SY33-8552-1
File No. S370-36

Systems

DOS/VS Error Recovery and Recording Transients Logic

Program Numbers 5745-SC-DKE
5745-SC-IOX
5745-SC-RMS
5745-SC-TPE

Release 29

IBM

Second Edition (November, 1973)

This edition applies to Version 5, Release 29, of the IBM Disk Operating System/Virtual Storage, DOS/VS, and to all subsequent versions and releases until otherwise indicated in new editions or Technical Newsletters. Changes are continually made to the information herein. Before using this publication in connection with the operation of IBM systems, consult the latest IBM System/360 and System/370 Bibliography, GA22-6822, for the editions that are applicable and current.

This is a major revision of, and obsoletes, SY33-8552-0. Device information is added for:

- IBM 3203 Printer,
- IBM 3340 Direct Access Storage Device,
- IBM 3540 Diskette Input/Output Unit,
- IBM 5203 Printer,
- IBM 5203U Printer with UCS feature,
- IBM 5425 Multifunction Card Unit.

Information for CPU Model 115 is also included.

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This Program Logic Manual (PLM) is a detailed guide to the IBM DOS/VS error recovery and recording transient programs. It supplements the program listings by providing descriptive text and flowcharts.

The lists that follow give the titles of companion system control PLMs and prerequisite publications.

For overall system control logic description, this PLM is to be used with the following PLMs:

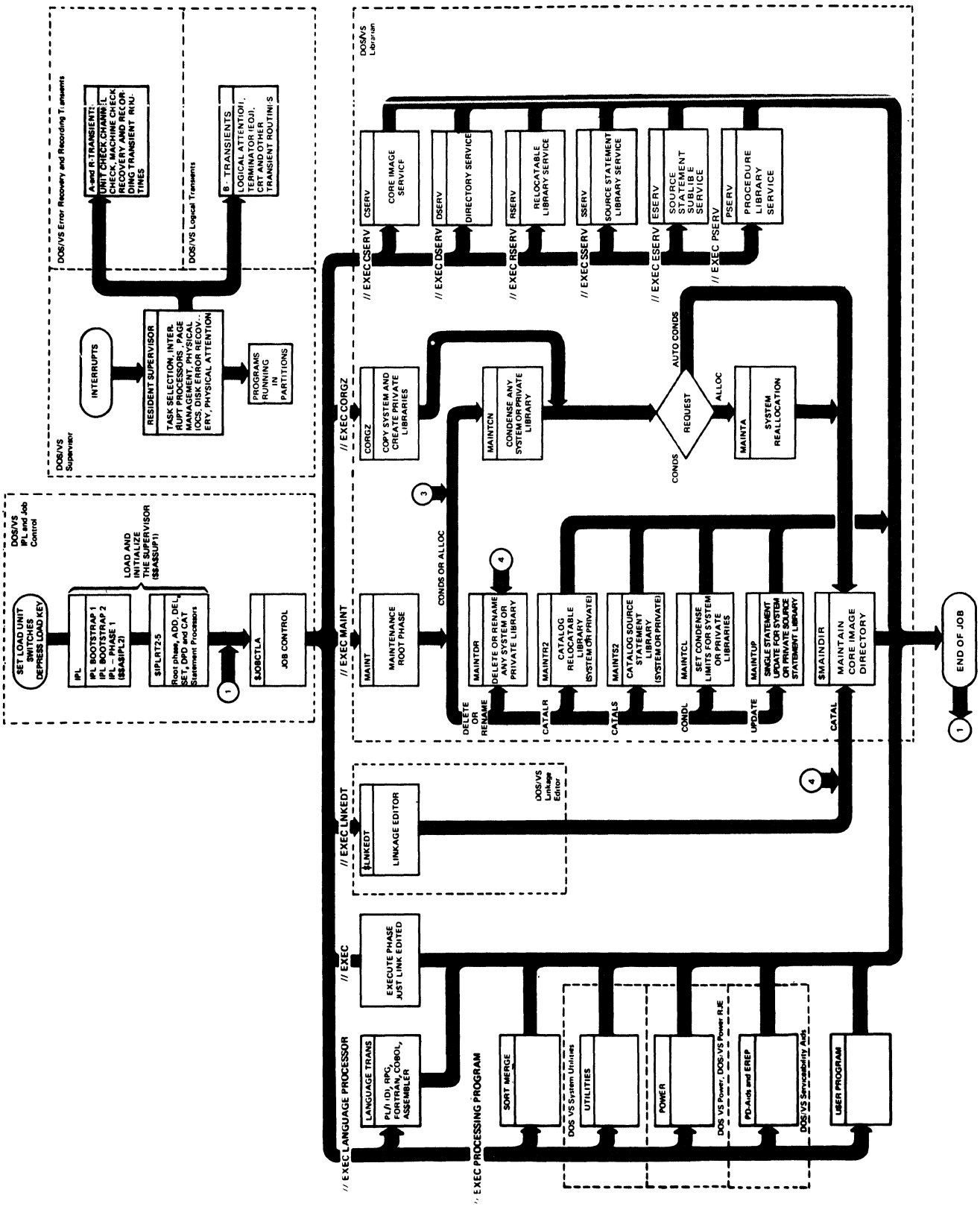
- DOS/VS Supervisor Logic, SY33-8551.
- DOS/VS Logical Transients, SY33-8553.
- DOS/VS Serviceability Aids, SY33-8554.
- DOS/VS IPL and Job Control, SY33-8555.
- DOS/VS Linkage Editor, SY33-8556.
- DOS/VS Librarian, SY33-8557.

Prerequisite to the effective use of the PLMs are the following publications:

- IBM System/370 Principles of Operation, GA22-7000.
- IBM System/360 Principles of Operation GA22-6821
- Introduction to DOS/VS, GC33-5370.
- DOS/VS System Management Guide, GC33-5371.
- DOS/VS Data Management Guide, GC33-5372.
- Guide to the DOS/VS Assembler, GC33-4024.

Titles and abstracts of other related publications are listed in the IBM System/360 and System/370 Bibliography, GA22-6822 and the IBM System/370 Advanced Function Bibliography, GC20-1763.

Chart 00. Disk Operating System Program Flow



This manual describes all physical transients, or A-transients, and Recovery transients, or R-transients, with the exception of $$ABERRZ and $$ABERZ1. The physical attention transient $$ABERRZ and the delay cancel transient $$ABERZ1 are described in the DOS/VS Supervisor Logic manual.

A-TRANSIENTS

A-transients are also referred to as physical transients. These infrequently used sections of the supervisor reside in the core image library and are fetched by the resident supervisor only when needed. Each program phase name begins with the prefix characters $$A. These phases are loaded singly into the A-transient or Physical Transient Area (PTA). The A-transients' functions within DOS/VS are:

- Provide device-dependent Error Recovery Procedures (ERP). See chapter 2 "Device-Dependent Error Recovery Procedures".
- Issue messages associated with ERP operations (ERP message writer). See chapter 2.
- Process console printer keyboard attention requests (Physical Attention Routine, $$ABERRZ). See DOS/VS Supervisor Logic.
- Update statistical data counters in PUB2 table, and build and write I/O device records on the Recorder File (IJSYSRC). See chapter 4 "Recovery Management Support Recorder".
- Issue Error Volume Analysis (EVA) messages, and message regarding the status of the recorder file. See chapter 4.

When the supervisor supports Relocating Load, the physical transient area may be used as an RLD Read-In Area. This is the case when the user has not specified an Independent Directory Read-In Area (which would be included in a Independent RLD Read-In Area). Because of this possible use of the PTA, A-transients will not be relocated and they must not issue a LOAD or FETCH for a relocatable phase.

Exit from A-Transients

To relinquish control, an A-transient may:

- Issue an SVC 5 to fetch another A-transient.
- Branch to ERPEXIT in the supervisor for cancel, ignore, or retry. Depending on the address in register 15, this results in a branch to the resident cancel routine (for cancel), or to the I/O interrupt handler (for ignore or retry). A macro called SUPRET is used to generate the required code in the transient.

If an exit is to be taken to ignore the error, the CSW and the interrupt information are first restored to the status that prevailed before the error was detected. The I/O interrupt handler is then re-entered to continue normal processing from the point where it was left when the error condition was detected.

If an exit is to be taken to retry the operation, the I/O request is left in the channel queue to be restarted. Any outstanding request for another device on the same channel has priority over this request. A byte in the relevant PUB holds the number of retries attempted.

Note: All general registers may be used by error recovery phases, and all registers are returned on the occurrence of an interruption.

R-TRANSIENTS

R-transients (Machine Check and Channel Check Handling Transients) reside in the core image library and are fetched by the RAS Monitor, which is part of resident supervisor, only when needed. Each program phase name begins with the characters $$RAST. These phases are loaded singly into the R-transient Area (RTA). The R-transients' functions within DOS/VS are to:

- Attempt recovery from machine checks and channel checks. See chapter 3 "Machine Check and Channel Check Handling".
- Issue messages associated with machine check and channel check recovery operations. See chapter 3.

- Attempt recording on recorder file of machine check and channel check records. See chapter 3 and chapter 4 "Recovery Management Support Recorder".

- Issue messages regarding the status of the recorder file (IJSYSRC). See chapters 3 and 4.

A- AND R-TRANSIENT SUPERVISOR CALLS

SVC is detected by microprogramming, which loads the SVC new PSW from storage location 96. Certain SVCs are involved in processing A- and R-transient operations. This section describes those supervisor calls which are directly used or handled in the A- and R-transients.

For reference purposes, Figure 1 contains a list of all SVCs used in the system. Refer to DOS/VS Supervisor Logic for an explanation of the SVCs outside the scope of this manual.

SVC 0: Execute the channel program (EXCP). The address of the user's command control block (CCB) must be supplied in general register 1 before this SVC is issued. If POWER is supported, control is transferred to POWSVC00 before executing the channel program.

SVC 5: When issued by a user through the MVCOM macro, modifies the supervisor communication region. It supplies the supervisor support for the MVCOM macro. The sequence of events is:

1. MVCOM macro issues a SVC 5.

2. The resident routine alters the supervisor communication region as specified by the parameters of the MVCOM macro.

Return is to task selection.

When a physical transient issues a SVC 5, another physical transient program (phase name prefix $$A) is loaded into the physical transient area (PTA), and is entered at its load address plus 10 bytes.

The calling transient sets up the physical transient name in the error block. The storage address of the physical transient phase name is loaded in general register 1 before the fetch is made.

The physical transient is loaded at the origin of the physical transient area (PTA) and this address is put into general register 11 which may then be used by the transient as a base register.

SVC 7: Waits for the completion of an I/O operation or for a timer interruption to occur. It supplies the supervisory support for the WAIT macro.

If the traffic bit (CCB) or event bit (TECB) has been posted, SVC 7 branches directly to task selection.

If the traffic bit or event bit has not been posted and the task was a:

- System task, the system task is deactivated and its PIB flag is set to I/O-bound.

- User task, the PIB of the interrupted program is set to SVC 7-bound (not ready to run).

If a page fault occurs during execution of a SVC 7, the SVC 7 is reissued after the page fault has been handled.

SVC 33: When issued by a user task, immediate exit is taken to task selection.

When issued by a system task, it results in deactivation of this system task (the select byte in the system communications region is set to zero). The deactivated system task is posted ready to run (X'83'). This procedure allows task selection to give control to any higher priority system task that is ready to run.

SVC 34: Reserved for the GETIME macro. SVC34 updates the date field in the communications region of the active partition. Upon return general register 1 contains the time of day in timer units (1/300 sec.)

SVC 44: Supplies support for specific requests to write records on the recorder file. The SVC 44 routine checks for an available error queue entry. If none is available, the SVC is reissued until an entry becomes available. The error queue name is then set to call $$AEERA3, and the task select exit is taken.

$$AEERA3 writes the record and takes the supervisor ignore exit. A second $$A transient is called to write messages, if necessary, before returning to the supervisor ignore exit.

SVC 54: This superviser call provides supervisory support for the FREEREAL macro to release page frames to the main page pool. These page frames may be released from a real partition, the PDAID alternate area, or the SDAID buffer area.

When the request is issued by the terminator (the page frames belonging to a real partition are freed), the lower and

upper addresses (on page boundary) of the real partition are passed to the SVC 54 routine in the registers 2 and 3.

A zero value in register 2 indicates that the request is issued by SDAID or PDAID. In this case the lower and upper limit of the area to be released are obtained from the boundary box. Control is passed immediately to task selection if no SDAID buffer area or PDAID alternate area exists.

The page frames are freed, one after the other, by updating the corresponding page frame table entries as follows:

- Bits 14 and 15 are reset (page frame returned to the selection pool; temporarily fixing in it allowed).
- Bytes 4 and 5 are set to X'FFFF' (page frame not in use).

The released page frames are added to Q00 (see "Selection Pool Queues" in Page Management DOS/VS Supervisor Logic).

If SVC 54 is called by the terminator, the number of active virtual partitions (entry in SYSCOM) is increased by one.

If SVC 54 is called by SDAID or PDAID, the boundary box is updated as follows:

- The end of real storage address is inserted in the entry for the SDAID/PDAID area address.
- The entry for the number of page frames in the main page pool is incremented by the number of freed page frames.

The SVC 54 routine posts the Page Manager system task ready to run (it may have been fix-bound). It also posts any tasks that are waiting for a page frame ready to run.

SVC 60: This SVC uses the real address to calculate the virtual address of a location within the data area of an I/O request. Before issuing the SVC, general register 8 must contain the address of the CCW, and general register 0 the displacement of the desired address from the start of the I/O area.

Using the data address or the address of the Indirect Addressing List, specified in the CCW, the supervisor calculates the virtual address and returns it in general register 15. This register will contain 0 when the real address is beyond the end of real storage, or when it corresponds to an unused page frame.

SVC 70: Returns the virtual address of the real address specified in the VIRTAD macro. On entry to the routine, the real address must be contained in register 1, and register 0 must contain zero. The virtual address is returned in register 0. No address is returned (register 0 contains zero) if

- The address is contained in a page that is not used;
- the read address is invalid;
- the address is within a page that is not fixed.

SVC 76: Initiates the recording of a RMSR record on the system recorder file (IJSYSRC). If DOS/VS runs under VM/370, not all information in the record may be valid. VM/370 gains control to perform the recording function. When not running under VM/370, the effect of this SVC is the same as that of SVC 15 (SYSIO).

The address of the user's Command Control Block (CCB) must be supplied in general register 1 before this SVC is issued. The data address must be supplied in general register 0. Register 1 must have the high-order bit on to indicate to VM/370 that the interrupt is to be intercepted. After having intercepted the interrupt, VM/370 zeros out register 1, so that on return, the issuing program can check whether VM/370 handled the I/O.

SVC		Macro	Function
Dec	Hex	Supported	
*optional			
0	0	EXCP	Execute Channel Program
1	1	FETCH	Fetch any phase
2	2		Fetch a logical transient (B-transient)
3	3		Force dequeue
4	4	LOAD	Load any phase
5	5	MVCOM	Modify supervisor communication region (if issued by MVCOM macro) Fetch another physical transient (if issued by a physical transient)
6	6	CANCEL	Cancel a problem program or task
7	7	WAIT	Wait for a CCB or TECB
8	8		Transfer control to the problem program from a logical transient (B-transient)
9	9	LBRET	Return to a logical transient (B-transient) from the problem program after an SVC 8
10*	A	SETIME	Set timer interval
11	B		Return from a logical transient (B-transient)
12	C		Reset switches in partition communications region
13	D		Set switches in partition communications region
14	E	EOJ	Terminate job and go to job control for end of job step
15	F	SYSIO	Headqueue and execute channel program
16*	10	STXIT(PC)	Provide supervisor with linkage to user's PC routine for program check interrupts
17*	11	EXIT(PC)	Return from user's PC routine
18*	12	STXIT(IT)	Provide supervisor with linkage to user's IT routine for interval timer interrupt
19*	13	EXIT(IT)	Return from user's IT routine
20*	14	STXIT(OC)	Provide supervisor with linkage to user's OC routine for external or attention interrupts (operator command)
21*	15	EXIT(CC)	Return from user's OC routine
22	16	SEIZE	Seize/release system; enable/disable for external and I/O interrupts; set key in user's PSW
23*	17		Load phase header. Phase load address is stored at user's address
24*	18	SETIME	Set timer interval and provide supervisor with linkage to user's TECB, if any

Figure 1. Supervisor Calls (Part 1 of 4)

SVC		Macro	Function
Dec	Hex	Supported	
25*	19		Issue HALT I/O on a teleprocessing device, or HALT I/O on any device if issued by OLTEP. With multiprogramming, dequeue an unstarted OLTEP I/O request to a shared device
26*	1A		Validate address limits
27*	1B		Special HIO on teleprocessing devices
28*	1C	EXIT(MR)	Return from user's stacker select routine (MICR type devices only)
29*	1D	WAITM	Provide support for multiple wait macro WAITM
30*	1E	QWAIT	Wait for a QTAM element
31*	1F	QPOST	Post a QTAM element
32	20		Reserved
33	21		Reserved for internal macro COMRG
34	22	GETIME	Provides Time-of-Day and updates the DATE field
35*	23	HOLD	Hold a track for use by the requesting task only
36*	24	FREE	Free a track held by the task issuing the FREE
37*	25	STXIT(AB)	Provide supervisor with linkage to user's AB routine for abnormal termination of a task
38*	26	ATTACH	Initialize a subtask and establish its priority
39*	27	DETACH	Perform normal termination of a subtask. It includes calling the FREE routine to free any tracks held by the subtask
40*	28	POST	Inform the system of the termination of an event and ready any waiting tasks
41*	29	DEQ	Inform the system that a previously enqueued resource is now available
42*	2A	ENQ	Prevent tasks from simultaneous manipulation of a shared data area (resource)
43	2B		Reserved
44*	2C		Provide supervisor support for external creation of unit check records by specific request
45*	2D		Provide emulator interface
46*	2E		Provide OLTEP with the facility to operate in supervisory state
47*	2F	WAITF	Provide support for multiple wait macro WAITF for MICR type devices
48*	30		Fetch a CRT transient
49	31		Reserved

Figure 1. Supervisor Calls (Part 2 of 4)

SVC		Macro	Function
Dec	Hex	Supported	
50	32		Reserved for IIOC error recovery
51	33		Return phase header
52*	34	TTIMER	Return the remaining time interval, or cancel a time interval
53	35		Reserved
54	36	FREEREAL	Release page frames to selection pool
55	37	GETREAL	Provide interface between SDAID and PDAID initialization routine and page management routine, to create the PDAID alternate area or the SDAID buffer area
		GETPUB	
56*	38	FREEPUB	Occupy or free PUB of the device used by POWER
57*	39		Make POWER-supported partition dispatchable
58	3A		Provide interface between job control and the supervisor. Get real storage for real jobs
59	3B		Provide interface between ECJ and the supervisor. Initialize specified page table entries
60	3C	GETADR	Provide virtual address of location within I/O areas for ERP and CRT routines
61*	3D	GETVIS	Get storage in virtual partition
62*	3E	FREEVIS	Free storage in virtual partition
63	3F	USE	Use a resource
64	40	RELEASE	Release a resource
65*	41	CDLOAD	Load VSAM or CI phase
66	42	RUNMODE	Return mode in which program is running
67*	43	PFIX	Fix page(s) in real storage
68*	44	PFREE	Free page(s) in real storage
69*	45	REALAD	Return real address corresponding to a given virtual address
70*	46	VIRTAD	Return virtual address corresponding to a given real address
71*	47	SETPFA	Establish or terminate the linkage between the supervisor and a user page-fault appendage routine
		GETCBUF	
72*	48	FREECBUF	Get or free copy buffer for IDAL or tape ERP
73*	49	SETAPP	Allow linkage to channel and appendage routines
74*	4A		Fix page(s) in real storage for restart

Figure 1. Supervisor Calls (Part 3 of 4)

SVC		Macro Supported	Function
Dec	Hex		
75	4B		Reserved
76	4C		Initiate recording of an RMSR I/O error
77	4D	TRANSCSW	Returns the virtual address of a copied CCW
78-84			Reserved
85	55	RELPAG	Release contents of one or more pages
86	56	FCEPGOUT	Force a page-out for one or more pages
87	57	PAGEIN	Pagein one or more pages

Figure 1. Supervisor Calls (Part 4 of 4)

Upon occurrence of a unit check, the resident supervisor usually does not immediately load one of the ERP transients into the physical transient area (PTA). Instead, one or more RMSR transients are loaded consecutively for recording purposes. Then the required ERP phases are loaded in proper sequence. For hard errors, exit is taken to the ERP message writer, although not immediately. Before the ERP message writer is actually entered, one or more RMSR phases are loaded consecutively for recording purposes. (See Chart 01). Note that for the Model 125 recording is performed only if RMSR was generated into the system.

On a Model 115 or 125 without RMSR, the supervisor loads $$ABERRA immediately into the PTA. The RMSR phases which are usually loaded and entered, are in this case bypassed. When ERP detects an irrecoverable error, an RMSR phase is fetched, as usual. This phase detects that the system does not support RMSR and passes control immediately to the ERP message writer. Also for devices which are recorded by hardware, the normal RMSR flow is maintained, but these devices are not recorded on SYSREC. This is controlled by a bit in the PUB2.

This chapter covers only the ERP transient routines, including the ERP message writer. Figure 2 illustrates each ERP transient in terms of phase name, function, and program level chart identification.

To understand the error recovery procedures, you should be familiar with the sense information that corresponds to the individual I/O devices supported by DOS/VS. Figure 5 illustrates the equipment supported by ERP and also indicates the sense bits associated with each device.

INTERFACE WITH ERP MESSAGE WRITER

To communicate with the ERP message writer, the ERP transients use the following flags of the flag byte in the error queue entry (Figure 3):

Bit 1 - Intervention Required.

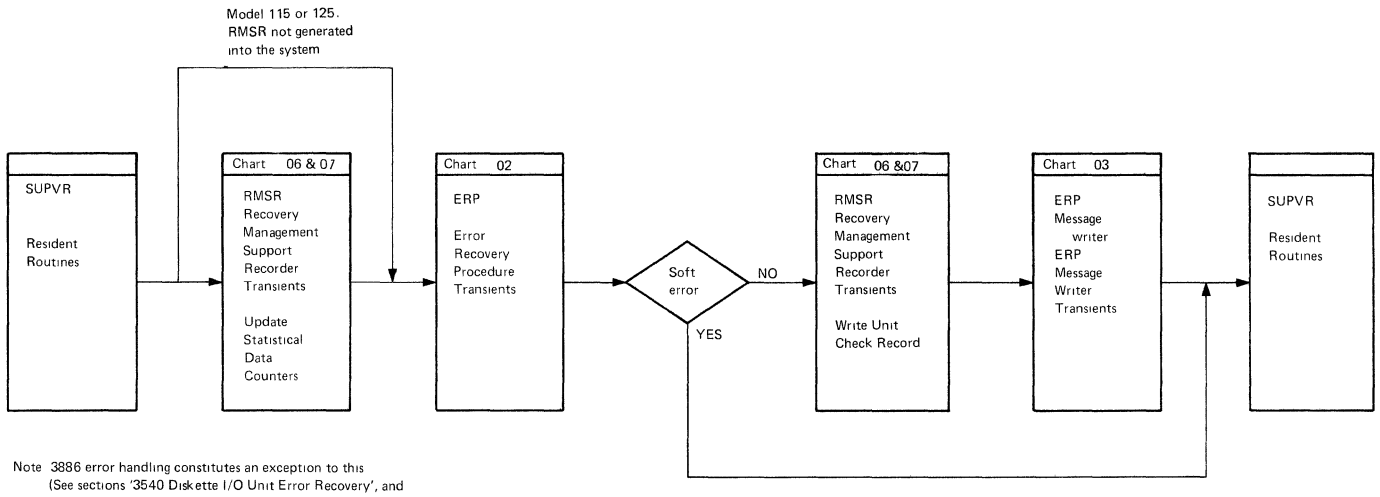
Bit 2 - Passback requested by user.

Bit 3 - Allow error to be ignored.

Bit 5 - Allow error to be retried.

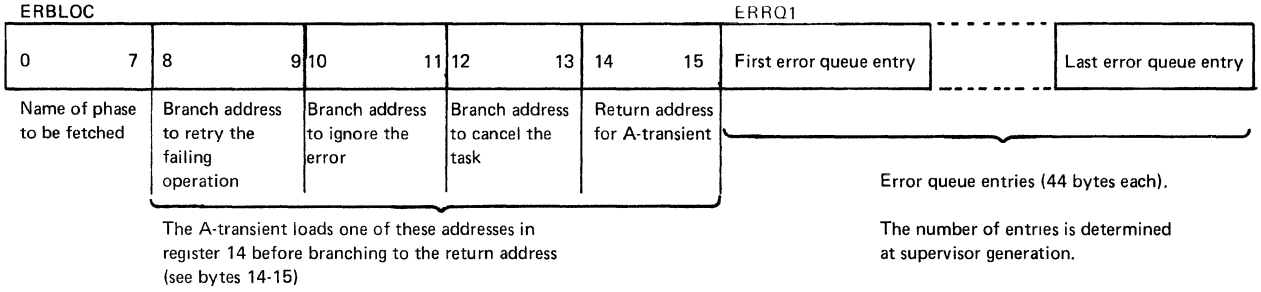
In addition, the message code byte in the error queue entry contains the message code, to indicate to the message writer which error message is to be printed.

Chart 01. General Overview of the Interrelationship of ERP Phases, RMSR Phases and Resident Routines



Phase name	Function	Program level Chart ID
$$ABERAB	2400, 3410, and 3420 tape error recovery. First tape ERP phase loaded. Handles data check on read and write commands.	02
$$ABERAC	2400, 3410, and 3420 tape error recovery. Handles data check on Erase Gap command, ID burst check, and errors during recovery from data check.	02
$$ABERAD	2400, 3410, and 3420 tape error recovery. First Read Opposite Recovery phase.	02
$$ABERAE	2400, 3410, and 3420 tape error recovery. Handles all errors except data check, ID burst check, and errors during repositioning.	02
$$ABERAF	2400, 3410, and 3420 tape error recovery. Second Read Opposite Recovery phase.	02
$$ABERAG	2400, 3410, and 3420 tape error recovery. Contin. recovery action initiated by $$ABERAE.	02
$$ABERAH	2400, 3410, and 3420 tape error recovery. Provides support for the OS/DOS emulator.	02
$$ABERAI	2400, 3410, and 3420 tape error recovery. Set up for Read Opposite Recovery when Indirect Address Lists are used.	02
$$ABERAN	3886 OCR reader ERP.	02
$$ABEREE	5425 card machine feed checking	03
$$ABERP1-9	BTAM error handling. (See DOS/VS BTAM Logic.)	02
$$ABERRA	ERP monitor for unit record and direct access devices.	02,06,07
$$ABERRB	2311, 2314, 3330, and 3340 disk ERP. Determine message code.	02,06
$$ABERRC	2560 card machine Message Writer/ERP phase.	03
$$ABERRD	2560, and 5425 card machine repositioning ERP.	02
$$ABERRE	5425 card machine message writer.	03
$$ABERRF	3211 printer ERP.	02
$$ABERRG	3504, 3505, 3525 punched card device ERP.	02
$$ABERRH	2245 printer ERP.	02
$$ABERRI	2495 tape cartridge reader ERP.	02
$$ABERRL	ERP message writer. Builds error message.	03
$$ABERRM	ERP message writer. Builds error message.	03
$$ABERRN	ERP message writer. Issues the message.	03
$$ABERRO	ERP message writer. Analyzes operator response. Handles message writer error conditions.	03
$$ABERRS	1412, and 1419 MICR ERP.	02
$$ABERRT	1287, and 1288 OCR ERP.	02
$$ABERRU	1017, and 1018 paper tape reader ERP.	02
$$ABERRV	2671 paper tape reader ERP.	02
$$ABERRW	Console printer-keyboard and display operator console ERP.	02
$$ABERRY	1403, 1443, 3203 and 5203 printer, 3881 optical mark reader, 1442, 2596, 2501, 2540, 2560, and 5425 Punched Card device ERP.	02
$$ABERR1	2321 data cell ERP.	02
$$ABERR2	2321 data cell ERP.	02
$$ABERR3	2321 data cell ERP.	02
$$ABERR4	2321 data cell ERP.	02
$$ABERR5	2321 data cell ERP.	02
$$ABERR7	3540 Diskette Input/Output Unit ERP. Determines message code and recovery action.	02

Figure 2. ERP Transient Programs



Layout of any Error Queue entry

Bytes 0- 7: CSW

Bytes 8- 9: Address of PUB for device in error

Byte 10: Flag byte:

Bit 0 : 1 No record found on DASD
1 : 1 Intervention required
2 : 1 Passback (Set by device ERP)
3 : 1 Allow ignore
4 Not used
5 : 1 Allow retry
6 Not used
7 : 1 Active entry

Byte 11: Message code: may refer to a device error recovery message generated by physical IOCS or:

Byte 11 (Cont'd) This location may contain one of the following:
X'E2' The error is recoverable
X'AE' A record is to be recorded on the system recorder file for SVC44 or a BTAM appendage routine, and a physical transient is to be fetched (last two characters of phase name are in bytes 20-21).

Bytes 12 - 15 Disk seek address

Bytes 16 - 19: Address of CCB

Bytes 20 - 43: Sense data: The number of sense bytes generated depends on the options specified; the minimum is 24 bytes.
Alternate entry name: If byte 11 contains X'AE', bytes 20-21 contain the last two characters of the phase name of the psysical transient to be fetched for SVC44 (A3) or BTAM (A5). X'AF' in byte 22 indicates that the I/O area associated with an alternate entry has been fixed temporarily.

Note: The address of the Error Block can be found in SYSCOM at displacement 0 (X'00').

Figure 3. Format of Error Recovery Block and Error Queue Entry

Count	Trans-mission Informa-tion	CSW Status Bits	Type Code and Logical Unit	Reserved for Logical IOCS	CCW Address	Reserved for Physical IOCS	CCW Address in CSW	Optional Sense CCW
0 1	2 3	4 5	6 7	8	9 11	12	13 15	16 23

Byte(s)	Description	
0-1 Used for residual count.		
2-3 Transmitting information between Physical IOCS and Problem Program	Byte 2	Set on by
	Bit 0: Traffic Bit (Wait) (Note 5).	PIOCS*
	Bit 1: End-of-File (/* or /&) 3211-UCSB Parity Check (Line Complete) (Note 2).	PIOCS
	Bit 2: Irrecoverable I/O error.	PIOCS
	Bit 3: Accept Irrecoverable I/O error.	Pr.Pr.**
	Bit 4: Return DASD Data Checks, 3540 Diskette Data Checks, 2671 errors, or 1017/1018 errors to the user; indicate action-type messages for DOC; return 5425 not ready.	Pr.Pr.
	Bit 5: Post at Device End (Note 5).	Pr.Pr.
	Bit 6: Return Tape Read Data Check; 1018 or 2560 Data Check; 2520, 2540, 2560, 3881, or 5425 Equipment Check; Accept 3504, 3505, or 3525 Permanent Error; DASD Data Checks on Read or Verify Command on 3211 or 2245 Passback Requested. (Notes 3, 6, and 8)	Pr.Pr.
	Bit 7: User Error Routine (Note 10).	Pr.Pr.
	Byte 3	Set on by
	Bit 0: DASD Data Check in Count Area; Permanent Error for 3330, or 3340; MICR-SCU Not Operational; 1287/1288 Data Check; 3211 Print Check/Equipment Check; 3540 Special Record Transferred.	PIOCS
	Bit 1: DASD Track Overrun; MICR Intervention required; 1287-Keyboard Correction in Journal Tape Mode; 1017-Broken Tape; 3211-Print Quality/Equipment Check.	PIOCS
	Bit 2: DASD End-of-Cylinder; MICR-(Note 4) 1287/1288-Hopper Empty in Document Mode; 3211/2245 Line Position Error (Note 7).	
	Bit 3: 2520, 2540, 3881-Equipment Check; 2560, 3203, 5203, 5425 Data Check/Equipment Check; Tape-Read Data Check; DASD-Any Data Check; 1287-Equipment Check; 1017/1018-Data Check; 3211-Print Check/Data Check; 3504, 3505, 3525 Permanent Error (Note 8); 3540 Diskette Data Check.	PIOCS
	Bit 4: Non-Recovery Questionable Condition: Card-Unusual Command Sequence; DASD-No Record Found; 1287/1288-Document Jam or Torn Tape; 3211-UCSB Parity Check (Command retry); 5425 not ready.	PIOCS

Figure 4. Command Control Block (CCB) (Part 1 of 3)

Count	Trans-mission Informa-tion	CCW Status Bits	Type Code and Logical Unit	Reserved for Logical IOCS	CCW Address	Reserved for Physical IOCS	CCW Address in CSW	Optional Sense CCW
0 1	2 3	4 5	6 7	8	9 11	12	13 15	16 23

Byte(s)	Description	Set on by
2-3 (continued)	Bit 5: No Record Found Condition (Retry on 2311, 2314, 2319, 3330, or 3340).	Pr.Pr.
	Bit 6: Carriage Channel 9 Overflow or Verify Error for DASD; 1287-Document Mode-Late, Stacker Select; 1288-End of Page.	PIOCS
	Bit 7: Command Chaining, Retry from the next CCW to be executed.	Pr.Pr.

4-5 CSW Status Bits	Byte 4 (Note 1)	Byte 5
	Bits:	Bits:
	0(32): Attention	0(40): Program Controlled Interruption
	1(33): Status Modifier	1(41): Incorrect Length
	2(34): Control Unit End	2(42): Program Check
	3(35): Busy	3(43): Protection Check
	4(36): Channel End	4(44): Channel Data Check
	5(37): Device End	5(45): Channel Control Check
	6(38): Unit Check	6(46): Interface Control Check
	7(39): Unit Exception	7(47): Chaining Check

6/7 Type Code and Logical Unit	Byte 6
	X'0u' Original CCB (Bytes 9-11 and 13-15 contain virtual addresses) X'2u' Translated CCB (Bytes 9-11 contain real address, bytes 13-15 virtual address) X'4u' BTAM request original CCB (Bytes 9-11 and 13-15 contain virtual address) X'6u' BTAM request translated CCB (Bytes 9-11 contain real address, bytes 13-15 virtual address) X'8u' User-translated CCB in virtual partition (Bytes 9-11 and 13-15 contain real addresses) Note: Any one of the above incremented by X'10' (bit 3 on) indicates automatic switching to the beginning of the next cylinder at End-of-Cylinder condition. u: 0 = The address in byte 7 refers to a System Logical Unit. 1 = The address in byte 7 refers to a Programmer Logical Unit.
	Byte 7
	Hexadecimal representation of SYSnnn: SYSRDR = C0 SYSCLB = 0B SYSIPT = C1 SYSVIS = 0C SYSPCH = 02 SYSCAT = 0D SYSLST = C3 SYS000 = 00 SYSLOG = 04 SYS001 = 01 SYSLNK = C5 SYS002 = 02 SYSRES = 06 . SYSSLB = 07 . SYSRLB = 08 . SYSUSE = 09 SYSnnn SYSREC = 0A (Note 9)

Figure 4. Command Control Block (CCB) (Part 2 of 3)

Count	Trans-mission Informa-tion	CCW Status Bits	Type Code and Logical Unit	Reserved for Logical IOCS	CCW Address	Reserved for Physical IOCS	CCW Address in CSW	Optional Sense CCW
0 1	2 3	4 5	6 7	8	9 11	12	13 15	16 23

Byte(s)	Description
8 Reserved for Logical IOCS	Buffer Offset: ASCII Input Tapes X'00' - X'63' ASCII Output Tapes Fixed X'00' Variable X'00' or X'04' Undefined X'00'
9-11 CCW Address	Virtual or real address of CCW asscciated with this CCB depending on byte 6: Real address if byte 6=X'2u', X'6u', or X'8u'; Virtual address if byte 6=X'0u', or X'4u'.
12 Reserved for Physical IOCS	X'80' CCB being used by ERP X'40' Channel Appendage Routine present for TP device, VSAM or POWER. X'20' Sense Information desired (Note 10) X'10' Message writer X'08' EU Tape Error X'04' OLTEP Appendage available X'02' Tape ERP Read Opposite Recovery X'01' Seek Separation
13-15 CCW Address in CSW	Virtual Address of CCW pointed to by CSW at Channel End (if byte 6 = X'8u', it is the real address) or address of the Channel End Appendage Routine for TP devices, VSAM or POWER.
16-23 Optional Sense CCW	8 bytes appended to the CCB when Sense Information is desired.

Figure 4. Command Control Block (CCB) (Part 3 of 3)

Notes:
1. Bytes 4 and 5 contain the status bytes of the Channel Status Word (Bits 32-47). If byte 2, bit 5 is on and device end results as a separate interrupt, device end will be ORed into CCB byte 4.
2. Indicates /* or /& statement on SYSRDR or SYSIPT. Byte 4, bit 7 (unit exception) is also on.
3. DASD data checks on count not returned.
4. For 1255/1259/1270/1275/1419, disengage. For 1275/1419D, I/O Error is external interrupt routine (Channel data check or bus-out check).
5. The traffic bit (Byte 2, bit 0) is normally set on at channel end to signify that the I/O was completed. If byte 2, bit 5 has been set on, the traffic bit and bits 2 and 6 in byte 3 will be set on at device end. Also see Note 1.
6. 1018 ERP does not support the Error Correction Function.
7. This error occurs as an equipment check, data check or FCB parity check. For 2245, this error occurs as a data check or FCB parity check.
8. For 3504, 3505, 3525 input or output files using ERROPT, byte 3, bit 3 is set on if a permanent error occurs. Byte 2, bit 6 is set on to allow you to accept permanent errors.
9. SYSnnn=255 - (Number of partitions times 14).
10. If User Error Routine is specified and the user needs the sense information to further process the error, byte 12, bit 2 must also be set. Otherwise, the supervisor error routine will mask off the status on return and the sense information is not available.-

Chart 02. Device ERP Functicnal Flow (Part 1 cf 3)

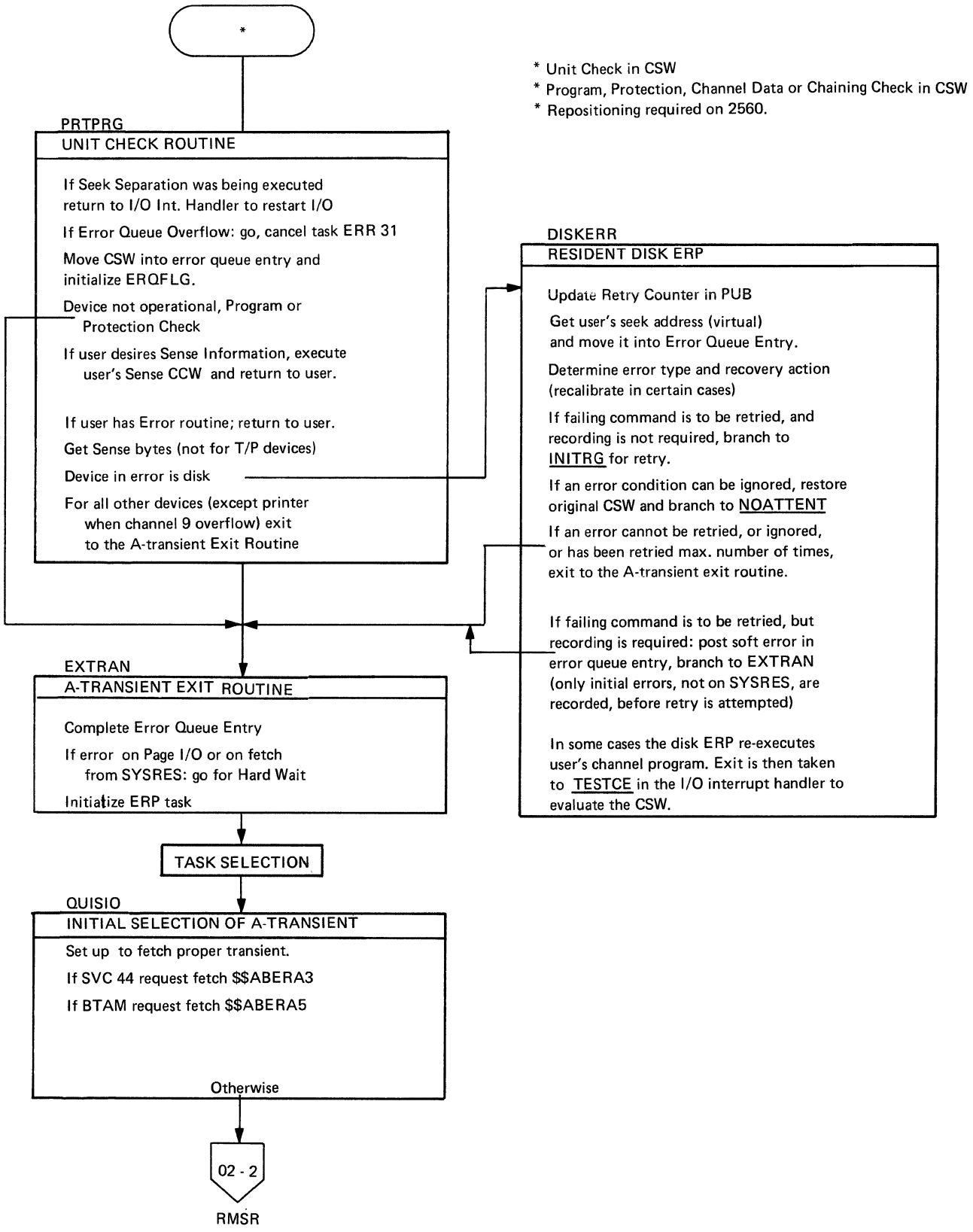


Chart 02. Device ERP Functicnal Flow (Part 2 cf 3)

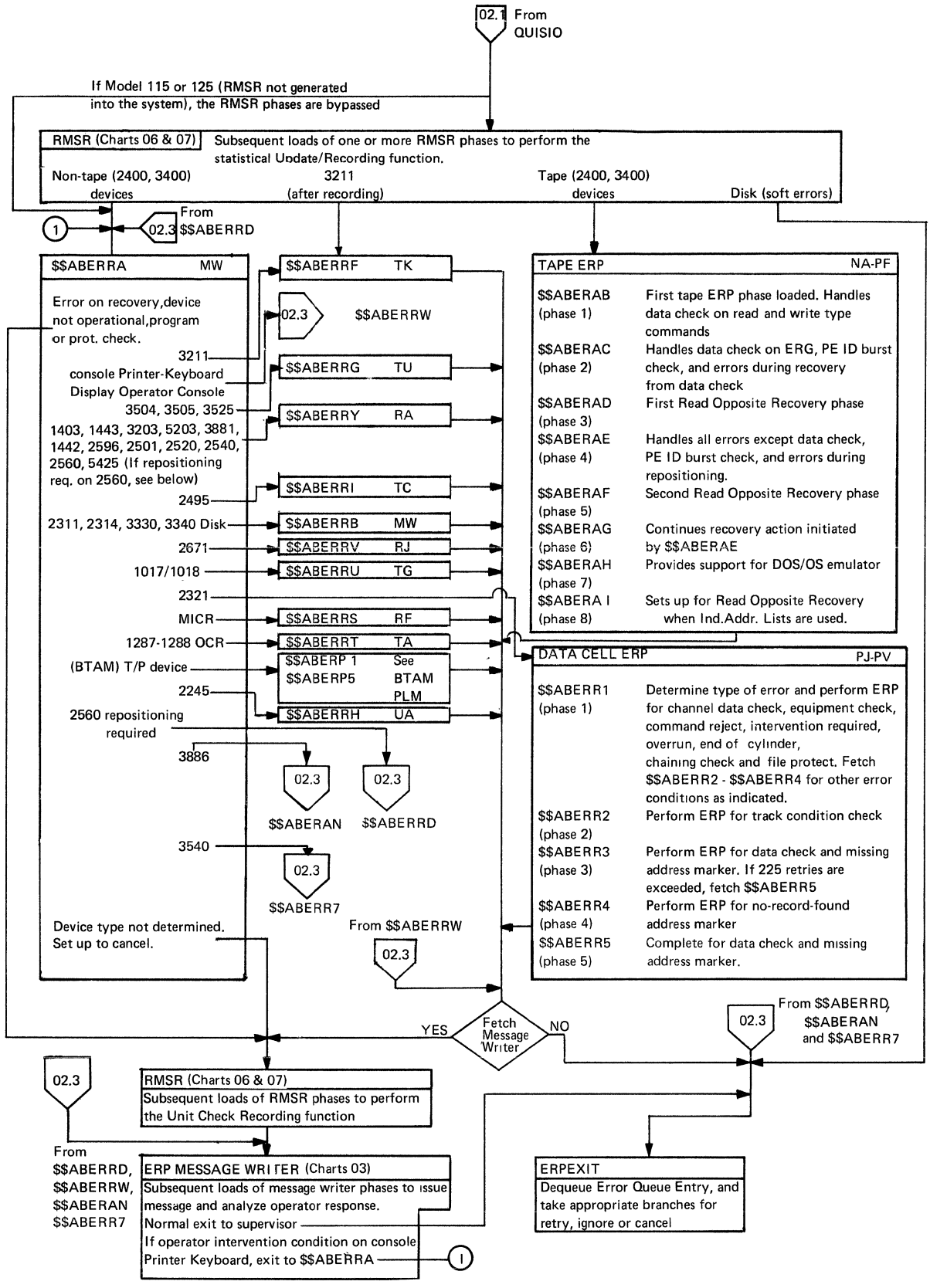
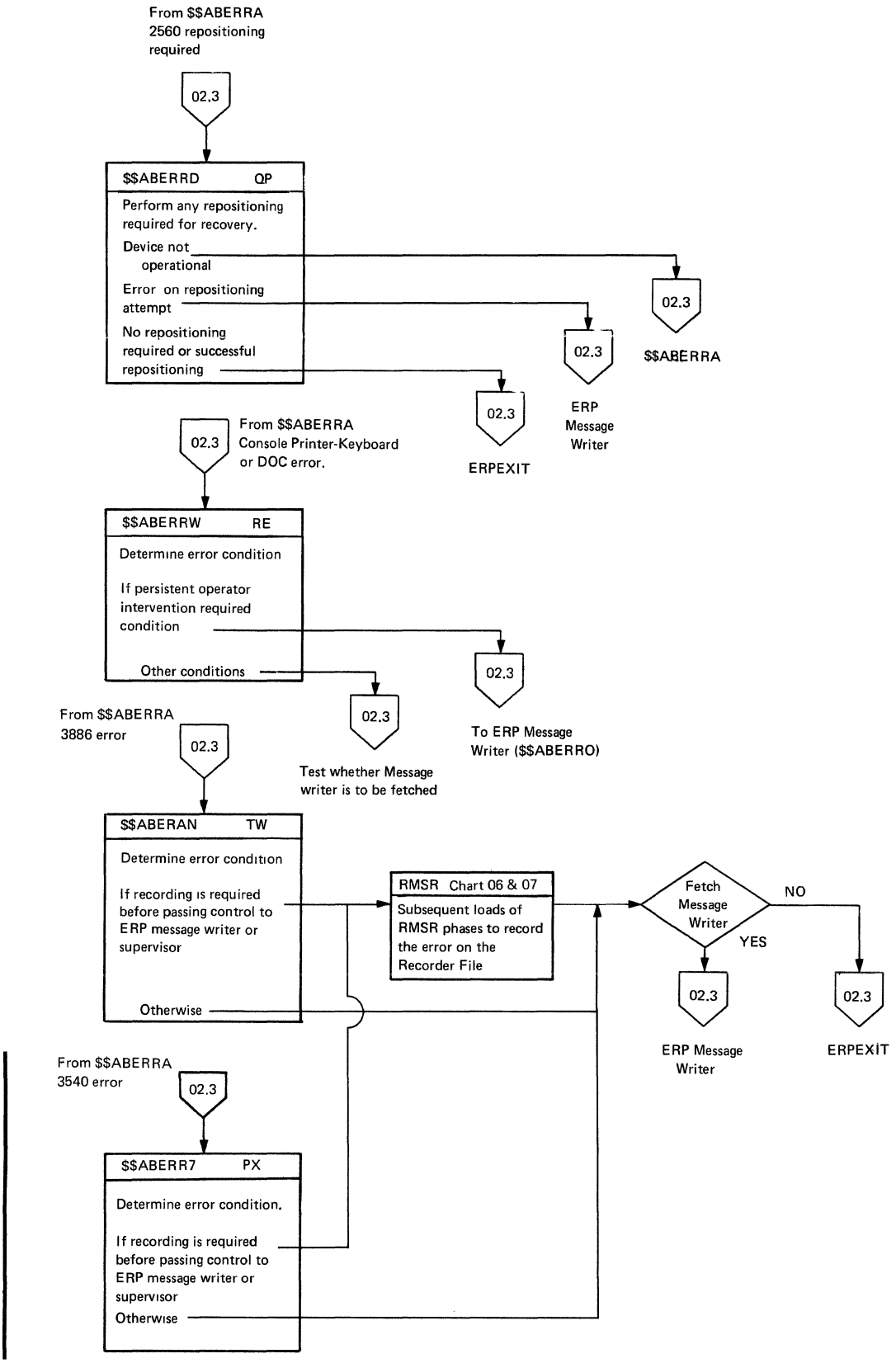


Chart 02. Device ERP Functicnal Flcw (Part 3 cf 3)



ERQUE DEVICE		SENSE BYTE 0 BITS :							
		0	1	2	3	4	5	6	7
DASD	2311, 2314 2319, 3330 3340, 2321	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	OVERRUN	TRACK CONDI-TION CHECK	SEEK CHECK
DISKETTE I/O UNIT	3540	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	N/A	N/A	N/A
TAPES	2400T7, 2400T9 3410T7, 3410T9 3420T7. 3420T9	COMMAND REJECT	INTERVEN TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	OVERRUN	WORD COUNT ZERO	(6)
READER PUNCH	1442, 2501,2520 2540, 2596,3504 3505, 3525	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	(3)	(5)	(7)
PRINTERS	1403,1404 1443	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	(4)	N/A	CHANNEL 9 OVERFLOW
	2245	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	FCB PARITY CHECK	LOAD CHECK	CHANNEL 9 OVERFLOW
	3211	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	BUFFER PARITY CHECK	LOAD CHECK	CHANNEL 9 OVERFLOW
PRINTER KEYBOARD	3210, 3215	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	N/A	N/A	N/A	N/A
PAPER TAPE READERS	2671 1017	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	N/A	N/A	(8)
PAPER TAPE PUNCH	1018	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	(2)	N/A	N/A	N/A
OPTICAL READER	1285,1287 1288	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	OVERRUN	NON-RE-COVERY	KEYBOARD CORREC-TION
	3886	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	N/A	N/A	NON-INITIALIZED	RCP ERROR
	3881	COMMAND REJECT	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	N/A	N/A	UNUSUAL COMMAND SEQUENCE	N/A
MICR	1412, 1419 1255, 1259 1270, 1275	(1)	INTERVEN-TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	OVERRUN	AUTO SELECT	(9)
TCR	2495	COMMAND REJECT	INTERVEN TION RE-QUIRED	BUSOUT CHECK	EQUIP-MENT CHECK	DATA CHECK	N/A	PARTITION CHECK	N/A
MFCM	2560	COMMAND REJECT	INTERVEN TION RE-QUIRED	N/A	EQUIP-MENT CHECK	DATA CHECK	FEED CHECK MACH CHECK	NO CARD AVAILABLE	N/A

Notes: N/A=Not Applicable

1 Command Reject or Disengage Failure (1412/1419); Command Reject or Control Command (1270/1275)
2 Only if Error Correction Feature present.
3 N/A for 2596, 3404, 3505 and 3525. Overrun for 1442, 2501, 2520, and 2540
4 UCB parity check (1403 only).
5 Unusual Command Sequence (2540 read only). Abnormal Format Reset (3505 and 3525 only)
6 Data Converter Check (3410T7 and 3420T7 only)
7 Permanent Error for 3404, 3505 and 3525. N/A for 1442, 2501, 2520, 2540, and 2596.
8 Applies to 1017 only, Broken Tape.

Figure 5. Sense Information for Devices Supported by Device Error Recovery (Part 1 of 2)

ERQUE DEVICE		SENSE BYTE 1 BITS: 0	1	2	3	4	5	6	7
DASD	2311, 2314 2319, 3330 3340, 2321	(10)	(17)	END-OF-CYLINDER	N/A	NO RECORD FOUND	FILE PROTECTED	(18)	(19)
DISKETTE I/O UNIT	3540	PERMANENT ERROR	AUTOMATIC RETRY	MOTION MALFUNC-TION	RETRY AFTER INTERVEN-TION	SPECIAL RECORD TRANS-FERRED	N/A	N/A	N/A
TAPES	2400T7, 2400T9 3410T7, 3410T9 3420T7, 3420T9	NOISE	TU STATUS A	TU STATUS B	SEVEN TRACK	AT LOAD POINT	SELECTED AND WAITE STATUS	FILE PROTECT RING MISSING	TAPE NOT COMPATIBLE
READER PUNCH *	1442, 2501, 2520 2540, 2596, 3504 3505, 3525	(11)	(13)	(14)	(15)	N/A	SELECTED AND WAITE STATUS	N/A	N/A
PRINTERS	1403, 1404 1443	(11)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2245	(11)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3211	COMMAND RETRY	PRINT CHECK	PRINT QUALITY	LINE POSITION	FORMS CHECK	COMMAND SUPPRESS	MECHANICAL MOTION	N/A
PRINTER KEYBOARD	3210, 3215	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAPER TAPE READERS	2671 1017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAPER TAPE PUNCH	1018	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OPTICAL READER	1285, 1287 1288	(12)	N/A	N/A	N/A	INVALID FONT (16)	N/A	N/A	N/A
	3886	N/A	LINE MARK STATION TIMING MARK CHECK	INVALID FORMAT	N/A	INCOMPLETE SCAN	N/A	NON-RECOVERY	OUTBOARD RECORD
	3881	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MICR	1412, 1419 1255, 1259 1270, 1275	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCR	2495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MFCM	2560	COVER INTERLOCK	JAM BAR CHECK	CORNER ST'N CHECK	CELL 8 TO 9 FEED CHECK	PRINT ST'N FEED CHECK	PUNCH ST'N FEED CHECK	READ ST'N FEED CHECK	INPUT ST'N FEED CHECK

Notes: N/A=Not Applicable

*For the 2596, the second sense byte contains the coded information of the error logged in the error log.

9 SIO-Batch numbering switch off; TIO Document Spacing Error (1287).

10 Data Check Count for 2311, 2314, 2319, and 2321. Permanent Error for 3330.

11 Permanent Error for 3404, 3505 and 3525. N/A for 1442, 2501, 2520, and 2540

12 Applies for 1287 to indicate tape (set to 1) or document (set to 0) mode.

13 Automatic Retry for 3404, 3505 and 3525. N/A for 1442, 2501, 2520 and 2540.

14 Motion Malfunction for 3404, 3505 and 3525. N/A for 1442, 2501, 2520, and 2540.

15 Retry after required intervention is complete for 3404, 3505 and 3525. N/A for 1442, 2501, 2520, and 2540.

16 Applies to 1287 in the document mode only.

17 Track Overrun (2311, 2314, 2319). Invalid Track Format (3330), operation incomplete (3340)

18 Write inhibited (3340), missing address marker (others)

19 Invalid track format (3340), overflow incomplete (others)

Figure 5. Sense Information for Devices Supported by Device Error Recovery (Part 2 of 2)

I/O ERROR RECOVERY PROCEDURES AND SENSE DATA

When the device in error is a tape (excluding 2495 tape-cartridge reader) the first ERP phase that gets control is $$ABERAB (see Chart 02).

For all other devices, $$ABERRA (see Chart 02) gets control. This transient analyzes the error type and the type of device in error and passes control to the proper ERP for the device in error, or to the ERP message writer (via RMSR).

The remainder of this section contains descriptions of the ERP phases with their corresponding messages.

Note: Although the disk error recovery procedure is not an A-transient, the sense data and action-taken information is included here to consolidate the sense data in this manual. The disk ERP is part of the supervisor nucleus.

CONSOLE PRINTER-KEYBOARD AND DISPLAY OPERATOR CONSOLE (DOC) ERROR RECOVERY ($$ABERRW)

Control is passed to this transient by the ERP monitor $$ABERRA. The following is a list of the conditions tested for. The ERP message writer prints any messages on SYSLST (if possible) and in the case of decision- or action-type messages displays message information in low real storage. The operator's reply to a decision-type message is to be entered in byte 4.

- CSW Bit 44 - Channel Data Check.

  Action: One retry. If error persists, exists to ERP message writer with the allow retry and allow ignore switches on.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 47 - Channel Chaining Check.

  Action: Exits to ERP message writer with the allow retry and allow ignore switches on.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 4, 5, 6, and 7.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: If error on DOC or on read command on Console Printer-Keyboard, exits to ERP message writer with the allow retry and allow ignore switches on. Otherwise, first one retry.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Executes audible alarm command and exits to ERP message writer. Control is returned to $$ABERRW (via $$ABERRA) if the device is not yet readied, to execute the alarm command again. If this occurs $$ABERRW, after a time interval of two seconds, passes control directly to the ERP message writer phase $$ABERR0. (On the initial intervention required condition, exit is taken to the ERP message writer in the normal way via RMSR). When the device is readied, the message writer exits to the supervisor for retry.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: One retry. If error persists, exits to ERP message writer with the allow retry and allow ignore switches on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- None of the above.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

2400, 3410, AND 3420 TAPE ERROR RECOVERY

2400, 3410, and 3420 tape error recovery consists of eight A-transients: 2400, 3410, and 3420 tape error recovery consists of eight A-transients: $$ABERAE, $$ABERAC, $$ABERAD, $$ABERAE, $$ABERAF, $$ABERAG, $$ABERAH and $$ABERAI. Control is first given to $$ABERAE after RMSR has performed its statistical counter update function. The following list gives the conditions tested for.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Exits to ERP message writer to issue message, after which the task will be canceled.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 2 - Bus Out Check.

  Action: If at initial selection, retry.

  Device end in unit status: If this condition occurs during a write, the tape is repositioned and the command is reissued. If this condition occurs during another type of command, the command is reissued. This procedure is followed until five retries have been attempted; if recovery is not successful, exits to ERP message writer to issue message, after which the task will be canceled.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: No device end in unit status: TU Status B (sense byte 1, bit 2) is tested. If TU Status B is off, the device is non-existent. No retries are attempted. If TU Status B is on, an operator intervention required message is provided and, when the unit is made ready, the command is reissued.

  Message: 0P08 INTERV REQ. or CP47 UNX INTERV. (for tapes that have been opened).

  Action: Device end in unit status: If the command was a rewind-unload, processing continues; otherwise, continues to check for a second error. Waits for tape to be mounted.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: If at load point and file protect, rewinds and unloads.

  Message: 0P17 FILE PROT.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 5 - Overrun.

  Action: The tape is repositioned and the command is reissued. This procedure is followed until five retries have been attempted. If recovery is not successful, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P14 OVERRUN.

  Note that a data check during overrun suppresses the overrun condition.

- Sense Byte 1, Bit 4 - Load Point

  Action: If not caused by read backward operation, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P29 BK INTO LP (Backspace into Load Point command).

- Sense Byte 0, Bit 4 - Data Check.

  Action: If the operation is read or read backward, and if the noise bit (byte 1, bit 0) is on, or if more than 11 bytes were read, the tape is repositioned and the read or read backward is retried. If the noise bit is on and the blocksize is less than the minimum requirement, recovery is not attempted and a data check is posted. If the noise bit is off and the blocksize is less than 12 bytes, another block is read and operation continues. This procedure is followed until forty retries have been attempted. Every fourth retry is followed by a tape cleaner action. A TIE (Track-In-Error) command is issued before every reread to send sense byte 2, which contains track-in-error information, to the tape control unit.

  If the above procedure does not recover the error, the error routine tries to recover by reading the opposite direction. If any of the following

conditions exists, however, the routine does not attempt opposite-direction recovery:

- Data chaining is being performed.
- Data conversion mode and 7-track tape are being used.
- The original CCW count is less than the physical block size on the tape.
- "Suppress data transfer" is specified in the original CCW.

In attempting opposite-direction recovery, the error routine first prepares to read without repositioning the tape. The routine then issues a Read or Read Backward command as its first retry. On subsequent retries, it repositions the tape, issues a Track-In-Error command, and then a Read or Read Backward command. After every fourth retry, the routine causes a tape-cleaner action. The routine continues to retry until it either succeeds (no unit check occurs) or has made 40 unsuccessful retries. The read-opposite CCW has the "suppress data transfer" bit set until the first successful retry. The routine then alters the read-opposite CCW so that it can transfer data. The alteration consists of clearing the "suppress data transfer" bit and placing the "exact" count and the data address in the CCW. The "exact" count equals the blocksize to be read. If successful, the routine issues a Forward Space Record command to reposition the tape past the block being read.

If all forty read-opposite recovery attempts are unsuccessful, the routiine makes one final retry, this time attempting to read in the original direction. Note that the routine avoids the final read attempt if either a permanent bus-out check occurs when the repositioning command is issued or an equipment check occurs. If the user will not accept the data check, exits to the ERP message writer (allow ignore) after the specified number of retries. If the user will accept the data check, exits to ERP message writer with PASSBK switch in ERQFLG on.

If the operation is a write or write tape mark, the tape is repositioned, an Erase Gap command is issued, and the Write or Write Tapemark command is reissued. This procedure is followed until fifteen retries have been attempted. For 3410 and 3420 tape units, a loop-write-to-read is issued between the 14th and 15th retries. If recovery is not successful, exits to ERP message writer to issue message, after which the task will be canceled.

If the operation is an erase gap, the command is reissued. This procedure is followed until three retries have been attempted; then exits to ERP message writer to issue message, after which the task is canceled.

Message: 0P11 DATA CHECK.

- CSW Bit 44 - Channel Data Check.

  Action: If this condition occurs during a read or write operation, the tape is repositioned and the command is reissued. If this condition occurs during a control command, the command is reissued. This procedure is followed until five retries have been attempted; then exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 7 - Data Converter Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P30 CONVRT CHK.

- Sense Byte 1, Bit 7 - Not Capable.

  Action: Rewinds and unloads tape. Waits for a new tape to be mounted.

  Message: 0P32 NON COMPAT.

- CSW Bit 47 - Channel Chaining Check.

  Action: The tape is repositioned and the command is reissued. This procedure is followed until five retries have been attempted; then, if recovery is without success, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P14 OVERRUN.

- Sense Byte 5, Bit 3 - PE ID Burst Check.

  Action: The tape is repositioned at the load point and retried fifteen times. If the fifteenth retry is also without success, the tape is unloaded. Waits for a new tape to be mounted.

  Message: 0P44 ID CHK.

- Sense Byte 7, Bit 4 - Unit Check (Data Security Erase Failed).

  Action: No retries are attempted. Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P42 DSE FAILED.

- Sense Byte 1, Bit 6 - File Protect.

  Action: No retries are attempted. Rewinds and unloads tape. Waits for file protect ring.

  Message: 0P17 FILE PROT.

- None of the above.

  Action: No retries are attempted. Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

1403, 1443, 3203, AND 5203 PRINTER ERROR RECOVERY ($$ABERRY)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for. For the 1443, bits 4 and 5 of sense byte 0 are set to zero.

- Sense Byte 0 = X'01' - Channel 9 Overflow.

  Action: Posts CCB and exits to continue processing.

  Note: This test is resident in real storage.

- CSW Bit 44 - Channel Data Check.

  Action: If initial selection, one retry. If error persists exits to ERP message writer. If Initial selection with the allow retry switch and if Channel end with both allow retry and allow ignore switches on.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 47 - Channel Chaining Check.

  Action: Exits to ERP message writer with allow retry switch on.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 2 (3203, 5203U), Bit 2,4, 5 (5203), Bit 4, 5 (1403) or Bit 6 (1403U, 1443).

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Exits to ERP message writer with the allow ignore switch on.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 5 - Code General Storage Parity Error (1403U, 3203, 5203U).

  Action: If not channel end, exits to ERP message writer to issue message, after which the task is canceled. UCS buffer must be reloaded. Otherwise, first one retry.

  Message: 0P33 BUF PARITY.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: If device end without channel end, ignores this condition. Otherwise, exits to ERP message writer for operator intervention.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer. If Initial selection with the allow retry switch and if Channel end with both allow retry and allow ignore switches on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check (1403U, 3203, 5203U).

  Action: If byte 0, bit 0 is on see Command Reject. Otherwise, exits to ERP

message writer with the allow ignore switch on.

Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: If command code is a UCS block data check or reset block data check command, this condition is ignored and processing continues. Otherwise, exits to ERP message writer to issue message, after which the task is canceled. This procedure allows UCS-oriented programs to operate on non-UCS hardware.

  Message: 0P18 COMM REJCT.

- Sense Byte 0 = X'00'.

  Action: If not initial selection, exits to ERP message writer with the allow retry switch on. If initial selection, first one retry.

  Message: 0P19 UNDETR ERR.

3211 PRINTER ERROR RECOVERY ($$AEERRF)

Control is normally passed to this transient by the ERP monitor $$AEERRA. When counter overflow or CE mode recording has taken place, the RMSR transients $$AERA1 and $$AERA2 may pass control to this phase. The following list gives the conditions tested for.

- Sense Byte 0, Bit 7 - Channel 9 Overflow.

  Action: Posts CCB and continues error testing.

  Note: There is also a main storage resident test for Channel 9 Overflow (with no other bits posted in sense byte 0).

- CSW Bit 44 - Channel Data Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled. If Channel end, exits to ERP message writer with the allow ignore switch on.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bit 0 - Command retry
  Bit 6 - Mechanical motion
  Bit 1 - Print check
  Bit 2 - Print quality
  Bit 3 - Line position.

  If none of the preceding conditions occurred, then a transparent sync check or a train overload condition occurred.

  Action: Exits to resident routines (via RMSR transients) to continue processing.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to ERP message writer for operator intervention (Intervention Required bit in ERQFLG on). The operator should make the device ready to continue processing.

  A Forms Check or an Interlock Condition has occurred on the 3211. The probable causes are:

  Carriage Detent Switch off
  Paper jammed or forms torn
  Out of paper
  Stacker full
  Gate not latched
  Train not positioned
  Stop key active
  Vacuum low
  Train overload.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: If not with FCB parity check (sense byte 3, bit 2), one retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled.

  If with FCB parity check, exits to ERP message writer with the allow retry switch on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bit 1 - Print check
  Bit 3 - Line position.

  If neither of the preceding conditions occurred, takes the following action:

  Action: Exits to ERP message writer with the allow ignore switch on.

  Message: 0P11 DATA CHK.

- Sense Byte 0, Bit 5 - Buffer Parity Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bit 3 - Line position
  Bit 0 - Command retry.

  If neither of the preceding conditions occurred, takes the following action:

  Action: If the error occurred on a write command, posts it in the associated CCB. If return is specified in the CCB (byte 2, bits 5 and 6 on), turn on the PASSBK switch in ERQFLG and exits to ERP message writer to issue message, after which control will be returned to user. If return is not specified, exits to ERP message writer with the allow ignore switch in ERQFLG on, to provide a message that allows the operator to respond with IGNORE or CANCEL.

  If the error occurred on a Buffer Read command, returns (via RMSR transients) to resident routines to continue processing.

  Message: 0P33 BUF PARITY.

- Sense Byte 0, Bit 3 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 6 - Load Check.

  Action: An error condition occurred when either the UCSB or the FCB was loaded. Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P41 LOAD CHECK.

- None of the above.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

- Sense Byte 1, Bit 0 - Command Retry.

  Action: For message 0P10, a print line buffer parity check occurred. The recovery procedure depends on the user's error option for Command Retry (CCB byte 2, bit 5).

  a. If the Command Retry option is specified, reissues the failing CCW. If the retry is unsuccessful, the error is considered uncorrectable. Issues a Skip to channel 0 (X'83') command to allow the carriage to perform the suppressed carriage motion command. Then exits to ERP message writer to issue message, after which the task is canceled.

  b. If the Command Retry option is not specified, issues a Skip to channel 0 (X'83') command to allow the carriage to perform the suppressed carriage motion command. Then exits to ERP message writer to issue message, after which the task is canceled.

  For message 0P33, a UCSB parity check occurred. If return is specified in the CCB (byte 2, bits 5 and 6 on), turns on the PASSBK switch in ERQFLG and exits to ERP message writer to issue message, after which control will be returned to user. If return is not specified, issues a Skip to channel 0 (X'83') command to allow the carriage to perform the suppressed carriage motion command, then exits to ERP message writer to issue message, after which the task is canceled.

  Note: When control is returned to the user, the action depends on the user's error routine to reload the UCS buffer. After the UCS buffer is reloaded, the failing CCW can be reissued.

- Sense Byte 1, Bit 1 - Print Check.

  Action: For message 0P10, a print check occurred for one or more of the following reasons:

  Hammer fire check
  Sync check
  Coil protection.

  For message 0P11, a print check occurred because of an unprintable character. In both cases (0P10 and 0P11) the following action is taken:

  Posts the error in the CCB. If return is specified in the CCB (byte 2, bits 5 and 6 on), turns on the PASSBK switch in ERQFLG and exits to ERP message writer to issue message, after which control will be returned to user. If return is not specified, then exits to ERP message writer with the allow ignore switch on.

- Sense Byte 1, Bit 2 - Print Quality.

  Action: A print quality check occurred because the platen failed to advance or retract, or because excessive ribbon motion or ribbon skew or both were detected. Posts the error in the CCB. If return is specified in the CCB (byte 2, bits 5 and 6 on), turns on the PASSBK switch in ERQFLG and exits to ERP message writer to issue message, after which control will be returned to user. If return is not specified, then exits to ERP message writer with the allow ignore switch on.

- Sense Byte 1, Bit 3 - Line Position.

  Action: For message 0P10, the probable causes are:

  Carriage failed to move
  Carriage sequence check
  Carriage stop check.

  For message 0P11, the probable cause is:
  Non-compare FCB.

  For message 0P33, the probable cause is:
  Parity check FCB.

  In each case, posts the error in the CCB. If return is specified in the CCB (byte 2, bits 5 and 6 on), turns on the PASSBK switch in ERQFLG and exits to ERP message writer to issue message, after which control will be returned to user. If return is not specified, exits to ERP message writer with the allow ignore switch on (0P10 and 0P11). For message 0P33, the task is canceled eventually.

- Sense Byte 1, Bit 6 - Mechanical Motion.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

2245 PRINTER ERROR RECOVERY ($$AEERRH)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for.

- Sense Byte 0, Bit 7 - Channel 9 Overflow.

  Action: Post CCB and continue error testing.

  Note: There is also a main storage resident test for Channel 9 Overflow (with no other bits in sense byte 0 on).

- CSW Bit 44 - Channel Data Check.

  Action: If initial selection, one retry. If error persists exits to ERP message writer to issue message, after which the task is canceled. Channel end: exits to ERP message writer with the allow ignore switch on.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 6 - Load Check.

  Action: One retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P41 LOAD CHECK.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 5 - FCB Parity Check.

  Action: If the command is load FCB, one retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled. If the command is not load FCB, posts 'Line Position' in the CCB and tests the CCB for passback option (byte 2, bits 5 and 6). If on, posts PASSBK in the ERQFLG flag byte and exits to ERP message writer. If not on, exits to ERP message writer with allow ignore switch on.

  Message: 0P33 BUF PARITY.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: If initial selection, or data transfer of a load FCB command, one retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled. If data transfer of a write command, no retry.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Posts 'Line Position' in the CCB and tests the CCB for passback option (byte 2, bits 5 and 6). If on, posts PASSBK in the ERQFLG flag byte and exits to ERP message writer. If not on, exits to ERP message writer with allow ignore switch on.

  Message: 0P11 DATA CHECK.

- None of the above.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

1442 AND 2596 PUNCHED CARD DEVICE ERROR RECOVERY ($$ABERRY)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for.

- CSW Bit 44 - Channel Data Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer with the allow retry switch on. If data transfer, exits to ERP message writer for operator intervention.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 47 - Channel Chaining Check (1442P only).

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 6 and 7.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: If device end without channel end, ignores this condition. Otherwise, exits to ERP message writer for operator intervention.

  Message 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer with the allow retry switch on. If data transfer, exits to ERP message writer for operator intervention.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 5 - Overrun (1442 only).

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P14 OVERRUN.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0 = X'00'.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

2501, 2520, AND 2540 PUNCHED CARD DEVICE AND 3881 OPTICAL MARK READER ERROR RECOVERY ($$ABERRY)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for.

- CSW Bit 44 - Channel Data Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer with the allow retry switch on. If read data transfer, exits to ERP message writer for operator intervention. If punch data transfer, one retry. If error persists, exits to ERP message writer with the allow retry switch on.

  Message: 0P28 CHAN DTCHK

- CSW Bit 47 - Channel Chaining Check (2540, 2520P and 3881 only).

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 6 and 7 (2501); Bits 5 and 7 (2540, 3881); Bits 4, 5, and 6 (2520, on Write command), Bit 6 (2520, not on Write command).

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Reader - Exits to ERP message writer for operator intervention. Punch - If initial selection continues testing sense bits. Otherwise, if Return Equipment Check bit in CCB is on, switches PASSBK on, posts CCB (Eq. Check) and exits to ERP message writer. If Return Equipment Check bit is not on, exits to ERP message writer with the allow ignore switch on. For 2520, Byte 0, Bit 7 indicates punch check.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: If device end without channel end, ignores this condition. Otherwise, exits to ERP message writer for operator intervention.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: If initial selection, one retry. If error persists, exits to ERP message writer with the allow retry switch on. If the device is a 2540P, also one retry even when not initial selection.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check (cannot occur on 2520 punch or 3881).

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 5 - Overrun (cannot occur on 2540 or 2520 punch or 3881).

  Action: Exits to ERP message writer for operator intervention.

  Message: 014 OVERRUN.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 6 - Unusual Command Sequence (2540 read command or 3881).

  Action: Posts CCB and continues, ignoring the condition.

  Message: 0P18 COMM REJCT.

- Sense Byte 0 = X'00'.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

- CSW Bit 47 - Channel Chaining Check (not 2540, 2520P, or 3881).

  Action: Exits to ERP message writer for operator intervention.

  Message: 0P14 OVERRUN.

- None of the above.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

3504, 3505, AND 3525 PUNCHED CARD DEVICE ERROR RECOVERY ($$ABERRG)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for.

- CSW Bit 45 and 46 - Channel or Interface Control Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- CSW Bit 44 - Channel Data Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P28 CHAN DTCHK.

- CSW Bits 32, 33, and 34 (unused status bits) - or not Unit Check in CSW status byte - or Sense Byte 0, Bit 5 (unused sense bit).

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 7 - Permanent Error (Error Bypass Key).

  Action: Operator pressed the permanent error bypass key instead of having recovery performed. If Return Permanent Error bit in CCB is on, switches PASSBK in ERQFIG on, posts CCB and exits to ERP message writer. Otherwise, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P49 PERM ERROR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bits 4, 5, 6, and 7 - unused bits
  Bit 0 - Permanent Error
  Bit 3 - Retry after intervention complete
  Bit 1 - Automatic Retry.

  If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 6 - Abnormal Format Reset.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

Bits 4, 5, 6, and 7 - unused bits
Bit 0 - Permanent Error
Bit 3 - Retry after intervention complete
Bit 1 - Automatic Retry.

If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

Message: 0P48 FORMAT RST.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bits is on when tested, the system takes the action indicated in the discussion of these bits.

  Bits 4, 5, 6, and 7 - unused bits
  Bit 0 - Permanent Error
  Bit 3 - Retry after intervention complete
  Bit 1 - Automatic Retry.

  If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bits 4, 5, 6, and 7 - unused bits
  Bit 0 - Permanent Error
  Bit 3 - Retry after intervention complete
  Bit 1 - Automatic Retry.

  If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action of these bits.

  Bits 4, 5, 6, and 7 - unused bits
  Bit 0 - Permanent Error
  Bit 3 - Retry after intervention complete
  Bit 1 - Automatic Retry.

  If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Checks the following bits of sense byte 1 in the order indicated; if a bit is on when tested, the system takes the action indicated in the discussion of these bits.

  Bits 4, 5, 6, and 7 - unused bits
  Bit 0 - Permanent Error
  Bit 3 - Retry after intervention complete
  Bit 1 - Automatic Retry.

  If none of the preceding conditions occurred, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- None of the above.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 1, Bits 4, 5, 6, and 7 - unused bits.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: See corresponding bits in Byte 0.

- Sense Byte 1, Bit 0 - Permanent Error.

  Action: If Return Permanent Error bit in CCE is on, switches PASSBK in ERQFIG on, posts CCB and exits to ERP message writer. Otherwise, exits to ERP message writer to issue message, after which the task is canceled.

  Message: see corresponding bits in Byte 0.

- Sense Byte 1, Bit 3 - Retry after Intervention complete.

  Action: Exits to ERP message writer for operator intervention. (Intervention Required flag in ERQFLG on).

  Message: see corresponding bits in Byte 0.

- Sense Byte 1, Bit 1 - Automatic Retry.

  Action: Retries failing CCW once. If successful, continues normal program execution. If unsuccessful, and if Return Permanent Error bit in CCB is on, switches PASSBK in ERQFLG on, posts CCB and exits to ERP message writer. Otherwise, exits to ERP message writer to issue message, after which the task is canceled.

  Message: see corresponding bits in Byte 0.

2560 CARD MACHINE ERROR RECOVERY ($$ABERRY, $$ABERRC, $$ABERRD)

Control is passed to $$ABERRY by the ERP monitor $$ABERRA. The transients $$ABERRC and $$ABERRD are called only if operator intervention is required. $$ABERRC is called by $$ABERRM and $$ABERRD is called by the ERP monitor $$ABERRA. The following list gives the conditions tested for by $$ABERRY.

- CSW Bit 44 - Channel Data Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled. If initial selection, first one retry.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 47 - Channel Chaining Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 2 and 7.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Posts CCB (byte 3, bit 3). Checks CCB whether user wants return. If this is the case, exits to the ERP message writer with the PASSBK flag in ERQFLG on.

  If the user did not specify return, exit is taken to the ERP message writer for operator intervention (OPINT in ERQFLG on). This causes the message writer phase $$ABERRM to fetch the special 2560 message writer phase $$ABERRC. $$ABERRC provides the appropriate restart information in the message and stores repositioning information in the System Communication Region (SYSCOM) for use by $$ABERRD. The repositioning required condition is indicated in the PUB. It then passes control to the next ERP message writer phase $$ABERRN for operator intervention with the allow retry switch on.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to ERP message writer for operator intervention. The operator intervention required flag (OPINT) in ERQFLG causes the ERP message writer phase $$ABERRM to fetch the special 2560 message writer phase $$ABERRC. $$ABERRC provides the appropriate restart information in the message and stores repositioning information in the System Communication Region (SYSCOM) for use by $$ABERRD. The repositioning required condition is indicated in the PUB. It then passes control to the next ERP message writer phase $$ABERRN for operator intervention with the allow retry switch on.

  However, if $$ABERRC determines a Intervention Required condition, not at Initial Selection and not Cover or Feed/Machine Check, the error is ignored.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Posts CCB (byte 3, bit 3). Checks CCB whether user wants return. If this is the case, exits to the ERP message writer with the PASSBK flag in ERQFLG on.

  If the user did not specify return, exit is taken to the ERP message writer for operator intervention (OPINT in ERQFLG

cn). This causes the message writer phase $$ABERRM to fetch the special 2560 message writer phase $$ABERRC.

If the data check is on a command other than read, $$ABERRC returns control to the supervisor for one retry. If the error persists, control is passed to the supervisor to cancel the task. No message is issued.

For other data checks, $$ABERRC provides the appropriate restart information in the message and stores repositioning information in the System Communication Region (SYSCOM) for use by $$ABERRD. The repositioning required condition is indicated in the PUB. It then passes control to the next ERP message writer phase $$ABERRN for operator intervention with the allow retry switch on.

Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 6 - No Card Available.

  Action: Posts CCB and exits to ERP message writer with the allow ignore switch on.

  Message: 0P18 COMM REJCT.

- Sense Byte 0 = X'00'.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

$$ABERRD is called by the ERP Monitor $$ABERRA when it finds that the device in error is a 2560 with the high-order bit (repositioning required, set by $$ABERRC) in the PUBOPIN byte of the PUB on. $$ABERRD performs any repositioning necessary before an attempt to retry the failing operation can be made. It uses the repositioning information stored in SYSCOM by $$ABERRC.

If the device is not operational, control is passed to $$ABERRA, with the repositioning required bit reset. Eventually the task will be canceled.

If an error occurs during the repositioning attempt, control is passed to the ERP message writer with the CPINT (X'40') and allow retry (X'04') flags in ERQFLG on. Eventually $$ABERRC receives control again and moves the restart number 5 (error on recovery) into the message.

After successful repositioning, the repositioning required flag is reset and control is passed to the supervisor to retry the failing operation.

5425 CARD MACHINE ERROR RECOVERY ($$ABERRY, $$ABERRE, $$ABEREE, $$ABERRD)

Control is passed to $$ABERRY by the ERP monitor $$ABERRA. The transients $$ABERRE, $$ABEREE, and $$ABERRD are called only if operator intervention is required. $$ABERRE is called by $$ABERRM and $$ABERRD is called by the ERP monitor $$ABERRA. The following list gives the conditions tested for by $$ABERRY.

- CSW Bit 44 - Channel Data Check.

  Action: Exits to ERP message writer to issue message, after which the task is cancelled. If initial selection, first one retry.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 47 - Channel Chaining Check.

  Action: Exits to ERP message writer to issue message, after which the task is cancelled.

  Messgae: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 2, 4, 5, and 7.

  Action: Exits to ERP message writer to issue message, after which the task is cancelled.

  Message: 0P19 UNDETR ERR.

  Note: This message is also issued if the equipment check bit is on (see below) and sense byte 1 is zero.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Posts CCB (byte 3, bit 3). Checks CCB whether user wants return. If this is the case, exits to the ERP message writer with the PASSBK flag in ERQFLG on. If the user did not specify return, exit is taken to the ERP message writer for operator intervention (OPINT in ERQFIG on). This causes the message

writer phase $$ABERRM to fetch the special 5425 message writer phase $$ABERRE. $$ABERRE provides (1) the restart information in the message and (2) the CCW operation codes for the restart in the IJBMFCER area of the ERP SYSCOM; these operation codes are later used by $$ABERRD. The Repositioning Required condition is indicated in the PUB. $$ABERRE then passes control to the next ERP message writer phase $$ABERRN for operator intervention with the for operator intervention with the Allow Retry switch on.

Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to ERP message writer for operator intervention. The Operator Intervention Required flag (OPINT) in ERQFLG causes the ERP message writer phase $$ABERRM to fetch the special 5425 message writer phase $$ABERRE. In case of Device Not Ready and CCB byte 2 bit 4 on, d bit 4 on, $$ABERRE returns to user (PASSBK in ERQFLG on). Otherwise $$ABERRE provides (1) the restart information in the message and (2) the CCW operation codes for the restart in the IJBMFCER area of the ERP SYSCOM; these operation codes are later used by $$ABERRD. If a feed check has occurred, control is passed to $$ABEREE which completes the error message and generates the CCW operation codes for feed-check restart. The Repositioning Required condition is indicated in the PUB. $$ABERRE then passes control to the next ERP message writer phase $$ABERRN for operator intervention with the Allow Retry switch on.

  However, if $$ABERRE determines an Intervention Required condition, not at Initial Selection and not Hopper or Feed Check, the error is ignored.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is cancelled.

  Message: 0P18 COMM REJCT.

- Sense Byte 0, Bit 6 - No Card Available.

  Action: Exits to ERP message writer to issue message, after which the task is cancelled.

  Message: 0P18 COMM REJCT.

$$ABERRD is called by the ERP Monitor $$ABERRA when it finds that the device in error is a 5425 with the high-order bit (Repositioning Required, set by $$ABEREE or $$ABERRE) in the PUBCPTN byte of the PUB on. $$ABERRD performs any repositioning necessary before an attempt to retry the failing operation can be made. It uses the CCW operation codes stored in SYSCOM by $$ABEREE or $$ABERRE.

If the device is not operational, control is passed to $$ABERRA, with the Repositioning Required bit reset. Eventually, the task will be cancelled.

If an error occurs during the repositioning attempt, control is passed to the ERP message writer with the OPINT (X'40') and Allow Retry (X'04') flags in the ERQFLG on. Eventually, $$ABERRE receives control again and moves the restart number 6 (error on recovery) into the message.

After successful repositioning, the Repositioning Required flag is reset and control is passed to the supervisor to retry the failing operation.

2671 ERROR RECOVERY ($$ABERRV)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives the conditions tested for.

- CSW Bit 44 - Channel Data Check.

  Action: If not initial selection, exits to ERP message writer to issue message, after which the task is canceled. If initial selection, first one retry.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bits 5, 6, and 7 (unused bits) - or Byte 0, Bit 2 (Bus-Out) with channel End or device End.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Tests CCB for ignore option (byte 2, bit 4) and if on, turns on byte 3, bit 1 of the CCB and exits to the ERP message writer with both allow ignore

and allow retry switches on. Otherwise, exits to ERP message writer for operator intervention.

Message: 0P10 EQUIP CHK.

Note: When an equipment check occurs, reposition the paper tape to the beginning of the record in error to perform the retry operation. The device must not be readied until this repositioning has been performed. If the ignore option is available, exercise this option by repositioning the tape to the beginning of the next record on the tape and then responding IGNORE on the console printer-keyboard. The ignore option is available to the operator whenever the user specifies any of the DTFPT ERROPT entry options.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to ERP message writer for operator intervention. (Intervention Required flag in ERQFLG on).

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: One retry. If error persists, exits to ERP message writer with the allow retry switch on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check.

  Action: Tests CCB for ignore option (byte 2, bit 4) and if on, turns on byte 3, bit 3 of the CCB and exits to the ERP message writer with both allow ignore and allow retry switches on. Otherwise, exits to ERP message writer for operator intervention.

  Message: 0P11 DATA CHECK.

  Note: When a data check occurs, the user's CCW is modified by the error routine to allow rereading of the last character. The data address is the last character read (character in error), and the byte count is decreased by the number of valid characters read. If the CCB ignore option is chosen and the operator responds IGNORE, the I/O operation is dequeued and posted with the unrecoverable error bit on (CCB byte 2, bit 2) and 2671 data check bit on (CCB byte 3, bit 3).

  To read the rest of the record, the problem program (logical IOCS) should add one to the CCW data address and subtract one from the byte count to adjust for not reading the bad character. It should then reissue the EXCP. The operator must backspace the tape two character characters for retry (option retry or on the A-type message when ignore is not allowed). If the operator chooses the ignore option (the character in error is not to be reread), he must backspace the tape one character if the load key was pressed to free the tape or if the character preceding the character under the read head is EOR (End-Of-Record). Otherwise, no manual intervention is required for the ignore option. The ignore option is available to the operator whenever the user specifies any of the DTFPT ERROPT entry options.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P18 COMM REJCT.

  Note: A record must not be partly on one tape and partly on another.

- None of the above.

  Action: Exits to ERP message writer with the allow retry switch on.

  Message: 0P19 UNDETR ERR.

2311 AND 2314 DASD ERROR RECOVERY

This routine is resident and entered at label DISKERR. The following list gives the conditions tested for.

- CSW Bit 44 - Channel Data Check.

  Action: One retry. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P10 EQUIP CHK.

- Sense Byte 1, Bit 4 - No Record Found.

  Action: Tests for byte 1, bit 6 (Missing Address Marker). If present, executes restore command and exits to retry the operation. If the error still persists after 10 retries, exits to disk ERP transient and ERP message writer with the allow retry switch on. If not present, reads Home Address and compares it to user's Seek Address. If equal, posts No Record Found to the CCB and exits to continue processing. If not equal, the condition is treated as a Seek Check.

  Message: 0P21 NRF - MADDMK (No Record Found/Missing Address Marker), or 0P15 SEEK CHECK (Home Address unequal to Seek Address).

  Note: Home Address is read, and the track address is provided for the error message. For other errors, the track address is obtained from the user seek address if error occurs during channel program execution.

- Sense Byte 0, Bit 7 - Seek Check.

  Action: If byte 0, bit 0 (command reject) is on, exits to disk ERP transient and ERP message writer to issue message after which the task is canceled. Otherwise, executes restore command and exits to retry the operation. If the error still persists after ten retries, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P26 INVAL SEEK (Seek Check/Command Reject), or 0P15 SEEK CHECK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Exits to disk ERP transient and ERP message writer for operator intervention.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: Exits to retry the operation. If the error still persists after ten retries, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4 - Data Check.

  Action: CCB options (all data checks, data check on read or verify). Exits to retry the operation. If the error still persists after 256 retries, exits to disk ERP transient and ERP message writer with the allow retry switch on. After each 16 retries, a recalibrate is performed until the maximum of 256 retries is reached. If error persists after 256 retries, posts data check on count to CCB, if present; otherwise, posts data check. If command code is verify (implied), posts verify error in CCB.

  The verify command is implied under the following conditions:

  The CCW has a command code X'01' (Write - Special Count, Key and Data), and the skip and SLI flags are set on.

  The CCW has a command code X'1E' (Read - Count, Key and Data), the skip and SLI flags are set on, and this CCW follows a CCW with a write command code X'1D'.

  Message: 0P12 VERIFY CHK (Data Check on Verify command), or 0P11 DATA CHECK (Data Check/not Data Check on Count or Verify), or 0P16 DTA CHK CT (Data Check on Count).

  Note: Home Address is read, and the track address is provided for the error message. For other errors, the track address is obtained from the user seek address if error occurs during channel program execution.

- Sense Byte 0, Bit 5 - Overrun.

  Action: Exits to retry the operation. If the error still persists after ten retries, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P14 OVERRUN.

- Sense Byte 1, Bit 6 - Missing Address Markers.

  Action: Exits to retry the operation. If the error still persists after ten retries, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P13 ADDR MRKER.

  Note: Home Address is read, and the track address is provided for the error message. For other errors, the track

address is obtained from the user seek address if error occurs during channel program execution.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Check for Byte 1, Bit 5 (File Protect); exits in either case to disk ERP transient and ERP message writer to issue message after which the task is canceled.

  Message: 0P18 COMM REJCT, or 0P17 FILE PROT.

- Sense Byte 0, Bit 6 - Track Condition Check.

  Action: Reads Home Address and R0 in the error recovery routine and moves CCHH from R0 to Seek command executed below.

  If alternate track: updates seek address to the next track address. If the track address equals ten, treats it as End of Cylinder; otherwise proceeds to next step.

  Sets up the channel program: Seek, Read Home Address (with skip bit on), TIC to CSW address minus eight. Executes this channel program in error recovery. At channel end, exits to channel scheduler CSW processing routine. If DASD file protection is present, sets the appropriate file mask following Seek.

- Sense Byte 1, Bit 1 - Track Overrun.

  Action: Posts track overrun to the CCB and exits to continue processing.

- Sense Byte 1, Bit 2 - End of Cylinder.

  Action: Posts End of Cylinder to the CCB and exits to continue processing.

- Sense Byte 1, Bit 5 - File Protect.

  Action: Exits to disk ERP transient and ERP message writer to issue message after which the task is canceled.

  Message: 0P17 FILE PROT.

- CSW Bit 47 - Chaining Check.

  Action: Ten retries. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P14 OVERRUN.

  Note: If the error routine gets an error while trying to execute a Restore command or Read Home Address or R0, exit is taken to the ERP message writer with the allow retry switch on.

  Message: 0P20 ERR ON REC (error during recovery).

3330 DISK STORAGE ERROR RECOVERY

This routine is resident and entered at label DISKERR. The following list gives the conditions tested for.

- CSW Bit 44 - Channel Data Check.

  Action: One retry. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P28 CHAN DTCHK.

- Sense Byte 1, Bit 0 - Permanent Error.

  Action: Exits to retry the operation.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Ten retries. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: One retry. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: One retry. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Exits to disk ERP transient and ERP message writer to issue message after which the task is canceled.

  Message: 0P18 COMM REJCT.

- Sense Byte 1, Bit 4 - No Record Found.

  Action: Retries nine times. If condition persists, posts no-record-found to CCB and exits to continue processing.

  Message: 0P21 NRF-MADDMK.

- Sense Byte 0, Bit 5 - Overrun.

  Action: Nine retries. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P14 OVERRUN.

- Sense Byte 1, Bit 1 - Invalid Track Format.

  Action: Posts track overflow to CCB and exits to continue processing.

- Sense Byte 0, Bit 4 - Data Check.

  Action: If error is not correctable (Byte 2, Bit 1 = 0), then retries nine times and if error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  If error is correctable and track overflow occurred (Byte 1, Bit 7), then exit is taken to retry the operation.

  If error is correctable with no track overflow, then the error correction bytes are ORed to error bytes in the data area, channel end and device end are posted in the CCB, and exit is taken to continue processing.

  If the error correction function detects incorrect length and the SLI flag bit is off, then incorrect length is also posted to the CCB before exit is taken.

  If chaining and end-of-record has been detected by error correction before the end of the user's channel program, then a Read Count CCW and TIC to user's next CCW is built, and exit is taken to restart the operation.

  If channel truncation exits, the equipment check bit in sense byte 0 is turned on and exit is taken to retry the operation.

  Message: 0P11 DATA CHECK.

- Sense Byte 1, Bit 3 - End of Cylinder.

  Action: Posts End of Cylinder to the CCB and exits to continue processing.

- Sense Byte 1, Bit 5 - File Protect.

  Action: Exits to disk ERP transient and ERP message writer to issue message after which the task is canceled.

  Message: 0P17 FILE PROT.

- Sense Byte 1, Bit 7 - Track Overflow.

  Action: Exits to retry the operation.

- Sense Byte 2, Bit 3 - Environmental Data Present.

  Action: Decrements error count and exits to retry the operation.

- CSW Bit 47 - Chaining Check.

  Action: Ten retries. If error persists, exits to disk ERP transient and ERP message writer with the allow retry switch on.

  Message: 0P14 CVERRUN.

3340 DASD ERROR RECOVERY

This routine is resident and entered at label DISKERR. The following list gives the conditions tested for.

- Sense Byte 0, Bit 0 - Command reject.

  Action: Permanent error - the existing supervisor permanent error routine will be used.

  Message: 0P18 COMM REJCT.

- Sense Byte 1, Bit 1 - Invalid track format.

  Action: Post the track overflow bit in the CCB and continue.

- Sense Byte 0, Bit 4 - No record found.

  Action: Post the no record found bit in the CCB and take the continue exit. If user wants to retry, retry 10 times, then take a permanent error exit.

  Message: 0P21 NRF - MADDMK (If retried).

- Sense Byte 0, Bit 1 - Intervention required.

  Action: The 2314 error routine will be used. The logging will be done if a nonzero condition exists in byte 10, bits 1 - 3 of the error queue entry. Return is to the supervisor which calls the message routine.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2 - Bus out parity check.

  Action: Retry one time, then consider error permanent. The 2314 error routine will be used. The error logging bit will be turned on.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 2, Bit 3 - Environmental data present.

  Action: Decrement the error count by one and retry. The 3330 error routine will be used. The logging bit will be turned on.

- Sense Byte 0, Bit 3 - Equipment check.

  Action: Retry 10 times, then consider error permanent. The 2314 error routine will be used. The logging bit will be turned on.

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 4 - Data check noncorrectable (byte 2 bit 1 is zero).

  Action: Retry 10 times, then consider error permanent. The 2314 error routine will be used. The logging bit will be turned on.

  Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 5 - Overrun.

  Action: Retry 10 times, then consider error permanent. The 2314 error routine will be used. The logging bit will be turned on.

  Message: 0P14 OVERRUN.

- Sense Byte 0, Bit 6 - Track condition check.

  Action: Read home address and record 0. If defective track, get the address of the alternate track from record 0, seek to the alternate track, then search and resume the operation. If alternate track, get the address of the defective track from record 0, seek to the defective track plus 1, then search and resume the operation. The 2314 error routine will be used with modifications to allow for 3340 cylinder size when checking for end-of-cylinder.

- Sense Byte 0, Bit 7 - Seek check.

  Action: Execute a recalibrate CCW and issue a seek to the original address. Retry 10 times, then consider the error permanent. The 2314 error routine will be used. The logging bit will be turned on.

  Message: 0P15 SEEK CHECK.

- Sense Byte 0, Bit 4, Byte 2 Bit 1 - Data check and correctable.

  Action: The 3330 error correction routine will be used with modifications to allow for a 2-byte error correction code for 3340 and a 3-byte error correction code for 3330. The logging bit will be turned on. The following action is taken depending on the type of error detected:

  a. If the error is correctable, OR the error correction bytes to error bytes in the data area, post channel end and device end bits in the CCB and take the continue exit.

  b. If the error correction routine detects the incorrect length and the SLI flag bits are off, then post incorrect length bit in the CCB before taking the continue exit.

  c. If the chaining and end-of-record conditions have been detected by the error correction routine before the end of the user's channel program, then build a read count CCW, TIC to the user's next CCW, and take the restart exit.

d. If the channel truncation condition exists, turn on the equipment check bit in the sense byte and take the retry exit.

- Sense Byte 1, Bit 2 - End-of-cylinder.

  Action: Post the end-of-cylinder bit in the CCB and continue. The 3330 error routine will be used.

- Sense Byte 1, Bit 5 - File protected.

  Action: The permanent error routine in the supervisor will be used.

  Message: 0P17 FILE PROT.

2321 DASD ERROR RECOVERY ($$ABERR1-R5)

Control is passed to $$ABERR1 by the ERP monitor $$ABERRA. The following list gives condition tested for.

- CSW Bit 44--Channel Data Check

  Action: One retry; then take equipment error exit (cancel, retry).

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 3--Equipment Check

  Action: Take equipment error exit (cancel, retry).

  Message: 0P10 EQUIP CHK.

- Sense Byte 1, Bit 4--No Record Found

  Action:
  1. If Byte 1, Bit 6 (missing Address Markers) is present, go to step 2. Otherwise, go to step 6.
  2. If retry count is less than 3, issue a Restore command and go to step 5.
  3. If retry count is equal to 3, issue a Read Home Address to the first and last tracks of the cylinder. If neither is successful (unit checks), take equipment error exit (cancel, retry). Otherwise, go to step 4.
  4. If retry count is equal to 15, take equipment error exit (cancel, retry). Otherwise, go to step 5.
  5. Increment retry count and take retry exit.
  6. Issue a Read R0 and compare CCH to user's Seek Address. If equal, post No Record Found to the CCB and take continue exit. Otherwise, go to routine for Seek Check (alone).

  Messages: 0P15 SEEK CHECK (No Record Found/R0 unequal to Seek Address).
  0P23 BLNK STRIP (Step 3, cannot read Home Address).
  0P21 NRF - MADDMK (Step 4, 15 retries).

- Sense Byte 0, Bit 7--Seek Check

  Action: If Byte 0, Bit 0 (command reject) is present, take program check exit. If Byte 1, Bit 6 (missing Address Markers) is present, take operator intervention exit. Otherwise, issue a Seek to BB1111, a Seek to BB2222, and take retry exit. After ten retries, take equipment error exit (cancel, retry).

  Messages: 0P26 INVAL SEEK (Seek Check/Command Reject).
  0P22 BAIST CELL (Seek Check/Missing Address Markers).
  0P15 SEEK CHECK (Seek Check alone).

- Sense Byte 0, Bit 1--Intervention Required

  Action: Take operator intervention exit.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 2--Bus Out Check

  Action: Take retry exit. After 15 retries, take equipment error exit (cancel, retry).

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 4--Data Check

  Action:
  1. If retry count is less than eight, go to step 5.
  2. If retry count is equal to 226, take equipment error exit (cancel, retry).
  3. If retry count is an even number, issue a Seek to X-X-X-4-19 (last track of strip) and a Seek to X-X-X-0-0 (first track of strip). Perform this operation eight times. Then proceed to step 4.
  4. If retry count is any multiple of 32 (32, 64, 96, ...), issue a Seek to next lower strip. (If this is the lowest strip - 00000 - seek the next higher strip.) Proceed to step 5.

5. Increment retry count and take retry exit.

Messages: 0P11 DATA CHECK (Data Check/not Data Check on Count or Verify).
0P12 VERIFY CHK (Data Check on Verify Command).
0P16 DTA CHK CT (Data Check on Count).

Note: Home Address is read, and the track address is provided for the error message. For other conditions, the track address is obtained from the user's initial Seek Address if the error occurs during channel program execution.

- Sense Byte 0, Bit 5--Overrun

  Action: Take retry exit. After 15 retries, take equipment error exit (cancel, retry).

  Message: 0P14 OVERRUN.

- Sense Byte 1, Bit 6--Missing Address Markers

  Action: Perform action indicated under Data Check just described.

  Message: 0P13 ADDR MRKER.

  Note: Home Address is read, and the track address is provided for the error message. For other conditions, the track address is obtained from the user's initial Seek Address if the error occurs during channel program execution.

- Sense Byte 0, Bit 0--Command Reject

  Action: Check for byte 1, bit 5 (file protect); in either case, take program check exit.

  Messages: 0P17 FILE PRCT (Command Reject/File Protect).
  0P18 COMM REJCT (Command Reject alone).

- Sense Byte 0, Bit 6--Track Condition Check

  Action:
  1. Read Home Address and R0 and move CCHH from R0 to Seek command executed below.
  2. If alternate track: Update Seek Address to the next track address. If track address equals 20, treat it as End of Cylinder; otherwise, proceed to step 3.
  3. Set up the channel program: Seek, Read Home Address (with skip bit on), TIC to CSW command address minus eight (last CCW executed). Execute this channel program in error recovery. At channel end, exit to channel scheduler CSW processing routine. If DASD file protection is present, set file mask (inhibit long Seeks) following the seek.

- Sense Byte 1, Bit 1--Track Overrun

  Action: Post track overrun to the CCB and take continue exit.

- Sense Byte 1, Bit 2--End of Cylinder

  Action: Post End of Cylinder to the CCB and take continue exit.

- Sense Byte 1, Bit 5--File Protect

  Action: Take program check exit.

  Message: 0P17 FILE PRCT.

- CSW Bit 47--Chaining Check

  Action: Take retry exit. After 15 retries, take equipment error exit (cancel, retry).

  Message: 0P14 OVERRUN.

Note: If the 2321 Error Routine gets an error while trying to execute a Restore command, a Seek command (data-check procedure), or a Read Home Address or a Read R0, equipment error exit is taken with retry and cancel options with the message: 0P20 ERR ON REC (Error During Recovery).

3540 DISKETTE INPUT/OUTPUT UNIT ERROR RECOVERY ($$ABERR7)

Control is passed to this transient by the ERP Monitor $$ABERRA. This phase performs three functions:

1) Determines the proper ERP action to be taken;

2) Determines proper message code for the message writer;

3) Updates the Statistical Data Records (SDR) counters in the PUB2 Table entry for the device.

The following list gives the conditions tested for.

- CSW Bits 45 and 46 - Channel or Interface Control Check.

  Action: Exit to ERP message writer via RMSR recording phase, to issue message; then the task is canceled.

  Message: 0P19 UNDETR ERR.

- CSW Bit 44 - Channel Data Check.

  Action: Exit to ERP message writer to issue message, then the task is canceled.

  Message: 0P28 CHAN DTCHK.

- CSW Bit 38 - Unit Check

  Action: If this bit is 0, exits to ERP message writer to issue message, then the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 5, 6 and 7 - unused bits.

  Action: Exits to ERP message writer with retry and allow ignore flags off. Exit to message writer is via RMSR phase for recording of an OBR record.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: Determine further action by checking the bits in Sense Byte 1 (see System Action).

  Message: 0P10 EQUIP CHK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: If motion malfunction, then set the flag to write an OBR record. Determine further action by checking the bits in Sense Byte 1 (see System Action).

  Message: 0P08 INTERV REQ

- Sense Byte 0, Bit 2 - Bus Out Check.

  Action: Set flag to write an OBR record then determine further action by checking the bits in Sense Byte 1 (see System Action).

  Message: 0P09 BUSOUT CHK

- Sense Byte 0, Bit 4 - Data Check.

  Action: Determine further action by checking the bits in Sense Byte 1 (see System Action).

  Message: 0P11 DATA CHECK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Set on the allow ignore flag and exit to message writer.

  Message: 0P18 COMM REJCT.

System Action - Check bits in Sense Byte 1.

- Sense Byte 1, Bits 5, 6 and 7 - unused bits.

  Action: Set off retry and ignore flags, and exit to ERP message writer via RMSR phase for OBR recording.

  Message: 0P19 UNDETR ERR.

- Sense Byte 1, Bit 0 - Permanent Error.

  Action: Post unrecoverable I/O Bit in CCB. If a Data Check, post Data Check bit in CCB. If return to user is requested, exit to message writer with allow ignore flag on, via RMSR phase or OBR recording. If return is not requested, exit to message writer with allow ignore flag and retry flag off, via RMSR phase for OBR recording.

- Sense Byte 1, Bit 3 - Retry After Intervention.

  Action: If OBR recording is wanted, exit to message writer with action ad action and retry flags on, via RMSR recording phase. If OBR recording is not wanted, exit to message writer with action and retry flags on.

- Sense Byte 1, bit 1 - Automatic Retry.

  Action: Retry the error 10 times, updating the appropriate SDR counter each time. If no recovery, then indicate Permanent Error (see Permanent

Error Action). If SDR counter overflows, retry after RMSR phase for CBR recording.

- Sense Byte 1, Bit 4 - Special Record Transferred.

  Action: Set on special record transferred bit in CCB. Exit to message writer with ignore flag on.

  Message: 0P55 SPEC REC.

- If none of the above, exit to message writer with retry and ignore flags off, via RMSR recording phase.

  Message: 0P19 UNDETR ERR.

1287-1288 CCR ERROR RECOVERY ($$AEERRT)

Control is passed to this transient by the ERP monitor $$AEERRA. The following list gives conditions tested for.

- CSW Bit 44--Channel Data Check

  Action: One retry; then take equipment error exit (retry, cancel).

  Message: 0P28 CHAN DTCHK.

- Sense Byte 0, Bit 3--Equipment Check

  Action: Post byte 3 of CCB and then take continue exit.

  Note: Data Check and Equipment Check, which indicate unreadable character and unreadable line, respectively, are retried by Logical IOCS in an attempt to correct the error.

- Sense Byte 0, Bit 1--Intervention Required

  Action: Test for byte 0, bit 6 (Nonrecovery)--if present, post byte 3, bit 4 of the CCB. This indicates that the error is passed back to the problem program. Exit via equipment error.

  Message: 0P35 NON RECOV. If byte 0, bit 6 is not present, take operator intervention exit.
  0P08 INTERV REQ.

- Sense Byte 0, Bit 6--Nonrecovery

  Action: Post byte 3, bit 4, of CCB and take continue exit.

- Sense Byte 0, Bit 2--Buscut Check

  Action: One retry; then take equipment error exit (manual retry, cancel through ATTN routine).

  Message: 0P09 BUSCUT CHK.

- Sense Byte 0, Bit 4--Data Check

  Action: Post byte 3, bit 0, of CCB and take continue exit.

  Note: Data Check and Equipment Check, which indicate unreadable character and unreadable line, respectively, are retried by Logical IOCS in an attempt to correct the error.

- Sense Byte 0, Bit 5--Overrun

  Action: Four retries; then take equipment error exit (retry, cancel).

  Message: 0P14 OVERRUN.

- Sense Byte 0, Bit 0--Command Reject

  Action: Take program check exit.

  Message: 0P18 COMM REJCT.

- CSW Bit 47--Chaining Check

  Action: Four retries; then take equipment error exit (retry, cancel).

  Message: 0P14 OVERRUN.

- Sense Byte 0, Bit 7--Keycard Correction

  Action: Post byte 3, bit 1, of CCB and take continue exit.

- Sense Byte 1, Bit 4--Invalid Font

  Action: Take program check exit.

  Message: 0P37 INVLD FONT.

  Note: Byte 1, bit 4 applies only to the 1287 in document mode.

3886 OCR ERROR RECOVERY ($$ABERAN)

Control is passed to this transient by the ERP monitor $$ABERRA. This phase not only determines the proper ERP action to be taken, but also performs the RMSR function of updating the Statistical Data Counters in the PUB2 Table entry for the device. If recording on the record file is required (OBR sense bit on, or counter overflow occurred), this phase passes control to RMSR transients. The first RMSR phase fetched is $$ABERA4. If no recording is necessary, exit is taken directly to the supervisor or the ERP message writer, depending on the error condition. The following list gives the conditions tested for.

- CSW Bits 45 and 46 - Channel or Interface Control Check.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- CSW Bit 44 - Channel Data Check.

  Action: One retry. If error persists, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P28 CHAN DTCHK.

- CSW Bits 32, 33, 34 - unused bits.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- CSW Bit 38 - Unit Check.

  Action: If this bit is 0, exits to ERP message writer to issue message, after which the task is canceled.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bits 4 and 5 - or Byte 1, Bits 0, 3, and 5 (unused bits).

  Action: Posts permanent error in the CCB. Exits to ERP message writer with the allow ignore switch on. Exits to ERP message writer is taken via RMSR phases for recording of a Unit Check Condition record.

  Message: 0P19 UNDETR ERR.

- Sense Byte 0, Bit 7 - Recognition Control Program Error.

  Action: Posts permanent error in the CCB. Exits to ERP message writer with the allow ignore switch on. Exit is taken to the ERP message writer via RMSR phases for recording of a Unit Check Condition record.

  Message: 0P53 RCP ERROR.

- Sense Byte 0, Bit 6 - Non Initialized.

  Action: Posts permanent error in the CCB. Exits to ERP message writer with the allow ignore switch on.

  Message: 0P54 NON-INIT.

- Sense Byte 0, Bit 3 - Equipment Check.

  Action: If Mark Check is not on, and the error occurred on a load format or scan command, one retry. Before returning to the supervisor for the retry, checks whether recording is required (OBR sense bit, byte 1, bit 7 on). If it is, exits via RMSR phases. Otherwise, updates appropriate statistical data counter before return to the supervisor (via RMSR phases for recording if counter overflow occurred).

  If the error persists or if retry is not permitted, posts permanent error in the CCB and exits to the ERP message writer with the allow ignore switch on. Mark Check is also posted in the CCB, if this condition is present. If the OBR sense bit is on, exit is taken via RMSR phases for recording. If this bit is not on, the appropriate statistical data counter is updated before exit to the ERP message writer is taken (via RMSR phases for recording if counter overflow occurred).

  Message: 0P10 EQUIP CHK.

- Sense Byte 1, Bit 6 - Non Recovery Error.

  Action: Posts Non Recovery error in the CCB, updates the appropriate statistical data counter, and exits to the ERP message writer with operator intervention and PASSBK flags on. If recording is required because of counter overflow, exit is taken via RMSR phases.

Message: OP35 NON RECOV.

- Sense Byte 1, Bit 4 - Incomplete Scan.

  Action: One retry. Before returning to the supervisor for the retry, updates the appropriate statistical data counter. If recording is required because of counter overflow, exit is taken via RMSR phases. If the error persists, post incomplete scan in the CCB and takes supervisor ignore exit. The appropriate statistical data counter is updated before exit is taken. If recording is required because of counter overflow, exit is taken via RMSR phases.

  Message: none.

- Sense Byte 1, Bit 1 - Mark Check Error.

  Action: Posts Mark Check Error error in the CCB, updates the appropriate statistical data counter, and exits (via RMSR phases if counter overflow occurred) to the ERP message writer with CPINT and PASSBK flags on.

  Message: OP51 MARK CHECK.

- Sense Byte 0, Bit 1 - Intervention Required.

  Action: Updates appropriate statistical data counter. Exits to ERP message writer with operator action required and allow retry (if not ending status, or Load Format command) or PASSBK (otherwise) switch on. If counter overflow occurred, exit is taken via RMSR phases for recording.

  Message: OP08 INTERV REQ.

  Note: This condition can occur as ending status only when an eject command has been issued. In this case, the command is not to be reissued.

- Sense Byte 0, Bit 2 - Bus-Out Check.

  Action: One retry. Exits to supervisor for retry via RMSR phases to have the error recorded. If error persists, posts a permanent error in the CCB and exits to ERP message writer with the allow ignore switch on. Exits to ERP message writer via RMSR phases to have the error recorded.

  Message: OP09 BUSOUT CHK.

- Sense Byte 0, Bit 0 - Command Reject.

  Action: Posts permanent error in the CCB. Exits to ERP message writer with the allow ignore switch on.

  Message: OP18 COMM REJCT.

- Sense Byte 1, Bit 2 - Invalid Format.

  Action: Posts permanent error in the CCB. Exits to ERP message writer with the allow ignore switch on.

  Message: OP52 INV FORMAT.

- None of the above.

  Action: Exits to ERP message writer to issue message, after which the task is canceled.

  Message: OP19 UNDETR ERR.

1419 ERROR RECOVERY ($$AEERRS)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives conditions tested for.

- CSW Bit 44--Channel Data Check

  Action: Post unrecoverable I/O error to CCB byte 2, bit 2. Turn on passback bit in error queue entry byte 10, bit 2 for return to user for error recovery. Exit to ERP message writer.

  Message: OP28 CHAN DTCHK.

- Sense Byte 0, Bit 0--Command Reject

  Action: Check command code of CCW causing interrupt with X'E1' for 'Disengage Failed'. If 'Disengage Failed', post intervention required to CCB byte 3, bit 1; if not, post unrecoverable I/O error to CCB byte 2, bit 2. In either case, turn on passback in error queue entry of ERBIOC byte 10, bit 2, for return to user for error recovery. Exit to ERP message writer.

  Message: OP18 COMM REJCT or OP37 DISEN FAIL.

- Sense Byte 0, Bit 1--Intervention Required

  Action: Post "Intervention Required" to the CCB (byte 3, bit 1), and exit to supervisor. The error is ignored. No message is printed.

  Message: 0P08 INTERV REQ.

  Note: The problem program should process all documents in the input buffer, note the Intervention Required and perform any print out necessary for operator recovery, and issue an Engage-Read to the device to continue processing documents. If the Intervention Required is due to a batch numbering update failure, the operator must update the batch number as part of manual recovery.

- Sense Byte 0, Bit 2--Bus Out Check

  Action: Post unrecoverable I/O error to CCB byte 2, bit 2, and turn on passback bit in error queue entry of ERBLOC Byte 10, bit 2, for return to user for error recovery. Exit to ERP message writer.

  Message: 0P09 BUSOUT CHK.

- Sense Byte 0, Bit 3--Should not occur

  Action: Post Unrecoverable I/O error to the CCB and provide informational message to the operator. Exit to ERP message writer.

  Message: 0P19 UNDETR ERR

Note: CSW Bit 47 and Sense bits 4, 5, 6, and 7 will not cause an I/O Interrupt. If CSW bit 44 or sense bit 1, 2, or 3 is not present for an I/O interrupt, the action and message for sense bit 3 will be generated. IIOCS issues two informational messages through the MICR Message Writer:

1. 4MR1I - EXTERNAL INTERRUPT I/O ERROR
2. 4MR2I - SCU NOT OPERATIONAL

- Sense Byte 0, Bit 7--Batch Numbering Switch Off

  Action: Post document buffer byte 0, bits 0 and 1 and insert reject code X'CF' in byte 5. Turn off retry and turn on ignore bits in ERQFIG of error queue entry of ERBLOC. Exit to ERP message writer.

  Message: OP34 BCH NM OFF.

2495 ERROR RECOVERY ($$AEERRI)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives conditions tested for.

- CSW Bit 42--Program Check

  Action: Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P24 PROG CHECK

- CSW Bit 43--Protection Check

  Action: Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P25 PROT CHECK

- CSW Bit 44--Channel Data Check

  Action:
  1. Read Commands--backspace record, one retry. If error persists exit to ERP message writer to issue message after which the task is canceled.
  2. All other commands-- Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P28 CHAN DTCHK

- Sense Byte 0, Bit 5--Should not occur or
- Sense Byte 0, Bit 7--Should not occur

  Action: Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P19 UNDETR ERR

- Sense Byte 0, Bit 3--Equipment Check

  Action: Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P10 EQUIP CHK

- Sense Byte 0, Bit 2--Bus Out Check

  Action: One retry, If error persists exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P09 BUSOUT CHECK

- Sense Byte 0, Bit 1--Intervention Required

  Action: Exit to ERP message writer for operator intervention.

  Message: 0P08 INTERV REQ.

- Sense Byte 0, Bit 6--Position Check

  Action:
  1. Read Commands--backspace one byte. Reread the remaining portion of the record. Repeat this sequence nine times for a total of ten rereads. On the eleventh try, exit to ERP message writer to issue message after which the task is canceled.
  2. All other commands -- Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P39 POSN CHECK

- Sense Byte 0, Bit 4--Data Check

  Action:
  1. Read Commands-- Backspace one byte. Reread the remaining portion of the record. Repeat this sequence nine times for a total of ten rereads. On the eleventh try, post data check error to CCB and set passback flag in ERQFLG and exit to ERP message writer, if user requests return of data check errors. Otherwise exit to ERP message writer. Allow ignore.

  Message: 0P11 DATA CHECK

  2. All other commands-- Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P18 UNDETR ERR

- Sense Byte 0, Bit 0--Command Reject

  Action: Exit to ERP message writer to issue message after which the task is canceled.

  Message: 0P18 COMM REJCT

1017/1018 ERROR RECOVERY ($$ABERRU)

Control is passed to this transient by the ERP monitor $$ABERRA. The following list gives conditions tested for.

- CSW Bit 44--Channel Data Check

  Action: For Read/Write Commands: If data transfer, no retry is performed. If initial selection, retry twice without repositioning. After specified number of retries has been reached, exit to ERP message writer to issue message after which the task is canceled.

  Message: OP28 CHAN DTCHK

- CSW Bit 47--Chaining Check (Read/Write Commands).
- Sense Byte 0, Bit 2--Bus-Out Check (Read Command during data transfer).
- Sense Byte 0, Bit 3--Equipment Check (Read Command)
- Sense Byte 0, Bit 4--Data-Check (Write Command if Error Correction feature not present)
- Sense Byte 0, Bit 5--Overrun (Read/Write Commands)
- Sense Byte 0, Bit 6--Lost Data (Read/Write Commands)
- Sense Byte 0, Bit 7--Broken Tape (Write Command) This sense and status information is not used or may not occur for the indicated condition.

  Action: Exit to ERP message writer to issue message after which the task will be canceled.

  Message: 0P19 UNDETR ERR

- Sense Byte 0, Bit 0--Command Reject

  Action: Exit to ERP message writer to issue message after which the task will be canceled.

Message: 0P18 COMM REJCT

- Sense Byte 0, Bit 1--Intervention Required

  Action: If initial selection (Read/Write Commands), exit to ERP message writer for operator intervention. If data transfer (Write Command), update interrupted CCW and exit to supervisor for retry.

  Message: 0P08 INTERV REQ

- Sense Byte 0, Bit 2--Bus-Out Check

  Action: If initial selection (Read/Write Commands), retry the operation twice. If data transfer (Write Command), update interrupted CCW and retry twice. If error persists, or if data transfer (Read Command), exit to ERP message writer to issue message after which the task will be canceled.

  Message: 0P09 BUSOUT CHK

- Sense Byte 0, Bit 3--Equipment Check (Write Command)

  Action: Exit to ERP message writer to issue message after which the task will be canceled.

  Message: 0P10 EQUIP CHK

- Sense Byte 0, Bit 4--Data Check

  Action: If Read Command, update interrupted CCW, backspace one character and retry. If the error persists after four retries, test the CCB for the ignore option (byte 2, bit 4); if the bit is on, turn on byte 3, bit 3 of the CCB (1017/1018 data check) and exeit to ERP message writer. Allow ignore. If the bit is not on, exit to ERP message writer to issue message after which the task will be canceled. If Write Command, (Error Correction Feature Not Supported) byte 3, bit 3 in the CCB is set on, then if the user wants to process the data check himself (byte 2, bit 6 on in the CCB), control is returned to the user program. If the user does not want to process the data check, exit to ERP message writer. Allow ignore if bit 4 of byte 2 in CCB is on. Task will be canceled if byte 2, bit 4 in CCB is off.

  Message: 0P11 DATA CHECK

  Note: When a data check occurs, the user's CCW is modified by the error routine to allow rereading or rewriting of the last character. The data address is the last character read or written (i.e., the character in error), and the byte count is decreased by the number of valid characters read or written. If the CCB ignore option is chosen and the operator responds ignore, the I/O operation is dequeued and posted with the unrecoverable error bit on (CCB byte 2, bit 2) and 1017/1018 data check bit on (CCB byte 3, bit 3). To read or write the rest of the record, the problem program (logical IOCS) adds 1 to the CCW data address and subtracts 1 from the byte count to adjust for not rereading or rewriting the bad character, and then reissues the EXCP. The ignore option is available to the operator whenever the user specifies any of the DTFPT ERROPT entry options.

- Sense byte 0, Bit 7--Broken Tape (Read Command)

  Action: When this condition occurs, the last record has not been completely read. Turn on byte 3, bit 1 of the CCB (1017 broken tape) and exit to ERP message writer. Allow retry, ignore.

  Message: 0P40 BROKEN TAPE

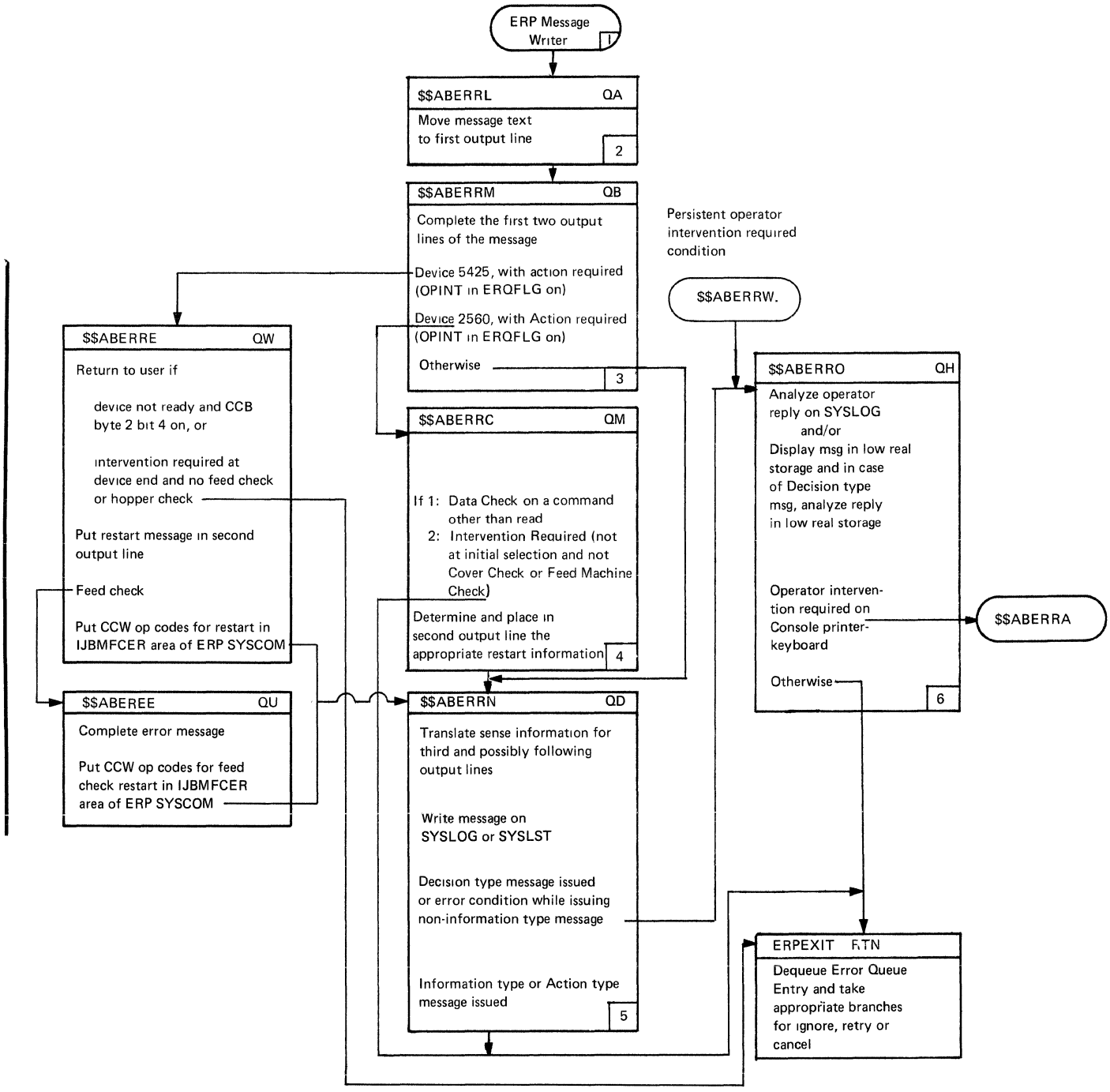
  Note 1: When broken tape condition occurs, the operator must reposition the paper tape at the beginning of the record before responding. The 1017 must not be readied until this repositioning has been performed. If the ignore option is chosen, the I/O operation is dequeued and posted with the unrecoverable error bit on (CCB byte 2, bit 2) and the 1017 broken tape bit on (CCB byte 3, bit 1).

  Note 2: A record may not be partly on one tape and partly on another.

ERP MESSAGE WRITER

The ERP message writer is a group of A-transients ($$ABERRL, $$ABERRM, $$ABERRC, $$ABERRN, $$ABERRC) that build error messages, issue the messages, analyze operator responses, and select the proper exit. See Figure 6 for a listing of the error messages. The numbers of the following sections refer to Chart 03.

Chart 03. ERP Message Writer Functional Flow



1. Usually, the ERP phases exit to the ERP message writer via RMSR phases. The following RMSR transients may pass control to the ERP message writer: $$ABERA1, $$ABERA2, $$ABERA4, $$ABERA5, $$ABERRK, $$ABERRP.

The 3886 OCR ERP transient $$ABERAN and 3540 Diskette I/O Unit ERP transient $$ABERR7 exit directly to the ERP message writer when recording on the recorder file is not required.

2. $$ABERRL picks up the message number (stored by ERP phases) from the Error Queue Entry and uses it to move the applicable message text to the first output line. It then passes control to $$ABERRM.

3. $$ABERRM completes the first two lines of the message. It will be printed (by $$ABERRN) in 3 or more lines. The third and following lines are filled with sense information by $$ABERRN. The first line is filled with the message number, the Action and Target Codes (see below), the message text (done by $$ABERRL), the logical unit name, and the physical channel and unit number of the device on which the error occurred. The second line is filled with the command code of the last CCW executed, the contents of the CSW, and the seek address of the track on which the error occurred if the device is DASD. If the device is a 2560 or 5425, the second line may contain a restart number. For a 2560, the restart number is inserted by $$ABERRC and for a 5425 by $$ABERRE or $$ABEREE. For more information, see DOS/VS Messages.

Depending on the availability of the CCB and the applicable flags (Intervention Required, Passback, Allow Ignore, and Allow Retry) of the ERQFLG flag byte in the Error Queue Entry, the Action and Target (operator reply) codes are determined. These flags are set by ERP. The action code may be A (action-type message, operator intervention required), D (decision-type message, operator decision required), or I (information-type message, no operator action or decision required). For decision-type messages, the target code may be I (decide between canceling the task or ignoring the error), IR (cancel, ignore or retry), or R (cancel or retry). For information type messages the Target code may be C (task will be canceled) or I (task to be continued, error ignored).

When the CCB is not available the action code is set to I and the target code is left blank, which will result in continuation of the task, with the error ignored.

When operator intervention is required, the action code is set to A and the target code is left blank. In the PUBCSFLG flag byte of the PUB, the INTREQ flag is posted.

When the PASSBK switch is on (indicating that the user wants return), both codes are set to I (to continue and ignore error) and the irrecoverable I/O error bit is posted in the CCB.

When cancel is specified for tape devices (both flags allow ignore and allow retry off), but the accept I/O error bit in the CCB is on, the error is posted in the CCB and the codes are both set to I, indicating that the task is not to be canceled and the error is to be ignored. This does not apply to program, protection, or equipment check and command reject conditions.

When retry and/or ignore are allowed but the accept I/O error bit in the CCB is on, the error is posted in the CCB, and the codes are set to I, indicating that the error is to be ignored.

When operator intervention is required (OPINT in ERQFLG on) and the device is a 2560 or 5425, $$ABERRM gives control to $$ABERRC(2560) or $$ABERRE(5425). Otherwise, $$ABERRN is called.

4. When $$ABERRC receives control the device is a 2560 with one of the following error conditions: intervention required, data check, or equipment check.

If the error is a data check on a command other than read, exit is taken to the supervisor for one retry. If the error persists, the supervisor receives control to cancel the task.

An intervention required condition, not at initial selection and not of the cover-check or Feed/Machine-check type is ignored and control is given to the supervisor.

In all other cases $$ABERRC sets up the correct restart information, which is printed as part of the action type message by $$ABERRN. The allow retry flag in ERQFLG is turned on, and repositioning required is indicated in the PUB (byte 5, bit 0). In addition, $$ABERRC stores repositioning information (sense information, command code, and restart number) in the System Communications Region (SYSCOM). This repositioning information is used later on by $$ABERRD when a restart is attempted.

5. $$ABERRN does a right to left scan for zeros in the ERQSNS field of the Error

Queue Entry. The message will include up to the last non/zero byte of the ERQSNS field in the third and, if necessary, following lines. Then the message is written on SYSLOG.

After writing an A-type message, control is returned to the supervisor for ignore (if PASSBK switch is on) or retry. The message 0P08 INTERV REQ is issued only when the device has not yet been readied. Only the first line of this message is printed.

After issuing an I-type message, control is returned to the supervisor to cancel or ignore (depending on operator code).

In the case of D-type messages, the operator reply is to be analyzed. For this function $$ABERRN passes control to $$ABERRO.

When SYSLOG is not assigned or is in error, the message is issued on SYSLST. When SYSLST is not assigned or is in error control is passed back to the supervisor to cancel or ignore (depending on target code) in the case of I-type messages. For the other messages control is given to $$ABERRO.

When an I/O error occurs while attempting to write the message on SYSLOG or SYSLST, $$ABERRO gets control for A-type and D-type messages.

When the message is issued on a printer (because SYSLOG is not assigned, or is assigned to a printer, or because the console printer-keyboard is in error) the operator cannot reply. $$ABERRC gets control, except for I-type messages.

6. $$ABERRC receives control when one of the following functions are to be performed:

   - An operator reply on SYSLOG is to be read and analyzed.
   - A-type or D-type messages the message and their replies are to be displayed and entered in low real storage, because SYSLOG is in error or not assigned to a console printer-keyboard or display operator console.

After performing the first function, control is returned to the supervisor for cancel, retry, or ignore, depending on the reply. When an I/O error occurs while attempting to read the reply, the second function is performed. When the reply is invalid, another reply is solicited.

The second function is to be performed as follows: The message number is inserted in byte 0, X'C1' or X'C4' in byte 1 and the channel and unit number of the device in error in bytes 2 and 3. The contents of byte 4 are analyzed in the case of D-type messages.

When operator intervention is required, a check is made whether the device has been readied in the meantime. If so, control is returned to the supervisor for ignore (if PASSBK bit on) or retry. If not, and the device is the console printer-keyboard or display operator console, $$ABERRA is called, which will pass control to $$ABERRW to execute the alarm command again. If it is not the console device, the system is set in an enabled wait state.

For D-type messages, the external new PSW in low real storage is saved and replaced. The system is set in an enabled wait state. When the operator presses the interrupt key, a routine within this transient will be entered. The saved external new PSW is restored and an exit taken to the supervisor for cancel, retry or ignore, depending on the contents of byte 4. If the contents of byte 4 are invalid, a new operator response is solicited.

MESSAGE CODE (IN HEX)	10-CHARACTER MESSAGE	ERROR
08	C'INTERV REQ'	OPERATOR INTERVENTION REQUIRED
09	C'BUSOUT CHK'	BUS OUT CHECK
10	C'EQUIP CHK '	EQUIPMENT CHECK
11	C'DATA CHECK'	DATA CHECK
12	C'VERIFY CHK'	VERIFY CHECK
13	C'ADDR MRKER'	MISSING ADDRESS MARKER
14	C'OVERRUN '	OVERRUN
15	C'SEEK CHECK'	SEEK CHECK
16	C'DTA CHK CT'	DATA CHECK IN COUNT FIELD
17	C'FILE PROT '	VIOLATED FILE PROTECTION
18	C'COMM REJCT'	COMMAND REJECT
19	C'UNDETR ERR'	UNDETERMINED ERROR
20	C'ERR ON REC'	ERROR DURING RECOVERY ATTEMPT
21	C'NRF-MADDMK'	NO RECORD FOUND & MISSING ADDRESS MARKER
22	C'BALST CELL'	BALLAST CELL ACCESSED ON 2321
23	C'BLNK STRIP'	ACCESSED A PREVIOUSLY UNUSED STRIP
24	C'PROG CHECK'	I/O PROGRAM CHECK
25	C'PROT CHECK'	STORAGE PROTECTION CHECK
26	C'INVAL SEEK'	SEEK ADDRESS NOT VALID
27	C'UNKNWN DEV'	DEVICE IN ERROR NOT RECOGNIZED
28	C'CHAN DTCHK'	CHANNEL DATA CHECK
29	C'BK INTO LP'	BACKSPACE INTO LOADPOINT
30	C'CONVRT CHK'	TAPE CONVERT CHECK
31	C'DVC NOT OP'	DEVICE NOT OPERATIONAL
32	C'NON COMPAT'	NONCOMPATIBLE TAPE ON DRIVE
33	C'BUF PARITY'	PARITY ERROR IN PRINTER BUFFER
34	C'BCH NM OFF'	BATCH NUMBERING SWITCH OFF ON MICR
35	C'NON RECOV '	NON-RECOVERY ON 1285, 3886 OCR
36	C'NO REC FND'	NO RECORD FOUND
37	C'DISEN FAIL'	DISENGAGE FAILURE ON MICR
38	C'INVAL FONT'	INVALID FONT ON 1287 IN DOCUMENT MODE
39	C'POSN CHECK'	POSITION CHECK ON 2495 TOR
40	C'BROKN TAPE'	BROKEN TAPE ON 1017
41	C'LOAD CHECK'	BUFFER LOAD CHECK ON 3211
42	C'DSE FAILED'	DSE COMMAND FAILED
43	C'TAPEVOL CH'	TAPE VOLUME CHANGED
44	C'ID CHK '	IDENTIFICATION BURST CHECK
45	C'WR INHIBTD'	WRITE ASSUMED ON DISK WITH READ-ONLY SWITCH ON
46	C'INTERCEPT '	IMMEDIATE COMMAND FAILED
47	C'UNX INTERV'	INTERVENTION REQUIRED TO OPEN TAPE VOLUME
48	C'FORMAT RST'	ABNORMAL FORMAT RESET
49	C'PERM ERROR'	PERMANENT ERROR KEY
51	C'MARK CHECK'	MARK CHECK ERROR ON 3886 OCR READER
52	C'INV FORMAT'	INVALID FORMAT ON 3886 OCR READER
53	C'RCP ERROR '	RECOGNITION CONTROL PROGRAM ERROR ON 3886 OCR READER
54	C'NON-INIT '	NON-INITIALIZED ON 3886 OCR READER
55	C'SPEC REC '	SPECIAL RECORD TRANSFERRED ON 3450 DISKETTE I/O UNIT

Figure 6. ERP Transients Error Messages

R-TRANSIENTS AND RAS MONITOR

The R-transients perform machine check and channel check recovery and recording. When required, they are called by the resident Machine Check Handler and the resident Channel Check Handler via the RAS Monitor. The R-transients are listed in order of descending priority in Figure 7 and in the load list portion (bytes 0 - 63) of the RAS Monitor Table RASTAB, Figure 8. The R-transient with the highest priority is activated whenever multiple transients are selected for the R-Transient Area (RTA).

The channel check ERP transients handle channel control and interface checks (the channel data check condition is handled by the device dependent ERP A-transients). They attempt to retry the operation, or terminate the affected partition, while trying to permit continued system activity. See Figure 9 for the R-transient error messages. They also record the errors on the recorder file (IJSYSRC).

The RAS Monitor is a resident control program which controls the RTA. At system generation the RAS Monitor forms a portion of the resident supervisor. The RAS Monitor and MCAR/CCH coding are always generated for the Models other than 115 and 125. For Model 115 and 125, the RAS Monitor and MCAR/CCH coding are generated only if RMS=YES or MCH=YES was specified at system generation time. The RAS Monitor:

- Fetches R-transients into the RTA
- schedules I/O requests from the RTA
- Accepts RTA I/O request complete postings from CCH
- Provides an exit interface from R-transients.

LOAD LIST FOR THE R-TRANSIENTS

The primary function of the transient $$BCCHHR (called at IPL-time) is to scan the core image library directory for transients beginning with '$$RAST', and to build a directory for these transients in real storage. This directory (load list) is located in the RASTAB, where a fullword is reserved for each R-transient. The low-order three bytes of each fullword contain the disk address of the phase; the remaining byte contains switches and flags. Currently, the first 64 bytes of RASTAB are occupied by sixteen fullword entries, one for each R-transient.

All R-transient names have the format $$RASTnn, where nn is a decimal number, currently from 00 to 13. The last two digits in the phase name of a RAS transient are used as an index to the load list in RASTAB. The address of a particular entry is obtained by multiplying this number by four and adding the product to the RASTAB address.

Another function of the $$BCCHHR transient is to determine whether the Recorder File is on a 2311, 2314, 3330, or 3340 disk storage device. The channel addresses of the devices to which SYSRES, SYSREC, and SYSLOG are assigned are placed in RASTAB at RASRES, RASREC, and RASLOG respectively.

R-Transient	Charts	Function
$$RAST00	VA-VE	MCAR analysis / CCH data gatherer
$$RAST01	VF,VG	MCAR/CCH recording / Interface Builder
$$RAST02	WA-WD	CCH ERP scheduling
$$RAST03	WE-WJ	MCAR repair (error frequency analysis)
$$RAST04	XA-XD	Unit record CCH ERP
$$RAST05	XE-XG	Unit record CCH ERP
$$RAST06	XH-XJ	3504, 3505/3525, 3540 and 3886 CCH ERP
$$RAST07	XK,XL	Tape CCH ERP (2400)
$$RAST08	XM-XP	MCAR/CCH record writer
$$RAST09	XQ-XS	Partition reallocation
$$RAST10	XT-XV	Message writer for ERPs
$$RAST11	XW	Message writer
$$RAST12	XY,XZ	Tape CCH ERP (3400 and 3410)
$$RAST13	YA	Page pool reallocation
$$RAST14		Reserved
$$RAST15		Reserved

Figure 7. Load List of R-Transients

DISPLACEMENT
DEC HEX

0 (0)	4 (4)	8 (8)	12 (C)	16 (10)	20 (14)	24 (18)	28 (1C)	32 (20)
LD00SLOT ($$RAST00) (1) (2)	LD01SLOT ($$RAST01) (3)	LD02SLOT ($$RAST02) (5)	LD03SLOT ($$RAST03) (5)	LD04SLOT ($$RAST04) (5)	LD05SLOT ($$RAST05) (5)	LD06SLOT ($$RAST06) (5)	LD07SLOT ($$RAST07) (5)	LD08SLOT ($$RAST08) (5)
36 (24)	40 (28)	44 (2C)	48 (30)	52 (34)	56 (38)	60 (3C)	64 (40)	66 (42)
LD09SLOT ($$RAST09) (5)	LD10SLOT ($$RAST10) (5)	LD11SLOT ($$RAST11) (5)	LD12SLOT ($$RAST12) (5)	LD13SLOT ($$RAST13) (5)	LD14SLOT ($$RAST14) (5)	LD15SLOT ($$RAST15) (5)	RASCCB Residual Count	RASTIB Transmission information
68 (44)	70 (46)	72 (48)	73 (49)	76 4C)	80 (50)	88 (58)	96 (60)	104 (68)
-------- CCW Status bytes	-------- SYSRES LUB	RASCCBF RAS CCB indicator	-------- RAS Fetch CCWs address	-------- CCW stored address	RASCCWS RAS seek CCW	RASRCG RAS search CCW	RASTIC RAS TIC CCW	RASREAD CCW to read module into RTA
112 (70)	119 (77)	120(78)	122(7A)	124(7C)	128(80)	132(84)	133(85)	134(86)
RASEEK Seek Address	RTAOWN Index to load list for RTA owner	MCPIK PIK of task interrupted by machine check	MCTIK TIK of task interrupted by machine check	ERPIBA ERPIB queue address	CCENTADR Address of channel check routine	RTAID RTA I/O requestor ID	ERPID WTOR request return load index	RASRES SYSRES I/O address
136(88)	138(8A)	140(8C) TRANSAV - RTA Register Save Area						
		140(8C)	144(90)	148(94)				200(C8)
RASREC SYSREC I/O address	RASLOG SYSLOG device address	TRANSAVO Register 0	TRANSAV1 Register 1	TRANSAV 2 - TRANSAVE Registers 2 - 14				TRANSAVF Register 15
204(CC)	SYSREGS - System Register Save Area						268(10C)	269(10D)
204(CC)	208(D0)	212(D4)				264(10C)		
SYSREG 0 Register 0	SYSREG 1 Register 1	SYSREG 2 - SYSREG E Registers 2 - 14				SYSREG F Register 15	LINKFLAG (8)	SUPLINK Address of RAS system function scan routine
182 (B6) (HIR-Hardware Instruction Retry accumulators)		284(11C) (ECCMAIN-Main storage error accumulators)						296(128)
272(110)	274(112)	276(114)	280(118)	284(11C)	286(11E)	288(120)	292(124)	
HIRACNT HIR accumulated count	HIRLCNT Count threshold value	HIR1TIME Time of day for first error of group	HIRLTIME Time threshold in clock units	ECMACNT Accumulated ECC count for main storage	ECMLCNT Count threshold value	ECMITME Time of day for first error of count	ECMLTME Time threshold in clock units	RESTARTA Disk restart address
300(12C)	302(12E)	303(12F)	304(130)	305(131)				
RESTARTP PUB address of unit to be restarted	MCMODE Mode status for machine checks (9)	BUFDEL Count of buffers deleted	RASMSG1 Message byte 1 (6)	RASMSG2 Message byte 2 (7)				

Note: RASTTAB identifies the first byte of the RAS Monitor table. Its address can be found at displacement X'00' in RASLINK area.

Figure 8. RAS Monitor Table (RASTAB) (Part 1 of 2)

Notes:

(1) Areas labeled LDxxSLOT (bytes 0 - 63 are called the Load List and each of the 16 entries are formatted as follows:

BYTE	0	1	2	3
	Flag Byte	Cylinder	Head	Record
		(disk address of R-transient in the core image directory)		

(2) LD00SLOT flag byte:

Bit	Flag	Description
0	X'80'	$$RAST00 module activated.
1	X'40'	Machine check analysis to be performed.
2	X'20'	Channel check analysis to be performed.
3	X'10'	List of active I/O units invalid.
4	X'08'	System termination situation.
5	X'04'	Reserved.
6	X'02'	Reserved.
7	X'01'	Attempt mode to record in system termination situation.

(3) LD01SLOT flag byte:

Bit	Flag	Description
0	X'80'	$$RAST01 module activated.
1	X'40'	Build and record channel check records.
2-7	----	Reserved.

(4) LD10SLOT flag byte:

Bit	Flag	Description
0	X'80'	$$RAST10 module activated.
1	X'40'	Refetch calling module after issuing message.
2-7	----	Reserved.

(5) LDxxSLOT flag byte:

Bit	Flag	Description
0	X'80'	$$RASTxx module activated; that is, should be fetched.
1-7	----	Reserved.

(6) RASMSG1:

Bit	Flag	Description
0-3	----	Reserved.
4	X'08'	Timer damage.
5	X'04'	ECC in Quiet mode.
6	X'02'	Reserved.
7	X'01'	EFL Overflow

(7) RASMSG2:

Bit	Flag	Description
0	X'80'	Clock damage
1	X'40'	Last track on SYSREC.
2	X'20'	Reserved.
3	X'10'	Soft machine checks disabled.
4	X'08'	ECC MCI disabled.
5	X'04'	SYSREC full-run EREP.
6	X'02'	Error on SYSREC at BBCCHHR.
7	X'01'	Soft machine check.

(8) LINKFLAG: Indicates which function is requested by R-transient. This byte is tested by the RAS system function scan routine

Bit	Flag	Description
0	X'80'	Normal I/O request
1	X'40'	Emergency I/O request
0,1	X'C0'	Restart I/O request
2	X'20'	Fetch request
3	X'10'	Request for exit
0,3	X'90'	Wait request
4	X'08'	Request to initialize registers for I/O
5	X'04'	Dequeue CCB request
6	X'02'	Request to cancel task
7	X'01'	Getime request

(9) MCMODE flag byte:

Bit	Flag	Description
0	X'80'	HIR recording mode
1	X'40'	HIR quiet mode
2	X'20'	ECC recording mode in main storage
3	X'10'	ECC quiet mode in main storage
4	X'08'	ECC recording mode in control storage
5	X'04'	ECC quiet mode in control storage
6	X'02'	ECC threshold mode in control storage
7	----	Reserved.

Figure 8. RAS Monitor Table (RASTAB) (Part 2 of 2)

Message Code	Initiating Phase	Error Message
0I29I	$$IPLRT4 (Note 3)	Insufficient PUB2 space available. Re-IPL.
0F13A	$$RAST10	Invalid response.
0F81I	$$BECJ2A (Note 2)	Job XXXXXXXX canceled due to CPU failure.
0F82I	$$BECJ2A (Note 2)	Job XXXXXXXX canceled due to channel failure.
0T00I	$$ABERA1,A2,A3 $$RAST11,08	Last track on Recorder File.
0T03I	$$RAST8,11	Error on Recorder File at cchhr.
0T05E	$$RAST08,11 $$ABERA1,A2,A3	Recorder File full--run EREP.
0T06I	$$RAST03,11	ECC real storage MCI disabled.
0T07I	$$RAST03,11	All soft machine checks disabled.
0T08I	$$RAST03,11	C40 buffer pages deleted = XXX.
0T09I	$$RAST03,11	Successful recovery from machine check.
0T10I	$$RAST02,04,5,6, 7,10,12	Channel error recovery on cuu.
0T11W	$$RAST00,01	Hard wait, Code = X. (Note 1) Run EREP. Recording successful. Run SEREP. Recording incomplete. Run SEREP. Recording unsuccessful.
0T12I	$$RAST02,04,5,6, 7,10,12	Irrecoverable channel errors on cuu.
0T13A	$$RAST04,5,6,10	Channel error on cuu.
0T14E	$$RAST03,11	Clock damage. All modes quiet.
0T15E	$$RAST09,13	MCAR repair failed.
0T16I	$$RAST03,11	EFL overflow.
0T17I	$$RAST03,11	Control storage ECC in quiet mode.
0T18E	$$RAST03,11	Timer damage.
0T19E	$$RAST09	(Lower, Upper) boundary of XXR is xxxxxx, length is LLLK.
0T20E	$$RAST13	Page frame xxxxxx deleted. Main page pool size is LLLK.
1I82A	$JOBCTLM (Note 3)	Recording completed

Figure 9. MCAR/CCH/RMSR Error Messages (Part 1 of 2)

Message Code	Initiating Phase	Errcr Message
1I83A	$JOBCTLM (Note 3)	Reccrder file tcc small
1I84A	$JOBCTLM (Note 3)	Recorder file cpen failure
1I86A	$JOBCTLM (Note 3)	Errcr cn reccrder file at cccchhhhrr
1I93I	$JOBCTLM (Note 3)	Recorder File is nnn% full. (Run EREP).
4E10I	$$ABERAA,A2 $$ABERAK	vvvvvv cuu TR=rrr IW=www SIO=sssss

Note 1: Hard wait has resulted due tc system failure explained in the ccde X, where

X = A Irrecoverable machine check
B RAS fetch errcr
C SYSLOG channel check while printing RMSR message
D No ECSW stored
E ERPIB exhausted
F Twc channels damaged or RTA I/C active
G System Reset Code in ECSW
H Retry/Reset Codes invalid
I Invalid channel address cn channel error
J Irrecoverable channel check on paging device cr channel

Note 2: For this phase, refer tc DOS/VS Lcgical Transients Lcgic, listed in Preface.

Note 3: For this phase, refer tc DOS/VS IPL and Jcb Ccntrcl Lcgic, listed in Preface.

Figure 9. MCAR/CCH/RMSR Errcr Messages (Part 2 cf 2)

RASLINK

Hex	0	8	9	0A	0B	0C	10	14	18	1C
Dec	0	8	9	10	11	12	16	20	24	28
	CPU ID Field	Damaged Channel Byte	RAS Flag Byte	Machine Check Flags	Largest CPU Model	RAS Table (RASTAB) Address	Base Address for RAS Monitor	Address of Headqueue Table	Address of CCH Savearea	Address of Page Queue
	xxxxxxxx	x	x	x	x	xxxx	xxxx	xxxx	xxxx	xxxx

Displacement

Key to RAS Linkage Area displacement

0	CPU ID Field				
8	Address of damaged channel, or X'FF' if no channel damaged				
9	RAS Flag Byte				
	bit	flag	description		
	0	X'80'	RAS active		
	1	X'40'	RAS SIO flag		
	2	X'20'	RTA in control		
	3	X'10'	RAS I/O delayed		
	4	X'08'	Channel check on error SIO		
	5	X'04'	Reserved		
	6	X'02'	Channel check on SIO		
	7	X'01'	I/O active for SIO		
10	Machine Check Flags				
	bit	flag	description		
	0-4	----	Reserved		
	5	X'04'	Hard machine check		
	6	X'02'	All machine records built		
	7	X'01'	All channel check records built		
11	Largest CPU Model				
12	Address of RAS Monitor Table (RASTAB)				
16	Address used for base register in RAS Monitor Program				
20	Address of Headqueue Table				
24	Address of CCH Savearea				
28	Address of Page Queue Table				

Bytes 112-115 (X'70'-X'73') of the System Communication Region (SYSCOM) contain the address of the area Label RASLINK identifies the first byte of the area.

Figure 10. RAS Linkage Area (RASLINK)

MACHINE CHECK ANALYSIS AND RECORDING (MCAR)

MCAR responds to MCIs, attempts recovery, and provides operator messages on SYSLOG. Machine check records are recorded on the recorder file IJSYSRC by the RMSR transients $$RAST01 and $$RAST08. (See Figures 50 through 52.)

When a machine check occurs, hardware first logs the error in the Machine Check Logout Area in low real storage and then retries the failure by CPU retry and ECC (Error Checking and Correction). If the retry is successful, a soft machine check occurs on the Models 135, 145, 155-II and 158 (if enabled). The Models 115 and 125 do not generate an interrupt for a machine check from which it could recover (no soft MCI). For soft MCIs the recording is controlled through the Error Frequency Analysis (EFI) feature. If a specified error count is reached, the recording mode is changed from recording to quiet. The MODE command gives the operator control of soft MCIs. (EFI and MODE command do not apply to the Model 115 or 125.) It permits the operator three options:

- Determine whether the system is in quiet or recording mode.
- Alter mode of operation.
- Change error threshold values.

If hardware retry is not successful, MCAR determines machine check severity. A hard MCI occurs when:

- CPU retry is not successful.
- Interrupted instruction cannot be retried.
- Storage failure is permanent.

In the event of a hard MCI, the affected task is canceled. MCAR assesses the damage and continues system operation when possible. The system enters the hard wait state when a hard MCI:

- Interrupts supervisor coding.
- Occurs while accessing critical information or phases from SYSRES.
- Damages privileged coding through a permanent storage error.

MCAR attempts to notify the operator about:

- Machine check type.
- Wait state, re-IPL.
- Problem program termination.
- Mode operation change.
- Buffer deletion.

Chart 04 provides an overview of machine check analysis and recording. The following section accompanies this chart.

MACHINE CHECK ANALYSIS AND RECORDING FUNCTIONAL FLOW

(Numbers refer to Chart 04.)

1. The Resident Machine Check Handler analyzes the Machine Check Interruption Code (MCIC) and the Problem State bit (bit 13) of the Machine Check Old PSW. It catagorizes errors into 3 classes:

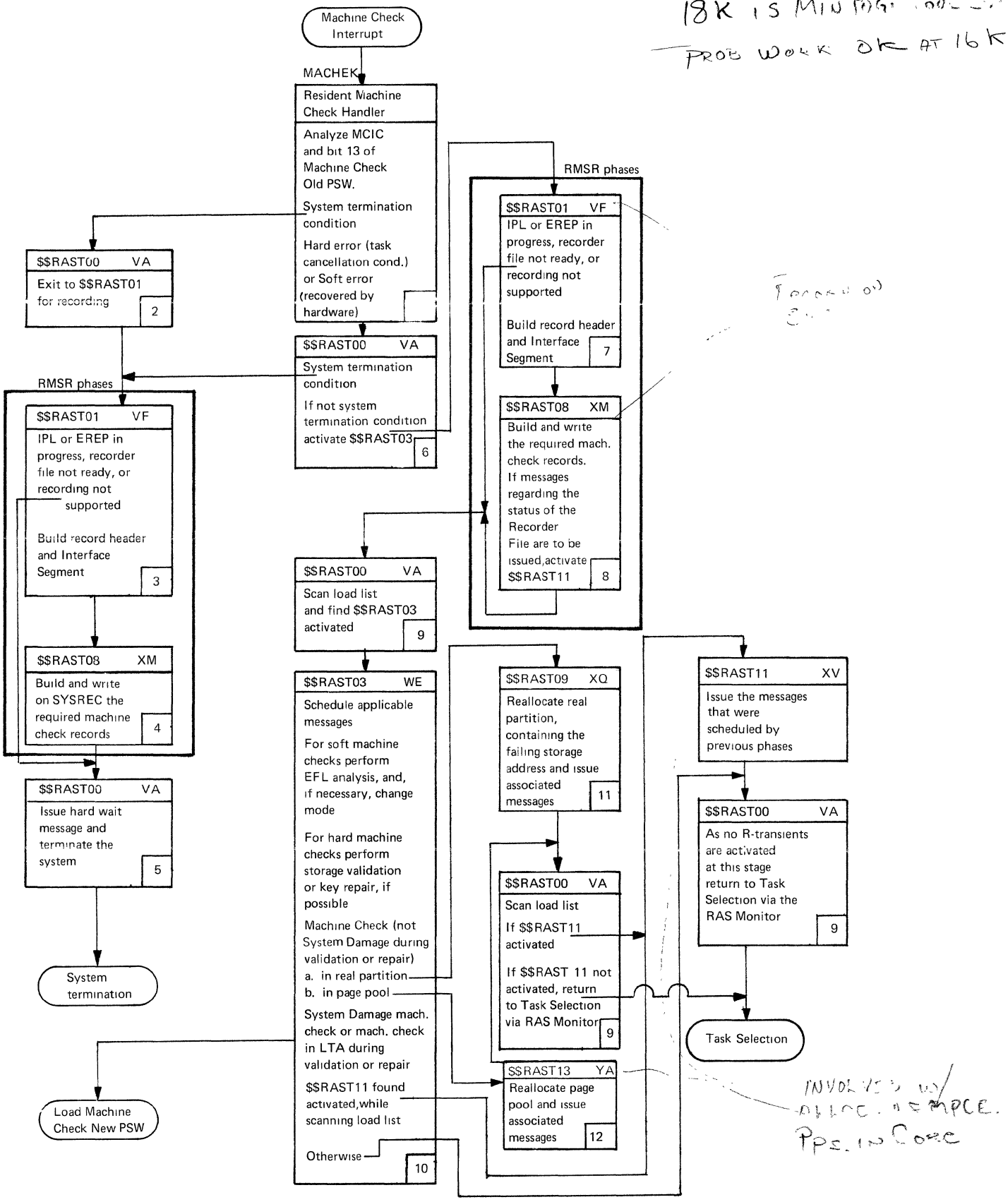
   a. System operation termination condition. The MCIC indicates:
      - System damage.
      - CPU-mask (1MWP) in old PSW is invalid.
      - Instruction processing damage (while the CPU is in the supervisor state).
      - One or more old PSW bits, other than in the CPU-mask, are invalid (while the CPU is in the supervisor state).
      - Storage or Protection error while the failing storage address is invalid.

      Action: Post C'A' in location 0 (system termination code), post C'S' in location 1 (for SEREP), and post Emergency Exit (EMEXIT,X'08') in LD00SLOT (indicator to $$RAST00 to terminate the system).

   b. Hard Machine Checks. The system can continue but the damaged task is to be canceled. While the CPU is in the problem state, the MCIC indicates:
      - Instruction processing damage.
      - One or more old PSW bits, other than in the CPU-mask, are invalid.

      Action: Activate RAS System task and branch to the cancel routine to cancel the task. If storage error on GETREAL request, exit to task selection (do not cancel task).

Chart 04. Machine Check Analysis, and Recording Function Flow



c. Soft Machine Check (if none of the above conditions is present). Only recording is required for errors from which hardware recovered successfully.

Action: If interruption occurred while in problem state, activate RAS system task and exit to Task Selection.

If supervisor function is being performed or system task active, activate RAS system task (if not already active) and return to the interrupted code by loading the machine check old PSW.

2. On finding the EMEXIT bit on in LD00SLOT, and C'A' in location 0, control is passed immediately to $$RAST01 for an attempt to record the irrecoverable machine check on the recorder file (IJSYSRC).

3. If IPL or EREP is in progress, if the recorder file is not ready, or if the recorder file is owned by the physical transient area, no record is built and an exit is taken immediately to $$RAST00.

For the Model 115 or 125, if RMSR has not been generated into the system, no recording is performed and an exit is taken immediately to $$RAST00.

$$RAST01 builds the standard 24-byte record header (plus additional information for the first record) and Interface Segments, which are used to establish an interface with $$RAST08. (See Figure 16.)

4. $$RAST08 posts SYSTERM (X'01') in LD00SLOT, and builds and records the required machine check records. It uses the record header and the interface segment passed to it by $$RAST01. (See Figures 50 through 52 for machine check record formats.)

$$RAST08 reads the recorder file header record and determines whether there is space available on the file. If so, the records are written on the file and the SYSREC header record is updated and rewritten.

If the recorder file is full, or if an I/O error occurs while accessing the file, no further recording is attempted. A code is posted in location 2 to indicate the status of the recording effort:

C'A' Recording was attempted but failure occurred on first record.

C'I' Recording was incomplete, but at least one record may have been written successfully on the recorder file.

C'S' Recording of all records was successful.

5. $$RAST00 tests LD00SLOT, and finding both the SYSTERM and EMEXIT bits on, executes the audible alarm command, issues a 0T11W hard wait message regarding the recording status, and terminates the system. (See Figure 9.)

6. $$RAST00 receives control, via Task Selection, when one of the conditions 2 and 3, specified in item 1, exist. The EMEXIT bit in LD00SLOT is not on. A test is made to determine if one of the following conditions exists:

   a. The first byte of the MCIC=0.

   b. Multiple bit ECC (Error Checking and Correction) errors occurred and the failing storage address is invalid.

   c. Multiple bit ECC error occurred and the failing storage address is in the supervisor area or in the alternate area.

Each of the above conditions causes the system to be terminated. C'A' is posted in location 0, SEREP code C'S' is posted in location 1, the EMEXIT bit is posted in LD00SLOT, and $$RAST01 is fetched.

If none of the above conditions exist, an exit is also taken to $$RAST01 and $$RAST03 is activated (high-order bit in LD03SLOT on).

7. See item 3. When the recorder file is owned by the physical transient area an exit is taken to resident routine to deactivate the RAS task.

8. $$RAST08 builds and records the required machine check records. It uses the record header and the interface segment passed to it by $$RAST01. (See Figures 50 through 52 for machine check record formats.)

It reads the recorder file header record and determines whether there is space available on the file. If so, the records are written on the file, and the SYSREC header record is updated and rewritten.

If the recorder file is full, or if an I/O error occurs while accessing the file, no further recording is attempted. For the following conditions $$RAST11 is activated

(high-order bit in LD11SLOT on) to write a message on SYSLOG:

a. I/O error while accessing the recorder file.

b. The recorder file is full.

c. Last track of the recorder file is being used.

9. The load list is a directory for the $$RASTnn transients. It is contained in in RASTAB. (See Figure 8.) A fullword is reserved for each phase, and the low-order three bytes of each fullword contain the disk address of the associated phase. The first byte is a flag byte. The load list is scanned for entries that have the high-order bit of the flag byte on. If such an entry is encountered, the associated phase is loaded because it appears that at some earlier stage a request for this phase was made. Before the requested phase is loaded, the entry is deactivated. The order in which the load list is scanned establishes a priority mechanism when more than one R-transient is activated. If no entry is found with the high-order bit on, an exit is taken to the resident RAS Monitor, which will pass control to Task Selection.

10. $$RAST03. For soft machine checks the primary function of this phase is Error Frequency Analysis (EFL). For hard machine checks the storage validation or SPF key repair is attempted. Messages are scheduled by this transient by turning on the appropriate bit in RASMSG1 or RASMSG2 in RASTAB. (See Figure 8.) The messages are to be printed by $$RAST11.

    a. Soft check.

       When a soft machine check has occurred, the message 0T09I is scheduled. If damage has occurred to the timer or to location 80, message 0T18E is also scheduled. The Models 115 and 125 do not generate an interrupt for a soft machine check.

For the model 155-II/158, ECC/EFL analysis is done by checking whether a specified error count has been reached within a specified time limit, whereupon a diagnose instruction is issued to place the machine in quiet mode. The message 0T06I is schedlued. 155-II/158 HIR/EFL analysis is done in a similar manner, but to switch from full recording mode to quiet mode, besides using a diagnose command, control register 14 is also loaded (with i loaded (with only bit 0 and 1 on). The message T07I is scheduled.

Model 145 HIR/EFL analysis is identical to that of the Model 155-II/158. Model 145 ECC/EFL analysis differs from the analysis for the Model 155-II/158 to the extent that control storage analysis is necessary and the EFI is initially set to sixteen signle bit errors in eight hours rather than eight errors in eight hours. Both real and control storage are switched to quiet mode by using two diagnose commands, if there is reason for it. On the occurrence of a single bit error while in control storage threshold mode, message CT17I is scheduled to indicate that control storage is in quiet mode.

For the Model 135, the hardware maintains an EFL counter. When the error frequency limit is reached a soft machine check occurs. If the machine check being handled is of this type (bit 17 of the MCIC on) a diagnose instruction is executed to place real storage in quiet mode. Moreover, the message 0T16I is scheduled.

If an error is detected while accessing the time of day clock, all modes of operation are changed to quiet, regardless of the machine type. The message 0T14E is scheduled.

The mode status is posted in a one-byte location in the RASTAB called MCMODE. The configuration of the byte is as follows:

Bit 0 - HIR recording mode.
Bit 1 - HIR quiet mode.
Bit 2 - ECC recording mode in real storage.
Bit 3 - ECC quiet mode in real storage.
Bit 4 - ECC recording mode in control storage.
Bit 5 - ECC quiet mode in control storage.
Bit 6 - ECC threshold mode in control storage.
Bit 7 - Not used.

    b. Hard check.

       The following tests are made before storage validation is attempted:

       - Check for multiple bit ECC errors.
       - Test if failing storage address (FSA) is valid.
       - Test to see that the region codes are valid and the FSA is not in the UCS (unit control storage) - Models 155-II and 158 only.

Storage validation is attempted only if each of the above conditions exists. First a doubleword of ones and then a doubleword

of zeros is moved into and read from the failing storage address. Before storage validation is attempted, bit 5 in the PSW is set to 0. The DAT (Dynamic Address Translation) mechanism is therefore not invoked during validation. After the attempt, the DAT bit is turned on again.

For uncorrected protection errors, an attempt to set the storage protect key is made when a storage protect failure occurs. The attempt is made only when the FSA is valid. A rotary scan is initiated in a multiprogramming environment (otherwise the BG key is taken) to determine which partition owns the failing storage address. Once this has been determined, an attempt is made to set the storage protection key for that partition.

Before storage validation or key repair is attempted, the machine check new PSW is saved and replaced by a PSW that causes a routine in this transient to be entered when a machine check occurs. After the recovery attempt, the original machine check new PSW is restored.

If a machine check, not in the logical transient area and other than system damage, is encountered while validating storage or repairing the SPF key, the Page Frame Table entry of the damaged page frame is flagged unusable for paging and GETREAL requests. $$RAST09, the dynamic reallocation of real partition phase, or $$RAST13, the reallocation of page pool phase, is fetched.

If system damage is encountered, the resident machine check handler is entered by loading the machine check new PSW and the system will eventually be terminated. This also applies when the check is in the logical Transient area. In this case, the supervisor state is simulated in the PSW.

For the model 155-II/158, message 0T08I is scheduled if Automatic Configuration has occurred. The total number of buffers deleted is saved in a one byte area in the RAS monitor table called BUFDEL.

Messages that can be scheduled by $$RAST03 are:

0T06I ECC MCI DISABLED
0T07I ALL SOFT MCI DISABLED
0T09I SUCCESSFUL RECOVERY FROM MACHINE CHECK
0T14E CLOCK DAMAGE. ALL MODES QUIET
0T16I EFL OVERFLOW
0T17I CONTROL STORAGE ECC IN QUIET MODE
0T18E TIMER DAMAGE.

11. $$RAST09 reallocates real partitions whenever a machine check interrupt, not in the logical transient area and other than system damage, occurs while storage validation or SPF key repair is being performed for multiple-bit failures. It also issues the message 0T15E MCAR REPAIR FAILED and the message 0T19E regarding the size and boundaries of the partition.

    The way in which the partitions are reallocated depends on where the storage or protection error occurred:

    a. The error occurred in a partition executing in real mode. A new high or low boundary is set for the partition. A new low boundary is set if the error occurred in the lower half of the partition, and a new high boundary is set if the error occurred in the upper half of the partition. The unused part of the partition is given to the page pool by FREEREAL (SVC 54). The entry of the page in the page table is set to unused and the high-address bit (bit 0) set to 1 to indicate invalid address space. The messages 0T15E and 0T19E are issued.

    b. The error occurred in a real partition that was released to the page pool because the partition is running in virtual mode or in that part of the real partition that was released by an EXEC REAL,SIZE job control statement. If the page frame is in the selection pool (and therefore in a page queue), it is removed from the selection pool and dequeued. The entry of the page in the page table is set to unused and the high-address bit (bit 0) is set to 1 to indicate invalid address space. The partition is reallocated by setting a new high boundary, if the page frame was released to the page pool by an EXEC REAL,SIZE job control statement. Otherwise the partition is reallocated as described in item 2. The messages 0T15E and 0T19E are issued. The unused part of the partition is given to the page pool by FREEREAL (SVC 54).

12. $$RAST13 reallocates the page pool when a machine check interrupt, other than system damage, occurs while storage validation or SPF key repair is being performed for multiple bit failures. It also issues the message 0T20E regarding the size of the page pool.

    Dynamic reallocation of the page pool is as follows:

a. The page is dequeued from the page queue and the page table entry corresponding to the failing storage address is set to unused. The high-address bit (bit 0) is set to 1 to indicate invalid address space.

b. The entry in the Boundary Box indicating the number of page frames in the main page pool is updated (reduced by one).

CHANNEL CHECK HANDLER (CCH)

The channel check handler responds to channel error conditions. It first records the error. Then, it evaluates the damage and attempts to reduce the impact of the error on the system as a whole.

CCH assesses channel control checks and interface control checks to determine if the system can continue. Figure 12 shows the results of the Channel Check Severity Detect Routine. Resident CCH performs severity analysis and builds an ERPIB entry. See Figure 11.

For devices other than DASD, resident CCH coding fetches the proper transient to attempt restoration of system operation and to record the error on the recorder file. For record formats see Figures 57 through 59. Transients needed by CCH operate under control of the RAS Monitor. For DASD devices, the resident DASD CCH is entered.

System termination results when:

- Hard channel error occurs during accessing of critical information or phases from SYSRES.
- Hard channel error occurs on the paging channel.
- System reset has occurred.
- Channel address or reset codes are invalid.

Chart 05 provides an overview of channel check handling. The following section accompanies this chart.

CHANNEL CHECK HANDLER FUNCTIONAL FLOW

(Numbers refer to Chart 05.)

1. A channel error is detected when a CSW is stored with either the interface control check or channel control check bit on. Thus, when an I/O interrupt with channel check occurs or when channel check occurs on an I/O instruction, the logging is done under control of CR14 bit 2.

2. This routine gains control from either the SIC or I/O interrupt routines when a channel check occurs. The ECSW is inspected to determine if enough information is valid to isolate the damage to either a channel or a device. (Refer to Figure 12, Channel Check Severity Detect Routine.)

When a system termination condition exits, the EMEXIT bit is posted in location LD00SLOT to indicate to $$RAST00 that the system is to be terminated. The applicable termination code is posted at location 0. The following list gives the termination codes for the various types of disastrous channel errors:

E Irrecoverable channel check on fetch.

C Channel check on log with RASMSG.

D ECSW not stored.

E ERPIB queue has been exhausted.

F Two channels damaged on RTA I/O active.

G System reset code in ECSW.

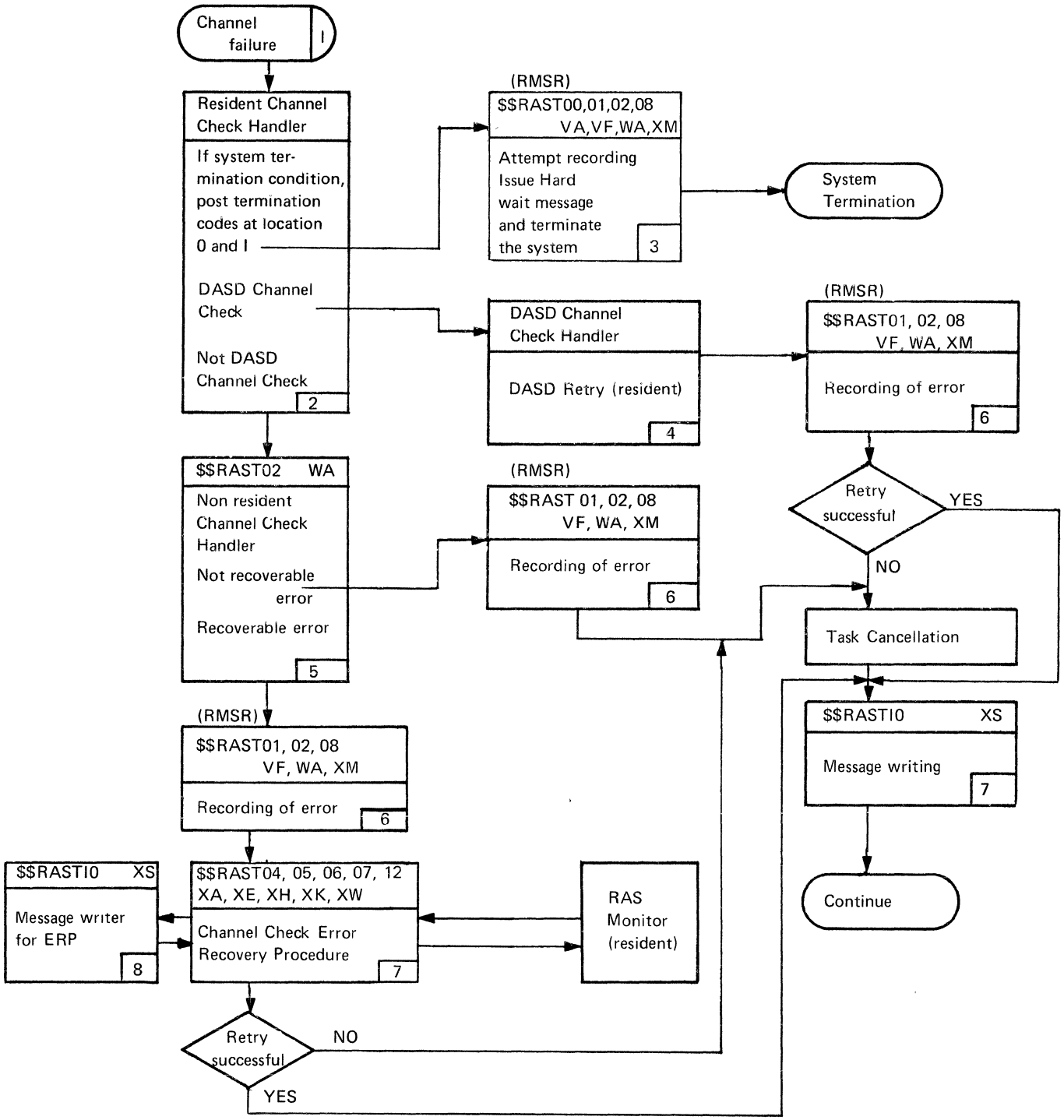
H Retry reset codes invalid.

I Channel address invalid.

J Irrecoverable channel check on paging channel.

If the damage cannot be isolated to a device, the entire channel is considered to be damaged. An ERPIB is created with the PUB field containing the address of the damaged channel. The CSW and ECSW are saved in the ERPIB for the non-resident channel check handler. If the damage can be isolated to a device, the entire ERPIB is filled for the non-resident channel check handler.

Chart 05. Channel Check Handler Functional Flow



3. $$RAST01 and $$RAST02 build channel check records, and $$RAST08 records them on the recorder file. A code is posted in location 2 to indicate the status of the recording effort:

   C'A' Recording was attempted but failure occurred on first record.

   C'I' Recording was incomplete but at least one record may have been written successfully on the recorder file.

   C'S' Recording of all records was successful.

   When C'B' is posted in location 0, no recording is attempted. The SYSTERM bit is posted in LD00SICI and $$RAST00 is fetched.

   With the EMEXIT and SYSTERM bits on, $$RAST00 attempts to issue the 0T11W hard wait message with information regarding the recording status, and then terminates the system.

   For the Models 115 and 125, if RMS=NO was specified at system generation time, no recording is performed.

4. This routine gains control from the resident channel check handler when the damaged device is a DASD device. The operation is retried for all conditions of termination code and sequence code by restarting the chain of CCWs from the beginning (from the initial SEEK, SET FILE MASK, etc.). Not more than ten retries are attempted.

   The channel queue pointer byte of the ERPIB is used as an error counter. If the retry count has not been reached and the channel check occurred on a SIO instruction, a branch is taken to the SIO instruction. If the channel check occurred with an interrupt, a branch to restart the operation is taken.

5. $$RAST02 collects information for the record builder $$RAST01. The appropriate channel check ERP phase is activated by setting the high-order bit of the load list entry for the phase.

6. $$RAST01 builds channel records, and $$RAST08 records them on the recorder file. The recording status is posted in location 2 when the system is terminated. See item 3 for the status codes. Any activated channel check ERP phase is fetched, according to its priority.

   For the Models 115 and 125, if RMSR was not generated into the system, no recording is performed.

7. One of the following channel check ERP phases gets control at this stage:

   $$RAST04 - channel check ERP for 1403, 1403U, 1442, 1443, 2501, 2540, 3881, console printer-keyboard unit record devices.

   $$RAST05 - channel check ERP for 252C and 3211 unit record devices.

   $$RAST06 - channel check ERP for 3505, 3525, 3540 and 3886 unit record devices.

   $$RAST07 - channel check ERP for 240C tape devices.

   $$RAST12 - channel check ERP for 341C and 3420 tape devices.

   The channel check ERP phases interrogate the termination and sequence codes associated with the error, and determine which action is to be taken. For an explanation of the sequence and termination codes, see the section "Termination and Sequence Codes". The decision tables of Figures 13 to 15 show the actions taken by the channel check ERP phases for the various possible values of these codes.

8. $$RAST10 issues all ERP messages and clears the ERPIBs if requested to do so by the channel check ERPs. The following messages possible:

   0T10I CHANNEL ERROR RECOVERY ON cuu

   0T12I IRRECOVERABLE CHANNEL ERROR ON cuu

   0T13A CHANNEL ERROR ON cuu.

   $$RAST00 is fetched to determine if any more errors are pending before continuing.

TERMINATION AND SEQUENCE CODES

The termination code indicates the type of termination that has occurred. It has meaning only when a channel control check or an interface control check is detected by the channel and indicated in the CSW. It is contained in the Limited Channel Logout field (ECSW, location 176-179) at location 179, bits 0 and 1.

The termination code bit settings have the following meaning:

00 Interface disconnect
01 Stop, stack, or normal termination
10 Selective reset
11 System reset.

The sequence code identifies the I/O sequence in progress at the time of the error. It is meaningless if stored during the execution of HALT I/O or HALT DEVICE. It is also contained in the ECSW at location 179, bits 5, 6, and 7.

The sequence code bit settings have the following meaning:

000 A channel-detected error occurred during the execution of a TEST I/O.

001 Command-Out with a non/zero command byte on Bus-Out has been sent by the channel, but device status has not yet been analyzed by the channel. This code is set with a Command-Out to Address-In during initial selection.

010 The command has been accepted by the device, but no data has been transferred. This code is set by a Service-Out or Command-Out response to Status-In during an initial selection sequence, if the status is either channel end alone, or channel end and device end, or channel end, device end, and status modifier, or all zeros.

011 At least one byte of data has been transferred over the interface. This code is set with a Service-Out response to Service-In and, when appropriate, may be used when the channel is in an idle or polling state.

100 The command in the current CCW either has not yet been sent to the device or was sent but not accepted by the device. This code is set when one of the following conditions occurs:

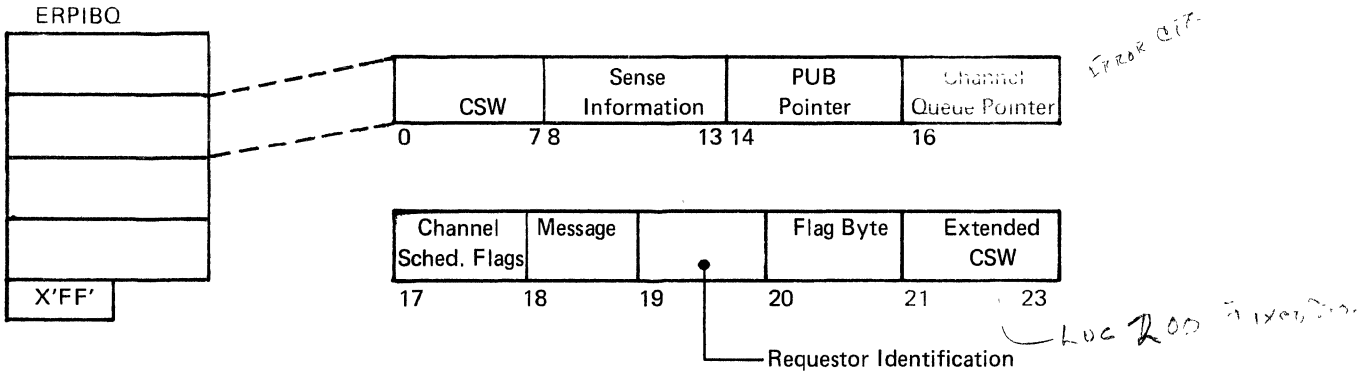
- When the command address is updated during command chaining or a START I/O.
- When Service-Out or Command-Out is raised in response to Status-In during an initial selection sequence with the status on Bus-In including attention, control unit end, unit check, unit exception, busy, status modifier (without channel end and device end), or device end (without channel end).
- When a short control-unit-busy sequence is signaled.
- When command retry is signaled.
- When the channel issues a TEST I/O rather than the command in the current CCW.

101 The command has been accepted, but data transfer is unpredictable. This code applies from the time a device comes on the interface until the time it is determined that a new sequence code applies. It may thus be used when a channel goes into the polling or idle state and it is impossible to determine that code two or three applies. It may also be used at other times when a channel cannot distinguish between code two or three.

110 Reserved.

111 Reserved.

The last three bytes of the ECSW are saved in the ERPIB associated with the error by the resident channel check handler. The channel check ERP phases ($$RAST04, $$RAST05, $$RAST06, $$RAST07, $$RAST12) interrogate the termination and sequence codes passed to them in an ERPIB and determine which action is to be taken. Refer to the decision tables in Figures 13 to 15 for channel check error recovery procedures for CCH-supported devices.



Byte 20: Flag Byte:

Bit		
	0:	1 = Channel Check on SIO
	1-4:	Not used
	5:	1 = Sense data stored
	6:	1 = DASD ERPIB active
	7:	Not used

Note: A free entry is indicated by X'FE' in byte zero.

Label ERPIBQ identifies the first byte of the Queue.

Figure 11. Error Recovery Procedure Information Block (ERPIB)

Channel Address Valid	Reset Codes Valid	System Reset Code On	Start I/O Time	Unit Adress Valid	RTA I/O Active	SYSRES Channel	Action Taken
No							1,2
Yes	No						1,2
Yes	Yes	Yes					1,3
Yes	Yes	No	Yes				5
Yes	Yes	No	No	No	No	No	1,3
Yes	Yes	No	No	No	yes		1,2
Yes	Yes	No	No	No	No	Yes	1,3,4,5
Yes	Yes	No	No	Yes			5

ACTION CODES

1. Schedule recording.
2. Schedule system termination with proper message.
3. Set the damaged channel byte for non-resident channel check handler.
4. Assume the error is on SYSRES device.
5. Error can be isolated to a device, use Part 2.

Note: Every Channel Check that occurs in the system is passed through the Channel Check Severity Detect Routine. You can determine the disposition of the check by using part 1. When a Channel Check has been isolated to a device, use part 2 to determine the action taken.

Channel Check Device Isolation Results (Part 2):

Active ERPIB Exists	Channel Check Entry	DASD	Channel Retry Request	Action Taken
No	No			6
No	Yes			7
Yes	No	No	No	8
Yes	No	No	Yes	6, 9,10
Yes	No	Yes		6
Yes	Yes	No	No	8
Yes	Yes	No	Yes	8,9,10
Yes	Yes	Yes		11

ACTION CODES

6. Exit to supervisor I/O routine after other functions performed.
7. Find a free ERPIB in queue and fill with information for ERPs.
8. Exit to task selection after other functions performed.
9. Post ERPIB complete.
10. Dequeue the RAS CCB and requeue the users CCB.
11. Exit to DASD channel check handler.

Figure 12. Channel Check Severity Detect Routine

1403 and 1443 Printers

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Write (Only)		2	5	5	3	5	3	2	3
Write/Control		2	5	3	3	5	3	2	3
No Op		2	5	5	5	5	5	2	5
Control		2	5	3	3	5	3	2	3
*Recovery procedures for the 1403 and 1443 are termination code independent.									

1442 Card Reach Punch

Operation	Termination Code	Sequence Code							
		000	001	010	011	100	101	110	111
Sense	00	2	5	5	5	5	5	2	5
	01	2	2	5	5	2	5	2	5
	10	2	5	3	3	5	3	2	3
	11	2	5	3	3	5	3	2	3
Read/Control	00	2	5	3	3	5	3	2	3
	01	2	2	3	3	2	3	2	3
	10	2	5	3	3	5	3	2	3
	11	2	5	3	3	5	3	2	3
Write/Control	00	2	5	3	3	5	3	2	3
	01	2	2	3	3	2	3	2	3
	10	2	5	3	3	5	3	2	3
	11	2	5	3	3	5	3	2	3

2501 Card Reader

Operation	Termination Code	Sequence Code							
		000	001	010	011	100	101	110	111
Read	00	2	5	4	4	5	4	2	4
	01	2	2	4	2	2	4	2	4
	10	2	5	4	4	5	4	2	4
	11	2	5	4	4	5	4	2	4
Sense	00	2	5	5	5	5	5	2	5
	01	2	2	5	5	2	5	2	5
	10	2	5	5	5	5	5	2	5
	11	2	5	5	5	5	5	2	5

2540 Card Read Punch and 3881 Optical Mark Reader

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Read-Feed-SS		2	5	3	4	5	3	2	3
Read		2	2	4	4	4	4	2	4
Feed-SS		2	4	3	2	4	2	2	3
Punch-Feed-SS		2	5	3	4	5	3	2	3
*Recovery procedures for the 2540, 3881 are termination code independent.									

Figure 13. $$RAST04 Channel Check ERP Decision Tables (Part 1 of 2)

Console Printer-Keyboard

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Read		2	5	5	3	5	3	2	3
Write, CR		2	5	5	3	5	3	2	3
Write, No CR		2	5	5	3	5	3	2	3
No Op		2	5	5	5	5	5	2	5
Alarm		2	5	5	5	5	5	2	5
*Recovery procedures for the 3210 and 3215 are termination code independent.									

For explanation of the termination and sequence code see section Termination and Sequence Codes.

ACTION CODES

Action 1. The channel is damaged and the channel user will be canceled unless he accepts unrecoverable I/O errors. If specified, control returns to the damaged channel user for further analysis. If the channel user is to be canceled due to a non-retryable or unrecoverable channel failure, the CCH ERP flags the ERPIB with a cancel code (X'FD'), saves CSW and CCW information for the user, and then returns to the CCH. The CCH then cancels the failing channel user.

Action 2. Action 1 is taken followed by the CCH ERP.

Action 3. This is non-retryable condition. An operator message is issued by the CCH ERP, and Action 1 follows.

Action 4. With this condition, retry is possible with manual repositioning by the operator. The CCH ERP issues an operator message and waits for a response to retry the operation (reoccurrence of this error during the retry causes Action 1).

Action 5. This condition indicates the failing CCW can be retried. The CCH ERP identifies the failing CCW chain. If the failure reoccurs during the retry operation, an operator message is issued and Action 1 follows.

Figure 13. $$RAST04 Channel Check ERP Decision Tables (Part 2 of 2)

2520 Card Read Punch

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Sense	00	2	5	5	5	5	5	2	5
	01	2	2	5	5	2	5	2	5
	10	2	5	5	5	5	5	2	5
	11	2	5	5	5	5	5	2	5
Read/Control	00	2	5	4	4	5	4	2	4
	01	2	2	4	4	2	4	2	4
	10	2	5	4	4	5	4	2	4
	11	2	5	4	4	5	4	2	4
Write/Control	00	2	5	4	4	5	4	2	4
	01	2	2	4	4	2	4	2	4
	10	2	5	5	5	5	5	2	5
	11	2	5	5	5	5	5	2	5
Write, No Control	00	2	5	3	3	5	3	2	3
	01	2	2	3	3	2	3	2	3
	10	2	5	5	5	5	5	2	5
	11	2	5	5	5	5	5	2	5
Immediate	00	2	5	2	2	5	2	2	5
	01	2	2	2	2	2	2	2	2
	10	2	5	2	2	5	2	2	5
	11	2	5	2	2	5	2	2	5

3211 Printer

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Control	01	2	5	3	2	5	2	2	3
	00, 10, 11	2	5	5	2	5	2	2	5
Initializing or Diagnostic		2	5	5	5	5	5	2	5
Write/Control	01	2	5	3	3	5	3	2	3
	00, 10, 11	2	5	5	5	5	5	2	5
Write (Only)	01	2	5	5	3	5	3	2	3
	00, 10, 11	2	5	5	5	5	5	2	5

* For explanation of termination and sequence codes, see the section Termination and Sequence Code.

ACTION CODES

Action 1. The channel is damaged and the channel user will be canceled unless he accepts unrecoverable I/O errors. If specified, control returns to the damaged channel user for further analysis. If the channel user is to be canceled due to a non-retryable or unrecoverable channel failure, the CCH ERP flags the ERPIB with a cancel code (X'FD'), saves CSW and CCW information for the user, and then returns to the CCH. The CCH then cancels the failing channel user.

Action 2. Action 1 is taken followed by the CCH ERP.

Action 3. This is a non-retryable condition. An operator message is issued by the CCH ERP, and Action 1 follows.

Action 4. With this condition, retry is possible with manual repositioning by the operator. The CCH ERP issues an operator message and waits for a response to retry the operation (reoccurrence of this error during the retry causes Action 1).

Action 5. This condition indicates the failing CCW can be retried. The CCH ERP identifies the failing CCW chain If the failure reoccurs during the retry operation, an operator message is issued and Action 1 follows.

Figure 14. $$RAST05 Channel Check ERP Decision Tables

3504, 3505 Card Reader, 3525 Card Punch

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Test I/O		3	2	2	2	2	2	2	2
Feed-Stacker Select		2	5	4	2	5	2	2	3
Print		2	5	5	4	5	4	2	5
Write-Feed Stacker S.		2	5	5	4	5	4	2	5
Read-Feed Stacker S.		2	5	5	4	5	4	2	5
Other Commands		2	5	5	5	5	5	2	5
* Recovery procedures for the 3504; 3505 and 3505 are termination code independent									

3540 Diskette Input/Output Unit

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Read IPL		2	5	5	5	5	5	2	7
Feed		2	5	5	5	5	5	2	7
Define Ops		2	5	5	5	5	5	2	7
Sense		2	5	5	5	5	5	2	7
No-Op		2	5	5	5	5	5	2	7
Seek		2	5	5	5	5	5	2	7
Write Control		2	5	5	5	5	5	2	7
Read Data		2	5	5	5	5	5	2	7
write Data		2	5	5	5	5	5	2	7
Test I/O		3	2	2	2	2	2	2	2
* Recovery procedures for the 3540 Diskette are termination code independent.									

Figure 15. $$RAST06 Channel Check ERP Decision Tables (Part 1 of 2)

3886 Optical Character Reader

Operation	Termination Code*	Sequence Code							
		000	001	010	011	100	101	110	111
Read		2	5	3	3	5	3	2	3
Eject		2	5	5	3	5	3	2	3
Scan No-op Load Line Mark Format Load Page Mark Format Sense Load Format		2	5	5	5	5	5	2	5
Test I/O		3	2	2	2	2	2	2	2
*Recovery procedures for the 3886 are termination code independent									

For an explanation of the termination and sequence codes see the section 'Termination and Sequence Codes'

ACTION CODES

Action 1. The channel is damaged and the channel user will be canceled unless he accepts unrecoverable I/O errors. If specified, control returns to the damaged channel user for further analysis. If the channel user is to be canceled due to a non-retryable or unrecoverable channel failure, the CCH ERP flags the ERPIB with a cancel code (X'FD'), saves CSW and CCW information for the user, and then returns to the CCH. The CCH then cancels the failing channel user.

Action 2. Action 1 is taken followed by the CCH ERP.

Action 3. This is a non-retryable condition. An operator message is issued by the CCH ERP, and Action 1 follows.

Action 4. With this condition, retry is possible with manual repositioning by the operator. The CCH ERP issues an operator message and waits for a response to retry the operation (reoccurrence of this error during the retry causes Action 1).

Action 5. This condition indicates the failing CCW can be retried. The CCH ERP identifies the failing CCW chain. If the failure reoccurs during the retry operation, an operator message is issued and Action 1 follows.

Action 6. The device is repositioned and the CCW on which the error occurred is retried. (Reoccurrence of this error during retry causes an operation message, followed by Action 1.)

Action 7. This condition is treated as complete without error. Any statistics relevant to the occurrence of this condition are updated.

Figure 15. $$RACT06 Channel Check ERP Decision Tables (Part 2 of 2)

LOGOUT ADDRESS	N OF N	LOG LENGTH	REC LENGTH	N OF N	LOG LENGTH	REC LENGTH	
A	B	C	D	B	C	D	

The Interface Segment is built by $$RAST01 or $$RAST02 to establish an interface for $$RAST08. $$RAST08 uses this area to determine the number, contents and lengths of the records to be built and recorded. The length of the Interface Segment is 2 + 3n bytes, where n is the number of records to be recorded.

A Start address of Machine Check or Channel Check Logout area. This field is updated by $$RAST08 when a record is built and written, to reflect the start address of the logout information to be included in the next record.

For every record that is to be built and recorded a three byte entry B - C - D is built.

B - First N is record sequence number, while second N is total number of records.

C - Total number of bytes to be moved (by $$RAST08) from the logout area into the record associated with this entry.

D - Total length of the record associated with this entry.

$$RAST08 builds and records the record associated with the first three byte entry B - C - D. Then, if there are more entries, the first entry is overlaid by the second, the second by the third, etc. Then $$RAST08 continues to process the first entry.

Figure 16. Interface Segment for $$RAST01, $$RAST02, and $$RAST08

RMSR increases system availability by writing records of environmental data on the Recorder File (IJSYSRC). Through examination and analysis of these records, it is possible to anticipate service requirements for the affected devices. This early warning can reduce the time spent in error recovery and unplanned maintenance while the system is supposed to be in operation.

RMSR is standard except for the Models 115 and 125. Supervisor generation option CHAN=YES or RMS=YES specified causes RMSR support to be generated for these models.

RMSR writes the following record types on the recorder file:

- Machine Check (key=X'10')
- Channel Check (key=X'20')
- I/O Device Records

Type 1 (key=X'30')

Unit Check condition - a record written because an irrecoverable error (hard error) occurred.

Device EOD (See $JOBCTLM in DOS/VS IPL and Job Control Logic.) - For each non-teleprocessing device that has statistics accumulated in its PUB2 table, a record is written after a ROD command was issued. For tape drives (2400, 3410, and 3420) that have a volume open, no Device EOD record is written even though statistics may be accumulated, as statistics for these devices are kept by volume. For 3330 and 3340 devices that have statistics accumulated, a type 3 (key=X'91') record is written. To write the records on the recorder file an SVC 44 is issued by $JOBCTLM. $$ABERA3 is fetched to perform the actual recording.

Volume Dismount (built by $$BOPEN and $$BOPEND; see DOS/VS LIOCS Logic, Vol. 1) - a record is written for the previously mounted volume, when a new tape or disk volume is mounted and the system detects the change. To write the records on the recorder file, an SVC 44 is issued by the open phase. $$ABERA3 is fetched to perform the actual recording.

SVC-requested - a record is written because an SVC 44 is issued after data has been built as input.

Counter Overflow - a record is written because at least one of the statistical data counters has filled up.

Type 2 (key=X'34')

Teleprocessing Access Method builds records, and requests service.

Type 3 (key=X'91')

Miscellaneous Data Recording (MDR) record for nonstandard unit check type records.

- System EOD (key=X'80'; see $JOBCTLM in DOS/VS IPL and Job Control Logic) - When a ROD command is issued and if ERRLOG=RDE was specified, during system generation the operator is asked whether it is 'END OF DAY'. If his reply is 'Y' a System EOD record is built by $JOBCTLM. To write the record on the recorder file, $JOBCTLM issues an SVC 44. $$AERRA3 is fetched to perform the actual recording.

- IPL (key=X'50'; see $JOBCTLM in DOS/VS IPL and Job Control Logic) - An IPL record is built after IPL by $JOBCTLM if ERRLOG=RDE was specified during system generation. $JOBCTLM issues an SVC 44 to write the record on the recorder file. $$AERRA3 is fetched to perform the actual recording.

Each of the records contains a standard 24-byte header, and most have a data area following the header. For record formats on the recorder file, see Figures 24 to 55. The formats of the records not built by the phases that are described in this manual are also included.

Phase name	Function	Program Level Chart ID
$$ABERAA	Updates the statistical data counters in the PUB2 Table for 2400, 3410, and 3420 tape devices.	07
$$ABERA1	Records I/O device records on the recorder file.	06,07
$$ABERA2	RMSR message writer. Issues messages regarding the status of the recorder file.	06,07
$$ABERA3	Writes records on the recorder file and enqueues or dequeues recorder file on SVC 44 request.	--
$$ABERA4	Builds I/O device records for 2400, 3410, and 3420 tape devices and 3211, 3504, 3505, and 3525 unit record devices.	07
$$ABERA5	Builds I/O device records for BTAM (type 2, key X'34') or 3330 (type 1 or 3, key X'30' or X'91').	06
$$ABERA6	Sets OS/VS device class and type code in record. Called only by $$ABERRK.	06,07
$$ABERA7	Builds I/O device records for 3340 (type 1 or 3, key X'30' or X'91').	06,07
$$ABERRJ $$ABERJ1	Updates the statistical data counters in the PUB2 Table for DASD (except 3330 and 3340), unit record devices, and 2495 tape cartridge reader.	06,07
$$ABERRK	Builds I/O device records for DASD (except 3330 and 3340), 3540 Diskette I/O unit, unit record devices (except 3211, 3504, 3505, and 3525) and 2495 tape cartridge reader.	06,07
$$ABERRP	Builds MDR (Miscellaneous Data Recording) records for 3211 (phase 1: FCB, PLB and FCAR records).	07
$$ABERRQ	Builds MDR (Miscellaneous Data Recording) records for 3211 (phase 2: UCB records).	07
$$RAST01	Builds machine check and channel check records.	04,05
$$RAST08	Builds and records machine check and channel check records on the recorder file.	04,05

Figure 17. RMSR A- and R-transient programs

The supervisor portion of RMSR consists of:

- The resident routines.
- The A-transients $$ABERAA, $$ABERA1, $$ABERA2, $$ABERA3, $$ABERA4, $$ABERA5, $$ABERA6, $$ABERRA7, $$ABERRJ, $$ABERRK, $$ABERRP, and $$ABERRQ.
- The R-transients $$RAST01 and $$RAST08. Besides other messages, $$RAST11 gives also information regarding the status of the recorder file.

The following functions of RMSR involve A- or R-transients and are described in the following sections.

- Unit Check Statistical Data Recording.
- Machine Check and Channel Check Recording.
- SVC 44 requested recording on the recorder file and en- and dequeuing of the recorder file ($$ABERA3).
- BTAM Recording ($$ABERA5).

UNIT CHECK STATISTICAL DATA RECORDING

The unit check statistical data functions build and write unit check and counter overflow records. The customer engineer may request specific errors to be recorded through the use of the MODE command (see DOS/VS Logical Transients Logic).

The supervisor, through the ERP task routine, selects the proper RMSR A-transient for initial entry into unit check handling. Charts 06 and 07 provide an overview of unit check handling. The text in the following two sections accompanies these charts.

RMSR/ERP FUNCTICNAL FLCW FCR UNIT CHECK TYPE ERRORS CN DISK DEVICES

(Numbers refer tc Chart 06.)

1. The CSW and the sense bytes are placed in the last error queue Entry. Alsc the errcr Queue flag byte ERQFIG is initialized. The allcw retry bit is set if the address of the failing command is available. Ctherwise, the Allow Ignore bit is set. If return to user is not specified in the CCB, control is passed to the resident disk error recovery routine. This dces not apply tc prcgram or prctecticn check, or device not operational, in which case the ERP task will be activated.

   If an error occurs while reading the sense bytes, the message code X'20' (errcr on recovery) is posted in the Errcr Queue Entry. The unit check status is cleared.

2. The disk errcr recovery routine determines the errcr type. Fcr initial soft (retriable) errors, the statistical data ccunters in the PUB2 Table are to be updated (by $$ABERRJ), unless the error is on SYSRES, SYSVIS, cr the device is a 3340. The Error Queue Entry for this errcr is completed and the ERP task is activated. Byte ERQMSG cf the Error Queue Entry contains C'S' to indicate that this is a soft error that is tc be retried. If the device is a 3330, this reccrding is not done for all scft error conditions. For a 3340, recording is dcne fcr all soft errcr conditions.

   For hard errors (errors that still persist after a specified number cf retries, or that are nct tc be retried at all and not to be ignored) the ERP task is activated.

   For soft errors that are not tc be reccrded, and for errors that are tc be ignered, appropriate branches are taken to resident routines.

3. When the ERP task is dispatched, $$ABERRJ is loaded into the PTA. For the Models 115 and 125 withcut RMSR, nc recording is performed and the ERP Monitor $$ABERRA is fetched.

4. $$ABERRJ checks for which device it was entered. For devices requiring no statistics updating or nc recording, exit is immediately taken tc $$ABERRA. Fcr unit reccrd devices exit is taken to $$AEERJ1.

   If the device is a 3330 cr 3340, nc ccunters are updated, but exit is taken immediately tc $$ABERA5 cr $$ABERA7 (soft errcr) cr tc $$ABERRA (hard errcr). This is because of the presense of hardware ccunters in the ccntrcl unit. $JOBCTLM and $$BECJ7 may update the ccunters in the PUB2 table entry (nct 3340).

   If the device is a 2314, the mcdule ID in the sense bytes may nct be eqcal tc the ID in the PUB2 table entry, because cf a swapped mcdule ID plug. If this is the case, and any statistics were accumulated in the PUB2 table entry, ccntrcl is passed immediately to $$ABERRK tc have a counter cverflcw reccrd built and reccrded on the recorder file. The RFEXIT field cf the reccrder file table (RFTABLE) is set tc C'RJ' in crder to cause recall cf this mcdule after reccrding. Ther the statistical counters will have been cleared (by $$ABERRK). The new mcdule ID will be set in the PUB2 Table, and the errcr will be accumulated.

   After the updating, a test is made to determine whether reccrding cn reccrder file is required. (For the Model 125, devices reccrded by hardware nc recording mcde is set by IPL.) If nct, exit is taken tc $$ABERRA (hard errcr) cr tc resident routines fcr retry (scft errcr). If reccrding is tc be performed, ccntrcl is passed to $$ABERRK. This is the case when the follcwing conditicns exist:

   - The device is in diagncstic mcde, the limit ccunt is not reached, and this errcr was selected by the CE via the MCDE ccmmand.
   - The device is in intensive mcde, the errcr is initial, the limit ccunt is nct reached, and this errcr was selected by the CE via the MODE ccmmand.
   - A counter in the PUB2 Table is full.

   In the first two cases bit RECDERR (X'40') in RFIAGS3 is set and the limit ccunt is reduced by cne. In the third case, bit RECDSF (X'20') is set.

   If it is found that the device is in diagncstic cr intensive mcde and the record limit has been reached (equal tc zerc), the device is reset to normal mode.

Chart 06. RMSR/ERP Functicnal Flcw for Unit Check Type Errcrs cn Disk Devices (Part 1 of 2)

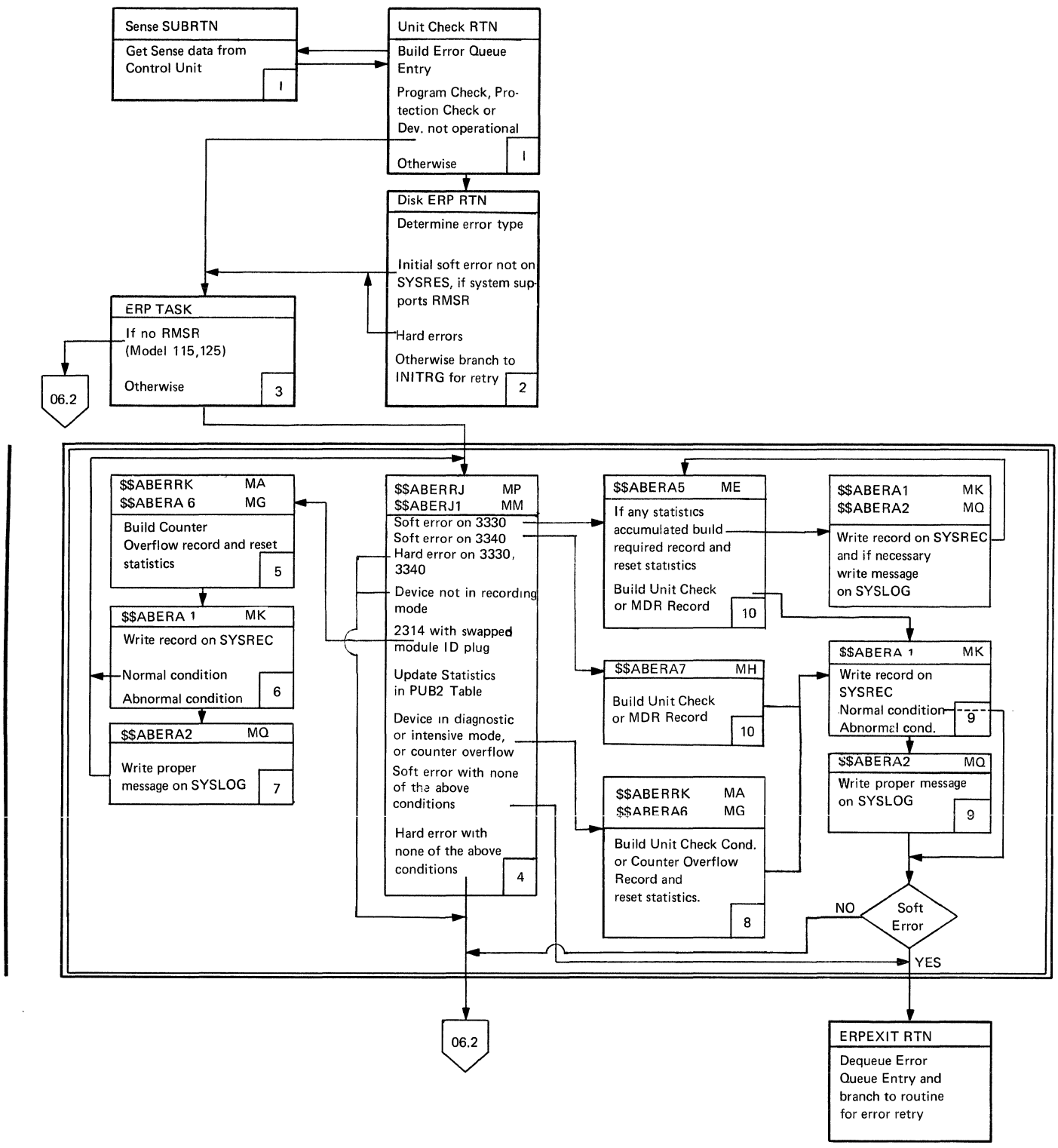
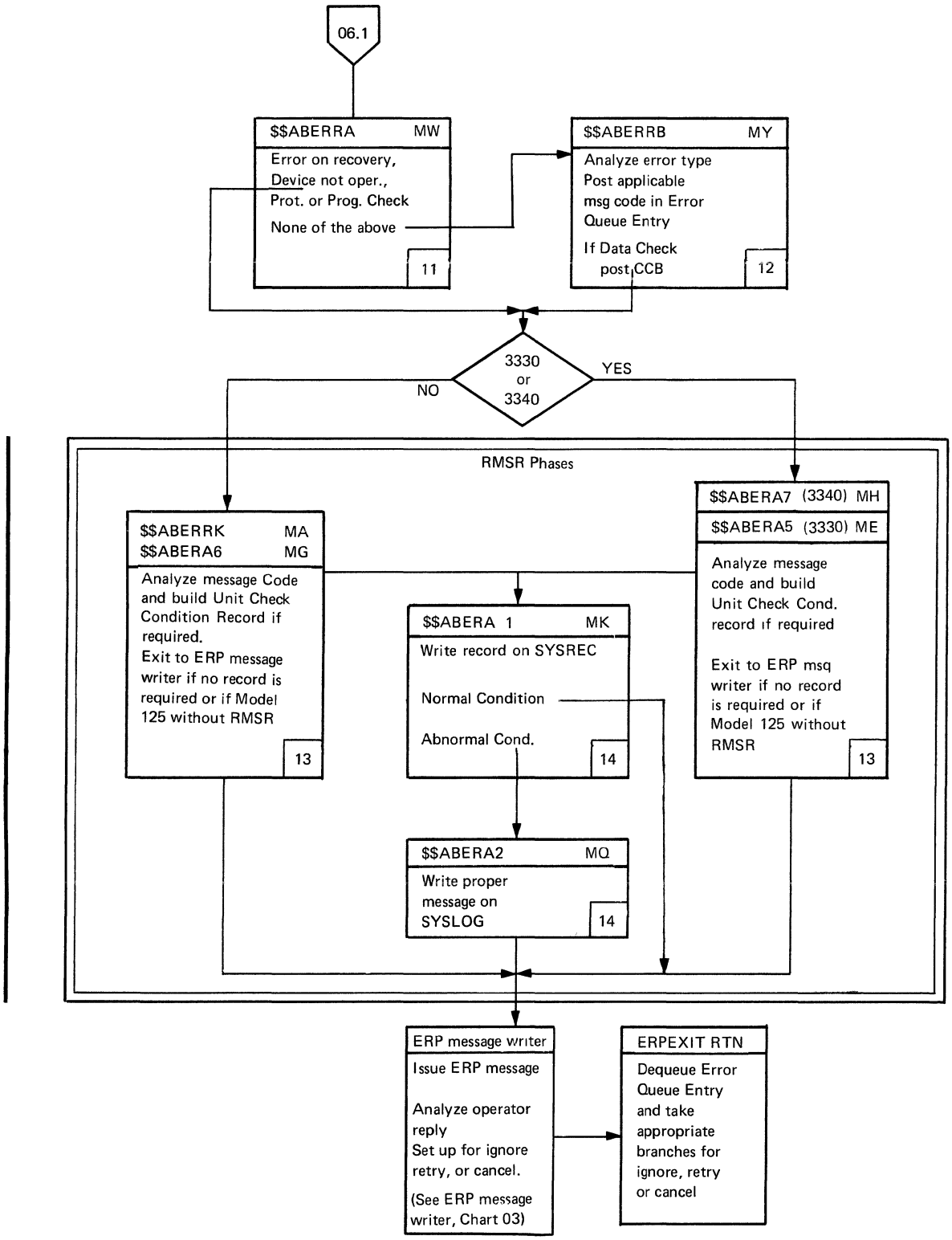


Chart 06. RMSR/ERP Functional Flow for Unit Check Type Errors on Disk Devices (Part 2 of 2)



This transient also sets the RFEXIT field of RFTABLE, which will be used later to determine the exit from this or following transients.

4A. $$ABERJ1 updates the appropriate statistical data counters of the affected device in the PUB2 table entry for unit record devices.

5. $$ABERRK builds a counter overflow record and resets the statistics in the PUB extension. $$ABERA6 adds the CS/VS device class and type code to the record.

6. $$ABERA1 reads the Recorder File header record and determines whether the record passed to it will fit in the file. If so, the standard 24-byte header is built and the record is appended to it. The record is now written on the next available space in the file, and the recorder file header record is updated and rewritten to the file. SVC 76 is used to write the record. If DOS/VS runs under VM/370, VM/370 will take over and handle the recording. If VM/370 is not active, SVC 76 has the same effect as SVC 15. (See also "A- and R-transient Supervisor Calls" in "Chapter 1, Introduction".)

This phase passes normally control to the transient specified in the RFEXIT field. For the following conditions, control is passed to $$ABERA2 to write a message on SYSLOG:

- I/O-error while accessing the recorder file.
- Recorder file is full.
- Last track of the recorder file is being used.

If the recorder file is not open and ready or is being accessed by EREP, exit is taken without recording.

7. At this stage, the following messages may be printed on SYSLOG:

   0T00I LAST TRACK ON RECORDER FILE
   0T03I ERROR ON RECORDER FILE AT (cchhr)
   0T05I RECORDER FILE FULL--RUN EREP

8. See item 5. A unit check condition record or a counter overflow record is built.

9. See items 6 and 7. Control is passed, according to the contents of the RFEXIT field, either to resident routines for retry (soft error) or to $$ABERRA (hard error).

10. $$ABERA5, using the sense bytes, builds a unit check condition record (type X'30') if the error is equipment check. For other errors, a miscellaneous data recording record (type X'91') is built.

If there are any statistics in the statistical data counters in the PUB2 table entry, the record is built using these statistics. The counters are cleared and the Module ID in sense byte 4 is copied into the PUB2 table entry. $$ABERA1 is called to write the record on the recorder file. The RFEXIT field is set to cause recall of $$ABERA5, which will then perform the function described above, as all the counters contain zero.

11. $$ABERRA is the ERP monitor. (See chart 02.) Control is passed to $$ABERA5 (3330), $$ABERA7 (3340) or $$ABERRK (other disks) for the following error conditions: error on recovery, device not operational, program check or protection check. In the case of program or protection check, the bits allow ignore and allow retry of ERQFLG (see item 1) are set to zero.

For other error conditions on disk, $$ABERRA exits to $$ABERRB.

12. $$ABERRB analyzes the error condition and moves the appropriate message code to ERQMSG in the error queue entry. For 3330 or 3340 devices, control is passed to $$ABERA5 or $$ABERA7, respectively for other disk devices, to $$ABERRK.

For the following conditions, the Allow Ignore and Allow Retry bits in ERQFLG are set to zero:

- Write assumed on disk with read-only switch on.
- File protection violated.
- Command reject.

For data checks, the CCB is posted and if the user has return specified in the CCB, the PASSBK switch in ERQFLG is posted to indicate this situation to the ERP message writer.

13. Except for the conditions specified below a unit check condition record is built by $$ABERA5 (3330), $$ABERA7 (3340), or $$ABERRK and $$ABERA6 (other disk devices). $$ABERRK also resets the statistics in the PUB2 table entry.

For the Models 115 and 125 if no RMSR is generated during system generation, or if devices are recorded by hardware, no

recording is performed. This phase exits immediately to the ERP message writer.

The message code is tested and an immediate exit to the ERP message writer is taken for the following codes:

X'08' - Intervention required
X'17' - File protect violation
X'18' - Command reject
X'24' - Program check
X'25' - Protection check
X'26' - Seek address not valid
X'31' - Device not operational.

14. See items 6 and 7. Exit is taken to the transient specified in the RFEXIT field, which in this case is $$ABERRL, the first module of the ERP message writer.

RMSR FUNCTIONAL FLOW FOR UNIT CHECK TYPE ERRORS ON DATA CELL, TAPE AND UNIT RECORD DEVICES

(Numbers refer to Chart 07.)

1. The CSW and the sense bytes are placed in the last error queue entry. Also the error queue flag byte ERQFLG is initialized. The Allow Retry bit is set if the address of the failing command is available. Otherwise, the Allow Ignore bit is set. If return to user is not specified in the CCB, the ERP task will be activated.

2. For tape devices, excluding 2495 Tape Cartridge Reader, $$ABERAA is loaded into the PTA. For data cell and unit record type devices, including the 2495, $$ABERRJ is loaded.

For the Models 115 and 125 with no RMSR generated during system generation, the RMSR phases are bypassed.

3. $$ABERAA updates the appropriate statistical data counters in the PUB2 table entry for the device.

First the counters for temporary read and write errors are updated. If a threshold value is reached, the RFEVA bit (X'08') in RFFLAGS2 is set to indicate that an EVA (Error Volume Analysis) message is required.

After the updating, a test is made to determine whether recording on the recorder file is required. If so, control is passed to $$ABERA4. This is the case when the following conditions exist:

- The device is in diagnostic mode, the limit count is not yet reached, and this error was selected by the CE via the MODE command.
- The device is in intensive mode, the error is initial, the limit count is not reached, and this error was selected by the CE via the MODE command.
- A counter in the PUB2 table is full.

In the first two cases, bit RECDERR (X'40') in RFLAGS3 is set. In the third case, bit RECDSF (X'20'). The limit count is reduced by one.

If no recording is to be done, the RFEVA bit is tested. If on, $$ABERRA2 is called to write an EVA message on SYSLOG.

If no record or message is to be written, this phase exits to the first of the tape ERP transients.

If it is found that the device is in the diagnostic or intensive mode and the record limit has been reached (equal to zero), the device is reset to normal mode.

This transient also sets the RFEXIT field of recorder file Table, which will be used later to determine the exit from this or following transients.

4. $$ABERA1 reads the Recorder File header record and determines whether the record passed to it will fit in the file. If so, the standard 24-byte header is built and the record is appended to it. The record is now written on the next available space in the file and the header record is updated and rewritten to the file. SVC 76 is used to write the record. If DOS/VS runs under VM/370, VM/370 will take over and handle the recording. If VM/370 is not active, SVC 76 has the same effect as SVC 15. (See also "A- and R-transient Supervisor Calls" in "Chapter 1, Introduction".)

This phase normally passes control to the transient specified in the RFEXIT field. For the following conditions, control is passed to $$ABERA2 to write a message on SYSLOG:

- I/O-error while accessing the recorder file.
- Recorder file is full.
- Last track of the recorder file is being used.

If the recorder file is not open and ready or is being accessed by EREP, exit is taken without recording.

Chart 07. RMSR Functional Flow for Unit Check Type Errors for Data Cell, Tape and Unit Record Devices (Part 1 of 3)

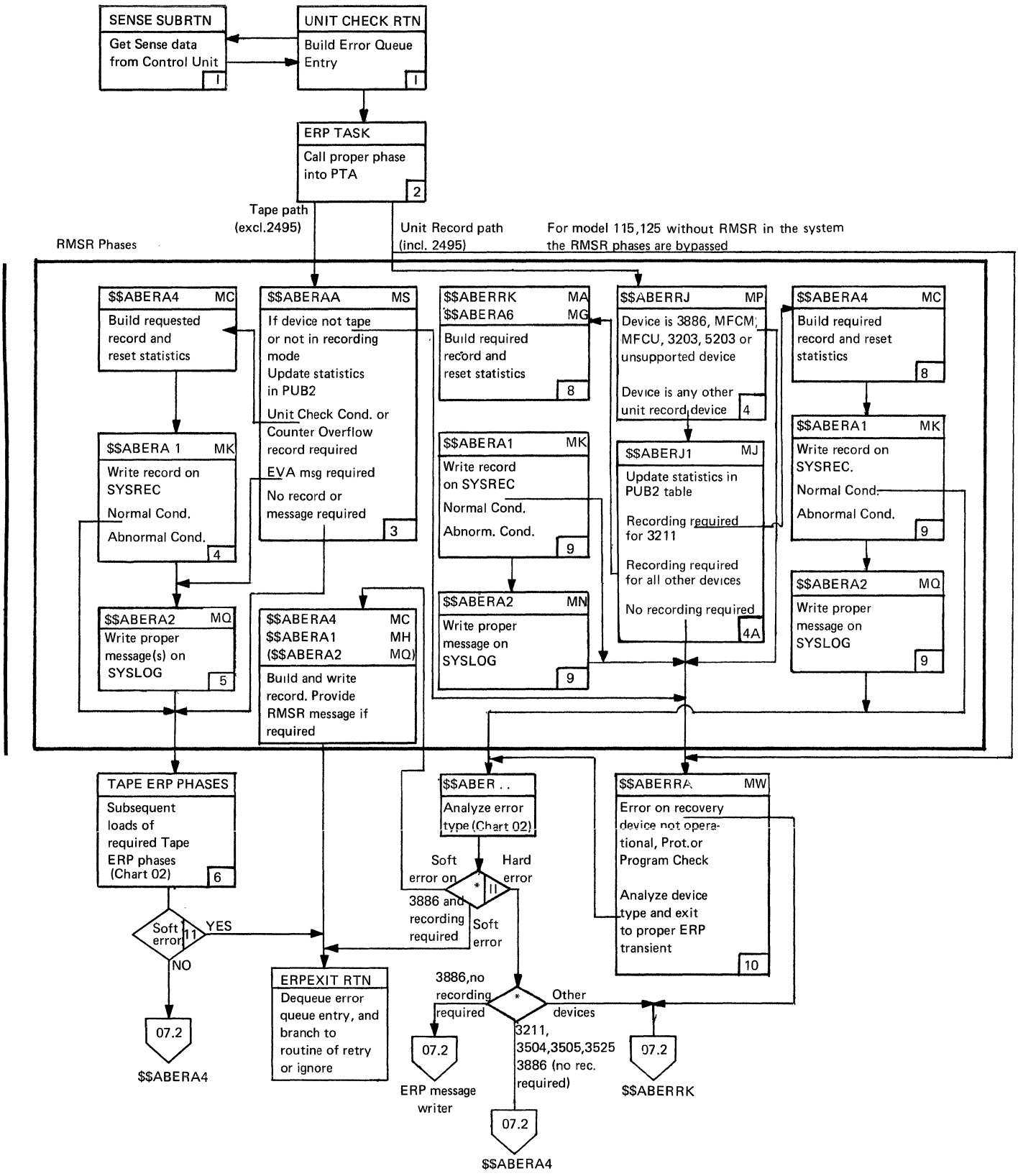


Chart 07. RMSR Functional Flow for Unit Check Type Errors for Data Cell, Tape and Unit Record Devices (Part 2 of 3)

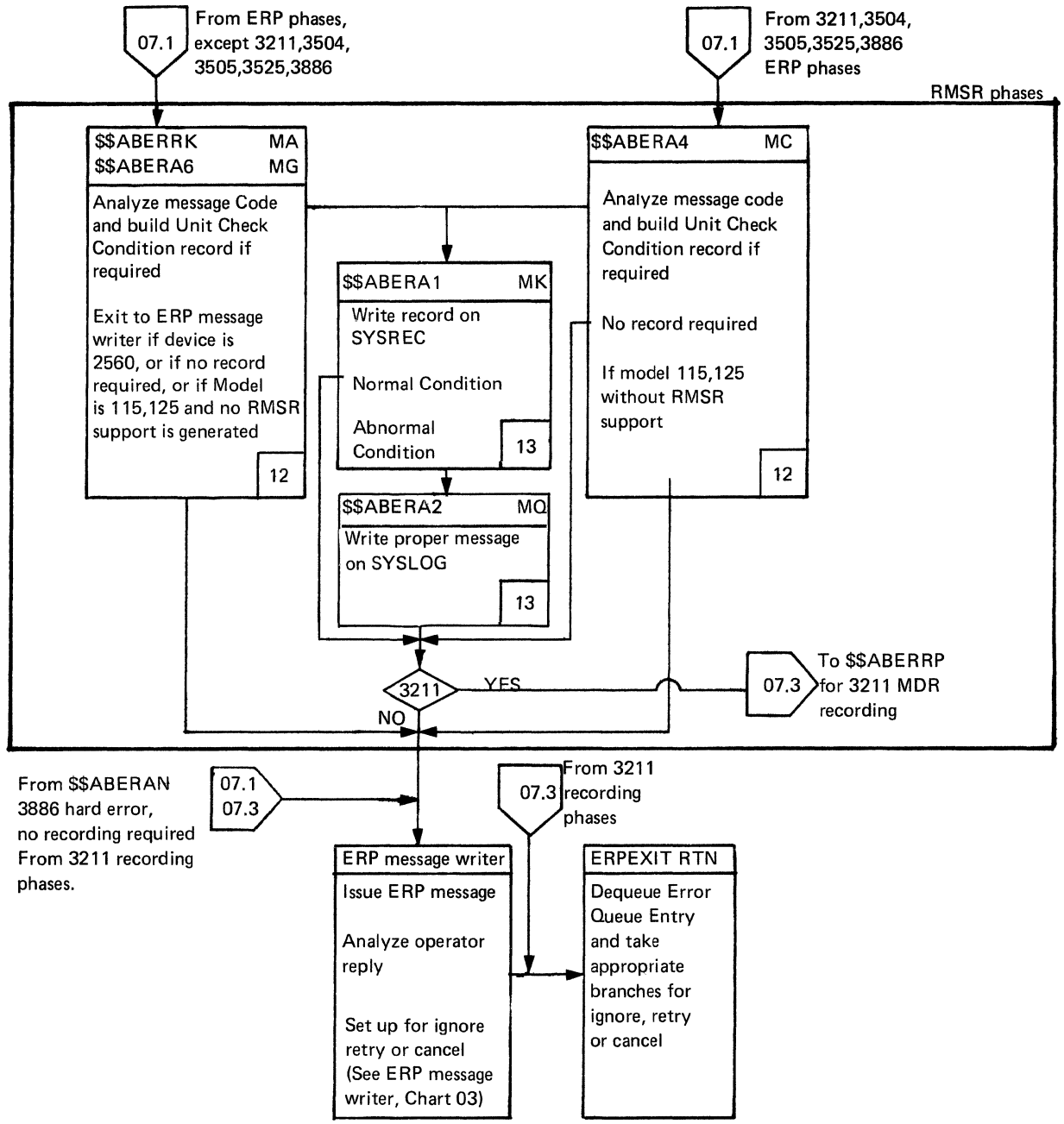
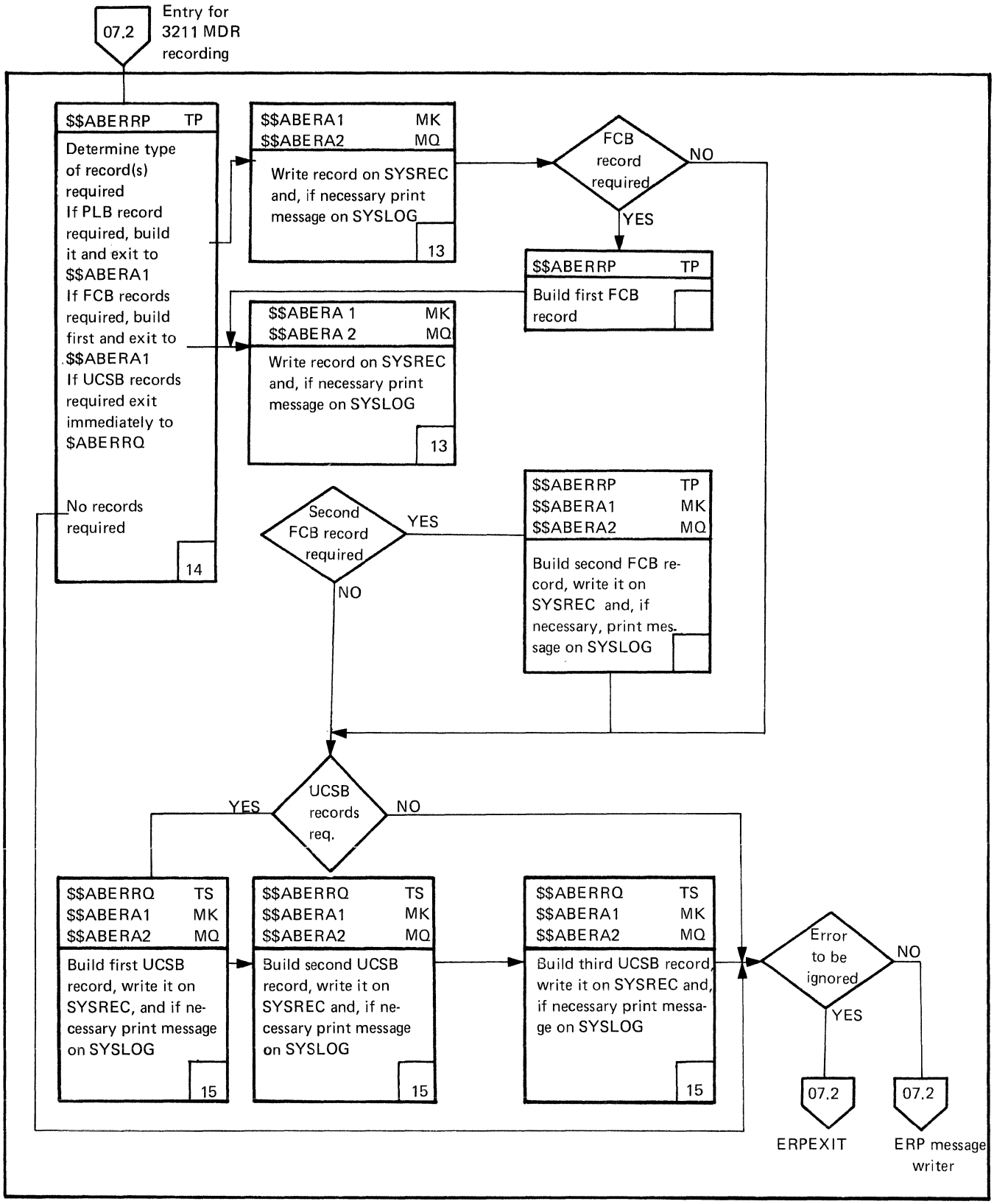


Chart 07. RMSR Functional Flow for Unit Check Type Errors for Data Cell, Tape and Unit Record Devices (Part 3 of 3)



5. At this stage, the following messages may be printed on SYSLOG:

```
0T00I LAST TRACK ON RECORDER FILE
0T03I ERROR ON RECORDER FILE AT (cchhr)
0T05I RECORDER FILE FULL--RUN EREP
4E10I xxxxxx cuu TR=nnn TW=nnn SIC=nnnnn
```

6. See Chart 02, Device ERP functional flow.

7. Usually the device is in recording mode (devices on the Model 125 which are recorded by hardware - CHAN=YES - are set to non-recording mode by IPL) and $$ABERRJ updates the statistical data counters in the PUB2 table entry for the device, except for the 3886 OCR Reader. In the latter case exit is taken to $$ABERRA without updating the counters, as this function is performed by the 3886 ERP, $$ABERAN.

After the updating, a test is made to determine whether recording on the recorder file is required. If this is not so, exit is taken to $$ABERRA. If recording is to be performed, control is passed to $$ABERA4 (3211) or $$ABERRK (other devices). This is the case when the following conditions exist:

- The device is in diagnostic mode and the limit count is not yet reached.
- The device is in intensive mode, the error is initial, and limit count not reached.
- A counter in the PUB2 table is full.

In the first two cases, bit RECDERR (X'40') in RFFLAGS3 is set and the limit count is reduced by one. In the third case, bit RECDSG (X'20') is set.

If it is found that the device is in the diagnostic or intensive mode and the record limit has been reached (equal to zero), the device is reset to normal mode.

This transient also sets the RFEXIT field of RFTABLE, which will be used later to determine the exit from this or following transients.

8. $$ABERRK builds the required unit check condition or counter overflow record and resets the statistics in the PUB2 table. $$ABERA6 adds the CS/VS device class and type code to the record.

$$ABERA4 builds the required record when the device in error is a 3211. When this record is handled, control is passed not to the ERP monitor $$ABERRA, but to the 3211 ERP transient $$ABERRF.

9. See items 4 and 5. The message 4E10I cannot be printed at this stage.

10. $$ABERRA is the ERP monitor. (See Chart 02) Control is passed to $$ABERRK for the following error conditions: error on recovery, device not operational, program check or protection check. In the case of program or protection check or device not operational, the bits allow ignore and allow retry of ERQFLG (see item 1) are set to zero.

For other error conditions, this transient analyzes the device type and exits to the proper ERP transient.

11. If the error is to be retried or ignored, control is returned to resident routines. If the error still persists after a specified number of retries or is not to be retried or ignored, exit is taken to $$ABERA4 (3211, 3504, 3505, 3525, and 3886, and tape devices except 2495) or $$ABERRK (unit record devices except 3211, 3504, 3505, 3525, and 3886).

Before passing control to the supervisor or to the ERP message writer, the 3886 ERP phase $$ABERAN determines whether recording is required. If this is the case, control is passed to $$ABERA4. Otherwise, control is passed directly to the supervisor or the ERP message writer.

12. Except for the conditions specified below, a unit check condition record is built by $$ABERA4 or by $$ABERRK and $$ABERA6. The statistical data counters in the PUB2 table entry are reset.

For the Models 115 and 125 with no RMSR generated during system generation, no recording is performed. This phase exits immediately to the ERP message writer. This is also true for devices on the Model 125 recorded by hardware (CHAN=YES).

The message code is tested, and an immediate exit is taken to the ERP message writer (or to $$ABERRP when the device is a 3211) for the following codes:

```
X'08' - Intervention required
X'17' - File protect violation
X'18' - Command reject
X'22' - Ballast cell
X'23' - Blank strip
X'24' - Program check
X'25' - Protection check
X'26' - Invalid seek address
X'29' - Backspace to load point
X'31' - Device not operational
X'32' - Non-compatible tape on drive
X'34' - Batch numbering switch off.
```

On a Model 115 or 125 without RMSR, this phase also exits immediately to the ERP message writer.

13. See items 4 and 5. The message 4E10I cannot be printed at this stage.

14. By inspecting the sense bytes, $$ABERRP first determines which type of 3211 Miscellaneous Data Recording record or records (type X'91') are to be built by this phase and $$ABERRQ. It uses the switches RFPLB (bit 1), RFFCB (bit 2) and RFUCB (bit 3) of RFFLAGS4 in RFTABLE to register which records are to be prepared.

A Forms Control Buffer Off-Load record (RFFCB on) is required for the following error conditions:

- FCB parity check
- Load check on 'FCB Load' command
- Data check with line position.

A Print Line Buffer / Check Read Buffer Off-Load record (RFPLB on) is required for the following error conditions:

- Mechanical motion
- Data check without line position
- Data check with line position and print check
- PLB parity check
- Coil protection check
- Hammer fire check.

A Universal Character Set Buffer Off-Load record (RFUCB on) is required for the following error conditions:

- Load check on 'UCSB Load' command
- Mechanical motion
- Data check without line position.
- Data check with line position and print check
- UCB parity check.

After the sense bytes have been inspected and the RFFLAGS4 flag byte has been initialized, this flag byte is used to determine which MDR records are to be built and written. The PLB/Check Read Buffer Off-Load and FCB Off-Load records are built by $$ABERRP. $$ABERRQ builds the UCSB Off-Load records. Every time a record is completed, $$ABERA1 is called to append it to the standard 24-byte header and to writer it on the recorder file.

To build the PLB record a Check Read command is issued to read check information stored in each addressable position of the PLB. Then a Read PLB command is issued to read in data from the PLB. The check information is scanned for error conditions. A maximum of 10 characters, on which a print error check occurred, are saved. The check information and the first ten PLB error positions are contained in the PLB record (Figure 42).

To build the FCB records, $$ABERRP first issues a Diagnostic Gate command, followed by a Check Read command, to obtain the eight bits of the Forms Control Address Register. If the FCAR is at position 1, the FCB record is built and written in two parts (Figure 43). They contain the FCAR and the carriage codes obtained from the FCB by issuing the Read FCB command.

If the FCAR is not at position 1, the Read FCB command is not issued, to avoid misalignment of the forms. Only one FCB record is built and written. This record does not contain the carriage codes (Figure 44).

15. $ABERRQ builds (and $$ABERA1 writes) the UCSB record in three parts (Figure 41). They contain the contents of the Universal Character Set Buffer, obtained by using the Read UCSB command. See also items 4 and 5. The message 4E10I cannot be printed at this stage.

16. The 3211 ERP transient $$ABERRF uses bit 4 (X'08') of RFFLAGS4 of RFTABLE to indicate that the error is to be ignored. When the 3211 MDR transients have completed their work this bit is tested. When on, exit is taken to resident routines. When off, control is passed to the ERP message writer.

MACHINE CHECK AND CHANNEL CHECK RECORDING

Recording of these records is performed by the R-transients $$RAST01 and $$RAST08. As this function is closely associated with the machine check and channel check recovery function, the description is included in "Chapter 3, Machine Check and Channel Check Handling".

SVC 44 REQUESTED RECORDING AND ENQUEUING AND DEQUEUING OF THE RECORDER FILE ($$ABERA3)

SVC 44 is used for two functions:

- To write records on the recorder file from outside the A- or R-transient area.
- To enqueue or dequeue the recorder file for use by EREP.

1. Some phases (for example, $$BOPEN, $$BOPEND, and $$BECJ7) use SVC 44 to request recording from outside the A- or R-Transient Areas. When the resident routine that processes the SVC 44 request passes control to $$ABERA3, the following interface exists:

   The first fullword in the error queue entry (built for this request by the resident routine) contains the address minus 4 of the record to be written. The next six bytes contain the following interface information: length of record to be written, record type code, the two record-dependent switches (each one byte), and the address of the PIB of the requestor (halfword). See also Figure 3, Format of Error Recovery Block and Error Queue Entry.

   $$ABERRA3 reads the Recorder File header record and determines whether the record passed to it will fit in the file. If so, the standard 24-byte header is built and the data portion is appended to it. The record is now written on the next available space in the file, and the header record is updated and rewritten to the file. If the data portion consists of more than 176 bytes, only 176 are actually written. To write the record SVC 76 is used. If DOS/VS runs under VM/370, VM/370 will take over and handle the recording. If VM/370 is not active, SVC 76 has the same effect as SVC 15. (See also "A- and R-transient Supervisor Calls" in "Chapter 1, Introduction.")

   This phase normally returns control to the resident routines. For the following conditions, control is first passed to $$ABERA2 to write a message on SYSLOG:

   - I/O-error while accessing the recorder file
   - Recorder file is full
   - Last track of the recorder file is being used.

   If the recorder file is not open and ready or is being accessed by EREP, exit is taken without recording.

   The four-byte interface area is set up by the user before issuing the SVC, and is saved in the second fullword of the error queue entry by the resident SVC 44 routine.

   Upon return of control, the user may inspect the third byte of his interface area, which has been set up by $$ABERA3 as a flagbyte:

   ```
   Bit 0  X'80' - Operation complete
   Bit 1  X'40' - I/O error while
                  accessing the recorder
                  file
   Bit 2  X'20' - SVC issued before the
                  file was opened, or
                  while EREP accesses the
                  file (see below).
   ```

2. To prevent RMSR ($$ABERA1 and $$ABERA3) from accessing the recorder file while EREP is processing it, EREP requests enqueuing of the file via SVC 44. When this is the case, the second byte of the four-byte interface area (see above) contains X'C5' (enqueue) or X'C4' (dequeue). Enqueuing consists of posting bit 2 (X'20') in RFFLAGS2 in the RFTABLE. It also involves storing the key of the partition in which EREP is running.

BTAM RECORDING ($$ABERA5)

A BTAM channel appendage routine may return to the I/O interrupt handler with a recording request. When the request is serviced, control is passed directly to $$ABERA5.

A BTAM (type 2, key X'34') I/O Device record is to be built. The first eight bytes of the error queue entry contain the following information: flags, transmission count, error count, device type (one byte each) and the terminal name (four bytes). See also Figure 3, Format of Error Recovery Block and Error Queue entry. $$ABERA5 passes control to $$ABERA1 to add the standard header and write the record. $$ABERA1 returns control to the supervisor (ignore exit).

Decimal Displacement	Label	Byte Length	Description
	RFTABLE		Label of Starting Address
0	RFFLAGS1	1	Bit 0: 1=File full 1: 1=RDE option included 2: 1=Initial IPL 3: Reserved 4: 1=File is to be created 5: 1=File has been created 6: Reserved 7: 1=File open and ready
1	RFFLAGS2	1	Bit 0: 1=File full message request 1: 1=Last track message request 2: 1=I/O error message request 3: 1=Data lost message request 4: 1=EVA message request 5: 1=File owned by RTA recorder 6: 1=File owned by PTA recorder 7: 1=File being accessed by EREP
2	RFFLAGS3	1	Bit 0: 1=Last track message issued once 1: 1=Error is to be recorded 2: 1=Short form record request 3: 1=Individual records for unlabeled tapes 4: Reserved 5: Reserved 6: 1=Exit to $$ECMT05 indicator for $$BOPEN 7: 1=Exit to $$ECMT01 indicator for $$BOPEN
3	RFFLAGS4	1	Work area switches for various transients including BTAM Bit 0: 1=multiple records required (3211 recording) 1: 1=PIB record required (3211 rec.) 2: 1=FCB record required (3211 rec.) 3: 1=UCB record required (3211 rec.) 4: 1=ignore exit requested (3211 rec.) 5: not used 6: not used 7: 1=record not written
4	RFFLAGS5	1	Reserved
5	RFNOFN	1	N of N records (low order 4 bits contain the number of records to be recorded and high order 4 bits contain the number of the record being processed)

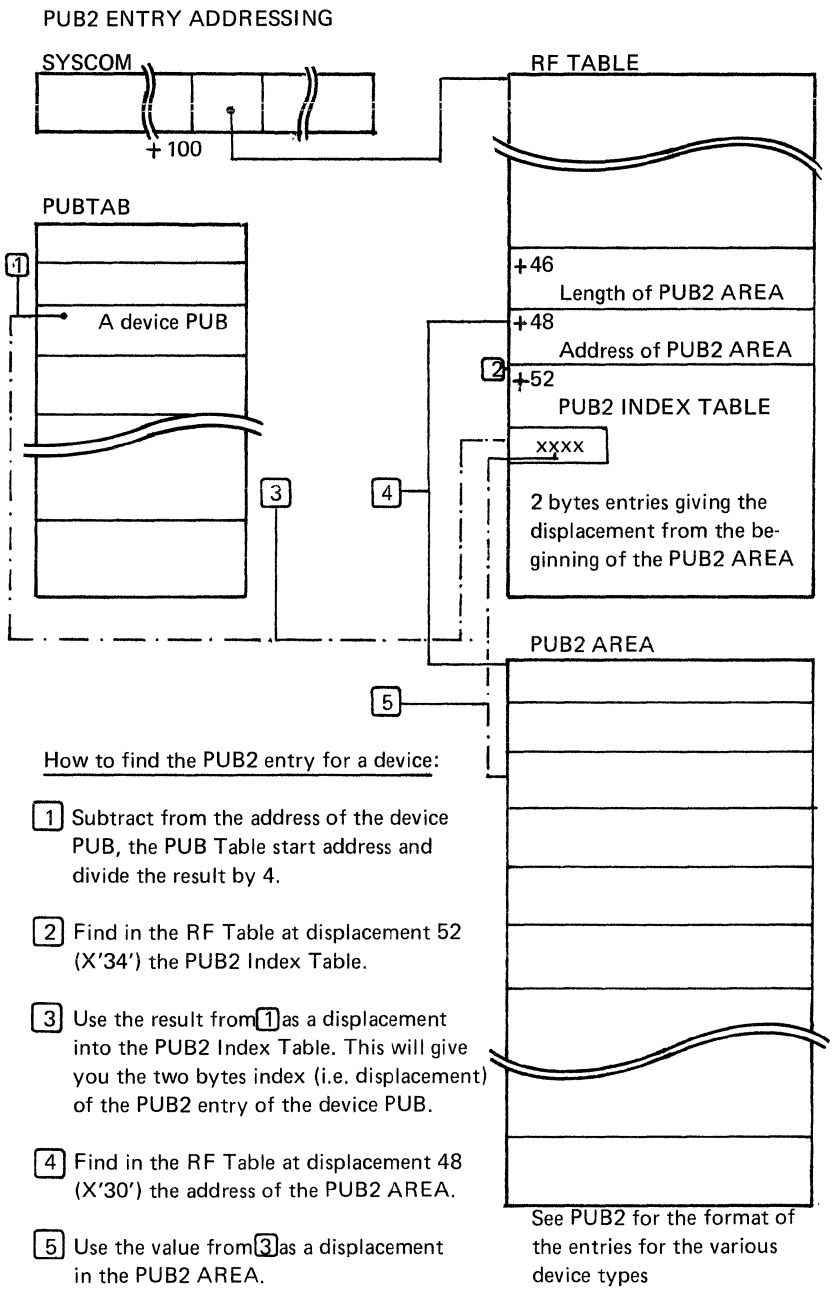
Figure 18. Recorder File Table (RFTABLE) (Part 1 of 2)

Decimal Displacement	Label	Byte Length	Description
6	RFRECTYP	1	Record type code
7	RFREL	1	DOS/VS ID-Release level code
8	RFRDSW1	1	Record dependent switch 1
9	RFRDSW2	1	Record dependent switch 2
10	RFEXIT	2	Exit phase name or exit address
12	RFMCONST	2	Multiplier for track balance
14	RFDCONST	2	Divisor for track balance
16	RFOCONST	2	Overhead for track balance
18	RFRECLEN	2	Length of record
20	RFTIMEA	4	Address of RMSR time entry
24	RFRECADR	4	Address of record
28	RFSEEK	7	Work area for seek address (BBCCHHR)
35	RFEREPK	1	Key of EREP partition
36	RFHDRCH	4	SYSREC cylinder/head
40	RFCHMAP	1	Map of supported channels
41	RFCHIDC	3	Channel ID codes
End of table for Model 115/125 without RMSR			
44	RFEVARTH	1	EVA read threshold
45	RFEVAWTH	1	EVA write threshold
46	RFP2ENTL	2	Length of PUB2 Entry Area
48	RFP2ENT	4	Address of PUB2 Entry Area
52	RFP2ITAB	*	PUB2 Index Table

*Two bytes are generated for each PUB2 entry in the system. See Figure 26 for using the PUB2 Index Table to access the PUB2 entries.

Bytes 100-103 (X'64'-'67') of the system communication region (SYSCOM) contain the address of the Recorder File Table. Label RFTABLE identifies the first byte of the table.

Figure 18. Recorder File Table (RFTABLE) (Part 2 of 2)



Note: PUB2AREA is not generated for Model 115,125 without RMSR support

Figure 19. Accessing the PUB2 Table (PUB2AREA)

Decimal Displacement	Byte Length	Description
0	3	Usage Count (number of non-ERP SIOs)
3	1	Flag Byte Bit 0: 1=Device in intensive mode 1: 1=Device in diagnostic mode 2: 1=No recording mode* 3: 1=Call statistics transient 2 4: 1=Use PUB2 name completion field 5: 1=Volume opened on this device 6,7 Reserved
4	1	CE mode limit byte
5	1	CE mode byte/bit mask
6	6	Statistical data counters
Total length 12		

*This bit is also set (during IPL) to indicate hardware recording for the device on the Model 115/125.

Figure 20. PUB2 Table Entry Format for Unit Record and Unsupported Devices

Decimal Displacement	Byte Length	Description
0	3	Usage Count (number of non-ERP SIOs)
3	1	Flag Byte Bit 0: 1=Device in intensive mode 1: 1=Device in diagnostic mode 2: 1=No recording mode 3: 1=Call statistics transient 2 4: 1=Use PUB2 name completion field 5: 1=Volume opened on this device 6,7 Reserved
4	1	CE mode limit byte
5	1	CE mode byte/bit mask
6	20	Statistical data counters
Total length 26		

Figure 21. PUB2 Table Entry Format for 3886 Optical Character Reader

Decimal Displacement	Byte Length	Description
0	3	Usage Count (number of non-ERP SIOs)
3	1	Flag Byte Bit 0: 1=Device in intensive mode 1: 1=Device in diagnostic mode 2: 1=No recording mode 3: 1=Call statistics transient 2 4: 1=Use PUB2 name completion field 5: 1=Volume opened on this device 6,7 Reserved
4	1	CE mode limit byte
5	1	CE mode byte/bit mask
6	8	Statistical data counters
14	1	Bits 0-5: Reserved 6: 1=System file opened by Job Control 7: 1=System file opened by Problem Program
15	1	Reserved
Total length 26		

Figure 22. PUB2 Table Entry Format for 3540 Diskette

Decimal Displacement	Byte Length	Description
0	3	Usage Count (number of non-ERP SIOs)
3	1	Flag Byte Bit 0: 1=Device in intensive mode 1: 1=Device in diagnostic mode 2: 1=No recording mode* 3: 1=Call statistics transient 2 4: 1=Use PUB2 name completion field 5: 1=Volume opened on this device 6,7 Reserved
4	1	CE mode limit byte
5	1	CE mode byte/bit mask
6	1	Flag byte Bit 0: 1=Soft DASD error is queued 1: 1=ERP requests logging of error 2-7 Reserved
7	2	Reserved
9	1	Physical module identifier
10	6	Volume serial number
16	8	Statistical data counters
End DASD except 3330: Total length 24		
24	8	Additional statistical data counters (3330 only)
End 3330: Total length 32		

*This bit is also set (during IPL) to indicate hardware recording for the device on the Model 115/125.

Figure 23. PUB2 Table Entry Format for DASD

Decimal Displacement	Byte Length	Description
0	3	Usage Count (number of non-ERP SIOs)
3	1	Flag Byte Bit 0: 1=Device in intensive mode 1: 1=Device in diagnostic mode 2: 1=No recording mode 3: 1=Call statistics transient 2 4: 1=Use PUB2 name completion field 5: 1=Volume opened on this device 6,7 Reserved
4	1	CE mode limit byte
5	1	CE mode byte/bit mask
6	2	Name of ERP that wants control
8	1	Flag byte 1 Bit 0: Reserved 1: 1=Unsolicited interrupt 2: 1=ERP is in control 3: 1=ERP requests repositioning 4: 1=Use original TIE byte 0=Use opposite TIE byte 5: 1=Intercept next SIO request 6: 1=ERP read opposite request 7: 1=Restart user's CCW chain
9	1	Flag byte 2 Bit 0: Last ERP operation was ERG 1: Last ERP operation was reposition 2: Cleaner action in progress 3: Read Opposite Recovery in progress 4: Message stored in P2ORGTIE 5: Error on attempt to recover by repositioning 6: Data check after ERP in control 7: Reserved
10	1	Flag byte 3 Bit 0: Failing CCW is Write or Control Command 1: User reading backwards 2: Read Opposite Recovery (ROR) 3: Maximum ROR retries 4: Command chaining ROR 5: ROR suppressed incorrect length 6,7 Reserved
11	1	Temporary read count
12	1	Temporary write count
13	1	Noise record count
14	2	Erase gap count
16	2	Cleaner action count

Figure 24. PUB2 Table Entry Format for Tapes (Part 1 of 2)

Decimal Displacement	Byte Length	Description
18	1	Permanent read errors count
19	1	Permanent write errors count
20	1	TIE original direction
21	1	TIE opposite direction
22	1	ERP counter 0
23	1	ERP counter 1
24	8	ERP work area
32	6	Tape serial number
38	2	Block length
40	4	RCR command address from CSW
44	2	RCR residual count from CSW
46	2	Reserved
48	10	2400-series statistical data counter area
58	2	Reserved
End 2400-series: Total length 60		
48	20	3410/3420 statistical data counter area
End 3410/3420: Total length 68		

Figure 24. PUB2 Table Entry Format for Tapes (Part 2 of 2)

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'34' - Type 2 I/O Device Record. See byte 3 for Unit Check Id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. X'00'=Unit Check Condition Record.
	4,5	2	X'0000' - Reserved Record Dependent Switches.
H	6	1	X'11' - Record No. of Total Records (1 of 1).
E	7	1	X'00' - Reserved.
A	8-11	4	X'00YYDDDF' - Date.
D	12-15	4	X'xxxxxxxx' - Timer Units.
E	16	1	X'00' - Reserved.
R	17-19	2	X'xxxxxx' - CPU Serial Number.
	20,22		
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'02' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'00' - Length (in bytes) of Statistical Data Counter Area.
	57-59	3	X'00C000' - Physical CUA.
	60,61	2	X'0000' - Number of I/O Retries.
	62,63	2	X'0002' - Number of Sense Bytes.
	64,65	2	Start I/O Count.
	66	1	Temporary Counter.
	67	1	X'xx' - Mask Byte.
	68	1	IP Code (Failing).
	69	1	IP Code (Original).
	70	1	Flags.
	71	1	2740-2.
	72-79	8	Terminal Name.
	80	1	Sense (Failing) - Sense/Status Byte 1 for 3270 Remote.
	81	1	Sense (Original) - Sense/Status Byte 0 for 3270 Remote.
	82-85	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 25. Unit Check Condition Record Format on IJSYSRC for 1030, 1050, 1060, 1130, 115A, 2020, 2260, 2701, 2702, 2703, 2740, 2760, 2780, 2848, 2972, 3270, 7770, 83B3, TWX33, and WTTA

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'34' - Type 2 I/O Device Record. See displacement 3 for specific record type.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx - Record Type. (Record Dependent Switches). X'80': Device ECD Record. X'40': Counter Overflow Record. X'02': SVC-Requested Record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	MCEL Length (X'0C00').
	24-31	8	Job Id Field (8 bytes of X'00').
	32-39	8	Failing CCW Field (8 bytes of X'00').
	40-47	8	CSW Field (8 bytes of X'00').
	48	1	X'02' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'00' - Length of Statistical Data Counter Area in Bytes.
	57-59	3	Physical CUA Field (X'C00000' supplied).
	60,61	2	Number of I/O Retries.
	62,63	2	X'0002' - Number of Sense Bytes.
	64,65	2	Start I/O Count.
	66	1	Temporary Counter.
	67	1	Mask Field (X'00').
	68	1	X'00' - TP Code (Failing) Field.
	69	1	X'00' - TP Code (Original) Field.
	70	1	X'00' - Flags.
	71	1	X'00' - 2740-2.
	72-79	8	Terminal Name Field (8 bytes of X'C0').
	80	1	X'00' - Sense (Failing) Field.
	81	1	X'00' - Sense (Original) Field.
	82-85	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 26. Counter Overflow, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 1030, 1050, 106C, 1130, 115A, 2020, 2260, 27C1, 2702, 27C3, 2740, 2760, 2780, 2848, 2972, 3270, 7770, 83B3, TWX33, and WTTA

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. See byte 3 for Unit Check Id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. X'00' = Unit Check Condition Record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	MCEL Length (X'0000').
	24-31	8	Job Id
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: CS device class and type
	56	1	X'0A' - Length (in bytes) of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA Field.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0006' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	Reserved (4 bytes of X'00').
	76	1	Temporary Reads Counter.
	77	1	Temporary Writes Counter.
	78,79	2	Start I/O Count for Volume.
	80	1	Permanent Reads Counter.
	81	1	Permanent Writes Counter.
	82	1	Noise Blocks Counter.
	83	1	Mode Set Count.
	84,85	2	Erase Gap Count.
	86,87	2	Cleaner Action Count.
	88-97	10	Statistical Data Counter Area. Byte 0 - Reserved. 1 - Noise 2 - Read/Write VRC 3 - MTE/LRCR 4 - EDC/CRC 5 - ENV/CRC 6 - Bits 0-3: Overrun 4-7: Skew 7 - Bits 0-3: C-Compare 4-7: Reserved 8 - Not applicable 9 - Not applicable
	98-103	6	Sense byte data

Figure 27. Unit Check Condition Record Format for 2400T9 on IJSYSRC

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. Record Dependent Switch Byte (displacement 3) identifies the particular record type.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches. X'80' - Device ECD Record X'40' - Counter Overflow Record X'04' - Volume Dismount Record X'02' - SVC-Requested Record
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	MCEL Length (X'0000').
	24-31	8	Job Id (Counter Overflow only, else zeros).
	32-39	8	Failing CCW (Counter Overflow only, else zeros).
	40-47	8	CSW (Counter Overflow only, else zeros).
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Length (bytes) of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA Field.
	60,61	2	X'0000' - Number of I/O Retries Field.
	62,63	2	X'0006' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	X'00000000' - Reserved.
	76	1	Temporary Reads Count.
	77	1	Temporary Writes Count.
	78,79	2	Start I/O Count for Volume.

Figure 28. Counter Overflow, Volume Dismount, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 2400T9 (Part 1 of 2)

Decimal Displacement	Byte Length	Contents/Description
80	1	Permanent Reads Count.
81	1	Permanent Writes Count.
82	1	Noise Blocks Count.
83	1	Mode Set Count.
84,85	2	Erase Gaps Count.
86,87	2	Cleaner Actions Count.
88-97	10	Statistical Data Counter Area. Byte 0 - Reserved 1 - Noise 2 - Read/Write VRC 3 - MTE/LRCR 4 - EDC/CRC 5 - ENV/CRC 6 - Bits 0-3: Overrun 4-7: Skew 7 - Bits 0-3: C-Compare 4-7: Reserved 8,9 - Not applicable
98-103	6	Sense Byte Data

Figure 28. Counter Overflow, Volume Dismount, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 2400T9 (Part 2 of 2)

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. Byte 3 is Unit Check Id.
	1	1	B'001xxxxx - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in Timer Units.
	3	1	X'00' - Record Dependent Switches. X'00' = Unit Check Condition Record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'14' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0018' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	X'00000000' - Reserved.
	76	1	Temporary Reads Count.
	77	1	Temporary Writes Count.
	78,79	2	Start I/O Count for Volume.
	80	1	Permanent Reads Count.
	81	1	Permanent Writes Count.
	82	1	Noise Blocks Count.
	83	1	Mode Set Count.
	84,85	2	Erase Gaps Count.
	86,87	2	Cleaner Actions Count.
	88-107	20	Statistical Data Counter Area (See Part 2 of this figure for use).
	108-131	24	Sense Byte data.

Figure 29. Unit Check Condition Record Format for 3420 on IJSYSRC (Part 1 of 2)

Bytes 88-107 Statistical Data Counter Area Usage

Displ into Counter Area	Bits Used	Retrieved from Sense Byte, Bit(s)	Type of Count
0	none	----	Spare byte
1	0-7	1,0	Noise
2	0-7	3,0	Read Write VRC
3	0-7	3,1	MTE/LRCR
4	0-7	3,3	EDC/CRC
5	0-7	3,4	ENV CHK/VRC
6	0-3	0,5	Overrun
	4-7	3,2	Skew
7	0-3	3,7	C-Compare
	4-7	4,3	Write Trigger VRC
8	0	5,3	PE Id Burst Check
	1-6		Mask Bit Expansion
	7		Parity
9	0-7	2,0-7	Track in Error Mask Bits
10	0-3	5,2	Write Tape Mark Check
	4-7	5,4	Start Read Check
11	0-3	5,5	Partial Record
	4-7	5,6	Excessive Postamble
12	0-3	8,0	IBG Drop While Writing
	4-7	8,1	Feed Through Check
13	0-3		Spare
	4-7	8,3	Early Begin Read Back Check
14	0-3	8,4	Early End Read Back Check
	4-7	8,5	Slow Begin Read Back Check
15	0-3	8,6	Slow End Read Back Check
	4-7	8,7	Velocity Retry
16	0-3		Spare
	4-7	9,1	Velocity Change During Write
17	none	----	Spare byte
18	0-7	3,6	Backward
19	0-3	0,2	Bus Out Check
	4-7	4,0	ALU Hardware Error

Figure 29. Unit Check Condition Record Format for 3420 on IJSYSRC (Part 2 of 2)

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. Record Dependent Switch Byte (displacement 3) identifies the particular record type.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches.
H			X'80' - Device EOD Record.
E			X'40' - Counter Overflow Record.
A			X'04' - Volume Dismount Record.
D			X'02' - SVC-Requested Record.
E	4,5	2	X'00' - Reserved Record Dependent Switches.
R	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length Field.
	24-31	8	Job Id (Counter Overflow only, else zeros).
	32-39	8	Failing CCW (Counter Overflow only, else zeros).
	40-47	8	CSW (Counter Overflow only, else zeros).
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'14' - Length (in bytes) of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0018' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	X'00000000' - Reserved.
	76	1	Temporary Reads Count.
	77	1	Temporary Writes Count.
	78,79	2	Start I/O Count for Volume.
	80	1	Permanent Reads Count.
	81	1	Permanent Writes Count.
	82	1	Noise Blocks Count.
	83	1	Mode Set Count.
	84,85	2	Erase Gaps Count.
	86,87	2	Cleaner Actions Count.
	88-107	20	Statistical Data Counter Area. See part 2 of Unit Check Condition Record Format for 3420 on IJSYSRC for use.
	108-131	24	Sense Byte Data (Counter Overflow only, else zeros).

Figure 30. Counter Overflow, Volume Dismount, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 3420

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. Byte 3 is Unit Check Id
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. X'00' = Unit Check Condition Record.
	4,5	2	X'0000' - Reserved Record Dependent Switches.
	6	1	X'11' - Record No. of Total Records (1 of 1).
H	7	1	X'00' - Reserved
E	8-11	4	X'00YYDDDF' - Date.
A	12-15	4	X'xxxxxxxx' - Timer Units.
D	16	1	X'00' - Reserved.
E	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'14' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0009' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	X'00000000' - Reserved.
	76	1	Temporary Reads Count.
	77	1	Temporary Writes Count.
	78,79	2	Start I/O Count for Volume.
	80	1	Permanent Reads Count.
	81	1	Permanent Writes Count.
	82	1	Noise Blocks Count.
	83	1	Mode Set Count.
	84,85	2	Erase Gaps Count.
	86,87	2	Cleaner Actions Count.
	88-107	20	Statistical Data Counter Area. See Part 2 of this figure for use.
	108-116	9	Sense Byte Data.

Figure 31. Unit Check Condition Record Format for 3410 on IJSYSRC (Part 1 of 2)

Bytes 88-107 Statistical Data Counter Area Usage

Displ into Counter Area	Bits Used	Retrieved from Sense Byte,Bit(s)	Type of Count
0	none	----	Spare byte
1	0-7	1,0	Noise
2	0-7	3,0	Read Write VRC
3	0-7	3,1	MTE/LRCR
4	0-7	3,3	EDC/CRC
5	0-7	3,4	ENV CHK/VRC
6	0-3	0,5	Overrun
	4-7	3,2	Skew
	0-3	3,7	C-compare
7	4-7	----	Spare
8	0	5,3	ID Burst Check
	1-6		Mask Bit Expansion
	7		Parity
9	0-7	2,0-7	Track in Error Mask Bits
10	0-3	5,2	Write Tape Mark Check
	4-7	5,4	Parity Compare
11	0-3	5,5	Tachometer Check
	4-7	5,6	False End Mark
12	0-3	----	Spare
	4-7	8,1	Feed Through Check
13	0-3	----	Spare
	4-7	8,3	End Velocity Check
14	0-3	8,4	Read Back Data Not Detected
	4-7	8,5	Start Velocity Check
15	0-3	----	Spare
	4-7	8,7	Velocity Retry
16	0-7	----	Spare byte
17	0-7	----	Spare byte
18	0-7	3,6	Backward
19	0-3	0,2	Bus Out Check
	4-7	4,0	Tape Unit Positioning Check

Figure 31. Unit Check Condition Record Format for 3410 on IJSYSRC (Part 2 of 2)

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. Record Dependent Switch Byte (displacement 3) identifies the particular record type.
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	E'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches. X'80' - Device ECD Record X'40' - Counter Overflow Record X'04' - Volume Dismount Record X'02' - SVC-Requested Record
HEADER	4,5	2	X'0000' - Reserved Record Dependent Switches.
	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB Bytes 4 and 5 54,55: CS device class and type
	56	1	X'14' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retires.
	62,63	2	X'0009' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	Block Length.
	72-75	4	X'00000000' - Reserved.
	76	1	Temporary Reads Count.
	77	1	Temporary Writes Count.
	78,79	2	Start I/O Count for Volume.
	80	1	Permanent Reads Count.
	81	1	Permanent Writes Count.
	82	1	Noise Blocks Count.
	83	1	Mode Set Count.
	84,85	2	Erase Gaps Count.
	86,87	2	Cleaner Actions Count.
	88-107	20	Statistical Data Counter Area. For usage, see Figure 30.
	108-116	9	Sense Byte Data (Counter Overflow Record only, else zeros).

Figure 32. Counter Overflow, Volume Dismount, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 3410

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record. (see displacement 3 for specific type)
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	E'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches.
H			X'00' - Unit Check Condition Record.
E			X'A0' - Device EOD Record
A			X'60' - Counter Overflow Record
D			X'22' - SVC-Requested Record
E	4,5	2	X'0000' - Reserved Record Dependent Switches.
R	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
Second part of record for Unit Check Condition Record			
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'00' - Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Bytes of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0001' - Number of Sense Bytes
	64-73	10	Statistical Data Counter Area. See Figure 48 for usage.
	74	1	X'xx' - Sense Byte Data.
	75-78	4	X'00xxxxxx' - SIO Count Since Last Record.
Second part of record for other Type 1 I/O Device Records			
	24-27	4	X'xxxx0000' - Device Type (PUB bytes 4,5).
	28	1	X'0A' - Bytes of Statistical Data Counter Area.
	29-31	3	X'00xxxx' - Failing CUA.
	32-41	10	Statistical Data Counter Area. See Figure 48 for usage.
	42-45	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 33. Unit Check Condition, Counter Overflow, Device EOD, and SVC-Requested Record Formats on IJSYSRC for 1017, 1018, 1403, 1403U, 2245, 1419, 1419P, 1442N1/N2, 1443, 2495, 2501, 2520B1/B2/B3, 2540P, 2540R, 2596, 2671, 3210, 3215, 3881, and Unsupported Devices

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key (see displacement 3 for specific record type).
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
H E A D	3	1	X'xx' - Record Dependent Switches. X'00' - Unit Check Condition X'A0' - Device EOD X'60' - Counter Overflow X'22' - SVC-Requested
E	4,5	2	X'0000' - Reserved Record Dependent Switches.
R	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
Second Part of Unit Check Condition Record			
	24-31	8	Job Id
	32-39	8	Failing CCW
	40-47	8	CSW
	48	1	X'00' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0002' - Number of Sense Bytes
	64-73	10	Statistical Data Counter Area. See Figure 48 for usage.
	74,75	1	X'xxxx' - Sense Byte Data.
	76-79	4	X'00xxxxxx' - SIO Count Since Last Record.
Second Part of Record for other Type 1 I/O Device Records			
	24-27	4	X'xxxx0000' - Device Type (PUB bytes 4,5).
	28	1	X'0A' - Byte Length of Statistical Data Counter Area.
	29-31	3	X'00xxxx' - Failing CUA.
	32-41	10	Statistical Data Counter Area. See Figure 48 for usage.
	42-45	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 34. Unit Check Condition, Device EOD, Counter Overflow, and SVC-Requested Record Formats on IJSYSRC for 1287, 1288, and 1419S

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key (see displacement 3 for specific record type).
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches.
H			X'00' - Unit Check Condition
E			X'A0' - Device ECD
A			X'60' - Counter Overflow
D			X'22' - SVC-Requested
E	4,5	2	X'0000' - Reserved Record Dependent Switches.
R	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
Second Part of Unit Check Condition Record			
	24-31	8	Job Id
	32-39	8	Failing CCW
	40-47	8	CSW
	48	1	X'06' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'14' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0006' - Number of Sense Bytes
	64	1	Failing command
	65-67	3	Related data bytes
	68-87	20	Statistical data counter area. See Figure 48 for usage.
	88-93	6	Sense bytes
	94-97	4	SIO count since last recording

Figure 35. Unit Check Condition, Device ECD, Counter Overflow, and SVC-Requested Record Formats on IJSYSRC for 3886

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key (see displacement 3 for specific record type).
	1	1	E'001xxxxx' - DOS/Release Level. X'24' is DOS/Release 29.
	2	1	x
	2	1	X'00' - Record Independent Switches.No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches. X'00' - Unit Check Condition X'A0' - Device EOD X'60' - Counter Overflow X'22' - SVC-Requested
HEADER	4,5	2	X'0000' - Reserved Record Dependent Siwtches.
	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
Second Part of Record for Unit Check Condition Record			
	24-31	8	Job Id.
	32-39	8	Failing CCW
	40-47	8	CSW
	48	1	X'00' - Number of Double Words if Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type. 52,53: DOS PUB Bytes 4 and 5 54,55: CS device class and type
	56	1	X'08' - Byte Length of Statustical Data Counter Area
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0006' - Number of Sense Bytes.
	64-71	8	Statistical Data Counter Area. See Figure 49 for usage.
	72-77	6	Sense Byte Data
	78-81	4	X'00xxxxxx' - SIO Count since Last Record.
Second Part of Record for Other Type 1 I/O Device Records			
	24-27	4	X'xxxx0000' - Device Type (DOS PUB Bytes 4 and 5).
	28	1	X'08' - Byte Length of Statistical Data Counter Area
	29-31	3	X'00xxxx' - Failing CUA.
	32-39	8	Statistical Data Counter Area. See Figure 49 for usage.
	40-41	2	Reserved
	42-45	4	X'00xxxxxx' - SIO Count SINSE Last Record.

Figure 36. Unit Check Condition, Device EOD, Counter Overflow, and SVC-Requested Record Formats on IJSYSRC for 3540.

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/C Device Record Key. See displacement 3 for specific record type.
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
H	3	1	X'xx' - Record Dependent Switches. X'00' - Unit Check Condition Record X'A0' - Device ECD Record X'60' - Counter Overflow Record X'24' - Volume Dismount Record X'22' - SVC-Requested Record
E	4,5	2	X'0000' - Reserved Record Dependent Switches.
A	6	1	X'11' - Record No. of Total Records (1 of 1).
D	7	1	X'00' - Reserved.
E	8-11	4	X'00YYDDDF' - Date.
R	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU Id.
	22,23	2	X'0000' - MCEL Length.
	Second Part of Record for Unit Check Condition Record		
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Byte Length of Statistical Data Counter Area.
	57-59	3	Physical CUA. X'000000' for 2311 or 2321 X'00xxxx' for 2314
	60,61	2	Number of I/O Retries plus one.
	62,63	2	X'0006' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	X'0000' - Reserved.
	72-77	6	Last Seek Address. X'00xxxxxxxxxx': 2311/2314 X'xxxxxxxxxxxx': 2321
	78,79	2	X'0000' - Reserved.
	80-85	6	X.0000xxxxxxxx' - Actual Home Read Address.
	86-87	2	X'0000' - Reserved.
	88-97	10	Statistical Data Counter Area. See Figure 48 for usage.
	98-103	6	X'xxxxxxxxxxxx' - Sense Byte Data.
	104-107	4	X'00xxxxxx' - SIO Count Since Last Record.
	Second Part of Record for Other Type 1 I/O Device Records		
	24-27	4	X'xxxx0000' - Device Type (PUB bytes 4,5).
	28	1	X'0A' - Byte Length of Statistical Data Counter Area.
	29-31	3	X'00xxxx' - Failing CUA.
	32-41	10	Statistical Data Counter Area. See Figure 48 .
	42-45	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 37. Unit Check Condition, Counter Overflow, Volume Dismount, and SVC-Requested Record Formats on IJSYSRC for 2311, 2314, and 2321

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key. See displacement 3 for specific record type.
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches. X'00' - Unit Check Condition Record X'A0' - Device EOD Record X'60' - Counter Overflow Record X'22' - SVC-Requested Record
HEADER	4,5	2	X'00' - Reserved Record Dependent Switches.
	6	1	X'11' - Record No. of Total Records (1 of 1).
	7	1	X'00' - Reserved.
	8-11	4	X'00YYDDDF' - Date.
	12-15	4	X'xxxxxxxx' - Timer Units.
	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
Second Part of Unit Check Condition Record			
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'00' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'00' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'00C000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0004' - Number of Sense Bytes.
	64-67	4	X'xxxxxxxx' - Sense Byte Data.
	68-71	4	X'00xxxxxx' - SIO Count Since Last Record.
Second Part of Other Type 1 I/O Device Records.			
	24-27	4	X'xxxx0000' - Device Type (PUB bytes 4,5).
	28	1	X'00' - Byte Length of Statistical Data Counter Area.
	29-31	3	X'00xxxx' - Failing CUA.
	32-35	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 38. Unit Check Condition, Device EOD, Counter Overflow, and SVC-Requested Record Formats on IJSYSRC for 3504, 3505, 3525 Punch, and 3525 Reader/Punch

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key. Displacement 3 identifies this as Unit Check Condition by X'00'.
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. X'00' = Unit Check Condition Record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'03' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'00' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'00xxxx' - Physical CUA.
	60,61	2	Number of I/O Retries plus one.
	62,63	2	X'0018' - Number of Sense Bytes.
	64-69	6	Volume Serial Number.
	70,71	2	X'0000' - Unused.
	72-79	8	Last Seek Address (MBBCCHHR).
	80-85	6	Home Address Read (CCHHR).
	86,87	2	X'0000' - Unused.
	88-111	24	Sense Byte Data
	112-115	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 39. Unit Check Condition Record Format on IJSYSRC for 3330 and 3340

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record Key. See displacement 4 for device code.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. Not used in this record type.
	4	1	X'01' - Record Dependent Switches Device Code (X'01' = 3330).
H	5	1	X'00' - Reserved Record Dependent Switches. (X'09'=3340)
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24,25	2	X'xxxx' - CUA.
	26-31	6	Volume Serial Number.
	32-55	24	Sense Byte Buffer Off-load.

Figure 40. Counter Overflow, Volume Dismount, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 3330 and 3340

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key. Byte displacement 3 identifies this as a Unit Check Condition by X'00'.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. X'00' = Unit Check Condition.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-39	8	Failing CCW.
	40-47	8	CSW.
	48	1	X'01' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0006' - Number of Sense Bytes.
	64	1	X'xx' - Correlation Number.
	65-71	7	X'00000000000000' - Reserved.
	72-81	10	Statistical Data Counter Area. See Figure 48 for usage.
	82-87	6	Sense Byte Data.
	88-91	4	X'00xxxxxx' - SIO Count Since Last Record.

Figure 41. Unit Check Condition Record Format on IJSYSRC for 3211

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'30' - Type 1 I/O Device Record Key. Byte displacement 3 identifies specific record type.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'xx' - Record Dependent Switches. X'80' - Device EOD Record. X'40' - Counter Overflow Record. X'02' - SVC-Requested Record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id (Counter Overflow only, else zeros).
	32-39	8	Failing CCW (Counter Overflow only, else zeros).
	40-47	8	CSW (Counter Overflow only, else zeros).
	48	1	X'01' - Number of Double Words of Device Dependent Data.
	49-51	3	X'00xxxx' - Failing CUA.
	52-55	4	X'xxxxxxxx' - Device Type 52,53: DOS PUB bytes 4 and 5 54,55: OS device class and type
	56	1	X'0A' - Byte Length of Statistical Data Counter Area.
	57-59	3	X'000000' - Physical CUA.
	60,61	2	Number of I/O Retries.
	62,63	2	X'0006' - Number of Sense Bytes.
	64	1	X'00' - Not Used by DOS.
	65-71	7	X'00000000000C000' - Reserved.
	72-81	10	Statistical Data Counter Area. See Figure 48 for usage.
	82-87	6	Sense Byte Data (Counter Overflow only, else zeros).
	88-91	4	X'00xxxxxx' - SIC Count Since Last Record.

Figure 42. Counter Overflow, Device ECD, and SVC-Requested Record Formats on IJSYSRC for 3211

First Record

HEADER	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record. See byte displacement 4 for device type and byte displacement 27 for buffer type id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'80' - Record Independent Switches. Bit 0=1: More records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. This byte not used in this record type.
	4	1	X'04' - Record Dependent Switches. X'04' = 3211 Printer.
H	5	1	X'00' - Reserved Dependent Record Switches.
E	6	1	X'13' - Record No. of Total Records (1 of 3).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not used by DCS.
	27	1	X'01' - Buffer Type Id (X'01' = UCSB).
	28-199	172	UCSB

Second Record

Same as First Record except byte displacement 6 = X'23' for Record 2 of 3.

Third Record

HEADER			
	Header same as First Record except: Byte displacement 2 (bit 0=0 to indicate no more records to follow); byte displacement 6 = X'33' to indicate record 3 of 3.		
H			
E			
A			
D			
E			
R			
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not Used by DCS.
	27	1	X'01' - Buffer Type Id (X'01' = UCSB).
	28-195	168	UCSB.

Figure 43. UCSB Off-Load Record Format on IJSYSRC for 3211

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record. See byte displacement 4 for device type and byte displacement 27 for buffer type id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. This byte not used in this record type.
	4	1	X'04' - Record Dependent Switches. X'04' = 3211 Printer.
H	5	1	X'00' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not Used by DOS.
	27	1	X'03' - Buffer Type Id (X'03' = PLB).
	28-177	150	Check Read Buffer.
	178-187	10	First 10 PLB Error Positions, left justified.

Figure 44. PLB/Check Read Buffer Off-Load Record Format on IJSYSRC for 3211

First Record

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record. See byte displacement 4 for device type and byte displacement 27 for buffer type id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'80' - Record Independent Switches. Bit 0=1: Another record to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. This byte not used in this record type.
	4	1	X'04' - Record Dependent Switches. X'04' = 3211 Printer.
H	5	1	X'00' - Reserved Record Dependent Switches.
E	6	1	X'12' - Record No. of Total Records (1 of 2).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not Used by DCS.
	27	1	X'02' - Buffer Type Id (X'02' = FCB).
	28	1	Forms Control Address Register.
	29-199	171	FCB.

Second Record

	Header same as First Record except: Byte displacement 2 = X'CC' (bit 0=0 to indicate no more records to follow); byte displacement 6 = X'22' to indicate record 2 of 2.		
H			
E			
A			
D			
E			
R			
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not Used by DCS.
	27	1	X'02' - Buffer Type Id (X'02' = FCB).
	28-36	9	FCB.

Figure 45. FCB Off-Load (Job Cancel Condition) Record Format on IJSYSRC for 3211

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record. See byte displacement 4 for device type and byte displacement 27 for buffer type id.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	X'00' - Device Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. This byte not used in this record type.
	4	1	X'04' - Record Dependent Switches. X'04' = 3211 Printer.
H	5	1	X'00' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24,25	2	X'xxxx' - CUA.
	26	1	X'00' - Not Used by DOS.
	27	1	X'00' - Buffer Type Id (X'00' = FCAR).
	28	1	Forms Control Address Register

Figure 46. FCB Off-Load (Condition other than Cancel) Record Format on IJSYSRC for 3211

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'91' - Type 3 I/O Device Record. See Displacement 4 for device type.
	1	1	X'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Unused Record Dependent Switch in this record format.
	4	1	B'00001000' - Record Dependent Switches. Bit 4=1: Device type is 2715.
H	5	1	X'00' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	MCEL Length (X'0C00').
	24,25	2	X'xxxx' - CUA.
	26,27	2	Station Id.
	28-30	3	Date. Date-time stamp for first group of seven
	31-34	4	Time. records
	35	1	Error Type.
	36-38	3	Logical Record.
	39	1	Error Type.
	40-42	3	Logical Record.
	43	1	Error Type.
	44-46	3	Logical Record.
	47	1	Error Type. Seven 4-byte records
	48-50	3	Logical Record.
	51	1	Error Type.
	52-54	3	Logical Record.
	55	1	Error Type.
	56-58	3	Logical Record.
	59	1	Error Type.
	60-62	3	Logical Record.
	63-65	3	Date. Date-time stamp for second group of seven
	66-69	4	Time. records
	70-97	28	Same as bytes 35-62 (i.e., 7 four-byte records consisting of 1 error-type byte and a three-byte logical record).

Figure 47. 2715 Record Format on IJSYSRC

Figure 48. Overview of the Use of the Statistical Data Counters by Devices

BYTE DISPLACEMENT INTO COUNTER AREA (HALF-BYTE) COUNTER	0		1		2		3		4		5		6		7		BYTES 8 AND 9 ARE ZEROS
	TEMP READ	TEMP WRT	INTER-VENTION REQUIRED	BUS OUT CHECK	EQUIP-MENT CHECK		NON RCVY	BROKEN TAPE	UN-SAFE	LATE STACKER SELECT	NO DOC FOUND	CHAN TAG LINE	INVLD OP	TRACK OVERFLOW	MISSING ADDRESS MARKER	CHAN DATA CHECK	
2671	X	X	X	X	X											X	
3210, 3215	X	X	X	X	X											X	
1017	X	X	X	X	X			X								X	
1018	X	X	X	X	X											X	
1403, 1403 U	X	X	X	X	X											X	
1443	X	X	X	X	X											X	
							POS CHECK										
2495	X	X	X	X	X		X									X	
							UN CMD SEQ										
2540 R, 2540 P 3881	X	X	X	X	X		X									X	
						OVER-RUN	NON RCVY										
1287	X	X	X	X	X	X	X			X	X		X			X	
1288	X	X	X	X	X	X	X				X		X			X	
UNSUPPORTED	X	X	X	X	X	X											
2501	X	X	X	X	X											X	
1442 N1,N2/2596	X	X	X	X	X	X										X	
2520	X	X	X	X	X	X										X	
2520 B1/B2/B3	X	X	X	X	X	X										X	
							AUTO SEL										
1419, 1419 P/S	X	X	X	X		X	X									X	
							TRACK CONDENSE	SEEK CHECK			SERIAL DATA SET ERASE		ALU				
2311, 2314, 2321, 3330	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	
			USCAR SYNC		PSE SYNC	P1 RT FAIL	SKEW	COM-MAND REJECT	SERV AID	COM-MAND RETRIED	COMMAND SUPPRESSED						
3211			X	X	X	X	X	X	X	X	X						

Note 1 See individual record formats for 3410, 3420 and 2400- series Tapes
The SDR counters for certain DASD errors may not match the I/O retry counters

ccunter	condition
0	No Record Found (with ID CRC Errcr)
1	No Record Found (without ID CRC Error)
2	Fast or Slow Index
3	Address Mask ID Failure
4	Data AM Incorrect
5	Data CRC Errcr
6	Data Overrun
7	Bus Out Check
8 one-byte counters are used (8 bytes).	

Figure 49. 3540 Use of Statistical Data Counters

event	ccunter	condition
intervention required	1	Separatcr Jam Switch
	2	Separatcr Timecut
	3	Document Tcc Lcng
	4	Aligner Section Timecut
	5	Intermediate Transpcrt Timecut
	6	Stacker Select Error
	7	Hopper Nct In Pcsiticn
	8	Serial Num Update Check
	9	Stacker A Jam
	10	Stacker B Jam
	11	Intermediate Transpcrt Overrun
	12	Step Mctor Stop Error
	13	Stacker A Cr B Jam
	14	Stepping Mctcr Start Error
	15	Stepping Mctcr Speed Error
	16	Increment Timecut
	17	Stacker Sel Jam
	18	Clutch Fail Tc Pick
	19	Not Used
equipment check	20	Traverse Limit Switch
	21	Traverse Time Cverrun
	22	Traverse Emitter Errcr
	23	Traverse Speed Errcr
	24	Traverse Scan Pitch Control Error
	25-26	Not Used
mark check	27	Line Mark Nct Ccmplete
	28	Serial Number Print Check
	29	Line Mark Print Check
	30	Line Mark Detect Errcr
	31	Line Mark Misccmpare
incomplete scan	32	Character Cut Of Scan
	33	Field Delimiter Not Found
	34	Character On Field Bcundary
	35	Video Cverrun
	36	Character Buffer Overflow
	37	Noise Check
	38	Not Used
ncn recovery	39	Read Staticn TM Check
	40	Line Mark Request Errcr
40 four-bit counters are used (20 bytes).		

Figure 50. 3886 Use of Statistical Data Ccunters

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'50' - IPL Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches. No meaning in IPL record.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	X'0000' - MCEL Length.
	24	1	Subsystem Id.
	25-27	3	X'000000' - Unused.
	28,29	2	Reason Code.
	30,31	2	Channel Map.
	32-39	8	X'xxxxxxxx00C00000' - Channel Type Assignments.
	40-43	4	Highest Storage Address.
	44-47	4	X'00C00000' - Unused.

Figure 51. IPL Record Format on IJSYSRC

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'80' - System End of Day (SECD) Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	X'00' - Record Dependent Switches (no meaning in System End of Day record).
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU id.
	22,23	2	MCEL Length (X'0000').

Figure 52. System End of Day (SECD) Record Format on IJSYSRC

First Record

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'10' - Record type key for machine check.
	1	1	E'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	E'10000000' - Record independent switches. Bit 0=1: Another record to follow. Bit 4=0: Time field in timer units.
	3	1	E'0xx00000' - Record dependent switches Bit 1=1: Record incomplete (missing data within record) Bit 2=1: System termination
	4,5	2	X'0000' - Reserved record dependent switches
H	6	1	X'12' - Record no. of Total records (1 of 2).
E	7	1	X'00' - Reserved.
A	8-11	4	X'00YYDDDF' - Date
D	12-15	4	X'xxxxxxxx' - Timer units.
E	16	1	X'00' - Reserved.
R	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU Id.
	22,23	2	X'0000' - Unused.
	24-31	8	Program Id.
	32-39	8	Job Id.
	40-47	8	Program Status Word (PSW).
	48-199	152	Independent Logout (contains zeros).

Second Record

	Same as First Record except: Byte displacement 2, bit 0=0 to indicate no more records to follow. Byte displacement 6 = X'22' to indicate record 2 of 2.		
H			
E			
A			
D			
E			
R			
	24-151	128	Independent Logout (contains zeros).

Figure 53. Model 115/125 Machine Check Record Format on IJSYSRC

First Record

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'10' - Record type key for machine check.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'10000000' - Record independent switches. Bit 0=1: Another record to follow. Bit 4=0: Time field in timer units.
	3	1	B'0xx00000' - Record dependent switches Bit 1=1: Record incomplete (missing data within record) Bit 2=1: System termination
	4,5	2	X'0000' - Reserved record dependent switches
H	6	1	X'12' - Record no. of Total records (1 of 2).
E	7	1	X'00' - Reserved.
A	8-11	4	X'00YYDDDF' - Date
D	12-15	4	X'xxxxxxxx' - Timer units.
E	16	1	X'00' - Reserved.
R	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'0135' - CPU Id.
	22,23	2	X'0000' - Unused.
	24-31	8	Program Id.
	32-39	8	Job Id.
	40-47	8	Program Status Word (PSW).
	48-199	152	Independent Logout.

Second Record

	Same as First Record except: Byte displacement 2, bit 0=0 to indicate no more records to follow. Byte displacement 6 = X'22' to indicate record 2 of 2.		
H			
E			
A			
D			
E			
R			
	24-151	128	Independent Logout.

Figure 54. Model 135 Machine Check Record Format on IJSYSRC

First Record

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'10' - Machine Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'10000000' - Record Independent Switches. Bit 0=1: Another record to follow. Bit 4=0: Time field is in timer units.
	3	1	B'0xx00000' - Record Dependent Switches. If bit 1=1, record is incomplete (missing data within record). If bit 2=1, system termination.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'13' - Record No. of Total Records (1 of 3).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'0145' - CPU Id.
	22,23	2	X'00C0' - Machine Check Extended Logout (MCEL) Length (decimal 192).
	24-31	8	Program Id.
	32-39	8	Job Id.
	40-47	8	PSW.
	48-199	152	Independent Logout.

Second Record

	Decimal Displacement	Byte Length	Contents/Description
	Same as First Record except byte displacement 6 = X'23' to indicate record 2 of 3.		
H			
E			
A			
D			
E			
R			
	24-151	128	Independent Logout
	152-199	48	Dependent Logout

Third Record

	Same as First Record except: Byte displacement 2, bit 0=0 to indicate no more records to follow. Byte displacement 6 = X'33' to indicate record 3 of 3.		
H			
E			
A			
D			
E			
R			
	24-167	144	Dependent Logout

Figure 55. Model 145 Machine Check Record Format on IJSYSRC

First Record

Header	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'10' - Machine Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' DOS/Release 28.
	2	1	B'10000000' - Record Independent Switches. Bit 0=1: Another record to follow. Bit 4=0: Time field is in timer units.
	3	1	B'0xx00000' - Record Dependent Switches. If bit 1=1, record incomplete (missing data within record). If bit 2=1, system termination.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'18' - Record No. of Total Records (1 of 8).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU SERIAL Number.
	20,21	2	X'0155' - CPU id or X'0158'.
	22,23	2	X'03E0' - Machine Check Extended Logout (MCEL) Length (decimal 992).
	24-31	8	Program Id.
	32-39	8	Job Id.
	40-47	8	PSW.
	48-199	152	Independent Logout.

Second Record

Header	Decimal Displacement	Byte Length	Contents/Description
	Same as First Record except byte displacement 6 = X'28' to indicate record 2 of 8.		
H			
E			
A			
D			
E			
R			
	24-151	128	Independent Logout
	152-199	48	Dependent Logout

Third Record - Seventh Record

Header			
	Same as First Record except byte displacement 6 = X'38' - X'78' to indicate records 3 of 8 through 7 of 8.		
H			
E			
A			
D			
E			
R			
	24-199	176	Dependent Logout

Figure 56. Model 155-II/158 Machine Check Record Format on IJSYSREC (Part 1 of 2)

Eighth Record

H E A D E R	Same as First Record except: byte displacement 2, bit 0=0 to indicate no more records to follow; byte displacement 6 = X'88' to indicate record 8 66 8.		
	24-87	64	Dependent Logout

Figure 56. Model 155-II/158 Machine Check Record Format on IJSYSRC (Part 2 of 2)

	Decimal Displacement	Byte Length	Contents/Description
	0	0	X'20' - Channel Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'23' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	B'1xx000x0' - Record Dependent Switches. Bit 0 = 1: Message required. Always on for Channel Check records. If bit 1 = 1, record is incomplete. If bit 2 = 1, system termination. If bit 6 = 1, ERP in progress.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'xxxx' - CPU Id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job ID.
	32-47	16	Active I/O Units at Failure. A series of two-byte channel-unit addresses (Ocuu).
	48-55	8	Failing CCW.
	56-63	8	CSW.
	64-67	4	ECSW.
	68-71	4	X'xxxx0000' - Device Type 68,69: DOS PUB bytes 4 and 5
	72	1	Channel Id.
	73-75	3	X'00xxxx' - CUA.
	76	1	B'x0000000' - Reserved for DOS/EREP Use. If bit 0=1, I/O units are invalid.
	77-79	3	X'000000' - Reserved for DOS Use.

Figure 57. Model 115/125 Channel Check Record Format on IJSYSRC

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'20' - Channel Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	B'1xx000x0' - Record Dependent Switches. Bit 0=1: Message required. Always on for Channel Check records. If bit 1=1, record is incomplete. If bit 2=1, system termination. If bit 6=1, ERP in progress.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'12' - Record No. of Total Records (1 of 2).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'0135' - CPU Id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job ID.
	32-47	16	Active I/O Units at Failure. A series of two-byte channel-unit addresses (0cuu).
	48-55	8	Failing CCW.
	56-63	8	CSW
	64-67	4	X'00xxxxxx' - ECSW.
	68-71	4	X'xxxx0000 - Device Type 68,69: DOS PUB bytes 4 and 5
	72	1	Channel Id.
	73-75	3	X'00xxxx' - CUA.
	76	1	B'x0000000' - Reserved for DOS/EREP Use. If bit 0=1, I/O units are invalid
	77-79	3	X'000000' - Reserved for DOS use.
	80-199	120	Independent Logout

Figure 58. Model 135 Channel Check Record Format on IJSYSRC

	Decimal Displacement	Byte Length	Contents/Description
	0	0	X'20' - Channel Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00C00000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	B'1xx000x0' - Record Dependent Switches. Bit 0 = 1: Message required. Always on for Channel Check records. If bit 1 = 1, record is incomplete. If bit 2 = 1, system termination. If bit 6 = 1, ERP in progress.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11' - Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00' - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'0145' - CPU Id.
	22,23	2	X'0000' - MCEL Length (none for channel check).
	24-31	8	Job ID.
	32-47	16	Active I/O Units at Failure. A series of two-byte channel-unit addresses (Ocuu).
	48-55	8	Failing CCW.
	56-63	8	CSW.
	64-67	4	ECSW (X'00xxxxxx').
	68-71	4	X'xxxx0000' - Device Type 68,69: DOS PUB bytes 4 and 5
	72	1	Channel Id.
	73-75	3	X'00xxxx' - CUA.
	76	1	B'x0000000' - Reserved for DOS/EREP Use. Bit 0=1 indicates I/O units are invalid.
	77-79	3	Reserved for DOS Use.
	80-175	96	Channel Logout.

Figure 59. Model 145 Channel Check Record Format on IJSYSRC

	Decimal Displacement	Byte Length	Contents/Description
	0	1	X'20' - Channel Check Record Key.
	1	1	B'001xxxxx' - DOS/Release Level. X'22' is DOS/Release 28.
	2	1	B'00000000' - Record Independent Switches. Bit 0=0: No more records to follow. Bit 4=0: Time field is in timer units.
	3	1	B'1xx00000' - Record Dependent Switches. Bit 0=1: Message required. Always on for Channel Check records. If bit 1 = 1, record is incomplete. If bit 2 = 1, system termination. If bit 6 = 1, ERP in progres.
H	4,5	2	X'0000' - Reserved Record Dependent Switches.
E	6	1	X'11'- Record No. of Total Records (1 of 1).
A	7	1	X'00' - Reserved.
D	8-11	4	X'00YYDDDF' - Date.
E	12-15	4	X'xxxxxxxx' - Timer Units.
R	16	1	X'00 - Reserved.
	17-19	3	X'xxxxxx' - CPU Serial Number.
	20,21	2	X'0155' or X'0158' - CPU Id.
	22,23	2	X'0000' - MCEL Length.
	24-31	8	Job Id.
	32-47	16	Active I/O Units at Failure. A series of two-byte channel-unit addresses (0cuu).
	48-55	8	Failing CCW.
	56-63	8	CSW.
	64-67	4	ECSW.
	68-71	4	X'xxxx0000' - Device Type 68,69: DOS PUB bytes 4 and 5.
	72	1	Channel Id.
	73-75	3	X'00xxxx' - CUA.
	76	1	B'x0000000' - Reserved for DOS/EREP Use. If bit 0=1, I/O units are invalid.
	77-79	3	X'000000' - Reserved for DOS Use.

Figure 60. Model 155-II/158 Channel Check Record Format on IJSYSRC

Chart MA. $$ABERRK - Unit Check Record Builder (Part 1 cf 2)
Refer to Charts 06 and 07.

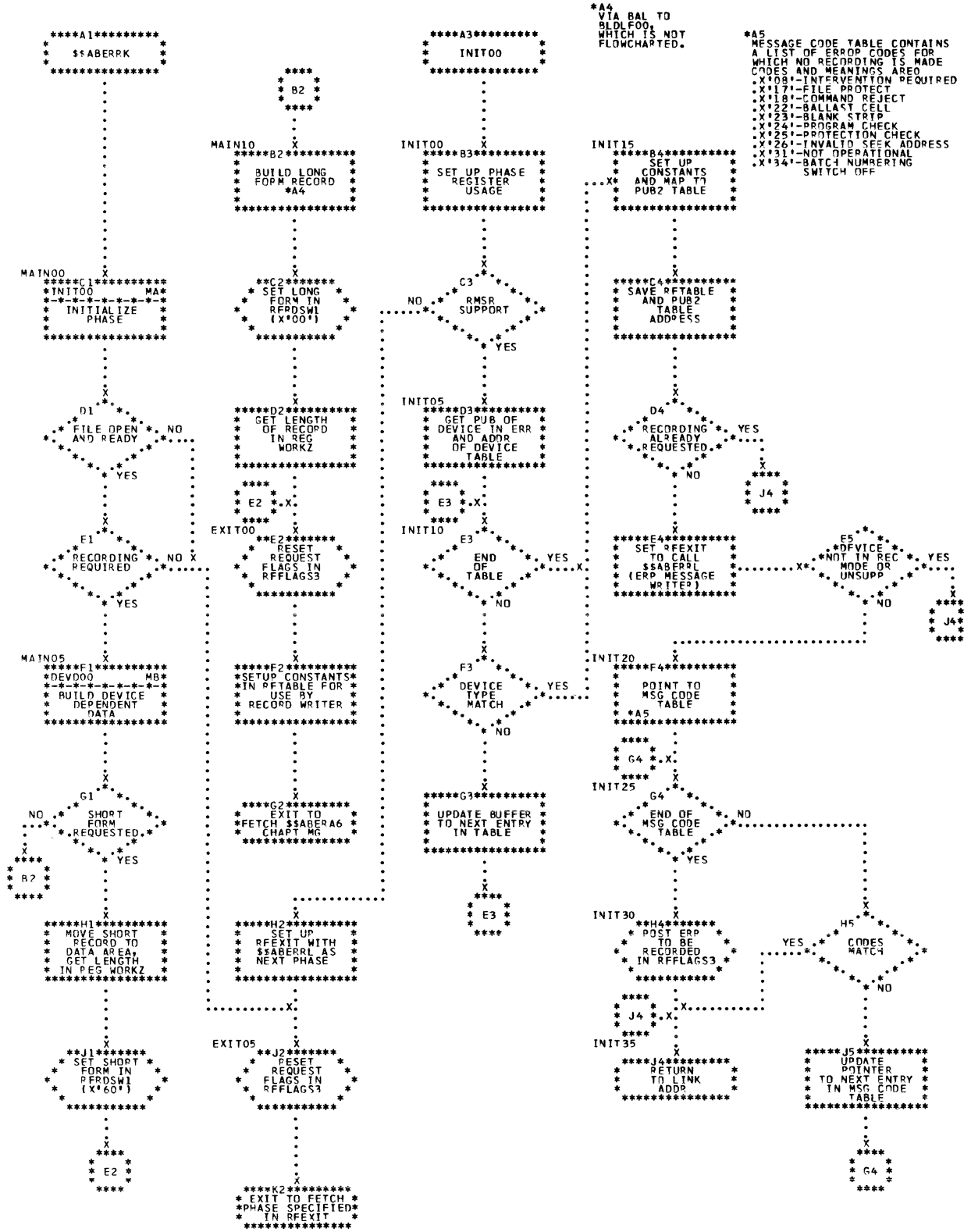


Chart ME. $$ABERRK - Unit Check Record Builder (Part 2 of 2)
Refer to Charts C6 and C7.

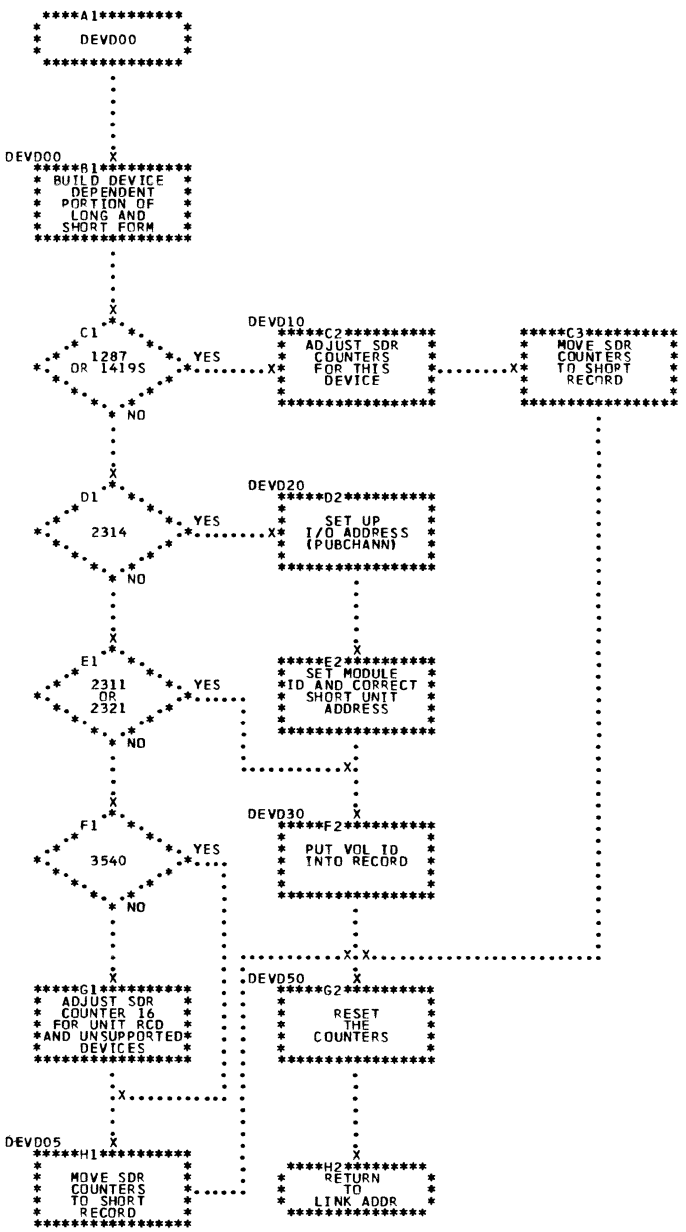


Chart MC. $$ABERA4 - Unit Check Record Builder (Part 1 of 2)
Refer to Chart 07.

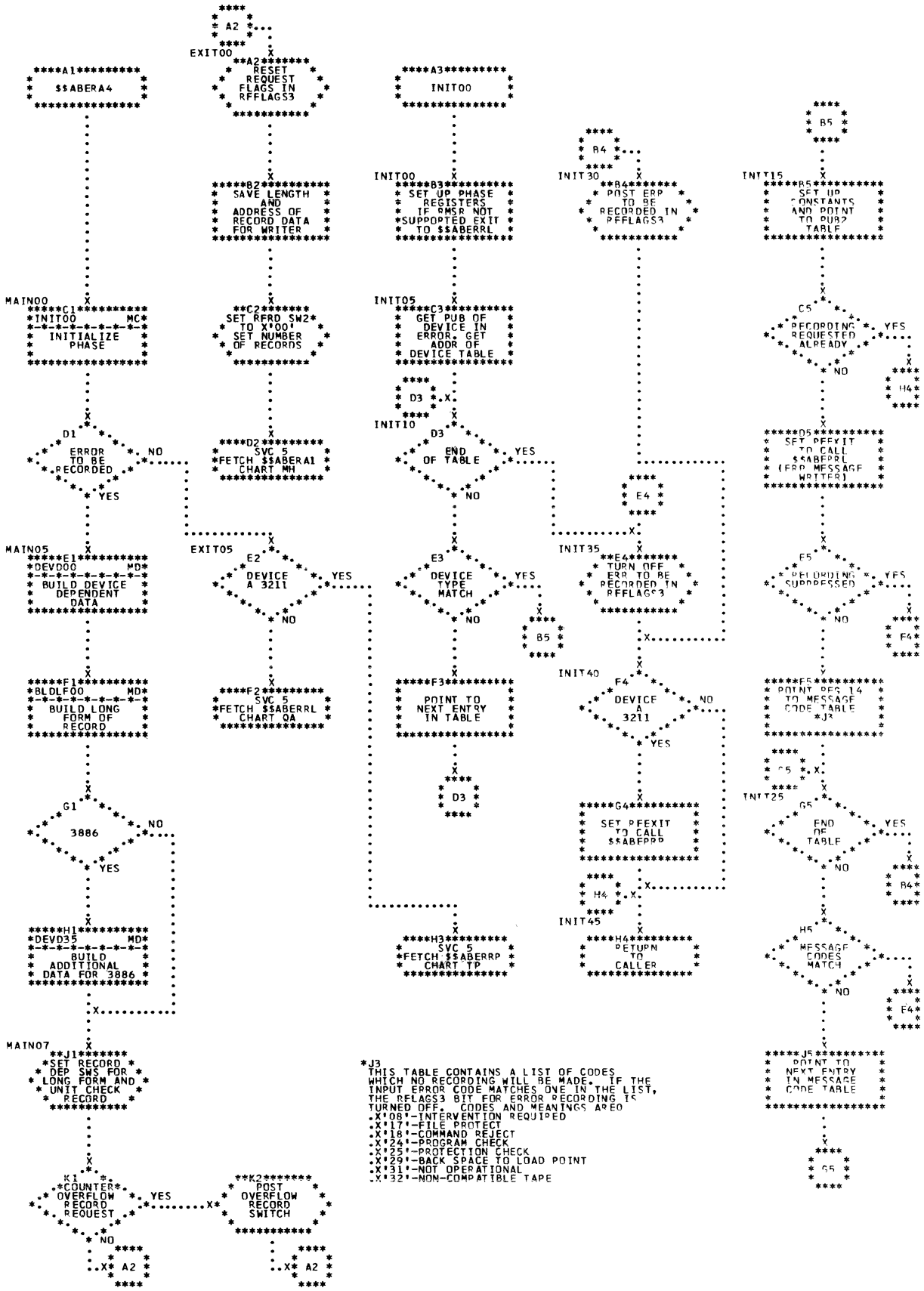


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Chart MD. $$ABERA4 - Unit Check Record Builder (Part 2 of 2)
Refer to Chart 07.

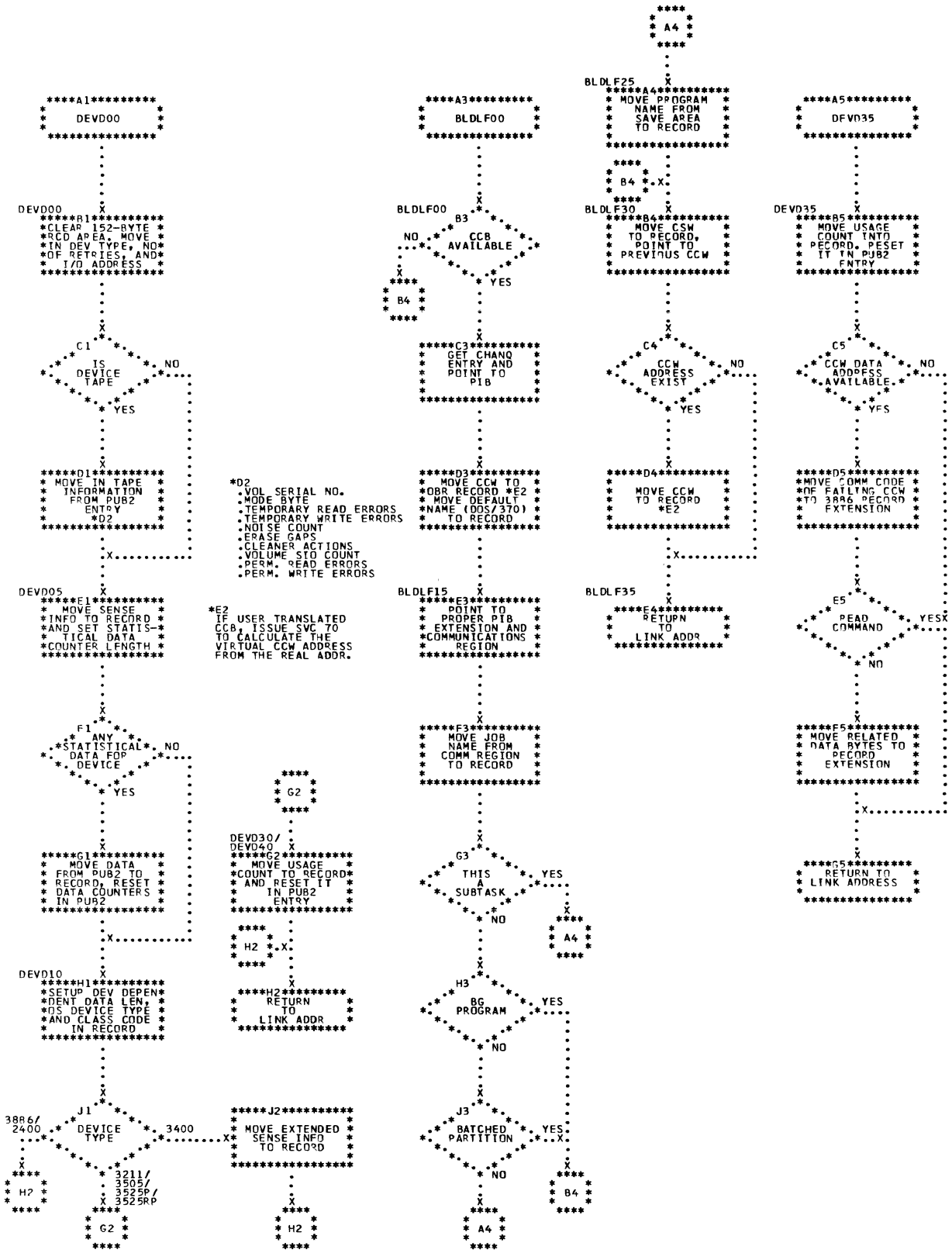


Chart ME. $$ABERA5 - RMSR I/O Device Record Builder for BTAM and 3330 (Part 1 of 2)
Refer to Chart 06.

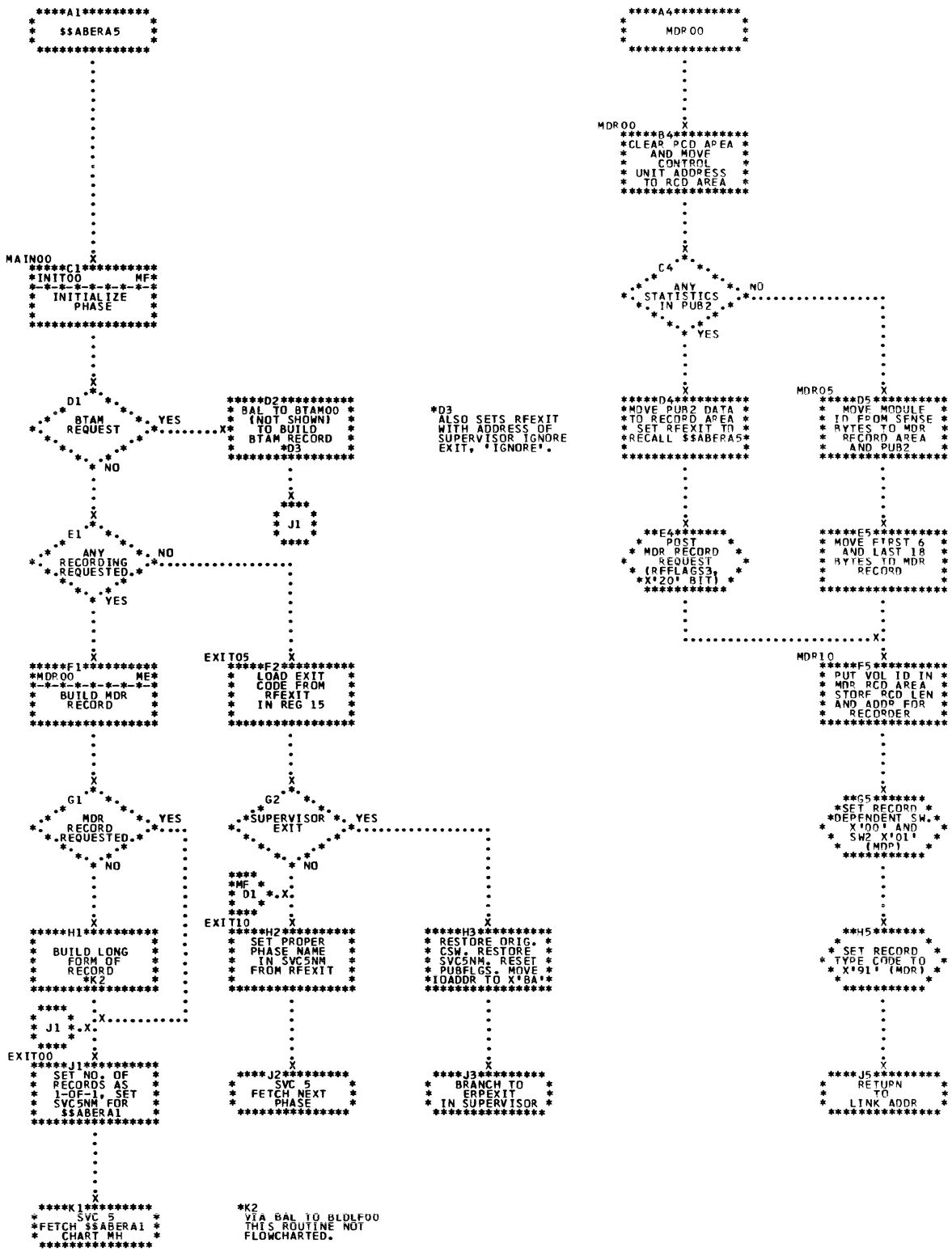


Chart MF. $$ABERA5 - RMSR I/O Device Record Builder for BTAM and 3330 (Part 2 of 2)
Refer to Chart 06.

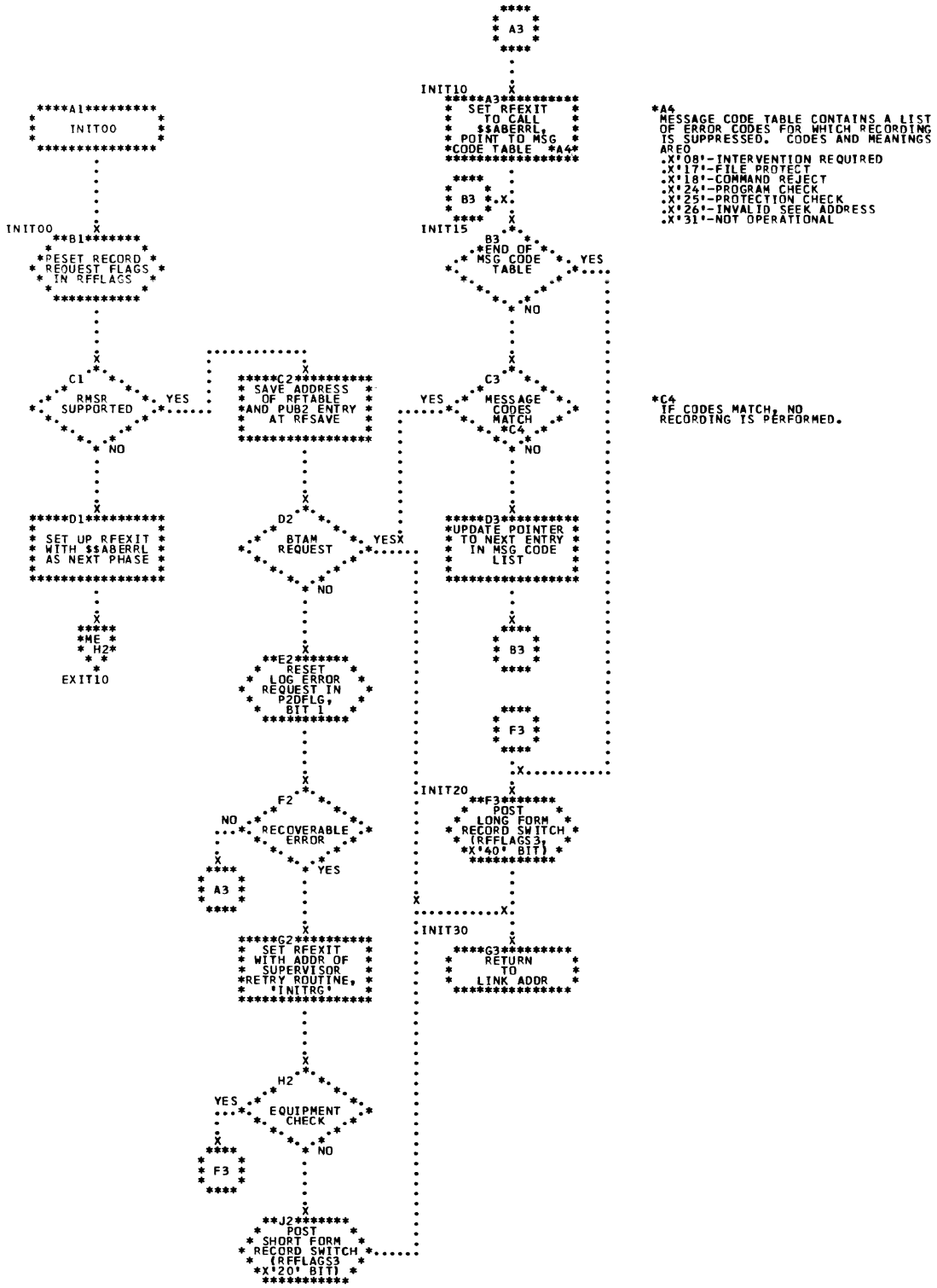


Chart MG. $$ABERA6 - Set CS Device Codes in SYSREC Record
Refer to Charts C6 and C7.

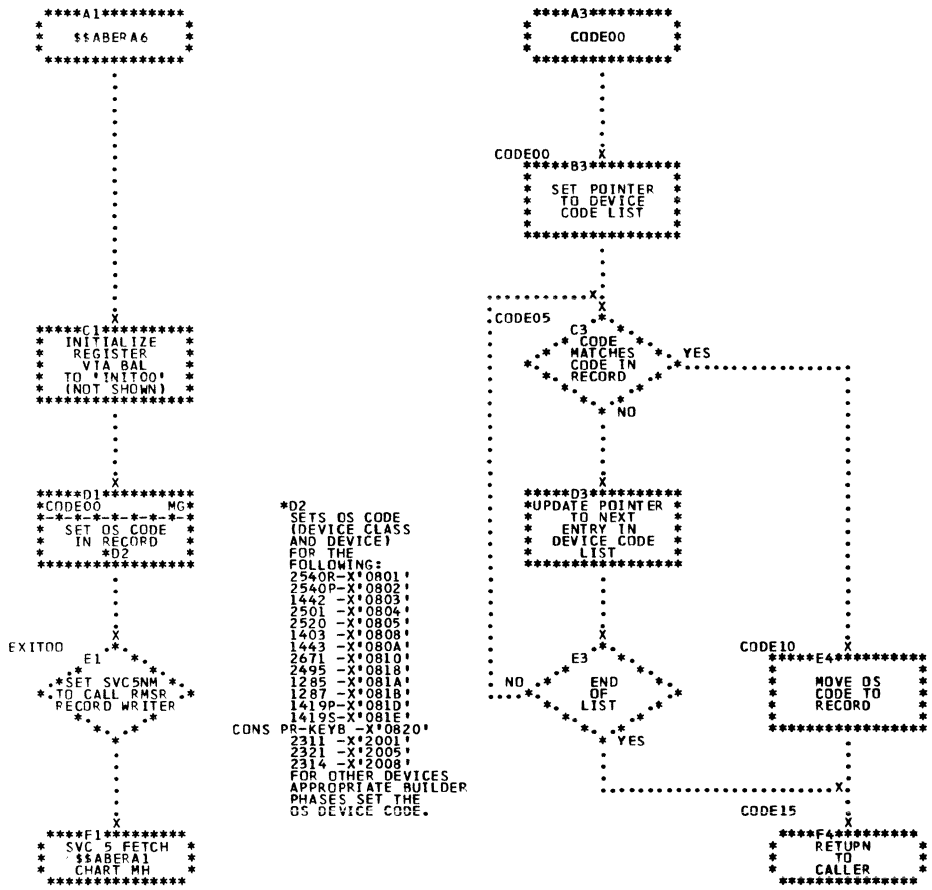


Chart MH. $$ABERA7 - RMSR I/O Device Record Builder for 3340 (Part 1 of 2)
Refer to Chart 06.

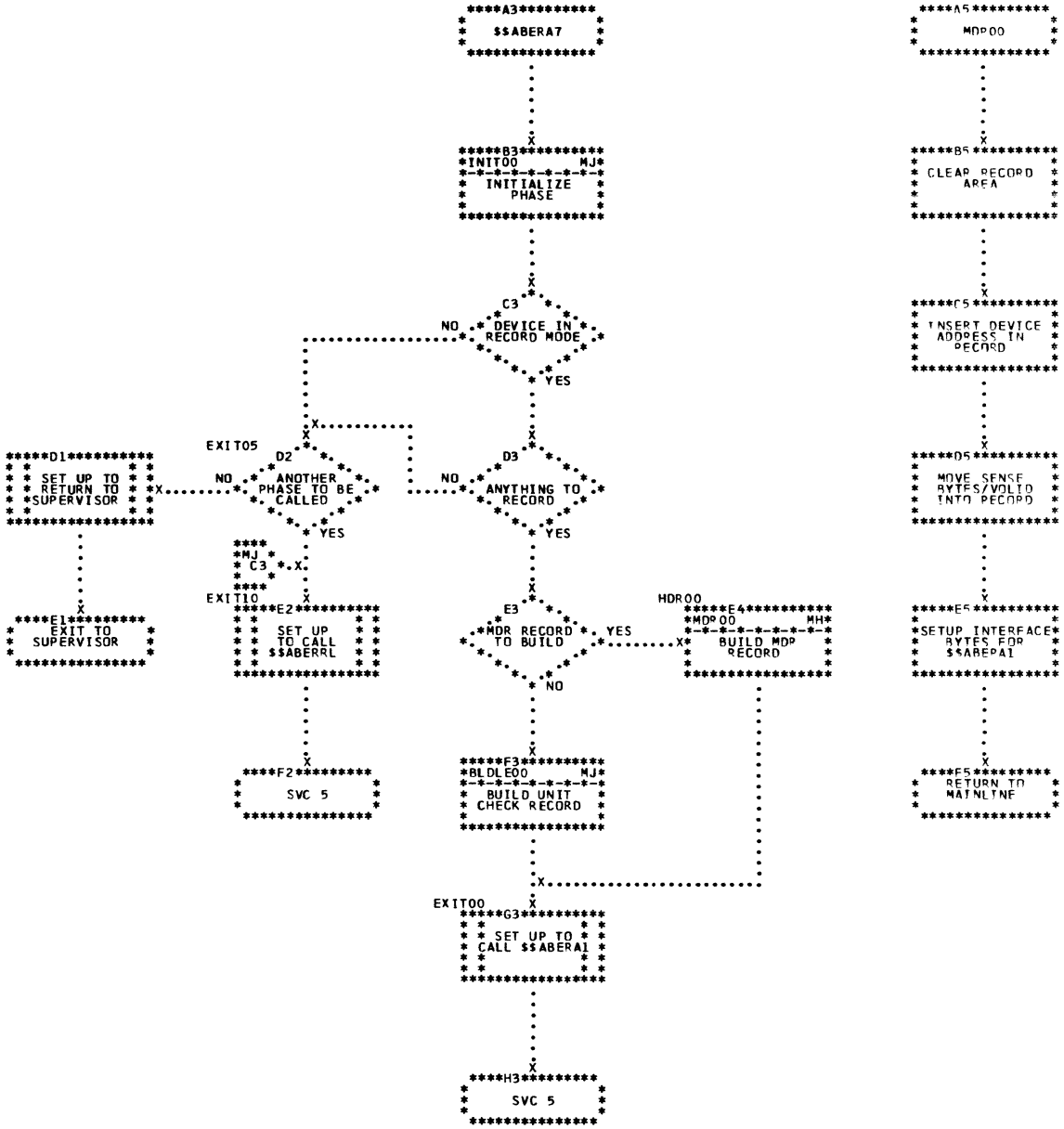


Chart MJ. $$ABERA7 - RMSR I/O Device Record Builder for 3340 (Part 2 of 2)
Refer to Chart 06.

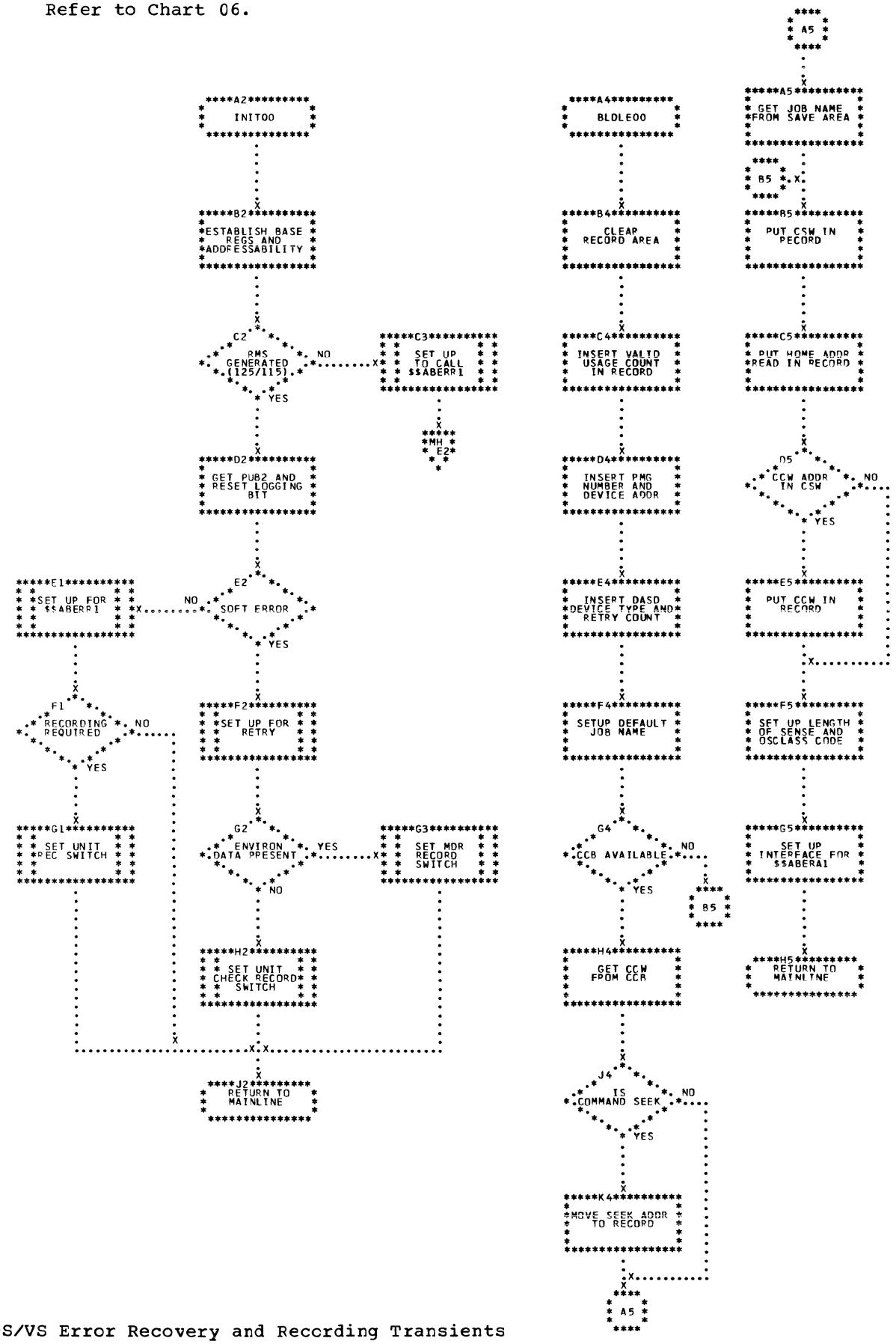


Chart MK. $$ABERA1 - RMSR Reccrd Writer (Part 1 cf 2)
Refer to Charts 06 and 07.

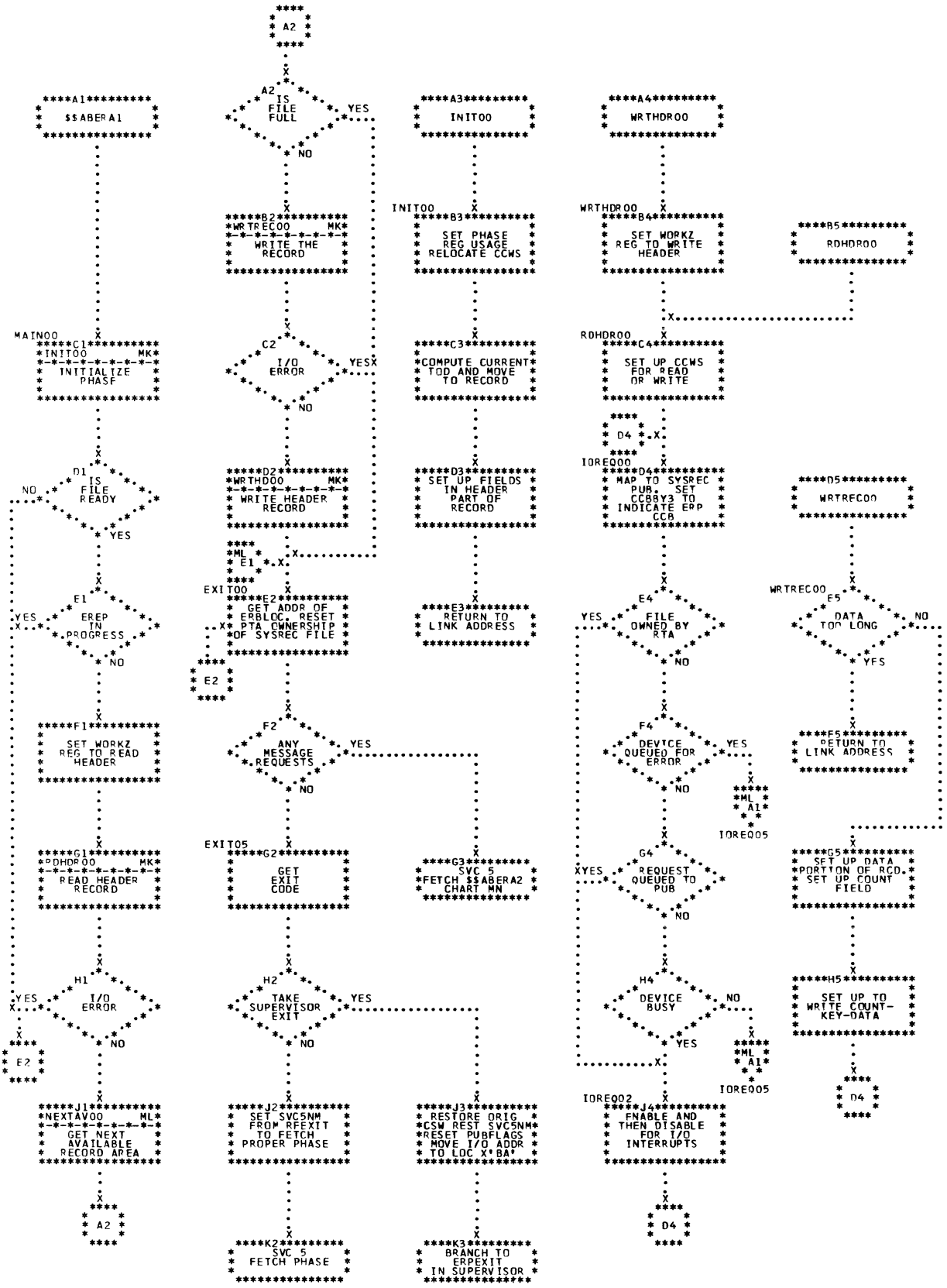


Chart ML. $$ABERA1 - RMSR Record Writer (Part 2 of 2)
Refer to Charts C6 and C7.

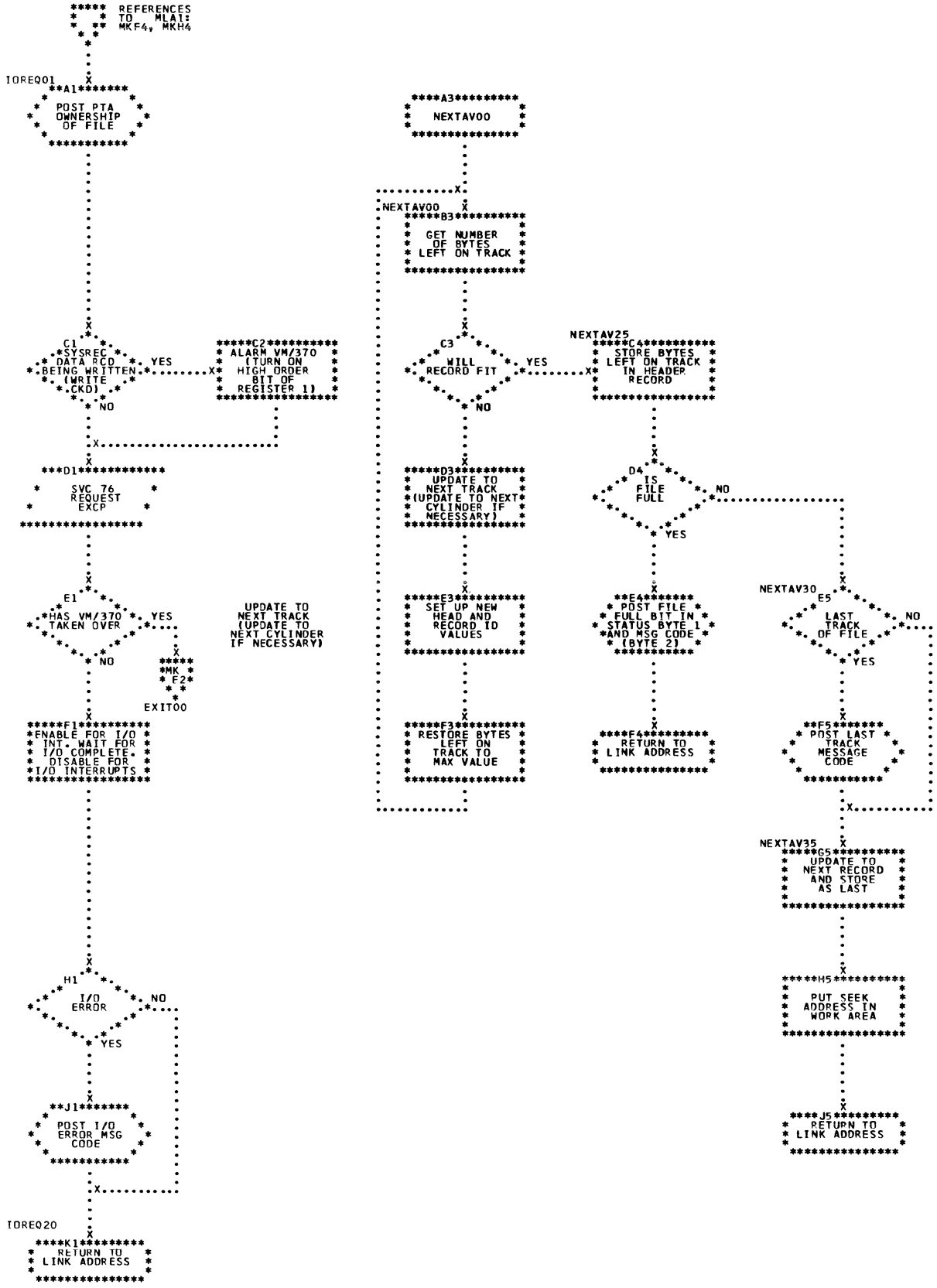


Chart MM. $$ABERJ1 - Statistical Counter Update for Disk and Unit Record Devices (Part 1 of 2)
Refer to Charts C6 and C7.

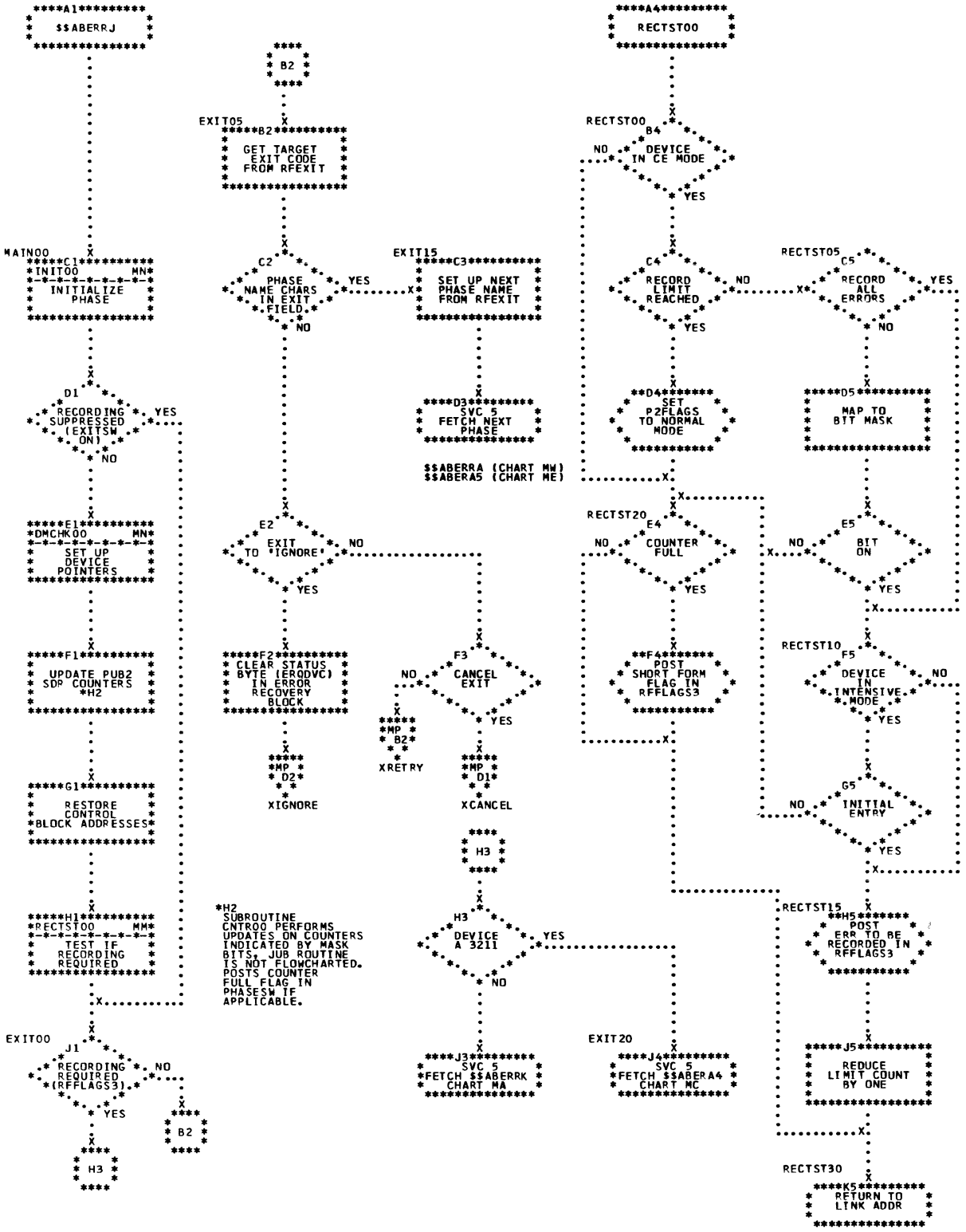


Chart MN. $$ABERJ1 - Statistical Ccunter Update fcr Disk and Unit Reccrd Devices (Part 2 of 2)
Refer to Charts C6 and C7.

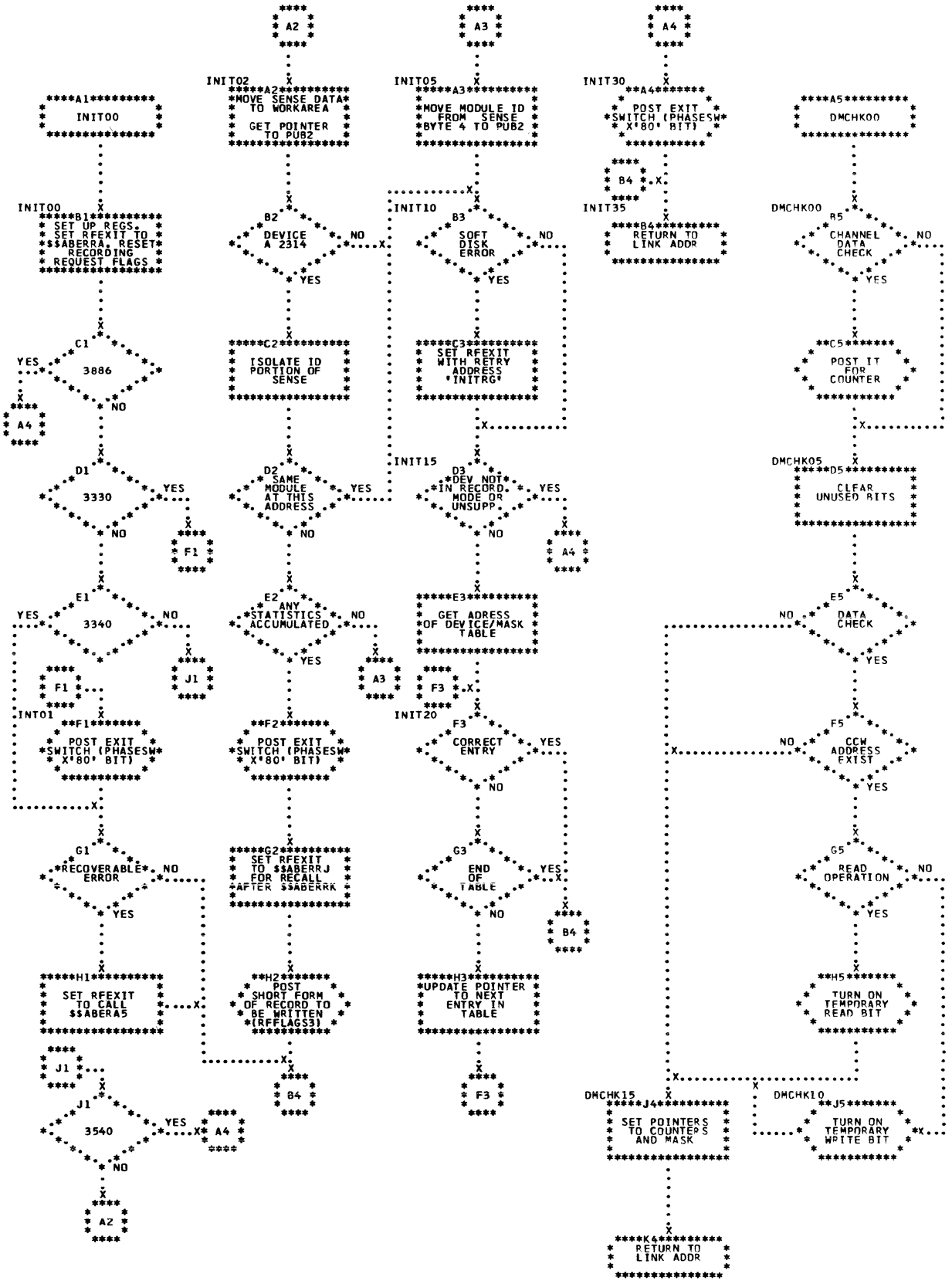


Chart MP. $$ABERRJ - Statistical Counter Update for Disk and Unit Record Devices
Refer to Charts 06 and 07.

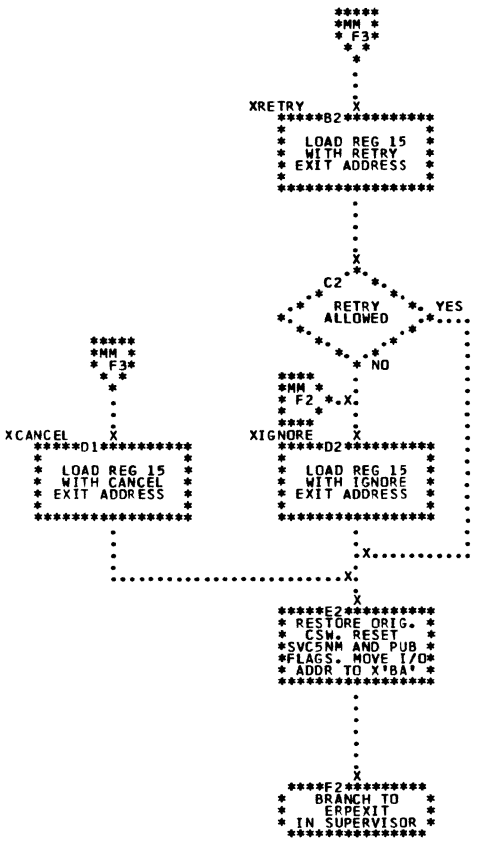


Chart MQ. $$AEERA2 - RMSR Message Writer (Part 1 of 2)
Refer to Charts C6 and C7.

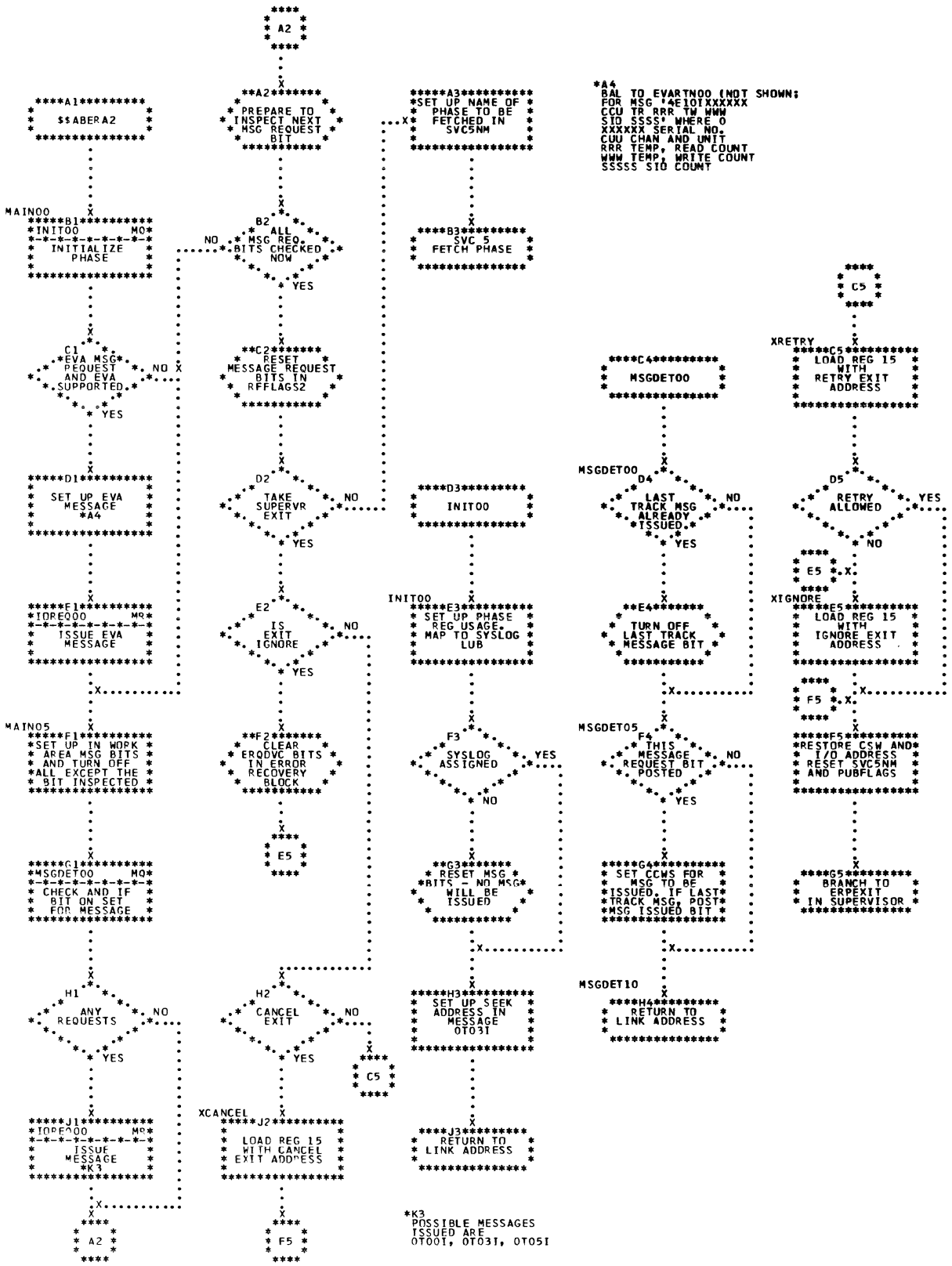


Chart MR. $$ABERA2 - RMSR Message Writer (Part 2 of 2)
Refer to Charts 06 and 07.

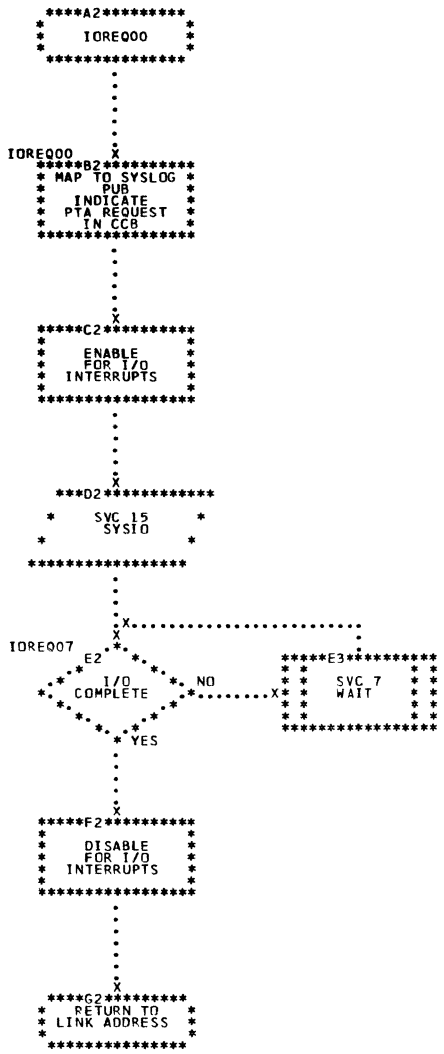


Chart MS. $$ABERA3 - RMSR Record Writer for SVC 44 Requests (Part 1 of 2)

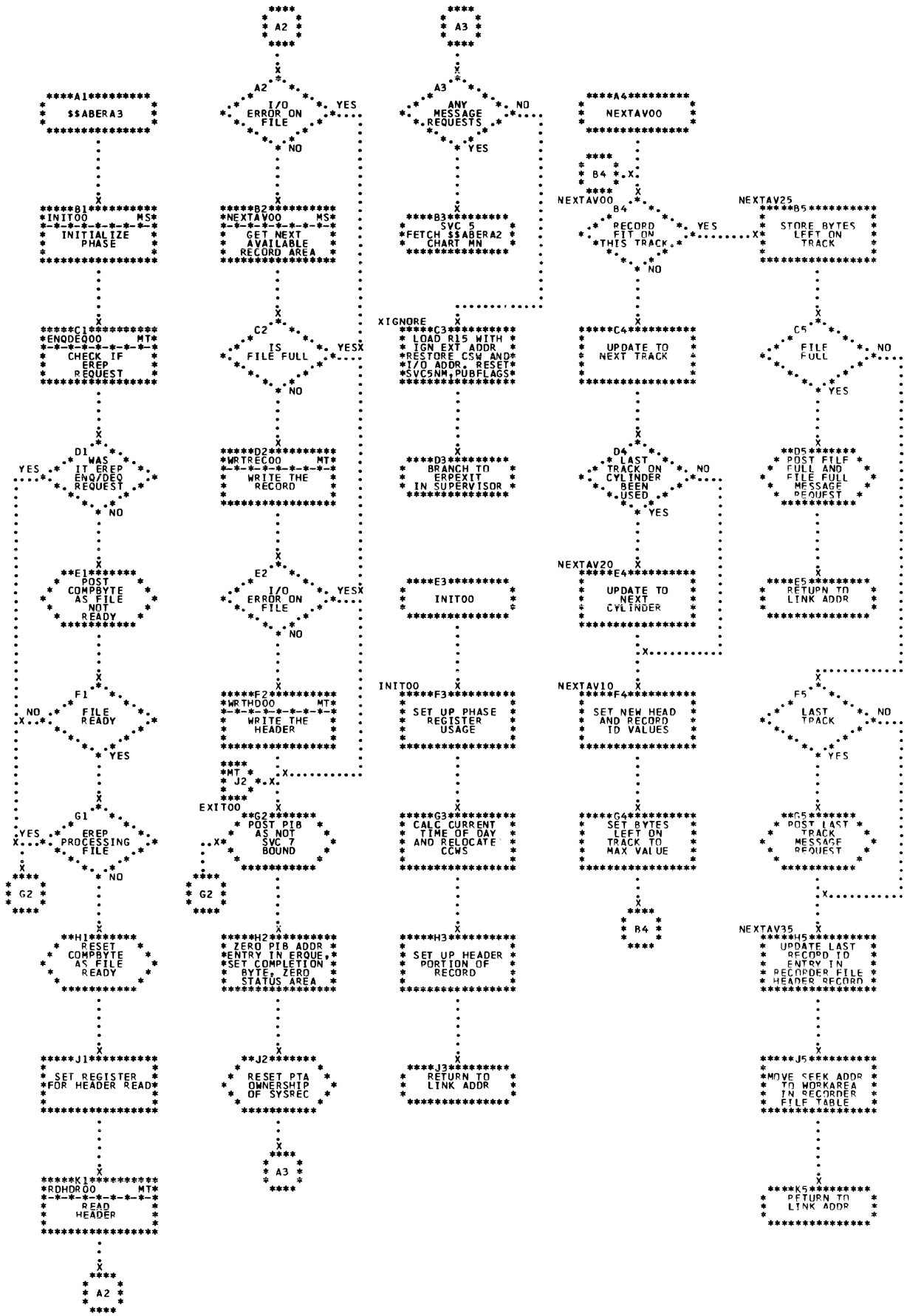


Chart MT. $$ABERA3 - RMSR Reccrd Writer fcr SVC 44 Requests (Part 2 cf 2)

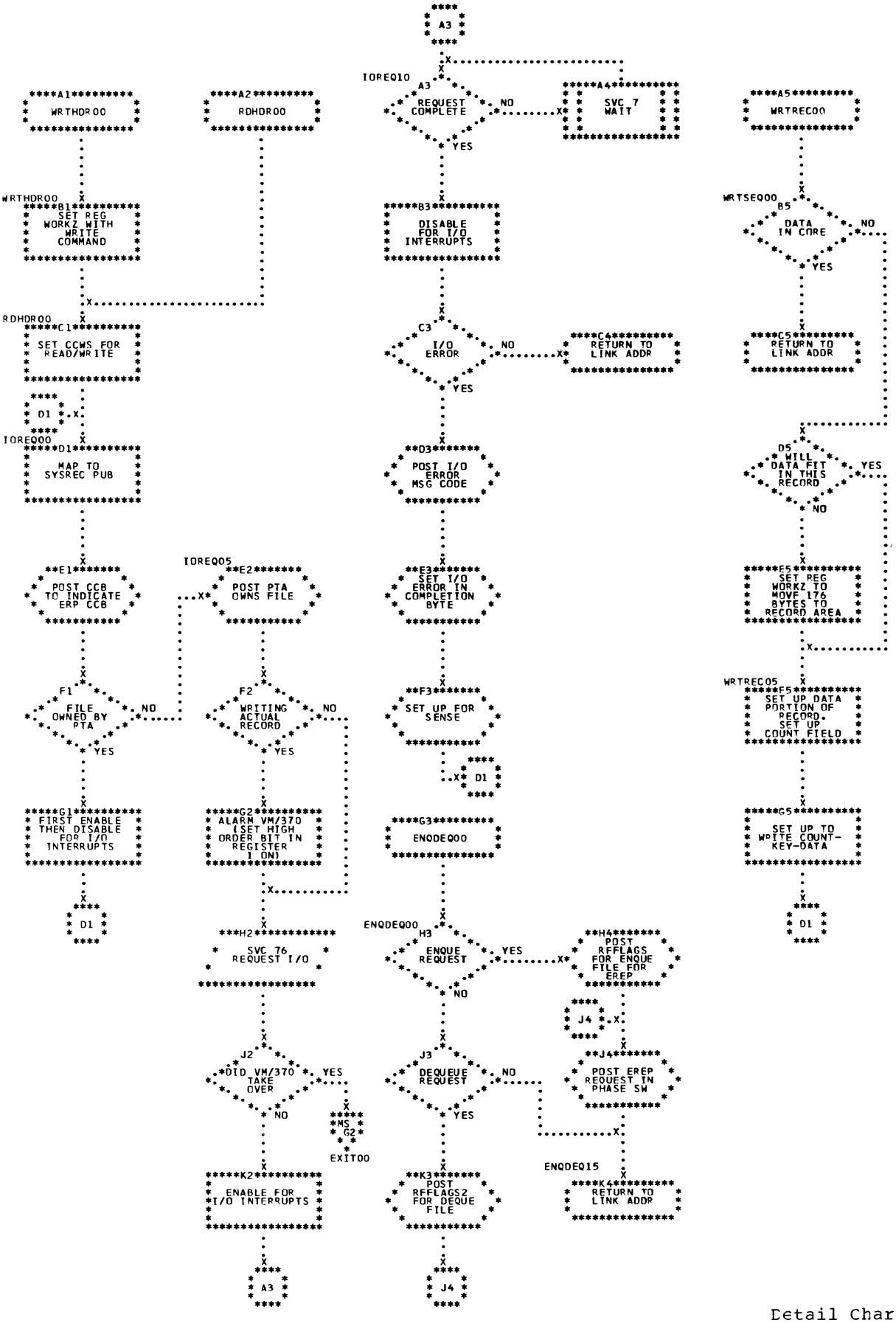


Chart MU. $$ABERAA - Statistical Counter Update for Tape Devices (Part 1 of 2)
Refer to Chart 07.

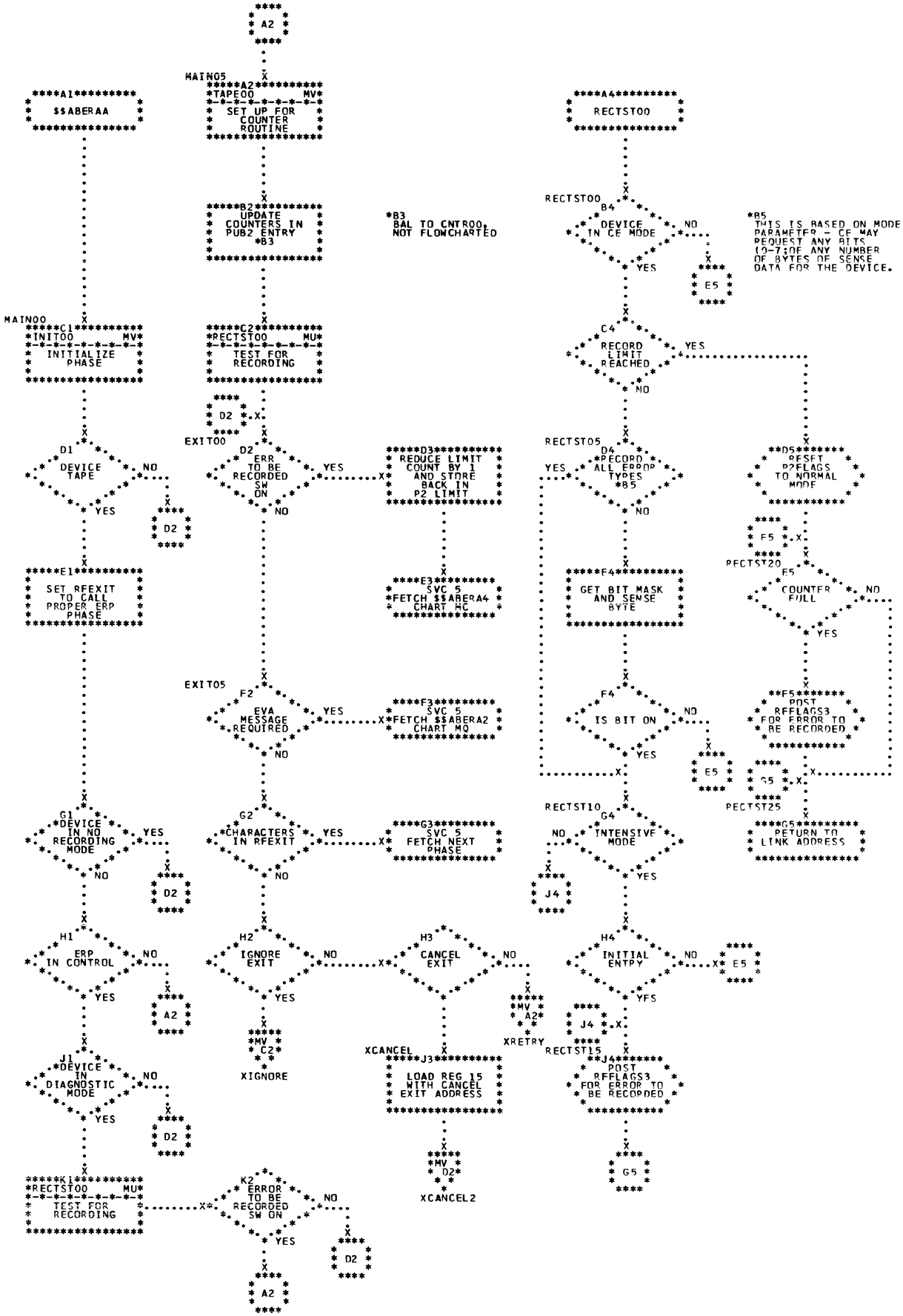


Chart MV. $$ABERAA - Statistical Counter Update for Tape Devices (Part 2 of 2)
Refer to Chart 07.

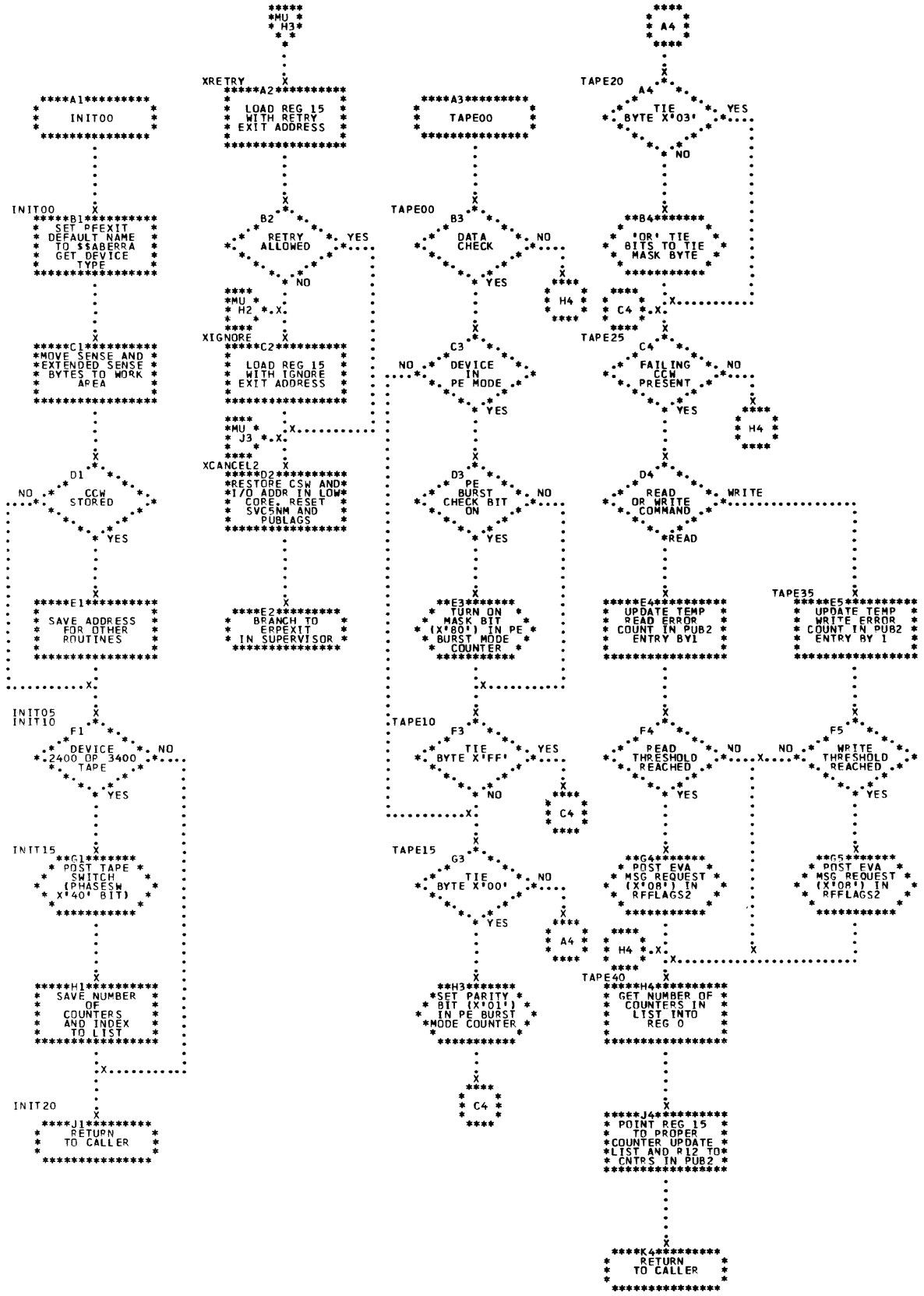


Chart MW. $$ABERRA - ERP Monitor (Part 1 of 2)
Refer to Charts 02, 06 and 07.

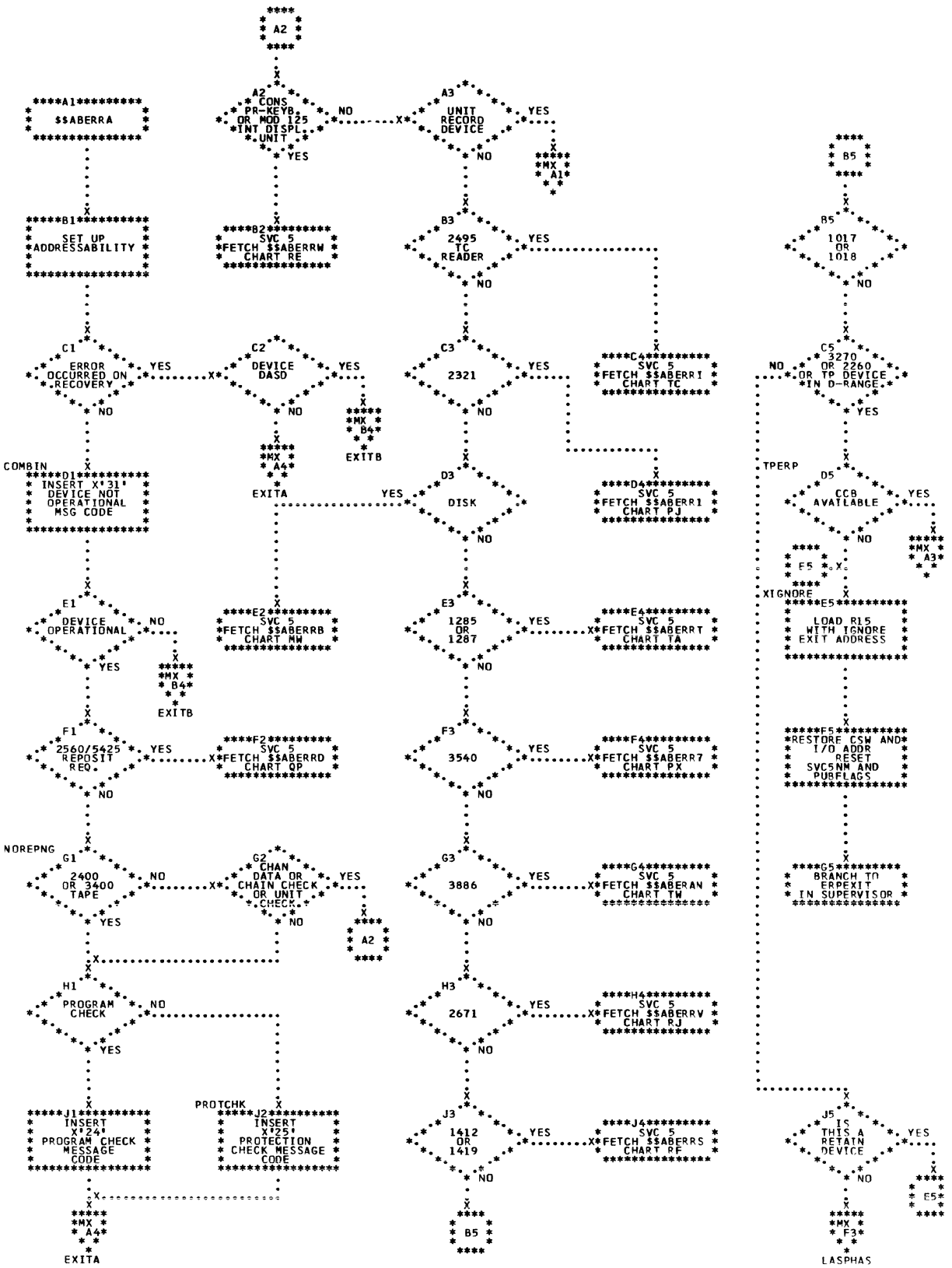


Chart MX. $$ABERRA - ERP Monitor (Part 2 of 2)
Refer to Charts C2, C6 and C7.

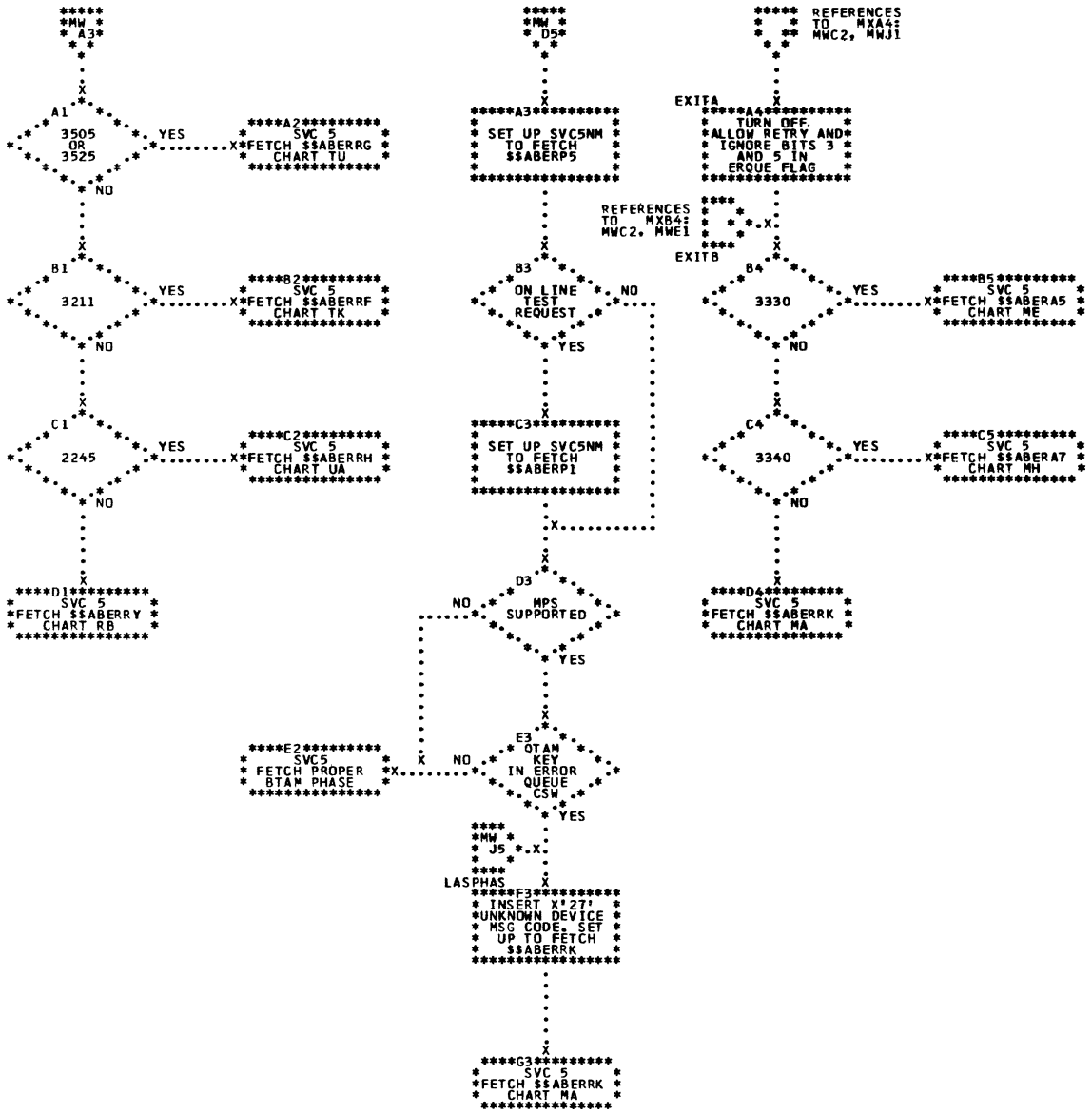


Chart MY. $$ABERRB - Disk ERP (Part 1 cf 2)
Refer to Charts 02 and 06.

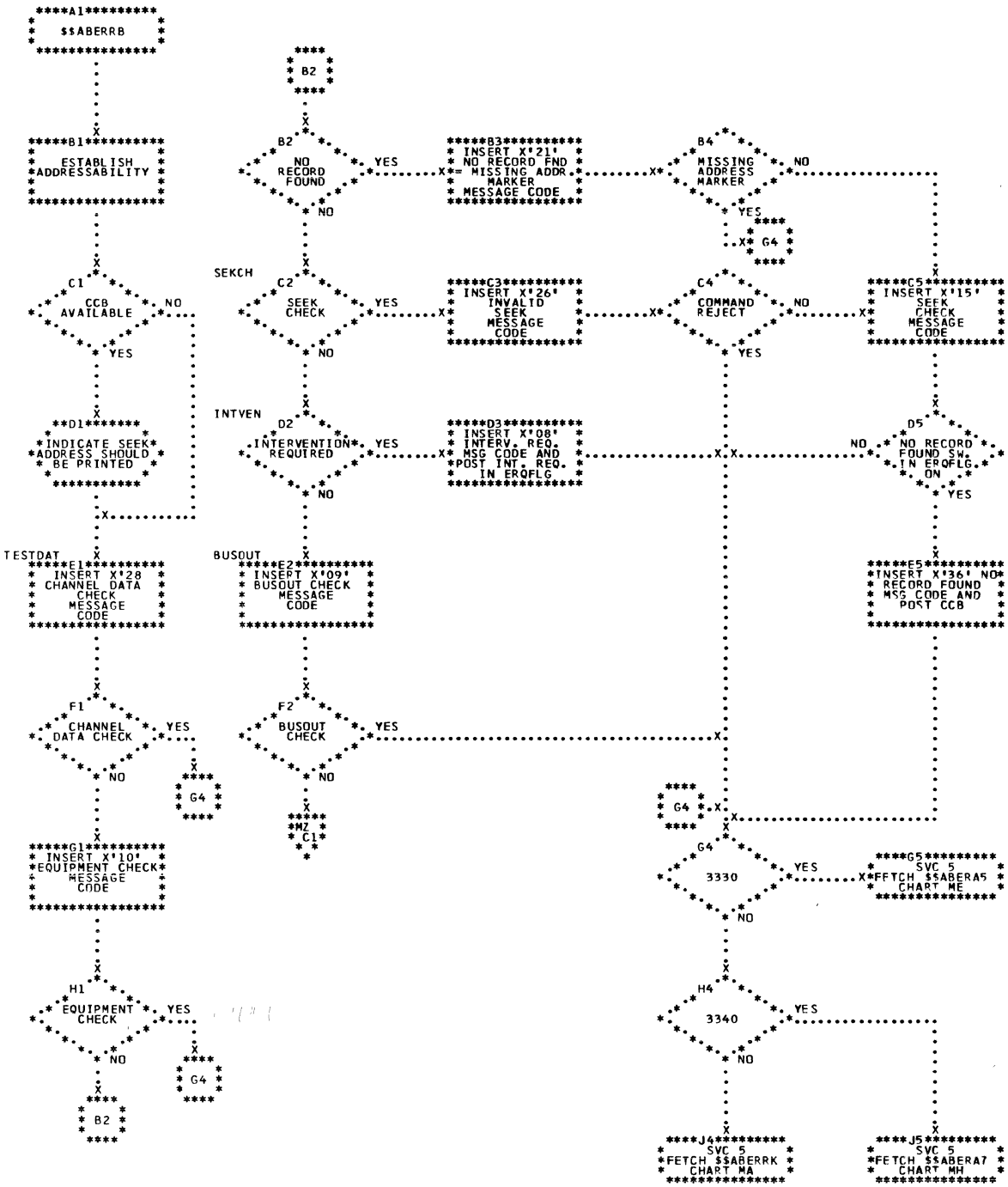


Chart MZ. $$ABERRB - Disk ERP (Part 2 of 2)
Refer to Charts C2 and C6.

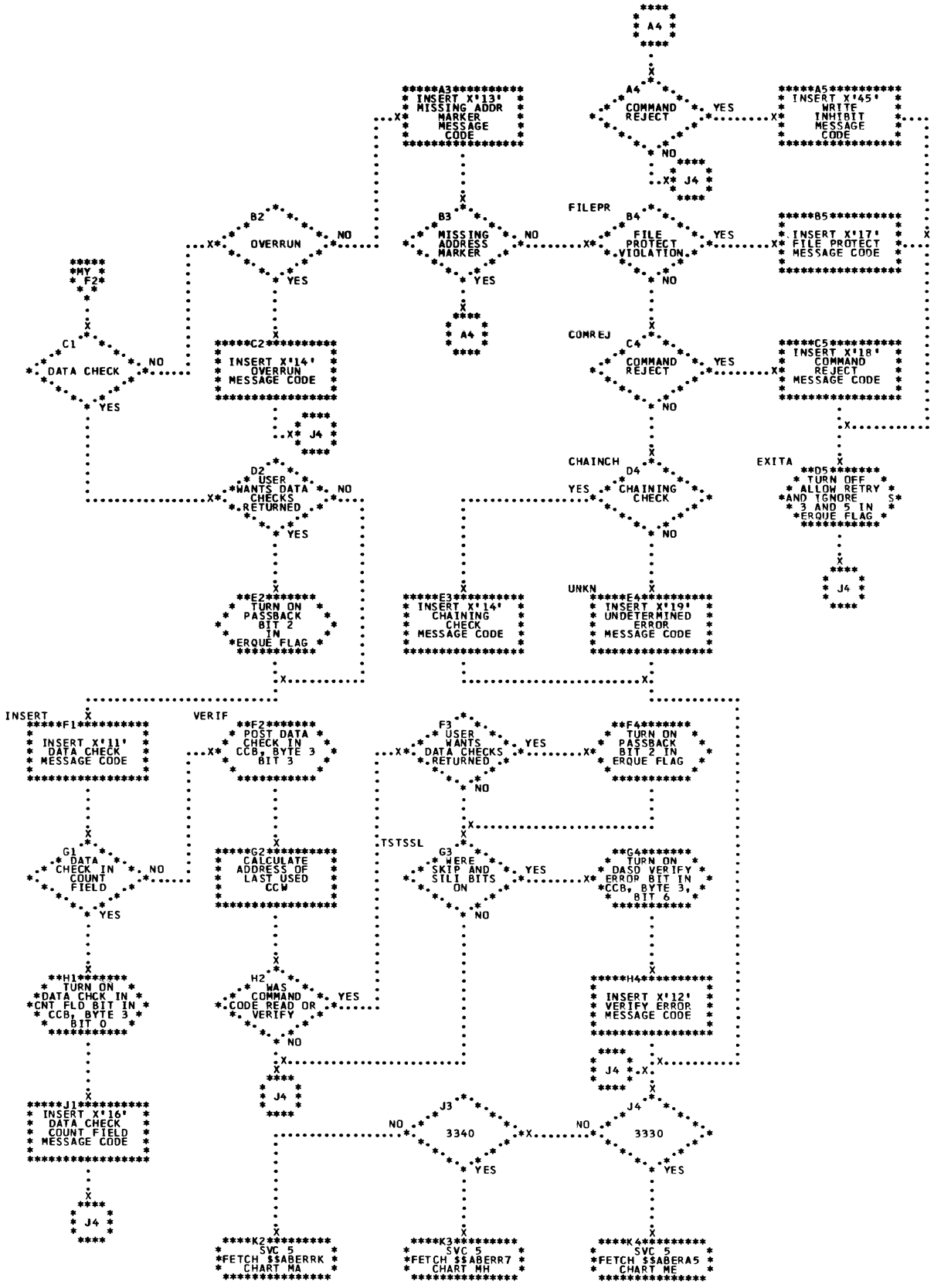


Chart NA. $$ABERAB - Phase 1 cf Tape ERP (Part 1 cf 4)
Refer to Chart 02.

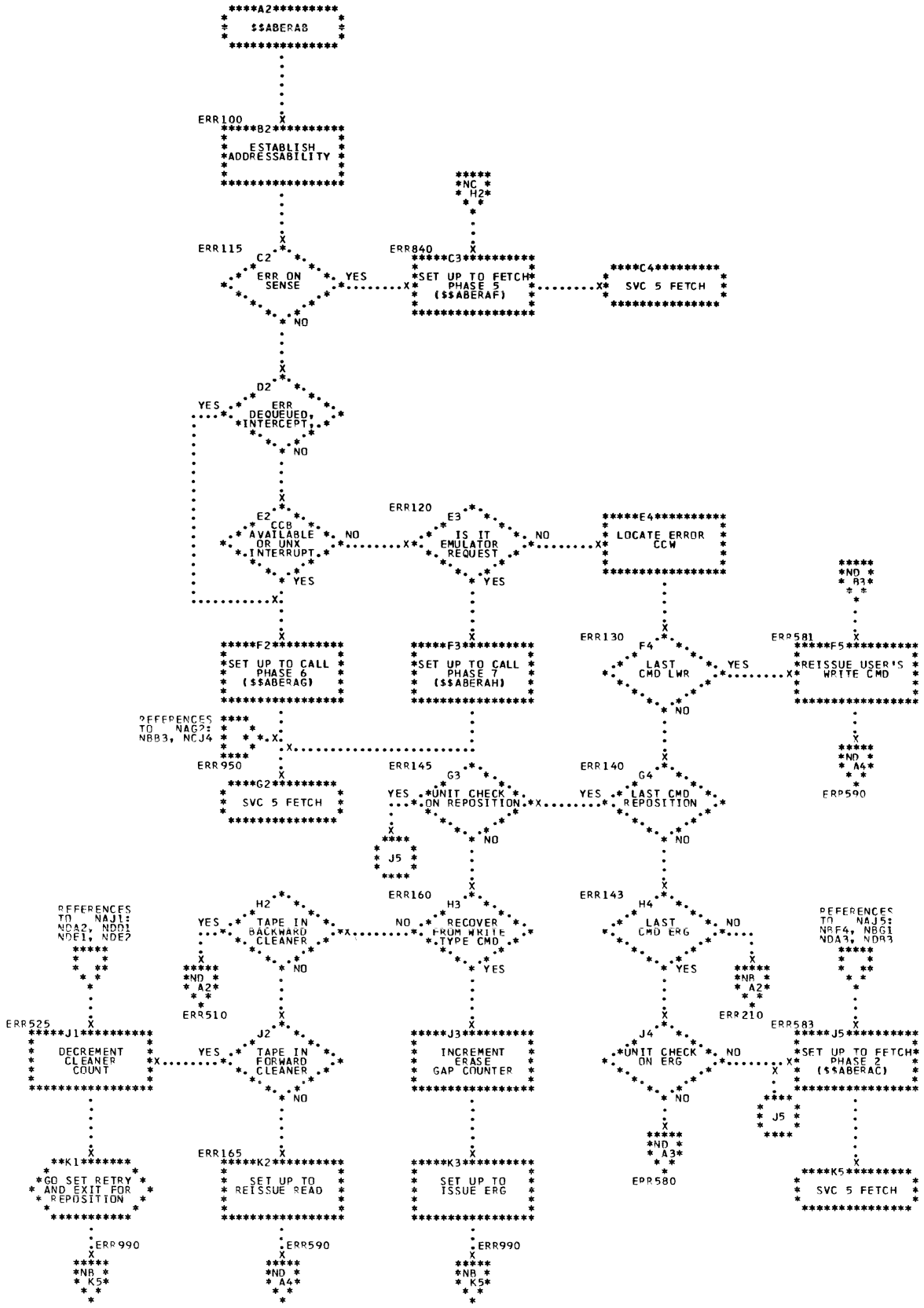


Chart NB. $$ABERAB - Phase 1 of Tape ERP (Part 2 of 4)
Refer to Chart 02.

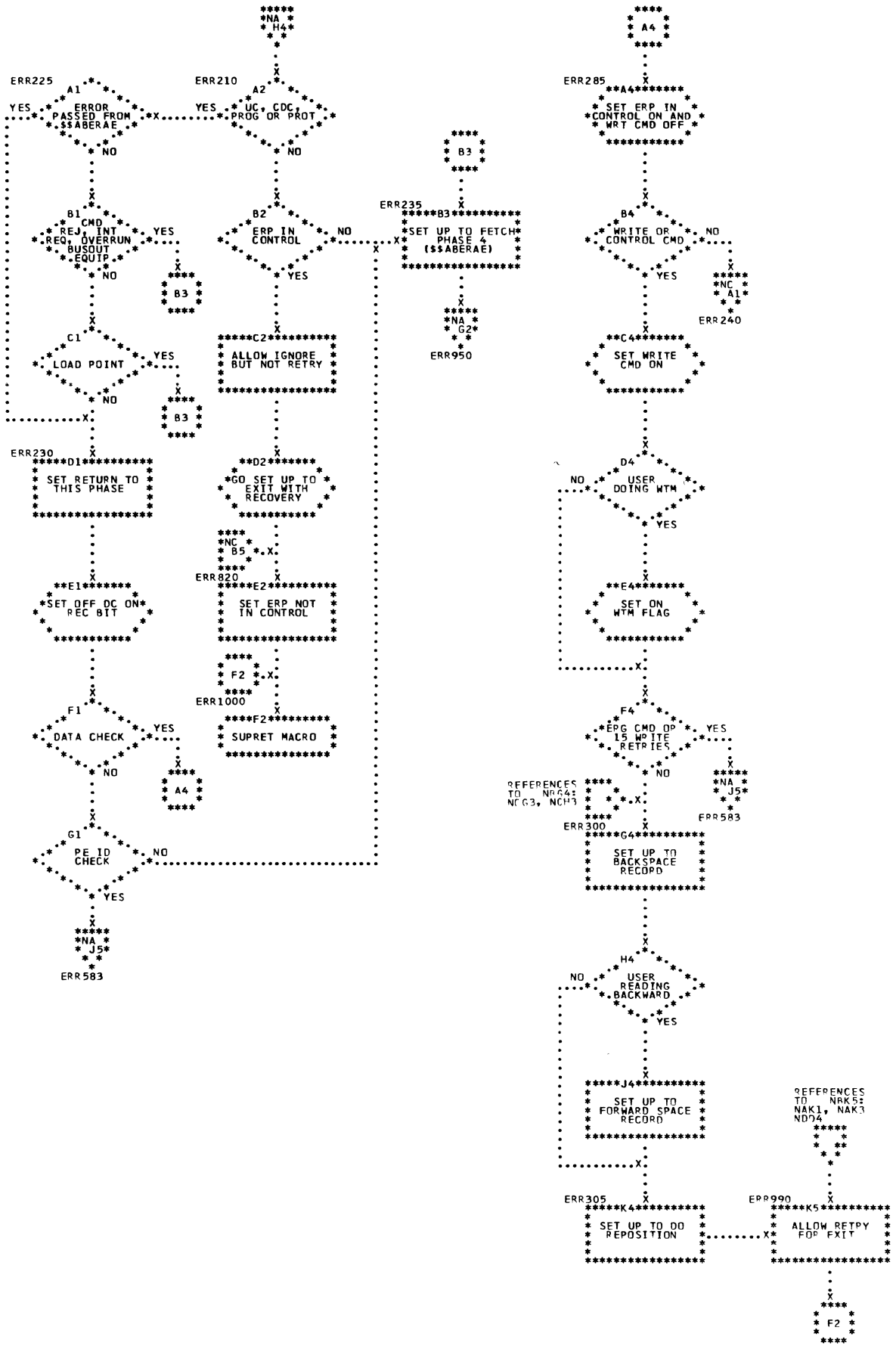


Chart NC. $$ABERAB - Phase 1 of Tape ERP (Part 3 of 4)
Refer to Chart 02.

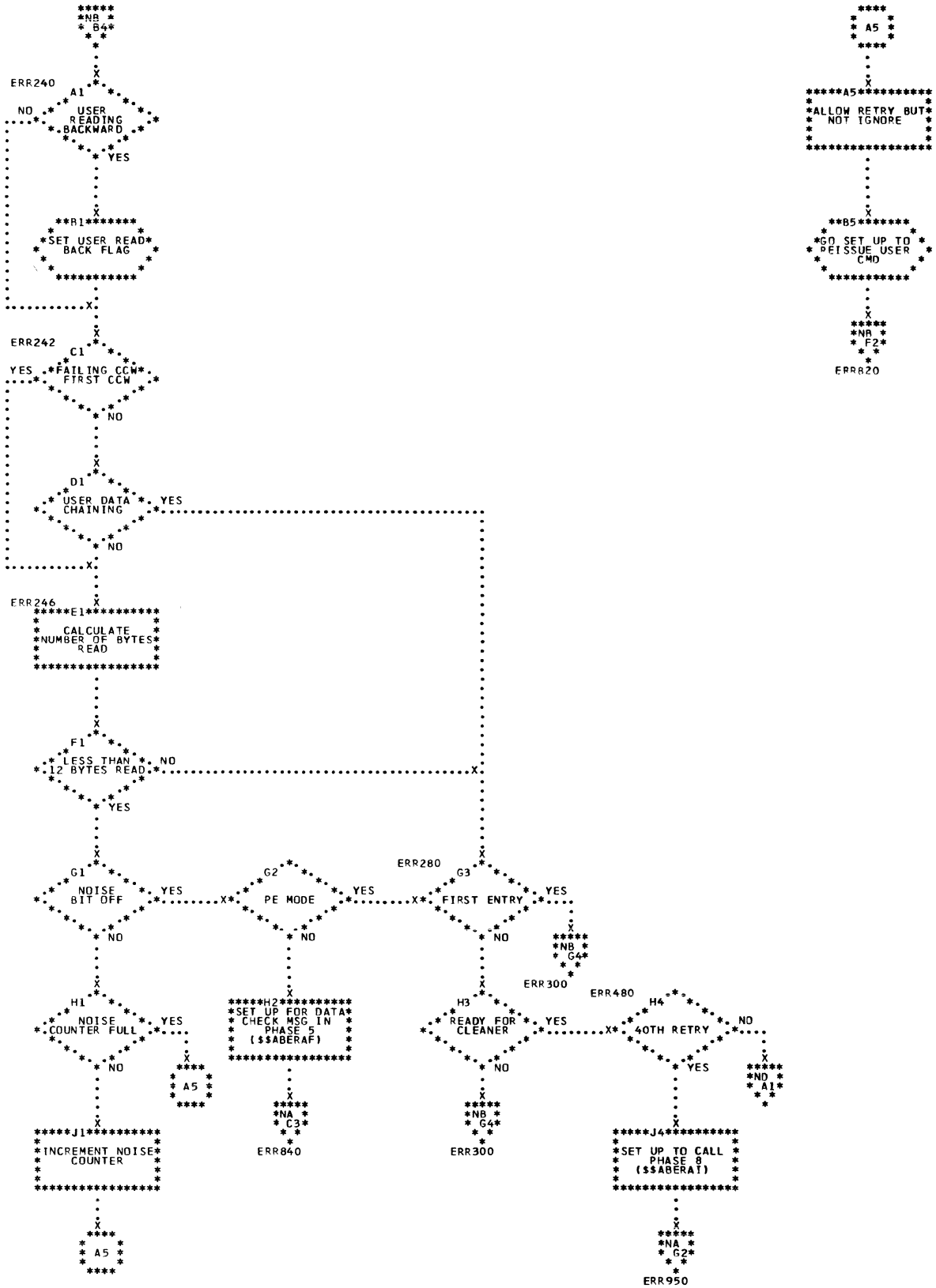


Chart ND. $$ABERAB - Phase 1 of Tape ERP (Part 4 of 4)
Refer to Chart 02.

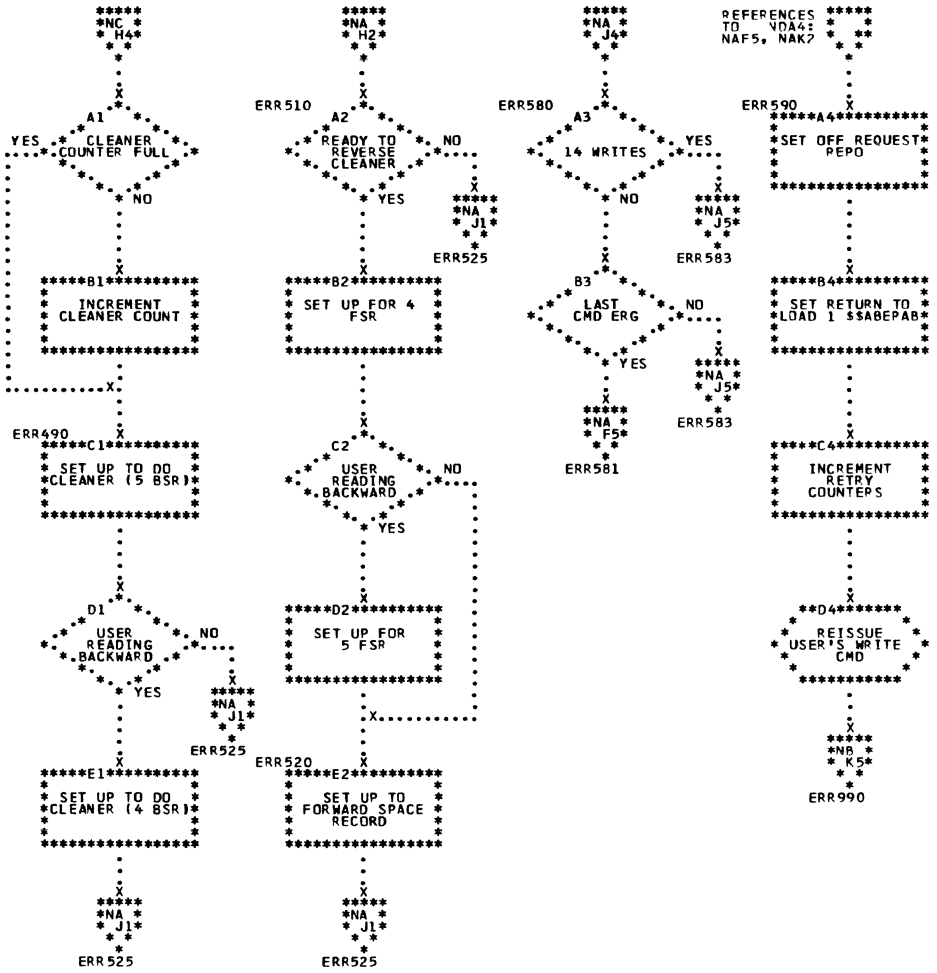


Chart NE. $$ABERAC - Phase 2 of Tape ERP (Part 1 of 5)
Refer to Chart 02.

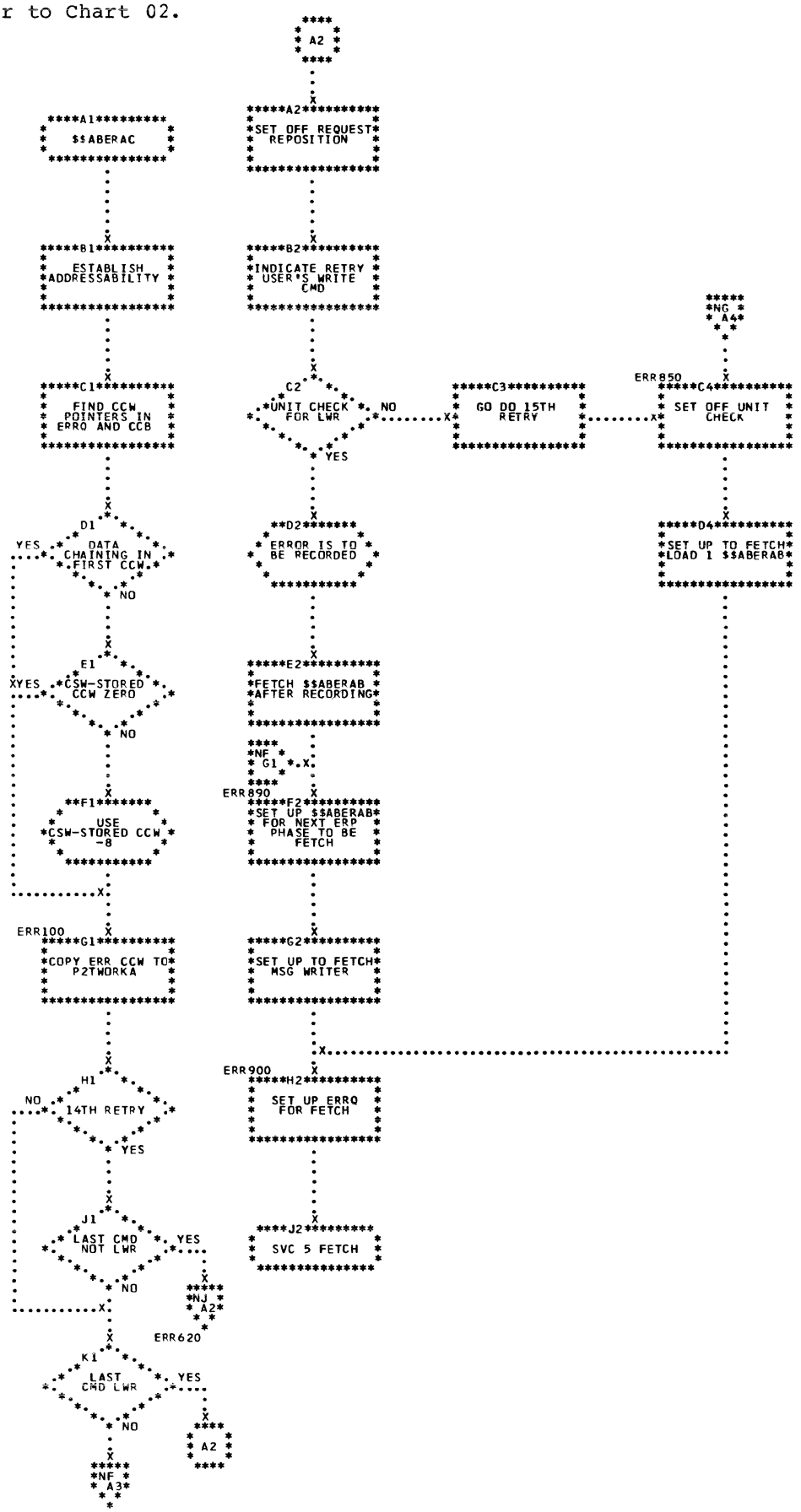


Chart NF. $$ABERAC - Phase 2 cf Tape ERP (Part 2 cf 5)
Refer to Chart 02.

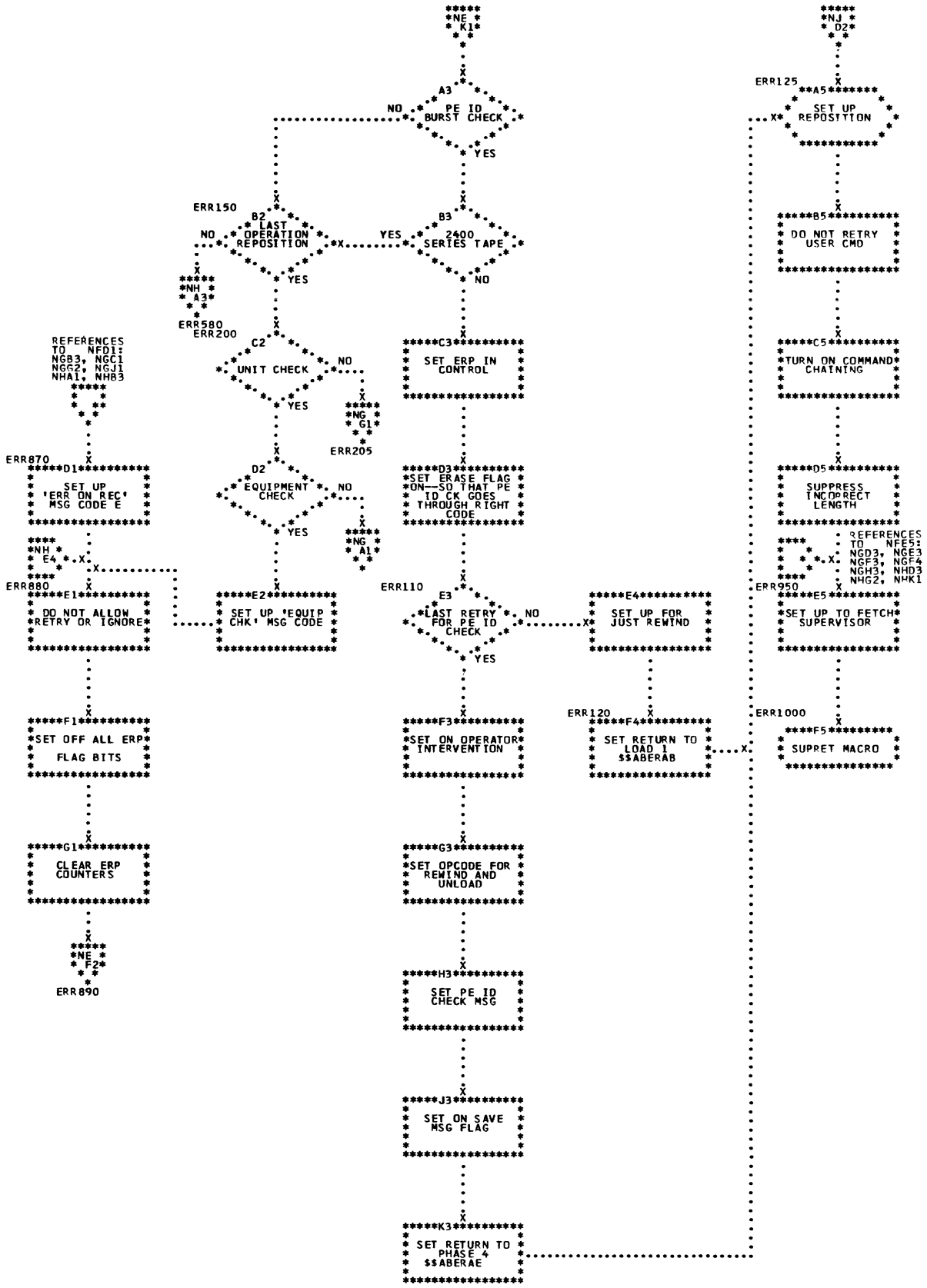


Chart NG. $$AERAC - Phase 2 of Tape ERP (Part 3 of 5)
Refer to Chart 2.

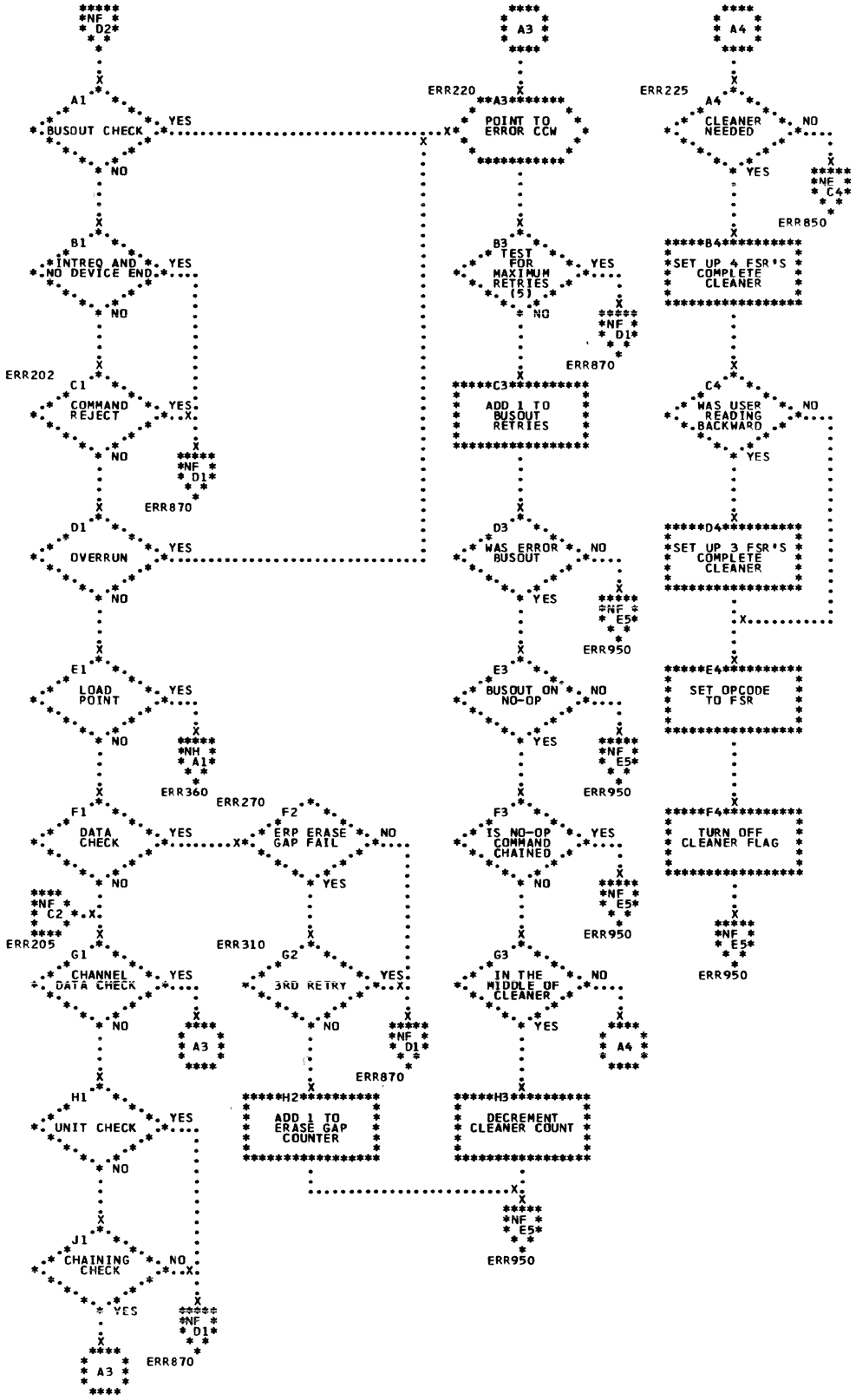


Chart NH. $$ABERAC - Phase 2 cf Tape ERP (Part 4 cf 5)
Refer to Chart 02.

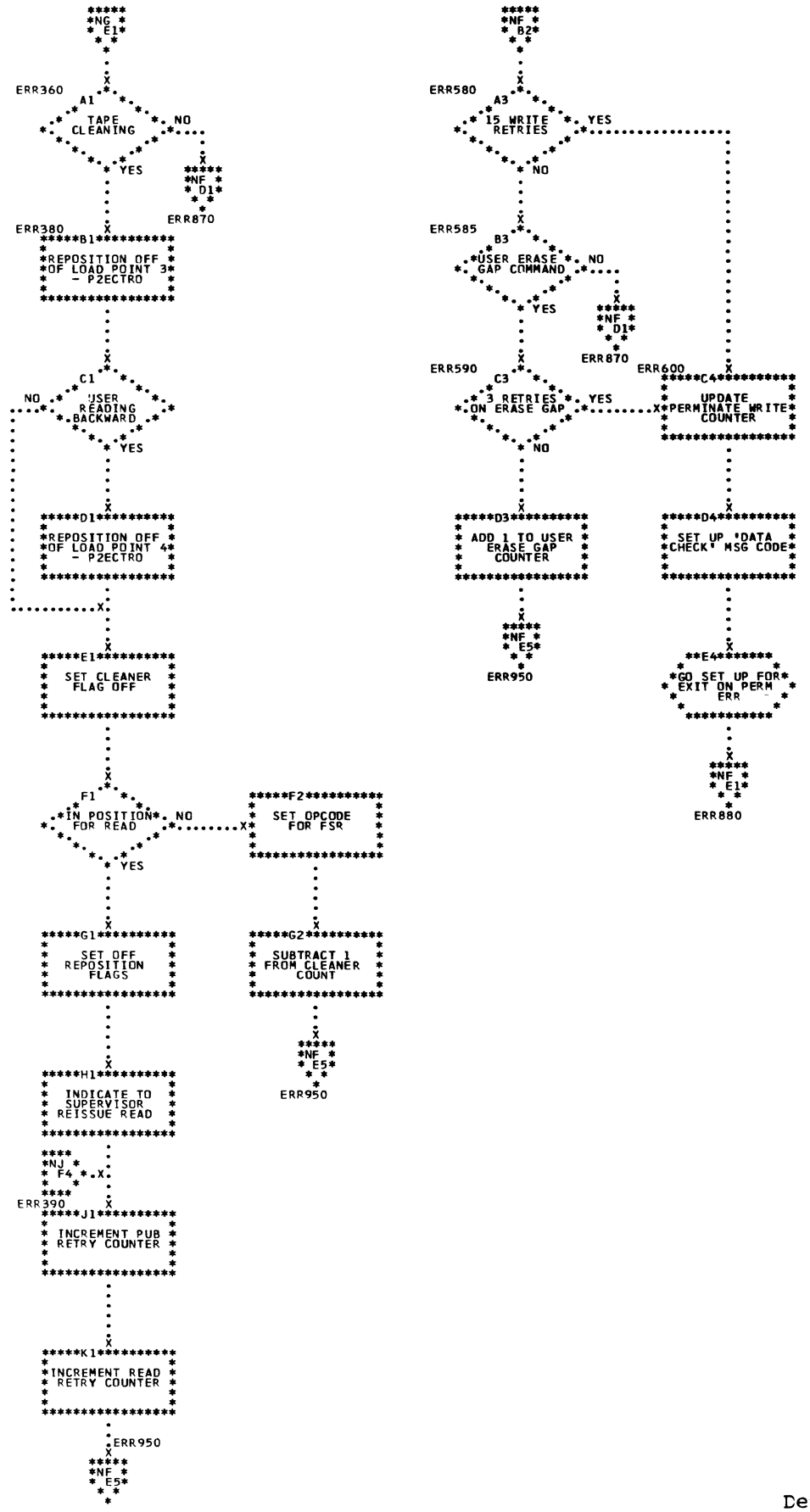


Chart NJ. $$AEERAC - Phase 2 of Tape ERP (Part 5 of 5)
Refer to Chart 02.

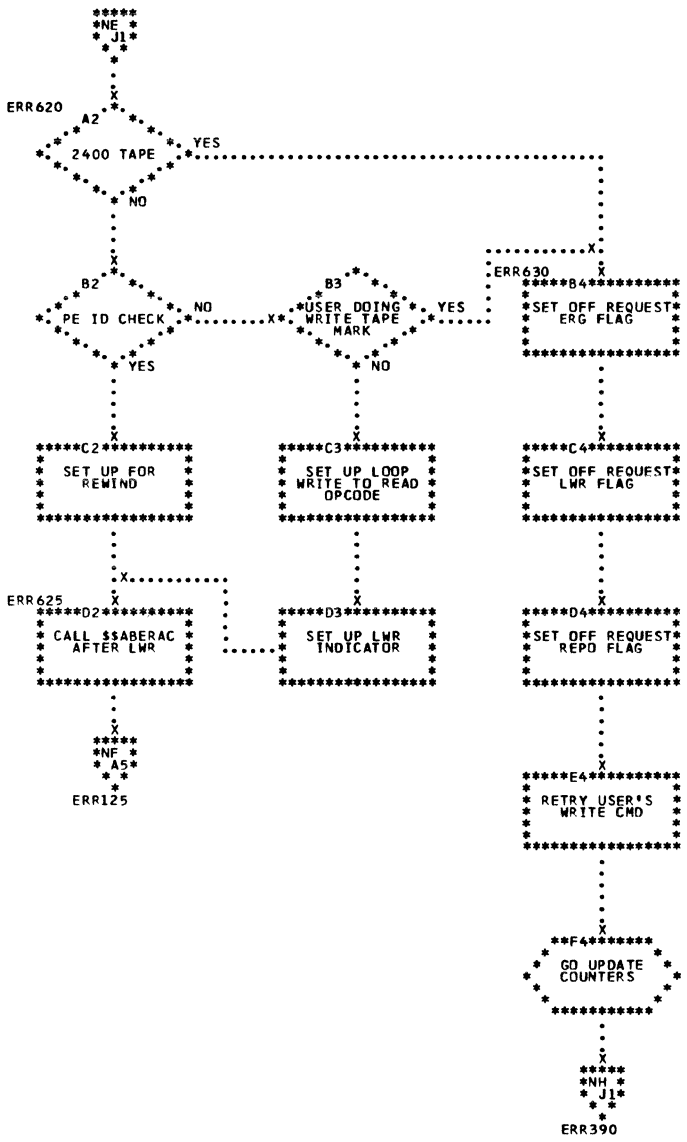


Chart NK. $$ABERAD - Phase 3 of Tape ERP (Part 1 of 3)
Refer to Chart 02.

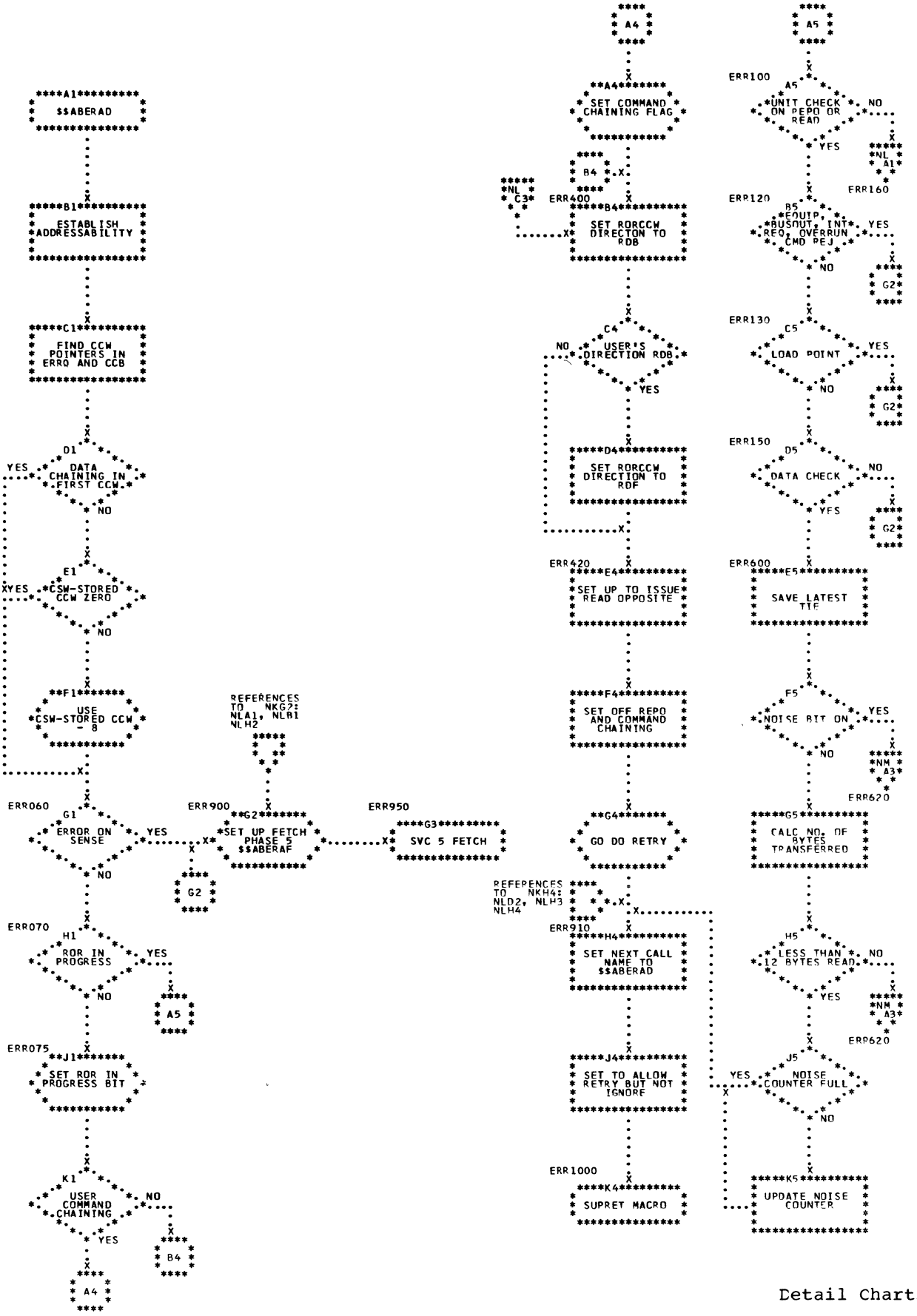


Chart NL. $$ABERAD - Phase 3 of Tape ERP (Part 2 of 3)
Refer to Chart 02.

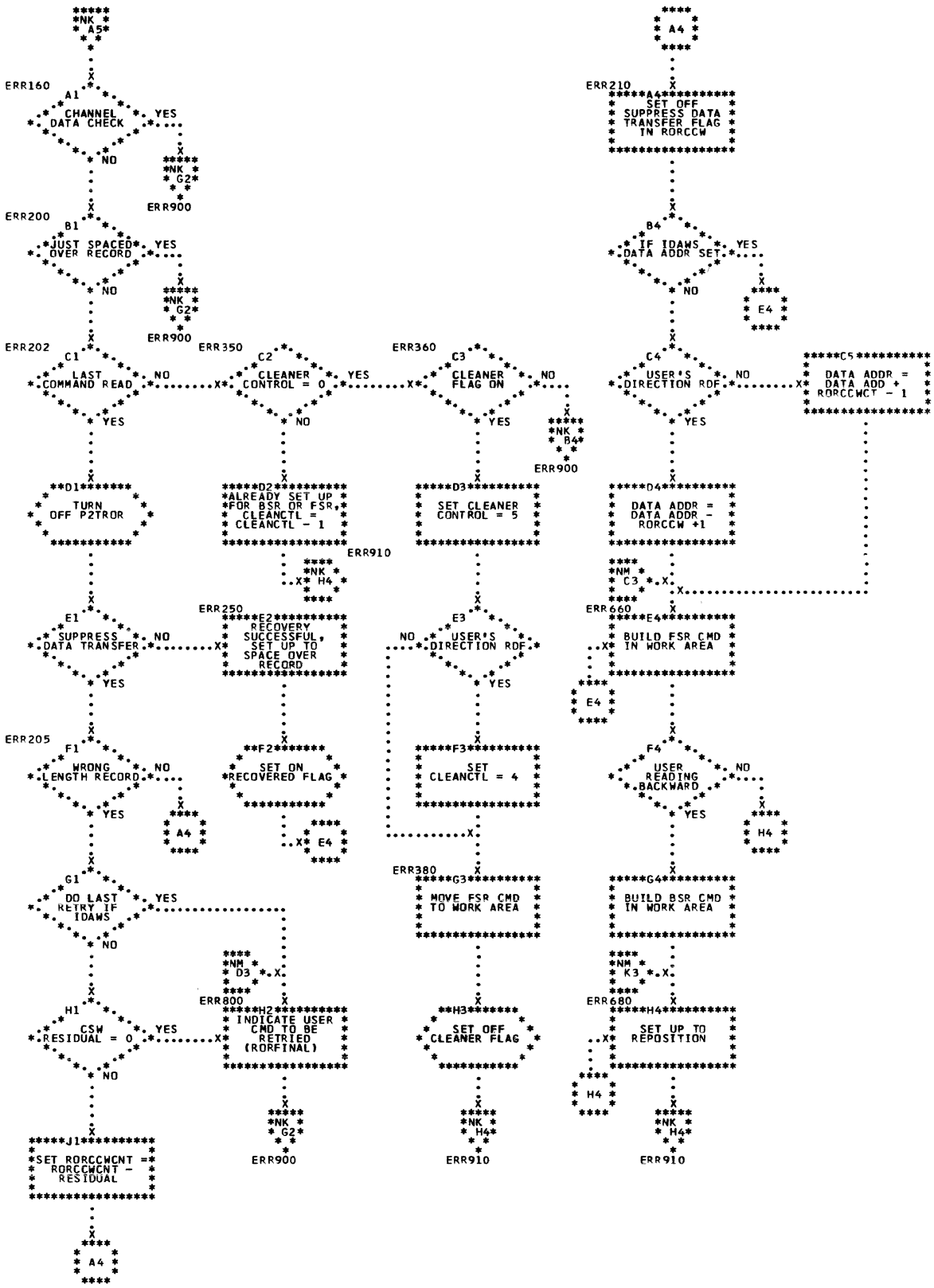


Chart NM. $$ABERAD - Phase 3 cf Tape ERP (Part 3 cf 3)
Refer to Chart 02.

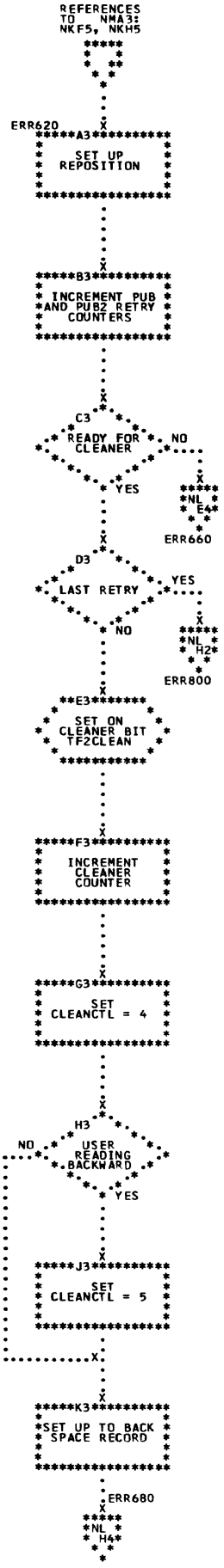


Chart NN. $$ABERAE - Phase 4 of Tape ERP (Part 1 of 4)
Refer to Chart 02.

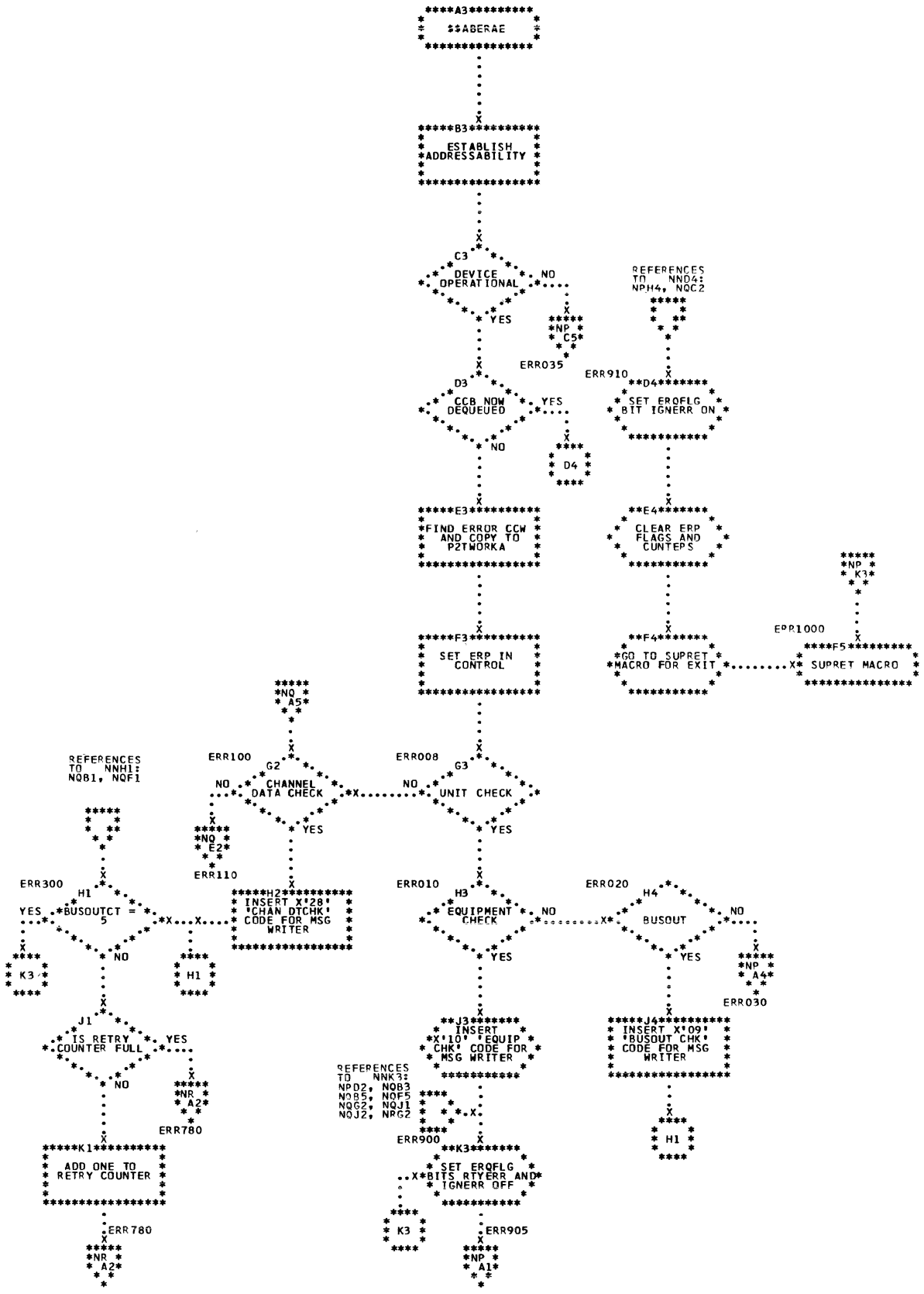


Chart NP. $$ABERAE - Phase 4 cf Tape ERP (Part 2 cf 4)
Refer to Chart 02.

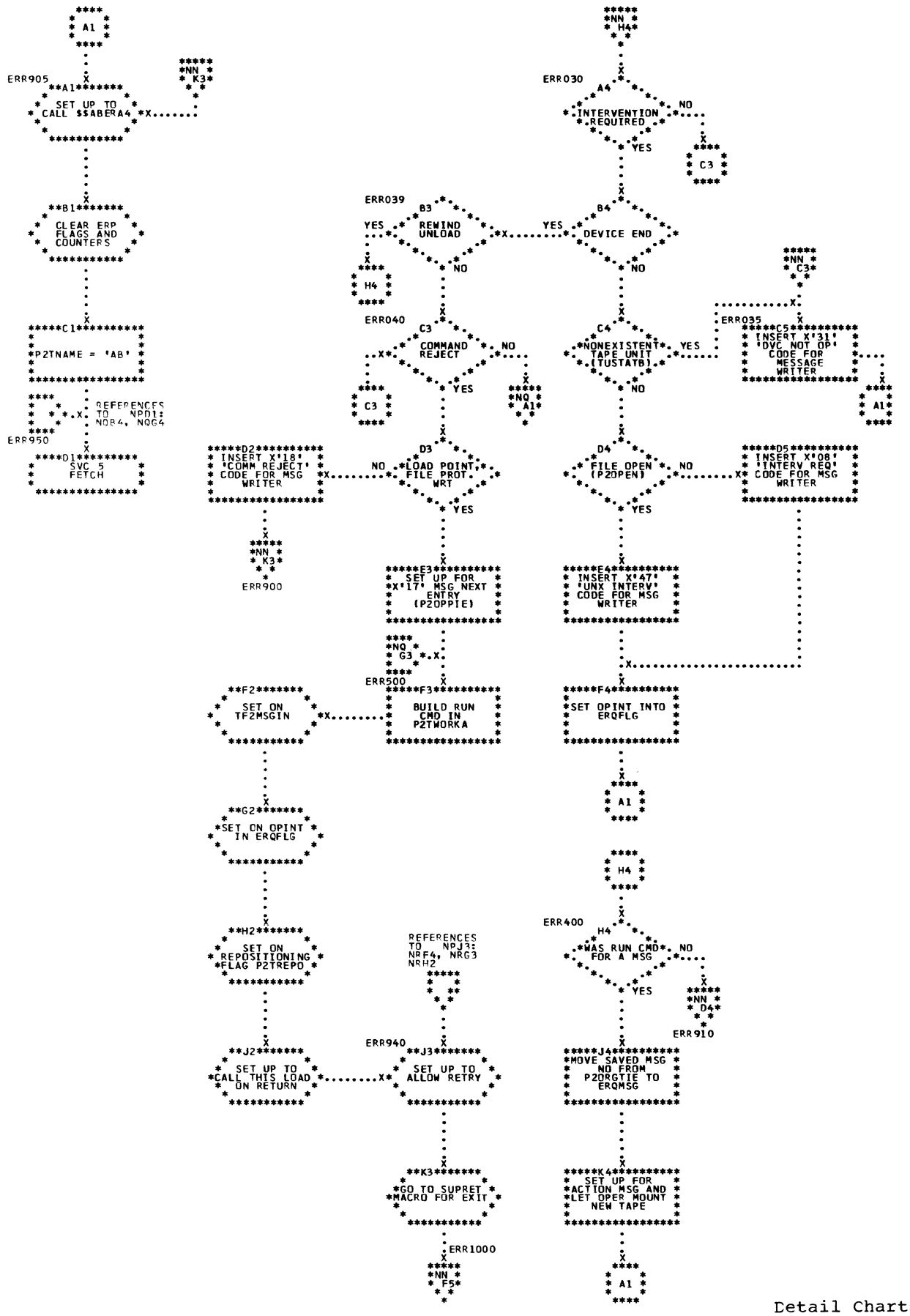


Chart NQ. $$AEERAE - Phase 4 of Tape ERP (Part 3 of 4)
Refer to Chart 02.

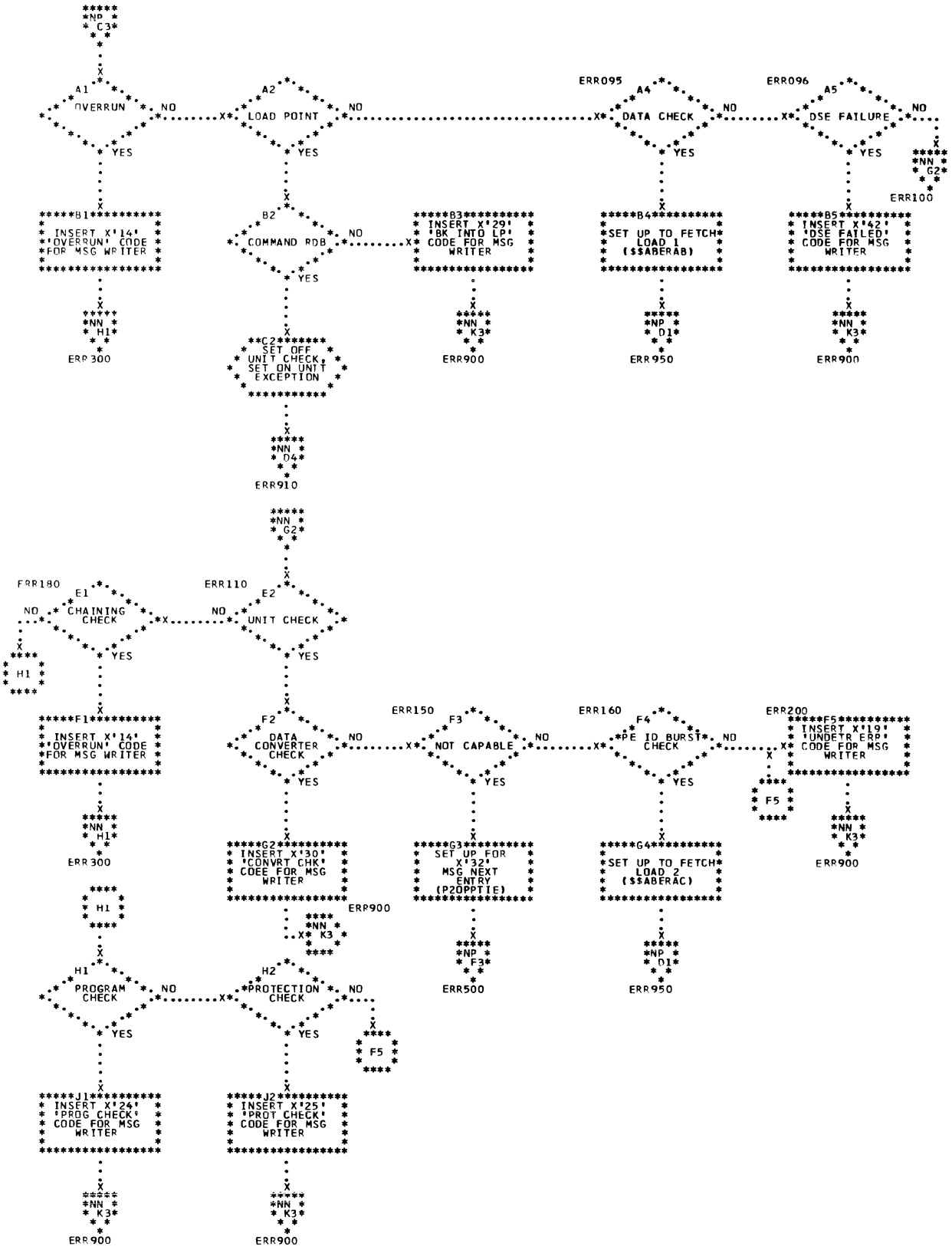


Chart NR. $$ABERAE - Phase 4 cf Tape ERP (Part 4 cf 4)
Refer to Chart 02.

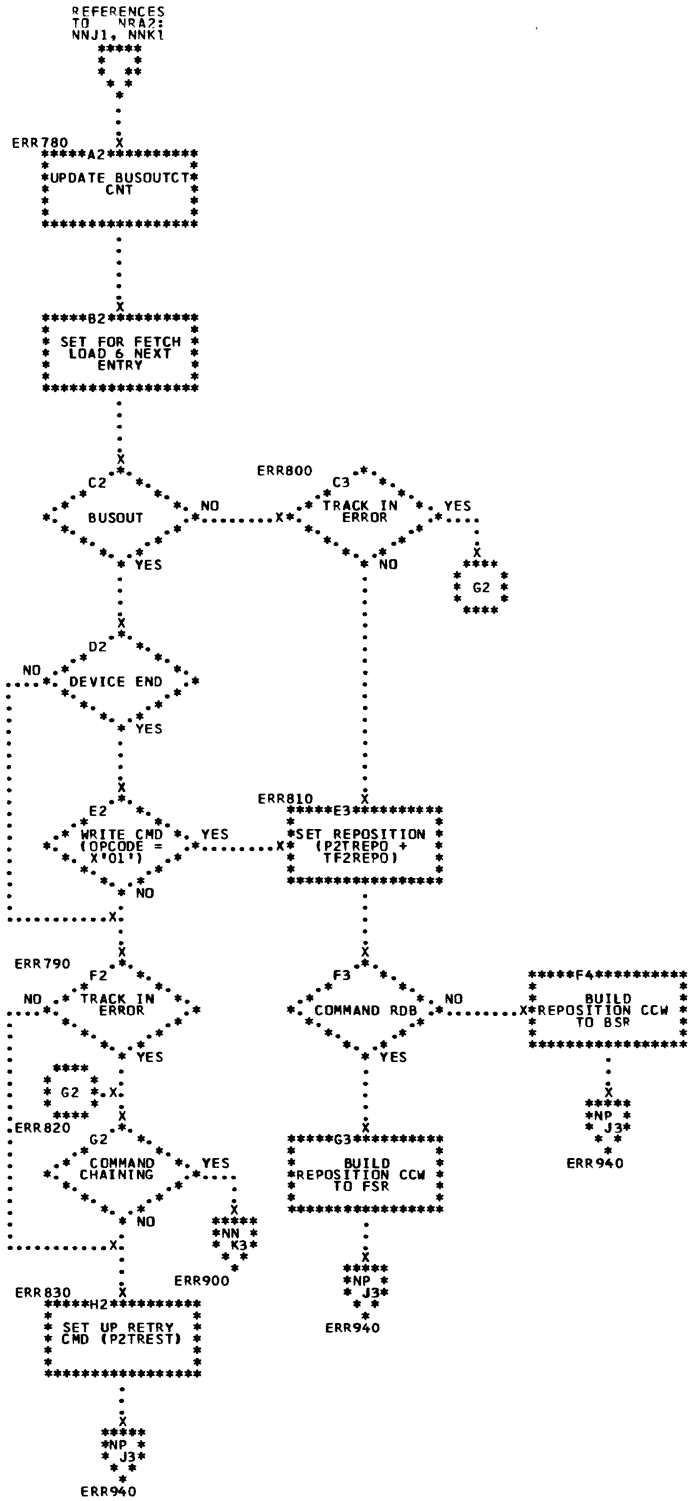


Chart NT. $$ABERAF - Phase 5 of Tape ERP (Part 1 of 4)
Refer to Chart 02.

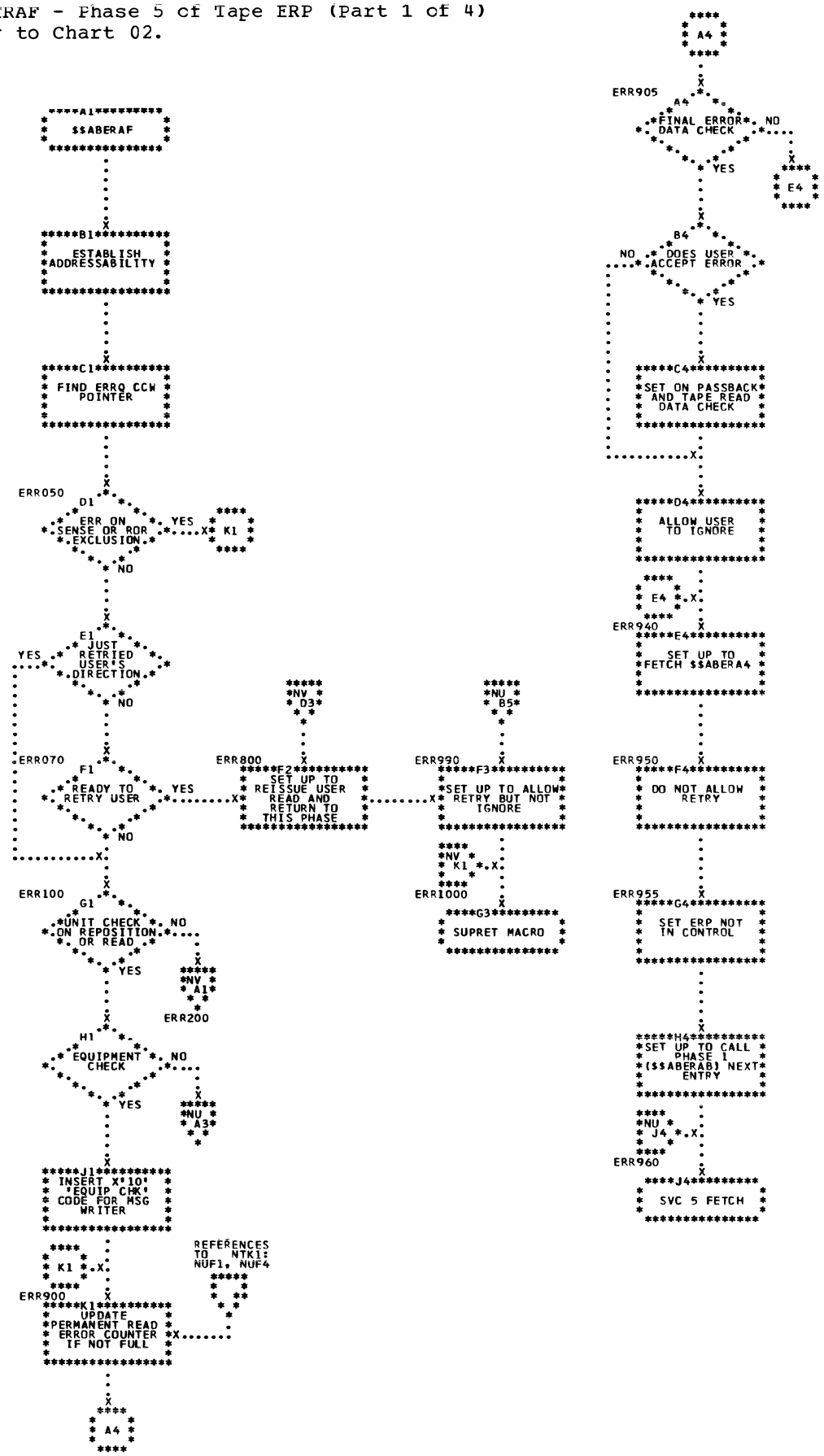


Chart NU. $$ABERAF - Phase 5 cf Tape ERP (Part 2 cf 4)
Refer to Chart 02.

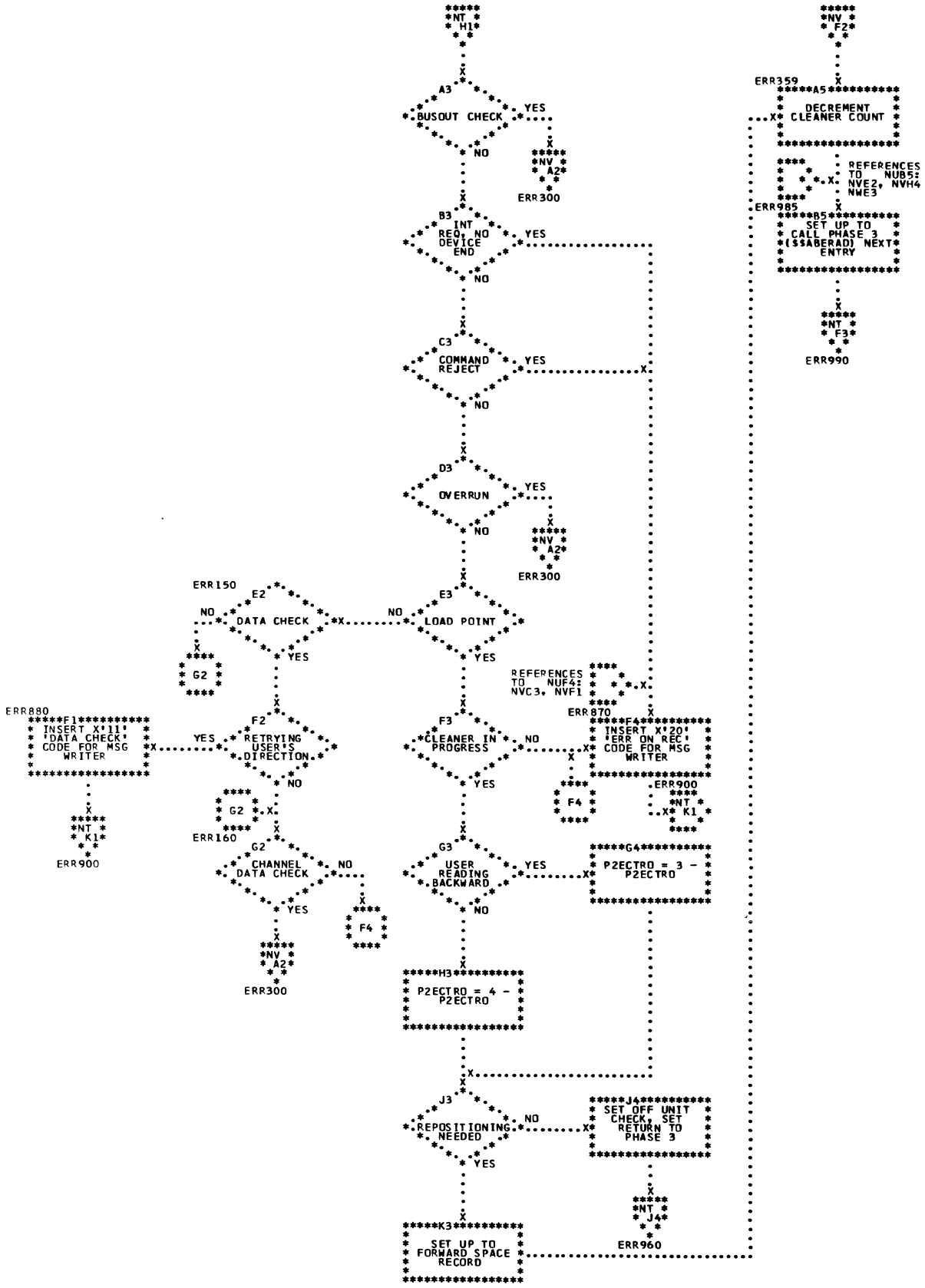


Chart NV. $$ABERAF - Phase 5 of Tape ERP (Part 3 of 4)
Refer to Chart 02.

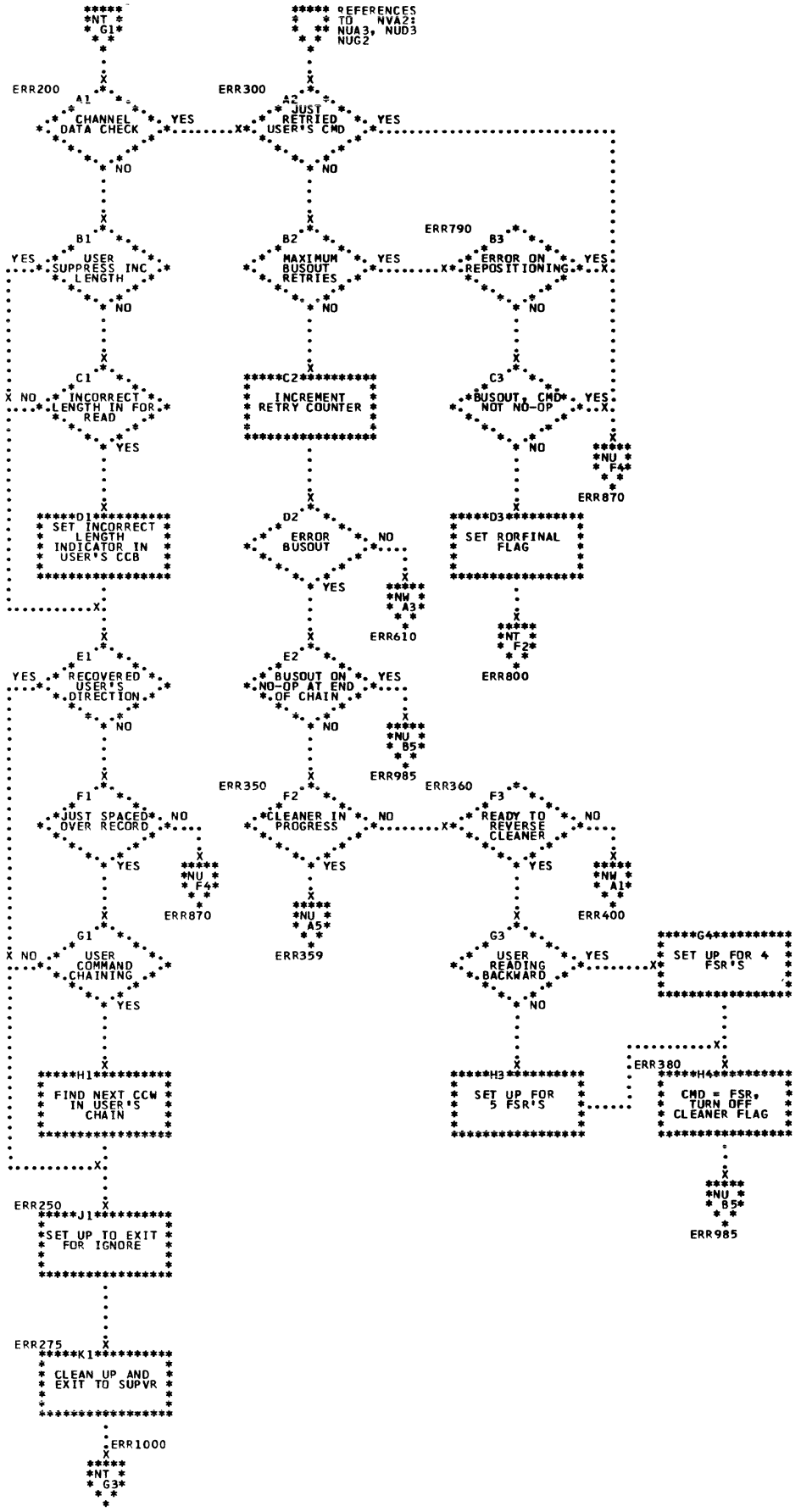


Chart NW. $$ABERAF - Phase 5 of Tape ERP (Part 4 of 4)
Refer to Chart 02.

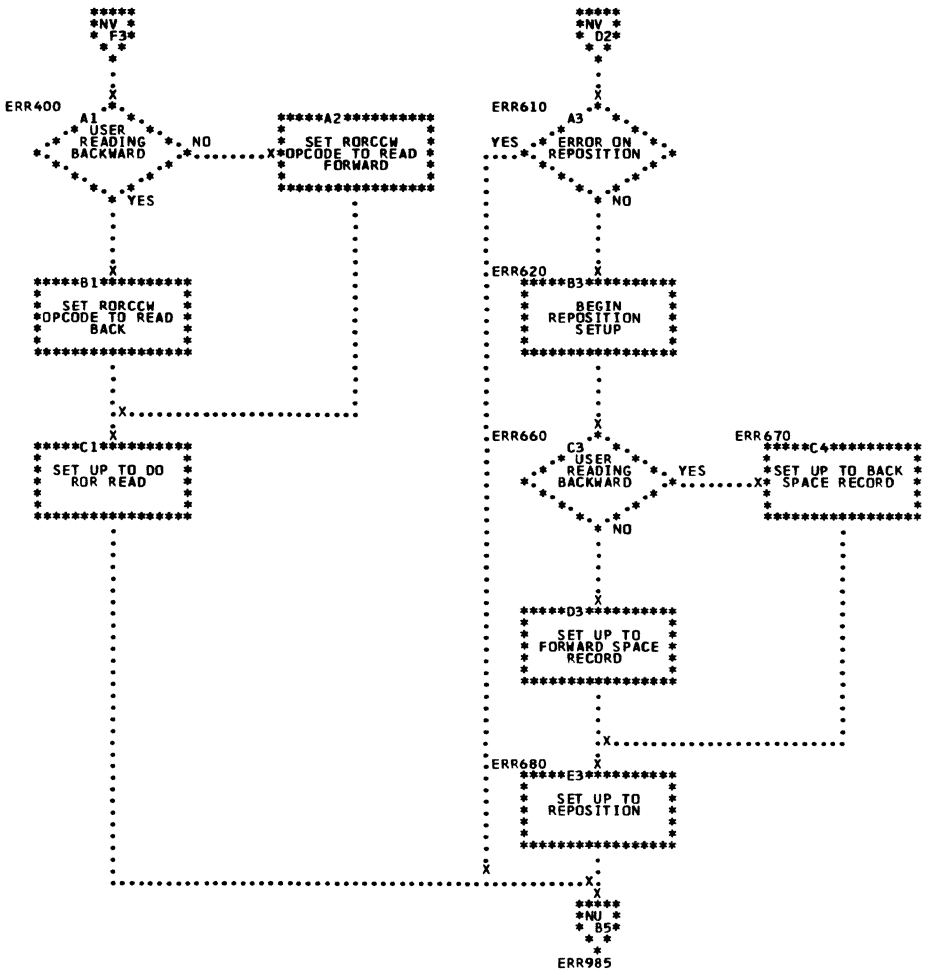


Chart NX. $$ABERAG - Phase 6 of Tape ERP (Part 1 of 3)
Refer to Chart 02.

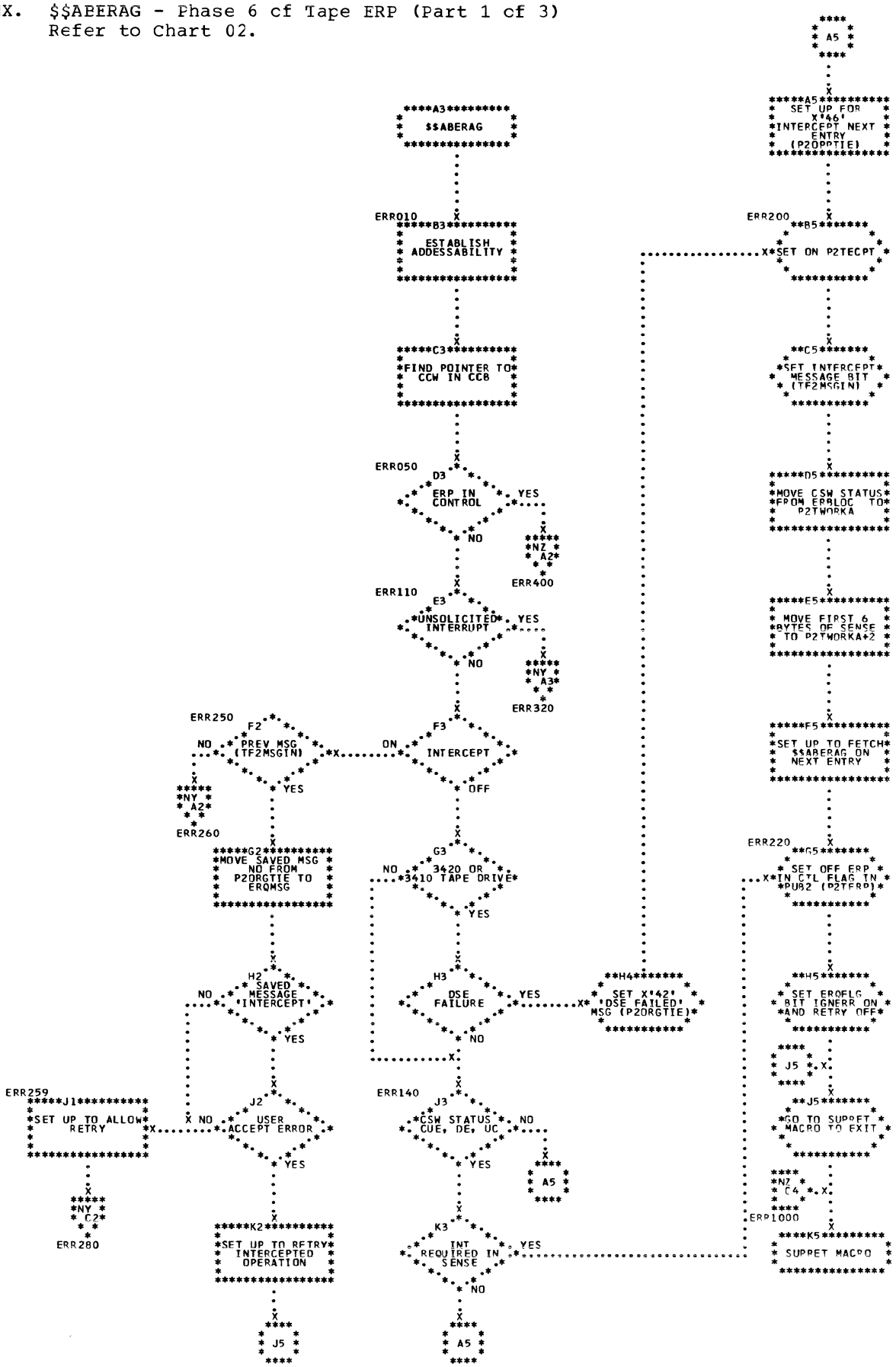


Chart NY. $$ABERAG - Phase 6 cf Tape ERP (Part 2 cf 3)
Refer to Chart 02.

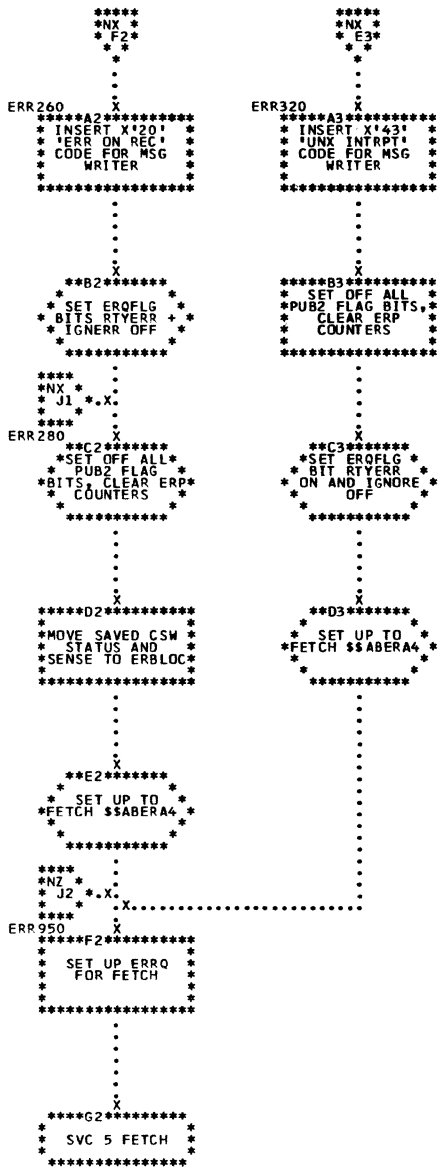


Chart NZ. $$ABERAG - Phase 6 of Tape ERP (Part 3 of 3)
Refer to Chart 02.

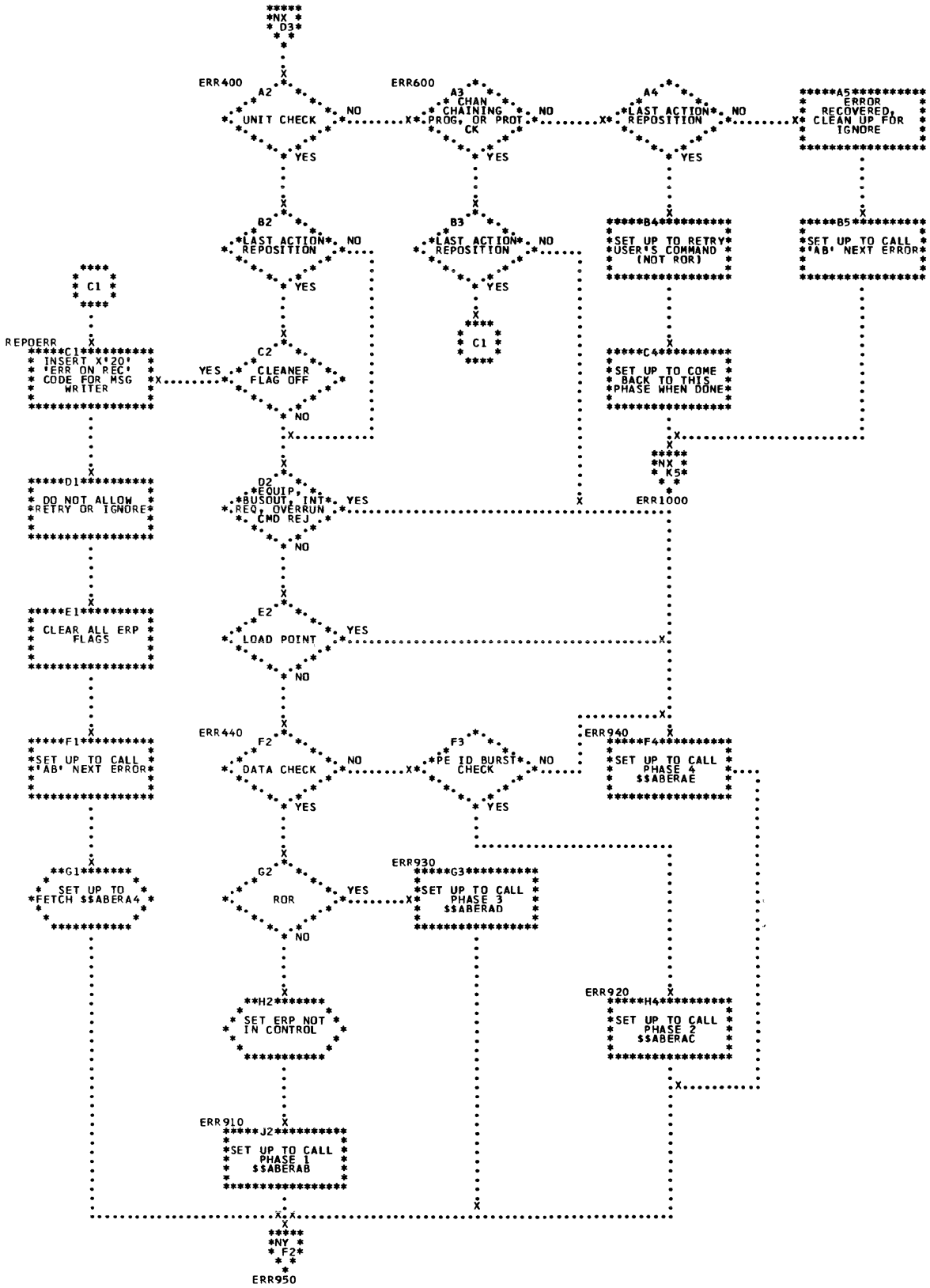


Chart PA. $$ABERAH - Phase 7 of Tape ERP (Part 1 of 3)
Refer to Chart 02.

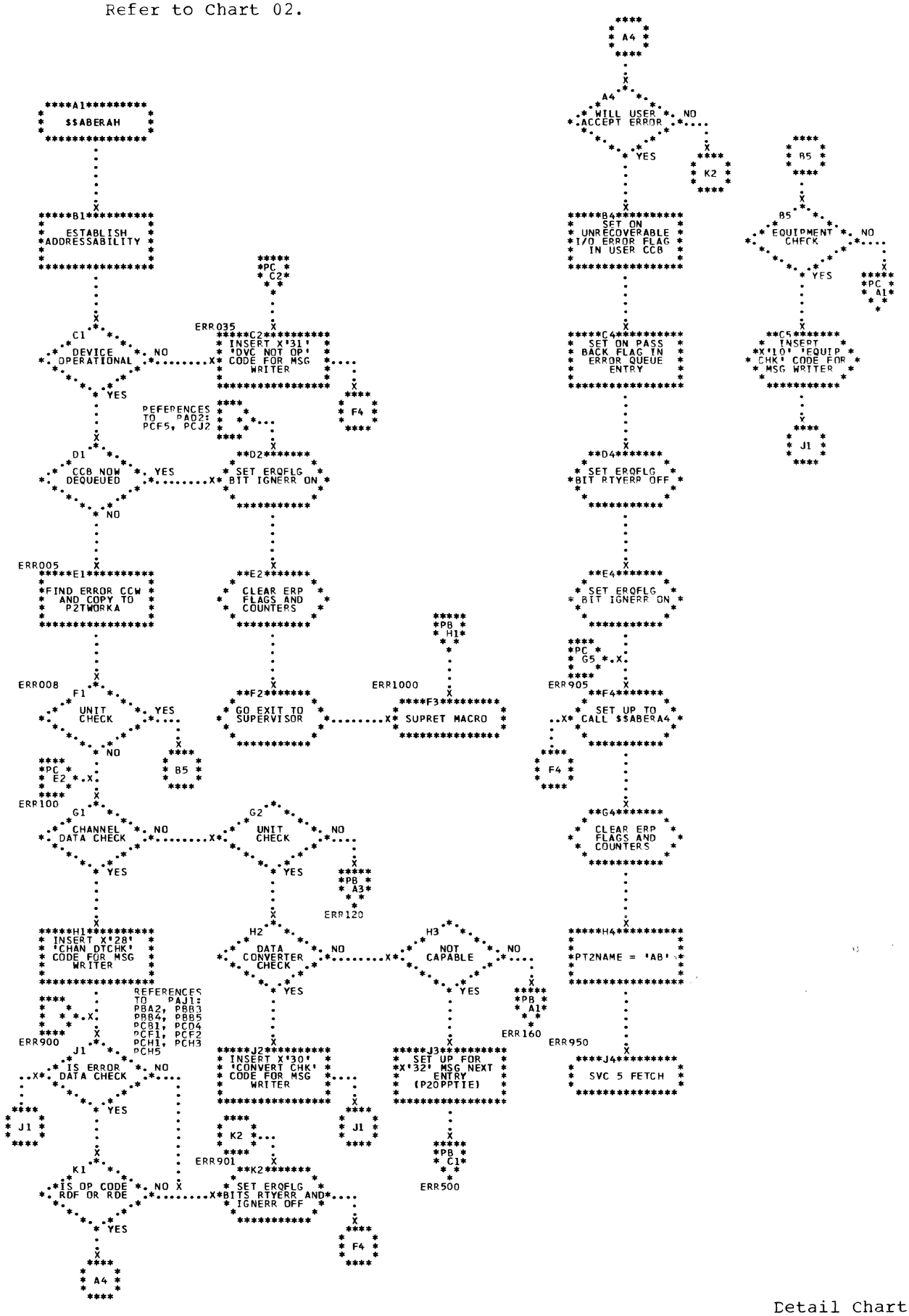


Chart PB. $$AEERAH - Phase 7 of Tape ERP (Part 2 of 3)
Refer to Chart 02.

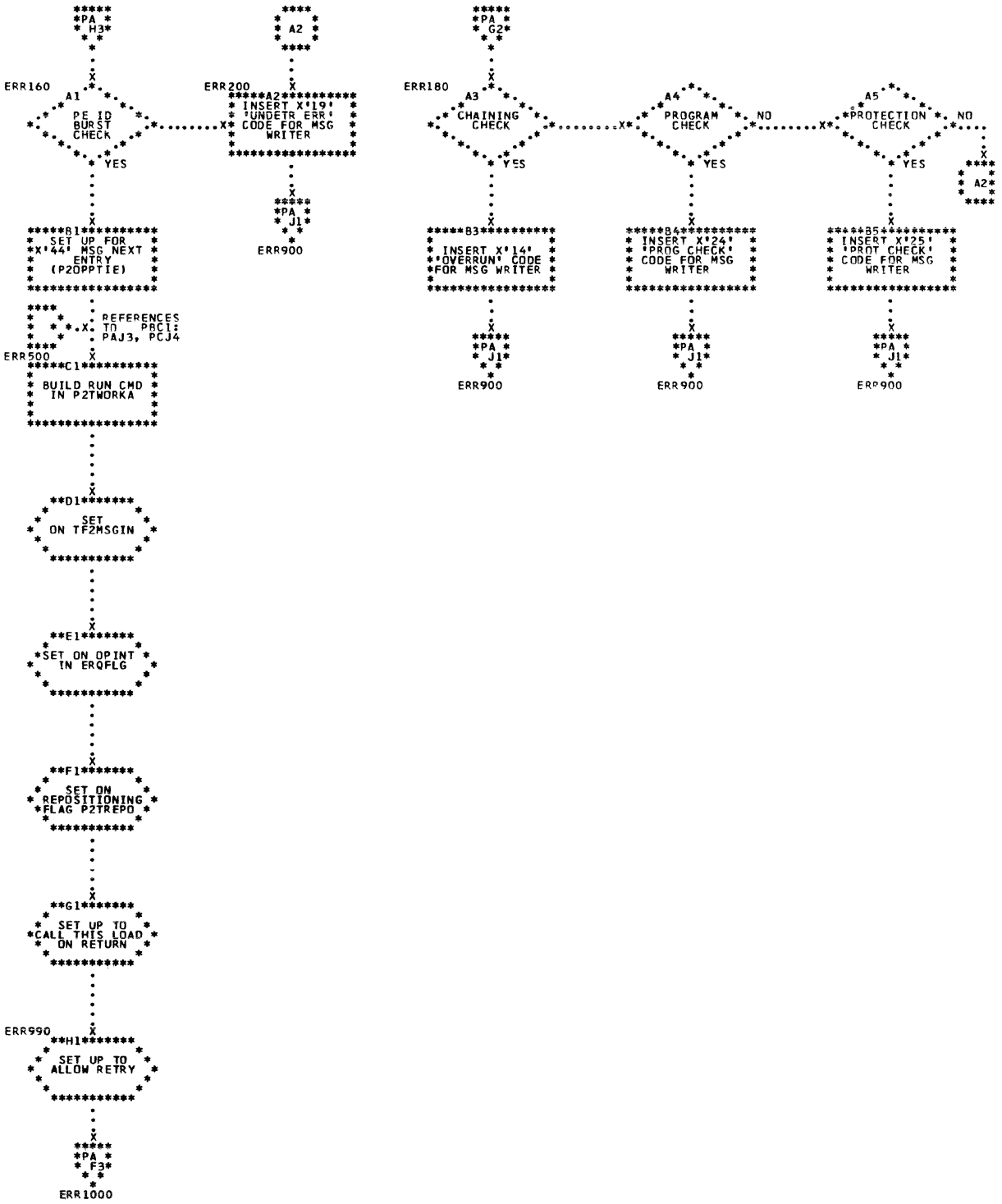


Chart PC. $$ABERAH - Phase 7 of Tape ERP (Part 3 of 3)
Refer to Chart 02.

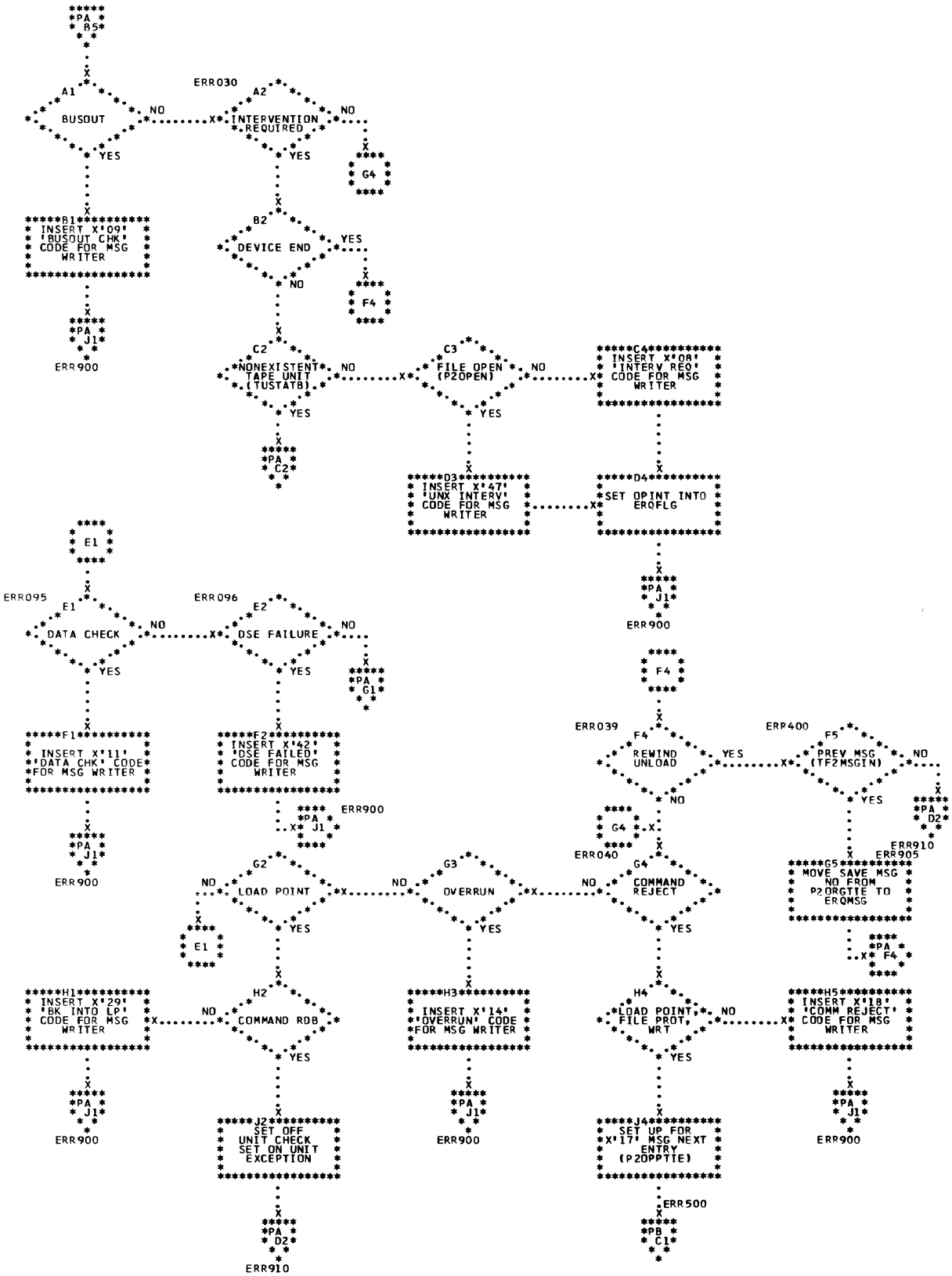


Chart PE. $$ABERAI - Phase 8 of Tape ERP (Part 1 of 2)
Refer to Chart 02.

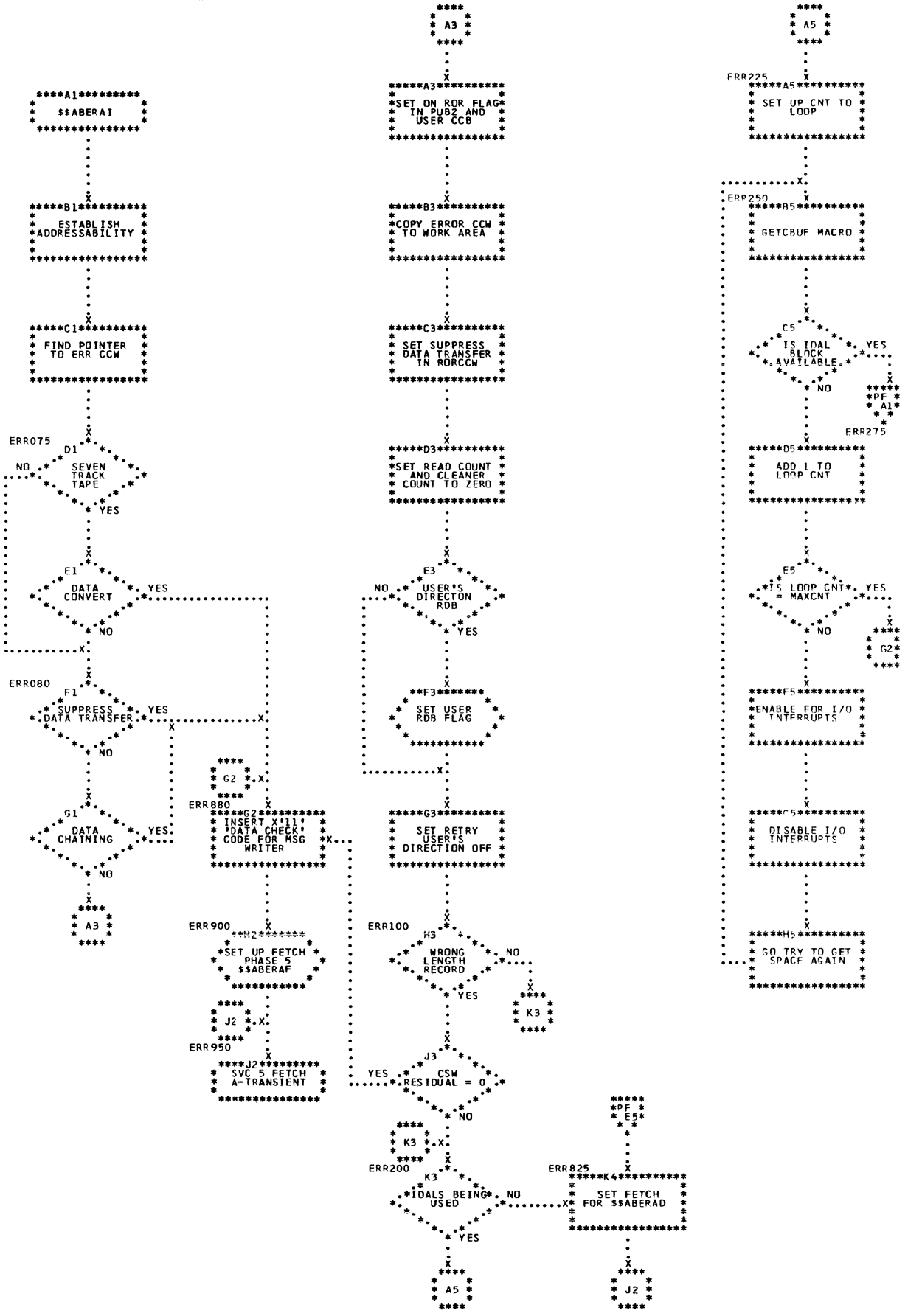


Chart PF. $$ABERAI - Phase 8 of Tape ERP (Part 2 of 2)
Refer to Chart 02.

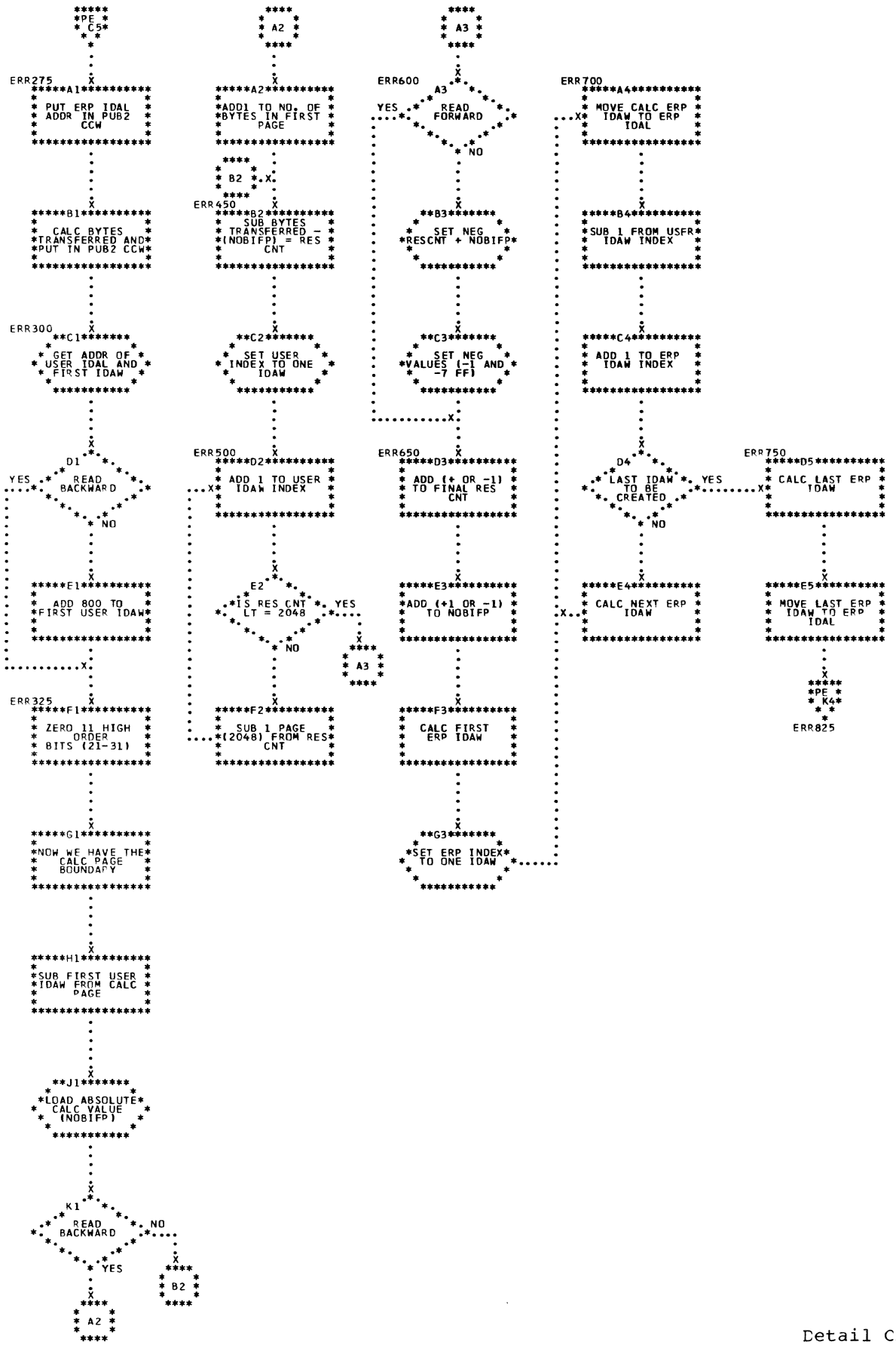


Chart PJ. $$AEERR1 - Data Cell ERP (Part 1 of 4)
Refer to Chart 02.

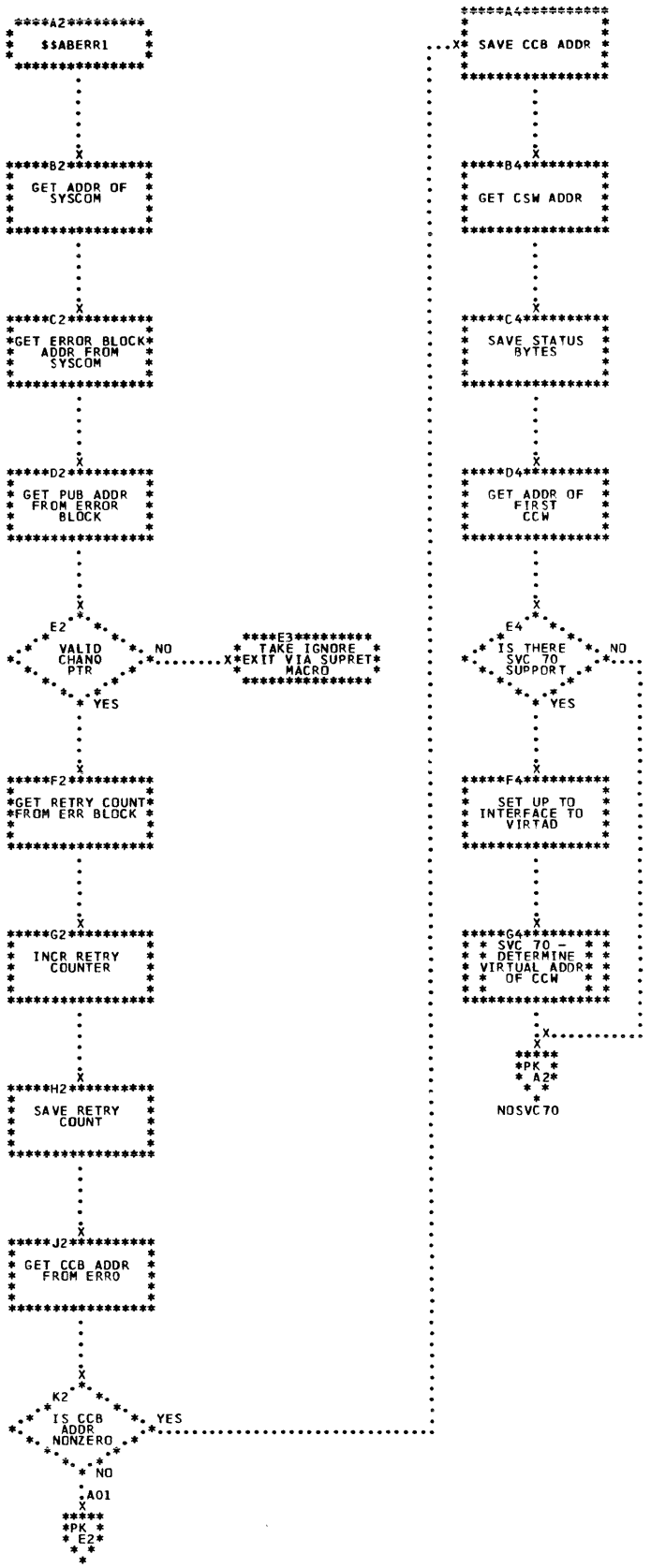


Chart PK. $$ABERR1 - Data Cell ERP (Part 2 cf 4)
Refer to Chart 02.

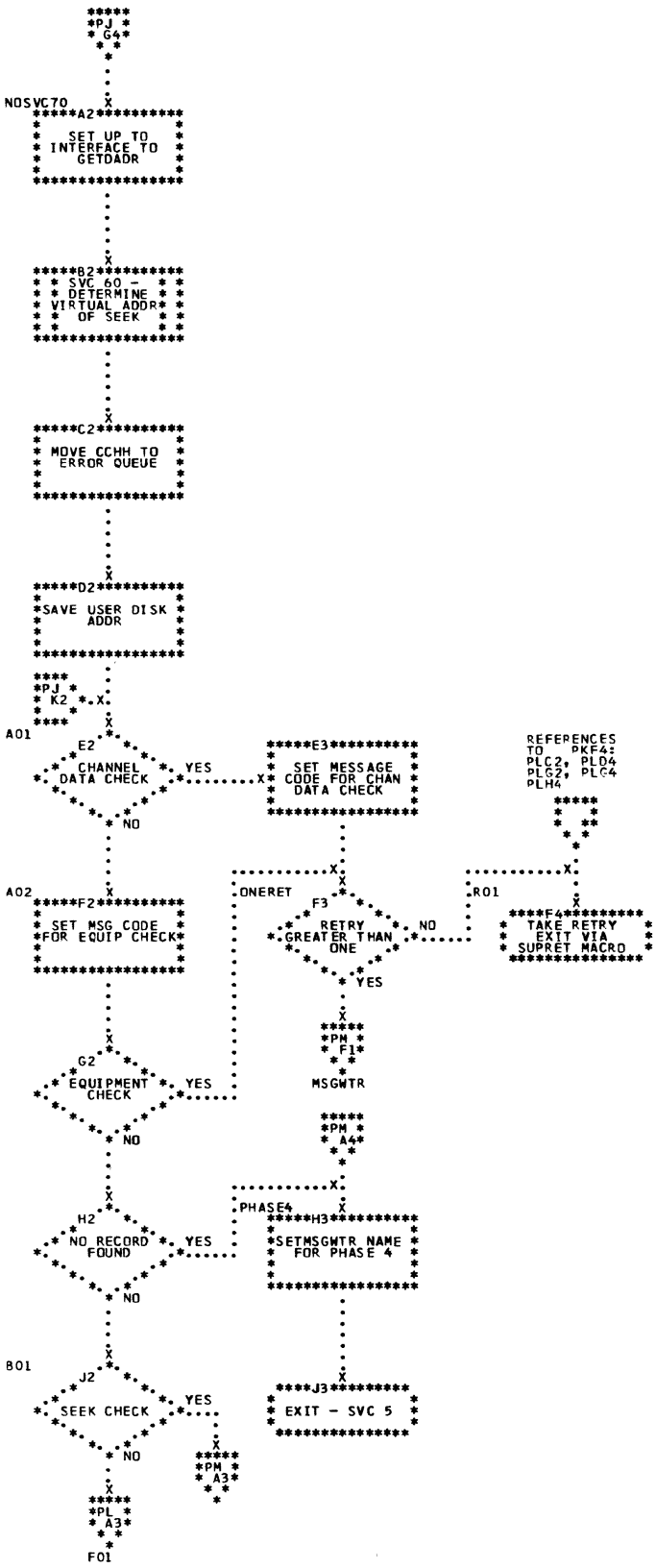


Chart PL. $$AEERR1 - Data Cell ERP (Part 3 of 4)
Refer to Chart 02.

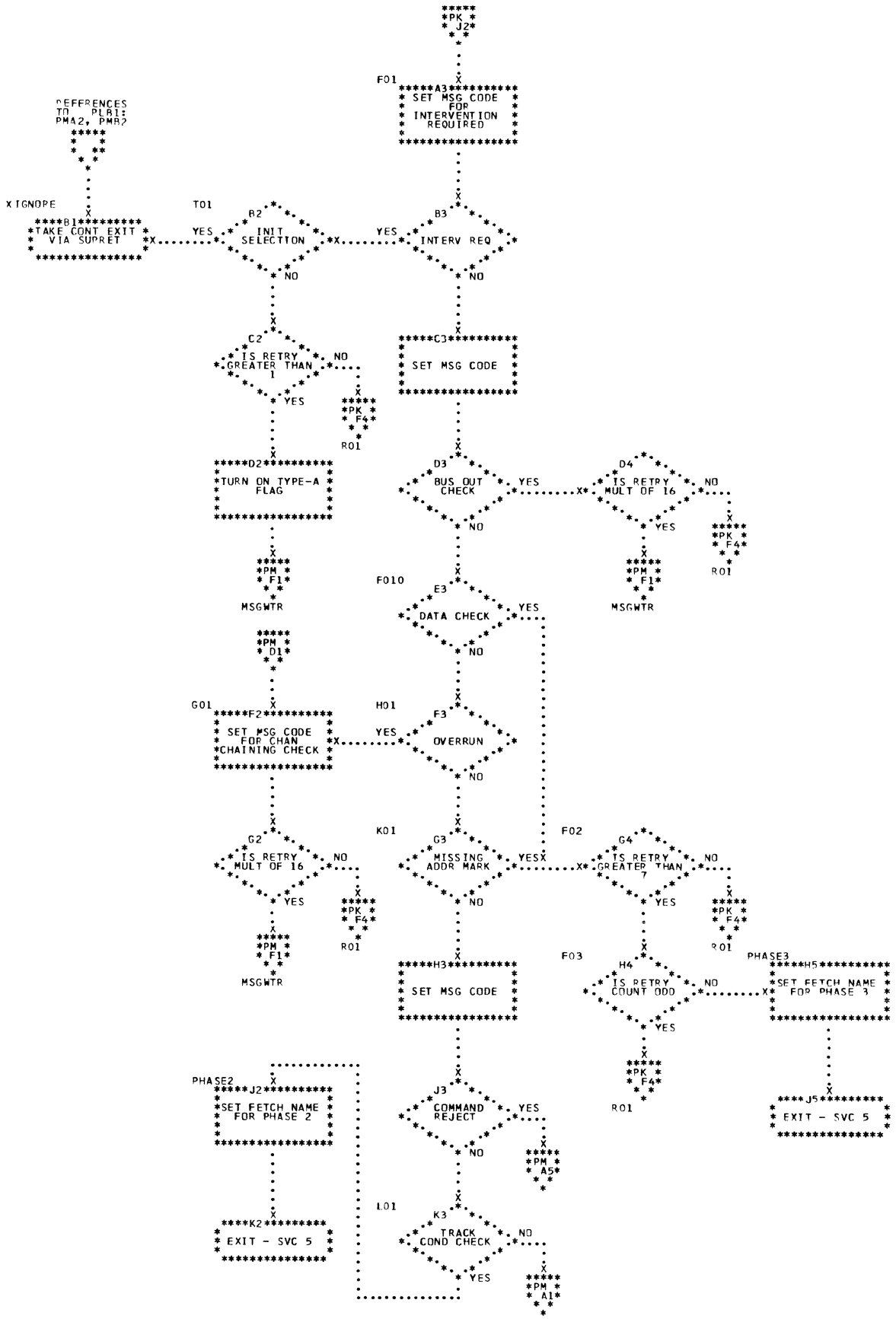


Chart PM. $$ABERR1 - Data Cell ERP (Part 4 cf 4)
Refer to Chart 02.

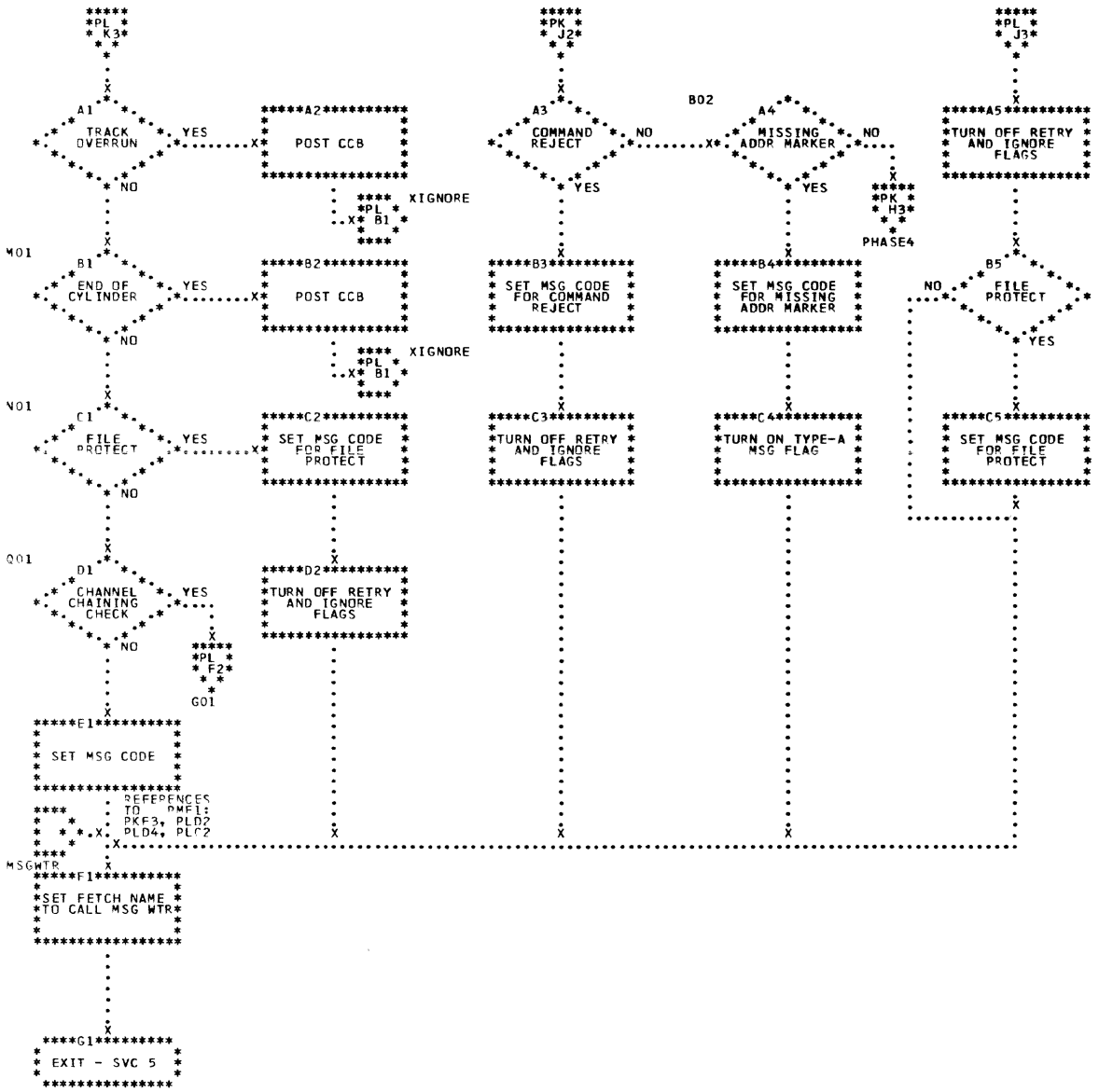


Chart PN. $$ABERR2 - Data Cell ERP (Part 1 of 2)
Refer to Chart 02.

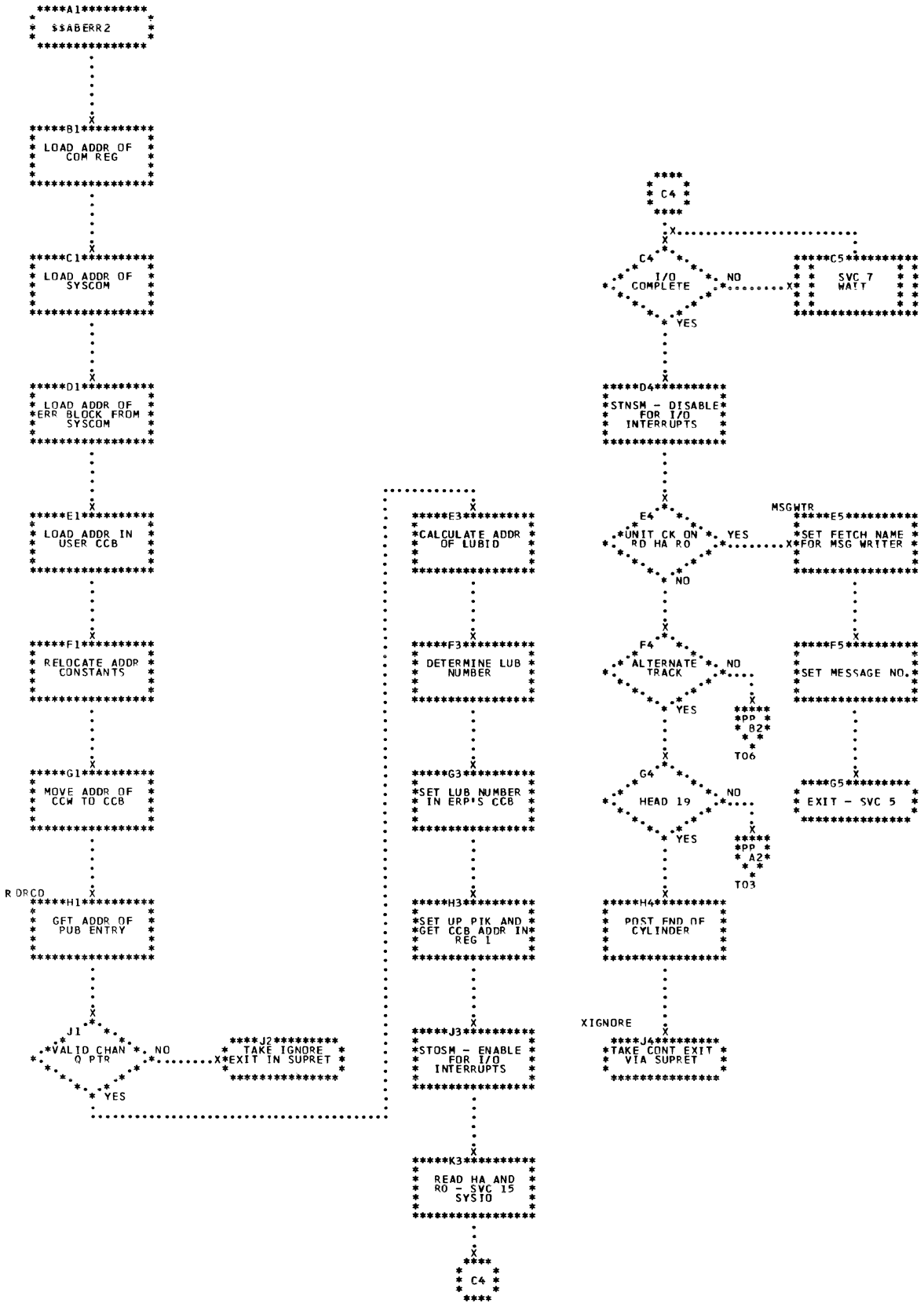


Chart PP. $$ABERR2 - Data Cell ERP (Part 2 of 2)
Refer to Chart 02.

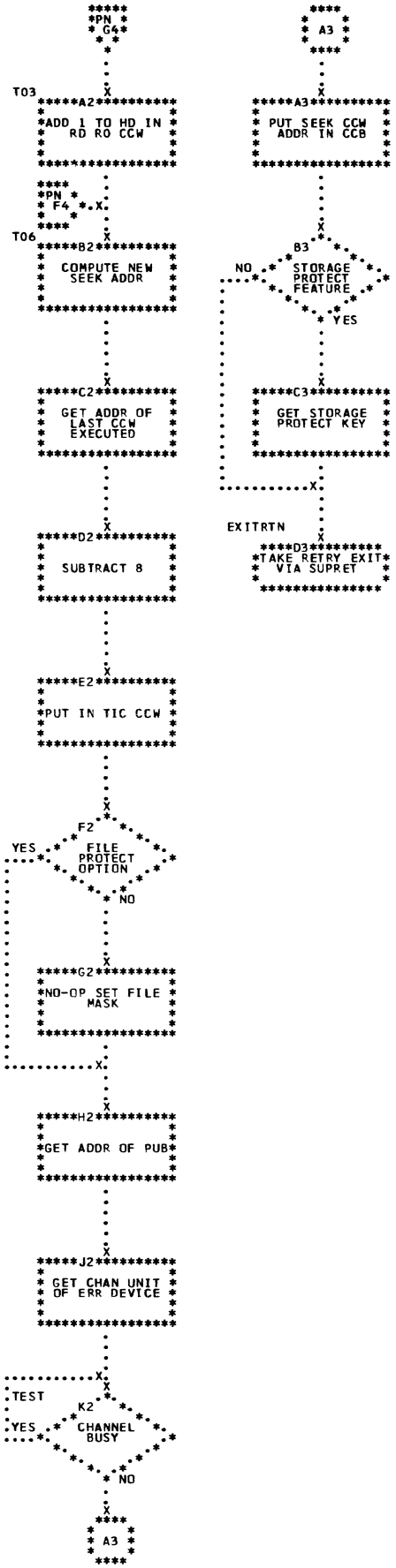


Chart PQ. $$ABERR3 - Data Cell ERP (Part 2 of 2)
Refer to Chart 02.

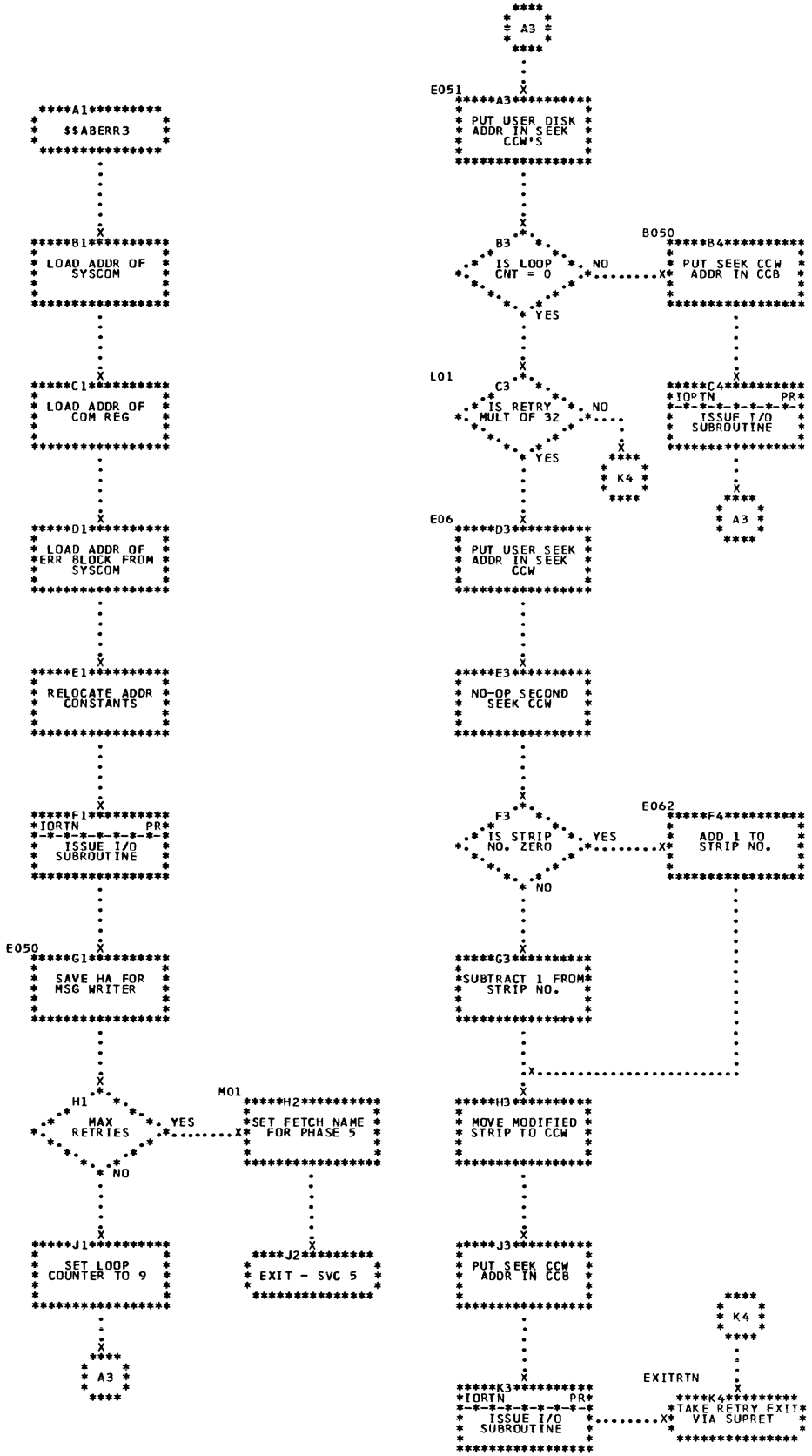


Chart PR. $$ABERR3 - Data Cell ERP (Part 2 of 2)
Refer to Chart 02.

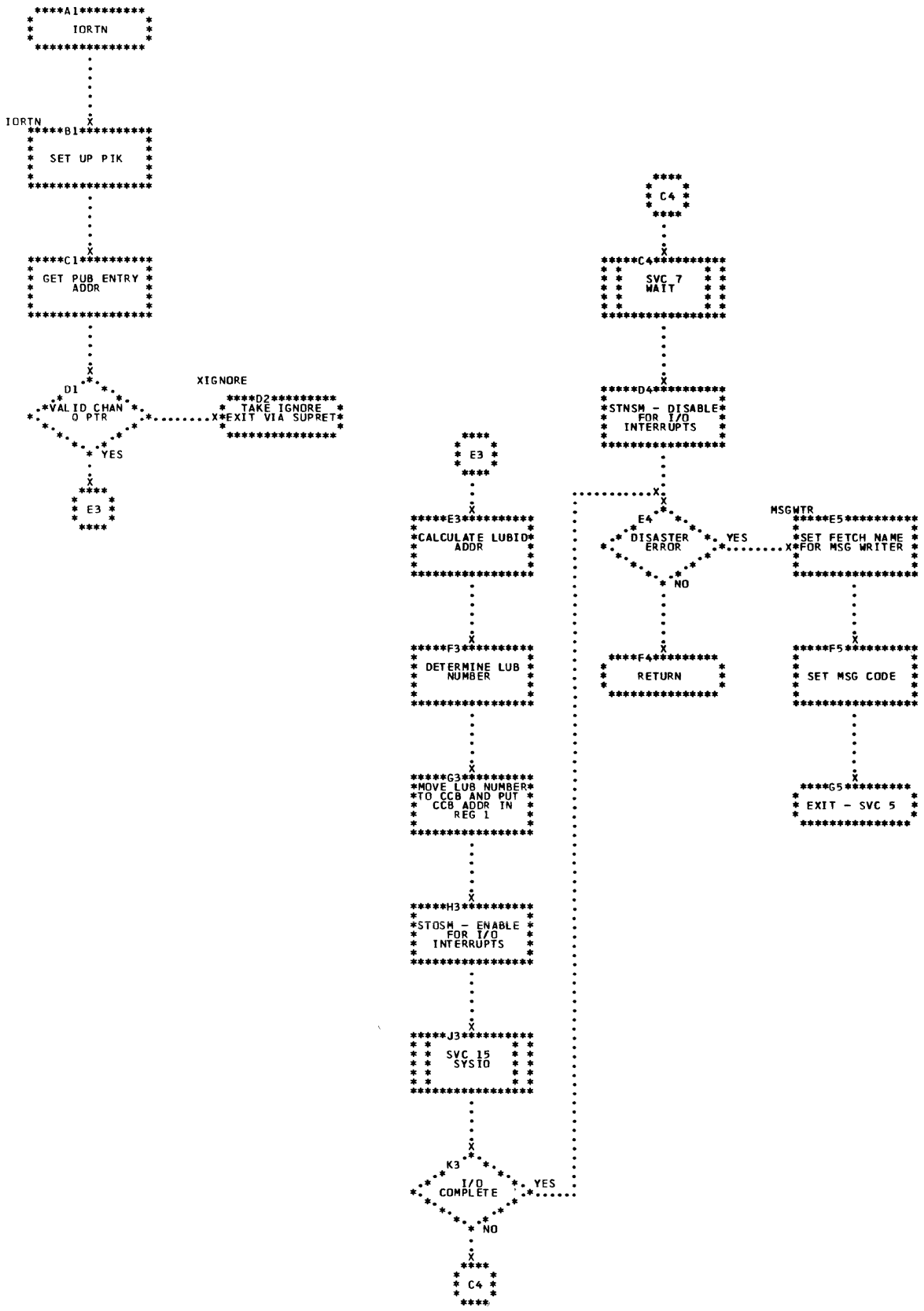


Chart PS. $$ABERR4 - Data Cell ERP (Part 1 of 3)
Refer to Chart 02.

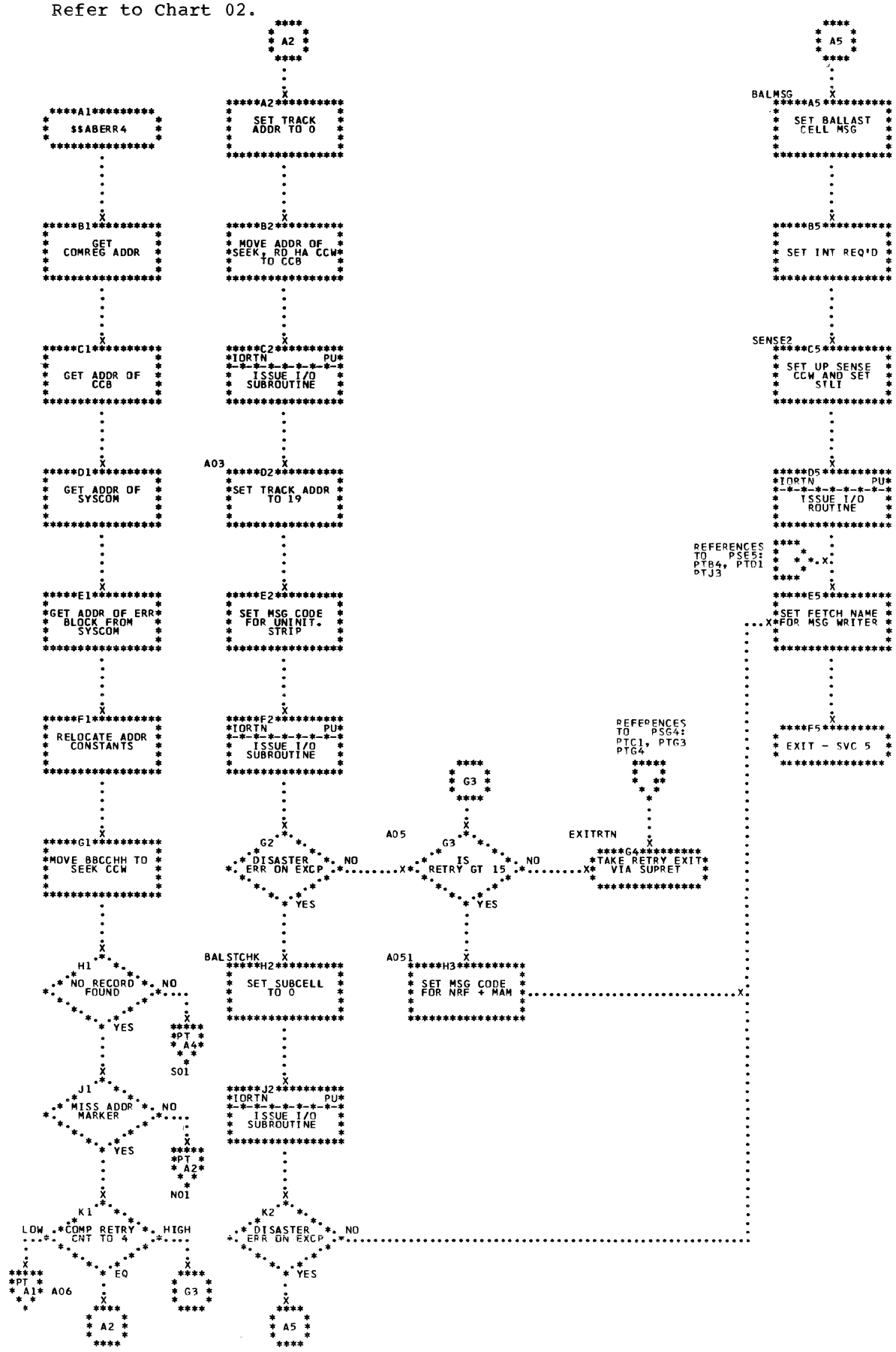


Chart PT. $$ABERR4 - Data Cell ERP (Part 2 of 3)
Refer to Chart 02.

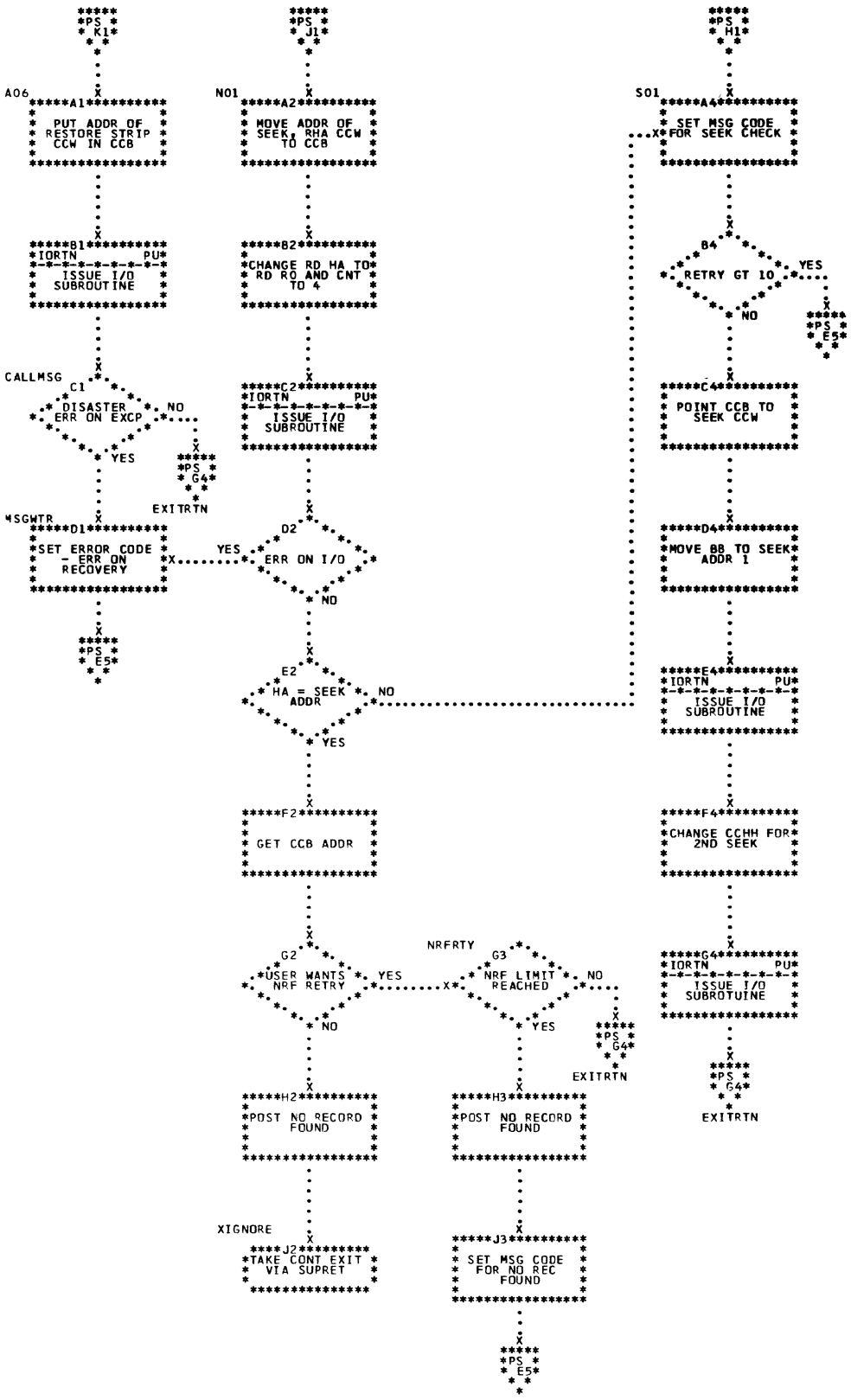


Chart PU. $$ABERR4 - Data Cell ERP (Part 3 of 3)
Refer to Chart 02.

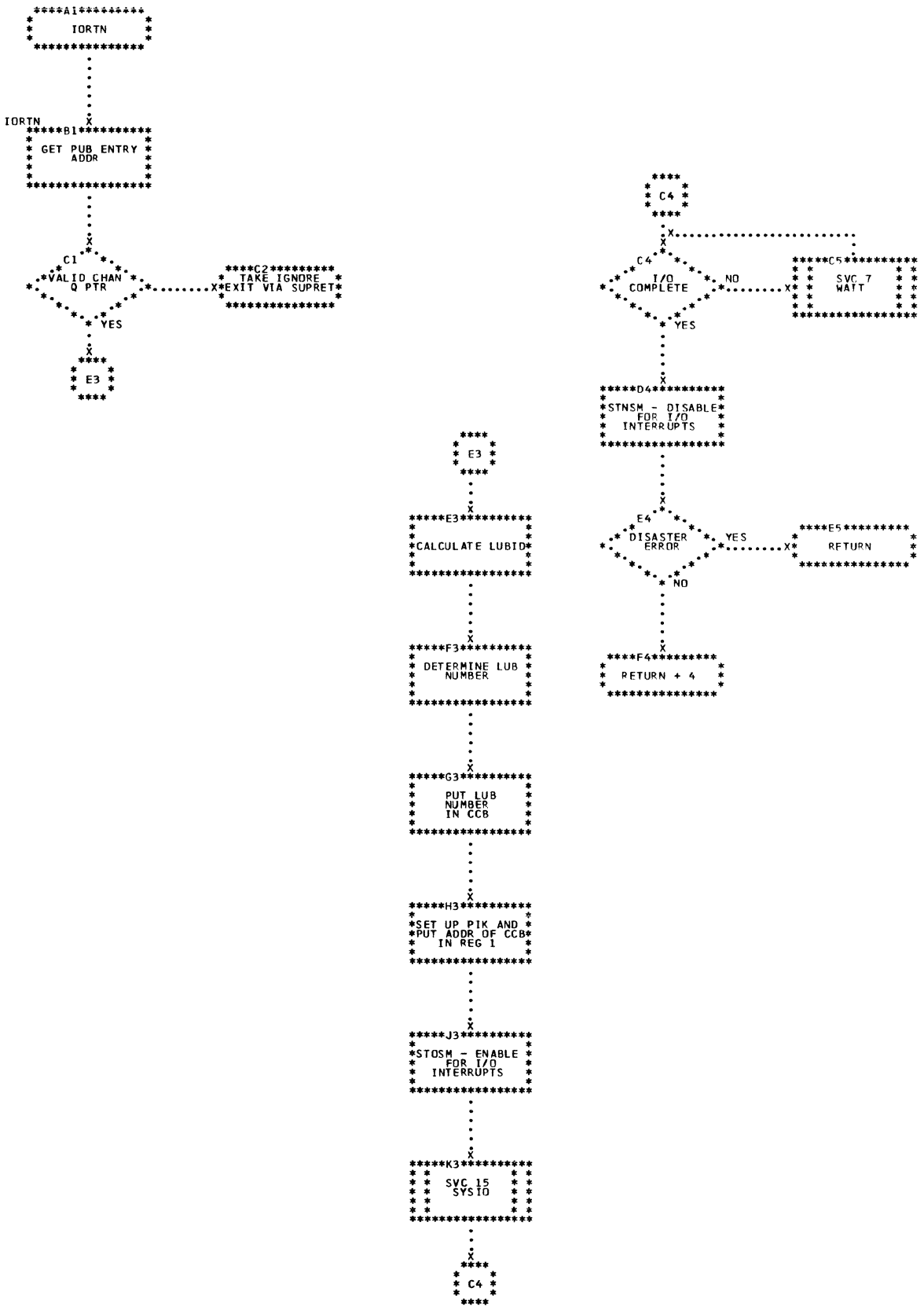


Chart PV. $$AEERR5 - Data Cell ERP

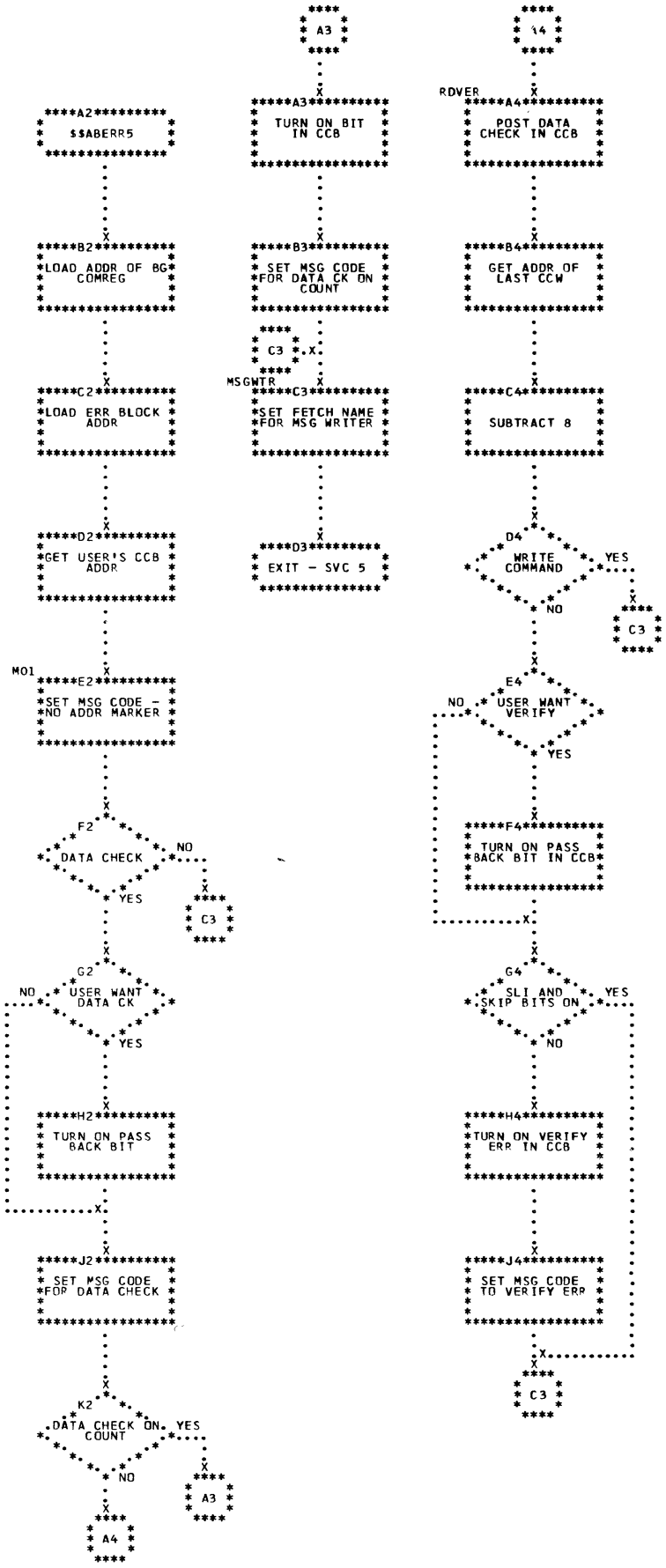


Chart PX. $$ABERR7 - Diskette I/C Unit ERP (Part 1 cf 3)
Refer to Chart 02.

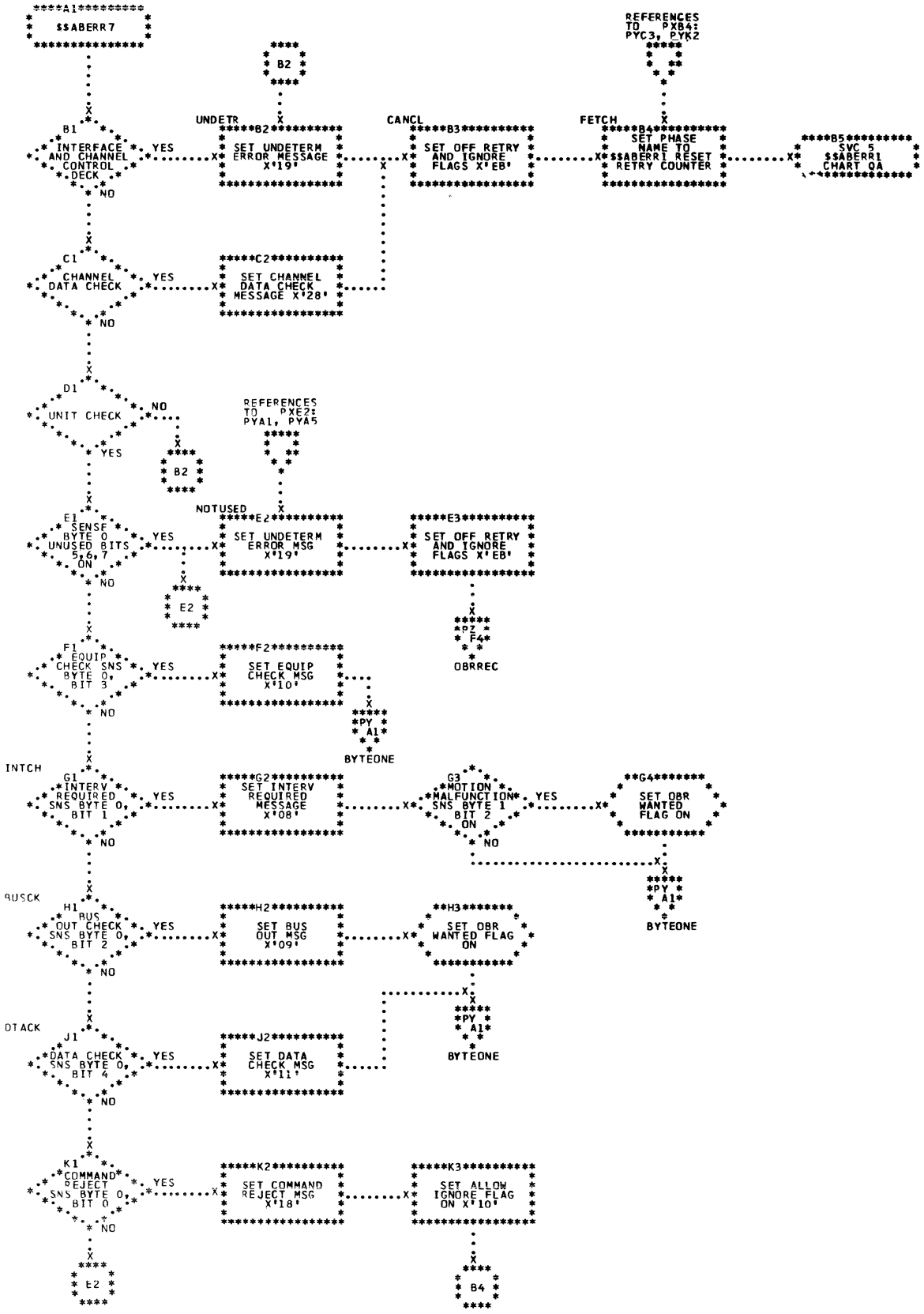


Chart PY. $$ABERR7 - Diskette I/C Unit ERP (Part 2 of 3)
Refer to Chart 02.

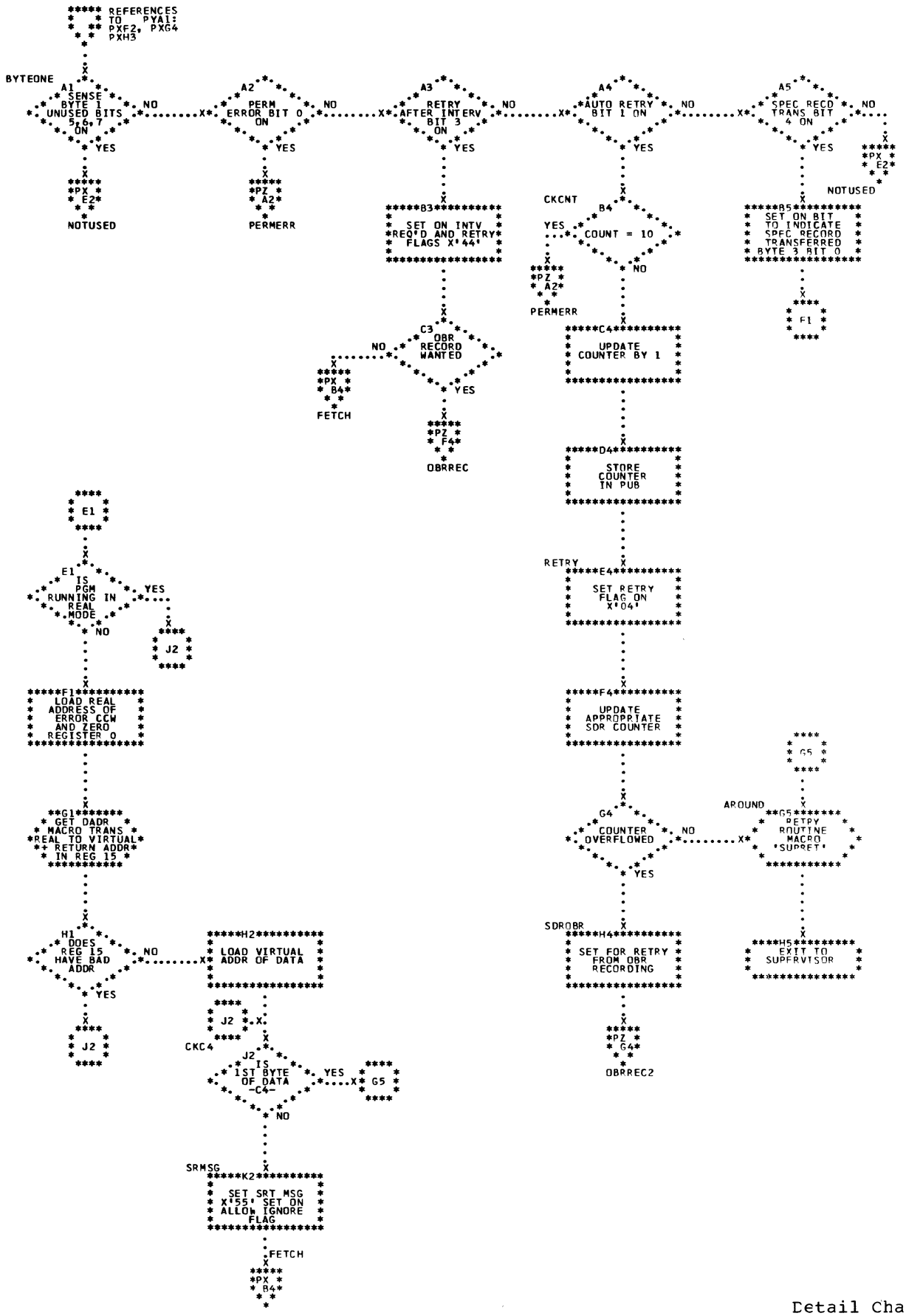


Chart PZ. $$ABERR7 - Diskette I/C Unit ERP (Part 3 of 3)
Refer to Chart 02.

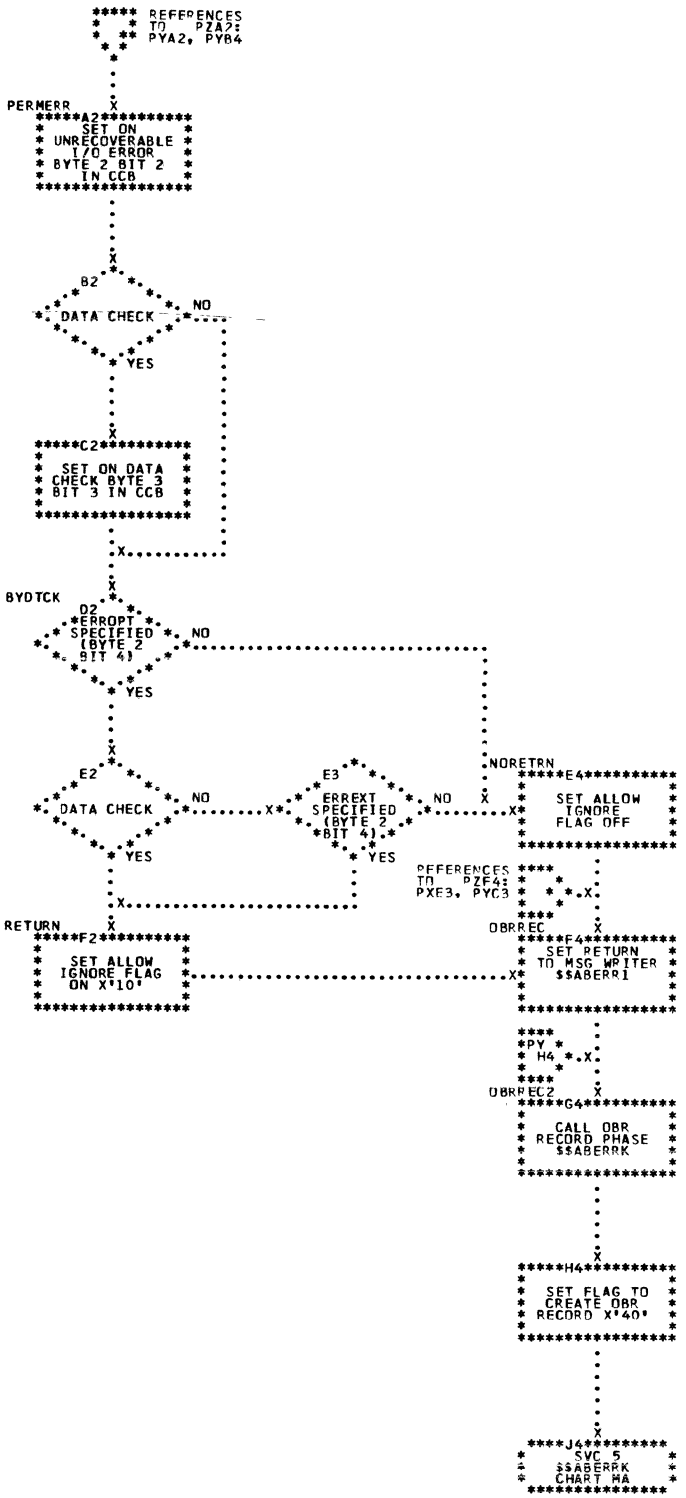


Chart CA. $$ABERRL - Phase 1 of ERP Message Writer
Refer to Chart 03.

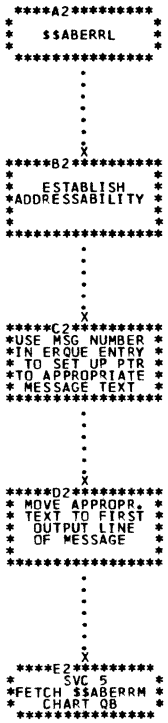


Chart QB. $$ABERRM - Phase 2 of ERP Message Writer (Part 1 of 2)
Refer to Chart 03.

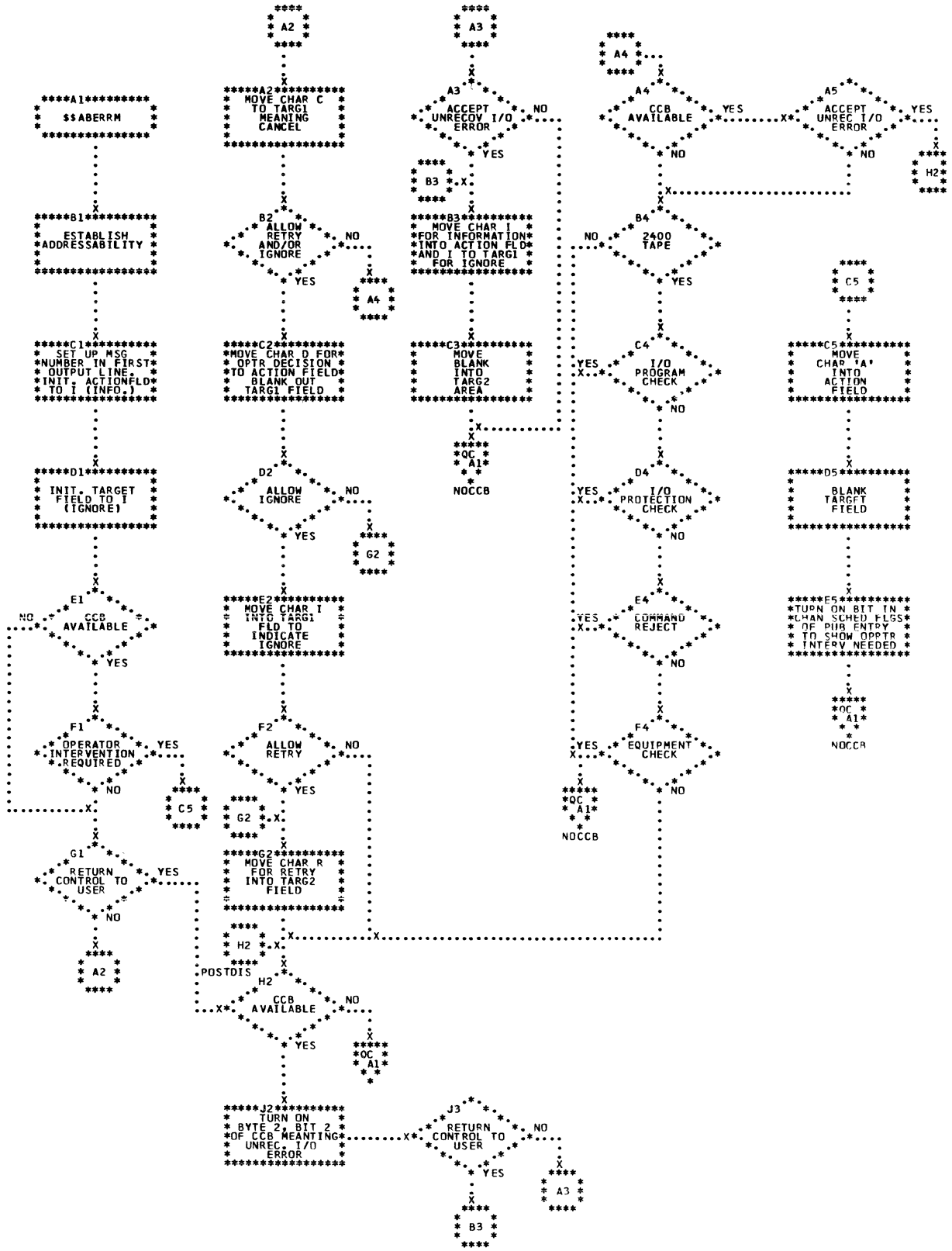


Chart QC. $$ABERRM - Phase 2 of ERP Message Writer (Part 2 of 2)
Refer to Chart 03.

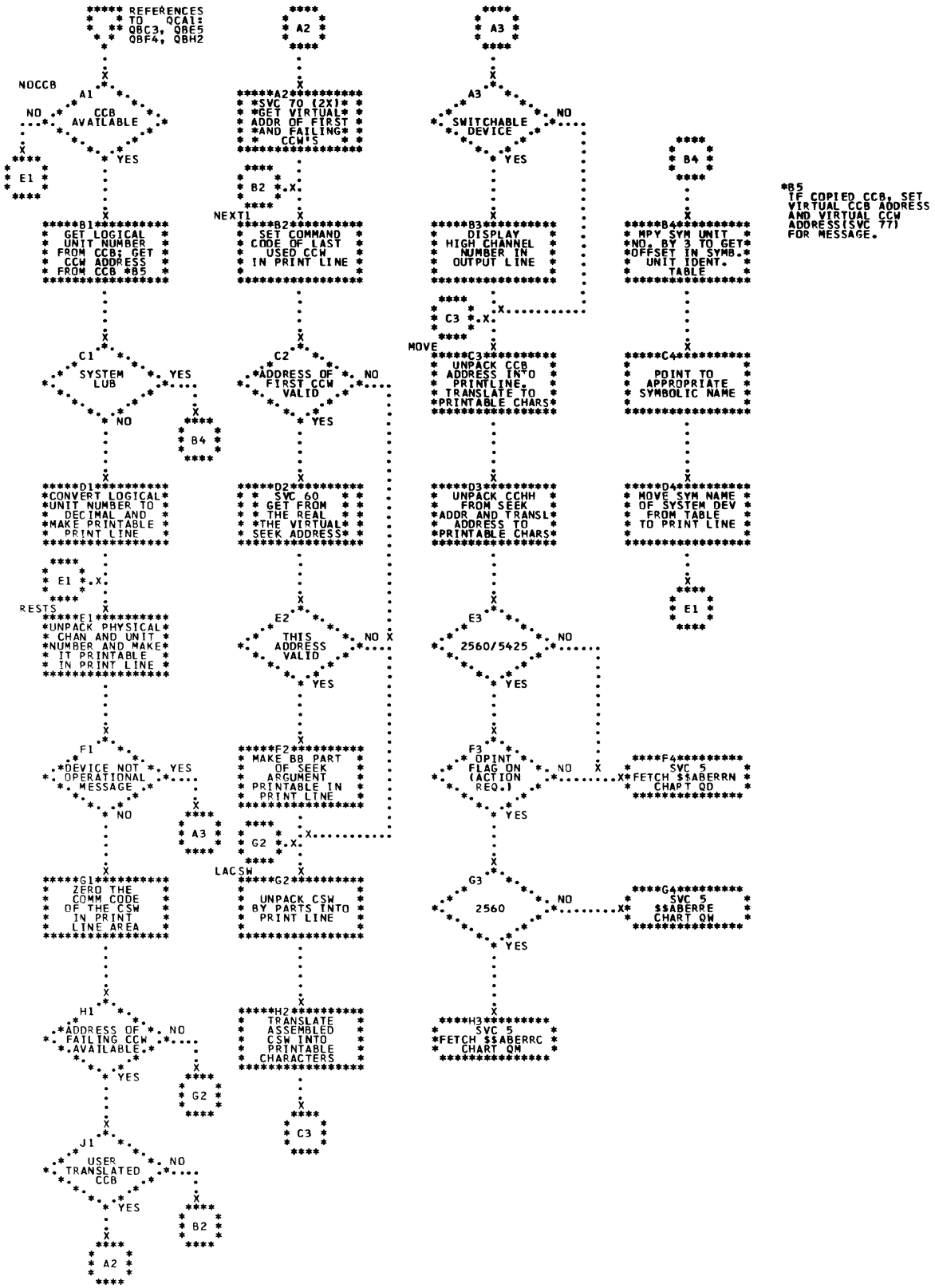


Chart QD. $$ABERRN - Phase 3 of ERP Message Writer (Part 1 of 3)
Refer to Chart 03.

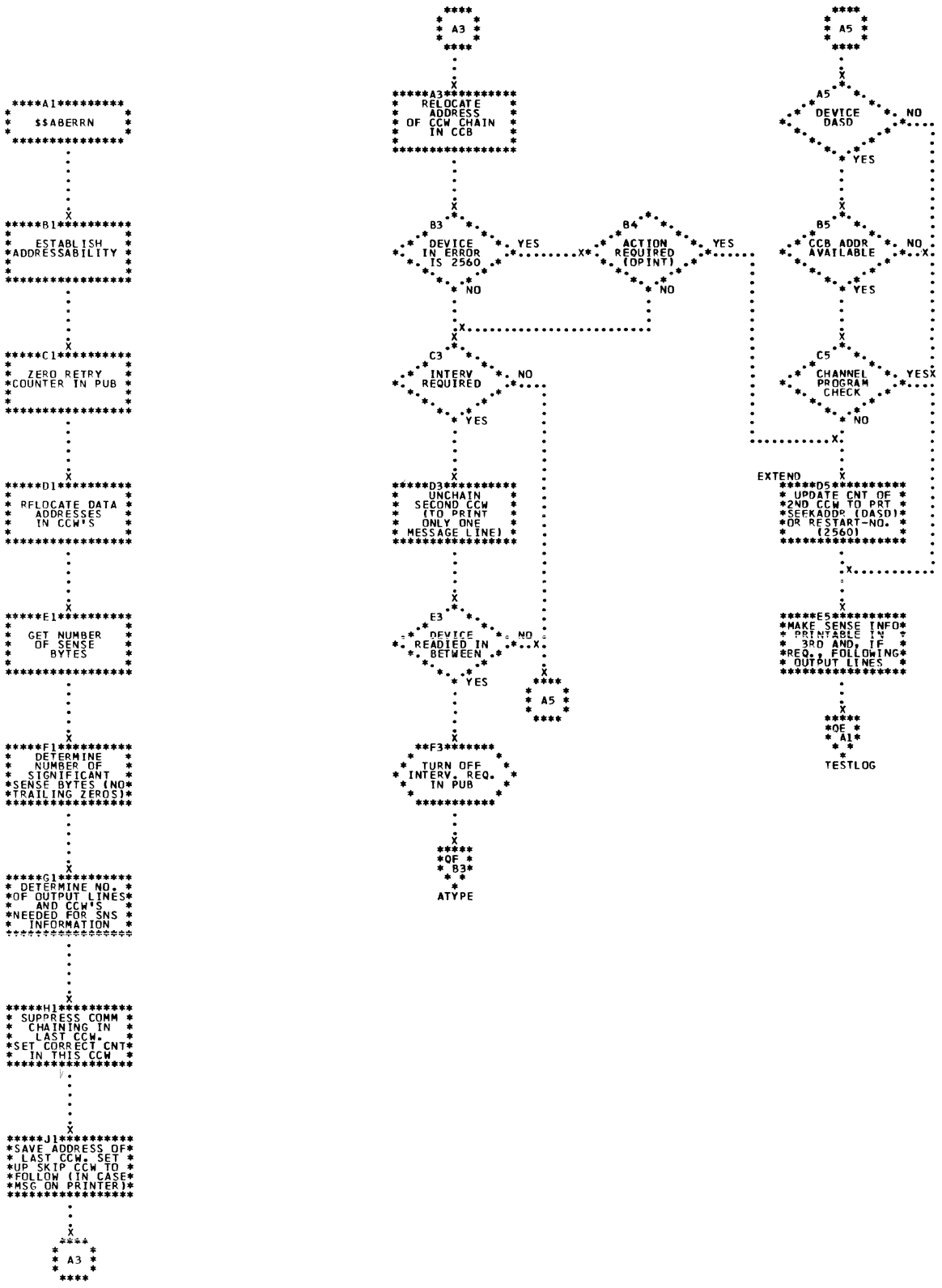


Chart QE. $$AERRN - Phase 3 of ERP Message Writer (Part 2 of 3)
Refer to Chart 03.

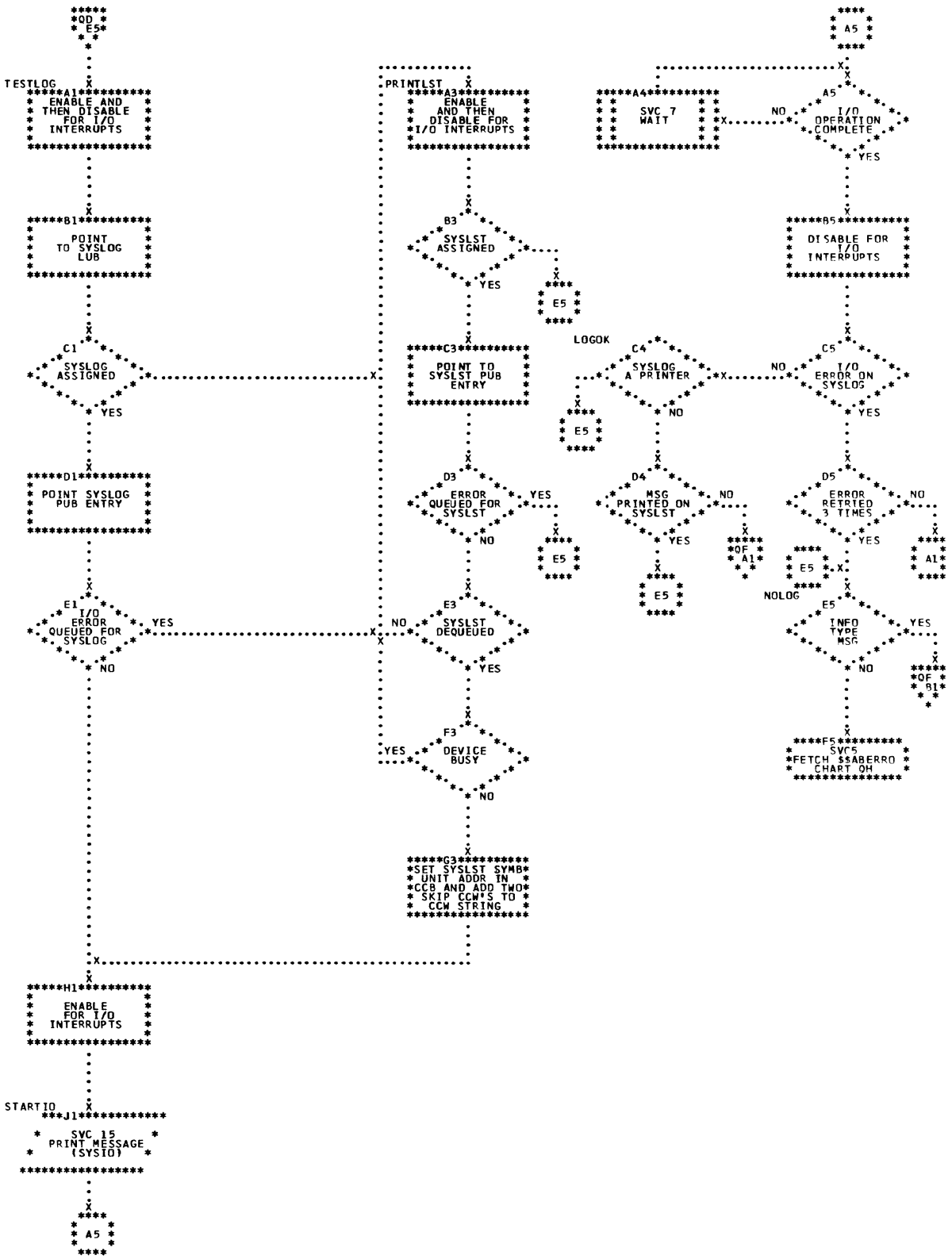


Chart QF. $$ABERRN - Phase 3 of ERP Message Writer (Part 3 of 3)
Refer to Chart 03.

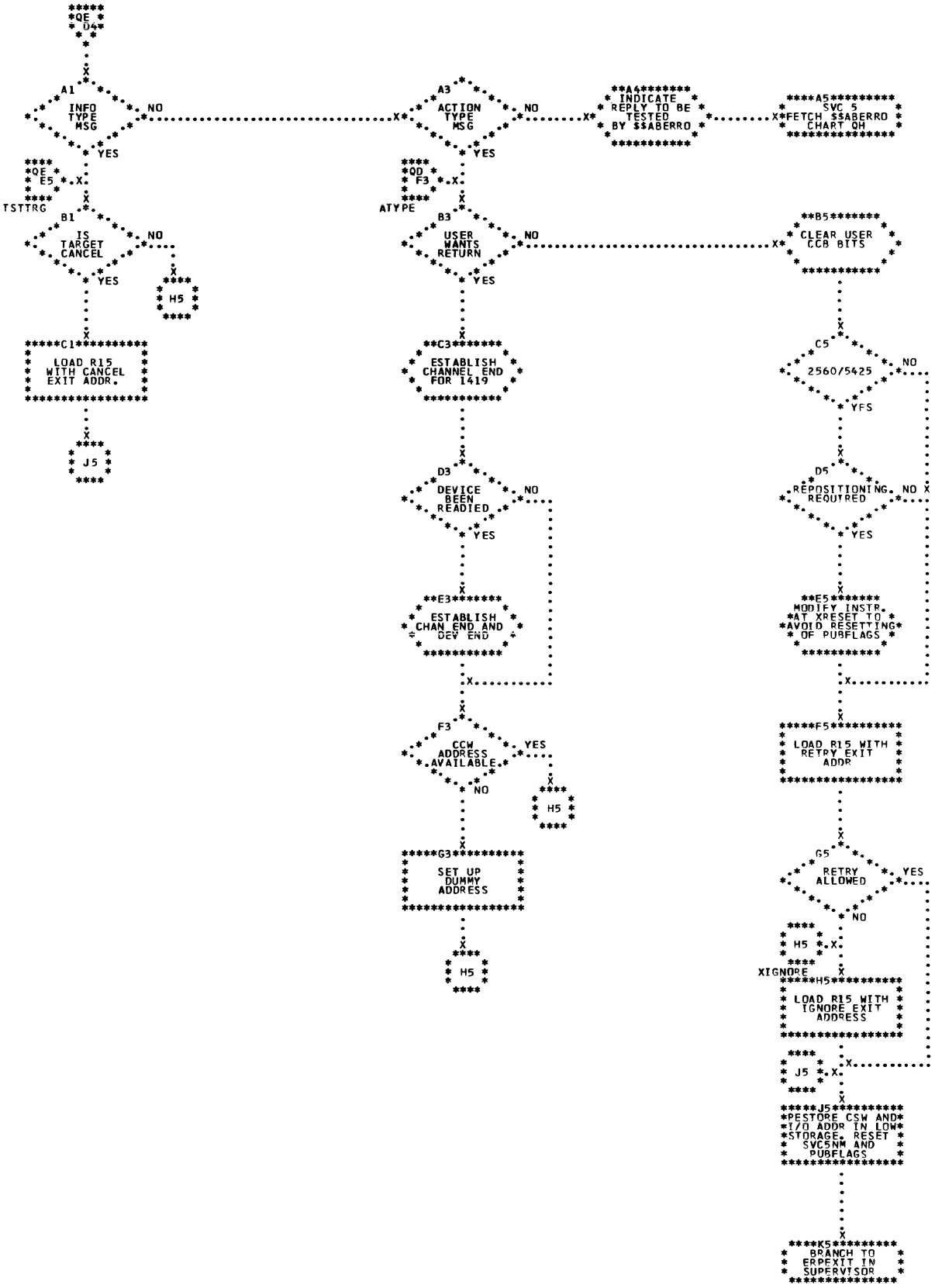


Chart QH. $$ABERRO - Phase 4 of ERP Message Writer (Part 1 of 2)
Refer to Chart 03.

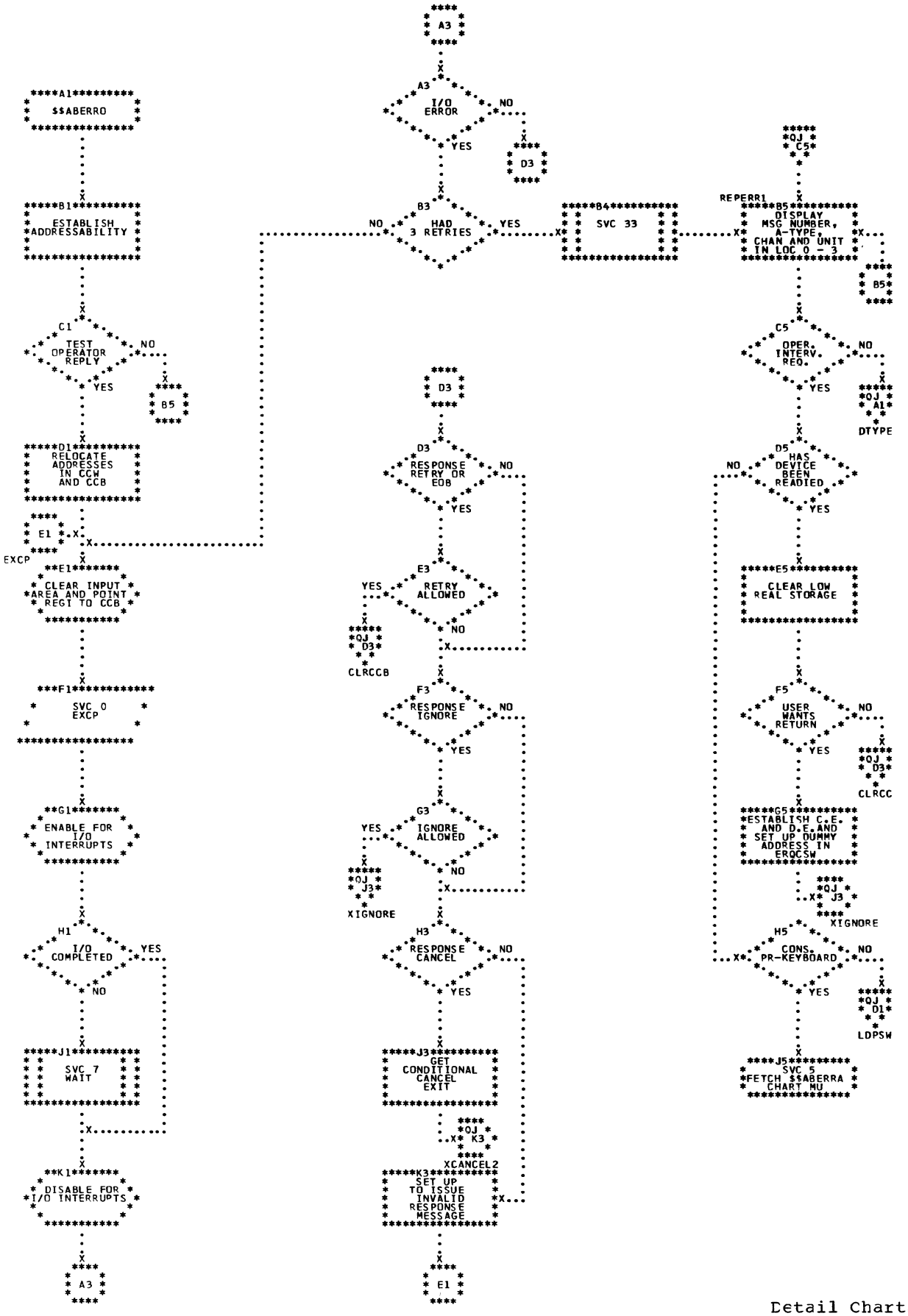


Chart QJ. $$ABERRO - Phase 4 cf ERP Message Writer (Part 2 cf 2)
Refer to Chart 03.

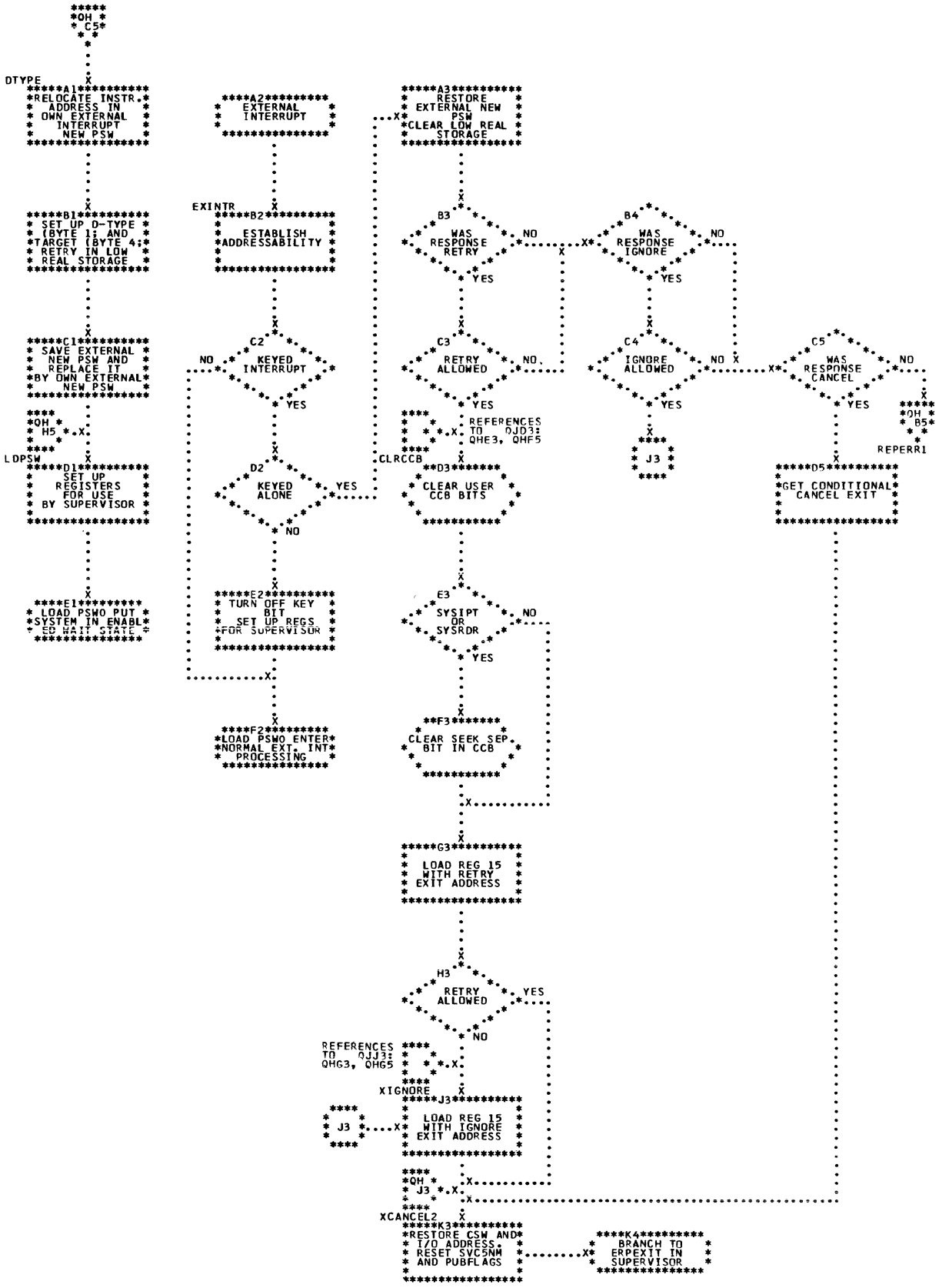


Chart QM. $$ABERRC - Set up repcsitioning infcrmation fcr MFCM (Part 1 of 4)
Refer to Chart 03.

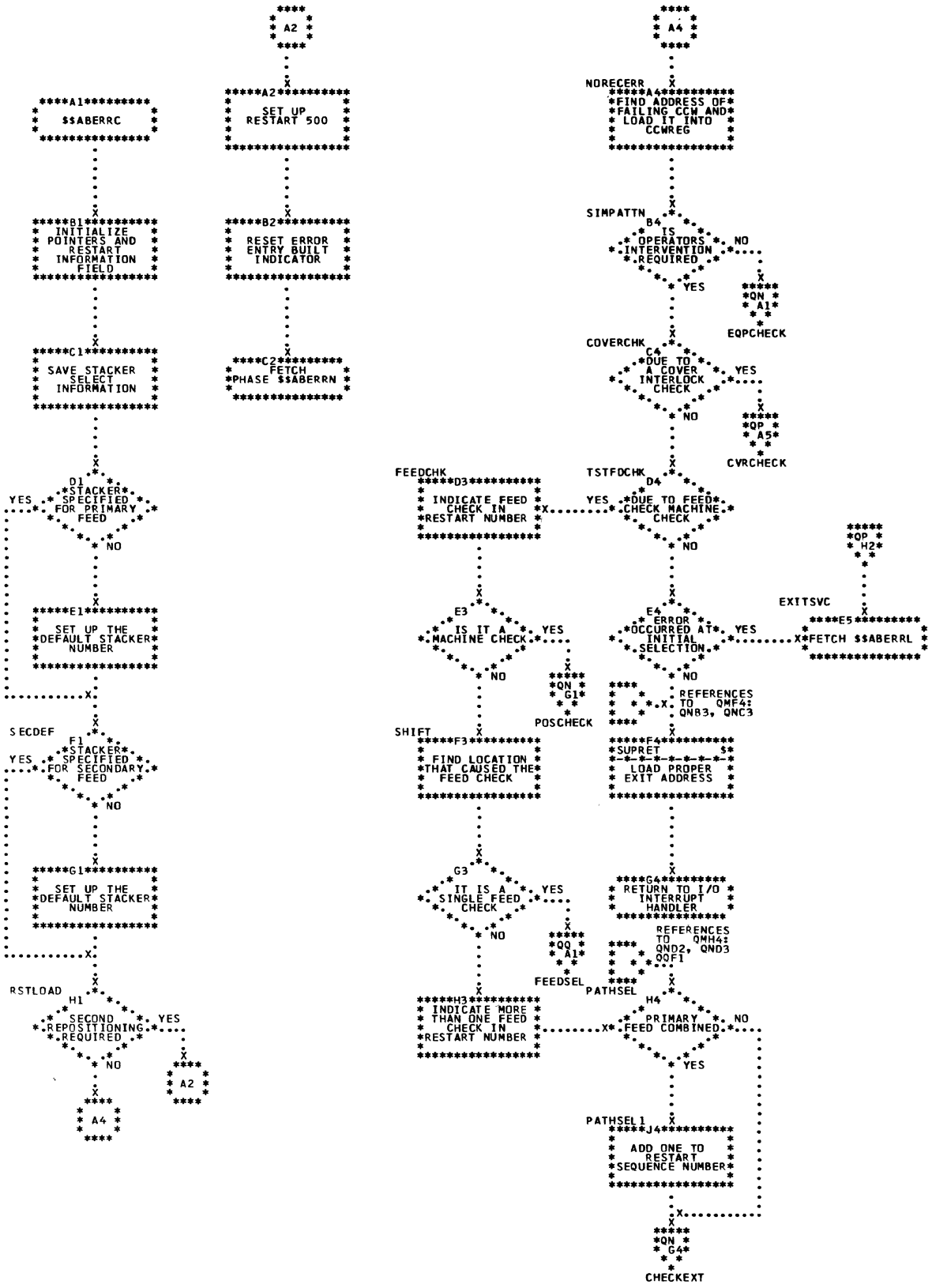


Chart QN. $$ABERRC - Set up repcsitioning infcrmation for MFCM (Part 2 of 4)
Refer to Chart 03.

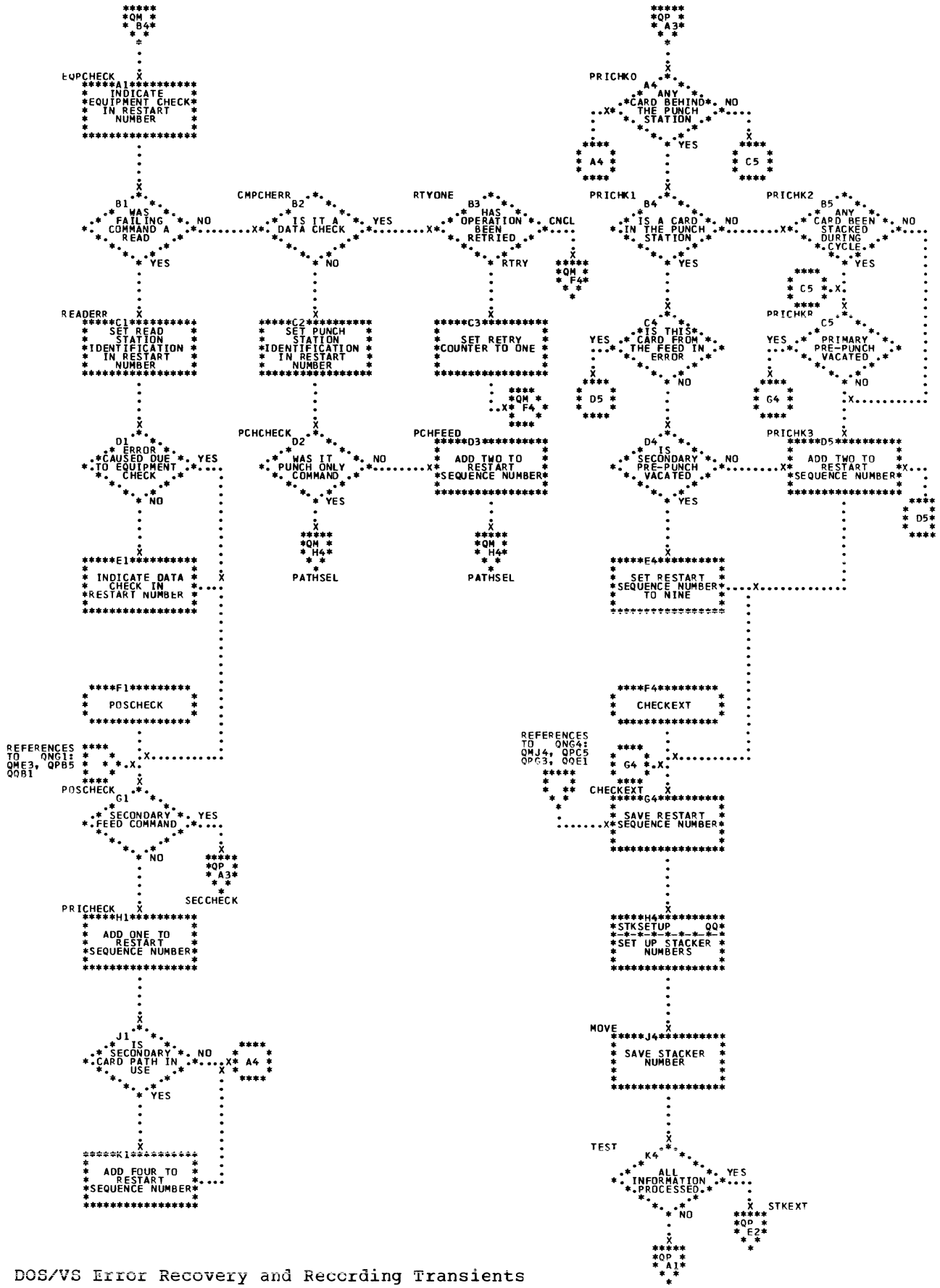


Chart QP. $$ABERRC - Set up repcsitioning infcrmaticn fcr MFCM (Part 3 of 4)
Refer to Chart 03.

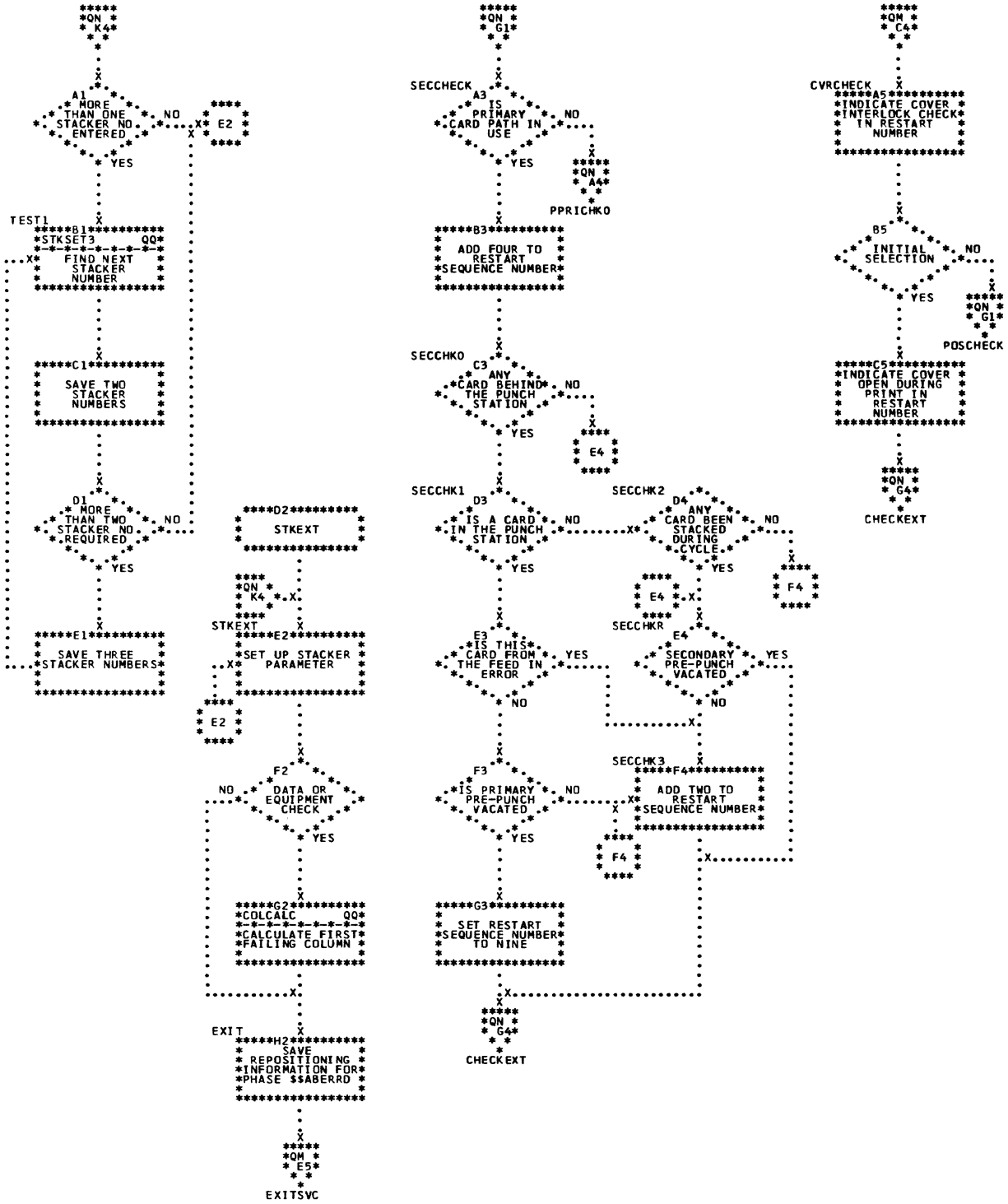


Chart CQ. $$ABERRC - Set up repositioning information for MFCM (Part 4 of 4)
Refer to Chart 03.

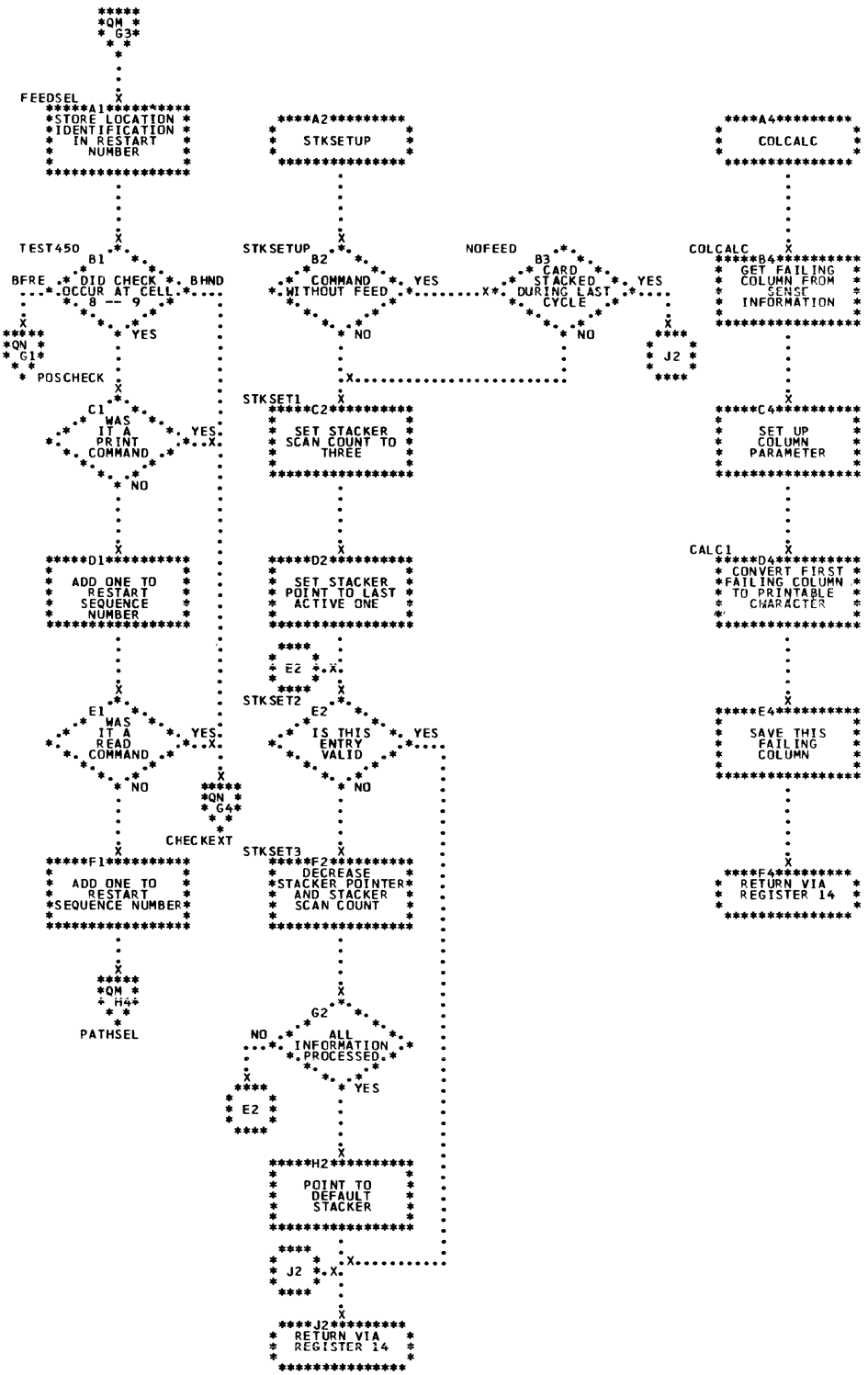


Chart QR. $$ABERRD - MFCM/MFCU repositioning phase (Part 1 of 3)
Refer to Chart 02.

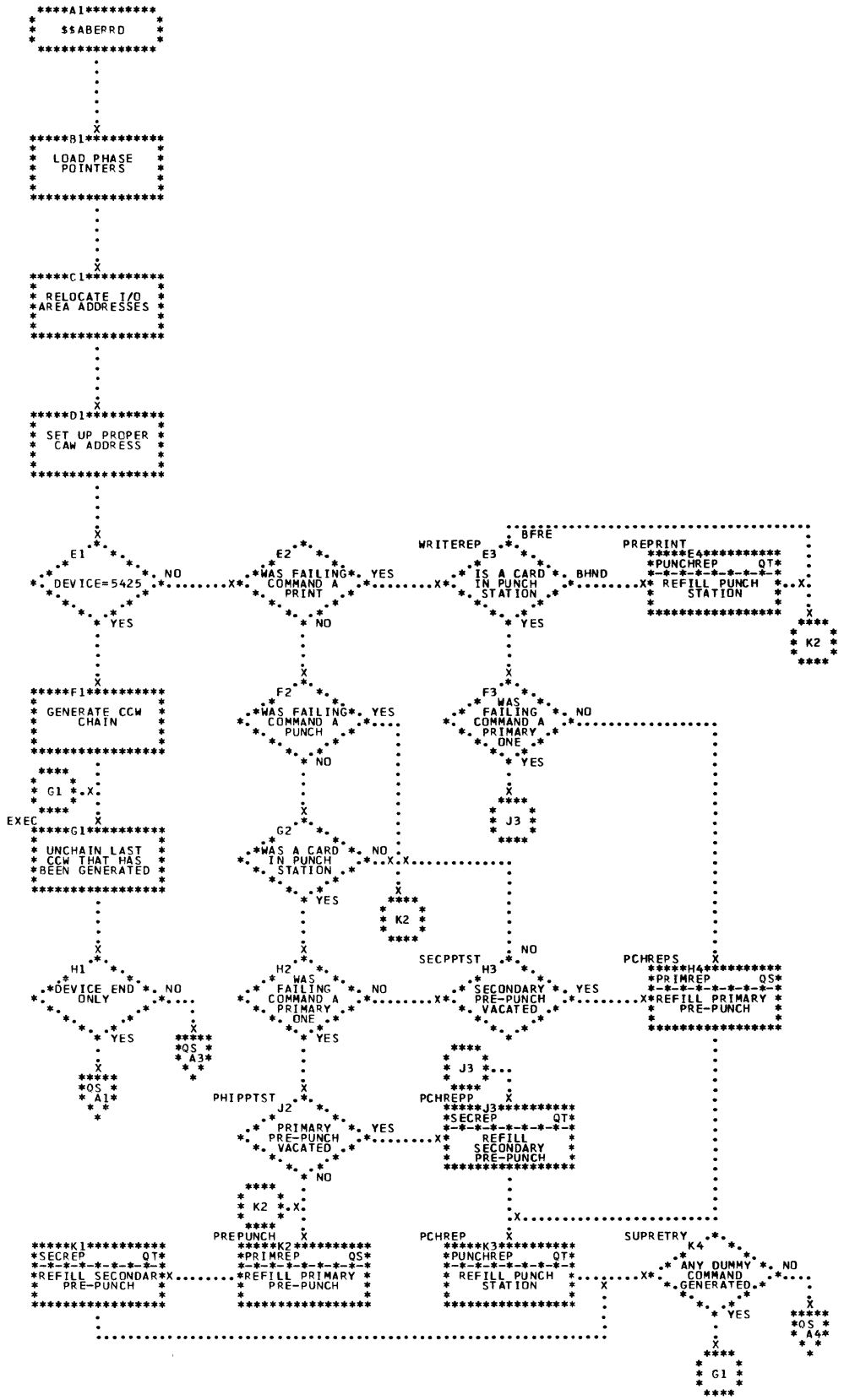


Chart QS. $$AERRD - MFCM/MFCU repositioning phase (Part 2 of 3)
Refer to Chart 03.

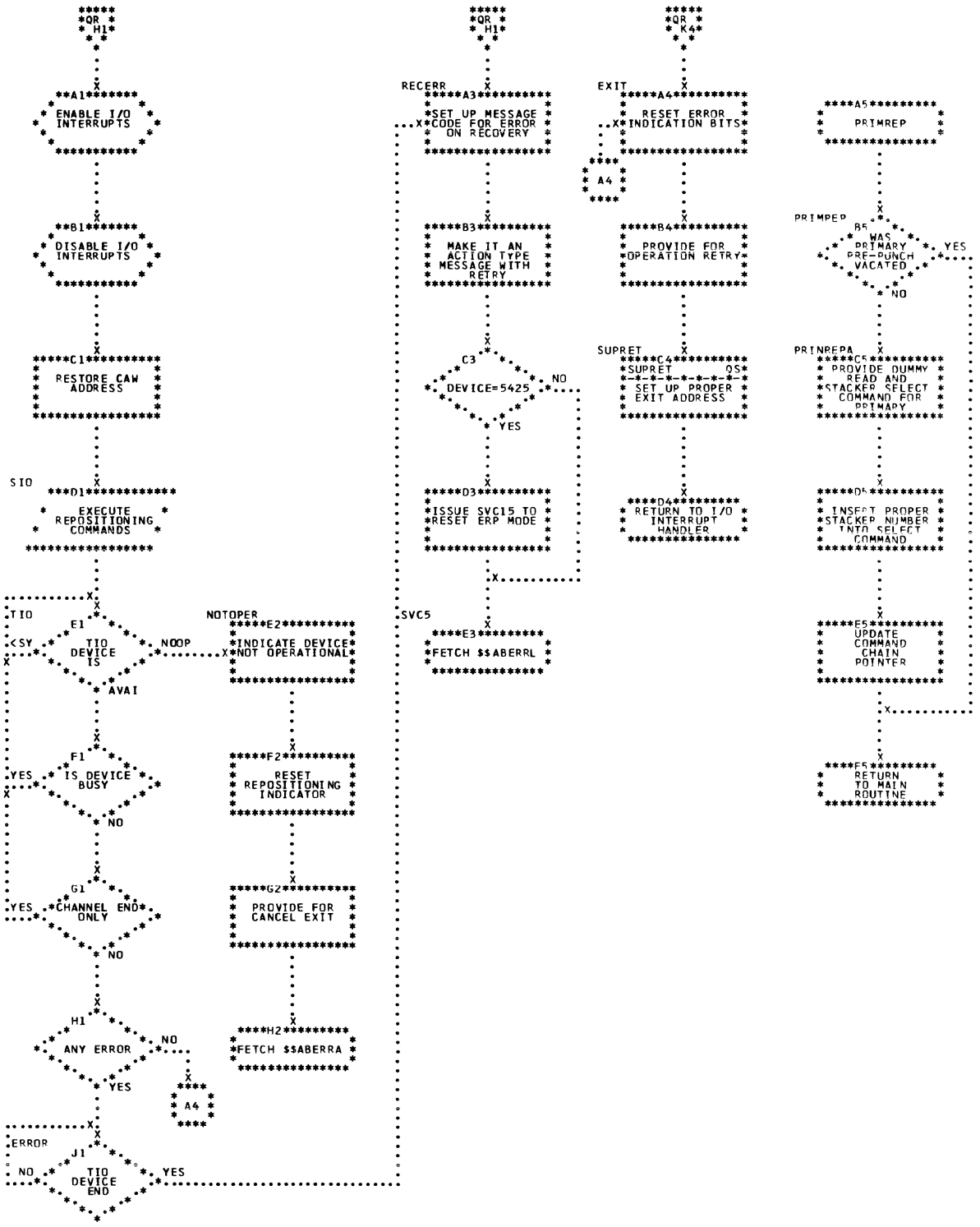


Chart QT. $$ABERRD - MFCM/MFCU repositioning phase (Part 3 of 3)
Refer to Chart 03.

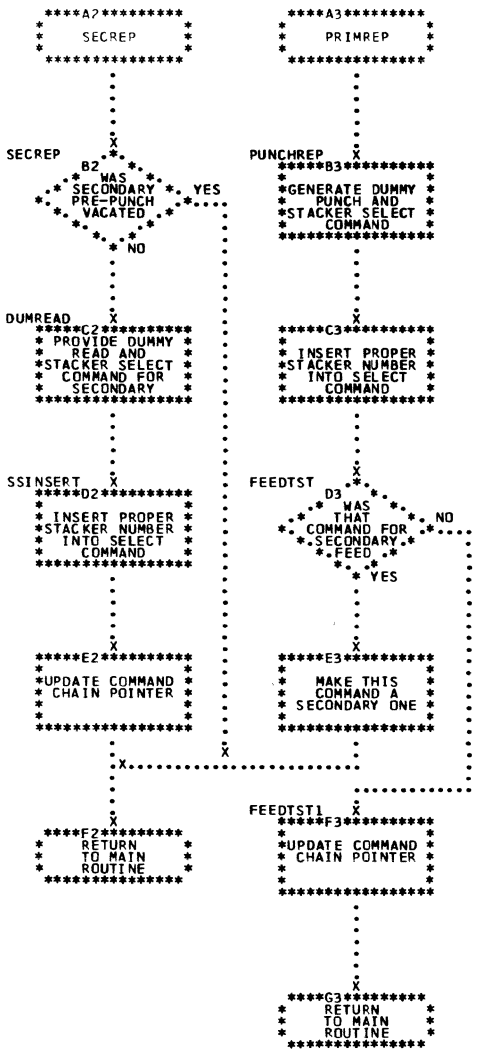


Chart QU. $$ABERFE - MFCU Feed Check Handling (Part 1 of 2)
Refer to Chart 03.

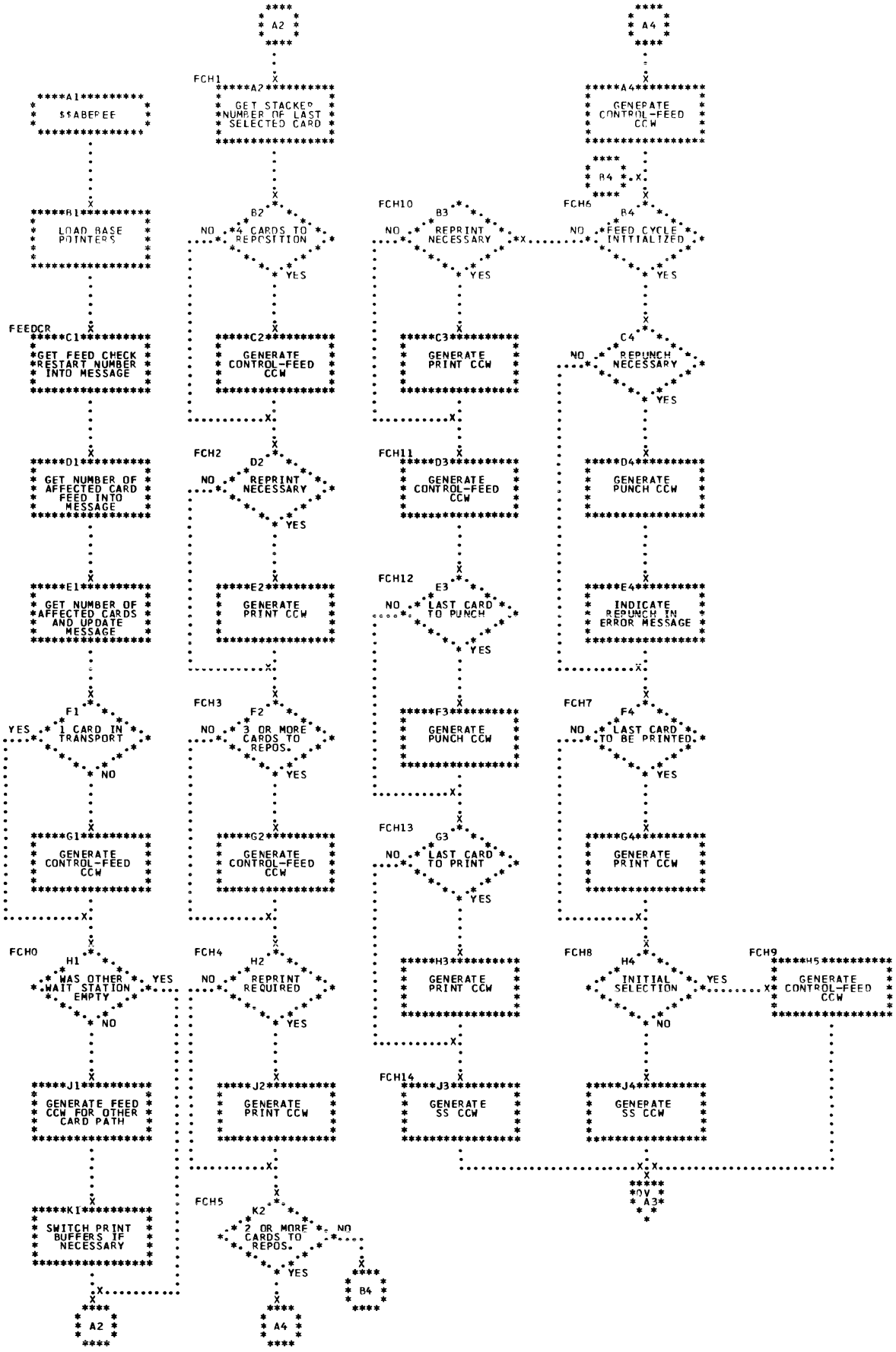


Chart QV. $$ABEREE - MFCU Feed Check Handling (Part 2 cf 2)
Refer to Chart 03.

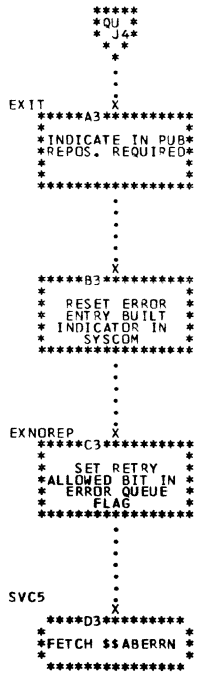


Chart QW. $$ABERRE - MFCU Message Writer (Part 1 of 2)
Refer to Chart 03.

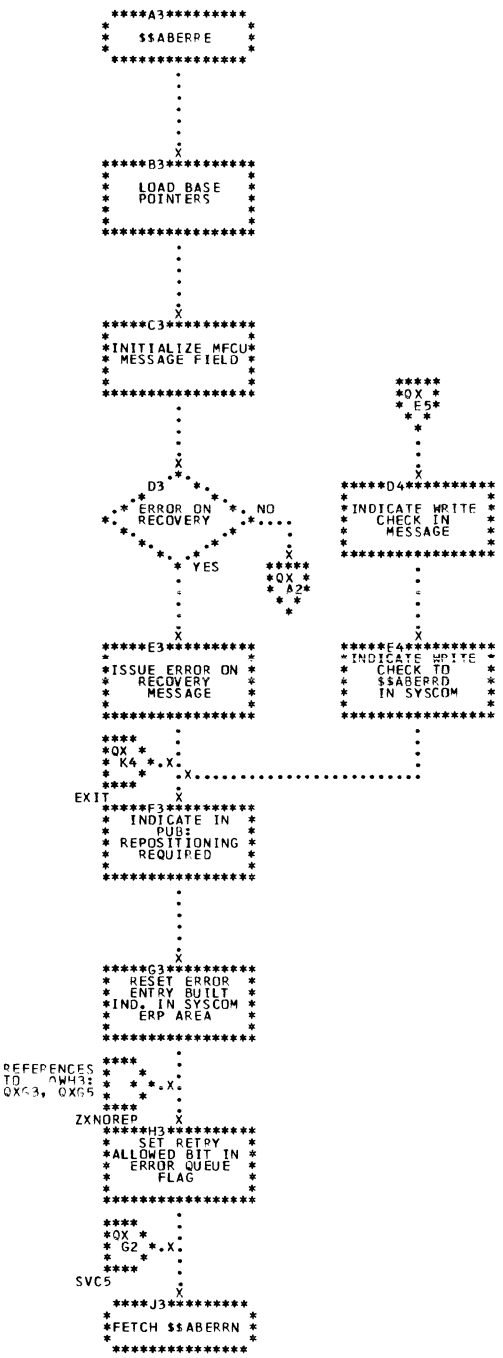


Chart QX. $$ABERRE - MFCU Message Writer (Part 2 of 2)
Refer to Chart 03.

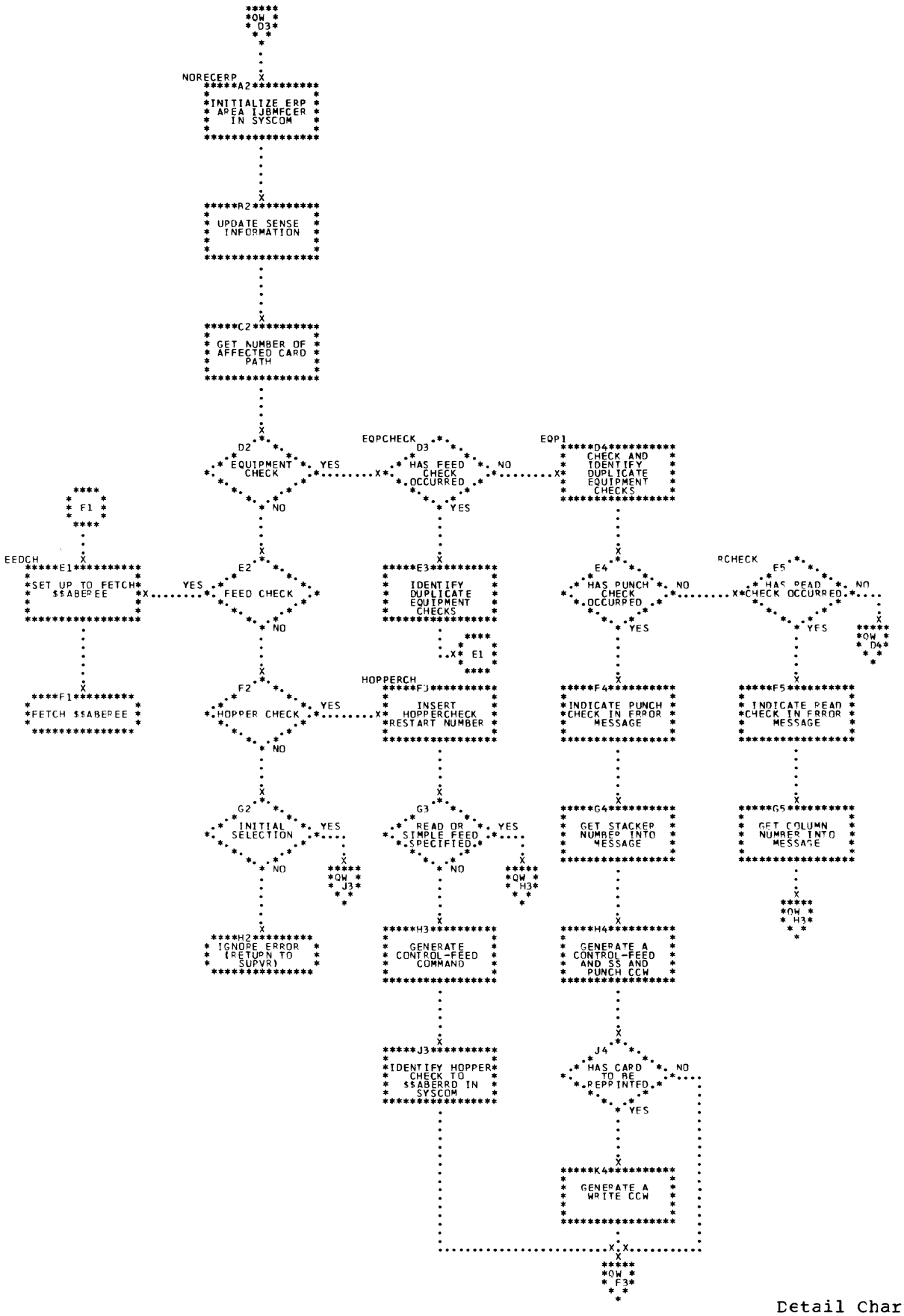


Chart RA. $$AEERRY - Unit Record ERP (Part 1 of 4)
Refer to Chart 02.

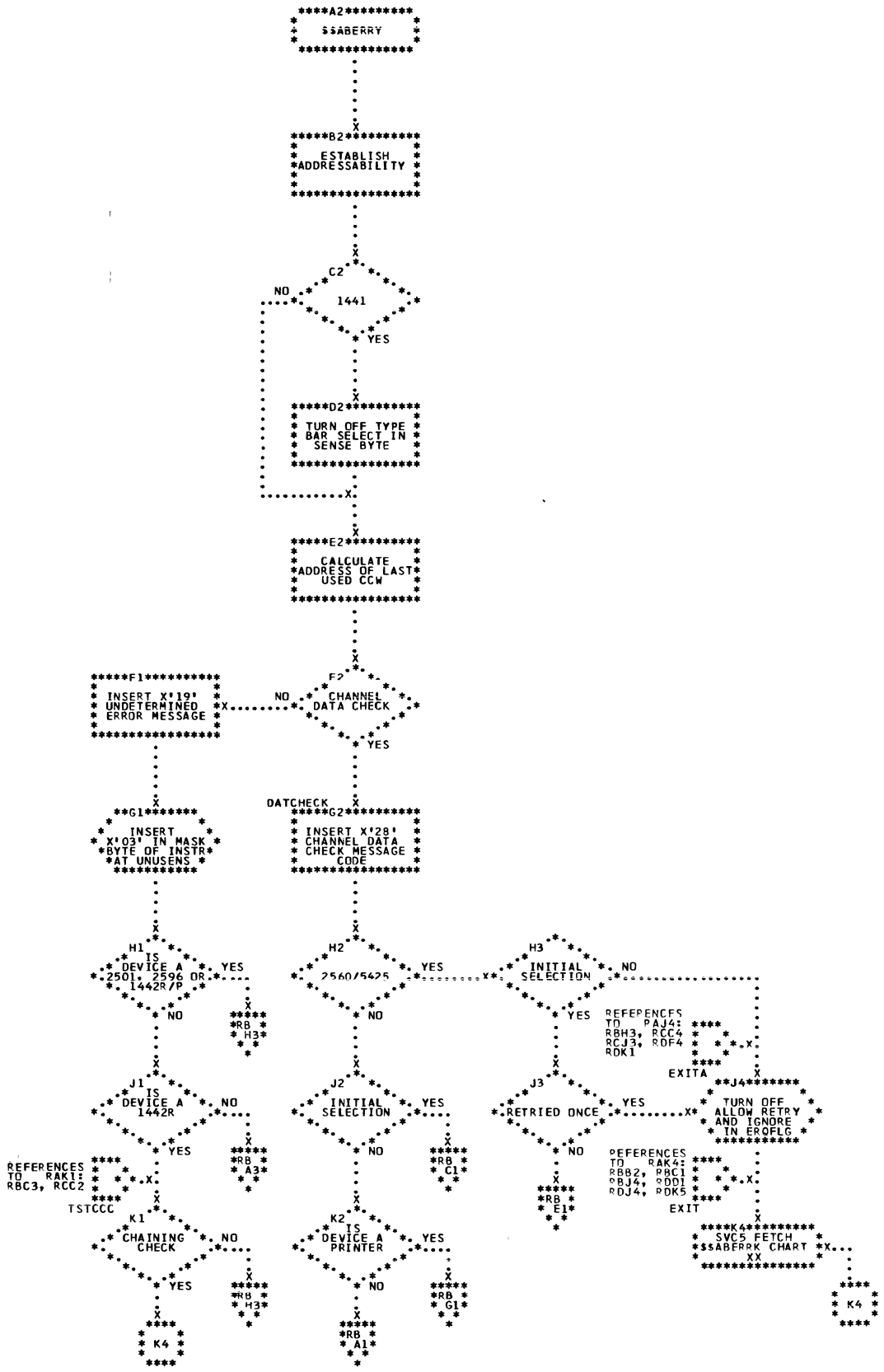


Chart RB. $$ABERRY - Unit Reccrd ERP (Part 2 cf 4)
Refer to Chart 02.

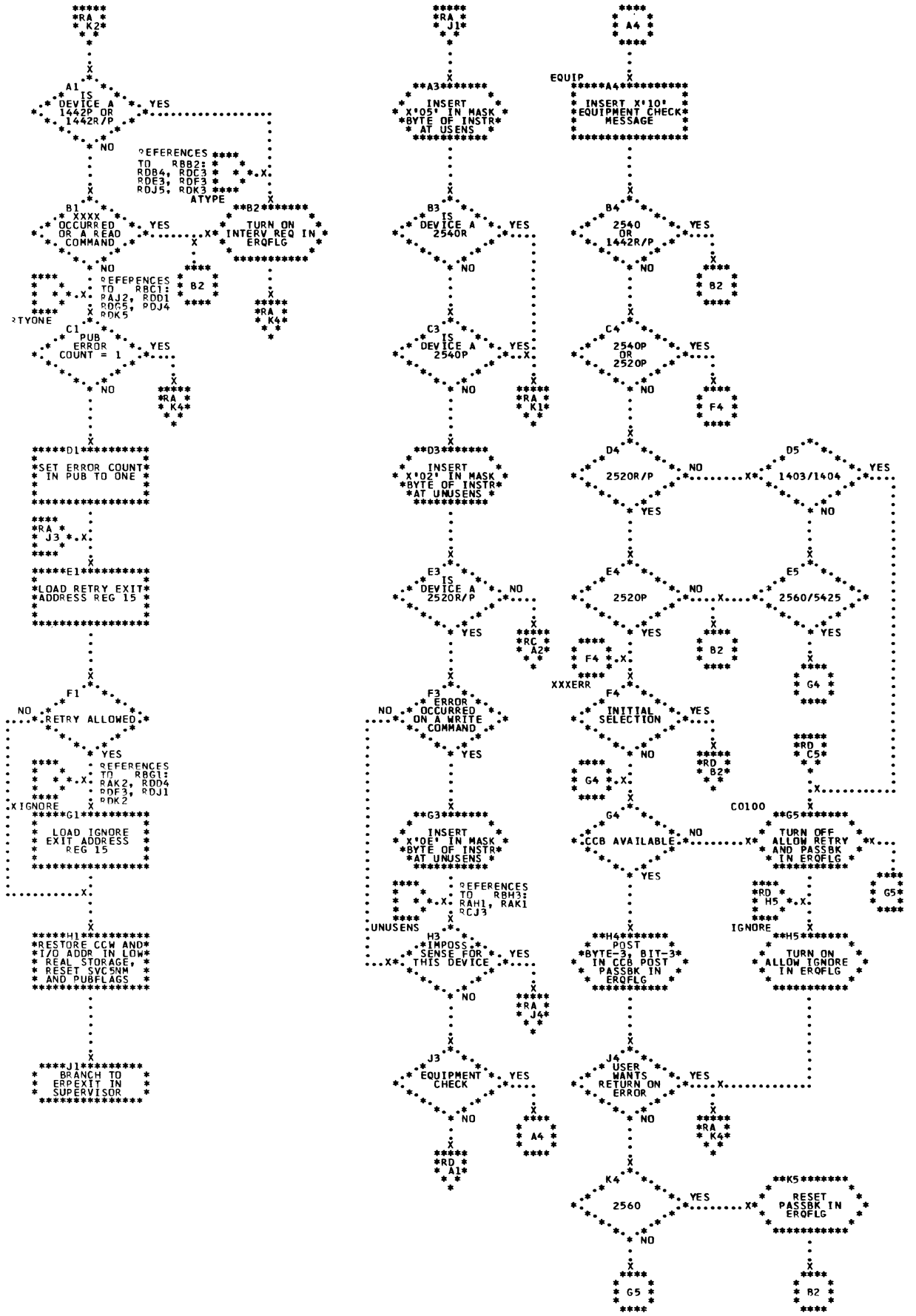


Chart RC. $$ABERRY - Unit Record ERP (Part 3 of 4)
Refer to Chart 02.

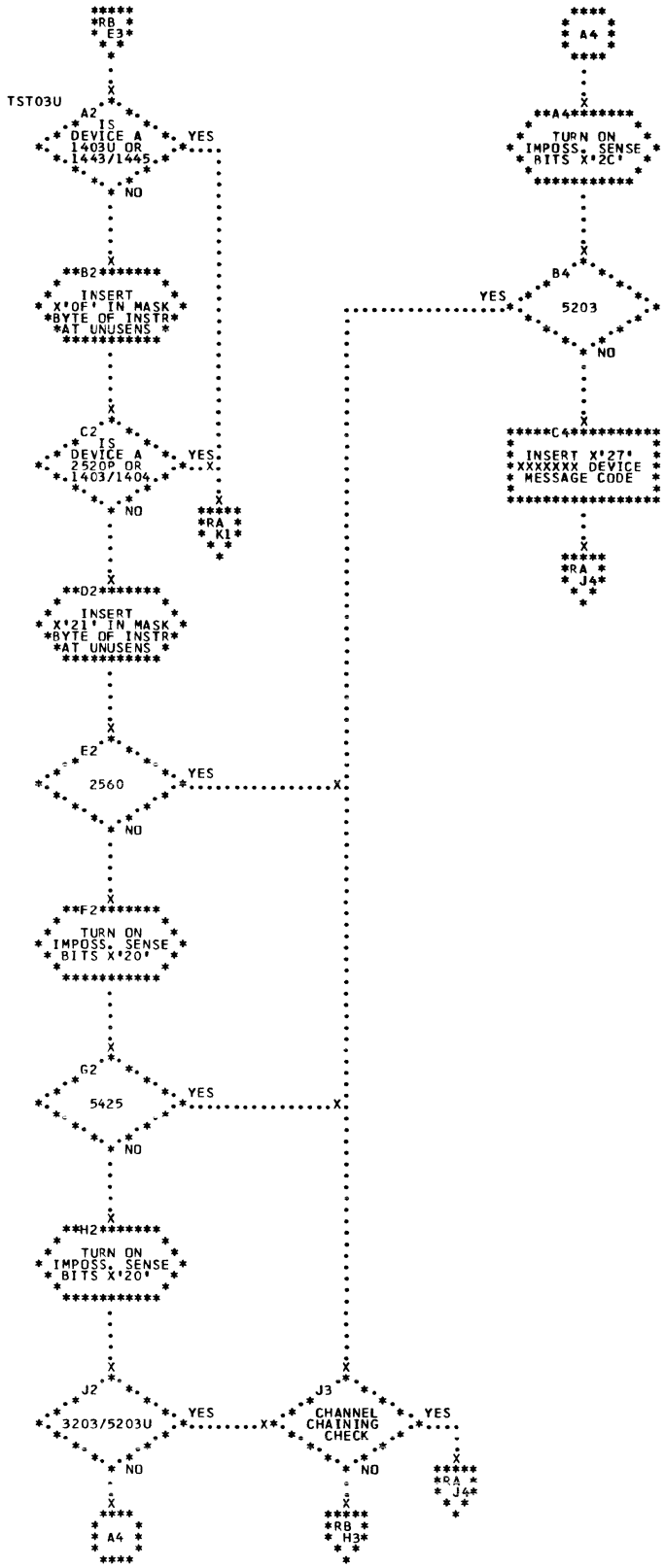


Chart RD. $$ABERRY - Unit Reccrd ERP (Part 4 cf 4)
Refer to Chart 02.

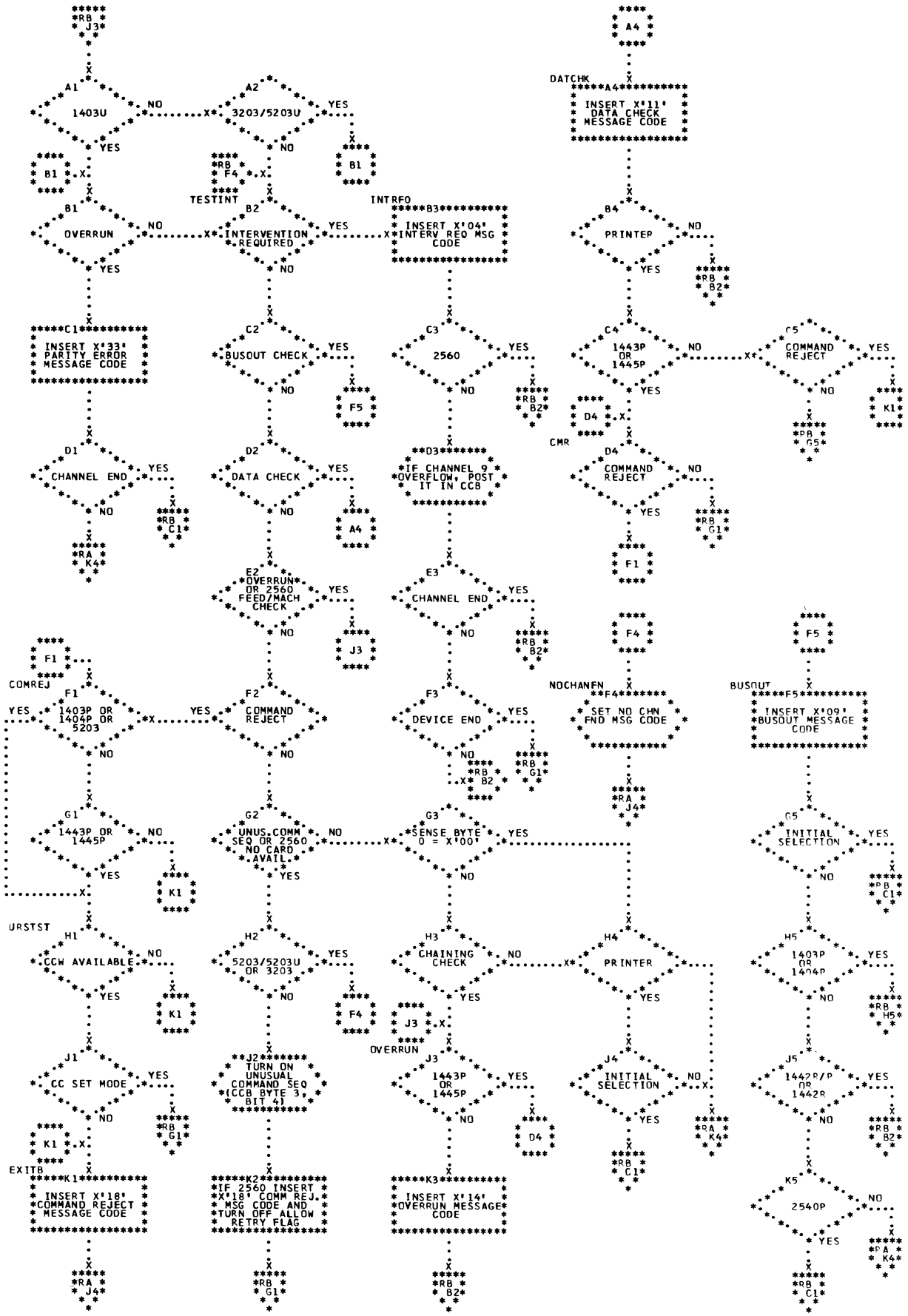


Chart RE. $$ABERRW - Console Printer Keyboard and CRT ERP
Refer to Chart 02.

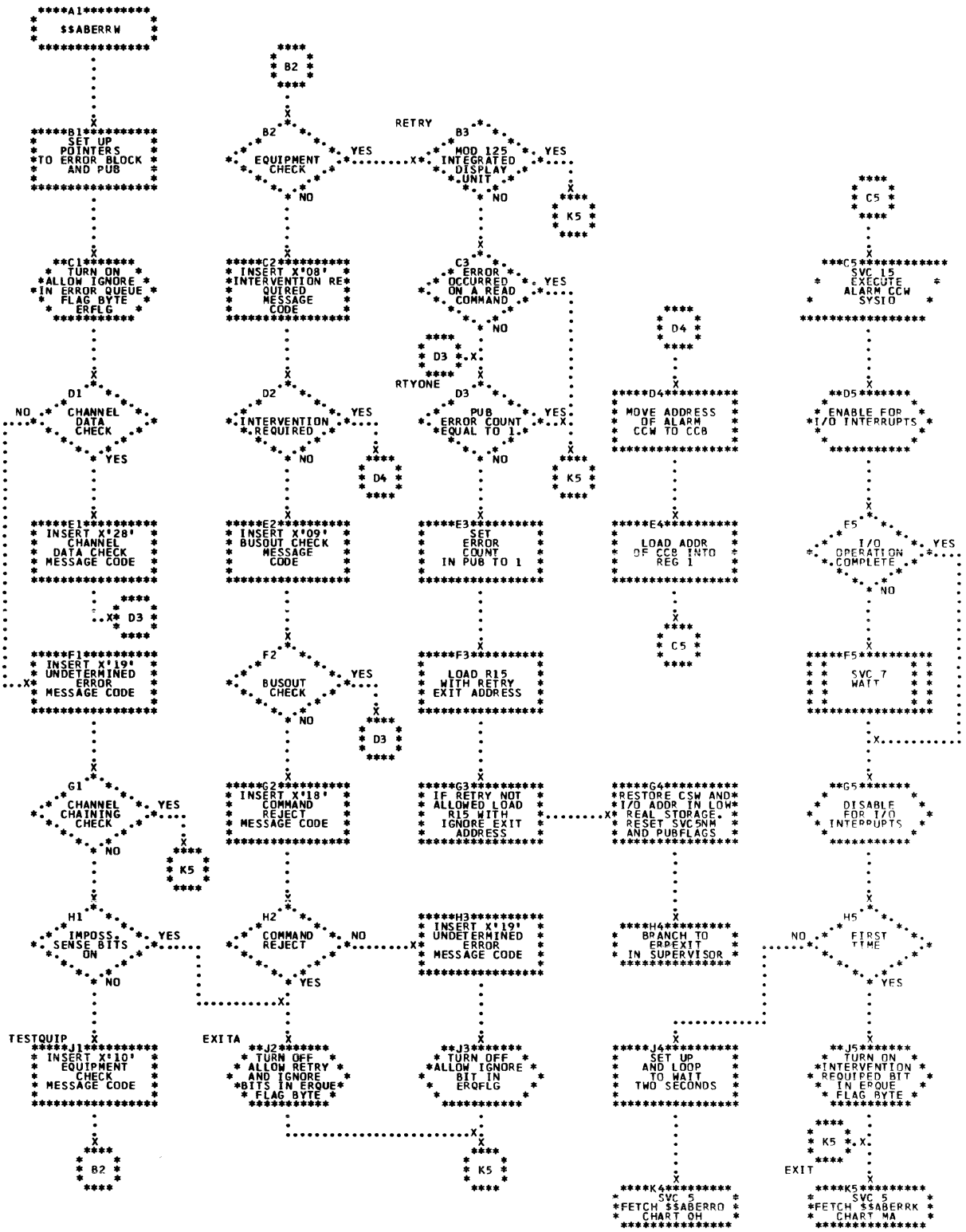


Chart RF. $$ABERRS - MICR (1412, 1419, 1419D) ERP (Part 1 of 3)
Refer to Chart 02. (0135 or 0145

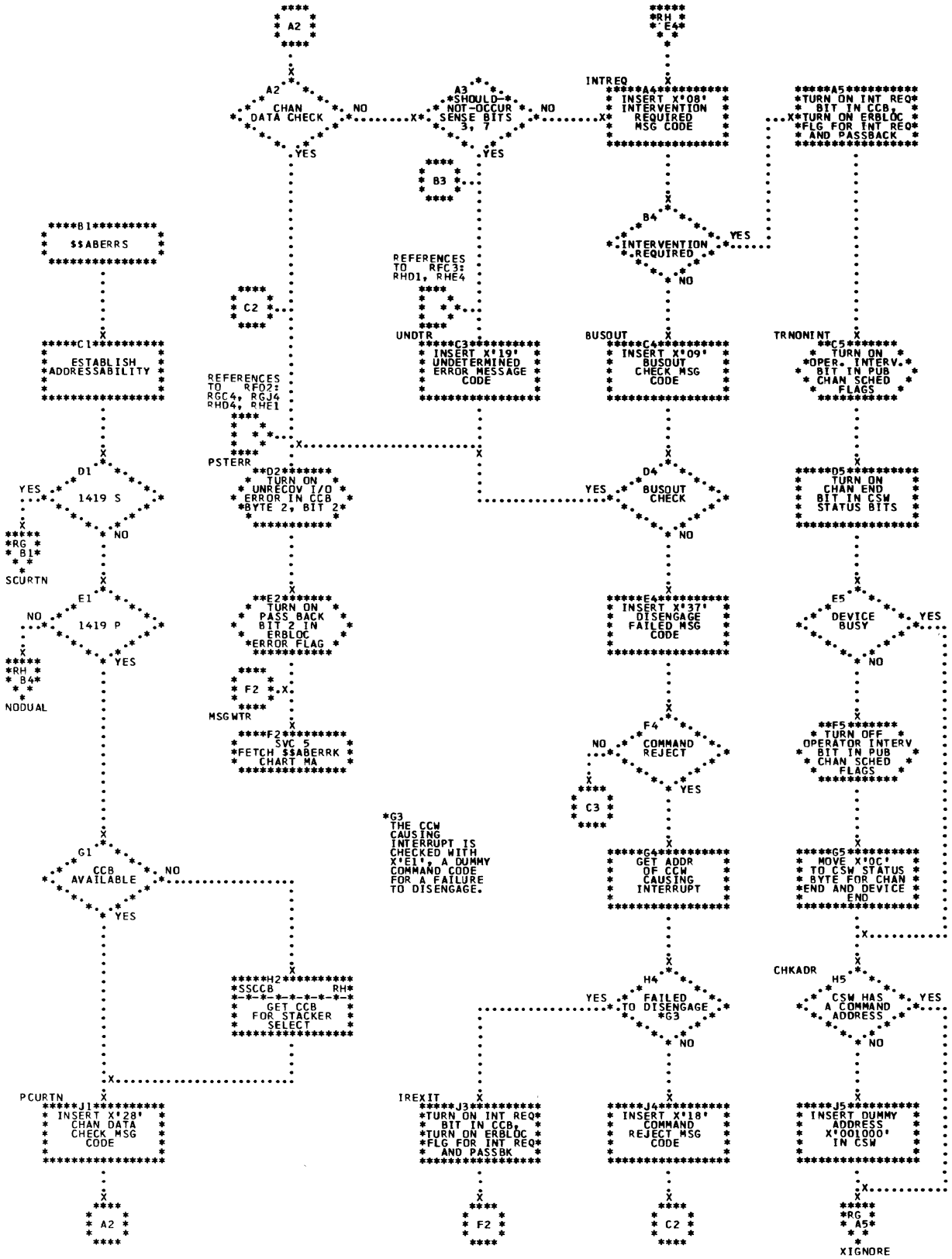


Chart RG. $$AEERRS - MICR (1412, 1419, 1419D) ERP (Part 2 of 3)
Refer to Chart 02.

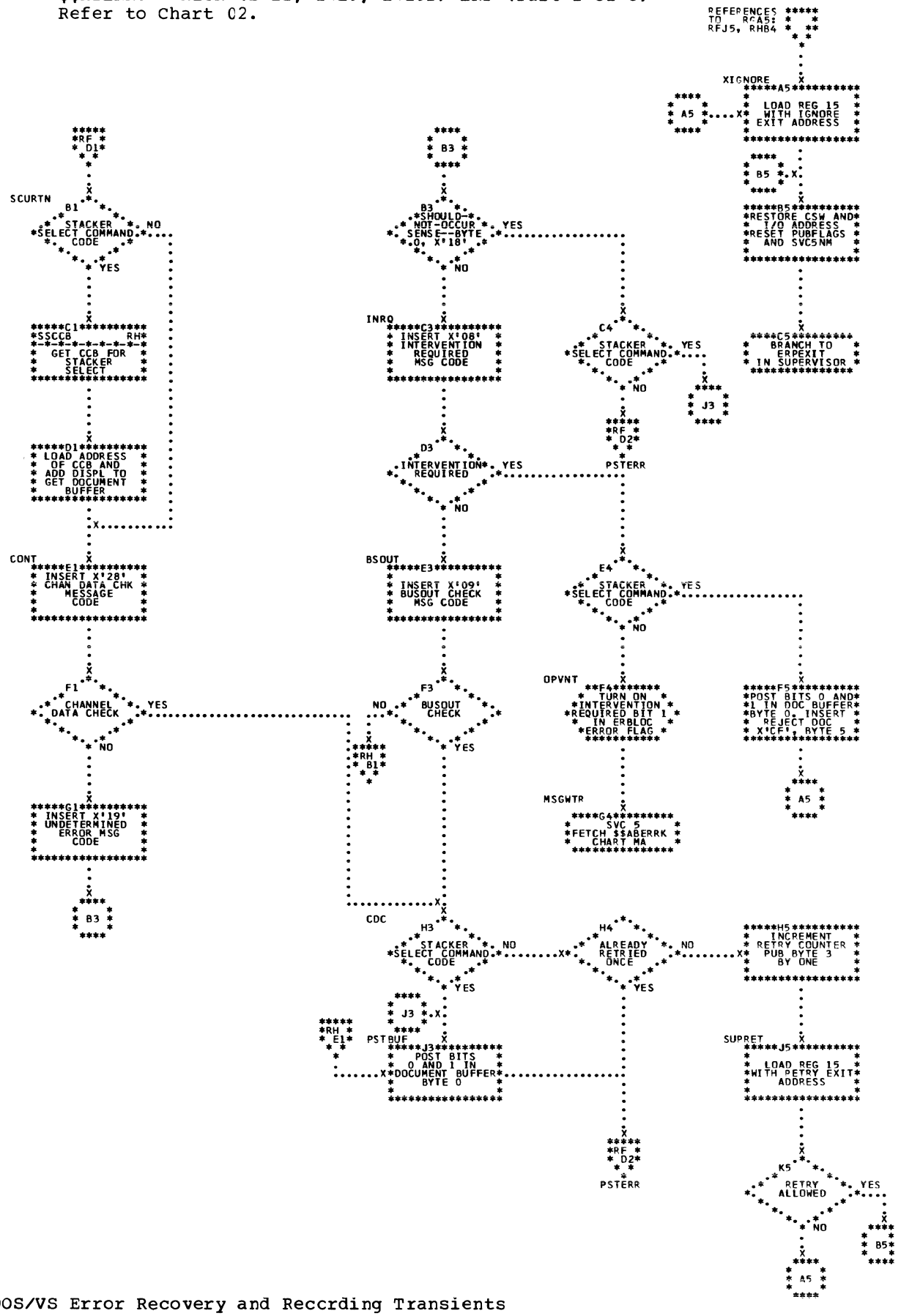


Chart RH. $$ABERRS - MICR (1412, 1419, 1419D) ERP (Part 3 of 3)
Refer to Chart 02.

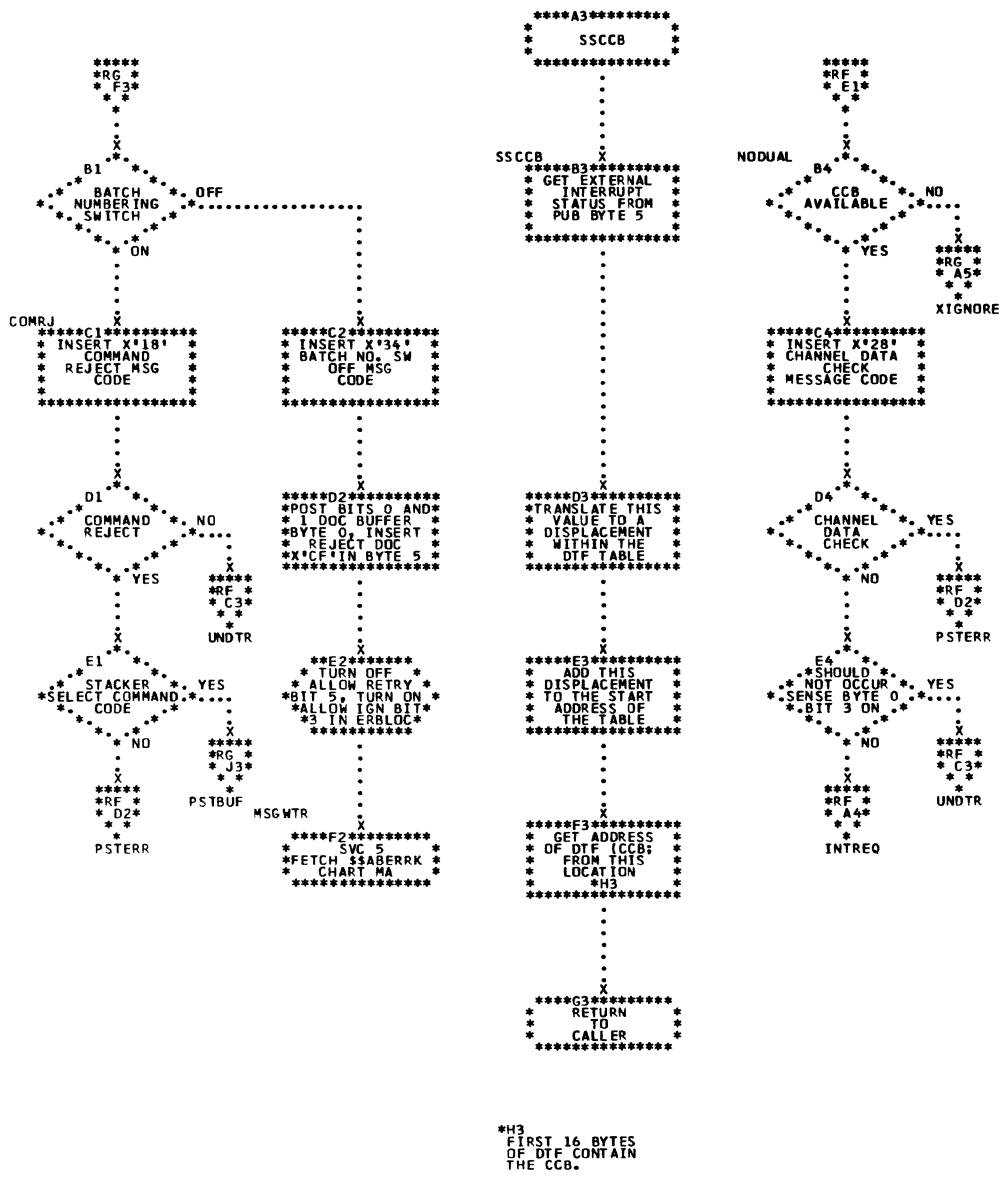


Chart RJ. $$ABERRV - 2671 Paper Tape ERP (Part 1 cf 2)
Refer to Chart 02.

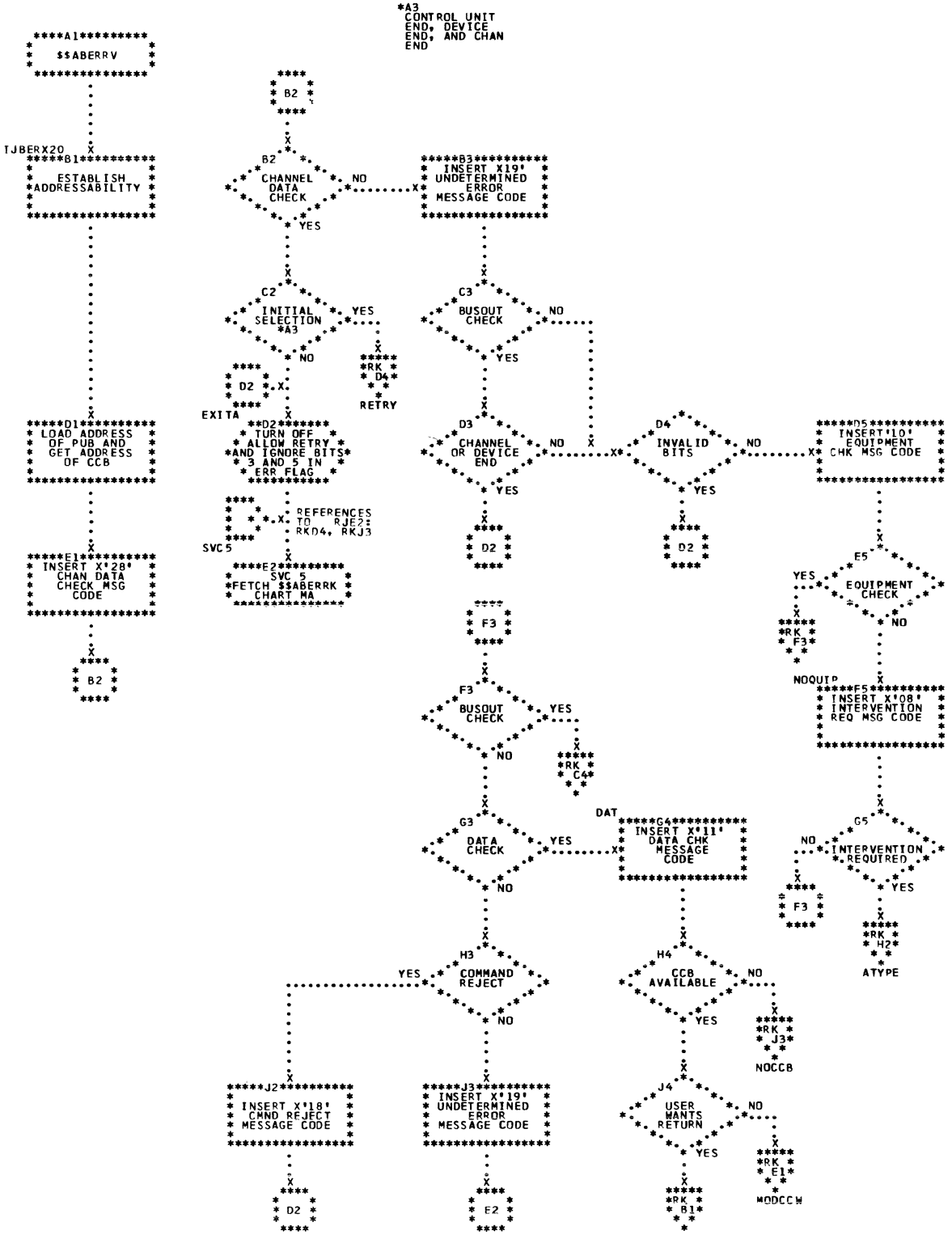


Chart RK. $$AERRV - 2671 Paper Tape ERP (Part 2 of 2)
Refer to Chart C2.

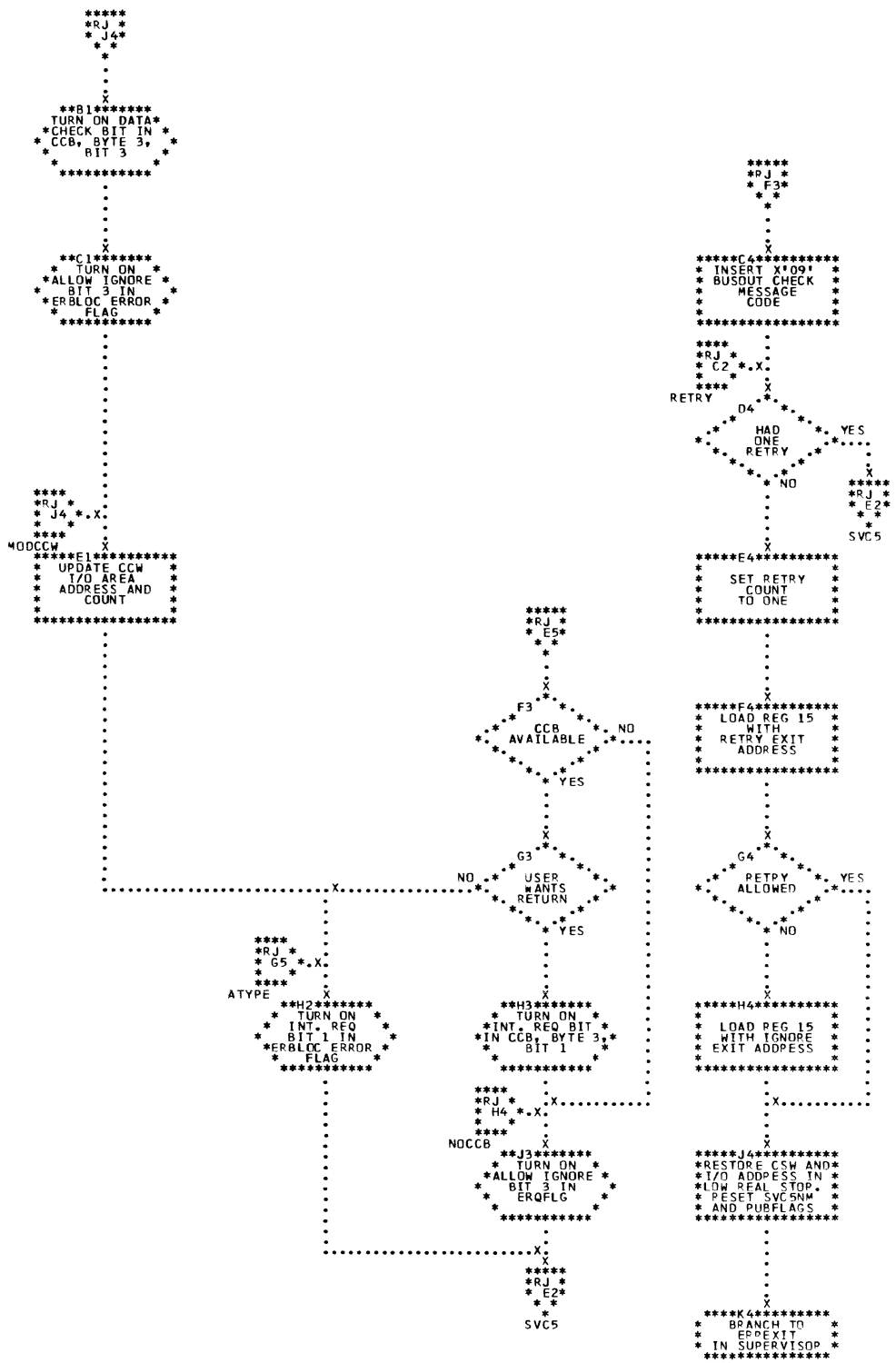


Chart TA. $$ABERRT - 1287, 1288 CCR ERP (Part 1 of 2)
Refer to Chart 02.

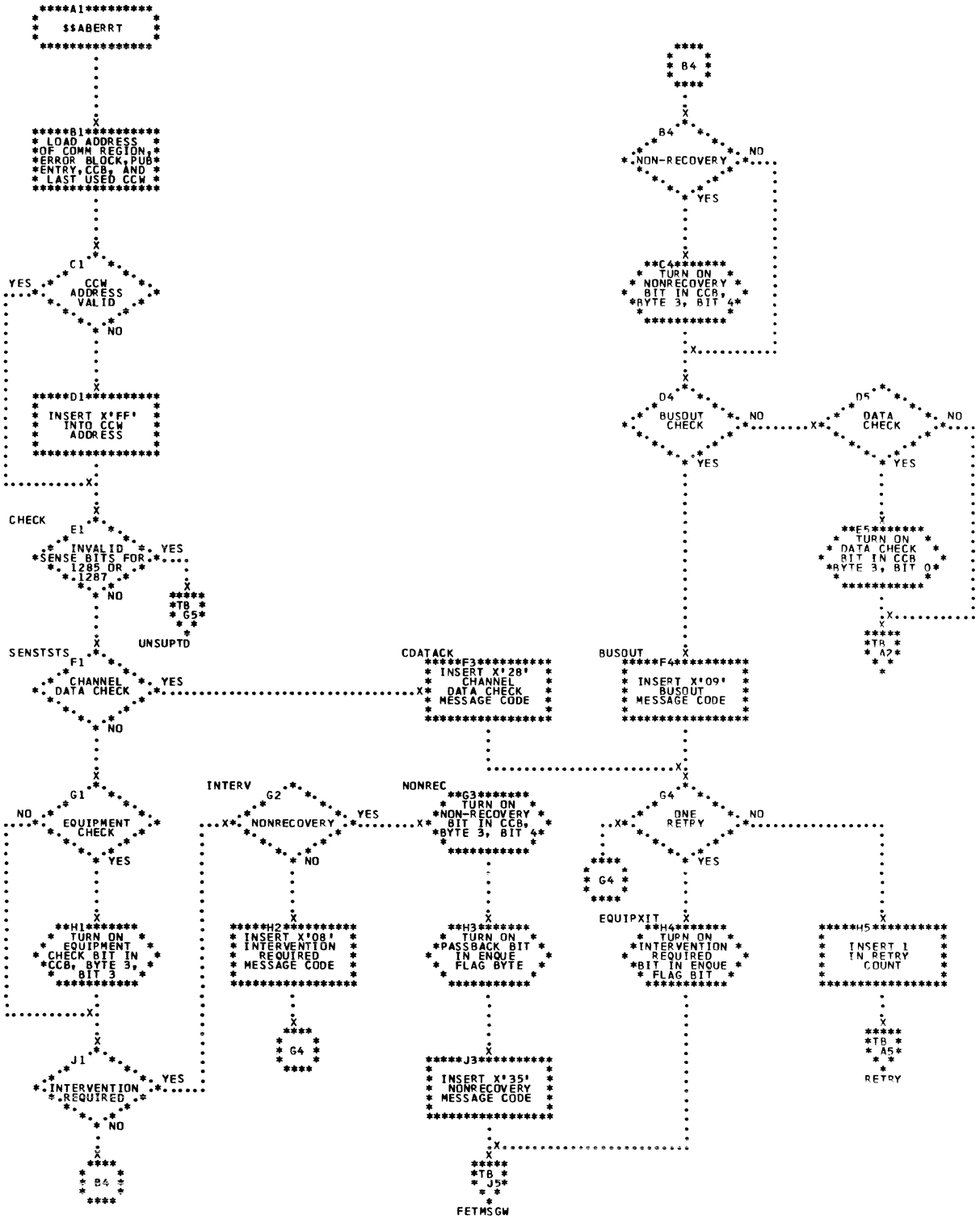


Chart TB. $$ABERRT - 1287, 1288 CCR ERP (Part 2 of 2)
Refer to Chart 02.

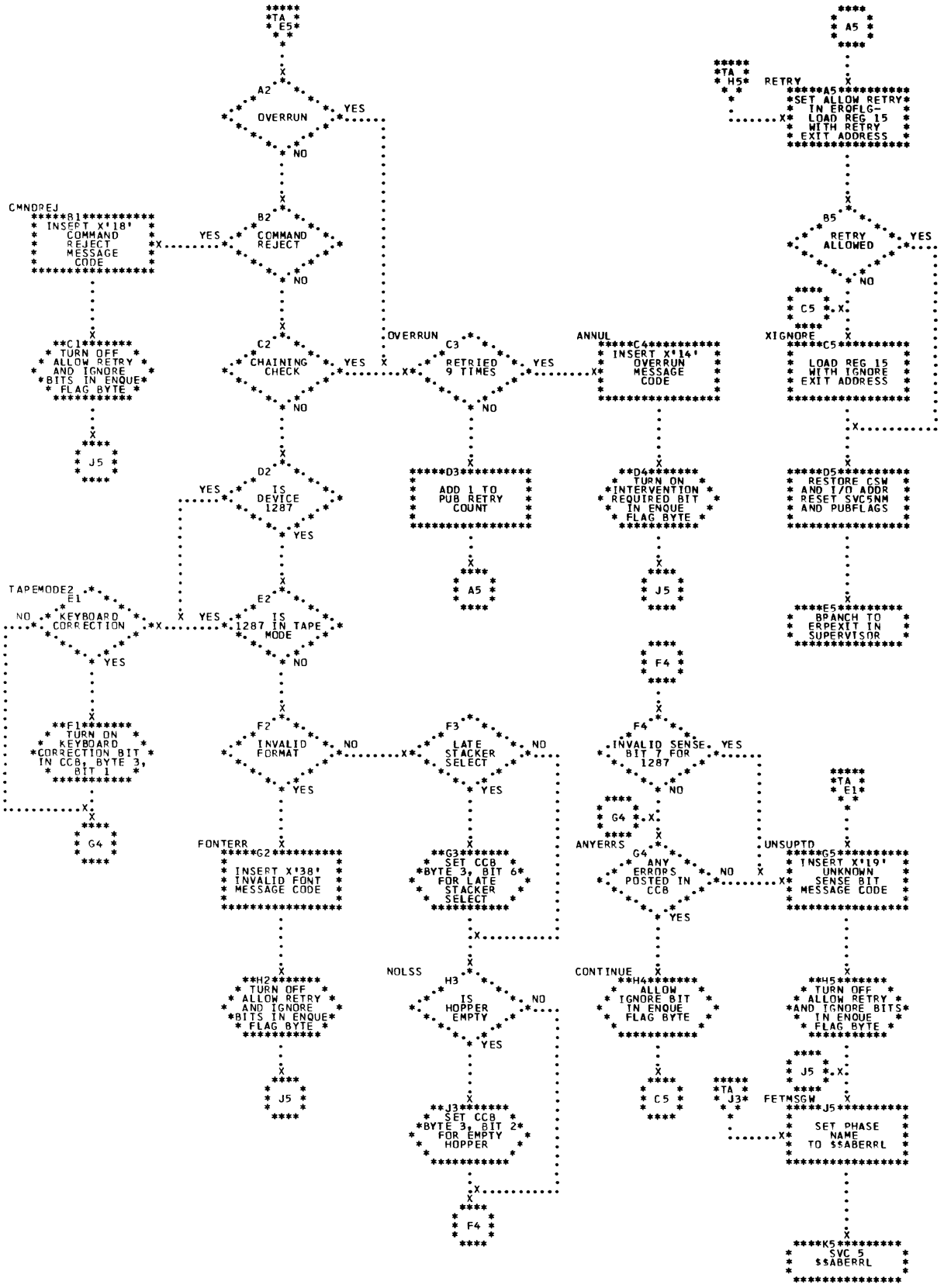


Chart TC. $$ABERRI - 2495 Tape Cartridge Reader ERP (Part 1 of 4)
Refer to Chart 02.

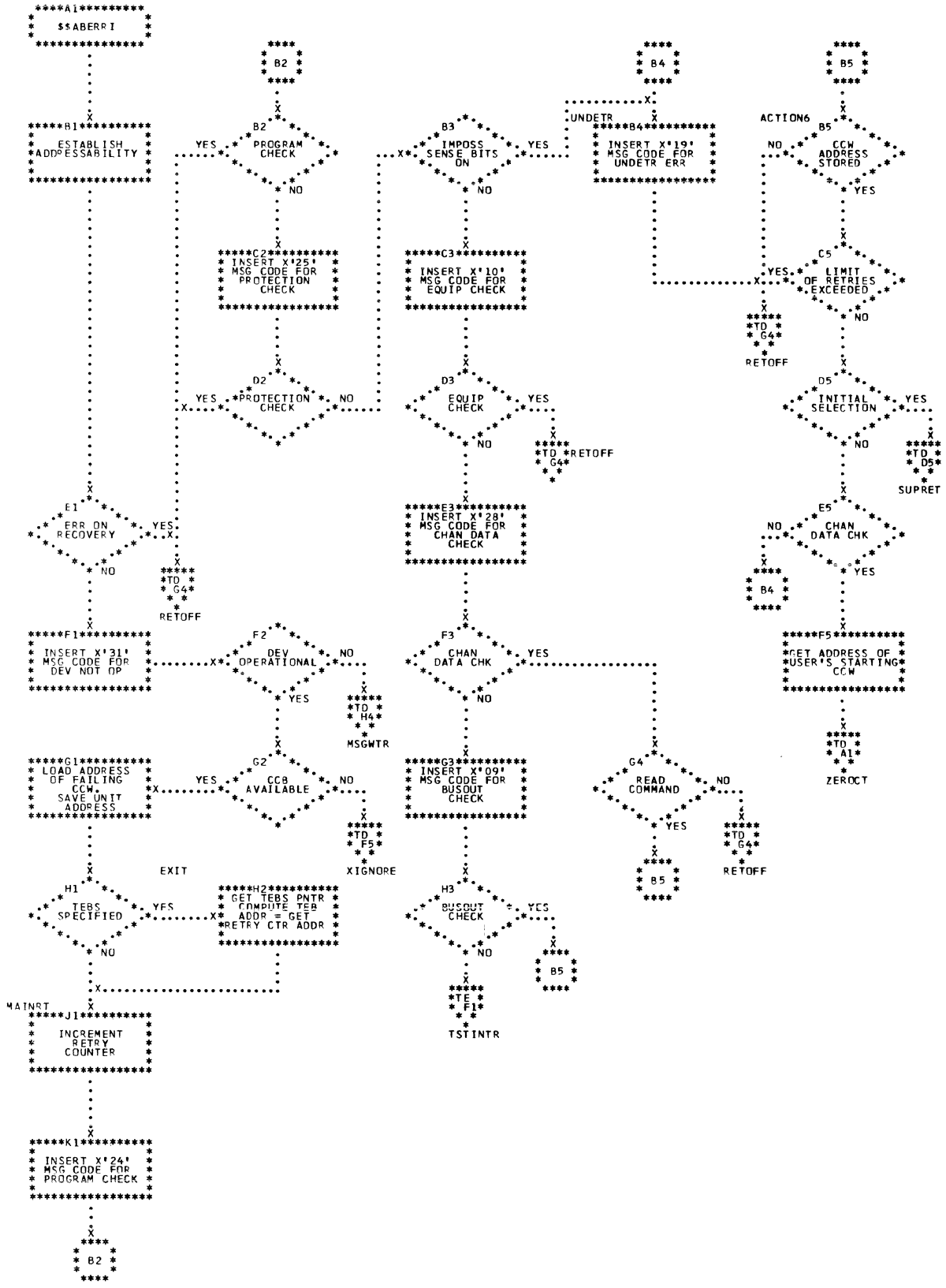


Chart ID. $$ABERRI - 2495 Tape Cartridge Reader ERP (Part 2 of 4)
Refer to Chart 02.

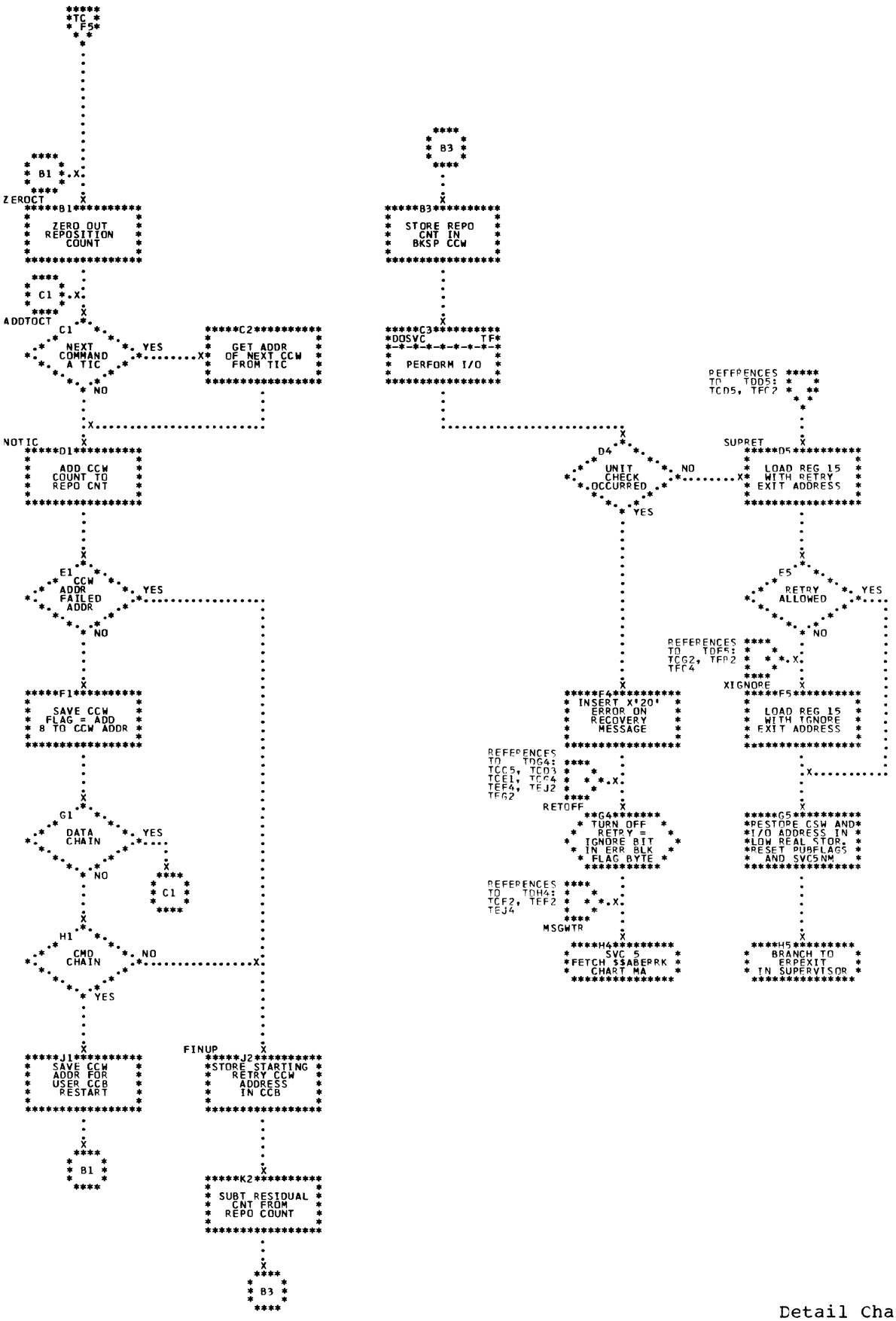


Chart TE. $$AERRI - 2495 Tape Cartridge Reader ERP (Part 3 of 4)
Refer to Chart 02.

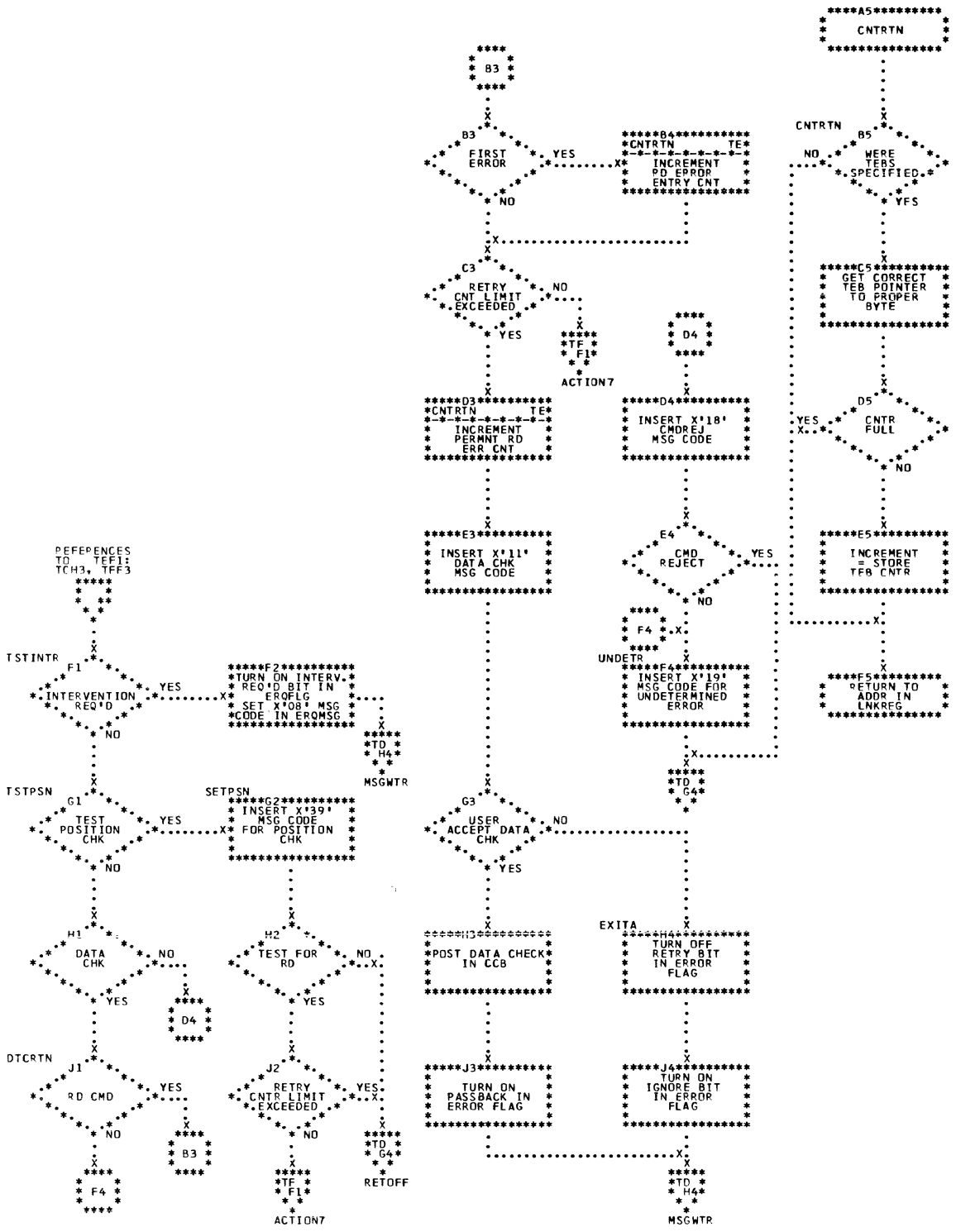


Chart TF. $$ABERRI - 2495 Tape Cartridge Reader ERP (Part 4 of 4)
Refer to Chart 02.

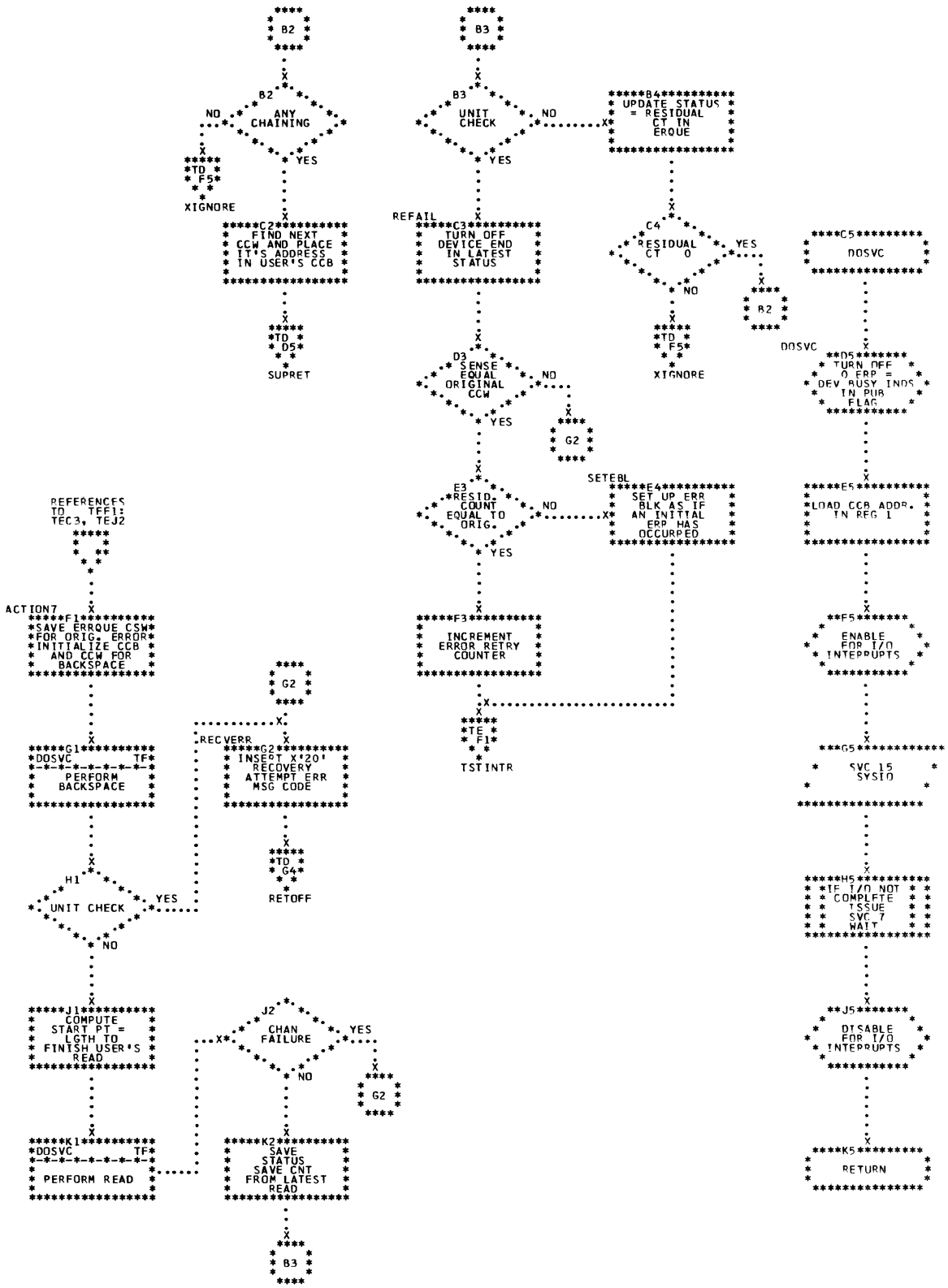


Chart TG. $$AEERRU - 1017/1018 Paper Tape ERP (Part 1 of 3)
Refer to Chart 02.

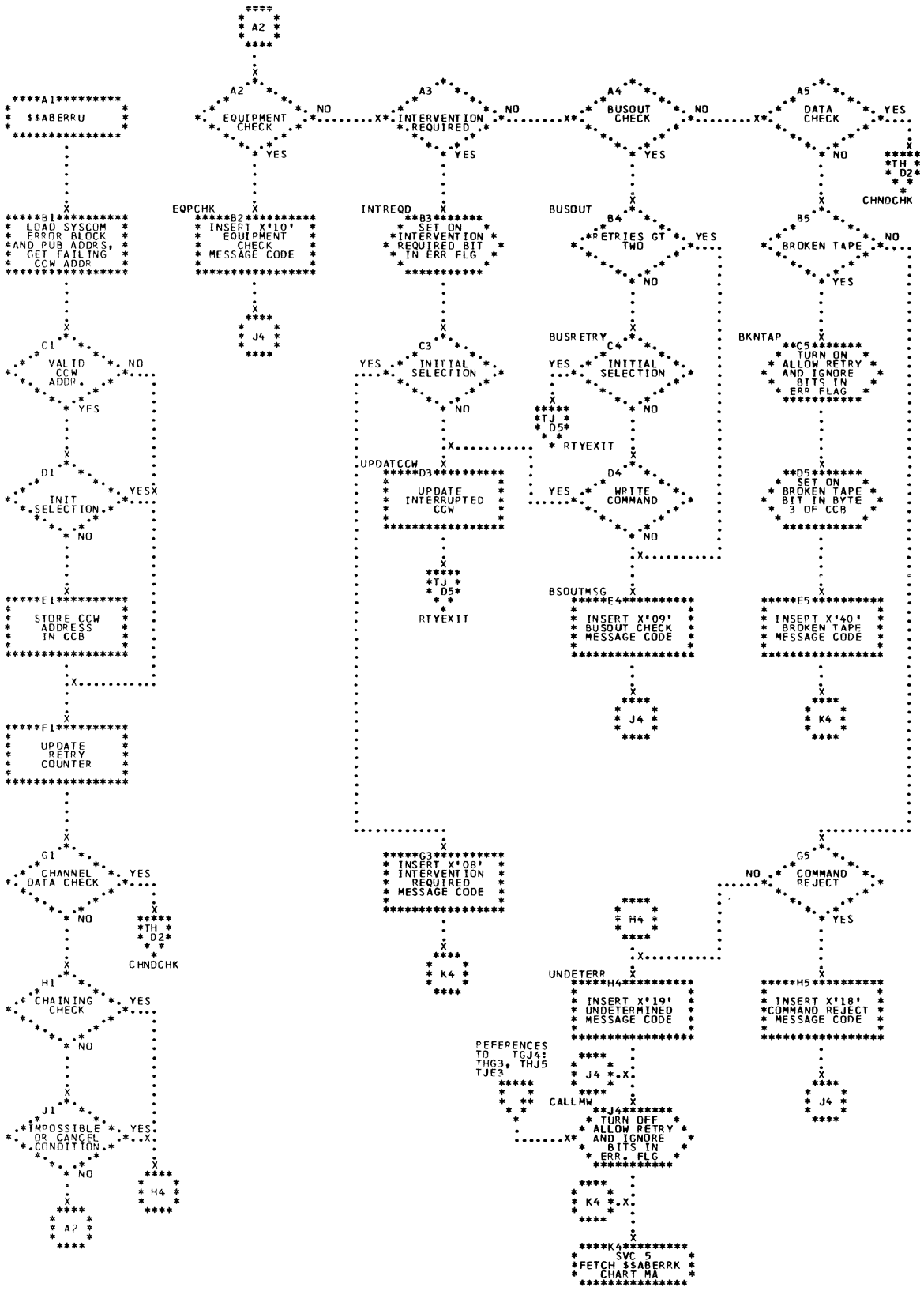


Chart TH. $$ABERRU - 1017/1018 Paper Tape ERP (Part 2 of 3)
Refer to Chart 02.

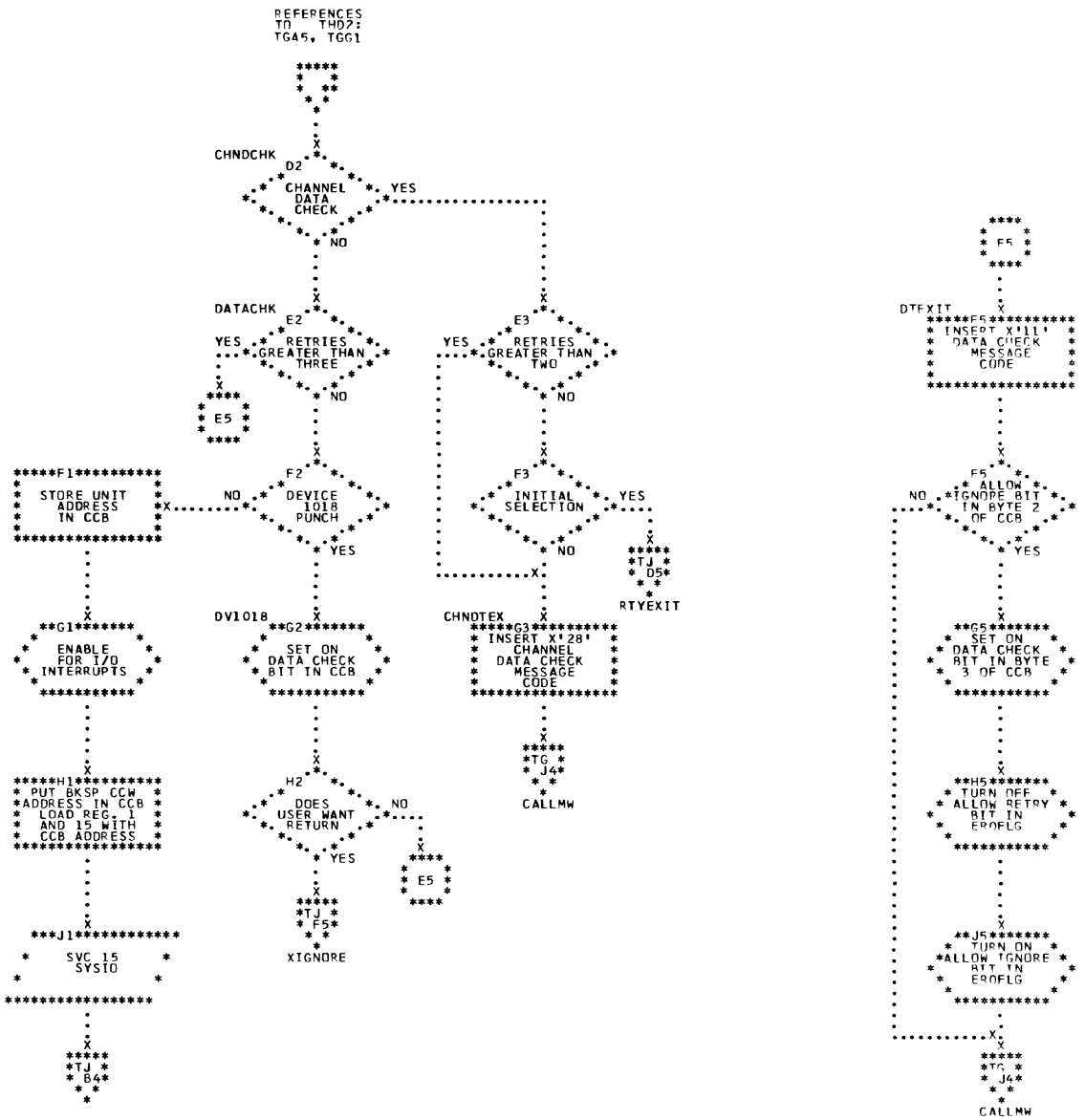


Chart TJ. $$AEERRU - 1017/1018 Paper Tape ERP (Part 3 of 3)
Refer to Chart 02.

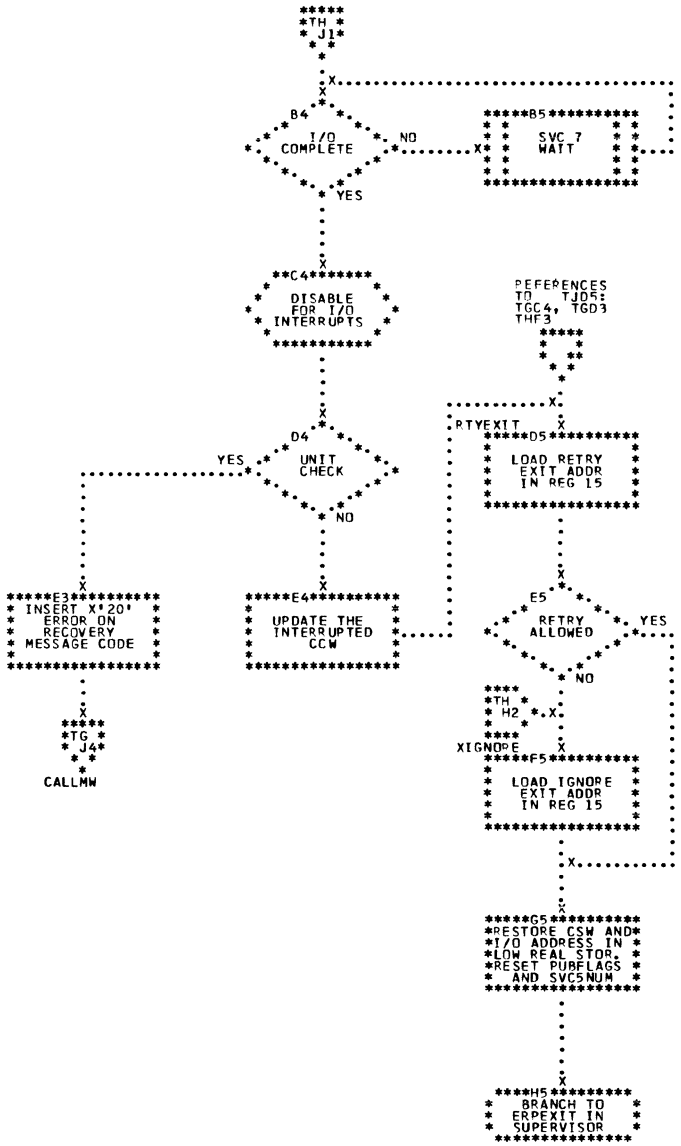


Chart TK. $$ABERRF - 3211 Printer ERP (Part 1 of 4)
Refer to Chart 02.

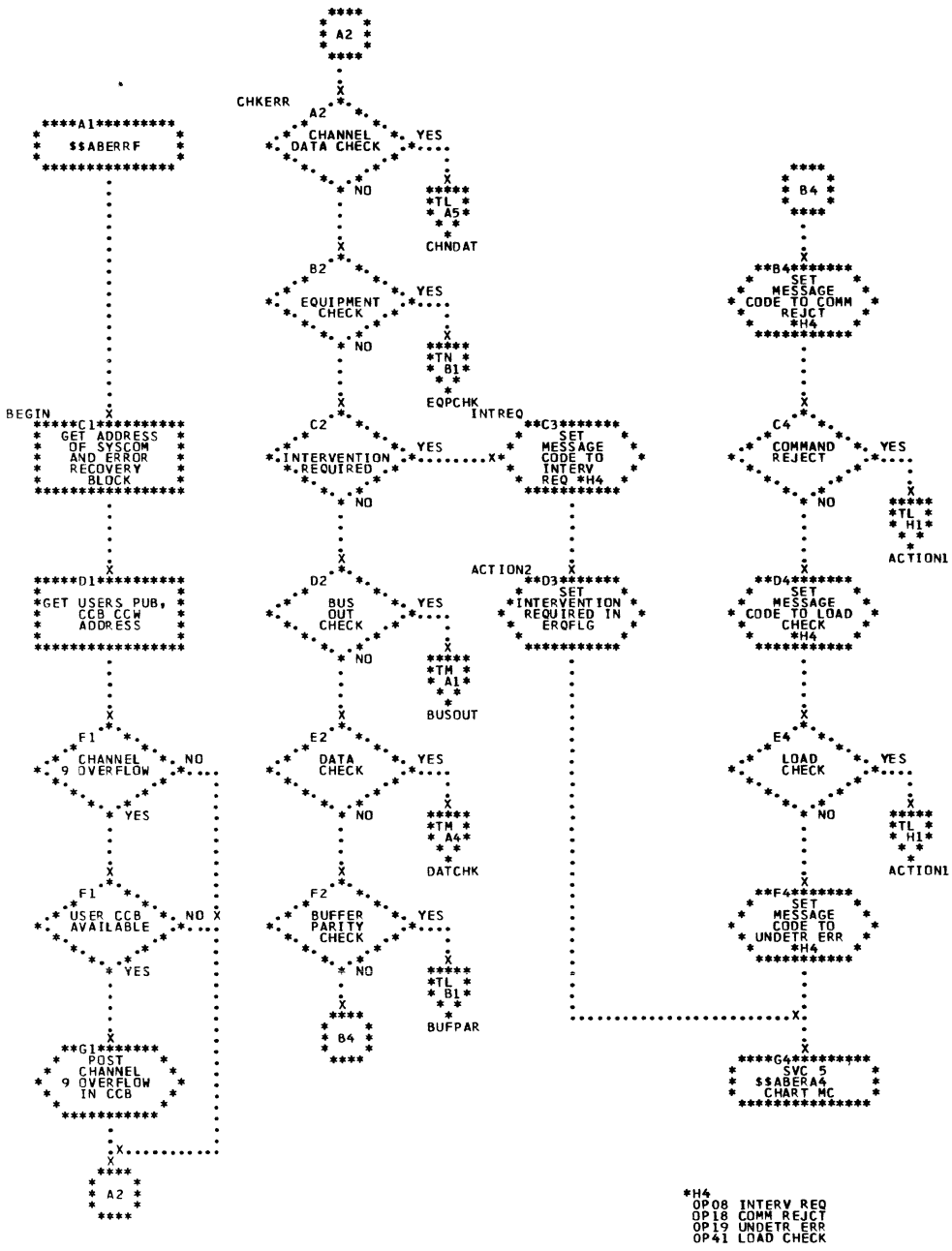


Chart TL. $$AEERRF - 3211 Printer ERP (Part 2 of 4)
Refer to Chart 02.

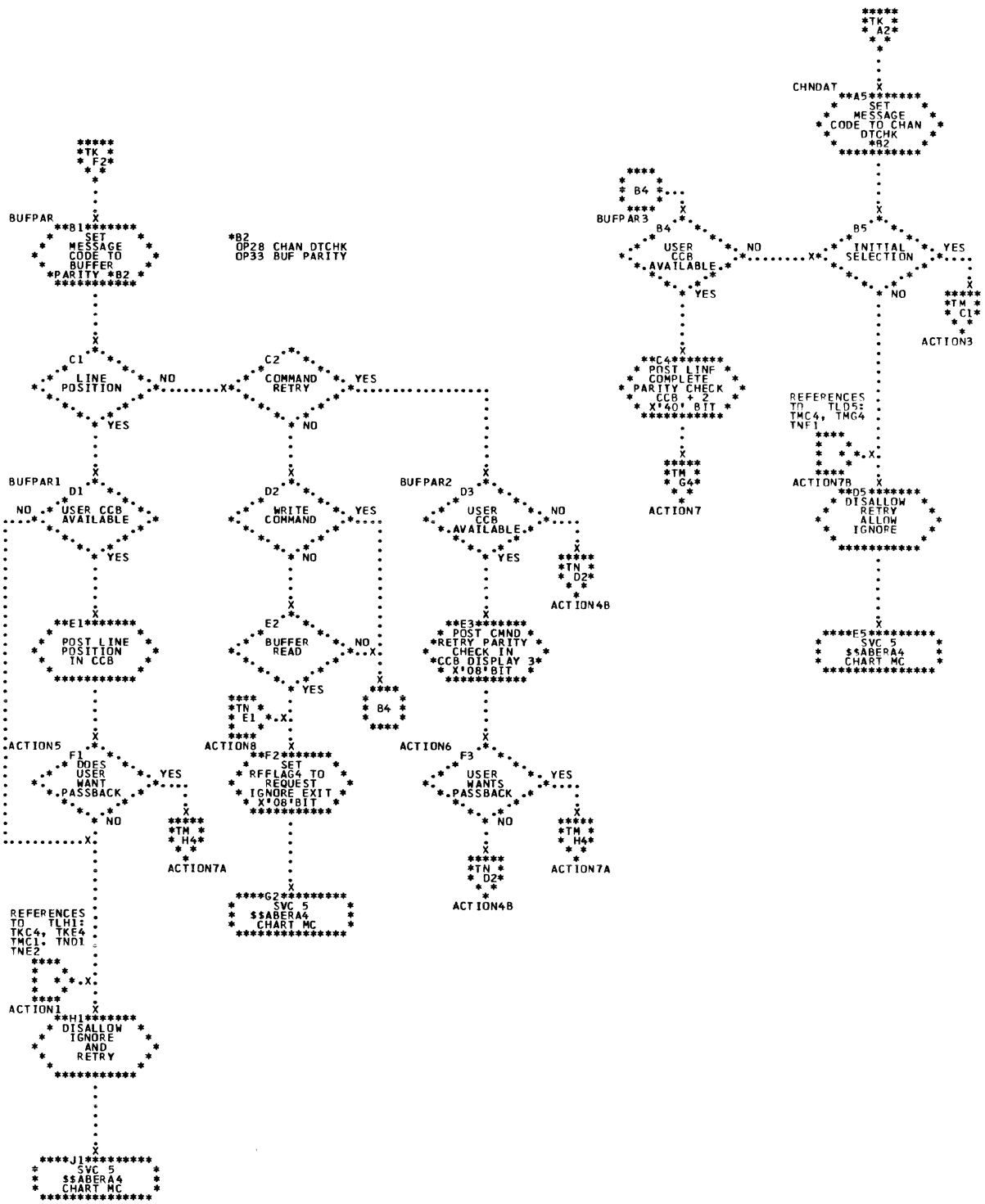


Chart TM. $$ABERRF - 3211 Printer ERP (Part 3 of 4)
Refer to Chart 02.

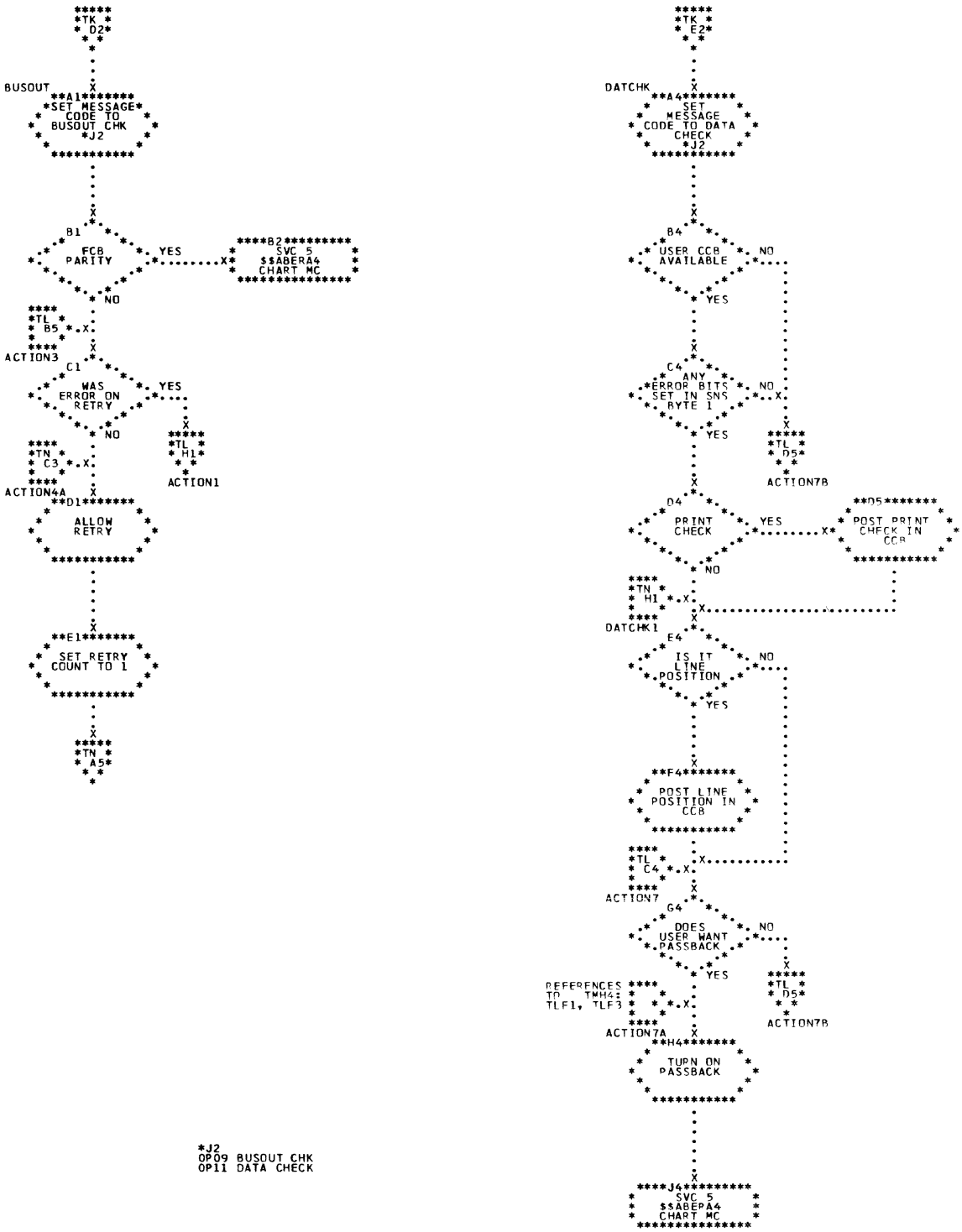


Chart TN. $$ABERRF - 3211 Printer ERP (Part 4 of 4)
Refer to Chart 02.

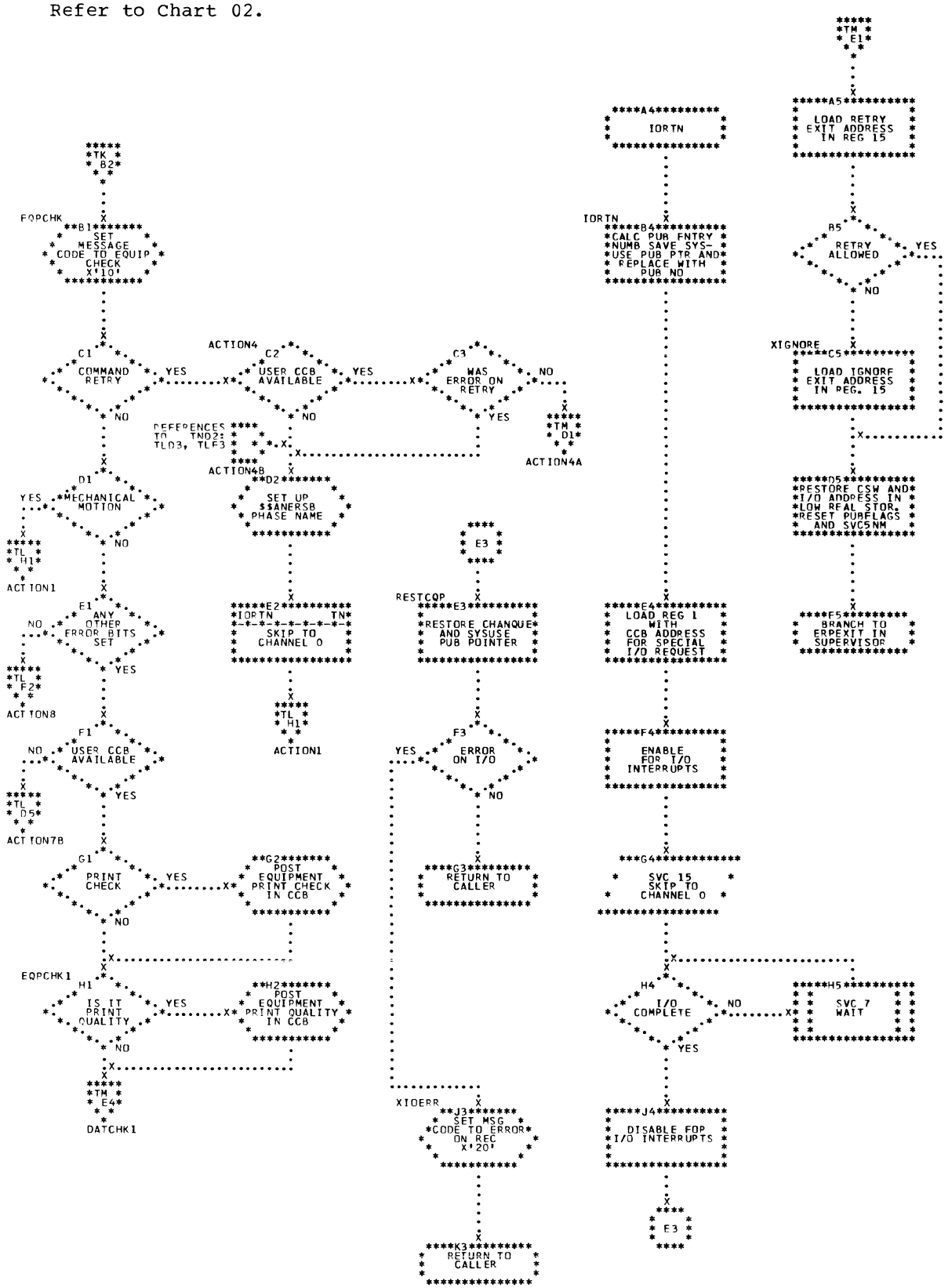


Chart TP. $$ABERRP - 3211 MDR Reccrd Builder (Phase 1) (Part 1 of 3)
Refer to Chart 07.

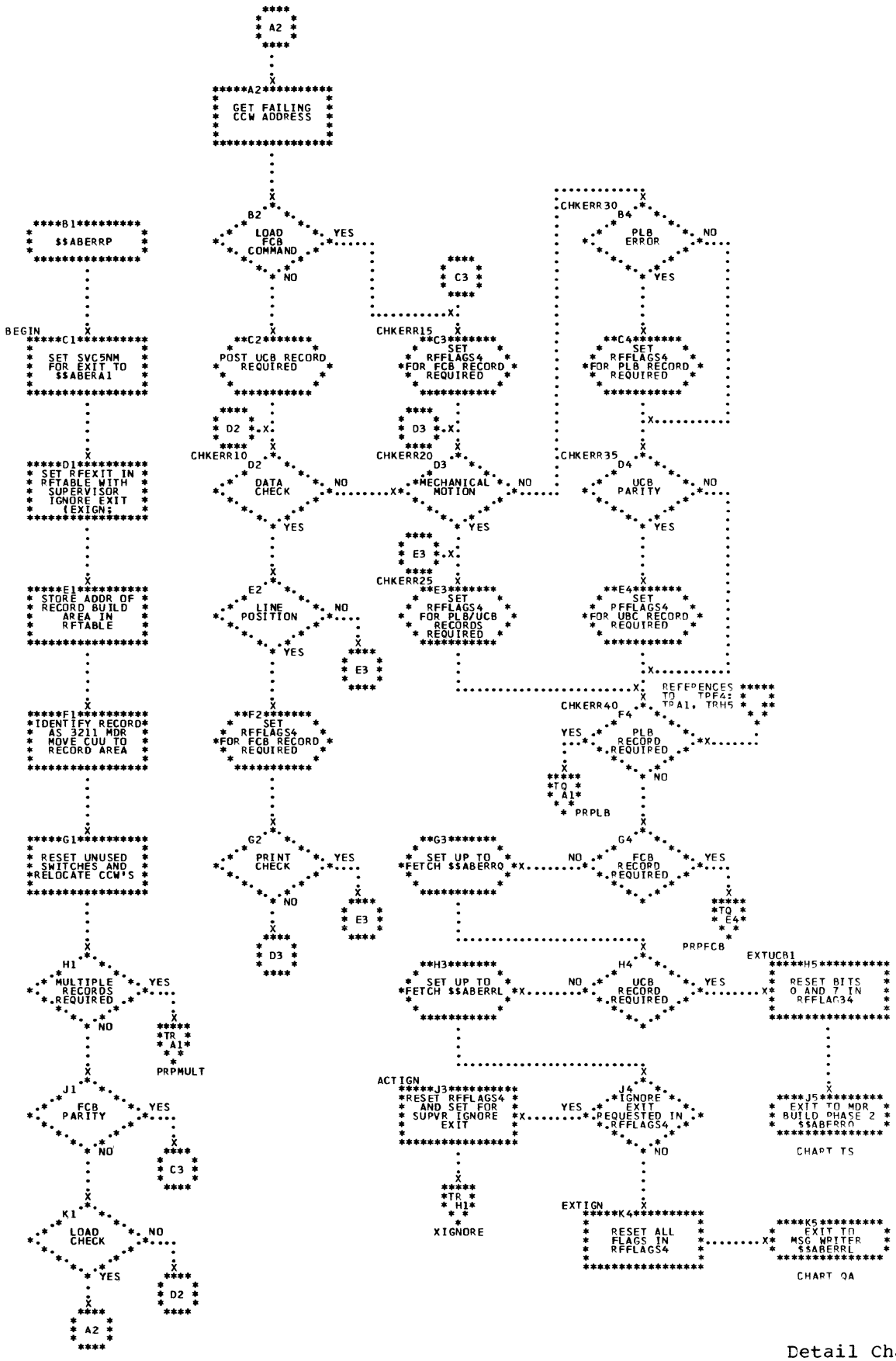


Chart TQ. $$ABERRP - 3211 MDR Record Builder (Phase 1) (Part 2 of 3)
Refer to Chart 07.

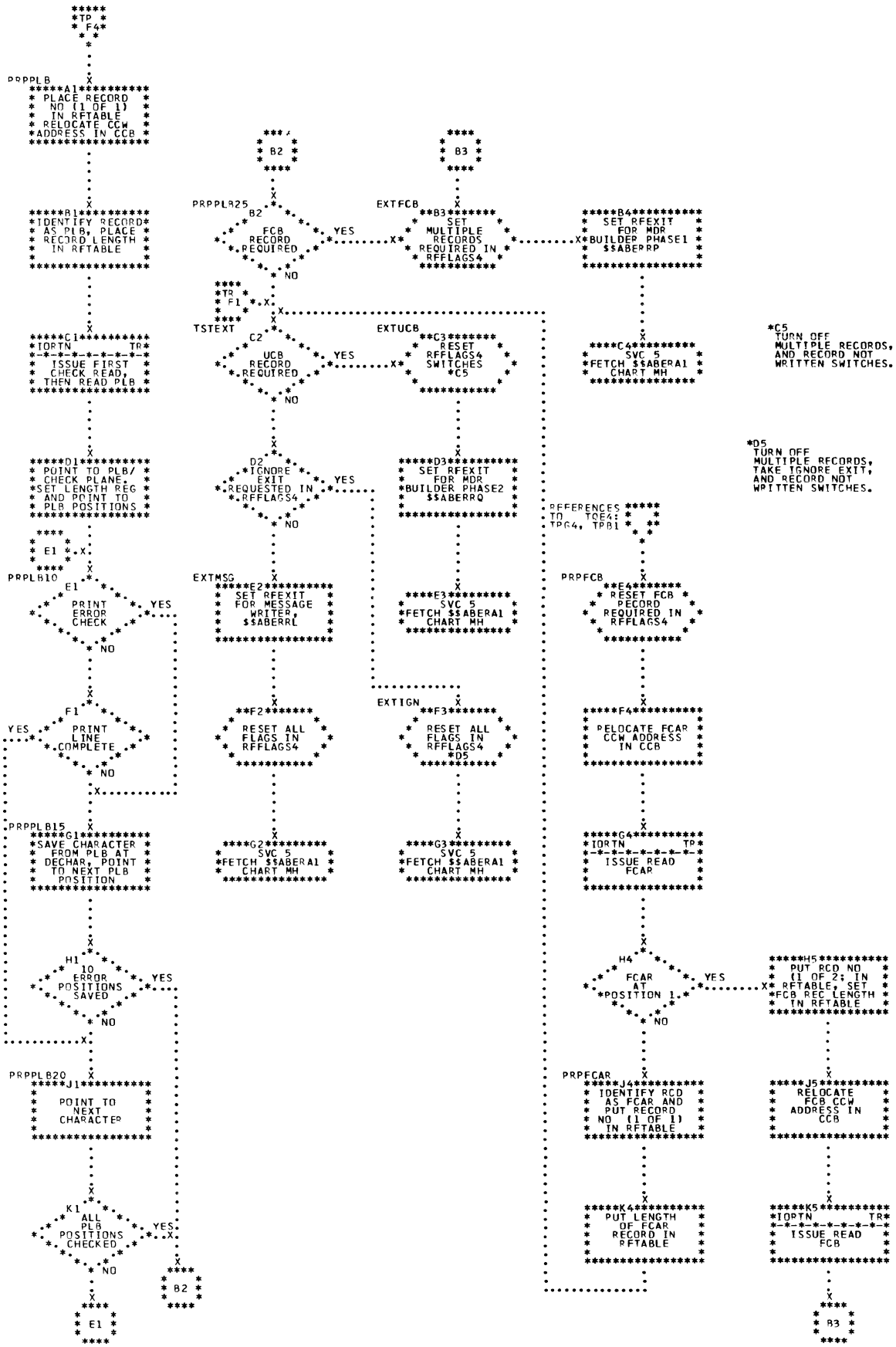


Chart TR. $$ABERRP - 3211 MDR Reccrd Builder (Phase 1) (Part 3 of 3)
Refer to Chart 07.

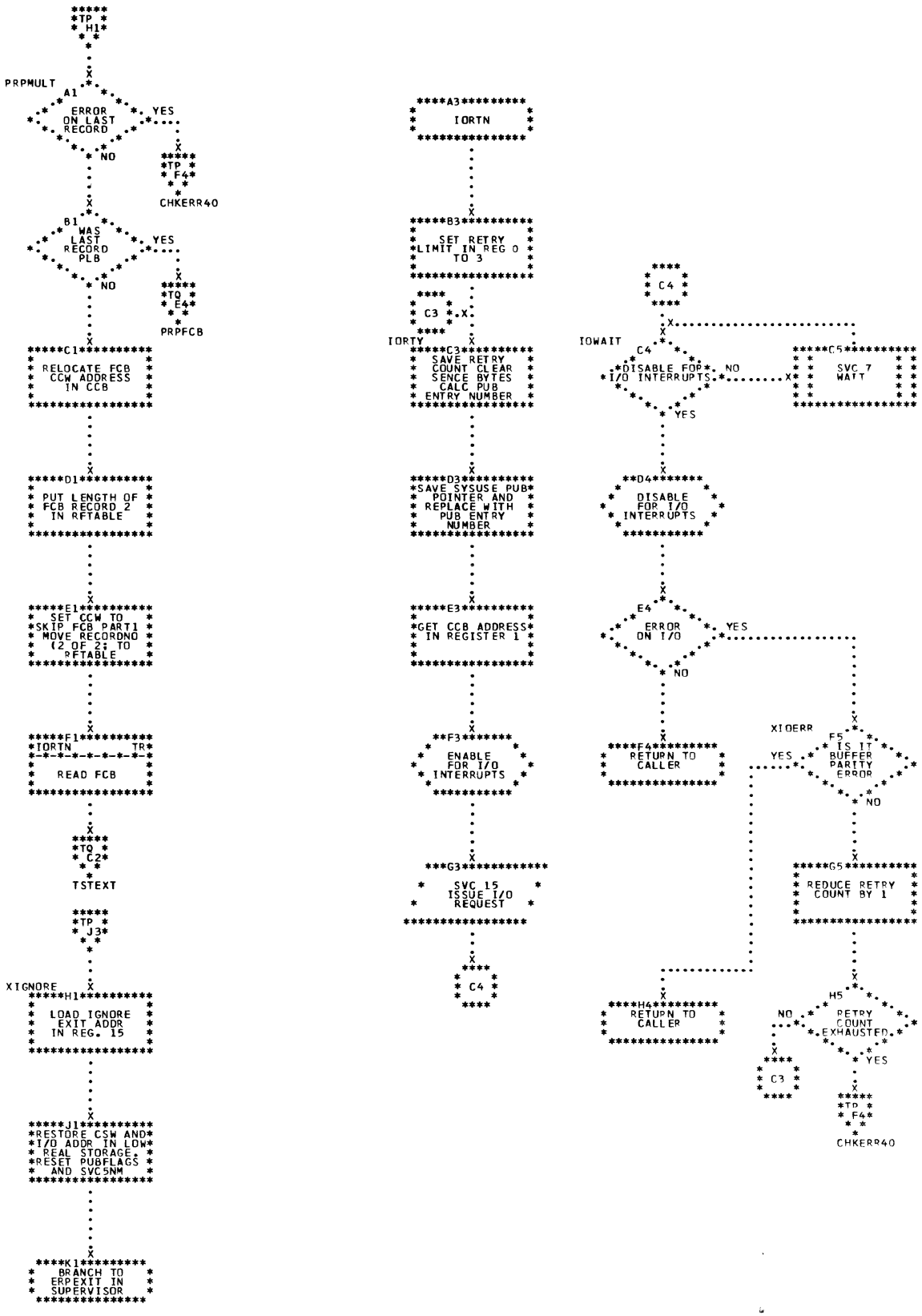


Chart TS. $$ABERRQ - 3211 MDR Record Builder (Phase 2) (Part 1 of 2)
Refer to Chart 07.

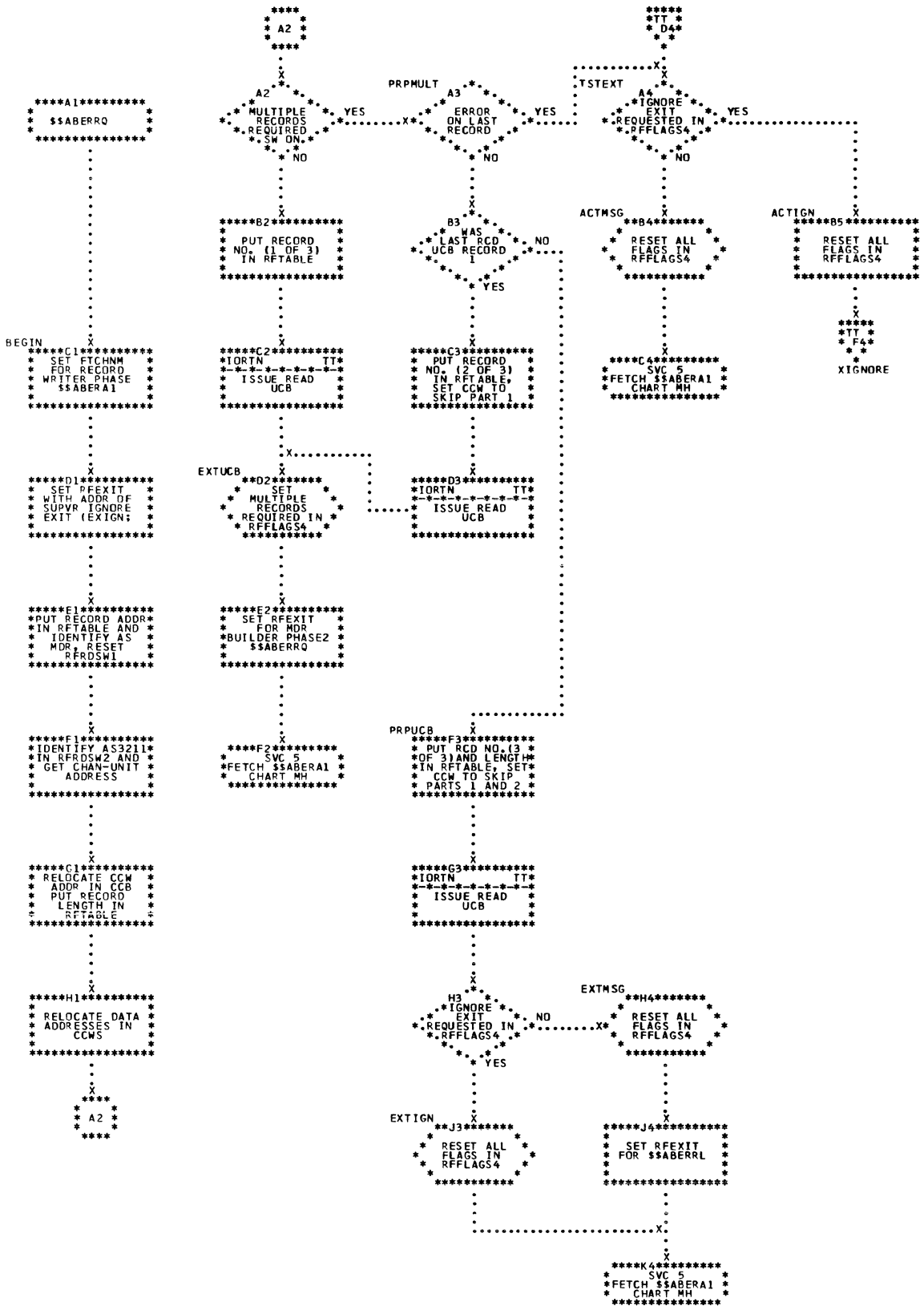


Chart TT. $$ABERRQ - 3211 MDR Reccrd Builder (Phase 2) (Part 2 of 2)
Refer to Chart 07.

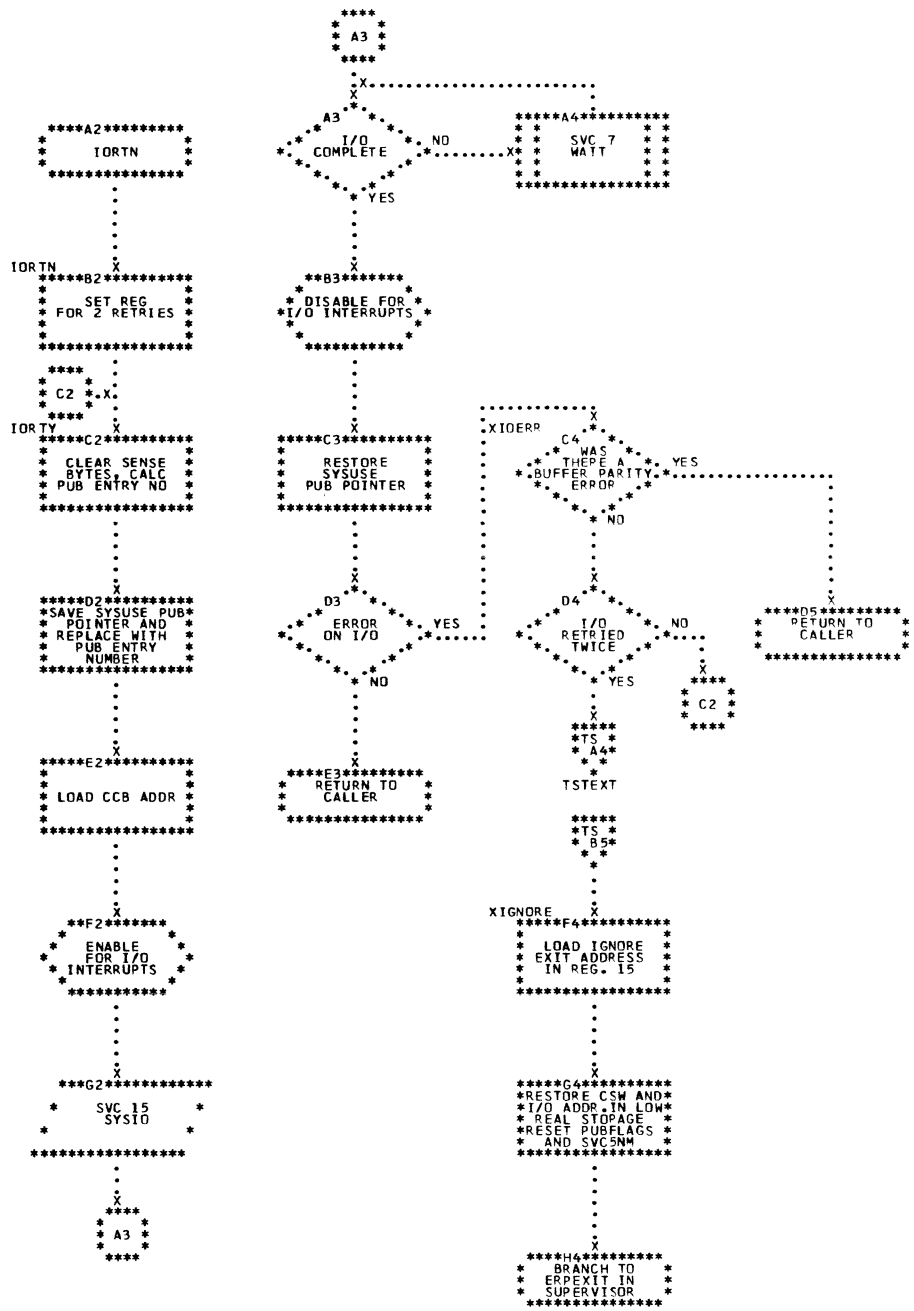


Chart TU. $$ABERRG - 3505 Card Reader and 3525 Card Punch ERP (Part 1 of 2)
Refer to Chart 02.

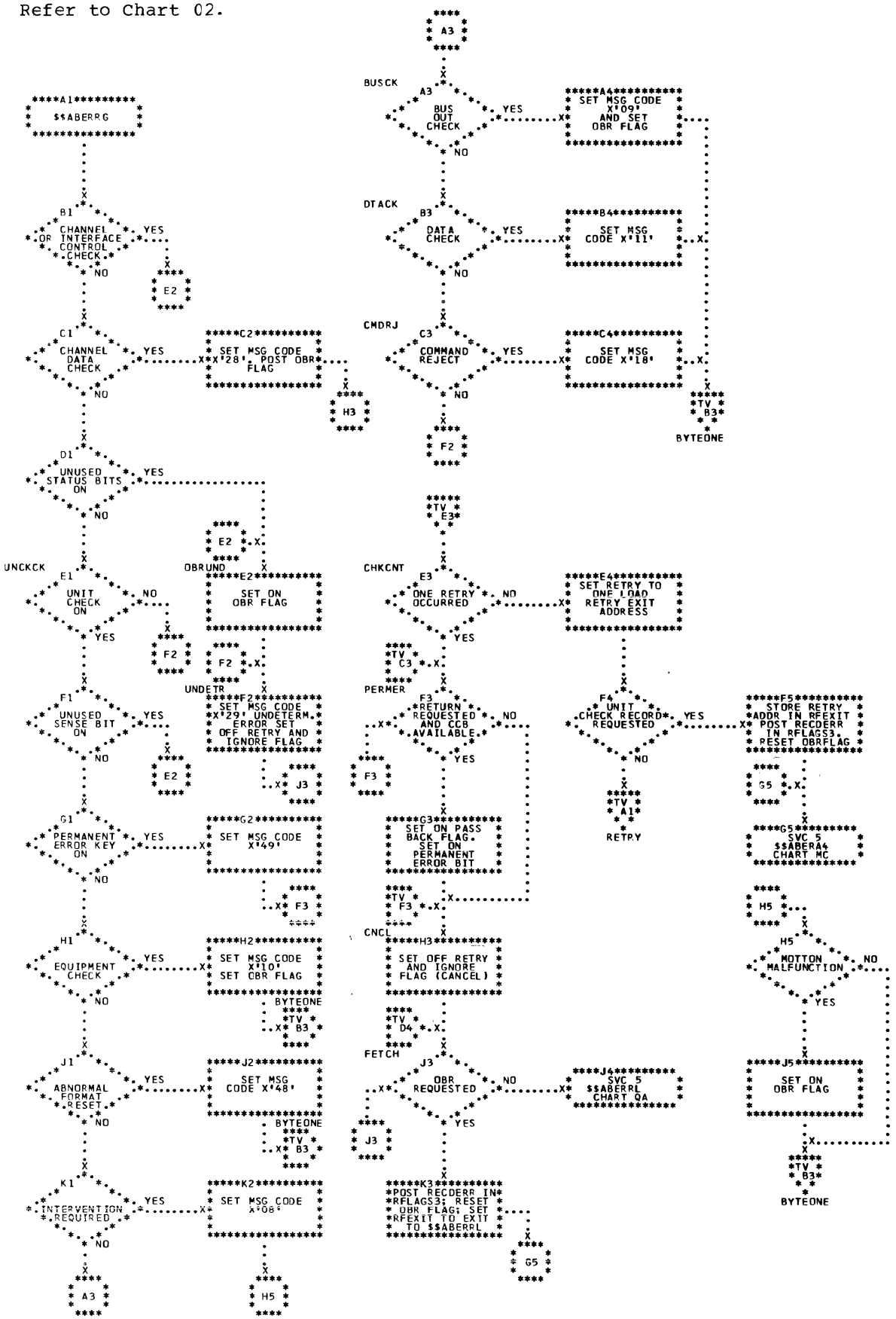


Chart TV. $$ABERRG - 3505 Card Reader and 3525 Card Punch ERP (Part 2 cf 2)
Refer to Chart 02.

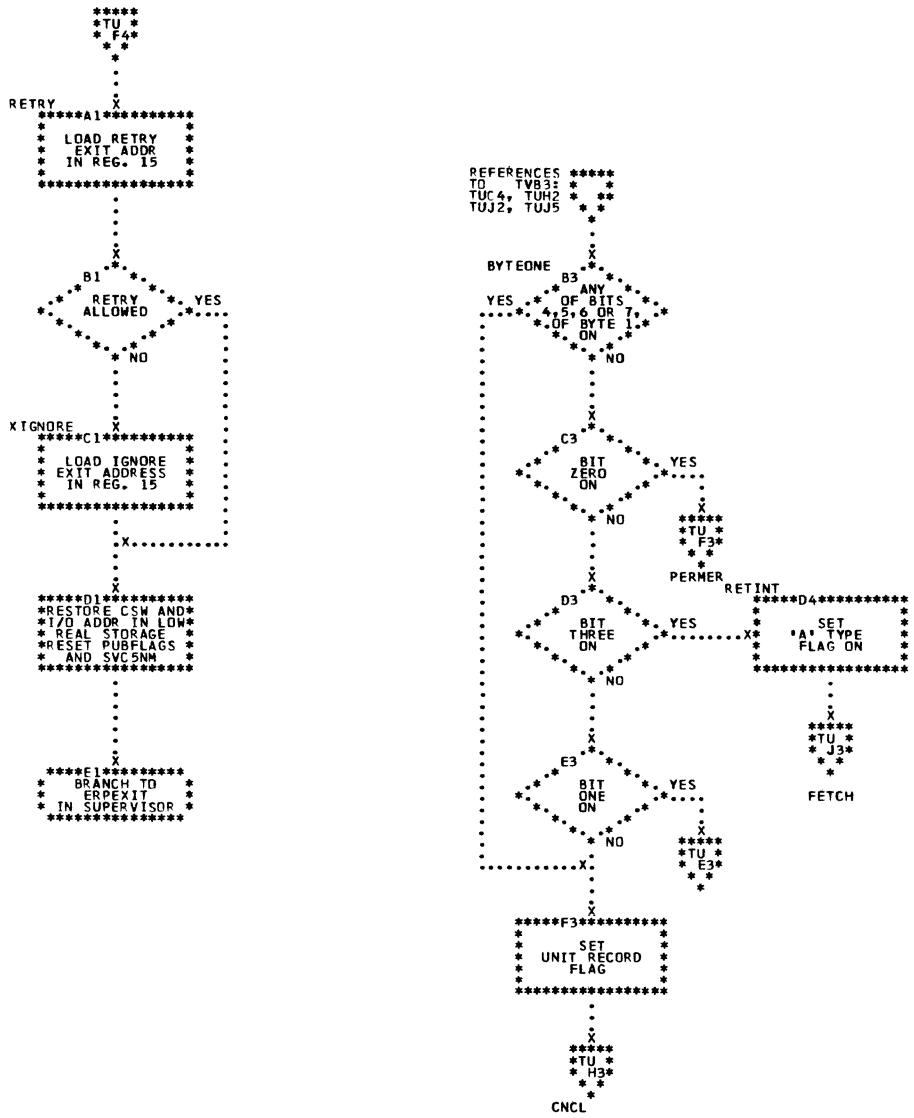


Chart TW. $$ABERAN - 3886 CCR Reader ERP (Part 1 of 4)
Refer to Chart 02.

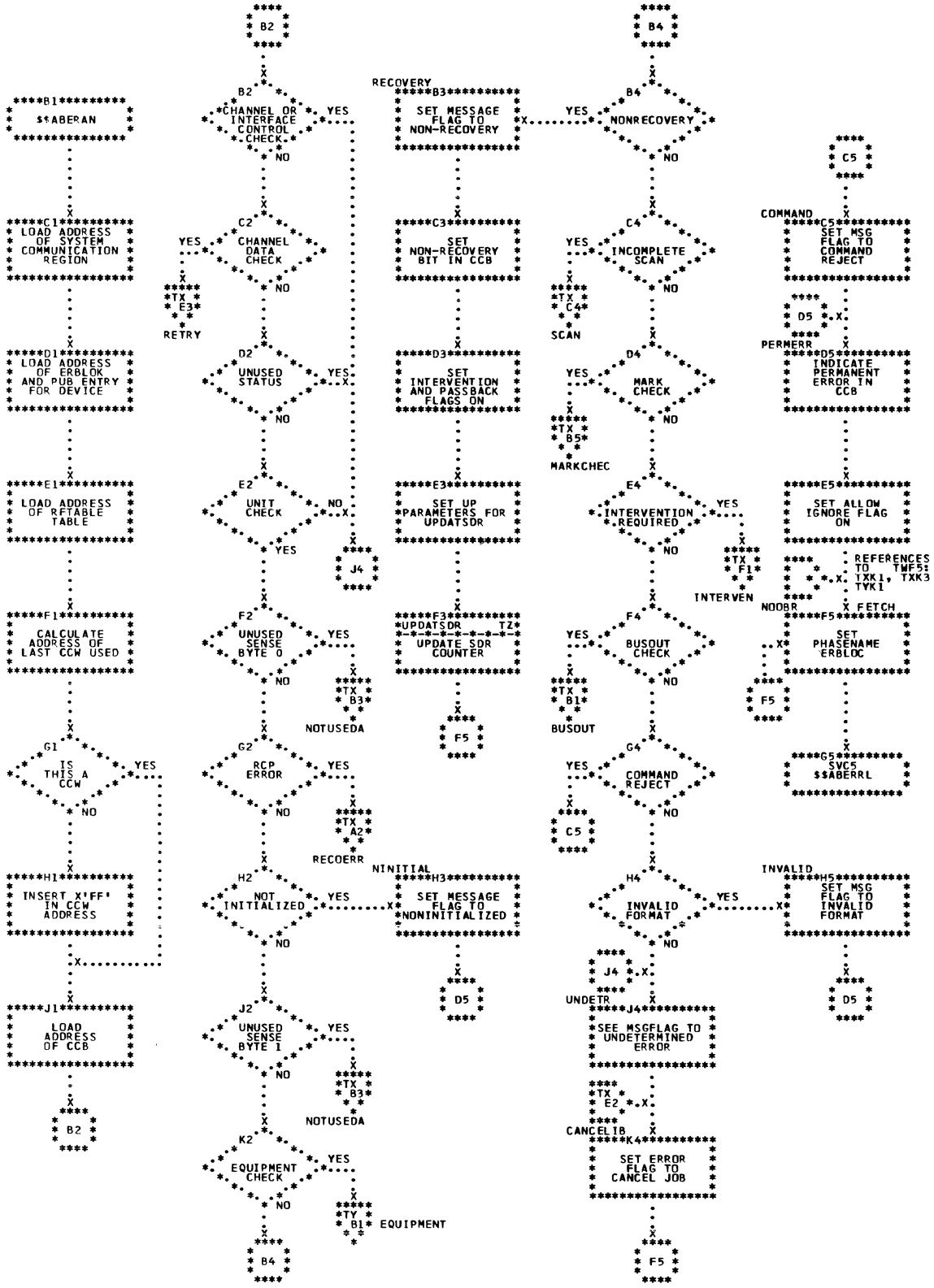


Chart TX. $$ABERAN - 3886 CCR Reader ERP (Part 2 of 4)
Refer to Chart 02.

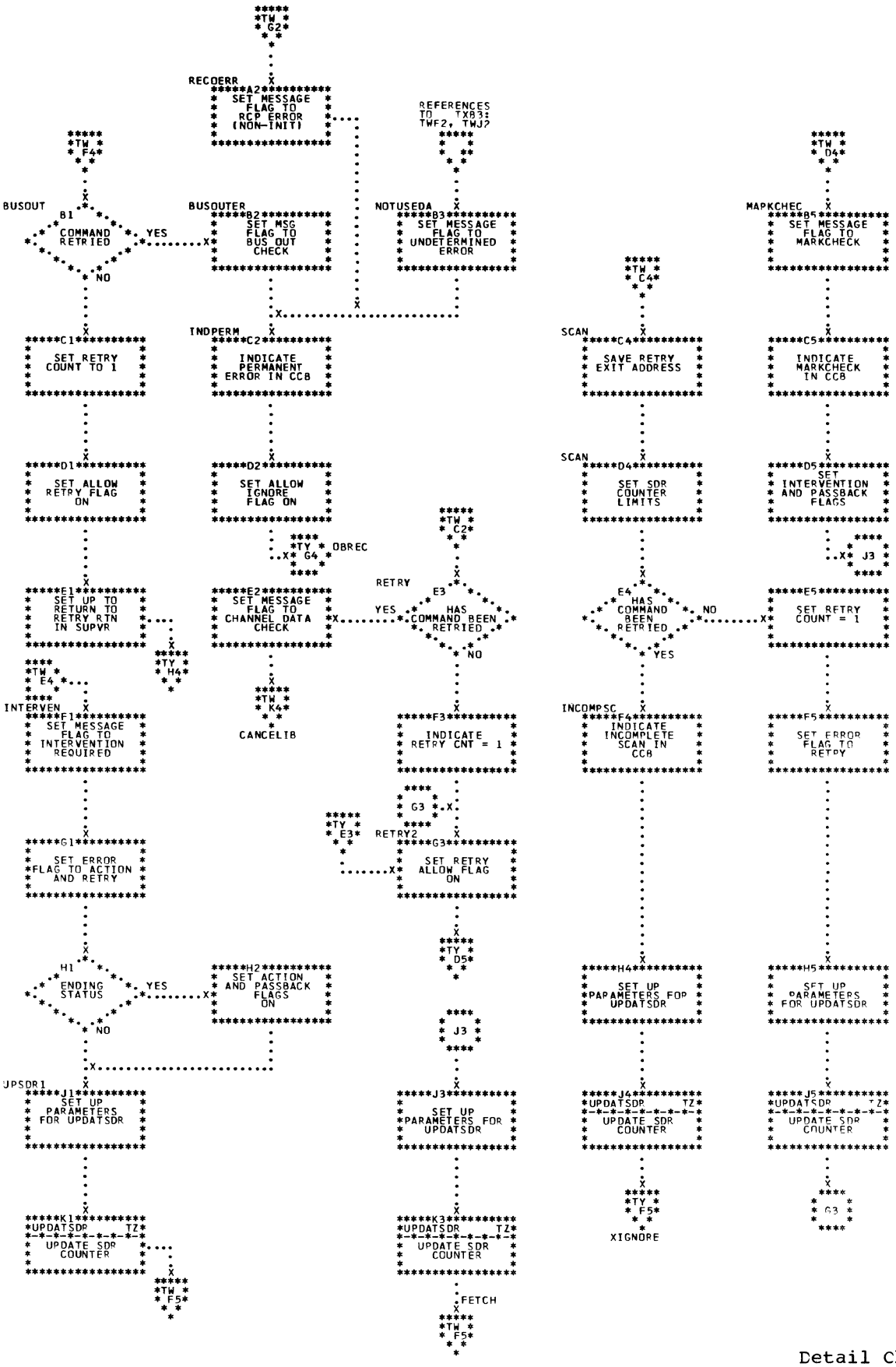


Chart TY. $$ABERAN - 3886 CCR Reader ERP (Part 3 of 4)
Refer to Chart 02.

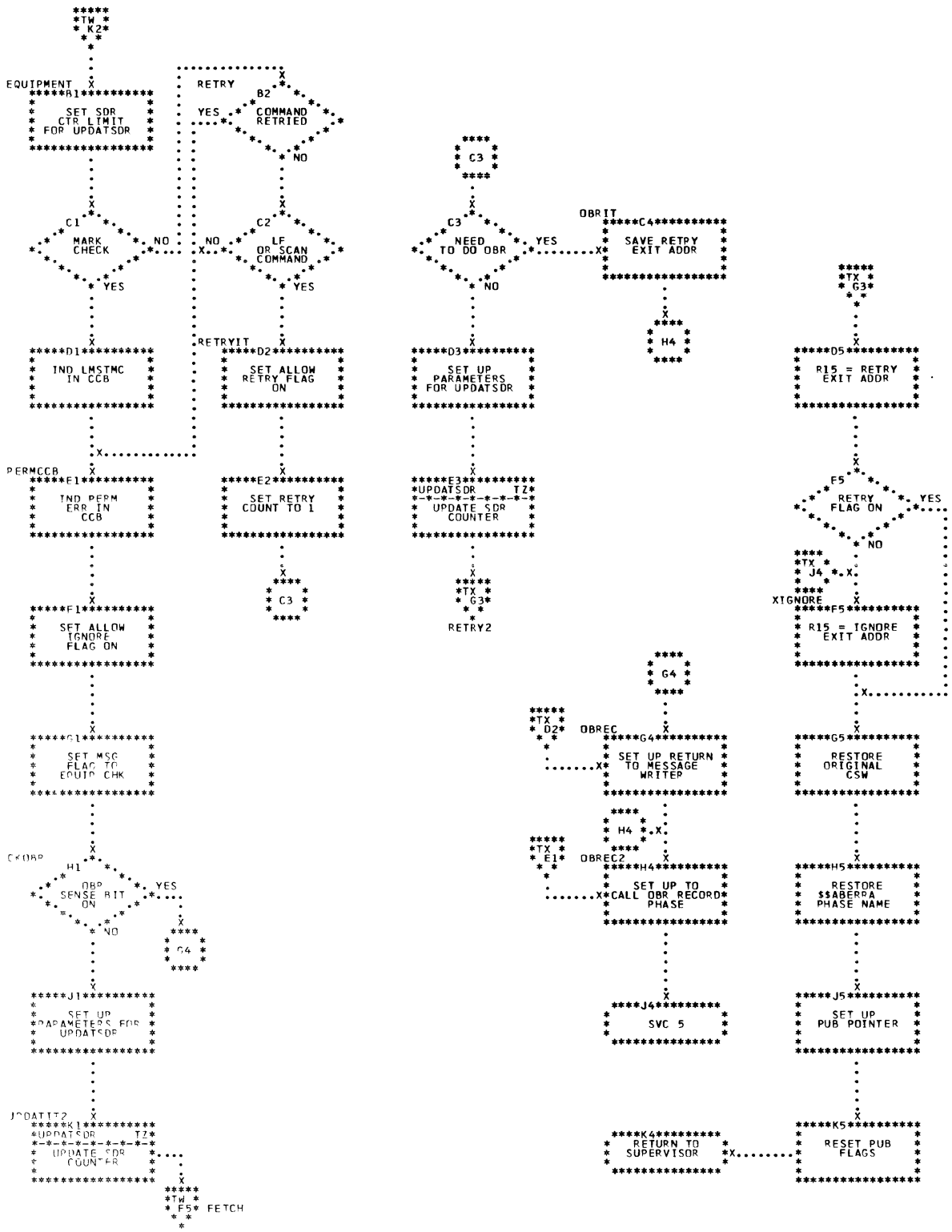


Chart TZ. $$ABERAN - 3886 CCR Reader ERP (Part 4 of 4)
Refer to Chart 02.

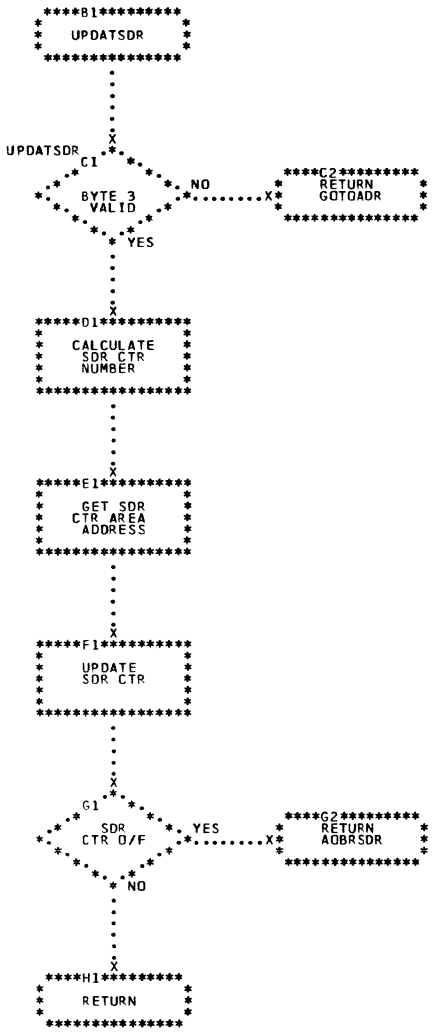


Chart UA. $$ABERRH - 2245 Printer ERP (Part 1 of 2)
Refer to Chart 02.

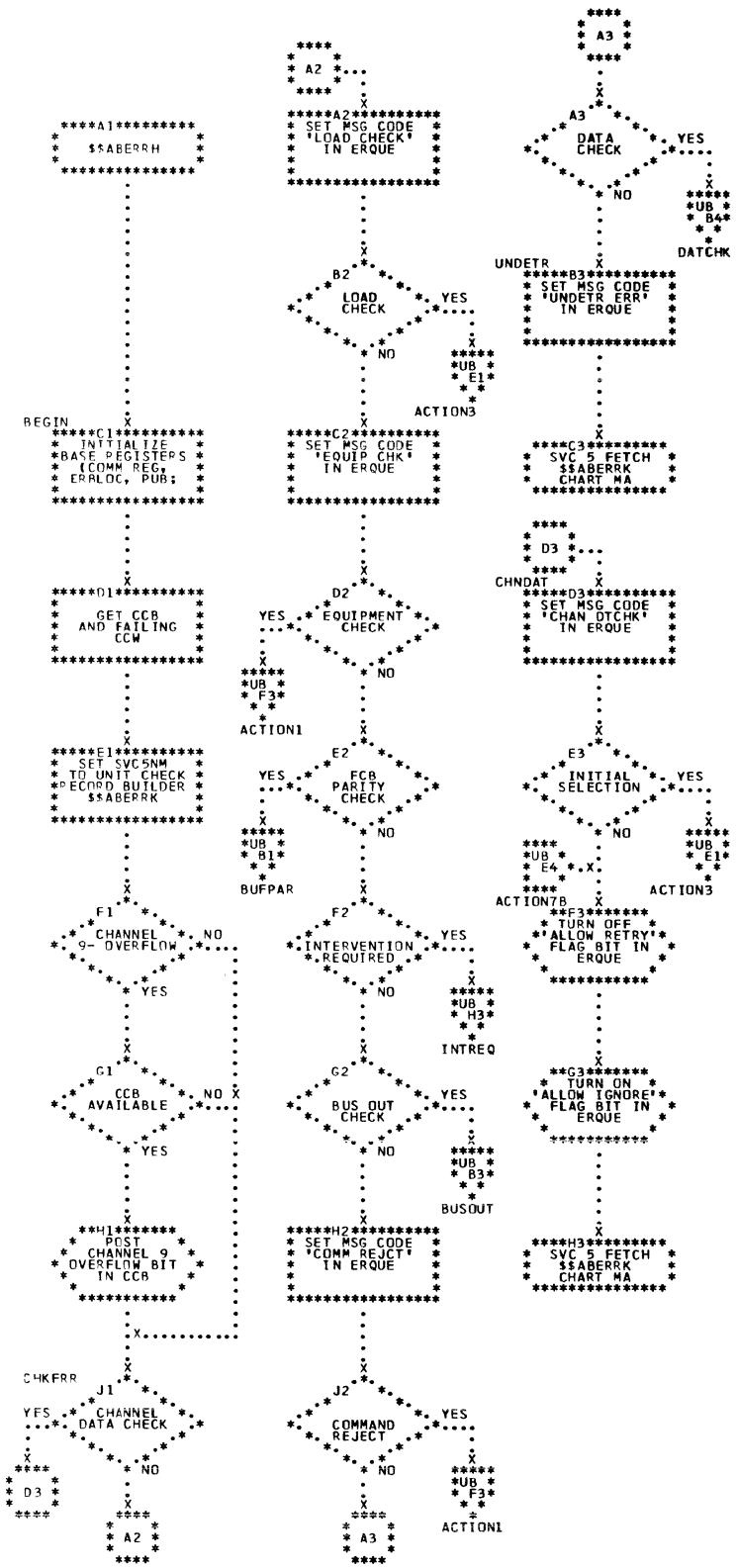


Chart UB. $$ABERRH - 2245 Printer ERP (Part 2 of 2)
Refer to Chart 02.

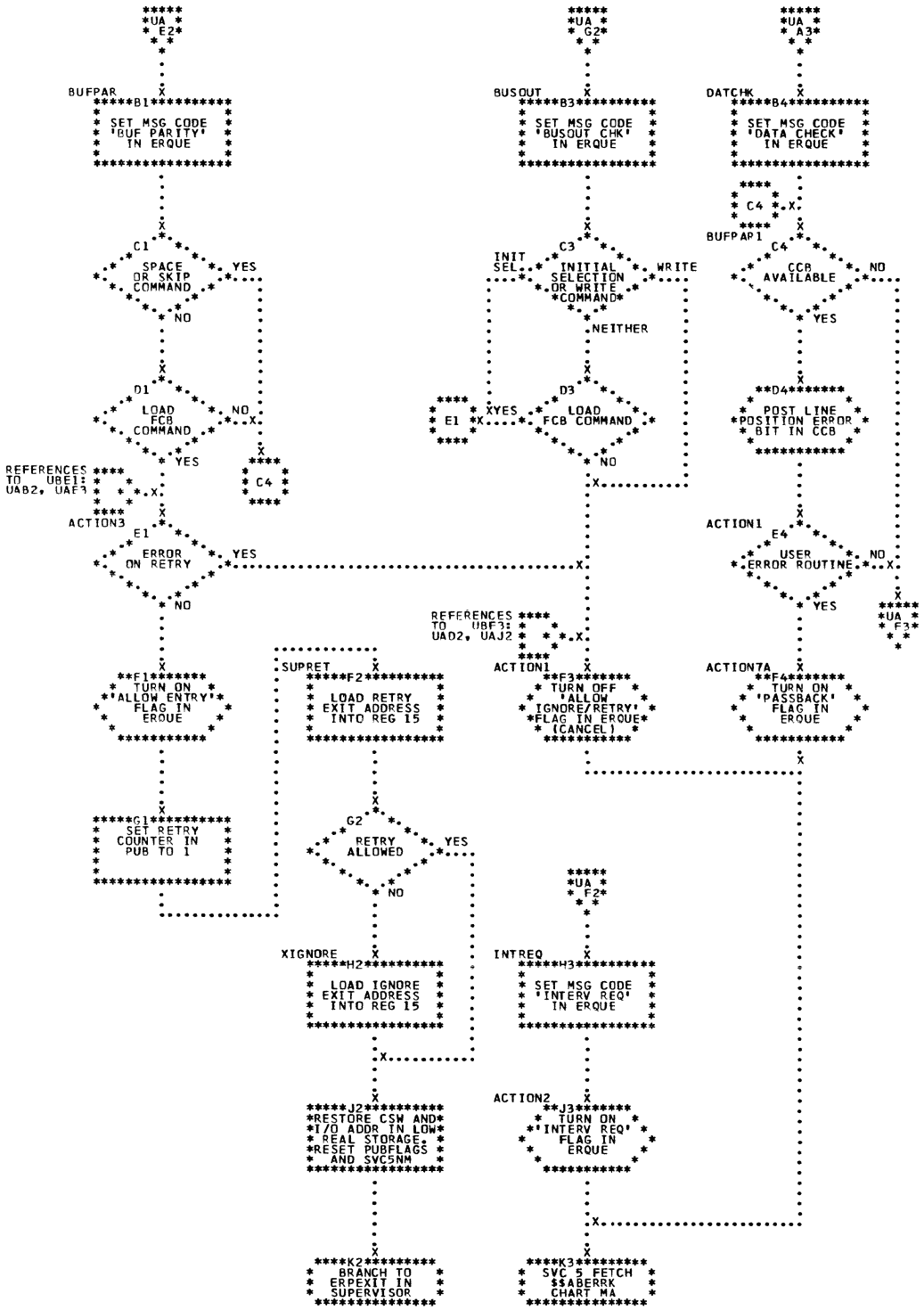


Chart VA. $$RAST00 - Initial Machine Check/Channel Check Analysis (Part 1 of 5)
Refer to Chart 04.

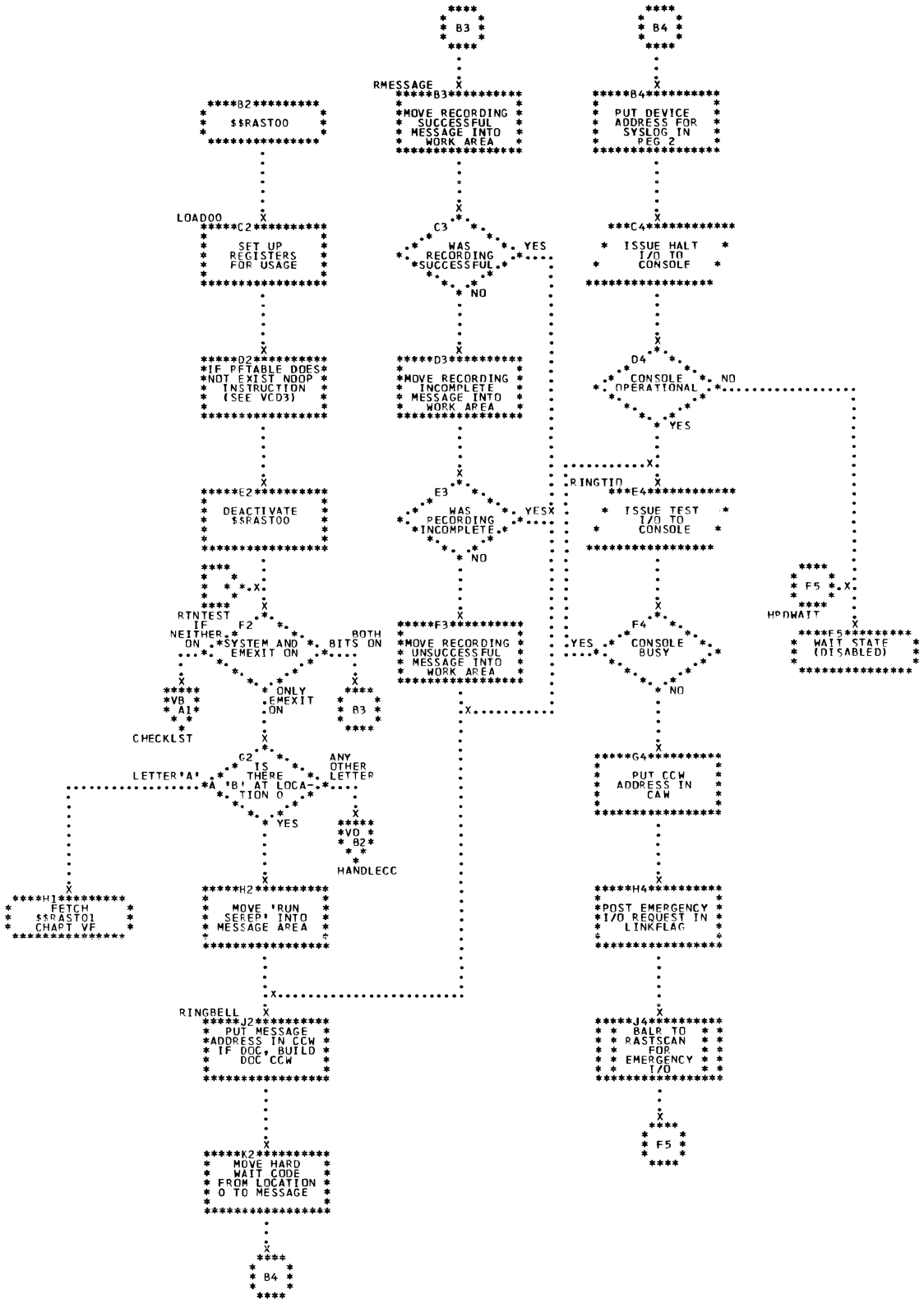


Chart VB. $$RAST00 - Initial Machine Check/Channel Check Analysis (Part 2 of 5)
Refer to Chart 04.

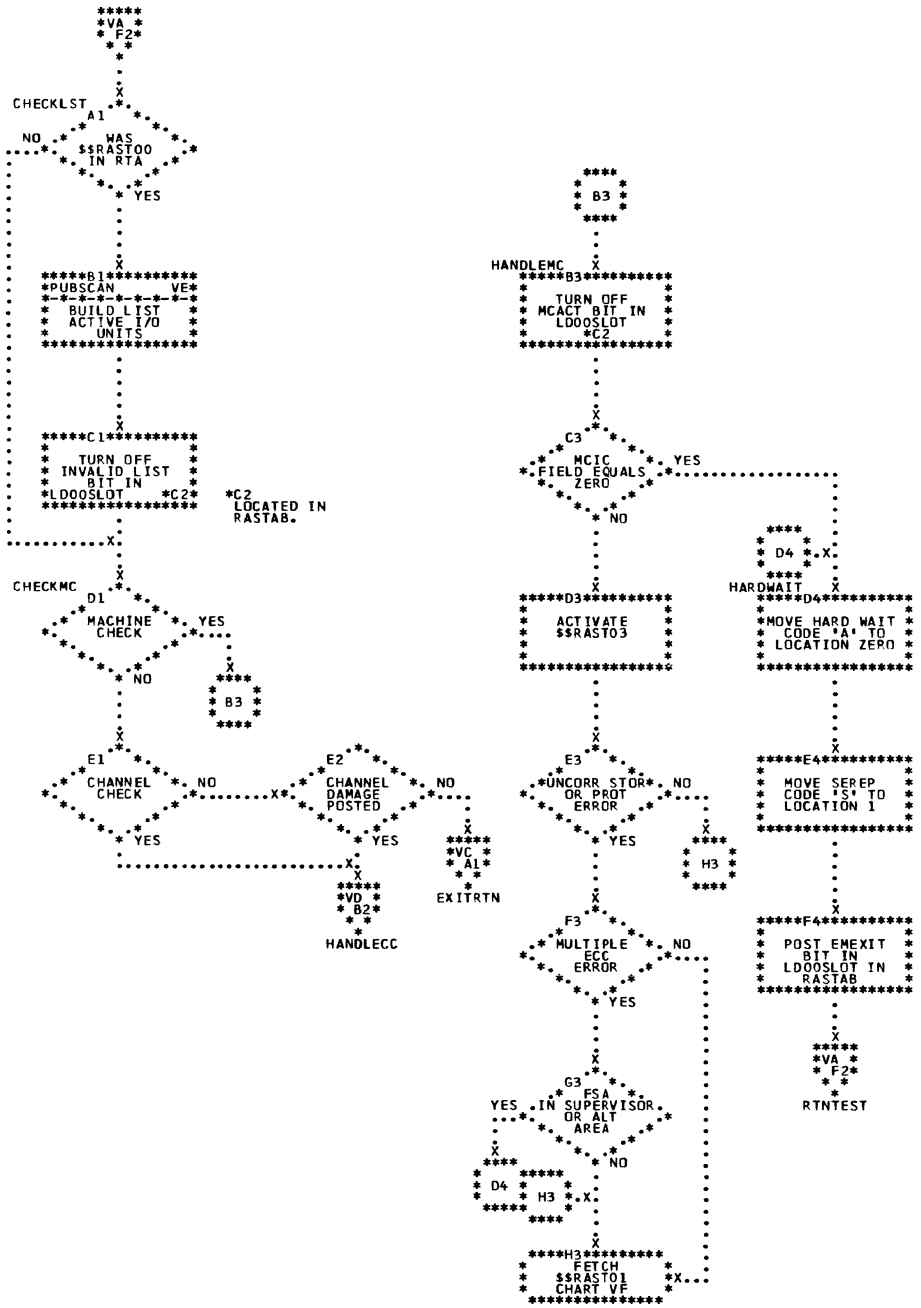


Chart VC. $$RAST00 - Initial Machine Check/Channel Check Analysis (Part 3 of 5)
Refer to Chart 04.

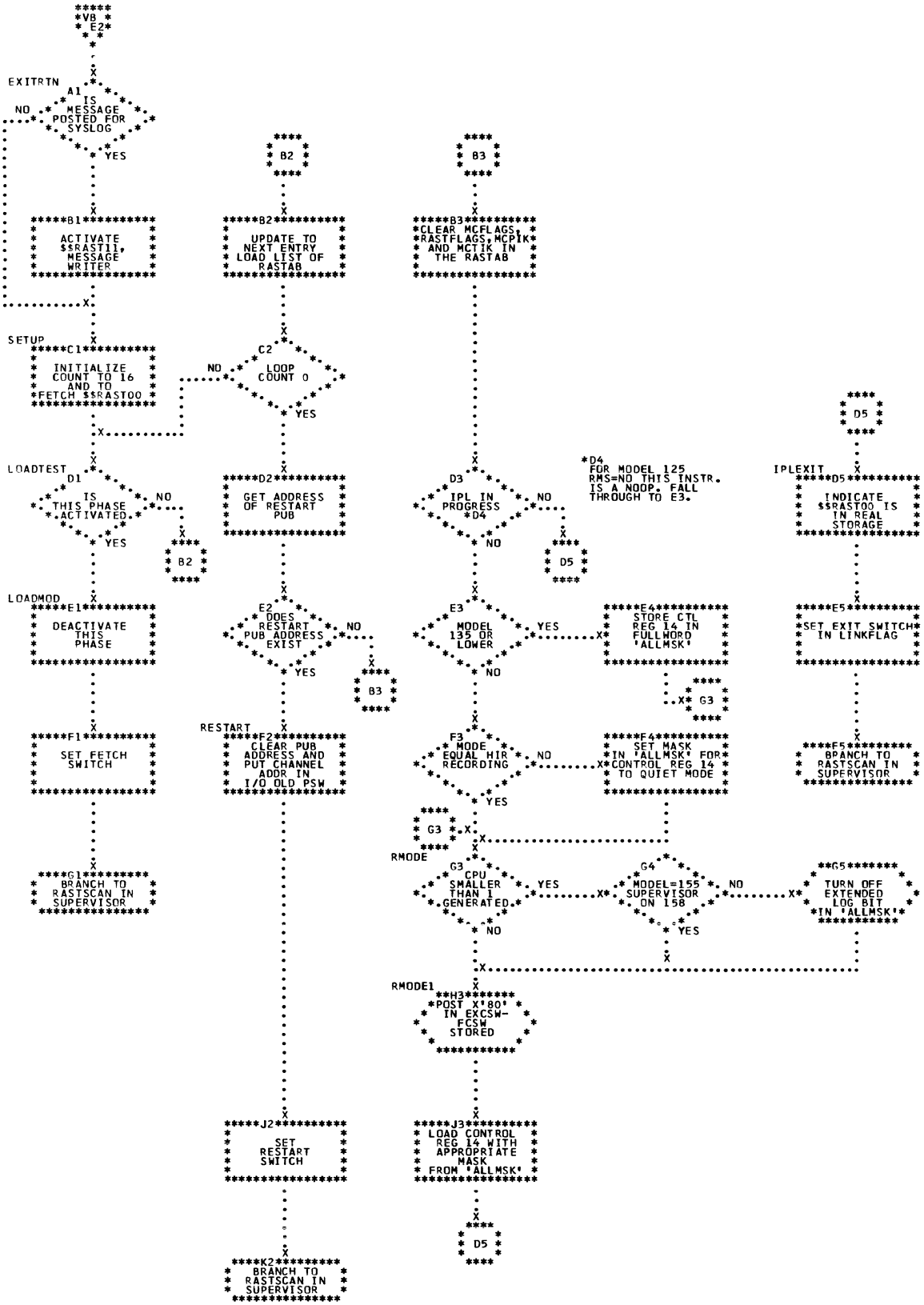


Chart VD. $$RAST00 - Initial Machine Check/Channel Check Analysis (Part 4 of 5)
Refer to Chart 04.

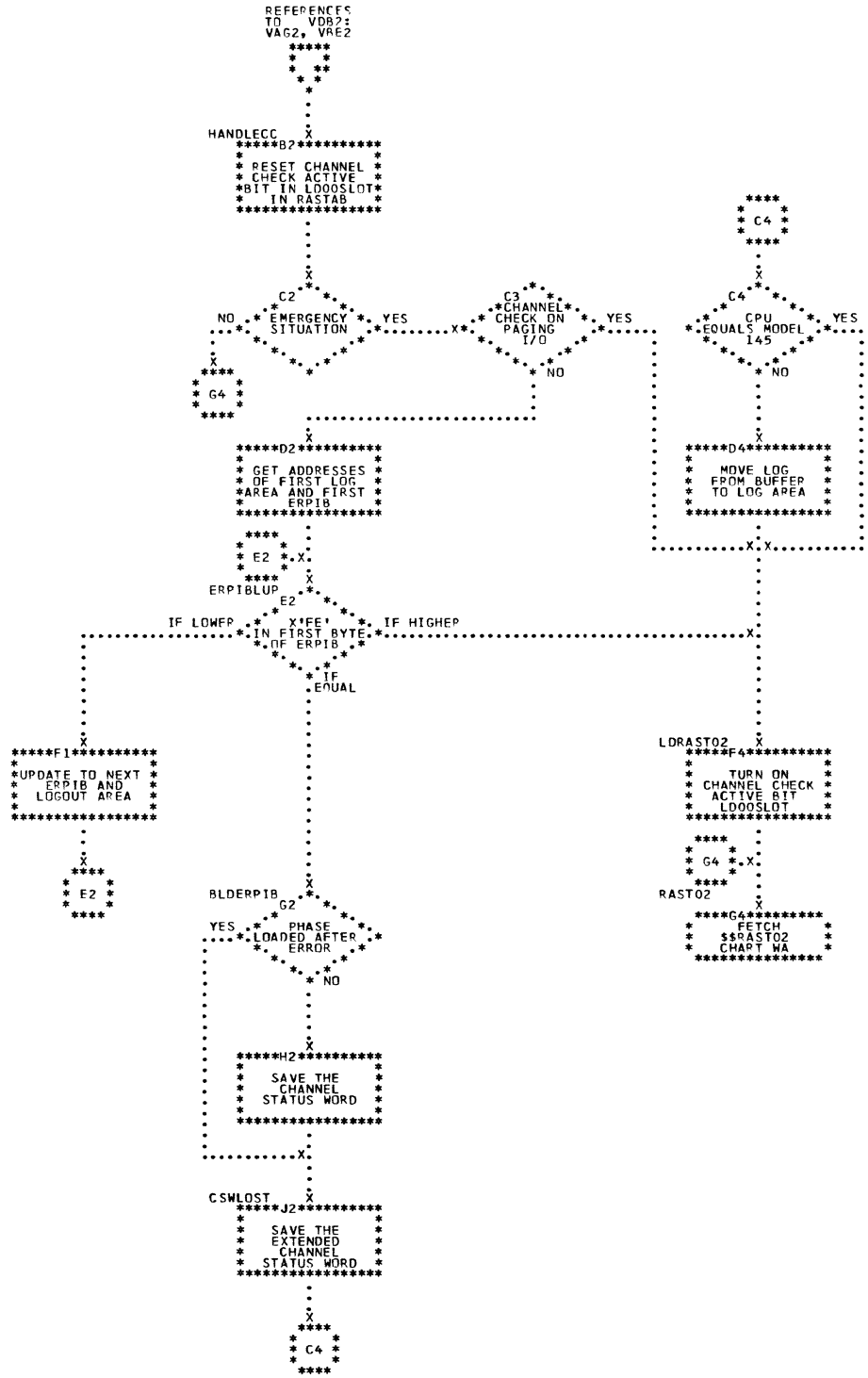


Chart VE. $$RAST00 - Subroutines (Part 5 of 5)
Refer to Chart 04.

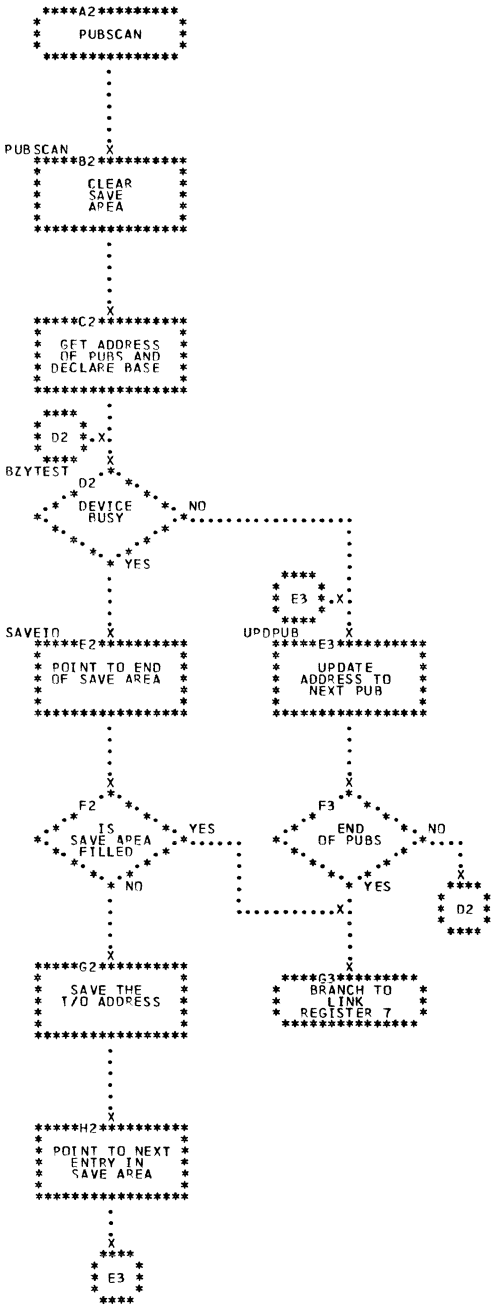


Chart VF. $$RAST01 - Machine Check/Channel Check Record Building Interface (Part 1 of 2)
Refer to Charts 04 and C5.

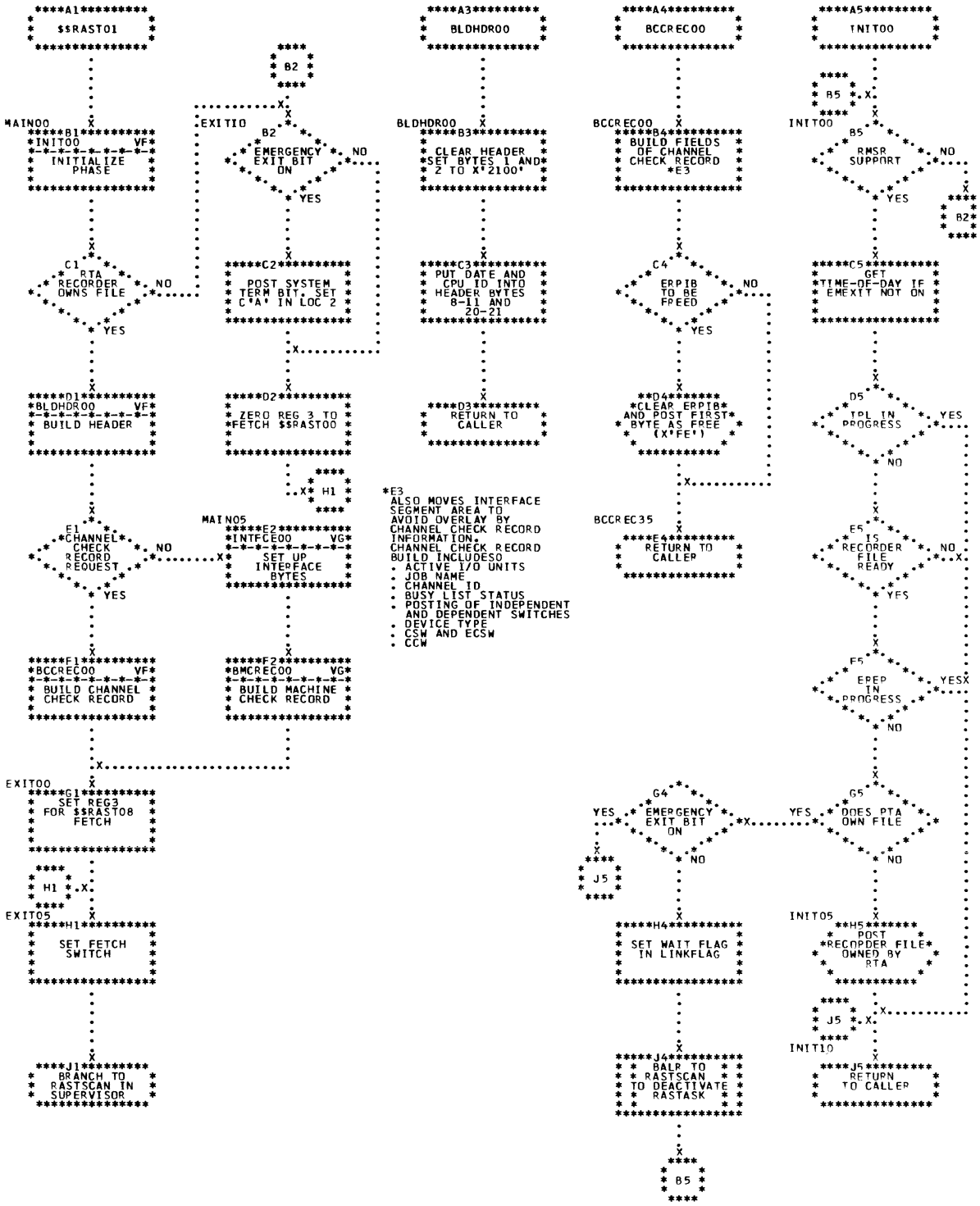


Chart VG. $$RAST01 - Machine Check/Channel Check Record Building Interface (Part 2 of 2)
Refer to Charts 04 and C5.

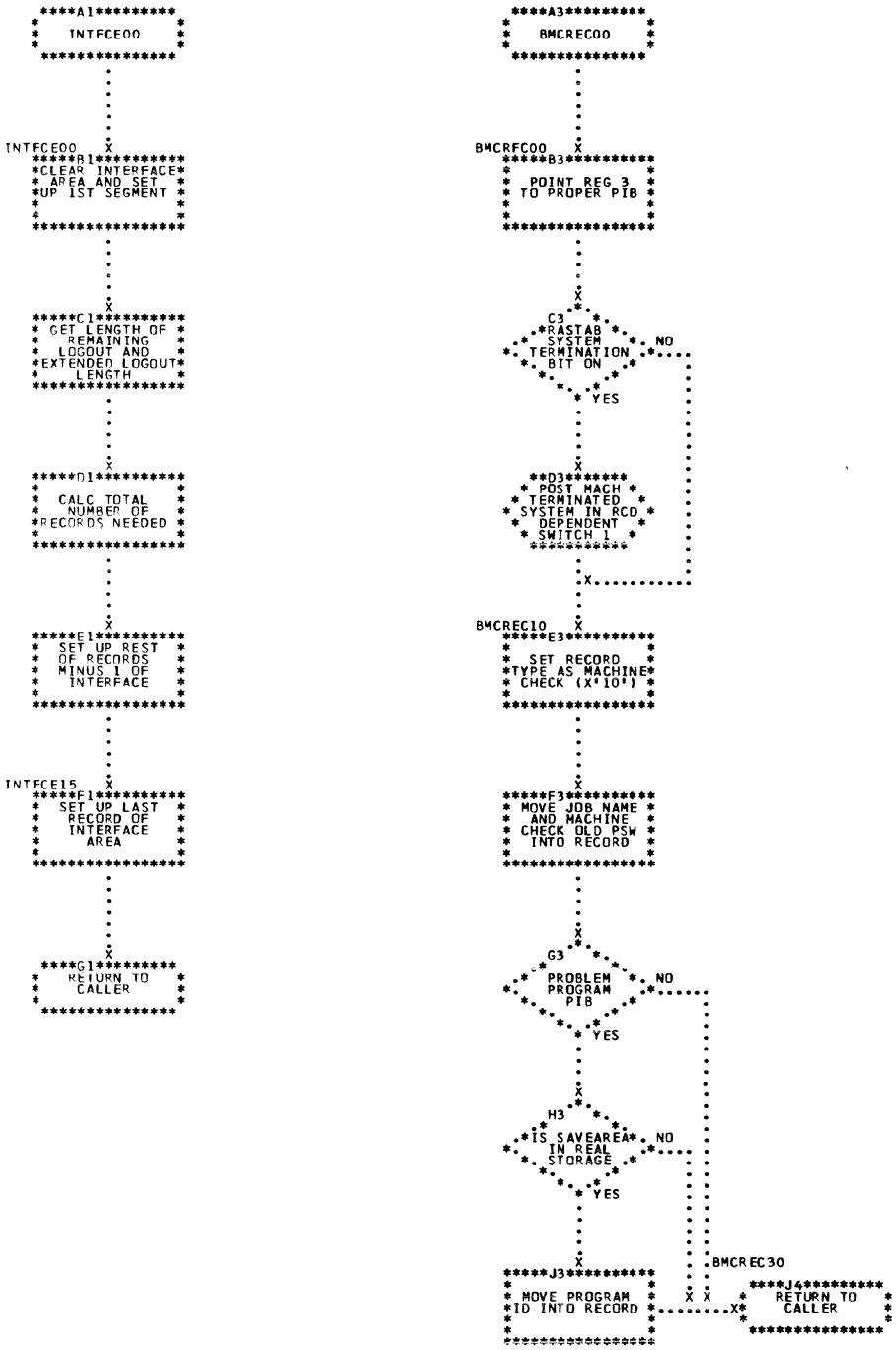


Chart WA. $$RAST02 - Nonresident Channel Check Handler (Part 1 of 4)
Refer to Chart 05.

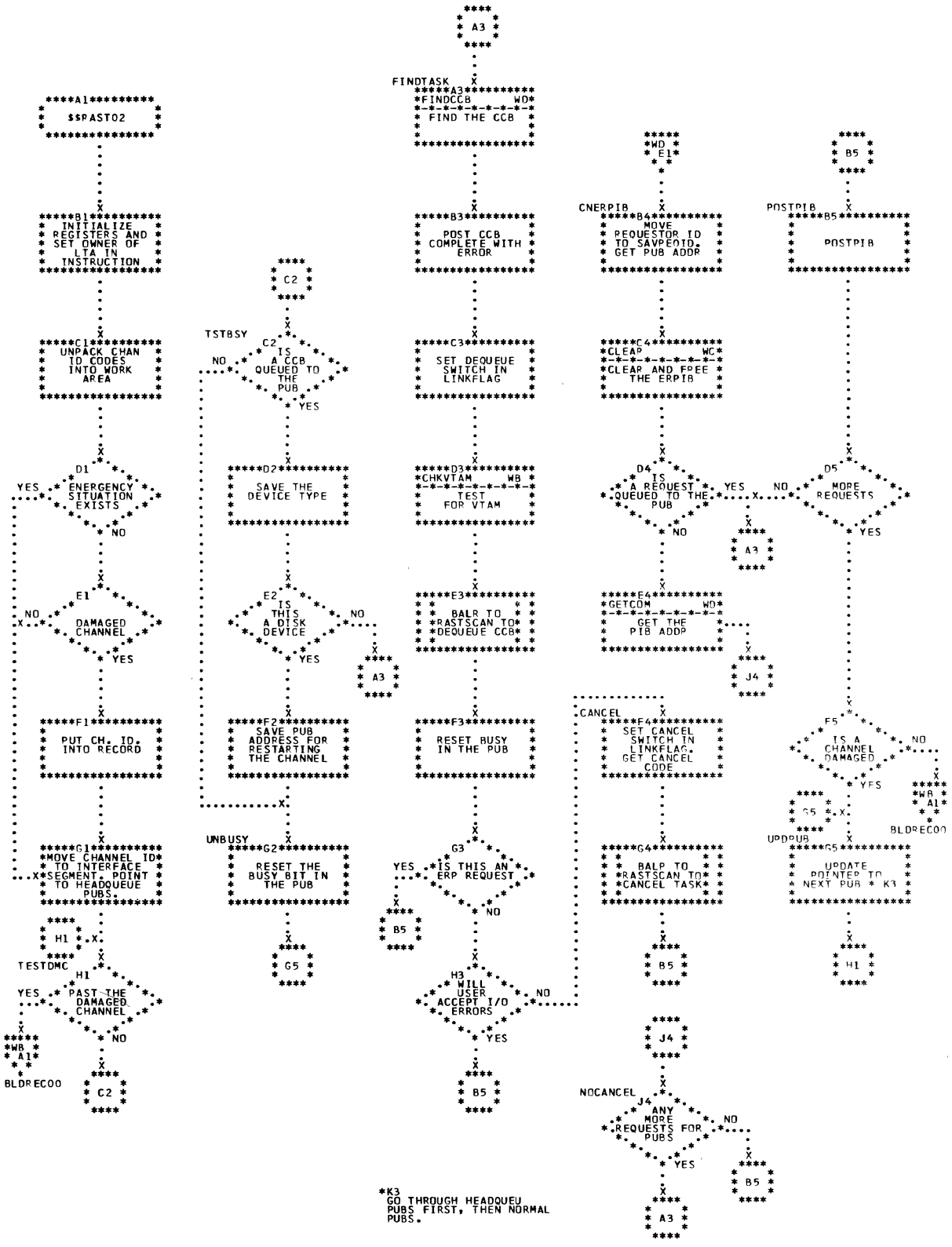


Chart WB. $$RAST02 - Nonresident Channel Check Handler (Part 2 of 4)
Refer to Chart 05.

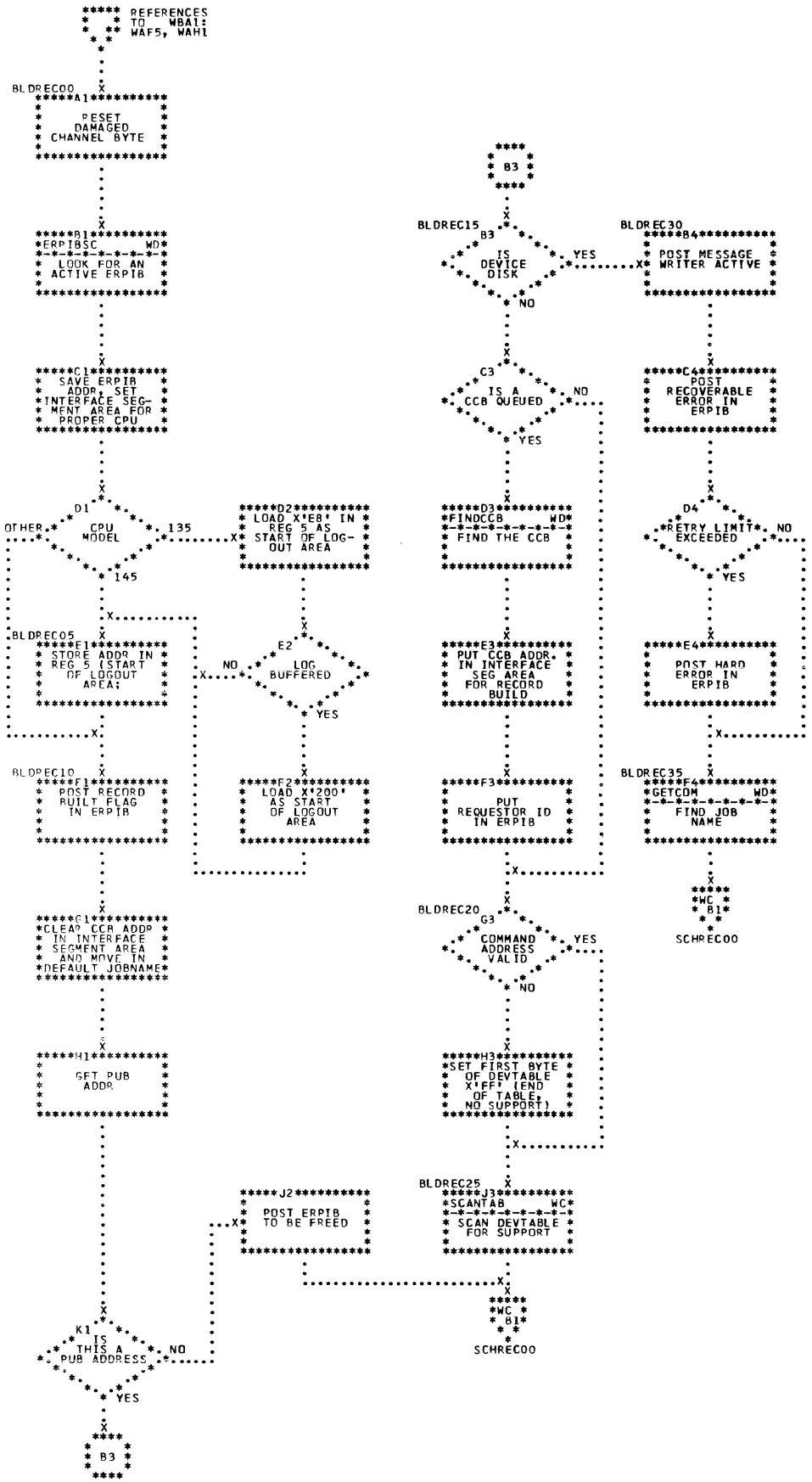


Chart WC. $$RAST02 - Nonresident Channel Check Handler (Part 3 of 4)
Refer to Chart 05.

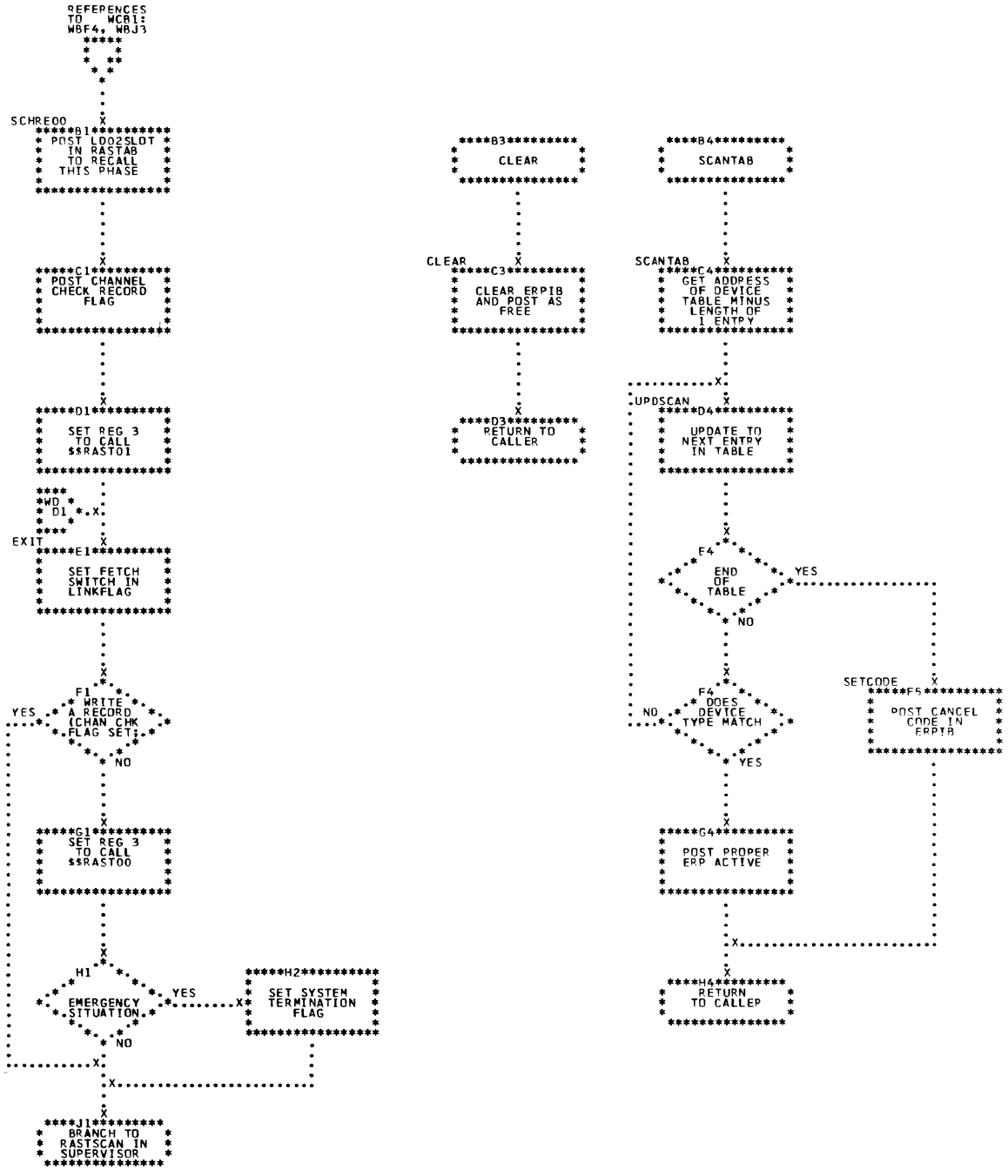


Chart WD. $$RAST02 - Subroutines (Part 4 of 4)
Refer to Chart 05.

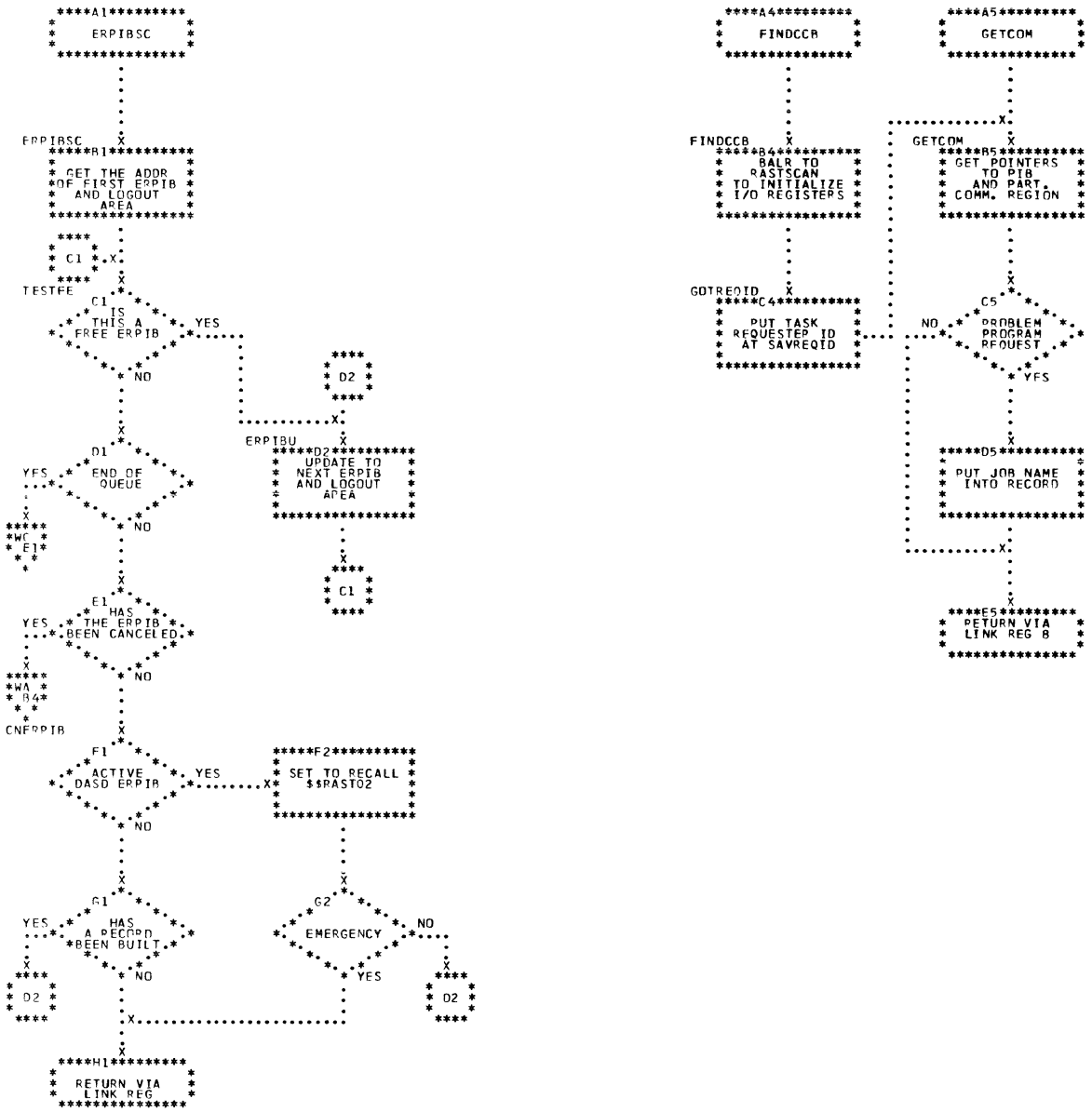


Chart WE. $$RAST03 - Machine Check Repair / EFL Functions (Part 1 of 5)
Refer to Chart 04.

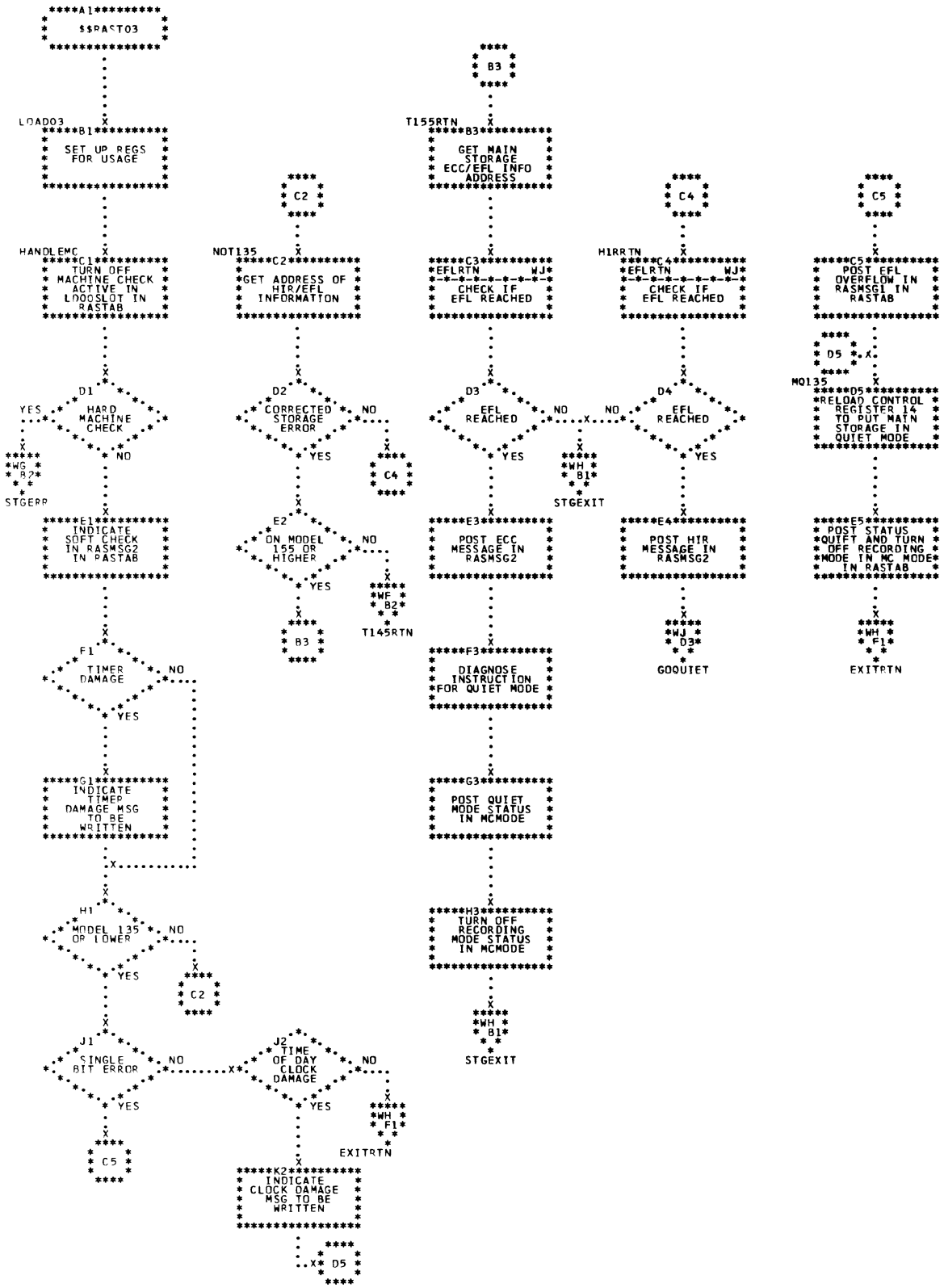


Chart WF. $$RAST03 - Machine Check Repair / EFI Functions (Part 2 of 5)
Refer to Chart 04.

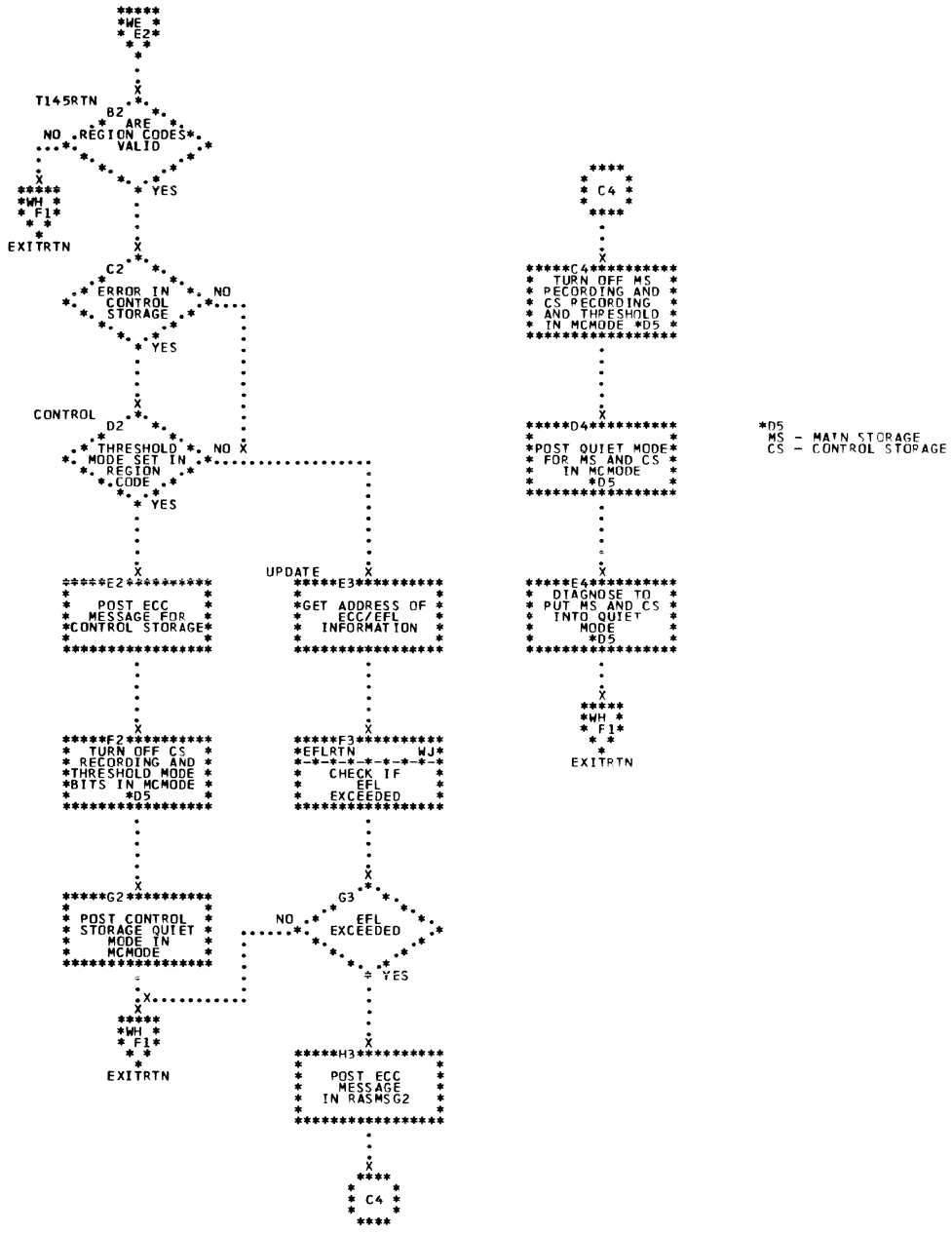


Chart WG. $$RAST03 - Machine Check Repair / EFL Functions (Part 3 of 5)
Refer to Chart 04.

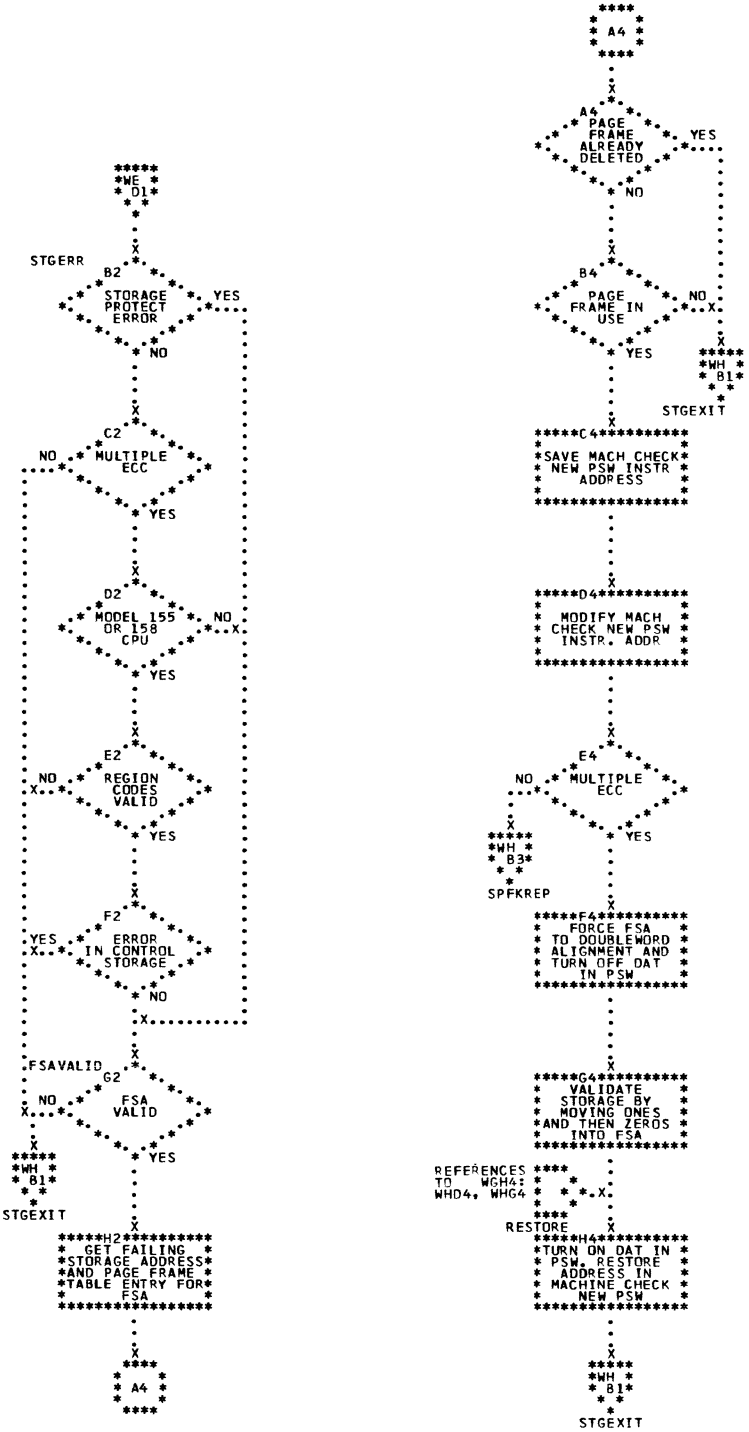


Chart WH. $$RAST03 - Machine Check Repair / EFI Functions (Part 4 of 5)
Refer to Chart 04.

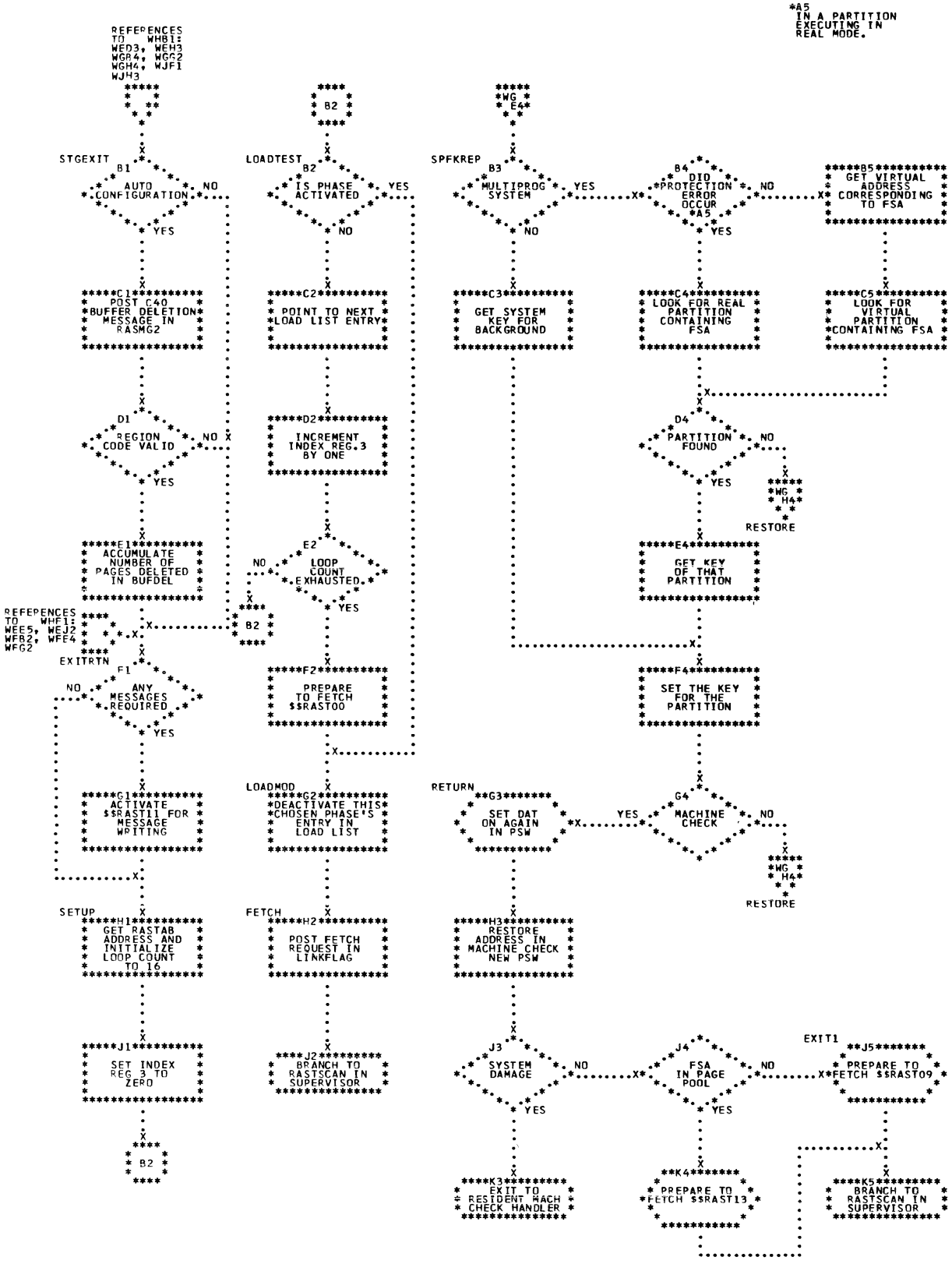


Chart WJ. $$RAST03 - Subrcutines (Part 5 cf 5)
Refer to Chart 04.

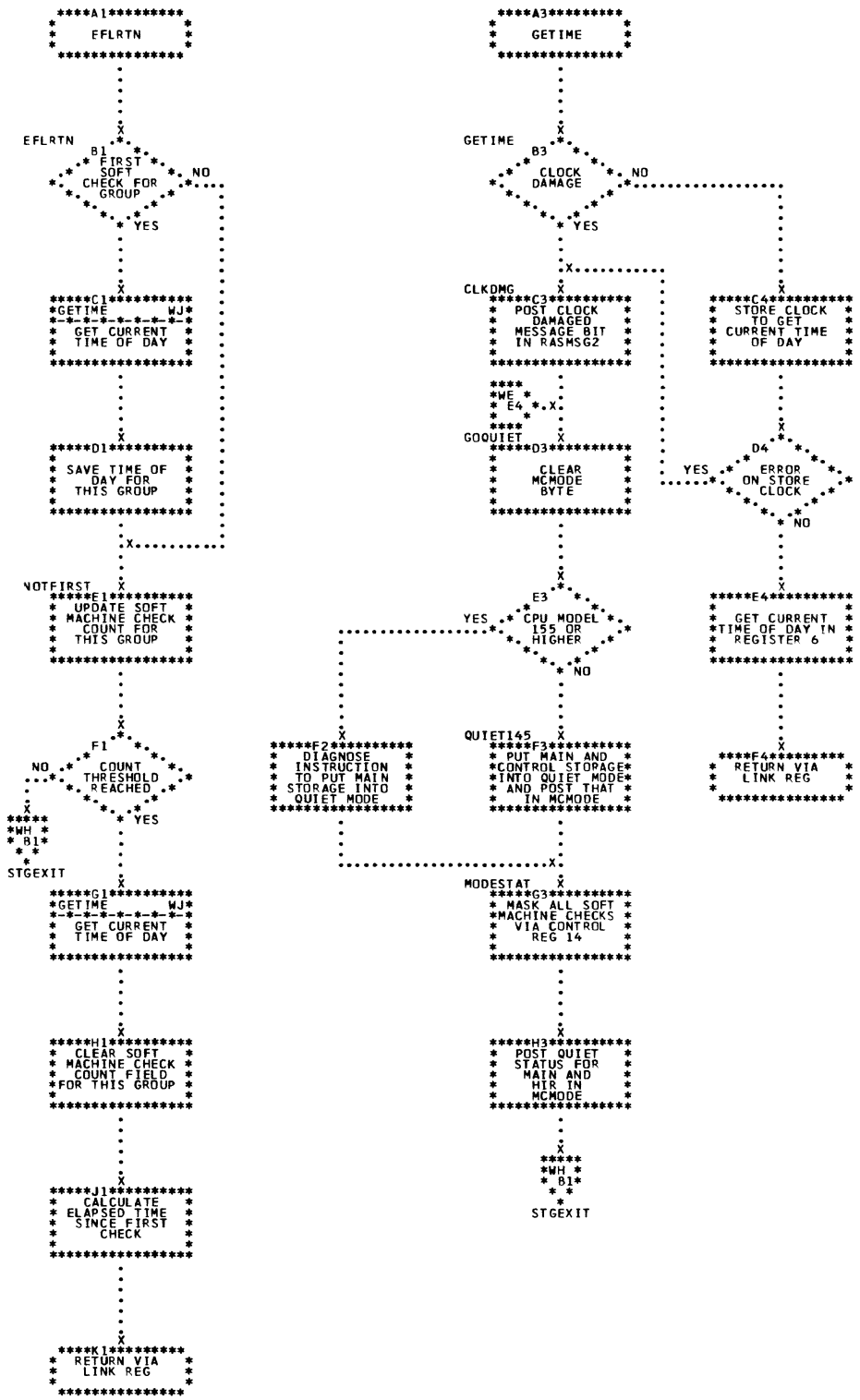


Chart XA. $$RAST04 - 1403, 1403U, 1443, 3210, 3215, 1442, 2501, 2540 Unit Record Channel Check ERP (Part 1 of 4)
Refer to Chart 05.

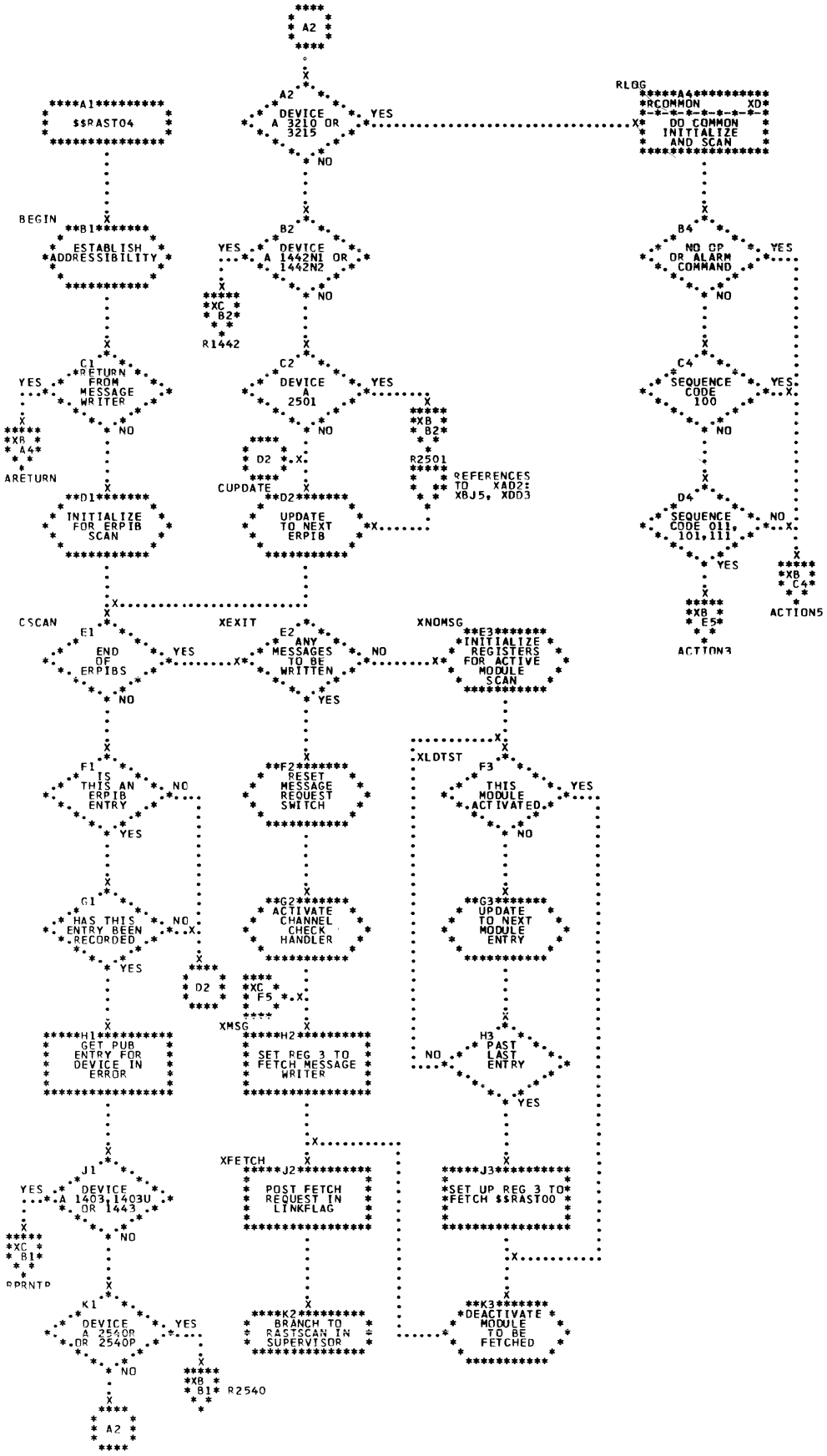


Chart XB. $$RAST04 - 1403, 1403U, 1443, 3210, 3215, 1442, 2501, 2540 Unit Record Channel Check ERP (Part 2 of 4)
Refer to Chart 05.

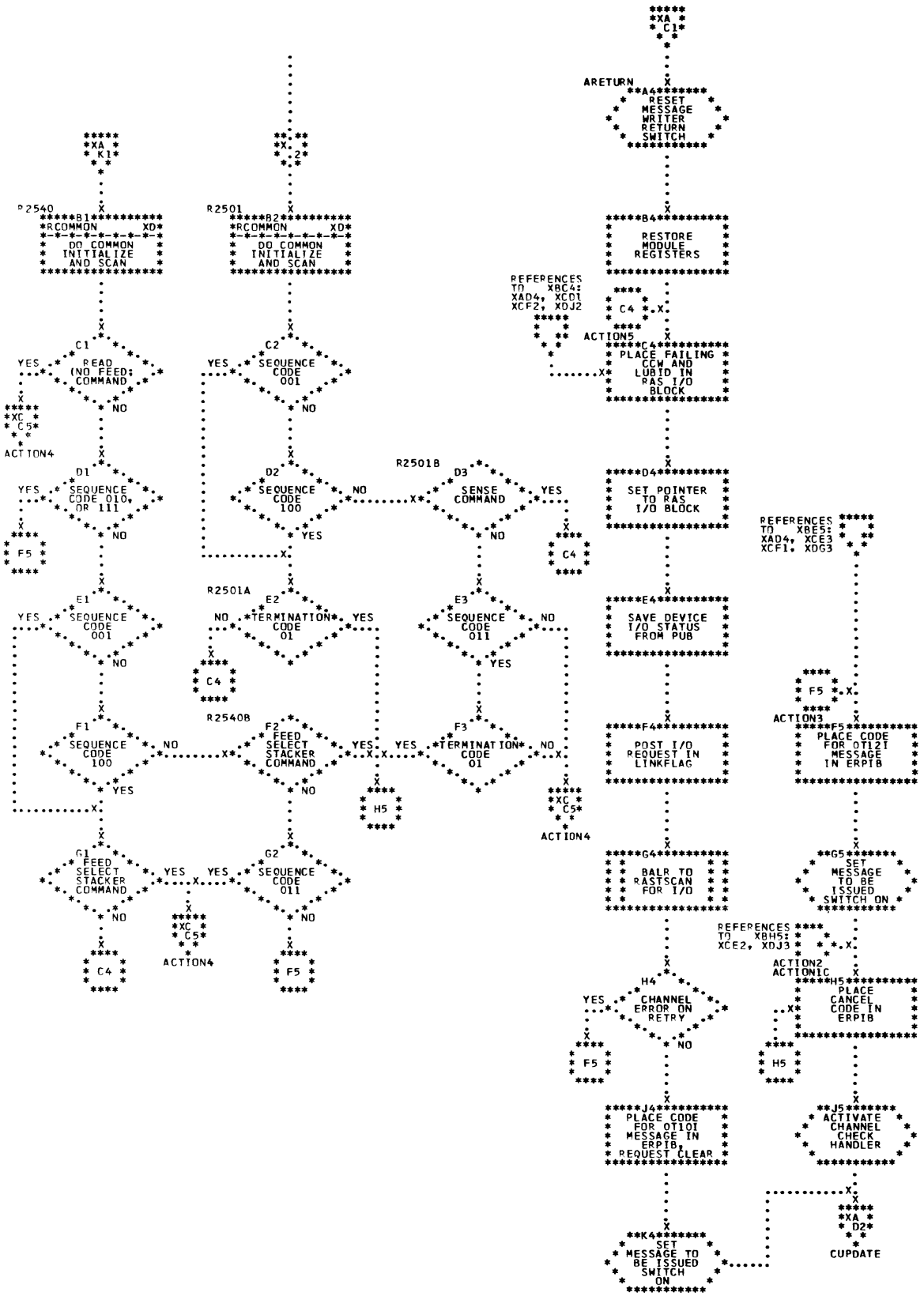


Chart XC. $$RAST04 - 1403, 1403U, 1443, 3210, 3215, 1442, 2501, 2540 Unit Reccrd Channel Check ERP (Part 3 of 4)
Refer to Chart 05.

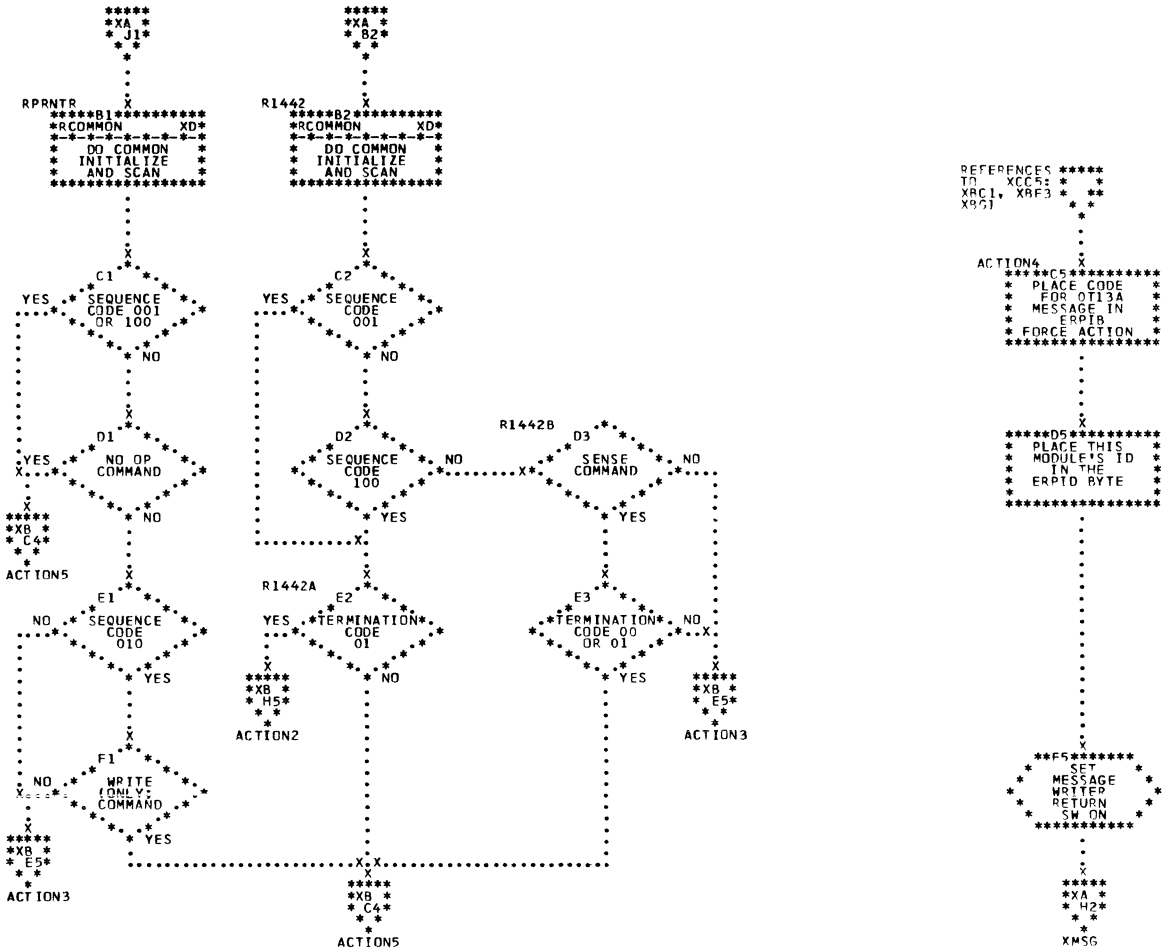


Chart XD. $$RASI04 - 1403, 1403U, 1443, 3210, 3215, 1442, 2501, 2540 Unit Record Channel Check ERP (Part 4 of 4)
Refer to Chart 05.

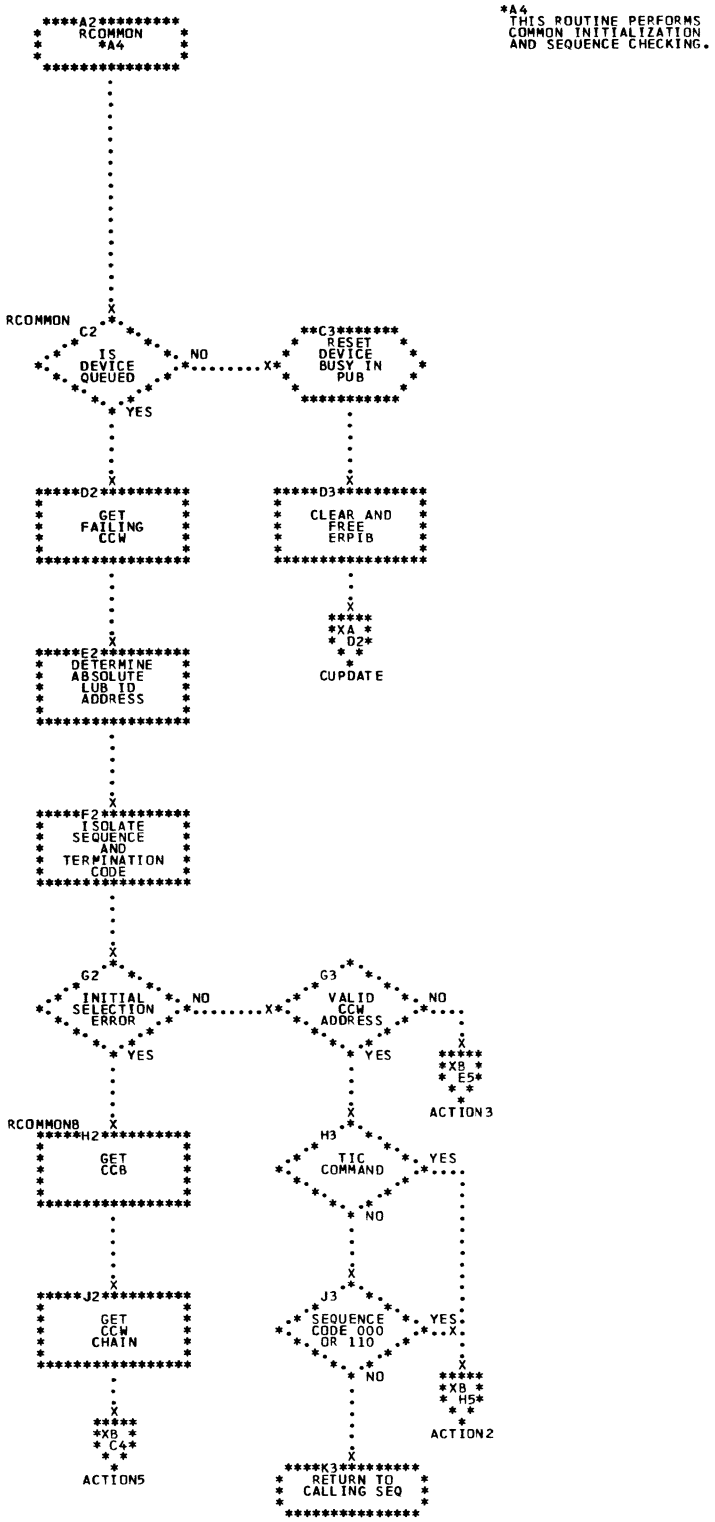


Chart XE. $$RAST05 - 2520 and 3211 Channel Check ERP (Part 1 of 3)
Refer to Chart 05.

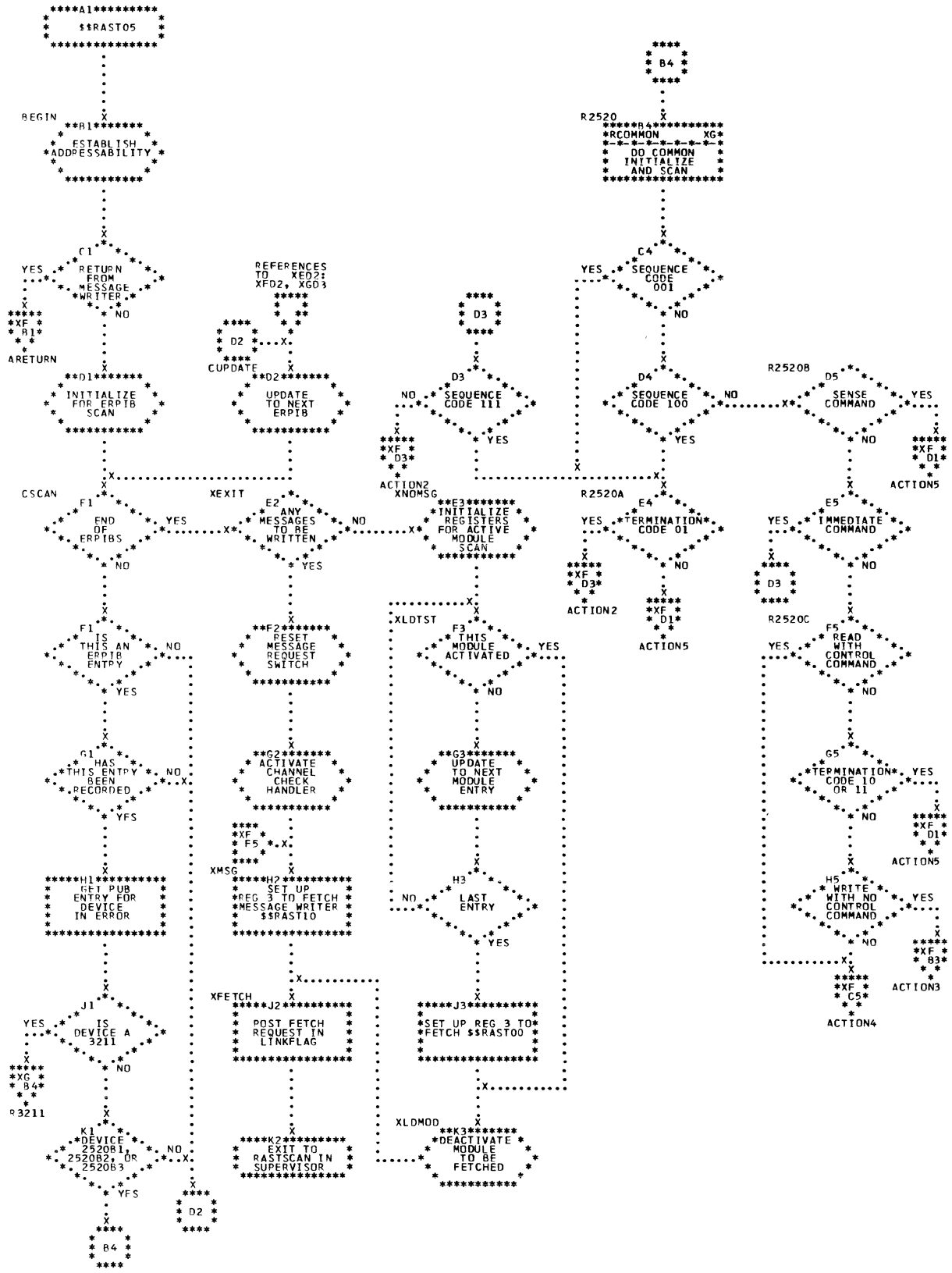


Chart XF. $$RAST05 - 2520 and 3211 Channel Check ERP (Part 2 of 3)
Refer to Chart 05.

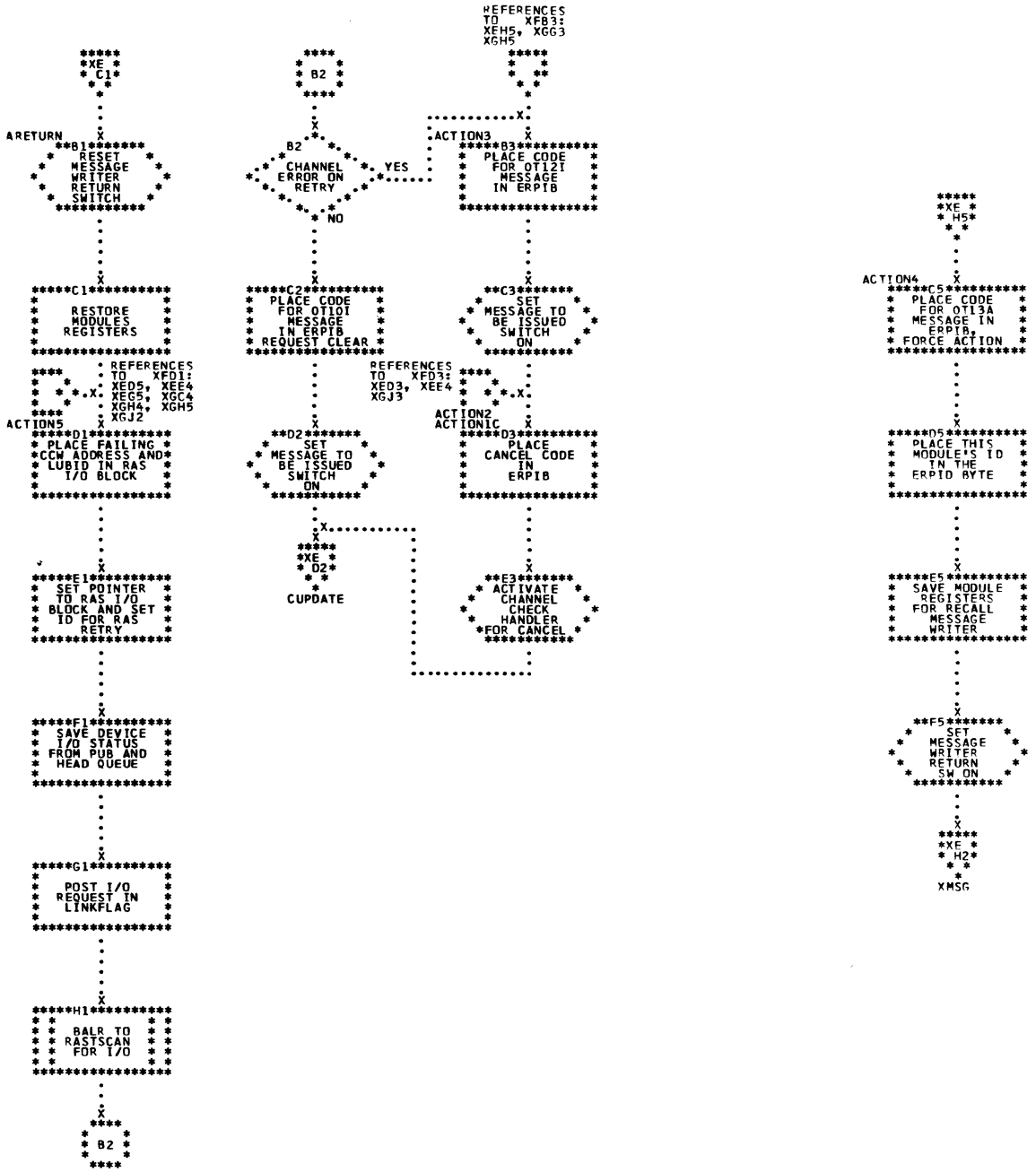


Chart XG. $$RAST05 - 2520 and 3211 Channel Check ERP (Part 3 of 3)
Refer to Chart 05.

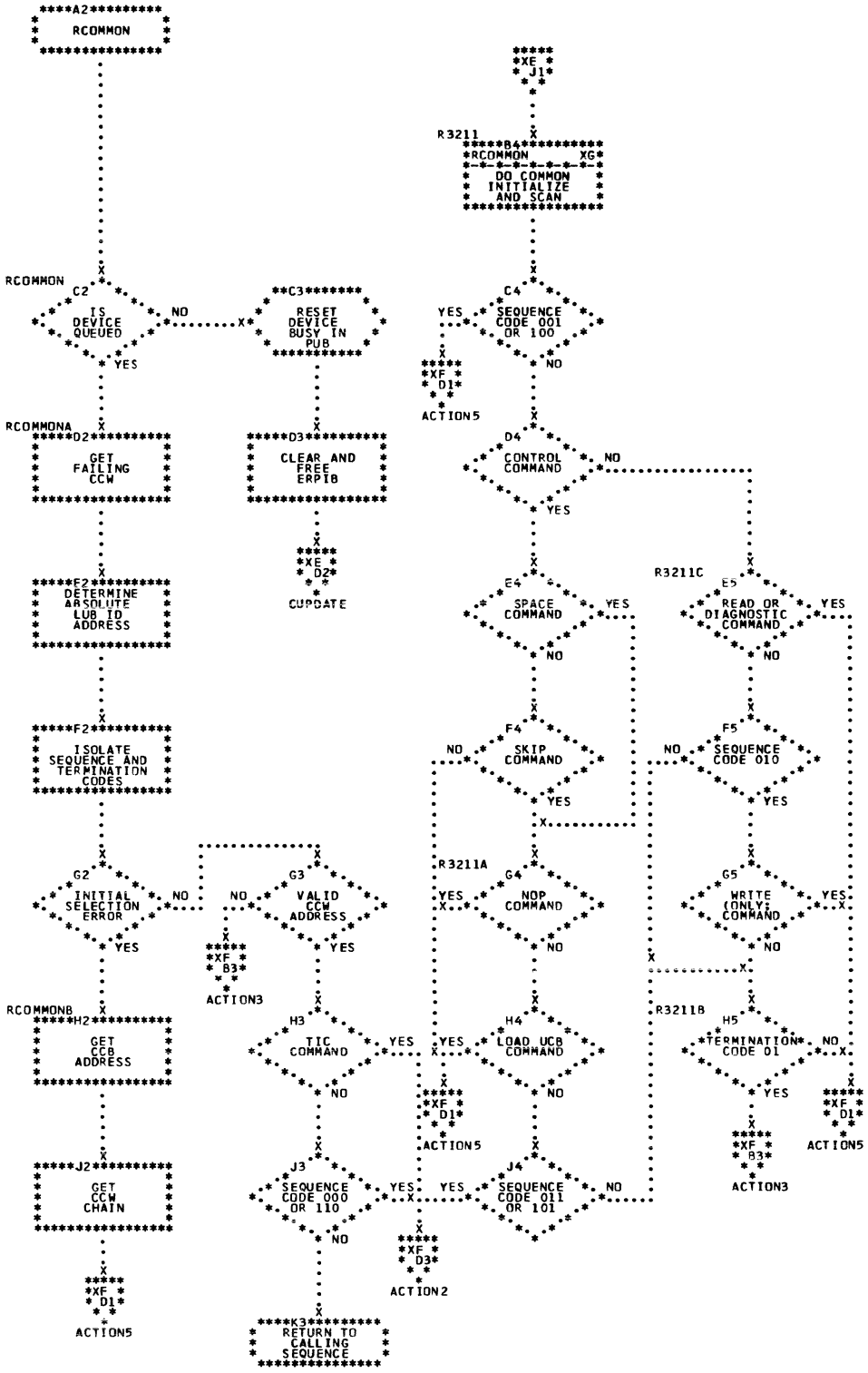


Chart XH. $$RAST06 - 3505, 3525, 3540 and 3886 Channel Check ERP (Part 1 cf 3)
Refer to Chart 05.

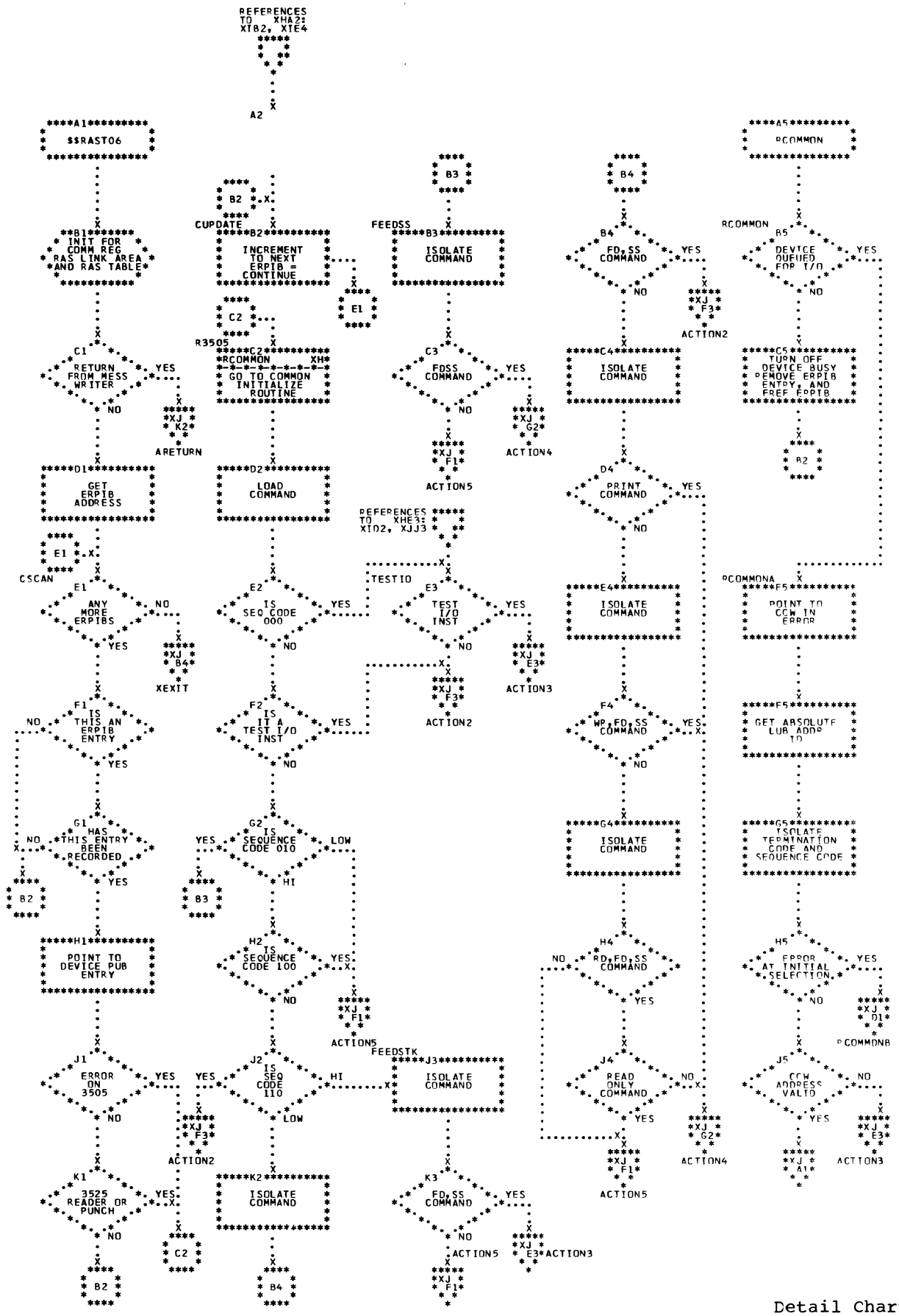


Chart XI. $$RAST06 - 3505, 3525, 3540 and 3886 Channel Check ERP (Part 2 of 3)
Refer to Chart 05.

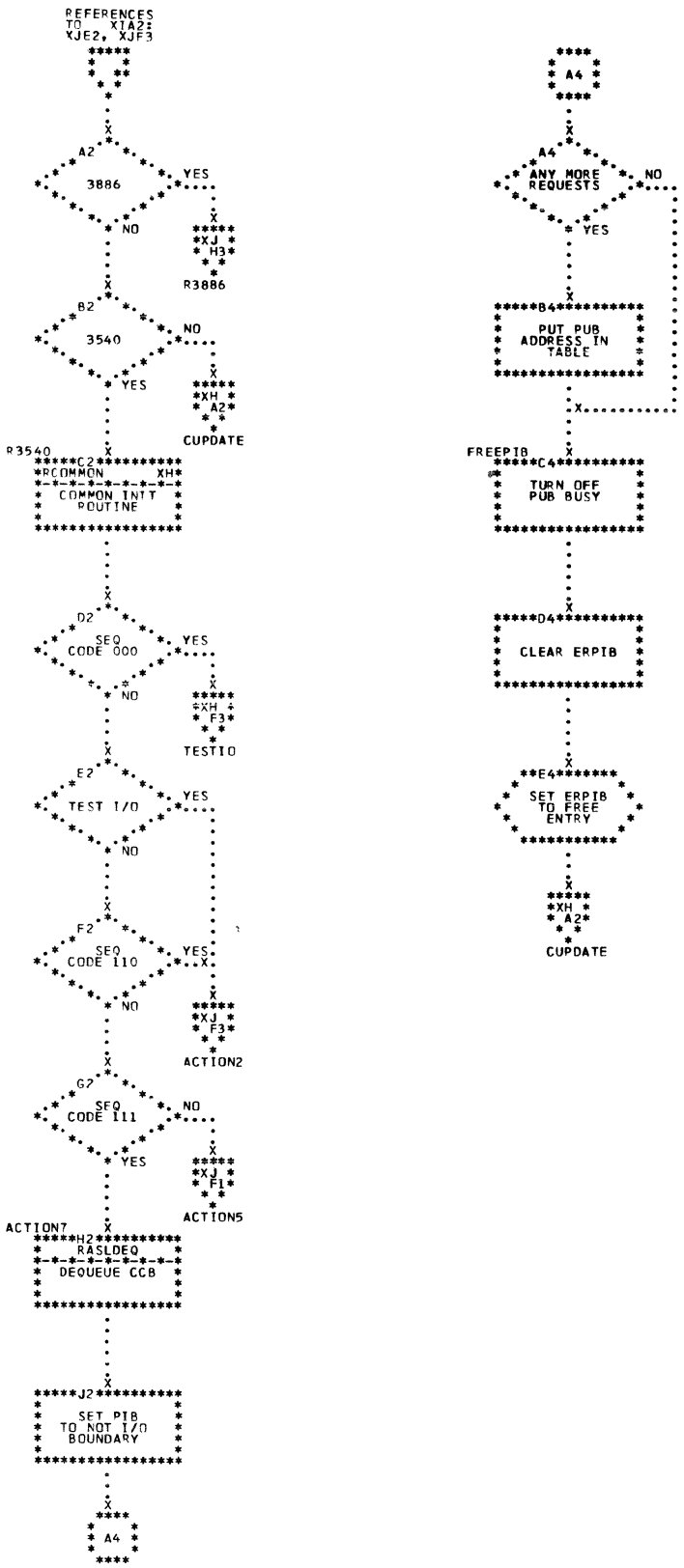


Chart XJ. $$RAST06 - 3505, 3525, 3540 and 3886 Channel Check ERP (Part 3 of 3)
Refer to Chart 05.

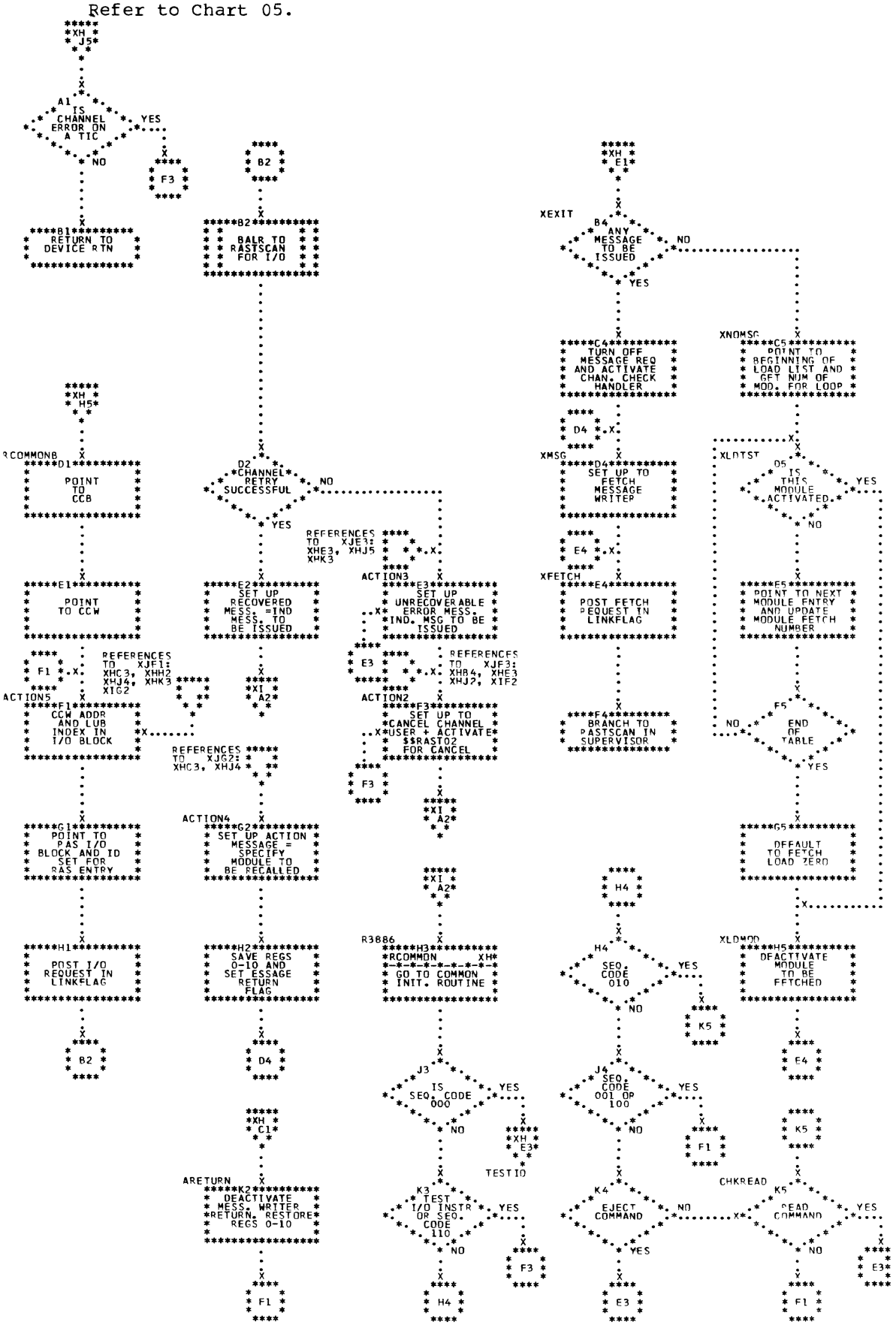


Chart XK. $$RAST07 - 2400 Tape Channel Check ERP (Part 1 of 2)
Refer to Chart 05.

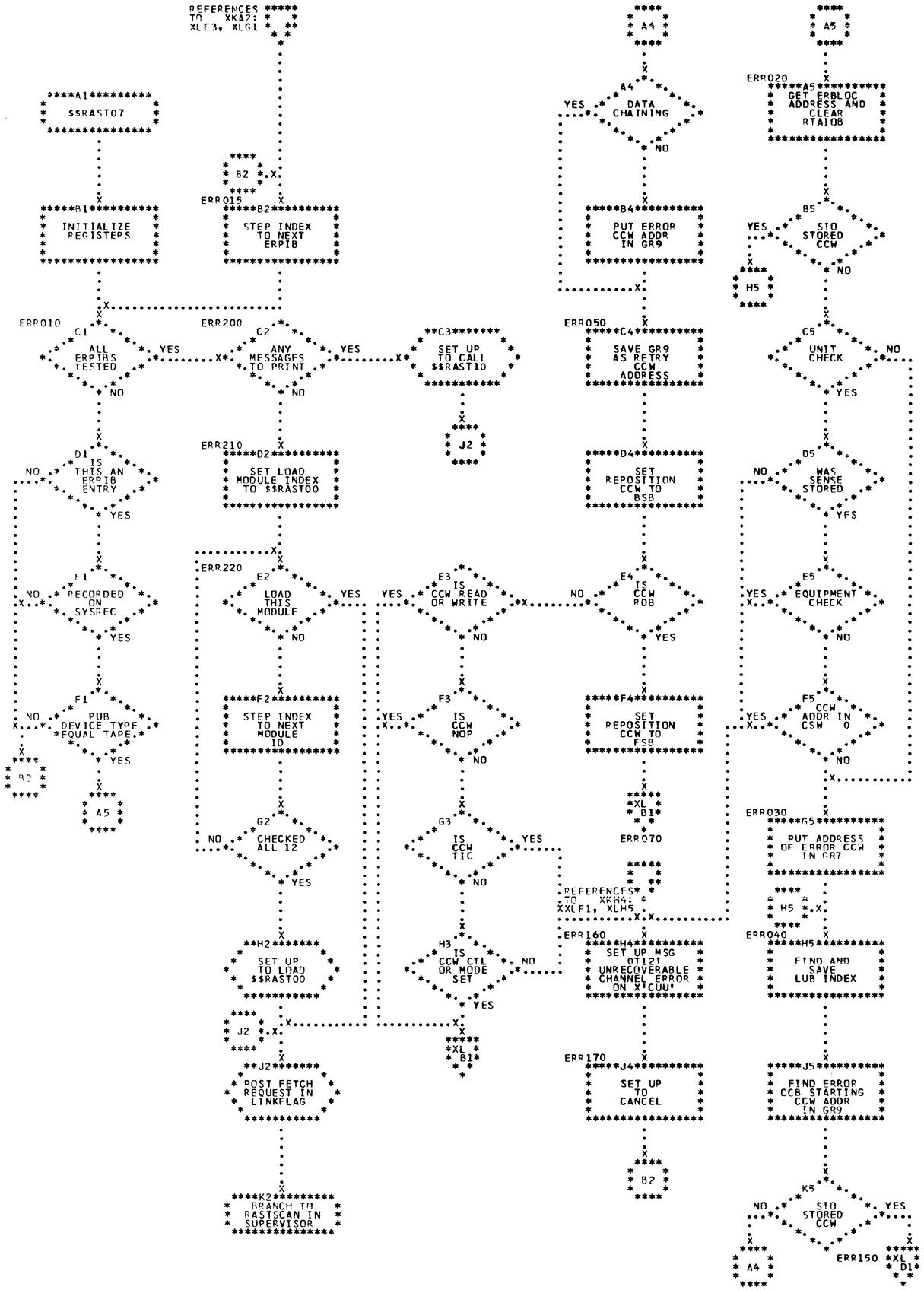


Chart XL. $$RAST07 - 2400 Tape Channel Check ERP (Part 2 of 2)
Refer to Chart 05.

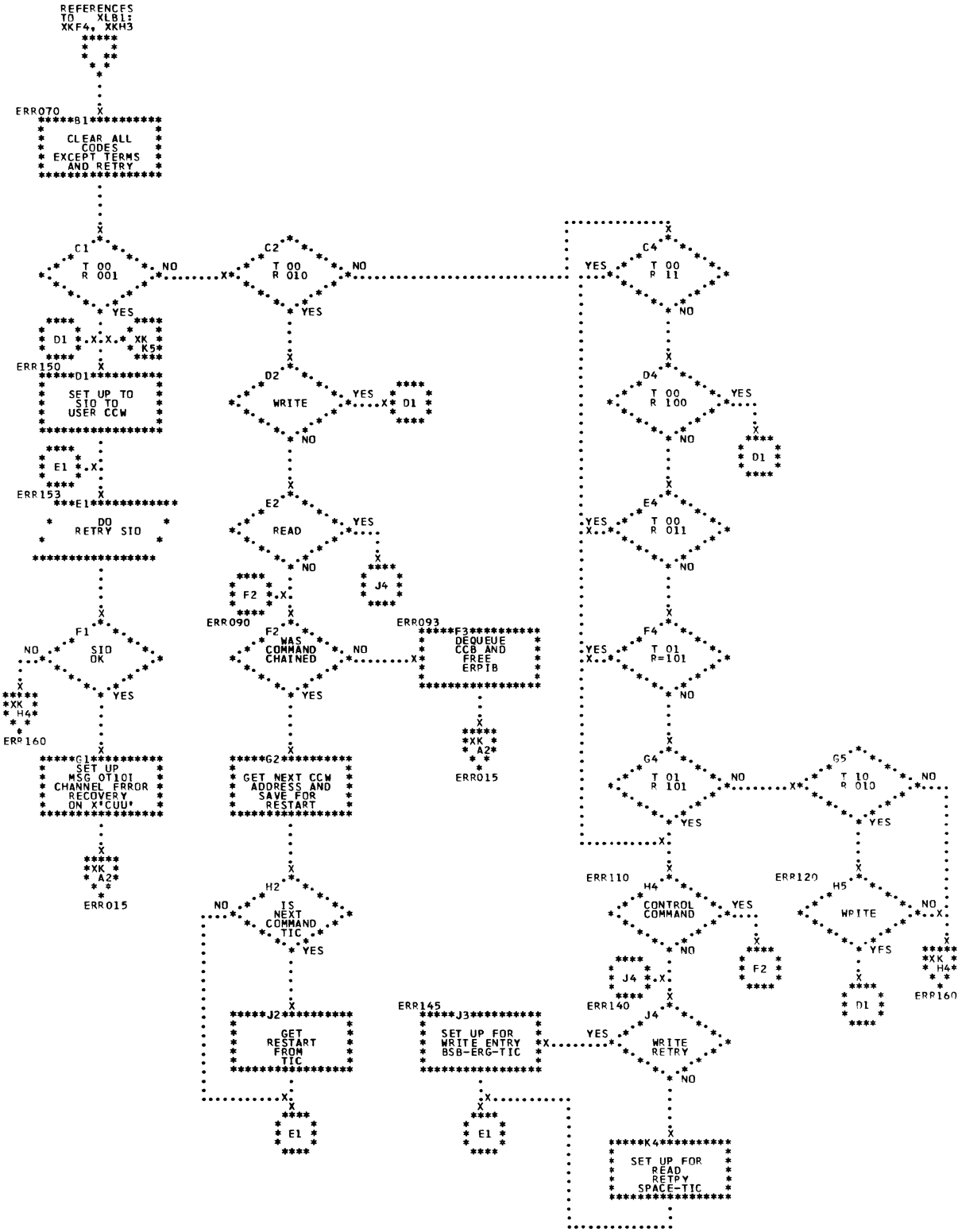


Chart XM. $$RAST08 - Machine Check/Channel Check Record Writer (Part 1 of 3)
Refer to Charts C4 and C5.

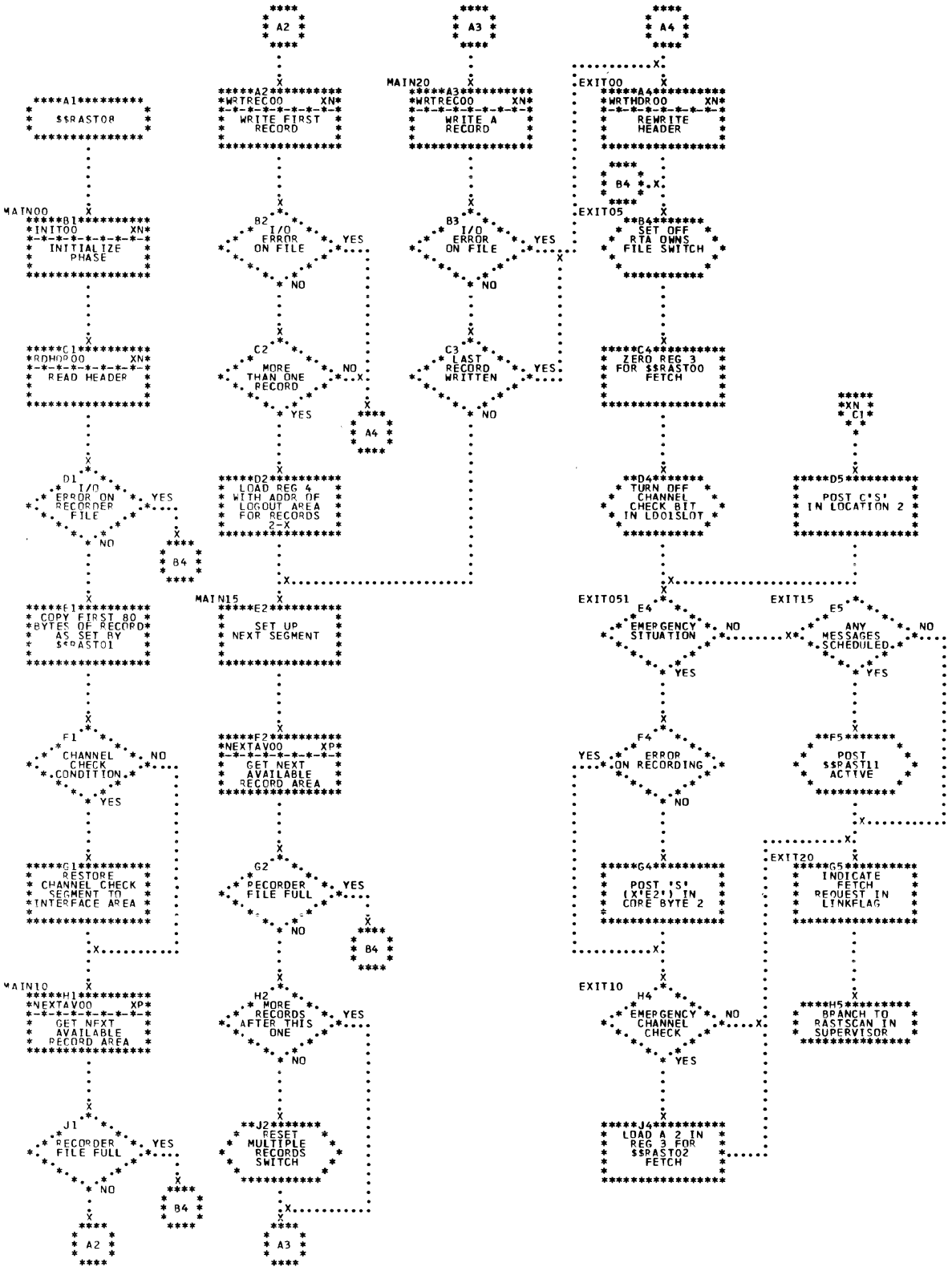


Chart XN. $$RAST08 - Machine Check/Channel Check Record Writer (Part 2 of 3)
Refer to Charts 04 and 05.

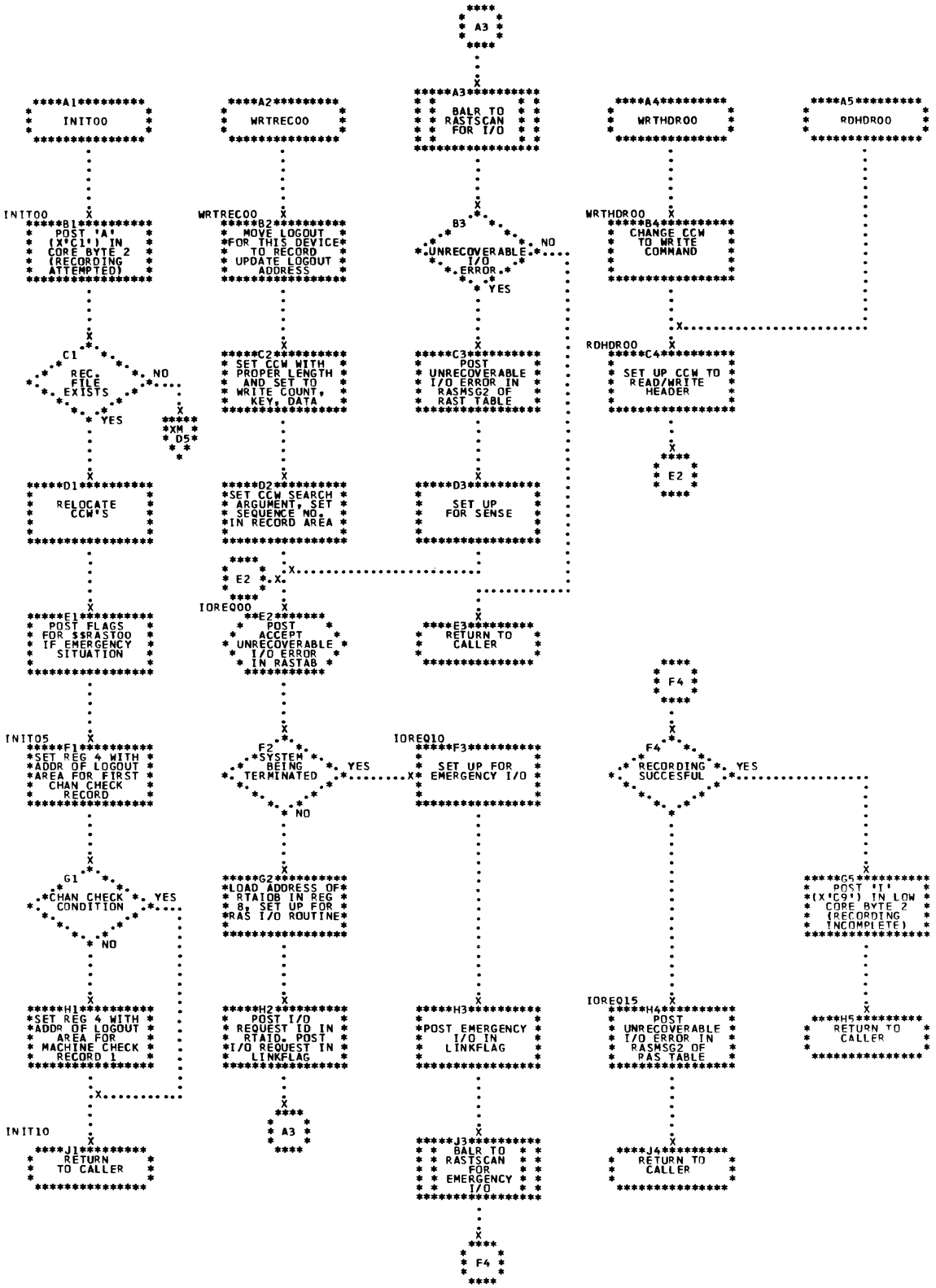


Chart XP. $$RAST08 - Machine Check/Channel Check Record Writer (Part 3 of 3)
Refer to Charts 04 and C5.

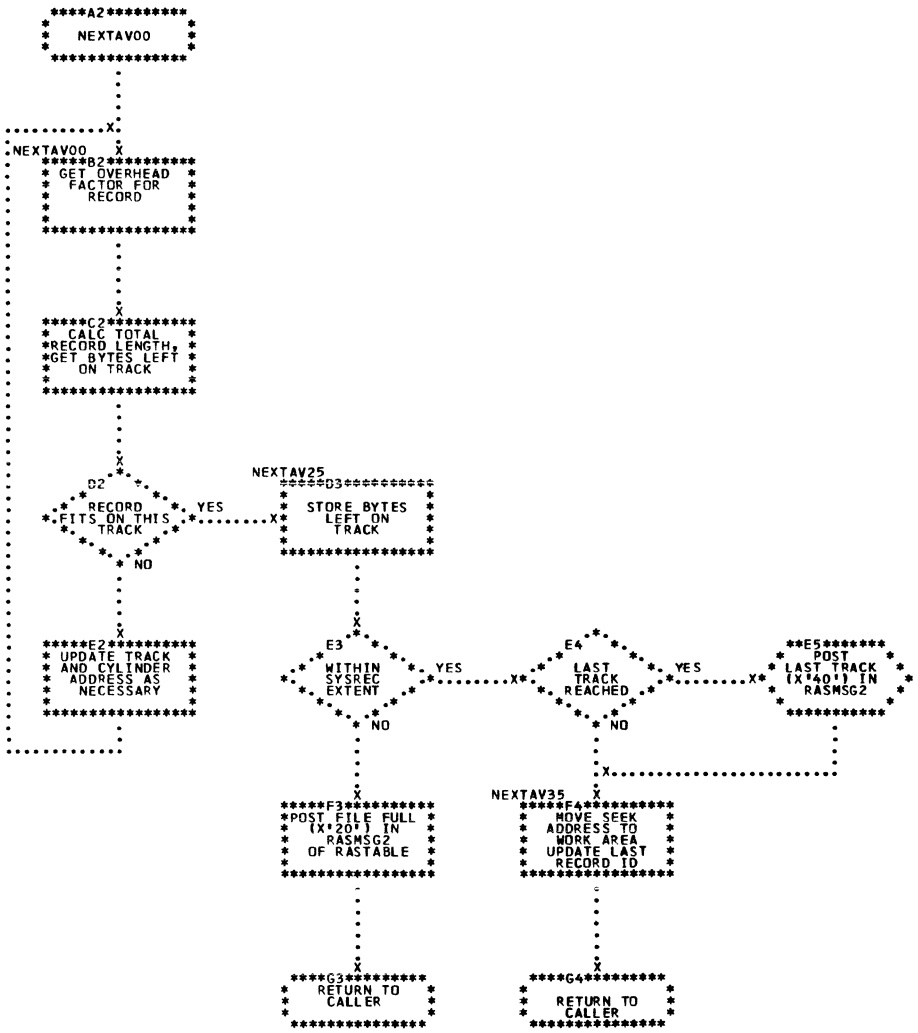


Chart XQ. $$RAST09 - Dynamic Reallocation of Partition (Part 1 of 3)
Refer to Chart 04.

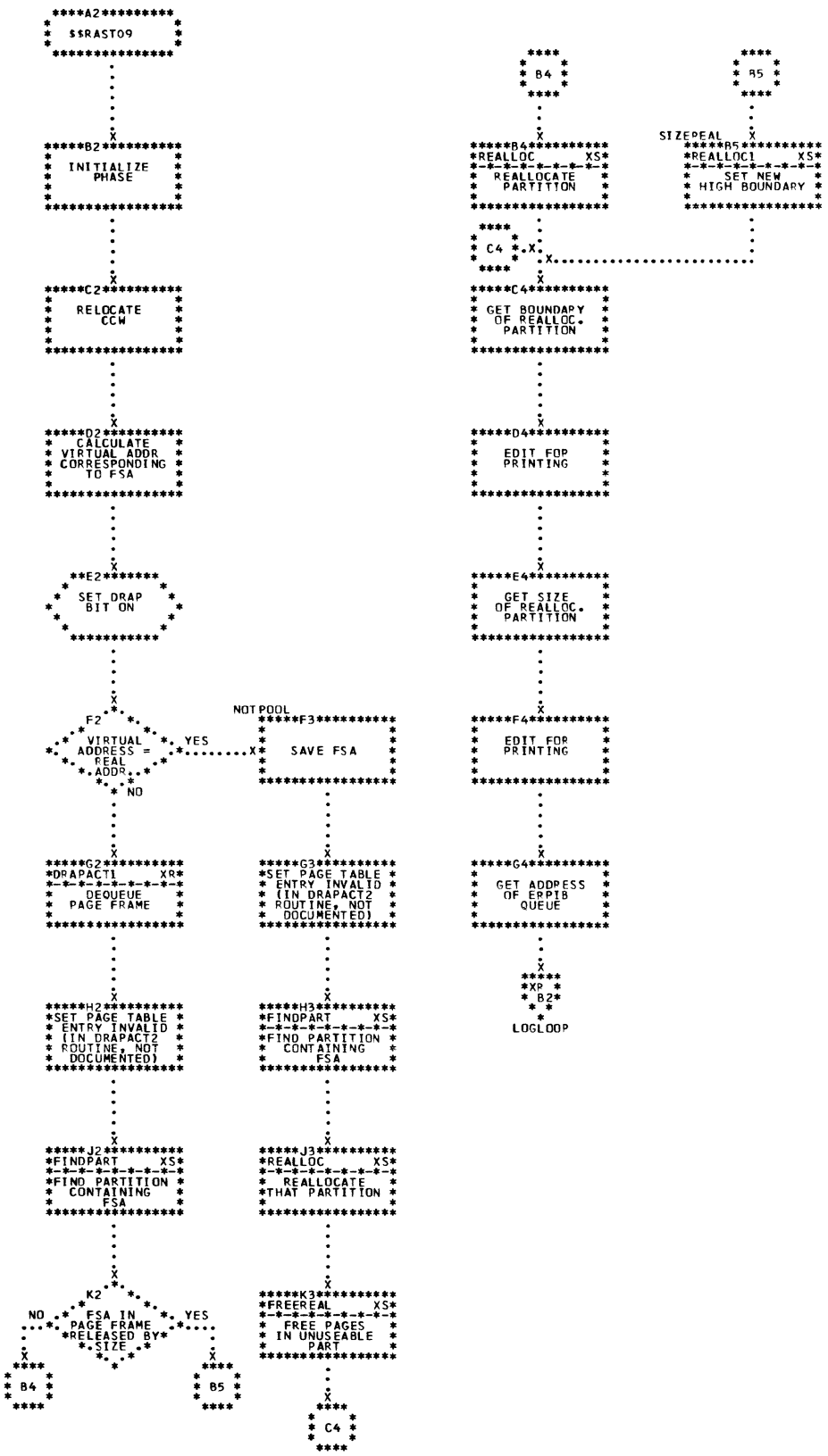


Chart XR. $$RAST09 - Dynamic Reallocation of Partition (Part 2 of 3)
Refer to Chart 04.

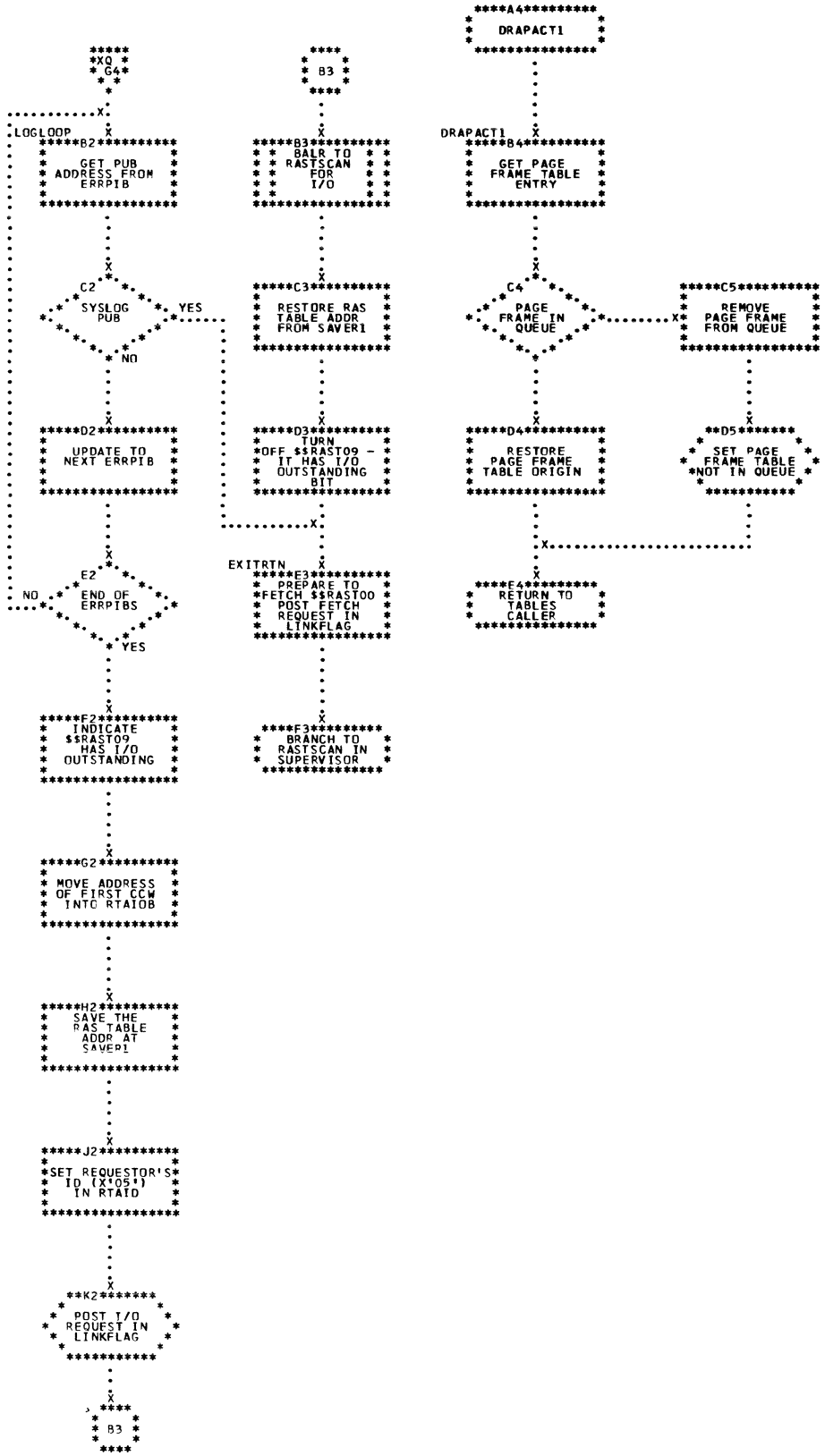


Chart XS. $$RAST09 - Dynamic Reallocation of Partition (Part 3 of 3)
Refer to Chart 04.

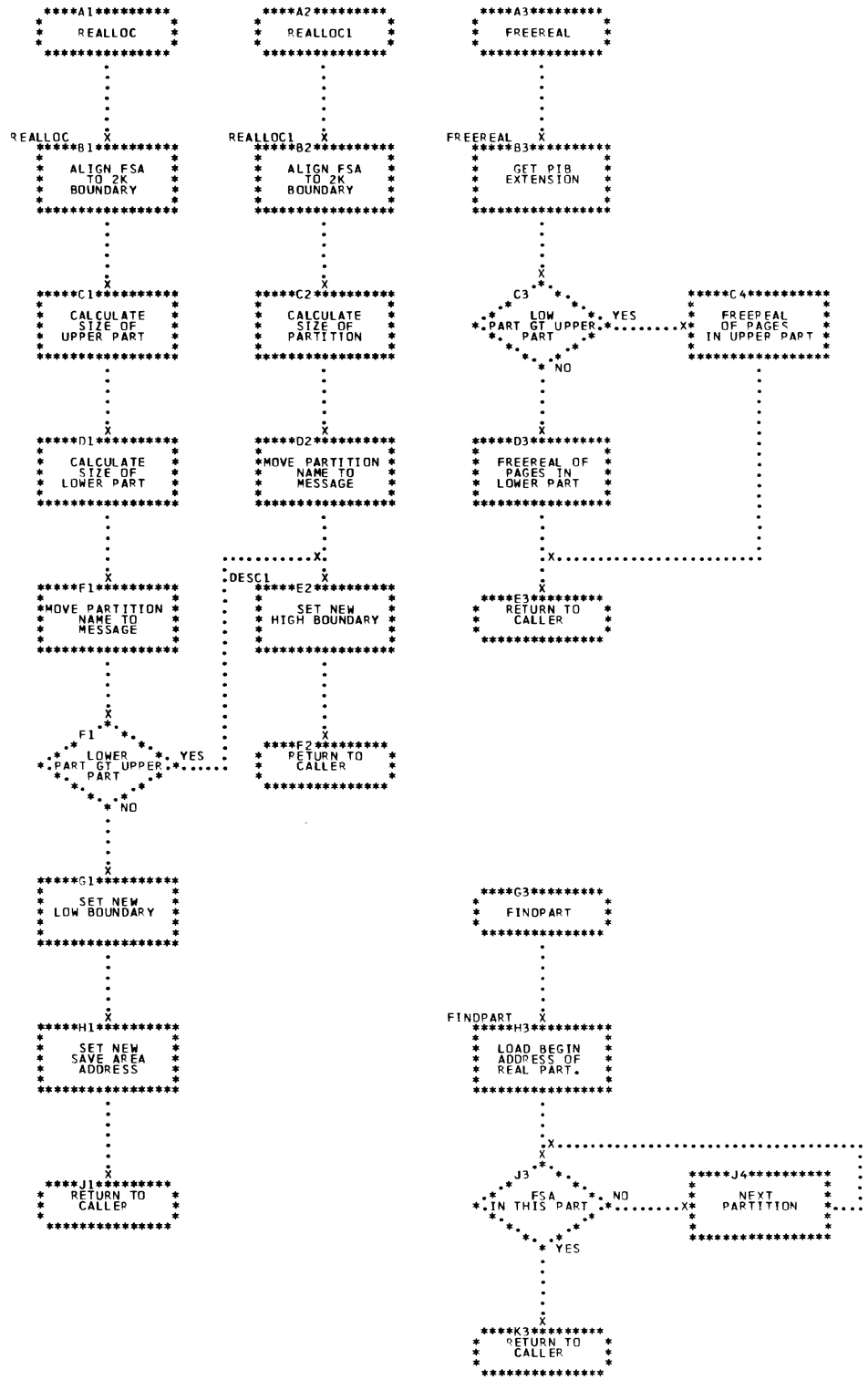


Chart XT. $$RAST10 - ERP Message Writer (Part 1 of 3)
Refer to Chart 05.

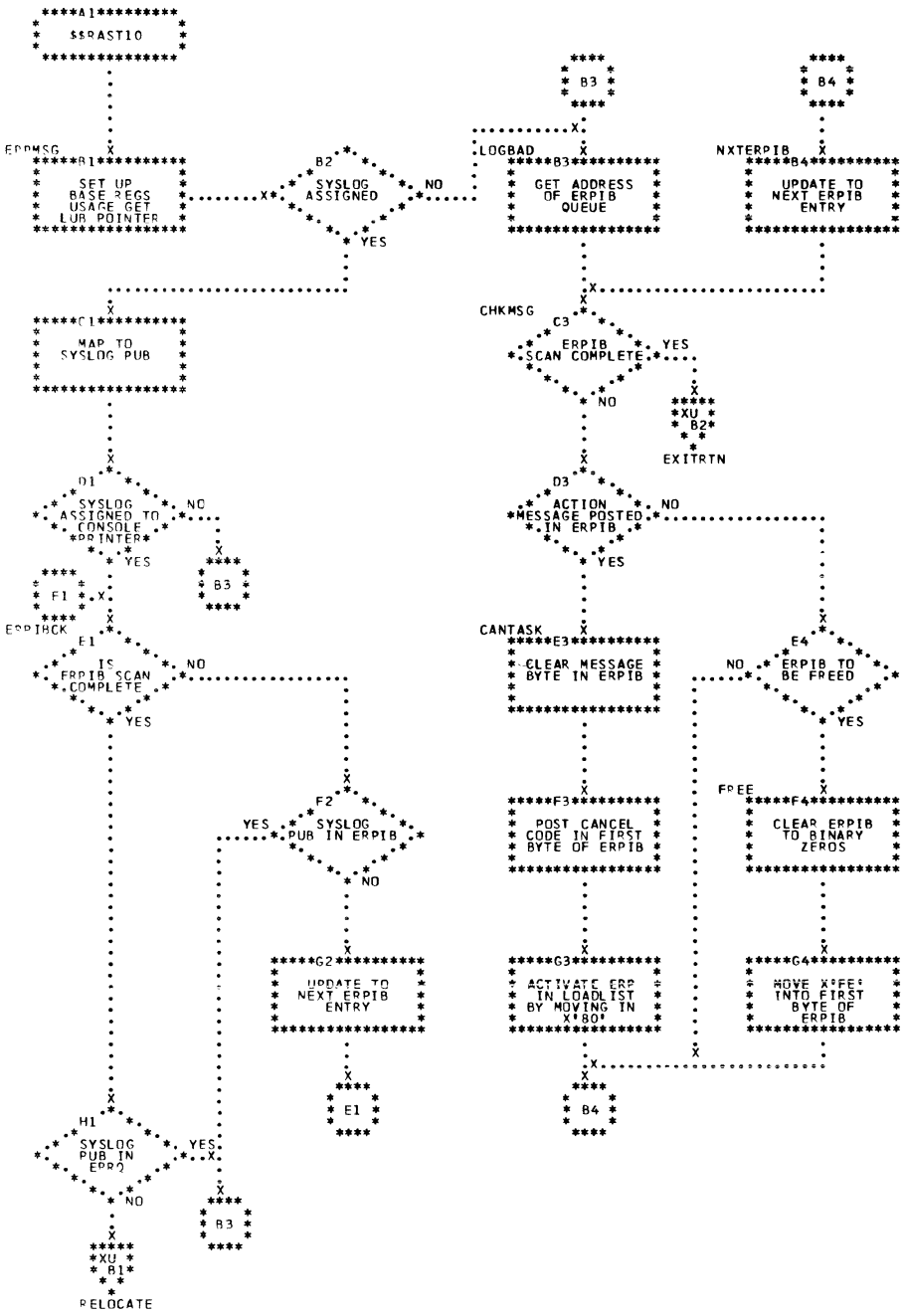


Chart XU. $$RAST10 - ERP Message Writer (Part 2 of 3)
Refer to Chart 05.

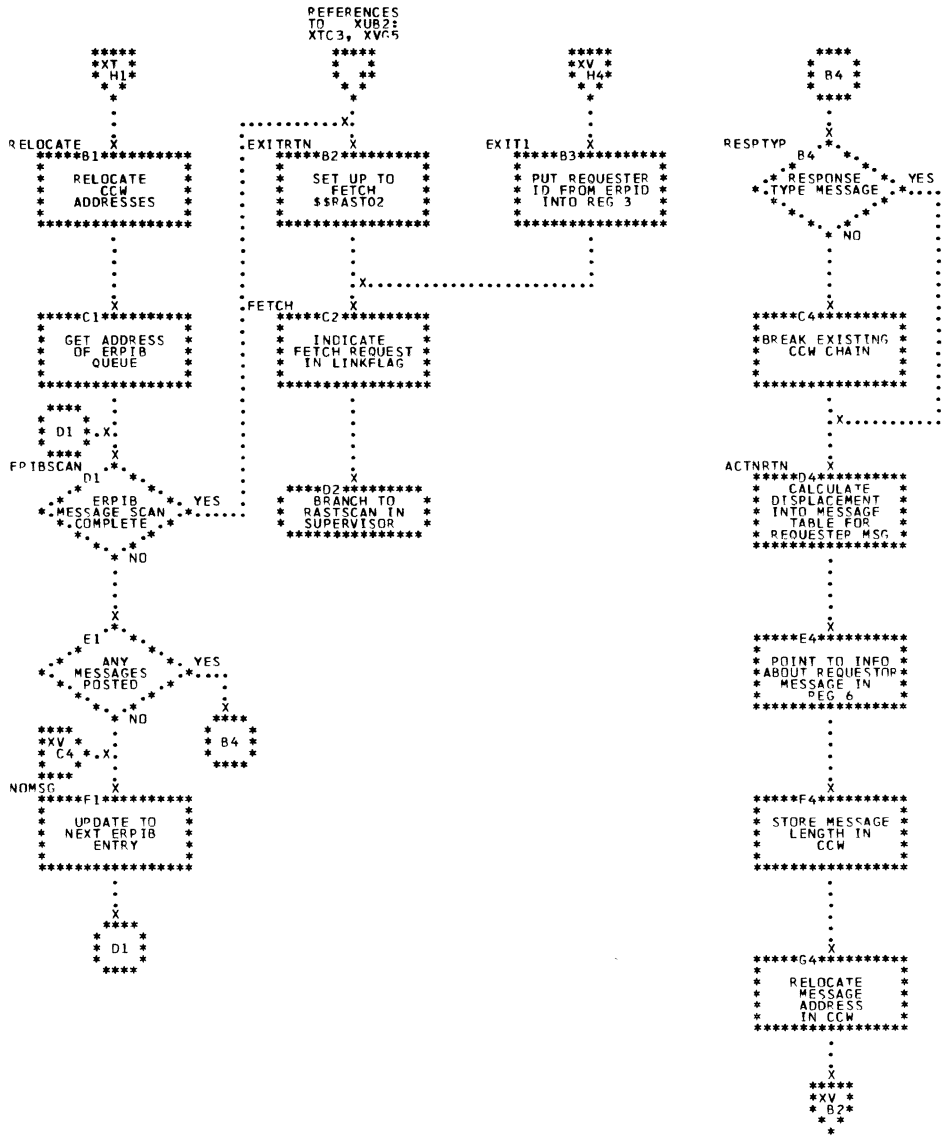


Chart XV. $$RAST10 - ERP Message Writer (Part 3 of 3)
Refer to Chart 05.

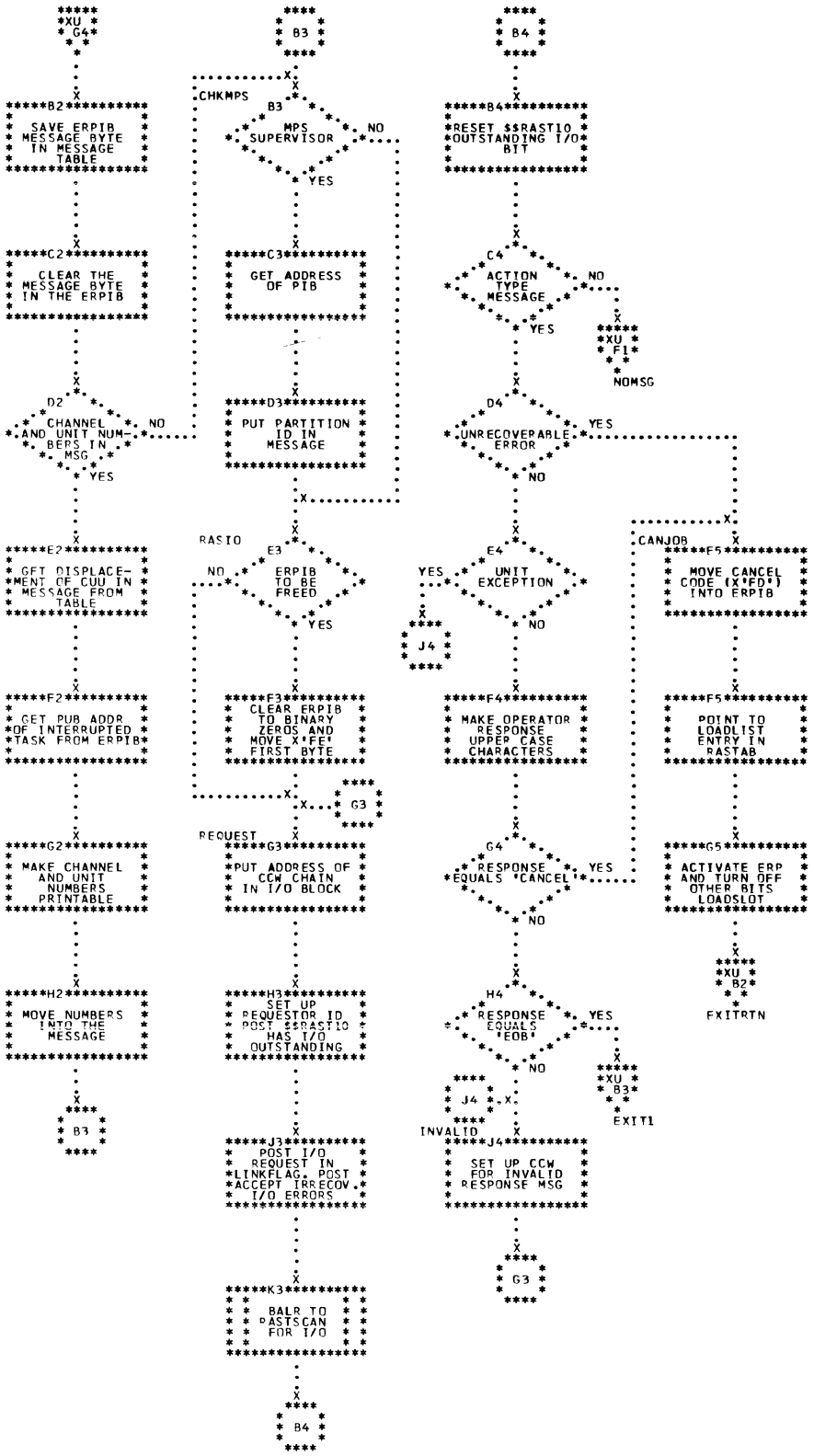


Chart XW. $$RAST11 - RTA Message Writer
Refer to Chart 04.

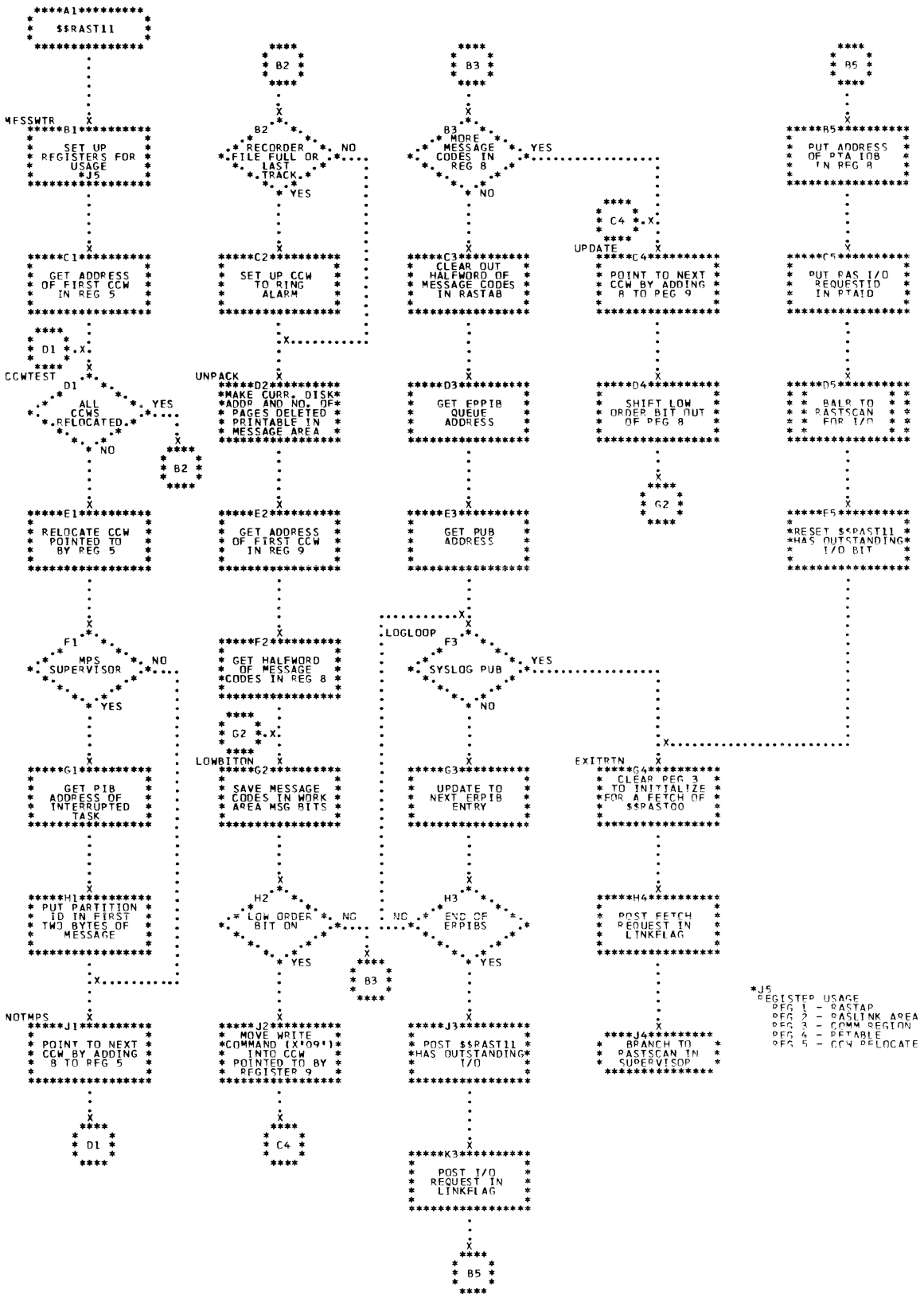


Chart XY. $$RAST12 - 3400 Tape Channel Check ERP (Part 1 of 2)
Refer to Chart 05.

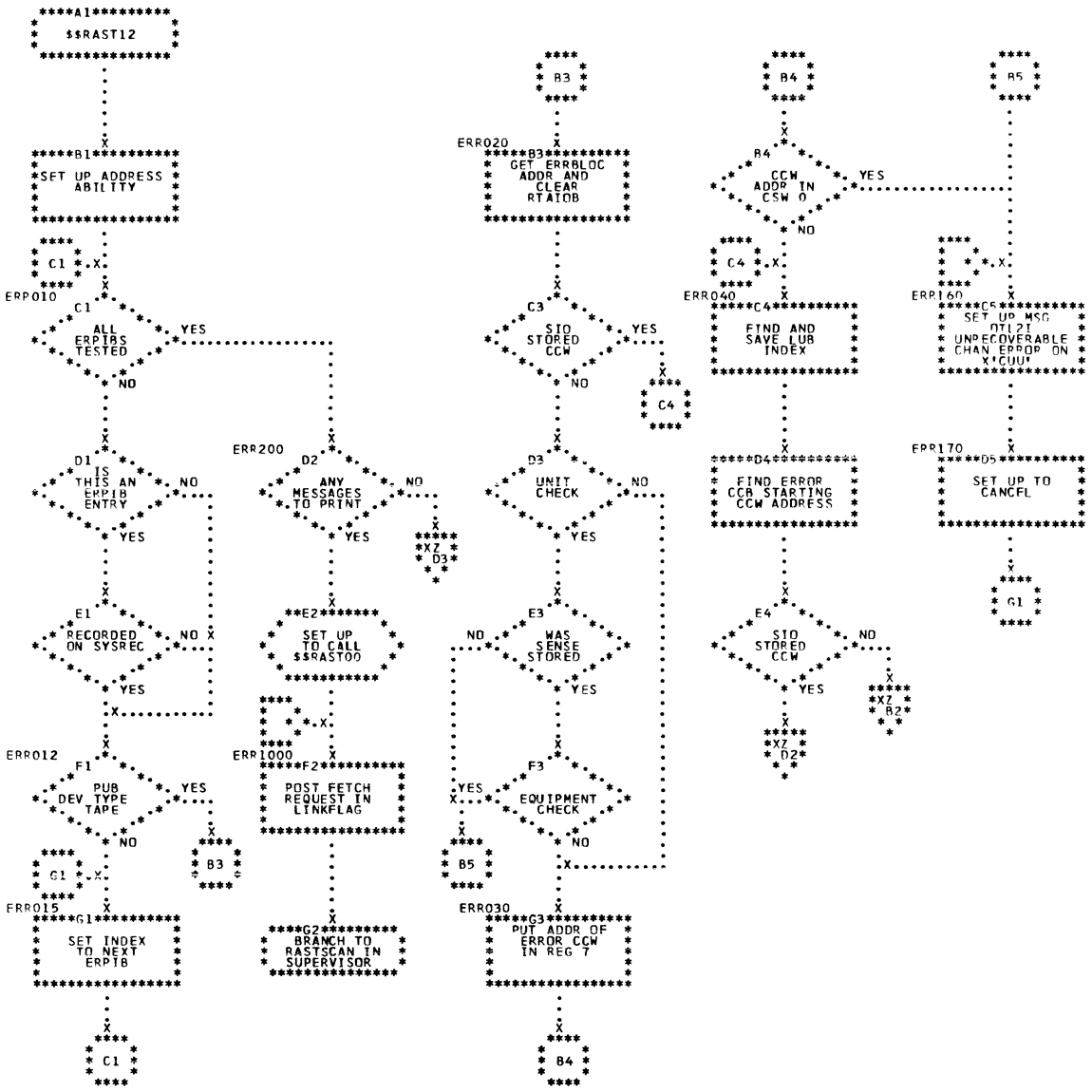


Chart XZ. $$RAST12 - 3400 Tape Channel Check ERP (Part 2 of 2)
Refer to Chart 05.

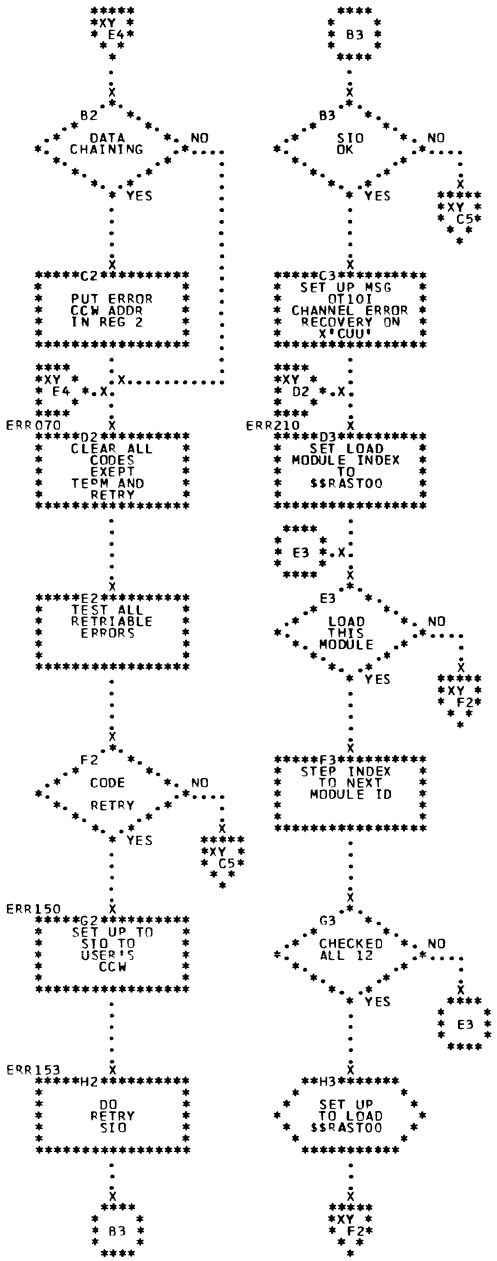
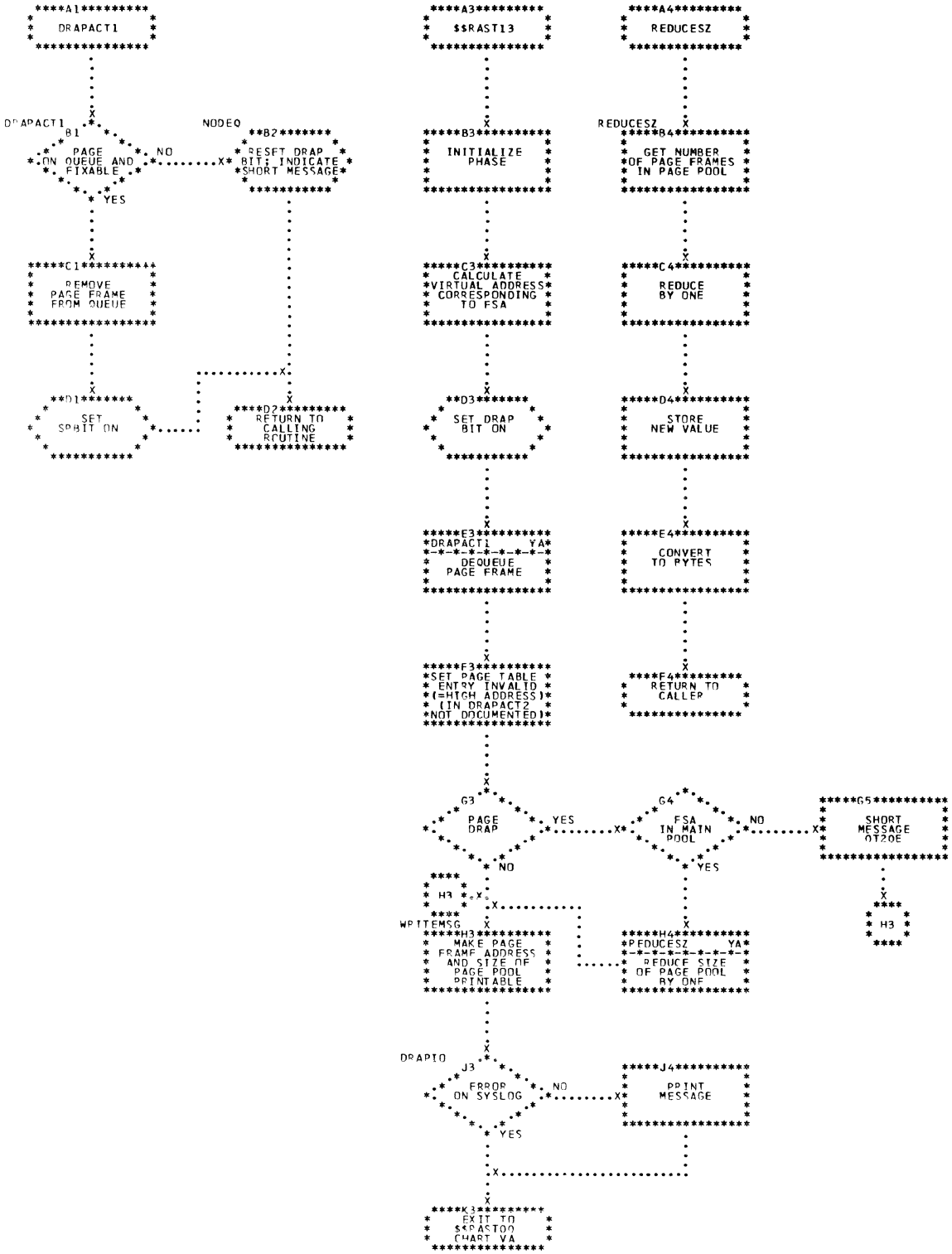


Chart YA. $$RAST13 - Dynamic Reallocation of Page Pool
Refer to Chart 04.



Label	Phase	Location
ACTIGN	$$ABERRP	TPJ3
ACTIGN	$$ABERRQ	TSB5
ACTICN1	$$ABERRF	TLH1
ACTICN1	$$ABERRH	UBE4
ACTION1	$$ABERRH	UBF3
ACTICN1C	$$RAST04	XBH5
ACTICN1C	$$RAST05	XFD3
ACTION2	$$ABERRF	TKD3
ACTICN2	$$ABERRH	UBJ3
ACTION2	$$RAST06	XJF3
ACTICN3	$$ABERRF	TMC1
ACTION3	$$ABERRH	UBE1
ACTION3	$$RAST04	XBF5
ACTICN3	$$RAST05	XFB3
ACTION3	$$RAST06	XJE3
ACTION4	$$ABERRF	TNC2
ACTICN4	$$RAST04	XCC5
ACTICN4	$$RAST05	XFC5
ACTICN4	$$RAST06	XJG2
ACTION4A	$$ABERRF	TMD1
ACTION4B	$$ABERRF	TND2
ACTICN5	$$ABERRF	TLF1
ACTION5	$$RAST04	XBC4
ACTICN5	$$RAST05	XFD1
ACTION5	$$RAST06	XJF1
ACTION6	$$ABERRI	TCB5
ACTION6	$$ABERRF	TLF3
ACTION7	$$ABERRI	TFF1
ACTICN7	$$ABERRF	TMG4
ACTION7	$$RAST06	XIH2
ACTION7A	$$ABERRF	TMH4
ACTICN7A	$$ABERRH	UBF4
ACTION7B	$$ABERRF	TLD5
ACTICN7B	$$ABERRH	UAF3
ACTION8	$$ABERRF	TLF2
ACTMSG	$$ABERRQ	TSB4
ACTNFTN	$$RAST10	XUD4
ADDTOCT	$$ABERRI	TDC1
ANNUL	$$ABERRT	TBC4
ANYERRS	$$ABERRT	TBG4
ARETURN	$$RAST04	XBA4
ARETURN	$$RAST05	XFB1
ARETURN	$$RAST06	XJK2
AROUND	$$ABERR7	PYG5
ATYPE	$$ABERRN	QFB3
ATYPE	$$ABERRY	RBB2
ATYPE	$$ABERRV	RKH2
A01	$$ABERR1	PKE2
A02	$$ABERR1	PKF2
A03	$$ABERR4	PSD2
A05	$$ABERR4	PSG3
A051	$$ABERR4	PSH3
AC6	$$ABERR4	PTA1
BALMSG	$$ABERR4	PSA5
BALSICHK	$$ABERR4	PSH2
BCCREC00	$$RAST01	VFB4
BCCREC35	$$RAST01	VFE4
BEGIN	$$ABERRF	TKC1
BEGIN	$$ABERRP	TPC1
BEGIN	$$ABERRQ	TSC1
BEGIN	$$ABERRH	UAC1
BEGIN	$$RAST04	XAB1
BEGIN	$$RAST05	XFB1
BKNTAP	$$ABERRU	TGC5
BLDERPIB	$$RAST00	VDG2
BLDHDR00	$$RAST01	VFB3
BLDLF00	$$ABERR4	MDB3
BLDLF15	$$ABERR4	MDE3
BLDLF25	$$ABERR4	MDA4
BLDLF30	$$ABERR4	MDB4
BLDLF35	$$ABERR4	MDE4
BLDREC00	$$RAST02	WBA1
BLDREC05	$$RAST02	WBE1
BLDREC10	$$RAST02	WBF1
BLDREC15	$$RAST02	WBB3
BLDREC20	$$RAST02	WBG3
BLDREC25	$$RAST02	WBJ3
BLDREC30	$$RAST02	WBB4
BLDREC35	$$RAST02	WBF4
BMCREC10	$$RAST01	VGE3
BMCREC30	$$RAST01	VGJ4
BMCRFC00	$$RAST01	VGB3
BSOUT	$$ABERRS	RGE3
BSOUTMSG	$$ABERRU	TGE4
BUFPAR	$$ABERRF	TLB1
BUFPAR	$$ABERRH	UBB1
BUFPAR1	$$ABERRF	TLD1
BUFPAR1	$$ABERRH	UBC4
BUFPAR2	$$ABERRF	TLD3
BUFPAR3	$$ABERRF	TLB4
BUSCK	$$ABERR7	PXH1
BUSCK	$$ABERRG	TUA3
BUSOUT	$$ABERRB	MYE2
BUSOUT	$$ABERRY	RDF5
BUSOUT	$$ABERRS	RFC4
BUSOUT	$$ABERRT	TAF4
BUSOUT	$$ABERRU	TGB4
BUSOUT	$$ABERRF	TMA1
BUSOUT	$$ABERAN	TXB1
BUSOUT	$$ABERRH	UBB3
BUSOUTER	$$ABERAN	TXB2
BUSRETRY	$$ABERRU	TGC4
BYDTCK	$$ABERR7	PZD2
BYTEONE	$$ABERR7	PYA1
BYTEONE	$$ABERRG	TVB3
BZYTEST	$$RAST00	VED2
B01	$$ABERR1	PKJ2
B02	$$ABERR1	PMA4
B050	$$ABERR3	PQB4
CALC1	$$ABERRC	QQD4
CALLMSG	$$ABERR4	PTC1
CALLMW	$$ABERRU	TGJ4
CANCEL	$$RAST02	WAF4
CANCELIB	$$ABERAN	TWK4
CANCL	$$ABERR7	PXB3
CANJOB	$$RAST10	XVE5
CANTASK	$$RAST10	XTE3
CCWTEST	$$RAST11	XWD1
CDATACK	$$ABERRT	TAF3
CDC	$$ABERRS	RGH3

Label	Phase	Location
CHAINCH	$$ABERRB	MZD4
CHECK	$$ABERRT	TAE1
CHECKEXT	$$ABERRC	QNG4
CHECKLST	$$RAST00	VBA1
CHECKMC	$$RAST00	VBD1
CHKADR	$$ABERRS	RFH5
CHKCNT	$$ABERRG	TUE3
CHKERR	$$ABERRF	TKA2
CHKERR10	$$ABERRP	TPD2
CHKERR15	$$ABERRP	TPC3
CHKERR20	$$ABERRP	TPD3
CHKERR25	$$ABERRP	TPE3
CHKERR30	$$ABERRP	TPB4
CHKERR35	$$ABERRP	TPD4
CHKERR40	$$ABERRP	TPF4
CHKFRR	$$ABERRH	UAJ1
CHKMES	$$RAST10	XVB3
CHKMSG	$$RAST10	XTC3
CHKREAD	$$RAST06	XJK5
CHNDAT	$$ABERRF	TLA5
CHNDAT	$$ABERRH	UAD3
CHNDCHK	$$ABERRU	THD2
CHNDTEX	$$ABERRU	THG3
CKCNT	$$ABERR7	PYB4
CKC4	$$ABERR7	PYJ2
CKOBR	$$ABERAN	TYH1
CLEAR	$$RAST02	WCC3
CLKDMG	$$RAST03	WJC3
CLRCCB	$$ABERRO	QJD3
CMDRJ	$$ABERRG	TUC3
CMNDREJ	$$ABERRT	TBB1
CMPCHERR	$$ABERRC	QNB2
CMR	$$ABERRY	RDD4
CNCL	$$ABERRG	TUH3
CNERPIB	$$RAST02	WAB4
CNTRIN	$$ABERRI	TEB5
CODE00	$$ABERA6	MGB3
CODE05	$$ABERA6	MGC3
CODE10	$$ABERA6	MGE4
CODE15	$$ABERA6	MGF4
COLCALC	$$ABERRC	QQB4
COMBIN	$$ABERRA	MWD1
COMMAND	$$ABERAN	TWC5
COMREJ	$$ABERRB	MZC4
COMREJ	$$ABERRY	RDF1
COMRJ	$$ABERRS	RHC1
CONT	$$ABERRS	RGE1
CONTINUE	$$ABERRT	TBH4
CONTROL	$$RAST03	WFD2
COVERCHK	$$ABERRC	QMC4
CSCAN	$$RAST04	XAE1
CSCAN	$$RAST05	XEE1
CSCAN	$$RAST06	XHE1
CSWLOST	$$RAST00	VDJ2
CUPDATE	$$RAST04	XAD2
CUPDATE	$$RAST05	XED2
CUPDATE	$$RAST06	XHB2
CVRCHECK	$$ABERRC	QPA5
CC100	$$ABERRY	RBG5
DAT	$$ABERRV	RJG4
DATACHK	$$ABERRU	THE2
DATCHECK	$$ABERRY	RAG2
DATCHK	$$ABERRY	RDA4
DATCHK	$$ABERRF	TMA4
DATCHK	$$ABERRH	UBB4
DATCHK1	$$ABERRF	TME4
DESC1	$$RAST09	XSE2
DEVD00	$$ABERRK	MBB1
DEVD00	$$ABERA4	MDB1
DEVD05	$$ABERRK	MBH1
DEVD05	$$ABERA4	MDE1
DEVD10	$$ABERRK	MBC2
DEVD10	$$ABERA4	MDH1
DEVD20	$$ABERRK	MBD2
DEVD30	$$ABERRK	MBF2
DEVD35	$$ABERA4	MDB5
DEVD50	$$ABERRK	MBG2
DMCHK00	$$ABERRJ	MNB5
DMCHK05	$$ABERRJ	MND5
DMCHK10	$$ABERRJ	MNJ5
DMCHK15	$$ABERRJ	MNJ4
DOSVC	$$ABERRI	TFD5
DRAPACT1	$$RAST09	XRB4
DRAPACT1	$$RAST13	YAB1
DRAPIO	$$RAST13	YAJ3
DTACK	$$ABERR7	PXJ1
DTACK	$$ABERRG	TUB3
DTCRTN	$$ABERRI	TEJ1
DTEXIT	$$ABERRU	THE5
DTYPE	$$ABERRO	QJA1
DUMREAD	$$ABERRD	QTC2
DV1018	$$ABERRU	THG2
EEDCH	$$ABERRE	QXE1
EFLRTN	$$RAST03	WJB1
ENQDEQ00	$$ABERA3	MTH3
ENQDEQ15	$$ABERA3	MTK4
EPIBSCAN	$$RAST10	XUD1
EQPCHECK	$$ABERRC	QNA1
EQPCHECK	$$ABERRE	QXD3
EQPCHK	$$ABERRU	TGB2
EQPCHK	$$ABERRF	TNB1
EQPCHK1	$$ABERRF	TNH1
EQP1	$$ABERRE	QXD4
EQUIP	$$ABERRY	RBA4
EQUIPMENT	$$ABERAN	TYB1
EQUIPXIT	$$ABERRT	TAH4
ERPIBCK	$$RAST10	XTE1
ERPIBLUP	$$RAST00	VDE2
ERPIBSC	$$RAST02	WDB1
ERPIBU	$$RAST02	WDD2
ERPMSG	$$RAST10	XTB1
ERROR	$$ABERRD	QSJ1
ERR005	$$ABERAH	PAE1
ERR008	$$ABERAE	NNG3
ERR008	$$ABERAH	PAF1
ERR010	$$ABERAE	NNH3
ERR010	$$ABERAG	NXB3
ERR010	$$RASTOM	XKC1
ERR010	$$RAST12	XYC1
ERR012	$$RAST12	XYF1
ERR015	$$RASTOM	XKB2
ERR015	$$RAST12	XYG1
ERR020	$$ABERAE	NNH4
ERR020	$$RASTOM	XKA5
ERR020	$$RAST12	XYB3
ERR030	$$ABERAE	NPA4
ERR030	$$ABERAH	PCA2
ERR030	$$RASTOM	XKG5
ERR030	$$RAST12	XYG3
ERR035	$$ABERAE	NPC5

Label	Phase	Location
ERR035	$$AEERAH	PAC2
ERR039	$$AEERAE	NPB3
ERR039	$$ABERAH	PCF4
ERR040	$$AEERAE	NPC3
ERR040	$$ABERAH	PCG4
ERR040	$$PASTOM	XKH5
ERR040	$$RAST12	XYC4
ERR050	$$AEERAF	NTD1
ERR050	$$AEERAG	NXD3
ERR050	$$RASTOM	XKC4
ERR060	$$ABERAD	NKG1
ERR070	$$AEERAD	NKH1
ERR070	$$ABERAF	NTF1
ERR070	$$RASTOM	XLB1
ERR070	$$RAST12	XZD2
ERR075	$$ABERAD	NKJ1
ERR075	$$AEERAI	PED1
ERR080	$$ABERAI	PEF1
ERR090	$$RASTOM	XLF2
ERR093	$$RASTOM	XLF3
ERR095	$$ABERAE	NQA4
ERR095	$$AEERAH	PCE1
ERR096	$$ABERAE	NQA5
ERR096	$$AEERAH	PCE2
ERR100	$$ABERAB	NAB2
ERR100	$$ABERAC	NEG1
ERR100	$$AEERAD	NKA5
ERR100	$$ABERAE	NNG2
ERR100	$$AEERAF	NTG1
ERR100	$$ABERAH	PAG1
ERR100	$$ABERAI	PEH3
ERR1000	$$AEERAB	NBF2
ERR1000	$$ABERAC	NFF5
ERR1000	$$AEERAD	NKK4
ERR1000	$$ABERAE	NNF5
ERR1000	$$ABERAF	NTG3
ERR1000	$$AEERAG	NXK5
ERR1000	$$ABERAH	PAF3
ERR1000	$$RAST12	XYF2
ERR110	$$AEERAC	NFE3
ERR110	$$ABERAE	NQE2
ERR110	$$AEERAG	NXE3
ERR110	$$RASTOM	XLH4
ERR115	$$AEERAB	NAC2
ERR120	$$AEERAB	NAE3
ERR120	$$ABERAC	NFF4
ERR120	$$AEERAD	NKB5
ERR120	$$RASTOM	XLH5
ERR125	$$AEERAC	NFA5
ERR130	$$AEERAB	NAF4
ERR130	$$ABERAD	NKC5
ERR140	$$AEERAB	NAG4
ERR140	$$ABERAG	NXJ3
ERR140	$$RASTOM	XLJ4
ERR143	$$AEERAB	NAH4
ERR145	$$ABERAB	NAG3
ERR145	$$PASTOM	XLJ3
ERR150	$$ABERAC	NFB2
ERR150	$$ABERAD	NKD5
ERR150	$$AEERAE	NQF3
ERR150	$$ABERAF	NUE2
ERR150	$$RASTOM	XLD1
ERR150	$$RAST12	XZG2
ERR153	$$RASTOM	XLE1
ERR153	$$RAST12	XZH2
ERR160	$$ABERAB	NAH3
ERR160	$$ABERAD	NLA1
ERR160	$$ABERAE	NQF4
ERR160	$$ABERAF	NUG2
ERR160	$$ABERAH	PBA1
ERR160	$$RASTOM	XKH4
ERR160	$$RAST12	XYC5
ERR165	$$ABERAB	NAK2
ERR170	$$PASTOM	XKJ4
ERR170	$$RAST12	XYD5
ERR180	$$AEERAE	NQF1
ERR180	$$ABERAH	PBA3
ERR200	$$ABERAC	NFC2
ERR200	$$ABERAD	NLB1
ERR200	$$AEERAE	NQF5
ERR200	$$ABERAF	NVA1
ERR200	$$ABERAG	NXB5
ERR200	$$ABERAH	PBA2
ERR200	$$ABERAI	PEK3
ERR200	$$RASTOM	XKC2
ERR200	$$RAST12	XYD2
ERR202	$$ABERAC	NGC1
ERR202	$$ABERAD	NLC1
ERR205	$$ABERAC	NGG1
ERR205	$$ABERAD	NLF1
ERR210	$$ABERAB	NBA2
ERR210	$$ABERAD	NLA4
ERR210	$$RASTOM	XKD2
ERR210	$$RAST12	XZD3
ERR220	$$ABERAC	NGA3
ERR220	$$ABERAG	NXG5
ERR220	$$RASTOM	XKE2
ERR225	$$ABERAB	NBA1
ERR225	$$ABERAC	NGA4
ERR225	$$ABERAI	PEA5
ERR230	$$ABERAB	NBD1
ERR235	$$ABERAB	NBB3
ERR240	$$ABERAB	NCA1
ERR242	$$ABERAB	NCC1
ERR246	$$ABERAB	NCE1
ERR250	$$ABERAD	NLE2
ERR250	$$ABERAF	NVJ1
ERR250	$$ABERAG	NXF2
ERR250	$$ABERAI	PEB5
ERR259	$$ABERAG	NXJ1
ERR260	$$ABERAG	NYA2
ERR270	$$ABERAC	NGF2
ERR275	$$ABERAF	NVK1
ERR275	$$ABERAI	PFA1
ERR280	$$ABERAB	NCG3
ERR280	$$ABERAG	NYC2
ERR285	$$ABERAB	NBA4
ERR300	$$ABERAB	NBG4
ERR300	$$ABERAE	NNH1
ERR300	$$ABERAF	NVA2
ERR300	$$ABERAI	PFC1
ERR305	$$ABERAB	NBK4
ERR310	$$ABERAC	NGG2
ERR320	$$ABERAG	NYA3
ERR325	$$ABERAI	PFF1
ERR350	$$ABERAD	NLC2
ERR350	$$ABERAF	NVF2
ERR359	$$ABERAF	NUA5
ERR360	$$ABERAC	NHA1
ERR360	$$ABERAD	NLC3
ERR360	$$ABERAF	NVF3
ERR380	$$ABERAC	NHB1

Label	Phase	Location
ERR380	$$ABERAD	NLG3
ERR380	$$ABERAF	NVH4
ERR390	$$ABERAC	NHJ1
ERR400	$$ABERAD	NKB4
ERR400	$$ABERAE	NPH4
ERR400	$$ABERAF	NWA1
ERR400	$$ABERAG	NZA2
ERR400	$$ABERAH	PCF5
ERR420	$$ABERAD	NKE4
ERR440	$$ABERAG	NZF2
ERR450	$$ABERAI	PFB2
ERR480	$$ABERAB	NCH4
ERR490	$$ABERAB	NDC1
ERR500	$$ABERAE	NPF3
ERR500	$$ABERAH	PBC1
ERR500	$$ABERAI	PFD2
ERR510	$$ABERAB	NDA2
ERR520	$$ABERAB	NDE2
ERR525	$$ABERAB	NAJ1
ERR580	$$ABERAB	NDA3
ERR580	$$ABERAC	NHA3
ERR581	$$ABERAB	NAF5
ERR583	$$ABERAB	NAJ5
ERR585	$$ABERAC	NHB3
ERR590	$$ABERAB	NDA4
ERR590	$$ABERAC	NHC3
ERR600	$$ABERAC	NHC4
ERR600	$$ABERAD	NKE5
ERR600	$$ABERAG	NZA3
ERR600	$$ABERAI	PFA3
ERR610	$$ABERAF	NWA3
ERR620	$$ABERAC	NJA2
ERR620	$$ABERAD	NMA3
ERR620	$$ABERAF	NWB3
ERR625	$$ABERAC	NJD2
ERR630	$$ABERAC	NJB4
ERR650	$$ABERAI	PFD3
ERR660	$$ABERAD	NLE4
ERR660	$$ABERAF	NWC3
ERR670	$$ABERAF	NWC4
ERR680	$$ABERAD	NLH4
ERR680	$$ABERAF	NWE3
ERR700	$$ABERAI	PFA4
ERR750	$$ABERAI	PFD5
ERR780	$$ABERAE	NRA2
ERR790	$$ABERAE	NRF2
ERR790	$$ABERAF	NVB3
ERR800	$$ABERAD	NLH2
ERR800	$$ABERAE	NRC3
ERR800	$$ABERAF	NTF2
ERR810	$$ABERAE	NRE3
ERR820	$$ABERAB	NBE2
ERR820	$$ABERAE	NRG2
ERR825	$$ABERAI	PEK4
ERR830	$$ABERAE	NRH2
ERR840	$$ABERAB	NAC3
ERR850	$$ABERAC	NEC4
ERR870	$$ABERAC	NFD1
ERR870	$$ABERAF	NUF4
ERR880	$$ABERAC	NFE1
ERR880	$$ABERAF	NUF1
ERR880	$$ABERAI	PEG2
ERR890	$$ABERAC	NEF2
ERR900	$$ABERAC	NEH2
ERR900	$$ABERAD	NKG2
ERR900	$$ABERAE	NNK3
ERR900	$$ABERAF	NTK1
ERR900	$$ABERAH	PAJ1
ERR900	$$ABERAI	PEH2
ERR901	$$ABERAH	PAK2
ERR905	$$ABERAE	NPA1
ERR905	$$ABERAF	NTA4
ERR905	$$ABERAH	PAF4
ERR910	$$ABERAD	NKH4
ERR910	$$ABERAE	NND4
ERR910	$$ABERAG	NZJ2
ERR920	$$ABERAG	NZH4
ERR930	$$ABERAG	NZG3
ERR940	$$ABERAE	NPJ3
ERR940	$$ABERAF	NTE4
ERR940	$$ABERAG	NZF4
ERR950	$$ABERAB	NAG2
ERR950	$$ABERAC	NFE5
ERR950	$$ABERAD	NKG3
ERR950	$$ABERAE	NPD1
ERR950	$$ABERAF	NTF4
ERR950	$$ABERAG	NYF2
ERR950	$$ABERAH	PAJ4
ERR950	$$ABERAI	PEJ2
ERR955	$$ABERAF	NTG4
ERR960	$$ABERAF	NTJ4
ERR985	$$ABERAF	NUB5
ERR990	$$ABERAB	NBK5
ERR990	$$ABERAF	NTF3
ERR990	$$ABERAH	PBH1
EXCP	$$ABERRO	QHE1
EXEC	$$ABERRD	QRG1
EXINTR	$$ABERRO	QJB2
EXIT	$$ABERRC	QPH2
EXIT	$$ABERRD	QSA4
EXIT	$$ABEREE	QVA3
EXIT	$$ABERRE	QWF3
EXIT	$$ABERRY	RAK4
EXIT	$$ABERRW	REK5
EXIT	$$RAST02	WCE1
EXITA	$$ABERRA	MXA4
EXITA	$$ABERRB	MZD5
EXITA	$$ABERRY	RAJ4
EXITA	$$ABERRW	REJ2
EXITA	$$ABERRV	RJD2
EXITA	$$ABERRI	TEH4
EXITB	$$ABERRA	MXB4
EXITB	$$ABERRY	RDK1
EXITIO	$$RAST01	VFB2
EXITOO	$$ABERA6	MGE1
EXITRTN	$$ABERR2	PPD3
EXITRTN	$$ABERR3	PQK4
EXITRTN	$$ABERR4	PSG4
EXITRTN	$$RAST00	VCA1
EXITRTN	$$RAST03	WHF1
EXITRTN	$$RAST09	XRE3
EXITRTN	$$RAST10	XUB2
EXITRTN	$$RAST11	XWG4
EXITSVC	$$ABERRC	QME5
EXITOO	$$ABERRK	MAE2
EXITOO	$$ABERA4	MCA2
EXITOO	$$ABERRA5	MEJ1
EXITOO	$$ABERA7	MHG3
EXITOO	$$ABERA1	MKE2
EXITOO	$$ABERRJ	MMJ1
EXITOO	$$ABERA3	MSG2
EXITOO	$$ABERAA	MUD2

Label	Phase	Location
EXITC0	$$RAST01	VFG1
EXITC0	$$RAST08	XMA4
EXITC5	$$ABERRK	MAJ2
EXITC5	$$ABERA4	MCE2
EXITC5	$$ABERRA5	MEF2
EXITC5	$$ABERA7	MHD2
EXITC5	$$ABERA1	MKG2
EXITC5	$$ABERRJ	MMB2
EXITC5	$$ABERAA	MUF2
EXITC5	$$RAST01	VFH1
EXITC5	$$RAST08	XMB4
EXITC51	$$RAST08	XME4
EXIT1	$$RAST03	WHJ5
EXIT1	$$RAST10	XUB3
EXIT10	$$ABERRA5	MEH2
EXIT10	$$ABERA7	MHE2
EXIT10	$$RAST08	XMH4
EXIT15	$$ABERRJ	MMC3
EXIT15	$$RAST08	XME5
EXIT20	$$ABERRJ	MMJ4
EXIT20	$$RAST08	XMG5
EXNOFEP	$$ABERREE	QVC3
EXTEND	$$ABERRN	QDD5
EXTFCB	$$ABERRP	TQB3
EXTIGN	$$ABERRP	TPK4
EXTIGN	$$ABERRP	TQF3
EXTIGN	$$ABERRQ	TSJ3
EXTMSG	$$ABERRP	TQE2
EXTMSG	$$ABERRQ	TSH4
EXTUCB	$$ABERRP	TQC3
EXTUCB	$$ABERRQ	TSD2
EXTUCB1	$$ABERRP	TPH5
E050	$$ABERR3	PQG1
E051	$$ABERR3	PQA3
E06	$$ABERR3	PQD3
E062	$$ABERR3	PQF4
FCH0	$$ABEREE	QUH1
FCH1	$$ABEREE	QUA2
FCH10	$$ABEREE	QUB3
FCH11	$$ABEREE	QUD3
FCH12	$$ABEREE	QUE3
FCH13	$$ABEREE	QUG3
FCH14	$$ABEREE	QUJ3
FCH2	$$ABEREE	QUD2
FCH3	$$ABEREE	QUF2
FCH4	$$ABEREE	QUH2
FCH5	$$ABEREE	QUK2
FCH6	$$ABEREE	QUB4
FCH7	$$ABEREE	QUF4
FCH8	$$ABEREE	QUH4
FCH9	$$ABEREE	QUH5
FEEDCHK	$$ABERRC	QMD3
FEEDCR	$$ABEREE	QUC1
FEEDSEL	$$ABERRC	QQA1
FEEDSS	$$RAST06	XHB3
FEEDSTK	$$RAST06	XHJ3
FEEDTST	$$ABERRD	QTD3
FEEDTST1	$$ABERRD	QTF3
FETCH	$$ABERR7	PXB4
FETCH	$$ABERRG	TUJ3
FETCH	$$RAST03	WHH2
FETCH	$$RAST10	XUC2
FETMSGW	$$ABERRT	TBJ5
FILEPR	$$ABERRB	MZB4
FINDCCB	$$RAST02	WDB4
FINDPART	$$RAST09	XSH3
FINDTASK	$$RAST02	WAA3
FINUP	$$ABERRI	TDJ2
FONTERR	$$ABERRT	TBG2
FREE	$$RAST10	XTF4
FREEPIB	$$RAST06	XIC4
FREEREAL	$$RAST09	XSB3
FSAVALID	$$RAST03	WGG2
F01	$$ABERR1	PLA3
F010	$$ABERR1	PLE3
F02	$$ABERR1	PLG4
F03	$$ABERR1	PLH4
GETCOM	$$RAST02	WDB5
GETIME	$$RAST03	WJE3
GOQUIET	$$RAST03	WJD3
GOTREQID	$$RAST02	WDC4
G01	$$ABERR1	PLF2
HANDLECC	$$RAST00	VDB2
HANDLEMC	$$RAST00	VBB3
HANDLEMC	$$RAST03	WEC1
HARDWAIT	$$RAST00	VBD4
HDR00	$$ABERA7	MHE4
HOPPERCH	$$ABERRE	QXF3
HRDWAIT	$$RAST00	VAF5
H01	$$ABERR1	PLF3
H1RRTN	$$RAST03	WEC4
IGNORE	$$ABERRY	RBH5
IJBERX20	$$ABERRV	RJB1
INCOMPSC	$$ABERAN	TXF4
INDPERM	$$ABERAN	TXC2
INIT00	$$ABERRK	MAB3
INIT00	$$ABERA4	MCB3
INIT00	$$ABERRA5	MFB1
INIT00	$$ABERA1	MKB3
INIT00	$$ABERRJ	MNB1
INIT00	$$ABERA2	MQE3
INIT00	$$ABERA3	MSF3
INIT00	$$ABERAA	MVB1
INIT00	$$RAST01	VFB5
INIT00	$$RAST08	XNB1
INIT02	$$ABERRJ	MNA2
INIT05	$$ABERRK	MAD3
INIT05	$$ABERA4	MCC3
INIT05	$$ABERRJ	MNA3
INIT05	$$RAST01	VFH5
INIT05	$$RAST08	XNF1
INIT10	$$ABERRK	MAE3
INIT10	$$ABERA4	MCD3
INIT10	$$ABERRA5	MFA3
INIT10	$$ABERRJ	MNB3
INIT10	$$ABERAA	MVF1
INIT10	$$RAST01	VFJ5
INIT10	$$RAST08	XNJ1
INIT15	$$ABERRK	MAB4
INIT15	$$ABERA4	MCB5
INIT15	$$ABERRA5	MFB3
INIT15	$$ABERRJ	MND3
INIT15	$$ABERAA	MVG1
INIT20	$$ABERRK	MAF4
INIT20	$$ABERRA5	MFF3
INIT20	$$ABERRJ	MNF3
INIT20	$$ABERAA	MVJ1
INIT25	$$ABERRK	MAG4

Label	Phase	Location
INIT25	$$ABERA4	MCG5
INIT30	$$ABERRK	MAH4
INIT30	$$ABERA4	MCB4
INIT30	$$ABERRA5	MFG3
INIT30	$$ABERRJ	MNA4
INIT35	$$ABERRK	MAJ4
INIT35	$$ABERA4	MCE4
INIT35	$$ABERRJ	MNB4
INIT40	$$ABERA4	MCF4
INIT45	$$ABERA4	MCH4
INRQ	$$ABERRS	RGC3
INSERT	$$ABERRB	MZF1
INTCH	$$ABERR7	PXG1
INTERV	$$ABERRT	TAG2
INTERVEN	$$ABERAN	TXF1
INTFCE00	$$RAST01	VGB1
INTFCE15	$$RAST01	VGF1
INTREQ	$$ABERRS	RFA4
INTREQ	$$ABERRF	TKC3
INTREQ	$$ABERRH	UBH3
INTREQD	$$ABERRU	TGB3
INTRFO	$$ABERRY	RDB3
INTVEN	$$ABERRB	MYD2
INT01	$$ABERRJ	MNF1
INVALID	$$ABERAN	TWH5
INVALID	$$RAST10	XVJ4
IOREQ00	$$ABERA1	MKD4
IOREQ00	$$ABERA2	MRB2
IOREQ00	$$ABERA3	MTD1
ICREQ00	$$RAST08	XNE2
IOREQ01	$$ABERA1	MLA1
IOREQ02	$$ABERA1	MKJ4
IOREQ05	$$ABERA3	MTE2
IOREQ07	$$ABERA2	MRE2
IOREQ10	$$ABERA3	MTA3
IOREQ10	$$RAST08	XNF3
IOREQ15	$$RAST08	XNH4
IOREQ20	$$ABERA1	MLK1
IORTN	$$ABERR3	PRB1
ICRTN	$$ABERR4	PUB1
IORTN	$$ABERRF	TNB4
IORTN	$$ABERRQ	TTB2
IORTY	$$ABERRP	TRC3
IORTY	$$ABERRQ	TTC2
ICWAIT	$$ABERRP	TRC4
IPLEXIT	$$RAST00	VCD5
IREXIT	$$ABERRS	RFJ3
K01	$$ABERR1	PLG3
LACSW	$$ABERRM	QCG2
LASPHAS	$$ABERRA	MXF3
LDPSW	$$ABERRO	QJD1
LDRAST02	$$RAST00	VDF4
LOADMOD	$$RAST00	VCE1
LOADMOD	$$RAST03	WHG2
LCADTEST	$$RAST00	VCD1
LOADTEST	$$RAST03	WHB2
LCAD00	$$RAST00	VAC2
LOAD03	$$RAST03	WEB1
LCGBAD	$$RAST10	XTB3
LCGLCOP	$$RAST09	XRB2
LOGLOOP	$$RAST11	XWF3
LCGOK	$$ABERRN	QEC4
LOWBITON	$$RAST11	XWG2
LO1	$$ABERR1	PLK3
L01	$$ABERR3	PQC3
MAINRT	$$ABERRI	TCJ1
MAIN00	$$ABERRK	MAC1
MAIN00	$$ABERA4	MCC1
MAIN00	$$ABERRA5	MEC1
MAIN00	$$ABERA1	MKC1
MAIN00	$$ABERRJ	MMC1
MAIN00	$$ABERA2	MQB1
MAIN00	$$ABERAA	MUC1
MAIN00	$$RAST01	VFB1
MAIN00	$$RAST08	XME1
MAIN05	$$ABERRK	MAF1
MAIN05	$$ABERA4	MCE1
MAIN05	$$ABERA2	MQF1
MAIN05	$$ABERAA	MUA2
MAIN05	$$RAST01	VFE2
MAIN07	$$ABERA4	MCJ1
MAIN10	$$ABERRK	MAB2
MAIN10	$$RAST08	XMH1
MAIN15	$$RAST08	XME2
MAIN20	$$RAST08	XMA3
MARKCHEC	$$ABERAN	TXB5
MDR00	$$ABERRA5	MEB4
MDR05	$$ABERRA5	MED5
MDR10	$$ABERRA5	MEF5
MESSWTR	$$RAST11	XWB1
MODCCW	$$ABERRV	RKE1
MODESTAT	$$RAST03	WJG3
MOVE	$$ABERRM	QCC3
MOVE	$$ABERRC	QNJ4
MQ135	$$RAST03	WED5
MSGDET00	$$ABERA2	MQD4
MSGDET05	$$ABERA2	MQF4
MSGDET10	$$ABERA2	MQH4
MSGWTR	$$ABERR1	PMF1
MSGWTR	$$ABERR2	PNE5
MSGWTR	$$ABERR3	PRE5
MSGWTR	$$ABERR4	PTD1
MSGWTR	$$ABERR5	PVC3
MSGWTR	$$ABERRS	RFF2
MSGWTR	$$ABERRS	RGG4
MSGWTR	$$ABERRS	RHF2
MSGWTR	$$ABERRI	TDH4
M01	$$ABERR1	PMB1
M01	$$ABERR3	PQH2
M01	$$ABERR5	PVE2
NEXTAV00	$$ABERA1	MLE3
NEXTAV00	$$ABERA3	MSB4
NEXTAV00	$$RAST08	XPB2
NEXTAV10	$$ABERA3	MSF4
NEXTAV20	$$ABERA3	MSE4
NEXTAV25	$$ABERA1	MLC4
NEXTAV25	$$ABERA3	MSB5
NEXTAV25	$$RAST08	XPD3
NEXTAV30	$$ABERA1	MLE5
NEXTAV35	$$ABERA1	MLG5
NEXTAV35	$$ABERA3	MSH5
NEXTAV35	$$RAST08	XPF4
NEXT1	$$ABERRM	QCB2
NINITIAL	$$ABERAN	TWH3
NOCANCEL	$$RAST02	WAJ4
NOCCB	$$ABERRM	QCA1
NOCCB	$$ABERRV	RKJ3
NOCHANFN	$$ABERRY	RDF4

Label	Phase	Location
NODEQ	$$RAST13	YAB2
NCDUAL	$$ABERRS	RHB4
NOFEED	$$ABERRC	QQB3
NOLOG	$$ABERRN	QEE5
NCLSS	$$ABERRT	TBH3
NOMSG	$$RAST10	XUF1
NONREC	$$ABERRT	TAG3
NCOBF	$$ABERAN	TWF5
NOQUIP	$$ABERRV	RJF5
NORECERP	$$ABERRE	QXA2
NORECERR	$$ABERRC	QMA4
NOREING	$$ABERRA	MWG1
NORETRN	$$ABERR7	PZE4
NOSVC70	$$ABERR1	PKA2
NOTFIRST	$$RAST03	WJE1
NOTIC	$$ABERRI	TDD1
NOTMPS	$$RAST11	XWJ1
NOTOPER	$$ABERRD	QSE2
NOTPOOL	$$RAST09	XQF3
NOTUSED	$$ABERR7	PXE2
NOTUSEDA	$$ABERAN	TXB3
NOT135	$$RAST03	WEC2
NRFRTY	$$ABERR4	PTG3
NXTERPIB	$$RAST10	XTB4
NO1	$$ABERR1	PMC1
NO1	$$ABERR4	PTA2
OBREC	$$ABERAN	TYG4
OBREC2	$$ABERAN	TYH4
OBRIT	$$ABERAN	TYC4
OBRREC	$$ABERR7	PZF4
OBRREC2	$$ABERR7	PZG4
OBRUND	$$ABERRG	TUE2
ONERET	$$ABERR1	PKF3
OPVNT	$$ABERRS	RGF4
OVERRUN	$$ABERRY	RDJ3
OVERRUN	$$ABERRT	TBC3
PATHSEL	$$ABERRC	QMH4
PATHSEL1	$$ABERRC	QMJ4
PCHCHECK	$$ABERRC	QND2
PCHFEED	$$ABERRC	QND3
PCHREP	$$ABERRD	QRK3
PCHREPP	$$ABERRD	QRJ3
PCHREPS	$$ABERRD	QRH4
PCURIN	$$ABERRS	RFJ1
PERMCCB	$$ABERAN	TYE1
PERMER	$$ABERRG	TUF3
PERMERR	$$ABERR7	PZA2
PERMERR	$$ABERAN	TWD5
PHASE2	$$ABERR1	PLJ2
PHASE3	$$ABERR1	PLH5
PHASE4	$$ABERR1	PKH3
PHIPPTST	$$ABERRD	QRJ2
POSCHECK	$$ABERRC	QNG1
POSTDIS	$$ABERRM	QBH2
POSTPIB	$$RAST02	WAB5
PREPRINT	$$ABERRD	QRE4
PREPUNCH	$$ABERRD	QRK2
PRICHECK	$$ABERRC	QNH1
PRICHKR	$$ABERRC	QNC5
PRICHK0	$$ABERRC	QNA4
PRICHK1	$$ABERRC	QNB4
PRICHK2	$$ABERRC	QNB5
PRICHK3	$$ABERRC	QND5
PRIMREP	$$ABERRD	QSB5

Label	Phase	Location
PRINREPA	$$ABERRD	QSC5
PRINTLST	$$ABERRN	QEA3
PROTCHK	$$ABERRA	MWJ2
PRPFCAR	$$ABERRP	TQJ4
PRPFCB	$$ABERRP	TQE4
PRPLB10	$$ABERRP	TQE1
PRPMULT	$$ABERRP	TRA1
PRPMULT	$$ABERRQ	TSA3
PRPPLB	$$ABERRP	TQA1
PRPPLB15	$$ABERRP	TQG1
PRPPLB20	$$ABERRP	TQJ1
PRPPLB25	$$ABERRP	TQB2
PRPUCB	$$ABERRQ	TSF3
PSTBUF	$$ABERRS	RGJ3
PSTERR	$$ABERRS	RFD2
PUBSCAN	$$RAST00	VEB2
PUNCHREP	$$ABERRD	QTB3
QUIET145	$$RAST03	WJF3
Q01	$$ABERR1	PMD1
RASIO	$$RAST10	XVE3
RAST02	$$RAST00	VDG4
RCHECK	$$ABERRE	QXE5
RCOMMON	$$RAST04	XDC2
RCOMMON	$$RAST05	XGC2
RCOMMON	$$RAST06	XHB5
RCOMMONA	$$RAST05	XGD2
RCOMMONA	$$RAST06	XHE5
RCOMMONB	$$RAST04	XDH2
RCOMMONB	$$RAST05	XGH2
RCOMMONB	$$RAST06	XJD1
RDHDR00	$$ABERA1	MKC4
RDHDR00	$$ABERA3	MTC1
RDHDR00	$$RAST08	XNC4
RDRCD	$$ABERR2	PNH1
RDVER	$$ABERR5	PVA4
READERR	$$ABERRC	QNC1
REALLOC	$$RAST09	XSB1
REALLOC1	$$RAST09	XSB2
RECERR	$$ABERRD	QSA3
RECOERR	$$ABERAN	TXA2
RECOVERY	$$ABERAN	TWB3
RECTST00	$$ABERRJ	MMB4
RECTST00	$$ABERAA	MUB4
RECTST05	$$ABERRJ	MMC5
RECTST05	$$ABERAA	MUD4
RECTST10	$$ABERRJ	MMF5
RECTST10	$$ABERAA	MUG4
RECTST15	$$ABERRJ	MMH5
RECTST15	$$ABERAA	MUJ4
RECTST20	$$ABERRJ	MME4
RECTST20	$$ABERAA	MUE5
RECTST25	$$ABERAA	MUG5
RECTST30	$$ABERRJ	MMK5
RECVERR	$$ABERRI	TFG2
REDUCESZ	$$RAST13	YAB4
REFAIL	$$ABERRI	TFC3
RELOCATE	$$RAST10	XUB1
REPERR1	$$ABERRO	QHB5
REPOERR	$$ABERAG	NZC1
REQUEST	$$RAST10	XVG3
RESPTYP	$$RAST10	XUB4
RESTART	$$RAST00	VCF2
RESTCQP	$$ABERRF	TNE3
RESTORE	$$RAST03	WGH4

Label	Phase	Location
RESTS	$$ABERRM	QCE1
RETINT	$$ABERRG	TVD4
RETOFF	$$ABERRI	TDG4
RETRY	$$ABERR7	PYE4
RETRY	$$ABERRW	REB3
RETRY	$$ABERRV	RKD4
RETRY	$$ABERRT	TBA5
RETRY	$$ABERRG	TVA1
RETRY	$$ABERAN	TXE3
RETRY	$$ABERAN	TYB2
RETRYIT	$$ABERAN	TYD2
RETRY2	$$ABERAN	TXG3
RETURN	$$ABERR7	PZF2
RETURN	$$RAST03	WHG3
RINGBELL	$$RAST00	VAJ2
RINGTIO	$$RAST00	VAE4
RLOG	$$RAST04	XAA4
RMESSAGE	$$RAST00	VAB3
RMODE	$$RAST00	VCG3
RMODE1	$$RAST00	VCH3
RRNTR	$$RAST04	XCB1
RSTLOAD	$$ABERRC	QMH1
RTNTEST	$$RAST00	VAF2
RTYEXIT	$$ABERRU	TJD5
RTYONE	$$ABERRC	QNB3
RTYONE	$$ABERRY	RBC1
RTYONE	$$ABERRW	RED3
R01	$$ABERR1	PKF4
R1442	$$RAST04	XCB2
R1442A	$$RAST04	XCE2
R1442B	$$RAST04	XCD3
R2501	$$RAST04	XBB2
R2501A	$$RAST04	XBE2
R2501B	$$RAST04	XBD3
R2520	$$RAST05	XEB4
R2520A	$$RAST05	XEE4
R2520B	$$RAST05	XED5
R2520C	$$RAST05	XEF5
R2540	$$RAST04	XBB1
R2540B	$$RAST04	XBF2
R3211	$$RAST05	XGB4
R3211A	$$RAST05	XGG4
R3211B	$$RAST05	XGH5
R3211C	$$RAST05	XGE5
R3505	$$RAST06	XHC2
R3540	$$RAST06	XIC2
R3886	$$RAST06	XJH3
SAVEIO	$$RAST00	VEE2
SCAN	$$ABERAN	TXC4
SCAN	$$ABERAN	TXD4
SCANTAB	$$RAST02	WCC4
SCHREOO	$$RAST02	WCB1
SCURIN	$$ABERRS	RGB1
SDROER	$$ABERR7	PYH4
SECCHECK	$$ABERRC	QPA3
SECCHKR	$$ABERRC	QPE4
SECCHK0	$$ABERRC	QPC3
SECCHK1	$$ABERRC	QPD3
SECCHK2	$$ABERRC	QPD4
SECCHK3	$$ABERRC	QPF4
SECDEF	$$ABERRC	QMF1
SECPPTST	$$ABERRD	QRH3
SECREP	$$ABERRD	QTB2
SEKCH	$$ABERRB	MYC2
SENSE2	$$ABERR4	PSC5
SENSTSTS	$$ABERRT	TAF1
SETCODE	$$RAST02	WCF5
SETEBL	$$ABERRI	TFE4
SETPSN	$$ABERRI	TEG2
SETUP	$$RAST00	VCC1
SETUP	$$RAST03	WHH1
SHIFT	$$ABERRC	QMF3
SIMPATTN	$$ABERRC	QME4
SIO	$$ABERRD	QSD1
SIZEREAL	$$RAST09	XQB5
SPFKREP	$$RAST03	WHB3
SRMSG	$$ABERR7	PYK2
SSCCB	$$ABERRS	RHB3
SSINSERT	$$ABERRD	QTD2
STARTIO	$$ABERRN	QEJ1
STGERR	$$RAST03	WGB2
STGEXIT	$$RAST03	WHB1
STKEXT	$$ABERRC	QPE2
STKSETUP	$$ABERRC	QQB2
STKSET1	$$ABERRC	QQC2
STKSET2	$$ABERRC	QQE2
STKSET3	$$ABERRC	QQF2
SUPRET	$$ABERRD	QSC4
SUPRET	$$ABERRS	RGJ5
SUPRET	$$ABERRI	TDD5
SUPRET	$$ABERRH	UBF2
SUPRETRY	$$ABERRD	QRK4
SVC5	$$ABERRD	QSE3
SVC5	$$ABEREE	QVD3
SVC5	$$ABERRE	QWJ3
SVC5	$$ABERRV	RJE2
S01	$$ABERR4	PTA4
TAPEMODE2	$$ABERRT	TBE1
TAPE00	$$ABERAA	MVB3
TAPE10	$$ABERAA	MVF3
TAPE15	$$ABERAA	MVG3
TAPE20	$$ABERAA	MVA4
TAPE25	$$ABERAA	MVC4
TAPE35	$$ABERAA	MVE5
TAPE40	$$ABERAA	MVH4
TEST	$$ABERR2	PPK2
TEST	$$ABERRC	QNK4
TESTDAT	$$ABERRB	MYE1
TESTDMC	$$RAST02	WAH1
TESTFE	$$RAST02	WDC1
TESTINT	$$ABERRY	RDB2
TESTIO	$$RAST06	XHE3
TESTLOG	$$ABERRN	QEA1
TESTQUIP	$$ABERRW	REJ1
TEST1	$$ABERRC	QPB1
TEST450	$$ABERRC	QQB1
TIO	$$ABERRD	QSE1
TPERP	$$ABERRA	MWD5
TRNONINT	$$ABERRS	RFC5
TSTBSY	$$RAST02	WAC2
TSTCCC	$$ABERRY	RAK1
TSTEXT	$$ABERRP	TQC2
TSTEXT	$$ABERRQ	TSA4
TSTFDCHK	$$ABERRC	QMD4
TSTINTR	$$ABERRI	TEF1
TSTPSN	$$ABERRI	TEG1
TSTSSL	$$ABERRB	MZG3
TSTTRG	$$ABERRN	QFB1
TST03U	$$ABERRY	RCA2
T01	$$ABERR1	PLB2

Label	Phase	Location
T03	$$ABERR2	PPA2
T06	$$ABERR2	PPB2
T145RTN	$$RAST03	WFB2
T155RTN	$$RAST03	WEB3
UNBUSY	$$RAST02	WAG2
UNCKCK	$$ABERRG	TUE1
UNDETERR	$$ABERRU	TGH4
UNDETR	$$ABERR7	PXB2
UNDETR	$$ABERRI	TCB4
UNDETR	$$ABERRI	TEF4
UNDETR	$$ABERRG	TUF2
UNDETR	$$ABERAN	TWJ4
UNDETR	$$ABERRH	UAB3
UNDTF	$$ABERRS	RFC3
UNKN	$$ABERRB	MZE4
UNPACK	$$RAST11	XWD2
UNSUPTD	$$ABERRT	TBG5
UNUSENS	$$ABERRY	RBH3
UPDATCCW	$$ABERRU	TGD3
UPDATE	$$RAST03	WFE3
UPDATE	$$RAST11	XWC4
UPDATIT2	$$ABERAN	TYK1
UPDATSDR	$$ABERAN	TZC1
UPDPUB	$$RAST00	VEE3
UPDPUB	$$RAST02	WAG5
UPDSCAN	$$RAST02	WCD4
UPSDB1	$$ABERAN	TXJ1
URSTST	$$ABERRY	RDH1
VERIF	$$ABERRB	MZF2
WRITEMSG	$$RAST13	YAH3
WRITEREP	$$ABERRD	QRE3
WRTHDR00	$$ABERA1	MKB4
WRTHDR00	$$ABERA3	MTB1
WRTHDR00	$$RAST08	XNB4
WRTREC00	$$ABERA1	MKE5
WRTREC00	$$RAST08	XNB2
WRTREC05	$$ABERA3	MTF5
WRTSEQ00	$$ABERA3	MTB5
XCANCEL	$$ABERRJ	MPD1
XCANCEL	$$ABERA2	MQJ2
XCANCEL	$$ABERAA	MUJ3
XCANCEL2	$$ABERAA	MVD2
XCANCEL2	$$ABERRO	QJK3
XEXIT	$$RAST04	XAE2
XEXIT	$$RAST05	XEE2
XEXIT	$$RAST06	XJB4
XFETCH	$$RAST04	XAJ2
XFETCH	$$RAST05	XEJ2
XFETCH	$$RAST06	XJE4
XIGNCRE	$$ABERRJ	MPD2
XIGNORE	$$ABERA2	MQE5
XIGNCRE	$$ABERA3	MSC3
XIGNORE	$$ABERAA	MVC2
XIGNCRE	$$ABERRA	MWE5
XIGNORE	$$ABERR1	PLB1
XIGNCRE	$$ABERR2	PNJ4
XIGNORE	$$ABERR3	PRD2
XIGNCRE	$$ABERR4	PTJ2
XIGNORE	$$ABERRN	QFH5
XIGNCRE	$$ABERRO	QJJ3
XIGNORE	$$ABERRY	RBG1
XIGNCRE	$$ABERRS	RGA5
XIGNORE	$$ABERRT	TBC5
XIGNORE	$$ABERRI	TDF5
XIGNORE	$$ABERRU	TJF5
XIGNORE	$$ABERRF	TNC5
XIGNORE	$$ABERRP	TRH1
XIGNORE	$$ABERRQ	TTF4
XIGNORE	$$ABERRG	TVC1
XIGNORE	$$ABERAN	TYF5
XIGNORE	$$ABERRH	UBH2
XIOERR	$$ABERRF	TNJ3
XIOERR	$$ABERRP	TRF5
XIOERR	$$ABERRQ	TTC4
XLDMOD	$$RAST05	XEK3
XLDMOD	$$RAST06	XJH5
XLDTST	$$RAST04	XAF3
XLDTST	$$RAST05	XEF3
XLDTST	$$RAST06	XJD5
XMSG	$$RAST04	XAH2
XMSG	$$RAST05	XEH2
XMSG	$$RAST06	XJD4
XNOMSG	$$RAST04	XAE3
XNOMSG	$$RAST05	XEE3
XNOMSG	$$RAST06	XJC5
XRETRY	$$ABERRJ	MPB2
XRETRY	$$ABERA2	MQC5
XRETRY	$$ABERAA	MVA2
XXXERR	$$ABERRY	RBF4
ZEROCT	$$ABERRI	TDB1
ZXNOREP	$$ABERRE	QWH3

Message	Phase		Chart
0P08	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRS	(1412,1419 ERP)	RF
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P09	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRS	(1412,1419 ERP)	RF
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P10	$$ABERAC	(tape ERP)	NE
	$$ABERAE	(tape ERP)	NN
	$$ABERAF	(tape ERP)	NT
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP	TC
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P11	$$ABERAB	(tape ERP)	NA
	$$ABERAC	(tape ERP)	NE
	$$ABERAF	(tape ERP)	NT
	$$ABERAH	(tape ERP)	PA
	$$ABERAI	(tape ERP)	PE
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRY	(unit record ERP)	RB
	$$ABERR5	(data cell ERP)	PV
	$$ABERR7	(3540 diskette ERP)	PX
0P12	$$ABERRB	(disk ERP)	MW
	$$ABERR5	(data cell ERP)	PV
0P13	$$ABERRB	(disk ERP)	MW
	$$ABERR5	(data cell ERP)	PV
0P13A	$$RAST10	(CCH message writer)	XS
0P14	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERRB	(disk ERP)	MW
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
0P15	$$ABERRB	(disk ERP)	MW
	$$ABERR4	(data cell ERP)	PS
0P16	$$ABERRB	(disk ERP)	MW
	$$ABERR5	(data cell ERP)	PV
0P17	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERRB	(disk ERP)	MW
	$$ABERR1	(data cell ERP)	PJ
0P18	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRS	(1412,1419 ERP)	RF
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P19	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC

	$$ABERRS	(1412,1419 ERP)	RF
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P20	$$A$SUP1		
	$$ABERAC	(tape ERP)	NE
	$$ABERAF	(tape ERP)	NT
	$$ABERAG	(tape ERP)	NX
	$$ABERRD	(2560 MFCM ERP)	QP
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERR2	(data cell ERP)	PN
	$$ABERR4	(data cell ERP)	PS
0P21	$$ABERRB	(disk ERP)	MW
	$$ABERR4	(data cell ERP)	PS
0P22	$$ABERR1	(data cell ERP)	PJ
	$$ABERR4	(data cell ERP)	PS
0P23	$$ABERR4	(data cell ERP)	PS
0P24	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERRA	(ERP monitor)	MU
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
0P25	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERRA	(ERP monitor)	MU
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
0P26	$$ABERRB	(disk ERP)	MW
	$$ABERR1	(data cell ERP)	PJ
0P27	$$ABERRA	(ERP monitor)	MU
	$$ABERRY	(unit record ERP)	RB
0P28	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERAN	(3886 OCR ERP)	TW
	$$ABERRB	(disk ERP)	MW
	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERRH	(2245 printer ERP)	UA
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
	$$ABERRS	(1412,1419 ERP)	RF
	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERRU	(1017,1018 ERP)	TG
	$$ABERRV	(2671 paper tape ERP)	RJ
	$$ABERRW	(console device ERP)	RE
	$$ABERRY	(unit record ERP)	RB
	$$ABERR1	(data cell ERP)	PJ
	$$ABERR7	(3540 diskette ERP)	PX
0P29	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
0P30	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
0P31	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
	$$ABERRA	(ERP monitor)	MU
	$$ABERRI	(2495 tape cartridge reader ERP)	TC
0P32	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
0P33	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRY	(unit record ERP)	RB
0P34	$$ABERRS	(1412,1419 ERP)	RF
0P35	$$ABERRT	(1287,1288 ERP)	TA
	$$ABERAN	(3886 OCR ERP)	TW
0P36	$$ABERRB	(disk ERP)	MW
	$$ABERR4	(data cell ERP)	PS
0P37	$$ABERRS	(1412,1419 ERP)	RF
0P38	$$ABERRT	(1287,1288 ERP)	TA
0P39	$$ABERRI	(2495 tape cartridge reader ERP)	TC
0P40	$$ABERRU	(1017,1018 ERP)	TG
0P41	$$ABERRF	(3211 printer ERP)	TK
	$$ABERRH	(2245 printer ERP)	UA
0P42	$$ABERAE	(tape ERP)	NN
	$$ABERAG	(tape ERP)	NX
	$$ABERAH	(tape ERP)	PA
0P43	$$ABERAG	(tape ERP)	NX
0P44	$$ABERAC	(tape ERP)	NE
	$$ABERAH	(tape ERP)	PA
0P45	$$ABERRB	(disk ERP)	MW
0P46	$$ABERAG	(tape ERP)	NX
0P47	$$ABERAE	(tape ERP)	NN
	$$ABERAH	(tape ERP)	PA
0P48	$$ABERRG	(3505,3525 ERP)	TU
0P49	$$ABERRG	(3505,3525 ERP)	TU
	$$ABERR7	(3540 diskette ERP)	PX
0P50	$$ABERR4	(unit record ERP)	RA
0P51	$$ABERAN	(3886 OCR ERP)	TW
0P52	$$ABERAN	(3886 OCR ERP)	TW
0P53	$$ABERAN	(3886 OCR ERP)	TW
0P54	$$ABERAN	(3886 OCR ERP)	TW
0P55	$$ABERR7	(3540 diskette ERP)	PX
0T001	$$ABERA1	(RMSR record writer)	MH
	$$ABERA2	(RMSR message writer)	MN

	$$ABERA3	(RMSR record writer)	MQ
	$$RAST08	(RMSR record writer)	XM
	$$RAST11	(MCH/RMSR msg writer)	XW
0T03I	$$ABERA1	(RMSR record writer)	MH
	$$ABERA2	(RMSR message writer)	MN
	$$ABERA3	(RMSR record writer)	MQ
	$$RAST08	(RMSR record writer)	XM
	$$RAST11	(MCH/RMSR msg writer)	XW
0T05E	$$RAST08	(RMSR record writer)	XM
	$$RAST11	(MCH/RMSR msg writer)	XW
0T05I	$$ABERA1	(RMSR record writer)	MH
	$$ABERA2	(RMSR message writer)	MN
	$$ABERA3	(RMSR record writer)	MQ
0T06I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T07I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T08I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T09I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T10I	$$RAST02	(CCH ERP scheduler)	WA
	$$RAST04	(unit record CCH ERP)	XA
	$$RAST05	(unit record CCH ERP)	XE
	$$RAST06	(unit record CCH ERP)	XH
	$$RAST07	(2400 CCH ERP)	XK
	$$RAST10	(CCH message writer)	XT
	$$RAST12	(3400 CCH ERP)	XY
0T11W	$$RAST00	(MCAR/CCH)	VA
0T12I	$$RAST02	(CCH ERP scheduler)	WA
	$$RAST04	(unit record CCH ERP)	XA
	$$RAST05	(unit record CCH ERP)	XE
	$$RAST06	(unit record CCH ERP)	XH
	$$RAST07	(2400 CCH ERP)	XK
	$$RAST10	(CCH message writer)	XT
	$$RAST12	(3400 CCH ERP)	XY
0T13A	$$RAST04	(unit record CCH ERP)	XA
	$$RAST05	(unit record CCH ERP)	XE
	$$RAST06	(unit record CCH ERP)	XH
	$$RAST10	(CCH message writer)	XT
0T14E	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T15E	$$RAST09	(MCAR DRAP)	XQ
	$$RAST13	(MCAR DRAP)	XZ
0T16I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T17I	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer	XW
0T18E	$$RAST03	(MCAR EFL and repair)	WE
	$$RAST11	(MCH/RMSR msg writer)	XW
0T19E	$$RAST09	(MCAR DRAP)	XQ
0T20E	$$RAST13	(MCAR DRAP)	YA
4E10I	$$ABERAA	(RMSR counter update)	MS
	$$ABERA2	(RMSR message writer)	MN

Card Code	Actual IBM Device	Device-Type X'nn'	Device Type
2400T9	9-track Magnetic Tape units	50	
2400T7	7-track Magnetic Tape units	50	
3410T9	9-track 3410 Magnetic Tape units	53	Magnetic Tape
3410T7	7-track 3410 Magnetic Tape units	53	
3420T9	9-track 3420 Magnetic Tape units	52	
3420T7	7-track 3420 Magnetic Tape units	52	
2495TC	2495 Tape Cartridge Reader	51	Tape Cartridge Reader
1442N1	1442N1 Card Read Punch	30	
2520B1	2520B1 Card Read Punch	31	
2560	2560 Multifunction Card Machine		Card Read Punches
2596	2596 Card Read Punch	30	
3525RP	3525 Card Punch (with optional read feature)	32	
5425	Multifunction Card Unit	34	
2501	2501 Card Reader	10	Card Readers
2540R	2540 Card Reader	11	
3504	3504 Card Reader	12	
3505	3505 Card Reader	12	
2540P	2540 Card Punch	21	Card Punches
2520B2	2520B2 Card Punch	20	
1442N2	1442N2 Card Punch	22	
2520B3	2520B3 Card Punch	20	
3525P	3525 Card Punch	23	
1403	1403 Printer	40	
1403U	1403 Printer with UCS feature	42	
1443	1443 Printer	41	
2260 (local)	1053 Printer with 2548 Control Unit. MODE operand must be entered as X'01'	C0	
3203	3203 Printer	4A	
3211	3211 Printer	43	Printers
3277 (local 3270)	3284 or 3286 Printer with 3272 Control Unit. MODE operand must be entered as X'01'	B0	
3277B (local 3270)	3284 or 3286 Printer with 3272 Control Unit, attached in burst mode to a multiplexer channel. MODE operand must be entered as X'01'	B0	
5203	5203 Printer	4C	
5203U	5203 Printer with UCS feature	4D	
1050A	3210, 3215 Console Printer Keyboards	00	Printer Keyboards
125D	Model 115/125 Integrated Display Operator Console	B2	
125DP	Model 115/125 Integrated Display Operator Console with 5213 Console Printer attached	B2	Display Operator Consoles

Figure 61. Device Type Codes (Part 1 of 2)

Card Code	Actual IBM Device	Device-Type X'nn'	Device Type
UNSP	Unsupported device	FF	Unsupported nc burst mode on multiplexer channel
UNSPB	Unsupported device	FF	Unsupported with burst mode or multiplexer channel
2311	2311 Disk storage device	60	
2314	2314 Direct-access storage facility	62	
2314	2319 Disk storage facility	62	DASD
2321	2321 Data cell drive	61	
3330	3330-1, 3330-2, or 3333-1 Disk storage	63	
3340	3340 Disk Storage (General)	68	
3340	3340 Disk Storage with 3348 Model 35	69	
3340	3340 Disk Storage with 3348 Model 70	6A	
1419	1255 Magnetic Character Reader	72	
1419	1259 Magnetic Character Reader	72	MICR-Magnetic Ink
1419	1419 Magnetic Character Reader	72	Character Recognition
1419P	1419 Dual Address Adapter Primary Control Unit	73	devices
1419S	1419 Dual Address Adapter Secondary Control Unit	74	
2701	2701/2715 Data Adapter Unit	D0	Teleprocessing lines
A			A=SAD0 command when
B	2702 Transmission Control Unit	D1	B=SAD1 command enabling
2702 C			C=SAD2 command the line
D			D=SAD3 command
2703	2703 Transmission Control Unit	D2	
2703	Integrated Communication Adapter (Models 125/135)	D2	
2703	3704/3705 Communication Controller in Emulation Mode	D2	
2955	2955 Data Adapter Unit	D7	Data Link for RETAIN
1017	1017 Paper Tape Reader with 2826 Control Unit	78	Paper Tape Readers
2671	2671 Paper Tape Reader	70	
1018	1018 Paper Tape Punch with 2826 Control Unit	79	Paper Tape Punch
1419	1270 Optical Reader/Sorter	79	
1419P	1275 Optical Reader/Sorter	73	
1287	1287 Optical Reader	77	Optical Readers
1288	1288 Optical Page Reader	77	
3881	3881 Optical Mark Reader	11	
3886	3886 Optical Character Reader	7C	
3540	3540 Diskette Input/Output Unit	80	Diskette
2260	2260 Display Station	C0	
3277	3277 Display Station;	B0	
(local3270)	MODE operand need not be entered		
3277B (local 3270)	3277 Display Station; attached in burst mode to a multiplexer channel. MODE operand need not be entered	B0	Display Station
7770	7770 Audio Response Unit	D3	Audio Response Unit

Figure 61. Device Type Codes (Part 2 of 2)-

All messages issued by the DOS/VS system control programs are listed in this appendix with a reference to the PLM and issuing phase. For cause and action of each message, see DOS/VS Messages, GC33-5379.

Message	Phase	PLM
0D01A	$$BOCRTV	SY33-8553
0D02I	$$BOCRTM	SY33-8553
0D03A	$$BOCRTX	SY33-8553
0D04A	$$BOCRTV	SY33-8553
0D05A	$$BOCRTW	SY33-8553
0D05A	$$BOCRT1	SY33-8553
0D06A	$$BOCRTY	SY33-8553
0D07D	$$BOCRTS	SY33-8553
0D08A	$$BOCRTS	SY33-8553
0D09D	$$BOCRTR	SY33-8553
0D20E	$$BOCRTB	SY33-8553
0D25E	$$BOCRTB	SY33-8553
0D26A	$$BOCRTG	SY33-8553
0D26E	$$BOCRTB	SY33-8553
0D29E	$$BOCRTB	SY33-8553
0D30A	$$BOCRTV	SY33-8553
0D30A	$$BOCRT1	SY33-8553
0D33A	$$BOCRTE	SY33-8553
0D34E	$$BOCRTF	SY33-8553
0D35E	$$BOCRTF	SY33-8553
0D36E	$$BOCRTF	SY33-8553
0D97A	$$BOCRT1	SY33-8553
0I00A	$$A$IPL2	SY33-8555
0I00I	$IPLRT2	SY33-8555
0I01A	$$A$IPL2	SY33-8555
0I02A	$$A$IPL2	SY33-8555
0I03A	$$A$IPL2	SY33-8555
0I04I	$$A$IPL2	SY33-8555
0I10A	$IPLRT2	SY33-8555
0I11A	$IPLRT2	SY33-8555
0I12A	$IPLRT3	SY33-8555
0I13A	$IPLRT3	SY33-8555
0I14A	$IPLRT3	SY33-8555
0I15A	$IPLRT3	SY33-8555
0I16A	$IPLRT4	SY33-8555
0I17A	$IPLRT4	SY33-8555
0I18A	$IPLRT2	SY33-8555
0I19I	$IPLRT4	SY33-8555
0I20I	$IPLRT5	SY33-8555
0I23A	$IPLRT4	SY33-8555
0I24A	$IPLRT3	SY33-8555
0I25I	$IPLRT4	SY33-8555
0I26I	$$BFLDR	SY33-8554
0I26I	$$BUFLDR	SY33-8553
0I26I	$IPLRT4	SY33-8555
0I27I	$$BUFLD2	SY33-8553
0I27I	$IPLRT4	SY33-8555
0I28D	$$BUFLD2	SY33-8553
0I28D	$IPLRT4	SY33-8555
0I28I	$$BFLD2	SY33-8554
0I29I	$IPLRT4	SY33-8555
0I30I	$IPLRT2	SY33-8555
0I31A	$IPLRT2	SY33-8555
0I32I	$IPLRT2	SY33-8555
0I33A	$IPLRT4	SY33-8555
0I34D	$IPLRT4	SY33-8555
0I35I	$IPLRT4	SY33-8555
0I37A	$IPLRT5	SY33-8555
0I38A	$IPLRT5	SY33-8555
0I39A	$IPLRT5	SY33-8555
0I40A	$IPLRT5	SY33-8555
0I41A	$IPLRT5	SY33-8555
0I42A	$IPLRT5	SY33-8555
0I43A	$IPLRT5	SY33-8555
0I44A	$IPLRT5	SY33-8555
0I4[illegible]	$IPLRT5	SY33-8555
0I46[illegible]	$IPLRT5	SY33-8555
0I47I	$IPLRT2	SY33-8555
0I48I	$IPLRT2	SY33-8555
0I49A	$IPLRT5	SY33-8555
0I50A	$IPLRT2	SY33-8555
0I51A	$IPLRT5	SY33-8555
0I52I	$IPLRT5	SY33-8555
0I60A	$IPLRT3	SY33-8555
0I61I	$IPLRT4	SY33-8555
0P08	$$ABERAE	SY33-8552
0P08	$$ABERAH	SY33-8552
0P08	$$ABERAN	SY33-8552
0P08	$$ABERRB	SY33-8552
0P08	$$ABERRF	SY33-8552
0P08	$$ABERRG	SY33-8552
0P08	$$ABERRH	SY33-8552
0P08	$$ABERRI	SY33-8552
0P08	$$ABERRS	SY33-8552
0P08	$$ABERRT	SY33-8552
0P08	$$ABERRU	SY33-8552
0P08	$$ABERRV	SY33-8552
0P08	$$ABERRW	SY33-8552
0P08	$$ABERRY	SY33-8552
0P08	$$ABERR1	SY33-8552
0P08	$$ABERR7	SY33-8552
0P09	$$ABERAE	SY33-8552
0P09	$$ABERAH	SY33-8552
0P09	$$ABERAN	SY33-8552
0P09	$$ABERRB	SY33-8552
0P09	$$ABERRF	SY33-8552
0P09	$$ABERRG	SY33-8552
0P09	$$ABERRH	SY33-8552
0P09	$$ABERRI	SY33-8552
0P09	$$ABERRS	SY33-8552
0P09	$$ABERRT	SY33-8552
0P09	$$ABERRU	SY33-8552
0P09	$$ABERRV	SY33-8552
0P09	$$ABERRW	SY33-8552
0P09	$$ABERRY	SY33-8552
0P09	$$ABERR1	SY33-8552
0P09	$$ABERR7	SY33-8552
0P10	$$ABERAC	SY33-8552
0P10	$$ABERAE	SY33-8552
0P10	$$ABERAF	SY33-8552
0P10	$$ABERAH	SY33-8552
0P10	$$ABERAN	SY33-8552
0P10	$$ABERRB	SY33-8552
0P10	$$ABERRF	SY33-8552

Message	Phase	PLM
0P10	$$ABERRG	SY33-8552
0P10	$$ABERRH	SY33-8552
0P10	$$ABERRI	SY33-8552
0P10	$$ABERRU	SY33-8552
0P10	$$ABERRV	SY33-8552
0P10	$$ABERRW	SY33-8552
0P10	$$ABERRY	SY33-8552
0P10	$$ABERR1	SY33-8552
0P10	$$ABERR7	SY33-8552
0P11	$$ABERAE	SY33-8552
0P11	$$ABERAC	SY33-8552
0P11	$$ABERAF	SY33-8552
0P11	$$ABERAH	SY33-8552
0P11	$$ABERAI	SY33-8552
0P11	$$ABERRE	SY33-8552
0P11	$$ABERRF	SY33-8552
0P11	$$ABERRG	SY33-8552
0P11	$$ABERRH	SY33-8552
0P11	$$ABERRI	SY33-8552
0P11	$$ABERRU	SY33-8552
0P11	$$ABERRV	SY33-8552
0P11	$$ABERRY	SY33-8552
0P11	$$ABERR5	SY33-8552
0P11	$$ABERR7	SY33-8552
0P12	$$ABERRE	SY33-8552
0P12	$$ABERR5	SY33-8552
0P13	$$ABERRE	SY33-8552
0P13	$$ABERR5	SY33-8552
0P13A	$$RAST10	SY33-8552
0P14	$$ABERAE	SY33-8552
0P14	$$ABERAH	SY33-8552
0P14	$$ABERRE	SY33-8552
0P14	$$ABERRI	SY33-8552
0P14	$$ABERRY	SY33-8552
0P14	$$ABERR1	SY33-8552
0P15	$$ABERRE	SY33-8552
0P15	$$ABERR4	SY33-8552
0P16	$$ABERRE	SY33-8552
0P16	$$ABERR5	SY33-8552
0P17	$$ABERAE	SY33-8552
0P17	$$ABERAH	SY33-8552
0P17	$$ABERRE	SY33-8552
0P17	$$ABERR1	SY33-8552
0P18	$$ABERAE	SY33-8552
0P18	$$ABERAH	SY33-8552
0P18	$$ABERAN	SY33-8552
0P18	$$ABERRE	SY33-8552
0P18	$$ABERRF	SY33-8552
0P18	$$ABERRG	SY33-8552
0P18	$$ABERRH	SY33-8552
0P18	$$ABERRI	SY33-8552
0P18	$$ABERRS	SY33-8552
0P18	$$ABERRT	SY33-8552
0P18	$$ABERRU	SY33-8552
0P18	$$ABERRV	SY33-8552
0P18	$$ABERRW	SY33-8552
0P18	$$ABERRY	SY33-8552
0P18	$$ABERR1	SY33-8552
0P18	$$ABERR7	SY33-8552
0P19	$$ABERAE	SY33-8552
0P19	$$ABERAH	SY33-8552
0P19	$$ABERAN	SY33-8552
0P19	$$ABERRE	SY33-8552
0P19	$$ABERRF	SY33-8552
0P19	$$ABERRG	SY33-8552
0P19	$$ABERRH	SY33-8552

Message	Phase	PLM
0P19	$$ABERRI	SY33-8552
0P19	$$ABERRS	SY33-8552
0P19	$$ABERRT	SY33-8552
0P19	$$ABERRU	SY33-8552
0P19	$$ABERRV	SY33-8552
0P19	$$ABERRW	SY33-8552
0P19	$$ABERRY	SY33-8552
0P19	$$ABERR1	SY33-8552
0P19	$$ABERR7	SY33-8552
0P20	$$A$SUP1	SY33-8552
0P20	$$ABERAC	SY33-8552
0P20	$$ABERAF	SY33-8552
0P20	$$ABERAG	SY33-8552
0P20	$$ABERRD	SY33-8552
0P20	$$ABERRF	SY33-8552
0P20	$$ABERRI	SY33-8552
0P20	$$ABERRU	SY33-8552
0P20	$$ABERR2	SY33-8552
0P20	$$ABERR4	SY33-8552
0P21	$$ABERRE	SY33-8552
0P21	$$ABERR4	SY33-8552
0P22	$$ABERR1	SY33-8552
0P22	$$ABERR4	SY33-8552
0P23	$$ABERR4	SY33-8552
0P24	$$ABERAE	SY33-8552
0P24	$$ABERAH	SY33-8552
0P24	$$ABERRA	SY33-8552
0P24	$$ABERRI	SY33-8552
0P25	$$ABERAE	SY33-8552
0P25	$$ABERAH	SY33-8552
0P25	$$ABERRA	SY33-8552
0P25	$$ABERRI	SY33-8552
0P26	$$ABERRE	SY33-8552
0P26	$$ABERR1	SY33-8552
0P27	$$ABERRA	SY33-8552
0P27	$$ABERRY	SY33-8552
0P28	$$ABERAE	SY33-8552
0P28	$$ABERAH	SY33-8552
0P28	$$ABERAN	SY33-8552
0P28	$$ABERRE	SY33-8552
0P28	$$ABERRF	SY33-8552
0P28	$$ABERRG	SY33-8552
0P28	$$ABERRH	SY33-8552
0P28	$$ABERRI	SY33-8552
0P28	$$ABERRS	SY33-8552
0P28	$$ABERRT	SY33-8552
0P28	$$ABERRU	SY33-8552
0P28	$$ABERRV	SY33-8552
0P28	$$ABERRW	SY33-8552
0P28	$$ABERRY	SY33-8552
0P28	$$ABERR1	SY33-8552
0P28	$$ABERR7	SY33-8552
0P29	$$ABERAE	SY33-8552
0P29	$$ABERAH	SY33-8552
0P30	$$ABERAE	SY33-8552
0P30	$$ABERAH	SY33-8552
0P31	$$ABERAE	SY33-8552
0P31	$$ABERAH	SY33-8552
0P31	$$ABERRA	SY33-8552
0P31	$$ABERRI	SY33-8552
0P32	$$ABERAE	SY33-8552
0P32	$$ABERAH	SY33-8552
0P33	$$ABERRF	SY33-8552
0P33	$$ABERRY	SY33-8552
0P34	$$ABERRS	SY33-8552
0P35	$$ABERAN	SY33-8552

Message	Phase	PLM
0P35	$$ABERRT	SY33-8552
0P36	$$ABERRE	SY33-8552
0P36	$$ABERR4	SY33-8552
0P37	$$ABERRS	SY33-8552
0P38	$$ABERRT	SY33-8552
0P39	$$ABERRI	SY33-8552
0P40	$$ABERRU	SY33-8552
0P41	$$ABERRF	SY33-8552
0P41	$$ABERRH	SY33-8552
0P42	$$ABERAE	SY33-8552
0P42	$$ABERAG	SY33-8552
0P42	$$ABERAH	SY33-8552
0P43	$$ABERAG	SY33-8552
0P44	$$ABERAC	SY33-8552
0P44	$$ABERAH	SY33-8552
0P45	$$ABERRE	SY33-8552
0P46	$$ABERAG	SY33-8552
0P47	$$ABERAE	SY33-8552
0P47	$$ABERAH	SY33-8552
0P48	$$ABERRG	SY33-8552
0P49	$$ABERRG	SY33-8552
0P49	$$ABERR7	SY33-8552
0P50	$$ABERRY	SY33-8552
0P51	$$ABERAN	SY33-8552
0P52	$$ABERAN	SY33-8552
0P53	$$ABERAN	SY33-8552
0P54	$$ABERAN	SY33-8552
0P55	$$ABERR7	SY33-8552
0P60D	$$ABERRZ	SY33-8551
0P70I	$$BEOJ2	SY33-8553
0P71I	$$BEOJ2	SY33-8553
0P72I	$$BEOJ2	SY33-8553
0P73I	$$BEOJ2A	SY33-8553
0P74I	$$BEOJ2A	SY33-8553
0P75I	$$BEOJ2	SY33-8553
0P76I	$$BEOJ2	SY33-8553
0P77I	$$BEOJ2	SY33-8553
0P78I	$$BEOJS2	SY33-8553
0P79I	$$BEOJ2A	SY33-8553
0P81I	$$BEOJ2A	SY33-8553
0P82I	$$BEOJ2A	SY33-8553
0P83A	$$BEOJ2A	SY33-8553
0P84I	$$BEOJ2A	SY33-8553
0P85I	$$BEOJ2A	SY33-8553
0P87A	$$BEOJS2	SY33-8553
0P88I	$$BEOJS2	SY33-8553
0P89I	$$ABERRZ	SY33-8551
0R01I	$JOBCTLB	SY33-8555
0R02I	$JOBCTLB	SY33-8555
0R03I	$JOBCTLB	SY33-8555
0R17I	$JOBCTLB	SY33-8555
0R19I	$JOBCTLB	SY33-8555
0S00I	$$BILSVC	SY33-8553
0S00I	$$BPCHK	SY33-8553
0S01I	$$BEOJ2	SY33-8553
0S02I	$$BEOJ2	SY33-8553
0S03I	$$BPCHK	SY33-8553
0S04I	$$BILSVC	SY33-8553
0S05I	$$BILSVC	SY33-8553
0S06I	$$BEOJ1	SY33-8553
0S07I	$$BPSW	SY33-8553
0S08I	$$BEOJ	SY33-8553
0S09I	$$BEOJ1	SY33-8553
0S11I	$$BEOJ1	SY33-8553
0S12I	$$BEOJ2A	SY33-8553
0S13I	$$BEOJ2A	SY33-8553
0S14I	$$BEOJ2A	SY33-8553
0S15I	$$BEOJ2A	SY33-8553
0S16I	$$BEOJ2A	SY33-8553
0S17I	$$BMVKEY	SY33-8553
0T00I	$$ABERA1	SY33-8552
0T00I	$$ABERA2	SY33-8552
0T00I	$$ABERA3	SY33-8552
0T00I	$$RAST08	SY33-8552
0T00I	$$RAST11	SY33-8552
0T03I	$$ABERA1	SY33-8552
0T03I	$$ABERA2	SY33-8552
0T03I	$$ABERA3	SY33-8552
0T03I	$$RAST08	SY33-8552
0T03I	$$RAST11	SY33-8552
0T05E	$$RAST08	SY33-8552
0T05E	$$RAST11	SY33-8552
0T05I	$$ABERA1	SY33-8552
0T05I	$$ABERA2	SY33-8552
0T05I	$$ABERA3	SY33-8552
0T06I	$$RAST03	SY33-8552
0T06I	$$RAST11	SY33-8552
0T07I	$$RAST03	SY33-8552
0T07I	$$RAST11	SY33-8552
0T08I	$$RAST03	SY33-8552
0T08I	$$RAST11	SY33-8552
0T09I	$$RAST03	SY33-8552
0T09I	$$RAST11	SY33-8552
0T10I	$$RAST02	SY33-8552
0T10I	$$RAST04	SY33-8552
0T10I	$$RAST05	SY33-8552
0T10I	$$RAST06	SY33-8552
0T10I	$$RAST07	SY33-8552
0T10I	$$RAST10	SY33-8552
0T10I	$$RAST12	SY33-8552
0T11W	$$RAST00	SY33-8552
0T12I	$$RAST02	SY33-8552
0T12I	$$RAST04	SY33-8552
0T12I	$$RAST05	SY33-8552
0T12I	$$RAST06	SY33-8552
0T12I	$$RAST07	SY33-8552
0T12I	$$RAST10	SY33-8552
0T12I	$$RAST12	SY33-8552
0T13A	$$RAST04	SY33-8552
0T13A	$$RAST05	SY33-8552
0T13A	$$RAST06	SY33-8552
0T13A	$$RAST10	SY33-8552
0T14E	$$RAST03	SY33-8552
0T14E	$$RAST11	SY33-8552
0T15E	$$RAST09	SY33-8552
0T15E	$$RAST13	SY33-8552
0T16I	$$RAST03	SY33-8552
0T16I	$$RAST11	SY33-8552
0T17I	$$RAST03	SY33-8552
0T17I	$$RAST11	SY33-8552
0T18E	$$RAST03	SY33-8552
0T18E	$$RAST11	SY33-8552
0T19E	$$RAST09	SY33-8552
0T20E	$$RAST13	SY33-8552
0V01I	$$BEOJS2	SY33-8553
0V02I	$$BEOJS2	SY33-8553
0V03I	$$BEOJS2	SY33-8553
0V04I	$$BEOJS2	SY33-8553
0V05I	$$BEOJS2	SY33-8553
0V06I	$$BEOJS2	SY33-8553
0V07I	$$BEOJS2	SY33-8553
0V08I	$$BEOJS2	SY33-8553

Message	Phase	PLM
0V09I	$$BEOJS2	SY33-8553
0V10I	$$BEOJ2A	SY33-8553
0V11I	$$BEOJ2	SY33-8553
0V20D	PDSDM	SY33-8554
0V21D	PDSDM	SY33-8554
0V22D	PDSDM	SY33-8554
0V23D	PDSDM	SY33-8554
0V24I	PDSDM	SY33-8554
0V25I	PDSDM	SY33-8554
0V26I	PDSDM	SY33-8554
0V27I	PDSDM	SY33-8554
0V28I	PDSDM	SY33-8554
0V29I	PDSDM	SY33-8554
0V30I	PDSDM	SY33-8554
0V31I	PDSDM	SY33-8554
0V32I	PDSDM	SY33-8554
0V33I	PDSDM	SY33-8554
0V34I	PDSDM	SY33-8554
0V35I	PDSDM	SY33-8554
0V36I	PDSDM	SY33-8554
0V37I	PDSDM	SY33-8554
0V39I	PDSDM	SY33-8554
0V40I	PDSDM	SY33-8554
0V41I	PDSDM	SY33-8554
0V42I	PDSDM	SY33-8554
0V43I	PDSDM	SY33-8554
0V44I	PDSDM	SY33-8554
04L6	SDEHR	SY33-8554
1A0ND	$JOBCTLD	SY33-8555
1A1ND	$JOBCTLD	SY33-8555
1A2ND	$JOBCTLD	SY33-8555
1A2ND	$JOBCTLG	SY33-8555
1A2ND	$JOBCTLJ	SY33-8555
1A3ND	$JOBCTLD	SY33-8555
1A3ND	$JOBCTLD	SY33-8555
1A4ND	$JOBCTLF	SY33-8555
1A4ND	$JOBCTLJ	SY33-8555
1A4ND	$JOBCTLK	SY33-8555
1A5ND	$JOBCTLD	SY33-8555
1A5ND	$JOBCTLF	SY33-8555
1A5ND	$JOBCTLJ	SY33-8555
1A6ND	$JOBCTLD	SY33-8555
1A6ND	$JOBCTLF	SY33-8555
1A7ND	$JOBCTLD	SY33-8555
1A7ND	$JOBCTLF	SY33-8555
1A7ND	$JOBCTLJ	SY33-8555
1A80D	$JOBCTLD	SY33-8555
1A81I	$JOBCTLA	SY33-8555
1A9ND	$JOBCTLD	SY33-8555
1A9ND	$JOBCTLF	SY33-8555
1B01A	SYSBUFLD	SY33-8554
1B02A	SYSBUFLD	SY33-8554
1B03I	SYSBUFLD	SY33-8554
1B10I	SYSBUFLD	SY33-8554
1B11D	SYSBUFLD	SY33-8554
1C00A	$JOBCTLA	SY33-8555
1C10A	$JOBCTLA	SY33-8555
1C10A	$JOBCTLJ	SY33-8555
1C30A	$JOBCTLJ	SY33-8555
1C33I	$JOBCTLE	SY33-8555
1C40I	$$BATTNA	SY33-8553
1C40I	$$BATTNE	SY33-8553
1C50I	$$BATTNA	SY33-8553
1C50I	$$BATTNE	SY33-8553
1C60D	$$BATTNN	SY33-8553
1C70D	$JOBCTLA	SY33-8555
1C80D	$JOBCTLA	SY33-8555
1C90D	$JOBCTLE	SY33-8555
1I00A	$JOBCTLA	SY33-8555
1I00A	$JOBCTLG	SY33-8555
1I10I	$JOBCTLF	SY33-8555
1I30D	$$BATTNC	SY33-8553
1I32D	$$ABERRZ	SY33-8551
1I40D	$$ABERRZ	SY33-8551
1I41D	$$BATTNT	SY33-8553
1I41D	$$BATTNU	SY33-8553
1I42D	$$BATTNT	SY33-8553
1I43D	$$BATTNV	SY33-8553
1I44I	$$BATTNX	SY33-8553
1I45D	$$BATTNT	SY33-8553
1I46D	$$BATTNT	SY33-8553
1I46D	$$BATTNW	SY33-8553
1I47I	$$BATTNT	SY33-8553
1I48I	$$BATTNU	SY33-8553
1I50I	$JOBCTLA	SY33-8555
1I60A	$$BATTNA	SY33-8553
1I70I	$JOBCTLA	SY33-8555
1I82I	$JOBCTLM	SY33-8555
1I83A	$JOBCTLM	SY33-8555
1I84A	$JOBCTLM	SY33-8555
1I86A	$JOBCTLM	SY33-8555
1I89A	$JOBCTLM	SY33-8555
1I90A	$JOBCTLM	SY33-8555
1I91A	$JOBCTLM	SY33-8555
1I92I	$JOBCTLM	SY33-8555
1I93I	$JOBCTLM	SY33-8555
1I95A	$JOBCTLM	SY33-8555
1I96A	$JOBCTLM	SY33-8555
1I97I	$JOBCTLM	SY33-8555
1I98I	$JOBCTLJ	SY33-8555
1I99A	$JOBCTLM	SY33-8555
1L0ND	$JOBCTLK	SY33-8555
1L1ND	$JOBCTLE	SY33-8555
1L1ND	$JOBCTLG	SY33-8555
1L1ND	$JOBCTLK	SY33-8555
1M10A	$JOBCTLA	SY33-8555
1M10A	$JOBCTLG	SY33-8555
1M20D	$JOBCTLA	SY33-8555
1M3ND	$JOBCTLA	SY33-8555
1M4ND	$JOBCTLG	SY33-8555
1M5ND	$JOBCTLD	SY33-8555
1M5ND	$JOBCTLF	SY33-8555
1M6ND	$JOBCTLE	SY33-8555
1M7ND	$JOBCTLE	SY33-8555
1M8ND	$JOBCTLE	SY33-8555
1M9ND	$JOBCTLE	SY33-8555
1N00I	$JOBCTLA	SY33-8555
1N10D	$JOBCTLE	SY33-8555
1N2ND	$JOBCTLE	SY33-8555
1N30D	$JOBCTLE	SY33-8555
1N40D	$JOBCTLE	SY33-8555
1N50D	$JOBCTLE	SY33-8555
1N60D	$JOBCTLE	SY33-8555
1N7ND	$JOBCTLG	SY33-8555
1N80I	$JOBCTLG	SY33-8555
1N90I	$JOBCTLG	SY33-8555
1P0ND	$JOBCTLJ	SY33-8555
1P00D	$$BATTNE	SY33-8553
1P00D	$$BATTNF	SY33-8553
1P1ND	$JOBCTLJ	SY33-8555
1P10D	$$BATTNG	SY33-8553
1P20D	$JOBCTLE	SY33-8555

Message	Phase	PLM
1Q62I	$$ABERRZ	SY33-8551
1R79I	$$BATTNC	SY33-8553
1S0ND	$JOBCTLE	SY33-8555
1S00D	$$BATTNB	SY33-8553
1S00D	$$BATTNC	SY33-8553
1S00D	$$BATTNE	SY33-8553
1S00D	$$BATTNF	SY33-8553
1S00D	$$BATTNG	SY33-8553
1S00D	$$BATTNH	SY33-8553
1S00D	$$BATTNN	SY33-8553
1S00D	$$BATTNQ	SY33-8553
1S00D	$$BATTNS	SY33-8553
1S00D	$$BATTNT	SY33-8553
1S00D	$$BATTNU	SY33-8553
1S00D	$$BATTNY	SY33-8553
1S00D	$$BATTNZ	SY33-8553
1S00D	$$BATTN2	SY33-8553
1S01D	$$ABERRZ	SY33-8551
1S02D	$$ABERRZ	SY33-8551
1S1ND	$JOBCTLG	SY33-8555
1S1ND	$JOBCTLJ	SY33-8555
1S1ND	$JOBCTLK	SY33-8555
1S1NI	$JOBCTLA	SY33-8555
1S1NI	$JOBCTLB	SY33-8555
1S1NI	$JOBCTLD	SY33-8555
1S1NI	$JOBCTLE	SY33-8555
1S1NI	$JOBCTLF	SY33-8555
1S1NI	$JOBCTLG	SY33-8555
1S1NI	$JOBCTLJ	SY33-8555
1S1NI	$JOBCTLK	SY33-8555
1S1NI	$JOBCTLM	SY33-8555
1T00A	$JOBCTLA	SY33-8555
1T10I	$JOBCTLA	SY33-8555
1T20I	$JOBCTLD	SY33-8555
1T50A	$JOBCTLD	SY33-8555
1T60A	$JOBCTLD	SY33-8555
1T70A	$JOBCTLD	SY33-8555
2100I	$LNKEDT	SY33-8556
2101I	$LNKEDT	SY33-8556
2102I	$LNKEDT	SY33-8556
2110I	$LNKEDT	SY33-8556
2111I	$LNKEDT	SY33-8556
2112I	$LNKEDT	SY33-8556
2113I	$LNKEDT	SY33-8556
2114I	$LNKEDT	SY33-8556
2116I	$LNKEDT	SY33-8556
2120I	$LNKEDT	SY33-8556
2121I	$LNKEDT	SY33-8556
2122I	$LNKEDT	SY33-8556
2123I	$LNKEDT	SY33-8556
2124I	$LNKEDT	SY33-8556
2125I	$LNKEDT	SY33-8556
2130I	$LNKEDT	SY33-8556
2131I	$LNKEDT	SY33-8556
2132I	$LNKEDT	SY33-8556
2133I	$LNKEDT	SY33-8556
2135I	$LNKEDT	SY33-8556
2136I	$LNKEDT	SY33-8556
2140I	$LNKEDT	SY33-8556
2141I	$LNKEDT	SY33-8556
2142I	$LNKEDT	SY33-8556
2143I	$LNKEDT	SY33-8556
2144I	$LNKEDT	SY33-8556
2145I	$LNKEDT	SY33-8556
2146I	$LNKEDT	SY33-8556
2147I	$LNKEDT	SY33-8556

Message	Phase	PLM
2150I	$LNKEDT	SY33-8556
2151I	$LNKEDT	SY33-8556
2155I	$LNKEDT	SY33-8556
2156I	$LNKEDT	SY33-8556
2158I	$LNKEDT	SY33-8556
2170I	$LNKEDT	SY33-8556
2181I	$LNKEDT	SY33-8556
2182I	$LNKEDT	SY33-8556
2184I	$LNKEDT	SY33-8556
2185I	$LNKEDT	SY33-8556
2191I	$LNKEDT	SY33-8556
2192I	$LNKEDT	SY33-8556
2193I	$LNKEDT	SY33-8556
2194I	$LNKEDT	SY33-8556
2195I	$LNKEDT	SY33-8556
2197I	$LNKEDT	SY33-8556
2199I	$LNKEDT	SY33-8556
3C30I	CORGZ	SY33-8557
3C30I	CORGZ1	SY33-8557
3C66I	CORGZ	SY33-8557
3C66I	CORGZ4	SY33-8557
3C66I	CORGZ5	SY33-8557
3C66I	CORGZ6	SY33-8557
3C66I	CORGZ7	SY33-8557
3C67I	CORGZ	SY33-8557
3C67I	CORGZ5	SY33-8557
3C67I	CORGZ6	SY33-8557
3C67I	CORGZ7	SY33-8557
3E01I	EREPMNTR	SY33-8554
3E02I	EREPMNTR	SY33-8554
3E04I	EREPMNTR	SY33-8554
3E06I	EREPMNTR	SY33-8554
3E07D	EREPESWK	SY33-8554
3E07D	EREPTES	SY33-8554
3E08A	EREPESWK	SY33-8554
3E09A	EREPESTR	SY33-8554
3E10I	EREPEDIT	SY33-8554
3E10I	EREPSMCP	SY33-8554
3E11D	EREPMNTR	SY33-8554
3E12D	EREPMNTR	SY33-8554
3E14A	EREPMNTR	SY33-8554
3E15A	EREPESTR	SY33-8554
3E15A	EREPHIST	SY33-8554
3E15A	EREPTES	SY33-8554
3E18A	EREPHIST	SY33-8554
3E20I	EREPESWK	SY33-8554
3E21I	EREPEDIT	SY33-8554
3E22I	EREPEDIT	SY33-8554
3E25I	EREPESTR	SY33-8554
3E25I	EREPHIST	SY33-8554
3E25I	EREPMNTR	SY33-8554
3E25I	EREPTES	SY33-8554
3E26I	EREPMNTR	SY33-8554
3E27I	EREPMNTR	SY33-8554
3E28I	EREPMNTR	SY33-8554
3E29I	EREPMNTR	SY33-8554
3E30A	EREPHIST	SY33-8554
3E31A	EREPESTR	SY33-8554
3E31A	EREPHIST	SY33-8554
3E31A	EREPTES	SY33-8554
3E32A	EREPRDE	SY33-8554
3E33A	EREPRDE	SY33-8554
3E34I	EREPRDE	SY33-8554
3E35I	EREPRDE	SY33-8554
3E36I	EREPRDE	SY33-8554
3E37I	EREPRDE	SY33-8554

Message	Phase	PLM
3E38I	EREPRDE	SY33-8554
3E40I	EREPRDE	SY33-8554
3E41I	EREPRDE	SY33-8554
3E42I	EREPRDE	SY33-8554
3E43I	EREPRDE	SY33-8554
3E67I	CORGZ6	SY33-8557
3H30I	MAINTP2	SY33-8557
3M00I	PSERV	SY33-8557
3M09I	PSERV	SY33-8557
3M10I	CORGZ	SY33-8557
3M10I	CORGZ1	SY33-8557
3M10I	DSERV	SY33-8557
3M10I	MAINT	SY33-8557
3M10I	MAINTA	SY33-8557
3M10I	PSERV	SY33-8557
3M10I	RSERV	SY33-8557
3M10I	SSERV	SY33-8557
3M11I	MAINTR2	SY33-8557
3M20I	PSERV	SY33-8557
3M21I	CORGZ	SY33-8557
3M21I	CORGZ1	SY33-8557
3M21I	CORGZ3	SY33-8557
3M21I	CORGZ4	SY33-8557
3M21I	CORGZ5	SY33-8557
3M21I	CORGZ6	SY33-8557
3M21I	CORGZ7	SY33-8557
3M21I	CORGZ8	SY33-8557
3M21I	DSERV	SY33-8557
3M21I	MAINRTN	SY33-8557
3M21I	MAINTCL	SY33-8557
3M21I	MAINTCN	SY33-8557
3M21I	MAINTDR	SY33-8557
3M21I	MAINTR2	SY33-8557
3M21I	PSERV	SY33-8557
3M21I	RSERV	SY33-8557
3M21I	SSERV	SY33-8557
3M23I	MAINTS2	SY33-8557
3M24I	MAINTS2	SY33-8557
3M25I	MAINTS2	SY33-8557
3M26I	MAINTS2	SY33-8557
3M27I	MAINTP2	SY33-8557
3M27I	MAINTR2	SY33-8557
3M27I	MAINTS2	SY33-8557
3M28I	MAINTS2	SY33-8557
3M29I	MAINTP2	SY33-8557
3M32I	MAINTP2	SY33-8557
3M33I	$MAINDIR	SY33-8557
3M33I	CORGZ3	SY33-8557
3M33I	MAINRTN	SY33-8557
3M33I	MAINTUP	SY33-8557
3M33I	PSERV	SY33-8557
3M33I	RSERV	SY33-8557
3M33I	SSERV	SY33-8557
3M34I	MAINT	SY33-8557
3M34I	MAINTP2	SY33-8557
3M35I	DSERV	SY33-8557
3M37I	MAINT	SY33-8557
3M37I	MAINTA	SY33-8557
3M37I	MAINTCL	SY33-8557
3M37I	MAINTCN	SY33-8557
3M37I	MAINTDR	SY33-8557
3M38I	MAINTP2	SY33-8557
3M43I	CORGZ1	SY33-8557
3M43I	CORGZ3	SY33-8557
3M43I	CORGZ4	SY33-8557
3M43I	DSERV	SY33-8557
3M43I	MAINT	SY33-8557
3M43I	MAINTCL	SY33-8557
3M43I	MAINTDR	SY33-8557
3M43I	MAINTP2	SY33-8557
3M43I	MAINTR2	SY33-8557
3M43I	MAINTS2	SY33-8557
3M43I	MAINTUP	SY33-8557
3M43I	PSERV	SY33-8557
3M43I	RSERV	SY33-8557
3M43I	SSERV	SY33-8557
3M44I	CORGZ6	SY33-8557
3M44I	MAINT	SY33-8557
3M44I	MAINTCN	SY33-8557
3M45I	DSERV	SY33-8557
3M52I	$MAINDIR	SY33-8557
3M52I	CORGZ3	SY33-8557
3M52I	MAINTP2	SY33-8557
3M52I	MAINTR2	SY33-8557
3M52I	MAINTS2	SY33-8557
3M52I	MAINTUP	SY33-8557
3M53I	CORGZ3	SY33-8557
3M53I	MAINTP2	SY33-8557
3M53I	MAINTR2	SY33-8557
3M53I	MAINTS2	SY33-8557
3M53I	MAINTUP	SY33-8557
3M53I	MAINTUP	SY33-8557
3M54I	$MAINDIR	SY33-8557
3M54I	MAINTDR	SY33-8557
3M54I	MAINTUP	SY33-8557
3M55I	MAINTR2	SY33-8557
3M62I	CORGZ7	SY33-8557
3M62I	MAINTA	SY33-8557
3M63I	CORGZ1	SY33-8557
3M63I	CORGZ7	SY33-8557
3M63I	MAINTA	SY33-8557
3M64I	MAINTA	SY33-8557
3M65I	CORGZ	SY33-8557
3M65I	CORGZ7	SY33-8557
3M65I	MAINTA	SY33-8557
3M66I	CORGZ7	SY33-8557
3M67I	CORGZ7	SY33-8557
3M68I	MAINTA	SY33-8557
3M68I	MAINTCN	SY33-8557
3M70A	MAINTA	SY33-8557
3M70I	MAINTCN	SY33-8557
3M75I	MAINTCN	SY33-8557
3M80I	MAINTA	SY33-8557
3M80I	MAINTCN	SY33-8557
3M81I	MAINTCN	SY33-8557
3M90I	$MAINDIR	SY33-8557
3M92I	$MAINDIR	SY33-8557
3M93I	$MAINDIR	SY33-8557
3N43I	DSERV	SY33-8557
3U10I	MAINTUP	SY33-8557
3U11I	MAINTUP	SY33-8557
3U20I	MAINTUP	SY33-8557
3U21I	MAINTUP	SY33-8557
3U30I	MAINTUP	SY33-8557
3U31I	MAINTUP	SY33-8557
3U32I	MAINTUP	SY33-8557
3U33I	MAINTUP	SY33-8557
4C10D	PDAID	SY33-8554
4C11D	PDAID	SY33-8554
4C12D	PDAID	SY33-8554
4C13D	PDAID	SY33-8554
4C14D	PDAID	SY33-8554

Message	Phase	PLM
4C15D	PDAID	SY33-8554
4C16D	PDAID	SY33-8554
4C17D	PDAID	SY33-8554
4C17D	SDAID1	SY33-8554
4C17D	SDPAR	SY33-8554
4C20D	PDAID	SY33-8554
4C21A	PDAID	SY33-8554
4C22A	PDAID	SY33-8554
4C23D	PDAID	SY33-8554
4C24A	$$BPDAID	SY33-8554
4C24A	PDAIDFTI	SY33-8554
4C24A	PDAIDGTP	SY33-8554
4C24A	PDAIDGTI	SY33-8554
4C24A	PDAIDITP	SY33-8554
4C24A	PDAIDITI	SY33-8554
4C24A	PDAIDTDI	SY33-8554
4C26I	PDLIST	SY33-8554
4C27D	PDAID	SY33-8554
4C28D	PDAID	SY33-8554
4C42A	DUMPGEN	SY33-8554
4C43A	DUMPGEN	SY33-8554
4C44A	DUMPGEN	SY33-8554
4C46A	DUMPGEN	SY33-8554
4C50E	PDAID	SY33-8554
4C51D	PDAID	SY33-8554
4C52E	PDAID	SY33-8554
4C53I	SDAID1	SY33-8554
4C54I	SDAID1	SY33-8554
4C55D	SDAID1	SY33-8554
4C56E	SDAID1	SY33-8554
4C57E	SDAID2	SY33-8554
4C58D	SDPAR	SY33-8554
4C59D	SDPAR	SY33-8554
4C60D	SDPAR	SY33-8554
4C61D	SDPAR	SY33-8554
4C62D	SDPAR	SY33-8554
4C63D	SDPAR	SY33-8554
4C64D	SDPAR	SY33-8554
4C65D	SDPAR	SY33-8554
4C66D	SDPAR	SY33-8554
4C67D	SDPAR	SY33-8554
4C68D	SDPAR	SY33-8554
4C69D	SDPAR	SY33-8554
4E10I	$$ABERAA	SY33-8552

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