chain.
- 4 Searches the DEB chain for subsystem data sets. For each one found, gets a 4096-byte SSCR. Then initializes the SSOB associated with the subsystem data set and puts header information in the SSCR. Issues the IEFSSREQ macro, which will cause the SSCR for the subsystem data set to be completed.
- 5 Determines whether an error occurred generating the SSCR. If so, sets error and message codes and then continues processing at step 1 in diagram 6. If no errors occurred, determines whether any data was put in the SSCR buffer (there may have been no positioning information to save). If not, the next subsystem data set is processed (if there is one).
- 5 If there is data in the subsystem SSCR, calls IHJGLU00 to write the SSCR in the checkpoint data set. Frees the SSCR buffer before processing the next subsystem data set (if there is one).
- 6 Writes a 4096-byte end record in the checkpoint data set. The end record, which contains X'FFFF', marks the end of the checkpoint entry.

If an error is detected, sets the appropriate error and message codes and issues an abend S43F or S53F.
- 7 Continues processing at step 1 in diagram 6.

DIAGRAM 6. RESTORING USER'S I/O REQUESTS



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Notes to Diagram 6

IGC0N06C

- 1A** Determines whether the DEB just processed is the last DEB in the chain (DEBDEBAD contains 0 if last).
- 1B** If so, or if errors were detected, deletes VSAM module IDA0I96C (if it was loaded) and then gives control to IHJACP50 (IGC0Q06C).
- 2** Examines the DEB to determine whether it is for a TCAM, VSAM, subsystem, or ISAM/VSAM compatibility interface data set. If so, skips processing of this data set, gets the address of the next DEB in the chain, and continues processing at step 1.
- 3** Determines whether the user's I/O requests were purged by checking the DEBUSRPG field in the DEB. If I/O was not purged, gets the address of the next DEB in the chain and continues processing at step 1.
- 4** Resumes processing of the user's I/O requests by issuing the RESTORE macro (with register 1 pointing to the address that points to the PURGE I/O request list). If any errors occur during the RESTORE operation, sets appropriate message and return codes and issues abend S53F.
- 5** Gets the address of the next DEB and continues processing at either (1) step 1A if no errors were detected, or (2) step 1B if errors were detected.

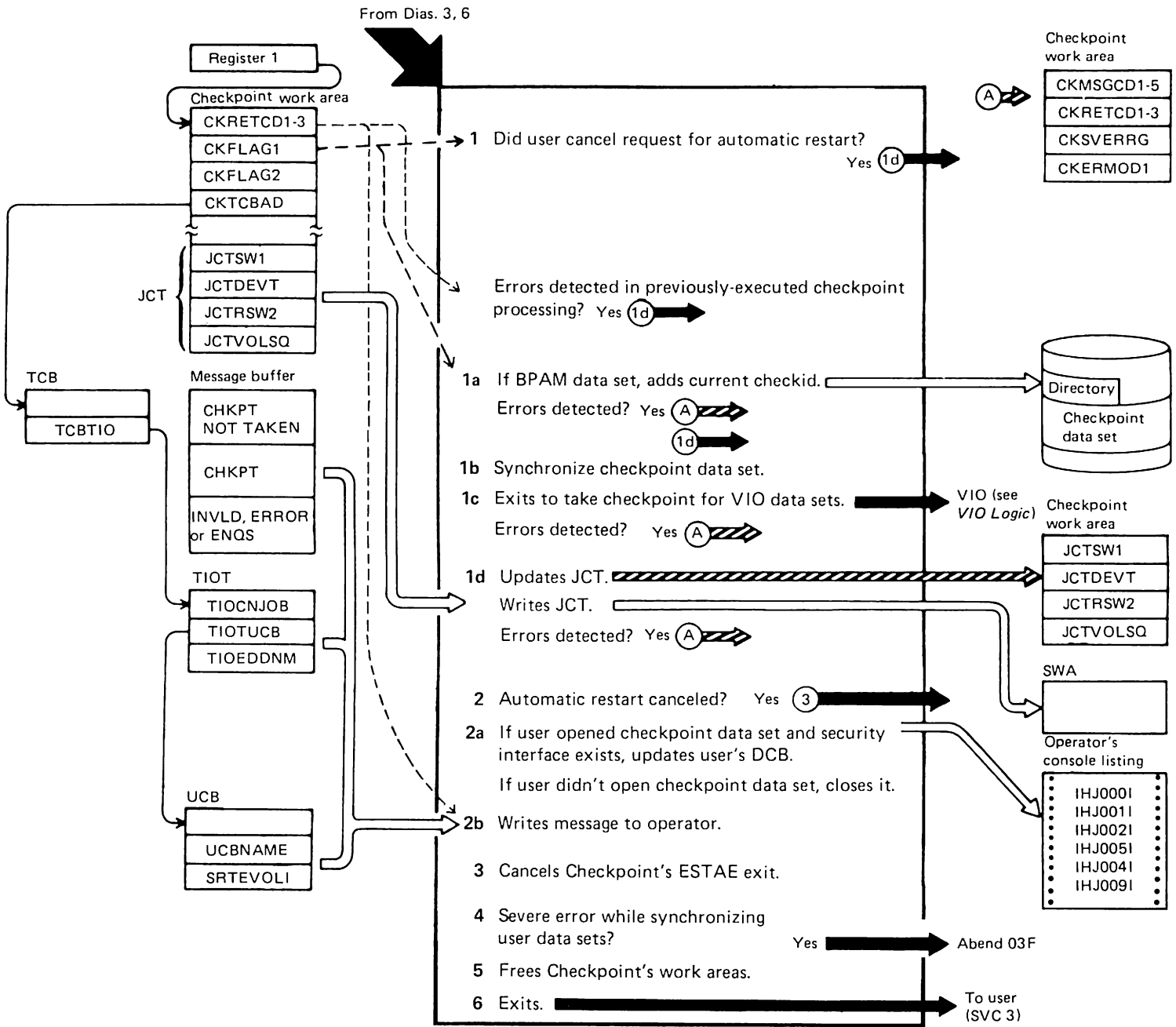


DIAGRAM 7. CHECKPOINT_EXIT

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Notes to Diagram 7

IHJACP50 (IGC0Q06C)

1 If no errors were detected, the user did not specify CANCEL, and a checkpoint entry was written:

- a) Issues STOW if DS organization is partitioned
- b) Issues the SYNCDEV macro against the checkpoint data set
- c) Issues WIJOURN
- d) Updates JCT and writes it
- e) If user is authorized and passed a DCB, restores SYNAD address and BLKSIZE

Else, if the user specified CANCEL, or if VIO errors occurred, clears the JCT fields relating to automatic restart and writes JCT.

IHJACP70 (IGC0S06C)

2 If user did not request CANCEL:

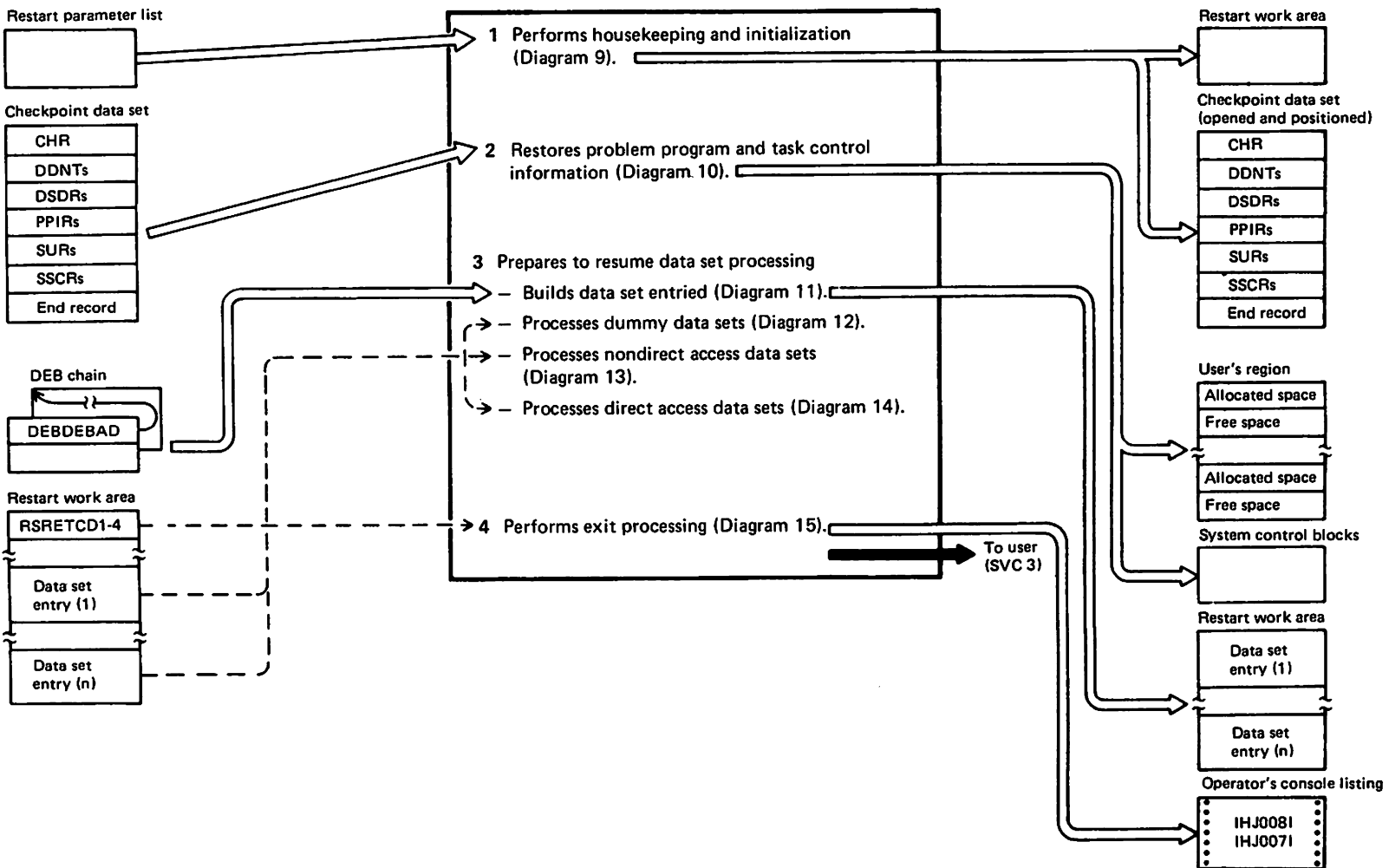
- a) And if the user passed a DCB and checkpoint opened it, closes it.
- b) Prepares and issues completion messages:

- 1. IHJ000I, if errors were detected before writing a checkpoint entry
- 2. IHJ001I, if errors were detected while writing a checkpoint entry
- 3. IHJ002I, if errors were detected after a checkpoint entry was written or a second error was detected
- 4. IHJ004I, if no errors were detected and a checkpoint entry was written
- 5. IHJ005I, if a condition that might require special action during restart was detected and a valid checkpoint entry was written

c) If IGC0506B detected a severe error while attempting to synchronize the buffer for a user's data set, issues an abend 33F.

- 3 Cancels checkpoint's ESTAE recovery routine.
- 4 Frees checkpoint's storage.
- 5 Returns to user with the return code in R15 and reason code in R0.

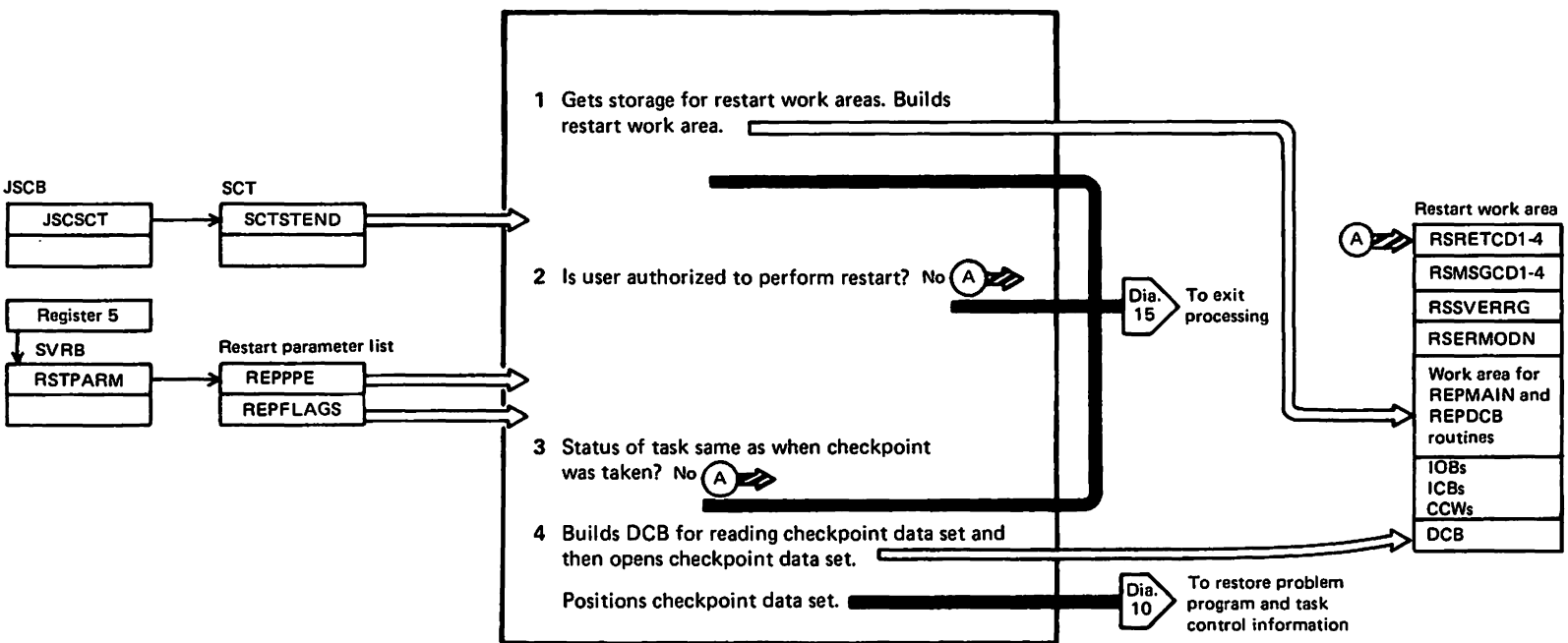
DIAGRAM 8. OVERVIEW OF RESTART PROCESSING



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DIAGRAM 9. RESTART HOUSEKEEPING AND INITIALIZATION



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Notes to Diagram 9

IHJARS00 (IGC0005B)

- 1** Acquires and initializes the work areas needed by restart, except for the DSTAB and SEG TAB areas (which are acquired by IGC0G05B).

Establishes an ESTAE recovery routine.
- 2** Checks that the caller of restart is scheduler restart. If not, sets error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S53F.
- 3** Compares the current environment with that recorded in the checkpoint header record (passed by scheduler restart) to see whether the environments are compatible. If not, sets error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S53F.

- 4** Constructs and opens a DCB for reading the checkpoint entry.

If no errors were detected, goes to IHJARS01 (IGC0205B). Else, sets error and return codes and goes to IHJARS60 (IGC0V05B) via abend S53F.

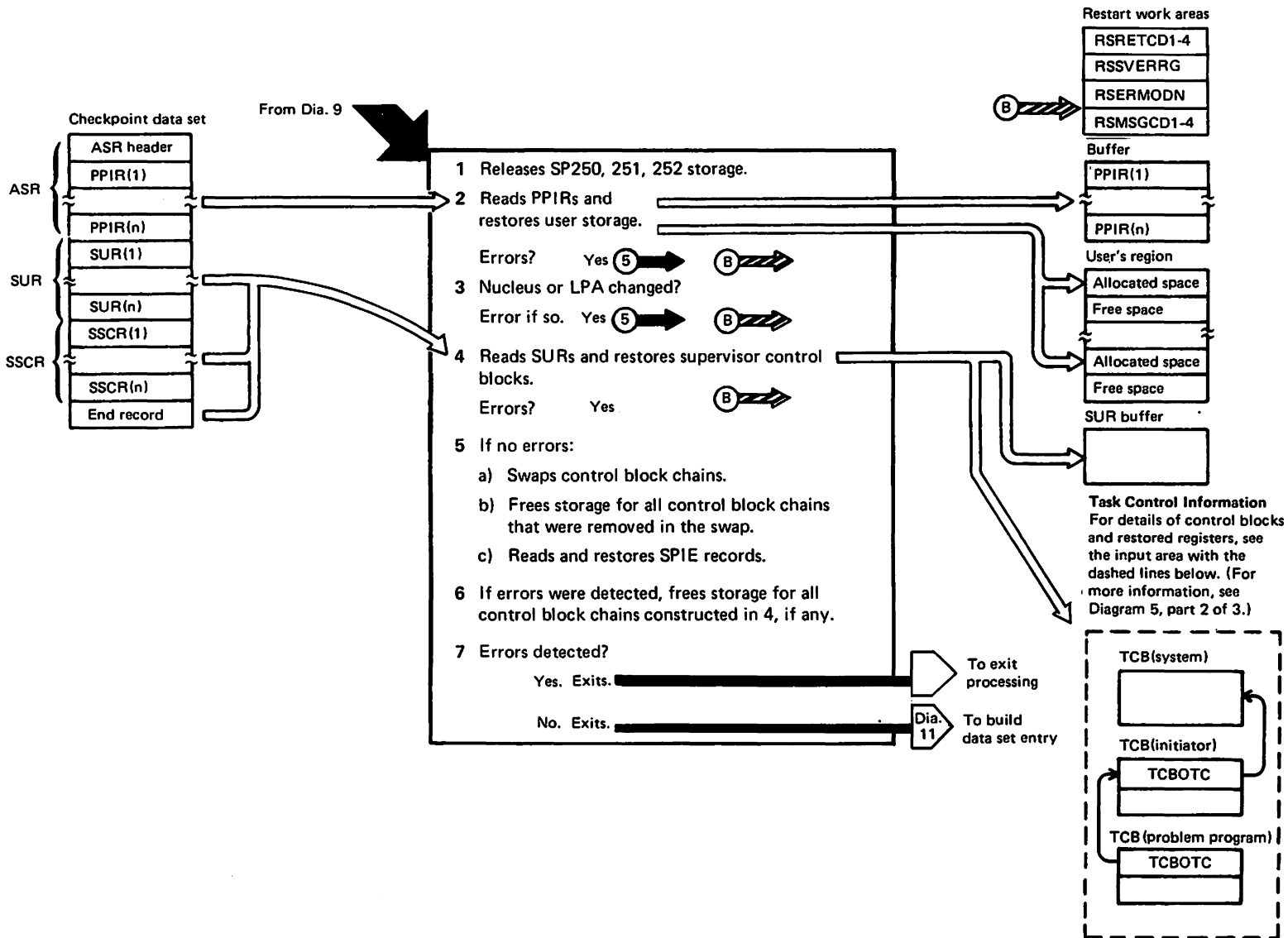
IHJARS01 (IGC0205B)

Moves the IOB, ICBs, SAMBs, and channel programs to a restart work area that is in a subpool owned by restart (subpools 250, 251, and 252 are released by IHJQRS20).

- 5** Positions the checkpoint data set to the first PPIR in the checkpoint entry to be restored.

Goes to IHJQRS20 if no errors were detected. Else, sets appropriate error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S43F or S53F.

DIAGRAM 10. RESTORING PROBLEM PROGRAM AND TASK CONTROL INFORMATION TO STORAGE



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Notes to Diagram 10

IHJQRS20

- 1 Releases all storage in subpools 250, 251, and 252.
- 2 Reads PPIR records and uses them to restore user storage to its condition as recorded at checkpoint.

If no errors were detected, goes to IHJQRS21 (IGC0605B). Else, sets the appropriate error and reason codes and goes to IHJQRS23 (IGC0805B).

IHJQRS21 (IGC0605B)

- 3 Checks that entry points to nucleus routines have not changed from that recorded at checkpoint.
- 4 Gets storage for and restores the following control blocks from the checkpoint entries, correcting pointers in those control blocks, as needed, to reflect the changed address locations of all control blocks thus restored:

- a) CDEs for the JOB pack area
- b) LLEs
- c) TCB and its extension (only saved by this module; IHJQRS22 does the restoring)
- d) RB chain (and corrects the key work in the XSB contained in the RB record).
- e) SCBs
- f) FOEs

If no errors were detected, goes to IHJQRS22 (IGC0705B). Else, sets the appropriate error and reason codes and goes to IHJQRS23 (IGC0805B).

IHJQRS22 (IGC0705B)

Restores fields in the current TCB from the TCB read from the checkpoint entry, as appropriate.

Saves the user's checkpoint DCB from the checkpoint entry in the restart work area.

Restores the user's general and floating point registers to that read from the checkpoint entry.

Saves the TIOT from the checkpoint entry in a restart work area.

Creates a DEB chain with its associated IRBs, IQEs, DEB extensions, SAMBs, PIRs, and EPCBs. These are processed later.

If the next record in the SUR buffer is a note table, moves the note table(s) to a work area for use by data set repositioning modules.

Restores information from the checkpoint entries for DSABs into the current DSABs.

If no errors were detected, goes to IHJQRS23 (IGC0805B). Else, sets the appropriate error and reason codes and goes to IHJQRS23 (IGC0805B) via abend S43F or S53F.

IHJQRS23 (IGC0805B)

- 5 If no errors were previously detected:
 - a) Swaps and corrects the following chains:
 1. RB chain
 2. LLE chain
 3. CDE chain
 - b) Frees areas occupied by the control blocks that were replaced by the previous step.
 - c) Reads the SPIE SSCR records, if any, from the checkpoint entry and passes them to IEAVSPI to be restored.
- 6 Else, releases storage acquired for the restored chains of control blocks and goes directly to IHJARS60 (IGC0V05B).
- 7 If no errors were detected, goes to IGC0G05B. Else, sets the appropriate error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S43F or S53F.

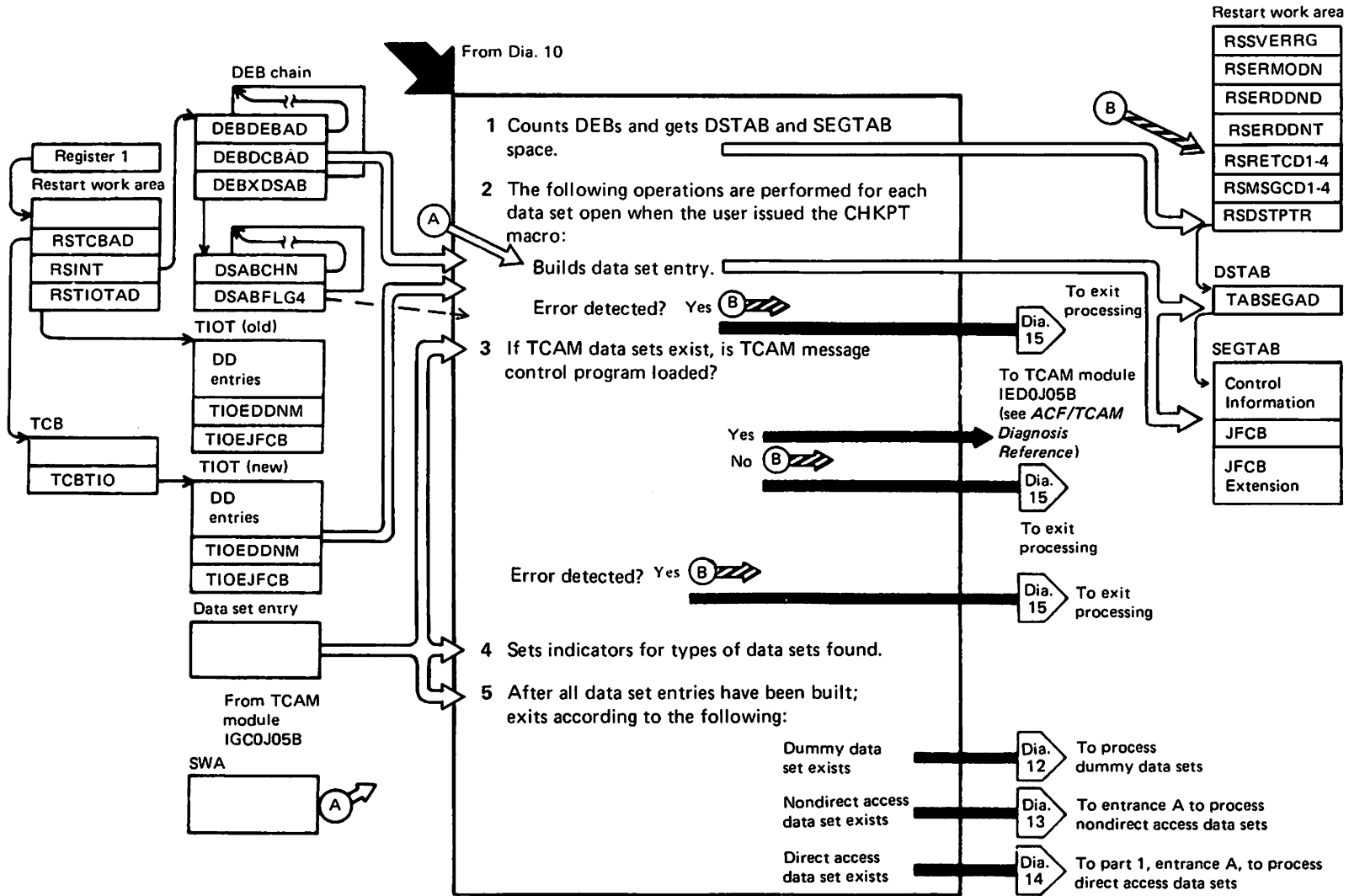


DIAGRAM 11. BUILDING DATA SET ENTRIES

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Notes to Diagram 11

IGC0G05B

- 1 Determines the space required for the DSTAB and SEGTAB work areas by counting the DEBs in the DEB chain. Gets the space for DSTAB and SEGTAB and divides these spaces into entries for each DEB to be processed.

- 2 Starts initializing each entry.

If no errors are encountered, goes to IGC0G95B. Else, sets appropriate error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S53F.

IGC0G95B

Does more initialization of the DSTAB and SEGTAB entries.

- 3 Calls IED0J05B if there are any TCAM data sets to restart.

If no errors are encountered, goes to IGC0I05B. Else, sets appropriate error and reason codes and goes to IHJARS60 (IGC0V05B) via abend S53F.

IGC0I05B

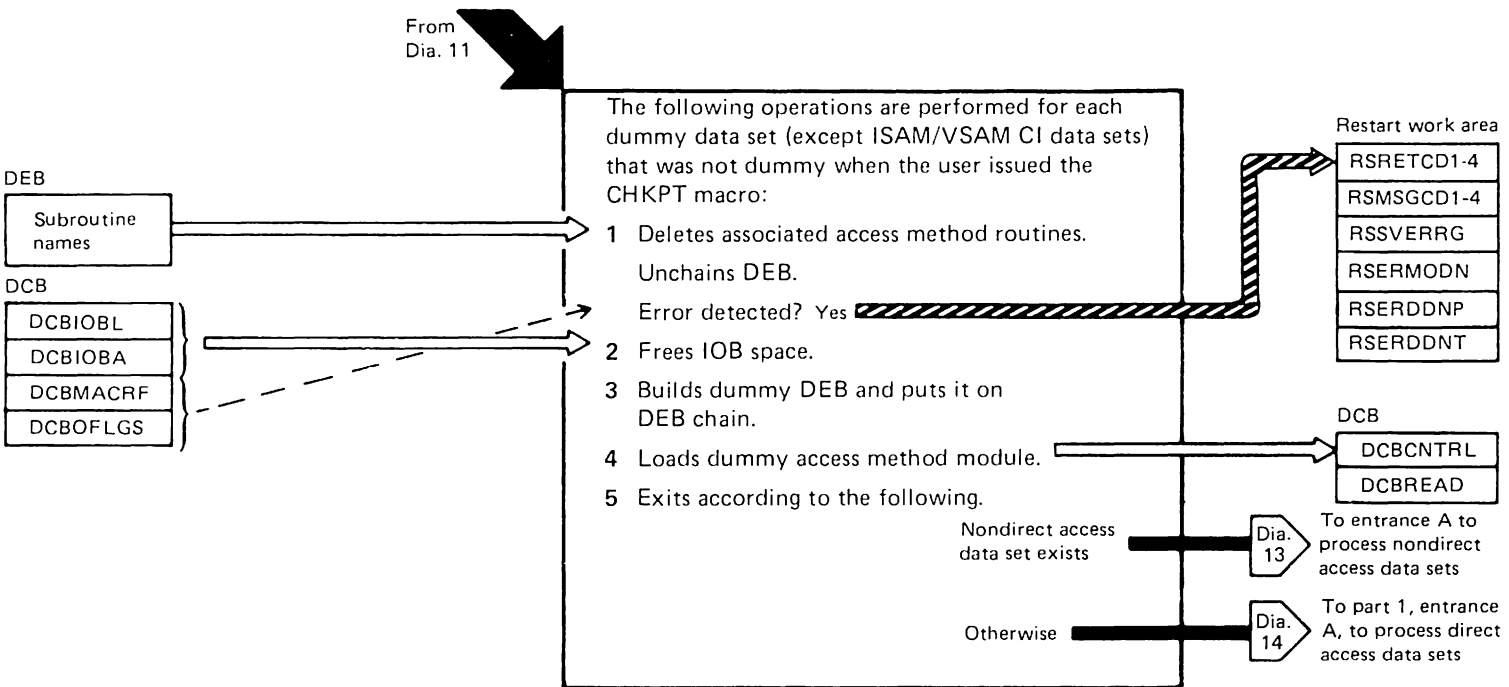
Completes initialization of the DSTAB and SEGTAB entries.

- 4 Sets flags in restart's work area to ease decision making for module flow based on the types of data sets being restarted.

- 5 If no errors were encountered, goes to the next module as follows:

- a) IGC0H05B, if any dummy data sets to restart
- b) IGC0K05B, if any non-DA data sets to restart and no dummy data sets
- c) IGC0M05B, if no dummy data sets and no non-DA data sets

DIAGRAM 12. PROCESSING DUMMY DATA SETS



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Notes to Diagram 12

IGC0H05B

For each dummy data set found, determines (from DEBEXSCL field in DEB) whether it was a dummy data set when the checkpoint was taken. If it was, bypasses the data set entry and processes the next one.

- 1 If the dummy data set was not a dummy data set when the checkpoint was taken, gets the names of the access method routines associated with it and deletes these routines, unless the data set was a SYSIN or SYSOUT data set.

Takes the DEB off the DEB chain.

- 2 Frees the IOB space created when the data set was originally opened.
- 3 Gets storage and builds a dummy DEB. Stores the DEB address in the DCB and puts the dummy DEB on the DEB chain.
- 4 Loads the dummy access method module (IGC019AV) and puts a pointer to it in the DCB.

If no errors were found, processes the next data set.
- 5 If no errors were encountered, goes to the next module as follows:
 - a) IGC0K05B, if any non-DA data sets to restart
 - b) IGC0M05B, if no non-DA data sets

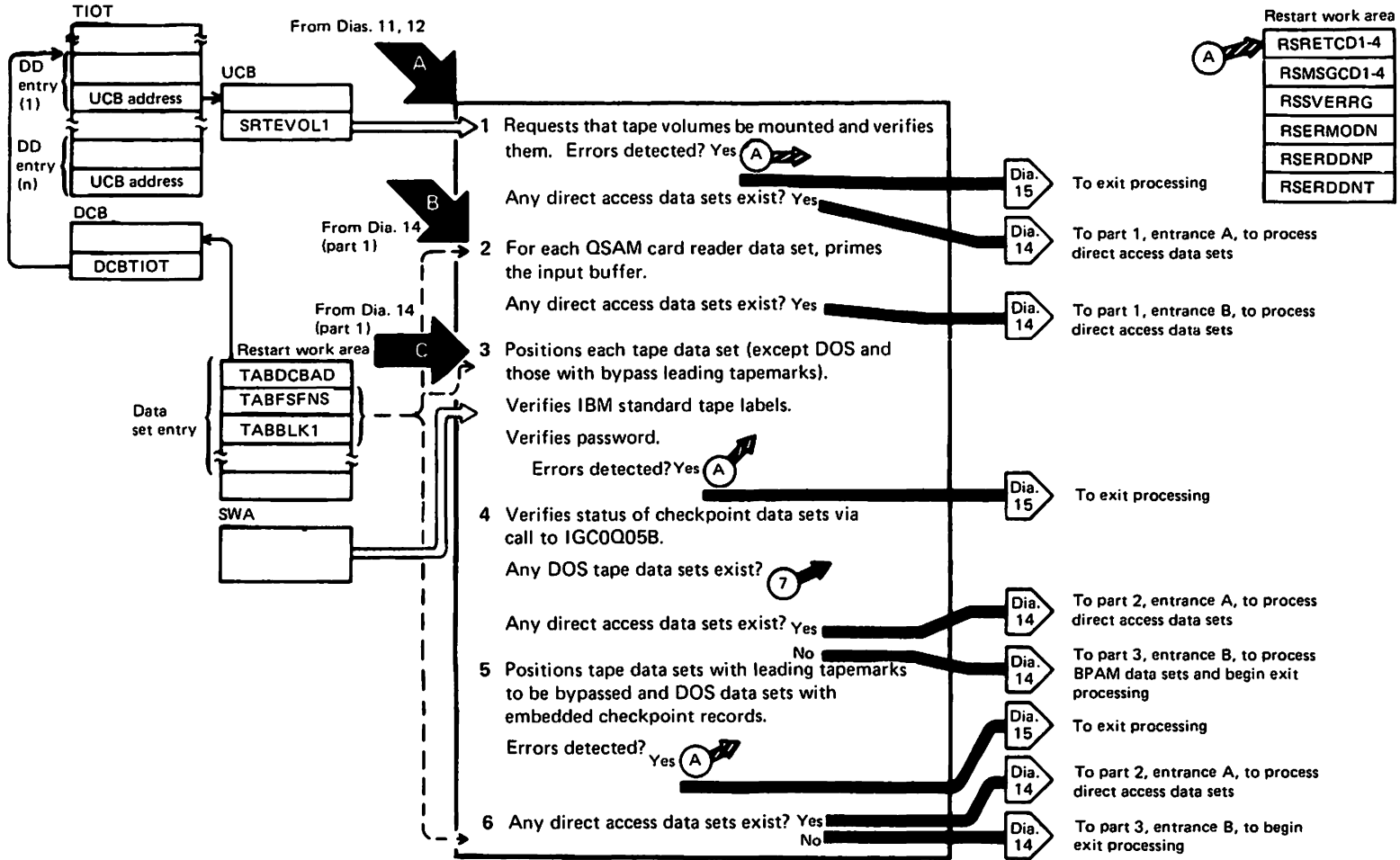


DIAGRAM 13. PROCESSING NONDIRECT ACCESS DATA SETS

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Notes to Diagram 13

IGC0K05B

- 1 Searches the data set entries for SYSIN, SYSOUT, unit record, and graphic data sets. For each one found, updates the UCB address in the DEB.

For tape data sets, ensures that:

- a) The correct volumes are mounted
- b) The correct label information is in the UCB
- c) User is authorized to use the tape volumes
- d) Nonstandard label processing is done for nonstandard labels

If any errors are found, sets the appropriate error and reason codes and goes to IHJARS60 via abend S53F.

If any direct access data sets exist, goes to IGC0M05B. Else, goes to IGC0L05B.

IGC0L05B

- 2 Searches through the data set entries for QSAM card reader data sets.

For each one found, calls the EOB subroutine to prime the input buffers.

Exits to IGC0N05B.

IGC0S05B

- 3 Positions the DOS tapes, and those tapes with leading tape marks and without a note value.

Calls IGC0Q05B to verify checkpoint data sets.

If password protection is specified and the volume was not found to be RACF protected, requests that the operator enter the correct password before processing continues.

Exits to IGC0005B.

IGC0Q05B

- 4 Verifies the status of the data set by asking the operator; and, if the checkpoint and restart security status of the data set are not the same, sets the appropriate error and reason codes and goes to IHJARS60 via abend S53F.

If both checkpoint and restart status are the same, control is returned to the caller.

If any errors were detected, sets the appropriate error and reason codes and goes to IHJARS60 via abend S53F.

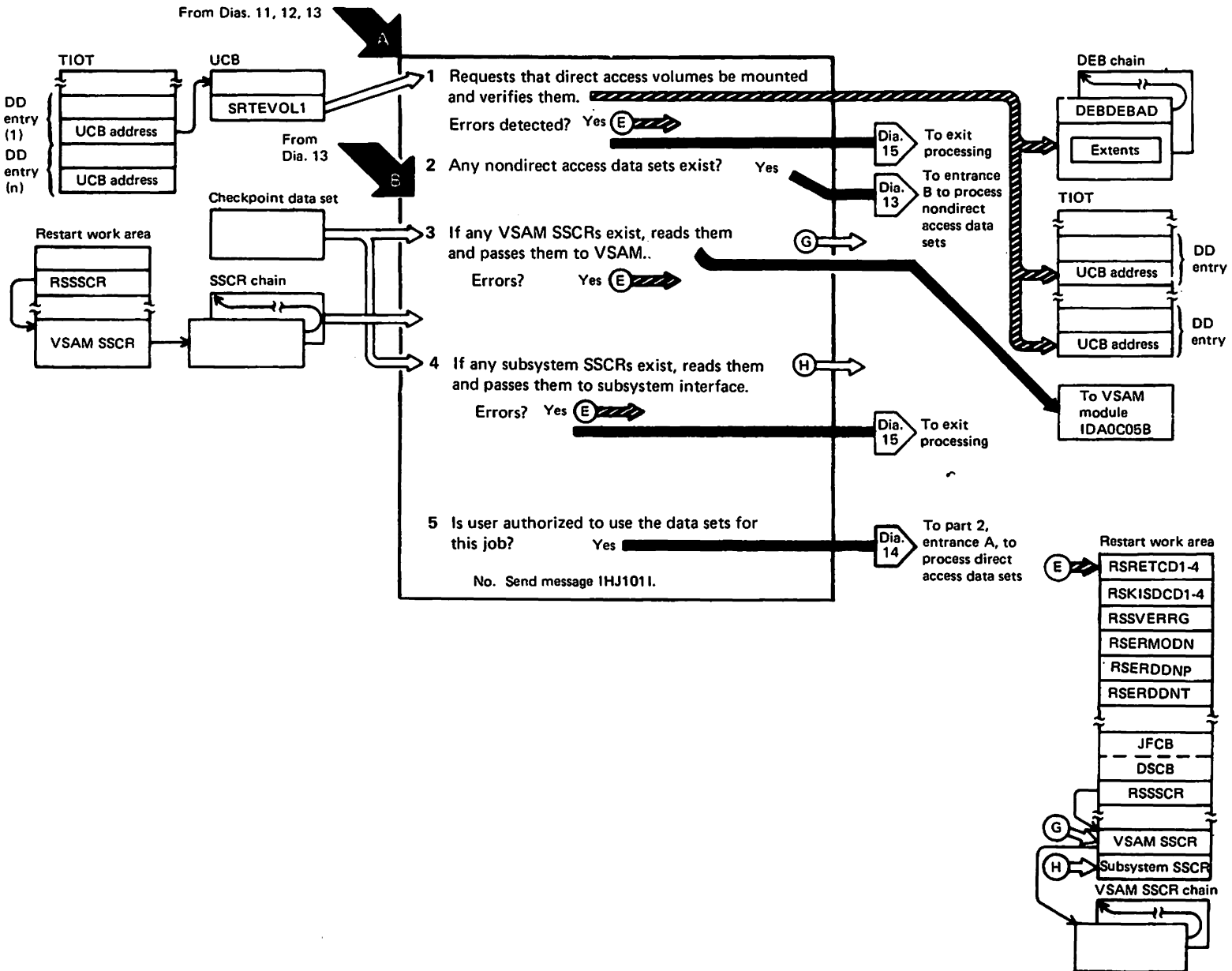
IGC0U05B

- 5 Searches through the data set entries. For each tape data set indicating leading tapemark or embedded DOS checkpoint records, repositions the data sets to the correct file and record.

- 6 If any direct access data sets exist, exits to IGC0R05B. Else, exits to IGC0T05B.

If any errors were detected, sets the appropriate error and reason codes and goes to IHJARS60 via abend S53F.

DIAGRAM 14 (PART 1 OF 3). PROCESSING DIRECT ACCESS DATA SETS



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Notes to Diagram 14 (Part 1 of 3)

IGCOM05B

- 1 Searches through the data set entries for data sets on direct access, and ensures that the correct volume or volumes for the data set are mounted.

If any error was detected, sets the appropriate error message codes and goes to IHJARS60 via abend S53F.

- 2 If any nondirect access data sets exist, gives control to IGC0L05B. Else, exits to IGC0N05B.

IGCON05B

- 3 If VSAM SSCRs exist, reads them from the checkpoint data set into the restart work area.

If a VSAM SSCR exists, VSAM Restart module IDA0C05B is called for SSCR and initial VSAM DEB processing (see VSAM Logic).

- 4 If subsystem SSCRs exist, reads them from the checkpoint data set into the restart work area. Sets the

restart flags in the subsystem's SSOB block. Then issues the IEFSSREQ macro, which gives control to JESSSREQ (subsystem request routine) to process the subsystem SSCRs.

- 5 Searches through the data set entries for data sets that are password or RACF protected, and verifies the user's authority to use the data set.

If the user isn't authorized, links to IHJCMM00 to write message IHJ101I, sets error and message codes, and passes control to IHJARS60 (IGC0V05B) via abend S53F.

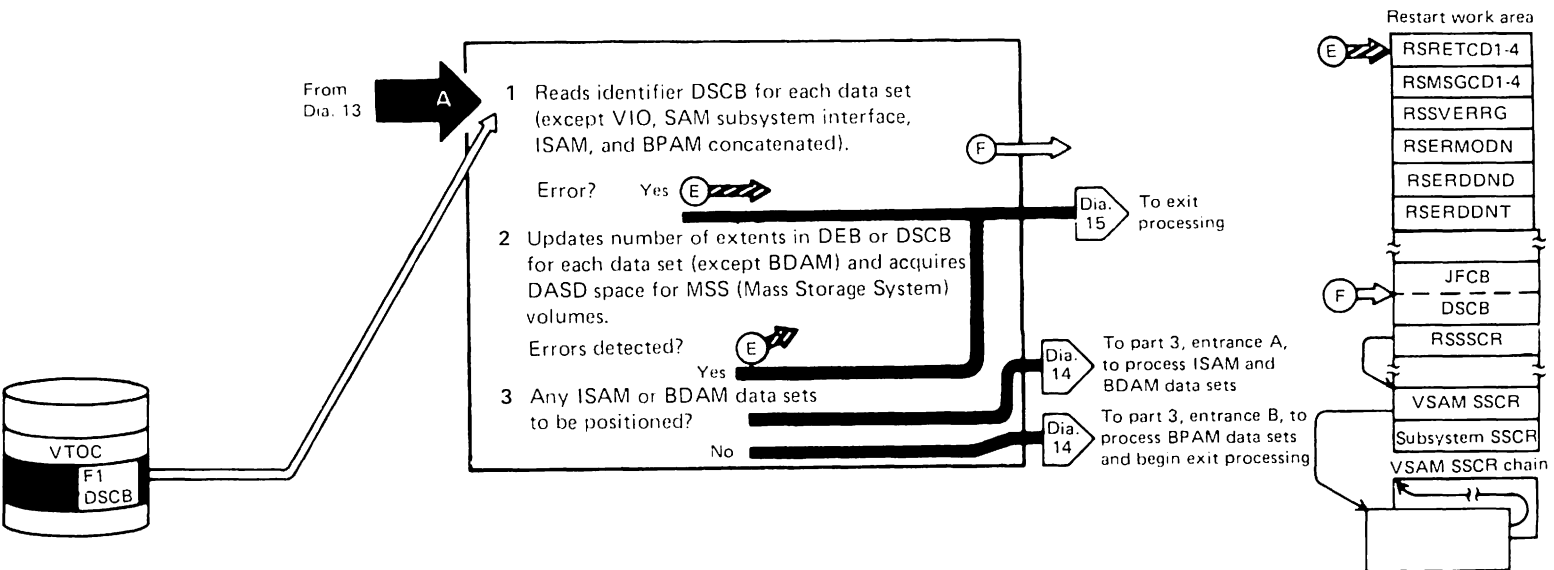
If JSCBPASS is set, the RACF security checks are bypassed.

If any errors are detected, sets the appropriate error codes and goes to IHJARS60 via abend S53F.

Exits to IGC0S05B if any tape data sets exist, or to IGC0R05B if any direct access data sets exist.

Else, exits to IGC0T05B.

DIAGRAM 14 (PART 2 OF 3). PROCESSING DIRECT ACCESS DATA SETS



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Notes to Diagram 14 (Part 2 of 3)

IGC0R05B

- 1 Searches through the data set entries for data sets on direct access devices (except for noncheckpoint VIO data sets, SAM, subsystem interface (SYSIN/SYSOUT), ISAM, and BPAM data sets that are concatenated).

If the data set being processed is a checkpoint data set, updates those fields in the DCB containing the MBBCCHHR and the number of bytes remaining on the track.
- 2 Compares the number of extents recorded in the DEB and DSCB. If they're equal, updates the DEB.

If the DSCB indicates more extents than the DEB, and if the data set is an output data set, gives control to the DADSM partial release routines to release all tracks after the last track for the last extent recorded in the DEB.

If the DEB indicates more extents than the DSCB, and if the data set is an output data set, moves the ending track address from the last extent in the DSCB to the last extent in the DEB.

If any errors were detected, sets the appropriate error codes and goes to IHJARS60 via abend S53F.

- 3 Exits to IGC0W05B if any ISAM or BDAM data sets exist. Else, exits to IGC0T05B.

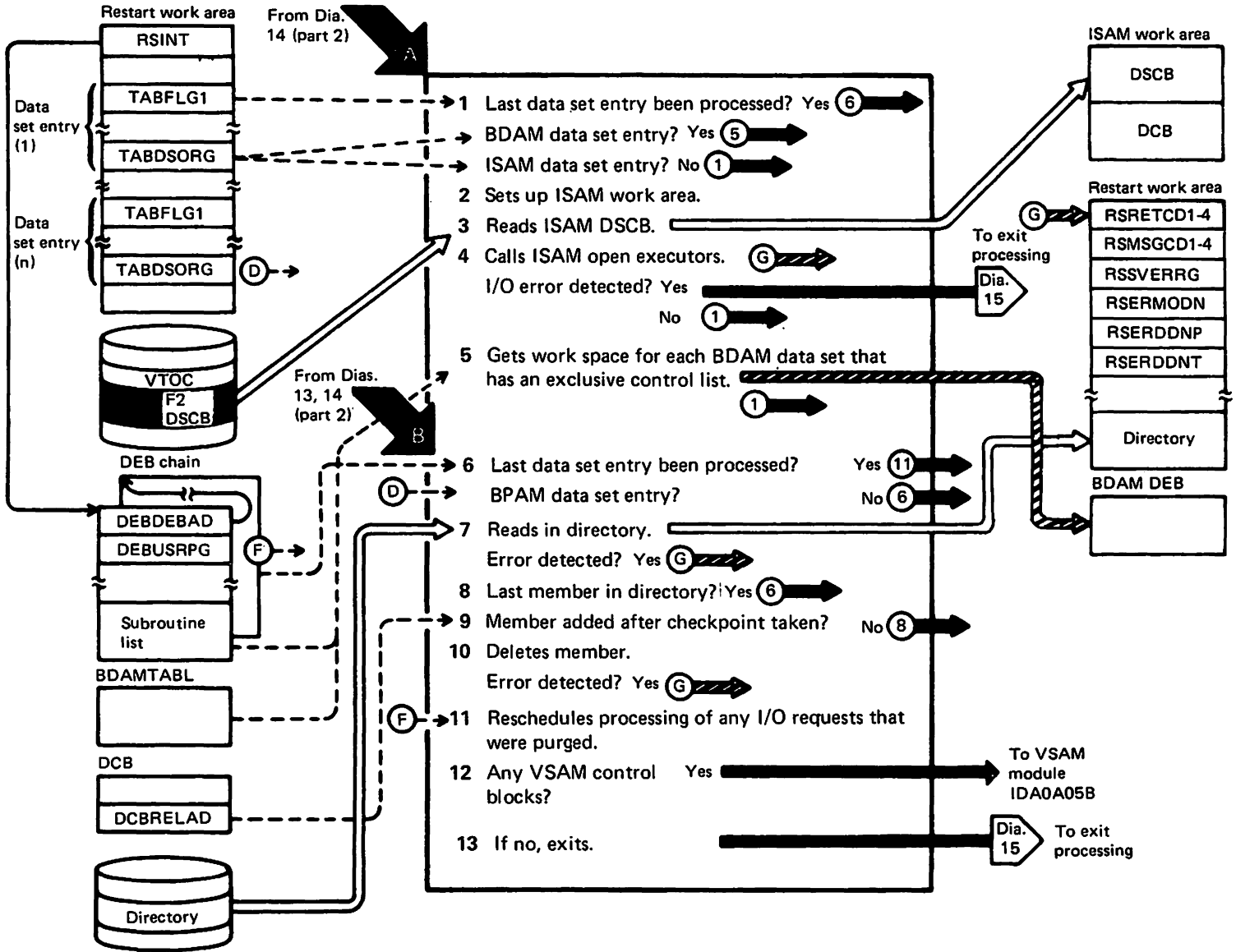


DIAGRAM 14 (PART 3 OF 3). PROCESSING DIRECT ACCESS DATA SETS

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Notes to Diagram 14 (Part 3 of 3)

IGCOW05B

- 1 Searches for ISAM and BDAM data set entries.
- 2 For each ISAM data set found, gets an ISAM work area (key 5) and prepares it for use by the ISAM open executors. Gets the UCB and disk address of the data set's ISAM (format 2) DSCB. Builds the IOB and channel program used to read the DSCB.
- 3 Reads the ISAM (format 2) DSCB into the ISAM work area. Then copies the ISAM DCB into the ISAM work area.
- 4 Loads and goes to the ISAM open executor IGG01920 (for fixed-length records) or IGG01950 (for variable-length records) to open the ISAM data set.
- 5 For each BDAM data set that has an exclusive control list, gets space in subpool 230 (key 5). Then stores the address of this space in the BDAM DEB extension.

If any errors were detected, sets the appropriate error codes and goes to IHJARS60 via abend S53F.

Exits to IGCOT05B.

IGCOT05B

- 6 Issues the DEBCHK macro for each data set open when the CHKPT macro was issued. This causes the DEB

address for each of these data sets to be added to the DEB table. If a DEB is found to be invalid, an ABEND 16E will be issued by DEBCHK.

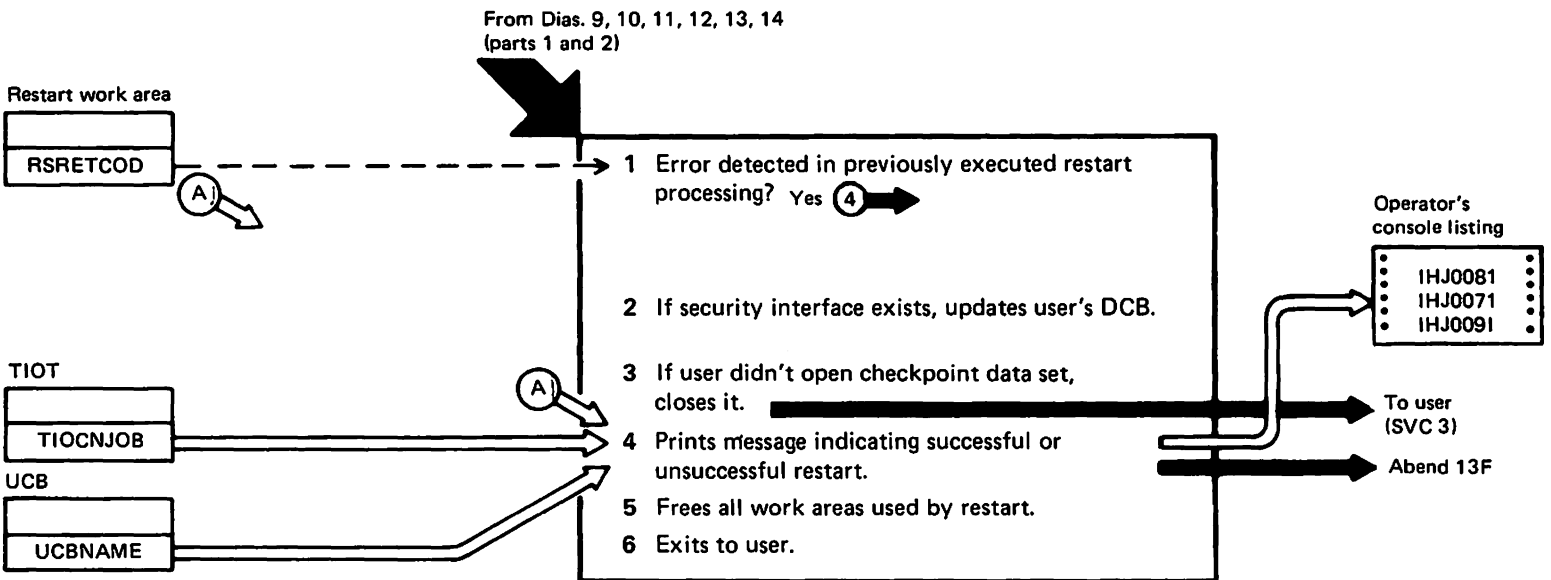
Searches through the data set entries for BPAM data sets that were open for output when the checkpoint was taken.

- 7 Builds the control blocks (DEB, ECB, IOB) and channel program necessary for reading the BPAM directory. Reads each block of the directory into the restart work area.
- 9 Determines whether any of the members of the directory were added after the checkpoint was taken.
- 10 Issues the STOW macro to delete any members in the directory that were added after the checkpoint was taken.
- 11 Examines each DEB (except those for TCAM, subsystem, or compatibility interface data sets) to determine whether the user I/O requests associated with the data set were purged. If so, issues the RESTORE macro to reschedule I/O processing.
- 12 If the VSAM SSCR points to the VSAM VAT control block, module IDA0A05B is called (see VSAM Logic).

If any errors were detected, sets the appropriate error codes and goes to IHJARS60 via abend S53F.

Else, control is passed directly to IHJARS60 (IGCOV05B).

DIAGRAM 15. RESTART EXIT



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Notes to Diagram 15

IGC0V05B

- 1** If any errors were not detected in previously executed restart modules:

Restores the user's checkpoint data set block size in the DCB.

If the checkpoint data set is on tape, sets the volume sequence number in the VOLSEQNO field in the DEB to 1 for automatic restarts.

- 2** If the security interface exists (an unauthorized user was taking checkpoints), updates the user's DCB from the protected DCB.
- 3** Closes the checkpoint data set if the user did not open it.

- 4** Builds the parameter list for IHJCMM00, and calls IHJCMM00 to issue message IHJ008I if the restart was successful, or IHJ007I if the restart was not successful.

Cancels the ESTAE routine.

Issues an abend S23F if any security violations were detected.

Issues an abend S13F if restart was not successful.

Else, loads R15 with a return code of 4 and R0 with a 0, then exits to the problem program.

- 5** Frees the restart work areas.
- 6** Exits to user.

DIAGRAM 16. ESTAE EXIT ROUTINE

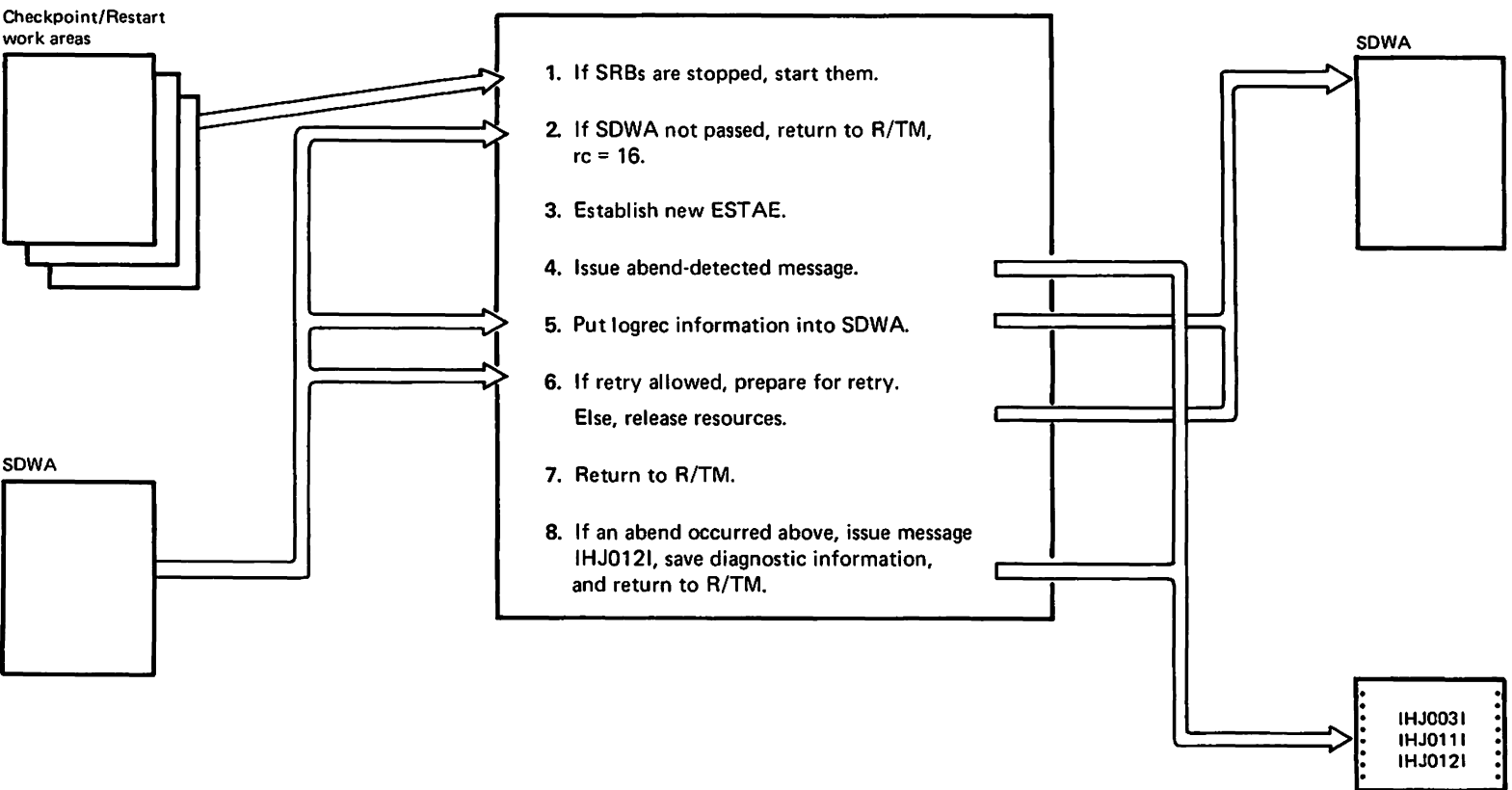
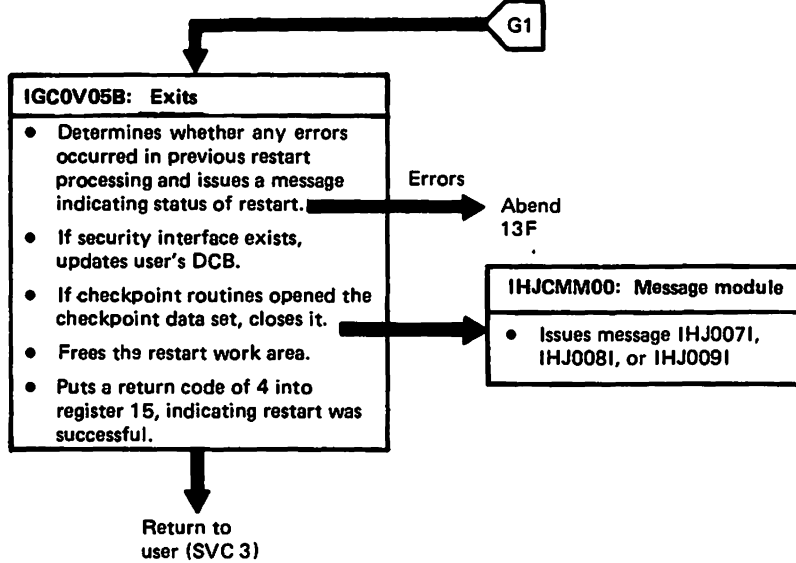


DIAGRAM G

From IGC0005B,
905B, G05B,
G95B, H05B,
I05B, K05B,
L05B, M05B,
N05B, Q05B, R05B,
S05B, T05B,
U05B, W05B



MODULE DIRECTORY

The cross-reference table that follows is ordered by CSECT name.

Microfiche Name	CSECT Name	Program Organization Diagram	Method of Operation Diagram	Operation Performed
IHJACP20	IGC0A06C	A	5 (part 1)	Builds checkpoint data set
IHJACP25	IGC0D06C	A	5 (part 1)	Builds checkpoint data set
IHJQCP30	IHJQCP30	A	5 (part 2)	Builds checkpoint data set
IGC0G05B	IGC0G05B	C	11	Builds data set entry
IHJQCP31	IGC0G06C	B	5 (part 2)	Builds checkpoint data set
IGC0G95B	IGC0G95B	D	11	Builds data set entry
IGC0H05B	IGC0H05B	D	12	Processes dummy data sets
IHJQCP32	IGC0H06C	B	5 (part 2)	Builds checkpoint data set
IGC0I05B	IGC0I05B	D	11	Builds data set entry
IGC0K05B	IGC0K05B	D	13	Mounts and verifies tape volumes
IGC0L05B	IGC0L05B	D	13	Processes QSAM card reader data sets
IGCOM05B	IGCOM05B	D	14 (part 1)	Mounts and verifies direct access volumes
IGCON05B	IGCON05B	E	14 (part 1)	Processes direct access data sets
IGCON06C	IGCON06C	B	5 (part 3)	Builds checkpoint data set
			6	Takes checkpoint and restores user's I/O requests
IGC0Q05B	IGC0Q05B	E	13, 14 (part 1)	Verifies status of checkpoint data sets
IHJACP50	IGC0Q06C	B	7	Checkpoint exit
IGC0R05B	IGC0R05B	F	14 (part 2)	Positions direct access data sets
IGC0S05B	IGC0S05B	F	13	Positions tape data sets
IHJACP70	IGC0S06C	B	7	Checkpoint exit
IGC0T05B	IGC0T05B	F	14 (part 3)	Processes BPAM data sets
IGC0U05B	IGC0U05B	F	13	Positions DOS tape data sets
IHJARS60	IGC0V05B	G	15	Restart exit
IGC0W05B	IGC0W05B	F	14 (part 3)	Processes ISAM and BDAM data sets
IHJARS00	IGC0005B	C	9	Restart housekeeping
IHJACP00	IGC0006C	A	3	Checkpoint housekeeping
IHJACP01	IGC0106C	A	3	Checkpoint housekeeping

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Microfiche Name	CSECT Name	Program Organization Diagram	Method of Operation Diagram	Operation Performed
IHJARS01	IGC0205B	C	9	Restart housekeeping
IHJACP02	IGC0206C	A	3	Checkpoint housekeeping
IHJQRS20	IHJQRS20	C	10	Restores user's region and task control information
IGC0506C	IGC0506C	A	4	Purges user's I/O requests
IHJQRS21	IGC0605B	C	10	Restores user's region and task control information
IHJQRS22	IGC0705B	C	10	Restores user's region and task control information
IHJQRS23	IGC0805B	C	10	Restores user's region and task control information
IHJCMM00	IHJCMM00	none	17	Builds and issues messages to the operator
IHJCES00	IHJCES00	none	16	ESTAE exit routine
IHJGLU00	IHJGLU00	none	18	Glue routine for services restricted to 24-bit address mode callers

DATA AREAS

This section shows the data areas used by checkpoint/restart.

MAJOR CONTROL BLOCK DESCRIPTIONS

CHKWA

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	1000	IHJCHKWA	
0	(0) CHARACTER	4	CKWAID	CONTAINS THE CHARACTERS 'CKWA'
4	(4) A-ADDRESS	4	CKWAPTR	ADDRESS OF BEGINNING OF CHKMAIN'S AND CHKDCB'S W.A.
8	(8) A-ADDRESS	4	CKBUFPTR	ADDRESS OF BEGINNING OF CHKPT'S BUFFER
12	(C) A-ADDRESS	4	CKBUFPT2	ADDRESS OF BEGINNING OF CHKPT'S SECOND BUFFER
16	(10) A-ADDRESS	4	CKBUFRA1	REAL OR VIRTUAL ADDRESS OF CHECKPOINT'S FIRST BUFFER (REAL ADDRESS IF V=R)
20	(14) A-ADDRESS	4	CKBUFRA2	REAL OR VIRTUAL ADDRESS OF CHECKPOINT'S SECOND BUFFER (REAL ADDRESS IF V=R)
24	(18) UNSIGNED	1	CKWASUBP	SUBPOOL OF WORK AREA
25	(19) UNSIGNED	1		RESERVED
26	(1A) UNSIGNED	2	CKRSDEBC	NUMBER OF DEBS TO BE CHECKPOINTED
28	(1C) SIGNED	4	CKWACL	LENGTH OF IHJCHKWA
32	(20) SIGNED	4	CKBUFL	LENGTH OF CHKPT'S BUFFER
=====				
THE ORDER OF THE NEXT FOUR CARDS MUST BE CKPPM, CKPPE, CKPML, CKPPEL.				
36	(24) A-ADDRESS	4	CKPPM	LOW ORDER ADDRESS OF PROBLEM PROGRAM STORAGE
40	(28) A-ADDRESS	4	CKPPE	SIZE OF PROBLEM PROGRAM STORAGE
44	(2C) A-ADDRESS	4	CKPML	LOW ORDER ADDR OF SECONDARY PP STORAGE
48	(30) A-ADDRESS	4	CKPPEL	SIZE OF SECONDARY PROBLEM PROGRAM STORAGE
52	(34) A-ADDRESS	4	CKDCBPTR	ADDRESS OF AREA GETMAINED FOR DCB
56	(38) UNSIGNED	2	CKTIOLN	LENGTH OF TIOT
58	(3A) UNSIGNED	2	CKDCBLEN	SIZE OF AREA GETMAINED FOR DCB
60	(3C) CHARACTER	8	CKCODES	CHKPT MESSAGE AND RETURN CODES
60	(3C) UNSIGNED	1	CKMSGCD1	MESSAGE TO BE USED
61	(3D) UNSIGNED	1	CKMSGCD2	REASON CODE
62	(3E) UNSIGNED	1	CKMSGCD3	VSAM CLOSE ERROR CODE IF ANY
63	(3F) UNSIGNED	1	CKMSGCD4	REASON CODE FOR SECOND ERROR IF ANY

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OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
64	(40) UNSIGNED	1	CKMSGCD5	REASON CODE TO BE PASSED TO CALLER
65	(41) UNSIGNED	1	CKRETC1	USED FOR ERRORS AFTER THE ERROR IN CKRETC2
66	(42) UNSIGNED	1	CKRETC2	RETURN CODE
67	(43) UNSIGNED	1	CKRETC3	RETURN CODE TO BE PASSED TO CALLER
68	(44) A-ADDRESS	4	CKSSCR	ADDR OF 1ST VSAM SSCR
72	(48) A-ADDRESS	4	CKDECBAD	ADDRESS OF 1ST DECB
76	(4C) A-ADDRESS	4	CKDCBADR	ADDR OF CHECKPOINTS DCB
80	(50) A-ADDRESS	4	CKDECBA2	ADDRESS OF SECOND DECB
84	(54) A-ADDRESS	4	CKSVRBPT	ADDRESS OF CHECKPOINTS SVRB
88	(58) A-ADDRESS	4	CKGLUPTR	POINTER TO GLUE PARAMETER LIST
92	(5C) A-ADDRESS	4	CKCLRPLA	ADDRESS OF CALLERS PARAMETER LIST
96	(60) SIGNED	4	CKNOTEVL	TTRZ FOR CHECKPOINT DS
100	(64) SIGNED	72	CKREGSAV	REGISTER SAVE AREA
172	(AC) SIGNED	72	CKREGSV2	REGISTER SAVE AREA
244	(F4) A-ADDRESS	4	CKSAVREG	SAVE AREA FOR A REGISTER
248	(F8) A-ADDRESS	4	CKTSTEOV	EOV TEST 1
248	(F8) UNSIGNED	1	CKNUMEXT	NUMBER OF EXTENTS ON DASD CHKPT DS
249	(F9) CHARACTER	3		REST OF CKTSTEOF FOR TAPE CHKPT DS
252	(FC) A-ADDRESS	4	CKEOVCMR	EOV TEST 2
256	(100) A-ADDRESS	4	CKJCTADR	ADDRESS OF JCT AREA
260	(104) A-ADDRESS	4	CKQMNADR	ADDRESS OF QMIOP PARMLIST AREA
264	(108) A-ADDRESS	4	CKQMNLEN	LENGTH OF QMIOP PARM LIST, WORK AREA, AND READIN AREAS.
268	(10C) A-ADDRESS	4	CKXAREAP	ADDRESS OF EXCP WORK AREA
272	(110) A-ADDRESS	4	CKJFCBAD	ADDRESS JFCB WORK AREA
276	(114) A-ADDRESS	4	CKUCBADR	ADDRESS OF UCB FOR CHKPT DS
280	(118) A-ADDRESS	4	CKGLUADR	ADDRESS OF IHJGLU00
284	(11C) A-ADDRESS	4	CKDSABAD	ADDRESS OF DSAB FOR CHKPT DS
288	(120) A-ADDRESS	4	CKTIOEAD	ADDRESS OF TIOT ENTRY FOR CHKPT DS
292	(124) A-ADDRESS	4	CKOPCLST	AREA FOR OPEN & CLOSE LIST
296	(128) CHARACTER	32	CKESTLST	AREA FOR LIST FORM OF ESTAE
328	(148) A-ADDRESS	4	CKDEBADR	ADDRESS OF DCB PREFIX FOR CHKPT DS
332	(14C) A-ADDRESS	4	CKDSCBAD	ADDRESS OF F1 DSCB FOR CHKPT DS
336	(150) SIGNED	4	CKBFLWA	REMAINING BYTES IN BUFFER

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
340 (154)	A-ADDRESS	4	CKBFSTAD	POINTER TO NEXT BYTE IN BUFFER TO BE FILLED
344 (158)	A-ADDRESS	4	CKCLNUP	ADDRESS OF MODULE TO GO TO FOR CLEANUP
348 (15C)	CHARACTER	80	CKSTRDTA	
348 (15C)	A-ADDRESS	4	CKSTRADR	ADDRESSES OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE. THESE AREAS ARE CONTROLLED BY AND MUST BE RELEASED BY THE MODULE ACQUIRING THEM. THE ADDRESS FIELD MUST BE ZEROED JUST PRIOR TO RELEASING THE AREA IT POINTS TO. THE LAST ENTRY IN THIS TABLE POINTS TO AN EXTENTION OF THIS TABLE
352 (160)	SIGNED	4		
352 (160)	UNSIGNED	1	CKSTRSPL	SUBPOOL OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE.
353 (161)	UNSIGNED	3	CKSTRLEN	LENGTH OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE.
428 (1AC)	SIGNED	4	CKSTRCNT	NUMBER OF ENTRIES IN TABLE EXTENSION
432 (1B0)	A-ADDRESS	4	CKENQTCB	TCB ADDRESS FOR ENQ. USED BY THE ENQ MACRO THIS FIELD MUST IMMEDIATELY PRECEDE CKENQLST.
436 (1B4)	CHARACTER	12	CKENQLST	
436 (1B4)	A-ADDRESS	4		
440 (1B8)	A-ADDRESS	4		
444 (1BC)	A-ADDRESS	4		
448 (1C0)	BITSTRING	1	CKFLAG1 CKRSRSV1 CKTRKOV CKTAPE CKAUTHUS CKVEQR CKUPDDNM CKOPEN	CHKPT HOUSEKEEPING FLAGS USED BY RESTART TRACK OVERFLOW WAS SPECIFIED CHECKPOINT DATA SET IS ON TAPE AUTHORIZED USER TASK IS VIRTUAL=REAL USER PASSED DD NAME CHECKPOINT ISSUED OPEN (USER PASSED A CLOSED DCB)
449 (1C1)	BITSTRING	1	CKBPAM CKFLAG2 CKRSV001 CKENVXM CKRSV002 CKRSV003 CKENVPK	CHECKPOINT DATA SET IS BPAM RESERVED INDICATES CROSS MEM. RESERVED RESERVED INDICATES 31 BIT ADDRESSING ENVIRONMENT AT CHECKPOINT TIME
450 (1C2)	BITSTRING	1	CKRSV004 CKFLAG3 CKCANCEL CKEOV CKCHRWTN	RESERVED FLAG BYTE 3 CANCEL WAS REQUESTED EOV CHR RECORD HAS BEEN WRITTEN

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OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
	...1		CK24MCLR	CALLER WAS IN 24 BIT ADDRESSING MODE
	.... 1...		CKECB1AC	ECB 1 IS ACTIVE
	.... .1..		CKECB2AC	ECB 2 IS ACTIVE
	.... ..1.		CKDDNOPN	DDN PASSED AND WAS OPENED DURING A PREVIOUS CHECKPOINT
451 (1C3)	BITSTRING 111.	1	CKUSPCHD CKFLAG4 CKRSV008	USER SUPPLIED CHECKID FLAG BYTE 4 A VSAM DATA SET IS ON THE DEB CHAIN
	...1 1111		CKINTUSE	RESERVED FOR USE BY INDIVIDUAL MODULES. MUST BE CLEARED ON ENTRY TO ANY MODULE USING THEM.
	...1		CKINTUS1	SAME AS CKINTUSE
	.... 1...		CKINTUS2	SAME AS CKINTUSE
	.... .1..		CKINTUS3	SAME AS CKINTUSE
	.... ..1.		CKINTUS4	SAME AS CKINTUSE
	.... ...1		CKINTUS5	SAME AS CKINTUSE
452 (1C4)	SIGNED	4	CKRSV007	RESERVED
456 (1C8)	CHARACTER	12	CKNEWPRM	
468 (1D4)	CHARACTER	32	CKGLUPRM	
500 (1F4)	CHARACTER	17	CKESTA	
517 (205)	CHARACTER	1	CKESTFLG	
10				
520 (208)	CHARACTER	16	CKCHEKID	GENERATED OR USER CHECKID
536 (218)	CHARACTER	8	CKDDNAME	CHKPT D.S. DDNAME
544 (220)	CHARACTER	44	CKDSNAME	DATA SET NAME FOR CHECKPOINT DATA SET
588 (24C)	CHARACTER	6	CKVOLSER	VOL.SER.NO.FOR CHKPT D.S.
594 (252)	CHARACTER	140	CKDSCBF1	DSCB WITH DS NAME FOR CHKPT DS
594 (252)	CHARACTER	44	CKDSCBNM	DATA SET NAME
638 (27E)	CHARACTER	96	CKDSCB	DSCB FOR CHECKPOINT DATA SET
734 (2DE)	CHARACTER	96	CKDCBCPY	DCB COPIED FROM CALLER OF CHECKPOINT
830 (33E)	CHARACTER	3	CKUNIT	UNIT FOR CHKPT D.S.
833 (341)	CHARACTER	1	CKJFCBSV	SAVE AREA FOR JFCBIND2
834 (342)	CHARACTER	1	CKDSABSV	SAVE AREA FOR DSABFLG2
835 (343)	CHARACTER	5		FILLER FOR BOUNDARY ALIGNMENT
840 (348)	CHARACTER	64	CKSVERRG	SAVE AREA FOR ERROR REGS
840 (348)	A-ADDRESS	64	CKSVERRA	SAVE AREA FOR ERROR REGS
904 (388)	CHARACTER	64	CKSVERR2	SAVE AREA FOR ERROR REGS
904 (388)	A-ADDRESS	64	CKSVERRB	SAVE AREA FOR ERROR REGS
968 (3C8)	CHARACTER	8	CKERM0D1	SAVE AREA FOR ERROR MODULE NAME
976 (3D0)	CHARACTER	8	CKERM0D2	SAVE AREA FOR ERROR MODULE NAME
984 (3D8)	A-ADDRESS	4	CKERDNT1	POINTER TO TIOT FOR ERROR DD NAME
988 (3DC)	A-ADDRESS	4	CKERDNP1	POINTER TO TIOT ENTRY FOR ERROR DDN

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
992 (3E0)	A-ADDRESS	4	CKERDNT2	POINTER TO TIOT FOR ERROR DD NAME
996 (3E4)	A-ADDRESS	4	CKERDNP2	POINTER TO TIOT ENTRY FOR ERROR DDN
1000 (3E8)	CHARACTER	0	CKWAEND	

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CROSS-REFERENCE

CKAUTHUS	448 X'10'	CKMSGCD2	61 (3D)
CKBFLWA	336(150)	CKMSGCD3	62 (3E)
CKBFSTAD	340(154)	CKMSGCD4	63 (3F)
CKBPAM	448 X'01'	CKMSGCD5	64 (40)
CKBUFL	32 (20)	CKNEWPRM	456(1C8)
CKBUFPTR	8 (8)	CKNOTEVL	96 (60)
CKBUFPT2	12 (C)	CKNUMEXT	248 (F8)
CKBUFRAD	16 (10)	CKOPCLST	292(124)
CKBUFRA2	20 (14)	CKOPEN	448 X'02'
CKCANCEL	450 X'80'	CKPPE	40 (28)
CKCHEKID	520(208)	CKPPEL	48 (30)
CKCHRWTN	450 X'20'	CKPPM	36 (24)
CKCLNUP	344(158)	CKPPML	44 (2C)
CKCLRPLA	92 (5C)	CKQMADR	260(104)
CKCODES	60 (3C)	CKQMLEN	264(108)
CKDCBADR	76 (4C)	CKREGSAV	100 (64)
CKDCBCPY	734(2DE)	CKREGSV2	172 (AC)
CKDCBLEN	58 (3A)	CKRETC1	65 (41)
CKDCBPTR	52 (34)	CKRETC2	66 (42)
CKDDNAME	536(218)	CKRETC3	67 (43)
CKDDNOPN	450 X'02'	CKRSDEBC	26 (1A)
CKDEBADR	328(148)	CKRSRSV1	448 X'80'
CKDECBAD	72 (48)	CKRSV001	449 X'80'
CKDECBA2	80 (50)	CKRSV002	449 X'20'
CKDSABAD	284(11C)	CKRSV003	449 X'10'
CKDSABSV	834(342)	CKRSV004	449 X'07'
CKDSCB	638(27E)	CKRSV007	452(1C4)
CKDSCBAD	332(14C)	CKRSV008	451 X'E0'
CKDSCBF1	594(252)	CKSAVREG	244 (F4)
CKDSCBNM	594(252)	CKSSCR	68 (44)
CKDSNAME	544(220)	CKSTRADR	348(15C)
CKECB1AC	450 X'08'	CKSTRCNT	428(1AC)
CKECB2AC	450 X'04'	CKSTRDTA	348(15C)
CKENQLST	436(1B4)	CKSTRLEN	353(161)
CKENQTCB	432(1B0)	CKSTRSPL	352(160)
CKENVPK	449 X'08'	CKSVERRA	840(348)
CKENVXM	449 X'40'	CKSVERRB	904(388)
CKEOV	450 X'40'	CKSVERRG	840(348)
CKEOVCMR	252 (FC)	CKSVERR2	904(388)
CKERDNP1	988(3DC)	CKSVRBPT	84 (54)
CKERDNP2	996(3E4)	CKTAPE	448 X'20'
CKERDNT1	984(3D8)	CKTIOEAD	288(120)
CKERDNT2	992(3E0)	CKTIOLN	56 (38)
CKERMOD1	968(3C8)	CKTRKOV	448 X'40'
CKERMOD2	976(3D0)	CKTSTEOV	248 (F8)
CKESTA	500(1F4)	CKUCBADR	276(114)
CKESTFLG	517(205)	CKUNIT	830(33E)
CKESTLST	296(128)	CKUPDDNM	448 X'04'
CKFLAG1	448(1C0)	CKUSPCHD	450 X'01'
CKFLAG2	449(1C1)	CKVEQR	448 X'08'
CKFLAG3	450(1C2)	CKVOLSER	588(24C)
CKFLAG4	451(1C3)	CKWAAC	28 (1C)
CKGLUADR	280(118)	CKWAEND	1000(3E8)
CKGLUPRM	468(1D4)	CKWAID	0 (0)
CKGLUPTR	88 (58)	CKWAPTR	4 (4)
CKINTUSE	451 X'1F'	CKWASBP	24 (18)
CKINTUS1	451 X'10'	CKXAREAP	268(10C)
CKINTUS2	451 X'08'	CK24MCLR	450 X'10'
CKINTUS3	451 X'04'	IHJCHKWA	0 (0)
CKINTUS4	451 X'02'		
CKINTUS5	451 X'01'		
CKJCTADR	256(100)		
CKJFCBAD	272(110)		
CKJFCBSV	833(341)		
CKMSGCD1	60 (3C)		

CHR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	400	IHJCHR	CHECKPOINT HEADER RECORD
0	(0) CHARACTER	100	IHJCHRDA	DATA PORTION OF RECORD
0	(0) CHARACTER	64	IHJHEADR	HEADER DATA EXPECTED BY RESTART
0	(0) UNSIGNED	2	IHJCHRLT	LENGTH OF THIS CHECKPOINT HEADER EXPECTED BY RESTART
2	(2) UNSIGNED	2	IHJCOUNT	NUMBER OF CHECKPOINTS TAKEN
4	(4) UNSIGNED	2	IHJCKIDL	LENGTH OF CHECKID FIELD
6	(6) BITSTRING	1	IHJFLAGS	CHECKPOINT FLAG BYTE 1
	1... ..		IHJAUTOS	JOB IS BEING AUTOSTARTED
	.1.. ..		IHJTRKOV	TRACK OVERFLOW SPECIFIED FOR CHECKPOINT DATA SET
	..1.		IHJTAPE	CHECKPOINT DATA SET IS ON TAPE
	...1		IHJUAUTH	USER IS AN AUTHORIZED USER
	.... 1...		IHJVEQR	USER WAS A V=R JOB AT CHECKPOINT TIME
	.... .1..		IHJUPDDN	USER PASSED A DD NAME
	.... ..1.		IHJCKOPN	CHECKPOINT ISSUED OPEN
	.... ...1		IHJBPM	CHECKPOINT DATA SET WAS OPENED FOR BPAM
7	(7) BITSTRING	1	IHJFLAG2	CHECKPOINT FLAG BYTE 2
	1... ..		IHJRSV02	RESERVED
	.1.. ..		IHJENVXM	CHECKPOINT WAS TAKEN WITH CROSS MEMORY SUPPORT INSTALLED
	..1.		IHJRSV03	RESERVE
	...1		IHJRSV04	RESERVED
	.... 1...		IHJENVPK	CHECKPOINT WAS TAKEN ON A 31 BIT ADDRESSING MACHINE
	.... .1..		IHJRSV05	RESERVED
	.... ..1.		IHJRSV06	RESERVED
	.... ...1		IHJRSV07	RESERVED
8	(8) CHARACTER	16	IHJCHKID	CHECKPOINT ID FIELD
24	(18) CHARACTER	8	IHJDDNM	DDNAME OF CHECKPOINT DATA SET USED FOR RESTART
32	(20) A-ADDRESS	4	IHJPPM	LOW ADDRESS OF PROBLEM PROGRAM REGION AT TIME OF CHECKPOINT
36	(24) SIGNED	4	IHJPPE	SIZE OF PROBLEM PROGRAM REGION SPACE BELOW 16M
40	(28) A-ADDRESS	4	IHJPPML	LOW ADDRESS OF SECONDARY PROBLEM PROGRAM ADDRESS SPACE
44	(2C) SIGNED	4	IHJPPEL	LENGTH OF SECONDARY PROBLEM PROGRAM ADDRESS SPACE
48	(30) A-ADDRESS	4	IHJCRGTP	TOP ADDRESS ALLOCATED TO USER FROM PRIVATE STORAGE
52	(34) A-ADDRESS	4	IHJERGTP	TOP ADDRESS ALLOCATED TO USER FROM EXTENDED PRIVATE STORAGE
56	(38) UNSIGNED	2	IHJVLSEQ	VOL SEQ NO. OF THIS ENTRY

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OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
58	(3A) UNSIGNED	2	IHJRSV01	RESERVED
60	(3C) SIGNED	4	IHJREGRQ	REGION SIZE FROM JOB OR EXEC STATEMENT
64	(40) CHARACTER	36	IHJRSV08	=====
RESERVED				
100	(64) CHARACTER	19	IHJIDENT	CHECKPOINT RECORD IDENTIFIER
119	(77) CHARACTER	281	IHJPADH	"\$\$\$/%@/\$ CHR PAD AREA CONTAINING ALL ONES ('FF'X)

CROSS-REFERENCE

IHJAUTOS	6	X'80'
IHJBPAM	6	X'01'
IHJCHKID	8	(8)
IHJCHR	0	(0)
IHJCHRDA	0	(0)
IHJCHRLT	0	(0)
IHJCKIDL	4	(4)
IHJCKOPN	6	X'02'
IHJCOUNT	2	(2)
IHJCRGTP	48	(30)
IHJDDNM	24	(18)
IHJENVPK	7	X'08'
IHJENVXM	7	X'40'
IHJERGTP	52	(34)
IHJFLAGS	6	(6)
IHJFLAG2	7	(7)
IHJHEADR	0	(0)
IHJIDENT	100	(64)
IHJPADH	119	(77)
IHJPPE	36	(24)
IHJPPEL	44	(2C)
IHJPPM	32	(20)
IHJPPML	40	(28)
IHJREGRQ	60	(3C)
IHJRSV01	58	(3A)
IHJRSV02	7	X'80'
IHJRSV03	7	X'20'
IHJRSV04	7	X'10'
IHJRSV05	7	X'04'
IHJRSV06	7	X'02'
IHJRSV07	7	X'01'
IHJRSV08	64	(40)
IHJTAPE	6	X'20'
IHJTRKOV	6	X'40'
IHJUAUTH	6	X'10'
IHJUPDDN	6	X'04'
IHJVEQR	6	X'08'
IHJVLSEQ	56	(38)

CKPT

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	12	IHJCKPT	CHECKPOINT MACRO PARAMETER LIST
0	(0) BITSTRING	1	CKPTFLGS	FLAG BYTE
	1... ..		CKPTCKID	CHECKPOINT ID WAS NOT SPECIFIED
	.111 1...		CKPTRV01	RESERVED
	.... .1..		CKPTIDSY	RETURN SYSTEM-GENERATED CHECKPOINT ID
	.... ..1.		CKPTDDNM	DD NAME ADDRESS GIVEN
	.... ...1		CKPTNFMT	NEW FORMAT IF ON
1	(1) A-ADDRESS	3	CKPTODCA	OLD FORMAT DCB ADDRESS
1	(1) UNSIGNED	1	CKPTNIDL	NEW FORMAT LENGTH OF CHECKPOINT ID
2	(2) UNSIGNED	1	CKPTNLTH	NEW FORMAT LENGTH OF THIS CHECKPOINT PARAMETER LIST
3	(3) CHARACTER	1	CKPTNRV5	NEW FORMAT RESERVED
4	(4) A-ADDRESS	4	CKPTNDCA	NEW FORMAT ADDRESS OF DCB OR DD NAME
4	(4) UNSIGNED	1	CKPTIODL	OLD FORMAT LENGTH OF CHECKPOINT ID
5	(5) A-ADDRESS	3	CKPTOIDA	OLD FORMAT ADDRESS OF CHECKPOINT ID
8	(8) A-ADDRESS	4	CKPTNIDA	NEW FORMAT ADDRESS OF CHECKPOINT ID

CROSS-REFERENCE

CKPTCKID	0 X'80'
CKPTDDNM	0 X'02'
CKPTFLGS	0 (0)
CKPTIDSY	0 X'04'
CKPTIODL	4 (4)
CKPTNDCA	4 (4)
CKPTNFMT	0 X'01'
CKPTNIDA	8 (8)
CKPTNIDL	1 (1)
CKPTNLTH	2 (2)
CKPTNRV5	3 (3)
CKPTODCA	1 (1)
CKPTOIDA	5 (5)
CKPTRV01	0 X'78'
IHJCKPT	0 (0)

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DDNAREA

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0)	STRUCTURE	20 DDNAREA	DDN TABLE
0	(0)	UNSIGNED	1 DDNASUBP	SUBPOOL OF THIS TABLE
1	(1)	UNSIGNED	3 DDNALNTH	LENGTH OF THIS TABLE
4	(4)	CHARACTER	8 DDNDDNAM	NAME OF DD NAME LAST PASSED BY A CHECKPOINT REQUEST
12	(C)	A-ADDRESS	4 DDNDCBAD	ADDRESS OF DCB FOR DDNDDNAM
16	(10)	SIGNED	4 DDNDCBLN	LENGTH OF DCB FOR DDNDDNAM

CROSS-REFERENCE

DDNALNTH	1	(1)
DDNAREA	0	(0)
DDNASUBP	0	(0)
DDNDCBAD	12	(C)
DDNDCBLN	16	(10)
DDNDDNAM	4	(4)

DDNT

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	176	IHJDDNT	DD NAME TABLE
0	(0) UNSIGNED	2	DDNTIDNT	ID OF DDNT RECORD
2	(2) SIGNED	2	DDNTUSCT	RELATIVE ADDRESS OF NEXT AVAILABLE ENTRY IN THIS TABLE
4	(4) A-ADDRESS	4	DDNTLINK	SWA ADDRESS OF NEXT DDNT
8	(8) CHARACTER	8	DDNTDDNM	AN EIGHT-BYTE DD NAME OF EACH DATA SET THAT HAS BEEN DYNAMICALLY DEALLOCATED SINCE THE BEGINNING OF THE JOB STEP. UP TO 21 OF THESE ENTRIES MAY EXIST.
16	(10) CHARACTER	160		ROOM FOR 20 MORE ENTRIES

CROSS-REFERENCE

DDNTDDNM	8	(8)
DDNTIDNT	0	(0)
DDNTLINK	4	(4)
DDNTUSCT	2	(2)
IHJDDNT	0	(0)

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DSDR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION	
0	(0)	STRUCTURE	200	IHJDSDR	DATA SET DESCRIPTOR RECORD
0	(0)	UNSIGNED	2	DSDRIDNT	ID OF DSDR RECORD
2	(2)	CHARACTER	193	DSDRDMMY	
2	(2)	CHARACTER	176	DSDRJFCB	JFCB
2	(2)	CHARACTER	176	DSDRJFCE	JFCB EXTENSION
2	(2)	CHARACTER	176	DSDRGDGT	GDG NAME TABLE
2	(2)	CHARACTER	176	DSDRSIOT	SIOT
178	(B2)	CHARACTER	8	DSDRDDNM	DD NAME OF DATA SET
186	(BA)	CHARACTER	4	DSDRUCBT	UCBTYP FIELD FROM UCB
190	(BE)	CHARACTER	1	DSDRSCTD	SCTDISP FIELD FROM SIOT
191	(BF)	CHARACTER	1	DSDRSCTB	SCTBYT3 FIELD FROM SIOT
192	(C0)	CHARACTER	1	DSDRSIOA	SIOTALTD FIELD FROM SIOT
193	(C1)	BITSTRING	1	DSDRSIOF	BITS FROM VARIOUS CONTROL BLOCKS
		1... ..		DSDRDALC	FROM DSABFLG1, DSABDALC
		.1.. ..		DSDRCCAT	DATA SET IS CONCATINATED
		..1.		DSDROCKP	FROM SIOTBYT1, SIOTOCKP
		...1 1111			RESERVED
194	(C2)	CHARACTER	1	DSDRDEBV	DEBVLSEQ FIELD FROM DEB
195	(C3)	CHARACTER	5		FILLER FOR BOUNDRY ALIGNMENT
200	(C8)	CHARACTER	0		END OF IHJDSDR

CROSS-REFERENCE

DSDRCCAT	193	X'40'
DSDRDALC	193	X'80'
DSDRDDNM	178	(B2)
DSDRDEBV	194	(C2)
DSDRDMMY	2	(2)
DSDRGDGT	2	(2)
DSDRIDNT	0	(0)
DSDRJFCB	2	(2)
DSDRJFCE	2	(2)
DSDROCKP	193	X'20'
DSDRSCTB	191	(BF)
DSDRSCTD	190	(BE)
DSDRSIOA	192	(C0)
DSDRSIOF	193	(C1)
DSDRSIOT	2	(2)
DSDRUCBT	186	(BA)
IHJDSDR	0	(0)

DSTAB

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	16	IHJDSTAB	DATA SET TABLE FOR RESTART
0	(0) CHARACTER	4	TABIDENT	EBCDIC ID CONTAINS "DSTB"
4	(4) SIGNED	4	TABCOUNT	NUMBER OF ENTRIES IN THIS TABLE
8	(8) SIGNED	4	TABENTLN	LENGTH OF EACH ENTRY
12	(C) A-ADDRESS	4	TABADIST	ADDRESS OF FIRST ENTRY
16	(10) CHARACTER	0	TABDSENT	ONE ENTRY FOR EACH DATA SET

CROSS-REFERENCE

IHJDSTAB	0	(0)
TABADIST	12	(C)
TABCOUNT	4	(4)
TABDSENT	16	(10)
TABENTLN	8	(8)
TABIDENT	0	(0)

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ENDR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	20	IHJENDR	END OF CHECKPOINT RCD
0	(0) CHARACTER	4	ENDRHEDR	RECORD HEADER
0	(0) UNSIGNED	2	ENDRIDNT	ID OF RECORD
2	(2) UNSIGNED	2	ENDRSV01	RESERVED
4	(4) CHARACTER	16	ENDRCKID	CHECKPOINT ID

CROSS-REFERENCE

ENDRCKID	4 (4)
ENDRHEDR	0 (0)
ENDRIDNT	0 (0)
ENDRSV01	2 (2)
IHJENDR	0 (0)

ESTA

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	17	IHJESTA	
0	(0) SIGNED	4	ESTPARML	LENGTH OF THIS PARAMETER LIST
4	(4) A-ADDRESS	4	ESTFLGPT	POINTER TO CURRENT PROCESS INDICATOR
8	(8) A-ADDRESS	4	ESTNAMPT	POINTER TO NAME OF MODULE CURRENTLY IN CONTROL
12	(C) A-ADDRESS	4	ESTWAPTR	POINTER TO THE CHECKPOINT OR RESTART WORK AREA
16	(10) UNSIGNED	1	ESTRTYFG	STATUS FLAGS AT TIME OF ABEND

CROSS-REFERENCE

ESTFLGPT	4	(4)
ESTNAMPT	8	(8)
ESTPARML	0	(0)
ESTRTYFG	16	(10)
ESTWAPTR	12	(C)
IHJESTA	0	(0)

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GLUP

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	32	IHJGLUP	PARAMETER LIST FOR IHJGLU00
0	(0) UNSIGNED	2	GLURQCDE	REQUEST CODE
2	(2) UNSIGNED	2	GLULEN	LENGTH OF READ OR WRITE
4	(4) A-ADDRESS	4		ADDRESS OF DECB
4	(4) UNSIGNED	1	GLUDECBH	MUST BE ZERO, ERROR IF NOT
5	(5) A-ADDRESS	3	GLUDECBA	ADDRESS OF DECB
8	(8) A-ADDRESS	4		ADDRESS OF DCB
8	(8) UNSIGNED	1	GLUDCBH	MUST BE ZERO, ERROR IF NOT
9	(9) A-ADDRESS	3	GLUDCBAD	ADDRESS OF DCB
12	(C) A-ADDRESS	4		ADDRESS OF AREA TO BE WRITTEN FROM OR READ INTO
12	(C) UNSIGNED	1	GLUAREAH	MUST BE ZERO, ERROR IF NOT
13	(D) A-ADDRESS	3	GLUAREAD	ADDRESS OF AREA
16	(10) A-ADDRESS	4	GLUBLKPT	ADDRESS OF VALUE FOR POINT
20	(14) A-ADDRESS	4	GLUWAADR	ADDRESS OF GLU WORK AREA (FOR USE BY IHJGLU00 ONLY)
24	(18) SIGNED	4	GLUWALEN	LENGTH OF GLU WORK AREA (FOR USE BY IHJGLU00 ONLY)
28	(1C) A-ADDRESS	4	GLUMODEN	END ADDRESS OF IHJGLU00 (FOR USE BY IHJGLU00 ONLY)

CROSS-REFERENCE

GLUAREAD	13	(D)
GLUAREAH	12	(C)
GLUBLKPT	16	(10)
GLUDCBAD	9	(9)
GLUDCBH	8	(8)
GLUDECBA	5	(5)
GLUDECBH	4	(4)
GLULEN	2	(2)
GLUMODEN	28	(1C)
GLURQCDE	0	(0)
GLUWAADR	20	(14)
GLUWALEN	24	(18)
IHJGLUP	0	(0)

NTBL

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	4096	IHJNTBL	BLOCK LOCATE ID RECORD
0	(0) CHARACTER	20	NOTTBHDR	RECORD HEADER
0	(0) UNSIGNED	2	NOTECD	RECORD ID
2	(2) UNSIGNED	2	NOTELENH	RECORD LENGTH
4	(4) SIGNED	8	NOTERSV1	OVERLAYED BY SUR HEADER
12	(C) UNSIGNED	2	NOTECNT	NUMBER OF ENTRIES
14	(E) UNSIGNED	2	NOTERSV2	RESERVED
16	(10) A-ADDRESS	4	NOTECHNP	CHAIN POINTER TO NEXT TBL
20	(14) CHARACTER	0	NOTENTYS	TABLE ENTRIES
20	(14) CHARACTER	8	NOTENTRY	A TABLE ENTRY
20	(14) A-ADDRESS	4	NOTDCBAD	DCB ADDRESS FOR THIS ENTRY
24	(18) UNSIGNED	4	NOTBLKID	BLOCK LOCATE ID

CROSS-REFERENCE

IHJNTBL	0 (0)
NOTBLKID	24 (18)
NOTDCBAD	20 (14)
NOTECHNP	16 (10)
NOTECNT	12 (C)
NOTECD	0 (0)
NOTELENH	2 (2)
NOTENTRY	20 (14)
NOTENTYS	20 (14)
NOTERSV1	4 (4)
NOTERSV2	14 (E)
NOTTBHDR	0 (0)

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PMSG

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	84	IHJMSP	CALL PARAMETER LIST DESCRIPTION FOR CALLS TO IHJCM00
0	(0) UNSIGNED	1	PMSGNUMB	MESSAGE NUMBER
1	(1) UNSIGNED	1	PMSGFCNT	NUMBER OF FILL FIELDS SUPPLIED
2	(2) UNSIGNED	2	PMSGRV01	RESERVED
4	(4) CHARACTER	80	PMSGENT	FILL FIELD ENTRY
4	(4) BITSTRING	1	PMSGFFLG	FLAG BYTES
	1... ..		PMSGFFOM	THIS FILL IS OMMITTED
	.1.. ..		PMSGFFEB	THIS FILL IS EBCDIC
	..1.		PMSGFFHX	THIS FILL IS AN ADDRESS OR HEX DATA
	...1		PMSGFFDE	THIS FILL IS HEX TO BE PRINTED AS DECIMAL
	.... 111.		PMSGFFLS	RESERVED
	.... ..1			THIS IS THE LAST FILL FIELD
5	(5) BITSTRING	2		RESERVED
7	(7) UNSIGNED	1	PMSGFLEN	LENGTH OF THIS FILL FIELD
8	(8) A-ADDRESS	4	PMSGFPTR	ADDRESS OF FILL FIELD

CROSS-REFERENCE

IHJMSP	0	(0)
PMSGENT	4	(4)
PMSGFCNT	1	(1)
PMSGFFDE	4	X'10'
PMSGFFEB	4	X'40'
PMSGFFHX	4	X'20'
PMSGFFLG	4	(4)
PMSGFFLS	4	X'01'
PMSGFFOM	4	X'80'
PMSGFLEN	7	(7)
PMSGFPTR	8	(8)
PMSGNUMB	0	(0)
PMSGRV01	2	(2)

PPIR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	4096	IHJPPIR	PROBLEM PROGRAM STORAGE IMAGE RECORD
0	(0) CHARACTER	20	PPIRHEDR	RECORD HEADER
0	(0) UNSIGNED	2	PPIRIDNT	RECORD ID
2	(2) UNSIGNED	2	PPIRLNTH	LENGTH OF RECORD
4	(4) A-ADDRESS	4	PPIRADDR	STORAGE IMAGE ADDRESS AT CHECKPOINT
8	(8) CHARACTER	1	PPIRSUBP	SUBPOOL OF STORAGE AT CHKPT TIME
9	(9) BITSTRING	1	PPIRKEYM	KEY OF STORAGE AT CHECKPOINT TIME
	1111		PPIRKEY	KEY OF STORAGE
	.... 1...		PPIRANYR	GETMAINED LOC(,ANY)
	.... .111		PPIRSV03	RESERVED
10	(A) CHARACTER	1	PPIRSV01	RESERVED
11	(B) CHARACTER	1	PPIRSV02	RESERVED
12	(C) A-ADDRESS	4	PPIRBLKA	BLOCK ALLOCATION ADDRESS
16	(10) A-ADDRESS	4	PPIRBLKE	BLOCK ALLOCATION END ADDRESS
20	(14) CHARACTER	4076	PPIRIMAG	STORAGE IMAGE AT CHECKPOINT TIME

CROSS-REFERENCE

IHJPPIR	0 (0)
PPIRADDR	4 (4)
PPIRANYR	9 X'08'
PPIRBLKA	12 (C)
PPIRBLKE	16 (10)
PPIRHEDR	0 (0)
PPIRIDNT	0 (0)
PPIRIMAG	20 (14)
PPIRKEY	9 X'F0'
PPIRKEYM	9 (9)
PPIRLNTH	2 (2)
PPIRSUBP	8 (8)
PPIRSV01	10 (A)
PPIRSV02	11 (B)
PPIRSV03	9 X'07'

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PROTDCB

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0)	STRUCTURE	32 PROTDCB	DDN TABLE
0	(0)	CHARACTER	24 PDCBHDR	CHRS 'CHECKPOINT PROTECTED DCB'
24	(18)	UNSIGNED	1 PDCBSBPL	SUBPOOL OF THIS AREA
25	(19)	UNSIGNED	3 PDCBLNTH	LENGTH OF THIS AREA
28	(1C)	A-ADDRESS 1... ..	4 PUDCBPTR PCHKPDCB	POINTER TO USER'S DCB CHECKPOINT'S DCB. ONLY CHECKPOINT SHOULD TURN ON THIS BIT.
29	(1D)	.111 1111 1111 1111		
30	(1E)	1111 1111		
31	(1F)	1111 1111		ADDRESS OF USER'S DCB
32	(20)	CHARACTER	0 PCKPTDCB	CHECKPOINT'S DCB

CROSS-REFERENCE

PCHKPDCB	28 X'80'
PCKPTDCB	32 (20)
PDCBHDR	0 (0)
PDCBLNTH	25 (19)
PDCBSBPL	24 (18)
PROTDCB	0 (0)
PUDCBPTR	28 (1C)

RSDSECT

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	528	RSDSECT	RESTART REPOSITIONING TABLE
0	(0) CHARACTER	48	RSDEB	DUMMY DEB
0	(0) A-ADDRESS	4	RSDEBTCB	TCB POINTER
4	(4) A-ADDRESS	4	RSDEBDEB	NEXT DEB ADDRESS
=====				
DUMMY DCB STARTS HERE				
8	(8) A-ADDRESS	4	RSDEBIRB	IRB ADDRESS
8	(8) BITSTRING	1	RSDEBOFL	
	1111 111.			
	.....1		RSDEBRER	REDUCED ERROR RECOVERY
9	(9) A-ADDRESS	3		
12	(C) A-ADDRESS	4	RSDEBSYS	1ST IOB ADDR IN SYS PURGE CHAIN
16	(10) A-ADDRESS	4	RSDEBUSR	1ST IOB ADDR IN USER PURGE CHAIN
20	(14) A-ADDRESS	4	RSDEBECB	PARAM LIST ADDR TO PURG ECB
24	(18) A-ADDRESS	4	RSDEBDCB	
24	(18) UNSIGNED	1	RSDEBID	DEB ID
25	(19) A-ADDRESS	3		DCB ADDRESS
28	(1C) A-ADDRESS	4	RSDEBAPP	I/O APPENDAGE VECTOR TABLE
32	(20) A-ADDRESS	4	RSDEBUCB	
32	(20) UNSIGNED	1	RSDEBMOD	
33	(21) A-ADDRESS	3		UCB ADDRESS
36	(24) UNSIGNED	2	RSDEBBIN	BIN NUMBER
38	(26) UNSIGNED	2	RSDEBSCC	CYLINDER START ADDRESS
40	(28) UNSIGNED	2	RSDEBSHH	TRACK START ADDRESS
42	(2A) UNSIGNED	2	RSDEBECC	CYLINDER END ADDRESS
44	(2C) UNSIGNED	2	RSDEBEHH	TRACK END ADDRESS
46	(2E) UNSIGNED	2	RSDEBHTR	NUMBER OF TRACKS IN THIS EXTENT
48	(30) A-ADDRESS	4	RSECBAD	ECB ADDRESS
52	(34) A-ADDRESS	4	RSDCBDEB	DEB ADDRESS
56	(38) CHARACTER	64	RSIOB	DUMMY IOB
56	(38) BITSTRING	1	RSIOBFG1	I/O FLAGS BYTE 1
57	(39) BITSTRING	1	RSIOBFG2	I/O FLAGS BYTE 2
58	(3A) BITSTRING	1	RSIOBSH1	FIRST SENSE BYTE
59	(3B) BITSTRING	1	RSIOBSH2	SECOND SENSE BYTE
60	(3C) A-ADDRESS	4	RSIOBECB	ECB ADDRESS

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OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
64	(40) CHARACTER	8	RSIOBCSW	LAST CSW
64	(40) A-ADDRESS	4		NEXT CCW
68	(44) BITSTRING	2		CU AND CHANNEL STATUS FLAGS
70	(46) UNSIGNED	2		RESIDULE COUNT
72	(48) A-ADDRESS	4	RSIOBCPA	ADDRESS OF FIRST CCW
76	(4C) A-ADDRESS	4	RSIOBCB	ADDRESS OF DCB
80	(50) A-ADDRESS	4	RSIOBRCP	RESTART ADDRESS FOR IOS
84	(54) UNSIGNED	2	RSIOBINC	INCREMENT BLOCK COUNT
86	(56) UNSIGNED	2	RSIOBECT	NUMBER OF ERROR ENTRIES
88	(58) CHARACTER	8	RSIOBDAD	SEEK ADDRESS FOR DA
96	(60) CHARACTER	24	RSCCWLST	CHANNEL PROGRAM
96	(60) CHARACTER	8	RSCCW1	CCW1
104	(68) CHARACTER	8	RSCCW2	CCW2
112	(70) CHARACTER	8	RSCCW3	CCW3
120	(78) CHARACTER	176	RSBUFSEG	SPACE FOR A JFCB
120	(78) CHARACTER	176	RSJFCB	
296	(128) CHARACTER	176	RSBUFSG2	SPACE FOR A JFCBX
296	(128) CHARACTER	176	RSJFCBX	
472	(1D8) CHARACTER	8	RSSTATUS	STATUS BYTES
472	(1D8) UNSIGNED	1	RSSTAT1	STATUS BYTE 1
473	(1D9) UNSIGNED	1	RSSTAT2	STATUS BYTE 2
474	(1DA) UNSIGNED	1	RSSTAT3	STATUS BYTE 3
475	(1DB) UNSIGNED	1	RSSTAT4	STATUS BYTE 4
476	(1DC) CHARACTER	4		
480	(1E0) CHARACTER	48	RSCCWLSA	ALTERNATE CCW LIST
480	(1E0) CHARACTER	8	RSCCWA1	CCW1
488	(1E8) CHARACTER	8	RSCCWA2	CCW2
496	(1F0) CHARACTER	8	RSCCWA3	CCW3
504	(1F8) CHARACTER	8	RSCCWA4	CCW4
512	(200) CHARACTER	8	RSCCWA5	CCW5
520	(208) CHARACTER	8	RSCCWA6	CCW6
528	(210) CHARACTER	0		

CROSS-REFERENCE

RSBUFSEG	120 (78)
RSBUFSG2	296(128)
RSCCWA1	480(1E0)
RSCCWA2	488(1E8)
RSCCWA3	496(1F0)
RSCCWA4	504(1F8)
RSCCWA5	512(200)
RSCCWA6	520(208)
RSCCWLSA	480(1E0)
RSCCW1	96 (60)
RSCCW2	104 (68)
RSCCW3	112 (70)
RSDCBDEB	52 (34)
RSDEB	0 (0)
RSDEBAPP	28 (1C)
RSDEBBIN	36 (24)
RSDEBDCB	24 (18)
RSDEBDEB	4 (4)
RSDEBECB	20 (14)
RSDEBECC	42 (2A)
RSDEBEHH	44 (2C)
RSDEBID	24 (18)
RSDEBIRB	8 (8)
RSDEBMOD	32 (20)
RSDEBNTR	46 (2E)
RSDEBOFL	8 (8)
RSDEBRER	8 X'01'
RSDEBSCC	38 (26)
RSDEBSHH	40 (28)
RSDEBSYS	12 (C)
RSDEBTCB	0 (0)
RSDEBUCB	32 (20)
RSDEBUSR	16 (10)
RSDSECT	0 (0)
RSECBAD	48 (30)
RSIOB	56 (38)
RSIOBCPA	72 (48)
RSIOBCSW	64 (40)
RSIOBDAD	88 (58)
RSIOBDCB	76 (4C)
RSIOBECB	60 (3C)
RSIOBECT	86 (56)
RSIOBFG1	56 (38)
RSIOBFG2	57 (39)
RSIOBINC	84 (54)
RSIOBRCP	80 (50)
RSIOBSH1	58 (3A)
RSIOBSN2	59 (3B)
RSJFCB	120 (78)
RSJFCBX	296(128)
RSSTATUS	472(1D8)
RSSTAT1	472(1D8)
RSSTAT2	473(1D9)
RSSTAT3	474(1DA)
RSSTAT4	475(1DB)

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RSTWA

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	888	IHJRSTWA	
0	(0) CHARACTER	4	RSWAID	CONTAINS THE CHARACTERS 'RSWA'
4	(4) SIGNED	4	RSMWPTR	POINTER TO INDEPENDENT WORK AREA
8	(8) SIGNED	4	RSBUFPTR	POINTER TO RESTART'S I/O BUFFER
12	(C) SIGNED	4	RSRBFPTR	REAL ADDRESS FO RESTART'S I/O BUFFER
16	(10) SIGNED	4	RSDSTPTR	POINTER TO SPACE FOR DSTAB TABLE
20	(14) SIGNED	4	RSDSTLEN	LENGTH OF SPACE FOR DSTAB TABLE
24	(18) A-ADDRESS	4	RSCKDCB	PTR TO OLD CHKPT DCB, FIELD IS FILLED IN BY REPMAN
28	(1C) A-ADDRESS	4	RSCKDCBU	PTR TO USER'S CHKPT DCB
32	(20) A-ADDRESS	4	RSCKDCBP	POINTER TO A CHKPT DCB BUILT IF DDH WAS EVER USED IF ON A CHKPT CALL
36	(24) A-ADDRESS	4	RSQMADR	ADDRESS OF PARAMETER LIST AND WORK AREA FOR IEFQMREQ SUPERVISOR SERVICE ROUTINE
40	(28) SIGNED	4	RSQMLEN	LENGTH OF Q MGR AREAS
44	(2C) UNSIGNED	1	RSWASUBP	SUBPOOL OF RESTARTS WORK AREA
45	(2D) CHARACTER	3	RSRSV001	RESERVED
48	(30) SIGNED	4	RSWACL	LENGTH OF RSTWA
52	(34) SIGNED	4	RSBUFL	LENGTH OF RESTART'S BUFFER
56	(38) SIGNED	4	RSINT	DATA MANAGEMENT INTERFACE BYTE
60	(3C) A-ADDRESS	4	RSPPM	LOW ORDER ADDRESS OF PROBLEM PROGRAM STORAGE
64	(40) A-ADDRESS	4	RSPPE	SIZE OF PROGRAM PROGRAM STORAGE
68	(44) A-ADDRESS	4	RSPFML	LOW ORDER ADDR OF SECONDARY PP STORAGE
72	(48) A-ADDRESS	4	RSPPEL	SIZE OF SECONDARY PROBLEM PROGRAM STORAGE
76	(4C) SIGNED	4	RSTIOTO	LENGTH OF OLD TIOT
80	(50) A-ADDRESS	4	RSTIOTAD	POINTER TO OLD P/P TIOT FILLED IN BY REPMAN
84	(54) A-ADDRESS	4	RSJFCBAD	ADDRESS OF JFCB READIN AREA
88	(58) A-ADDRESS	4	RSSCTADR	ADDRESS OF SCT READIN AREA

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
92	(5C) A-ADDRESS	4	RSOPCLST	OPEN/CLOSE PARM LIST WORD
96	(60) A-ADDRESS	4	RSBFSTAD	BUFFER POINTERS
100	(64) A-ADDRESS	4	RSBFLWA	
104	(68) A-ADDRESS	4	RSUCBERR	ADDRESS OF UCB OF TAPE DEVICE WITH AN ERROR DURING RESTART
108	(6C) A-ADDRESS	4	RSDOMNM1	MESSAGE NUMBER FROM WTOR/DOM
112	(70) A-ADDRESS	4	RSRBADR	ADDRESS OF RESTORED RB CHAIN
116	(74) A-ADDRESS	4	RSLLEADR	ADDRESS OF RESTORED LLE CHAIN
120	(78) A-ADDRESS	4	RSCDEADR	ADDRESS OF RESTORED CDE CHAIN
124	(7C) A-ADDRESS	4	RSDEBADR	ADDRESS OF RESTORED DEB CHAIN
128	(80) A-ADDRESS	4	RSFOEADR	ADDRESS OF RESTORED FOE CHAIN
132	(84) A-ADDRESS	4	RSTCBSAV	ADDRESS OF CHECKPOINTED TCB
136	(88) A-ADDRESS	4	RSIOBREL	POINTER TO RELOCATE AREA OF RESTART DCB'S IOBS, ICES, ICQES, CPS, ETC.
140	(8C) A-ADDRESS	4	RSSEGADR	ADDRESS OF SEGMENTED TABLE USED BY THE DATA SET REPOSITIONING MODULES.
144	(90) SIGNED	4	RSSEGLN	LENGTH OF SEGMENTED TABLE
148	(94) BITSTRING 1... .. .1.. .. ..1. .... ...1 1... 1.. ..... ..1	1	RSFLAG1 RSAUTORS RSTRKOV RSTAPE RSAUTHUS RSVEQR RSUPDDNM RSOPEN	RESTART HOUSEKEEPING FLAGS AUTORESTART IN PROGRESS TRACK OVERFLOW WAS SPECIFIED RESTART DATA SET IS ON TAPE AUTHORIZED USER TASK IS VIRTUAL-REAL USER PASSED DD NAME CHECKPOINT OPENED THE CHECKPOINT DATA SET (USER PASSED A CLOSED DCB)
149	(95) BITSTRING 1 1... .. .1.. .. ..11 1...	1	RSBPAM RSFLAG2 RSVSAM RSENVXM RSRSV005 RSENVPK	CHECKPOINT DATA SET WAS BPAM FLAG BYTE 2 VSAM INDICATOR CROSS MEMORY SUPPORT RESERVED 31 BIT ADDRESSING AT CHECKPOINT TIME
150	(96) BITSTRING 111 1... .. .1..1.1 1... 1..11	1	RSRSV007 RSFLAG3 RSTCAM RSNULLDS RSNONDA RSDASDDS RSNSLRTN RSDOSTAP	RESERVED FLAG BYTE 3 TYPES OF DATA SETS IN DS TABLE THERE IS A TCAM DATA SET IN THE DATA SET TABLE (IHJDSTAB) THERE IS A DUMMY DS IN THE DS TABLE THERE IS A NON-DASD DS IN THE DS TABLE THERE IS A DASD DS IN THE DS TABLE NON-STANDARD LABEL ROUTINE (NSLRHDRI) HAS BEEN CALLED VIA XCTL A DCB IS OPEN TO A DOS TAPE RESERVED

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OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
151	(97) BITSTRING	1	RSFLAG4	FLAG BYTE 4 FOR INDEPENDENT USE BY MODULES
151	(97) BITSTRING	1	RSINTUSE	
	1... ..		RSINTUS1	
	.1... ..		RSINTUS2	
	..1... ..		RSINTUS3	
	...1... ..		RSINTUS4	
	.... 1... ..		RSINTUS5	
	.... .1... ..		RSINTUS6	
	.... ..1... ..		RSINTUS7	
	.... ....1		RSINTUS8	
152	(98) UNSIGNED	4	RSDCBSI	SAVE AREA FOR USER BLKSIZE
156	(9C) UNSIGNED	1	RSRETC1	FIRST BYTE RESTART R.C.
157	(9D) UNSIGNED	1	RSRETC2	SECOND BYTE RESTART R.C.
158	(9E) UNSIGNED	1	RSRETC3	THIRD BYTE RESTART R.C.
159	(9F) UNSIGNED	1	RSRETC4	FOURTH BYTE RESTART R.C.
160	(A0) UNSIGNED	1	RSMGCD1	FIRST BYTE RESTART R. C.
161	(A1) UNSIGNED	1	RSMGCD2	SECOND BYTE RESTART R.C.
162	(A2) UNSIGNED	1	RSMGCD3	THIRD BYTE RESTART R.C.
163	(A3) UNSIGNED	1	RSMGCD4	FOURTH BYTE RESTART R.C.
164	(A4) A-ADDRESS	4	RSNSTAE	ANCHOR FOR USER SCB CHAIN
168	(A8) A-ADDRESS	4	RSPIE	ANCHOR FOR USER PIE CHAIN
172	(AC) A-ADDRESS	4	RSSSCR	ADDR OF 1ST SSCR FOR VSAM/ ADDR OF QMGR WORKAREA FOR TAPE POSITIONING
176	(B0) A-ADDRESS	4	RSGLUPT	ADDRESS OF GLU PARAMETER LIST
180	(B4) A-ADDRESS	4	RSGLUADR	ADDRESS OF IHJGLU00
184	(B8) A-ADDRESS	4	RSDCBADR	POINTER TO CHKPT DS DCB FOR RESTART
188	(BC) A-ADDRESS	4	RSRSV002	RESERVED WAS RSDCBLEN
192	(C0) A-ADDRESS	4	RSDECBAD	ADDRESS OF FIRST DECB
196	(C4) A-ADDRESS	4	RSEXTLST	OPEN EXIT LIST
200	(C8) A-ADDRESS	4	RSCKDCBS	ADDRESS OF UNUSED CHECKPOINT DCB
204	(CC) A-ADDRESS	4	RSNOTPTR	ADDRESS OF BLOCK LOCATE TABLE
208	(D0) CHARACTER	8	RSERMODN	SAVE AREA FOR ERROR MODULE NAME
216	(D8) SIGNED	72	RSREGSAV	REGISTER SAVE AREA
288	(120) SIGNED	72	RSREGSV2	REGISTER SAVE AREA
360	(168) SIGNED	4	RSTIOTL	LENGTH OF TIOT SAVE AREA
364	(16C) A-ADDRESS	4	RSTIOTPT	POINTER TO TIOT SAVE AREA
368	(170) A-ADDRESS	4	RSCLNUP	ADDRESS OF MODULE TO GO TO FOR CLEANUP
372	(174) CHARACTER	80	RSSTRDTA	

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
372 (174)	A-ADDRESS	4	RSSTRADR	ADDRESS OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE. THESE AREAS ARE CONTROLLED BY AND MUST BE RELEASED BY THE MODULE ACQUIRING THEM. THE ADDRESS FIELD MUST BE ZEROED JUST PRIOR TO RELEASING THE AREA IT POINTS TO. THE LAST ENTRY IN THIS TABLE POINTS TO AN EXTENSION OF THIS TABLE.
376 (178)	SIGNED	4		
376 (178)	UNSIGNED	1	RSSTRSPL	SUBPOOL OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE.
377 (179)	UNSIGNED	3	RSSTRLEN	SUBPOOL OF STORAGE ACQUIRED BY A MODULE FOR ITS OWN USE.
452 (1C4)	SIGNED	4	RSSTRCNT	NUMBER OF ENTRIES IN TABLE EXTENSION
456 (1C8)	CHARACTER	32	RSGLUPRM	
488 (1E8)	CHARACTER	17	RSESTA	
505 (1F9)	CHARACTER	1	RSESTFLG	
506 (1FA)	CHARACTER	2		FILLER
508 (1FC)	UNSIGNED	4	RSPFITTR	TTR OF FIRST PPIR RECORD
512 (200)	CHARACTER	80	RSCHRCPY	COPY OF CHR RECORD
592 (250)	CHARACTER	16	RSCHEKID	CHECKPOINT ID BEING RESTORED
608 (260)	CHARACTER	8	RSDDNAME	DD NAME OF RESTART DATA SET
616 (268)	CHARACTER	32	RSESTLST	PARAMETER LIST AREA FOR ESTAE
648 (288)	CHARACTER	96	RSCPYDCB	COPIED USER CHECKPOINT DCB
744 (2E8)	CHARACTER	64	RSSVERRG	SAVE AREA FOR ERROR REGS
744 (2E8)	A-ADDRESS	64	RSSVERRA	
808 (328)	A-ADDRESS	4	RSERDDNT	POINTER TO TIOT FOR ERROR DD NAME
812 (32C)	A-ADDRESS	4	RSERDDNP	POINTER TO TIOT ENTRY FOR ERROR DDN
816 (330)	SIGNED	72	RSREGSV3	REGISTER SAVE AREA
888 (378)	CHARACTER	0		END OF COMMON WORK AREA

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CROSS-REFERENCE

IHJRSTWA	0 (0)	RSNSTAE	164 (A4)
RSAUTHUS	148 X'10'	RSNULLDS	150 X'40'
RSAUTORS	148 X'80'	RSOPCLST	92 (5C)
RSBFLWA	100 (64)	RSOPEN	148 X'02'
RSBFSTAD	96 (60)	RSPIE	168 (A8)
RSBPAM	148 X'01'	RSPPE	64 (40)
RSBUFL	52 (34)	RSPPEL	72 (48)
RSBUFPTR	8 (8)	RSPPITTR	508(1FC)
RSCDEADR	120 (78)	RSPPM	60 (3C)
RSCHEKID	592(250)	RSPPML	68 (44)
RSCHRCPY	512(200)	RSQMNADR	36 (24)
RSCKDCB	24 (18)	RSQMNLEN	40 (28)
RSCKDCBP	32 (20)	RSRBADR	112 (70)
RSCKDCBS	200 (C8)	RSRBFPTR	12 (C)
RSCKDCBU	28 (1C)	RSREGSAV	216 (D8)
RSCLNUP	368(170)	RSREGSV2	288(120)
RSCPYDCB	648(288)	RSREGSV3	816(330)
RSDASDDS	150 X'10'	RSRETC1	156 (9C)
RSDCBADR	184 (B8)	RSRETC2	157 (9D)
RSDCBSI	152 (98)	RSRETC3	158 (9E)
RSDDNAME	608(260)	RSRETC4	159 (9F)
RSDEBADR	124 (7C)	RSRSV001	45 (2D)
RSDECBAD	192 (C0)	RSRSV002	188 (BC)
RSDOMNM1	108 (6C)	RSRSV005	149 X'30'
RSDOSTAP	150 X'04'	RSRSV007	149 X'07'
RSDSTLEN	20 (14)	RSSCTADR	88 (58)
RSDSTPTR	16 (10)	RSSEGADR	140 (8C)
RSENVPK	149 X'08'	RSSEGLN	144 (90)
RSENVXM	149 X'40'	RSSSCR	172 (AC)
RSERDDNP	812(32C)	RSSTRADR	372(174)
RSERDDNT	808(328)	RSSTRCNT	452(1C4)
RSERMODN	208 (D0)	RSSTRDTA	372(174)
RSESTA	488(1E8)	RSSTRLEN	377(179)
RSESTFLG	505(1F9)	RSSTRSPL	376(178)
RSESTLST	616(268)	RSSVERRA	744(2E8)
RSEXTLST	196 (C4)	RSSVERRG	744(2E8)
RSFLAG1	148 (94)	RSTAPE	148 X'20'
RSFLAG2	149 (95)	RSTCAM	150 X'80'
RSFLAG3	150 (96)	RSTCBAV	132 (84)
RSFLAG4	151 (97)	RSTIOTAD	80 (50)
RSFOEADR	128 (80)	RSTIOTL	360(168)
RSGLUADR	180 (B4)	RSTIOTO	76 (4C)
RSGLUPRM	456(1C8)	RSTIOTPT	364(16C)
RSGLUPTR	176 (B0)	RSTRKOV	148 X'40'
RSINT	56 (38)	RSUCBERR	104 (68)
RSINTUSE	151 (97)	RSUPDDNM	148 X'04'
RSINTUS1	151 X'80'	RSVEQR	148 X'08'
RSINTUS2	151 X'40'	RVSAM	149 X'80'
RSINTUS3	151 X'20'	RSWACL	48 (30)
RSINTUS4	151 X'10'	RSWAID	0 (0)
RSINTUS5	151 X'08'	RSWASUBP	44 (2C)
RSINTUS6	151 X'04'		
RSINTUS7	151 X'02'		
RSINTUS8	151 X'01'		
RSIOBREL	136 (88)		
RSJFCBAD	84 (54)		
RSLLLEADR	116 (74)		
RSMGCD1	160 (A0)		
RSMGCD2	161 (A1)		
RSMGCD3	162 (A2)		
RSMGCD4	163 (A3)		
RSMWPTR	4 (4)		
RSNONDA	150 X'20'		
RSNOTPTR	204 (CC)		
RSNSLRTN	150 X'08'		

SAVE

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	72	IHJSAVER	
0	(0) SIGNED	4		
4	(4) A-ADDRESS	4	SAVBPTR	
8	(8) A-ADDRESS	4	SAVFPTR	
12	(C) CHARACTER	60	SVR14R12	
12	(C) A-ADDRESS	4	SAVR14	
16	(10) A-ADDRESS	4	SAVR15	
20	(14) A-ADDRESS	4	SAVR00	
24	(18) A-ADDRESS	4	SAVR01	
28	(1C) CHARACTER	44	SAVR2R12	
28	(1C) A-ADDRESS	4	SAVR02	
32	(20) A-ADDRESS	4	SAVR03	
36	(24) A-ADDRESS	4	SAVR04	
40	(28) A-ADDRESS	4	SAVR05	
44	(2C) A-ADDRESS	4	SAVR06	
48	(30) A-ADDRESS	4	SAVR07	
52	(34) A-ADDRESS	4	SAVR08	
56	(38) A-ADDRESS	4	SAVR09	
60	(3C) A-ADDRESS	4	SAVR10	
64	(40) A-ADDRESS	4	SAVR11	
68	(44) A-ADDRESS	4	SAVR12	

CROSS-REFERENCE

IHJSAVER	0 (0)
SAVBPTR	4 (4)
SAVFPTR	8 (8)
SAVR00	20 (14)
SAVR01	24 (18)
SAVR02	28 (1C)
SAVR03	32 (20)
SAVR04	36 (24)
SAVR05	40 (28)
SAVR06	44 (2C)
SAVR07	48 (30)
SAVR08	52 (34)
SAVR09	56 (38)
SAVR10	60 (3C)
SAVR11	64 (40)
SAVR12	68 (44)
SAVR14	12 (C)
SAVR15	16 (10)
SAVR2R12	28 (1C)
SVR14R12	12 (C)

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SSCR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	4096	SSCR	SUBSYSTEM CHECKPOINT RECORD
0	(0) CHARACTER	16	SSCRHDR	HEADER
0	(0) CHARACTER	1	SSCRID	CHECKPOINT RECORD ID
1	(1) CHARACTER	1	SSCRSSID	SUBSYSTEM ID
2	(2) SIGNED	2	SSCRHDL	SSCR HDR LNTH AND OFFSET TO DATA AREA
4	(4) A-ADDRESS	4	SSCRFCHN	CHAIN PNTR IF OTHER SSCR'S
8	(8) BITSTRING	1	SSCRFLG1	FLAGS
	1... ..		SSCRCKRS	1 = CHECKPOINT TIME 0 = RESTART TIME
	.1... ..		SSCRBKC	1 = HOW MANY SSCR RECORDS ARE NEEDED TO CONTAIN ALL OF THE SPIE DATA TO BE CHECKPOINTED?
9	(9) CHARACTER	1	SSCRRES1	RESERVED
10	(A) SIGNED	2	SSCRDATL	DATA LENGTH
12	(C) A-ADDRESS	4	SSCRDCBA	ASSOCIATED DCB ADDRESS
16	(10) CHARACTER	4080	SSCRDATA	DATA TO END OF SSCR
16	(10) SIGNED	4	SSCRBLKC	NUMBER OF SSCR BLOCKS NEEDED. FILLED IN BY SPIE WHEN SSCRBKC AND SSCRCKRS ARE ON.
20	(14) CHARACTER	4076		NOT AVAILABLE WHEN SSCRBKC IS ON

CROSS-REFERENCE

SSCR	0 (0)
SSCRBKC	8 X'40'
SSCRBLKC	16 (10)
SSCRCKRS	8 X'80'
SSCRDATA	16 (10)
SSCRDATL	10 (A)
SSCRDCBA	12 (C)
SSCRFCHN	4 (4)
SSCRFLG1	8 (8)
SSCRHDR	0 (0)
SSCRHDL	2 (2)
SSCRID	0 (0)
SSCRRES1	9 (9)
SSCRSSID	1 (1)

SUR

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	13	IHJSUR	SUPERVISOR CONTROL BLOCK CHECKPOINT RECORD
0	(0) CHARACTER	12	SURHEDR	RECORD HEADER
0	(0) UNSIGNED	2	SURIDNT	ID OF RECORD
2	(2) UNSIGNED	2	SURLNTH	LENGTH OF THIS RECORD
4	(4) A-ADDRESS	4	SURCBADD	ADDRESS OF CONTROL BLOCK AT CHKPT
8	(8) BITSTRING	1	SURFLAGS	FLAGS
	1... ..		SURFLAST	THIS IS THE LAST OF THIS TYPE OF RECORD
	.1... ..		SURFIRST	THIS IS THE FIRST OF THIS TYPE OF RECORD
	..1.		SURFSPLT	CONTROL BLOCK IS SPLIT BETWEEN RECORDS
	...1 1111		SURFRV01	RESERVED
9	(9) UNSIGNED	1	SURAPLEN	LENGTH OF SUR APPENDAGE PORTION OF THIS RECORD
10	(A) UNSIGNED	2	SURCBLEN	TOTAL LENGTH OF CONTROL BLK
12	(C) CHARACTER	1	SURDATA	CONTROL BLOCK CONTENTS

CROSS-REFERENCE

IHJSUR	0 (0)
SURAPLEN	9 (9)
SURCBADD	4 (4)
SURCBLEN	10 (A)
SURDATA	12 (C)
SURFIRST	8 X'40'
SURFLAGS	8 (8)
SURFLAST	8 X'80'
SURFRV01	8 X'1F'
SURFSPLT	8 X'20'
SURHEDR	0 (0)
SURIDNT	0 (0)
SURLNTH	2 (2)

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TABENTRY

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
0	(0) STRUCTURE	100	TABENTRY	DESCRIPTION FOR EACH ENTRY
0	(0) A-ADDRESS	4	TABDCBAD	ADDRESS OF DCB FOR THIS DATA SET
4	(4) BITSTRING	1	TABDSORG	FLAG BYTE FOR DATA SET ORGANIZATION
	1... ..		TABISAM	ISAM DATA SET
	.1.. ..		TABPS	PHYSICAL SEQUENTIAL DATA SET
	..1.		TABBDAM	BASIC DIRECT DATA SET
	...1 11..		TABRSV01	RESERVED
	.... ..1.		TABPO	PARTITIONED DATA SET
	..... ..1		TABUNDF	UNDEFINED DATA SET
5	(5) BITSTRING	1	TABFLG1	FLAG BYTE 1
	1... ..		TABNULL	NULLFILE OR DUMMY DATA SET
	.1.. ..		TABSYS	SYSIN OR SYSOUT DATA SET
	..1.		TABDA	DIRECT ACCESS DEVICE
	...1		TABTAPE	TAPE DEVICE
	.... 1....		TABLAST	LAST TABLE ENTRY FLAG
	..... ..1.		TABUR	UNIT RECORD OR OTHER TYPE OF DEVICE
	..... ..1		TABTCAM	TCAM DATA SET
6	(6) BITSTRING	1	TABDOSTP	DOS TAPE DATA SET
	1... ..		TABTPLBL	TAPE LABEL FLAG BYTE
	.1.. ..		TABNSLER	ERROR IN NSL ROUTINE
	..1.		TABNSLMT	NSL MOUNT SWITCH
	...1		TABHSLCM	NSL COMMUNICATION BIT
	.... 1....		TABLBYP	BYPASS LABEL PROCESSING BIT
	.... ..1.		TABASCII	ASCII LABEL
	..... ..1.		TABNSL	NONSTANDARD LABEL
	..... ..1		TABSL	STANDARD LABEL
	..... ..1		TABNL	NO LABEL
7	(7) BITSTRING	1	TABFLG2	FLAG BYTE 2
	1... ..		TABG6V	GREATER THAN 6 VOLUMES
	.1.. ..		TABPOCAT	PO DATA SET IS CONCATENATED
	..1.		TABSW	PROCESS CONTROL SWITCH
	...1		TABRSDS	WORKING RESTART DATA SET
	.... 1....		TABCIDS	ISAM/VSAM CI DATA SET
	.... ..1.		TABVIODS	VIO DATA SET
	..... ..1.		TABOSSDS	OLD DATA SET WAS SUBSYSTEM
	..... ..1		TABFSTPS	FIRST PASS SWITCH
8	(8) BITSTRING	1	TABFLG3	FLAG BYTE 3
	1... ..		TABCKCK	CHECKPOINT DATA SET AT CHECKPOINT TIME
	.1.. ..		TABCKRS	CHECKPOINT DATA SET AT RESTART TIME
	..1.		TABBYPSPW	BYPASS PASSWORD CHECKING BECAUSE DATA SET IS RACF AUTHORIZED
	.... 1....		TABRCINP	RACF AUTHORIZED FOR INPUT
	.... ..1.		TABRCOUT	RACF AUTHORIZED FOR OUTPUT
	..... ..1		TABMLTVL	MULTI VOLUME DATA SET.
	..... ..1		TABRSV06	RESERVED
9	(9) UNSIGNED	1	TABNVOLS	TOTAL VOLUME COUNT
10	(A) UNSIGNED	1	TABFSQNO	FILE SEQUENCE NUMBER (USED FOR TAPE ONLY)
11	(B) UNSIGNED	1	TABDSCBE	SAVE AREA FOR DSCB EXTENT COUNT FOR DASD. SAVE AREA FOR LOGICAL FILE SEQUENCE NUMBER FOR TAPE.

OFFSETS	TYPE	LENGTH	NAME	DESCRIPTION
12	(C) UNSIGNED	2	TABOTIOT	OLD TIOT OFFSET
14	(E) UNSIGNED	2	TABNTIOT	NEW TIOT OFFSET
16	(10) A-ADDRESS	4	TABSEGAD	ADDRESS OF ASSIGNED WORK AREA SEGMENT
20	(14) A-ADDRESS	4	TABJFCB	ADDRESS OF THE JFCB ASSOCIATED WITH THIS DATA SET
24	(18) A-ADDRESS	4	TABTIODD	TEMPORARY STORE FOR ADDRESS OF DD NAME IN CHECKPOINTED TIOT
28	(1C) A-ADDRESS	4	TABDEBPT	ADDRESS OF DEB FOR THIS DCB AT RESTART TIME
32	(20) BITSTRING	1	TABOPS	OPERATIONS TO BE PERFORMED
	1... ..		TABOPREW	REWIND TO BE DONE
	.1... ..		TABOPFSF	FSF OPS TO BE DONE
	..1... ..		TABOPBSF	BSF OPS TO BE DONE
	...1... ..		TABOPRDF	READ FORWARD TO BE DONE
	.... 1... ..		TABOPRDB	READ BACK TO BE DONE
	.... .1... ..		TABPSWID	PASSWORD CHECK REQUIRED
	.... ..1... ..		TABBCKPT	BYPASS DOS. CHECKPOINT RECORDS
	.... ....1... ..		TABBYLTM	BYPASS LEADING TAPE MARK
33	(21) UNSIGNED	1	TABFSFN1	NUMBER OF FSF OPS TO BE DONE
34	(22) UNSIGNED	1	TABFSFN2	NUMBER OF FSF OPS ALREADY DONE
35	(23) BITSTRING	1	TABOPATB	OPEN ATTRIBUTES FROM DEB
36	(24) SIGNED	4	TABBLK1	NUMBER OF READ OPS TO BE DONE
40	(28) SIGNED	4	TABBLK2	NO OF READ OPS ALREAD DONE
44	(2C) A-ADDRESS	4	TABUCB	ADDRESS OF UCB
48	(30) CHARACTER	1	TABMSGLB	LABEL VALUE FOR MSGDISP
49	(31) BITSTRING	1	TABCKDSF	CHECKPOINT DS FLAGS FROM DSAB
50	(32) CHARACTER	30	TABVLIDS	VOLUME ID TABLE
50	(32) CHARACTER	6	TABVLID1	VOLUME ID 1
56	(38) CHARACTER	6	TABVLID2	VOLUME ID 2
62	(3E) CHARACTER	6	TABVLID3	VOLUME ID 3
68	(44) CHARACTER	6	TABVLID4	VOLUME ID 4
74	(4A) CHARACTER	6	TABVLID5	VOLUME ID 5
80	(50) CHARACTER	12	TABSTOW	STOW PARAMETER LIST AREA
92	(5C) SIGNED	4	TABDSNOT	BLOCK ID OF HEADER RECORDS IF JFCPOSID IS ON
96	(60) SIGNED	4	TABRPHOT	RECORD'S BLOCK ID FOR REPOSITIONING
100	(64) CHARACTER	0		ALIGN TO FULL WORD BNDRY

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TABASCII	6 X'08'	TABTAPE	5 X'10'
TABBCKPT	32 X'02'	TABTCAM	5 X'02'
TABBDAM	4 X'20'	TABTIODD	24 (18)
TABBLK1	36 (24)	TABTPLBL	6 (6)
TABBLK2	40 (28)	TABUCB	44 (2C)
TABBYLTM	32 X'01'	TABUNDF	4 X'01'
TABBYPSW	8 X'20'	TABUR	5 X'04'
TABCIDS	7 X'08'	TABVIODS	7 X'04'
TABCKCK	8 X'80'	TABVLIDS	50 (32)
TABCKDSF	49 (31)	TABVLID1	50 (32)
TABCKRS	8 X'40'	TABVLID2	56 (38)
TABDA	5 X'20'	TABVLID3	62 (3E)
TABDCBAD	0 (0)	TABVLID4	68 (44)
TABDEBPT	28 (1C)	TABVLID5	74 (4A)
TABDOSTP	5 X'01'		
TABDSCBE	11 (B)		
TABDSNOT	92 (5C)		
TABDSORG	4 (4)		
TABENTRY	0 (0)		
TABFLG1	5 (5)		
TABFLG2	7 (7)		
TABFSFN1	33 (21)		
TABFSFN2	34 (22)		
TABFSQNO	10 (A)		
TABFSTPS	7 X'01'		
TABG6V	7 X'80'		
TABISAM	4 X'80'		
TABJFCB	20 (14)		
TABLAST	5 X'08'		
TABLBBYP	6 X'10'		
TABLFG3	8 (8)		
TABMLTVL	8 X'04'		
TABMSGLB	48 (30)		
TABNL	6 X'01'		
TABNSL	6 X'04'		
TABNSLCM	6 X'20'		
TABNSLER	6 X'80'		
TABNSLMT	6 X'40'		
TABNTIOT	14 (E)		
TABNULL	5 X'80'		
TABNVOLS	9 (9)		
TABOPATB	35 (23)		
TABOPBSF	32 X'20'		
TABOPFSF	32 X'40'		
TABOPRDB	32 X'08'		
TABOPRDF	32 X'10'		
TABOPREW	32 X'80'		
TABOPS	32 (20)		
TABOSSDS	7 X'02'		
TABOTIOT	12 (C)		
TABPO	4 X'02'		
TABPOCAT	7 X'40'		
TABPS	4 X'40'		
TABPSWID	32 X'04'		
TABRCINP	8 X'10'		
TABRCOUT	8 X'08'		
TABRPNOT	96 (60)		
TABRSDS	7 X'10'		
TABRSV01	4 X'1C'		
TABRSV06	8 X'03'		
TABSEGAD	16 (10)		
TABSL	6 X'02'		
TABSTOW	80 (50)		
TABSW	7 X'20'		
TABSYS	5 X'40'		

DIAGNOSTIC AIDS

MESSAGES ISSUED BY CHECKPOINT/RESTART

Checkpoint/restart modules issue the following messages:

- IHJ000I CHECKPOINT jjj,sss [(ddn)] NOT TAKEN (xxx[-vvy])
MODULE = modname
- IHJ001I jjj,sss (ddn,ddd,ser) INVALID CHECKPOINT checkid
(xxx[-yyy]) MODULE = modname
- IHJ002I jjj,sss (ddn,ddd,ser) ERROR checkid (xxx[-yyy])
MODULE = modname
- IHJ003I jjj,sss ABEND (cde) DETECTED DURING CHECKPOINT IN
MODULE = modname
- IHJ004I jjj,sss (ddn,ddd,ser) CHECKPOINT SUCCESSFUL ID=
checkid
- IHJ005I jjj,sss (ddn,ddd,ser) CHECKPOINT SUCCESSFUL WITH
POSSIBLE ERRORS ID= checkid (xxx) MODULE = modname
- IHJ007I RESTART NOT SUCCESSFUL FOR jjj (xxx[-vvy] [,utn])
MODULE = modname
- IHJ008I jjj RESTARTED
- IHJ009I ERROR ON ddname
- IHJ011I jjj,sss ABEND cde DETECTED DURING RESTART IN MODULE
= modname
- IHJ012I RECURSIVE ERROR IN ESTAE ROUTINE
- IHJ101I jjj,sss USER NOT AUTHORIZED TO DASD DATA SET =
dsname, ser
- IHJ102I jjj,sss ENVIRONMENT NOT RACF AUTHORIZED TO TAPE VOL
= ser

where:

checkid
is the identification assigned to a checkpoint entry.

ddn
is the DD name of the checkpoint data set.

jjj
is the job name.

ser
is the volume serial number of the checkpoint data set
volume.

ddd
is a device number.

xxx
is the reason code as described below.

ddname
is the DD name of the data set that caused the error.

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yyy is an additional information code from VSAM.

modname is the name of the module encountering or detecting the error.

sss is the step name, including the procedure name when appropriate.

cde is the abend code.

REASON CODES

Following is a list of the reason codes and the return codes or abend codes associated with them. All messages resulting from errors detected are issued by IHJCM00. For some of these reason codes, an entry in SYS1.LOGREC may be made and a SVC Dump may be issued.

Note: Abend codes are preceded by "S".

Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
000	10	IHJACP01	Possible enqueue error.
001	08	IHJACP00	A checkpoint parameter list error was encountered.
002	08	IHJACP00	The DD statement for the checkpoint data set is missing.
003	08, S13F	IDA0C06C (VSAM) IGC0G05B IGC0H05B IGC0K05B IGC0N05B IGC0N06C IGC0R05B IGC0506C IHJACP00 IHJACP25 IHJARS00 IHJQCP30 IHJQCP32 IHJQRS20 IHJQRS21 IHJQRS22 IHJQRS23	Insufficient space was available for a work area.
004	0C	IHJACP00	Open failed for checkpoint data set.
005	08	IHJACP00	The checkpoint data set key length was not equal to zero.
006	08	IHJACP01	The checkpoint data set record format was not U.
007	08	IHJACP00 IHJACP01 IHJCES00	The data control block (DCB) for the checkpoint data set was opened for other than BSAM or BPAM processing, or MACRF=W was not specified in the DCB.

Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
008	08	IHJACP01	The time interval specified in the STIMER macro instruction had not elapsed.
009	08	IHJACP01	The CHKPT macro instruction was issued in an exit routine other than the end-of-volume exit routine, or an RB of an unacceptable type was found on the RB chain.
010	08	IHJACP01	A graphic data control block (DCB) has been detected, but it is not supported in checkpoint/restart.
011	08	IHJACP00	The current task was a subtask.
012	08	IHJACP00	The current task has subtasks.
013	08	IHJACP01	At the time the checkpoint was attempted, the job had issued the PCLINK macro instruction with the STACK option, but had not issued a corresponding PCLINK macro instruction with the UNSTACK parameter. (That is, the PCLINK stack was not empty.)
014	08	IHJACP01	A reply to a WTOR macro instruction was not received.
015	08	IHJACP01	An incorrect checkpoint identification length or format was encountered.
016	08	IHJACP00	The checkpoint data set device type was not magnetic tape or direct access.
017	10	IHJACP01	Insufficient storage to check enqueues—possible error.
018	10	IHJACP01	GQSCAN found an abnormal condition.
019	08	IHJACP00 IHJACP01	Either MACRF=W was not specified for the checkpoint data control block (DCB), or the data control block was opened by the user's program, but was not opened for output.
020	0C	IHJACP00	I/O error during open of CHKPT data set.
021	08	IHJACP00 IHJACP01	LABEL was coded in the DD statement for the checkpoint data set with a value other than SL or SUL. Other values for the LABEL parameter must not be used in a checkpoint data set DD statement.
022	0C	IHJACP25 IHJCES00	Error occurred reading or writing a SWA control block.
023	0C, S13F	IGCON06C IHJACP25 IHJACP50 IHJGLU00 IHJQCP30 IHJQCP31 IHJQCP32	An uncorrectable input/output error occurred while writing the checkpoint data set.
024	F13F	IGC0G95B	A data set has more than five volumes, but there is no JFCBX.

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Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
026	0C	IHJACP50	Execution of a STOW macro instruction was unsuccessful; a permanent input/output error occurred.
027	08	IGC0N06C IHJACP20 IHJACP25 IHJACP30 IHJACP31 IHJACP32	End-of-volume occurred while writing a checkpoint data set entry on a direct access volume, and secondary allocation was requested and allocated; or end-of-volume occurred twice while writing a checkpoint data set entry on tape.
028	0C, S33F	IGC0506C	I/O error during SYNCDEV because of a user error. It is possible that the user's data set may not be available for a restart.
029	08	IHJACP01	The OPTCD subparameter of the DCB parameter was coded incorrectly. The value coded is not acceptable for a checkpoint data set. ANSI translation on checkpoint data set is not allowed.
030	0C	IGC0506C	An uncorrectable I/O error occurred while quiescing pending I/O requests. The I/O error occurred on a QSAM or BSAM data set with ERROPT not equal to ACCEPT.
031	S13F	IGC0N05B IHJARS01 IHJGLU00 IHJQRS21 IHJQRS22 IHJQRS23	An uncorrectable I/O error occurred while reading from the checkpoint data set.
032	08	IHJACP01	DISP=SHR was specified for an ISAM data set at checkpoint time.
033	08	IGC0S05B	Cannot reposition to a tape data set or record because the block count in the DCB is negative. The block count can be labelled NL or BLP and it is open for RDBACK.
034	S13F	IGC0G05B IHJQRS22	A DD statement was missing for the restart step.
035	S13F	IHJGLU00	Wrong-length record detected when reading checkpoint data set.
040	S13F	IGC0K05B	An uncorrectable input/output error occurred while reading standard volume labels. Note: Reason codes 041 through 049 are reserved for VSAM.
041	08	IDA0C06C (VSAM)	CHKPT was issued with a VSAM data set open for create mode processing, and no reposition was specified.
042	0C	IDA0C06C (VSAM)	An error occurred during repositioning for a VSAM data set.
043	08	IDA0C06C (VSAM)	CHKPT was issued with an entry-sequenced data set open for output, an immediate-upgrade set open over it, and reposition required. NRE or NRC must be specified in the DD statement.

Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
044	08	IDA0C06C (VSAM)	CHKPT was issued for a relative-record data set open for create mode direct processing.
045	08	IDA0C06C (VSAM)	CHKPT was issued with a VSAM data set open with the GSR option.
046	08	IDA0C06C (VSAM)	A checkpoint is not allowed if any of the VSAM data sets in the region are utilizing the control block update facility processing, or if any of the VSAM data sets in the storage, region, or partition are associated with an alternate index that was using the enhanced share option 4 processing.
047	08	IDA0C06C (VSAM)	CHKPT was attempted with a VSAM data set open in a region that was using the CBIC option.
048	08	IDA0C06C (VSAM)	Media manager was in use.
050	S13F	IGC0M05B	A volume serial number at restart is not the same as it was when the checkpoint was taken.
051	08	IHJACP01	A SPIE exit was active when a CHKPT request was made.
052	S13F	IHJQRS21	A module, which was loaded in the link pack area (LPA) or the nucleus and was being used by job <u>jjj</u> when the checkpoint was taken, is not in the LPA or nucleus at restart.
053	S13F	IHJQRS21	A module has a different entry point address in the link pack area (LPA) or nucleus at restart than it did when the checkpoint was taken.
054	08	IHJACP01	A primary address space ID and/or secondary address space ID is not the same as the home address space ID. Cross-storage addressing was active when a checkpoint was requested.
055	0C	IHJACP00	VSMREGN failed.
056	0C	IHJQCP30 IHJQRS20	VSMLIST failed.
057	08	IHJACP00	Checkpoint DD statement is concatenated.
058	14, S13F	IGCON05B IGCON06C IHJACP20 IHJACP25 IHJARS01 IHJQCP30 IHJQCP31 IHJQCP32 IHJQRS20 IHJQRS21 IHJQRS22 IHJQRS23	A bad parameter list was passed to IHJGLU00.

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Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
059	0C, S13F	IGC0N05B IGC0N06C IHJACP20 IHJACP25 IHJARS01 IHJQCP30 IHJQCP31 IHJQCP32 IHJQRS20 IHJQRS21 IHJQRS22 IHJQRS23	An unexpected return code was received by IHJGLU00.
061	08	IHJACP01	Caller of CHKPT was in secondary addressing mode.
063	S13F	IGC0S05B IGC0U05B	Data set repositioning error occurred on a tape.
069	08	IHJQCP30	Too much VSMLIST data—user's storage is fragmented beyond checkpoint's capabilities.
074	S13F	IGC0N05B IGC0R05B IGC0W05B	An unacceptable input/output error occurred while reading a data set control block (DSCB). This message is also issued if a data set was being scratched or deleted.
075	08	IHJACP50	STOW encountered a full directory on the checkpoint data set.
076	S13F	IGC0R05B	A direct access data set (other than the system input data set) being processed for input did not occupy the same extent as it did originally; that is, discrepancies were found in comparing the space allocations described in the data extent block (DEB) and the data set control block (DSCB).
077	S13F	IGC0W05B	An error occurred during ISAM OPEN processing.
078	S13F	IHJARS00	Checkpoint was not on a 31-bit supervisor, whereas restart is.
079	S13F	IGC0H05B	DUMMY was specified for an open data set; and either the data set was not being processed by the basic or queued sequential access methods, or the checkpoint at which restart was to occur was established in an end-of-volume exit routine for the data set.
080	S13F	IGC0H05B	A compatibility interface data set was made DUMMY at restart.
081	S13F	IHJARS00	The checkpoint job or step specified ADDRSPC=REAL (V=R) and the restarting job or step did not, or vice versa.
082	S13F	IGC0G95B	The TCAM control program was not active at restart, but a TCAM DCB was open at checkpoint.
083	S13F	TCAM	The value of the QNAME keyword parameter on the DD statement is not defined in the TCAM table.

Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
084	S13F	TCAM	The process entry defined by the QNAME is already in use by another application program.
085	S13F	TCAM	A GETMAIN failed during TCAM restart.
086	S13F	IHJCES00	An abend occurred during a checkpoint or restart.
087	S13F	IGCON05B IHJQRS20 IHJQRS21 IHJQRS22 IHJQRS23	Record order on checkpoint data set incorrect—detected by restart.
088	S13F	IHJQRS20	Storage not allocated as expected—detected by restart.
090	14	IGCON06C IHJCES00 IHJQCP30 IHJQCP31 IHJQCP20	Checkpoint or restart detected an error internal to checkpoint/restart.
091	S13F	IHJCM00	Error building a message. Checkpoint/restart detected an error while building a message for the operator.
092	S13F	IGC0T05B	An error occurred during basic partitioned access method (BPAM) processing. For example, an error was detected after the convert routine, or after reading the directory blocks.
094	S13F	IHJQRS21	Nucleus routines or tables have moved or been deleted since checkpoint.
096	S13F	IGC0T05B	An error occurred during use of the STOW macro instruction to delete a member from the directory.
097	S13F	IGC0K05B	An unacceptable input/output error occurred in the user's nonstandard label (NSL) routine.
098	S13F	IGC0K05B IGC0M05B	Insufficient number of devices were available for restart.
099	S13F	IGC0G05B	A data set associated block (DSAB) is missing at restart.
100	S13F	IGC0M05B	MSS error occurred while mount processing. See IEC466I for explanation.
101	S13F	IGC0M05B	An uncorrectable input/output error occurred while reading a volume label on a direct access device.
102	08	IJHACP01	ISO/ANSI/FIPS data set open at checkpoint is not supported.
103	S13F	IGCON05B	A subsystem checkpoint record (SSCR) was written, but the corresponding DCB is not in the open data set table at restart.

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Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
104	S13F	IGC0S05B IGC0U05B	An I/O error occurred while repositioning to the correct data set on tape. Note: Reason codes 181 through 199 are reserved for VSAM.
181	S13F	IDA0A05B (VSAM)	An error occurred during VSAM restart preformat routine. <u>yyy</u> is the value from RPLERRCD.
182	S13F	IDA0A05B (VSAM)	An error occurred during VSAM restart verify routine. <u>yyy</u> is the value from RPLERRCD.
183	S13F	IDA0A05B (VSAM)	An error occurred during VSAM restart put routine. <u>yyy</u> is the value from RPLERRCD.
184	S13F	IDA0A05B (VSAM)	An error occurred during VSAM restart index put routine. <u>yyy</u> is the value from RPLERRCD.
185	S13F	IDA0A05B (VSAM)	VSAM open error during restart. <u>yyy</u> is the VSAM open error code.
186	0C	IDA0C06C (VSAM)	VSAM close error. <u>yyy</u> is the VSAM close error code.
190	S13F	IDA0A05B (VSAM)	An error occurred while attempting to obtain catalog information for the cluster identified by the ddname in message IHJ009I.
191	S13F	IDA0A05B (VSAM)	An error occurred while attempting to mount volumes for the ddname identified by message IHJ009I.
193	S13F	IDA0A05B (VSAM)	Checkpoint was taken during create mode, but, at restart time, the data set was no longer in create mode.
194	S13F	IDA0A05B (VSAM)	The catalog entries for a VSAM upgrade path have been altered since checkpoint.
195	S13F	IDA0A05B (VSAM) IDA0C05B (VSAM) IDA0C06C (VSAM) IDA0I96C (VSAM)	Insufficient storage is available for a VSAM restart.
196	S13F	IDA0A05B (VSAM)	The catalog for one or more VSAM data sets has been updated, indicating that another job successfully processed the data set after the checkpoint was taken. Restart cannot restore the data set to its checkpoint status.
197	S13F	IDA0A05B (VSAM)	A restart is not allowed for control block update facility (CBUF) processing.
198	S13F	IDA0A05B (VSAM)	A VSAM data set expanded to a new volume after the checkpoint was taken.
199	S13F	IDA0A05B (VSAM)	An error occurred during BLDVRP processing in VSAM restart. <u>yyy</u> is the return code from the BLDVRP request.
200	0C	IGC0506C	A PURGE I/O request failed.
201	S13F	IJHQRS21	PGFIX failed—uncorrectable.

Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
202	0C,S13F	IGC0506C IHJAPC00 IHJAPC01 IHJQCP30 IHJQRS21 IHJQRS23	SETLOCK failed—uncorrectable.
203	S13F	IHJARS00	An illegal attempt has been made to invoke RESTART SVC routines.
204	0C	IHJACP50	Unsuccessful WIJOURN—This checkpoint is unavailable for automatic restarts; however, deferred restarts are possible if the VIO data sets are made DUMMY.
205	0C	IHJACP50	Unsuccessful WIJOURN—This and previous checkpoints taken during this step are ineligible for automatic restarts; however, deferred restarts are possible if the VIO data sets are made DUMMY. An automatic restart cannot occur until a new and successful checkpoint is taken.
206	08	IHJACP01	A VTAM ACB was open when a CHKPT was attempted.
207	0C,S13F	IGCON05B IGCON06C	Failure in the subsystem interface when checkpointing or restarting subsystem data sets.
208	08	IHJACP00	The new checkpoint data set presented by the user is not empty. The integrity of this predata is uncertain and therefore unusable.
209	08	IHJACP00	Another user DCB is concurrently open to the new checkpoint data set offered by the user.
210	08	IHJACP00	The checkpoint data set offered by the user was defined with DISP=SHR.
211	08	IHJACP00	An attempt to create a new checkpoint data set has failed because of an insecure volume.
213	08	IHJACP00	The checkpoint data set offered by the user is a subsystem data set. Subsystem data sets cannot be used as checkpoint data sets.
214	08	IHJACP00	The new checkpoint data set offered by the user exists on a shared direct access device. Concurrent opens cannot be controlled; therefore, the data set is unacceptable.
215	18	IGCON06C	An error occurred while restoring the purged I/O operations. A checkpoint entry was successfully written; however, continuation of the user's program may produce errors.
216	S13F	IHJARS00	Residual subpool allocations in the user's region have prevented a successful reallocation of the user's checkpoint-time region image.
219	S13F	IGC0S05B	There is a password error for a password-protected tape data set.

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Reason Code	Return or Abend Code (hex)	Module Detecting	Reason Code Meaning
220	S13F	IGCON05B	The data set control block (DSCB) address of a data set to be repositioned has changed since the checkpoint was taken.
221	S13F	IGCON05B	The wrong password was given for a password-protected data set that was to be repositioned.
222	S13F	IGC0S05B	The tape data set name, recorded in header label 1, has changed since the checkpoint was taken.
224	08	IHJACP01	SAM-SI (non-CI) data set was open at checkpoint.
240	0C,S13F	IDA0A05B (VSAM) IDA0C05B (VSAM) IDA0C06C (VSAM) IDA0I96C (VSAM) IHJACP00 IHJARS00	A recovery (ESTAE) environment could not be established.
Note: Reason codes 241 through 249 are reserved for VSAM.			
241	0C, S13F	IDACKRA1(VSAM)	An indeterminate error occurred when processing VSAM data sets.
242	0C, S13F	IDACKRA1 (VSAM)	A machine check occurred while checkpointing or restarting VSAM data sets.
243	S13F	IDA0C05B (VSAM)	An invalid SSCR record was encountered in the checkpoint data set entry when repositioning VSAM data sets.
250	08	IHJACP01	SYS1.IMAGELIB data set open when checkpoint taken.
251	S23F	IGC0Q05B	A data set which was not a checkpoint data set at checkpoint time was found to be open to a secure checkpoint data set at restart time.
252	S23F	IGC0Q05B	In a job using more than one checkpoint data set, one of the checkpoint data sets (not the one used for restart) was deemed not secure.
255	S23F	IGC0K05B IGCON05B	A RACF processing error occurred during restart.

ABBREVIATIONS

ACB	access method control block	FOE	fixed ownership element
ANSI	American National Standards Institute	FQE	free queue element
ASCB	address space control block	GDG	generation data group
ASCII	American National Standard Code for Information Interchange	ICB	interruption control block
BDAM	basic direct access method	I/O	input/output
BPAM	basic partitioned access method	IOB	input/output block
BSAM	basic sequential access method	IQE	interruption queue element
CCW	channel command word	IRB	interruption request block
CDE	contents directory element	ISAM	indexed sequential access method
CHR	checkpoint header record	ISO	International Organization of Standards
CI	compatibility interface	JCT	job control table
CSA	common service area	JFCB	job file control block
CVT	communications vector table	JSCB	job step control block
DADSM	direct access device space management	LLE	load list element
DASD	direct access storage device	LPA	link pack area
DCB	data control block	LSQA	local storage queue area
DDNT	ddname table	MBBCHHR	absolute disk address
DEB	data extent block	MBCB	main SVRB pool control block
DOS	disk operating system	MSS	mass storage system
DSAB	data set association block	NCP	number of channel programs
DSCB	data set control block	NSL	nonstandard label
DSDR	data set descriptor record	O/C/EOV	open/close/end of volume
EBCDIC	extended binary-coded-decimal interchange code	PCB	page control block
ECB	event control block	PIRL	purge I/O restore list
EOB	end of block	PO	partitioned organization
EOF	end of file	PPIR	problem program storage image record
EOV	end of volume	PQE	partition queue element
EPCB	EXCP purge control block	PRB	program request block
FBQE	free block queue element	PS	physical sequential
FLIH	first level interruption handler	PSA	prefixed save area
		PVT	page vector table
		QCB	queue control block

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QDB	queue descriptor block	STCB	subtask control block
QSAM	queued sequential access method	SUR	supervisor record
RACF	Resource Access Control Facility	SVC	supervisor call
RB	request block	SVRB	supervisor request block
R/TM	recovery/termination manager	SVT	supervisor vector table
SAM	sequential access method	SWA	scheduler work area
SAMB	sequential access method block	TCAM	telecommunications access method
SCB	STAE control block	TCB	task control block
SCT	step control table	TIOT	task input/output table
SCVT	secondary communication vector table	TQE	timer queue element
SIOT	step input/output table	TTR	track, track, record (relative track address)
SDWA	STAE diagnostic work area	UCB	unit control block
SIRB	supervisor interruption request block	USASI	USA Standards Institute
SLIH	second level interruption handler	VAT	valid AMBL table
SPL	service priority list	VIO	virtual input output
SPQE	subpool queue element	VSAM	virtual storage access method
SSCR	subsystem checkpoint record	VTAM	virtual telecommunications access method
SSIB	subsystem identification block	VTOC	volume table of contents
SSOB	subsystem option block	WTO	write to operator
STAE	specify task asynchronous exit	XDAP	execute direct access program
STAI	subtask ABEND interception	XPTE	external page table entry
STC	system task control	XSB	extended status block

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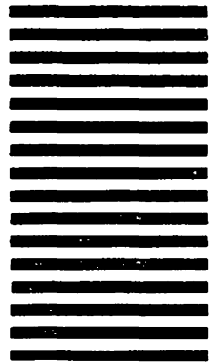


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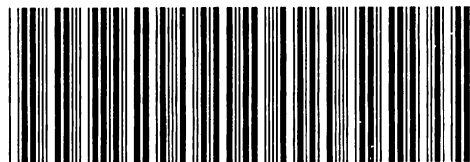




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