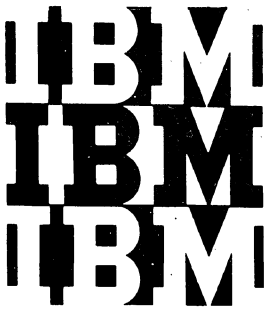
File Number S360-36 (DOS)
Order No. GY24-5153-2



Program Logic

DOS System Service Programs

Program Number 360N-CL-453

This reference publication describes the internal logic of supervisor-interrelated service programs of the IBM Disk Operating System.

This manual is intended for persons involved in program maintenance and for system programmers altering the program design. Program logic information is not needed for normal use or operation of the system control program. It is designed as a supplement to the program listing.

Its effective use requires an understanding of the IBM System/360 or System/370 operation and of the IBM Disk Operating System control and service programs, macro instructions, and operating procedures. Reference publications for this information are listed in the Preface of this manual.

DOS Release 25

Third Edition (June 1971)

This publication was formerly titled IBM System/360 Disk Operating System: System Service Programs. Although titles of some DOS publications (including this one) have been simplified, the change does not affect the contents of this publication. This edition, GY24-5153-2, is a major revision of, and obsoletes, GY24-5153-1.

This edition applies to Release 25 of the IBM Disk Operating System and to all subsequent releases until otherwise indicated in new editions or Technical Newsletters. Changes are continually made to the specifications herein; before using this publication in connection with the operation of IBM systems, consult the latest System/360 and System/370 SRL Newsletter, GN20-0360, for the editions that are applicable and current.

Summary of Amendments

This edition documents addition of, and changes to, the following information: QTAM trace in PDAIDs, PCIL (Private Core Image Library), DUMPGEN (the stand-alone dump), LSERV (label cylinder display program), EREP enhancements, IBM 3211 support, JAI (Job Accounting Interface), IDRA (Independent Directory Read-in Area), and System/370 RMS (Recovery Management Support). Changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form for readers' comments is provided at the back of this publication. If the form has been removed, comments may be addressed to IBM Laboratory, Publications Department, P.O. Box 24, Uithoorn, Netherlands. Comments become the property of IBM.

Preface

This PLM (Program Logic Manual) is a detailed guide to the IBM Disk Operating System service programs supplementing various supervisor and transient functions. It documents internal logic and data flow through descriptive text, flowcharts, and figures.

For the complete logic of the DOS control and service operations, this manual is to be used with the following six companion PLMs.

Note: Although titles of some DOS publications have been simplified, the change does not affect the contents of the publications.

- Introduction to DOS Logic, GY24-5017.
- DOS IPL and Job Control, GY24-5086.
- DOS Librarian, GY24-5079.
- DOS Linkage Editor, GY24-5080.
- DOS Supervisor and Related Transients, GY24-5151.
- DOS Logical Transients, GY24-5152.

Prerequisite to the effective use of the seven PLMs are the following publications.

- IBM System/360 Principles of Operation, GA22-6821.
- DOS System Control and Service, GC24-5036.
- IBM System/360 Disk and Tape Operating Systems, Assembler Language, GC24-3414.

Publications related in subject matter to the seven system control PLMs are:

- DOS Supervisor and I/O Macros, GC24-5037.
- DOS System Generation, GC24-5033.
- DOS Operating Guide, GC24-5022.
- DOS Messages, GC24-5074.
- DOS Data Management Concepts, GC24-3427.

Titles and abstracts of other related publications are listed in the IBM System/360 and System/370 Bibliography, GA22-3822.

This manual consists of seven major sections. The first section details PDAIDs (Problem Determination Aids), the second DUMPGEN (Stand-Alone Dump), the third LSERV (Label Cylinder Display) program, the fourth ESTV (Error Statistics by Tape Volume) programs, the fifth EREP (Environmental Recording, Editing, and Printing) program, and the sixth IBM 3211 Printer support programs. The seventh section is comprised of various cross-reference lists and figures for use in analyzing program internals.

The flowchart symbols used in this manual conform with the flowcharting standards of the American National Standards Institute, Inc. Numerals, such as 00, identify the program or general level flowcharts. The detailed flowcharts are identified by letters AA through ZZ. See Appendix E.

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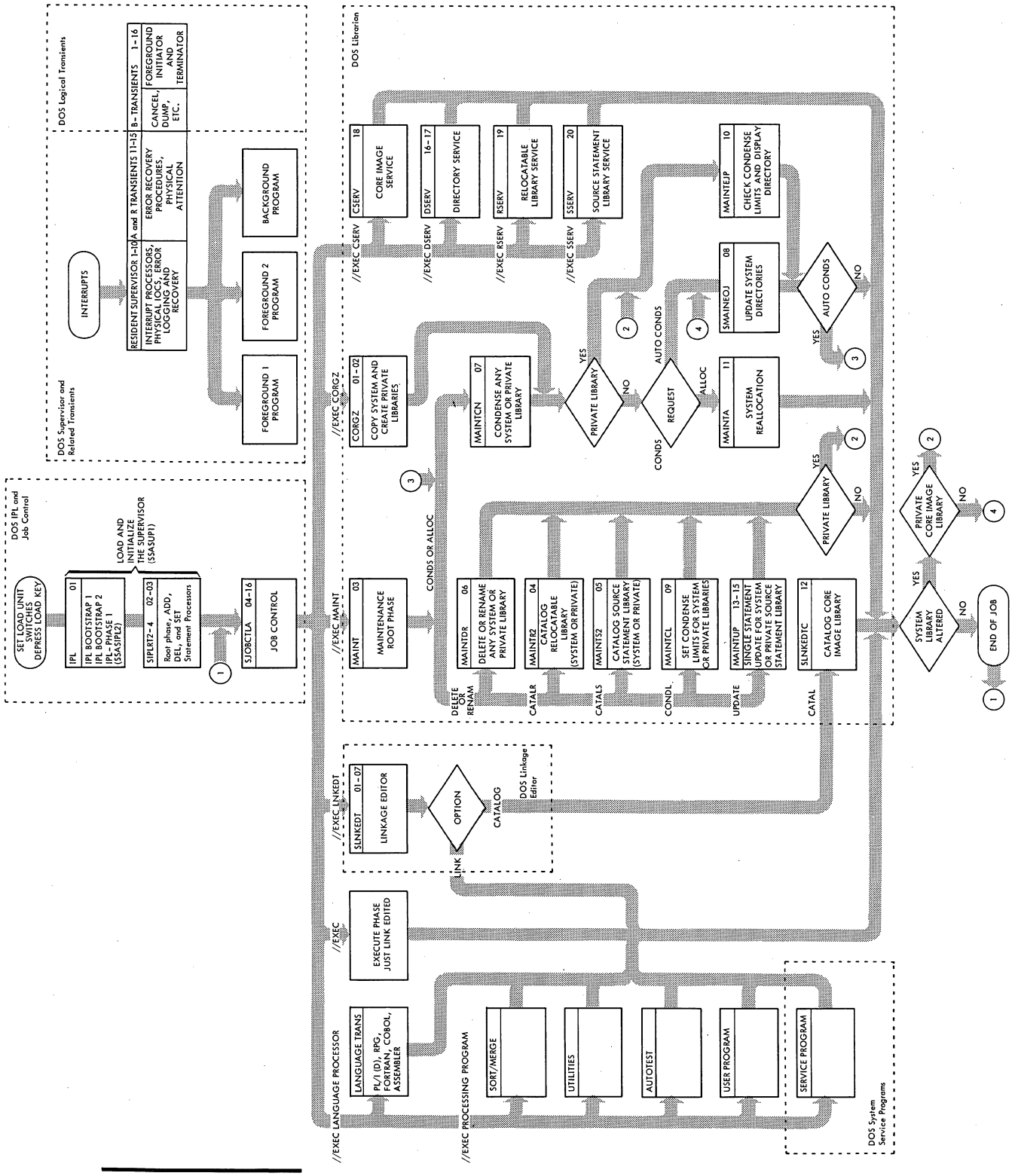
Figures

Charts

Chart 00. Disk Operating System Program Flow



PDAIDS (Problem Determination Aids)

Introduction

PDAIDs (Problem Determination Aids) provide the option to trace one of the specified events during the operation of a program. Tracing may be limited to recording the events of the problem program, the supervisor, or both.

INPUT/OUTPUT TRACE: The I/O (Input/Output) trace function records I/O device activity. The data recorded by the I/O trace function may be for all or a selected group of I/O devices. When an I/O interrupt occurs, the data recorded is:

- I/O old PSW
- CSW

When an SIO instruction is issued by the DOS supervisor, the data recorded is:

- device address
- CCB address
- CSW
- condition code

FETCH/LOAD TRACE: The F/L (Fetch/Load) trace function records the order in which phases and transients are called from the core image library under the control of DOS. When a fetch or a load is issued, which causes an SVC 1, 2, 3, or 4, the data recorded is:

- location of the SVC,
- program interrupt key,
- SVC number,
- phase or transient name,
- load address of the phase, and
- entry address of the phase.

At times, SVCs 5, 6, 11, and 14 branch directly into the supervisor fetch or load routine. The fetch or load (SVCs 1-4) is recorded; however, the calling address and the SVC values for SVCs 5, 6, 11-14 are not indicated in the actual fetch or load trace record.

GENERALIZED SUPERVISOR CALL TRACE: The GSVC (Generalized Supervisor Call) trace function records SVC interrupts as they occur. All SVCs, or a selected group of SVCs, may be traced. The data recorded by the GSVC trace function is:

- SVC old PSW,
- task identification,
- last three bytes of register 0, and
- contents of register 1.

If PTO=YES in the FOPT macro, then SVCs issued when the physical transient area is busy are not traced.

QTAM TRACE: The QTAM trace function traces the input/output activity of QTAM in three areas:

- SVCs 0 and 31
- a supervisor-issued SIO
- an I/O interrupt.

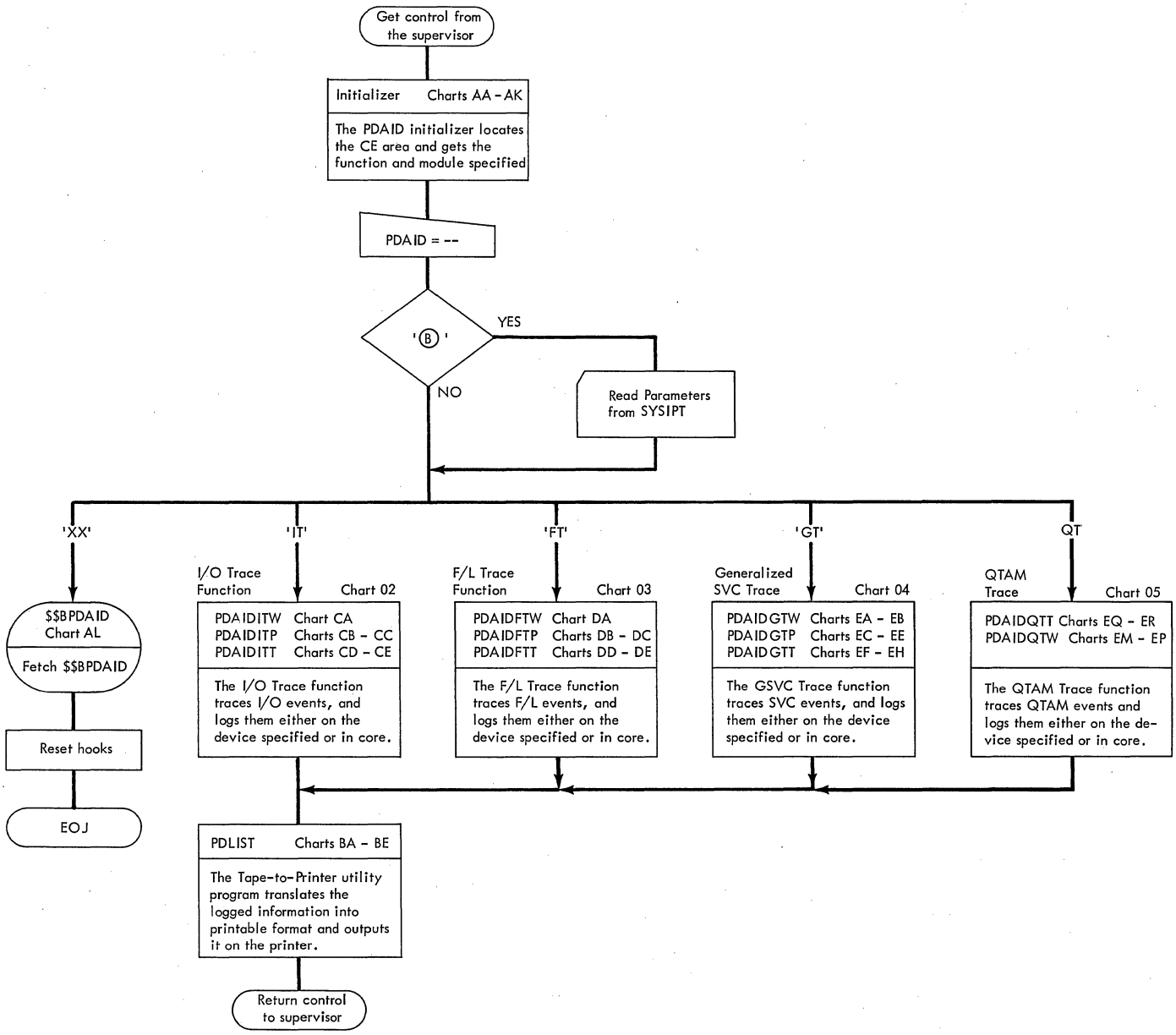
The I/O old PSW and the CSW are recorded when an I/O interrupt occurs. The condition code, device, CCB address, and CSW are recorded when a supervisor issues an SIO. The SVC old PSW and the contents of registers 0 and 1 are recorded when an SVC 0 or 31 is issued.

System Consideration for PDAIDs

If the use of PDAIDs is desired, then the following must be performed prior to their execution:

- During system generation, specify CE=800 in the FOPT macro of the installation tailored supervisor. (See Figure 28 in Appendix C for supervisor storage allocations.)
  Note: Up to 10,240 may be specified to increase the size of the save area for the core-wrap mode.
- Catalog either the absolute or the self-relocating version of the main phase (PDAID) to the core image library prior to its execution.

Chart 01. General Logic Flow of the PDAID Programs



If data provided by PDAIDs is recorded on magnetic tape, use the PDLIST program to make the data readable. Thus, catalog either the absolute or self-relocating version of PDLIST to the core image library prior to its execution. See the System Generation and Maintenance SRL listed in the Preface for supervisor specifications and cataloging procedures.

Initiation of PDAID

You can execute PDAIDs by using standard DOS Job Control language from either SYSLOG or SYSIPT. The statement

```
// EXEC PDAID
```

causes the main phase, PDAID, to load at the address of the initiating partition. Control is given to PDAID for further specifications to indicate the type of trace to be performed. PDAID issues the following message to the operator on SYSLOG:

```
4C10D PDAID=
```

The operator must respond to this message with one of the following:

IT	Specifies an I/O Trace. See Note.
FT	Specifies an F/L Trace. See Note.
GT	Specifies a GSVC Trace. See Note.
QT	Specifies a QTAM Trace. See Note.
XX	Terminates the PDAID presently running.
B	Indicates PDAID control statements are entered through SYSIPT.

Note: When IT, FT, GT, or QT is specified, the operator must give additional PDAID control statements through SYSLOG.

Figure 1 illustrates the PDAID control statements in the sequence they must be used.

- The (B) response is valid only for SYSLOG and cannot be used as a SYSIPT operand.
- Multiple operands or operator responses to PDAID control statements for traces with a variable number of functions (such as ignoring SVCs) are not allowed. Repeat each parameter with each variable. Repeat each message until either the maximum number of variables is reached or a (B) response is given.
- GO terminates the PDAID control input, and the default is taken for any PDAID options that are not specified. When you use SYSLOG, GO is a valid response (see Figure 1). When you use SYSIPT, GO should be the last parameter, and it has no operand associated with it.

Selection of an Output Device: PDAID message/parameter OUTPUT DEVICE= permits the selection of an output device. Specify the device by channel and unit, not by symbolic unit. If an output device is specified, PDAID checks the address against the supervisor PUB and selects the appropriate phase for the unit type (tape or printer).

Selection of Core-Wrap Mode: If an output device is not specified, core-wrap mode is assumed. The event trace tables (see Figures 2, 6, 8, and 11) are kept in the CE area. The number of events contained in this area depends on the size of that area generated at system generation time with the CE option of the FOPT macro. CE=800 is the minimum that can be selected. If the 800-byte area is specified, a maximum of 39 entries can be recorded for F/L and I/O traces, 32 entries for GSVC trace, and 30 entries for QTAM trace.

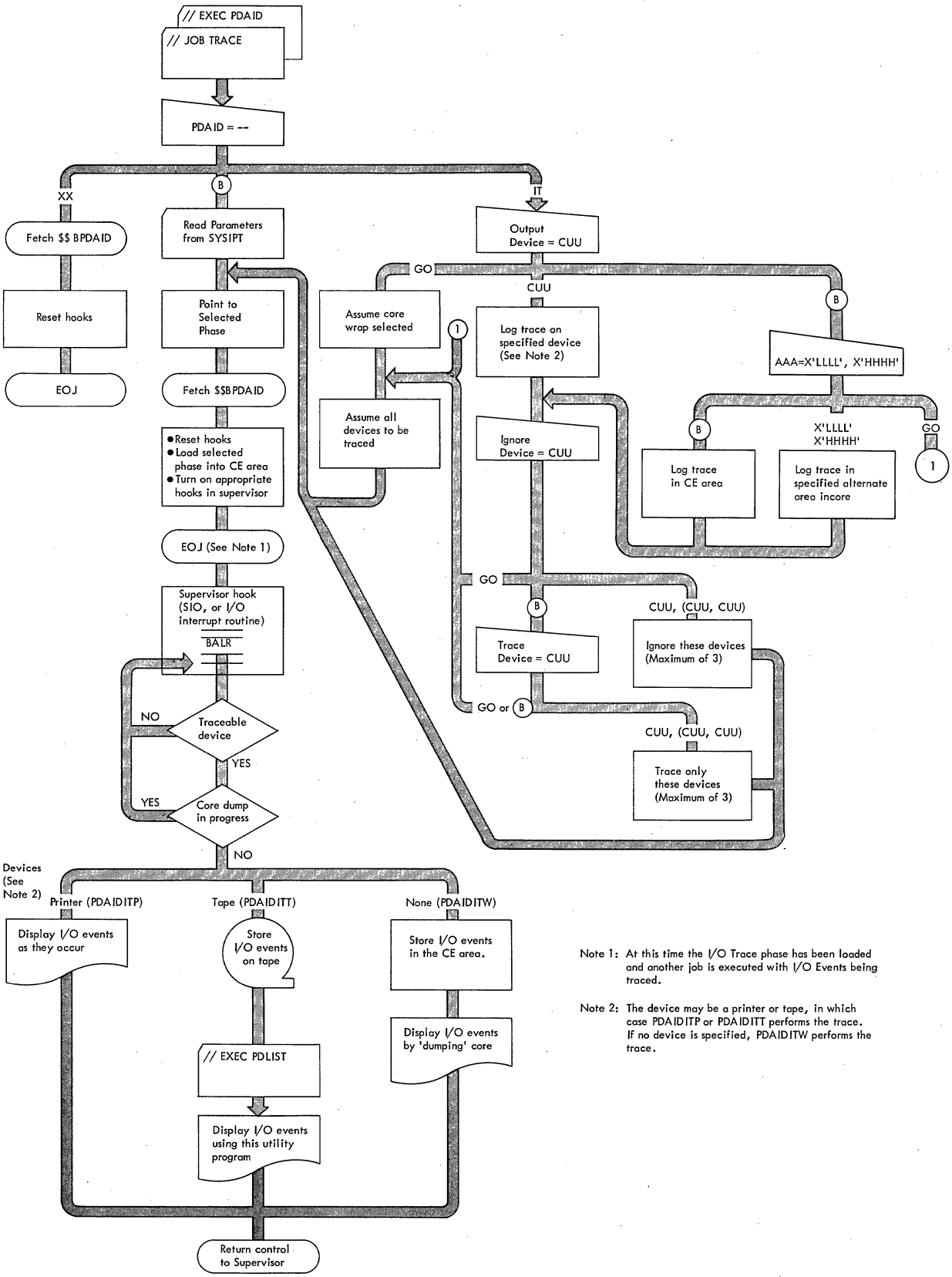
If core-wrap mode is selected, an alternate area can be used for the trace tables (see Figures 2, 6, 8, and 11) through the message/parameter AAA= (alternate area address). AAA= and OUTPUT DEVICE= are mutually exclusive; when one is specified, the other cannot be used. This alternate area must be free for use by the trace function. Program checks and/or unpredictable program operation can result if the area is also used by another program. With MPS this area may not be displayed if it is in a different partition than the one being dumped. In such cases, a stand-alone dump must be used to retrieve the trace tables.

SYSLOG Message / SYSIPT Parameter	SYSLOG Response / SYSIPT Operand	Meaning	Default
PDAID=	{ FT, GT, IT, QT, XX, (B) }	FT - Fetch/Load Trace GT - GSVC Trace IT - I/O Trace QT - QTAM Trace XX - Terminate present PDAID function. (B) - Additional PDAID control input through SYSIPT	None. The function continues.
OUTPUT DEVICE= (Note 3)	{ cuu, X'cuu', (B), GO }	Specify the hexadecimal channel and unit number of either a magnetic tape unit or a printer for the output device of the PDAID. NOTE: A magnetic tape unit is the only valid output device for the QTAM trace.	Core-Wrap mode.
AAA= (Note 3)	{ X'111111', X'hhhhhh', (B), GO }	Specify the beginning and ending addresses of an alternate area for core-wrap mode. If an alternate area is desired, a minimum of 512 bytes must be specified.	CE Save Area of the CE option in the FOPT macro.
TRACE PARTITION= (Valid for Fetch/ Load, SVC, and QTAM Trace	[{ SP, BG, F2, F1, (B), GO }]	SP - Supervisor BG - Background F2 - Foreground 2 F1 - Foreground 1 (Note 1)	Trace all partitions and the supervisor.
IGNORE DEVICE= (Note 2)	[{ cuu, X'cuu', (B), GO }]	Specify the hexadecimal channel and unit number of the device to be ignored by the I/O and QTAM trace. A maximum of 3 may be specified.	Trace all devices.
TRACE DEVICE= (Note 2)	[{ cuu, X'cuu', (B), GO }]	Specify the hexadecimal channel and unit number of the device to be traced by the I/O and QTAM trace. A maximum of 3 may be specified.	Trace all devices.
IGNORE SVC= (Note 2)	[{ nn, (B), GO }]	Specify the hexadecimal SVC number to be ignored by the GSVC trace. A maximum of 6 may be specified.	Trace all SVCs.
TRACE SVC= (Note 2)	[{ nn, (B), GO }]	Specify the hexadecimal SVC number to be traced by the GSVC trace. A maximum of 6 may be specified.	Trace all SVCs.
GO (Valid SYSIPT Parameter)	GO (Valid SYSLOG Reponse)	GO terminates the PDAID control input and the default is used for those options that are not specified.	None.

Note 1: Specification of F1 or F2 is valid for MPS supervisor only. Only SVCs 0 and 31 are recorded for the QTAM trace.
Note 2: The trace and ignore options are mutually exclusive.
Note 3: The output device and AAA options are mutually exclusive.

Figure 1. PDAID Control Statements

Chart 02. Logic Flow of the I/O Trace Function



Note 1: At this time the I/O Trace phase has been loaded and another job is executed with I/O Events being traced.

Note 2: The device may be a printer or tape, in which case PDAIDITP or PDAIDITT performs the trace. If no device is specified, PDAIDITW performs the trace.

I/O Trace Function

The I/O trace function (Chart 02) provides trace tables for input/output devices. (See Figures 2 and 3.)

I/O trace allows the I/O activity of programs run under DOS to be traced. Tracing consists of:

- recording the I/O old PSW and the CSW when an I/O interruption occurs and
- recording the device address, the CCB address, and the CSW (when the CSW is stored in response to an SIO instruction issued by the DOS supervisor).

Either of these is referred to as an I/O event. The events may be preserved in a rotating buffer (see Figure 5) in core (first entry overwritten when the area is full, etc), or output on a printer or tape unit. When a tape output is used, the tape must be processed by the PDLIST utility program to provide readable output data.

When an I/O interrupt occurs, the I/O old PSW and the CSW are stored, as follows:

I/O OLD PSW	CSW
xxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxx

When the CSW stored condition occurs after SIO, the condition code, device address, CCB address, and CSW are stored as follows:

C	CHANNEL Unit ADDRESS	CCB ADDRESS	CSW
x	0000xxx	xxxxxxxx	xxxxxxxxxxxxxxxx

You can detect the CSW stored condition by checking the PSW portion of an entry in the core-dump and determining if the system mask byte contains an X'00'. If the system mask byte is not X'00', the I/O event was an interruption.

Figure 2. I/O Trace Table Entry

Tracing Options

The I/O trace function provides the following options.

- trace all I/O activity on the system
- eliminate a maximum of three devices
- limit trace to a maximum of three devices.

The trace-limiting options (see Figure 1) are specified by the initializer keywords IGNORE DEVICE= or TRACE DEVICE=. All I/O activity is traced if one of these option keywords is not specified. The two keywords are mutually exclusive. When either is specified, the other becomes invalid.

The three limiting options are invoked by specifying the channel and unit addresses (X'CUU' or CUU) of the appropriate devices. Symbolic device references (SYSxxx) are invalid.

Data Collection

I/O trace resides in the CE area and performs the actual tracing of I/O events. The first entry to the phase causes some initialization to occur before the I/O event is acted upon. At each entry, the phase tests the logical transient area for a dump transient; normally, it does not trace any I/O activity when a dump is in progress. (If it is necessary to trace I/O events during a dump routine, the exit branch following the compare instruction labeled DUMCHK (CETAB+X'88') should be altered to a NOP.) This prevents a dump either from overflowing the trace table when core-wrap is used (see Figure 4), or from causing excess output in output mode.

If no dump is in progress, the device address is matched against either IGN or TRC entries to determine if the event should be entered into the trace tables.

Note: It is not necessary to ignore the CE output device. I/O events from this device are handled internally by the module. Events from the CE output device are traced if the I/O activity originates outside the CE module (that is, the device is being shared).

If the event is not to be traced, control is returned to the supervisor routine from which the trace was entered. If the event involves a device to be traced, an entry is made in the trace table. At this point, the core-wrap returns to the supervisor.

Output

The I/O output phase tests for a full table before returning to the supervisor, and attempts to output the table when it contains enough entries. If the output device cannot be accessed, control is returned to the supervisor, and output is retried at each subsequent entry to the trace phase. Limited overflow buffers are available in each module:

Type Output	Full Table	Overflow Entries	Maximum Capacity
Printer (PDAIDITP)	3 Entries	5 Entries	8 Entries
Tape (PDAIDITT)	13 Entries	7 Entries	20 Entries

When the I/O output device must share a selector channel or a control unit, the overflow capacity can be exceeded, and I/O events can be lost. The trace phase tests for such losses, and indicates such with an * when they occur. (It is recommended that output options be selected to avoid such losses, and that one or more of the most active devices be ignored if an overflow occurs.) Figure 3 illustrates output after it has been printed.

PDAIDITW (CORE-WRAP MODE)

PDAIDITW preserves a fixed number of I/O events in a save area that is in either the CE area or an alternate save area of the supervisor. If the alternate save area is specified, the CE save area (generated at SYSGEN) is not used. PDAIDITW generates as large a save area as possible within the CE area.

You can preserve a maximum of 39 entries in the 800-byte CE area. If the CE area size is increased (CE=nnnnn, where nnnnn is between 800 and 10,240), more than 39 entries can be preserved (each entry occupies 16 bytes).

When the area is full, the oldest entry is overlaid by each new entry. The output phases use a different method for updating the trace table (see Figures 4 and 5). A core dump must be used to retrieve the tables.

PDAIDITW sets up the following pointers (Figure 4).

- SLOT1 -- address of the beginning of the save area.
- NEXT -- address of the next available slot in the save area. (Because NEXT is filled with unchecked new information, it may contain either the oldest entry in the table, or the most recent activity of a device not being traced. If the latter is the case, ignore the entry.)
- WRAPADR -- address of the end of the save area.

Note: The location of these pointers at execution time is CETAB+X'C0'.

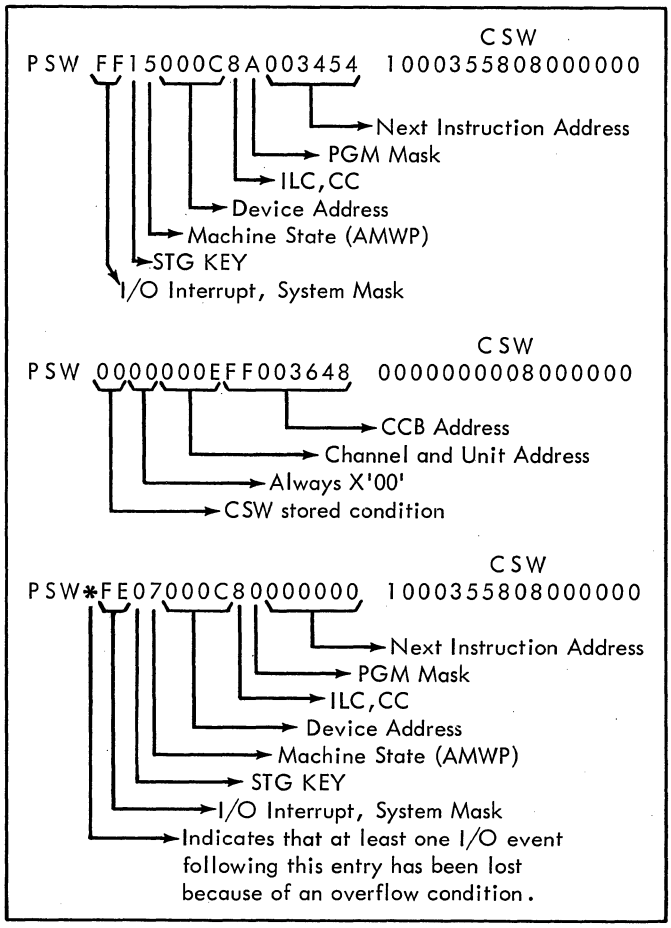
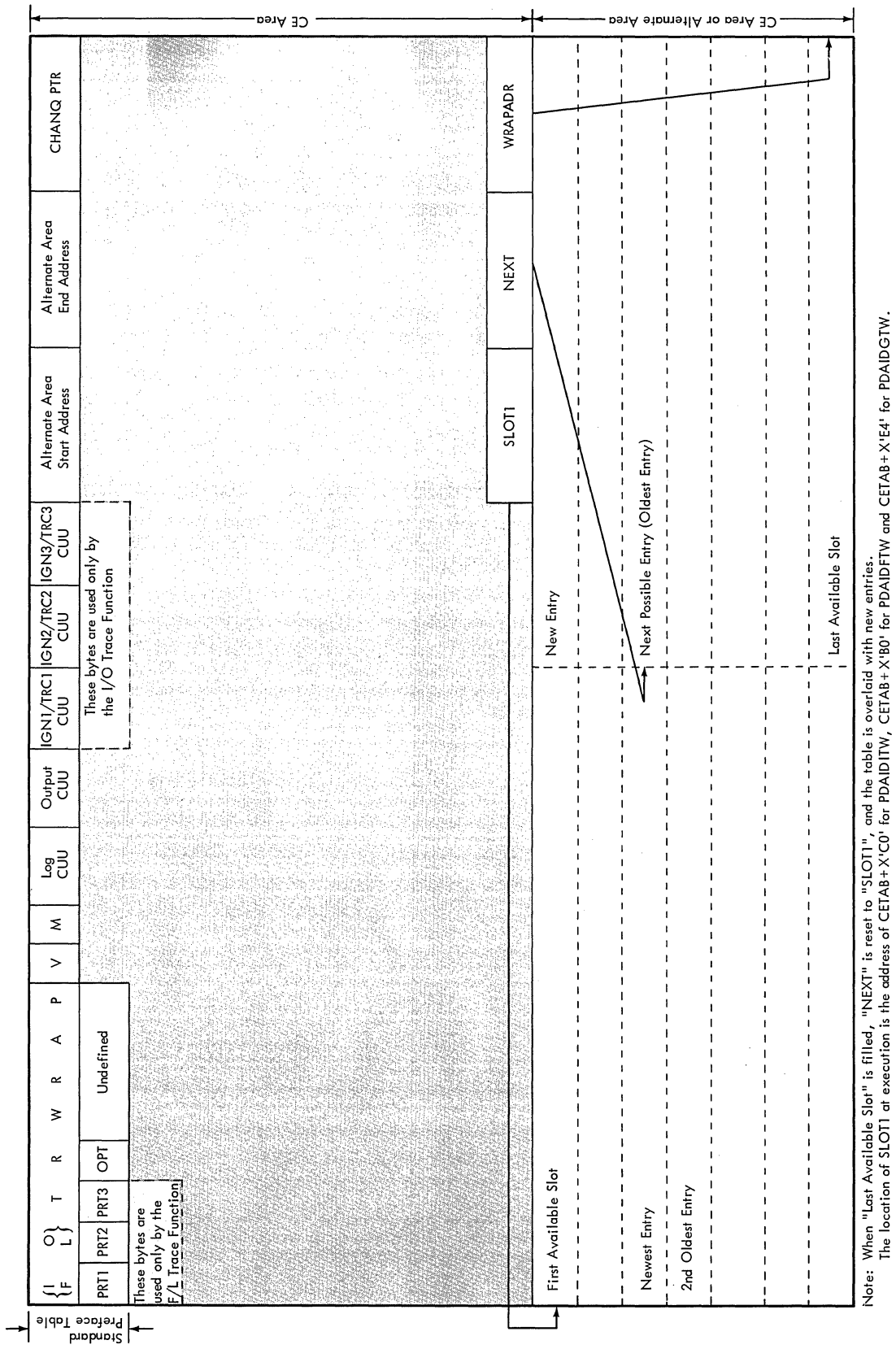


Figure 3. Sample Output for I/O Trace



Note: When "Last Available Slot" is filled, "NEXT" is reset to "SLOT1", and the table is overlaid with new entries.
The location of SLOT1 at execution is the address of CETAB+X'C0' for PDAIDITW, CETAB+X'B0' for PDAIDFTW and CETAB+X'E4' for PDAIDGTW.

Figure 4. Entering New Events in the Trace Table for I/O, F/L, GSVC, and QTAM Core-Wrap Modes

PDAIDITP (PRINTER OUTPUT)

PDAIDITP is selected when a printer is specified as the output device. It collects three I/O events, then formats and prints them, using a 1403 or 1443 printer.

If the printer cannot be accessed, control is returned to the supervisor. Subsequent events are preserved by 'pushing up' the table slot, and entering each new event at the bottom (Figure 5). When an unreported event is 'pushed out' of the top, an asterisk is set into the I/O area to indicate the overflow. Printing is attempted at each entry to the phase, until successful. If the printer is not ready, or indicates errors, the message 4C24A is issued on SYSLOG and the system waits for a (B) response when the device is made ready.

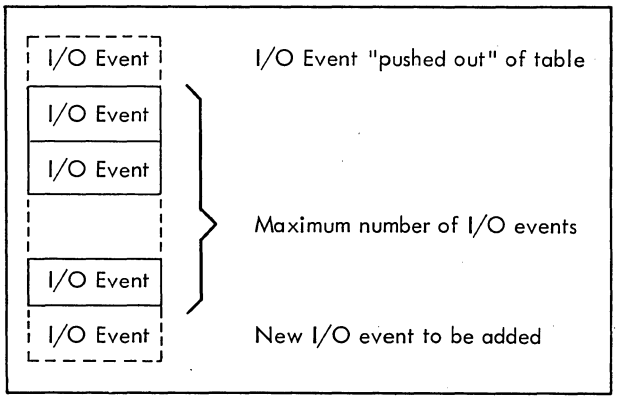


Figure 5. Entering New I/O Events in the Trace Table for Output Phases

PDAIDITT (TAPE OUTPUT)

PDAIDITT collects and writes on an unlabeled tape the I/O events that occur during execution of the problem program. The events are written on tape in core image (unprintable) format. PDAIDITT requires a tape-to-printer operation using the PDLIST utility program to retrieve the traced events. The tape must be processed with the tape drive temporarily assigned as SYS005 and SYSLST assigned to a printer to obtain readable listings of the traced events.

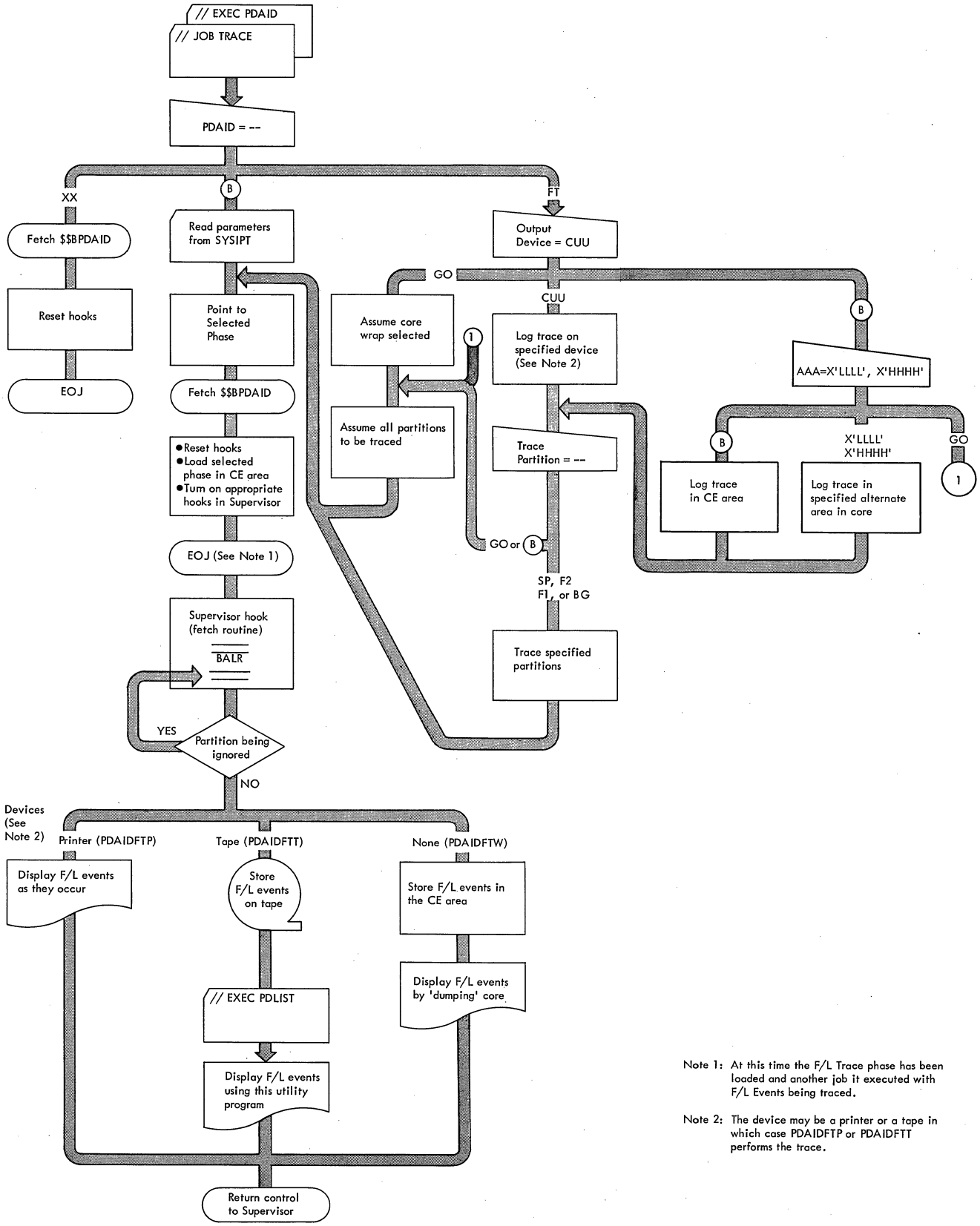
I/O events are collected in an area that may contain a maximum of 20 entries. An attempt is made to write the entire area as a single record when 13 events are present in the table. If the channel is busy on the attempted output, control is returned to the supervisor SIO routine or interrupt handler routine. When the next I/O event is received, it is entered in one of the five overflow entries, and another attempt to output is made. Thus, the records on tape contain between 13 and 20 I/O events per block. The PDLIST utility program takes this into account and prints only the valid I/O events.

Because 20 is the maximum number of I/O events that can be recorded, an overflow will occur when the 21st I/O event is entered in the table. The tape module recognizes this condition by checking the 20th entry location in the table for an unreported I/O event. If one is found, a flag is set in the preceding (19th) entry location. As the 20th entry is 'pushed out' (see Figure 5) of the table, the 19th entry replaces the 20th, and thus the flag is available in the last entry.

The PDLIST utility program checks for this flag when printing, and sets an * , indicating that an overflow has occurred and an I/O event(s) was lost. The * indicator is printed in the entry that precedes the missed I/O event(s).

PDAIDITT makes no provision to handle error conditions while outputting. If the tape unit is busy, an immediate return to the supervisor is made. If the tape unit is not busy, but a CSW stored condition is indicated or the tape unit is inoperable, the message 4C24A is issued on SYSLOG and the system waits for a (B) response when the device is ready.

Chart 03. Logic Flow of the Fetch/Load Trace Function



Note 1: At this time the F/L Trace phase has been loaded and another job it executed with F/L Events being traced.

Note 2: The device may be a printer or a tape in which case PDAIDFTP or PDAIDFTT performs the trace.

Fetch/Load Trace Function

The F/L (fetch/load) trace function (Chart 03) allows tracing the order in which phases and transients are under control of DOS. See Figure 6 for the format of F/L trace entries. Tracing consists of recording (for SVC 1, SVC 2, SVC 3, SVC 4):

- the location of the supervisor call
- the program interrupt key
- the supervisor call number
- the name of the phase or transient being called
- the load address of the phase
- the entry address of the phase

Note: At times, SVC 5, 6, 11 and 14 branch directly into the supervisor fetch or load routine. These are traced whenever they occur, and appear in the output of the trace; however, the calling address and SVC values do not indicate the actual fetch or load.

Each collection of data is referred to as an F/L event. The events may be preserved in a rotating buffer (first entry overwritten when the area is full), or may be output on a printer or tape unit. When a tape is used, the tape must be processed by the PDLIST utility program to provide readable output data.

Use of the request key during the operation of the F/L trace function may result in apparently erroneous data due to the supervisor action required to handle the request. In particular, supervisor calls that have already been recorded may not be completed, and part of the data put out by the specific phase (PDAIDFTW, PDAIDFTP, or PDAIDFTT) may pertain to these incomplete SVCs.

Tracing Options

The F/L trace functions:

- trace all SVC 1, 2, 3, 4, and certain SVC 5, 6, 11 and 14 interruptions, and
- limit the trace by partition (multiprogramming systems only).

Trace limiting options are specified by the initializer keyword TRACE PARTITION= (see Figure 1). These options are useful only when the user runs several partitions at once, and does not wish to trace all of them. Normally, only one partition would be operating at a given time, and the default (trace all partitions) would allow both the single partition and the supervisor to be traced.

Data Collection

F/L trace phases reside in the CE area, and perform the actual tracing of F/L events. All events are recorded before the phase is physically loaded into main storage. The first entry to the phase causes some initialization to occur before the F/L event is acted upon.

The value in the program interrupt key (PIK) is matched against the PRT entries to determine whether or not the event should be entered into the tables. To conserve main storage, the phase test for partitions to ignore, rather than partitions to trace. PDAID accepts parameters and converts them to ignore parameters for the F/L trace modules. For example, if F1, F2, or SP is specified, the initializer converts this information to an 'ignore BG' parameter for the F/L trace phase.

If the event is to be traced, an entry is made in the trace table. If not, control returns to the supervisor routine from which the trace was entered.

Output

F/L output phases test for a full table before returning to the supervisor, and attempt to output the table when it contains enough entries. If the output device cannot be accessed, control returns to the supervisor, and output is retried at each subsequent entry to the trace function. Limited overflow buffers are available in each phase as shown in the following table:

Type Output	Full Table	Overflow Entries	Maximum Capacity
Printer (PDAIDFTP)	2 Entries	4 Entries	6 Entries
Tape (PDAIDFTT)	9 Entries	6 Entries	15 Entries

When an F/L event occurs, the phase name, supervisor call, address of the supervisor call, program interrupt key, load address, and entry address are stored for each fetch or load, as follows.

PHASE NAME	SVC	CALLING ADDRESS	PIK	LOAD ADDRESS	ENTRY ADDRESS
xxxxxxxxxxxxxxxx	xx	xxxxxx	xx	xxxxxx	xxxxxxxx

Figure 6. F/L Trace Table Entry

PDAIDFTW (CORE-WRAP MODE)

PDAIDFTW preserves a fixed number of F/L events in a save area in either the CE area or an alternate save area outside the supervisor. If the alternate save area is specified, the CE save area is not used.

Thirty-nine entries can be preserved in the 800-byte CE area. If CE area size is increased (CE=nnnnn, where nnnnn is between 800 and 10,240), more than 39 entries can be preserved (each entry occupies 20 bytes).

When the area is full, the oldest entry is overlaid by each new entry. (Figure 4 illustrates the method for updating the trace table for core-wrap mode.) A core dump must be used to retrieve the tables.

PDAIDFTW sets up the following pointers:

- SLOT1 -- address of the beginning of the save area.
- NEXT -- address of the next available slot in the save area. (Because NEXT is filled with unchecked new information, it may contain either the oldest entry in the table, or the SVC number and calling address from a partition not being traced. If the latter is the case, ignore the entry.)
- WRAPADR -- address of the end of the save area.

Note: The location of these pointers at execution time is CETAB+X'B0'.

PDAIDFTP (PRINTER OUTPUT)

PDAIDFTP is selected when a printer is specified as the output device. It collects two F/L events, formats them for output, and prints them out, using a 1403 or 1443 printer. See Figure 7 for sample output.

If the printer cannot be accessed, control returns to the supervisor. If the printer is off-line or is not ready, the message 4C24A is issued on SYSLOG and the system waits for a Ⓑ response when the printer is made ready.

When two entries have been saved, they are formatted for output, and the save area is cleared. Two more entries may be saved before output is achieved, without an overflow condition occurring. However, when the I/O area and save area are full and an entry must be made, the save area is overflowed. The oldest entry in the save area is lost, and an * indicator is set in the I/O area. Thus, an * in the output indicates that the next chronological entry (or entries) was lost due to an overflow. Entries are double-spaced and printed two per line.

PDAIDFTT (TAPE OUTPUT)

PDAIDFTT collects and writes, on an unlabeled tape, the F/L events that occur during execution of a job stream. The events are written on tape in core image format. Output from PDAIDFTT is formatted into printable characters by the PDLIST utility program. The input tape drive must be temporarily assigned as SYS005 before execution of PDLIST, and SYSLST must be assigned to a printer.

F/L events are collected in a save area inside the CE area. When seven entries have been made in the save area, the phase attempts to output. If the tape drive cannot be accessed, control returns to the supervisor. If the tape drive is not ready, or indicates errors, the message 4C24A is issued on SYSLOG and the system waits for a (B) response when the device is made ready. At each entry to the phase, the top slot in the save area is checked for an entry. If an entry is present, the save area is full, and an overflow occurs when the current entry is saved. If an overflow occurs, a flag is set in the oldest entry remaining after the current entry is saved. The PDLIST utility program checks for this flag when printing, and sets an * indicator when the flag is found, signifying at least one F/L event was due to an overflow.

Because PDAIDFTT attempts to output when it receives the seventh entry and has a buffer of four entry slots, there are between 9 and 15 entries per 300-byte block on the tape. The PDLIST utility program therefore checks for a valid entry before formatting.

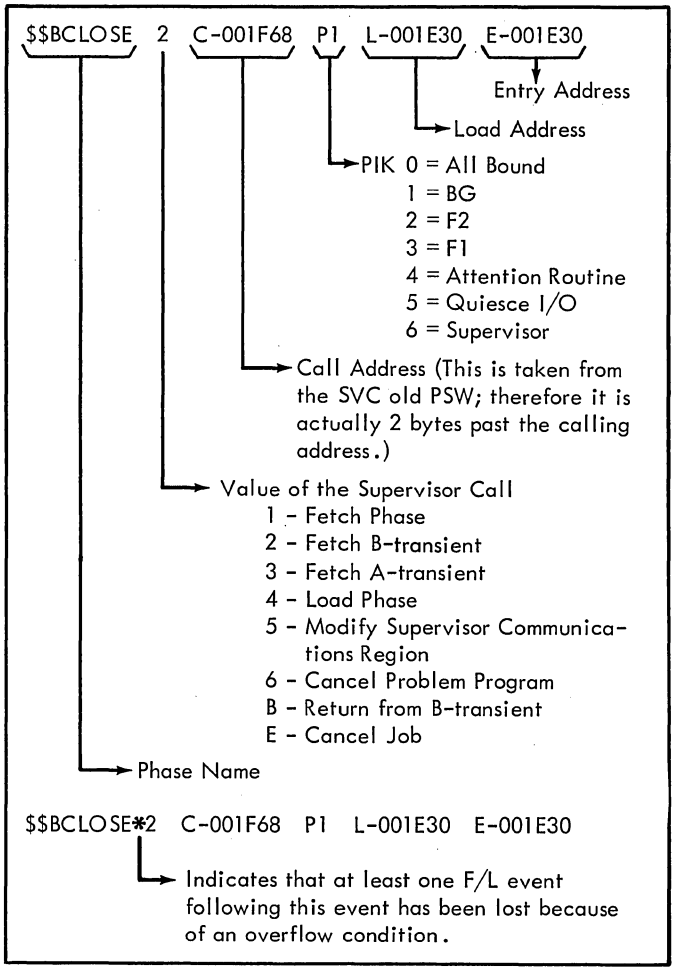
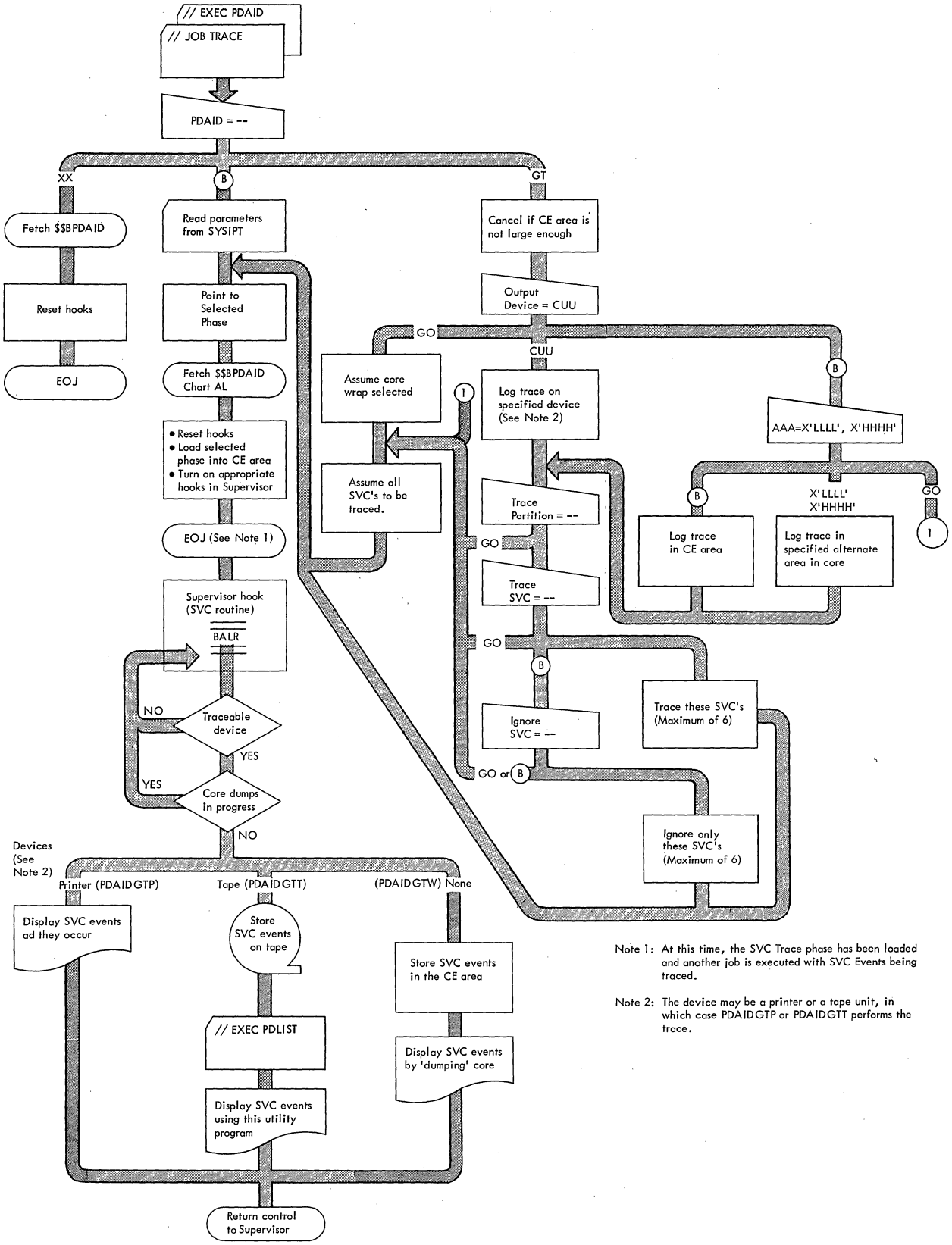


Figure 7. Sample Output for F/L Trace

Chart 04. Logic Flow of the GSVC Trace Function



Note 1: At this time, the SVC Trace phase has been loaded and another job is executed with SVC Events being traced.

Note 2: The device may be a printer or a tape unit, in which case PDAIDGTP or PDAIDGTT performs the trace.

GSVC Trace Function

The GSVC trace function (Chart 04) builds a trace table as SVC interrupts occur. The trace table (Figure 8) consists of:

- the SVC old PSW
- the task ID
- the last three bytes of register 0
- the contents of register 1

The trace table entries may be stored in a rotating buffer in core (core-wrap mode), or output to a printer or tape unit. When tape output is used, the tape must be processed by the PDLIST utility program to provide readable output data.

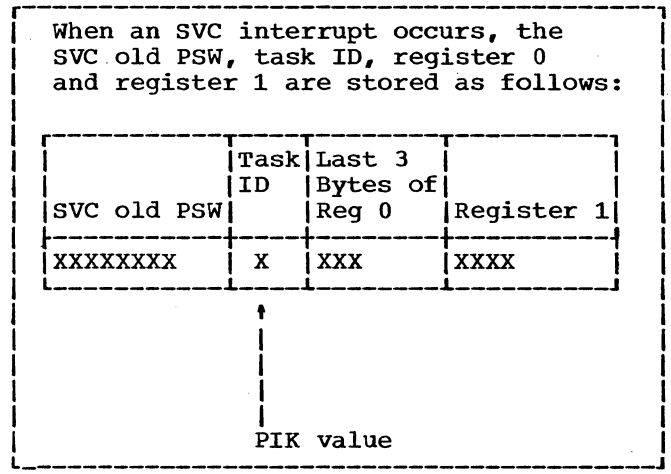


Figure 8. GSVC Trace Table Entry

Tracing Options

The GSVC function provides the following options:

- trace all SVCs occurring
- selectively trace up to six SVCs
- selectively eliminate up to six SVCs and trace all others
- trace in all partitions
- selectively trace up to three partitions

Trace limiting options (see Figure 1) are specified by the initializer keywords IGNORE SVC= or TRACE SVC=. All SVC activity is traced if one of these option keywords is not specified. The two keywords are mutually exclusive: when either is specified, the other becomes invalid.

The six SVC limiting options are invoked by specifying the SVCs to be traced or ignored. The partition limiting options are specified by the initializer keyword TRACE PARTITION=. This is useful only when the user must run several partitions at once, and does not wish to trace all of them.

Note: If PTO=YES in the FOPT macro then SVCs issued when the physical transient area is busy are not traced.

Data Collection

GSVC trace resides in the CE area and performs the actual tracing of SVCs. The first entry to the phase causes some initialization to occur before the SVC is acted upon.

The value in the program interrupt key (PIK) is matched against the PRT entries to determine whether or not the event should be entered into the tables. To conserve main storage, the phases test for partitions to ignore, rather than partitions to trace. The initializer program (PDAID) accepts TRACE PARTITION= parameters and converts them to ignore parameters for the SVC trace phases. For example, if F1, F2, or SP is specified, the initializer converts this information to an 'ignore BG' parameter for the SVC trace phase.

If the event is to be traced, an entry is made in the trace table. If not, control returns to the supervisor routine from which the trace was entered.

Output

If the SVC event was caused by an SVC being issued, the output phases store the necessary information in the table but do not attempt to move data to the I/O area. If, however, the SVC event was caused by an SIO or I/O interrupt, the phases first store the information in the table and then test for a full table. If the table is full, the phases attempt an output before returning control to the supervisor.

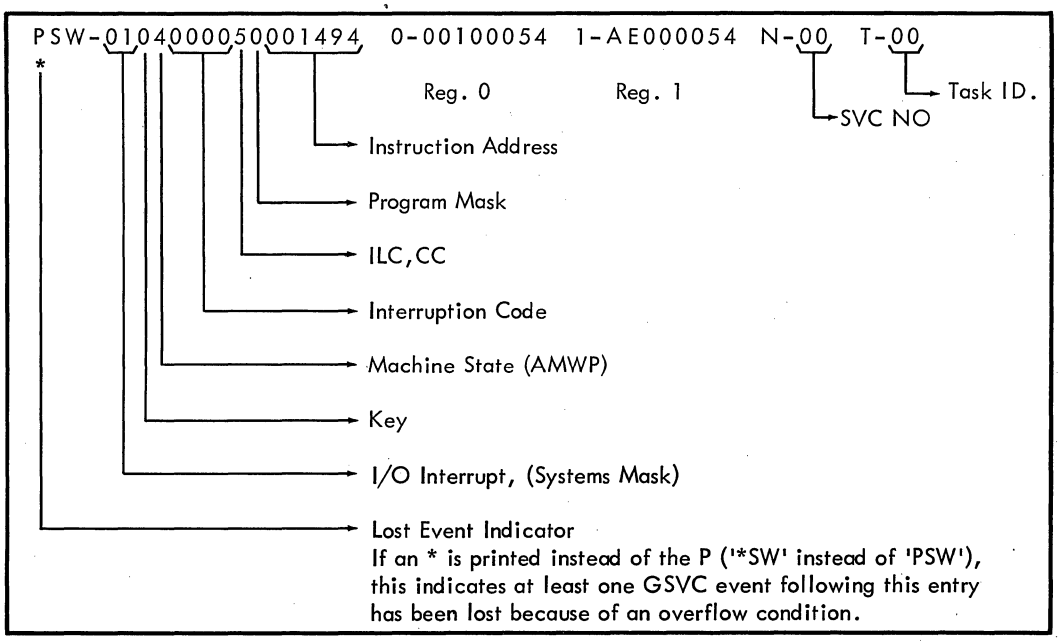


Figure 9. Sample Output for GSVC Trace

Type Output	Full Table	Overflow Entries	Maximum Capacity
Printer	2 Entries	4 Entries	6 Entries
Tape	9 Entries	5 Entries	14 Entries

When the output device must share a selector channel or a control unit, the trace tables overflow capacity can be exceeded and SVCs can be lost. The trace phase tests for such losses and indicates them with an * when they occur. (It is recommended that output options be selected to avoid such losses, and that one or more of the most active devices be ignored if an overflow occurs.) Figure 9 illustrates output after it has been printed.

PDAIDGTW (CORE-WRAP MODE)

PDAIDGTW preserves a fixed number of SVC events in either the CE area or an alternate save area outside the supervisor. If an alternate save area is specified, the CE save area is not used. PDAIDGTW generates as large a save area as possible within the CE area.

You can preserve a maximum of 39 entries in the 800-byte CE area. If the CE area size is increased (CE=nnnnn, where nnnnn is between 800 and 10,240 bytes), a maximum of 680 entries can be preserved in the CE area.

When the area is full, the oldest entry is overlaid by each new entry. (Figure 4 illustrates the method for updating the trace table for core-wrap mode.) A core dump must be used to retrieve the tables.

PDAIDGTW sets up the following pointers:

- SLOT1 -- address of the beginning of the save area.
- NEXT -- address of the next available slot in the save area. (Because NEXT is filled with unchecked new information, it may contain either the oldest entry in the table, or the SVC number and calling address from a partition not being traced. If the latter is the case, the entry should be ignored.)
- WRAPADR -- address of the end of the save area.

Note: The location of these pointers at execution time is CETAB+X'EC'.

PDAIDGTP (PRINTER OUTPUT)

PDAIDGTP is selected when a printer is specified as the output device. It collects the two GSVC events, formats them for output, and prints them using a 1403 or 1443 printer.

If the printer cannot be accessed, control returns to the supervisor. If the printer is not ready or indicates errors, the message 4C24A is printed on SYSLOG and the system waits for a (B) response when the printer is made ready.

When two entries have been saved, they are formatted for output and the save area is cleared. Four more entries may be saved before output is achieved, without an overflow condition occurring. However, when the I/O area and save area are full and an entry must be made, the save area is overflowed (Figure 10). The oldest entry in the save area is lost, and an * indicator is set in the I/O area. Thus, an * in the output indicates that the next chronological entry (or entries) was lost due to an overflow. Entries are double-spaced and printed two per line.

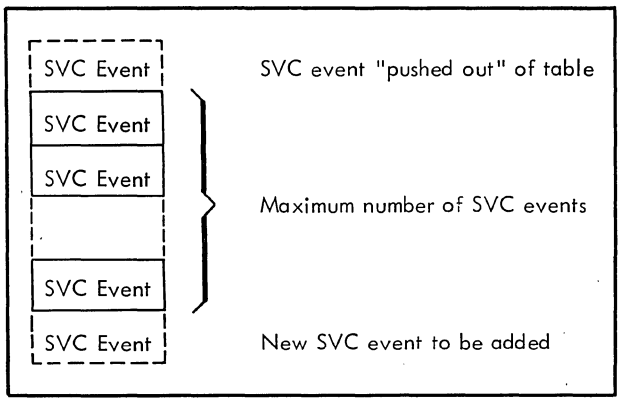


Figure 10. Entering New SVC Events in the Trace Table for Output Devices

PDAIDGTT (TAPE OUTPUT)

PDAIDGTT collects and writes on an unlabeled tape the SVC events that occur during execution of the problem program. The events are written on tape in core image (unprintable) format. PDAIDGTT requires a tape-to-printer operation using the PDLIST utility program to retrieve the traced events. The tape must be processed with the tape drive temporarily assigned as SYS005 and SYSLST assigned to a printer to obtain readable listings of the traced events.

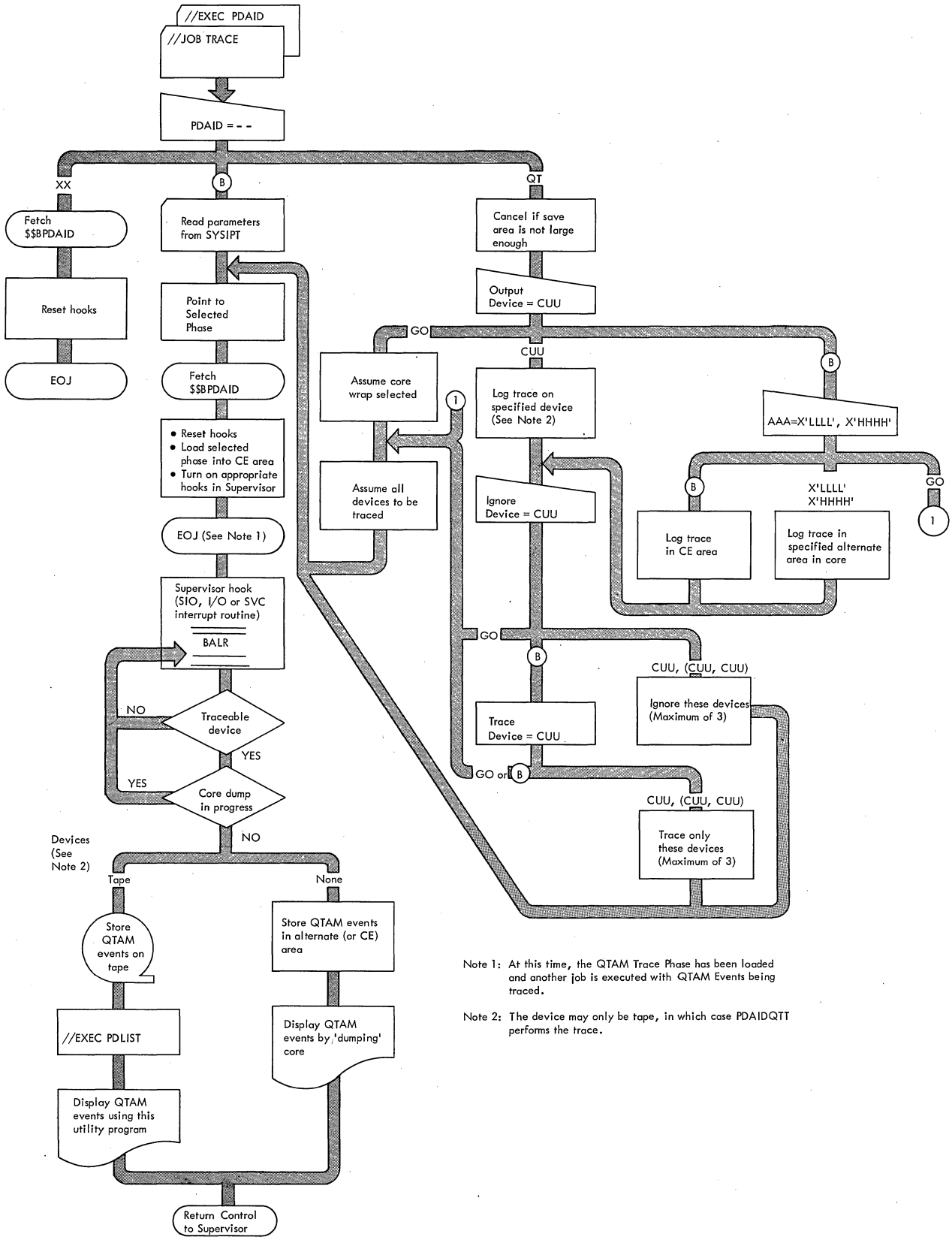
GSVC events are collected in an area that may contain a maximum of 14 entries. An attempt is made to write the entire area as a single record when 5 events are present in the table. If the channel is busy on the attempted output, control is returned to the supervisor SIO routine or interrupt handler routine. When the next SVC event is received, it is entered in one of the nine overflow entries, and another attempt to output is made. Thus, the records on tape contain between 5 and 14 SVC events per block. The PDLIST utility program takes this into account and prints only the valid SVC events.

Because 14 is the maximum number of SVC events that can be recorded, an overflow will occur when the 15th SVC event is entered in the table. PDAIDGTT recognizes this condition by checking the 14th entry location in the table for an unreported SVC event. If one is found, a flag is set in the preceding (13th) entry location. As the 14th entry is 'pushed out' of the table, (see Figure 10) the 13th entry replaces the 14th, and thus the flag is available in the last entry.

The PDLIST utility program checks for the flag when printing, and sets an * indicator, indicating that an overflow has occurred and an SVC event(s) was lost. The * indicator is printed in the entry that precedes the missed SVC event(s).

PDAIDGTT makes no provision to handle error conditions while outputting. If the tape unit is busy, an immediate return to the supervisor is made. If the tape unit is not busy, but a CSW stored condition is indicated or the tape unit is inoperable, the message 4C24A is issued on SYSLOG and the system waits for a (B) response when the device is made ready.

Chart 05. Logic Flow of the QTAM Trace Function



Note 1: At this time, the QTAM Trace Phase has been loaded and another job is executed with QTAM Events being traced.

Note 2: The device may only be tape, in which case PDAIDQTT performs the trace.

QTAM Trace Function

Description and Operation

The QTAM trace function builds a trace table as interrupts occur. There are three types of trace events, each having a prefix that defines the event type (Figure 11).

A V-type event (Figure 11) is created when an SVC interrupt occurs and consists of:

- V-prefix
- SVC old PSW
- Contents of register 0
- Contents of register 1

An S-type event (Figure 11) is created when an SIO interrupt occurs and consists of:

- S-prefix
- Condition code
- Overflow indicator (* if overflow has occurred)
- Device
- CCB address
- CSW

An I-type event (Figure 11) is created when an I/O interrupt occurs and consists of:

- I-prefix
- I/O old PSW
- CSW

The trace events may be stored in a rotating buffer in core (core wrap) or sent to a tape unit. When tape mode is used, the tape must be processed by the PDLIST utility program to provide readable output data.

When an SVC interrupt occurs, the event type, SVC old PSW, register 0 and register 1 are saved as follows.

Type	SVC old PSW	Register 0	Register 1
V	XXXXXXXX	XXXX	XXXX

When an SIO interrupt occurs, the event type, condition code, CSW status, CAW address, and CCW first executed are saved as follows.

Type	CC	Device	CCB	CSW	Not Used
S	X	XX	XXXX	XXXXXXXX	X

When an I/O interrupt occurs, the event type, I/O old PSW, and CSW are saved as follows.

Type	I/O old PSW	CSW
I	XXXXXXXX	XXXXXXXX

Figure 11. QTAM Trace Table Entries

Tracing Options

The QTAM trace function provides the following options.

- Trace all SVC 0 and 31, SIO, and I/O interrupts.
- Selectively trace SVC 0 and 31, SIO, and IO interrupts from any three devices.
- Ignore SVC 0 and 31, SIO, and I/O interrupts from any three devices.

Trace-limiting options (see Figure 1) are specified by the initializer message/parameters IGNORE DEVICE= or TRACE DEVICE=. (The device options are invoked by specifying the three devices to be traced or ignored.) All SVC 0 and 31, SIO, and I/O interrupt activity is traced in all partitions of core if one of these options is not specified. They are mutually exclusive: when either is specified, the other becomes invalid.

Data Collection

The QTAM trace phases reside in the CE area and perform the actual tracing of QTAM events. The first QTAM event causes some initialization to occur before it is acted upon. At each entry, the trace tests the logical transient area for a dump transient; normally, it does not trace any interrupt activity when a dump is in progress. (If it is necessary to trace QTAM events during a dump routine, the exit branch following the compare instruction is altered to a NOP.) This prevents the dump from either overflowing the trace table when core wrap is used (see Figure 4), or from causing excess output in output mode.

If no dump is in progress, the device address is matched against either IGN or TRC entries to determine if the event should be entered into the trace tables.

If the event is not to be traced, control is returned to the supervisor routine from which the trace was entered. If the event involves a device to be traced, an entry is made in the trace table. At this point, the core-wrap module returns control to the supervisor.

Output

The QTAM output phases test for a full table before returning to the supervisor, and attempt to output the table when it contains enough entries. If the output device cannot be accessed, control is returned to the supervisor, and output is retried at each subsequent entry to the trace module. Limited overflow buffers are available in each module:

Type Output	Full Table	Overflow Entries	Maximum Capacity
Tape	10 Entries	4 Entries	14 Entries

When the output device must share a selector channel or a control unit, the overflow capacity can be exceeded, and QTAM events can be lost. The trace tests for such losses, and indicates such with an * when they occur. (It is recommended that output options be selected to avoid such losses, and that one or more of the most active devices be ignored if an overflow occurs.) Figure 12 illustrates output after it has been printed.

PDAIDQTW (CORE-WRAP MODE)

PDAIDQTW preserves a fixed number of SVC events in a save area that may be in either the CE area or an alternate area outside the supervisor. If an alternate area is specified at initialization, it is used, rather than the CE area, to contain the trace table. Otherwise, PDAIDQTW generates as large a save area as possible within the CE area.

Thirty entries can be preserved in the minimum 800-byte CE area. If the CE area size is increased (CE=nnnnn, where nnnnn is between 800 and 10,240 bytes), a maximum of 602 entries can be preserved in the CE area.

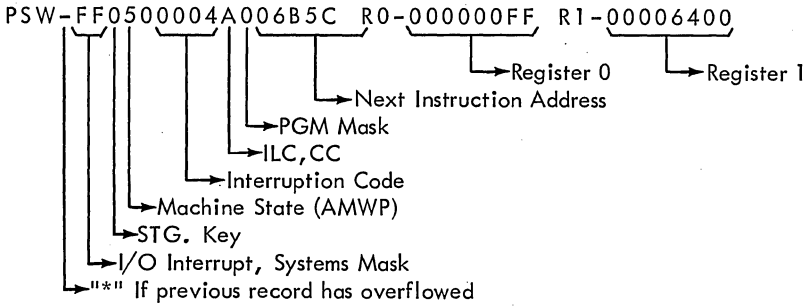
When the save area is full, the oldest entry is overlaid by each new entry. (Figure 4 illustrates the method for updating the trace table for core-wrap mode.) A core dump must be used to retrieve the table.

PDAIDQTW sets up the following pointers.

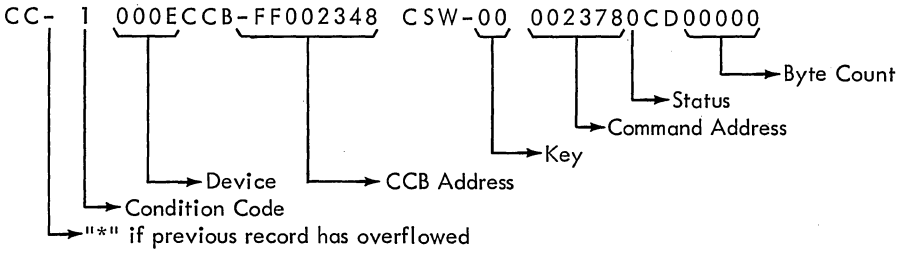
- SLOT 1 -- address of the beginning of the save area.
- NEXT -- address of the next available slot in the save area. (Because NEXT is filled with unchecked new data, it may contain either the oldest entry in the table, or the SVC number and calling address from the partition not being traced. If the latter is the case, the entry should be ignored.)
- WRAPADR -- address of the end of the save area.

Note: The location of these pointers at execution time is CETAB+X'0180'.

Sample Output for SVC 0 and 31 SVC Interrupt.



Sample Output for a supervisor-issued SIO.



Sample Output for I/O Interrupt.

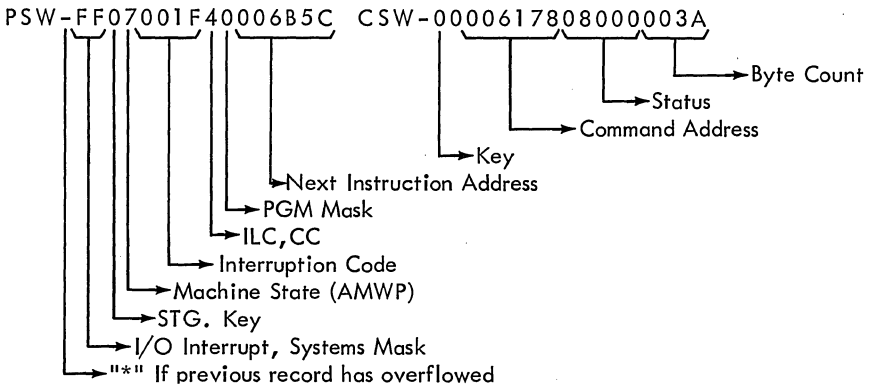


Figure 12. Sample Output for QTAM Trace

PDAIDQTT (TAPE OUTPUT)

PDAIDQTT collects and writes on an unlabeled tape the QTAM events that occur during execution of the problem program. The events are written on tape in core image (unprintable) format. Thus, this requires a tape-to-printer operation using the PDLIST utility program to retrieve the traced events. The tape must be processed with the tape drive temporarily assigned as SYS005, and SYSLST assigned to a printer to obtain readable listings of the traced events.

QTAM events are collected in an area that may contain a maximum of 14 entries. An attempt is made to write the entire area as a single record when 10 events are present in the table. If the channel is busy on the attempted output, control is returned to the supervisor SIO routine or interrupt handler routine. When the next QTAM event is received, it is entered in one of the four overflow entries, and another attempt to output is made. Thus, the records on tape contain between 10 and 14 QTAM events per block. PDLIST utility program takes this into account and prints only the valid QTAM events.

Because 14 is the maximum number of QTAM events that can be recorded, an overflow occurs when the 15th QTAM event is entered in the table. PDAIDQTT recognizes this condition by checking the 14th entry location in the table for an unreported QTAM event. If one is found, a flag is set in the preceding (13th) entry location. As the 14th entry is "pushed out" of the table (Figure 13), the 13th entry replaces the 14th, and thus the flag is available in the last entry. The PDLIST utility program checks for this flag when printing, and sets an * indicator, noting that an overflow has occurred and a QTAM event(s) was lost. The * indicator is printed in the entry that precedes the missed QTAM event(s).

PDAIDQTT makes no provision to handle error conditions while outputting. If the tape unit is busy, an immediate return to the supervisor is made. If the tape unit is not busy, but a CSW stored condition is indicated or the tape unit is inoperable, the message 4C24A is issued on SYSLOG and the system waits for a (B) response when the device is made ready.

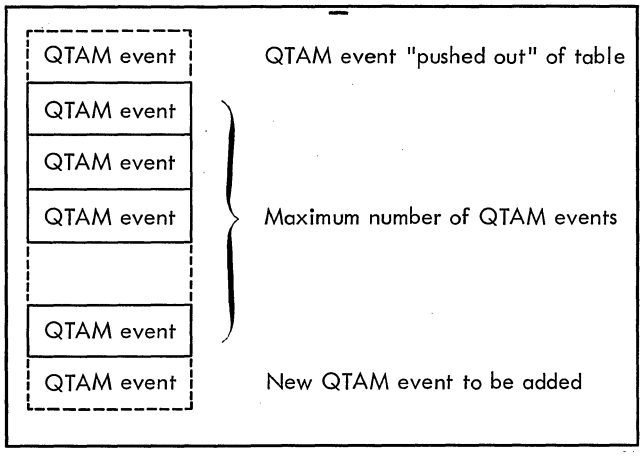


Figure 13. Entering New QTAM Events in the Trace Table for Tape Output Devices

Tables Used by PDAID

Byte		
0	CEAREAND	- Address of end of CE area
4	LTA	- Start of logical transient area
8	CEINTRHK	- Address of I/O interrupt hook*
12	CESIOHK	- Address of SIO-CSW stored hook*
16		Reserved
20		
24	CEFLTHK1	- Address of SVC monitoring hook*
28	CEFLTHK2	- Address of F/L hook*
32		Reserved
36		

* A hook is coding introduced at supervisor generation. The coding normally branches around itself. The initialization makes the branch instruction a NOP to allow a CEAID function to be performed.

This is a 40-byte table, located on a fullword boundary, and pointed to by the COMREG. It is followed by the CE area.

Figure 14. CE Address Table (CETAB)

I/O Trace

I/O old PSW (see Note)
Channel Status Word Stored

Note: If the first byte is X'00', the entry was made due to a CSW stored on an SIO. In this case, the channel and unit address and the CCB address are plugged into the I/O Old PSW entry, and no PSW information is saved. (See Figure 2.)

Figure 15. Trace Table Entries (Part 1 of 4)

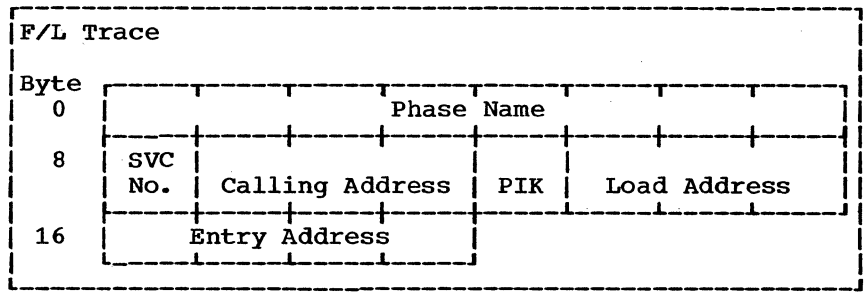


Figure 15. Trace Table Entries (Part 2 of 4)

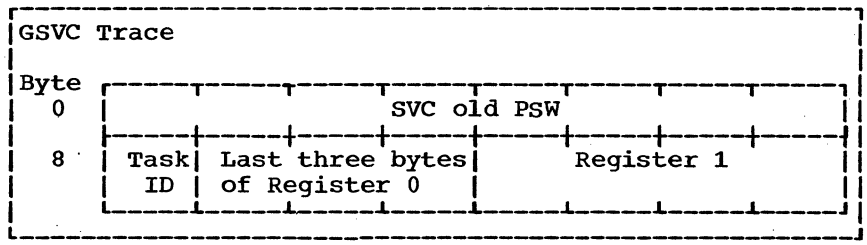


Figure 15. Trace Table Entries (Part 3 of 4)

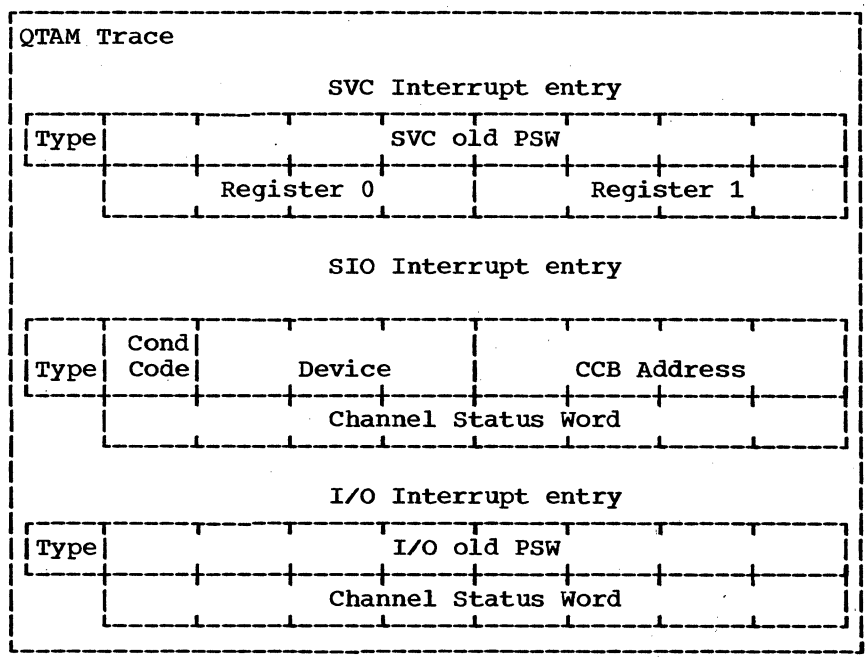
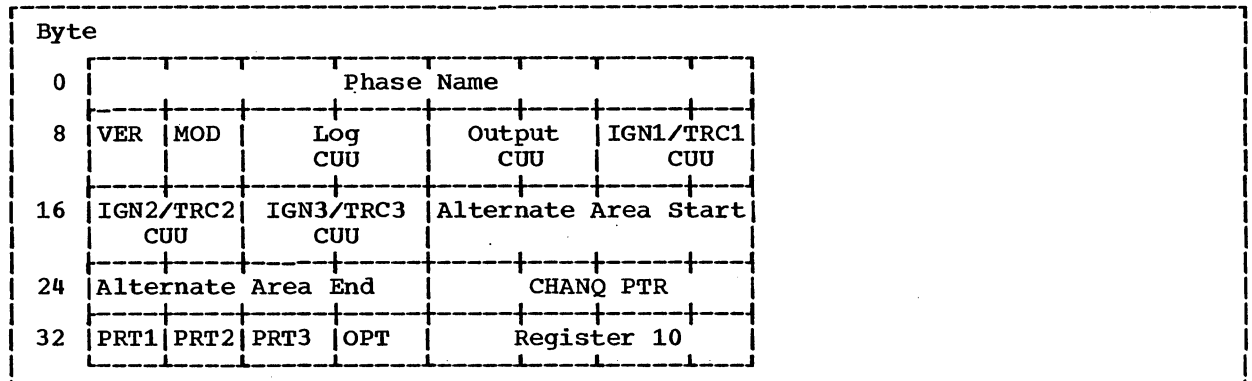


Figure 15. Trace Table Entries (Part 4 of 4)



Displacement	Label	Description
0-7	Phase Name	Phase being run
8	VER	Version number in hex
9	MOD	Modification level in hex
10-11	LOG	Address of system log device
12-13	Output	Address of output device
14-15	IGN1/TRC1	Address(es) of devices to ignore or trace
16-17	IGN2/TRC2	
18-19	IGN3/TRC3	
20-23	Alternate Area Start	Start address of alternate area
24-27	Alternate Area End	Ending address of alternate area
28-31	CHANQ PTR	Address of channel queue pointer for output device
32	PRT1	Partition(s) to be ignored*
33	PRT2	
34	PRT3	
35	OPT	Option byte X'00' = TRC device X'80' = IGN device
36-39	Register 10	Save area for register 10 (used by GSVC trace only)

* The initializer inverts the logic. When the user specifies a partition(s) to be traced, PDAID enters the partition(s) to be ignored in the standard preface table.

Figure 16. Standard Preface in CE Area for I/O, F/L, GSVC, and QTAM Traces

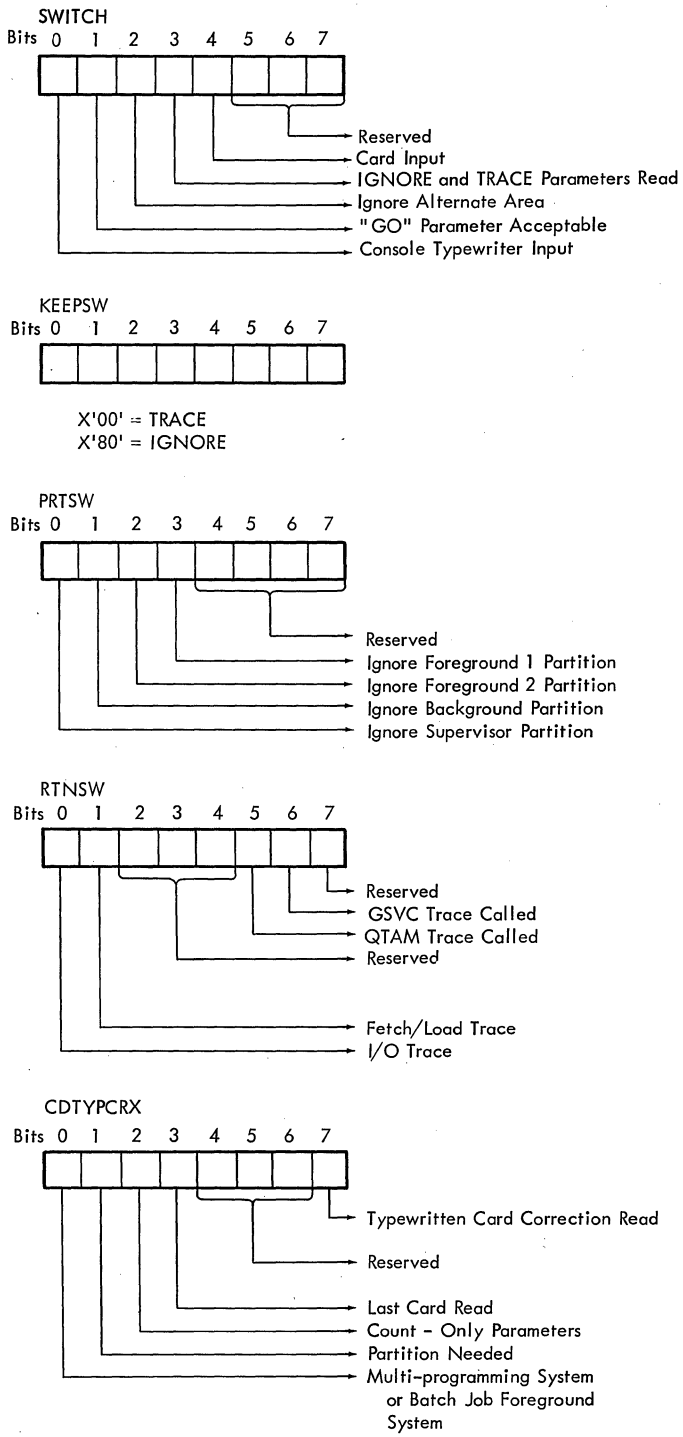


Figure 17. Switches Used by PDAID

Chart AA. PDAID Initializer: Determining the Function

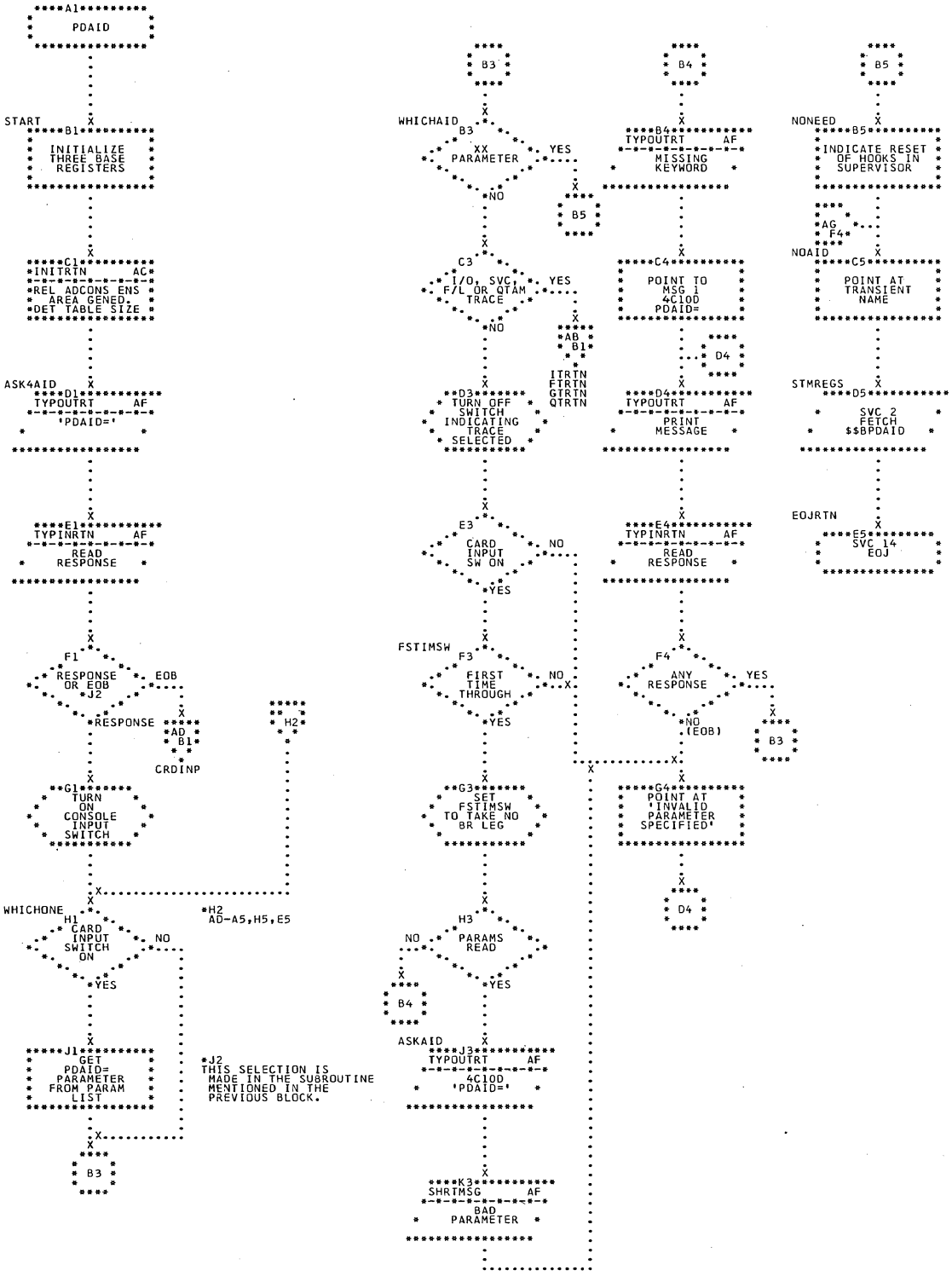


Chart AB. PDAID Initializer: Initializing the Function (Part 1 of 3)

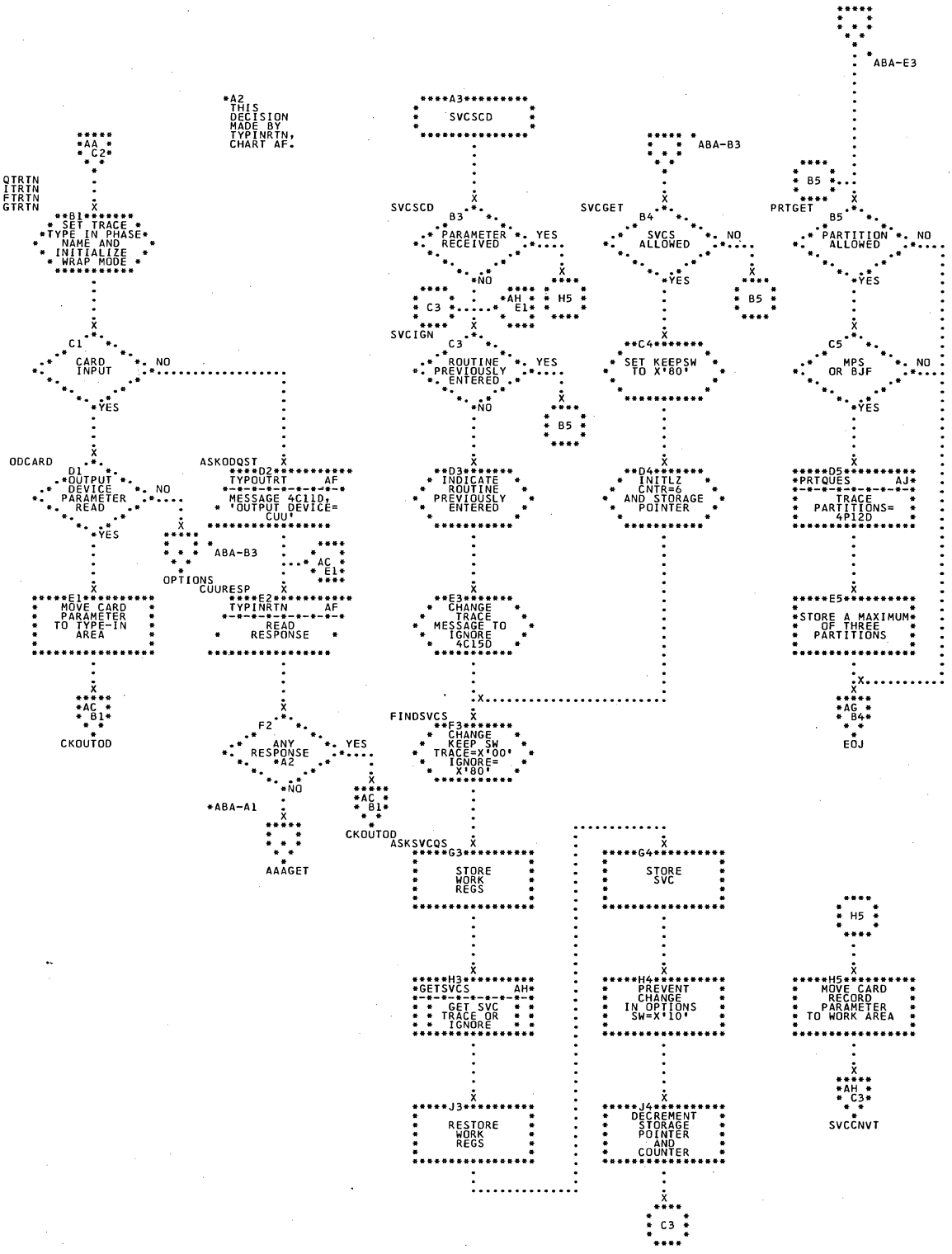
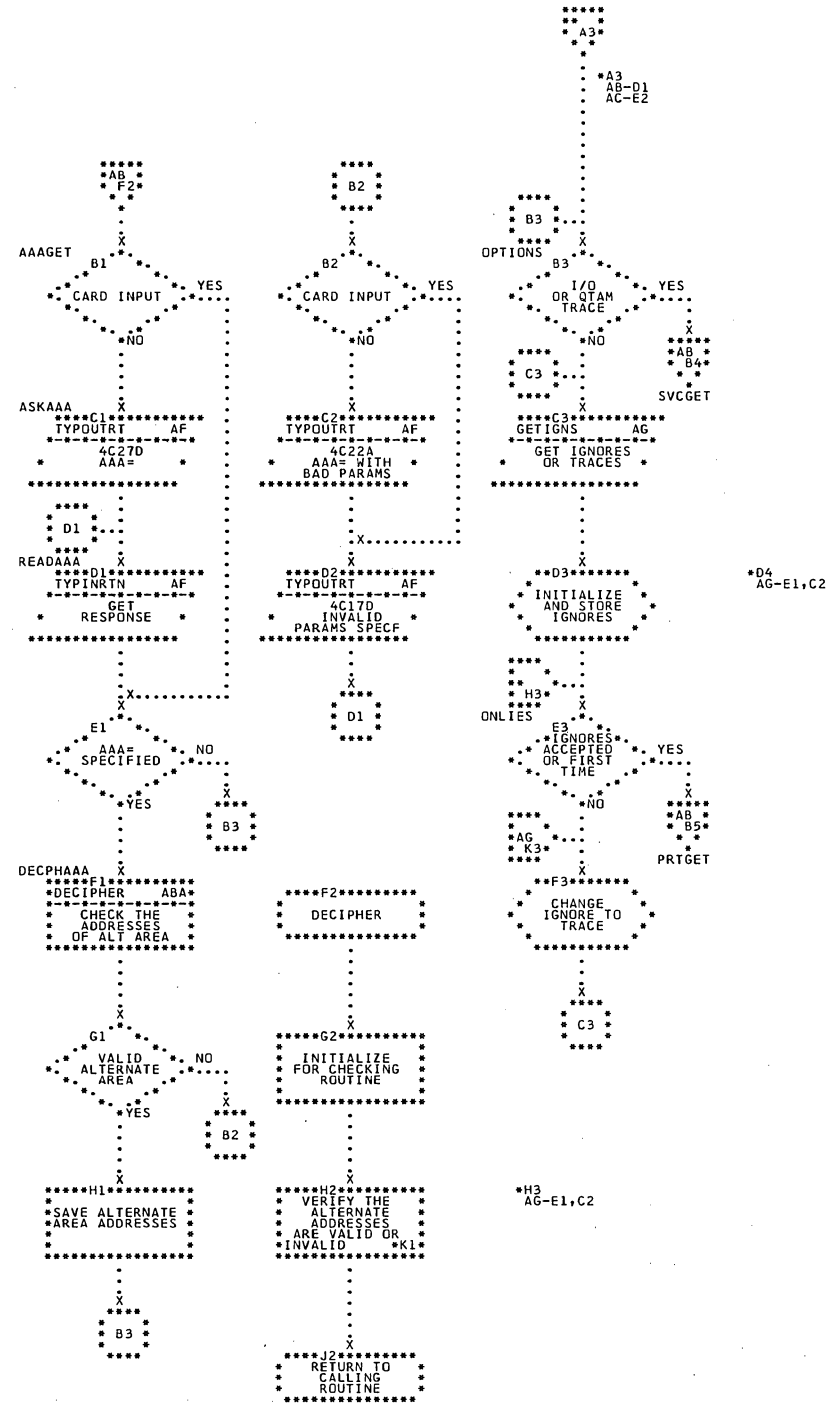


Chart ABA. PDAID Initializer: Initializing the Function (Part 2 of 3)



*K1
IF ADDRESSES ARE VALID,
THEY ARE ALIGNED TO
A FULLWORD BOUNDARY.

Chart AC. PDAID Initializer: Initializing the Function (Part 3 of 3)

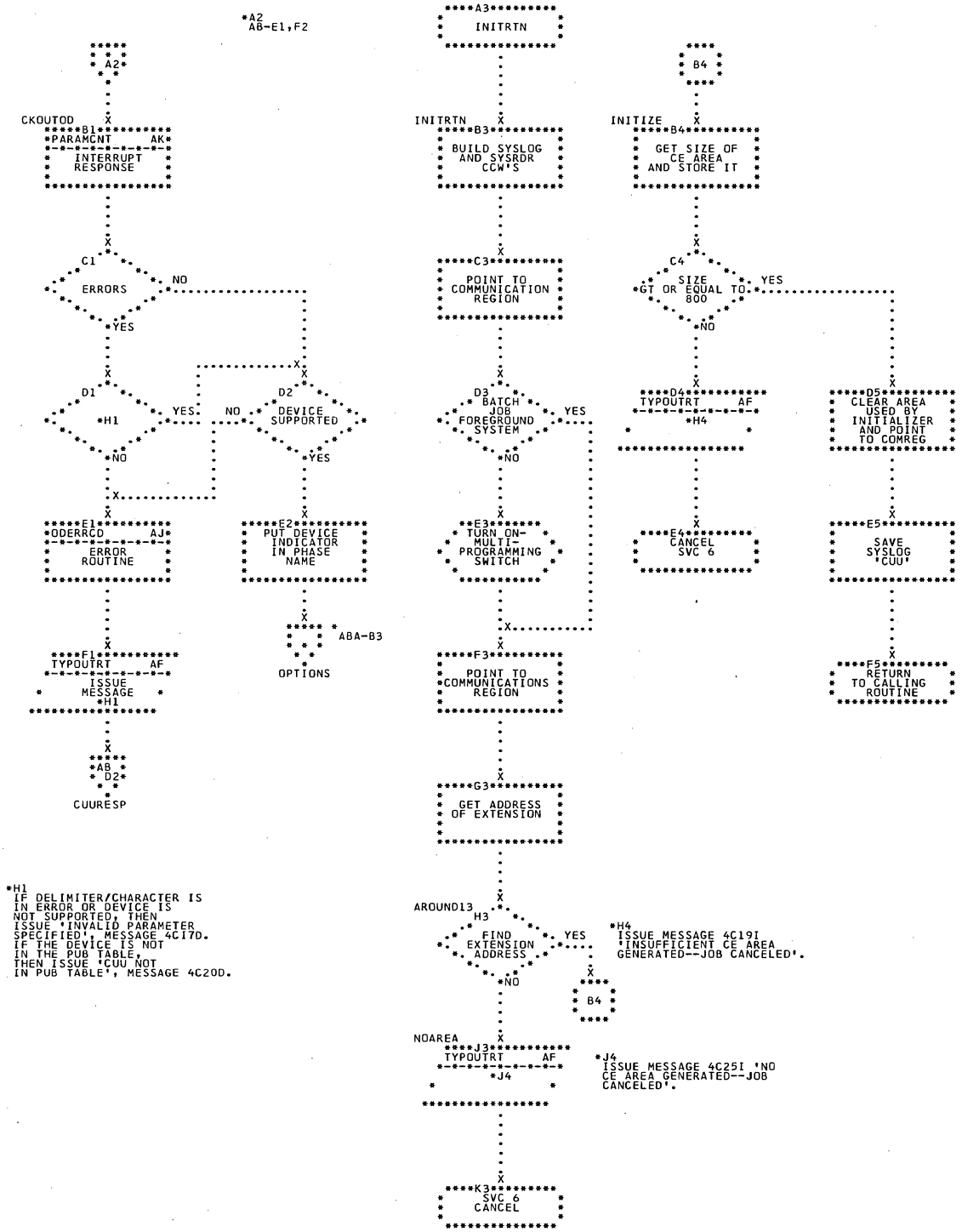


Chart AD. PDAID Initializer: Card Input Routine

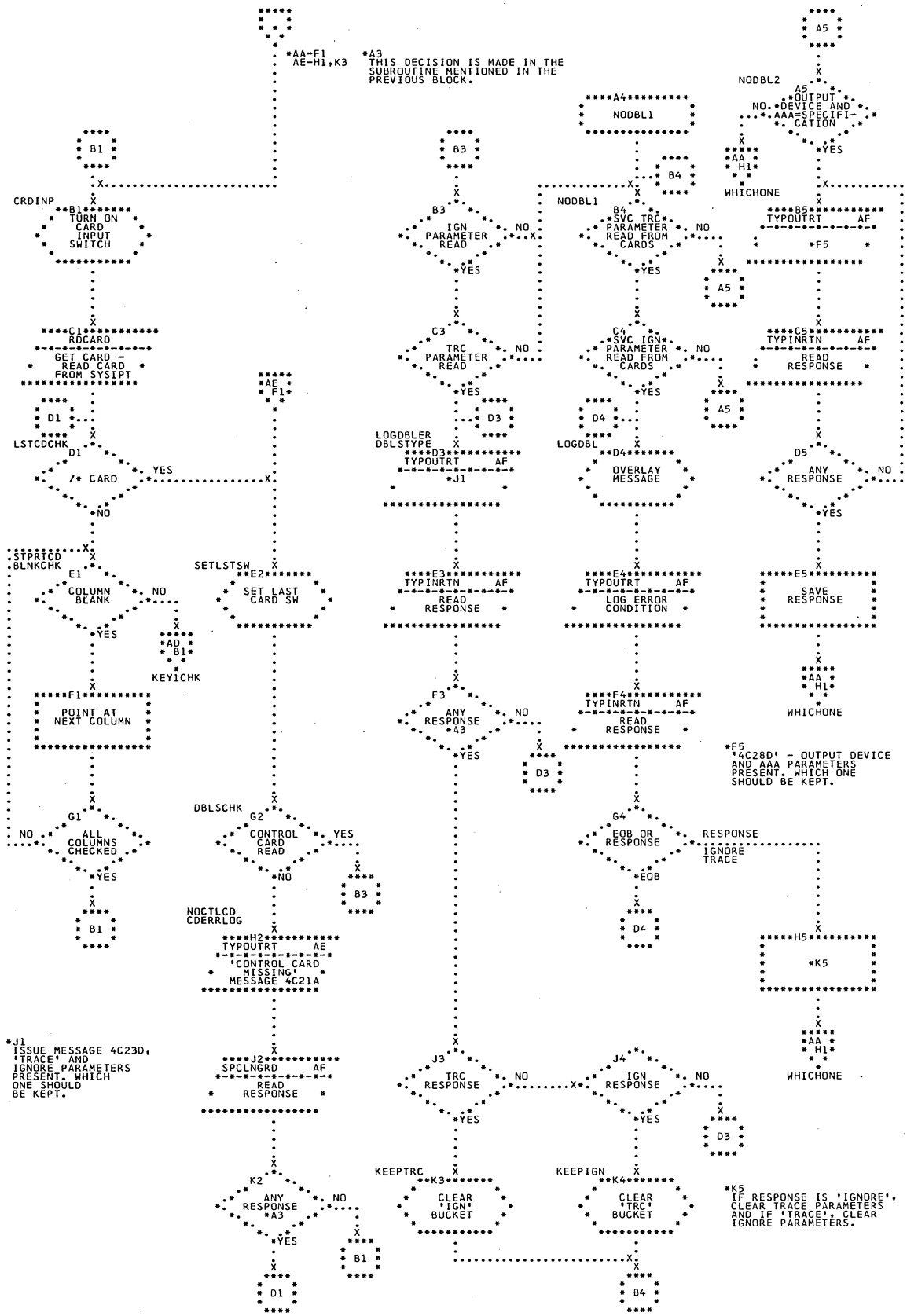


Chart AE. PDAID Initializer: Keyword Verification

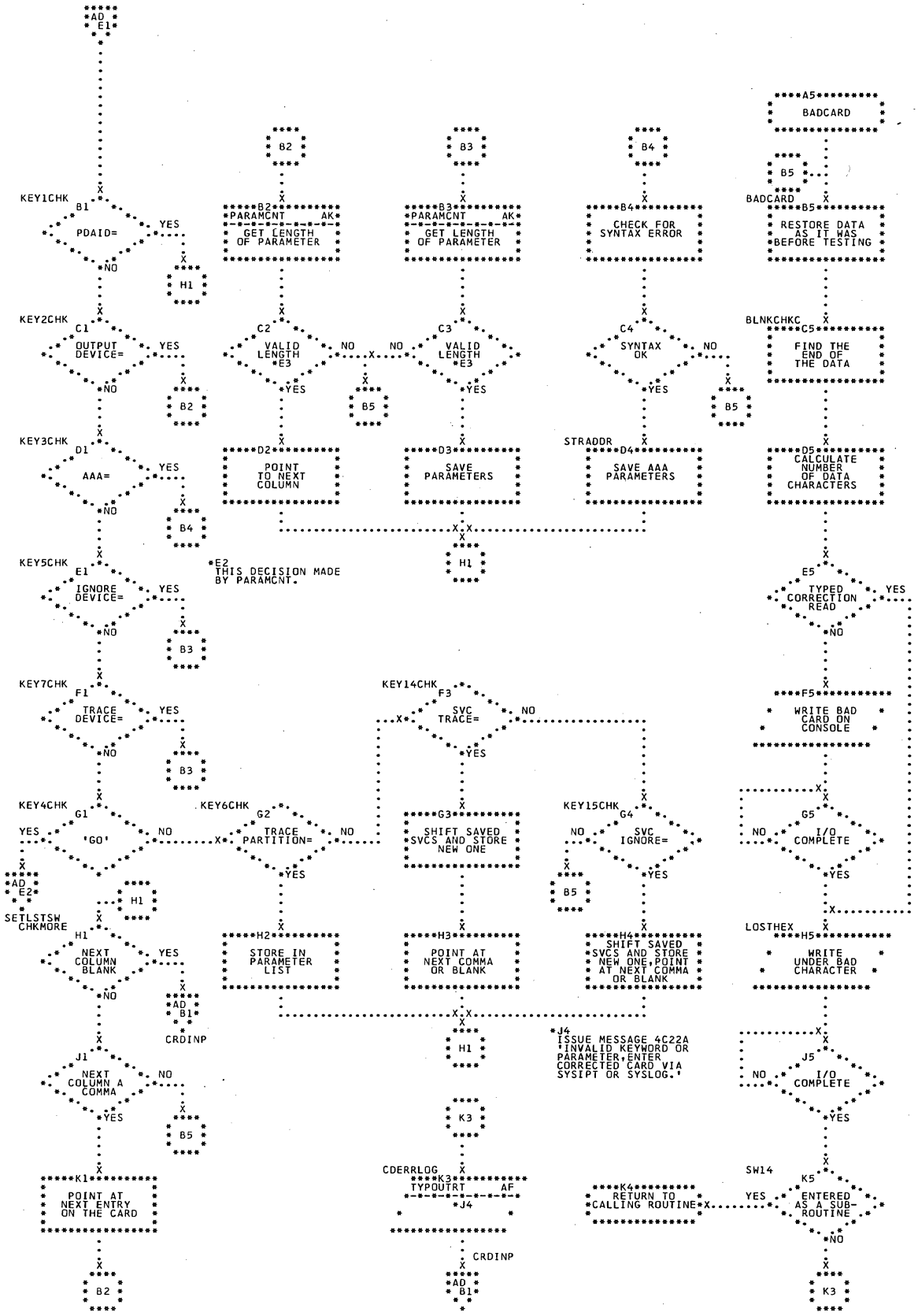


Chart AF. PDAID Initializer: Console Input/Output Routines

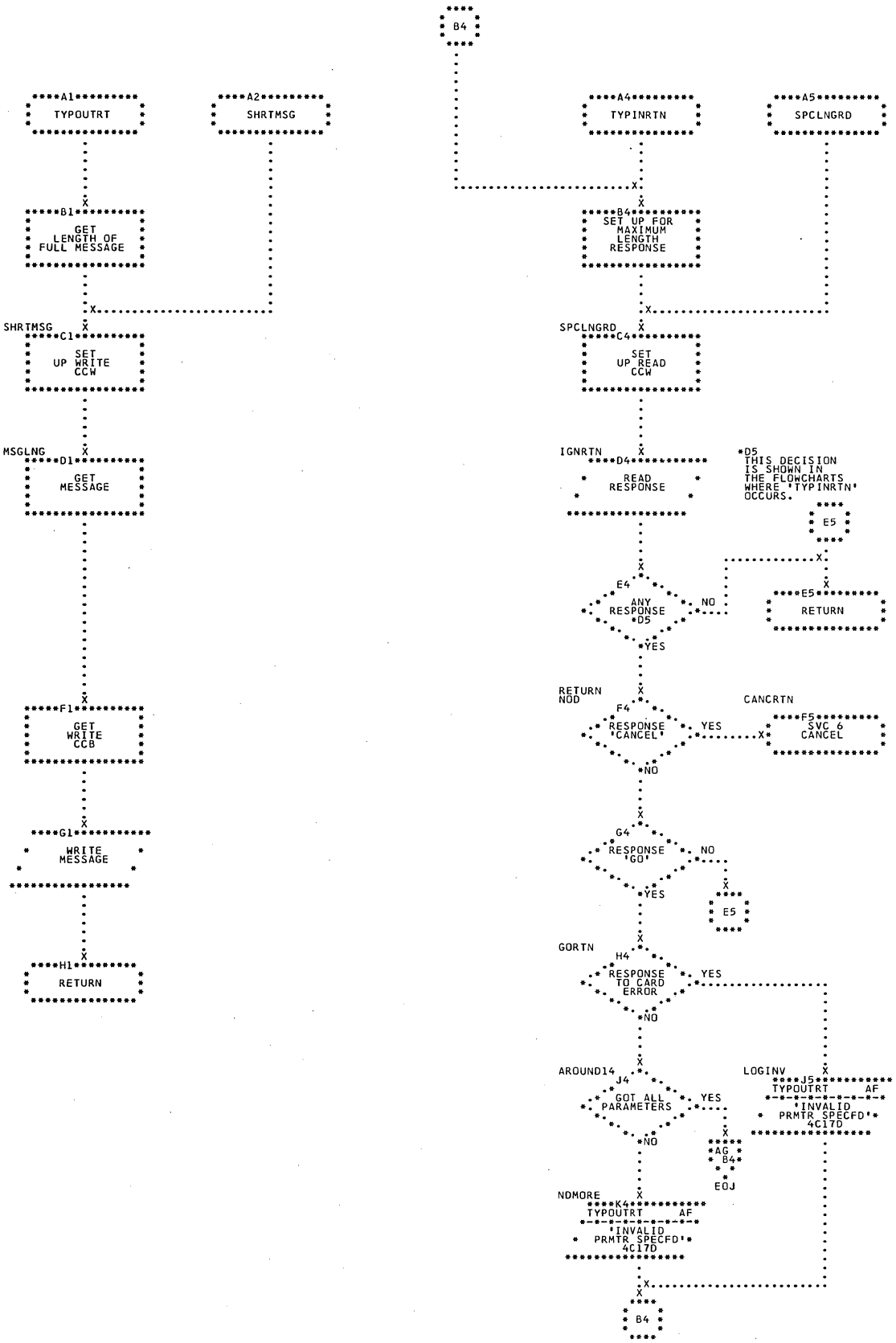


Chart AG. PDAID Initializer: Get IGN/TRC Parameters EOJ Routine; Check Display Limits (Part 1 of 2)

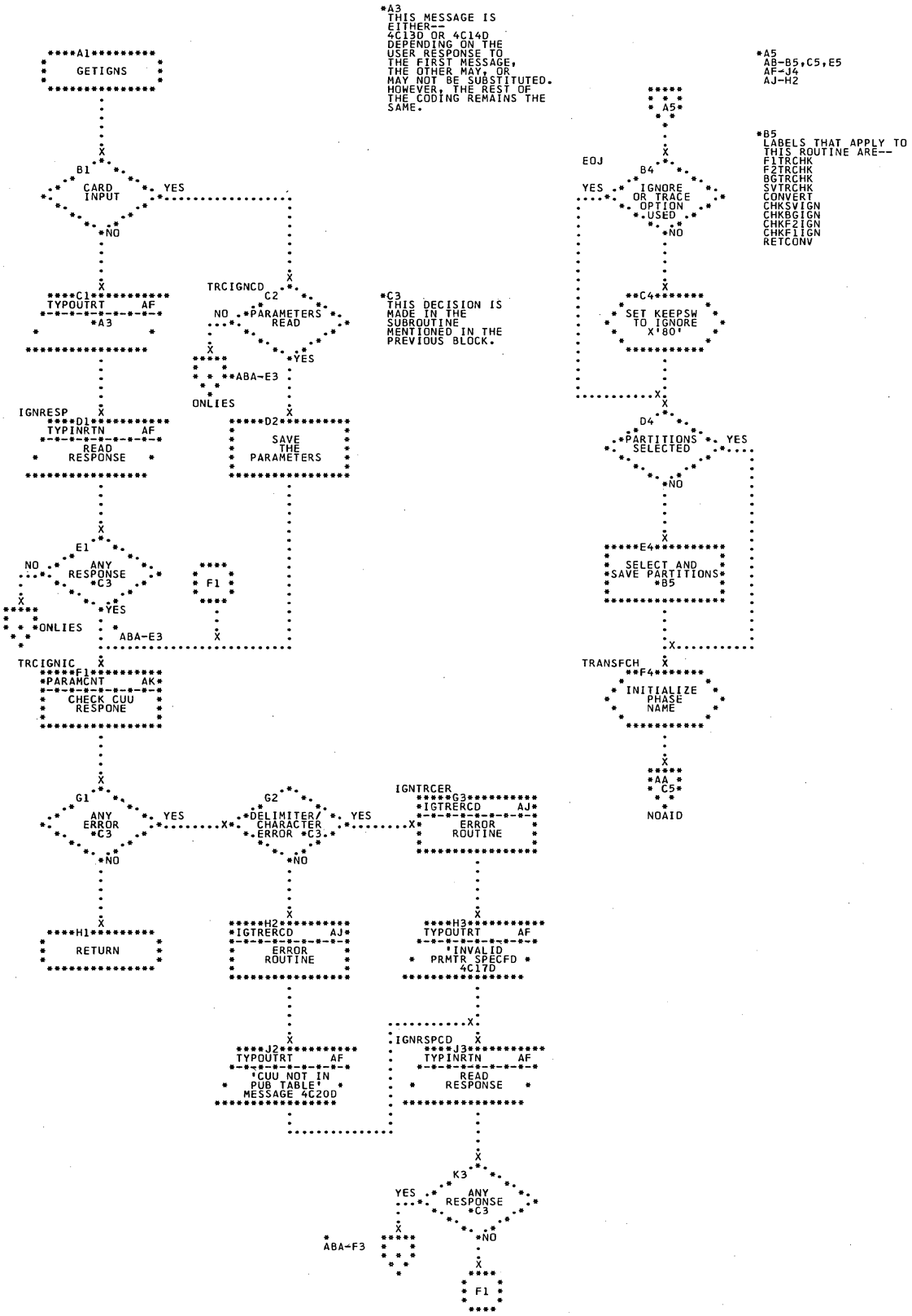


Chart AH. PDAID Initializer: Get IGN/TRC Parameters EOJ Routine; Check Display Limits (Part 2 of 2)

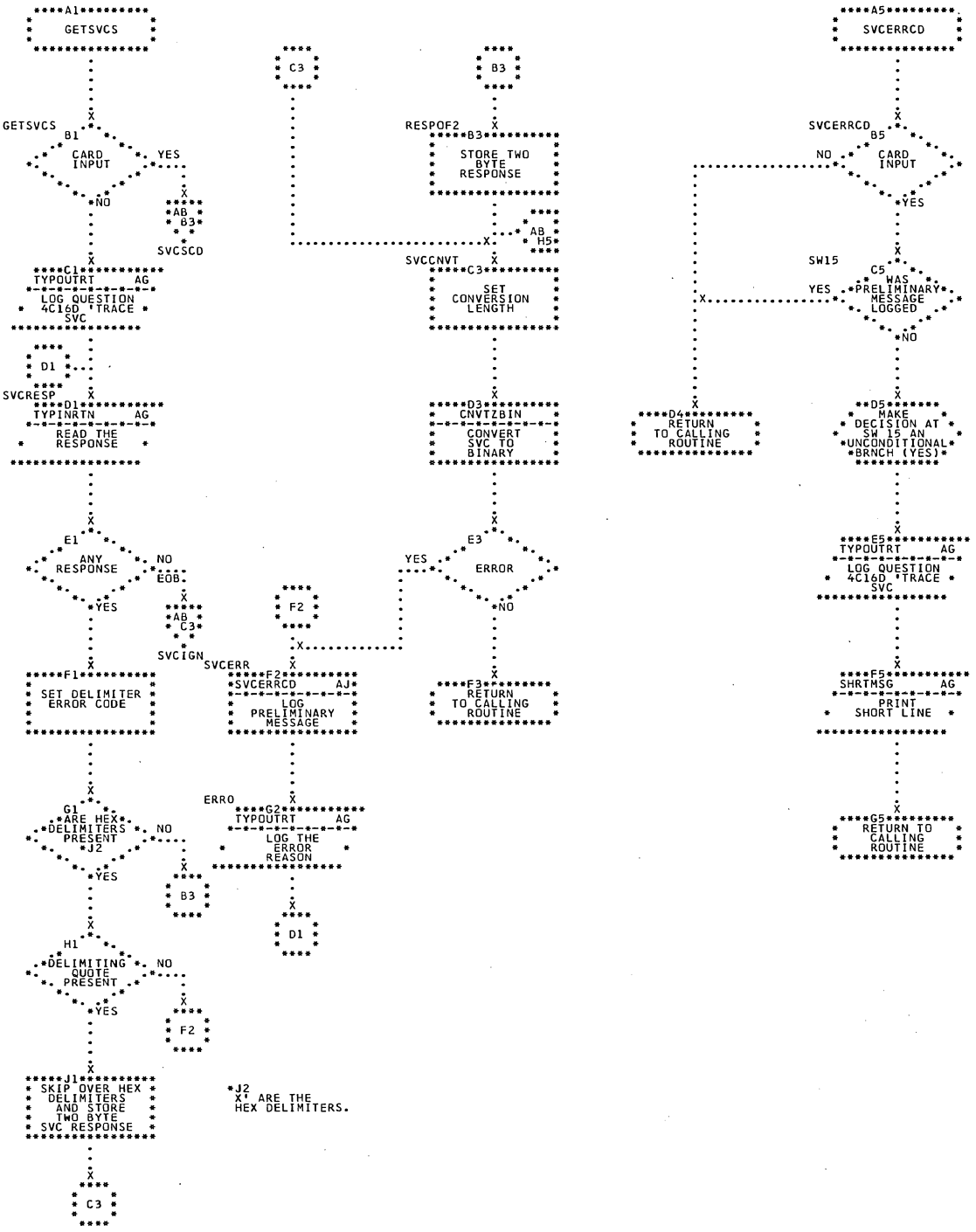


Chart AJ. PDAID Initializer: PHASE and PARTITION Parameters; Error Routines

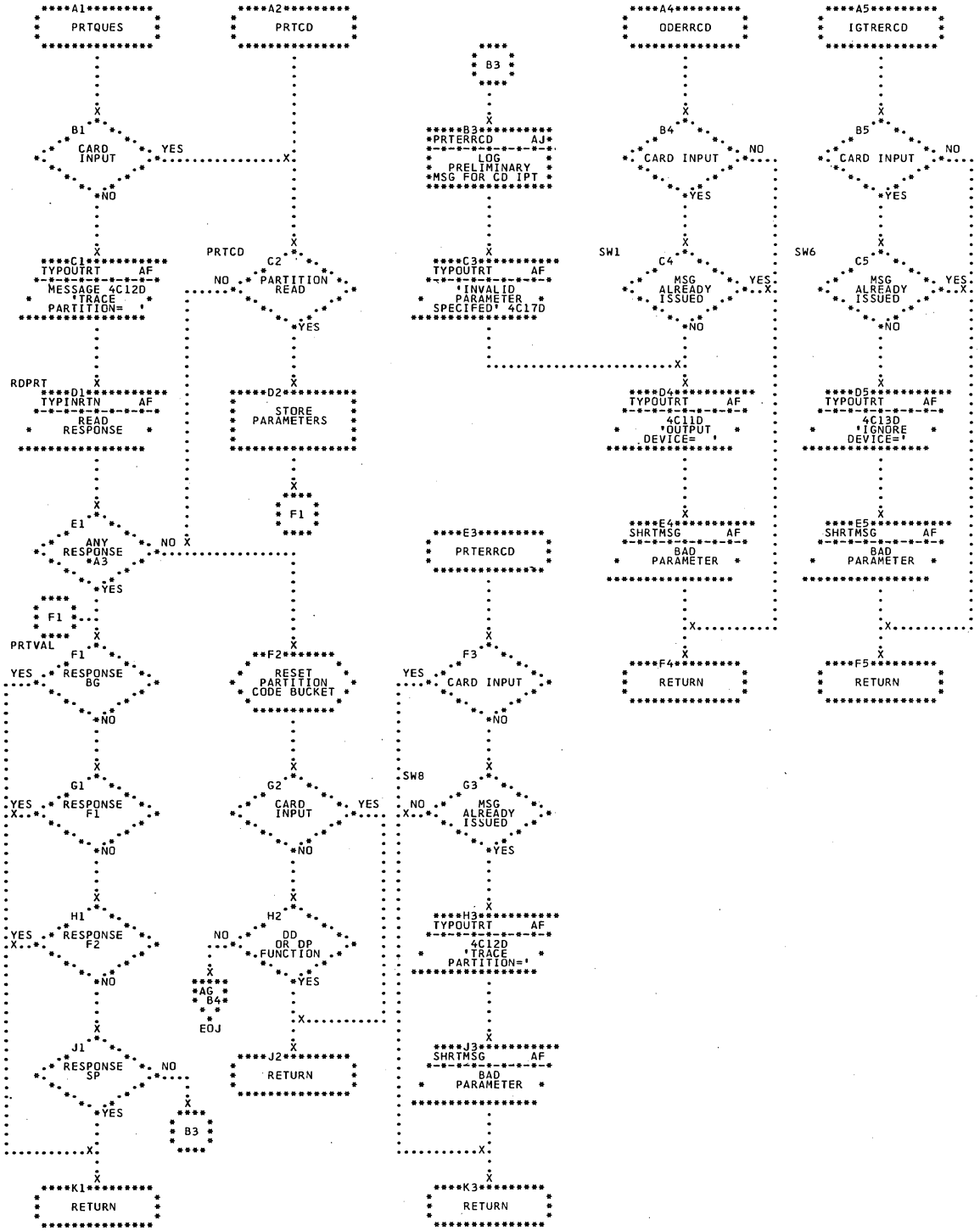


Chart AK. PDAID Initializer: Check Parameters, Devices, and Convert to Binary

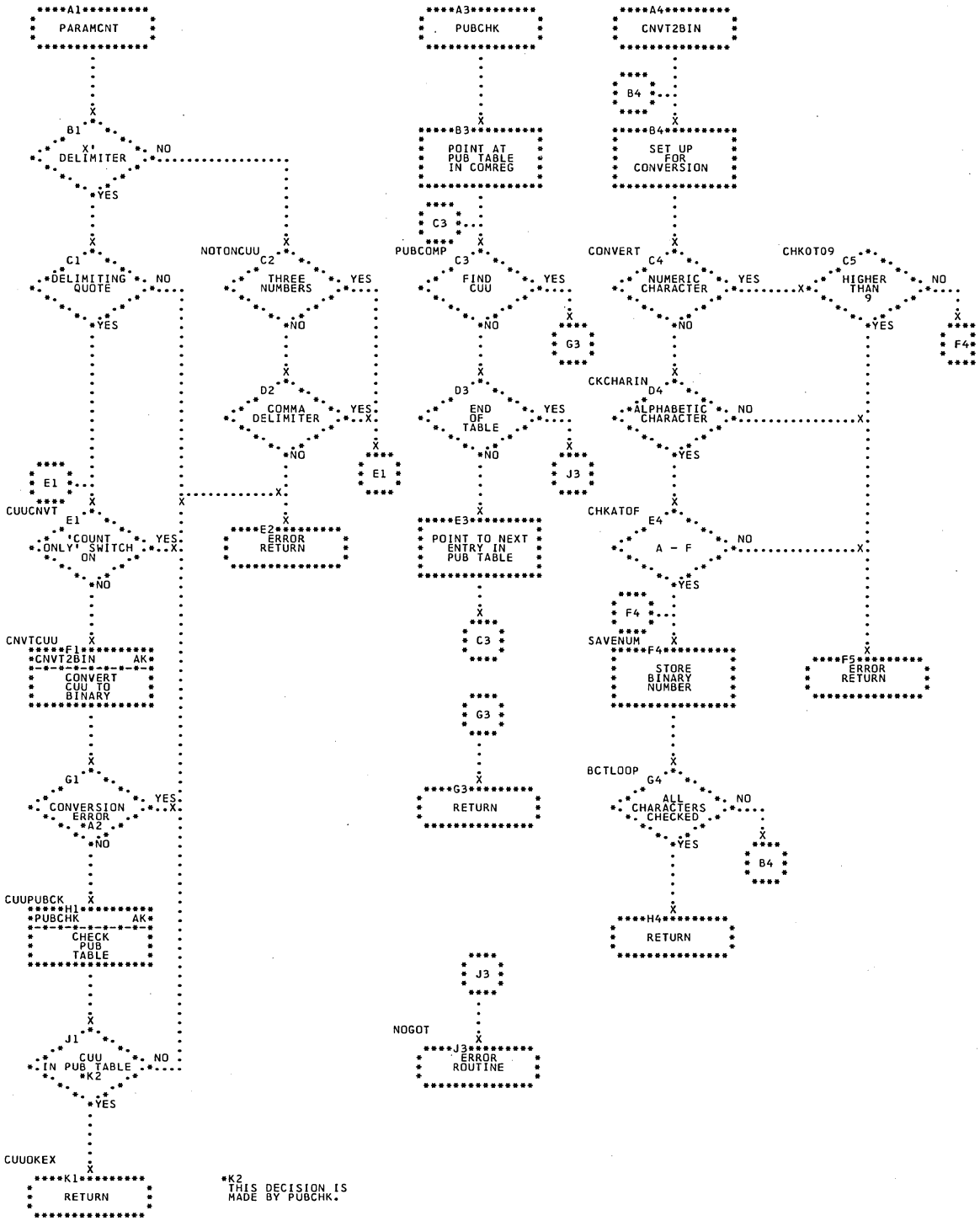


Chart AL. $$BPDAID - PDAID Transient Routine

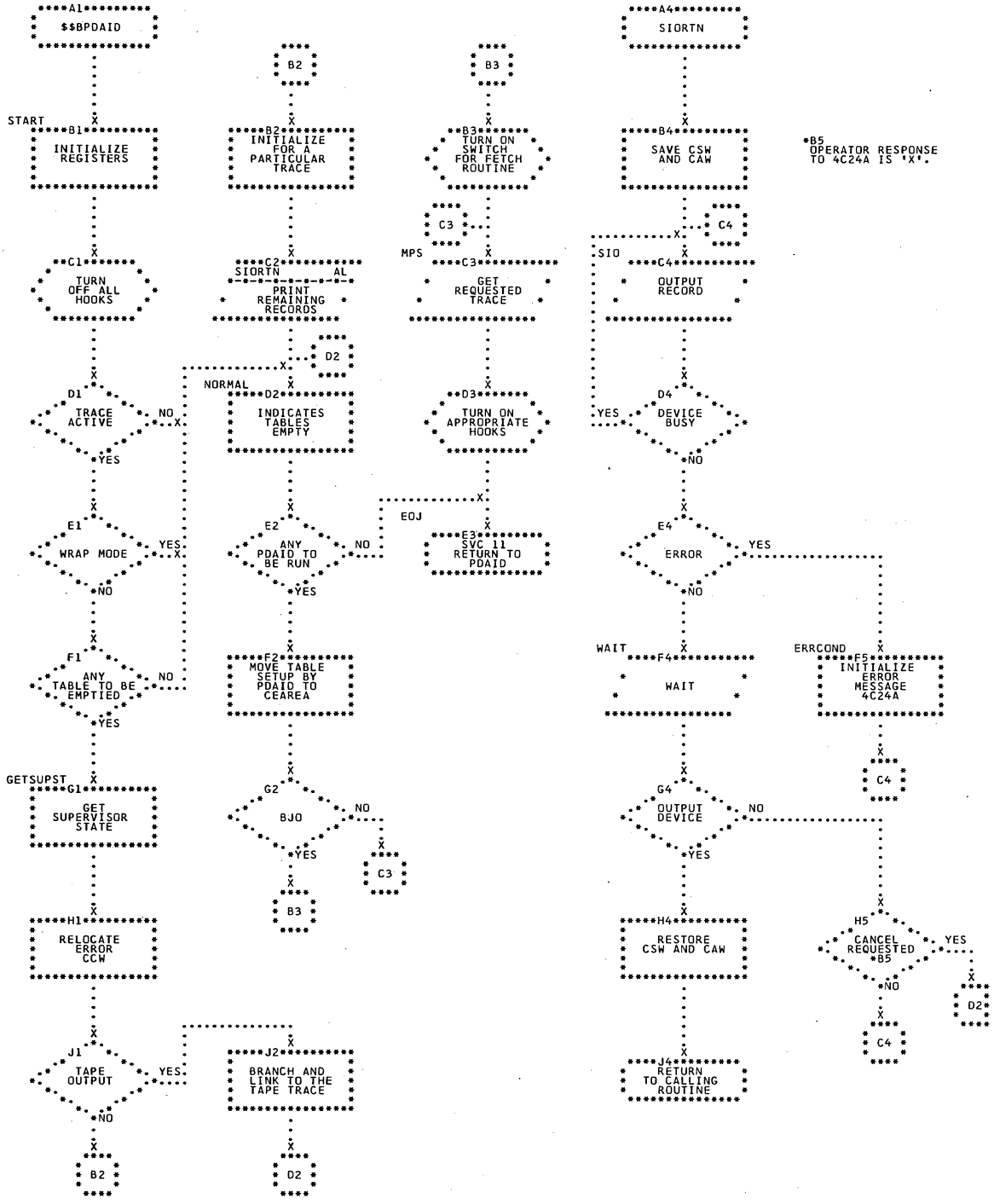


Chart BA. PDLIST - Tape-to-Printer Program (Part 1 of 3)

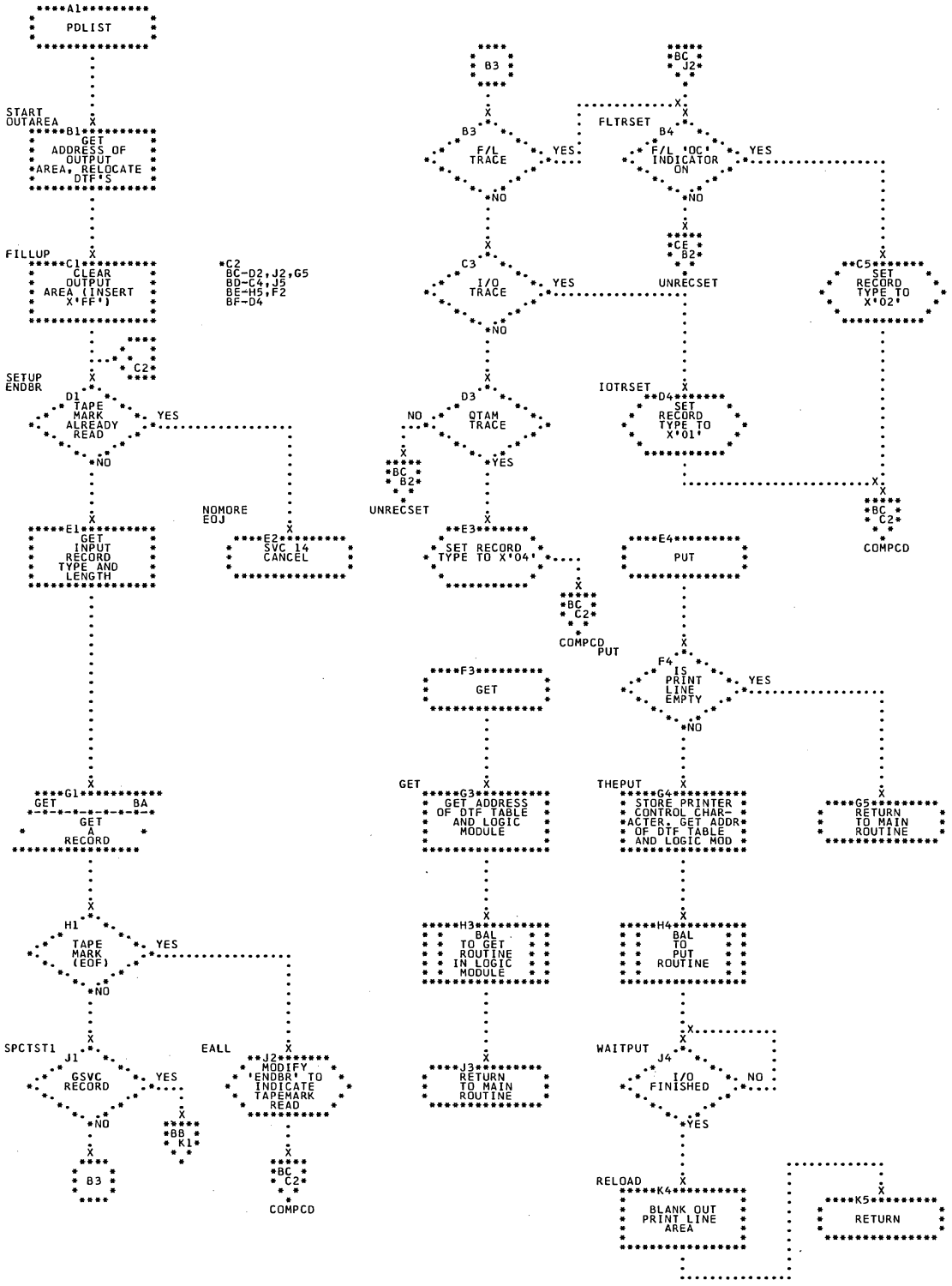


Chart BB. PDLIST - Tape-to-Printer Program (Part 2 of 3)

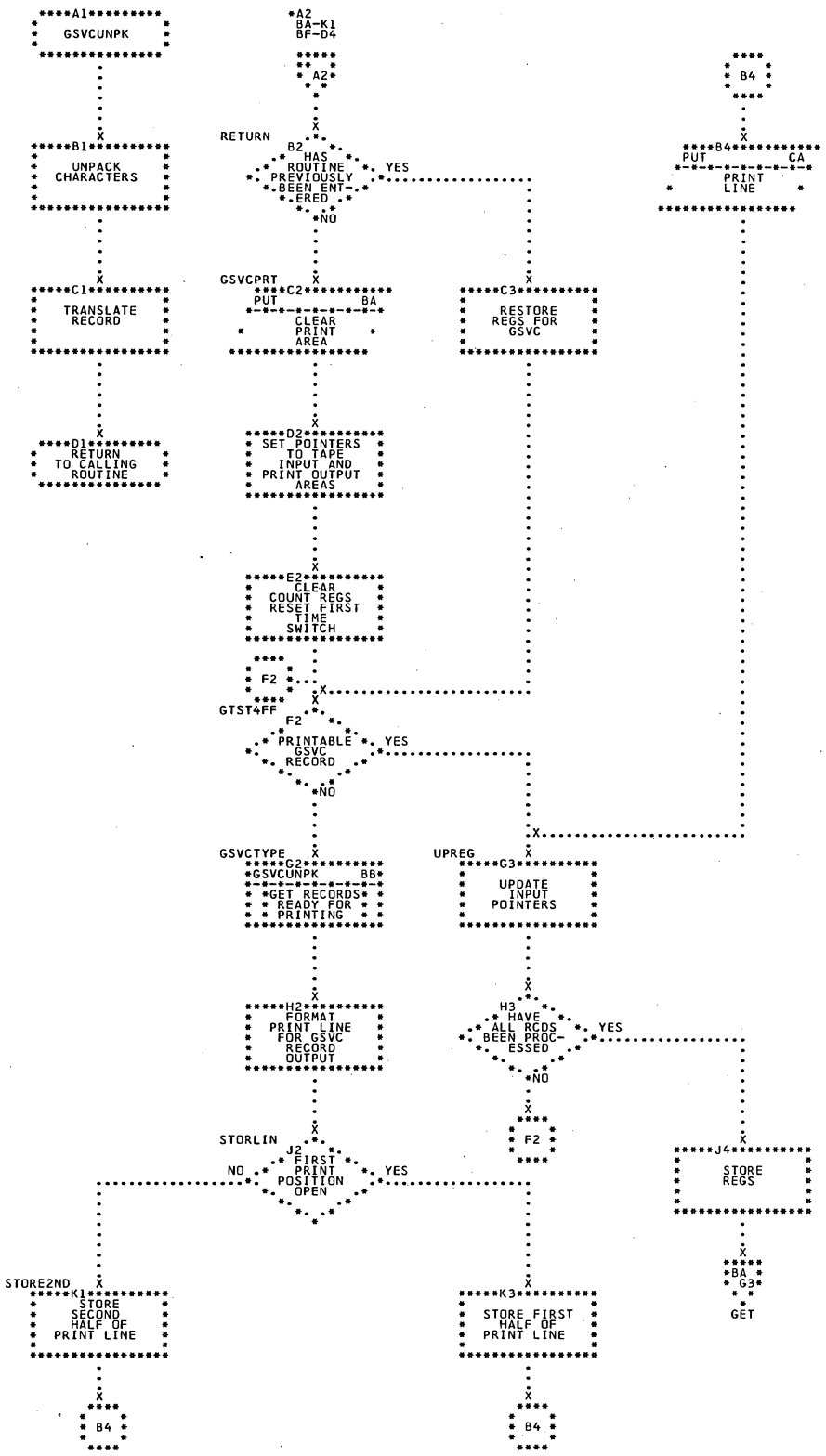


Chart BC. PDLIST - Tape-to-Printer Program (Part 3 of 3)

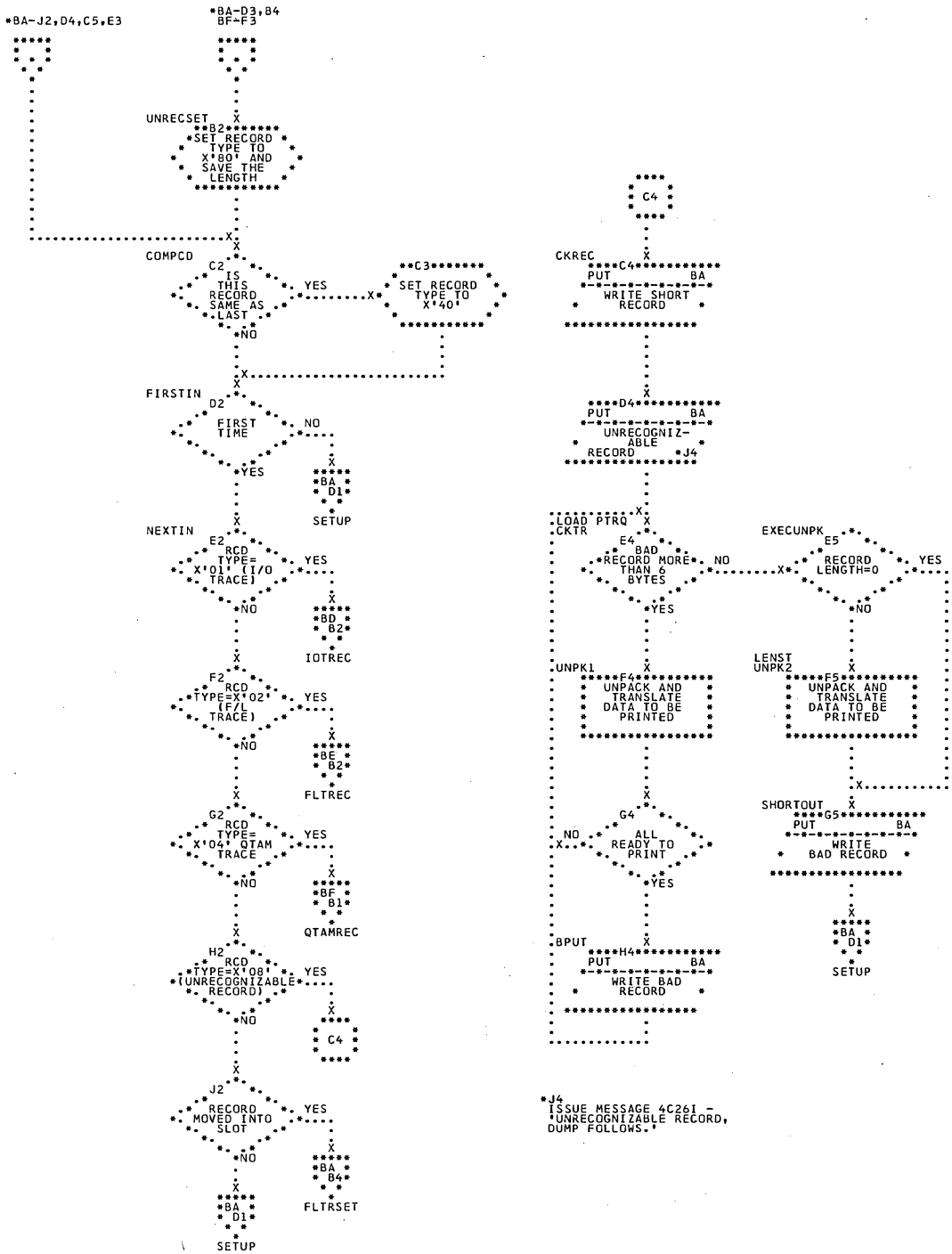


Chart BD. PDLIST - I/O Trace Records

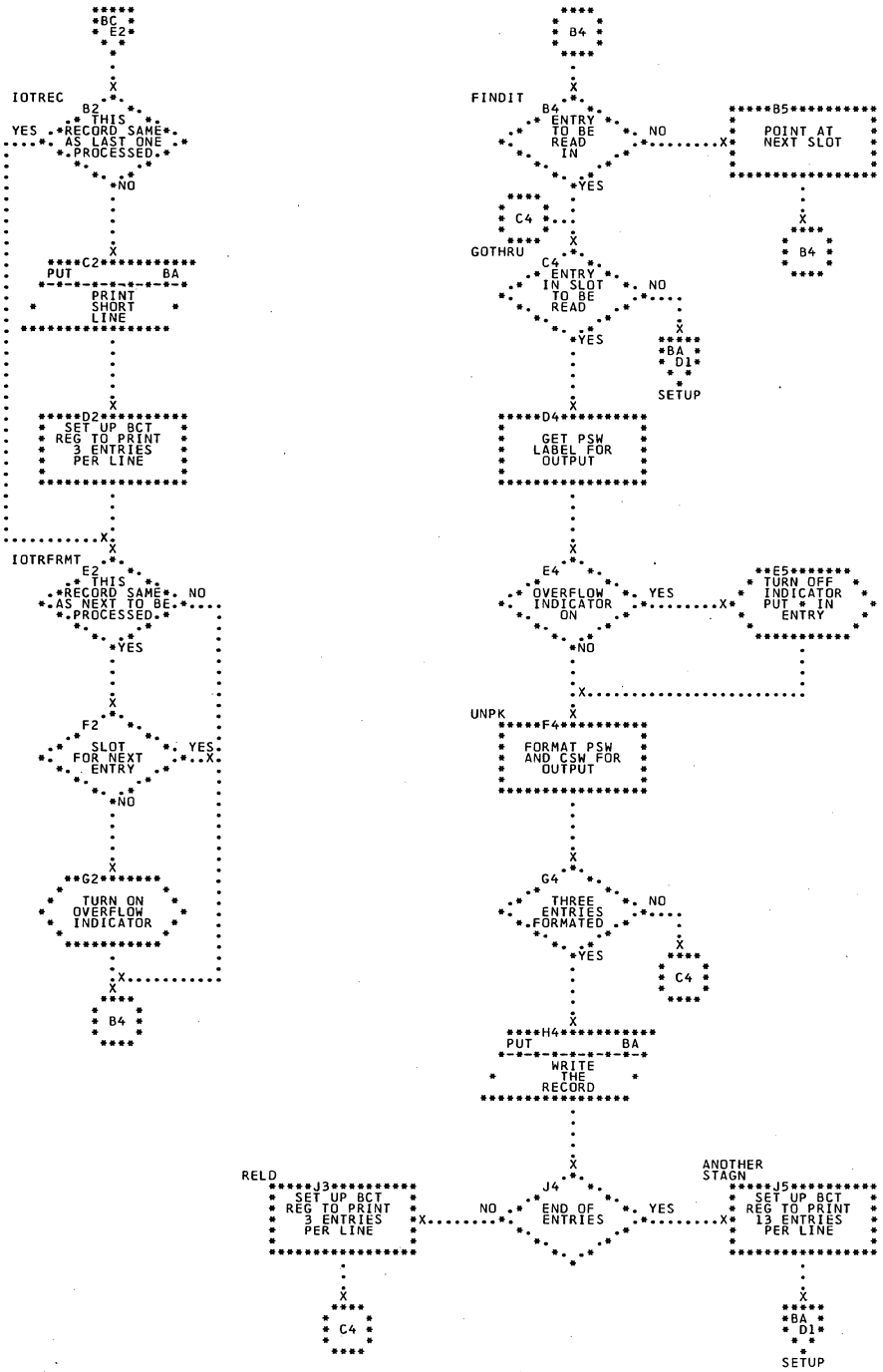


Chart BE. PDLIST - F/L Trace Records

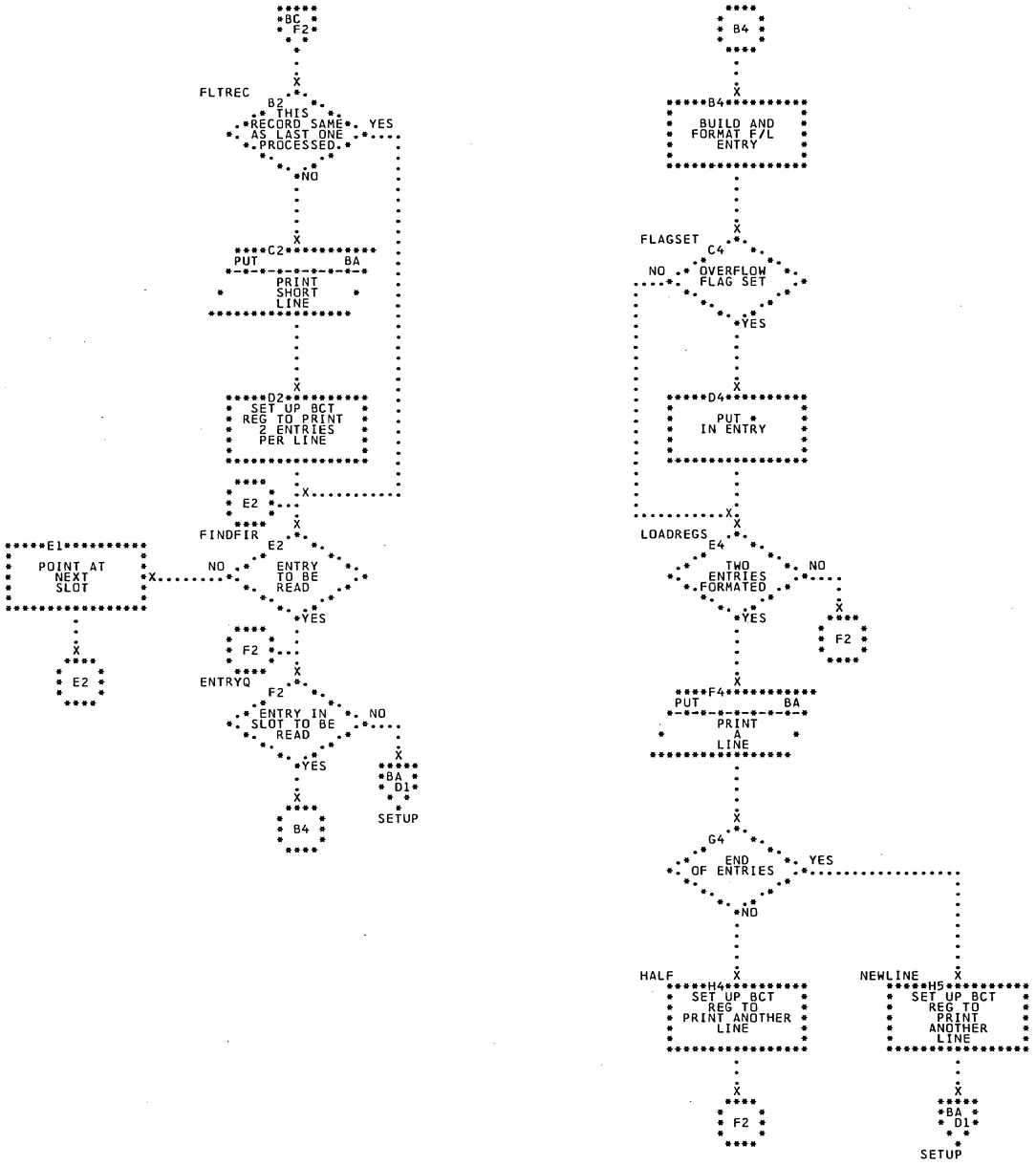


Chart BF. PDLIST - QTAM Trace Records

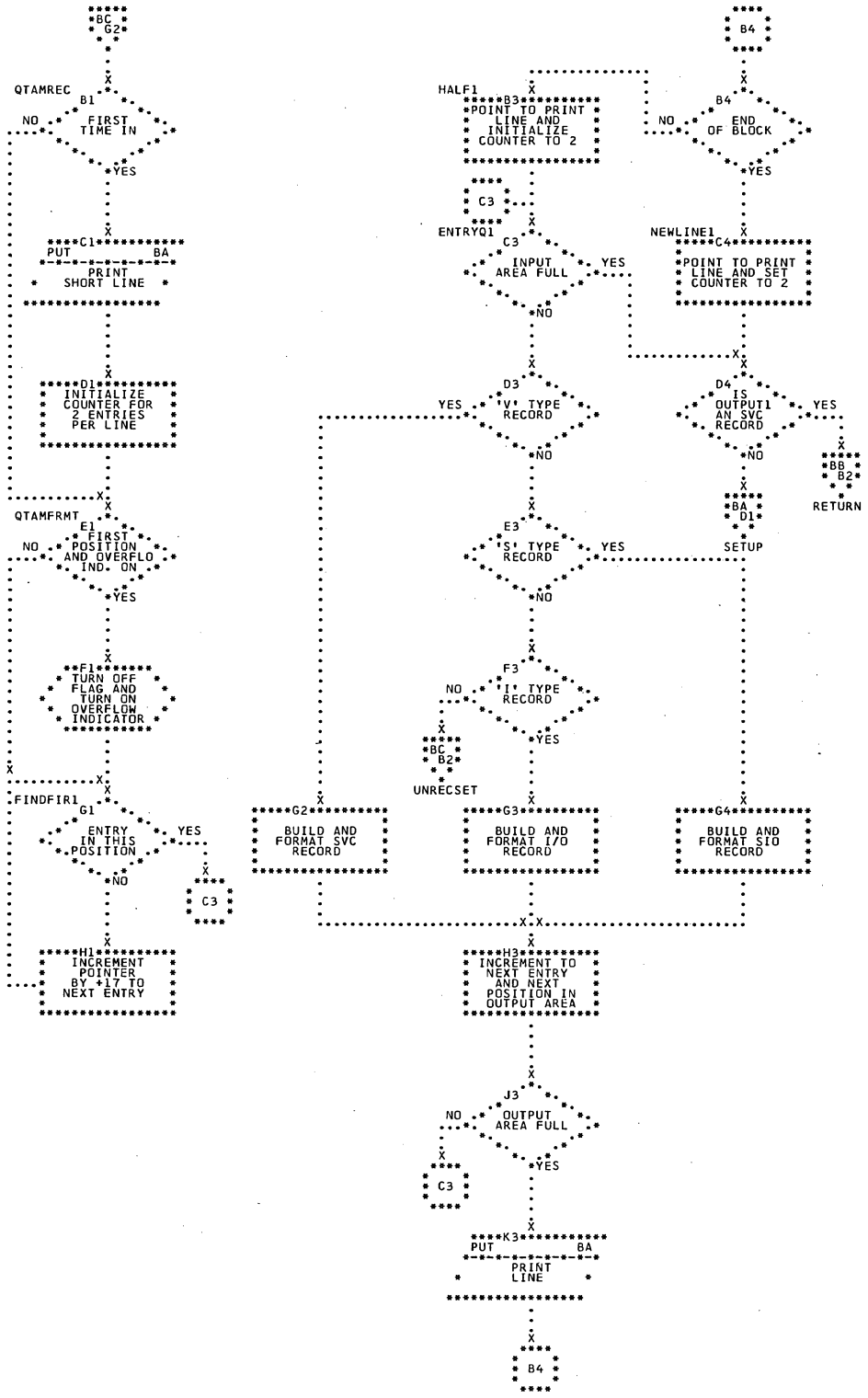


Chart CA. I/O Trace: Core-Wrap Mode (PDAIDITW)

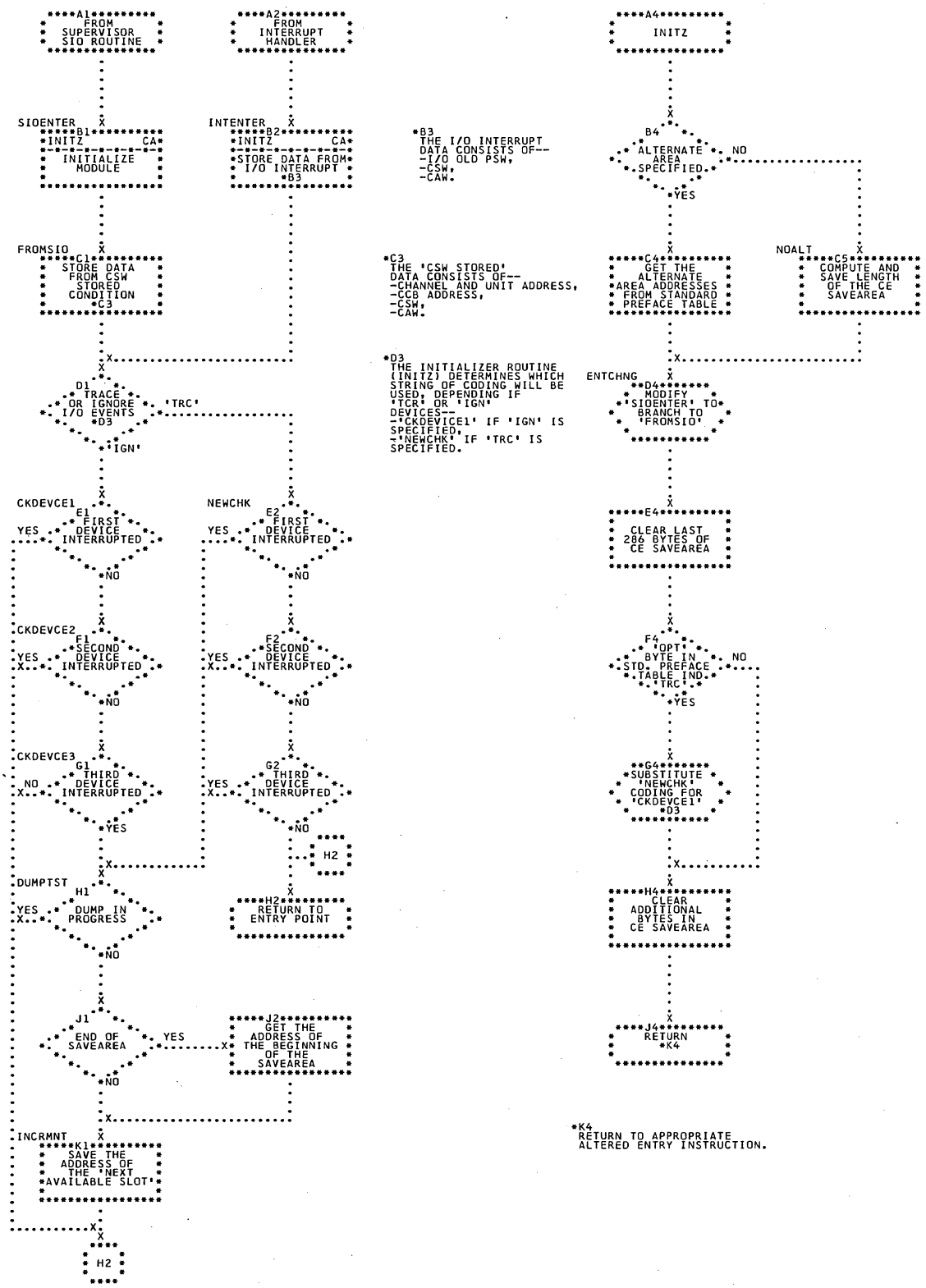


Chart CB. I/O Trace: Print Mode (PDAIDITP) (Part 1 of 2)

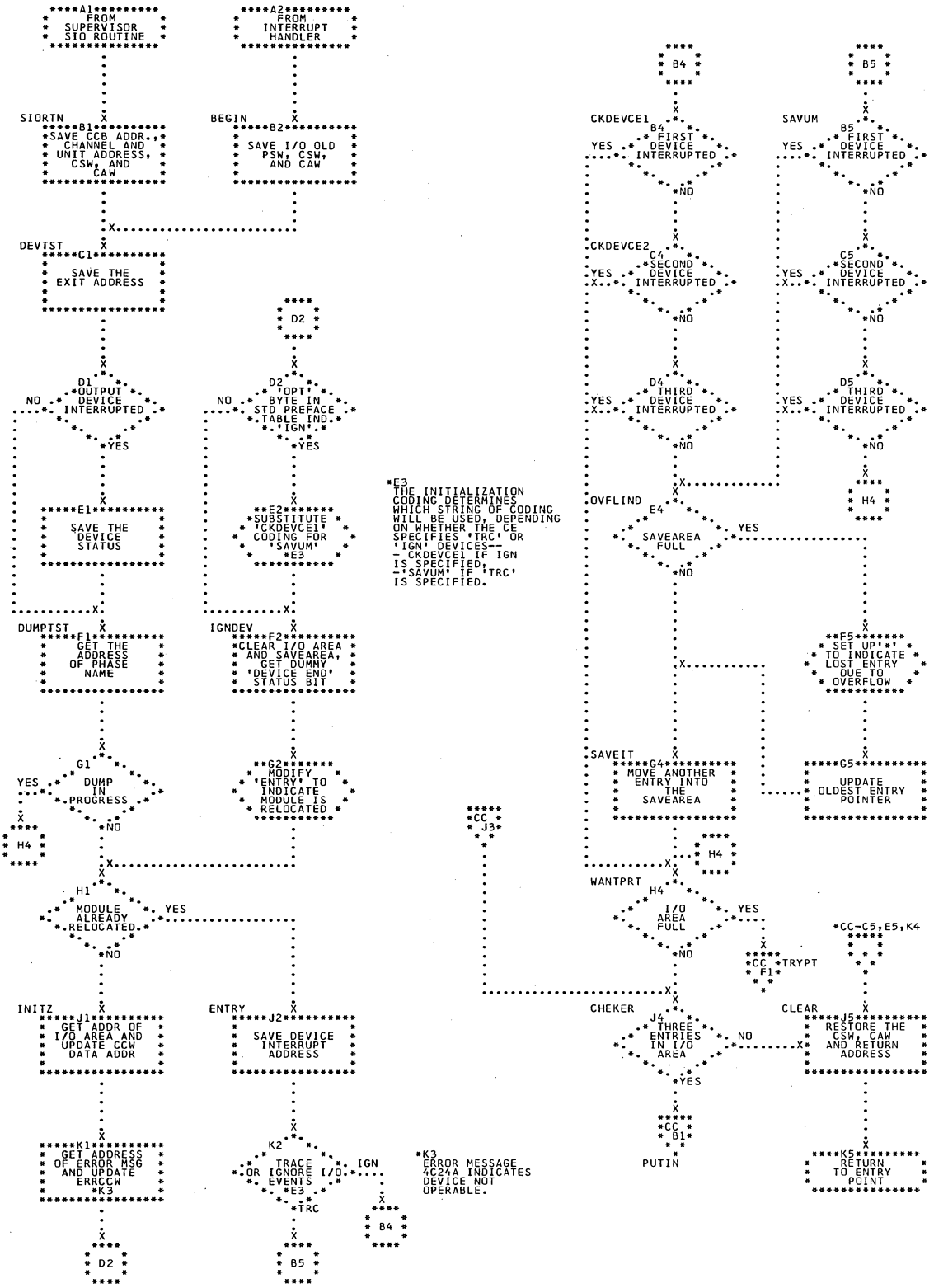


Chart CC. I/O Trace: Print Mode (PDAIDITP) (Part 2 of 2)

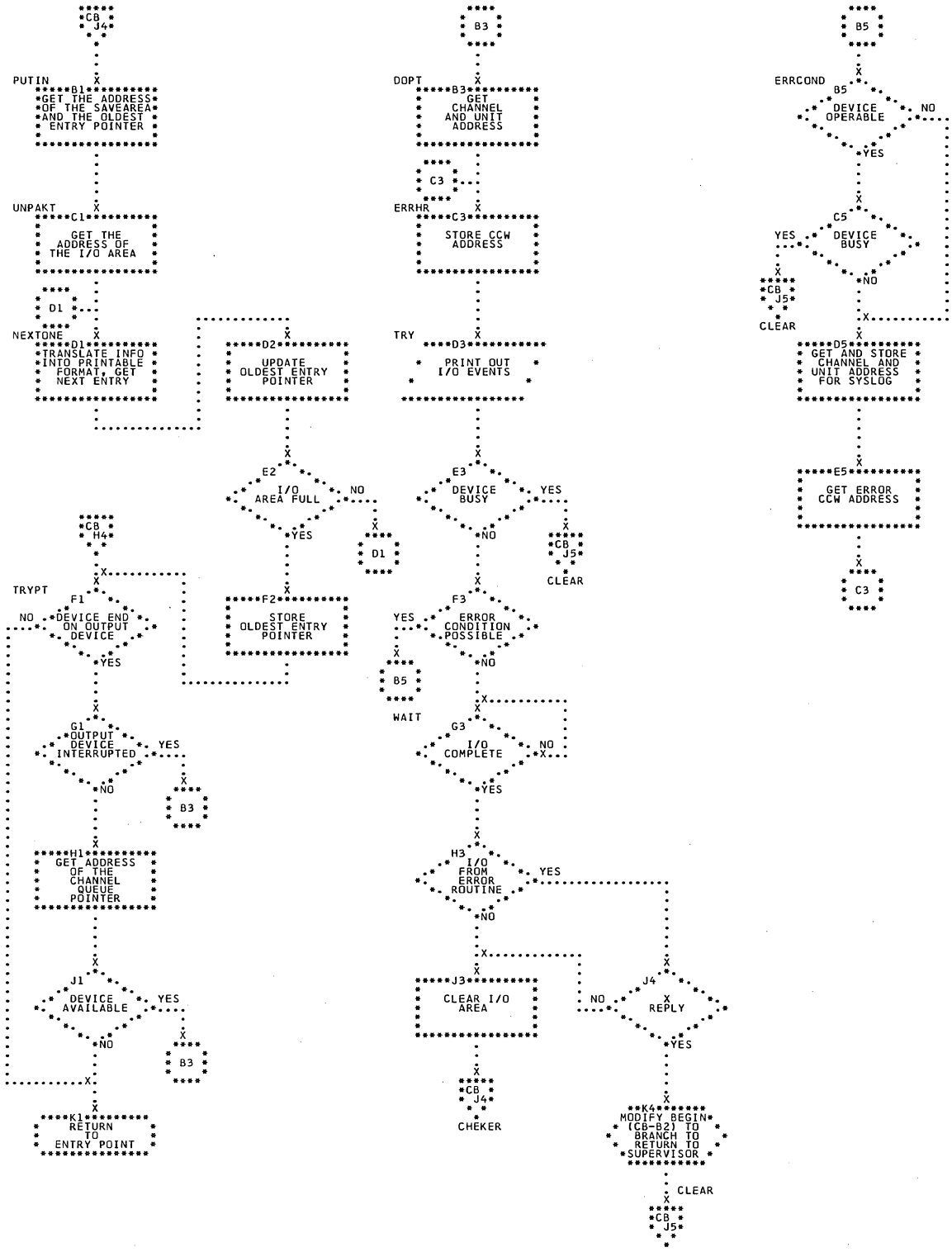


Chart CD. I/O Trace: Tape Mode (PDAIDITT) (Part 1 of 2)

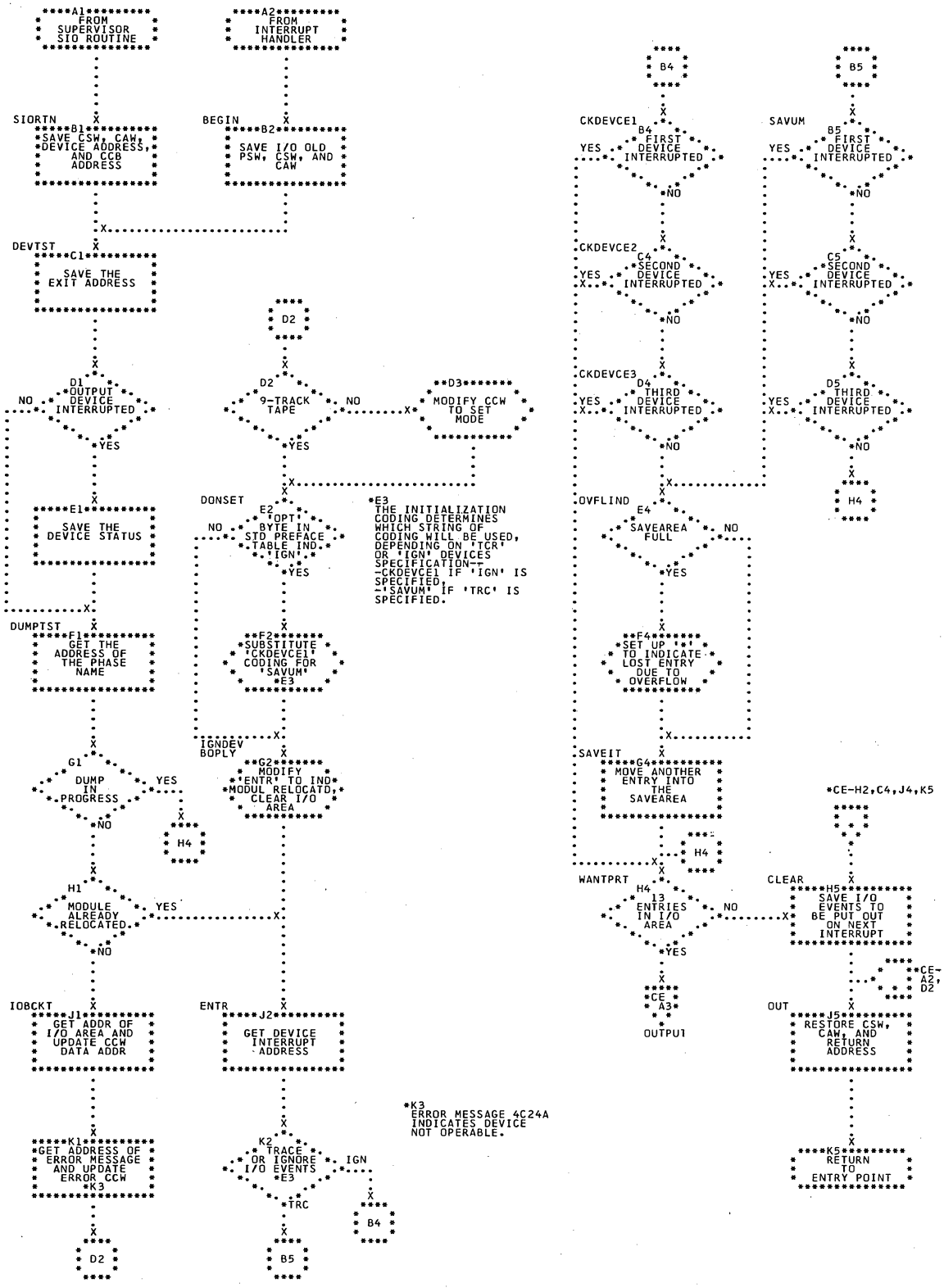


Chart CE. I/O Trace: Tape Mode (PDAIDITT) (Part 2 of 2)

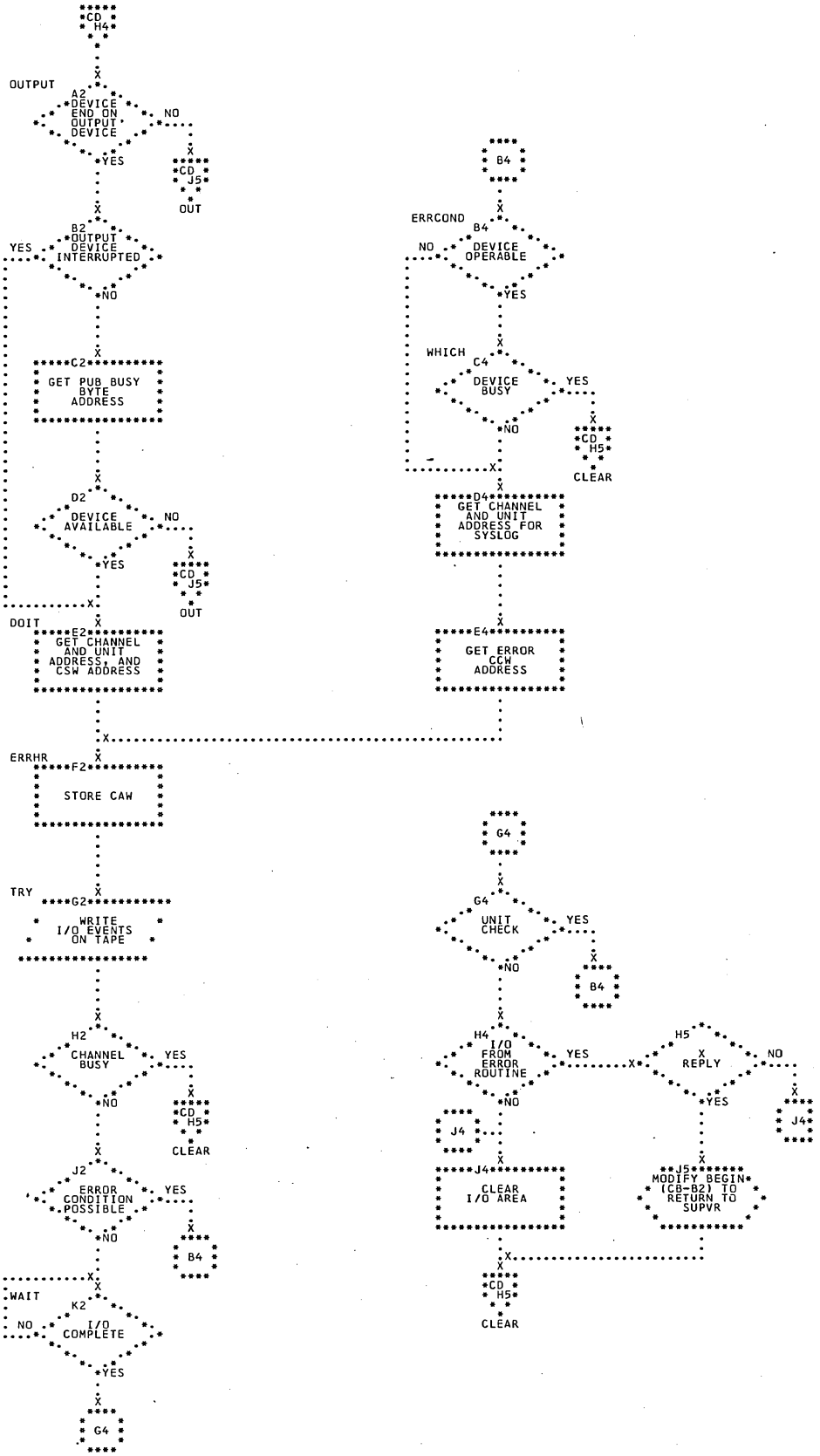


Chart DA. F/L Trace: Core-Wrap Mode (PDAIDFTW)

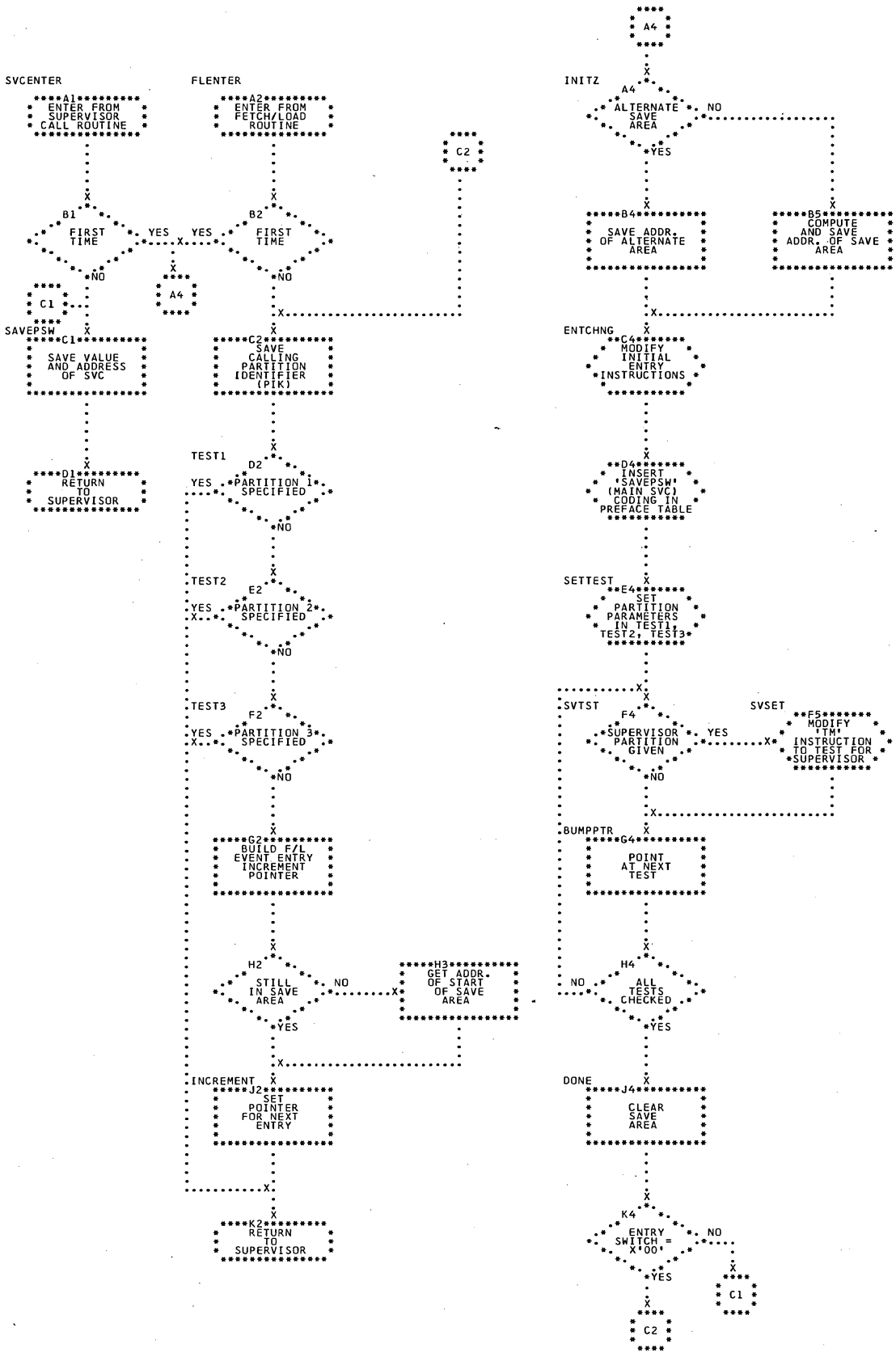


Chart DB. F/L Trace: Print Mode (PDAIDFTP) (Part 1 of 2)

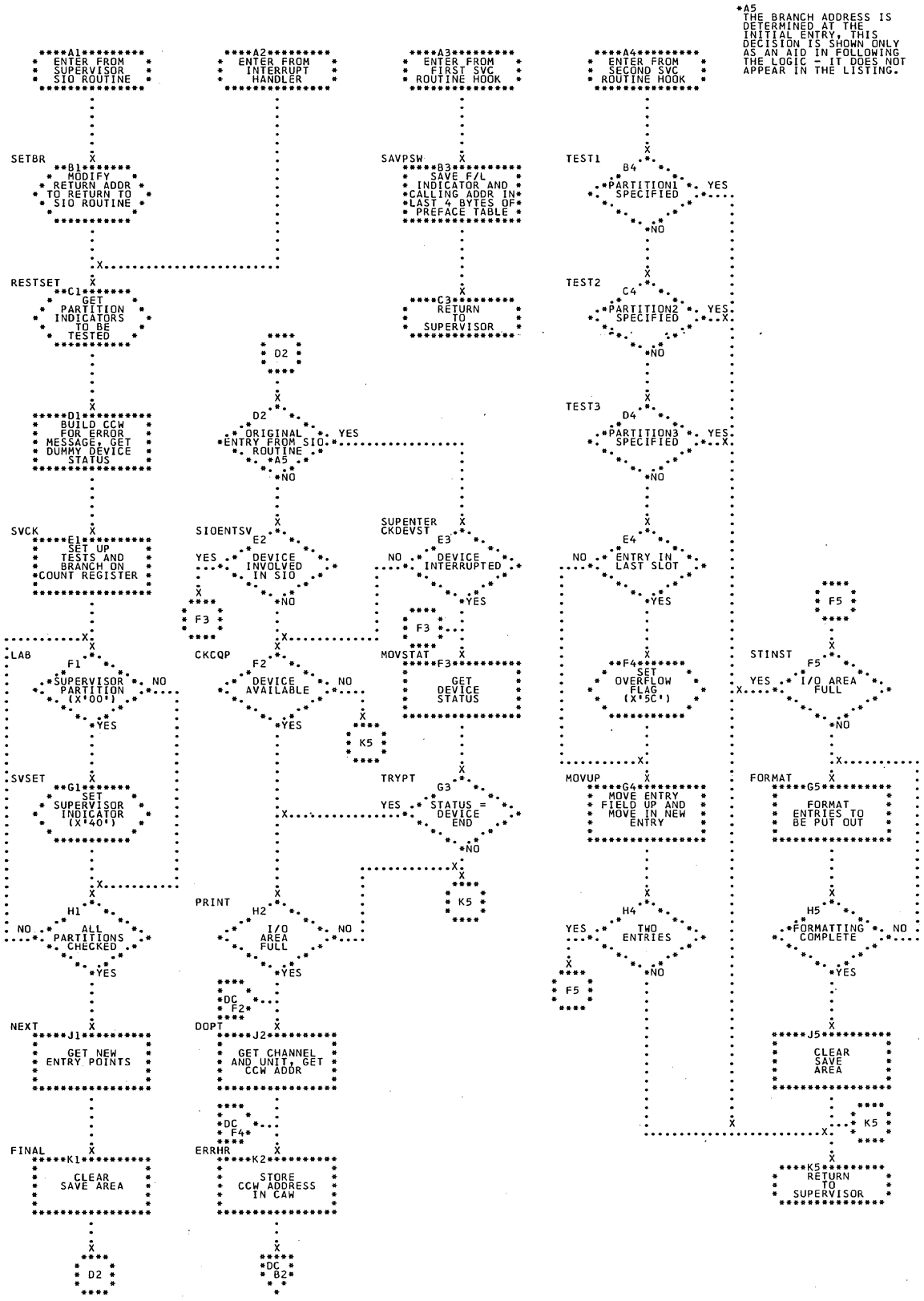


Chart DC. F/L Trace: Print Mode (PDAIDFTP) (Part 2 of 2)

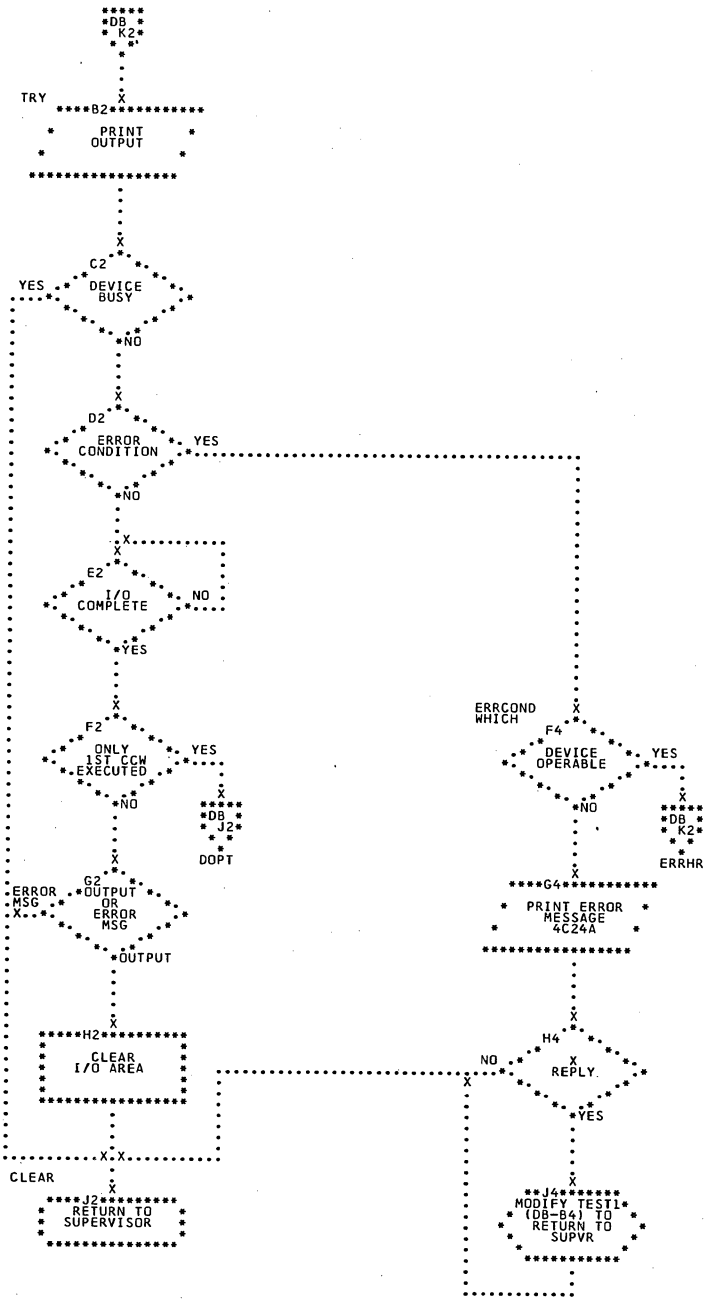


Chart DD. F/L Trace: Tape Mode (PDAIDFTT) (Part 1 of 2)

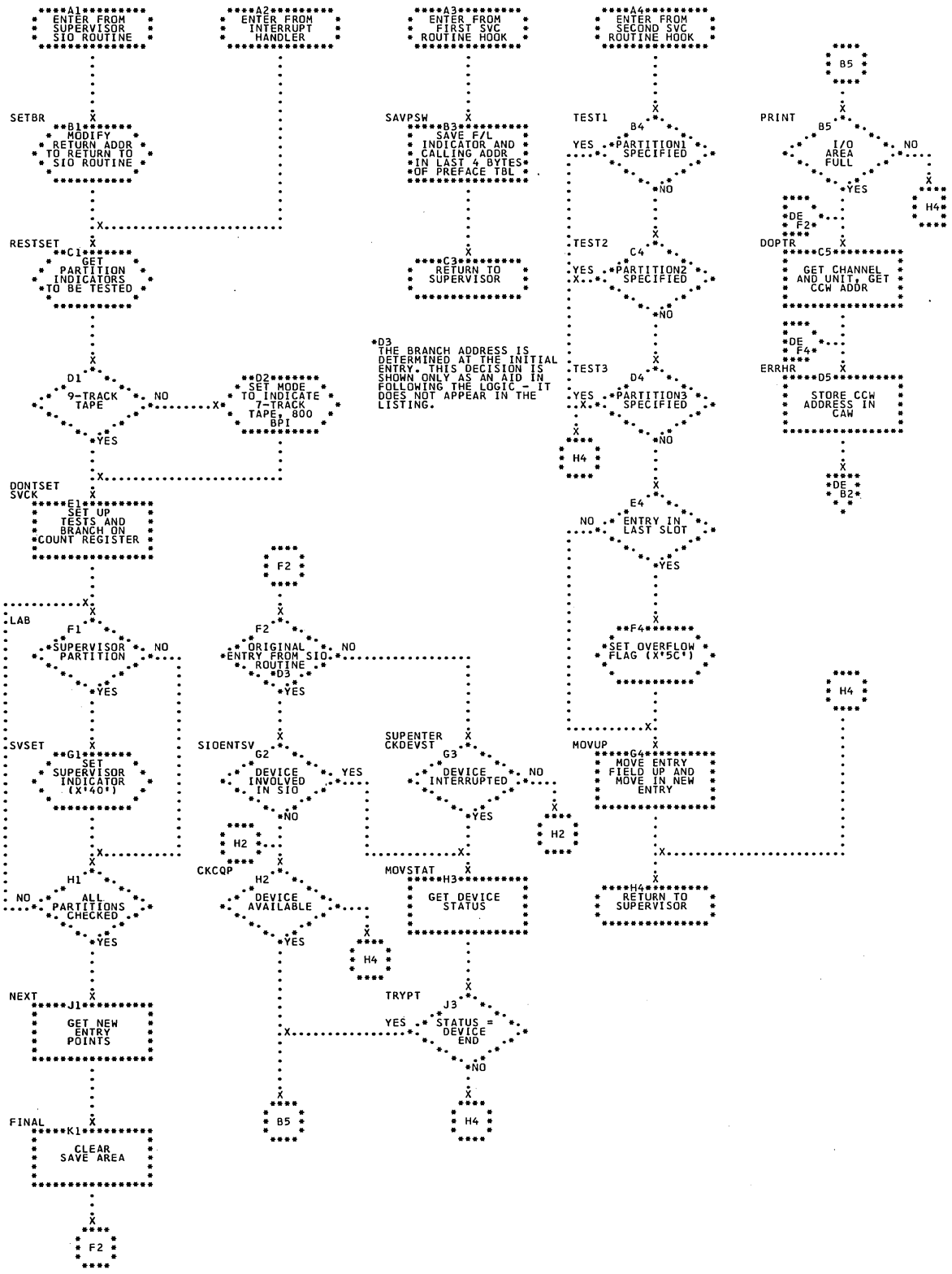


Chart DE. F/L Trace: Tape Mode (PDAIDFTT) (Part 2 of 2)

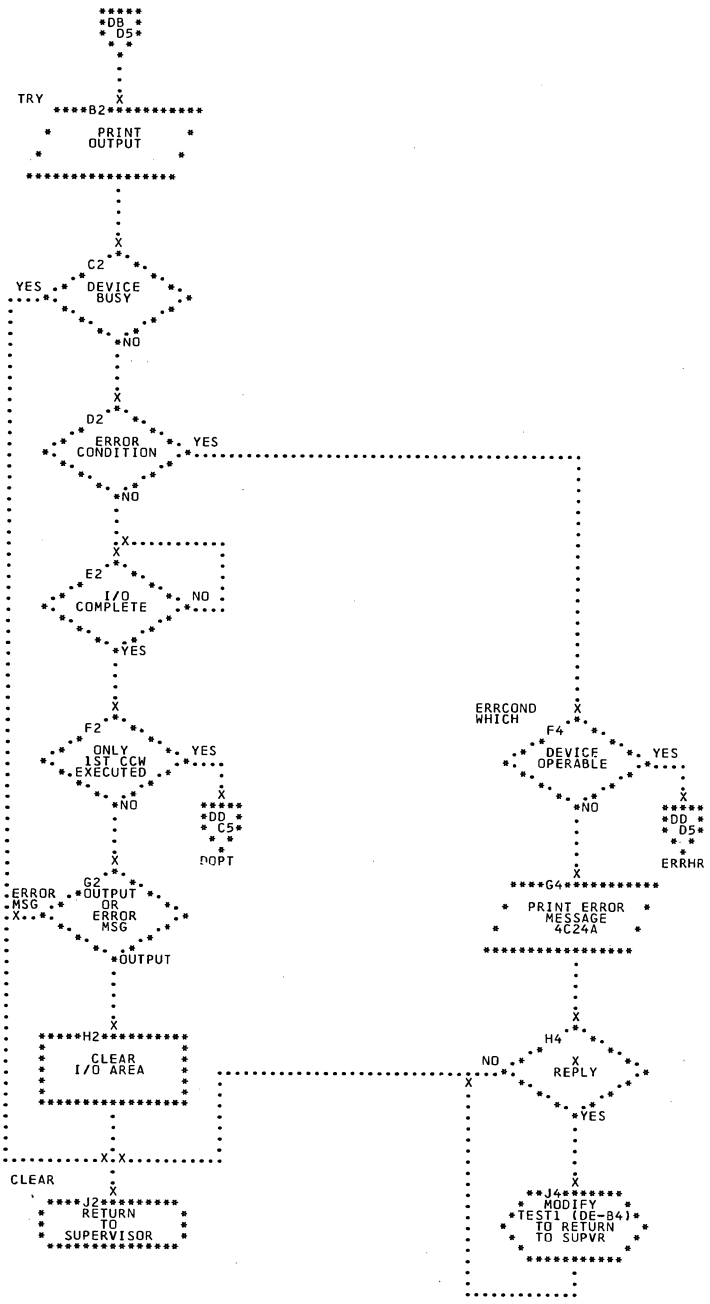


Chart EA. GSVC Trace: Core-Wrap Mode (PDAIDGTW) (Part 1 of 2)

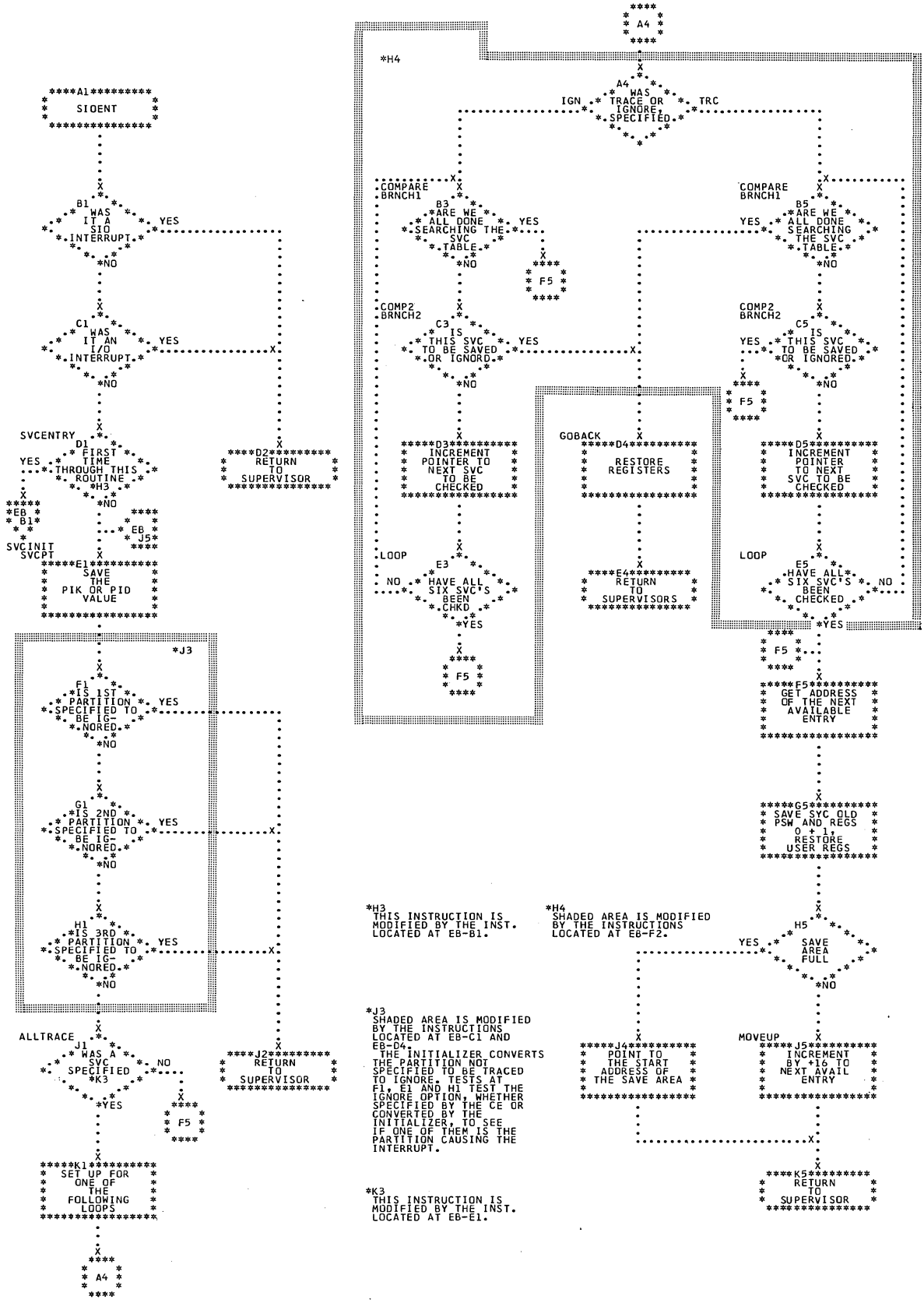


Chart EB. GSVC Trace: Core-Wrap Mode (PDAIDGTW) (Part 2 of 2)

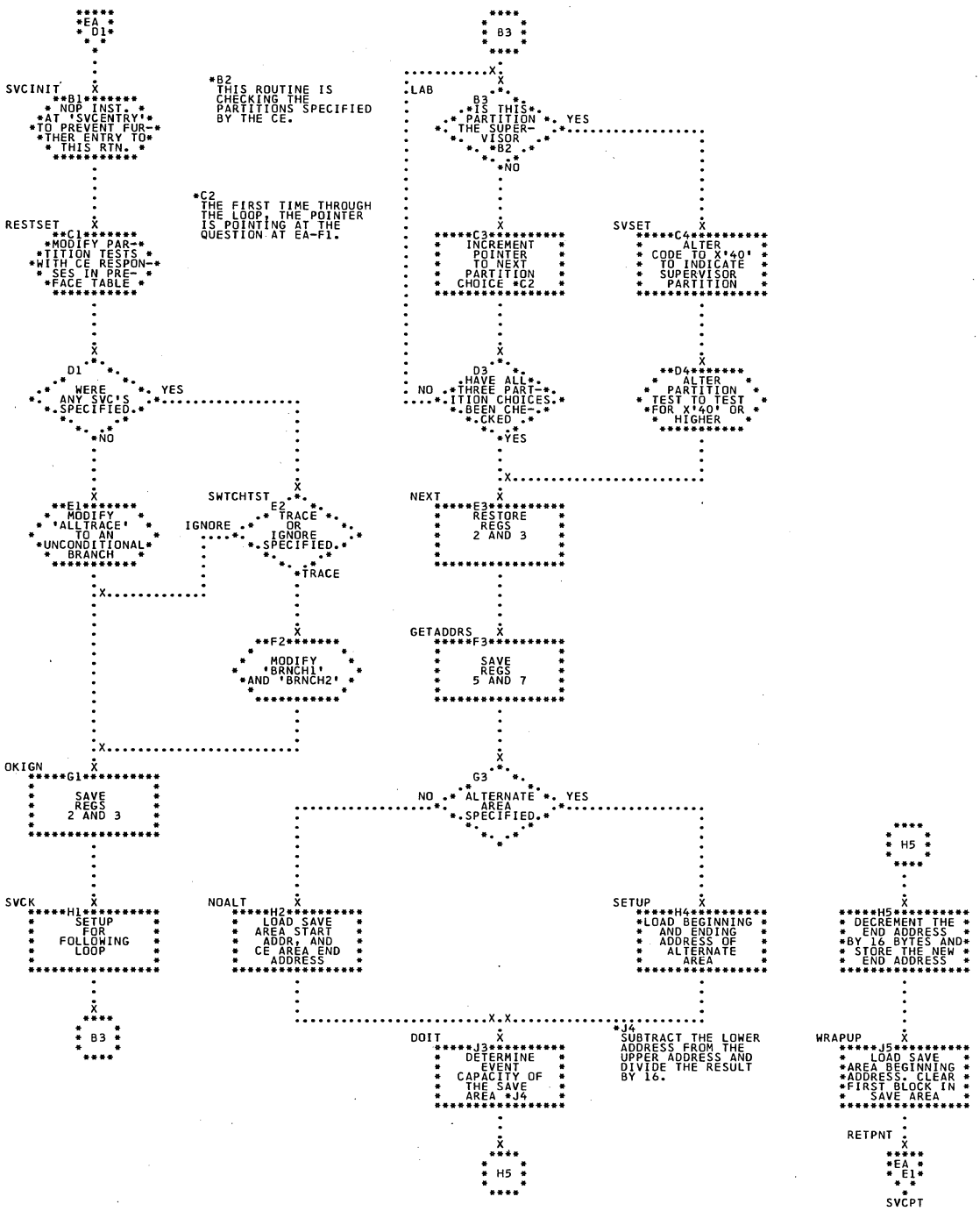


Chart EC. GSVC Trace: Print Mode (PDAIDGTP) (Part 1 of 3)

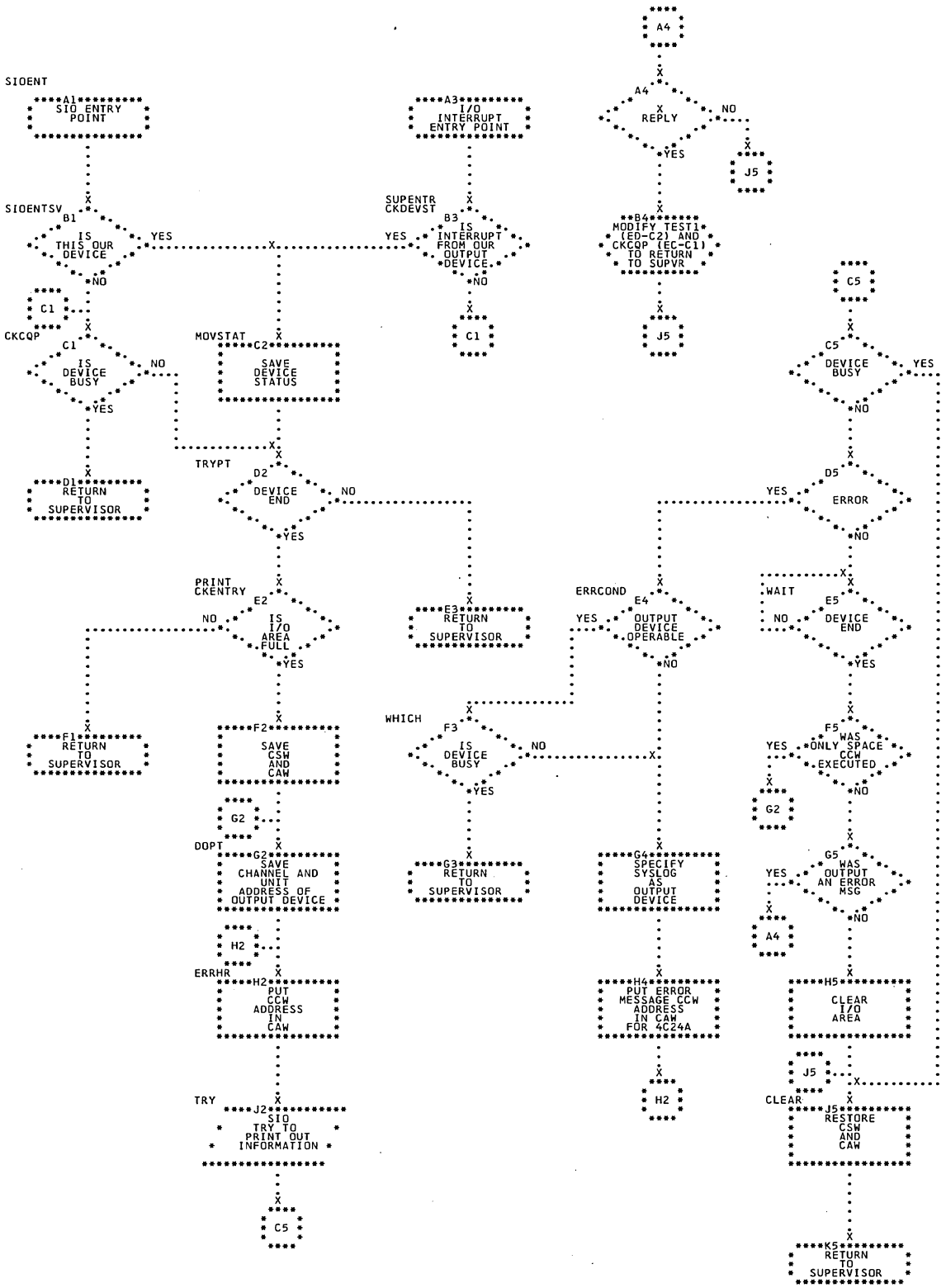


Chart ED. GSVC Trace: Print Mode (PDAIDGTP) (Part 2 of 3)

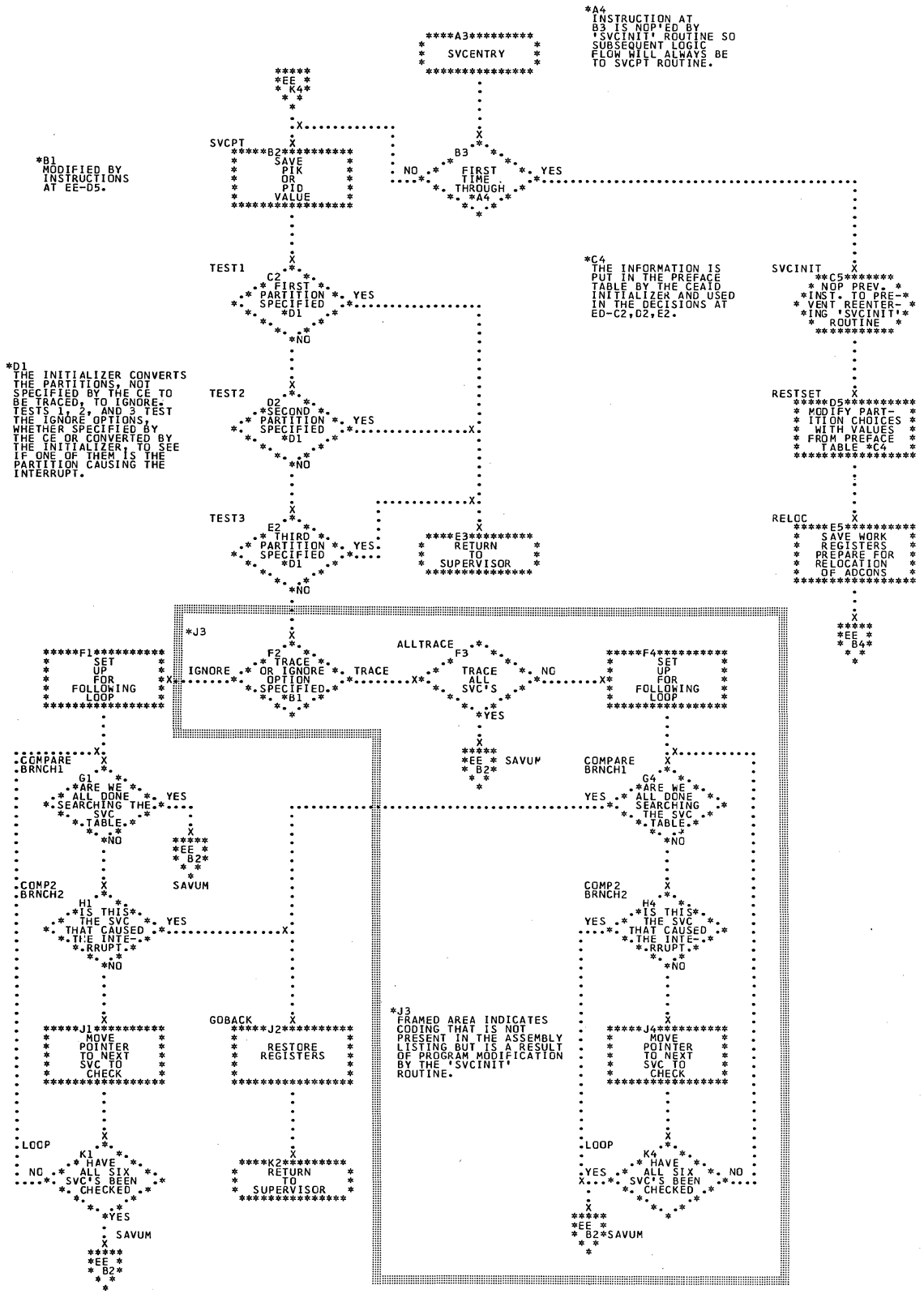


Chart EE. GSVC Trace: Print Mode (PDAIDGTP) (Part 3 of 3)

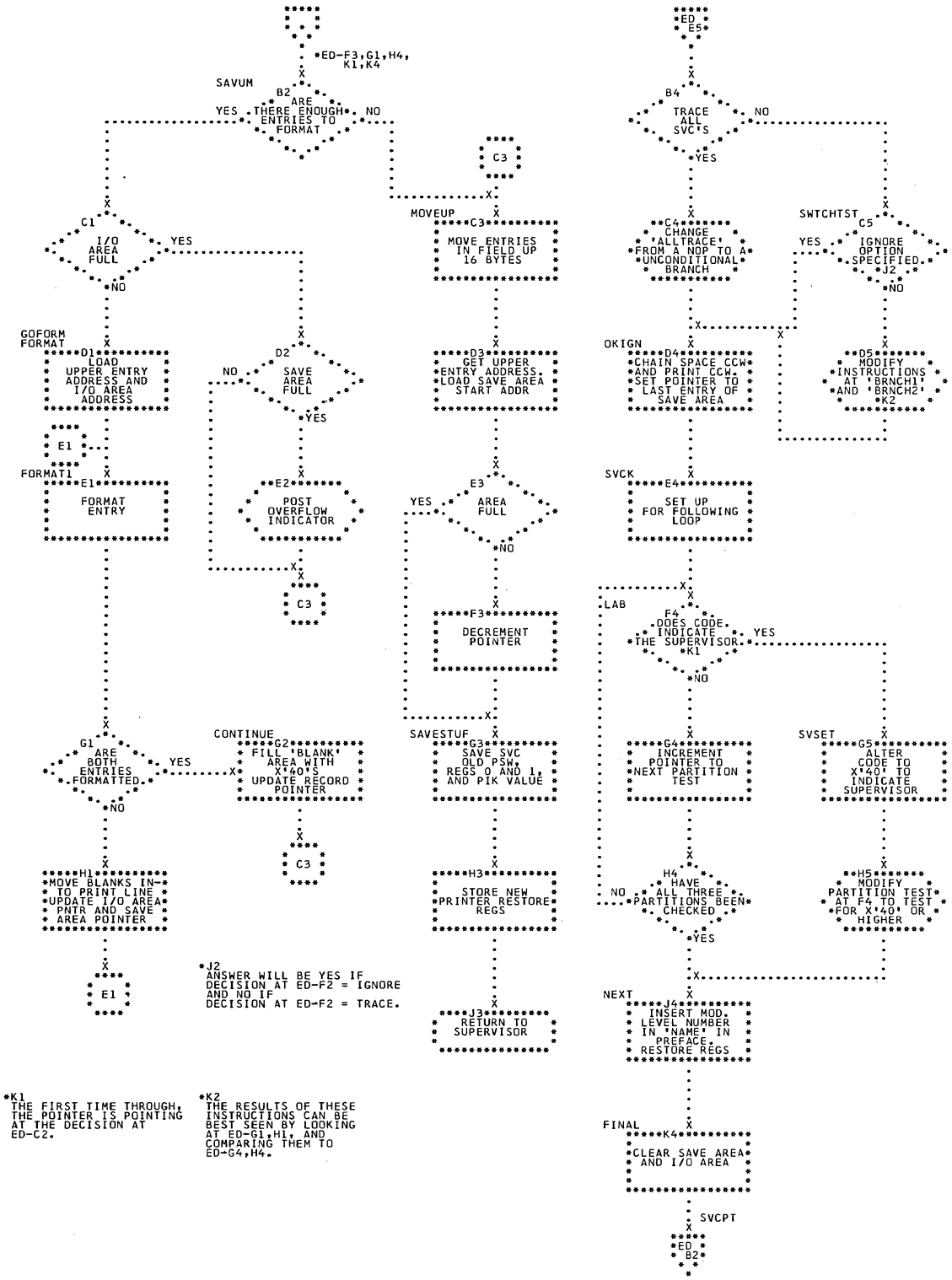


Chart EF. GSVC Trace: Tape Mode (PDAIDGTT) (Part 1 of 3)

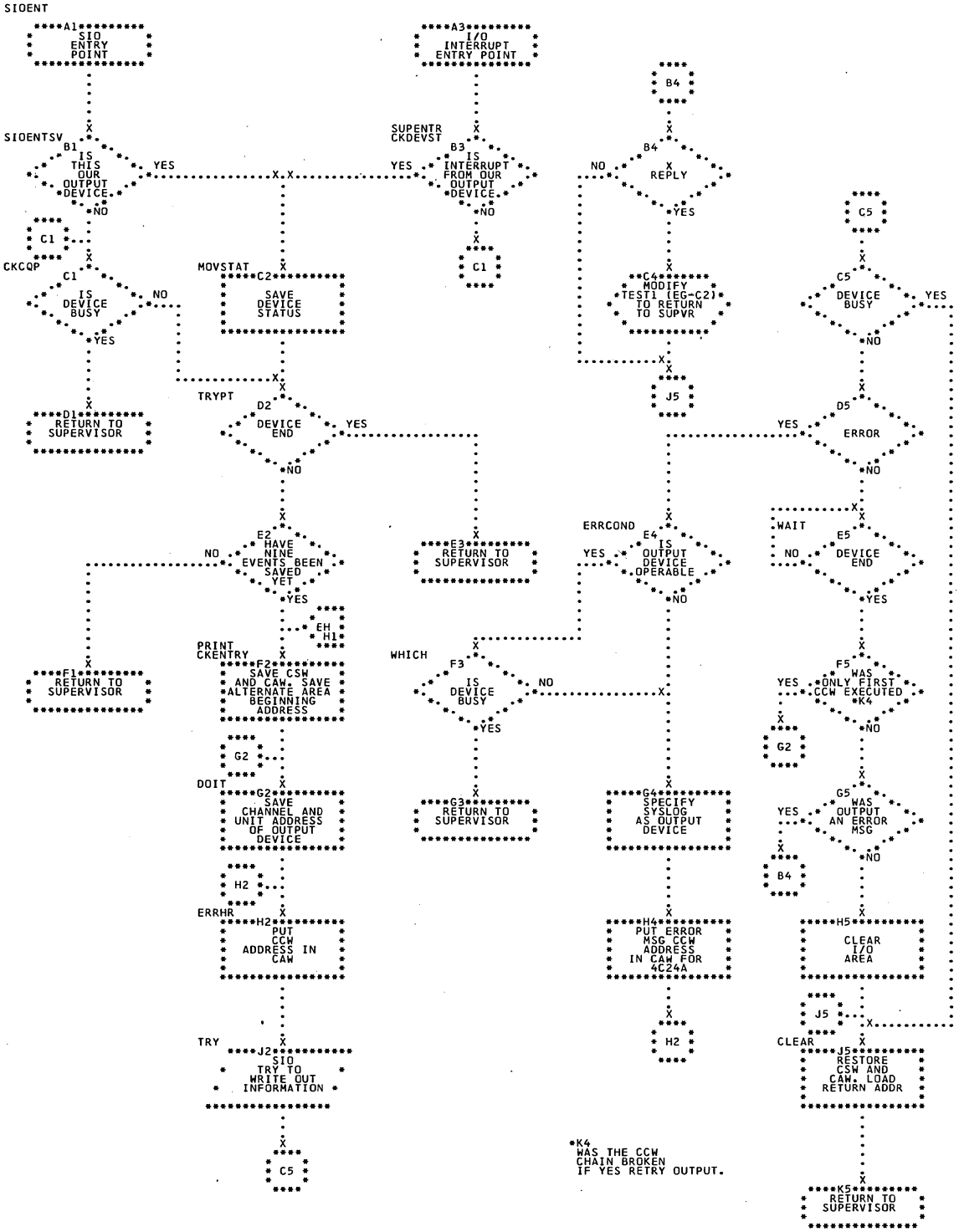


Chart EG. GSVC Trace: Tape Mode (PDAIDGTT) (Part 2 of 3)

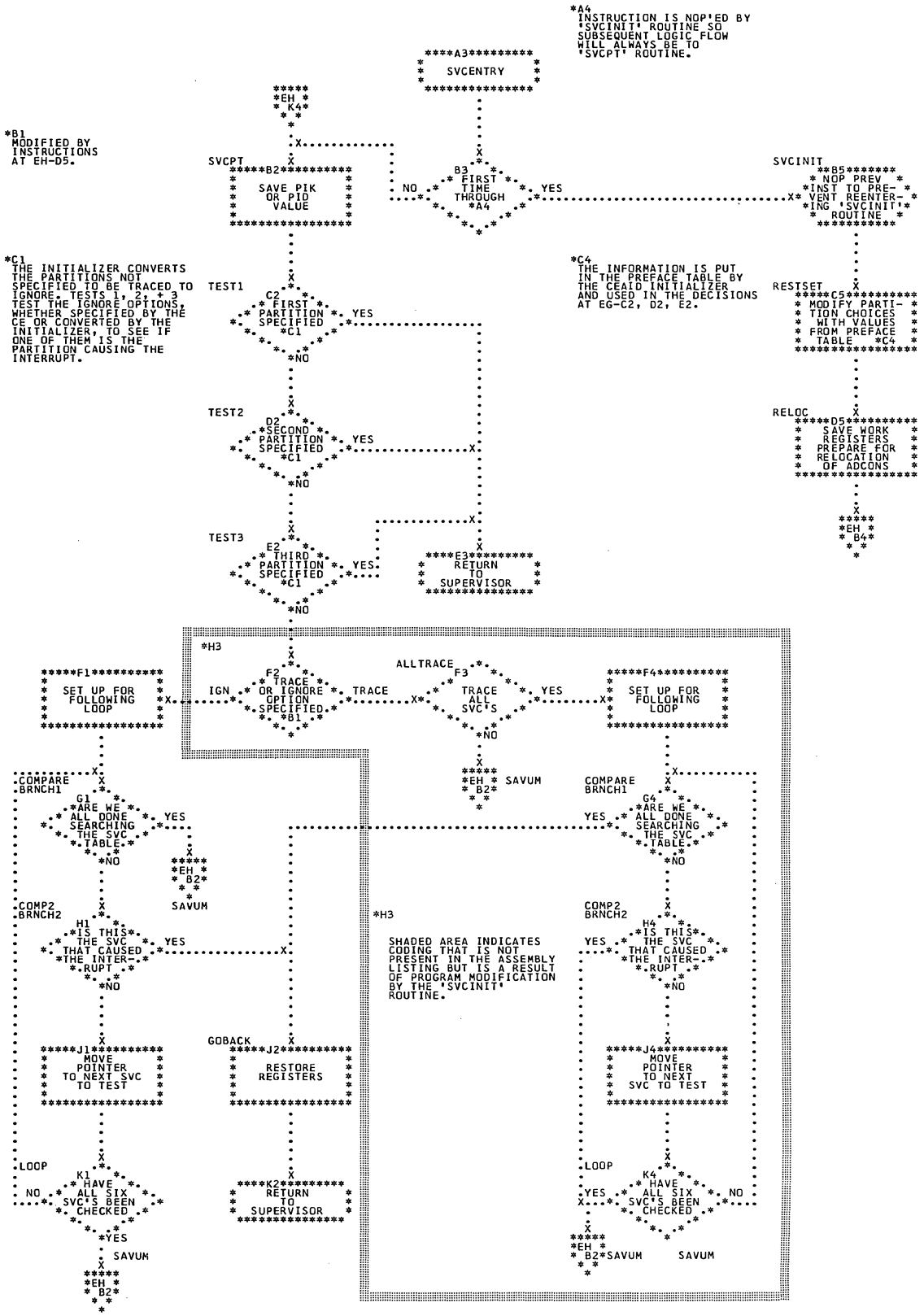


Chart EH. GSVC Trace: Tape Mode (PDAIDGTT) (Part 3 of 3)

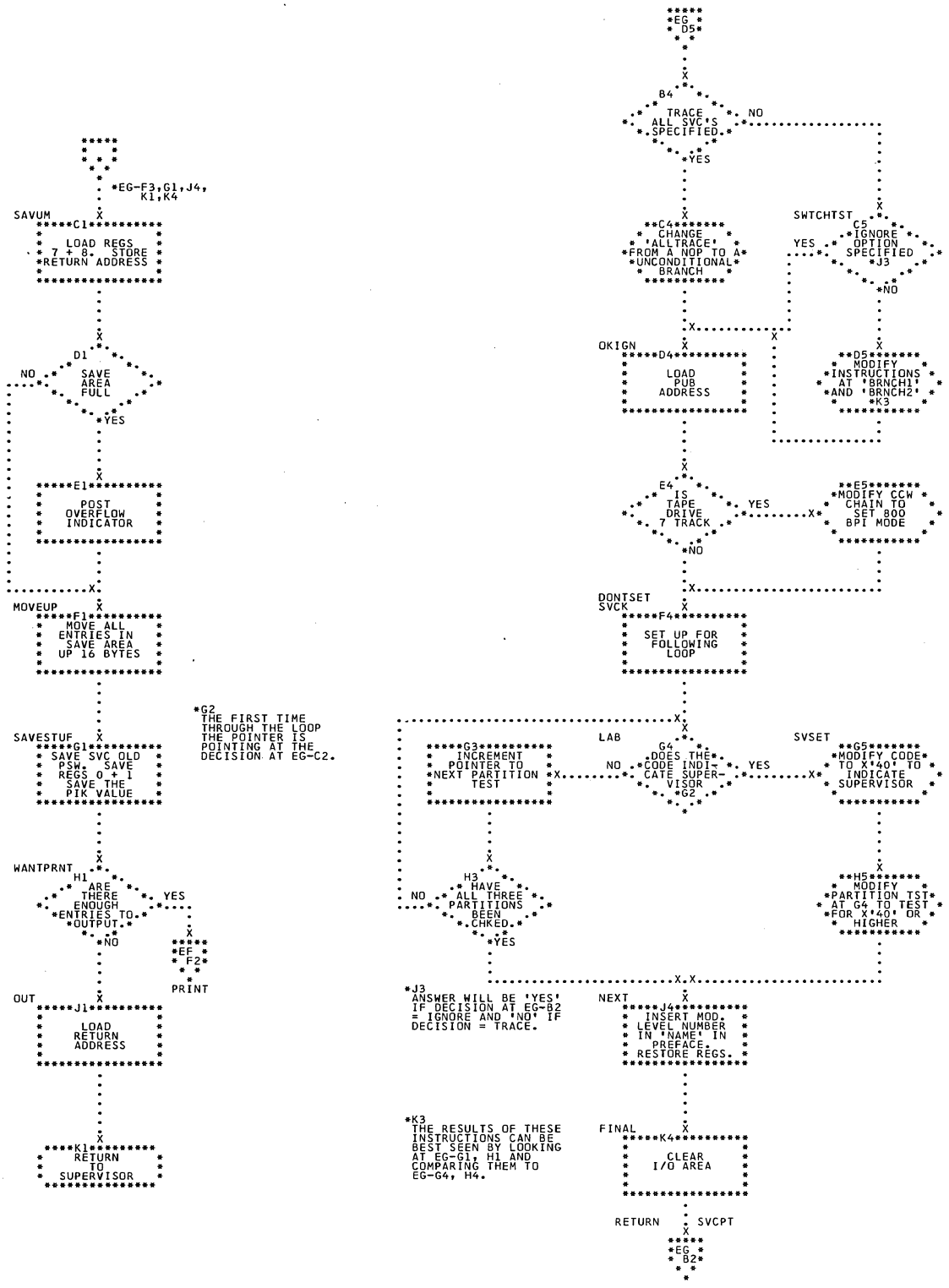


Chart EM. QTAM Trace: Core-Wrap Mode (PDAIDQTW) (Part 1 of 3)

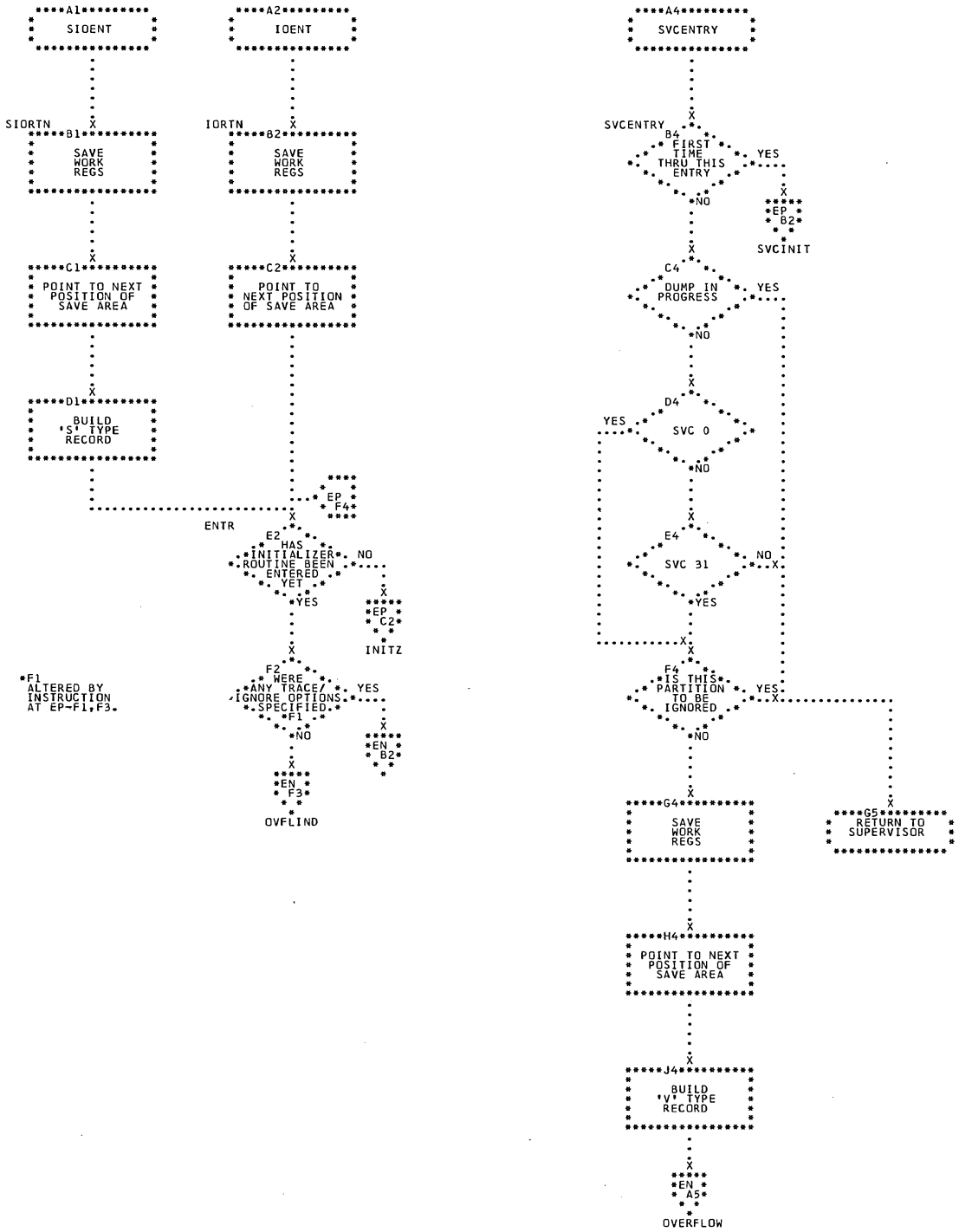


Chart EN. QTAM Trace: Core-Wrap Mode (PDAIDQTW) (Part 2 of 3)

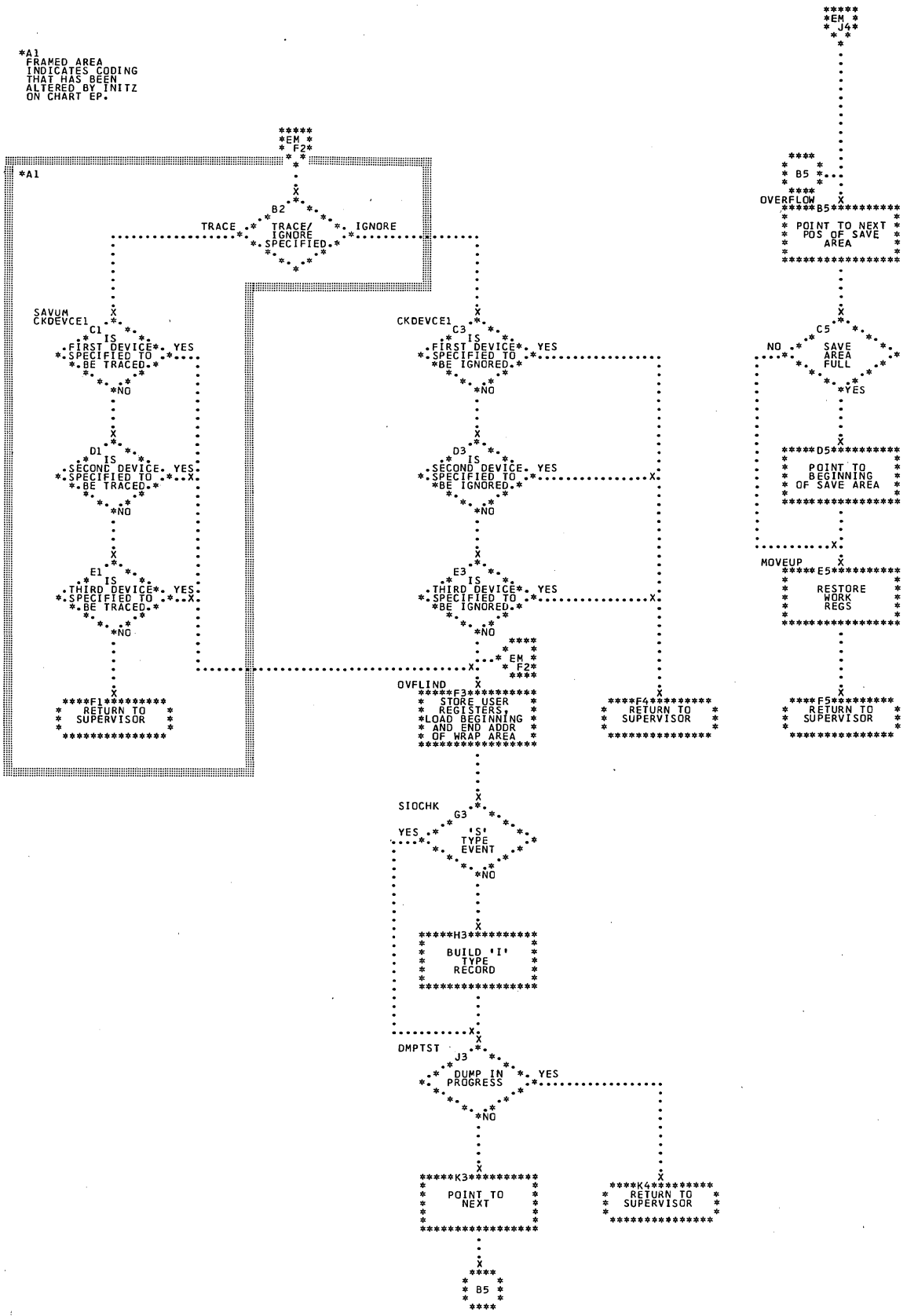


Chart EP. QTAM Trace: Core-Wrap Mode (PDAIDQTW) (Part 3 of 3)

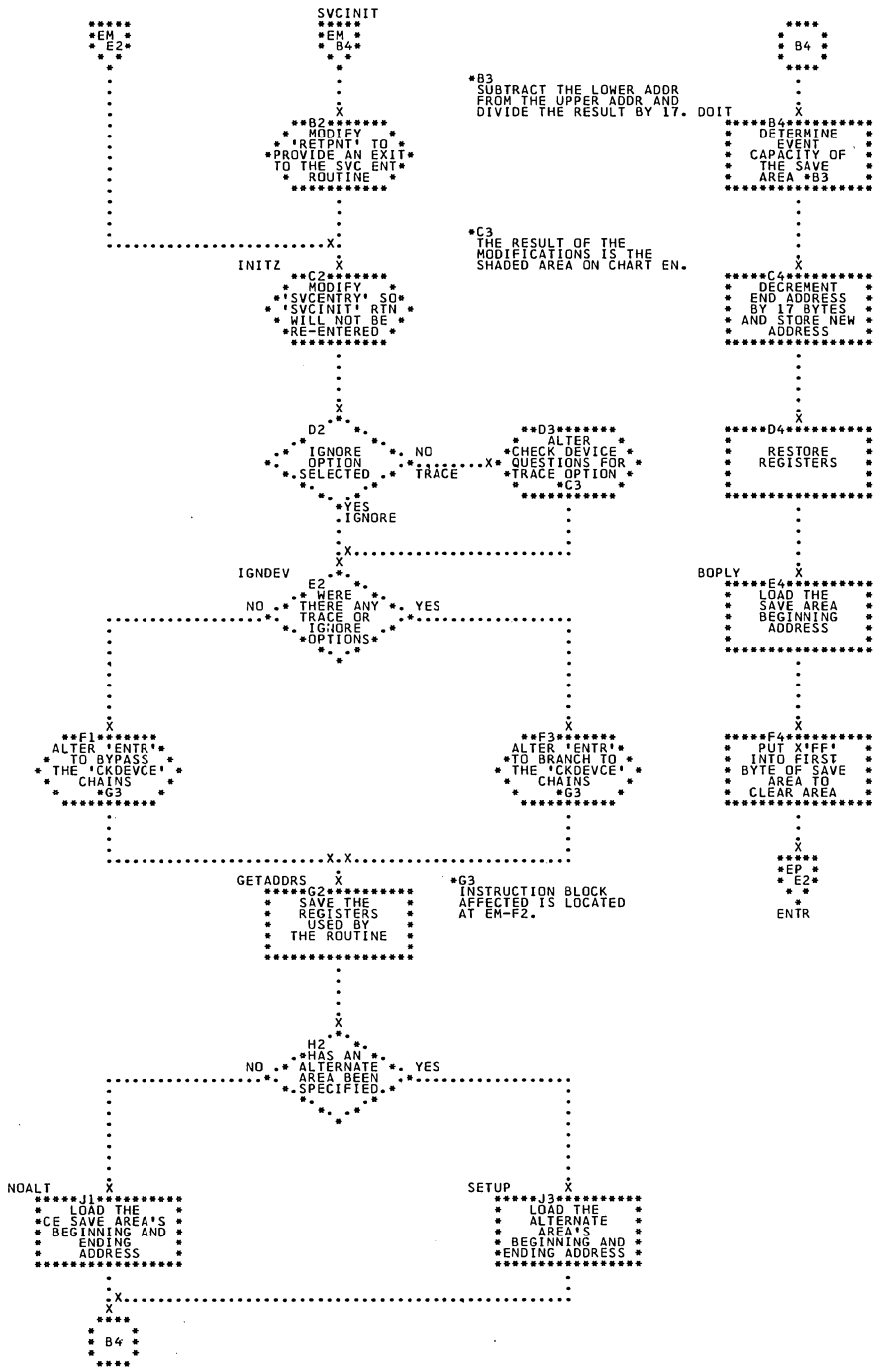


Chart EQ. QTAM Trace: Tape Output Phase (PDAIDQTT) (Part 1 of 2)

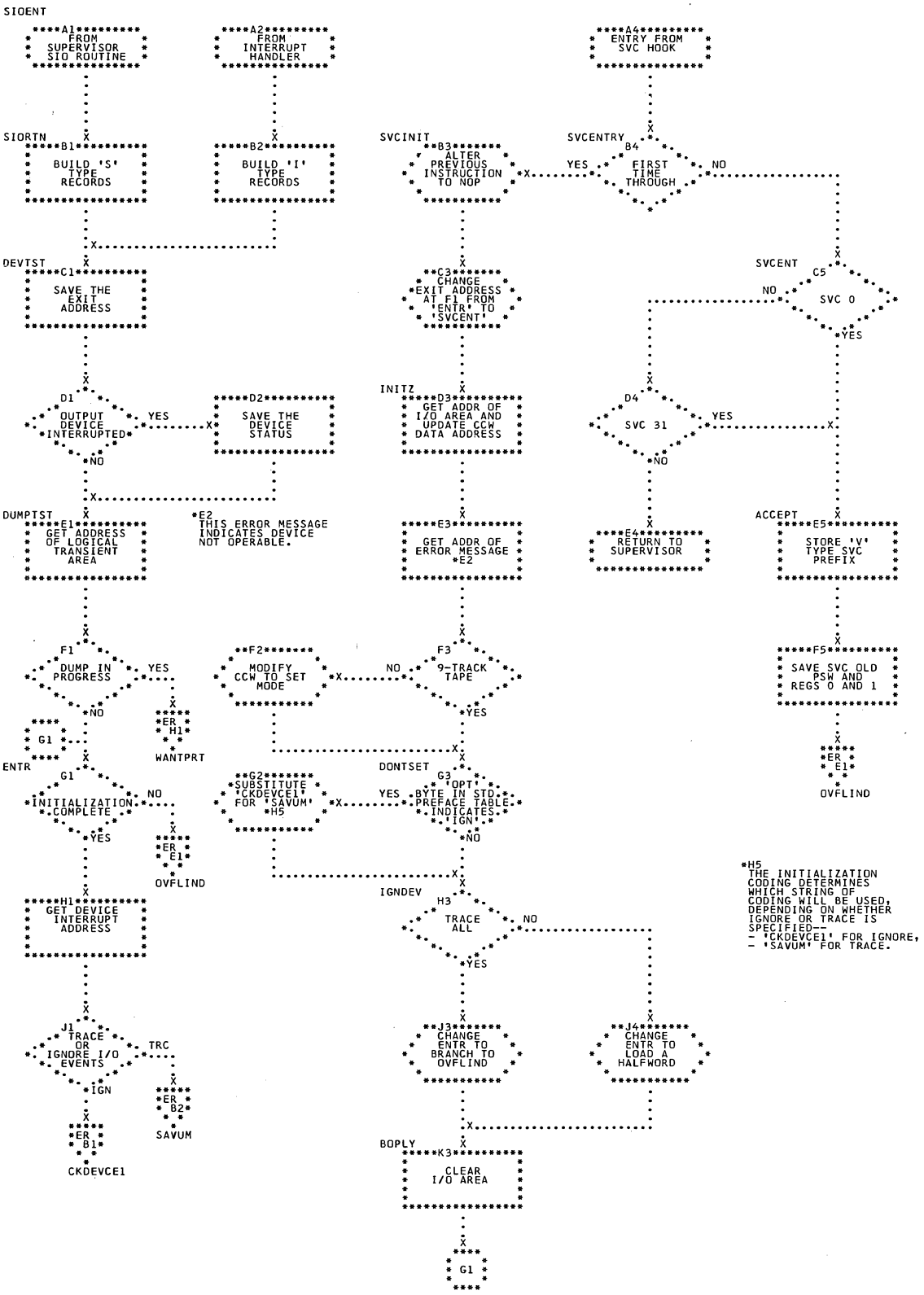
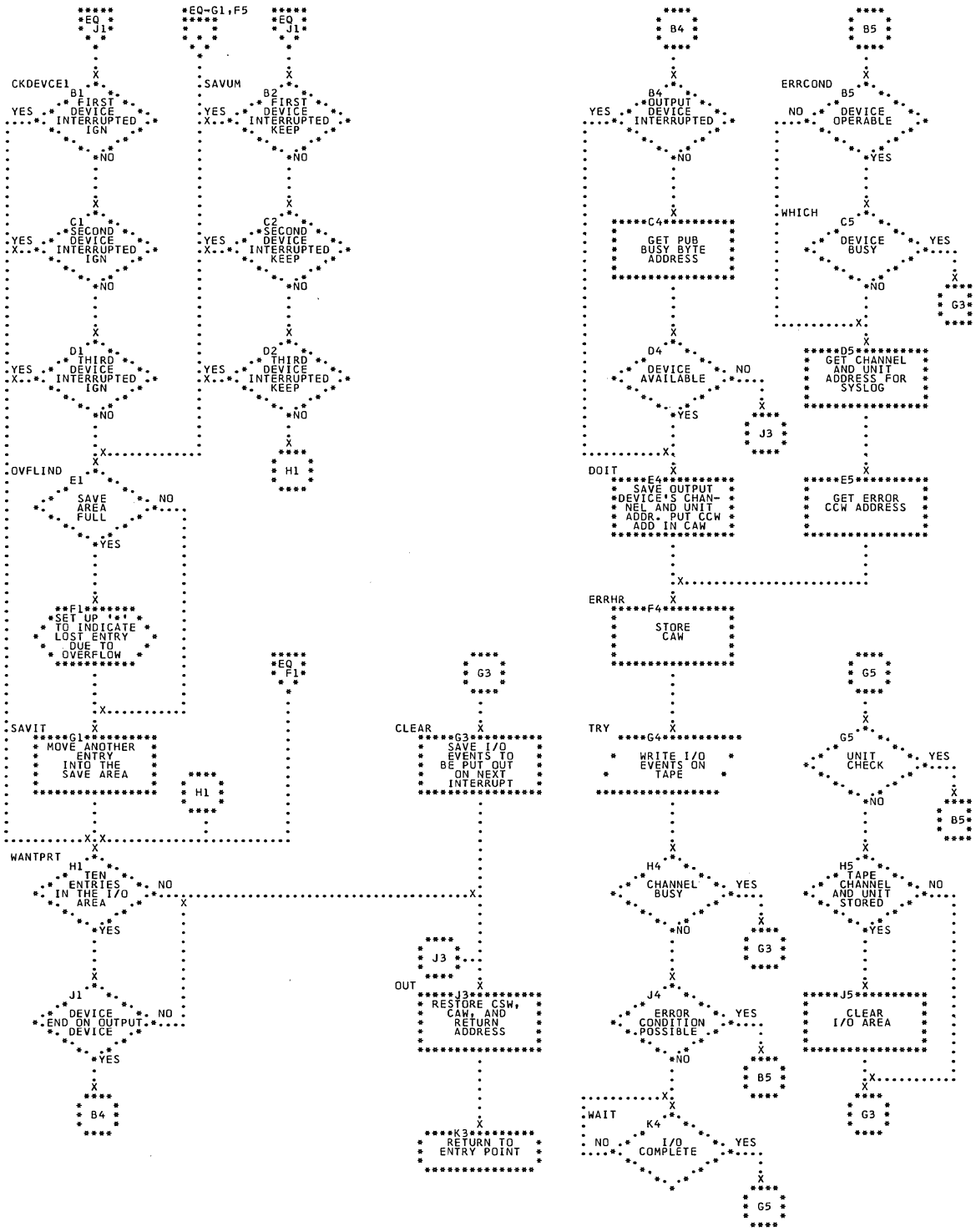


Chart ER. QTAM Trace: Tape Output Phase (PDAIDQTT) (Part 2 of 2)



DUMPGEN (Stand-Alone Dump)

DUMPGEN (Stand-Alone Dump) provides the ability to produce a stand-alone dump program (COREDUMP/DUMPCORE) tailored to system requirements. The DUMP is capable of displaying the contents of main storage from a minimum of 8K bytes to a maximum of 16384K bytes.

When you execute the DUMP, the original contents of bytes 0-23 and the 640 bytes, which this program occupies, are destroyed. If you need information in either of these areas, manually display it on the operational panel of the CPU and record it.

EXECUTING DUMPGEN

DUMPGEN is provided in the relocatable library of the IBM supplied system. You must catalog it to the core image library. Execute it in any partition by the command:

```
// EXEC DUMPGEN
```

You enter DUMPGEN at BEGIN and read its control statements from SYSIPT. The two types of control statements are ASSGN and OPTN.

ASSGN Statement: ASSGN defines the output device for COREDUMP. The format of the ASSGN statement is:

Name	Operation	Operand
(blank)	ASSGN	SYSLST,x'cuu'

SYSLST The only valid logical unit assignment.

x'cuu' Must define the address of the SYSLST printer. If the ASSGN statement is omitted, then X'00E' is assumed.

OPTN Statement: OPTN defines the upper limit of main storage to be displayed, the type of printer control, number of card decks, and the load address for the program to be generated. The format of the OPTN statement is as follows.

Name	Operation	Operand
(blank)	OPTN	CORE=nnnnnK INTR= {NO / YES} DECKS=nnnnnnn LOADADR={D'nnnnnnnn' / X'xxxx'} FORMAT= {NO / YES} TAPEIPL={NO / YES}

CORE Defines the area of main storage to be displayed. nnnnnK may be any number from 8K to 16384K in increments of 2K. An odd specification (for example, 15K) is rounded high to the next even number (in the example, 16K is assumed).

INTR NO produces a DUMP program which, when loaded, prints out the contents of main storage on the SYSLST printer defined with the ASSGN statement or X'00E'.

YES produces a DUMP program which, when loaded, enters the WAIT state. Either press the INTERRUPT button on the CPU operating panel to print the output on X'00E' or, first press the STOP button, and then the START button of the printer desired for the output device.

DECKS Specifies the number of DUMP card decks (punched out on SYSPCH) desired. nnnnnnnn may be any decimal number from 1 to 99,999,999. A blank card separates each deck produced. If DECKS is omitted, then 1 deck is produced.

LOADADR Specifies the load address of the DUMP. Any valid main storage address of the CPU for which this program is intended may be entered from 128 to 16,766,568. However, if the load address is not aligned to a doubleword, then the specified address is rounded high to the next doubleword. The specified address is checked for validity.

FORMAT If NO is specified or FORMAT is omitted, a non-formatting

translating dump is generated (COREDUMP).

YES produces a translating stand-alone dump (DUMPCORE), which formats and displays the DOS supervisor tables after displaying the contents of main storage. This formatted display depends upon the location of the communications region. If the stand-alone dump is loaded into the location of the communications region, the program is terminated when the formatted display is to occur.

TAPEIPL If NO is specified or TAPEIPL is omitted and SYSPCH is assigned to a tape unit, the stand-alone dump records are written on tape preceded by an ASA character.

If YES is specified and SYSPCH is assigned to a tape unit, the stand-alone dump written on tape may be IPLed directly from the tape unit.

The control statements may be specified in any order or amount; however, the following rules apply:

1. The last statement processed of a duplicate operation overrides all previous statements of the same operation with similar operands (if DECKS=2 is followed by DECKS=5, five programs are generated).

   NOTE: CORE and LOADADR are considered similar functions. Thus, the last statement of these two that is processed determines the amount of main storage to be displayed and the load address of the DUMP.

2. Decimal operands may contain leading zeros.

3. A program generated using the OPTN LOADADR statement displays all of main storage, and using the OPTN CORE statement displays all of main storage up to the beginning of the program.

4. The name field must be blank.

5. Only one operation and only one operand per control statement is allowed.

6. One or more blanks must follow the operand if comments are desired.

7. DUMPGEN requires either the OPTN CORE or LOADADR statements because it must be told where the DUMP is to be loaded. All other statements may be omitted, and if they are, DUMPGEN produces one card deck with the INTR=NO option and a printer assignment of X'00E'.

DUMPGEN MESSAGES

The functions of DUMPGEN-to-operator error message routines are to:

- Cancel the job if SYSLOG is not a 1052.
- Reissue the message if operator response is ALTERNATE CANCEL.
- Process an operator response of EOB as IGNORE.
- Cancel the job if operator response is CANCEL.
- Ignore the control card in question when the operator response is IGNORE.

If none of the preceding operator responses is issued, then DUMPGEN assumes a correction has been made and processes it. See Appendix B for Error Messages.

COREDUMP

COREDUMP is the installation-tailored dump program generated by DUMPGEN if FORMAT=NO. The specified contents of main storage starting at main storage address X'18' and the registers, the PSWs, the CAW, and the CSW, are displayed (decimal bytes 0-23 are displayed as binary zeros). Each COREDUMP program is generated with a specific number of lines to be printed. This is determined by the DUMPGEN control statements. When the total number of lines has been printed, COREDUMP is terminated and enters the WAIT state. Each line contains a maximum of eight fullwords. If the remaining portion of any line or group of lines is identical to the first word to be printed, the first word and the word SAME are printed, and printing is suspended until a line with different characters is encountered. See Figure 19, Part 1, for the printed output.

If any line to be printed is identical to the last line previously printed and the words of that line are different from each other, printing is suspended until the contents of the line change.

DUMPCORE

DUMPCORE is the formatting stand-alone dump generated by DUMPGEN when FORMAT=YES is specified. DUMPCORE functions the same as COREDUMP with the following exceptions.

1. Low core (PSWs, CAW, CSW, and TIMER data) is formatted and printed before main storage is dumped.
2. If the background communications region can be located after main storage is dumped, the DOS supervisor tables of the supervisor being dumped are formatted and printed. See Figure 19 for a sample of the output from DUMPCORE.

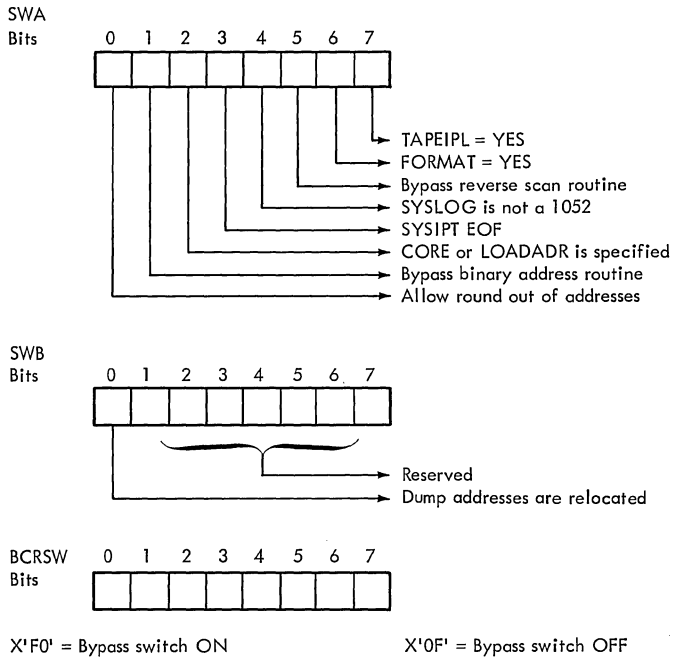


Figure 18. DUMPGEN Program Switches

```
GR 0-7  000000FF B0004780 00000000 00002068   00002414 0000213B 00000826 800007D0
GR 8-F  00001EB4 00000208 00001EA4 00001000   00002000 00003000 00004000 00000002


OLD PSWS                                      NEW PSWS
EXT INT         FF050000 00000000             EXT INT         00040000 0F0015F4
SVC CALL        FF050007 4A006C28             SVC CALL        00040000 000003AE
PROG CK         00000000 00000000             PROG CK         00040000 000000C0
MACH CK         5B5BC2C5 D6D1F440             MACH CK         00000000 00000AE4
I/O             FF07000C 000012EC             I/O             00040000 00000378

CSW             00000000 04000000
CAW             10000EC8
TIMER           FE860700


000000  00000000 00000000 00000000 00000000   00000000 00000000 FF050000 00000000   ................  ................
000020  FF050007 4A006C28 00000000 00000000   5B5BC2C5 D6D1F440 FF07000C 000012EC   ................  $$BEOJ4 ........
000040  0003FFA8 08000000 0003FFA0 00000000   FE857B00 00FEFB64 00040000 0F0015F4   ... ........ ....  ................4
000060  00040000 000003AE 00000000 0003FEA0   00000000 00000AE4 00040000 00000378   ........ ........  ........U........
000080  00000000 00000000 00000000 00030003   000506B0 06B041BB 00724570 0164940F   ................  ... . . ...... .
0000A0  00C141A0 BEB44570 0ACA18A8 419001A4   92FFB0B3 458000FA 9200B0B3 47F0B494   .A.   ..... . .    . .... .  .0
0000C0  470006D0 909F0270 9228022F 45900388   47F000DC 06B006B0 06B006B0 06B006B0   ...   .. .... ..  .0... . . . . .
0000E0  06B006B0 06B006B0 06B041BB 001741BB   00504570 01644180 01A49640 A0019120   . . . . . ...   .&.......    . .
000100  A00C4710 010A9250 A0019604 A00F95E2   A0024780 0C9C95C1 A0024780 0C9C9203    ..... & . . . S   ....  A ....  .
000120  008F9281 A0004BA0 030249A0 034441AA   BEA40778 94F902E3 D7010300 03009283   .. . .. ... ...     .. 9.TP..... .
000140  A00095FF B0B29200 B0B20788 9680A001   4400047C 4780B3E2 947FA001 92F0B3FF    . .   .  .. . .   ...'.. S . . 0 .
000160  47F0B3E2 42B00107 58B00290 9180A000   07175890 A0044880 022E5000 902C6000   .0 S. ... .  . .   ...  .....&. .-.
000180  90586020 90606040 90686060 9070D21B   90100270 D2079008 80009680 A00007F7    .-. --  .-- .K.   ...K. ... . ..7
0001A0  4570016C D20EB092 B0A2DC0E B092BEA4   1BAADD0F B092000C 43A10010 42A00347   ....K.    ..        . ..  ... ... ..
```

```
007540  B056B161 C2C7C6F2 C6F10000 00000000   00000000 00000000 00000000 00000000    . /BGF2F1......  ................
007560  00000000 --SAME--                                                           ................  ................
007D00  00000000 00000000 00000000 00000A00   00007D50 00000000 00070000 000A0001   ................  ...&............
007D20  00010001 00020003 00140C98 00700CB0   0D080038 01014400 00000000 00000000   ............ ...  ................
007D40  0D088000 0D000006 00007D50 00007D70   07007D70 40000006 31007D72 40000005   ............&....  .... ....... ...
007D60  08007D58 00000000 0E006FFC 20000D08   000000C6 00070100 00008000 08000003   ................  ...F............
007D80  00007DE8 00007DF0 08006000 3200D7D9   C9D5E340 40400000 00000000 00000800   ...Y...0..-...PR  INT   ..........
007DA0  002008F0 24006E35 80000000 00000000   00000000 0000FF00 00000000 00000000   ...0............  ................
007DC0  13000000 00000000 00000079 47000000   07007DB2 40000006 31007DB4 40000005   ................  ...  .......  ...
007DE0  08007DD8 20000001 01006E35 20000078   05006E34 60000079 31007DB4 40000005   ...0............  ....-.......  ...
007E00  08007DF8 20000001 1E001E08 30000081   5B5BC2D6 D7C5D5D9 5B5BC2C3 D3D6E2C5   ...8............  $$BOPENR$$BCLOSE
007E20  00000000 --SAME--                                                           ................  ................
03FDA0  END OF CORE DUMP
```

Figure 19. Sample Output of DUMPCORE (Part 1 of 4)

```
                          *** COMMUNICATION REGION ***
HEX    BG                 F2                 F1
DISP   02A8               02A8               02A8               COMMUNICATION REGION ADDRESS
 00    08/05/70           08/05/70           08/05/70           DATE
 08    6000               6000               6000               PPBEG ADDR
 0A    6000               6000               6000               END OF STORAGE PROTECT
 0C    0000               0000               0000               SEEK ADDRESS BLOCK,ONLY BG VLD
 0E    0000000000         0000000000         0000000000         PROBLEM PROGRAM USERS
       00000000           00000000           00000000                AREA IN HEX
 17    00                 00                 00                 UPSI BYTE IN HEX
 18    NO NAME            NO NAME            NO NAME            JOB NAME
 20    0003FFFF           0003FFFF           0003FFFF           UPPERMOST BYTE OF EACH PPA
 24    0000754F           0000754F           0000754F           END ADDR OF LAST FETCH OR LOAD
 28    00000000           00000000           00000000           LARGEST PROBLEM PROGRAM PHASE
 2C    0000               0000               0000               LENGTH OF PP LABEL AREA
 2E    0000               0000               0000               PROGRAM IDENTIFICATION KEY
 30    0003FFFF           0003FFFF           0003FFFF           END OF STORAGE ADDRESS
 34    EE                 EE                 EE                 MACHINE CONFIGURATION
 35    D2                 D2                 D2                 SYSTEM CONFIGURATION
 36    FED08000FE50       FED08000FE50       FED08000FE50       JOB CONTROL SWITCHES
 3C    00C6               00C6               00C6               DISK ADDR OF LABEL CYLINDER
 3E    2061               2061               2061               ADDR OF FOCL
 40    2068               2068               2068               ADDR OF PUB
 42    20E9               20E9               20E9               ADDR OF FAVP
 44    20EA               20EA               20EA               ADDR OF JIB
 46    2128               2128               2128               ADDR OF TEB
 48    21BE               21BE               21BE               ADDR OF FICL
 4A    21C2               21C2               21C2               ADDR OF NICL
 4C    21C6               21C6               21C6               ADDR OF LUB
 4E    38                 38                 38                 LINE COUNT FOR SYSLST
 4F    080570128          080570128          080570128          SYSTEM DATE
 58    0000               0000               0000               LIOCS COM BYTE
 5A    1EA4               1EA4               1EA4               ADDR OF PIB TABLE
 5C    0000               0000               0000               LAST CHECK POINT NO.
 5E    0009               0009               0009               LENGTH OF LUBID QUEUE
 60    0F68               0F68               0F68               ADDR OF DIB
 62    0FFA               0FFA               0FFA               CHANNEL SCHEDULER ERROR BLOCK
 64    0000               0000               0000               ADDR OF PC OPTION TABLE
 66    0000               0000               0000               ADDR OF IT OPTION TABLE
 68    0000               0000               0000               ADDR OF OC OPTION TABLE
 6A    0000               0000               0000               KEY OF PROGRAM WITH IT SUPPORT
 6C    203C               203C               203C               ADDR OF LUBID QUEUE
 6E    0000               0000               0000               LTK
 70    $$BO               $$BO               $$BO               BG ONLY
 74    003B000102         003B000102         003B000102         SYSTEM SEEK ADDR
 79    0010C0             0010C0             0010C0             ADDR OF LTA SAVE
 7C    1DA4               1DA4               1DA4               ADDR OF PIB EXTENSION
 7E    0000               0000               0000               ADDR OF MICR DTF LABEL
 80    00000000           00000000           00000000           ADDR OF QTAM VECTOR TABLE
 84    02A8               02A8               02A8               ADDR OF BG COMREG
 86    0000               0000               0000               RESERVED
 88    00000334           00000334           00000334           ADDR OF COMREG EXTENSION



                      *** COMMUNICATION REGION EXTENSION ***
       BG                 F2                 F1
00     00000000           00000000           00000000           ADDR OF CE TABLE
04     00000000           00000000           00000000           TRACK HOLD TABLE ADDR
08     00000100           00000100           00000100           PIBDIFF
0C     00000000           00000000           00000000           AB TERMINATION TABLE ADDR
10     0000               0000               0000               LID
12     0000               0000               0000               PIK
14     00002057           00002057           00002057           ADDR OF TASK REQUESTOR ID TABLE
18     000010A2           000010A2           000010A2           ADDR OF QTAM/AP MVCFLD
1C     00002258           00002258           00002258           SOR TABLE ADDR
20     0000214C           0000214C           0000214C           TEBV TABLE ADDR
24     00000000           00000000           00000000           OLTEP BUCKET ADDR
28     00000000           00000000           00000000           RASLINK ADDR
2C     00000000           00000000           00000000           TRANSLATION TABLE ADDR
30     00000000           00000000           00000000           RESERVED
34     00000000           00000000           00000000           JA COMMON TABLE ADDR
38     00000000           00000000           00000000           JA PARTITION TABLE ADDR
```

Figure 19. Sample Output of DUMPCORE (Part 2 of 4)

```
                        *** PROGRAM INFORMATION BLOCK ***

AB PIB  85  00  E2D7  47F00244  00000000  0000  00FF
BG PIB  82  00  C2C7  19005F88  0A006000  840B  1E80
F2 PIB  80  00  C6F2  19040000  00040000  0134  0500
F1 PIB  80  00  C6F1  19040000  00040000  0244  0500
AR PIB  80  00  C1D9  47F00E94  000010C0  0700  58B0
OS PIB  84  00  6150  47F00DC2  60000408  0C10  1418
SP PIB  84  00  E2D7  47F00230  20C00016  1F05  0000

                AP SUBTASK PIBS

        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000
        80004040 00000000 00000000 00000000


PARTITION SAVE AREA


BG   PSW=FF0500074A006C28
     REG  9-0  9A00709E 00006FFC 00006010 00006FD0 00007FD0 000002A8 00000002 000000FF
     REG  1-8  00006468 00002080 00002216 00000F68 00002214 000020E9 AA006A88 9A006806

F2   *** PROG NOT ACTIVE ***

F1   *** PROG NOT ACTIVE ***



*** LOGICAL UNIT BLOCK TABLE ***

LUB LOGIC  PUB JIB
TAB UNIT   PRT PTR CUU

BG SYSTEM LUBS

00  SYSRDR 00  FF  00C
01  SYSIPT 00  FF  00C
02  SYSPCH 01  FF  00D
03  SYSLST 02  FF  00E
04  SYSLOG 03  FF  01F
05  SYSLNK 0A  FF  292
06  SYSRES 0B  FF  293
07  SYSSLB FF  FF  UA
08  SYSRLB FF  FF  UA
09  SYSUSE FF  FF  UA
0A  SYSREC FF  FF  UA

BG PROGRAMMER LUBS

0B  SYS000 0A  FF  292
0C  SYS001 0A  FF  292
0D  SYS002 0A  FF  292
0E  SYS003 0A  FF  292
0F  SYS004 FF  FF  UA
10  SYS005 FF  FF  UA
11  SYS006 FF  FF  UA
12  SYS007 FF  FF  UA
13  SYS008 FF  FF  UA
14  SYS009 FF  FF  UA
15  SYS010 FF  FF  UA
16  SYS011 FF  FF  UA
17  SYS012 FF  FF  UA
18  SYS013 FF  FF  UA
19  SYS014 FF  FF  UA
1A  SYS015 FF  FF  UA
1B  SYS016 FF  FF  UA
1C  SYS017 FF  FF  UA
1D  SYS018 FF  FF  UA
1E  SYS019 FF  FF  UA
1F  SYS020 FF  FF  UA
20  SYS021 FF  FF  UA
21  SYS022 FF  FF  UA
22  SYS023 FF  FF  UA
23  SYS024 FF  FF  UA
24  SYS025 FF  FF  UA
25  SYS026 FF  FF  UA
26  SYS027 FF  FF  UA
27  SYS028 FF  FF  UA
28  SYS029 FF  FF  UA

F2 SYSTEM LUBS

29  SYSRDR FF  FF  UA
2A  SYSIPT FF  FF  UA
2B  SYSPCH FF  FF  UA
2C  SYSLST FF  FF  UA
```

Figure 19. Sample Output of DUMPCORE (Part 3 of 4)

```
                          *** PHYSICAL UNIT BLOCK TABLE ***

POS  CHAN   CHAN TEB DEV DEV  CHAN JOB      DEV  SWIT EOF    IOERR OPER  DEV   BURST SEVEN
     AND    QUE  PTR TYP CODE SCHD CTL      BUSY CHAB SYSRDR QUED  INTV  END   DV ON TRACK
     UNIT   PTR                FLGS FLGS         LE   SYSIPT RECOV REG   POST  MPX   TAPE

000  000C   FF   00  11  00   00   FC
001  000D   FF   00  21  00   00   FC
002  000E   FF   00  42  00   00   FC
003  001F   00   00  00  00   80   F8       *
004  0280   FF   00  50  C3   00   C0
005  0281   FF   01  50  CB   00   C8
006  0282   FF   02  50  C3   00   C0
007  0283   FF   03  50  C3   00   C0
008  0290   FF   00  60  00   00   F8
009  0291   FF   00  60  00   00   F8
00A  0292   FF   00  60  00   00   FC
00B  0293   FF   00  60  00   00   FC


*** ERROR RECOVERY BLOCK ***

  1018  ERROR QUE ADDR
  0D08  RETRY ERP EXIT
  0CE6  IGNOR ERP EXIT
  0CF4  DISWHY  EXIT
  2018  CHAN QUE TABLE
  1470  CANCEL  EXIT
  1070  LAST ERROR QUE
  1002  LAST ENTRY ADR
  0000  REG I/O KEY
  1474  ATTN CANX EXIT
  148A  ATTN DEQU EXIT
  01A4  ATTENTION EXIT
  $$ANERR   FETCH NAME


     STORED CSW      PUB   FLAG  MSG *  SENSE DATA    SEEK ADR  DEV
                     ADDR  BYTE  CODE                           ADDR

  00000F580E000005  20C0   04    00   002000C80000  003A0009  293
  0000000000000000  0000   00    00   000000000000  00000000  000
  0000000000000000  0000   00    00   000000000000  00000000  000
  0000000000000000  0000   00    00   000000000000  00000000  000
  0000000000000000  0000   00    00   000000000000  00000000  000


* MESSAGE CODE IS SECOND AND THIRD BYTE OF DEVICE ERROR RECOVERY MESSAGES
  GENERATED BY PHYSICAL IOCS (EXAMPLE 0P08A INTERV REQ)


    *** CHANNEL QUEUE TABLE ***

POS  CHAIN  CCB ADDR      CUU
     PTR

 00   FF    006468       01F
 01   02    006480
 02   03    000000
 03   04    000000
 04   05    000000
 05   06    000000
 06   07    000000
 07   08    000000
 08   FF    000000


*** FLOATING POINT REGISTERS ***

  REG 0  00.00000000000000
  REG 2  00.00000000000000
  REG 4  00.00000000000000
  REG 6  00.00000000000000


*** EOJ ***
```

Figure 19. Sample Output of DUMPCORE (Part 4 of 4)

Chart 06. DUMPGEN, COREDUMP, and DUMPCORE (DUMPGEN1)

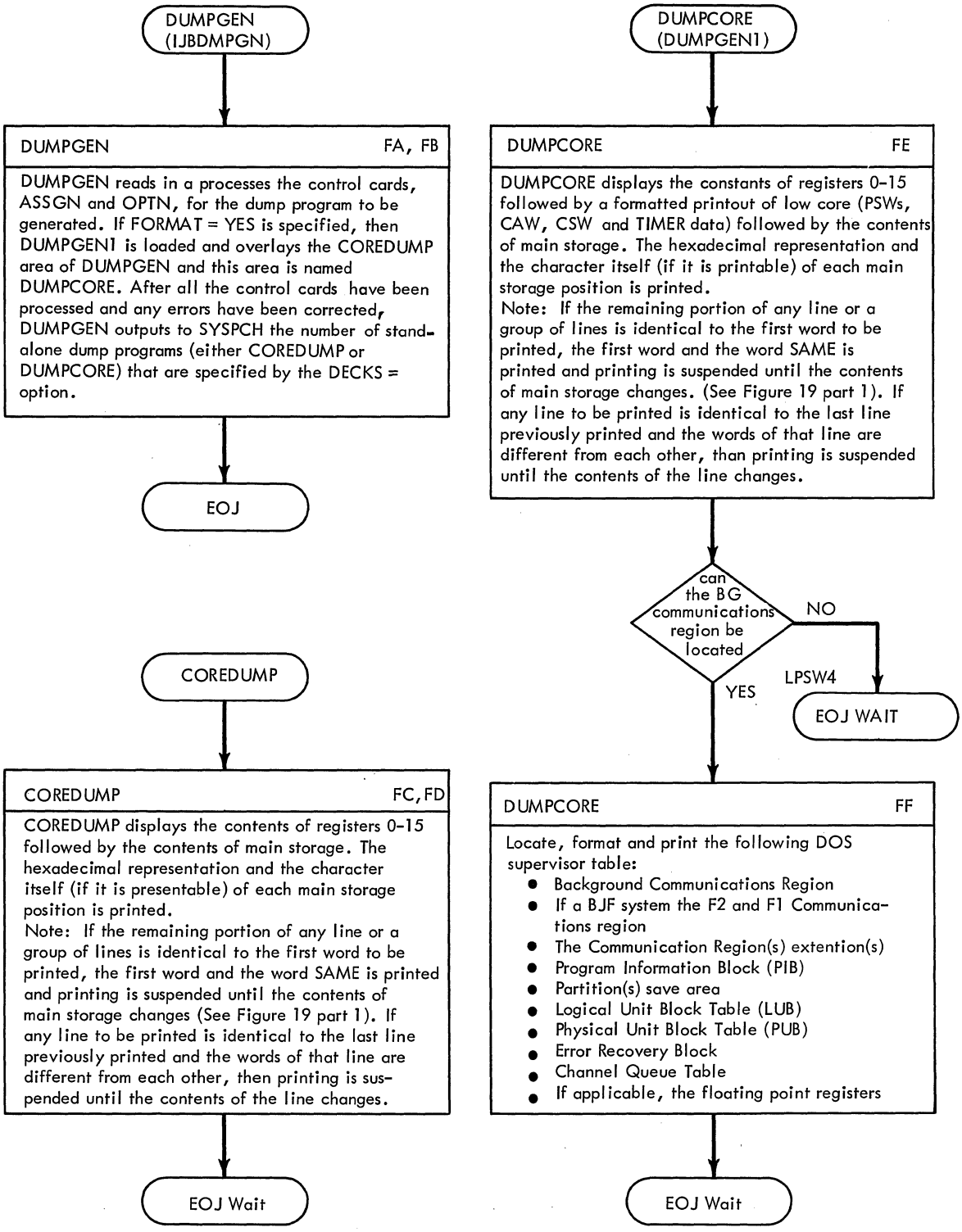


Chart FA. DUMPGEN (IJBDMPGN), Generator (Part 1 of 2)
Refer to Chart 06.

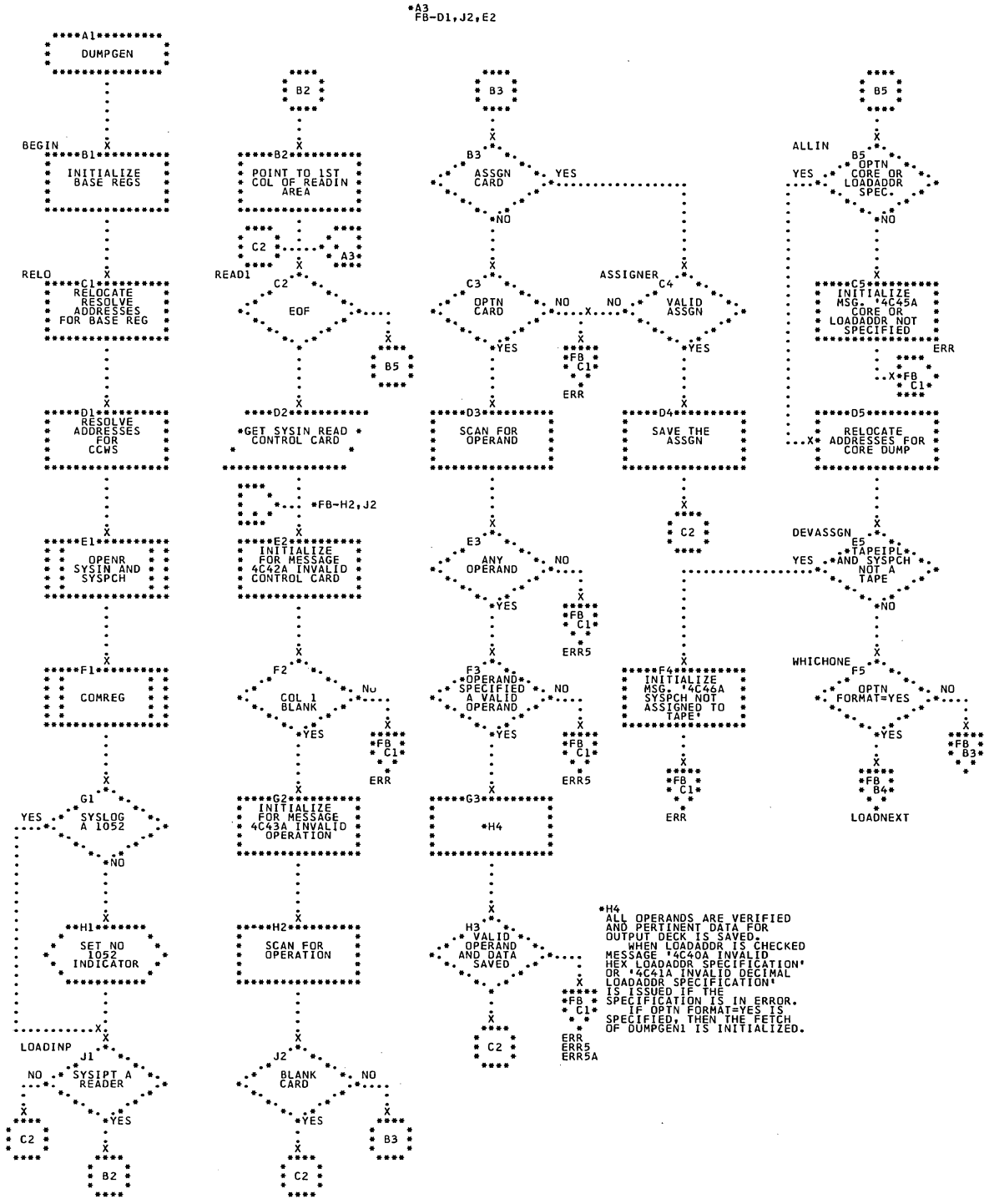


Chart FB. DUMPGEN (IJBDMPGN), Generator (Part 2 of 2)
Refer to Chart 06.

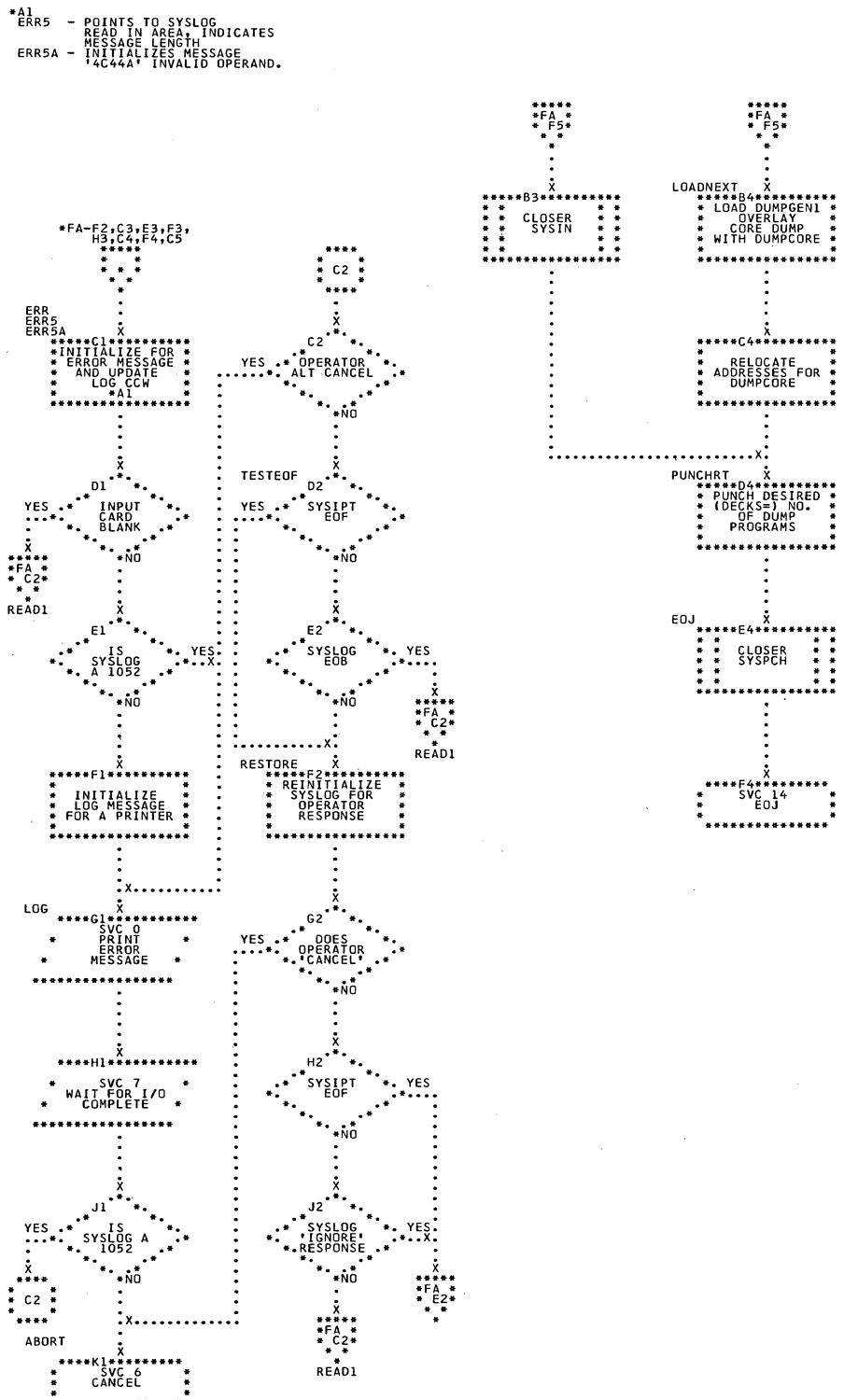


Chart FC. DUMPGEN (IJBDMPGN), COREDUMP (Part 1 of 2)
Refer to Chart 06.

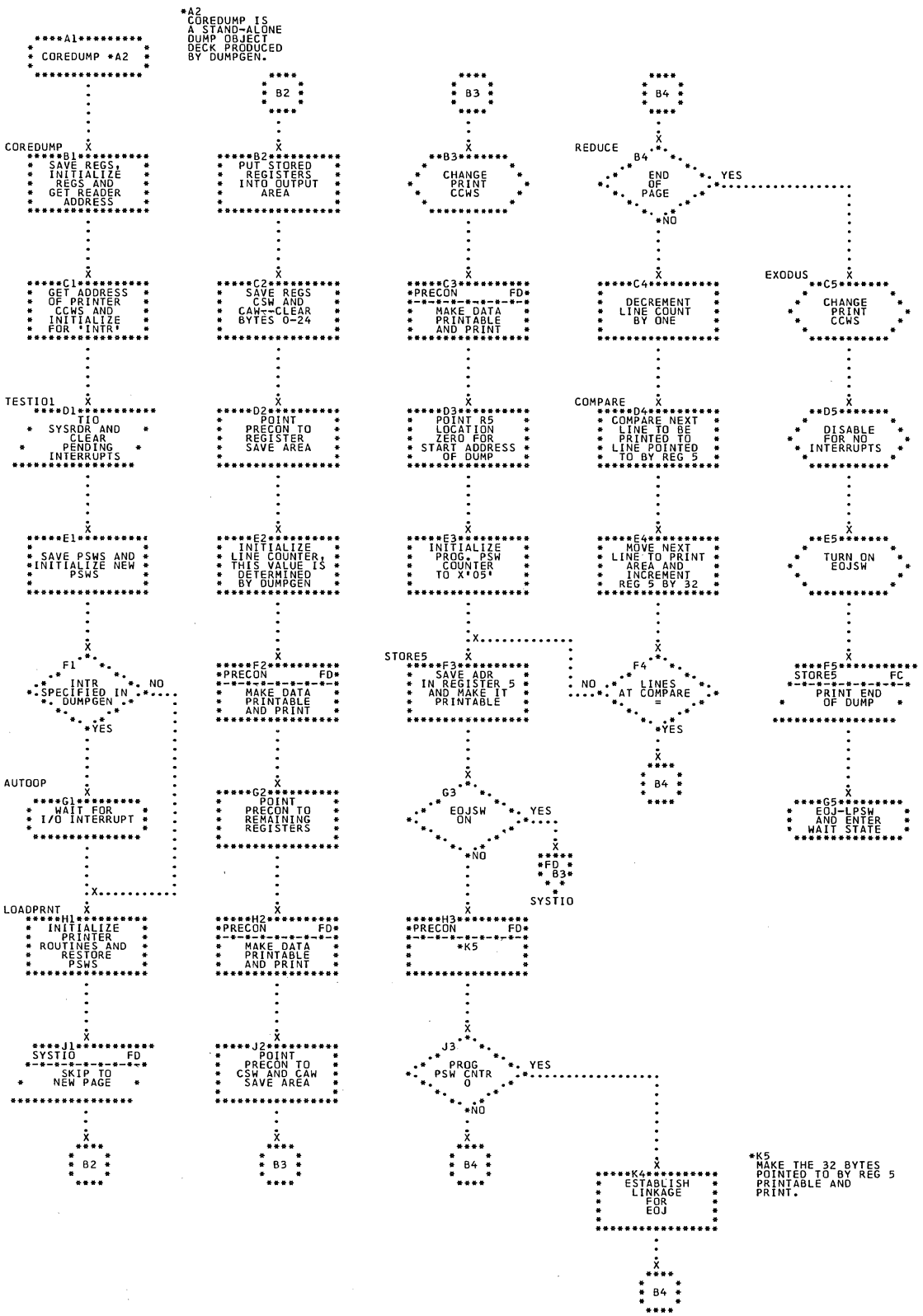


Chart FD. DUMPGEN (IJBDMPGN), COREDUMP (Part 2 of 2)
Refer to Chart 06.

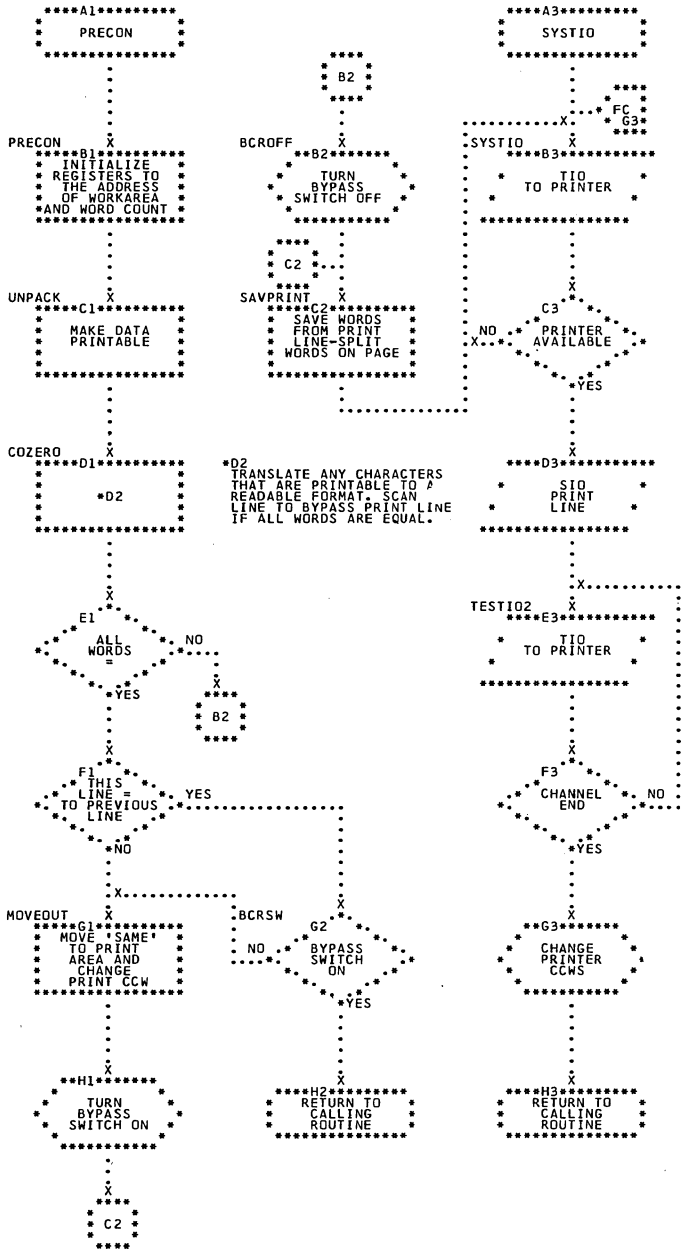


Chart FE. DUMPGEN1 (IJBDMPGN), DUMPCORE: Low Core and Translating Dump of Main Storage
Refer to Chart 06.

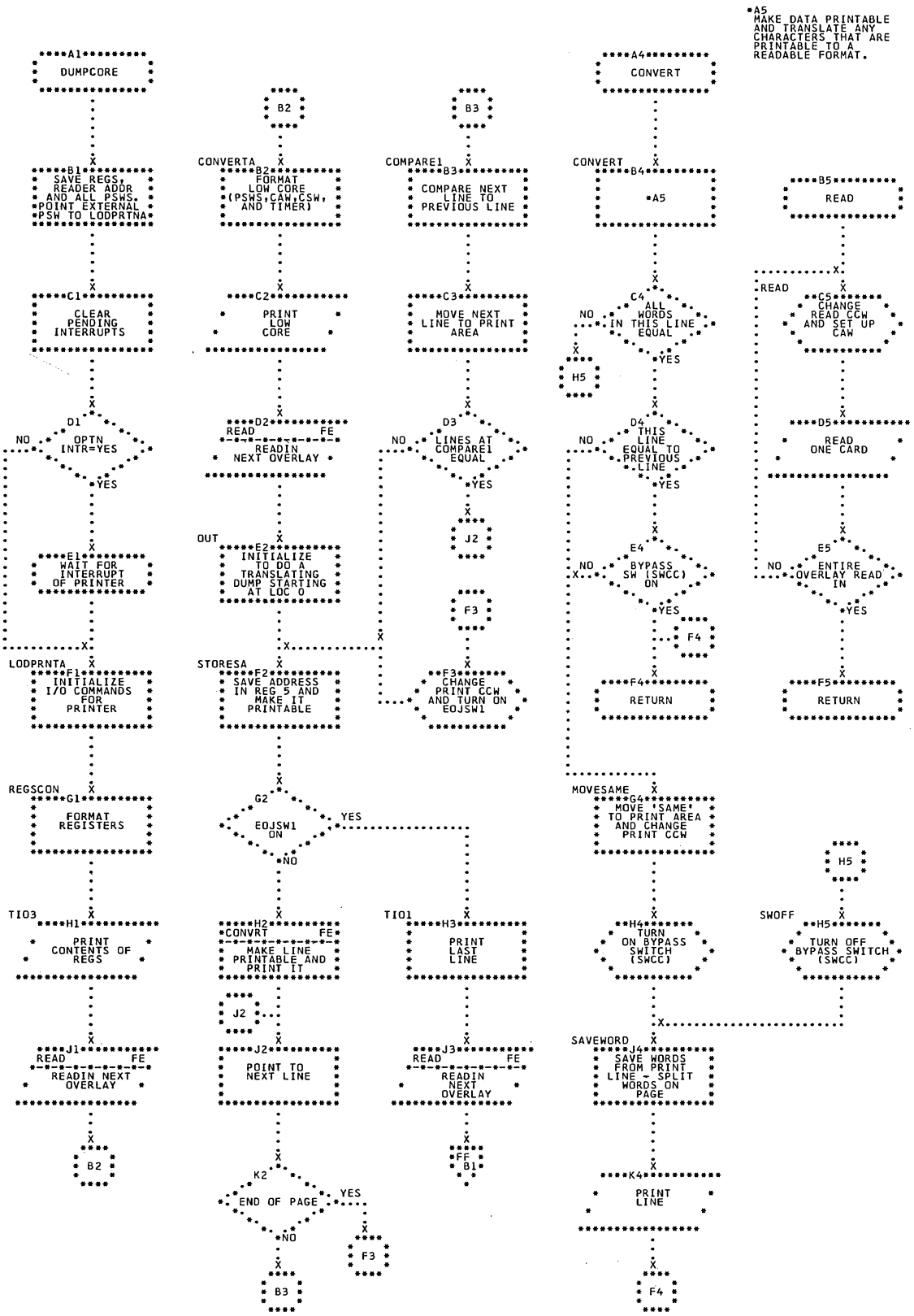
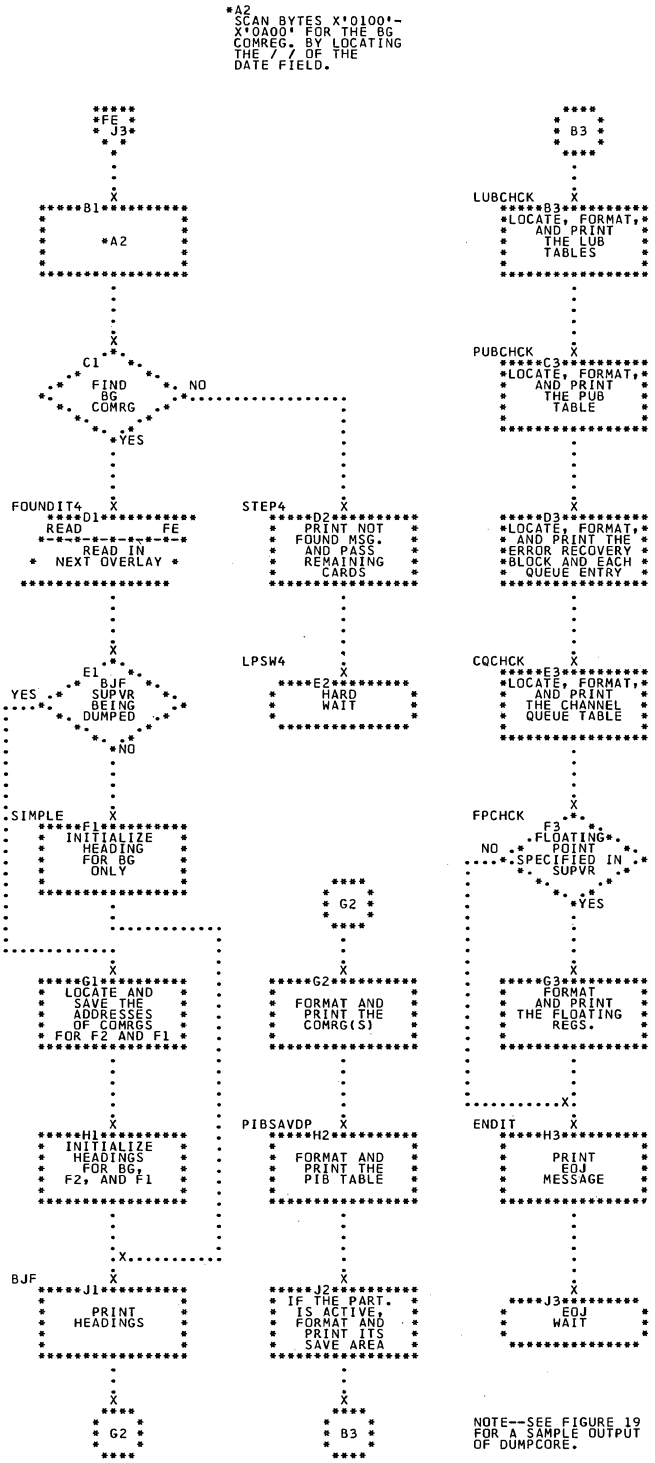


Chart FF. DUMPGEN1 (IJBDMPGN), DUMPCORE: Format Supervisor Tables
Refer to Chart 06.



LSERV (Label Cylinder Display)

The label cylinder display program, LSERV, displays the contents of the SYSRES label cylinder. The label cylinder contains the TLBL and the DLBL and EXTENT information for the logical units.

> Note: Secured data files are not processed.

LSERV may be executed in any partition with a minimum of 10,240 bytes of main storage by the command:

```
// EXEC LSERV
```

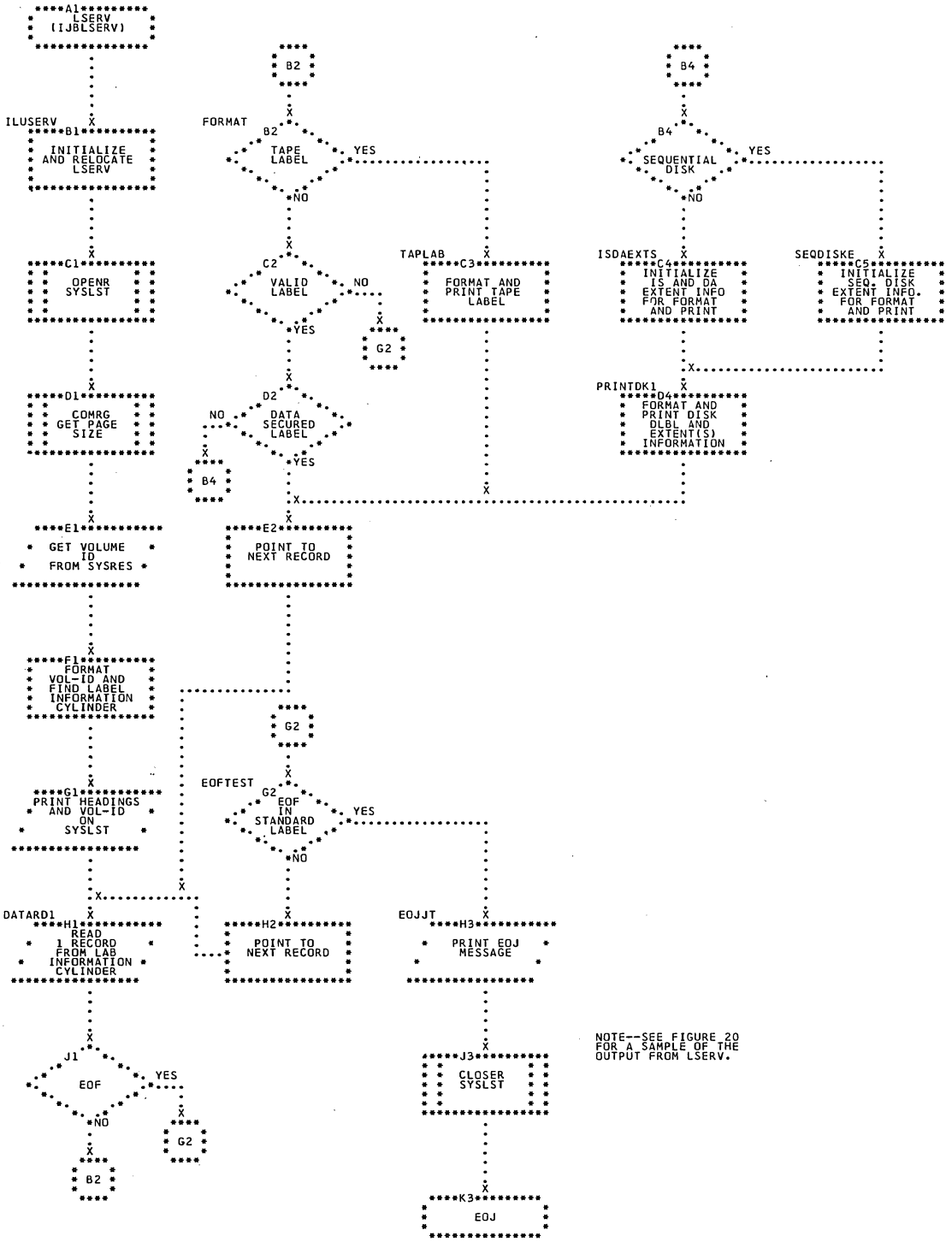
It requires no other control statements for its operation other than the normal job step or job termination controls, /* or /&. See Figure 20 for a sample output from LSERV.

LSERV assumes the label cylinder on SYSRES is formatted as it is described in the publication, DOS DASD Labels, GC24-5072.

```
                                    DOS LABEL CYLINDER DISPLAY

                                SYSRES VOLUME SERIAL NUMBER - 111111

BG USER LABELS (TEMPORARY) TRACK 0

   NONE

BG PARTITION STANDARD LABELS (PERMANENT) TRACK 1

   NONE

F2 USER LABELS (TEMPORARY) TRACK 2

   NONE

F2 PARTITION STANDARD LABELS (PERMANENT) TRACK 3

   NONE

F1 USER LABELS (TEMPORARY) TRACK 4

   NONE

F1 PARTITION STANDARD LABELS (PERMANENT) TRACK 5

   NONE

STANDARD LABELS (ALL PARTITIONS-PERMANENT) TRACKS 6-9 FOR 2311 OR 6-19 FOR 2314

   IJSYSSL
         FILE IDENTIFIER                  PRIVATE SOURCE STATEMENT LIBRARY
         FILE SERIAL NUMBER               111111
         VOLUME SEQUENCE NUMBER           01
         CREATION DATE                    OMITTED
         EXPIRATION DATE                  99/365
         FILE TYPE                        SEQUENTIAL

     EXTENT INFORMATION
         EXTENT SEQUENCE NUMBER           00
         EXTENT TYPE                      1 (PRIME DATA)
         EXTENT LOWER LIMIT               CYLINDER     106
                                          HEAD          00
         EXTENT UPPER LIMIT               CYLINDER     198
                                          HEAD          09
         SYMBOLIC UNIT                    SYSSLB       CCB FORMAT  0007
         VOLUME SERIAL NUMBER             111111


   IJSYSLN
         FILE IDENTIFIER                  GOFILE
         FILE SERIAL NUMBER               111111
         VOLUME SEQUENCE NUMBER           01
         CREATION DATE                    67/033
         EXPIRATION DATE                  99/365
         FILE TYPE                        SEQUENTIAL

     EXTENT INFORMATION
         EXTENT SEQUENCE NUMBER           00
         EXTENT TYPE                      1 (PRIME DATA)
         EXTENT LOWER LIMIT               CYLINDER     001
                                          HEAD          00
         EXTENT UPPER LIMIT               CYLINDER     020
                                          HEAD          09
         SYMBOLIC UNIT                    SYSLNK       CCB FORMAT  0005
         VOLUME SERIAL NUMBER             111111


         EXTENT TYPE                      1 (PRIME DATA)
         EXTENT LOWER LIMIT               CYLINDER     196
                                          HEAD          00
         EXTENT UPPER LIMIT               CYLINDER     198
                                          HEAD          09
         SYMBOLIC UNIT                    SYSREC       CCB FORMAT  000A
         VOLUME SERIAL NUMBER             111111

END OF LABEL CYLINDER DISPLAY
```

Figure 20. Sample Output from LSERV

Chart FL. LSERV (IJBLSERV) Format and Print Contents of the Label Information Cylinder



ESTV (Error Statistics by Tape Volume)

When DOS is generated, the user has the option of requesting the collection of error statistics by tape volume (ESTV). This ESTV data can be printed on the system console, or stored on a direct access storage device. If it is stored, dump file program ESTVUT must be used to process the data from the disk.

ESTV RECORDS

ESTV collects data on tape errors by volume for any tape volumes used by the system. Although DOS itself does not require it, the ESTV program requires that each user program contain an OPEN(R) statement if he wishes to collect volume statistics.

Specifying ESTV at system generation time causes the system to collect the following set of records for each tape volume whenever the volume is in use:

- Volume serial number of standard labeled volumes (blank for nonstandard and unlabeled volumes).
- Date this set of records was collected.
- Time of day this volume was closed (time the record was collected).
- Address of the unit on which the volume was mounted and the channel to which the unit was attached.
- Number of temporary read errors that occurred while the volume was open.
- Number of temporary write errors that occurred while the volume was open.
- Number of permanent read errors that occurred while the volume was open.
- Number of permanent write errors that occurred while the volume was open.
- Number of noise blocks encountered (records less than 12 bytes on a read operation, or less than 18 bytes on a write operation).
- Number of erase gaps (three and one-half-inch lengths of erased tape) encountered.
- Number of cleaner actions (passing the record in error back and forth under a cleaner blade) taken while trying to correct read errors.
- Number of START I/Os issued to the tape (does not include SIOs issued for or during error recovery).
- Bit density of the volume (in bits per inch for 7-track tape, and the designation 8/1600 for 9-track tape).
- Block length of each record if the volume has fixed-length blocked records. When the type of record is undefined or variable length, or when the program terminates abnormally (ABEND), a 0 appears in the space allocated for block length. A 0 also appears when physical IOCS is being used.

  Note 1: The temporary error counter is incremented whenever a data check error is detected. If the error is permanent, the permanent error counter is incremented. However, the temporary error counter is not decremented by permanent errors, and therefore contains the sum of true temporary errors and of permanent errors.

  Note 2: The cleaner action counter is not incremented during read-opposite recovery.

ESTV OUTPUT MODES

Two modes of operation for ESTV are available, Mode 1 and Mode 2. They provide two different standard output formats. The user selects the desired mode (at the time the system is generated) in the FOPT system generation macro. The mode selected determines the method in which the collected statistics will be written.

Mode 1: Mode 1 formats the ESTV records and records them on a system direct access storage device in a data set named ESTVFLE. ESTVFLE may later be dumped to a tape or printed on the printer attached to the system by the system service program ESTVUT.

Mode 2: Mode 2 prints the ESTV data collected at the console typewriter (SYSLOG) each time a particular volume is ended by CLOSE, EOJ, EOV, or ABEND.

ESTV DUMP FILE PROGRAM (ESTVUT)

ESTVUT gives the user five options to process the error statistics collected and stored on disk by the ESTV program. The system operator specifies the processing method at the start of execution of the ESTVUT program. To do this, he responds to messages sent to him by the program. The five options are:

1. ESTVUT dumps the data from the disk file to a printer and clears the disk file.
2. ESTVUT dumps the data from the disk file to a printer and leaves the disk file as it was. More records can be added to the disk and a later dump taken of the entire file, including the added records.
3. ESTVUT dumps the file to a magnetic tape and clears the file. This option includes dumping any statistics from a previous tape (obtained by this processing method) and then dumping the new data from the disk file to the new tape. This collects all error statistics on one tape.
4. ESTVUT dumps the collective tape file resulting from option 3 back to the original tape. This allows the user to keep his error volume statistics on a particular tape volume rather than on a new tape each time the file is dumped.
5. ESTVUT dumps the tape file that results from either option 3 or 4 to a printer.

ESTV FORMAT DATA SET PROGRAM (ESTVFMT)

System service program, ESTVFMT, must be the first program executed after the first initial program load (IPL) after the system is generated, if error statistics by tape volume are to be collected by the system on a disk. It must also be executed whenever new label information is entered into the system for the file. This is required in order to update information in the volume table of contents (VTOC). This program, ESTVFMT, opens the ESTV data set (ESTVFLE) on the disk file, enabling it to collect this system output, by putting the label information in the disk's volume table of contents. The data set must be on SYSREC.

Chart 07. Logic Flow of ESTV File Format and Dump Phases

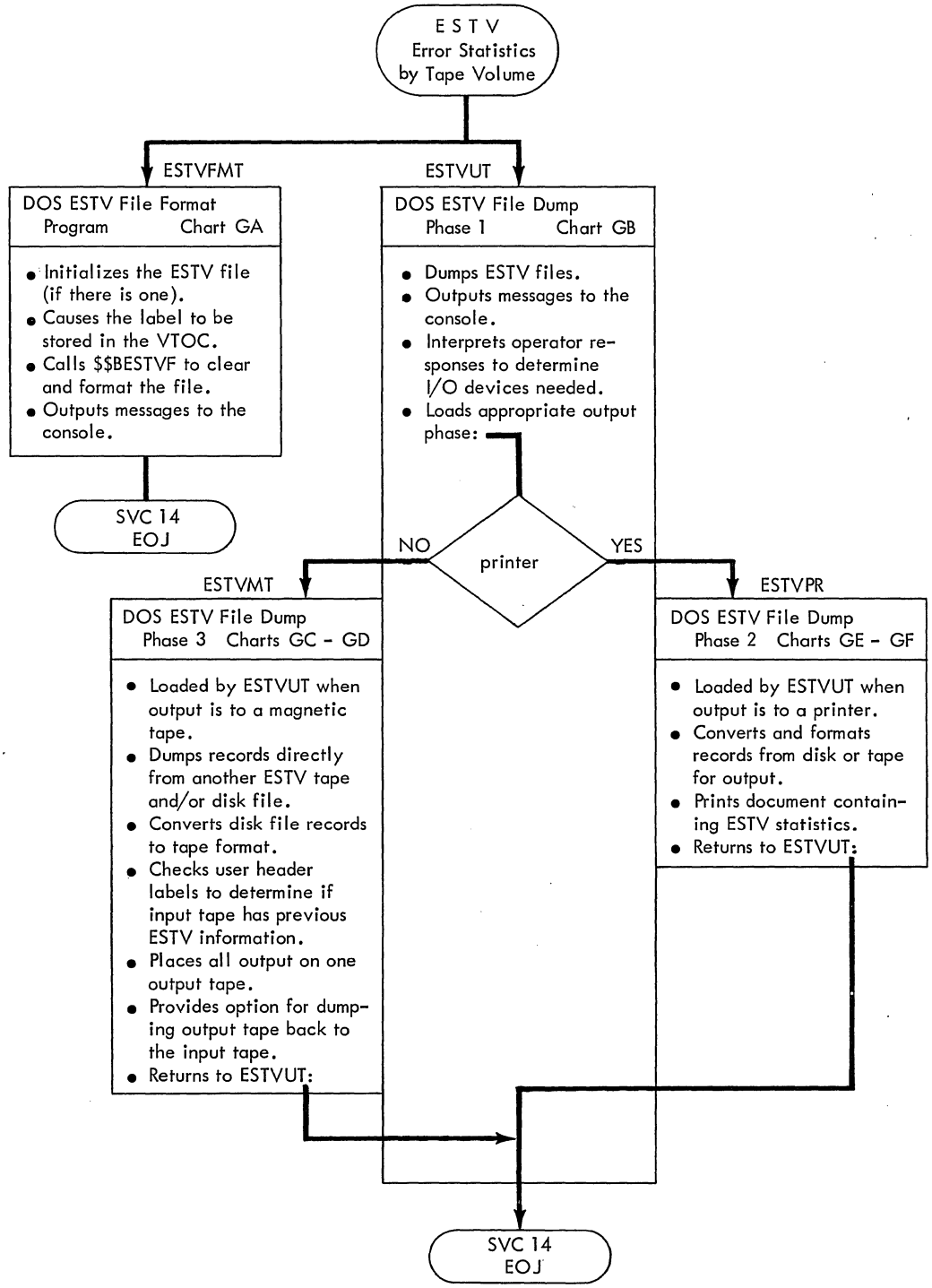


Chart GA. ESTVFMT - DOS ESTV File Format Program
Refer to Chart 07.

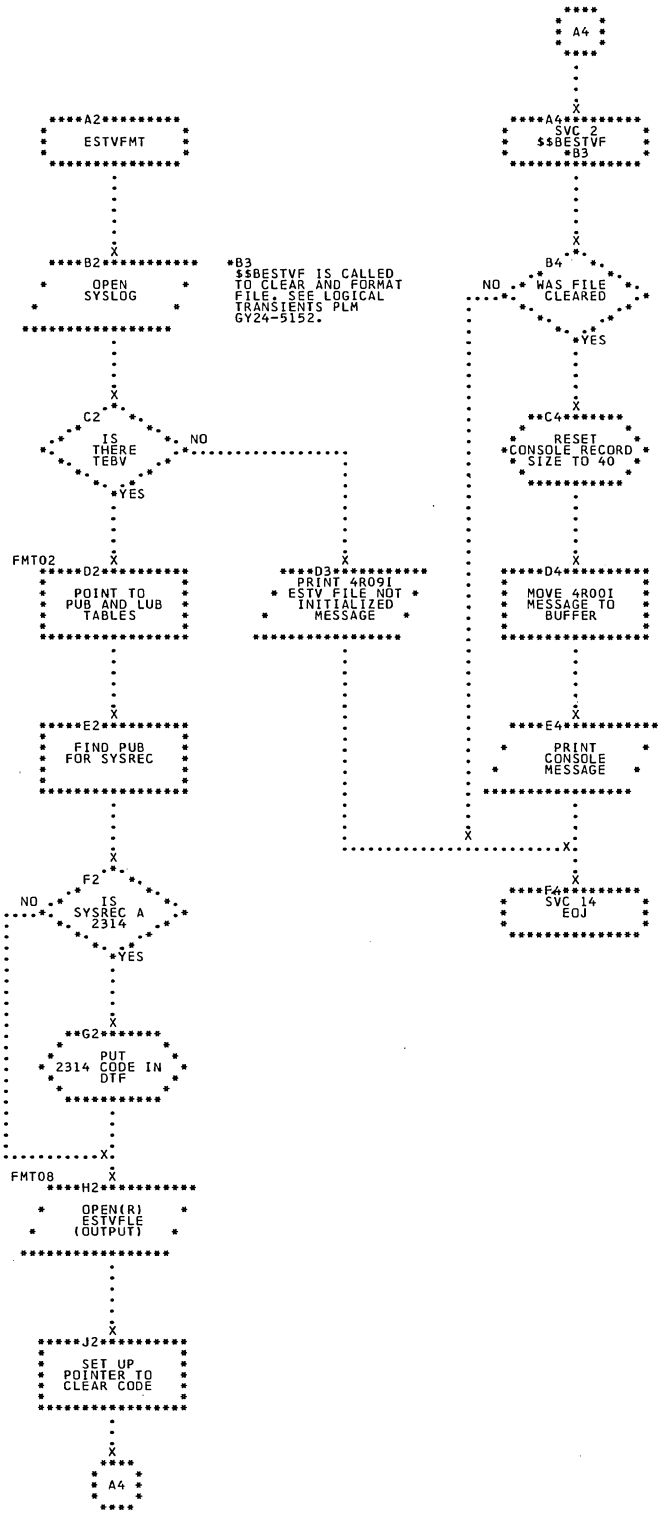


Chart GB. ESTVUT - Phase 1 of DOS ESTV File Dump
Refer to Chart 07.

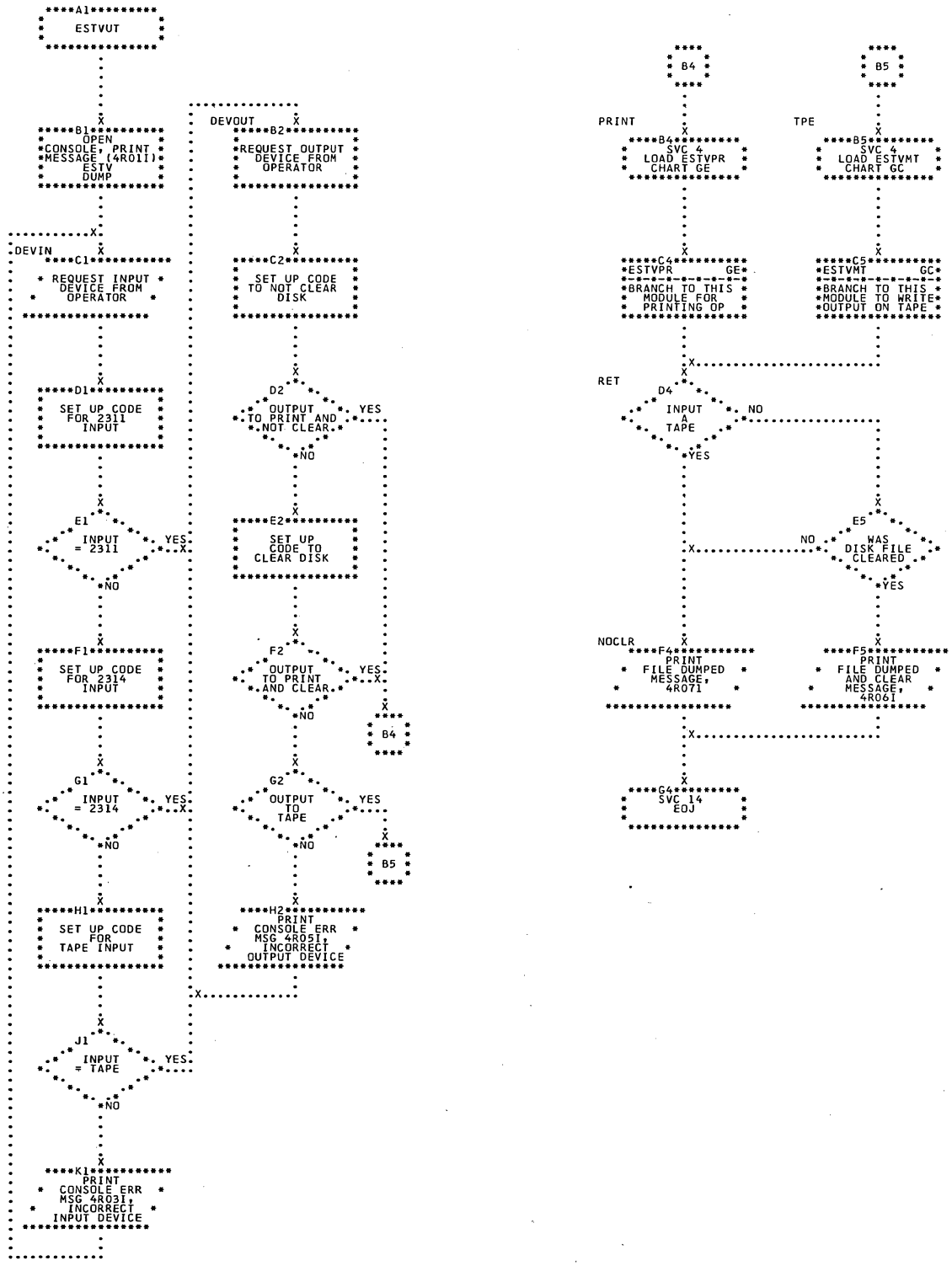


Chart GC. ESTVMT - Phase 3 of DOS ESTV File Dump (Part 1 of 2)
Refer to Chart 07.

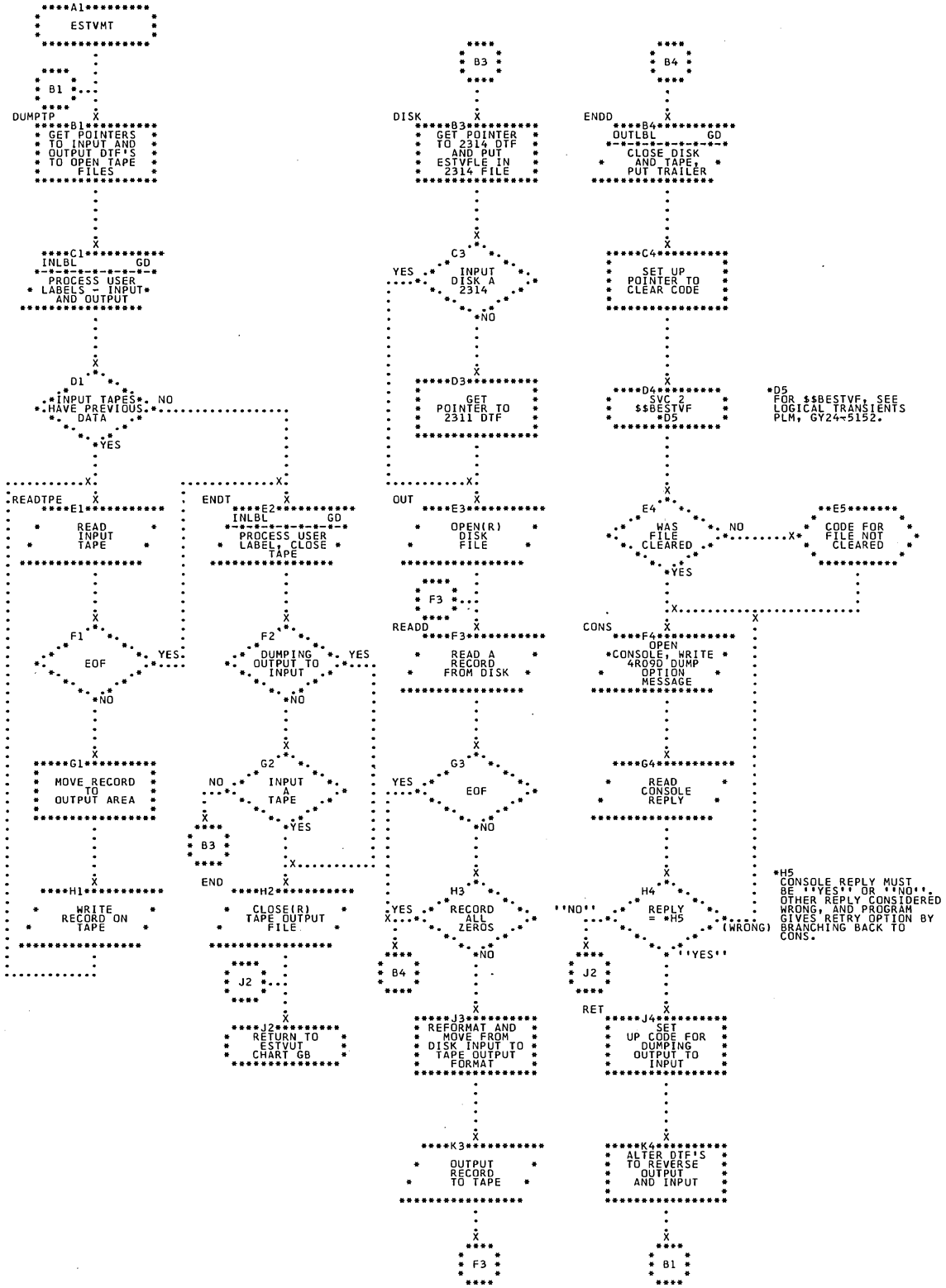


Chart GD. ESTVMT - Phase 3 of DOS ESTV File Dump (Part 2 of 2)
Refer to Chart 07.

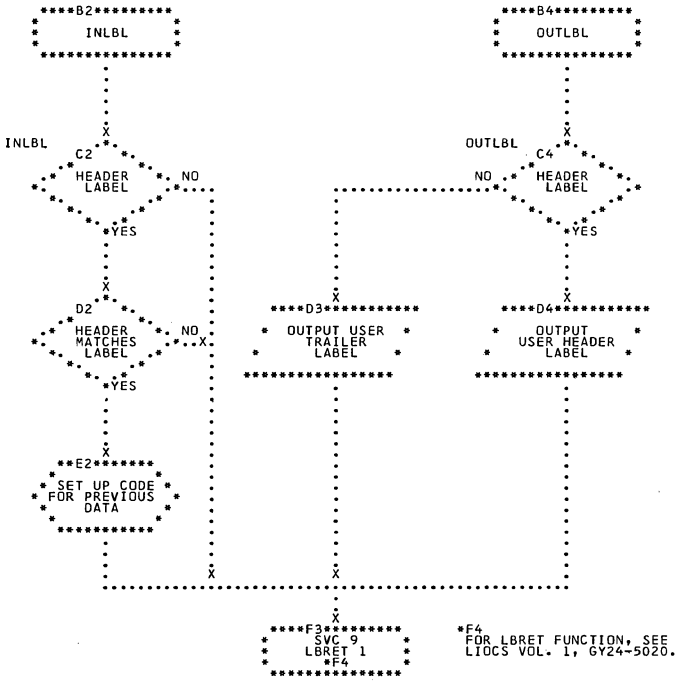


Chart GE. ESTVPR - Phase 2 of DOS ESTV File Dump (Part 1 of 2)
Refer to Chart 07.

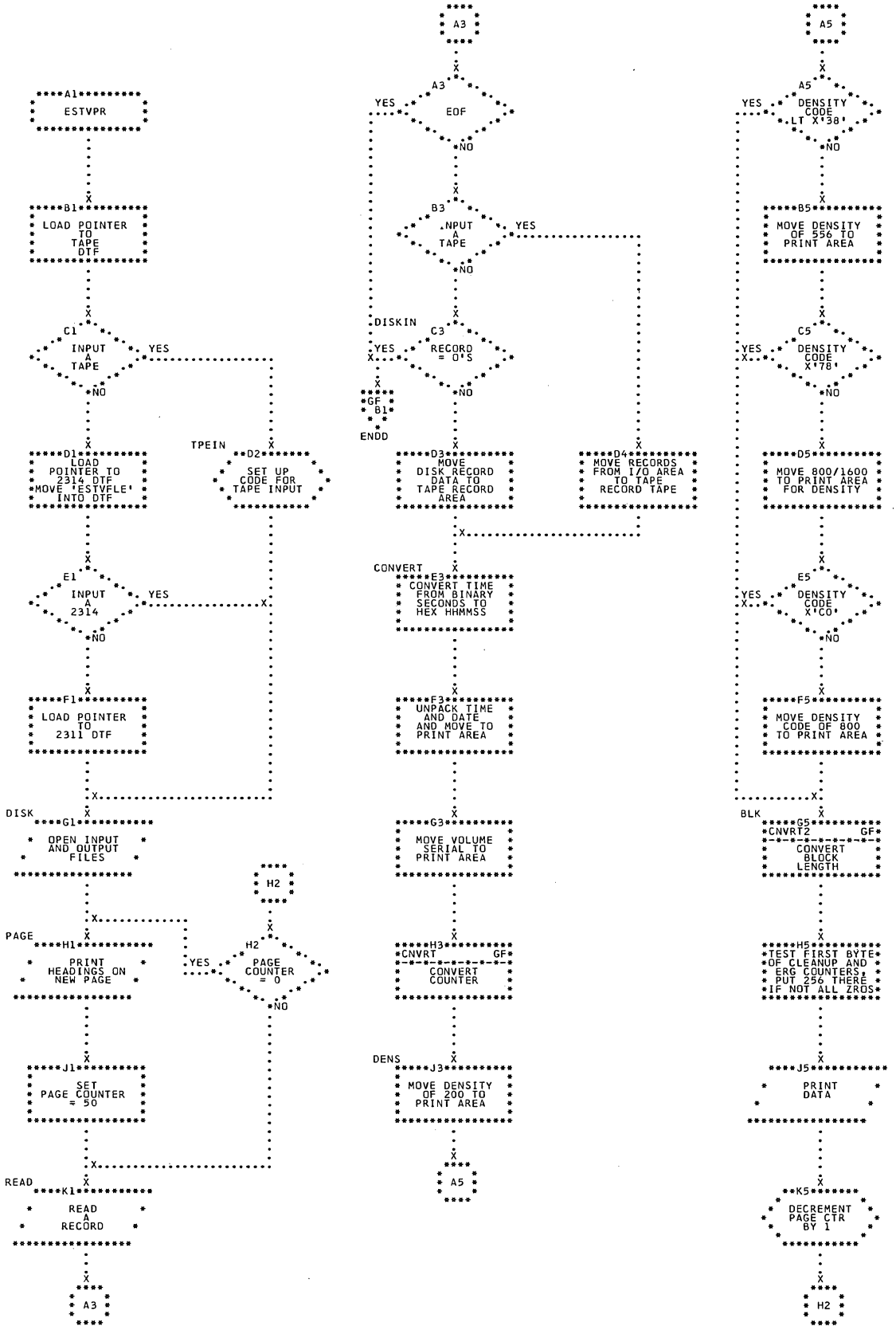
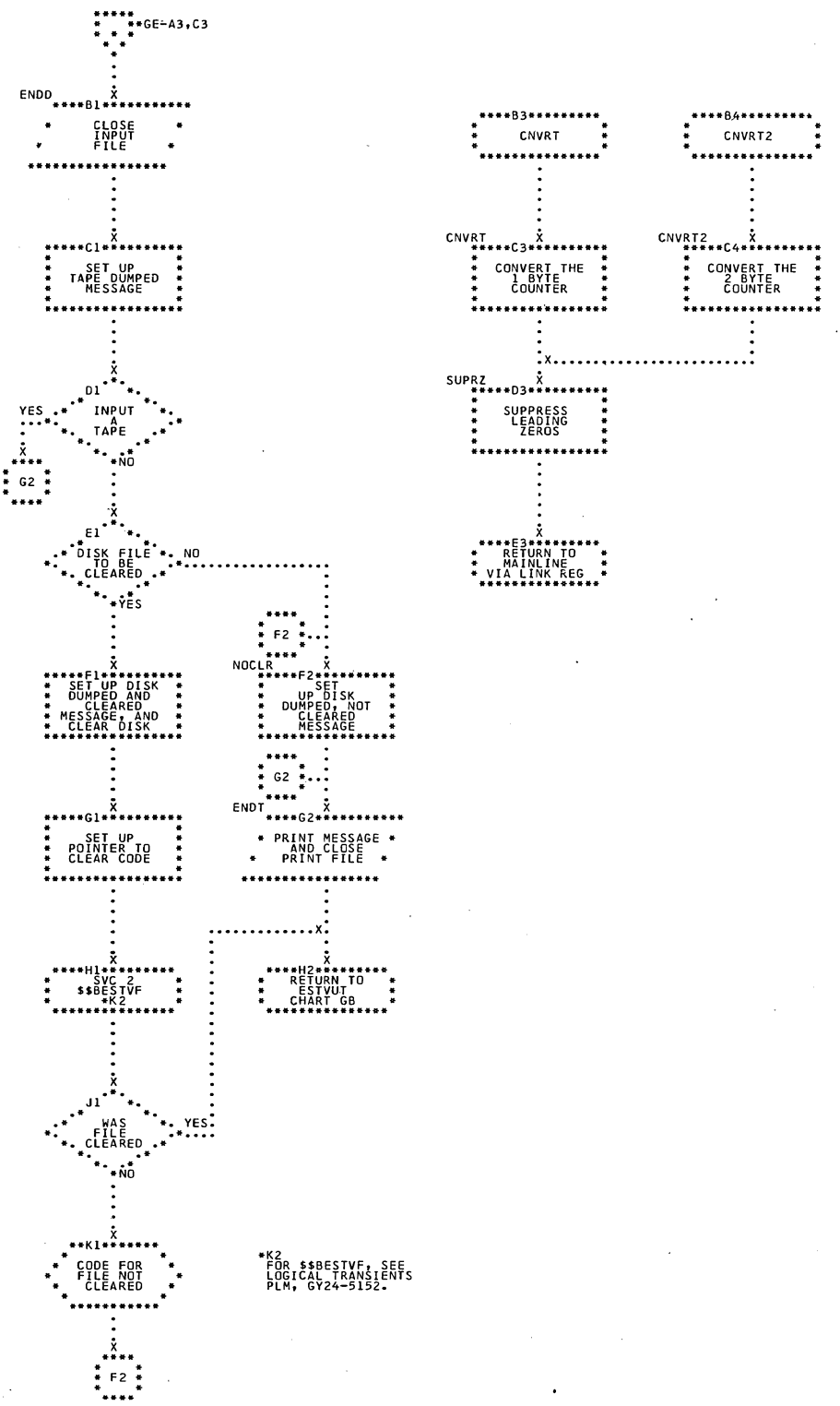


Chart GF. ESTVPR - Phase 2 of DOS ESTV File Dump (Part 2 of 2)
Refer to Chart 07.



EREP (Environmental Recording, Editing, and Printing)

The EREP (Environmental Recording, Editing, and Printing) programs edit, print, and maintain system environmental data stored on a Recorder File (SYSREC). The following records are stored on the Recorder File.

1. OBR (Outboard Recorder) records contain information on I/O errors not correctable by standard programmed error recovery.

2. SDR (Statistical Data Recorder) records contain cumulative error status of each I/O device on the system.

3. MCRR (Machine Check Recording and Recovery) records contain pertinent system control data about System/360 machine check and channel inboard errors.

4. RMS (Recovery Management Support) records contain error statistics about System/370 machine check and channel check (MCAR/CCH) errors.

5. IBM 2715 Errors

6. RDE (Reliability Data Extractor) information includes IPL and EOD (End Of Day) records for System/370.

OBR and SDR are initiated by specifying the I/O Error Log (ERRLOG) option. I/O Error Log is specified as a keyword operand in the SUPVR macro at system generation time. The MCRR option is also specified as a keyword operand in the SUPVR macro at system generation time. MCRR is used only with IBM System/360 models 30, 40, and 50. There are two MCRR record formats:

- Machine Check Interruptions
- Channel Inboard Errors.

RMS records apply only to System/370 and are similar to MCRR function for System/360. RMS builds records on SYSREC for EREP through two operations:

- MCAR (Machine Check Analysis and Recording)
- CCH (Channel Check Handler).

Recording on the Recorder File is suppressed while the EREP function is executing.

The EREP function is run as a problem program and is executed using standard job control language. This program is executed by the user or service representative whenever there is a need for environmental data. However, the operator may execute the EREP program when information recorded on the Recorder File is subject to loss. The operator is informed of this potential loss by an informational message, such as:

```
0T00I LAST TRACK ON RECORDER FILE or
0T01I cuu SDR RECORD OVERFLOWED or
1I93I RECORDER FILE IS xxx% FULL.
      [RUN EREP.]
```

You can execute EREP from card input or from the console typewriter (SYSLOG). After you enter // EXEC EREP, an operator message invites card or console responses. EREP then processes your options through the selected card or console method. See Figure 22, which summarizes valid option combinations.

EREP edits and displays records from the Recorder File in the following order.

1. Statistical Data Recording (SDR)

2. Outboard Recording (OBR)

3. Channel Inboard Error Records (MCRR) on System/360, or Channel Check Handler (CCH) on System/370

4. Machine Check Records (MCRR) on System/360, or Machine Check Analysis and Recording (MCAR) on System/370

5. Reliability Data Extractor (RDE)

6. IBM 2715 Error Records.

IBM 2715 records are printed in this order:

```
Disk adapter errors
2790 adapter errors
MPX adapter errors
2740 adapter errors
BSC adapter errors
Special code 70-75 errors
Area station errors
```

Recording on the Recorder File is suppressed when the EREP program is executed. SDR counters are reset after each record is processed. EREP prints records in the OBR and MCRR portions on the Recorder File on a first-in first-out basis beginning with the earliest real-time

entry; however, the OBR records are grouped by channel and unit. All information in the file is printed. The OBR, MCRR, MCAR, and 2715 portions of the Recorder File are reset by EREP only if CLEAR or HIST options are exercised.

RECORDER FILE

When OBR/SDR, MCAR/CCH, MCRR, or 2715 EREP records are desired, a Recorder File must be created. This file is assigned as SYSREC and must be an IBM 2311 or 2314 Direct Access Storage Device, or equivalent. The Recorder File is a data set that is defined by file definition statements kept on the standard labels section of the label cylinder of SYSRES. The Recorder File requires a minimum of two tracks of disk storage.

The Recorder File must be created immediately following IPL. Once created, the file is opened and updated without further assignment and definition. When the system is closed down, the operator must issue the Record on Demand (ROD) command to assure that statistical data in core storage is recorded on the Recorder File.

Information in the Recorder File can be eliminated by rebuilding the Recorder File. This is done using the job control SET command with the RF=CREATE operand. Or, you may execute the CLEAR opton in the EREP program.

EREP PHASES

Four major phases make up the EREP function:

- EREP - handles options and fetches the appropriate phase.
- EREPEDIT - performs edit and print operations.
- EREPHIST - creates and updates output tape files (history and RDE).
- EREPCLR - CLEARS SYSREC of records.

The EREP function requires a minimum of 10K for operation (Figure 21).

EREP, Option Handler Phase: EREP is called into storage when // EXEC EREP is read. It functions as a control phase. This phase has three major functions:

1. read and diagnose option statements,
2. queue valid options and indicate the parameters entered with them by posting appropriate bits in a parameter switch in the EREP communications region, and
3. dequeue options from the queue and fetch the proper phase to process it.

The option handler suppresses all recording on the Recorder File while EREP is executing. It accepts option input from either SYSIPT or SYSLOG. The EREP phase issues messages about option handling, status of operations, and error conditions.

EREP queues options in the EREP communications region along with parameter settings when specified. Each option is dequeued sequentially.

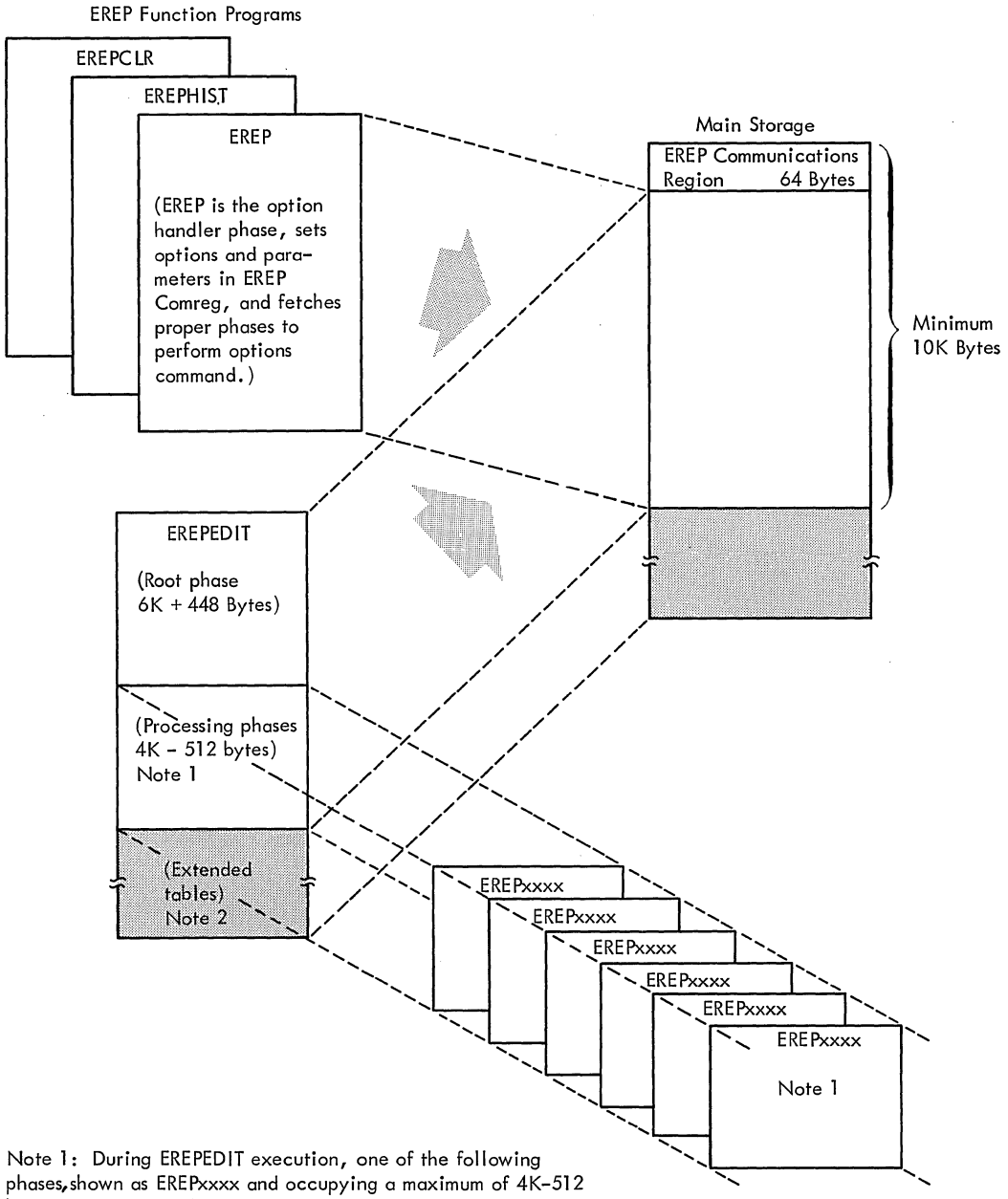
EREP fetches the proper phase to perform the option. When the option is completed, the phase fetches EREP, which dequeues the following option and fetches its phase. This procedure continues until the option queue is empty. EREP frees the Recorder File to record more errors and goes to EOJ.

EREPEDIT, Edit and Print Phase: Option EDIT (or the default effect of no option) selects EREPEDIT phase. The phase edits and prints all data sets from the Recorder File. It handles all SYSREC entries until no further valid entries are encountered. If the first eighty bytes of a record are absent, the entire data set is ignored. EREPEDIT prints on SYSLST.

EREPEDIT occupies an area 6K+448 bytes of storage. It fetches, into an approximately 4K area, successive phases to help process various types of records (Figure 21).

EREPHIST, History File Processor: Option HIST invokes this phase and updates a history tape file. It reads SYSREC files. EREPHIST creates new history tape files from the parameter NEW. If ,2 is specified with HIST,NEW or HIST, a second tape (identical to the first) is processed. The second tape is used for RDE data. OPTION UPNEW causes a tape (history or RDE) to be updated and then a new tape is created. This phase converts records on the OBR/MCAR/CCH portion of SYSREC to variable-length record format, and writes them on tape.

EREPCLR, Clear Recorder File Records Phase: Option CLEAR removes all records from SYSREC. It automatically executes after the HIST option. If it is the only option specified, the edit and print function is forced on before the clear function destroys the SYSREC file.



Note 1: During EREPEDIT execution, one of the following phases, shown as EREPxxxx and occupying a maximum of 4K-512 bytes, is in core with EREPEDIT root phase:

EREPSDR	EREPCI40	EREPLOG4	EREPCI45
EREPOBR	EREPMC40	EREPLOG5	EREPMC45
EREPCI30	EREPCI50	EREP2715	EREPLOG6
EREPCI55	EREPMC50	EREPASSM	EREPLOG7
EREPMC55	EREPLOG1	EREPIPL	EREPLOG8
EREPLST	EREPLOG2	EREPIFA	EREPLOG9
EREPMC30	EREPLOG3	EREPMPX	EREPSEL

Each of these phases either uses root phase EREPEDIT routines, or is used by the root phase. Phases listed that are not included in the detail flowcharts section (for example, EREPSDR) are tables or lists used by the root phase.

Note 2: The extended table area in EREPEDIT, is used by the EREP2715 summary phase (see chart 18) to increase the maximum number of records provided for area station/device combinations (from 60 in a 10K partition to 100 in a 12K or greater partition).

Figure 21. EREP Main Storage Map

Option Statements	EREP Response
None	1. Edits and prints file
EDIT	1. Edits and prints file
CLEAR	1. Edits and prints file 2. Clears file
HIST,NEW[,2]	1. Creates new history [and RDE] file(s) 2. Edits and prints file 3. Clears file
HIST[,2]	1. Updates history [and RDE] file(s) 2. Edits and prints file 3. Clears file
EDIT HIST[,2]	1. Edits and prints file 2. Updates history [and RDE] file(s) 3. Clears file
HIST[,2] EDIT	1. Updates history [and RDE] file(s) 2. Edits and prints file 3. Clears file
EDIT CLEAR	1. Edits and prints file 2. Clears file
HIST,UPNEW	1. Updates a history [or RDE] file 2. Creates a history [or RDE] file 3. Edits and prints file 4. Clears file

Figure 22. EREP Option Summary

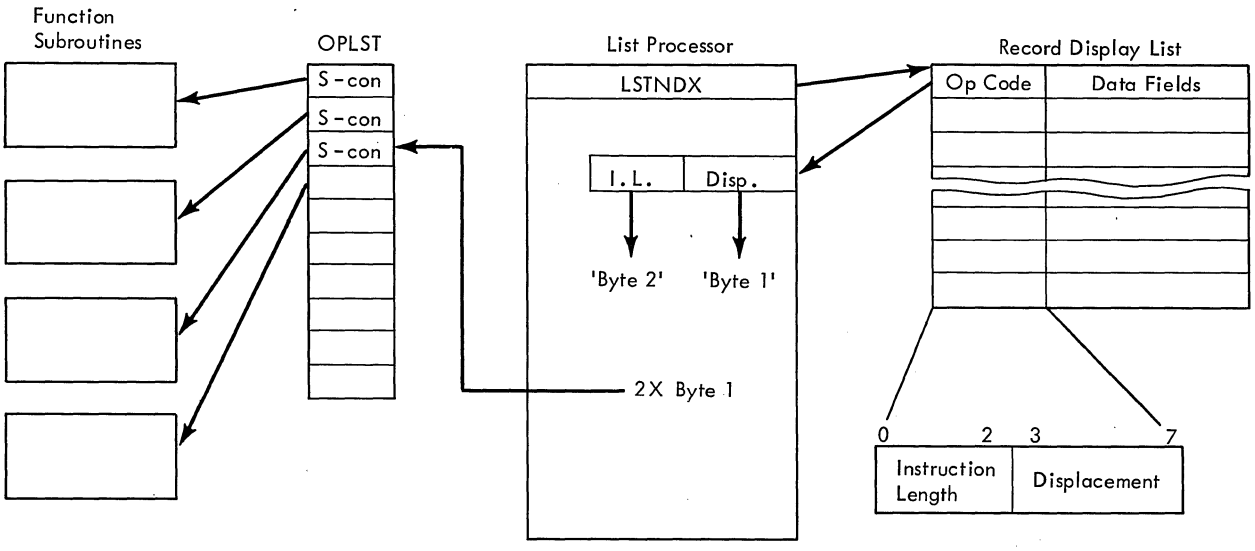
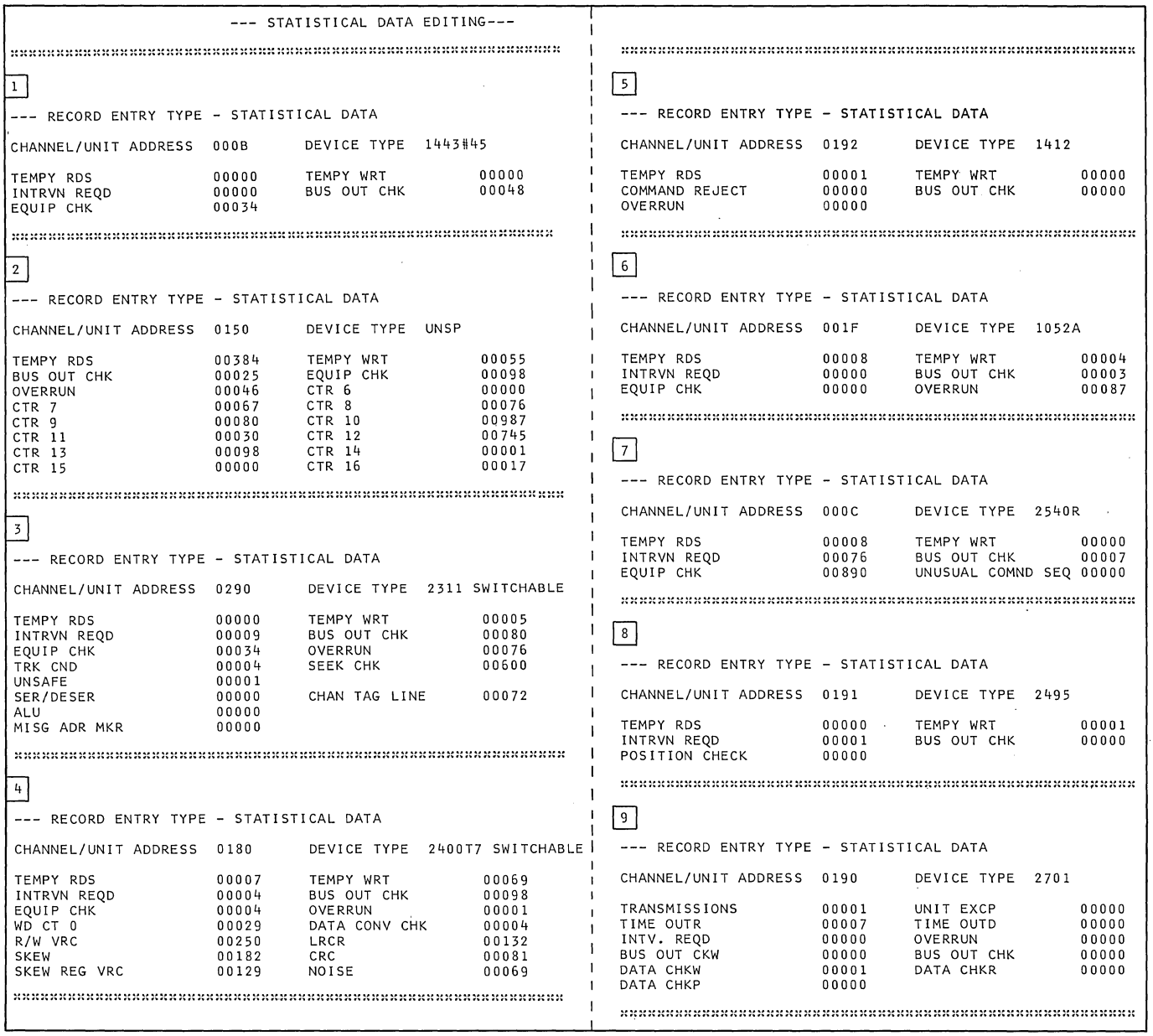


Figure 23. EREPEDIT List Processing



```
                    --- STATISTICAL DATA EDITING---

**********************************************************************

1

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  000B      DEVICE TYPE  1443#45

TEMPY RDS             00000     TEMPY WRT          00000
INTRVN REQD           00000     BUS OUT CHK        00048
EQUIP CHK             00034

**********************************************************************

2

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0150      DEVICE TYPE  UNSP

TEMPY RDS             00384     TEMPY WRT          00055
BUS OUT CHK           00025     EQUIP CHK          00098
OVERRUN               00046     CTR 6              00000
CTR 7                 00067     CTR 8              00076
CTR 9                 00080     CTR 10             00987
CTR 11                00030     CTR 12             00745
CTR 13                00098     CTR 14             00001
CTR 15                00000     CTR 16             00017

**********************************************************************

3

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0290      DEVICE TYPE  2311 SWITCHABLE

TEMPY RDS             00000     TEMPY WRT          00005
INTRVN REQD           00009     BUS OUT CHK        00080
EQUIP CHK             00034     OVERRUN            00076
TRK CND               00004     SEEK CHK           00600
UNSAFE                00001
SER/DESER             00000     CHAN TAG LINE      00072
ALU                   00000
MISG ADR MKR          00000

**********************************************************************

4

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0180      DEVICE TYPE  2400T7 SWITCHABLE

TEMPY RDS             00007     TEMPY WRT          00069
INTRVN REQD           00004     BUS OUT CHK        00098
EQUIP CHK             00004     OVERRUN            00001
WD CT 0               00029     DATA CONV CHK      00004
R/W VRC               00250     LRCR               00132
SKEW                  00182     CRC                00081
SKEW REG VRC          00129     NOISE              00069

**********************************************************************

**********************************************************************

5

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0192      DEVICE TYPE  1412

TEMPY RDS             00001     TEMPY WRT          00000
COMMAND REJECT        00000     BUS OUT CHK        00000
OVERRUN               00000

**********************************************************************

6

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  001F      DEVICE TYPE  1052A

TEMPY RDS             00008     TEMPY WRT          00004
INTRVN REQD           00000     BUS OUT CHK        00003
EQUIP CHK             00000     OVERRUN            00087

**********************************************************************

7

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  000C      DEVICE TYPE  2540R

TEMPY RDS             00008     TEMPY WRT          00000
INTRVN REQD           00076     BUS OUT CHK        00007
EQUIP CHK             00890     UNUSUAL COMND SEQ  00000

**********************************************************************

8

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0191      DEVICE TYPE  2495

TEMPY RDS             00000     TEMPY WRT          00001
INTRVN REQD           00001     BUS OUT CHK        00000
POSITION CHECK        00000

**********************************************************************

9

--- RECORD ENTRY TYPE - STATISTICAL DATA

CHANNEL/UNIT ADDRESS  0190      DEVICE TYPE  2701

TRANSMISSIONS         00001     UNIT EXCP          00000
TIME OUTR             00007     TIME OUTD          00000
INTV. REQD            00000     OVERRUN            00000
BUS OUT CKW           00000     BUS OUT CHK        00000
DATA CHKW             00001     DATA CHKR          00000
DATA CHKP             00000

**********************************************************************
```

A - UNIVSDR - List used for all SDR records. Sets up record headings, channel/unit and device types.
B - RETURNU - List which sets up sense counter information applicable to most devices

1 - UNTRCD List
2 - UNSPDEV List
3 - DASDLST
4 - TAPELST
5 - MICRLST
6 - CONSOLE List
7 - RDPCH List
8 - CARTAP List
9 - TPLIST

Figure 24. SDR Records Formatted by EREPSDR Lists

```
                                --- OUTBOARD EDITING ---

**********************************************************************************************************

                        PROGRAM IDENTITY - EXEC                          DAY  YEAR          HH MM SS
                                                                  DATE - 354   68    TIME - 10 05 17
CHANNEL/UNIT ADDRESS  0190          DEVICE TYPE  2311
LOGICAL UNIT - SYS009                       DASD ADDRESS - BB= 0000 CC= 00BE HH= 0000

             CC   DA     FL     CT
FIRST CCW    07 0030F6  40 00 0006                                      K   CA     US CS  CT
FAILING CCW  12 003150  00 00 0008                              CSW     00 003130  OE 40 0008

             --- UNIT STATUS ---                          --- CHANNEL STATUS ---
ATTENTION         0          CHANNEL END       1         PRGM-CTLD IRPT   0          CHAN DATA CHECK   0
STATUS MODIFIER   0          DEVICE END        1         INCORRECT LENGTH 1          CHAN CTL CHECK    0
CONTROL UNIT END  0          UNIT CHECK        1         PROGRAM CHECK    0          I/F CTL CHECK     0
BUSY              0          UNIT EXCEPTION    0         PROTECTION CHECK 0          CHAINING CHECK    0


SENSE BYTE DATA
  BYTE 0   BYTE 1   BYTE 2   BYTE 3   BYTE 4   BYTE 5
  00000100 00000000 00000000 11001000 00000000 00000000

**********************************************************************************************************

                        PROGRAM IDENTITY - TAPE                          DAY  YEAR          HH MM SS
                                                                  DATE - 007   69    TIME - 14 31 14
CHANNEL/UNIT ADDRESS  0285          DEVICE TYPE  2400T9
LOGICAL UNIT - SYS005               MODE C0
VOLUME I.D. -

             CC   DA     FL     CT
FIRST CCW    02 003BFE  00 00 0050                                      K   CA     US CS  CT
FAILING CCW  02 003BFE  00 00 0050                              CSW     00 003EF0  0C 08 0000

             --- UNIT STATUS ---                          --- CHANNEL STATUS ---
ATTENTION         0          CHANNEL END       1         PRGM-CTLD IRPT   0          CHAN DATA CHECK   1
STATUS MODIFIER   0          DEVICE END        1         INCORRECT LENGTH 0          CHAN CTL CHECK    0
CONTROL UNIT END  0          UNIT CHECK        0         PROGRAM CHECK    0          I/F CTL CHECK     0
BUSY              0          UNIT EXCEPTION    0         PROTECTION       0          CHAINING CHECK    0

SENSE BYTE DATA
   BYTE 0   BYTE 1   BYTE 2   BYTE 3   BYTE 4   BYTE 5
  00000000 00000000 00000000 00000000 00000000 00000000

**********************************************************************************************************
```

Figure 25. OBR Records Formatted by EREPOBR Lists

```
MODEL 30                              PROGRAM IDENTITY - TESTCASE

CHANNEL/UNIT ADDRESS  0181                                          DAY  YEAR          HH MM SS
                                                                DATE - 022   69    TIME - 00 01 36
             CC   DA    FL     CT                                          K   CA    US CS  CT
FIRST CCW    07 0030F6 40 00 0006                                    CSW   00 003128 OE 00 001F
FAILING CCW  06 00307A 60 00 0025

               --- UNIT STATUS ---                                --- CHANNEL STATUS ---
ATTENTION           1          CHANNEL END      0          PRGM-CTLD IRPT    1          CHAN DATA CHECK 0
STATUS MODIFIER     1          DEVICE END       0          INCORRECT LENGTH  1          CHAN CTL CHECK  0
CONTROL UNIT END    1          UNIT CHECK       0          PROGRAM CHECK     1          I/F CTL CHECK   0
BUSY                1          UNIT EXCEPTION   1          PROTECTION CHECK  1          CHAINING CHECK  1

I/O UNITS IN USE AT TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  000C 000E 001F 0181 0182 0183 0184 0290 0291

LOGOUT BYTES 80 81 82 83 84 85 86 87 88 89 8A 8B
             00 00 00 00 00 00 00 00 00 60 0C 91

CAT NO. 60 BAD ADDR. OR STATUS BYTE ON INITIAL SELECT

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

MODEL 30                          PROGRAM IDENTITY - TESTFOUR

CHANNEL/UNIT ADDRESS 0291                                           DAY   YEAR          HH MM SS
                                                                DATE - 022    69      TIME - 00 00 01
             CC   DA    FL     CT
FIRST CCW    07 0030F6 40 00 0006                                          K   CA    US CS  CT
FAILING CCW  12 003150 00 00 0008                                    CSW     00 003130 OE 40 0008

               --- UNIT STATUS ---                                --- CHANNEL STATUS ---
ATTENTION           1          CHANNEL END      0          PRGM-CTLD IRPT    1          CHAN DATA CHECK 0
STATUS MODIFIER     1          DEVICE END       0          INCORRECT LENGTH  1          CHAN CTL CHECK  0
CONTROL UNIT END    0          UNIT CHECK       1          PROGRAM CHECK     0          I/F CTL CHECK   1
BUSY                0          UNIT EXCEPTION   0          PROTECTION CHECK  0          CHAINING CHECK  1

I/O UNITS IN USE AT THE TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  000C 000E 001F 0180 0181 0182 0183 0184 0290 0291

LOGOUT BYTES 80 81 82 83 84 85 86 87 88 89 8A 8B
             00 00 00 00 00 F6 C8 CF 00 00 00 00

A REG CHECK          1                  SALS CHECK       0
B REG CHECK          1                  ROAR CHECK       1
M-N REG CHECK        1                  R REG CHECK      1
CNTRL REG CHECK      1                  ALU CHECK        0
```

Figure 26. Edited Channel Inboard Error Records (Model 30)

```
MODEL 30                        PROGRAM IDENTITY - PROGRAM1                  DAY  YEAR          HH MM SS
                                                                    DATE - 195   68    TIME - 00 00 17

I/O UNITS IN USE AT THE TIME OF FAILURE
CHANNEL/UNIT ADDRESSES 000C 000E 001F 0180 0181 0182 0185 0190 0191 0000

                          SM KS  IC  CM   IA
OLD MACHINE CHECK PSW     FF 01 02FF 04 002058

--- GENERAL PURPOSE REGISTERS ---

GP REGS 0-3    01 23 45 67    01 23 45 67    01 23 45 67    01 23 45 67
GP REGS 4-7    01 23 45 67    00 00 02 FE    00 00 02 FE    00 00 02 FE
GP REGS 8-B    00 00 02 FE    00 00 02 FE    00 00 02 FE    00 00 02 FE
GP REGS C-F    00 00 02 FE    00 00 02 FE    00 00 02 FF    00 00 02 FE

--- FLOATING POINT REGISTERS ---

FP REGS 0,2    00 00 00 00    11 22 33 44    00 00 00 00    11 22 33 44
FP REGS 4,6    00 00 00 00    11 22 33 44    00 00 12 12    12 12 12 12

LOGOUT BYTES 80 81 82 83 84 85 86 87 88 89 8A 8B
             A3 00 00 00 00 00 00 00 00 00 00 00

             MACHINE CHECK ERROR REGISTER

A REG CHECK          1                  SALS CHECK        0
B REG CHECK          0                  ROAR CHECK        0
M-N REG CHECK        1                  R REG CHECK       1
CNTRL REG CHECK      0                  ALU CHECK         1
```

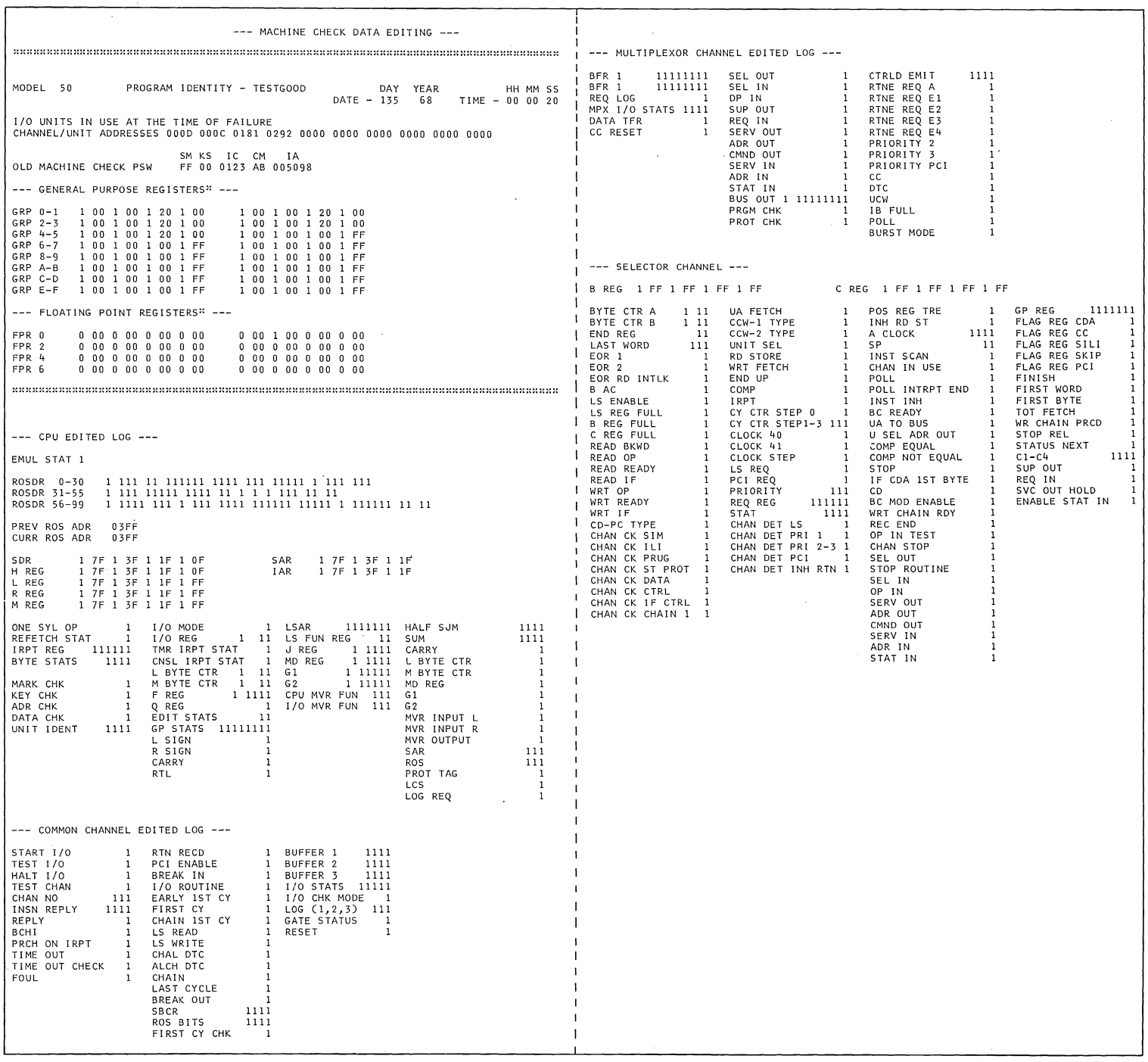
Figure 27. Edited Machine Check Record (Model 30)

```
MODEL 40                    PROGRAM IDENTITY - DF33B33

CHANNEL/UNIT ADDRESS 0280                                                    DAY  YEAR          HH MM SS
                                                                  DATE - 265   68    TIME - 00 01 27
            CC    DA    FL     CT
FIRST CCW   04 0040C0 20 00 0006                                              K   CA    US CS  CT
FAILING CCW 00 000000 00 00 0000                                    CSW   00 000000 00 00 0000


I/O UNITS IN USE AT THE TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  0280 0282 0000 0000 0000 0000 0000 0000 0000 0000


--- CHANNEL LOGOUT ---

ROBAR         1 0000     EARLY CK        0     CTRL CK        0     YA STATS       0000
A REG       0 00 00      LATE CK         0     ROS ADDR CK    0     YB STATS       0000
B REG         00 00      RX PTY CK       1     ROS DATA CK    0     FUNCT REG  0 01000
C REG       0 00 00      R0 PTY CK       0     B DEC CK       0     INH DUMP Y8       0
D REG         00 00      R1 PTY CK       0     C DEC CK       0     SKEW REF       0000
J REG            00      MSAB PTY CK     0     D DEC CK       0
H REG            00      ROAR CK         0     H LOAD DEC CK  0
P REG            00      LS RD PTY CK    0     H DES DEC CK   0
Q REG            00      D0 PTY CK       1     H INC DEC CK   0
LS 43-INST BUF   00      D1 PTY CK       0     J DEC CK       0     PMA               0
SPLS KEY       0000      SPLS KEY CK     1     N DEC CK       0     IMA               0
SPLS DATA      0000      SPLS DATA CK    0     P DEC CK       0     I/O               0
ALU EXT         000      STAT PTY CK     0     Q DEC CK       0     YCD               0
                         P PTY CK        0     R DEC CK       1     YCI               0
MPX INTRPT         0     Q PTY CK        0     D/Y8 CK        1     DPI               0
SC1 INTRPT         0     2-WIRE I-P CAR  0
SC2 INTRPT         1     2-WIRE I-P CAR  0
EXT INTRPT         0     ALU 2-W CKS    00
                         EX PTY CK       0
                         SQ SEL CK       0
                         ALU FUN CK      0
                         LSAR PTY CK     1

--- MULTIPLEXOR CHANNEL ---

CCW ADDR   00 00 00      CCK LOG INT     0     SEL OUT        0     I/F PTY           0
DATA ADDR  00 00 00      UF INT          0     SEL IN         0     I/F TAG           0
UNIT NO          00      END INT         0     ADDR OUT       0     I/O MODE          0
COUNT         00 00      PCI INT         0     ADDR IN        0     CHAN DATA         0
                         WLR             0     COM OUT        0     CHAN CTRL         0
MPX-ROAR     0 0 00      PGM CK          0     STAT IN        0     I/F CTRL          0
                         PROT CK         0     SER OUT        0     WLR WR            0
PMA                0     CDK             0     SER IN         0     I/F REG          00
IMA                0     CCK             0     OP OUT         0
CPU STATE          0     IFCC            0     OP IN          0
DAT                0     CLA             0     SUP OUT        0
                         CCW             0     REQ IN         0
                         SILI            0     SELECT         0
                         SKIP            0     INH SEL        0
                         PCI             0     UNIT UNOB      0
                         OP CODE       000     HLT I/O        0
                         CT ZERO         0
                         END             0


--- HIGH SPEED SELECTOR CHANNEL 1 ---

S REG        0 00 00     CDA             0     PCI            0     SEL OUT           0
T REG          00 00     CC              0     WLR            0     SEL IN            0
REF CCW AC   0 00 00     SILI            0     PGM CK         0     ADDR OUT          0
REF ADR WR   0 00 00     SKIP            0     PROT CK        0     ADDR IN           0
LS 25 WORK   0 00 00     CH Y3           0     CDK            0     COM OUT           0
LS 21 DREG   0 00 00     CH Y1           0     CCK            0     STAT IN           0
LS 20 AREG   0 00 00     RD/WR           0     ICC            0     SER OUT           0
UNIT NO            00    RD BACK         0     CHAIN          0     SER IN            0
                         LS 24 CH FLGS 00                           OP OUT            0
WC                 00    CHAIN FLGS 00000     CH SEL LATE    0     OP IN             0
W1                 00    BUF CT 0        0    T0 PTY CK      0     SUP OUT           0
W2                 00    BUF CT1         0    T1 PTY CK      0     REQ IN            0
W3                 00    BUF CT EQ       0    W0 PTY CK      0     SELECT            0
W4                 00    CHAN SP KEY 0000     BUS IN CK      0     INH SEL           0
                                              CCW FLGS CK    0     UNIT UNOB         0
                                              I/F TAG CK     0     HLT I/O           0

--- HIGH SPEED SELECTOR CHANNEL 2 --

S REG        0 00 00     CDA             0     PCI            0     SEL OUT           0
T REG          00 00     CC              0     WLR            0     SEL IN            0
REF CCW AD   0 00 00     SILI            0     PGM CK         0     ADDR OUT          0
REF ADR WR   0 00 00     SKIP            0     PROT CH        0     ADDR IN           0
LS 35 WORK   0 00 00     CH Y3           0     CDK            0     COM OUT           0
LS 31 DREG   0 00 00     CH Y1           0     CCK            0     STAT IN           0
LS 30 AREG   0 00 00     RD/WR           0     ICC            1     SER OUT           0
UNIT NO            80    RD BACK         0     CHAIN          0     SER IN            0
                         LS 34 CH FLGS 00                           OP OUT            0
WC                 00    CHAIN FLGS 00000     CH SEL LATE    0     OP IN             0
W1                 00    BUF CT 0        0    T0 PTY CK      0     SUP OUT           0
W2                 00    BUF CT 1        0    T1 PTY CK      0     REQ IN            0
W3                 00    BUF CT EQ       0    W0 PTY CK      0     SELECT            0
W4                 00    CHAN SP KEY 0000     BUS IN CK      0     INH SEL           0
                                              CCW FLGS CK    0     UNIT UNOB         0
                                              I/F TAG CK     0     HLT I/O           0
```

Figure 28. Edited Channel Inboard Error Record (Model 40)

```
MODEL 50                    PROGRAM IDENTITY - TESTCASE

CHANNEL/UNIT ADDRESS  0280*

                                                          DAY  YEAR              HH MM SS
            CC   DA    FL     CT                  DATE - 131   68       TIME - 01 17 06
FIRST CCW   FF 010006 AA 00 398E
FAILING CCW FF 00000E 00 49 9866                                 K   CA     US CS  CT
                                                      CSW        12 345678  90 12  3456
             --- UNIT STATUS* ---
                                                              --- CHANNEL STATUS* ---
ATTENTION          1        CHANNEL END     0       PRGM-CTLD IRPT    0        CHAN DATA CHECK  0
STATUS MODIFIER    0        DEVICE END      0       INCORRECT LENGTH  0        CHAN CTL CHECK   0
CONTROL UNIT END   0        UNIT CHECK      0       PROGRAM CHECK     0        I/F CTL CHECK    1
BUSY               1        UNIT EXCEPTION  0       PROTECTION CHECK  1        CHAINING CHECK   0

I/O UNITS IN USE AT THE TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  0280 0282 0000 0000 0000 0000 0000 0000 0000 0000

*****************************************************************************************************************


--- SELECTOR CHANNEL ---

B REG  0 01 1 23 1 45 1 67          C REG  0 01 1 23 1 45 1 67

BYTE CTR A    0 00   UA FETCH          0   POS REG TRE       0   GP REG     0000000
BYTE CTR B    0 00   CCW-1 TYPE       0   INH RD ST         0   FLAG REG CDA     0
END REG         00   CCW-2 TYPE       0   A CLOCK        0000   FLAG REG CC      1
LAST WORD      011   UNIT SEL         0   SP               00   FLAG REG SILI    0
EOR CT INTLK     0   RD STORE         0   INST SCAN         1   FLAG REG SKIP    0
EOR 1            1   WRT FETCH        0   CHAN IN USE       1   FLAG REG PCI     0
EOR 2            0   END UP           0   POLL              0   FINISH           1
EOR RD INTLK     0   COMP             0   POLL INTRPT END   0   FIRST WORD       1
B AC             0   IRPT             1   INST INH          1   FIRST BYTE       0
LS ENABLE        1   CY CTR STEP 0    1   BC READY          0   TOT FETCH        1
LS REG FULL      1   CY CTR STEP1-3 001   UA TO BUS         0   WR CHAIN PRCD    0
B REG FULL       1   CLOCK A0         0   U SEL ADR OUT     0   STOP REL         0
C REG FULL       0   CLOCK A1         0   COMP EQUAL        1   STATUS NEXT      1
READ BKWD        1   CLOCK STEP       0   COMP NOT EQUAL    1   C1-C4         0110
READ OP          0   LS REQ           1   STOP              1   SUP OUT          0
READ READY       0   PCI REQ          1   IF CDA 1ST BYTE   0   REQ IN           1
READ IF          0   PRIORITY       101   CD                1   SVC OUT HOLD     1
WRT OP           1   REQ REG   000101   BC MOD ENABLE     0   ENABLE STAT IN   1
WRT READY        0   STAT        1011   WRT CHAIN RDY     0
WRT IF           1   CHAN DET LS      0   REC END           0
CD-PC TYPE       1   CHAN DET PRI 1   0   OP IN TEST        1
CHAN CK SIM      0   CHAN DET PRI 2-3 1   CHAN STOP         0
CHAN CK ILI      1   CHAN DET PCI     1   SEL OUT           1
CHAN CK PROG     1   CHAN DET INH RTN 1   STOP ROUTINE      1
CHAN CK ST PROT  0                        SEL IN            0
CHAN CK DATA     0                        OP IN             1
CHAN CK CTRL     1                        SERV OUT          1
CHAN CK IF CTRL  1                        ADR OUT           0
CHAN CK CHAIN 1  1                        CMND OUT          0
                                          SERV IN           1
                                          ADR IN            1
                                          STAT IN           1
```

Figure 29. Edited Channel Inboard Error Record (Model 50 Short Record)



```
                                --- MACHINE CHECK DATA EDITING ---

MODEL  50        PROGRAM IDENTITY - TESTGOOD          DAY  YEAR          HH MM SS
                                                  DATE - 135   68    TIME - 00 00 20

I/O UNITS IN USE AT THE TIME OF FAILURE
CHANNEL/UNIT ADDRESSES 000D 000C 0181 0292 0000 0000 0000 0000 0000 0000

                        SM KS  IC  CM   IA
OLD MACHINE CHECK PSW   FF 00 0123 AB 005098

--- GENERAL PURPOSE REGISTERS* ---

GRP 0-1   1 00 1 00 1 20 1 00     1 00 1 00 1 20 1 00
GRP 2-3   1 00 1 00 1 20 1 00     1 00 1 00 1 20 1 00
GRP 4-5   1 00 1 00 1 20 1 00     1 00 1 00 1 00 1 FF
GRP 6-7   1 00 1 00 1 00 1 FF     1 00 1 00 1 00 1 FF
GRP 8-9   1 00 1 00 1 00 1 FF     1 00 1 00 1 00 1 FF
GRP A-B   1 00 1 00 1 00 1 FF     1 00 1 00 1 00 1 FF
GRP C-D   1 00 1 00 1 00 1 FF     1 00 1 00 1 00 1 FF
GRP E-F   1 00 1 00 1 00 1 FF     1 00 1 00 1 00 1 FF

--- FLOATING POINT REGISTERS* ---

FPR 0     0 00 0 00 0 00 0 00     0 00 1 00 0 00 0 00
FPR 2     0 00 0 00 0 00 0 00     0 00 0 00 0 00 0 00
FPR 4     0 00 0 00 0 00 0 00     0 00 0 00 0 00 0 00
FPR 6     0 00 0 00 0 00 0 00     0 00 0 00 0 00 0 00

--- CPU EDITED LOG ---

EMUL STAT 1

ROSDR  0-30   1 111 11 111111 1111 111 11111 1 111 111
ROSDR 31-55   1 111 11111 1111 11 1 1 1 111 11 11
ROSDR 56-99   1 1111 111 1 111 1111 111111 11111 1 111111 11 11

PREV ROS ADR   03FF
CURR ROS ADR   03FF

SDR       1 7F 1 3F 1 1F 1 0F          SAR    1 7F 1 3F 1 1F
H REG     1 7F 1 3F 1 1F 1 0F          IAR    1 7F 1 3F 1 1F
L REG     1 7F 1 3F 1 1F 1 FF
R REG     1 7F 1 3F 1 1F 1 FF
M REG     1 7F 1 3F 1 1F 1 FF

ONE SYL OP        1   I/O MODE          1  LSAR     1111111  HALF SUM          1111
REFETCH STAT      1   I/O REG       1   11  LS FUN REG   11  SUM               1111
IRPT REG     111111   TMR IRPT STAT     1  J REG     1 1111  CARRY                1
BYTE STATS     1111   CNSL IRPT STAT    1  MD REG     1 1111  L BYTE CTR           1
                      L BYTE CTR    1   11  G1        1 11111  M BYTE CTR           1
MARK CHK          1   M BYTE CTR    1   11  G2        1 11111  MD REG               1
KEY CHK           1   F REG        1 1111  CPU MVR FUN  111  G1                   1
ADR CHK           1   Q REG             1  I/O MVR FUN  111  G2                   1
DATA CHK          1   EDIT STATS       11                     MVR INPUT L          1
UNIT IDENT     1111   GP STATS   11111111                     MVR INPUT R          1
                      L SIGN            1                     MVR OUTPUT           1
                      R SIGN            1                     SAR                111
                      CARRY             1                     ROS                111
                      RTL               1                     PROT TAG             1
                                                              LCS                  1
                                                              LOG REQ              1

--- COMMON CHANNEL EDITED LOG ---

START I/O         1   RTN RECD          1  BUFFER 1     1111
TEST I/O          1   PCI ENABLE        1  BUFFER 2     1111
HALT I/O          1   BREAK IN          1  BUFFER 3     1111
TEST CHAN         1   I/O ROUTINE       1  I/O STATS   11111
CHAN NO         111   EARLY 1ST CY      1  I/O CHK MODE    1
INSN REPLY     1111   FIRST CY          1  LOG (1,2,3)   111
REPLY             1   CHAIN 1ST CY      1  GATE STATUS     1
BCHI              1   LS READ           1  RESET           1
PRCH ON IRPT      1   LS WRITE          1
TIME OUT          1   CHAL DTC          1
TIME OUT CHECK    1   ALCH DTC          1
FOUL              1   CHAIN             1
                      LAST CYCLE        1
                      BREAK OUT         1
                      SBCR           1111
                      ROS BITS       1111
                      FIRST CY CHK      1

--- MULTIPLEXOR CHANNEL EDITED LOG ---

BFR 1      11111111   SEL OUT           1   CTRLD EMIT     1111
BFR 1      11111111   SEL IN            1   RTNE REQ A        1
REQ LOG           1   DP IN             1   RTNE REQ E1       1
MPX I/O STATS  1111   SUP OUT           1   RTNE REQ E2       1
DATA TFR          1   REQ IN            1   RTNE REQ E3       1
CC RESET          1   SERV OUT          1   RTNE REQ E4       1
                      ADR OUT           1   PRIORITY 2        1
                      CMND OUT          1   PRIORITY 3        1
                      SERV IN           1   PRIORITY PCI      1
                      ADR IN            1   CC                1
                      STAT IN           1   DTC               1
                      BUS OUT 1 11111111    UCW               1
                      PRGM CHK          1   IB FULL           1
                      PROT CHK          1   POLL              1
                                            BURST MODE        1

--- SELECTOR CHANNEL ---

B REG  1 FF 1 FF 1 FF 1 FF          C REG  1 FF 1 FF 1 FF 1 FF

BYTE CTR A     1 11   UA FETCH          1   POS REG TRE       1   GP REG     1111111
BYTE CTR B     1 11   CCW-1 TYPE        1   INH RD ST         1   FLAG REG CDA      1
END REG          11   CCW-2 TYPE        1   A CLOCK        1111   FLAG REG CC       1
LAST WORD       111   UNIT SEL          1   SP               11   FLAG REG SILI     1
EOR 1             1   RD STORE          1   INST SCAN         1   FLAG REG SKIP     1
EOR 2             1   WRT FETCH         1   CHAN IN USE       1   FLAG REG PCI      1
EOR RD INTLK      1   END UP            1   POLL              1   FINISH            1
B AC              1   COMP              1   POLL INTRPT END   1   FIRST WORD        1
LS ENABLE         1   IRPT              1   INST INH          1   FIRST BYTE        1
LS REG FULL       1   CY CTR STEP 0     1   BC READY          1   TOT FETCH         1
B REG FULL        1   CY CTR STEP1-3  111   UA TO BUS         1   WR CHAIN PRCD     1
C REG FULL        1   CLOCK 40          1   U SEL ADR OUT     1   STOP REL          1
READ BKWD         1   CLOCK 41          1   COMP EQUAL        1   STATUS NEXT       1
READ OP           1   CLOCK STEP        1   COMP NOT EQUAL    1   C1-C4          1111
READ READY        1   LS REQ            1   STOP              1   SUP OUT           1
READ IF           1   PCI REQ           1   IF CDA 1ST BYTE   1   REQ IN            1
WRT OP            1   PRIORITY        111   CD                1   SVC OUT HOLD      1
WRT READY         1   REQ REG      111111   BC MOD ENABLE     1   ENABLE STAT IN    1
WRT IF            1   STAT           1111   WRT CHAIN RDY     1
CD-PC TYPE        1   CHAN DET LS       1   REC END           1
CHAN CK SIM       1   CHAN DET PRI 1    1   OP IN TEST        1
CHAN CK ILI       1   CHAN DET PRI 2-3  1   CHAN STOP         1
CHAN CK PRUG      1   CHAN DET PCI      1   SEL OUT           1
CHAN CK ST PROT   1   CHAN DET INH RTN  1   STOP ROUTINE      1
CHAN CK DATA      1                         SEL IN            1
CHAN CK CTRL      1                         OP IN             1
CHAN CK IF CTRL   1                         SERV OUT          1
CHAN CK CHAIN 1   1                         ADR OUT           1
                                            CMND OUT          1
                                            SERV IN           1
                                            ADR IN            1
                                            STAT IN           1
```

Figure 30. Edited Machine Check Record (Model 50)

```
                                        2715 ERROR LOG DATA EDITING

DISK ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 02030303
DISK ADAPTER ERROR LOG   CUA 0172  ID 04      DAY 287  TIME 11.23   ERRORS 02030303

DISK ADAPTER ERROR LOG   CUA 0170  ID 01      DAY 222  TIME 01.33   ERRORS 00050505

2790 ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 11F1F2F3
2790 ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 10F1F2F3

2790 ADAPTER ERROR LOG   CUA 0170  ID 01      DAY 222  TIME 01.33   ERRORS 11020202

MPX  ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 11.23   ERRORS 22F1F2F3
MPX  ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 23F1F2F3

MPX  ADAPTER ERROR LOG   CUA 0170  ID 01      DAY 222  TIME 01.33   ERRORS 22070707

2740 ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 11.23   ERRORS 33F1F2F3
2740 ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 30F1F2F3

2740 ADAPTER ERROR LOG   CUA 0170  ID 01      DAY 222  TIME 01.43   ERRORS 33080808

BSC  ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 11.23   ERRORS 44F1F2F3
BSC  ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 11.23   ERRORS 44444444
BSC  ADAPTER ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 11.23   ERRORS 44444444

SPECIAL CODE 71 AREA STAT 40  ERROR TYPE- ERROR COUNTER THRESHOLD WAS REACHED     CUA 0170  ID 04  DAY 287  TIME 01.23
SPECIAL CODE 75 ROUTINE   F1  ERROR TYPE- BSC ON LINE TEST WAS REQUESTED         CUA 0170  ID 04  DAY 287  TIME 01.23

SPECIAL CODE 74 AREA STAT 40  ERROR TYPE- AREA STATION EXERCISOR WAS REQUESTED   CUA 0170  ID 01  DAY 222  TIME 01.43

AS 80 DEV F1 ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 80F132F3  CHANGE IN DATA BYTE
AS F0 DEV F1 ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS F0F172F3  NULL ACKNWLDG OVERRN
AS 80 DEV F1 ERROR LOG   CUA 0170  ID 04      DAY 287  TIME 01.23   ERRORS 80F142F3  CHNGE IN STATUS BYTE

AS 85 DEV 00 ERROR LOG   CUA 0170  ID 01      DAY 287  TIME 11.23   ERRORS 85002356  INVALID A-S RESPONSE

AS 94 DEV F1 ERROR LOG   CUA 0172  ID 04      DAY 287  TIME 01.23   ERRORS 94F152F3  END REQST STATUS ERR

AS 80 DEV F1 ERROR LOG   CUA 0173  ID 04      DAY 287  TIME 11.23   ERRORS 80F132F3  CHANGE IN DATA BYTE
```

Figure 31. Sample Output by EREP2715

```
                                2715 ERROR LOG DATA EDITING


 AREA STATION ERROR SUMMARY  CUA - 0170      ID - 04
AS  DEV  -(0)------(1)------(2)------(3)------(4)------(5)------(6)------(7)------(8)------(9)
***ERROR LOG IS PRINTED BY AREA STATION ONLY AS AREA STATION-DEVICE COMBINATIONS EXCEED LIMITS***
80        0000     0000     0000     0000     0001     0256     0001     0000     0000     0000
90        0000     0000     0000     0000     0001     0512     0000     0001     0000     0000
A0        0000     0000     0000     0000     0000     0769     0000     0001     0000     0000
B0        0000     0000     0000     0001     0000     0000     0001     0000     0000     0000
C0        0000     0000     0000     0000     0001     0512     0001     0000     0001     0001
D0        0000     0000     0000     0000     0001     0200     0000     0000     0000     0000
E0        0000     0000     0000     0000     0002     0512     0000     0000     0000     0000
F0        0002 RECORDS PROCESSED


                                2715 ERROR LOG DATA EDITING


 AREA STATION ERROR SUMMARY  CUA - 0171      ID - 04
AS  DEV  -(0)------(1)------(2)------(3)------(4)------(5)------(6)------(7)------(8)------(9)
B4   04   0001     0000     0000     0000     0000     0000     0000     0000     0000     0000
C1   01   0000     0000     0001     0000     0000     0000     0000     0000     0000     0000
E1   06   0000     0001     0000     0000     0000     0000     0000     0000     0000     0000
E2   02   0000     0001     0000     0000     0000     0000     0000     0000     0000     0000
E3   01   0000     0001     0000     0000     0000     0000     0000     0000     0000     0000
E3   02   0000     0000     0002     0001     0000     0000     0000     0000     0000     0000
E3   03   0001     0000     0001     0000     0000     0000     0000     0000     0000     0000
E3   12   0000     0000     0000     0001     0000     0000     0000     0000     0000     0000
E3   93   0000     0000     0000     0000     0000     0000     0000     0000     0000     0001
E3   C2   0000     0000     0000     0000     0000     0000     0000     0000     0001     0000
E3   F1   0000     0000     0000     0001     0000     0000     0000     0000     0000     0000
```

Figure 32. Sample Area Station/Device Record Output by EREPASSM

0 (Decimal Displacement)	1	3	5	12	16	20	24	28	32	36	40	47	51	55	59	63	67	71	75	79
0 (Hexadecimal Displacement)	1	3	5	C	10	14	18	1C	20	24	28	2F	33	37	3B	3F	43	47	4B	4F
2715 Error	Chan & Unit	Sta Id	Day and Time	Seven Logical Error Records							Day and Time	Seven Logical Error Records							Re-served	
X'08'	XX	XX	XXXXXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXXXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	X'FF'

Key to Displacements (in Decimal)

0 X'08' identifies this as a 2715 error record.

1 Channel and unit address.

3 Station identification number, terminal if multidrop line.

5 Seven byte transaction header in the form $dddt_1t_1t_2t_2$ where

ddd = day of the year

t_1t_1 = hour of the day

t_2t_2 = minutes

12 Seven four-byte logical records. The first byte identifies the type of error as follows:

X'0n' Disk adapter error (See part 2 of this figure.)

X'1n' 2790 adapter error (See part 2 of this figure.)

X'2n' MPX adapter error (See part 3 of this figure.)

X'3n' 2740 adapter error (See part 3 of this figure.)

X'4n' BSC adapter error (See part 4 of this figure.)

X'7n' Special codes 70-75 (See part 4 of this figure.)

70 - Error counters were reset to zero

71 - Error counter threshold was reached

72 - Error scan was initiated

73 - Area station diagnostics

74 - Area station exercisor was requested

75 - BSC on-line test was requested

X'8n'-X'Fn' Area station errors (See part 5 of this figure.)

40 Same as 5-11

47 Same as 12-39

75 Four bytes reserved

79 Always X'FF'

Note: The logical records may be any combination of types as shown in displacements 12-39.

Figure 33. Format of 2715 Error Records on SYSREC (Part 1 of 5)

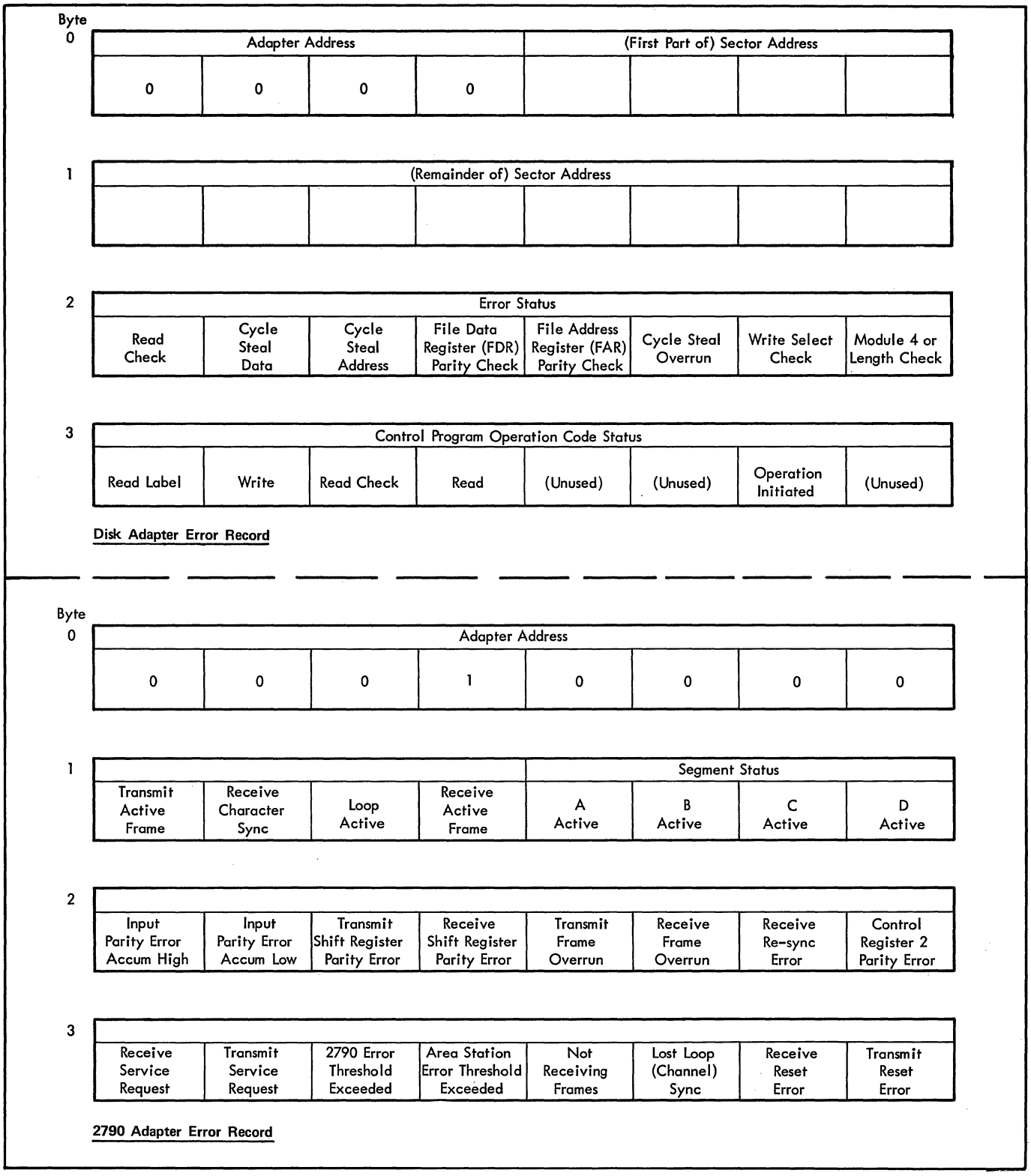


Figure 33. Format of 2715 Error Records on SYSREC (Part 2 of 5)

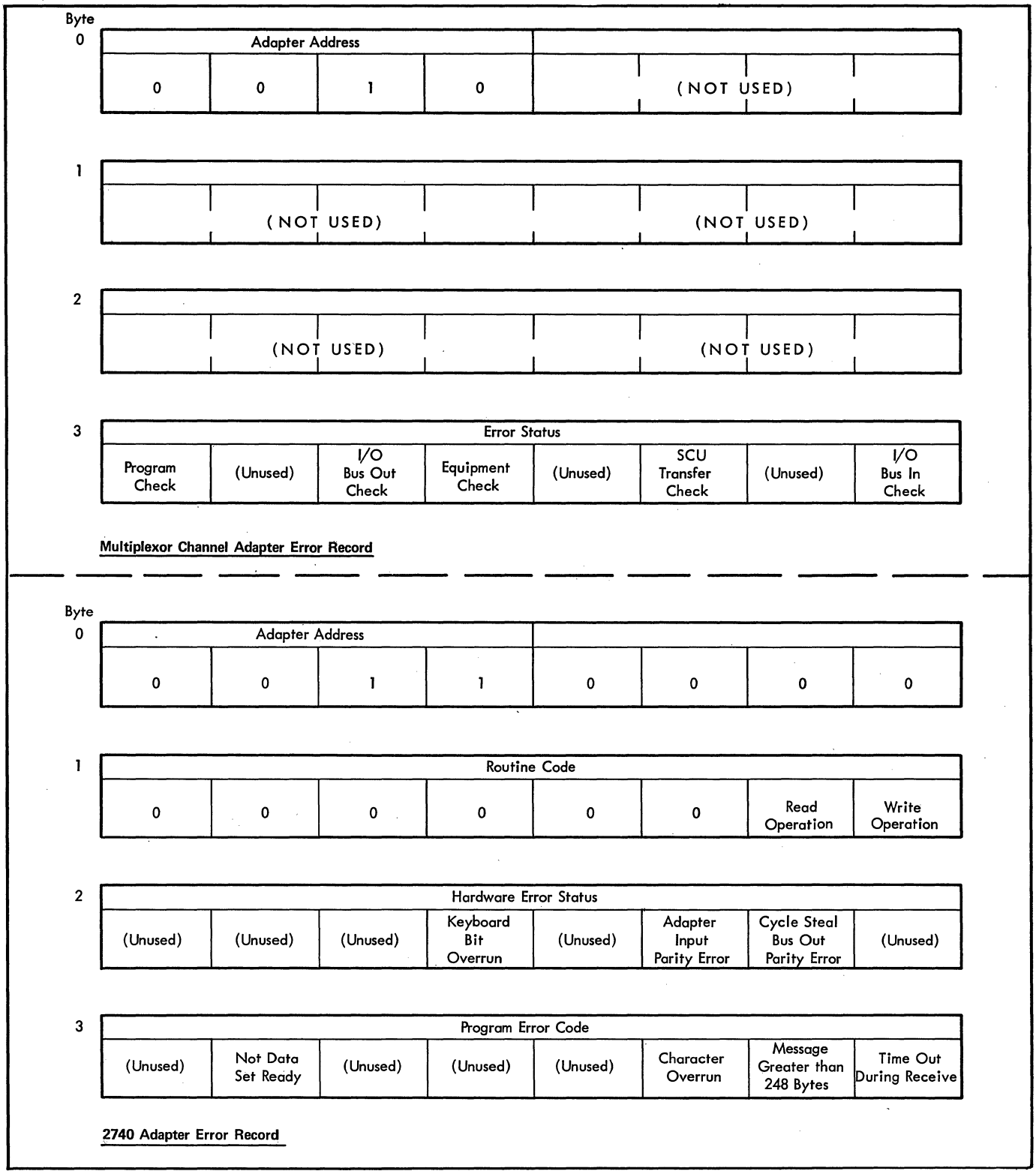


Figure 33. Format of 2715 Error Records on SYSREC (Part 3 of 5)

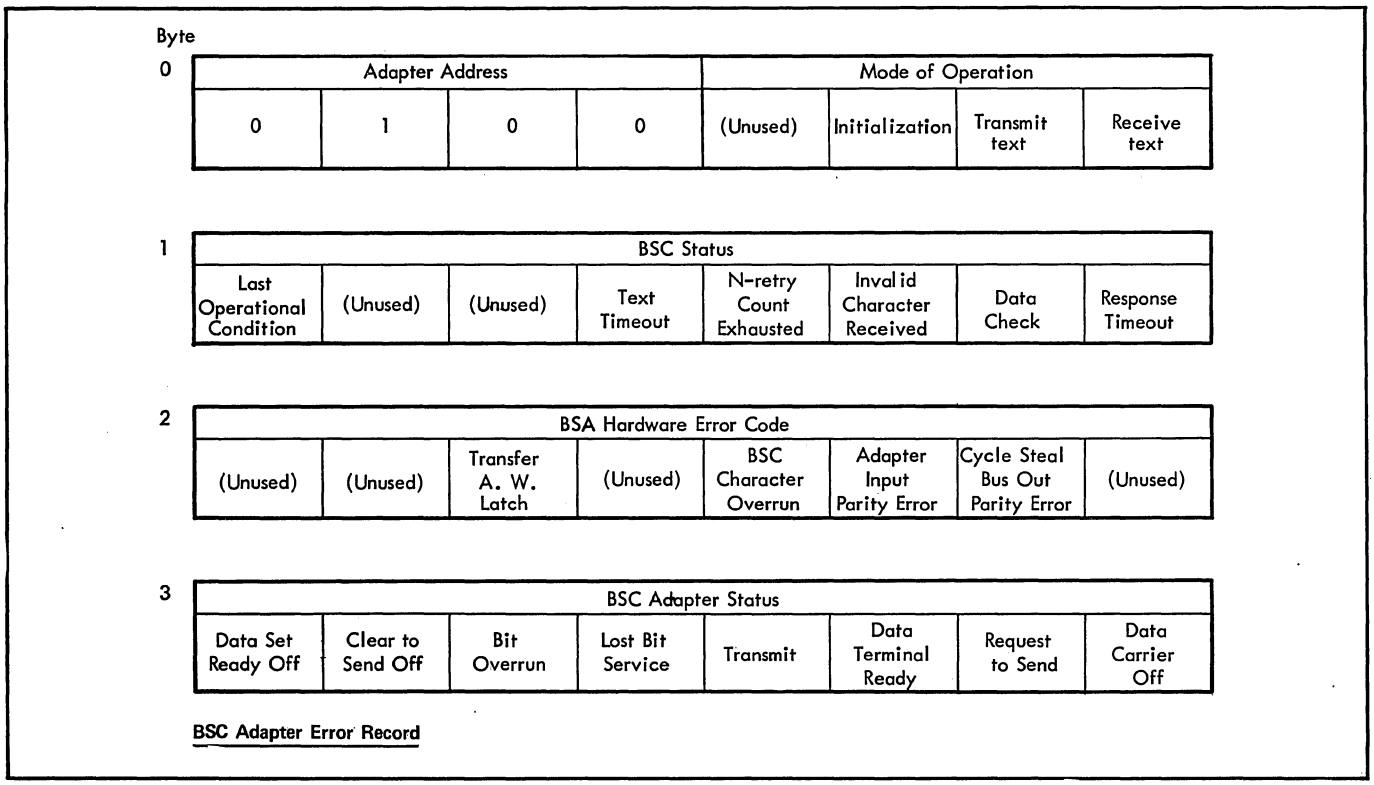


Figure 33. Format of 2715 Error Records on SYSREC (Part 4 of 5)

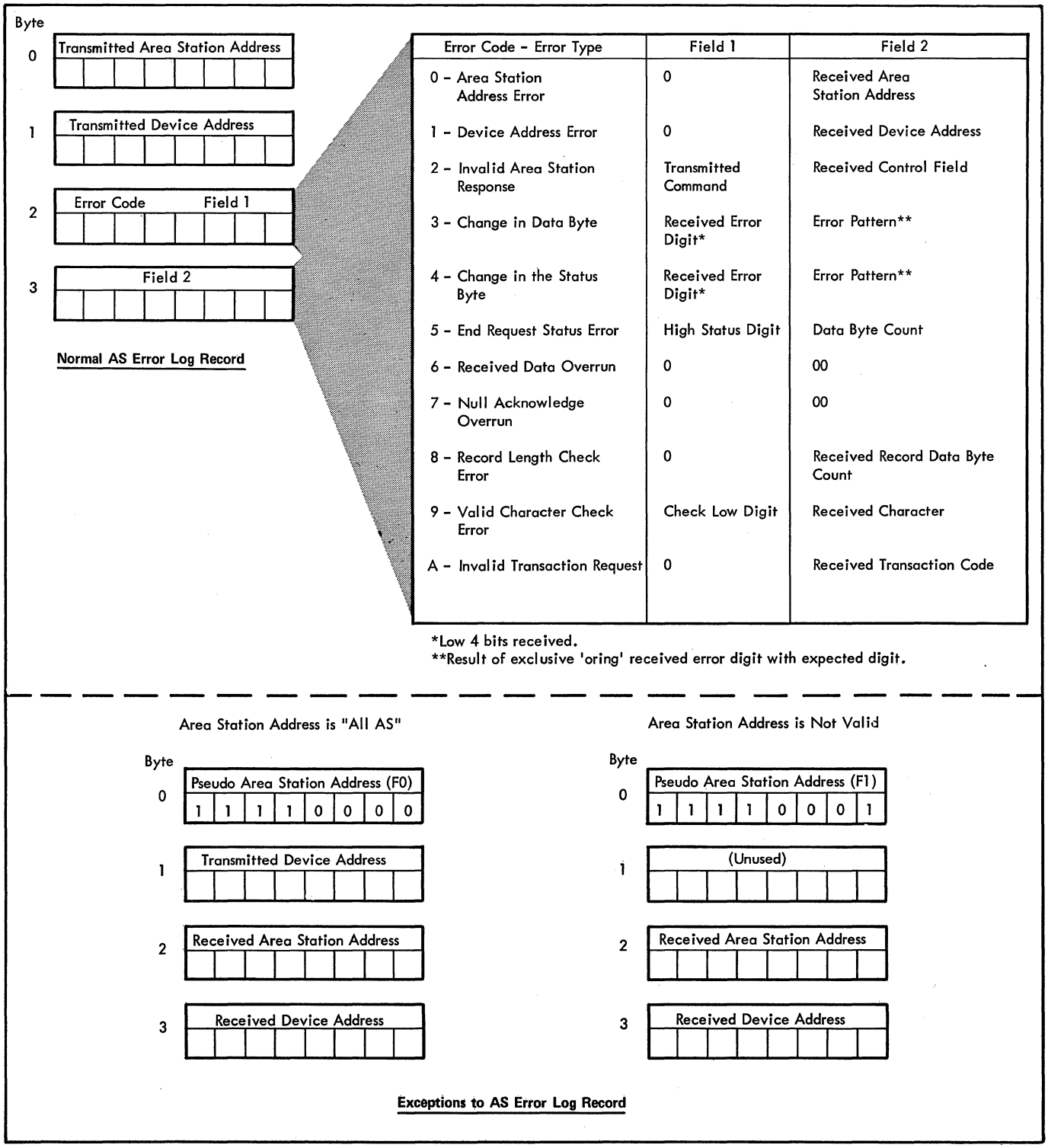


Figure 33. Format of 2715 Error Records on SYSREC (Part 5 of 5)

```
                                        --- MACHINE CHECK DATA EDITING ---

************************************************************************************************************************

MODEL nnn*       SERIAL NUMBER FFFFF          JOB IDENTITY - GET              PROGRAM IDENTITY - NO NAME

                                                                    DAY  YEAR            HH MM SS
                                                          DATE - 046   71      TIME - 00 02 13
                        SM KS  IC  CM   IA
OLD MACHINE CHECK PSW   FF 04 0000 80 007890

                      ************************************************************

                        --- MACHINE CHECK INTERRUPT CODE ---

                                --- SUB CLASS ---

SYSTEM DAMAGE (SD)      0                           CLOCK DAMAGE (CD)       0
PROC. DAMAGE (PD)       0                           EXTERNAL DAMAGE (ED)    0
SYSTEM RECOVERY (SR)    1                           AUTO-CONFIG (AC)        0
TIMER DAMAGE (TD)       0                           WARNING (W)             0

                           --- INTERRUPT TENSE CODES ---

BACK-UP (B)             0                           DELAYED (D)             0

                      --- STORAGE AND PROTECTION ERROR CODES ---

UNCORRECTED STORAGE ERRORS (SE)     0               UNCORRECTED PROTECTION ERRORS (PE)     0
CORRECTED STORAGE ERRORS (SC)       1

                                  --- PSW VALIDITY CODES ---

AMWP BITS OF M.C. OLD ARE VALID (WP)    1           SYSTEM MASK OF M.C. OLD IS VALID (MS)    1
PROGRAM MASK OF M.C. OLD IS VALID (PM)  1           INSTR ADDR OF M.C. OLD IS VALID (IA)     1

                                --- MISC VALIDITY CODES ---

FAILING STORAGE ADDR IS VALID (FA)      1           REGION CODE VALID (RC)             1
FP REGS STORED ARE VALID (FP)           1           GP REGS STORED ARE VALID (GP)      1
CONTROL REGS STORED ARE VALID (CR)      1           EXTENDED LOGOUT AREA VALID (LG)    1
INSTR MODIFIED STORAGE VALID (ST)       1

EXTENDED LOGOUT LENGTH          0000                    FAILING STORAGE ADDRESS     00007860

                                  --- REGION CODE ---
ERROR CORRECTION CODES      0000                        CONTROL WORD ADDRESS        C100

                      ************************************************************

--- FLOATING POINT REGISTERS ---

FP REGS 0,2   00 00 00 00    00 00 00 00    00 00 00 00    00 00 00 00
FP REGS 4,6   00 00 00 00    00 00 00 00    00 00 00 00    00 00 00 00

--- GENERAL PURPOSE REGISTERS ---

GP REGS 0-3   00 00 78 00    00 00 78 60    FF FF FF FF    00 00 78 00
GP REGS 4-7   00 07 FF 84    FF FF FF 7C    00 00 00 05    00 00 00 02
GP REGS 8-B   00 00 92 2C    0A 04 07 F1    40 00 78 02    00 00 78 10
GP REGS C-F   00 00 87 A0    00 00 97 A0    00 00 08 78    00 00 00 78

--- CONTROL REGISTERS ---

CT REGS 0-3   00 00 00 E0    00 00 00 00    FC 00 00 00    00 00 00 00
CT REGS 4-7   00 00 00 00    00 00 00 00    00 00 00 00    00 00 00 00
CT REGS 8-B   00 00 00 00    00 00 00 00    00 00 00 00    00 00 00 00
CT REGS C-F   00 00 00 00    00 00 00 00    CE 00 00 00    00 00 02 00

--- MACHINE CHECK LOGOUT BYTES ---

0000  20004FDF 00000000 00000000 00000000   00007860 0000C100 00000000 00000000   00000000 00000000 00000000 00000000
0030  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000
0060  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000
0090  00000000 00000000 00007800 00007860   FFFFFFFF 00007800 0007FF84 FFFFFF7C   00000005 00000002 0000922C 0A0407F1
00C0  40007802 00007810 000087A0 000097A0   00000878 0000007B 000000E0 00000000   FC000000 00000000 00000000 00000000
00F0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   CE000000 00000200


--- CPU DEPENDENT LOGOUT BYTES ---**

0000  00000000 00000000 00000000 00000000   047310B1 1E000200 00000000 00000000   FFC80132 9000854A FF0700E0 82000038
0030  FF0700E0 0A007881 10007880 10000000   0000854A FF070000 90AE90AF C888C2A0   0D24FC00 00200000 24640820 00000000
0060  00000000 00100000 00000000 00AC0D80   42520000 12000000 00000000 00000000   00448160 00730860 80572000 00080000
0090  000E0020 31430000 984C2C00 00009000   000E0020 31430000 F8542000 00080000   00000020 00000000 004C0C00 00080000
00C0  00000020 00000000 004C0000 00080000   00000020 00000000 004C0000 00080000   80008810 80000000 80000000 00000000
00F0  00000000 00000000 8208011C 80402000   18900004 00000000 00000000 00000000   00200000 00000000 00000000 00000000
0120  00000108 00000000 00000000 00000000   00000000 00000000 FFFFFF77 FFFFFFFF   00007880 00007888 00000000 007304E8
0150  08840000 82000080 80000400 00000000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000
0180  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000
01B0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000
01E0  00000000 00000000 00000000 00000000   00000000 00000000 00000000 00000000   AAAAAAAA 0251AA55 80A088A8 88AA282A
0210  608976D2 19457C55 554555A0 89565555   55410145 44050155 44050145 54554545   54554545 54554545 14151555 55554001
0240  54555555 45555555 50555555 AAAA5AA5   686A554E D65411AA 55555555 55555555   55555555 55555555 55555555 55555555
0270  55555555 55555555 55555555 55555555
```

* nnn= System/370 Models 145 or 155

** Displayed as Model 155; see Figure 35 for Model 145

Figure 34. Edited Machine Check Record -- Model 155

```
                                        --- MACHINE CHECK DATA EDITING ---

**************************************************************************************************************************

MODEL 145            SERIAL NUMBER 136            JOB IDENTITY - 145 CCH        PROGRAM IDENTITY - EREP

                                                                    DAY  YEAR              HH MM SS
                                                          DATE - 04   60       TIME - 08 00 00
                        SM  KS   IC   CM    IA
OLD MACHINE CHECK PSW   31  00  028E  40  000005

                    ******************************************************

                          --- MACHINE CHECK INTERRUPT CODE ---
(Similar to Model 155 printout through the Machine Check Logout Bytes)

                                        --- CPU DEPENDENT LOGOUT ---

**************************************************************************************************************************


                                    --- MACHINE CHECK REGISTER A ---

          BYTE  0                                                    BYTE  2
LOCAL STORAGE A SOURCE ADDR CHK      0                  ALU 2 HALF SUM CHK     1
LOCAL STORAGE B SOURCE ADDR CHK      1                  ALU 3 HALF SUM CHK     0
LOCAL STORAGE A DEST ADDR CHK        0                  ALU LOGICAL CHK        1
LOCAL STORAGE B DEST ADDR CHK        0                  B REG SHIFT CHK        0
DEST BYTE CTRL CHK                   1                  A REG PTY CHK          0
LOCAL STORAGE A-B DEST ADDR COMPARE  0                  B REG PTY CHK          1
LOCAL STORAGE CTRL ASSM CHK          0                  Z REG PTY CHK          0
CTRL REG PTY CHK                     1                  D REG PTY CHK          1

          BYTE  1                                                    BYTE  3
ADDR CHK BOUND REG CHK               0                  EXT REG DEST X COMP CHK  1

                                        --- SYSTEM REGISTER ---

          BYTE  0                                                    BYTE  2
MACHINE CHK INTERPT PENDING          1                  ENABLE CLEAR SW        0
RETRY ROUTINE                        0                  IMPL                   1
MACHINE CHK ROUTINE                  0                  LOAD FILE WAIT         0
DOCUMENTARY CONSOLE                  0                  CE KEY IN CE MODE      1
LOG PRESENT                          1                  IPL                    0
SPARE                                0                  POWER ON RESET         0
I/O INSTN LATCH                      0                  ERROR IN A STOP WORD   1
FORCE MODULE 0 TO LSCS               1                  INSTR PROC LATCH       0

          BYTE  1                                                    BYTE  3

                                    --- LOCAL STORAGE REGISTERS ---

        --- I REGISTER ---                                        --- U REGISTER ---

STORAGE PROTECT KEY - A2                                    INSTR LENGTH CODE    01
INSTR ADDR - 0267AE                                         CONDITION CODE       11
                                                            PROGRAM MASK         1011
                                                            AMWP BITS            0011
                                                            OP CODE              01100101
                                                            IMMEDIATE BYTE       00001101

   --- X REGISTER ---        --- R REGISTER ---        --- Y REGISTER ---        --- Q REGISTER ---
        2378A3E4                   AB34973E                  456792E1                  3EFFA202

  --- IBU REGISTER ---        --- TR REGISTER ---       --- SN REGISTER ---       --- PN REGISTER ---
        023467A0                   0457892E                  0246                      0578

  --- WK REGISTER ---         --- DM REGISTER ---       --- RW REGISTER ---       --- V REGISTER ---
        7840AE46                   BF904578                  905678EA                  00000000

  --- W REGISTER ---
       784078EF

  --- NP REGISTER ---         --- CPU REGISTER ---                    ---  PSWCTL REGISTER ---
   LAST LOGL ADDR 0345         HARD STOP LATCH       0     EVR MSK              0     MDC MODE          1
   ADR ADJ MODE   0            ENABLE HARD RETRY     1     TRANS MODE           1     MACH CHK MSK      0
   FORMAT CHK     1            SING BIT FAIL M STOR  0     I/O MASTER MSK       0     WAIT STATE        0
   NP-2-2         1            SING BIT FAIL CT STOR 1     EXT MASTER MSK       1     PROB STATE        1
   NP-2-3         0            THRESH MODE CT STOR   0     TIMER MSK            0     MPX CHAN MSK      1
   NP-2-4         1            LST I/S - CONS FILE   14    INTERRUPT KEY MSK    0     CHAN 1 MSK        0
   EMUL MODE      0                                       EXT SIGNAL MSK       1     CHAN 2 MSK        0
   NP-2-6         1                                                                  CHAN 3 MASK       1
   NP-2-7         0                                                                  CHAN 4 MASK       0
   NP-3-0         0
   NP-3-1         0
   NP-3-2         1
   NP-3-3         0
   EXECTD INSTR   0

--- MACHINE CHECK EXTENDED LOGOUT BYTES ---

0000 00000000 00000000 00000000 000C0000  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000
0030 00000000 00000000 00C00000 00000000  00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000
0060 00000000 00000000 0C000000 00000000
```

Figure 35. Edited Machine Check Record -- Model 145

```
                                        --- CHANNEL INBOARD EDITING ---

*****************************************************************************************************************************

MODEL 155        SERIAL NUMBER FFFFF        JOB IDENTITY - DISPLAY          PROGRAM IDENTITY - DOES NOT APPLY

MPX CHANNEL
CHANNEL/UNIT ADDRESS  000D                                                    DAY  YEAR          HH MM SS
                                                                    DATE - 046   71      TIME - 14 17 36
          CC   DA    FL    CT
FAILING CCW  01 007840  00 00 0050                                                K    CA    US CS  CT
                                                                          CSW     10 0078D0  00 04 000F

                                          --- ECSW ---

                          ERROR SOURCE          VALIDITY            TERM TYPE    00
                            CPU    0       I/F ADDR     1          DISCIN BIT   0
                            CHAN   1       SEQ CODE     1          SEQ CODE     101
                            SCU    0       DEV STATUS   1
                            SU     0       CCW ADDR     1
                            CU     0       CHAN ADDR    1
                                           DEV ADDR     1

          --- UNIT STATUS ---                                    --- CHANNEL STATUS ---

ATTENTION          0        CHANNEL END     0          PRGM-CTLD IRPT    0          CHAN DATA CHECK  0
STATUS MODIFIER    0        DEVICE END      0          INCORRECT LENGTH  0          CHAN CTL CHECK   1
CONTROL UNIT END   0        UNIT CHECK      0          PROGRAM CHECK     0          I/F CTL CHECK    0
BUSY               0        UNIT EXECPTION  0          PROTECTION CHECK  0          CHAINING CHECK   0

I/O UNITS IN USE AT TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  000D 0000 0000 0000 0000 0000 0000 0000
```

Figure 36. Edited Channel Check Record -- Model 155

```
                                --- CHANNEL INBOARD EDITING ---

*****************************************************************************************************************

MODEL 145        SERIAL NUMBER 010015      JOB IDENTITY - ERPU001          PROGRAM IDENTITY - DOES NOT APPLY

MPX CHANNEL *

CHANNEL/UNIT ADDRESS  000E                                          DAY  YEAR          HH MM SS
                                                          DATE - 131   71     TIME - 20 07 33
            CC   DA    FL     CT
FAILING CCW  01 0073C1  60 00 0C32                                    K    CA    US CS  CT
                                                              CSW     00 007388  08 04 1111


                                    --- ECSW ---

                  ERROR SOURCE              VALIDITY              TERM TYPE    00
                  CPU    0          I/F ADDR     0              DISCIN BIT   0
                  CHAN   1          SEQ CODE     1              SEQ CODE     101
                  SCU    0          DEV STATUS   0
                  SU     0          CCW ADDR     1
                  CU     0          CHAN ADDR    1
                                    DEV ADDR     1

        --- UNIT STATUS ---                          --- CHANNEL STATUS ---

ATTENTION          0       CHANNEL END      1      PRGM-CTLD IRPT    0       CHAN DATA CHECK  0
STATUS MODIFIER    0       DEVICE END       0      INCORRECT LENGTH  0       CHAN CTL CHECK   1
CONTROL UNIT END   0       UNIT CHECK       0      PROGRAM CHECK     0       I/F CTL CHECK    0
BUSY               0       UNIT EXECPTION   0      PROTECTION CHECK  0       CHAINING CHECK   0

I/O UNITS IN USE AT TIME OF FAILURE
CHANNEL/UNIT ADDRESSES  000C 000D 000E 001F 0131 0000 0000 0000
```

```
                                --- CHANNEL INBOARD EDITING ---

--- DEPENDENT LOGOUT ---



                             --- MACHINE CHECK REGISTER A ---

          BYTE 0                                          BYTE 2
LOCAL STORAGE A SOURCE ADDR CHK      0          ALU 2 HALF SUM CHK       0
LOCAL STORAGE B SOURCE ADDR CHK      1          ALU 3 HALF SUM CHK       0
LOCAL STORAGE A DEST ADDR CHK        0          ALU LOGICAL CHK          0
LOCAL STORAGE B DEST ADDR CHK        0          B REG SHIFT CHK          0
DEST BYTE CTRL CHK                   0          A REG PTY CHK            1
LOCAL STORAGE A-B DEST ADDR COMPARE  0          B REG PTY CHK            1
LOCAL STORAGE CTRL ASSM CHK          0          Z REG PTY CHK            0
CTRL REG PTY CHK                     0          D REG PTY CHK            1

          BYTE 1                                          BYTE 3
ADDR CHK BOUND REG CHK               0          EXT REG DEST X COMP CHK  1
```

```
                                --- CHANNEL INBOARD EDITING ---

   --- RETRY COUNTS ---                              --- RETRY REGS 1,2 ---

RETRIES PER CURRENT MACRO  1111                  RETRY REG 1 (ABRTY)  60030224
NUMBER OF MACROS RETRIED     01                  RETRY REG 2 (SPTLB)  00000000

       --- RETRY REG 3 ---                     --- RETRY REG 4 ---

MACHINE CHECK TRAP     0                     DESTBYTE LINES
RETRY TRAP             0                          4-1
CPU HIGH TRAP          0                          5-1
INT FILE ADAPTER OR                               6-1
    SEL CHAN 1,2,3     0                          7-0
```

```
                                --- SYSTEM REGISTER ---

          BYTE 0                                          BYTE 2
MACHINE CHK INTERPT PENDING    1          DOCUMENTARY CONSOLE 2    0
RETRY ROUTINE                  1          IMPL                     1
MACHINE CHK ROUTINE            1          LOAD FILE WAIT           0
DOCUMENTARY CONSOLE            1          CE KEY IN CE MODE        0
LOG PRESENT                    0          IPL                      1
SPARE                          0          POWER ON RESET           1
```

Figure 37. Edited Channel Check Record -- Model 145 (Part 1 of 2)

```
                                --- CHANNEL INBOARD EDITING ---

                              --- LOCAL STORAGE REGISTERS ---

   --- I REGISTER ---                                  --- U REGISTER ---

KEY - 0C                                          INSTR LENGTH CODE       00
INSTR ADDRESS - 00004B                            CONDITION CODE          11
                                                  PROGRAM MASK            0000
                                                  AMWP BITS               0000
                                                  OP CODE                 00011011
                                                  IMMEDIATE               00000000

   --- INSTRUCTION CODES ---     --- UNIT ADDRESS ---    --- UCW ADDRESS ---    --- SEQ CODE ---

CHAN LOADED          0                    00                    C100                   00
CONTROL COMMAND      0
CHAINING             0           --- INTERRUPT BUFFER ---  --- BUS IN ---       --- BUS OUT ---
SHARE REQ ---        0                    0000                  58                     E0
INTERRUPT            0
HIO                  0           --- MC REG ---           --- MD REG ---       --- COUNT ---
TIO                  0           KEY - 00                      00000000       HIGH  00
SIO                  0           NEXT CCW ADDR   F50002                       LO    07
* MC,MD,MF VALID IF 1

   --- FLAGS AND OPS ---         --- TAGS IN ---          --- TAGS OUT ---      --- UCW/CAHN STATUS ---
CHAIN DATA           1           OP IN              0     OP OUT         0      ACTIVE/PCI           0
CHAIN COMMAND        1           ADDR IN            0     SEL OUT        0      WLR                  0
SLI                  1           STAT IN            0     ADR OUT        0      PROG CK              1
SKIP                 1           SRV IN             0     CMD OUT        0      PROT CK              1
PCI                  1           SEL IN             0     SRV OUT        0      STATUS QUEUED OR
IDA                  1           MPX REQUEST        0     MPX INT        0       CHAN DATA CK        0
INPUT,OUTPUT*        1           MPX OR CONSOLE REG 0     SUPR OUT       0      CHAN CTRL CHECK      1
INCR,DECR**          1           DISC IN            0     MPX CHECK      0      I/F CTL CHECK        1
*OUTPUT IF 1, INPUT IF 0                                                        STATUS NEXT          1
**INCREMENT IF 1,DECREMENT IF 0

                                        --- DOCUMENTARY CONSOLE WORD ---

   --- BUS IN ---                --- BUS OUT ---          --- IA ---              --- IT ---

         58                             E0          READ LATCH         0        ATTENTION            0
                                                    WRITE LATCH        0        READY                0
                                                    STACKED REQ        0        INTV REQUIRED        0
                                                    SHARE RESET        0        END                  0
                                                    ATTEN RESET        0        CONSOLE REQ          0
                                                    ALARM              0        CANCEL               0
                                                    SEN SHARE SET      0

--- MPX DEPENDENT LOGOUT BYTES---**

0000  0000C100 00000003 00F500C2 40000DF0   00000000 000058E0 FF050000 00000000   FF350007 400304E8 FF350001 60030224
003C  00000000 00000000 FE040130 80001A5A   F0004E30 0C00004B 30001B00 00C10000   00000300 F5000240 000DF000 00000000
```

Printout of this area documents appropriate status for multiplexor-dependent, or selector-dependent, or integrated file adapter channel check errors. This example shows the MPX logout.

*This line logs the appropriate information for MPX channel, SEL channel, or Integrated File Adapter.

**This line displays appropriate logout bytes for MPX-dependent, SEL-dependent, or Integrated File Adapter channel checks.

Figure 37. Edited Channel Check Record -- Model 145 (Part 2 of 2)

```
                                        --- IPL AND EOD DATA EDITING ---

*************************************************************************************************************************

MODEL 145         SERIAL NUMBER 010015

                                                          DAY  YEAR              HH MM SS
                                                 DATE -   132   71       TIME - 22 48 32


SUB SYSTEM ID           00 - UNKNOWN              CUA                     0000
REASON CODE             NM - NORMAL               CHANNEL MAP             0000
CHANNEL TYPE ASSGNMT    0000000000000000          HIGHEST STORAGE ADDR    0003FFFF

*************************************************************************************************************************

MODEL 145         SERIAL NUMBER 010015

                                                          DAY  YEAR              HH MM SS
                                                 DATE -   132   71       TIME - 22 58 17


SUB SYSTEM ID           00 - UNKNOWN              CUA                     0000
REASON CODE             NM - NORMAL               CHANNEL MAP             0000
CHANNEL TYPE ASSGNMT    0000000000000000          HIGHEST STORAGE ADDR    0003FFFF

*************************************************************************************************************************

MODEL 155         SERIAL NUMBER 010009

                                                          DAY  YEAR              HH MM SS
                                                 DATE -   133   71       TIME - 05 01 12


SUB SYSTEM ID           00 - UNKNOWN              CUA                     0000
REASON CODE             NM - NORMAL               CHANNEL MAP             0000
CHANNEL TYPE ASSGNMT    0000000000000000          HIGHEST STORAGE ADDR    000FFFFF

*************************************************************************************************************************

MODEL 155         SERIAL NUMBER 010009

                                                          DAY  YEAR              HH MM SS
                                                 DATE -   133   71       TIME - 05 47 47


SUB SYSTEM ID           00 - UNKNOWN              CUA                     0000
REASON CODE             NM - NORMAL               CHANNEL MAP             0000
CHANNEL TYPE ASSGNMT    0000000000000000          HIGHEST STORAGE ADDR    000FFFFF
```

Figure 38. IPL and EOD Records

Chart 08. EREP - Option Handler (Part 1 of 4)

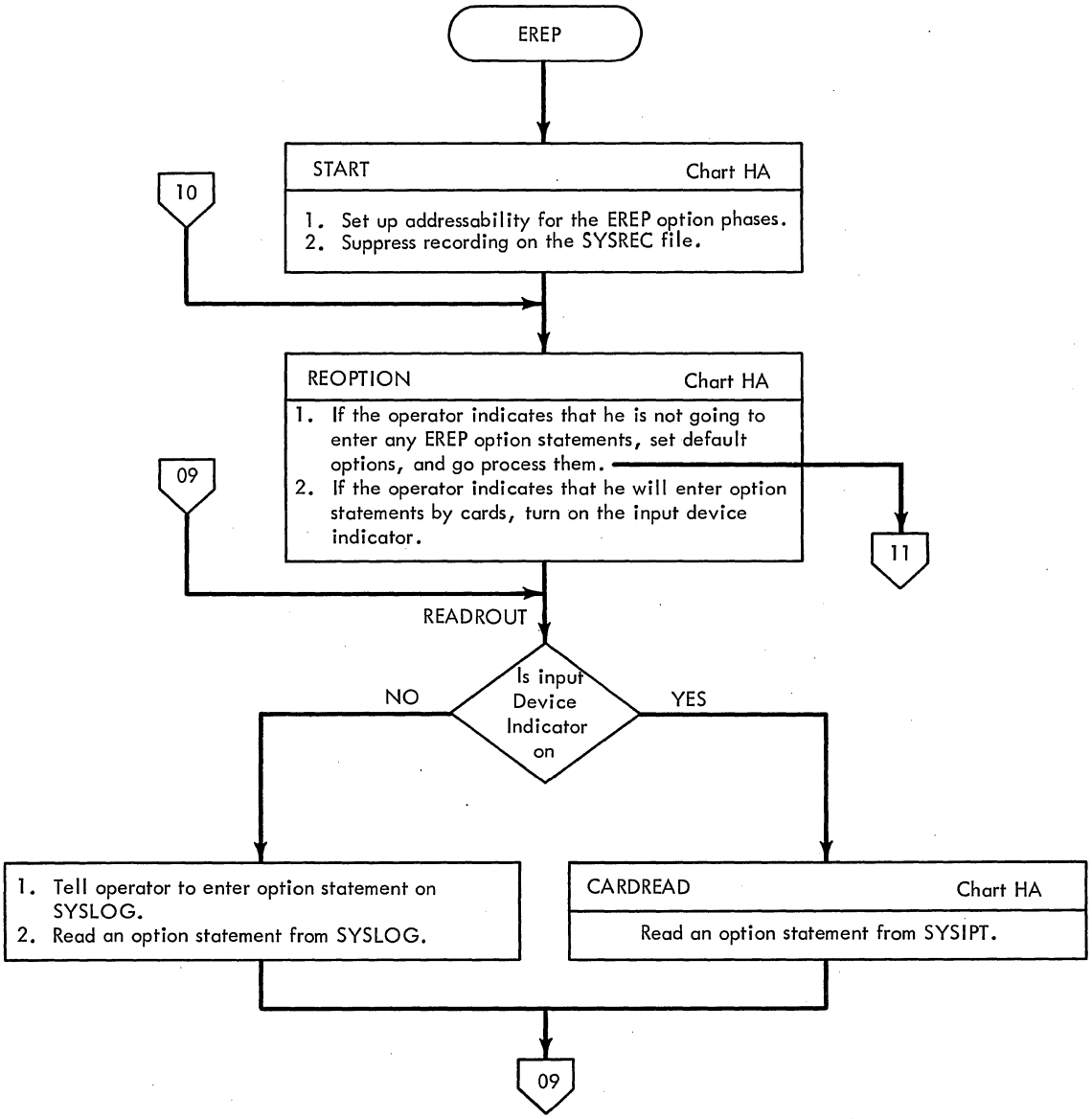


Chart 09. EREP - Option Handler (Part 2 of 4)

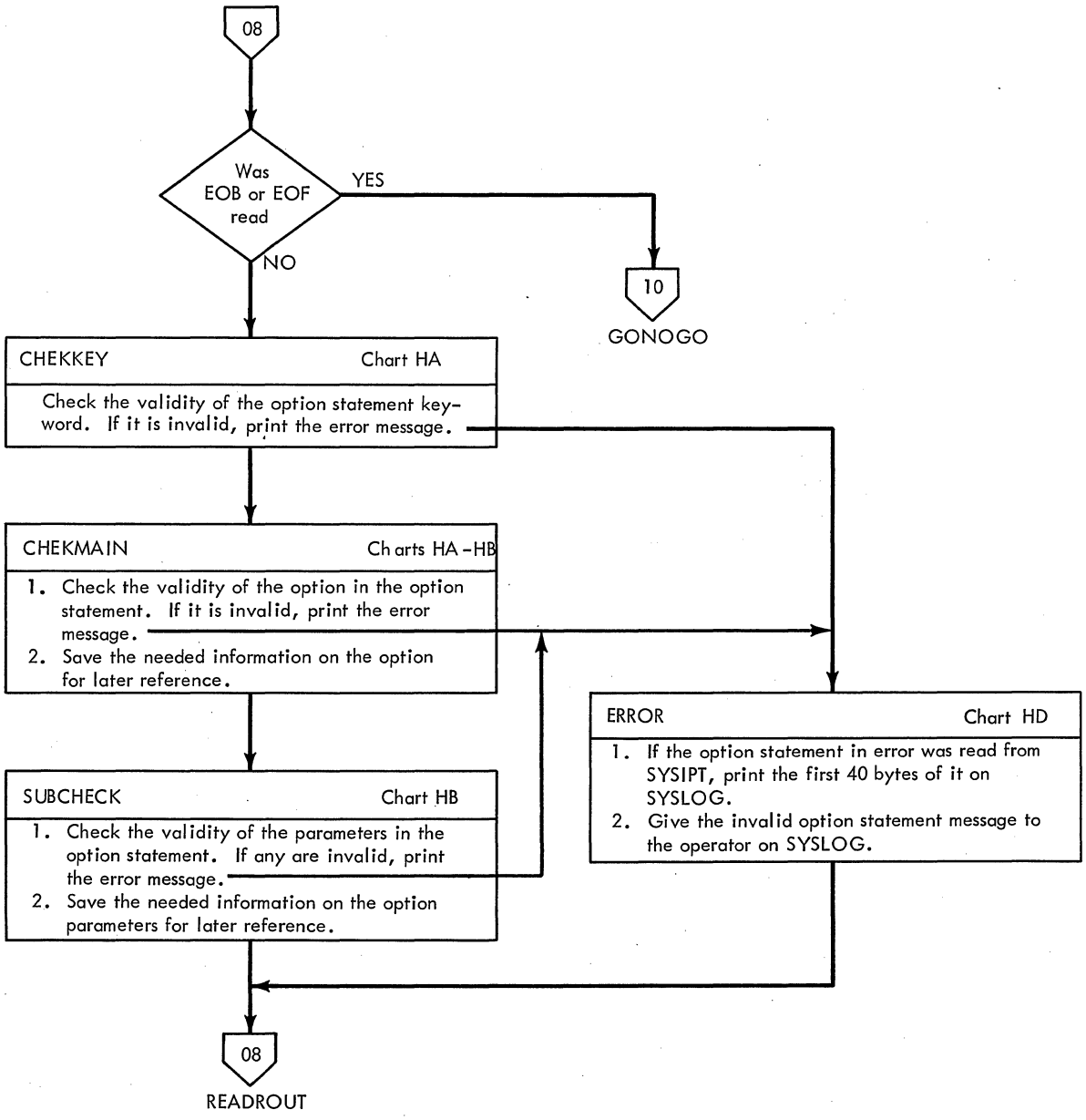


Chart 10. EREP - Option Handler (Part 3 of 4)

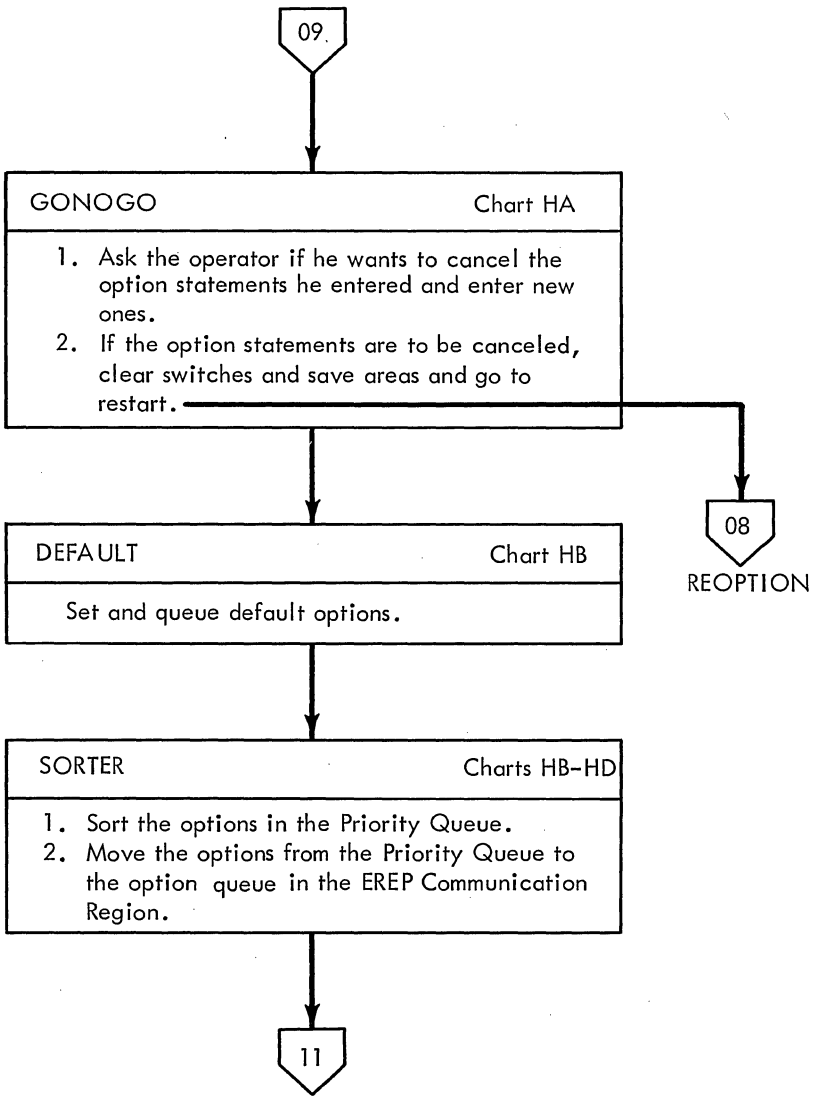


Chart 11. EREP - Option Handler (Part 4 of 4)

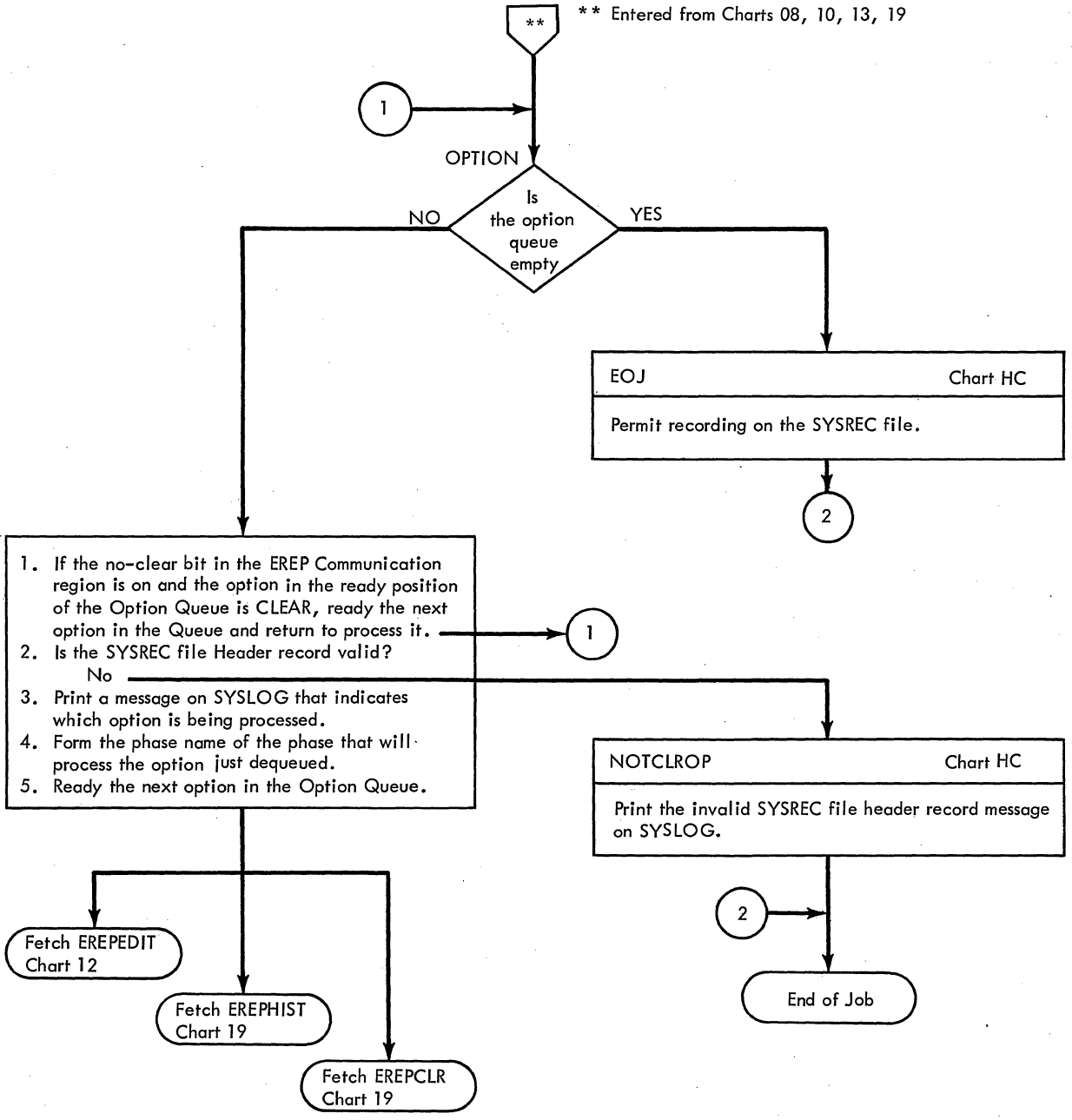


Chart 12. EREPEDIT Root Phase (Part 1 of 3)

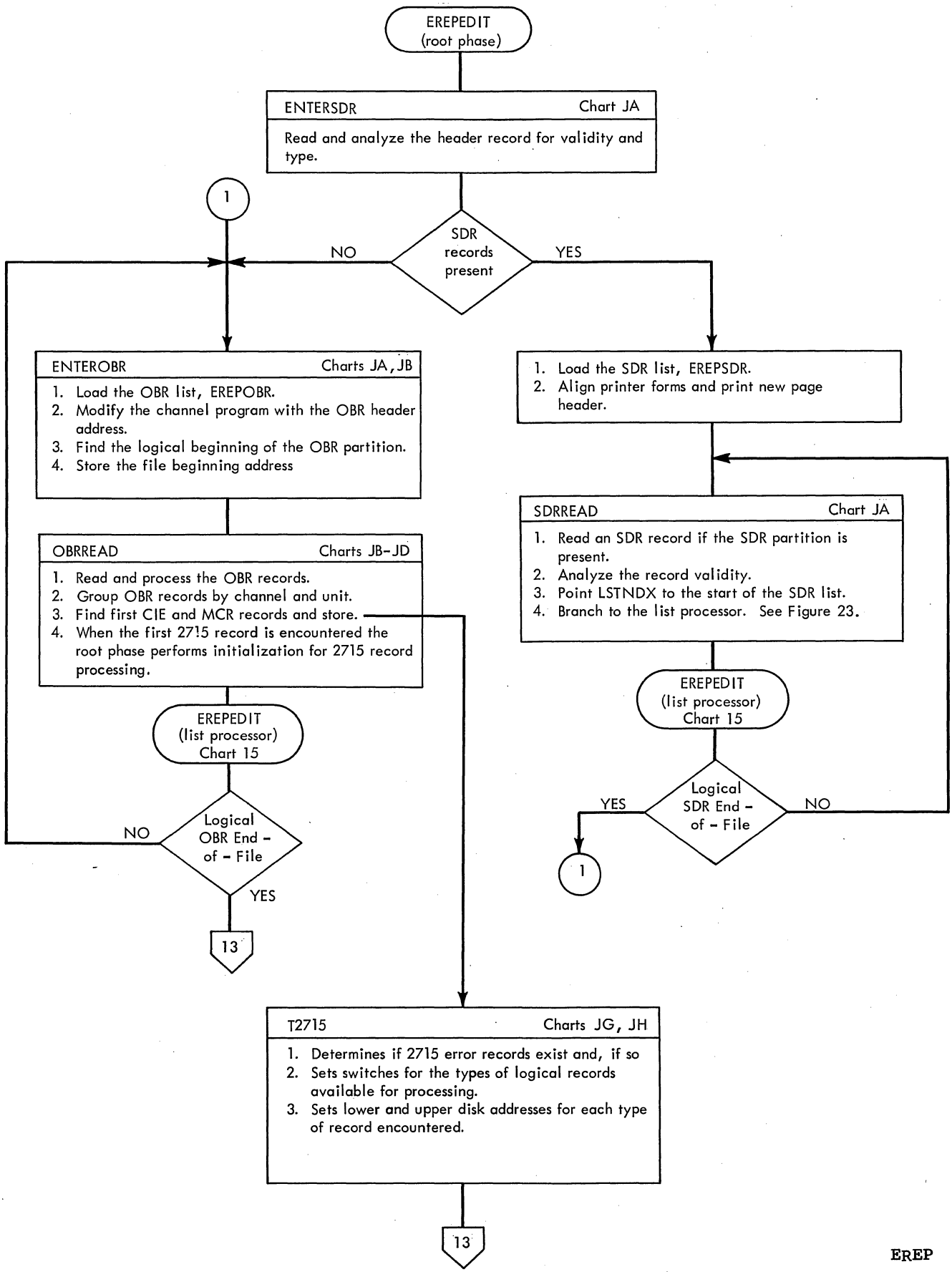


Chart 13. EREPEDIT Root Phase (Part 2 of 3)

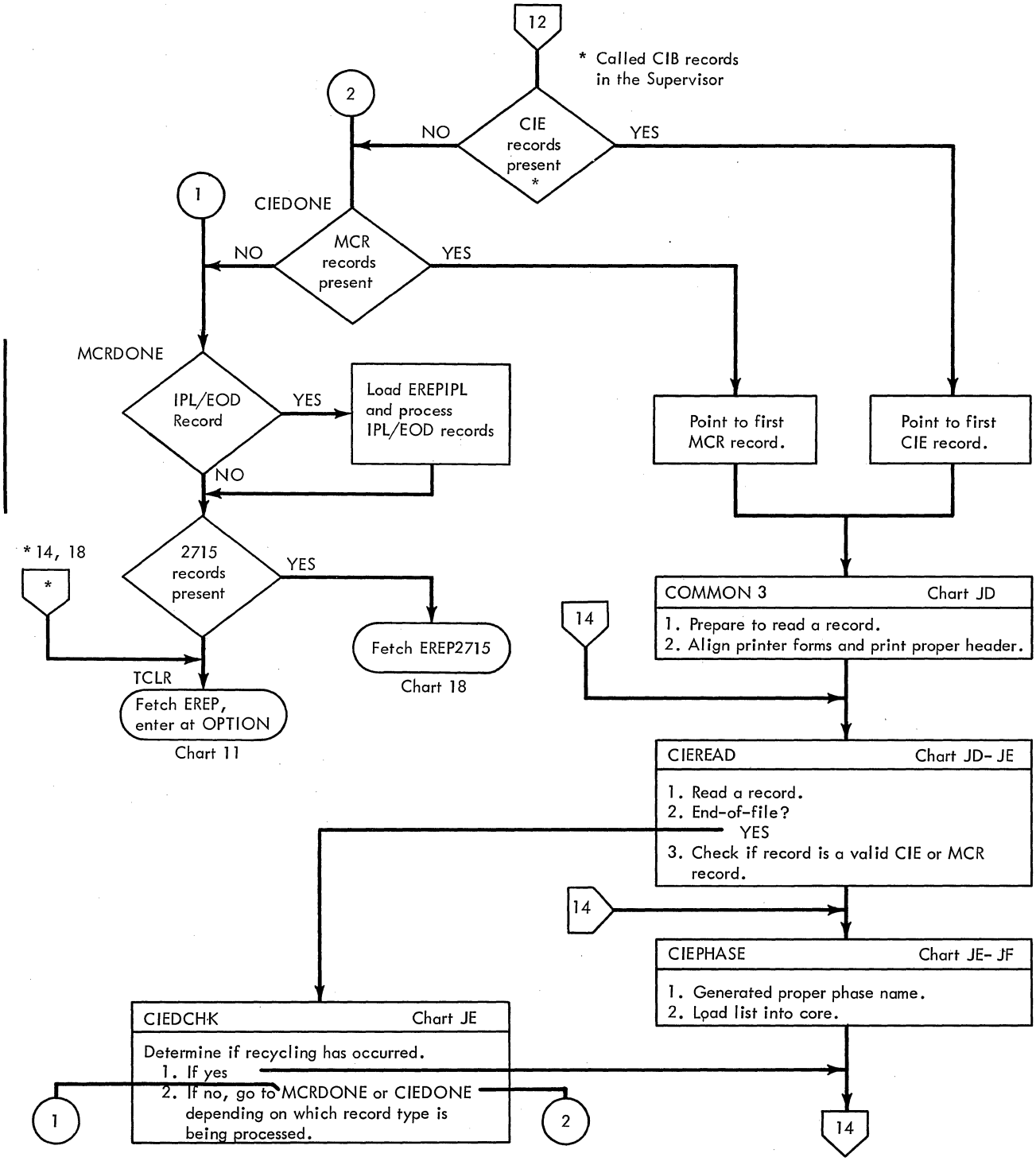


Chart 14. EREPEDIT Root Phase (Part 3 of 3)

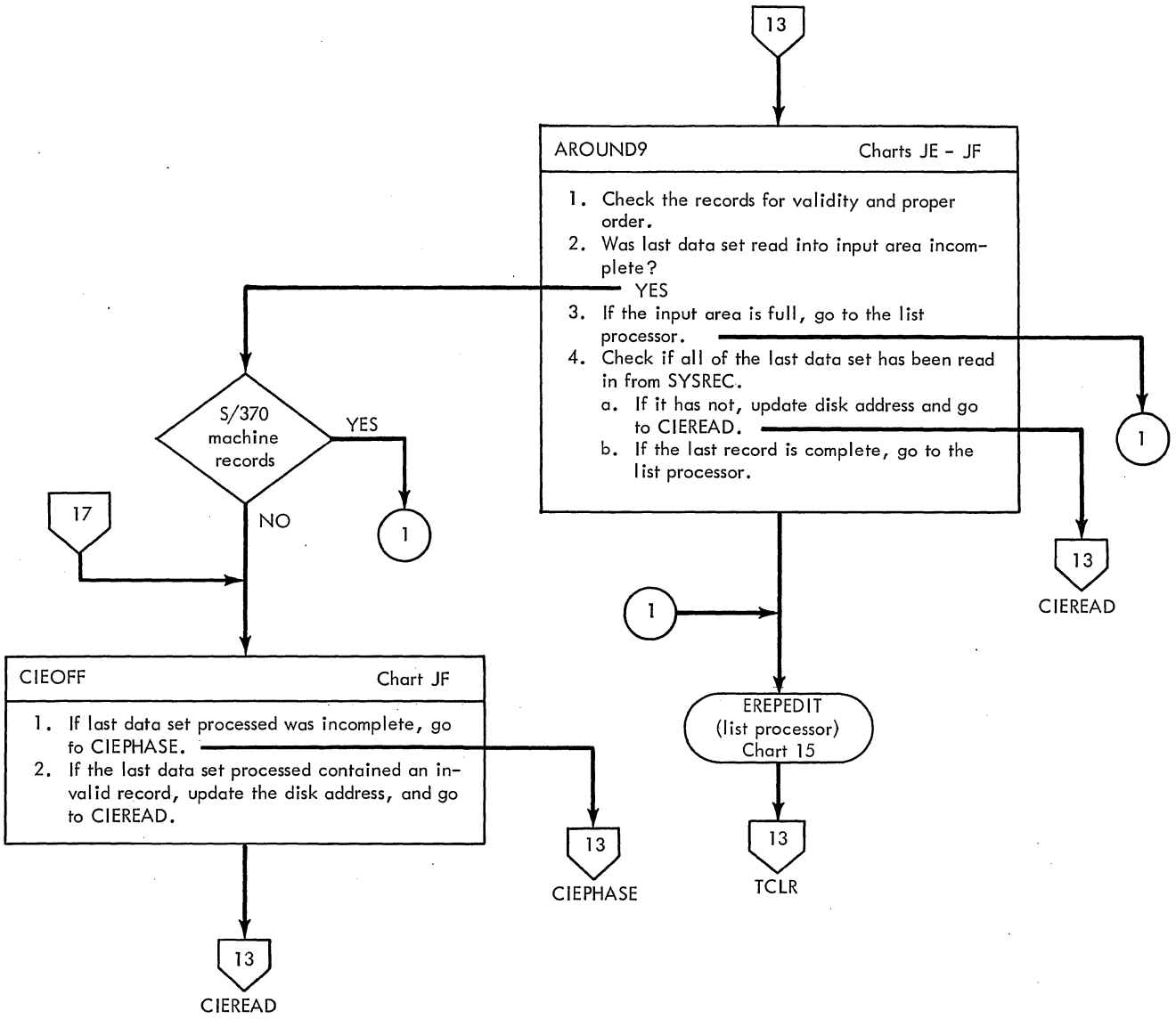


Chart 15. EREPEDIT Record Lists (Part 1 of 3)

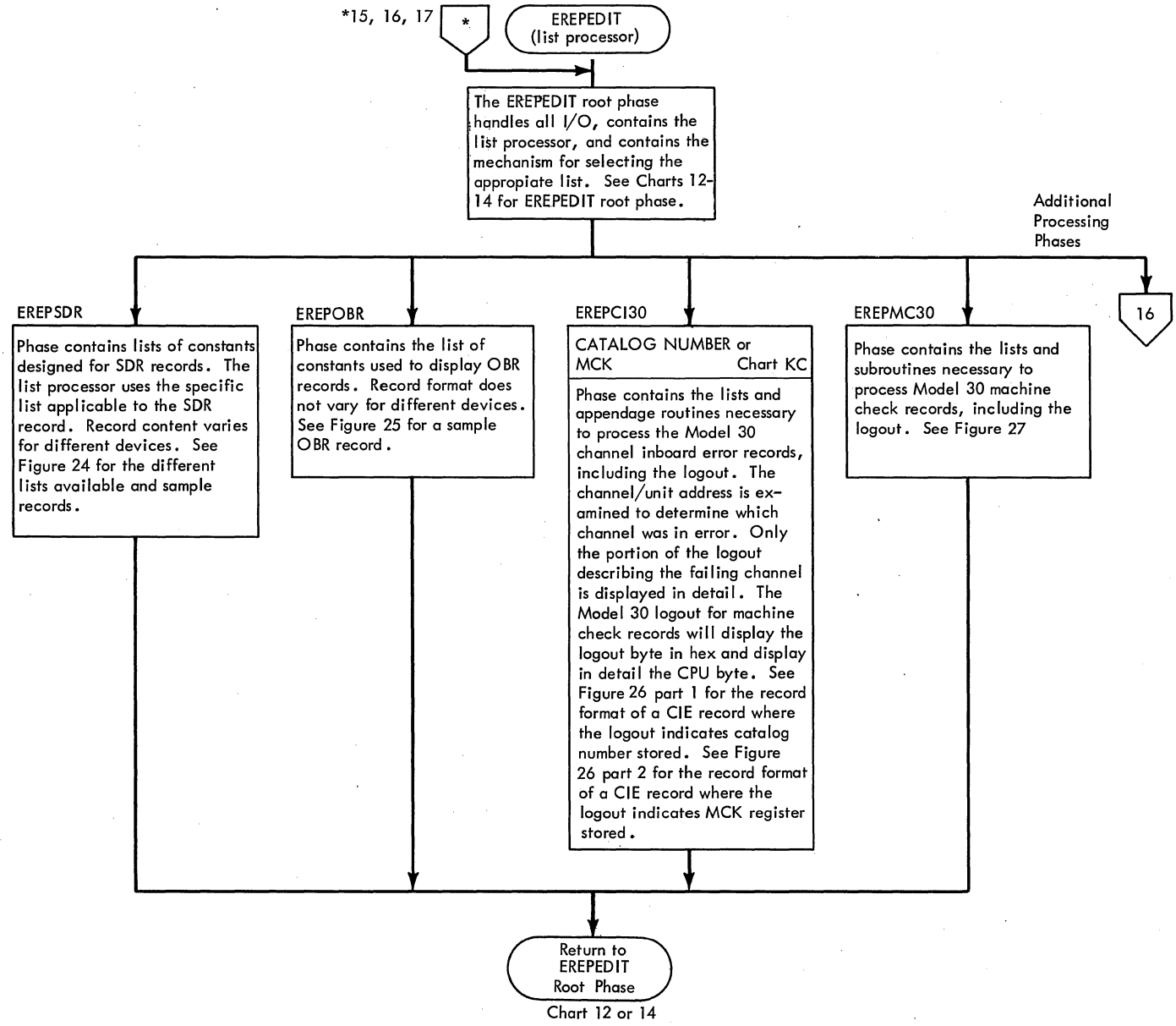


Chart 16. EREPEDIT Record Lists (Part 2 of 3)

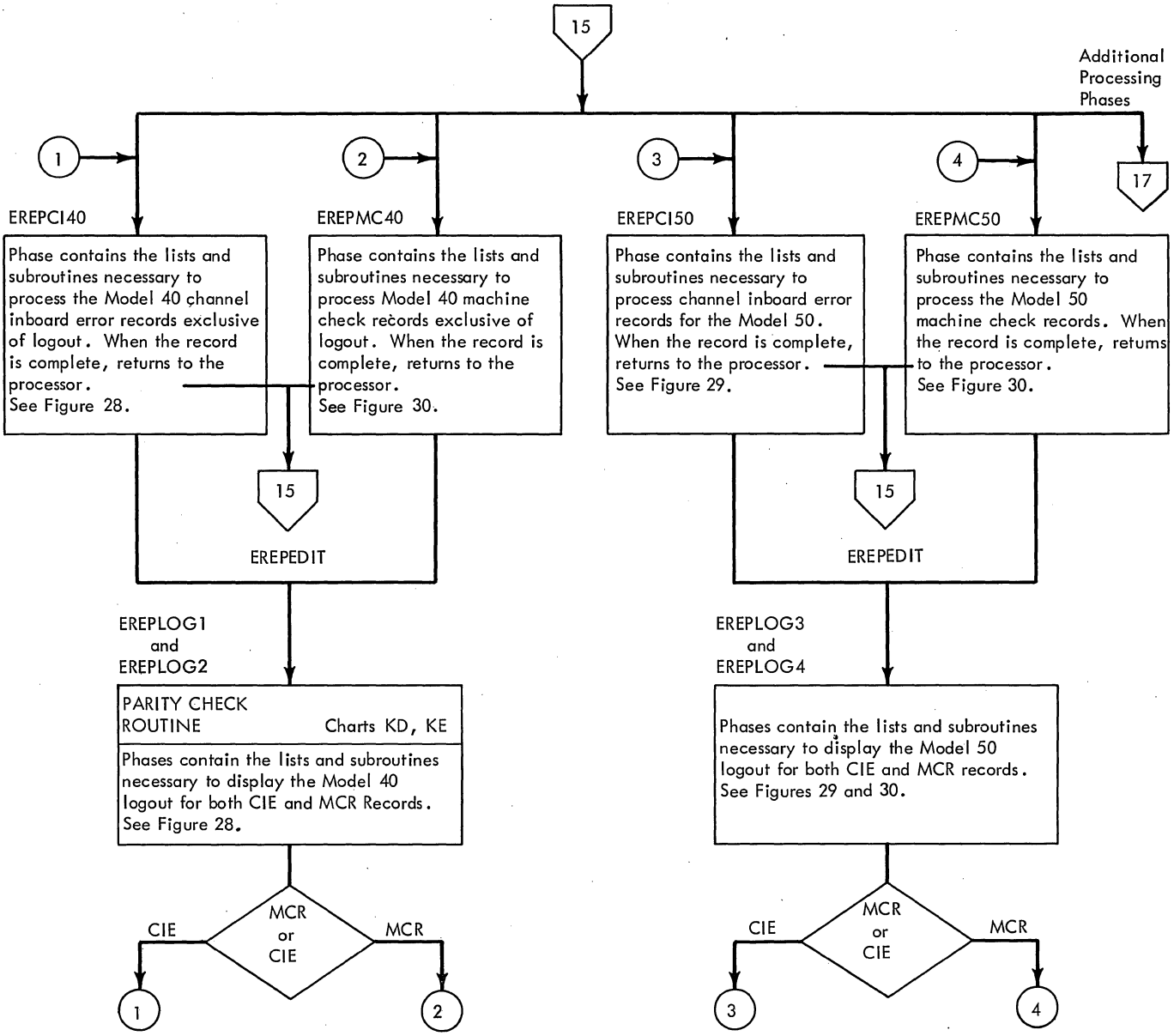


Chart 17. EREPEDIT Record Lists (Part 3 of 3)

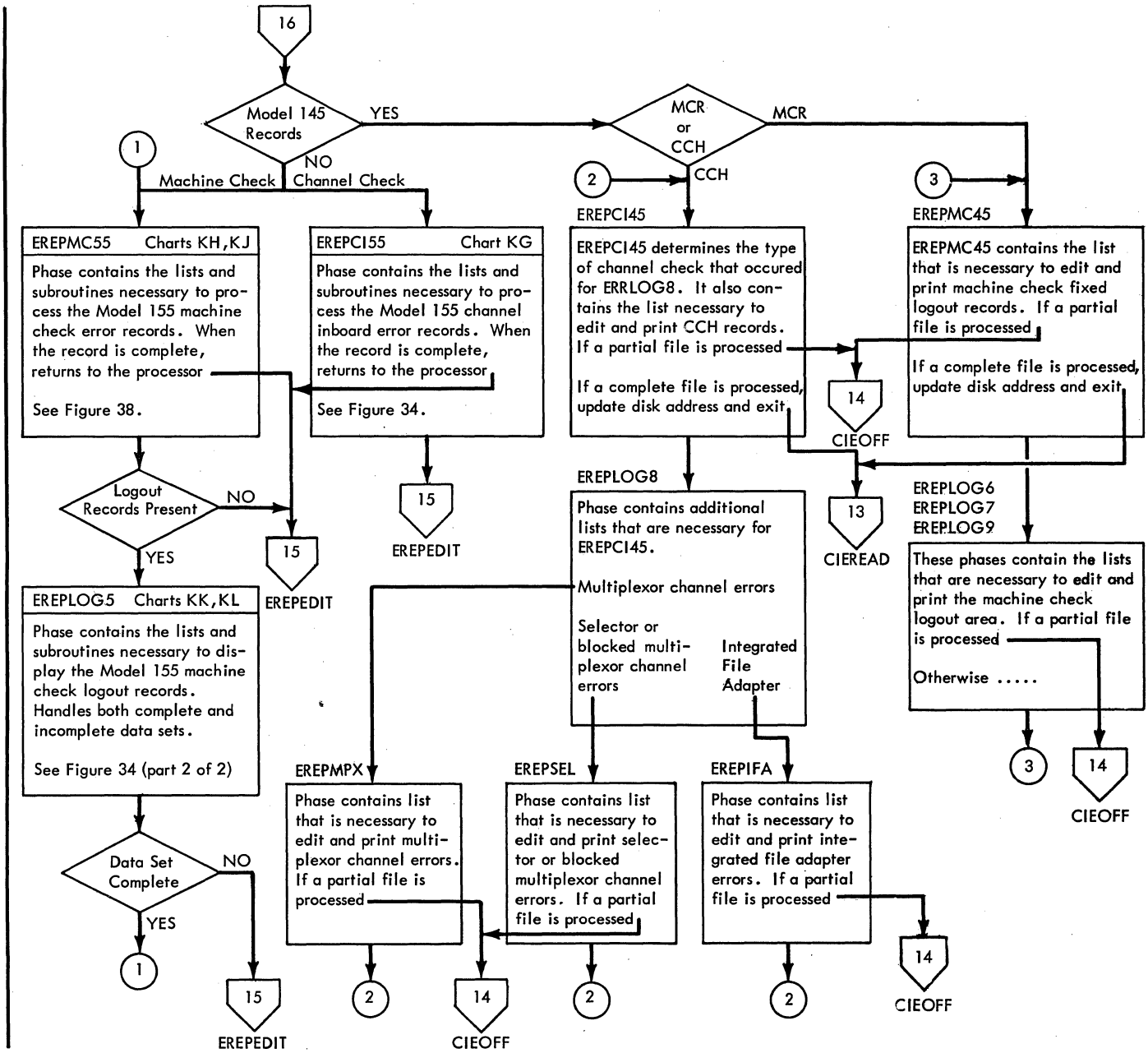


Chart 18. EREP2715 and EREPASSM

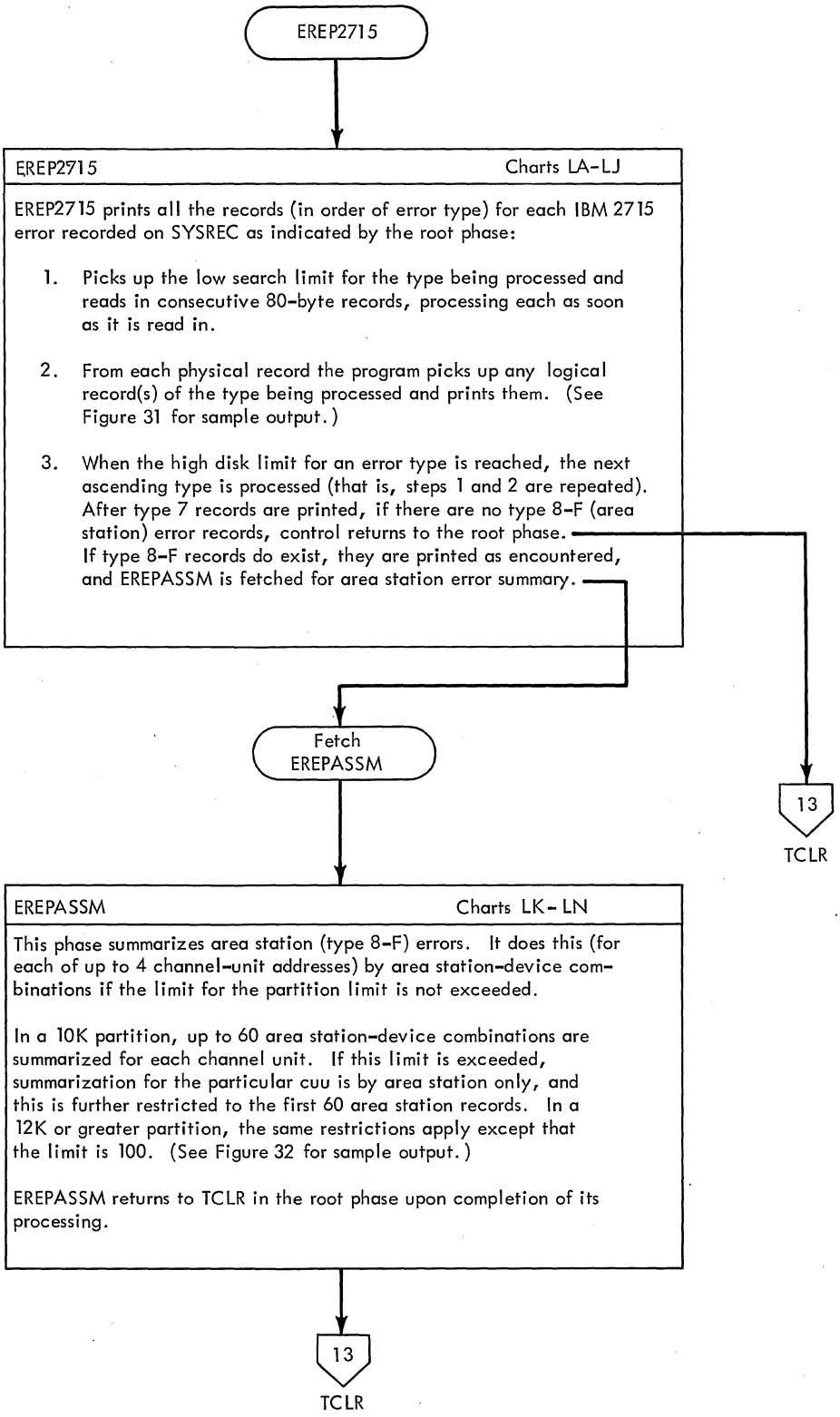


Chart 19. EREPCLR and EREPHIST

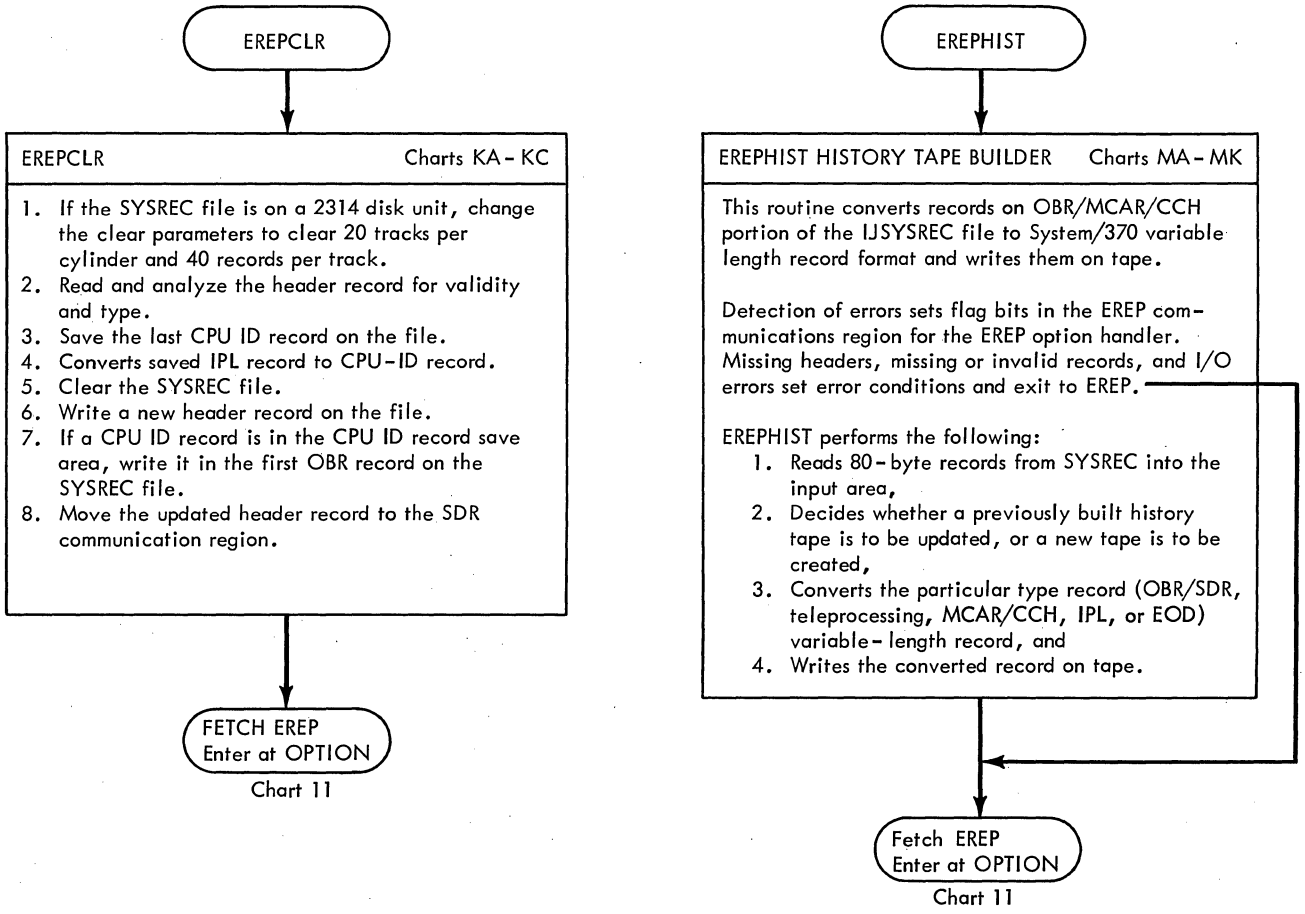


Chart HA. EREP - Option Handler (Part 1 of 3)
Refer to Charts 08-11.

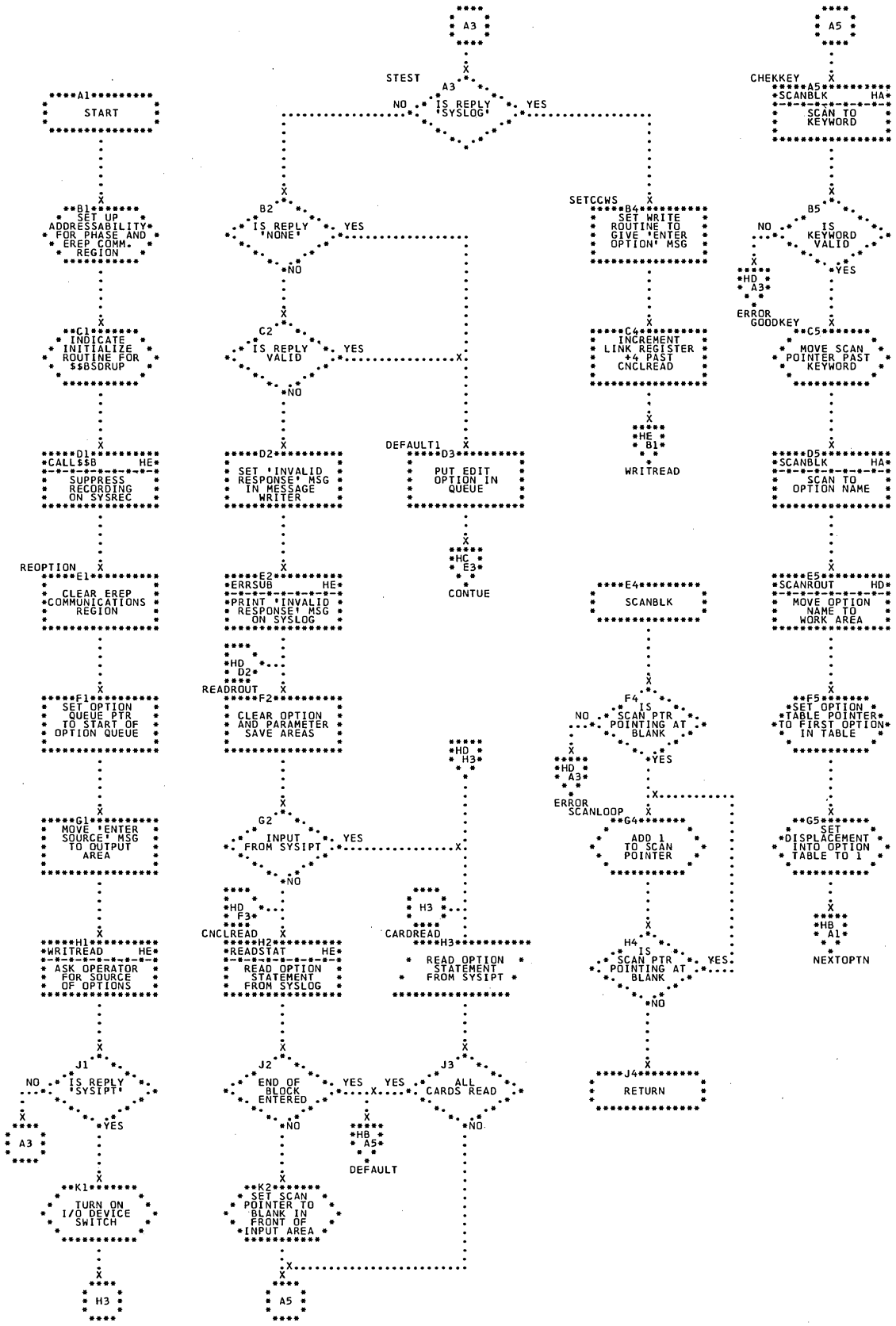


Chart HB. EREP - Option Handler (Part 2 of 3)
Refer to Charts 08-11.

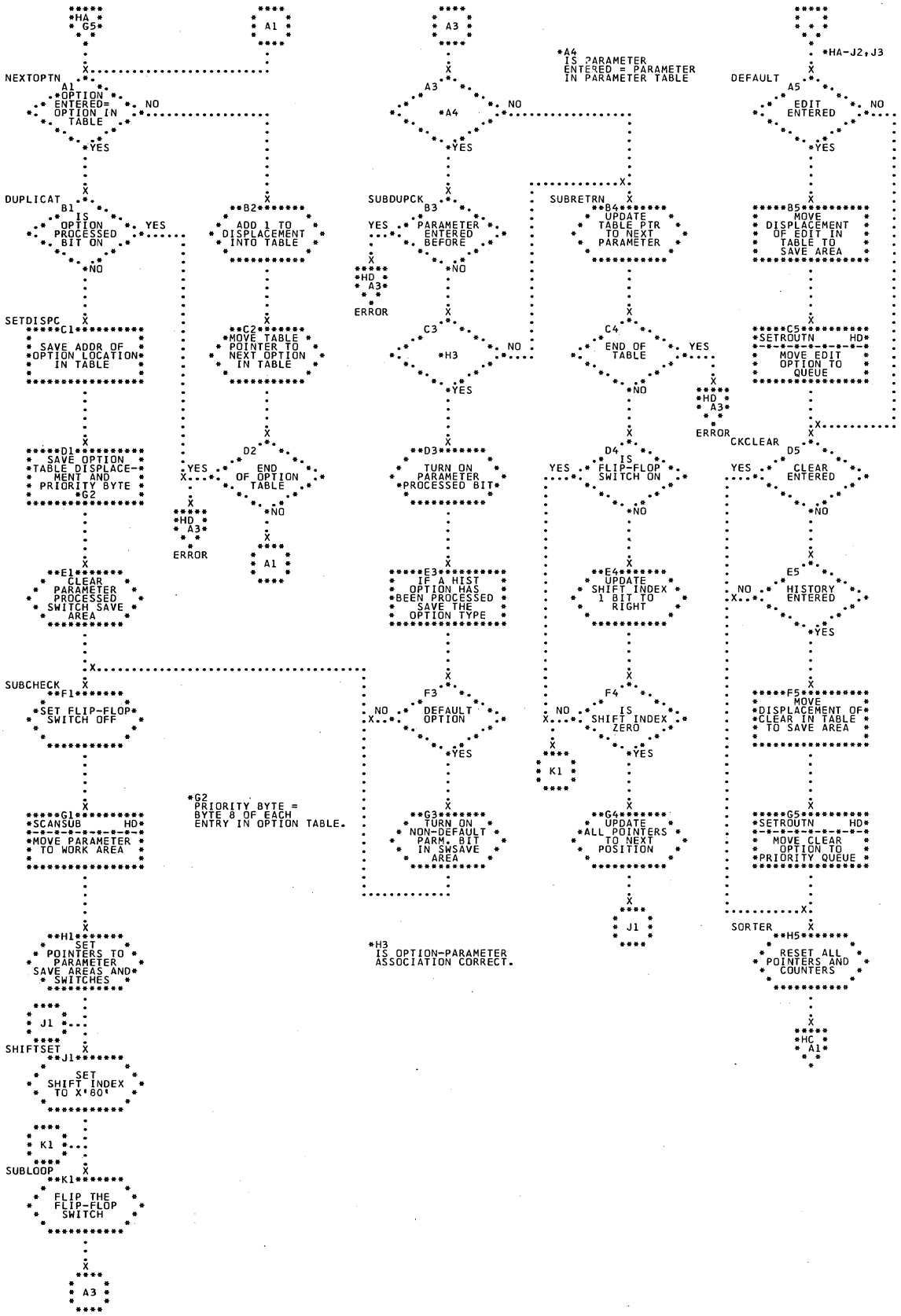


Chart HC. EREP - Option Handler (Part 3 of 3)
Refer to Charts 08-11.

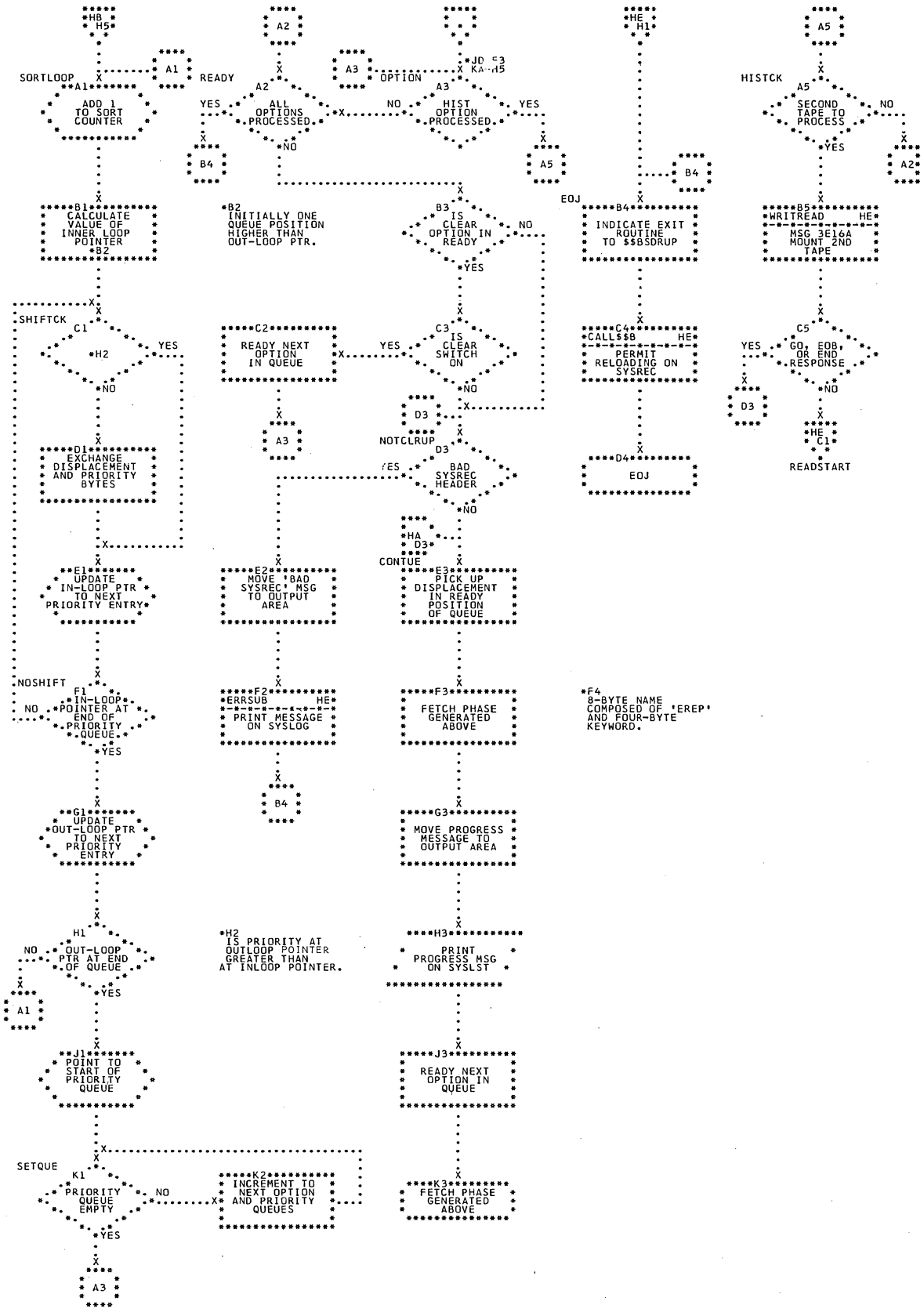


Chart HD. EREP Subroutines (Part 1 of 2)
Refer to Charts 08-11.

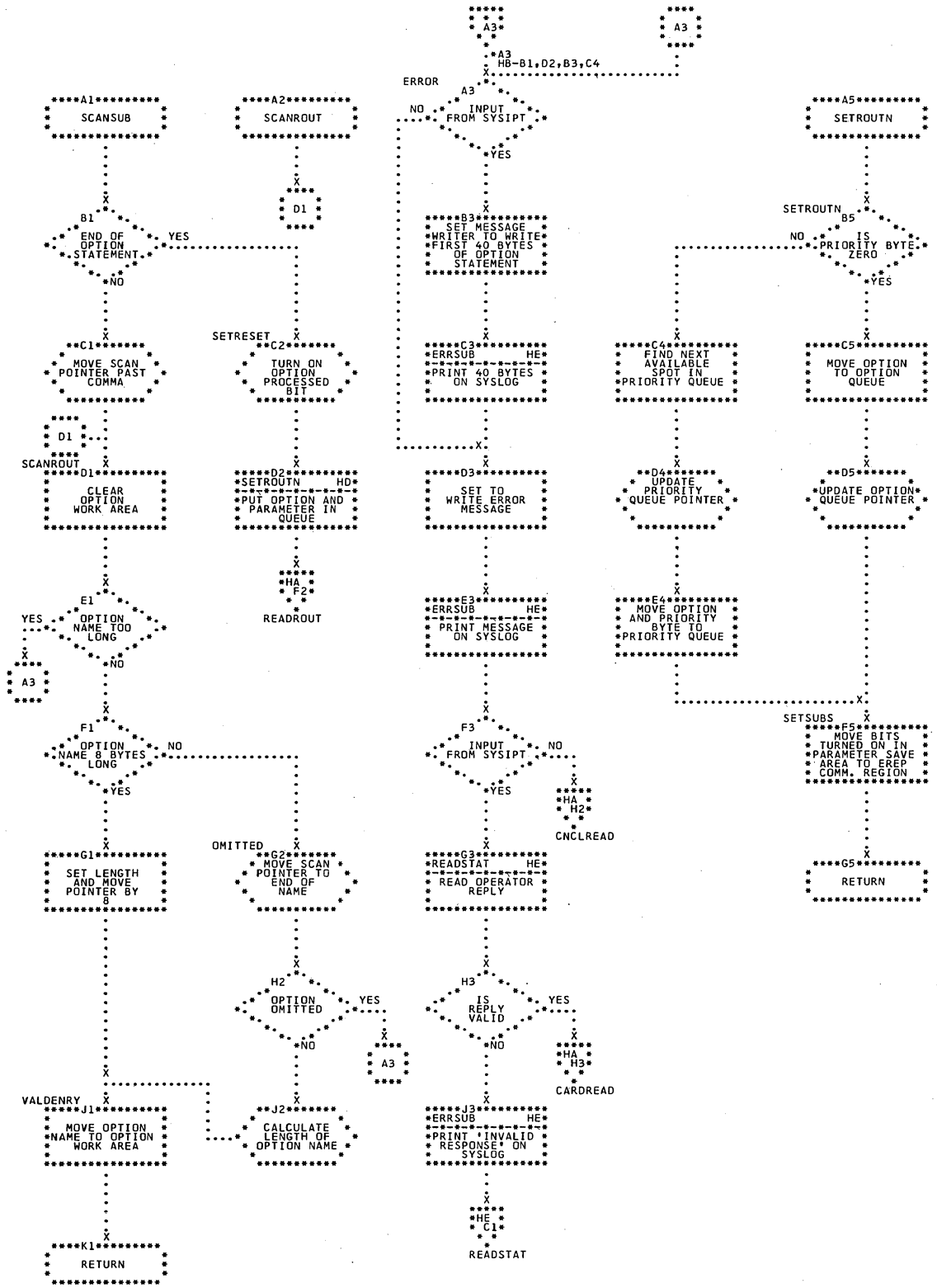


Chart HE. EREP Subroutines (Part 2 of 2)
Refer to Charts 08-11.

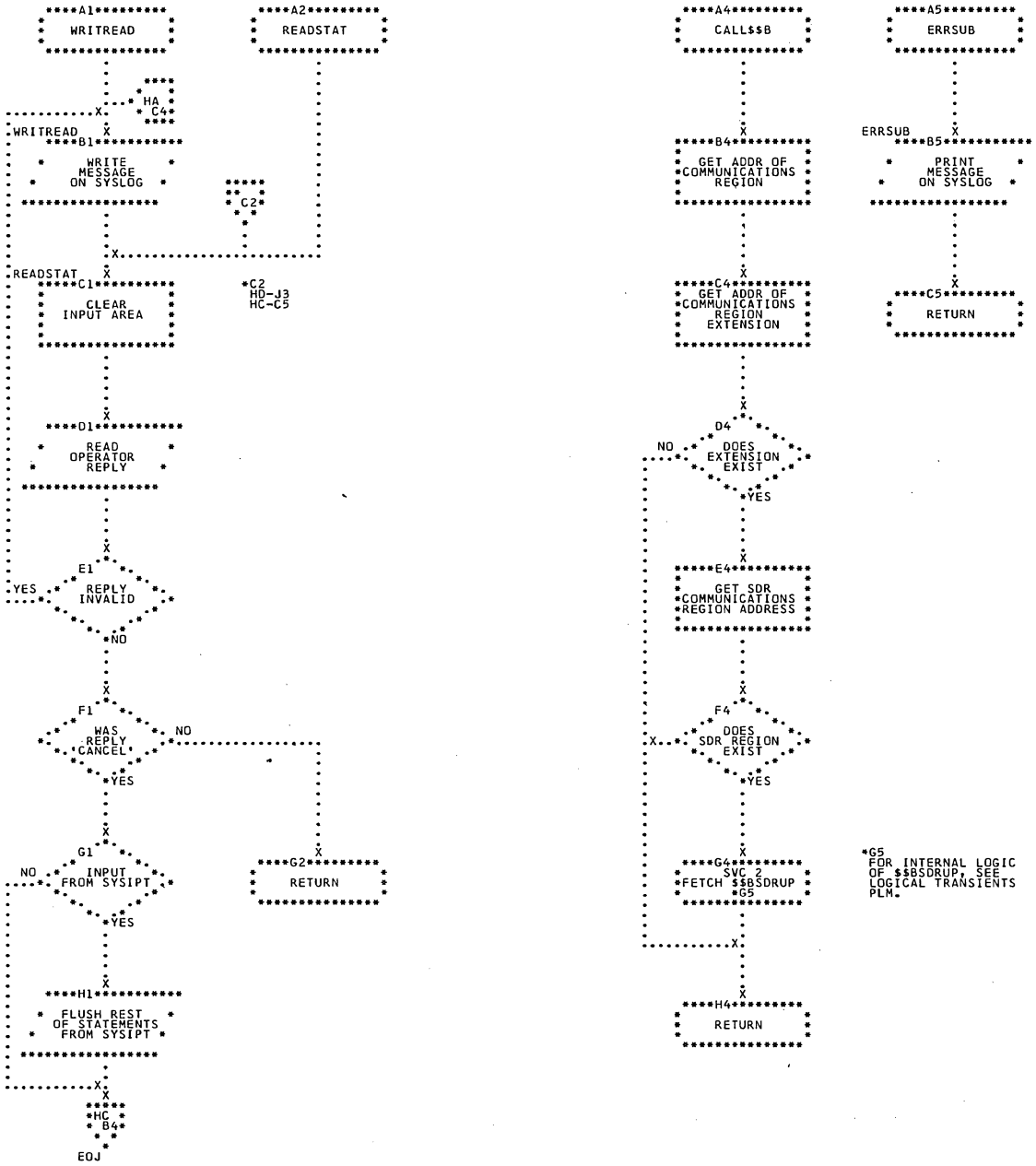


Chart JA. EREPEDIT - Root Phase (Part 1 of 6)
Refer to Charts 12-14.

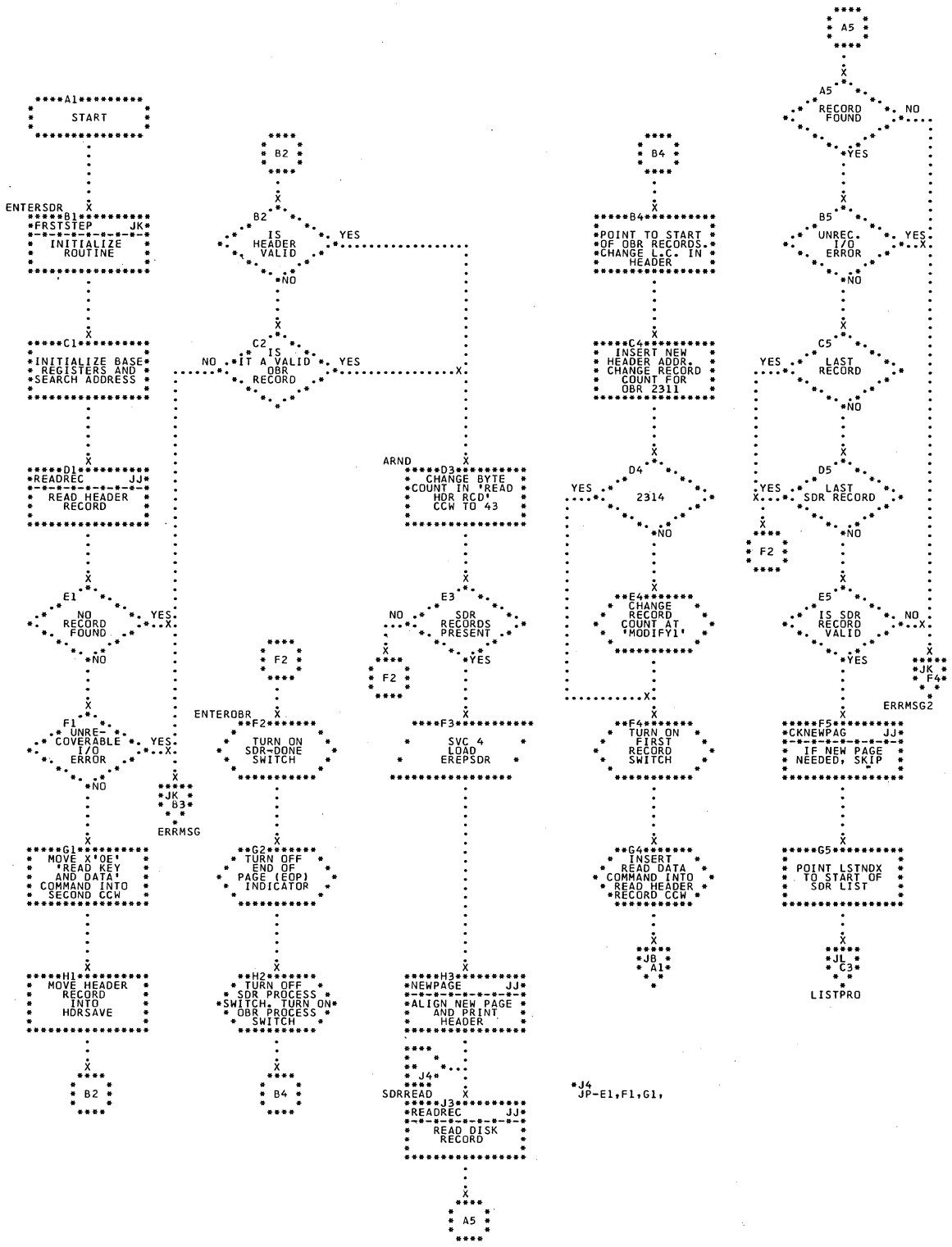


Chart JB. EREPEDIT - Root Phase (Part 2 of 6)
Refer to Charts 12-14.

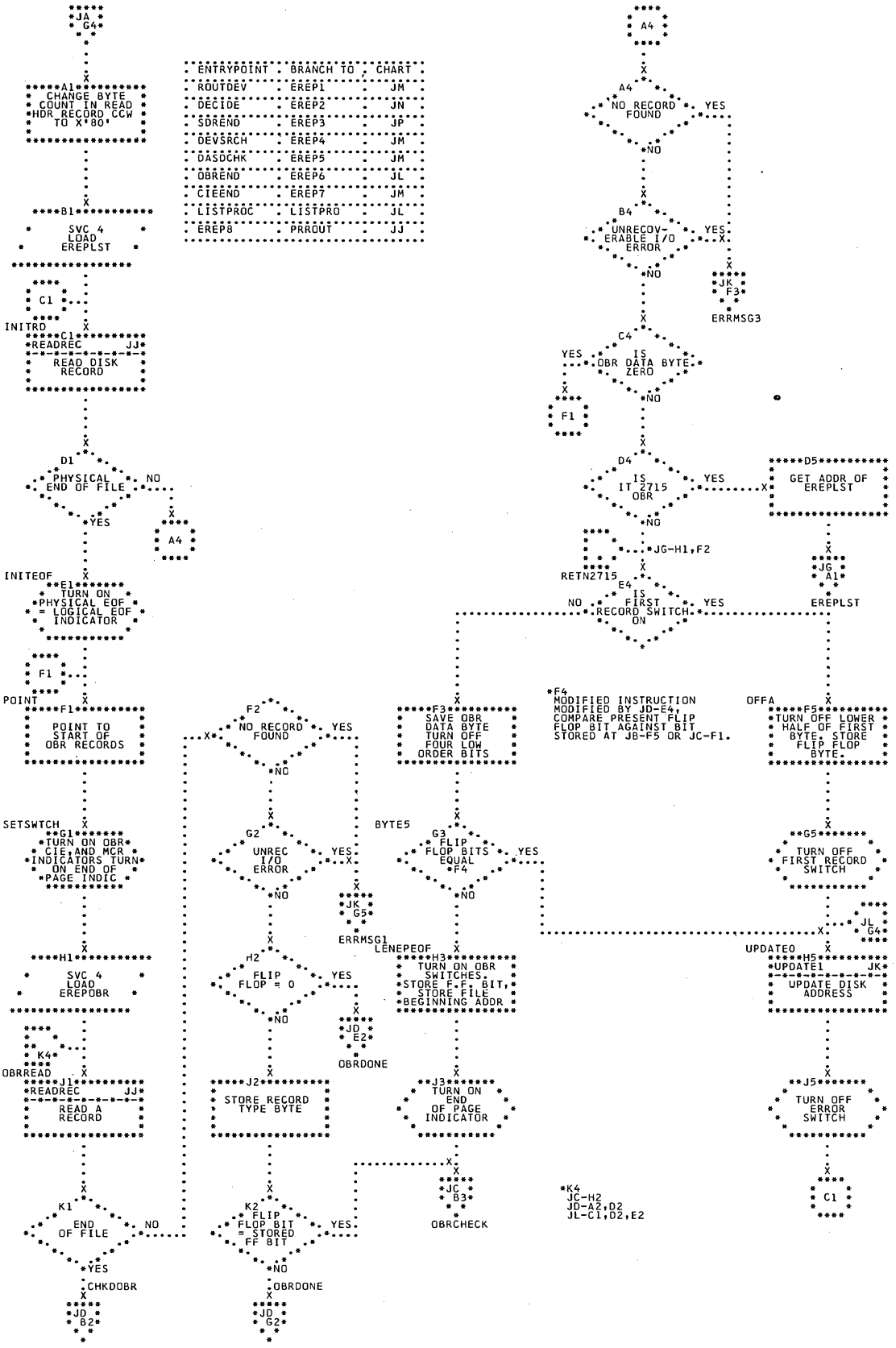


Chart JC. EREPEDIT - Root Phase (Part 3 of 6)
Refer to Charts 12-14.

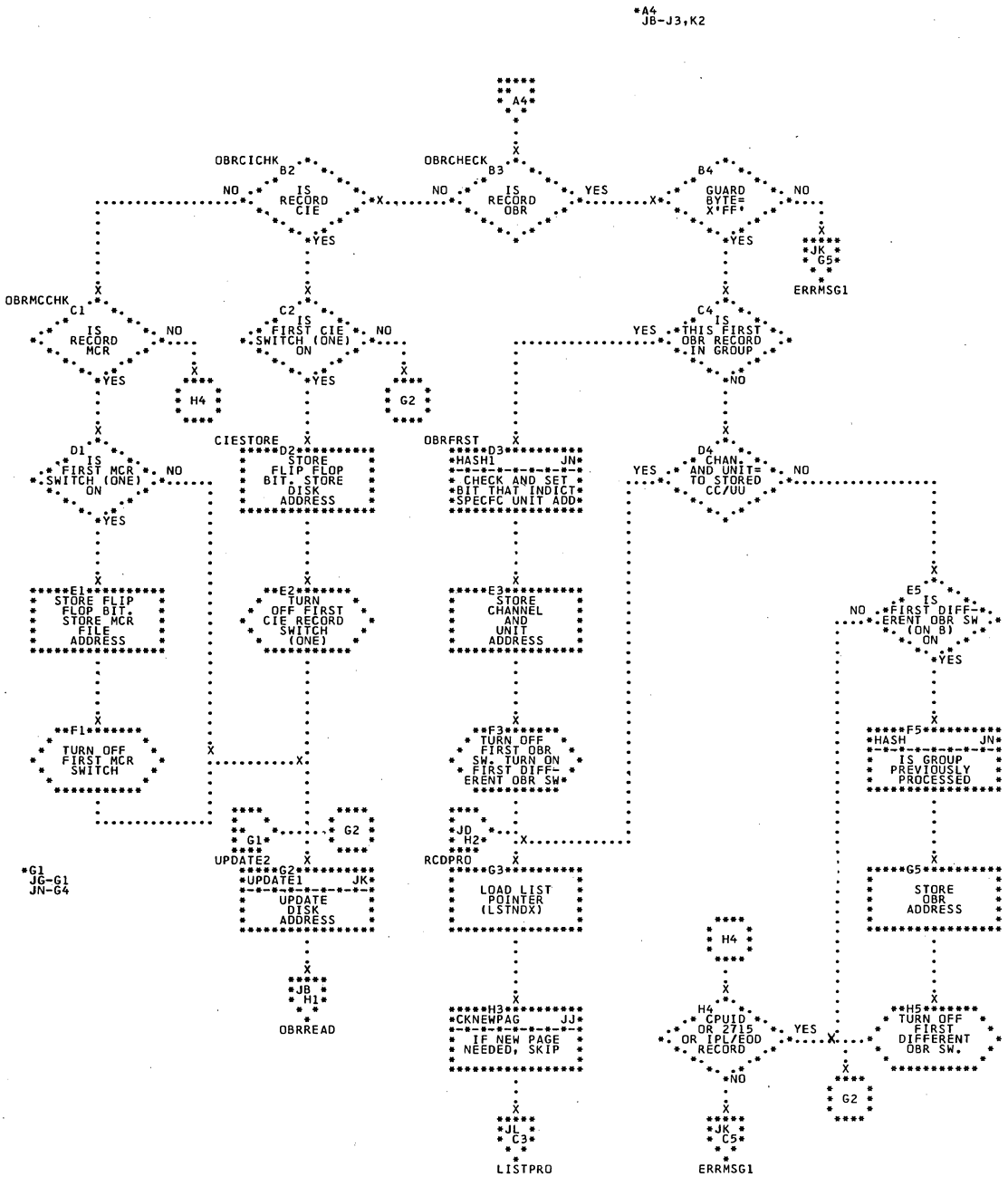


Chart JD. EREPEDIT - Root Phase (Part 4 of 6)
Refer to Charts 12-14.

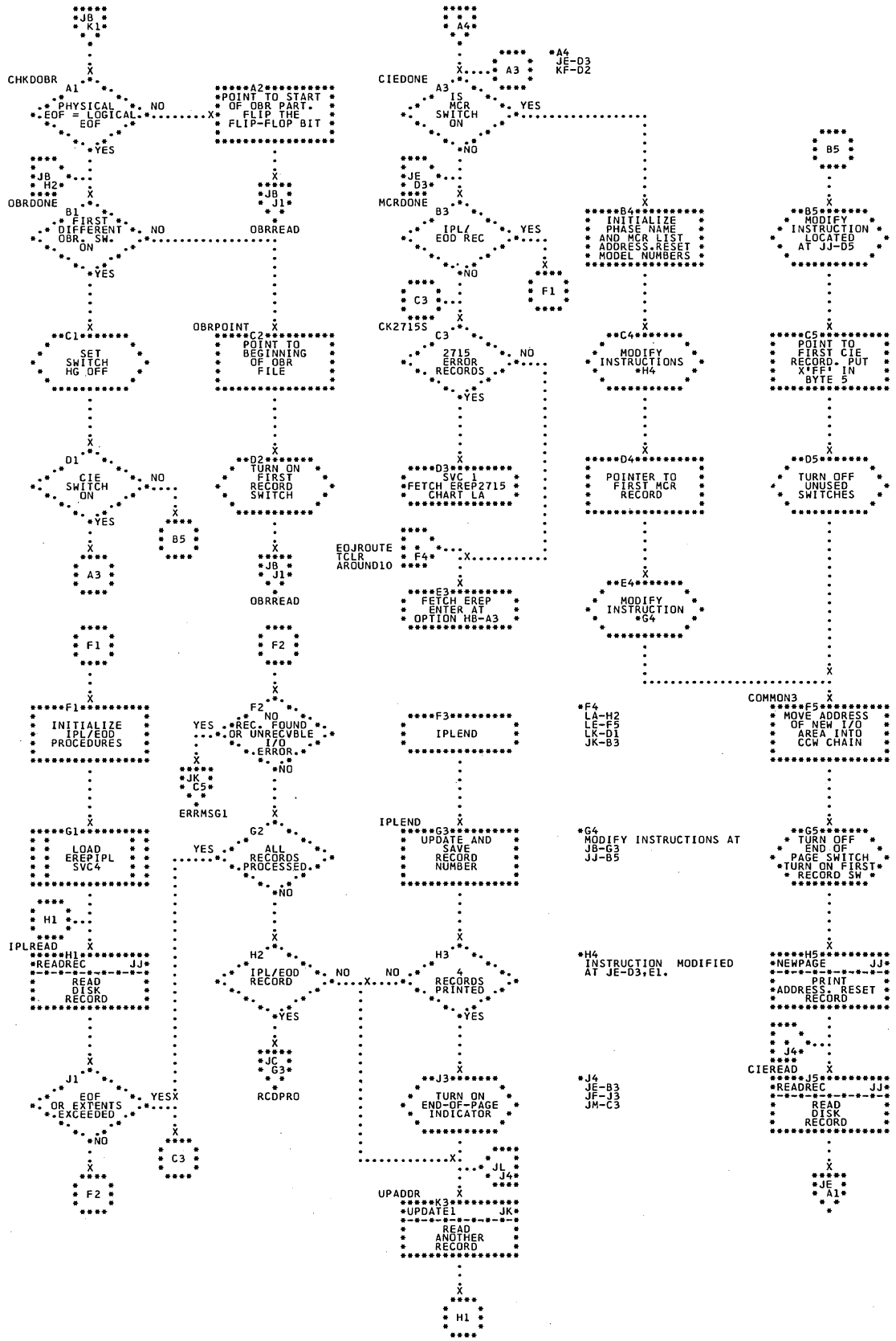


Chart JE. EREPEDIT - Root Phase (Part 5 of 6)
Refer to Charts 12-14.

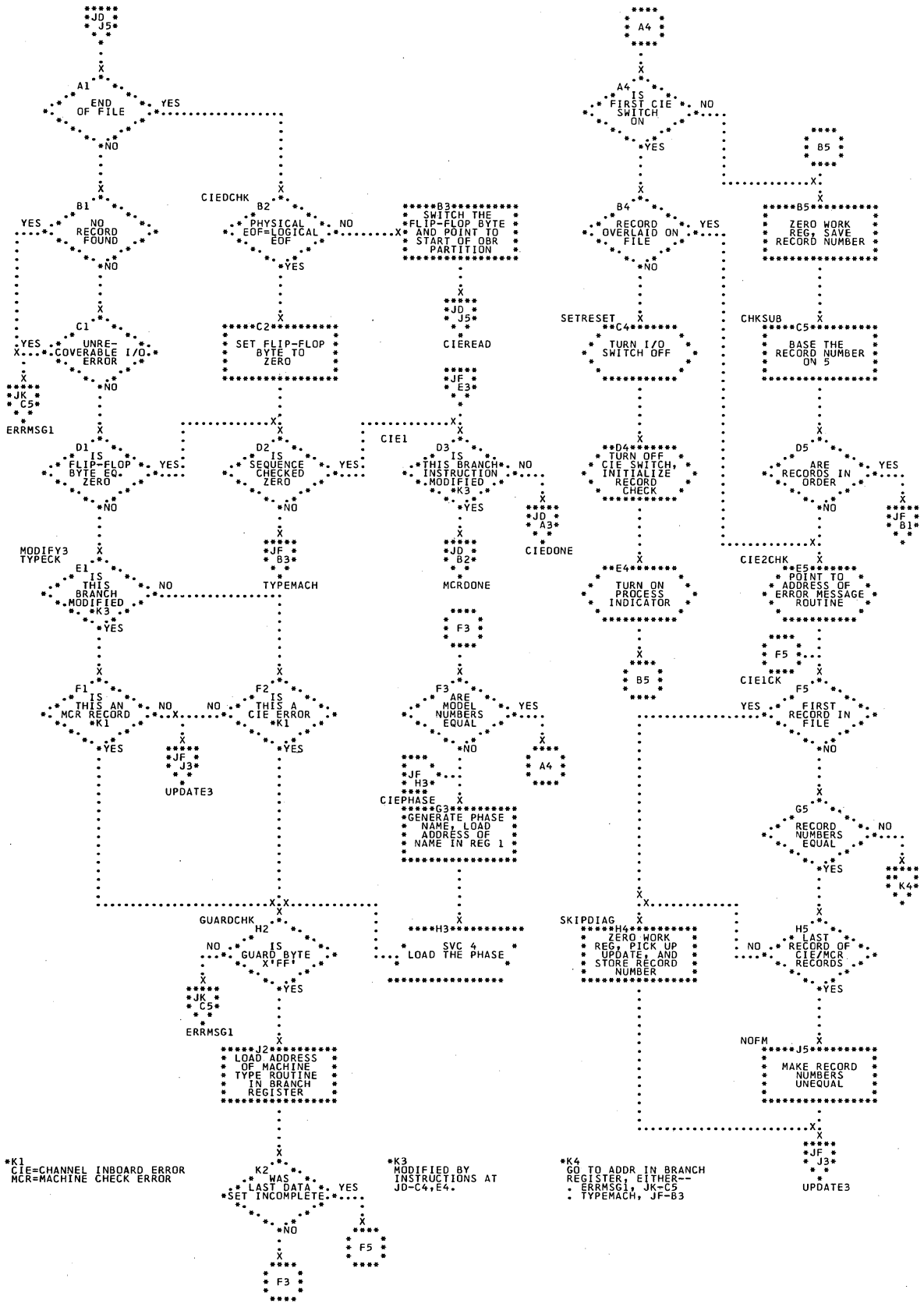


Chart JF. EREPEDIT - Root Phase (Part 6 of 6)
Refer to Charts 12-14.

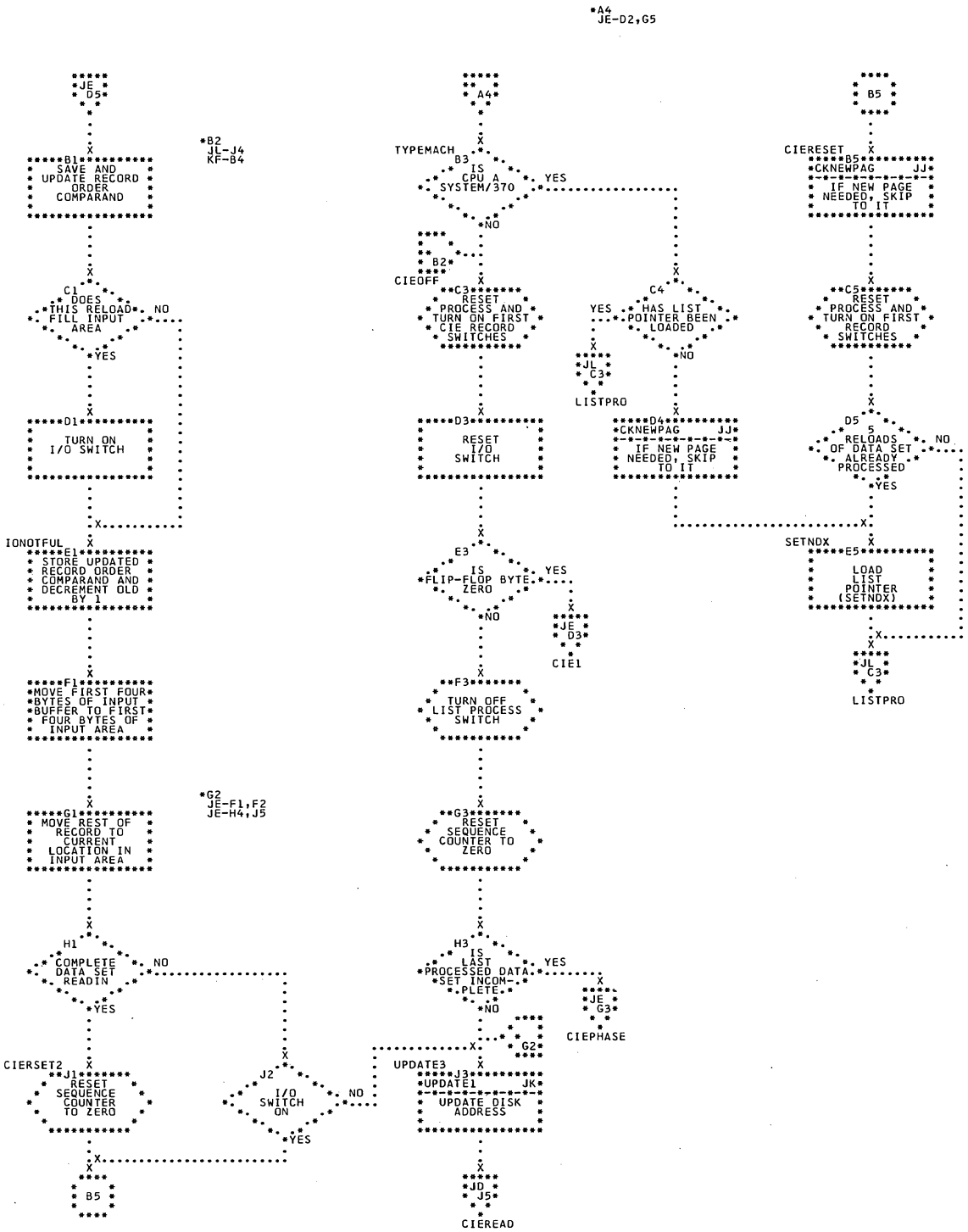


Chart JG. EREPLST (Part 1 of 2)
Refer to Charts 12-14.

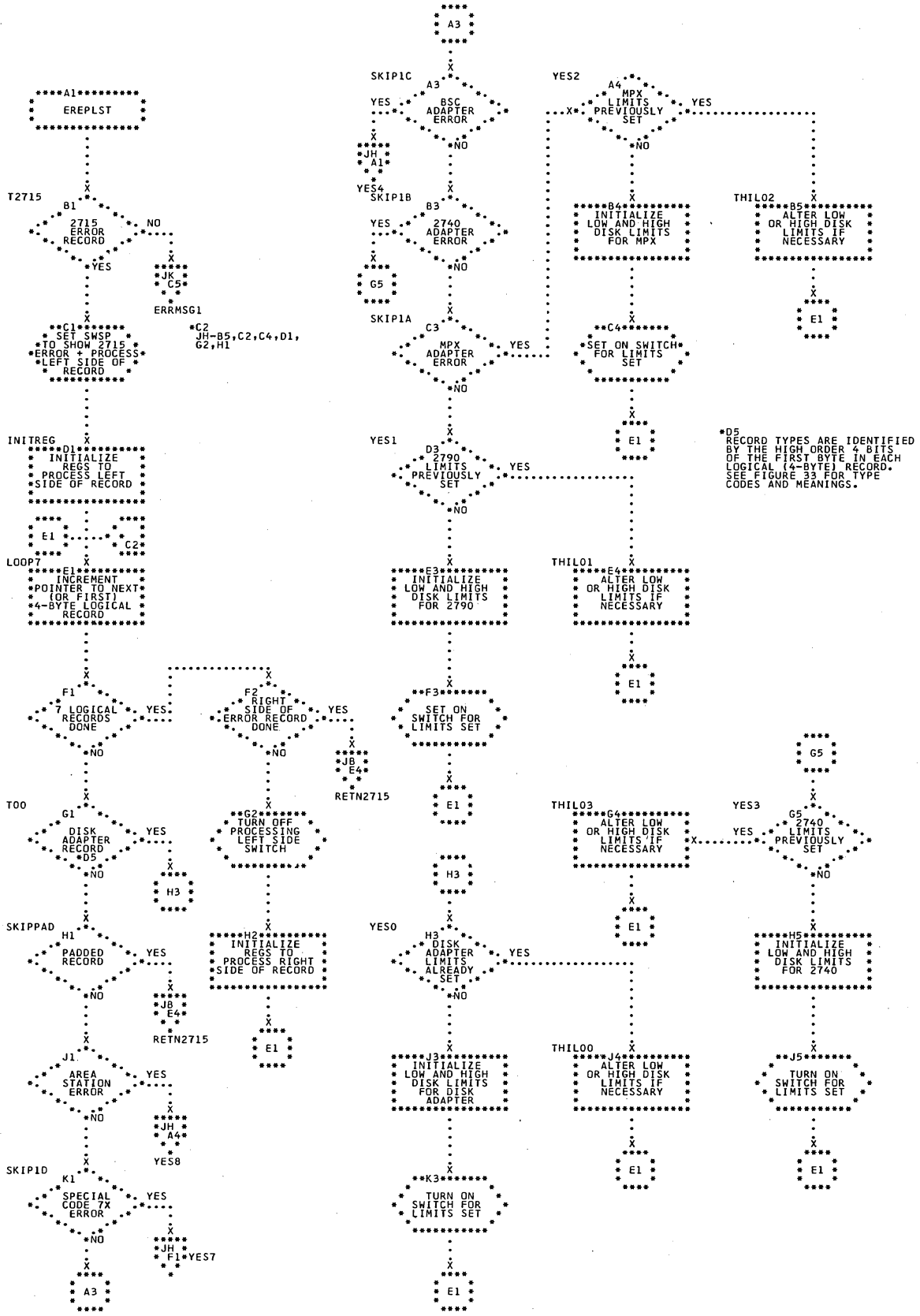


Chart JH. EREPLST (Part 2 of 2)
Refer to Charts 12-14.

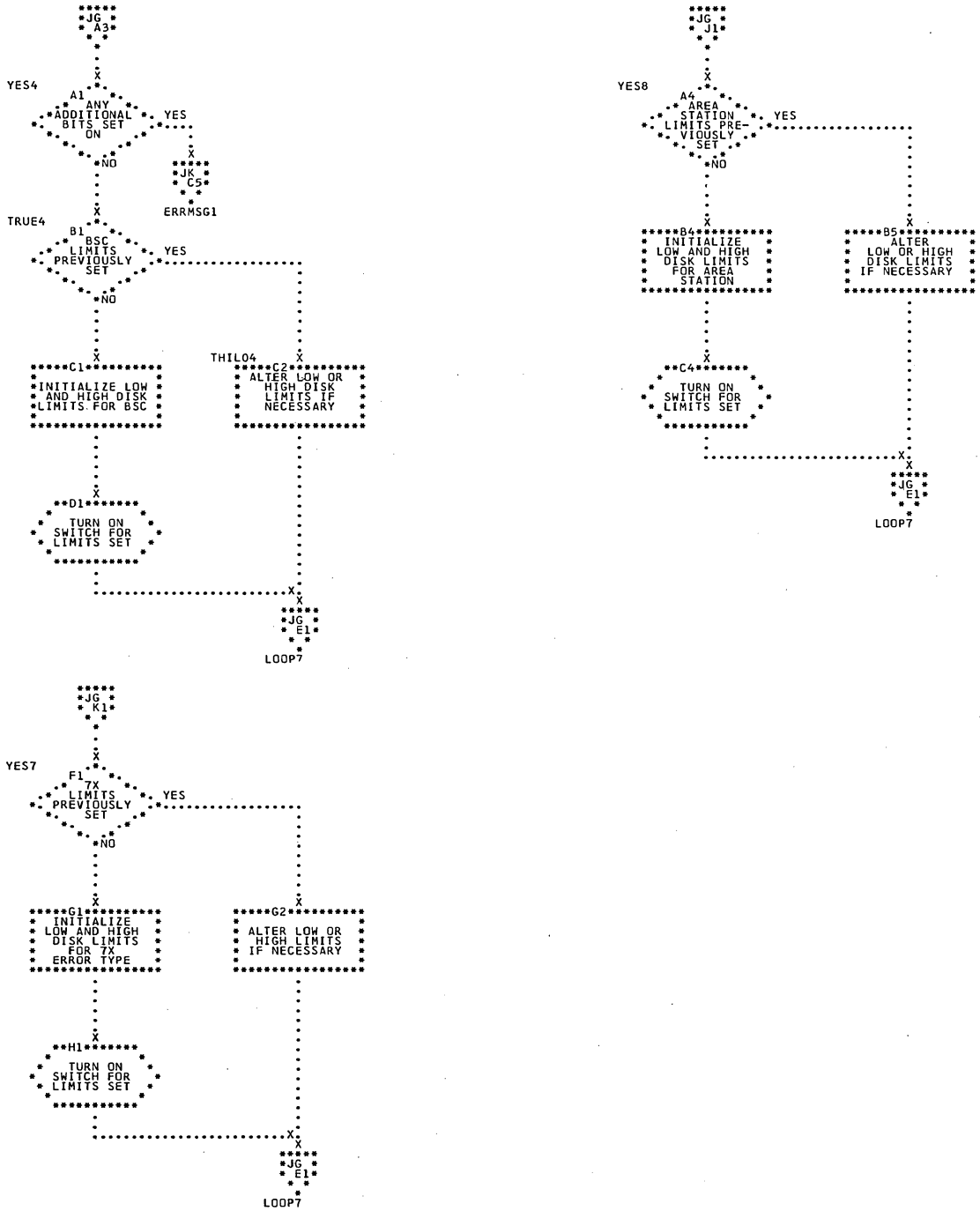


Chart JJ. EREPEDIT - Call, Read, and New Page Subroutines
Refer to Charts 12-14.

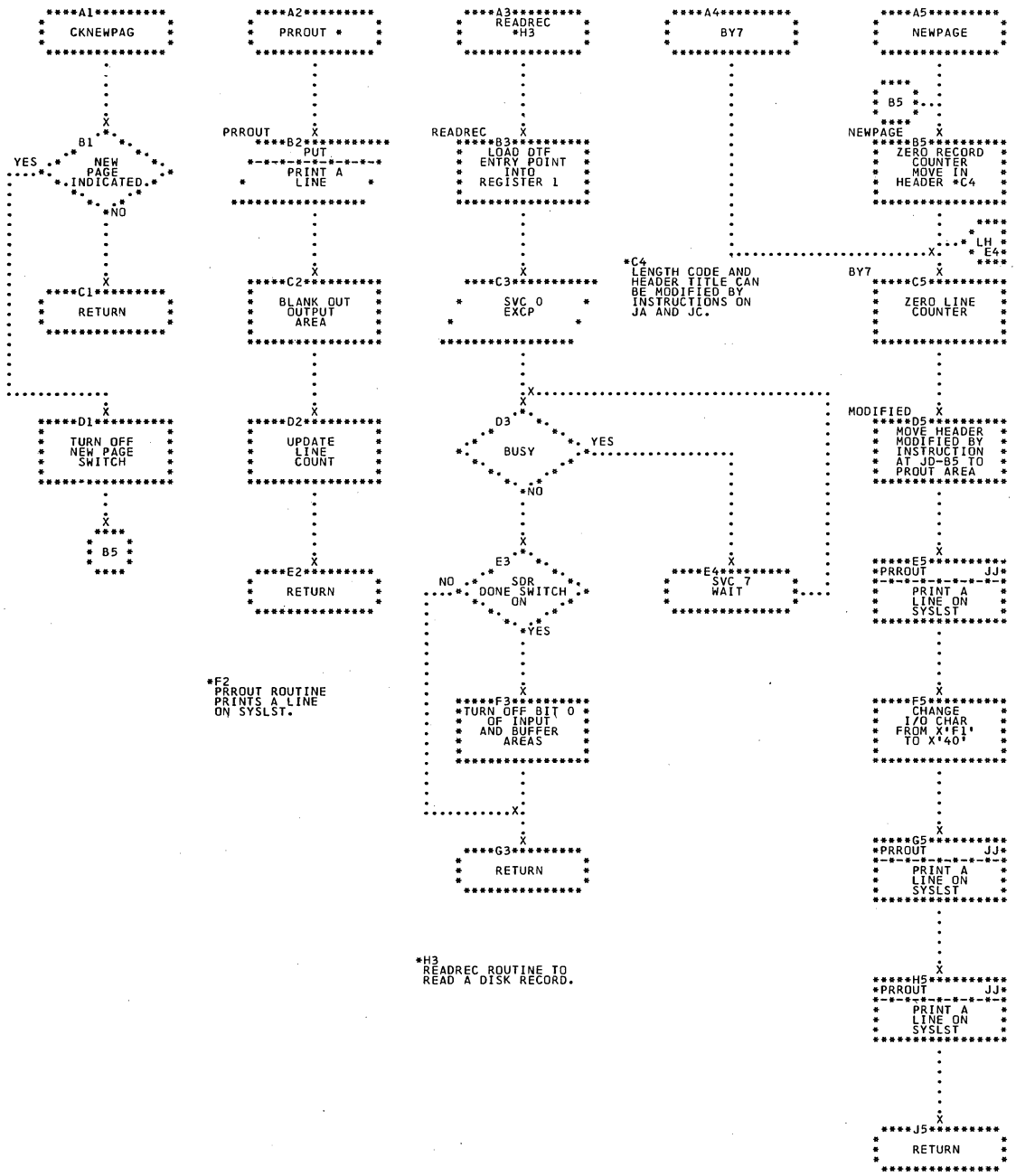


Chart JK. EREPEDIT - Disk Address Update, Open Files, and Error Message Subroutines
Refer to Charts 12-14.

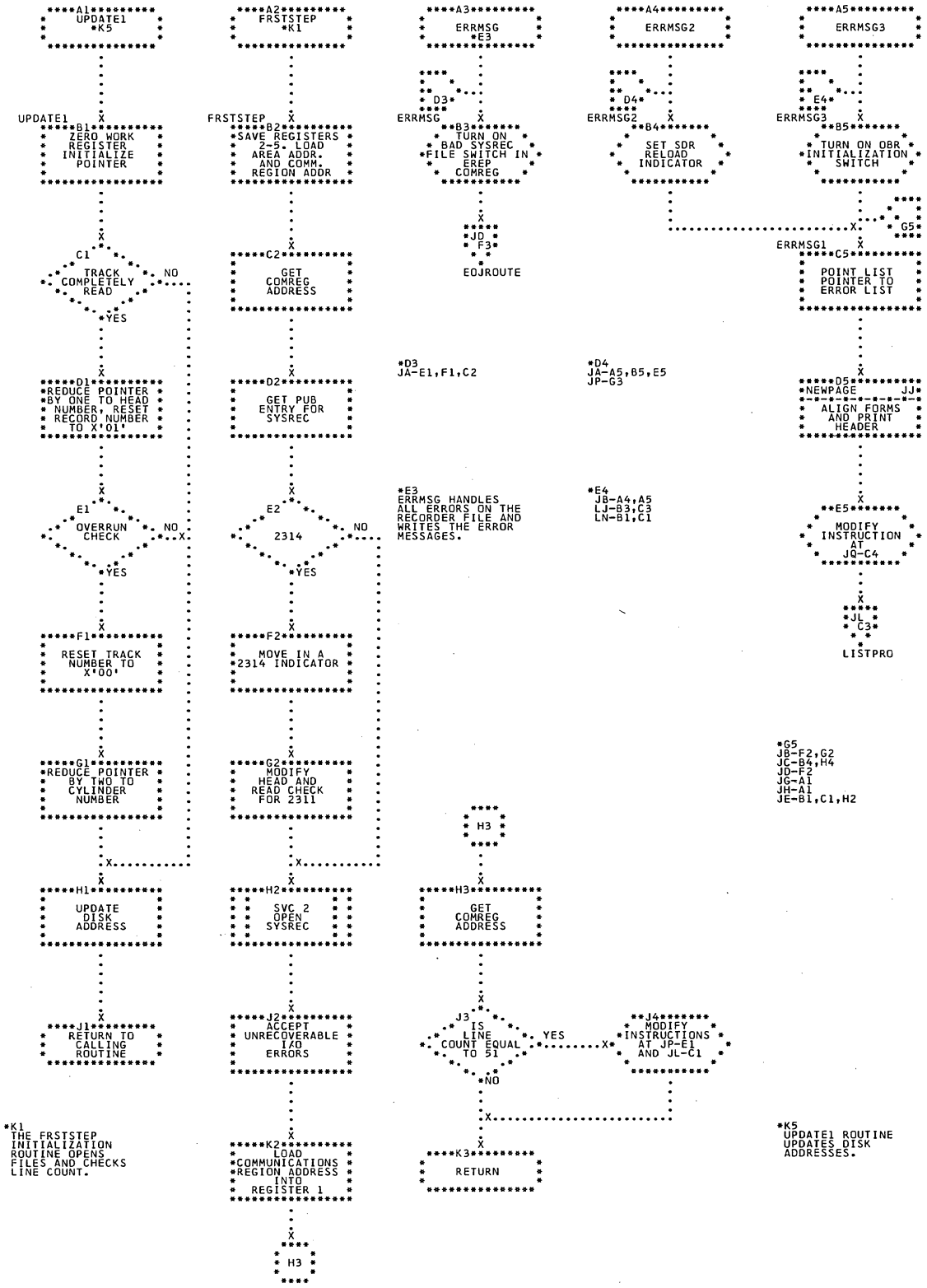


Chart JL. EREPEDIT - OBR Record End, Function Select, and Error Exit Subroutines
Refer to Charts 12-14.

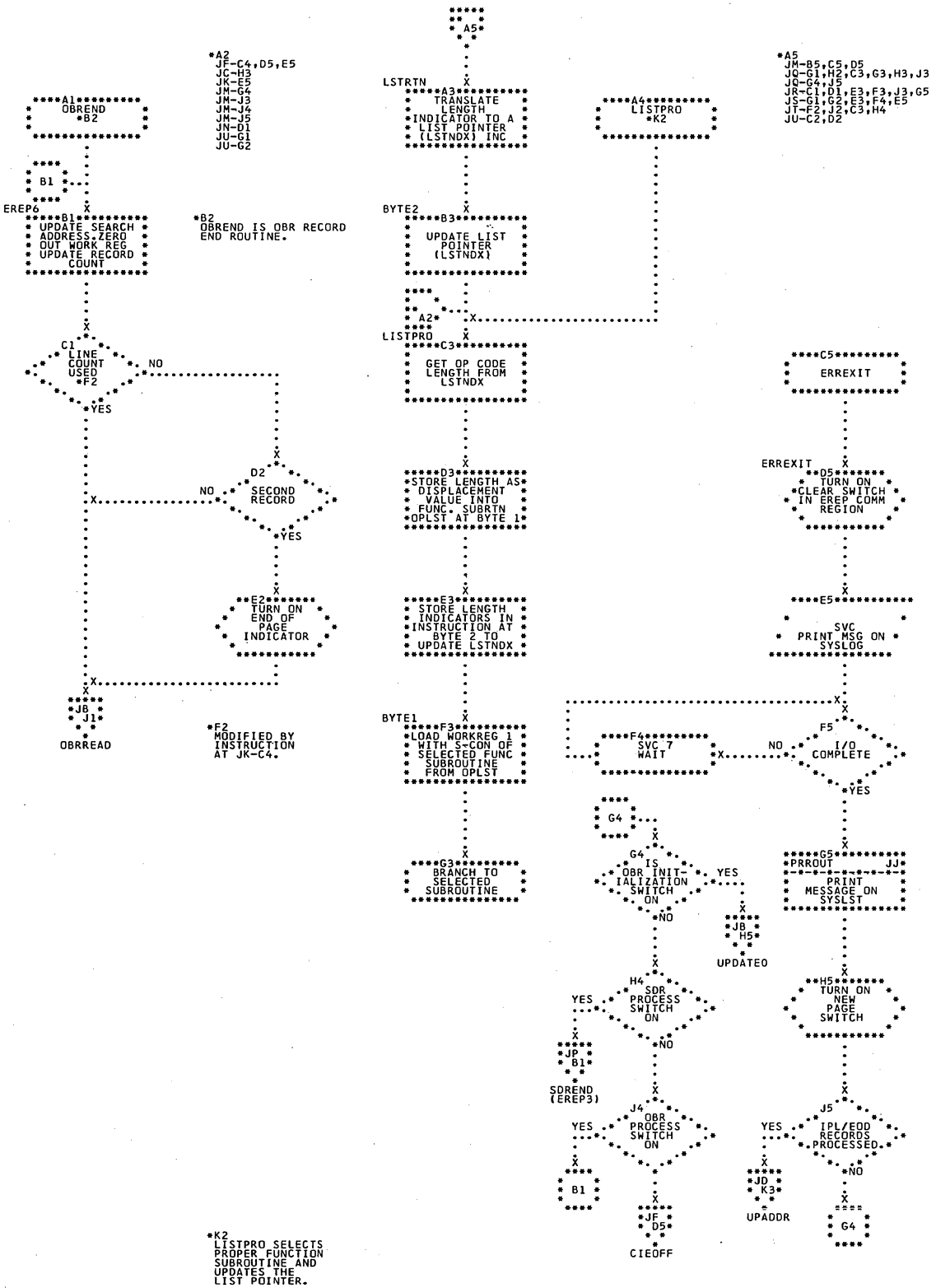


Chart JM. EREPEDIT - Subroutines
Refer to Charts 12-14.

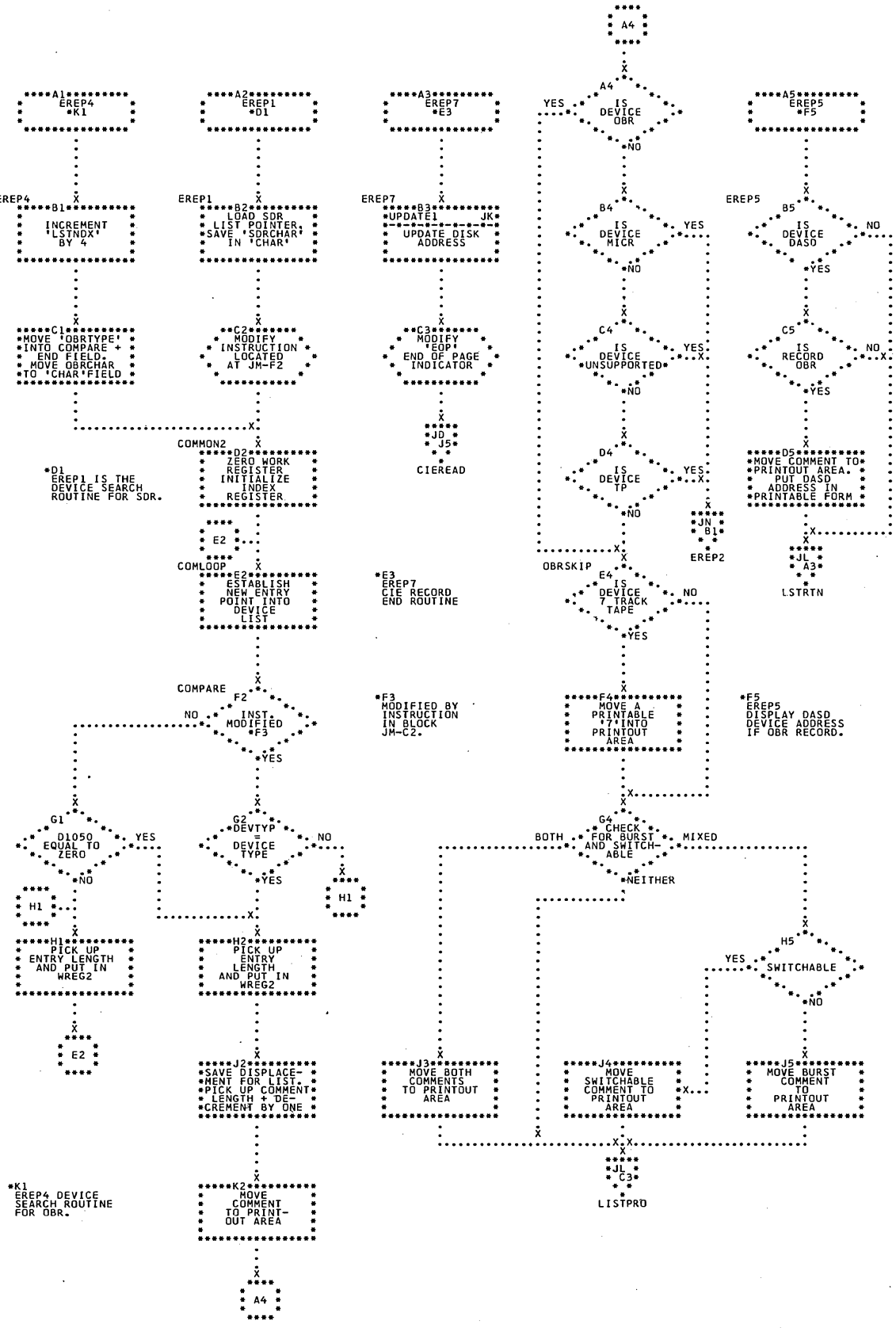


Chart JN. EREPEDIT - EREP2 and HASH Subroutines
Refer to Charts 12-14.

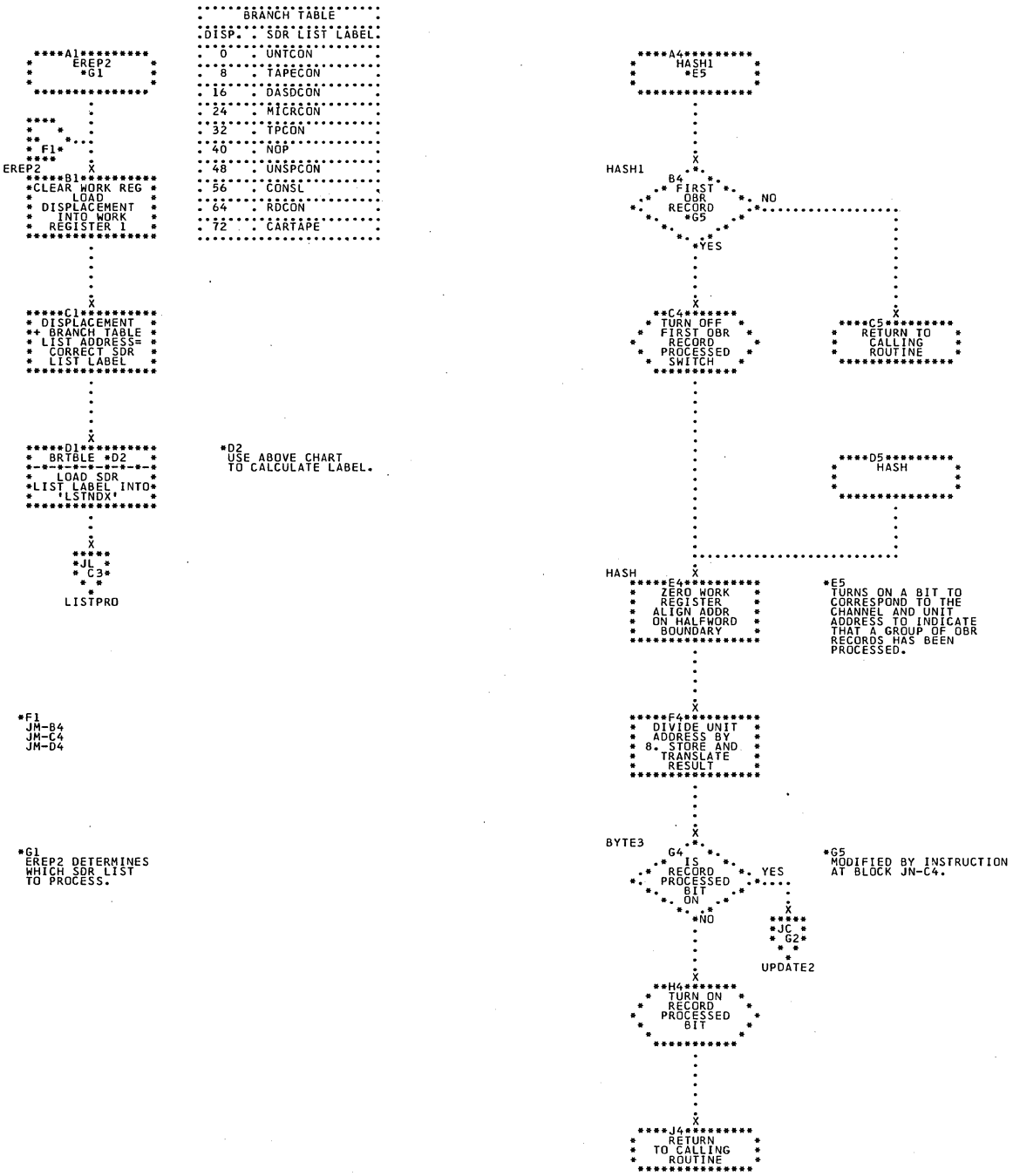


Chart JP. EREPEDIT - EREP3 and SDRCLEAR Subroutines
Refer to Charts 12-14.

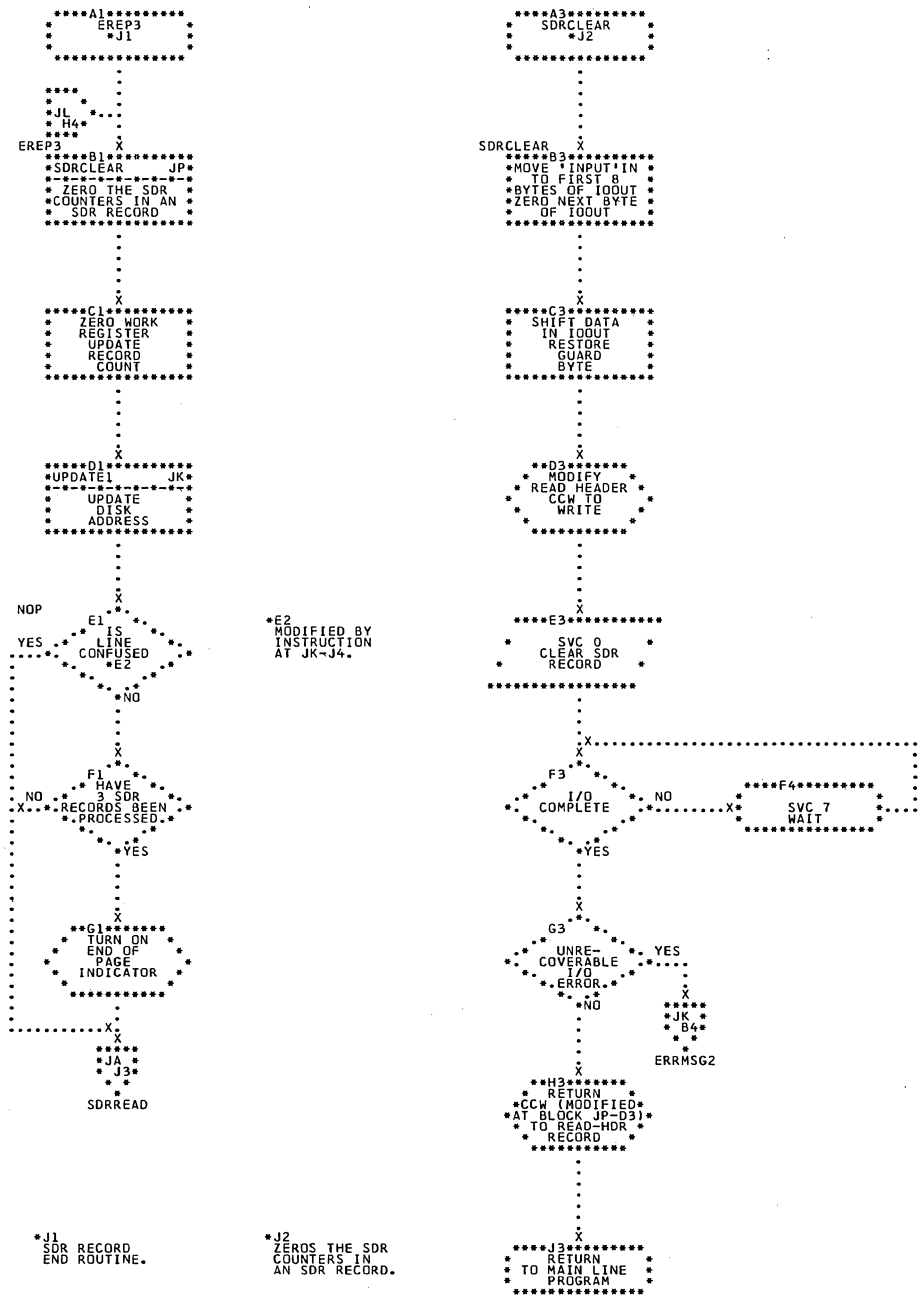


Chart JQ. EREPEDIT - Function Subroutines (Part 1 of 5)

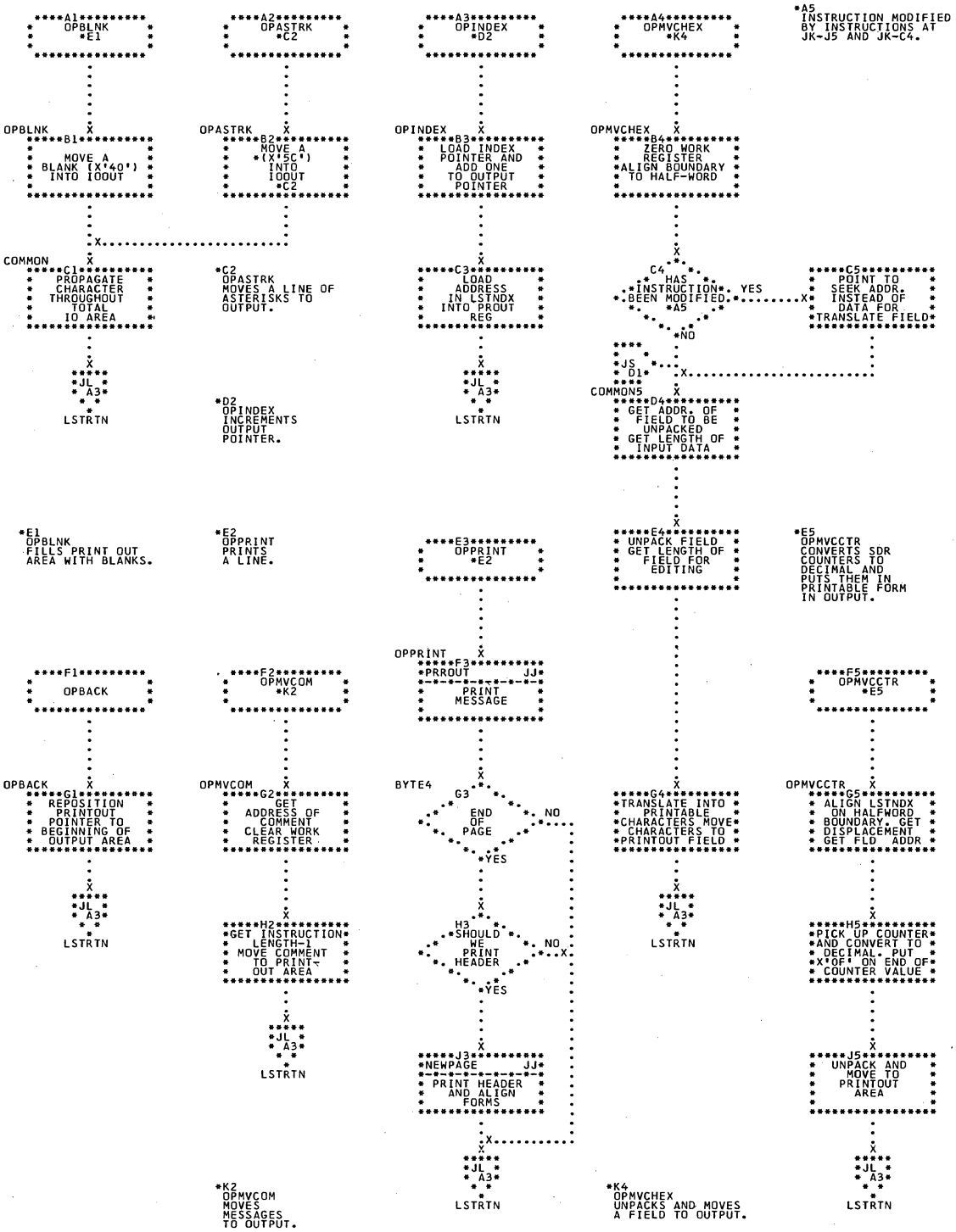


Chart JR. EREPEDIT - Function Subroutines (Part 2 of 5)

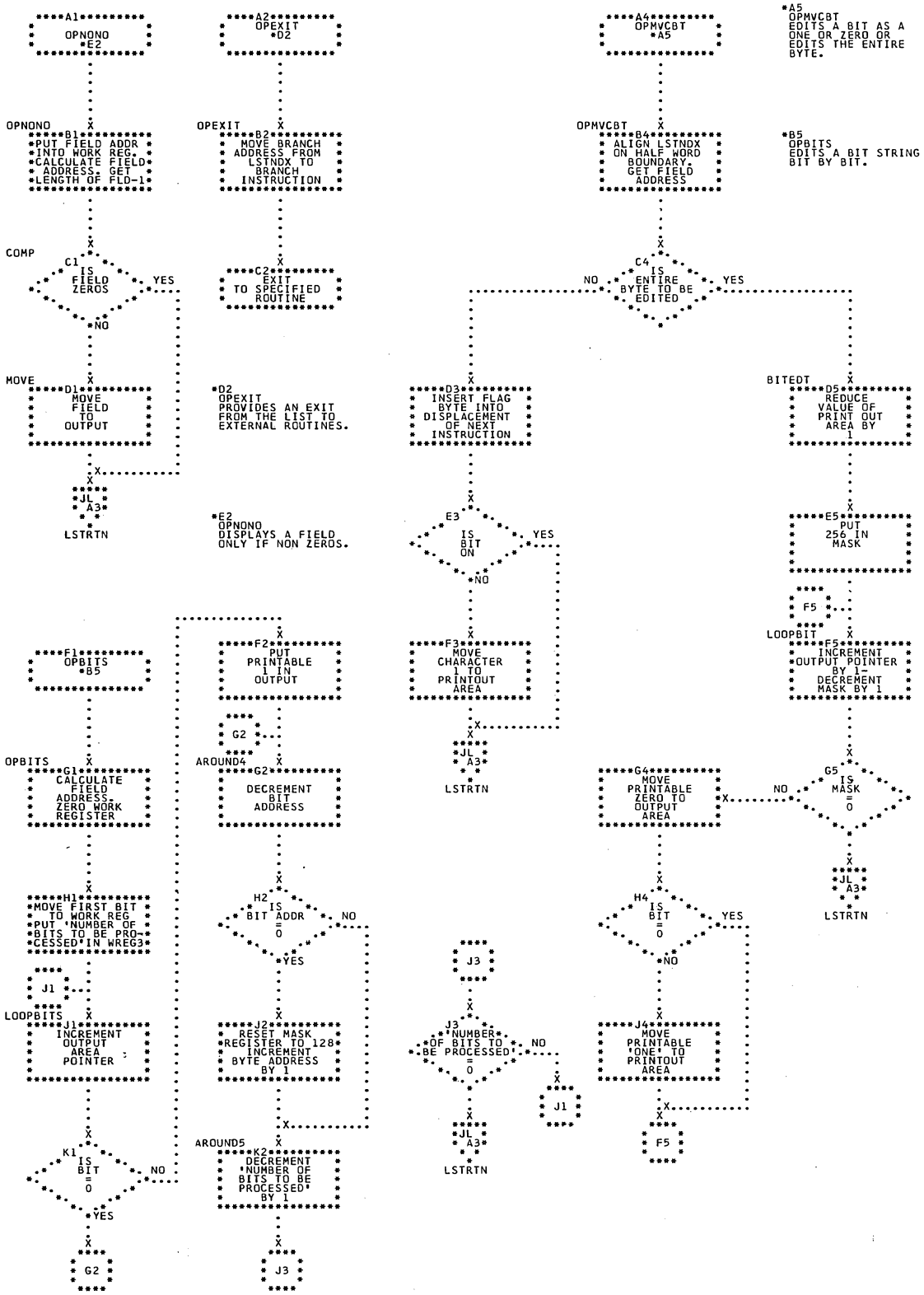
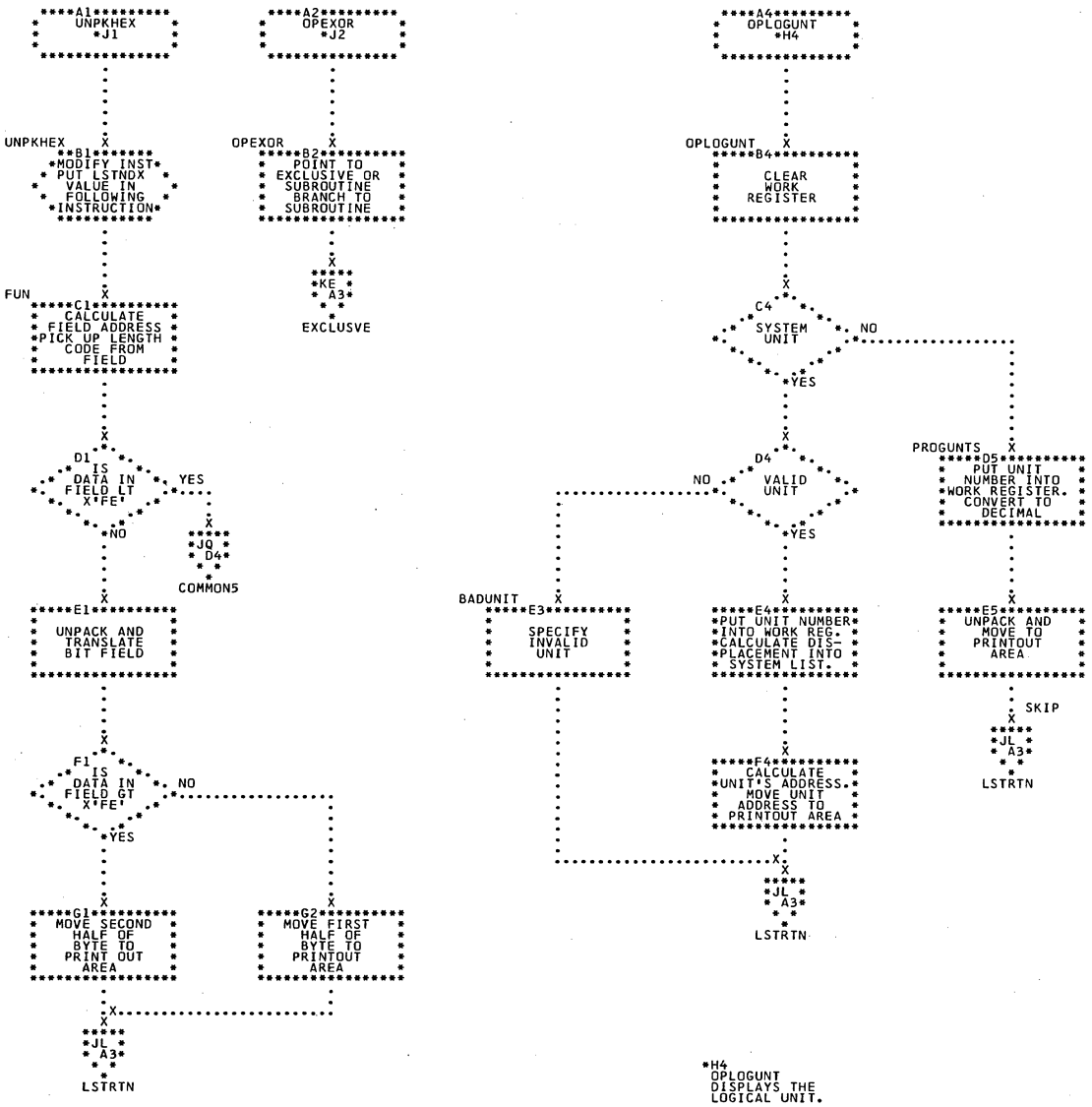


Chart JS. EREPEDIT - Function Subroutines (Part 3 of 5)

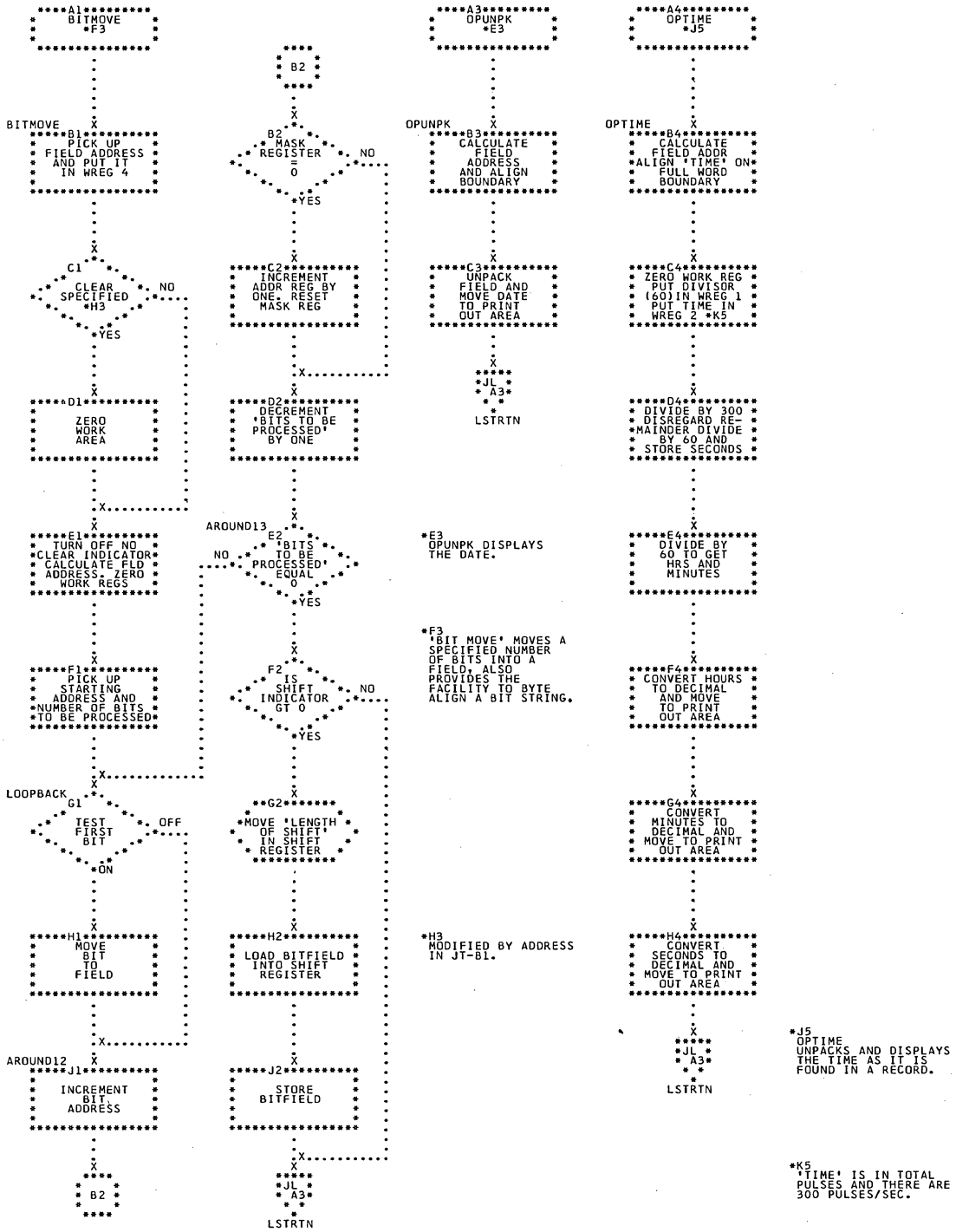


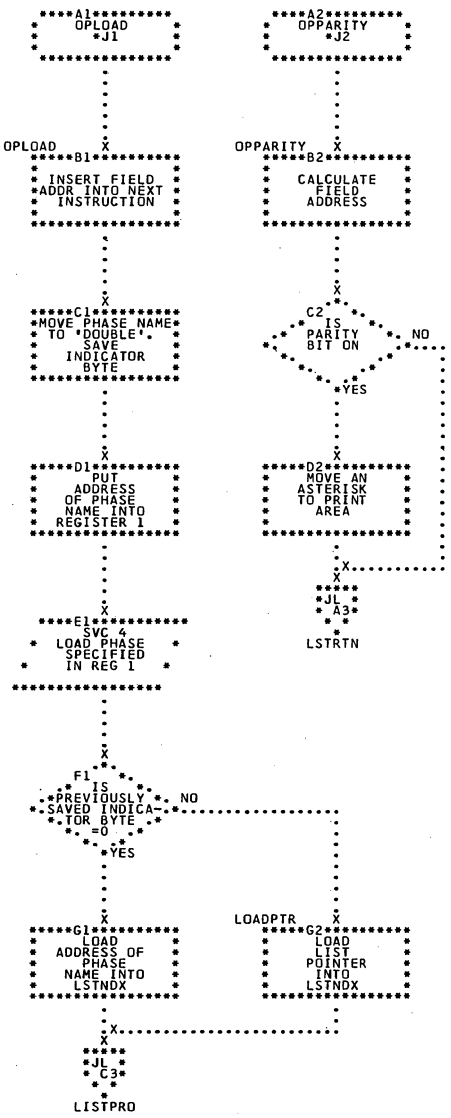
*J1
UNPKHEX
UNPACKS A
HALF BYTE
OR MORE.

*J2
OPEXOR
AN EXCLUSIVE OR
FUNCTION WHICH IS
PLACED IN EREP LOG1.

*H4
OPLOGUNT
DISPLAYS THE
LOGICAL UNIT.

Chart JT. EREPEDIT - Function Subroutines (Part 4 of 5)





*J1
OPLOAD
LOADS A NEW PHASE AND INITIALIZES THE LIST POINTER.

*J2
OPPARITY
CHECKS THE PARITY BIT AND PUTS AN ASTERISK PRECEDING THE FIELD IF A ONE IS ENCOUNTERED.

Chart KA. EREPCLR - Main Routine

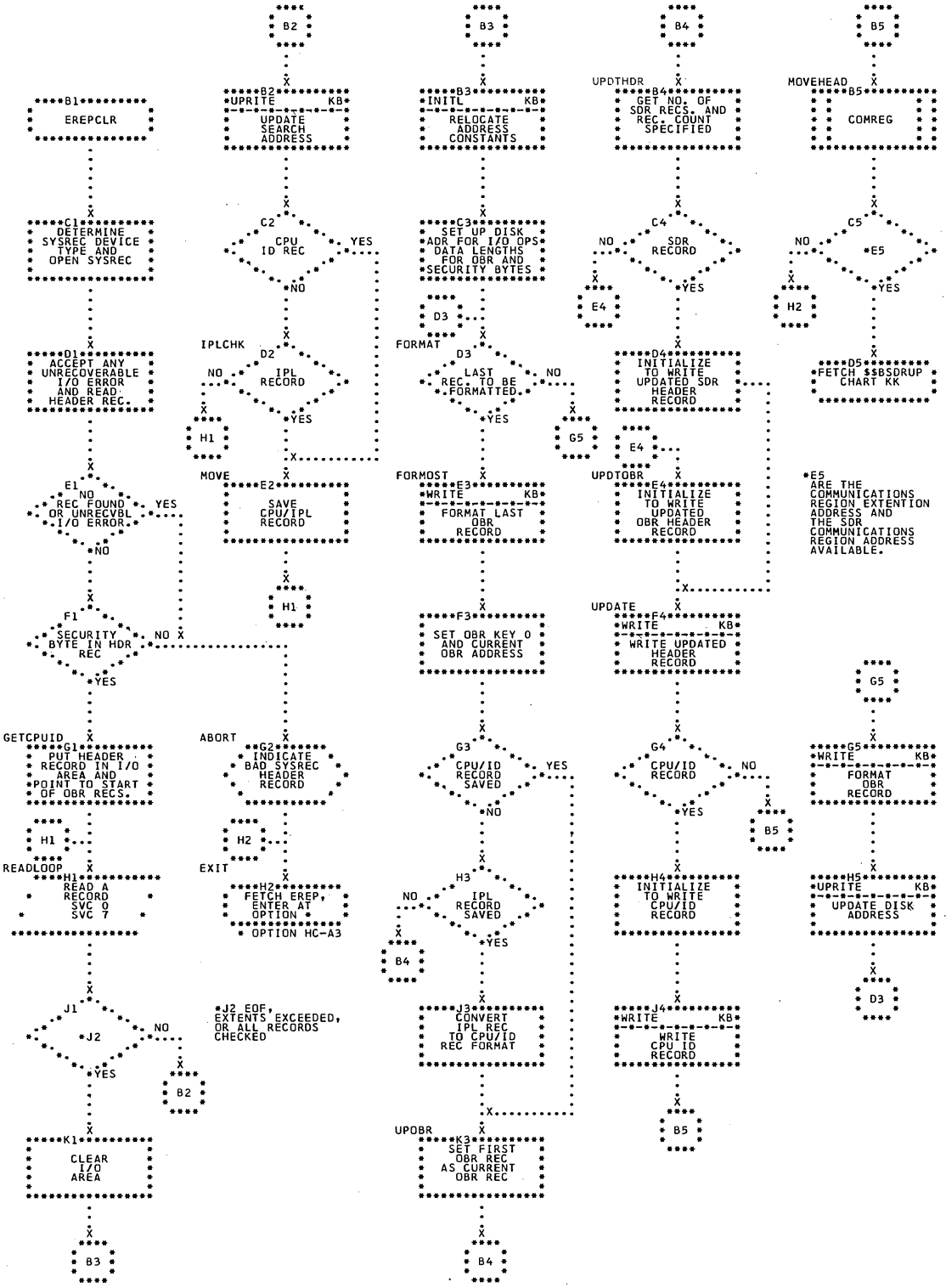
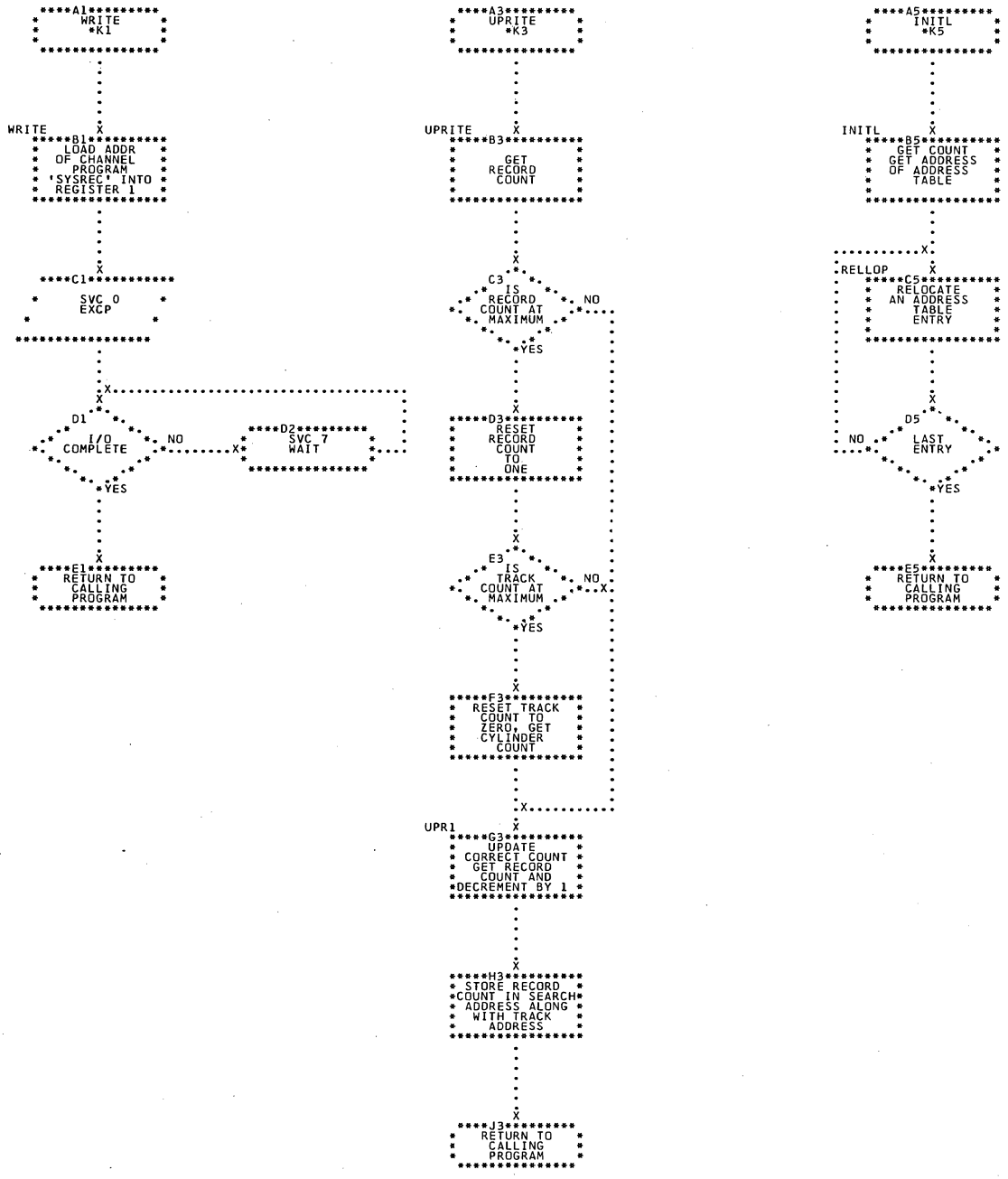


Chart KB. EREPCLR - Disk Address Update, Write, and Relocation Subroutines



*K1
ISSUES ALL THE WRITE COMMANDS TO THE RECORDER FILE.

*K3
ENTERED AFTER EACH WRITE TO UPDATE THE DISK ADDRESS FOR THE NEXT WRITE.

*K5
RELOCATES ALL THE ADCONS IN THE PHASE.

Chart KC. EREPCI30 - CIE Record Display of Catalog Number or MCK Information
Refer to Chart 15.

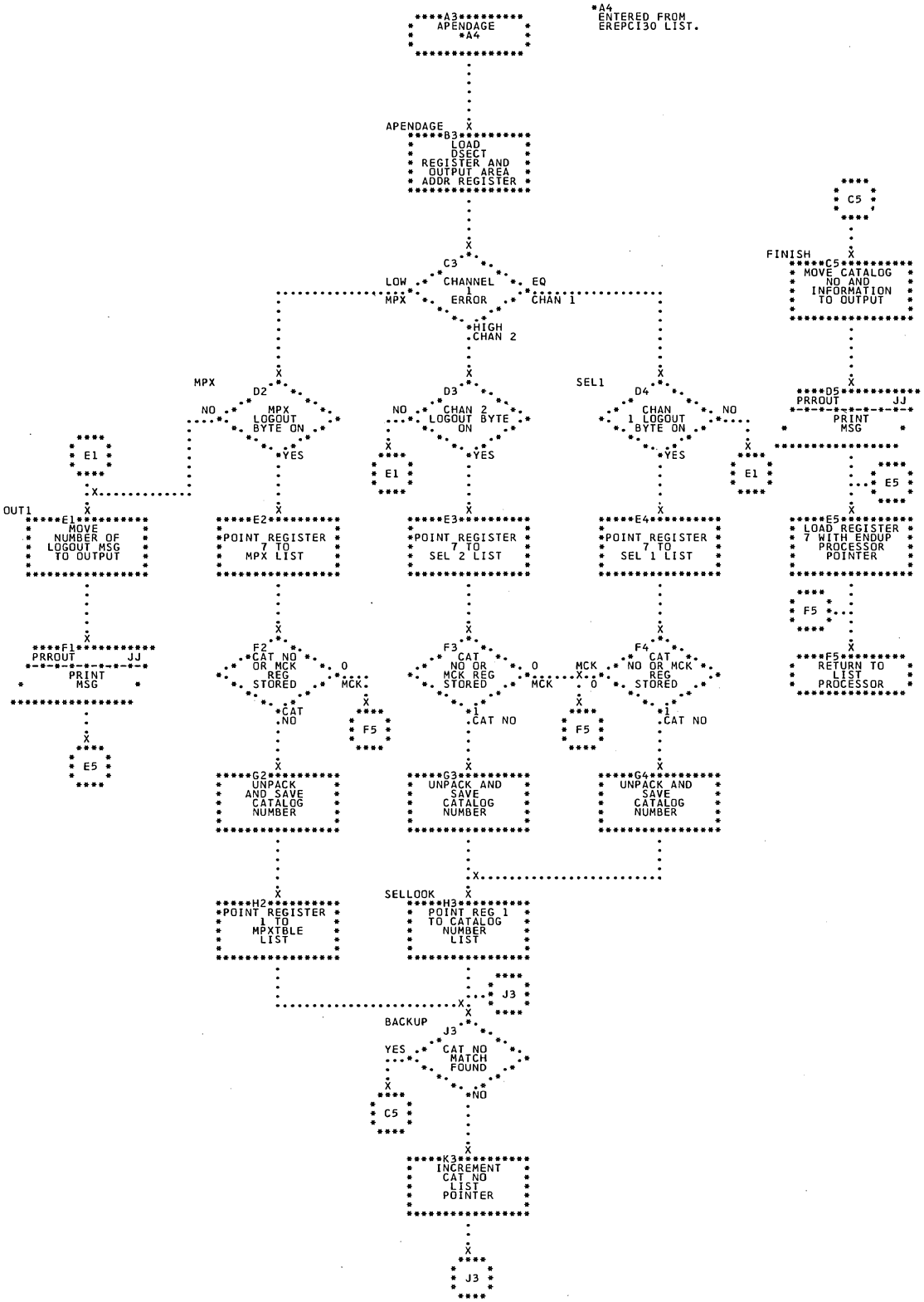


Chart KD. EREPLOG1 - ROBAR Parity Check Routine
Refer to Chart 16.

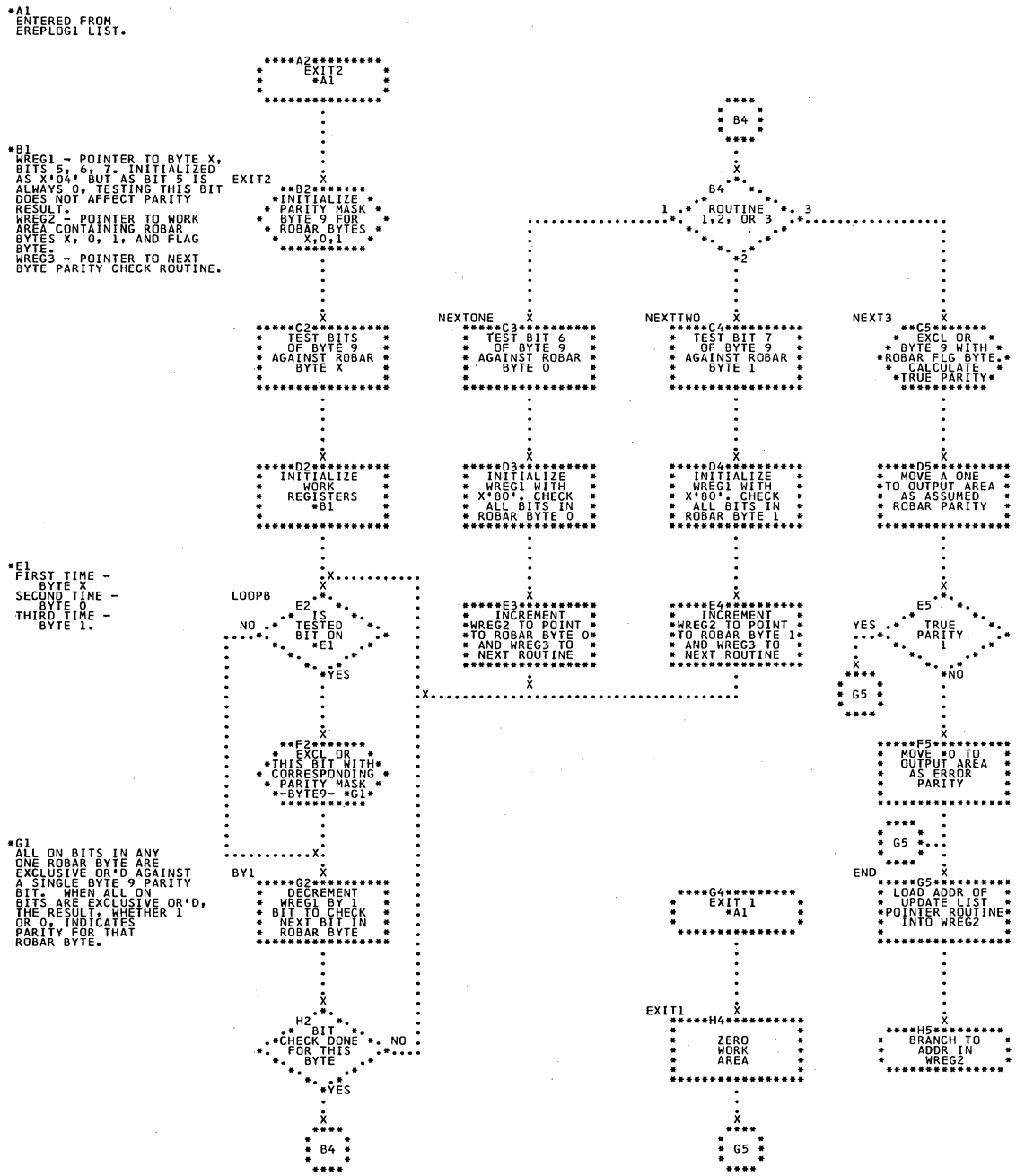


Chart KE. EREPLOG1 - LOGOUT Parity Check Routine
Refer to Chart 16.

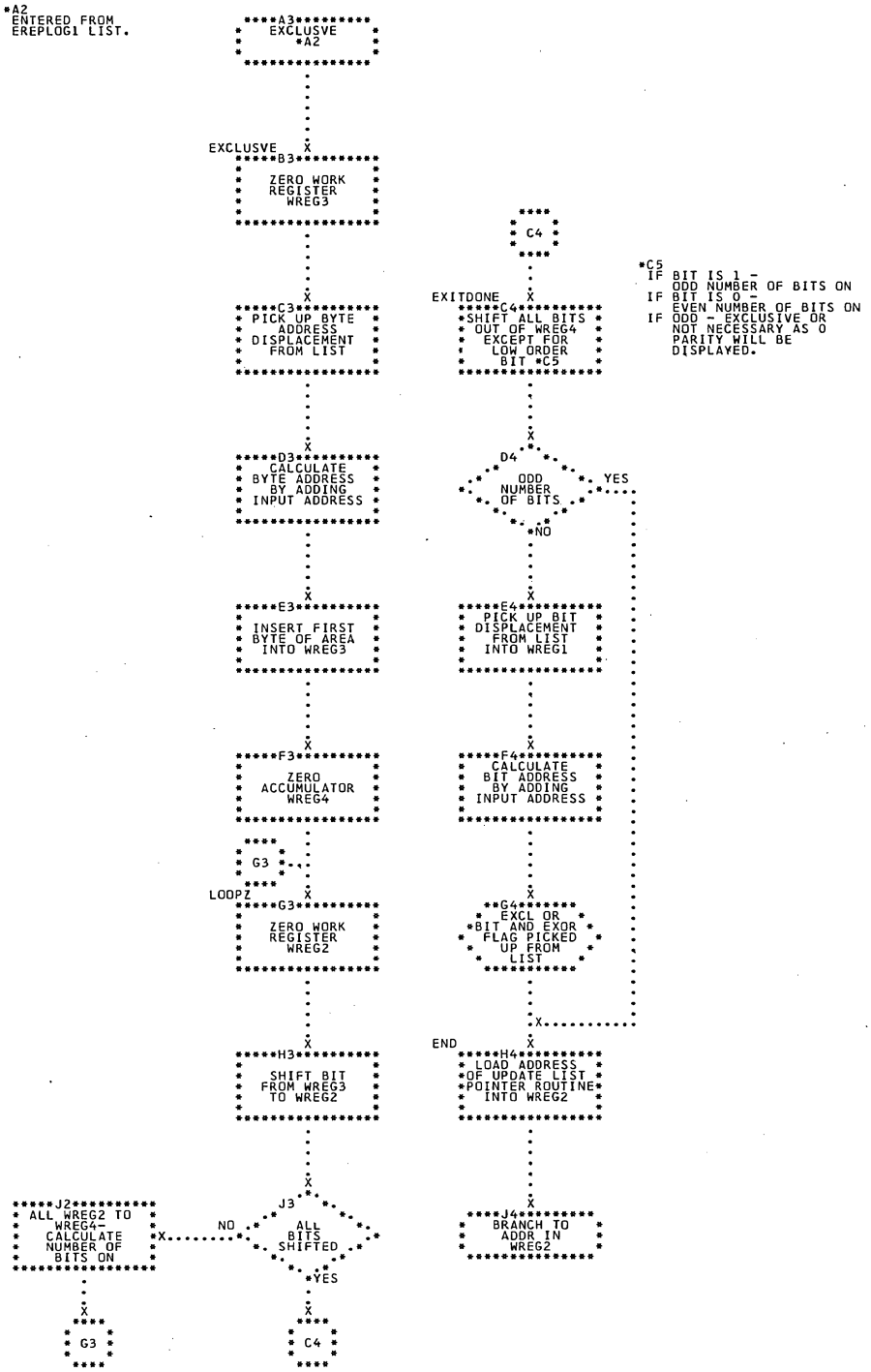


Chart KF. EREPCI55 - Subroutines
Refer to Chart 17.

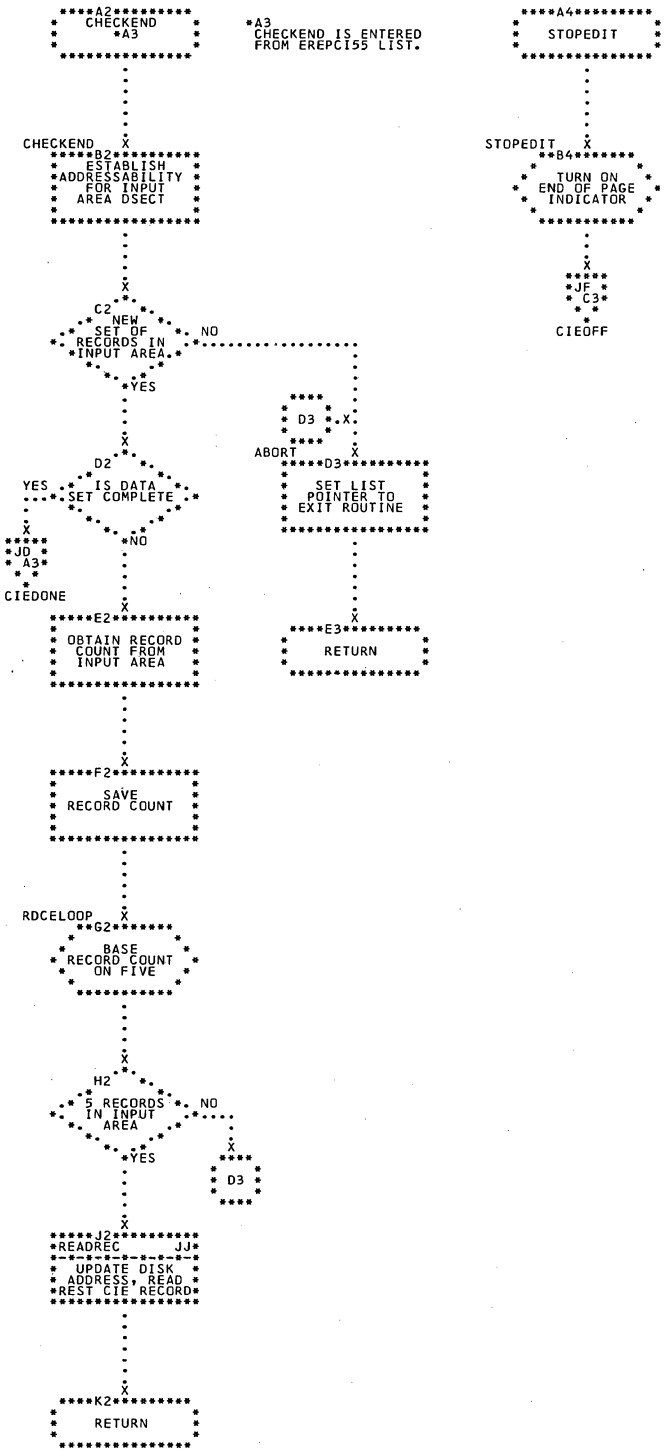


Chart KG. EREPMC55 - Subroutines
Refer to Chart 17.

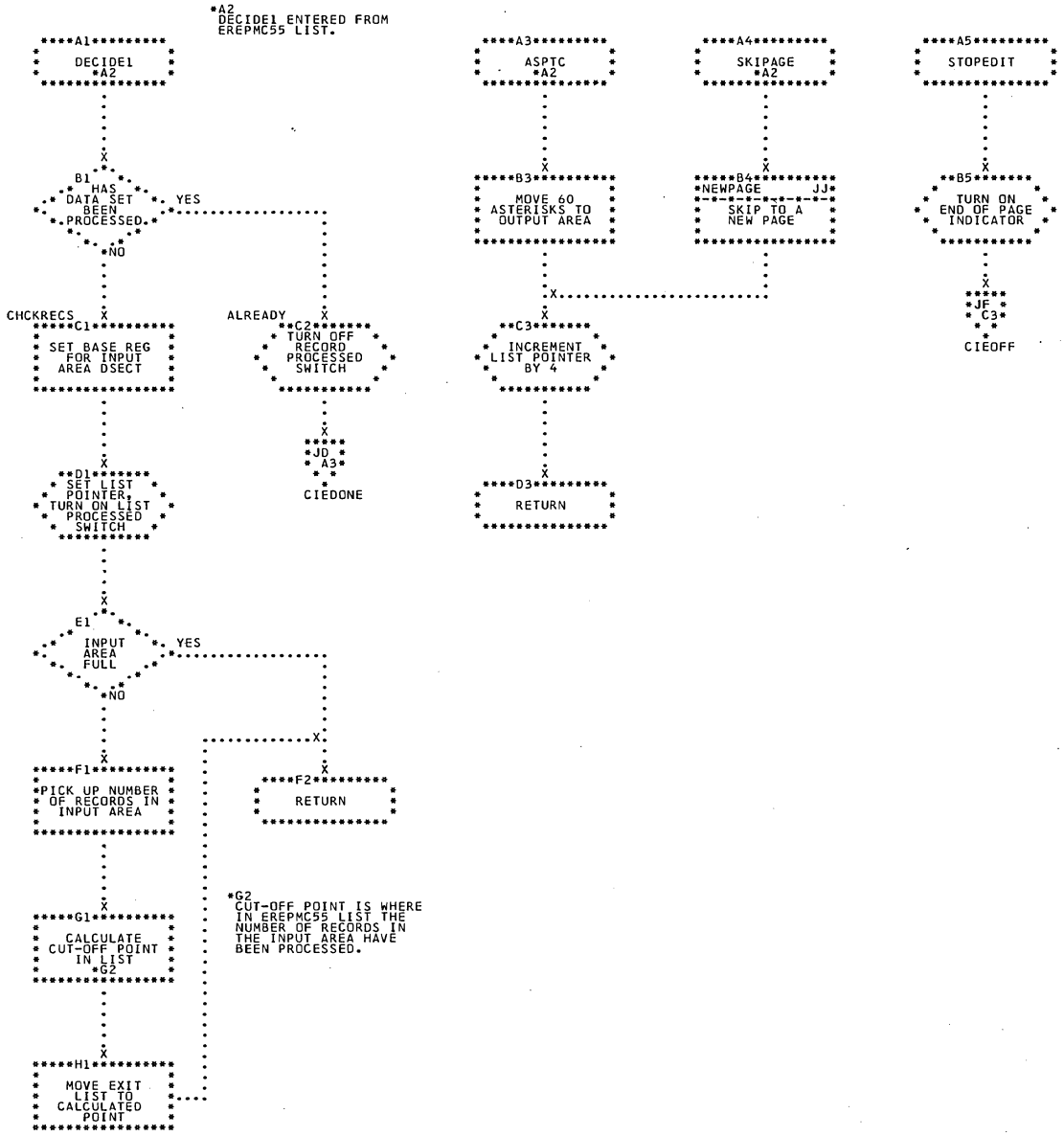


Chart KH. EREPLOG5 - Subroutines (Part 1 of 2)
Refer to Chart 17.

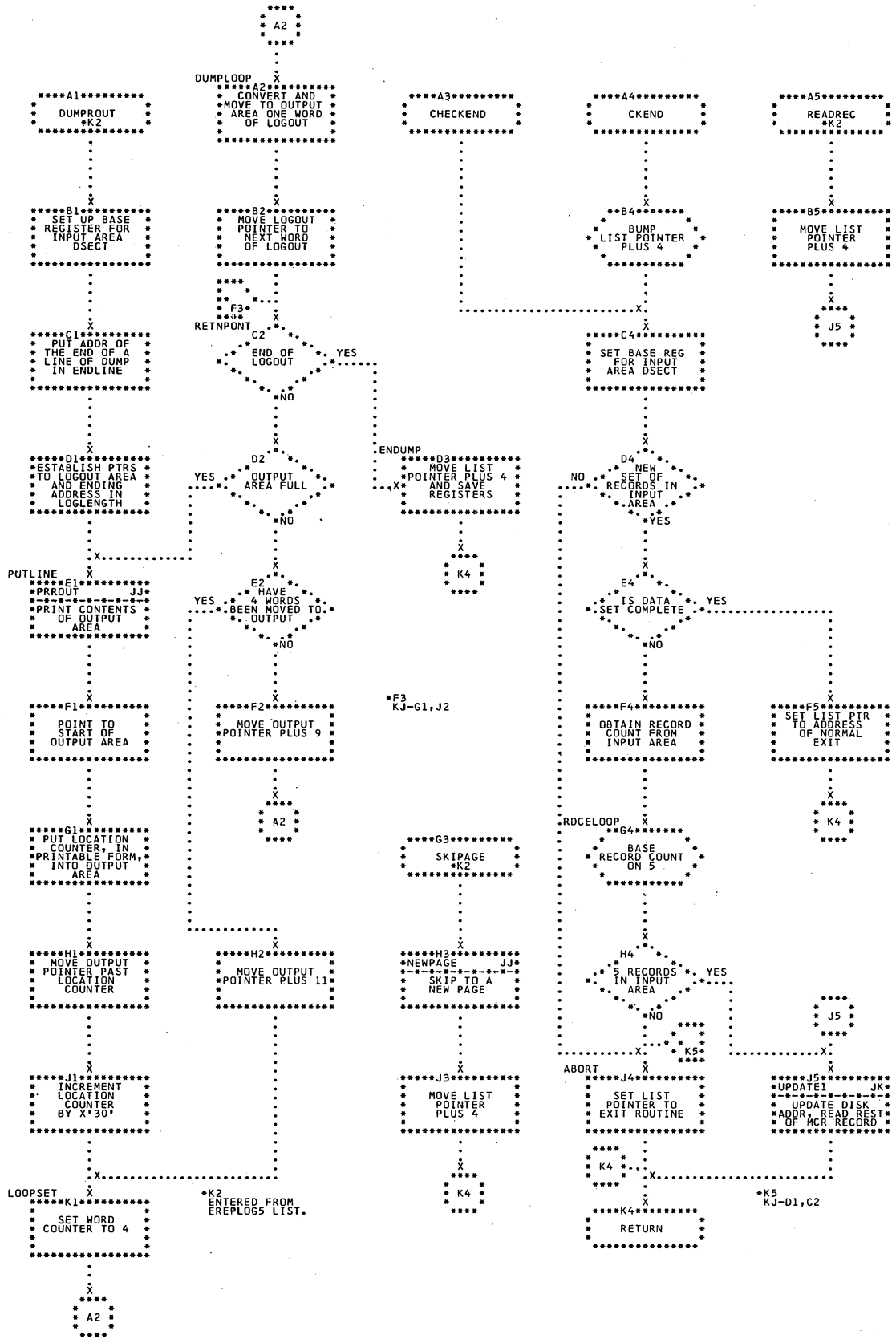


Chart KJ. EREPLOG5 - Subroutines (Part 2 of 2)
Refer to Chart 17.

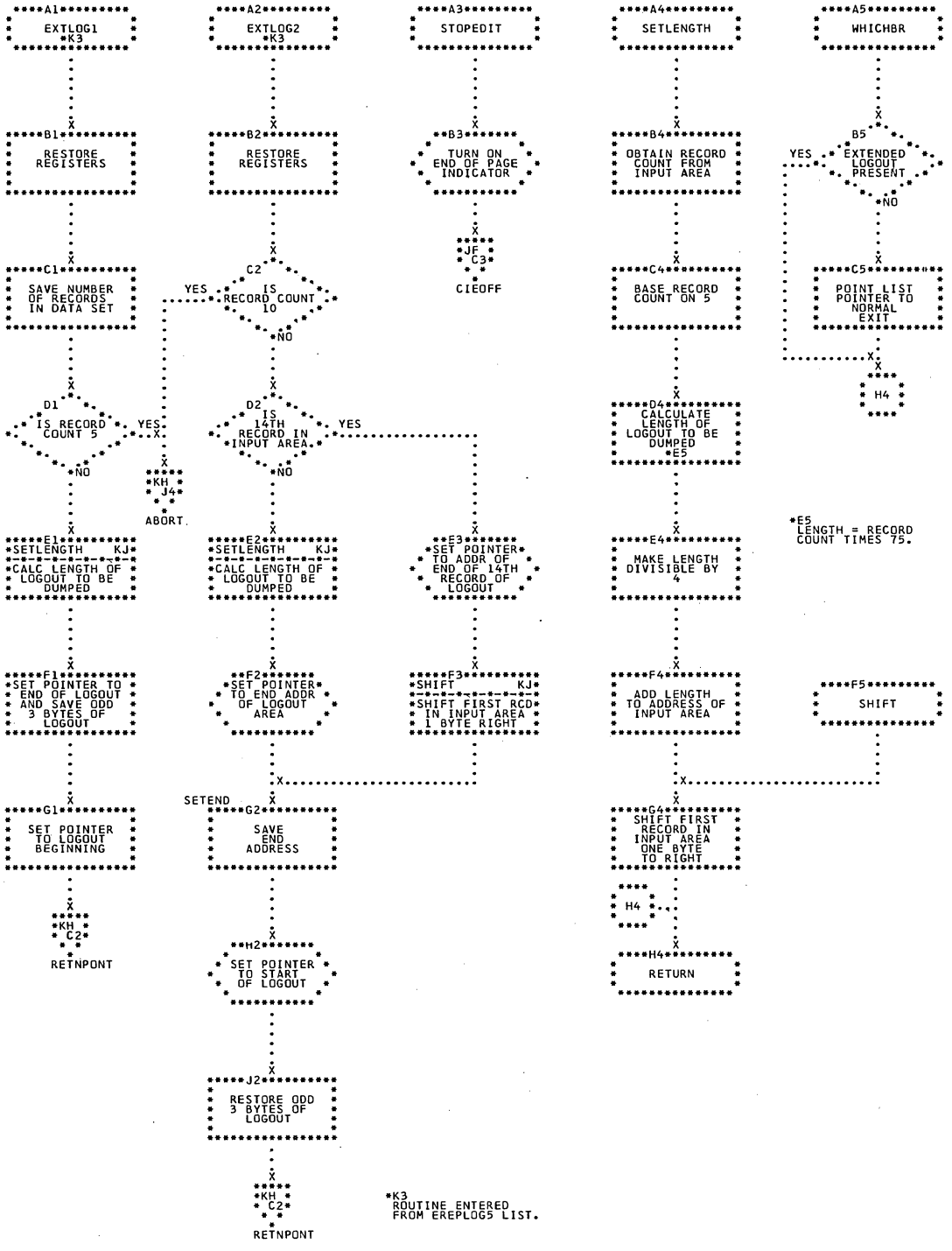


Chart KK. $$BSDRUP - EREP Processing Suppress File-Ready-for-Recording Switch

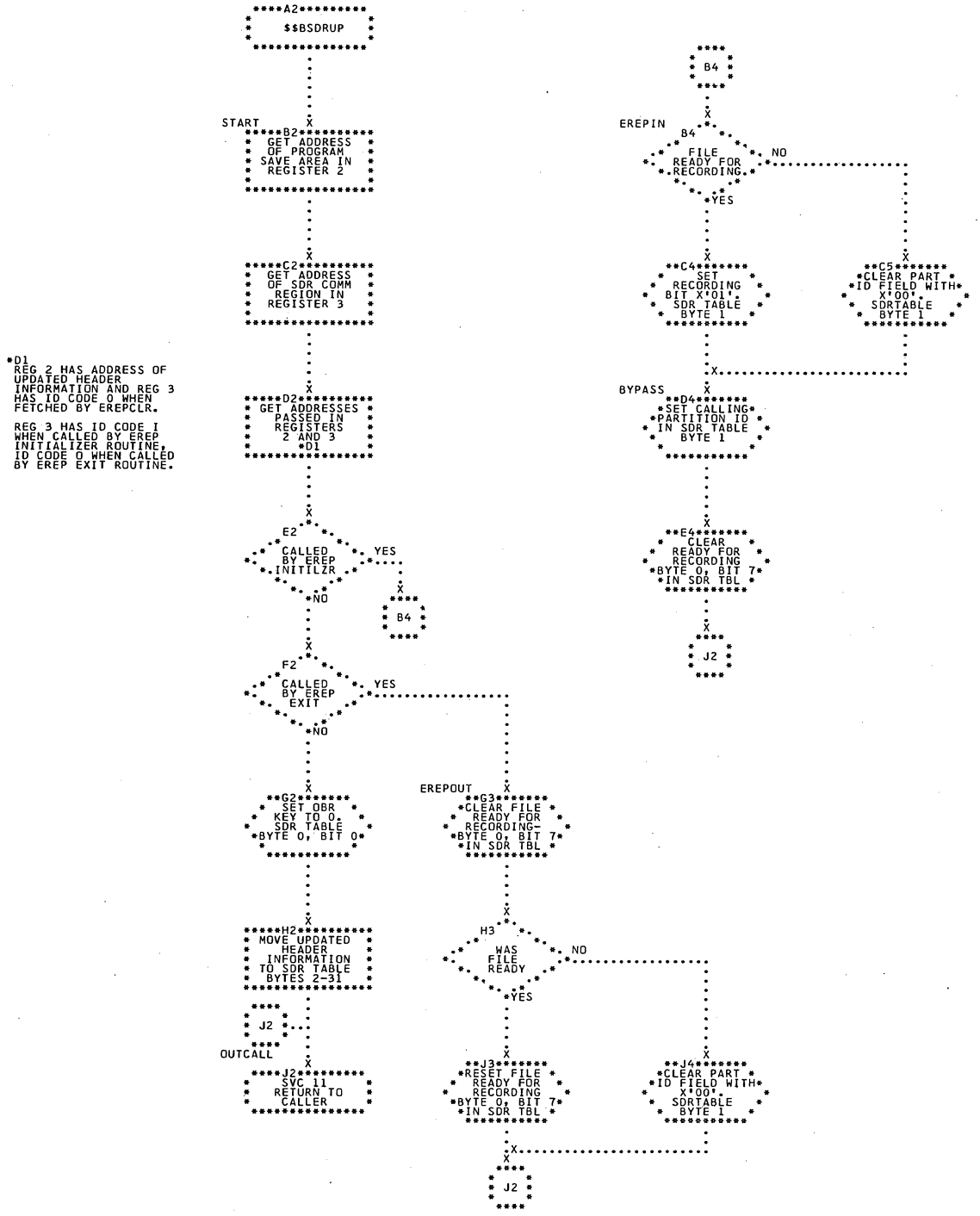


Chart LA. EREP2715 - Initialize and Print Type 0 Records
Refer to Chart 18.

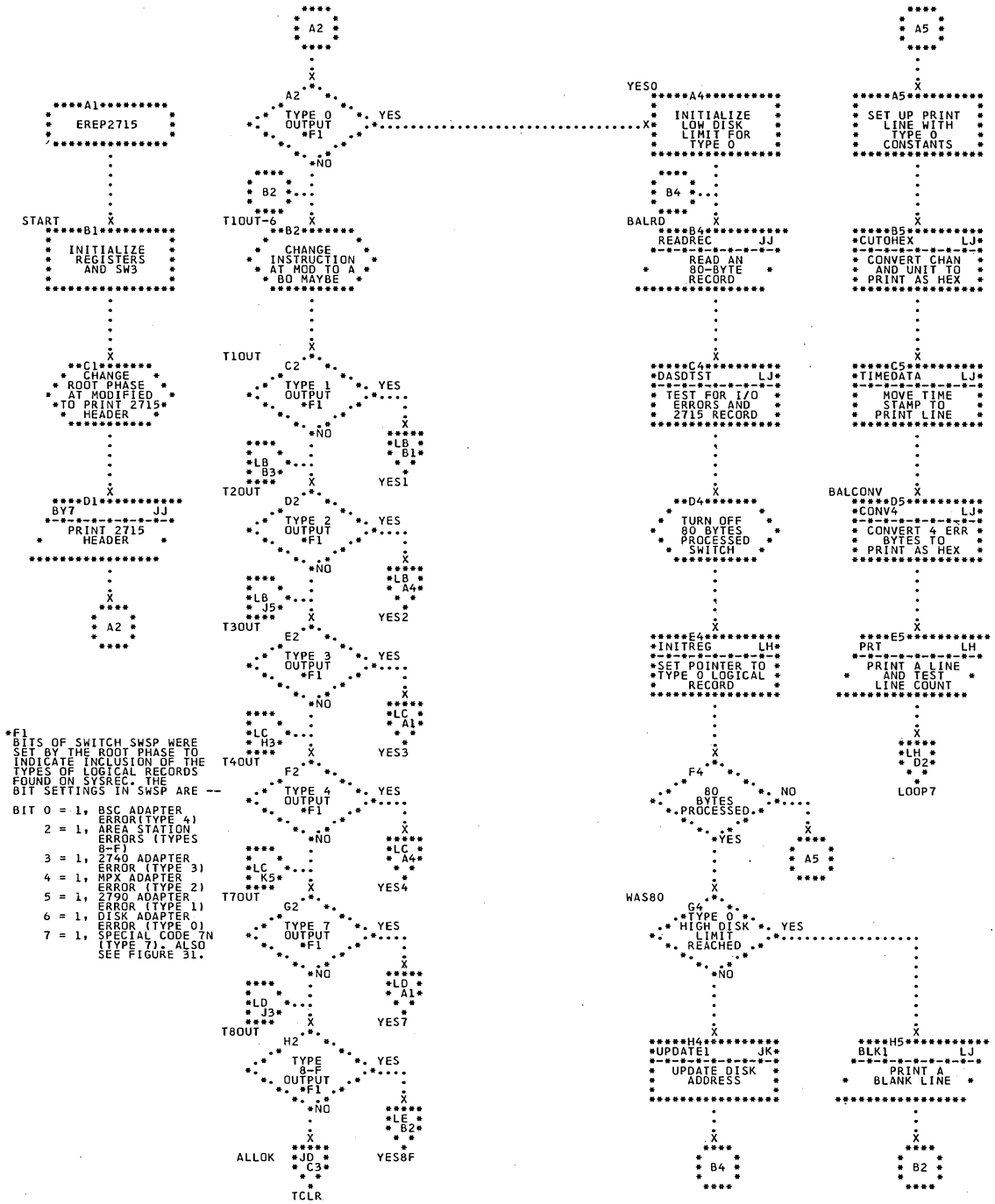


Chart LB. EREP2715 - Print Type 1 and Type 2 Records
Refer to Chart 18.

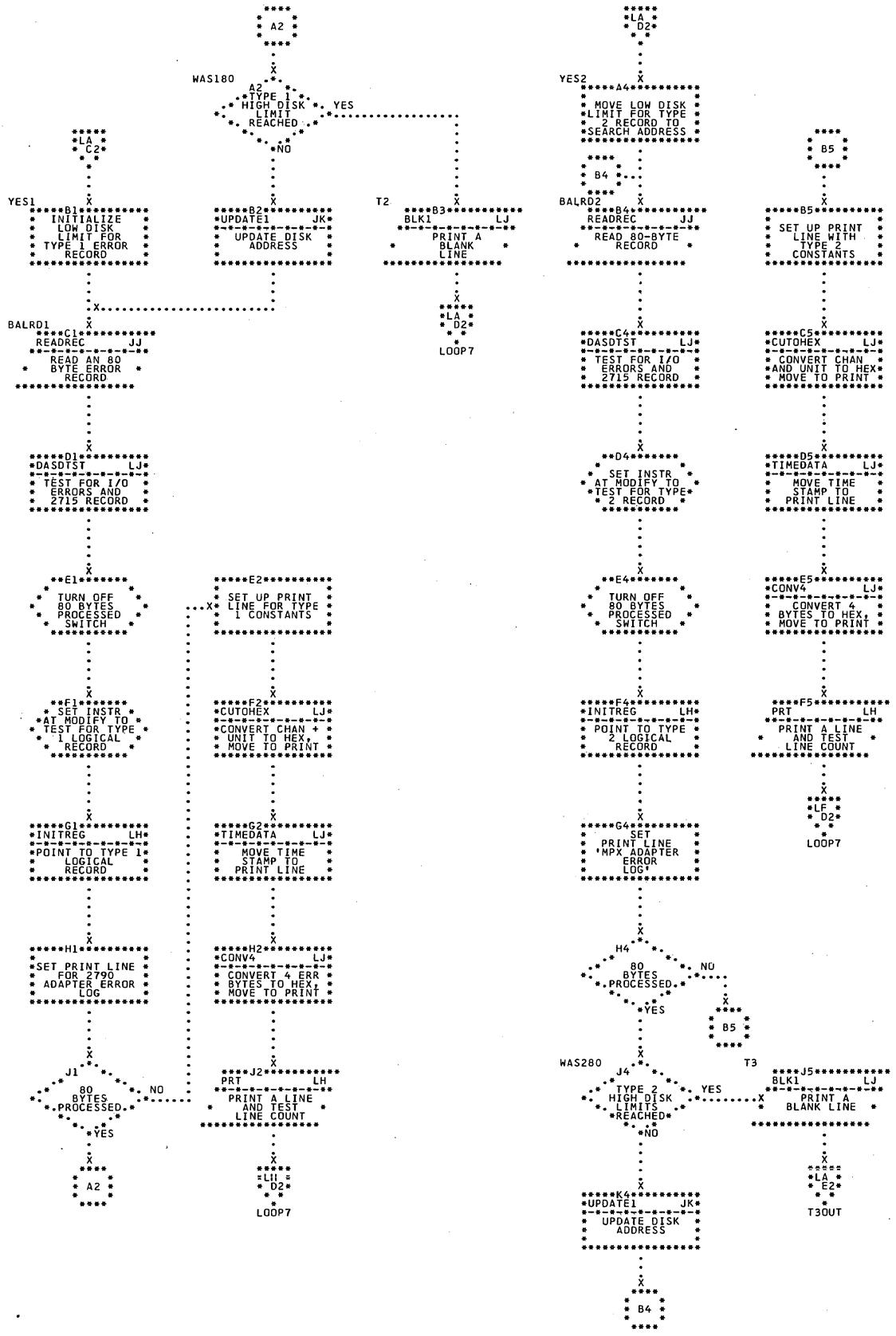


Chart LC. EREP2715 - Print Type 3 and Type 4 Records
Refer to Chart 18.

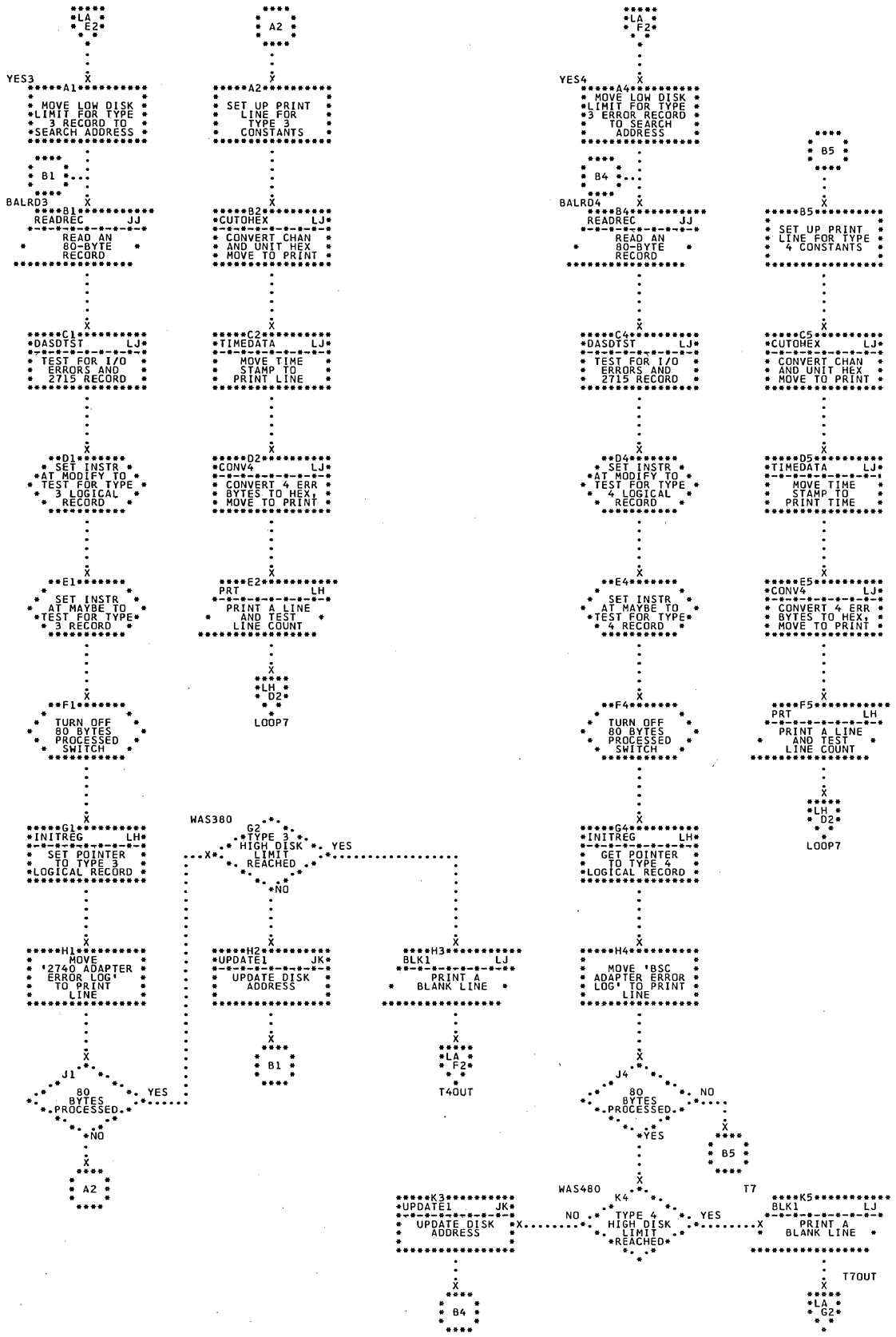


Chart LD. EREP2715 - Print Type 7 Records
Refer to Chart 18.

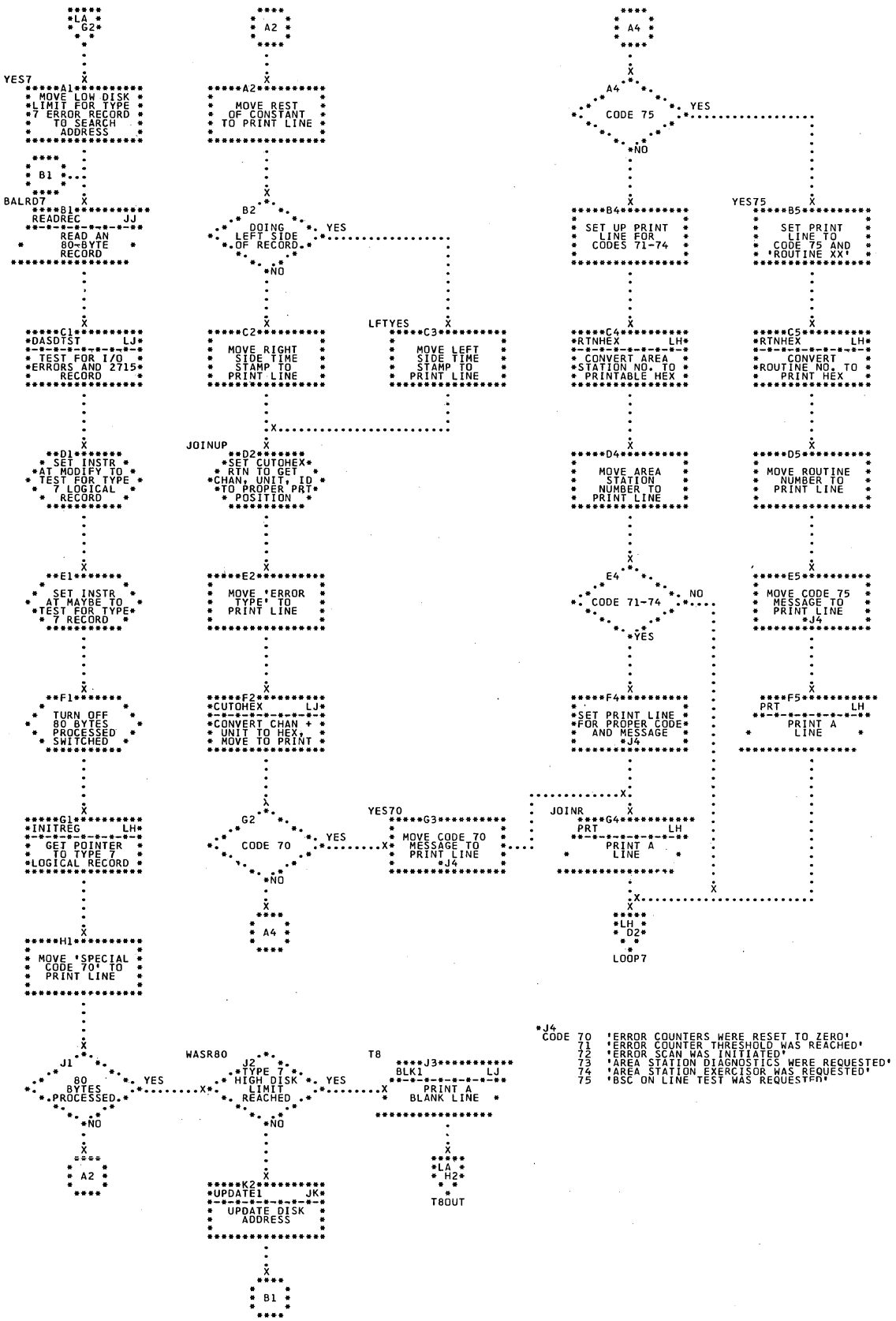


Chart LE. EREP2715 - Print Types 8-F Records
Refer to Chart 18.

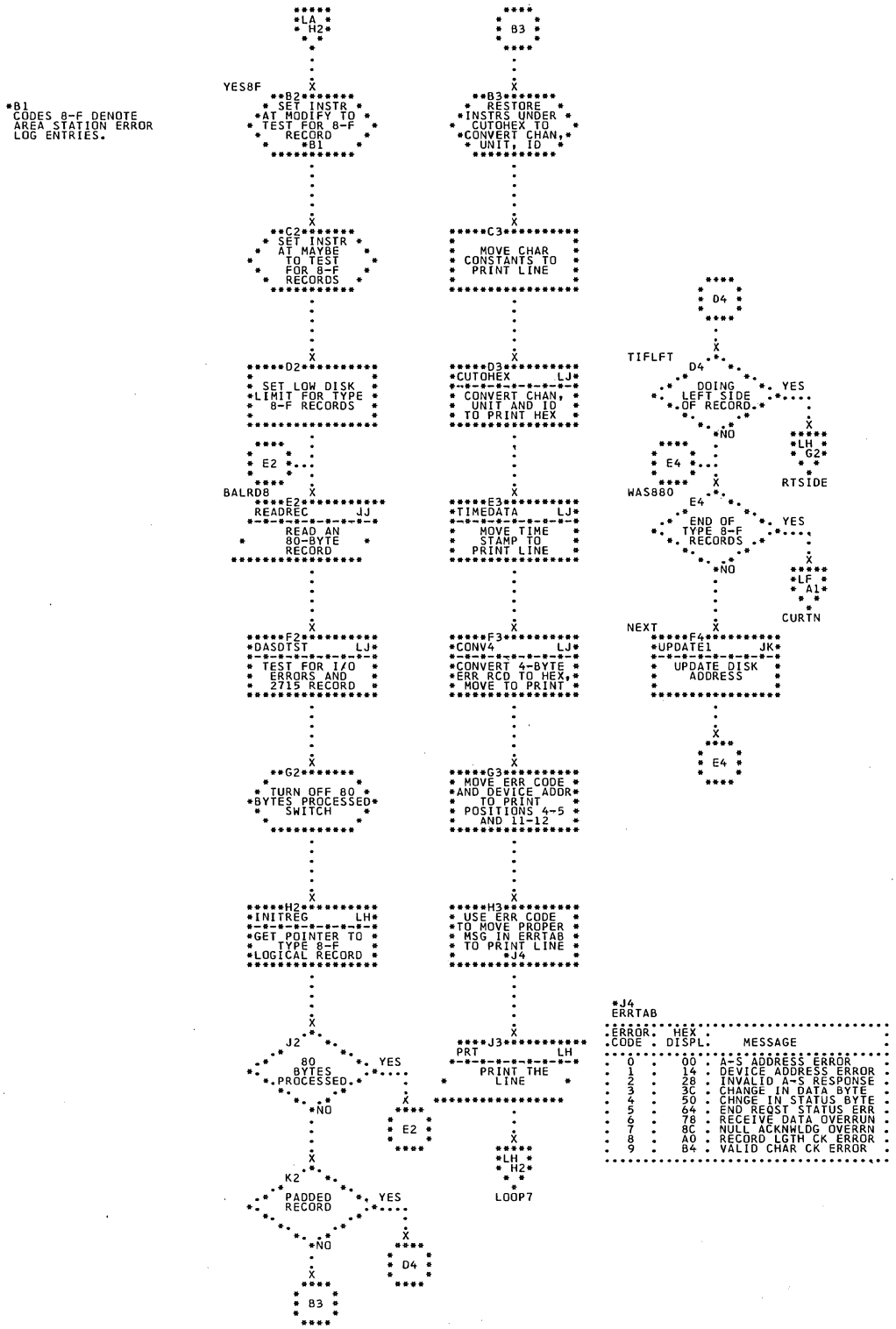


Chart LF. EREP2715 - Count Channel-Unit and Area Station-Device Combinations (Part 1 of 2)
Refer to Chart 18.

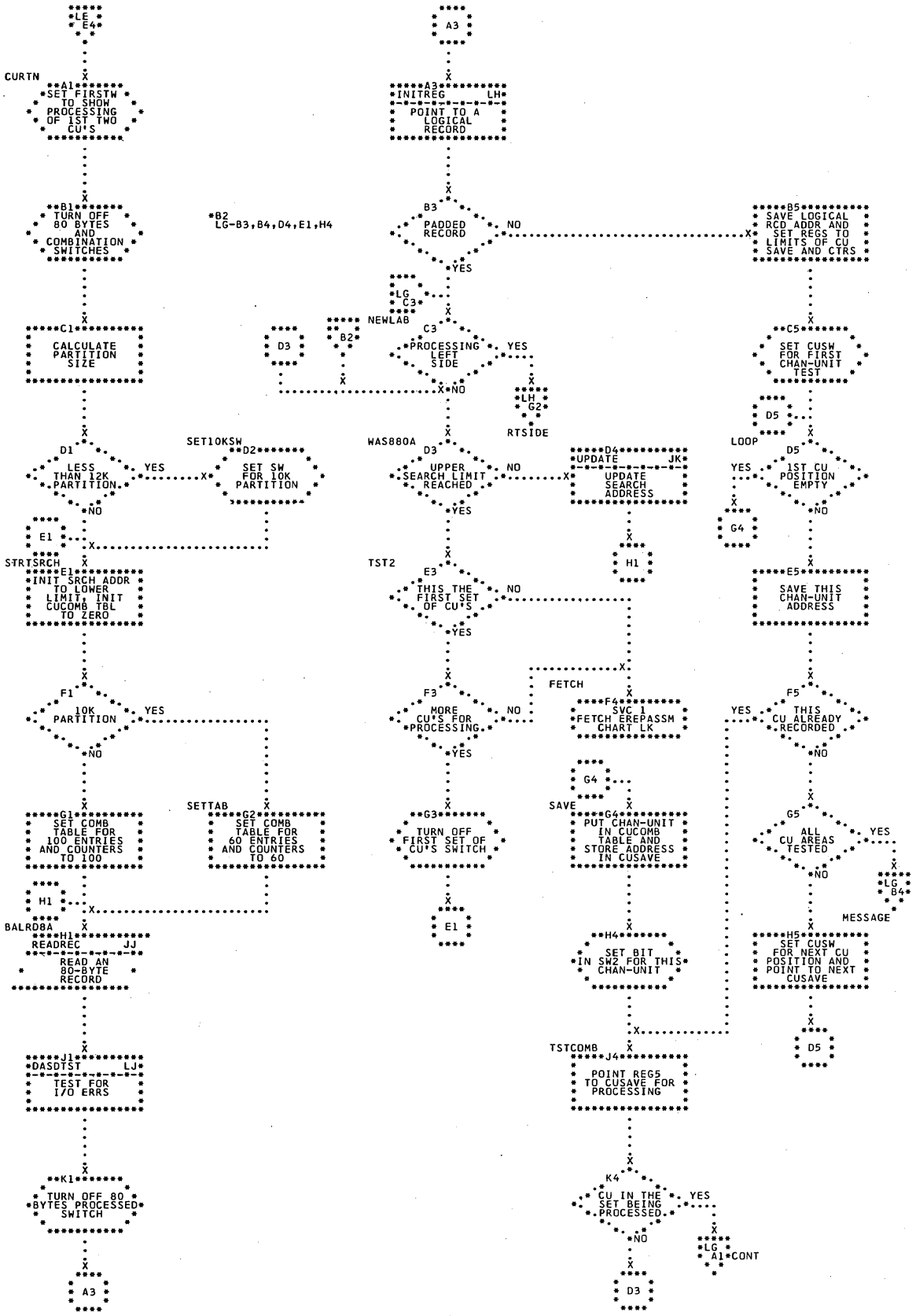


Chart LG. EREP2715 - Count Channel-Unit and Area Station-Device Combinations (Part 2 of 2)
Refer to Chart 18.

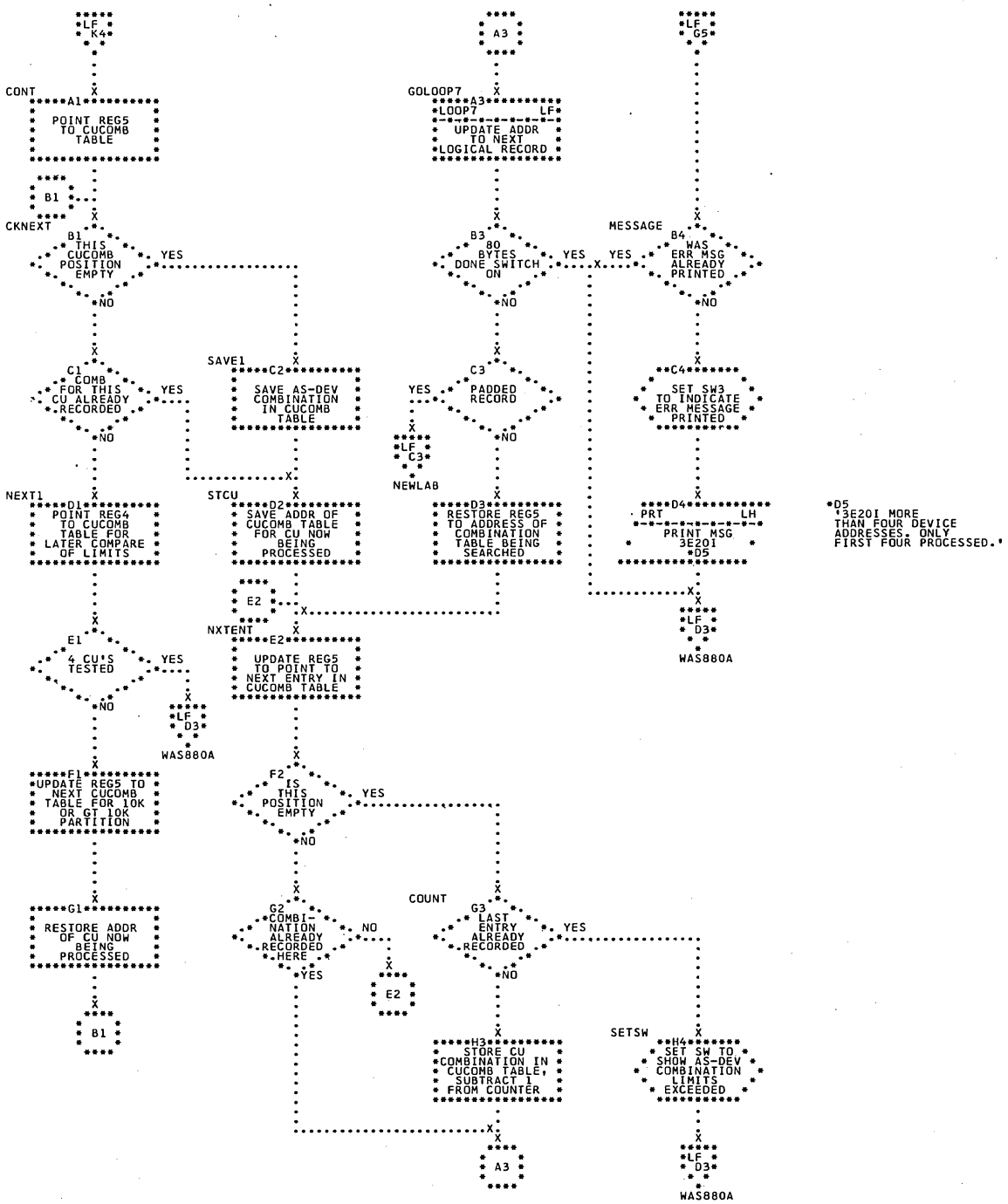


Chart LH. EREP2715 - INITREG, PRT, and RTNHEX Subroutines
Refer to Chart 18.

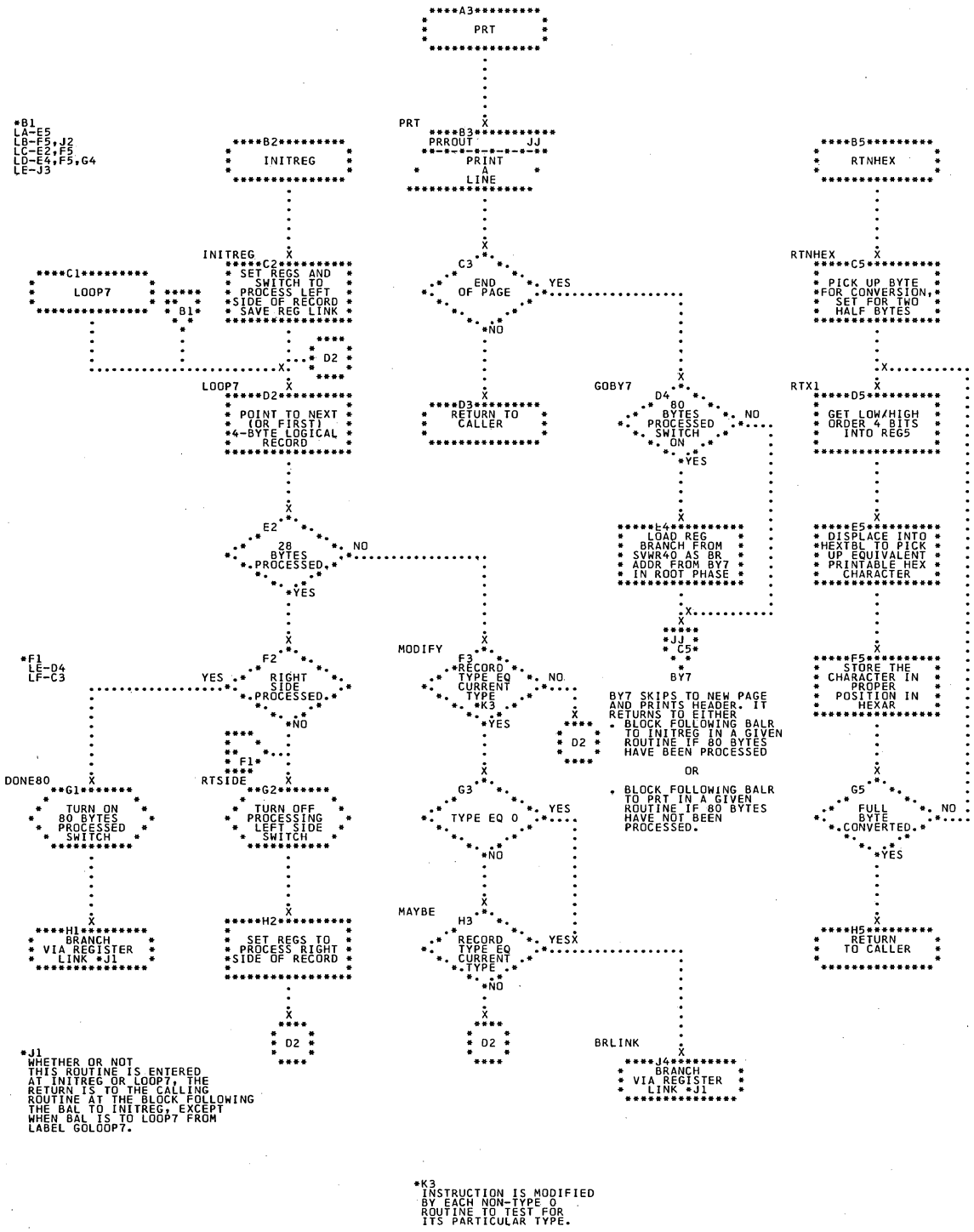


Chart LJ. EREP2715 - CUTOHEX, CONV4, DASDTST, TIMEDATA, and BLK1 Subroutines
Refer to Chart 18.

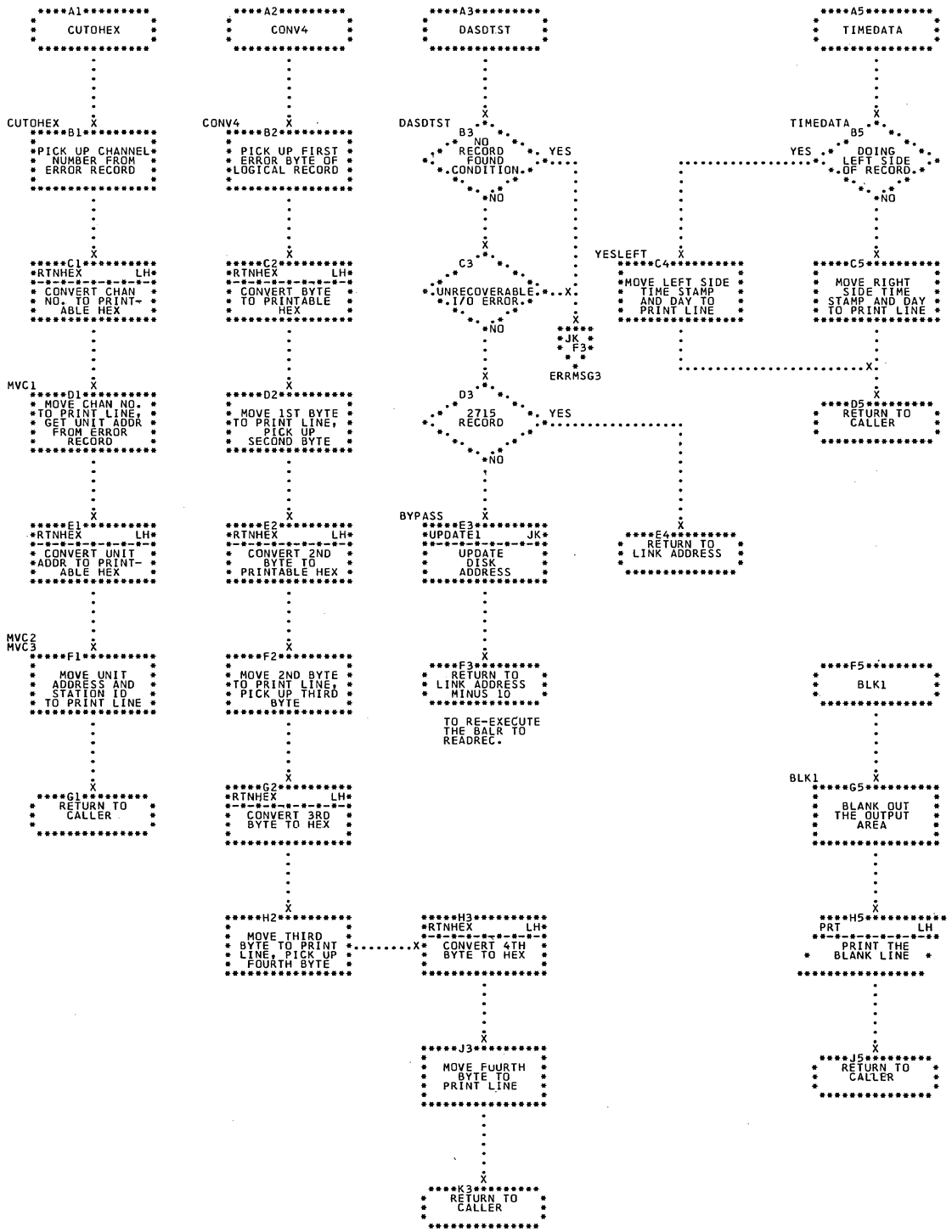


Chart LK. EREPASSM - Area Station-Device Summary Phase (Part 1 of 4)
Refer to Chart 18.

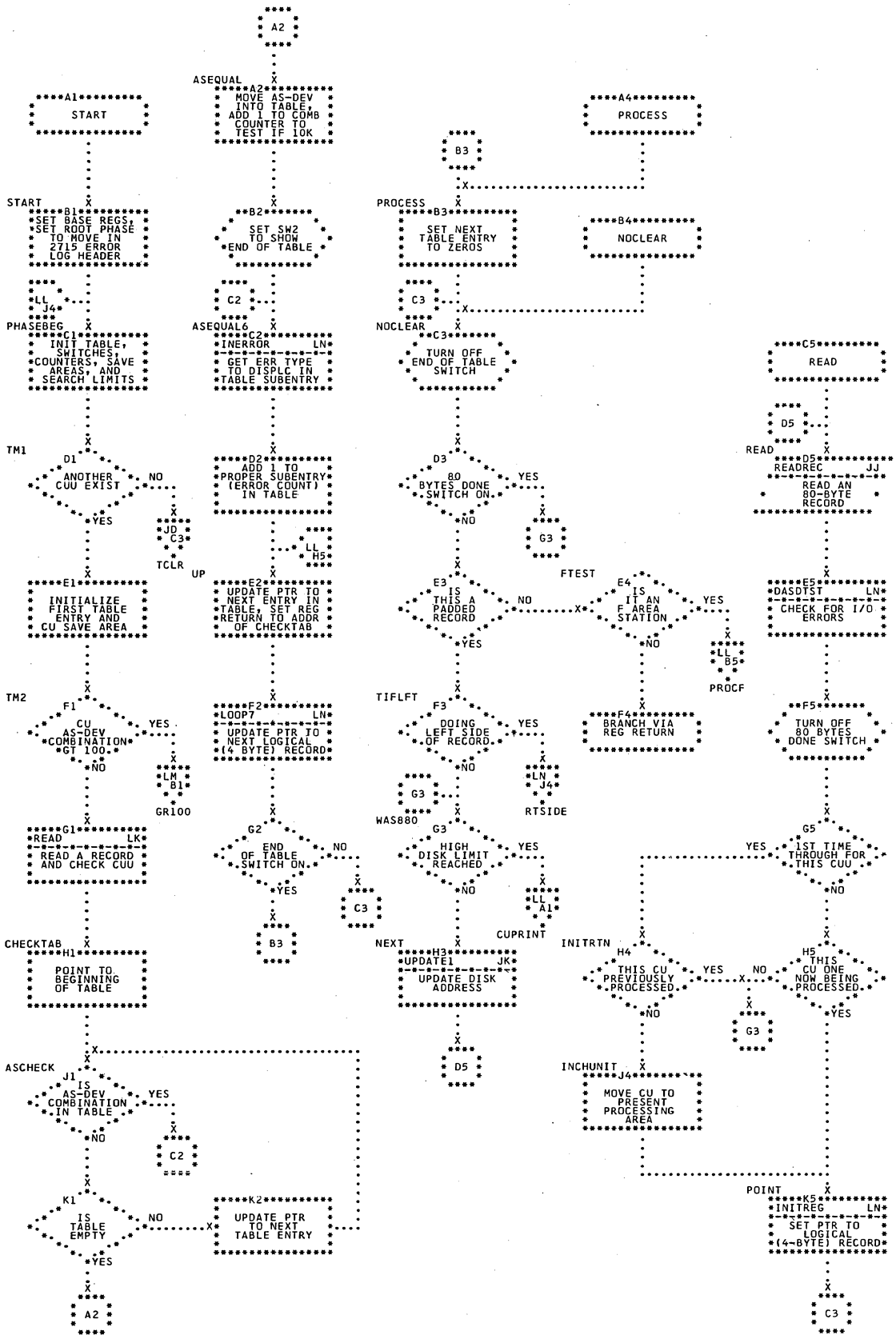


Chart LL. EREPASSM - Area Station-Device Summary Phase (Part 2 of 4)
Refer to Chart 18.

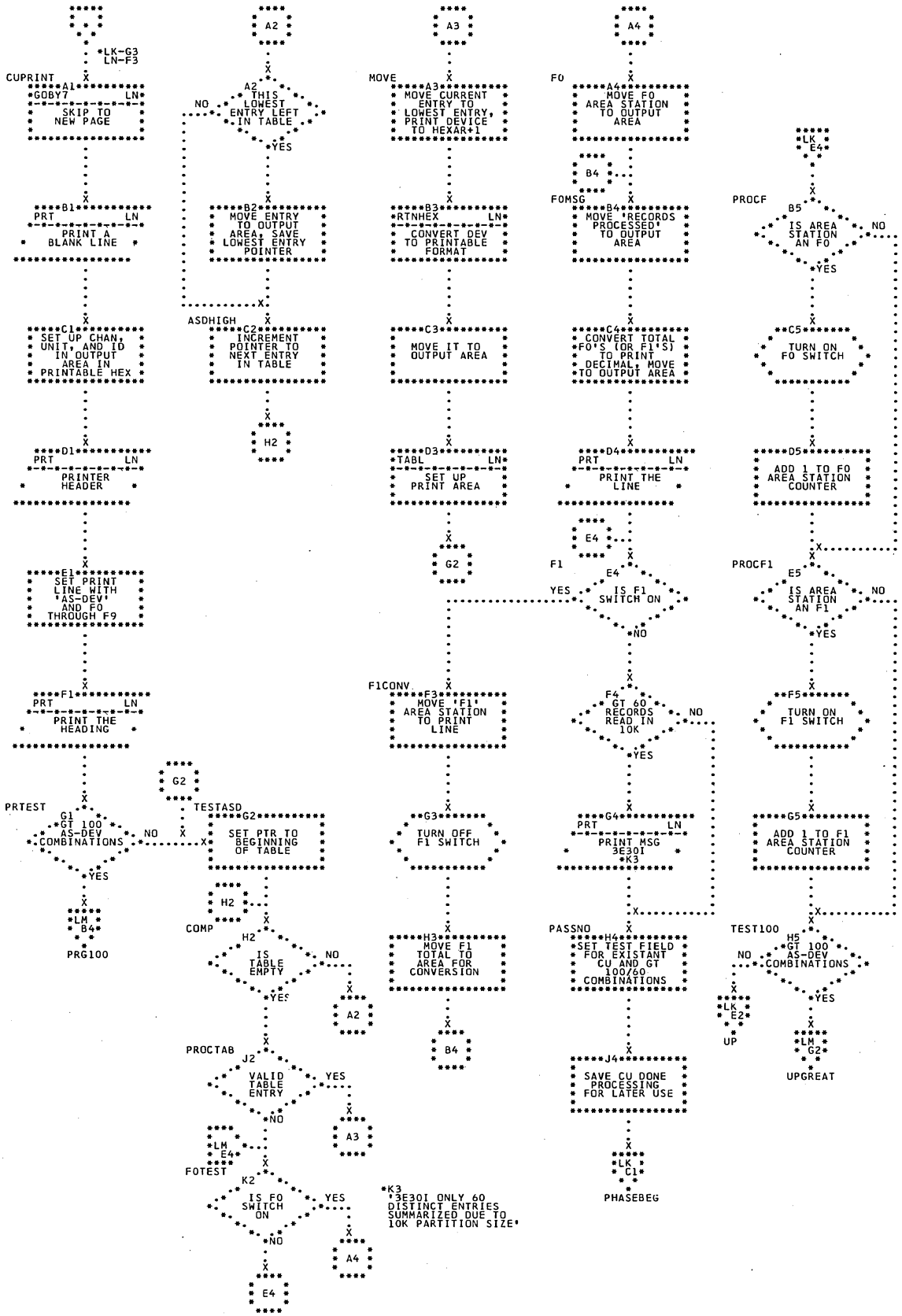


Chart LM. EREPASSM - Area Station-Device Summary Phase (Part 3 of 4)
Refer to Chart 18.

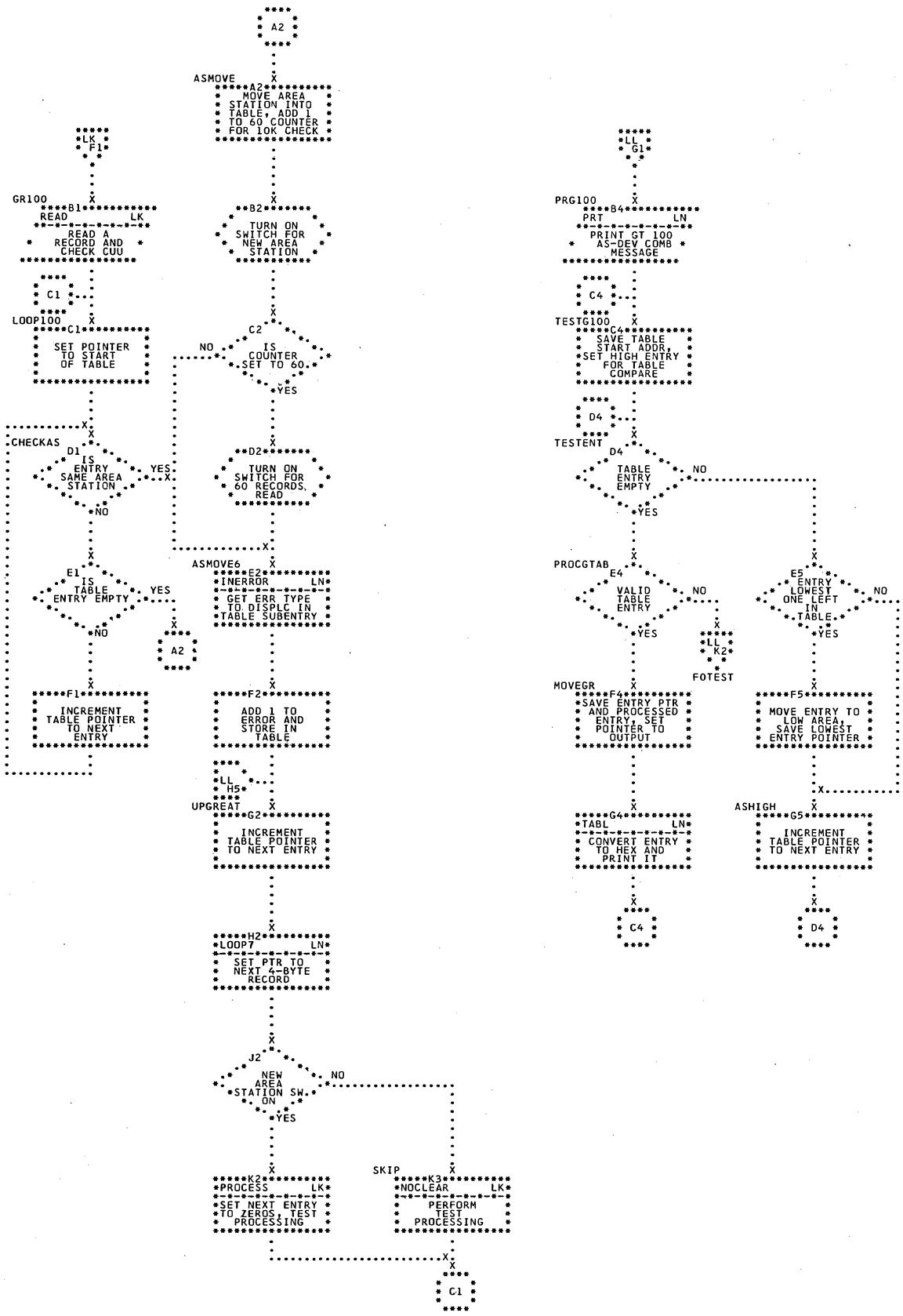


Chart LN. EREPASSM - Area Station-Device Summary Phase (Part 4 of 4)
Refer to Chart 18.

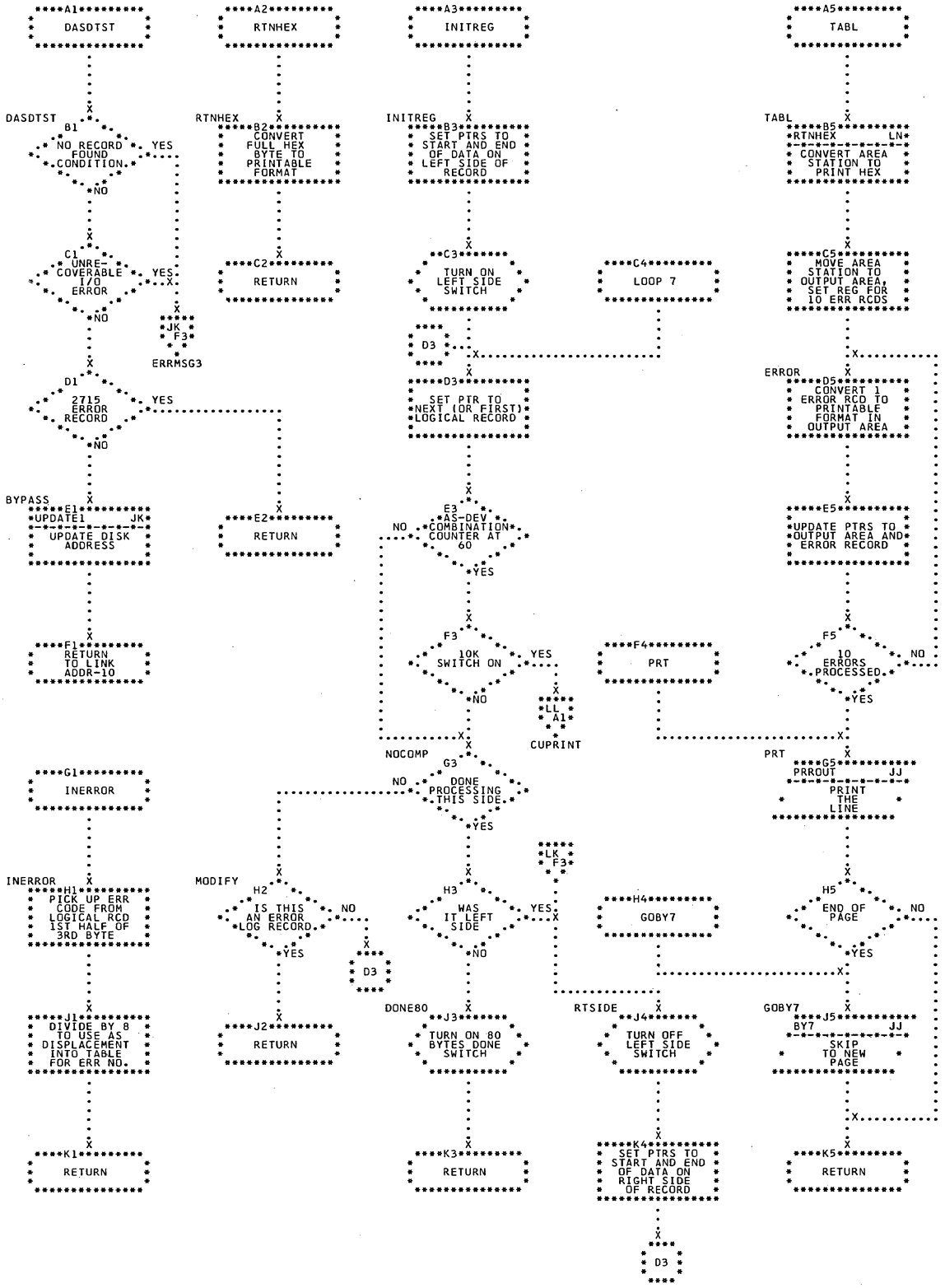


Chart MA. EREPHIST - History Tape Builder (Part 1 of 8)
Refer to Chart 19.

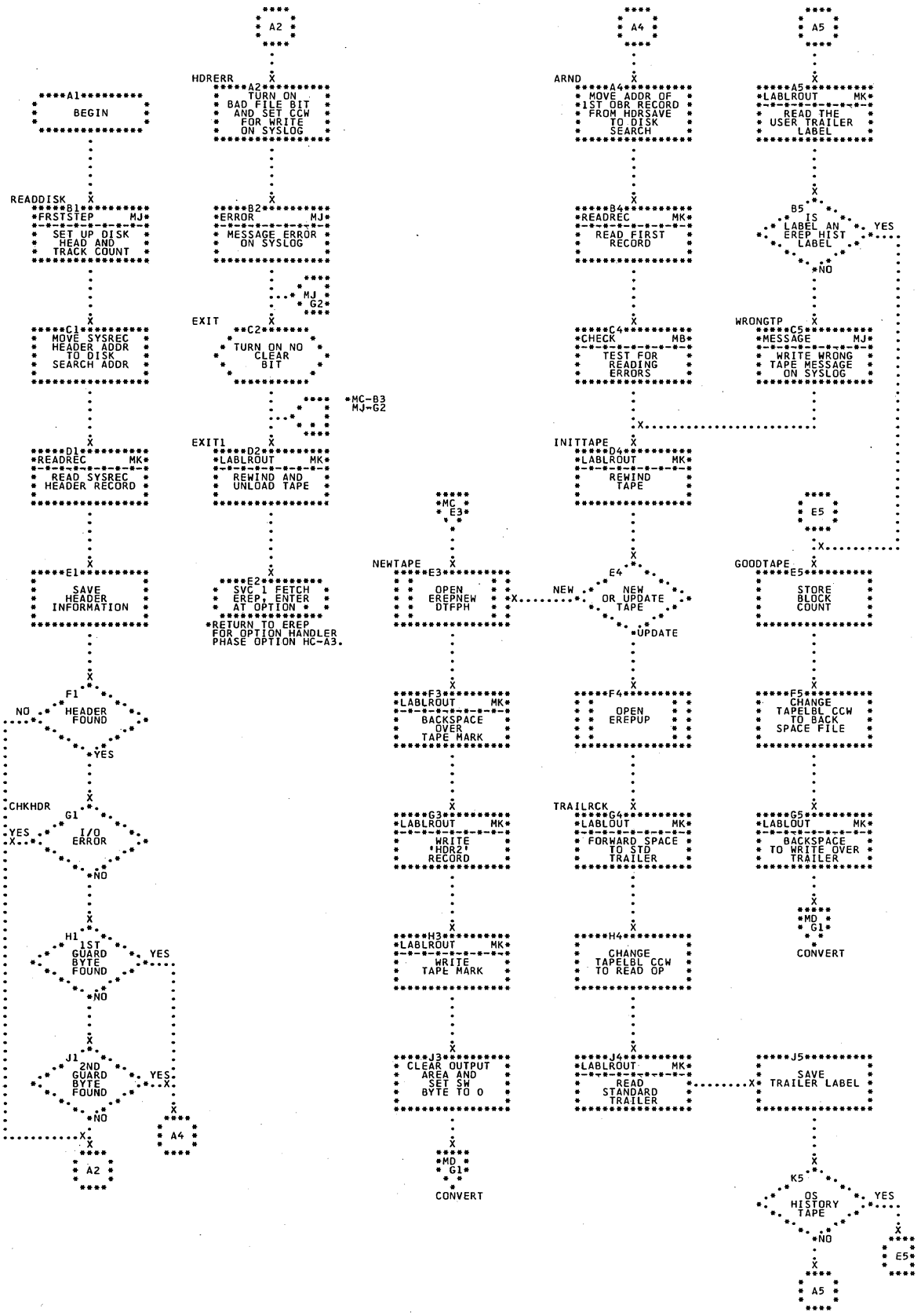


Chart MB. EREPHIST - History Tape Builder (Part 2 of 8)
Refer to Chart 19.

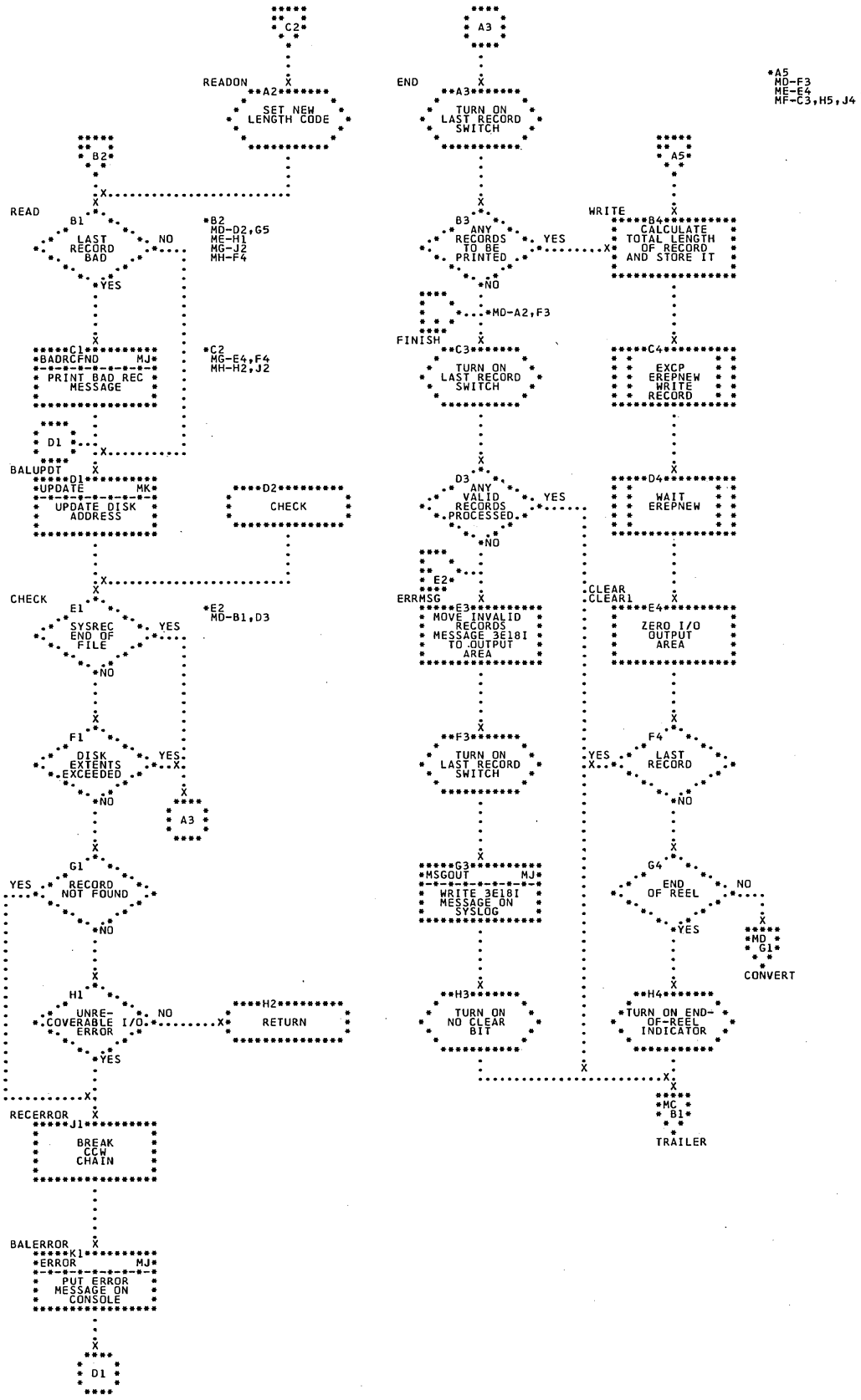


Chart MC. EREPHIST - History Tape Builder (Part 3 of 8)
Refer to Chart 19.

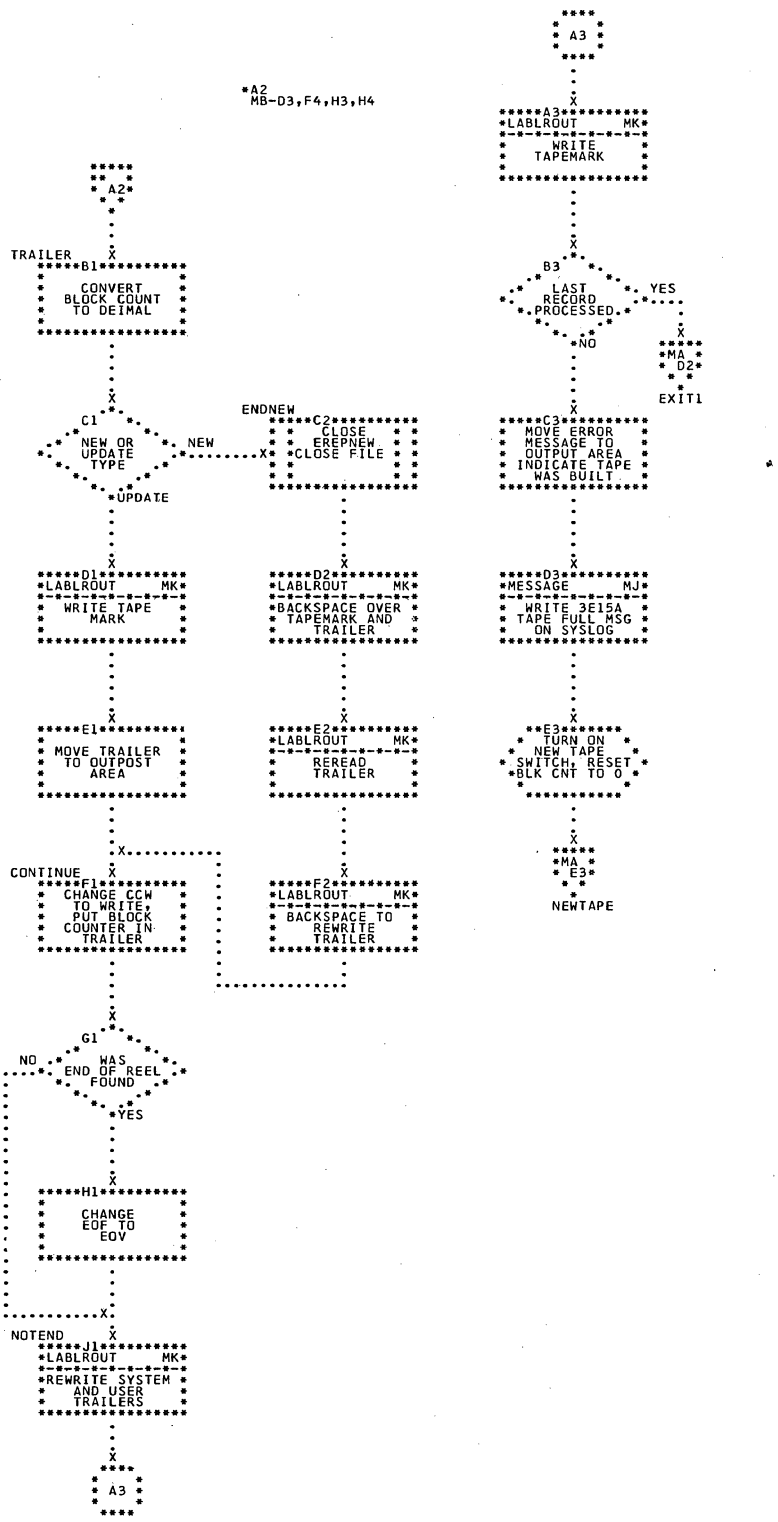


Chart MD. EREPHIST - History Tape Builder (Part 4 of 8)
Refer to Chart 19.

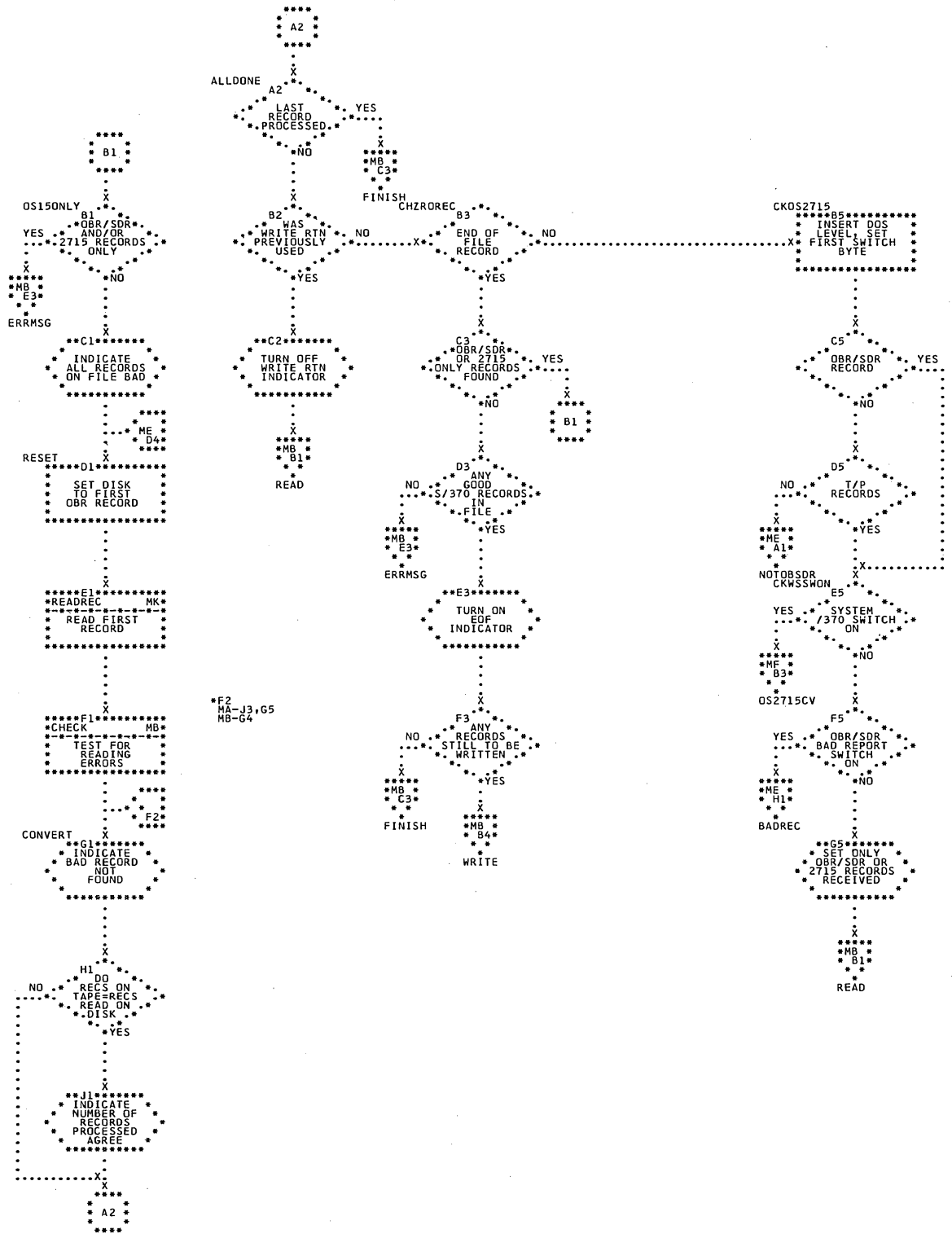


Chart ME. EREPHIST - History Tape Builder (Part 5 of 8)
Refer to Chart 19.

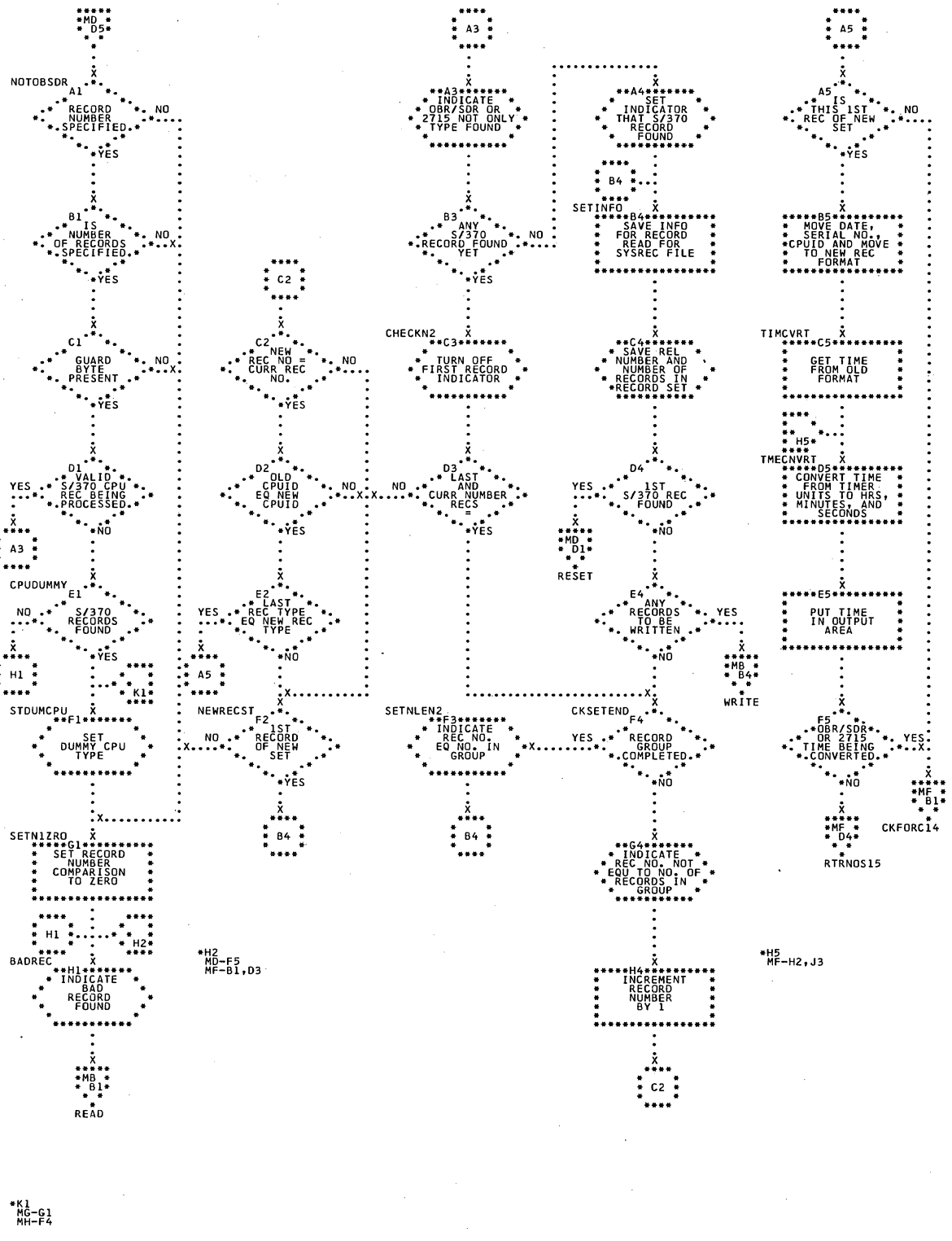


Chart MF. EREPHIST - History Tape Builder (Part 6 of 8)
Refer to Chart 19.

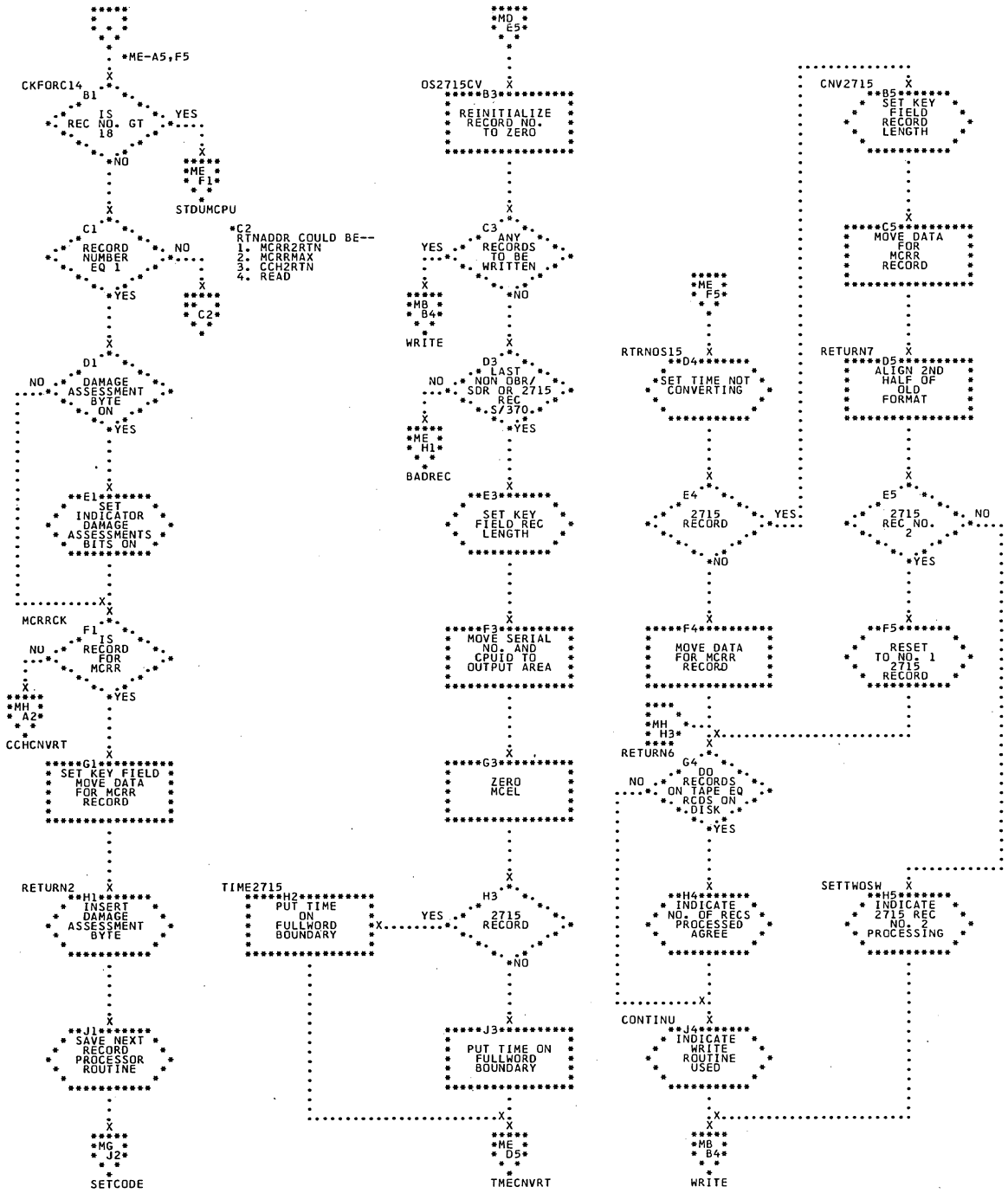


Chart MG. EREPHIST - History Tape Builder (Part 7 of 8)
Refer to Chart 19.

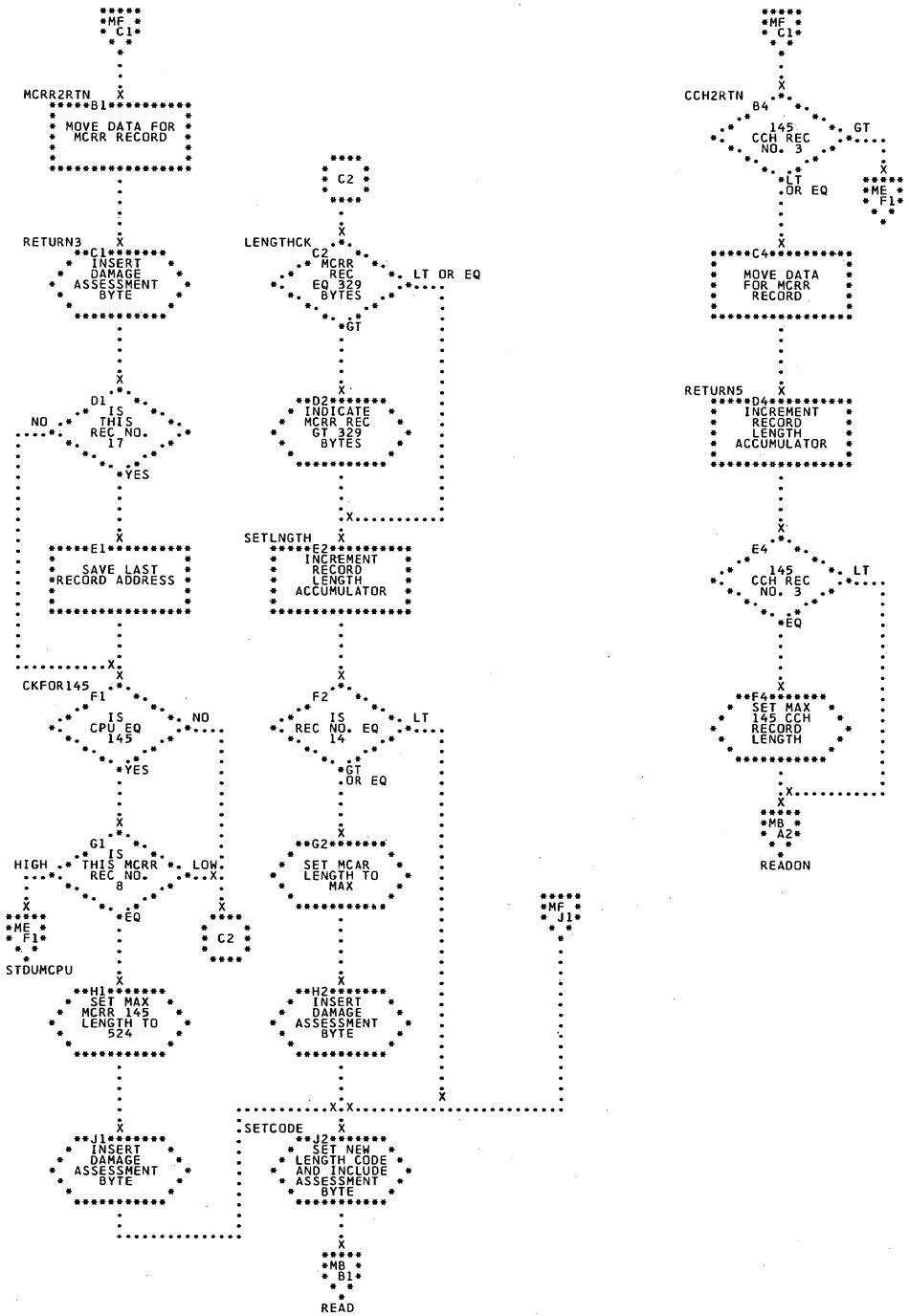


Chart MH. EREPHIST - History Tape Builder (Part 8 of 8)
Refer to Chart 19.

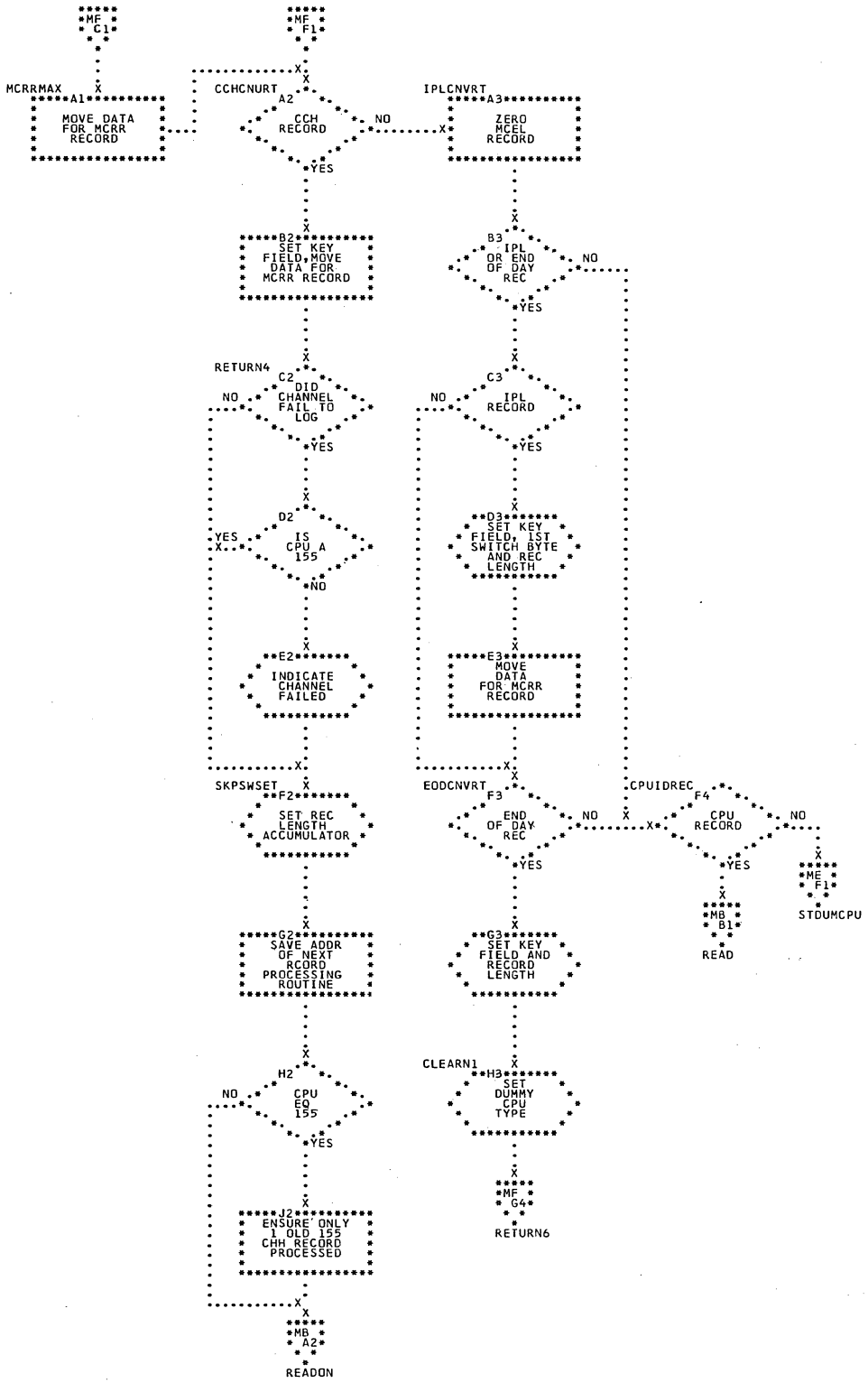


Chart MJ. EREPHIST - Subroutines (Part 1 of 2)
Refer to Chart 19.

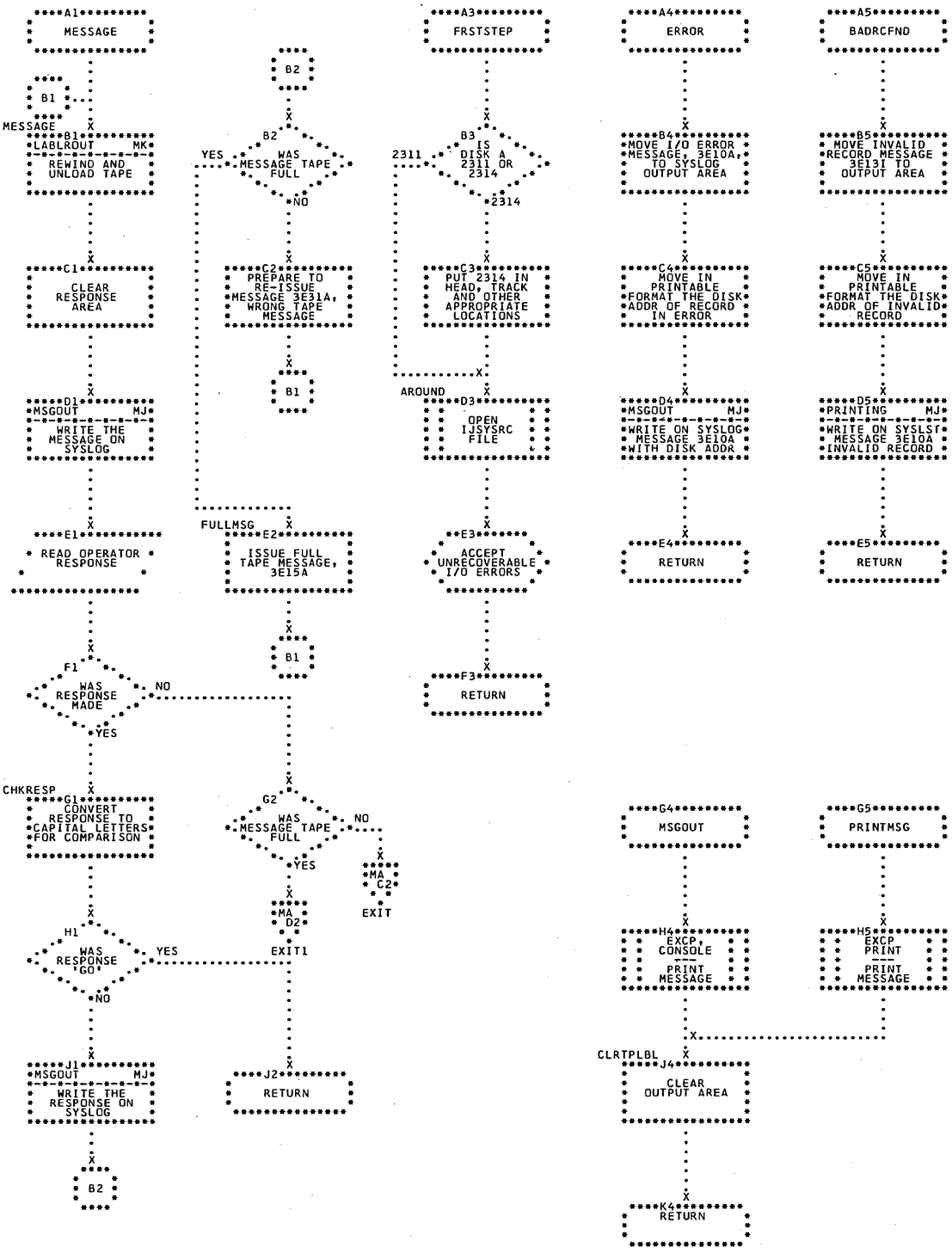
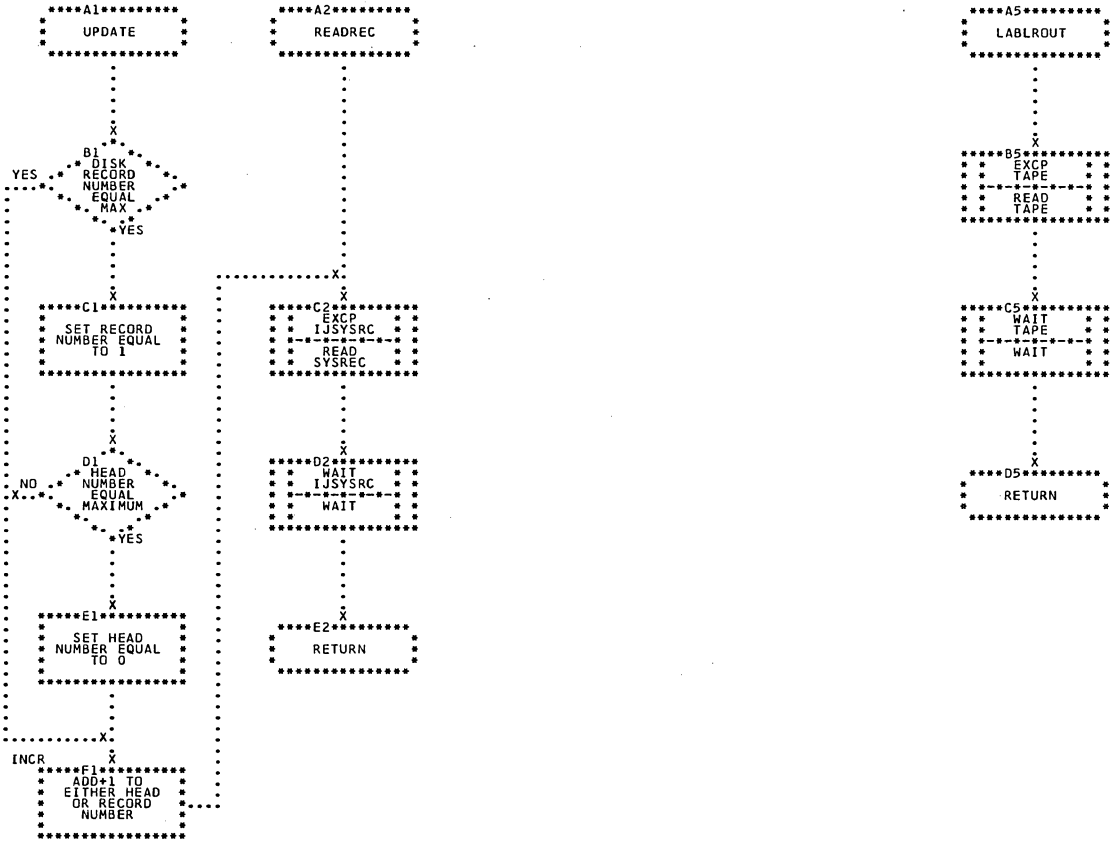


Chart MK. EREPHIST - Subroutines (Part 2 of 2)
Refer to Chart 19.



3211 Printer Support Programs

Two programs are supplied to load the UCSB (Universal Character Set Buffer) and FCB (Forms Control Buffer) of the 3211 printer. SYSBUFLD is designed to execute as a job step within the user job stream. With SYSBUFLD you may load one buffer, both buffers on a single 3211 printer, or any combination of buffers on any of the 3211 printers attached to the system.

$$BUFLDR is executed as part of the IPL procedure and, along with the installation standard buffer loads ($$BUCB and $$BFCB), must be available if 3211 printers are attached to the system. $$BUFLDR is loaded by the $IPLRT4 phase. It scans the entire PUB table and loads the FCB and UCSB buffers for each 3211 printer in the PUB table. When the buffers on the last 3211 printer have been loaded, return is made to $IPLRT4.

Chart 20. 3211 Printer Buffer Load

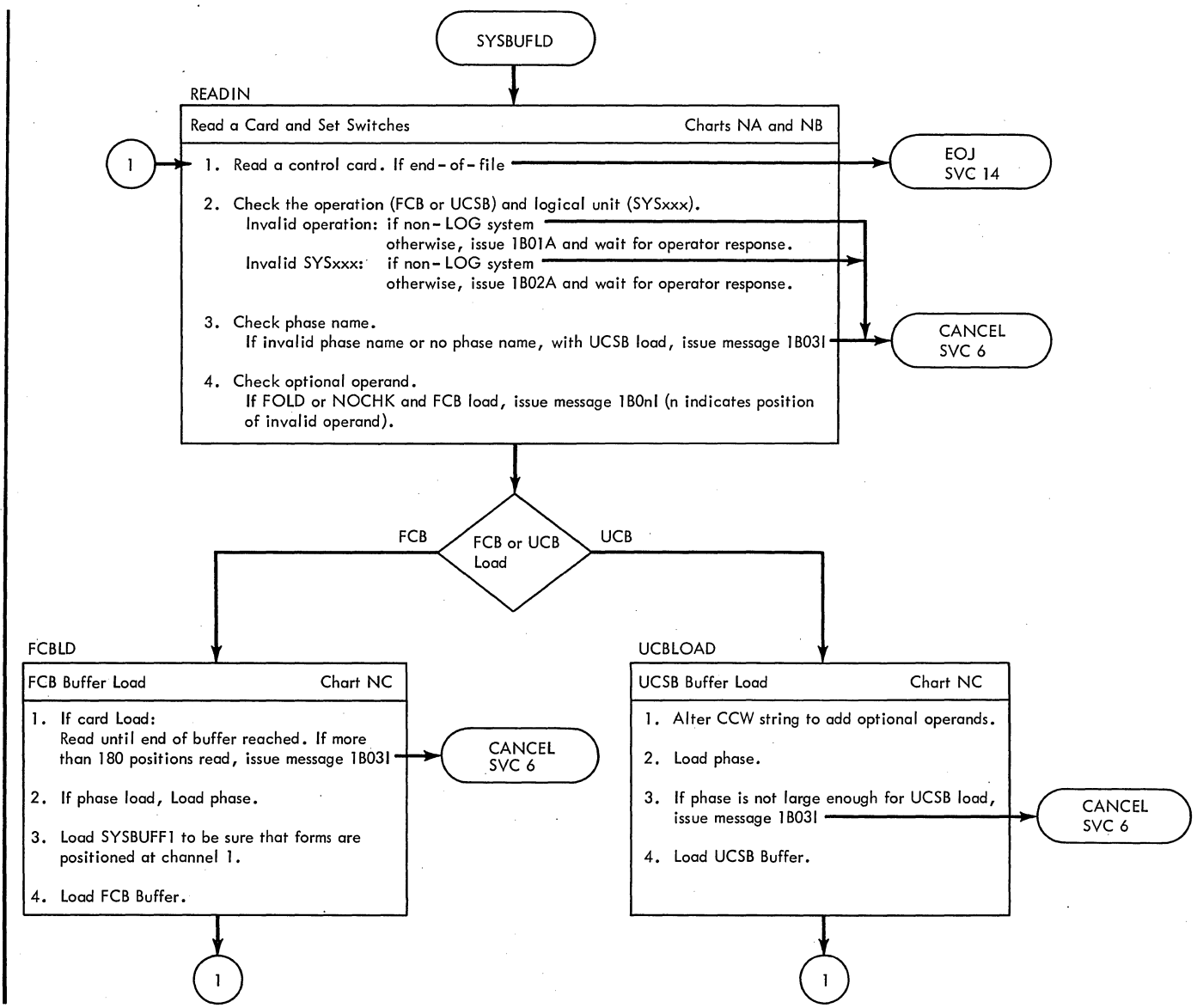


Chart 21. 3211 Printer IPL Buffer Load Programs

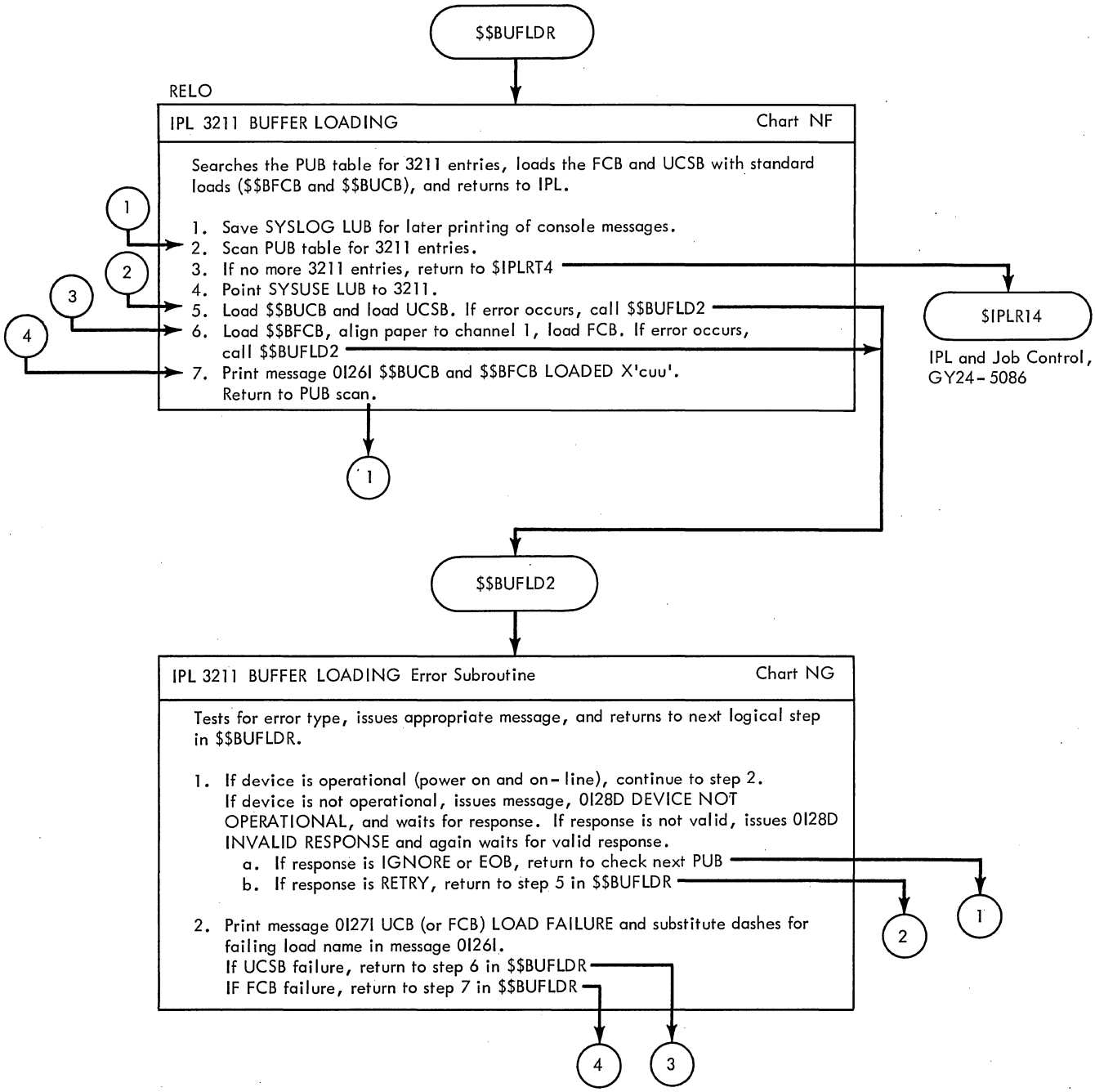


Chart NA. SYSBUFLD - Read Card and Print on SYSLOG and SYSLST
Refer to Chart 20.

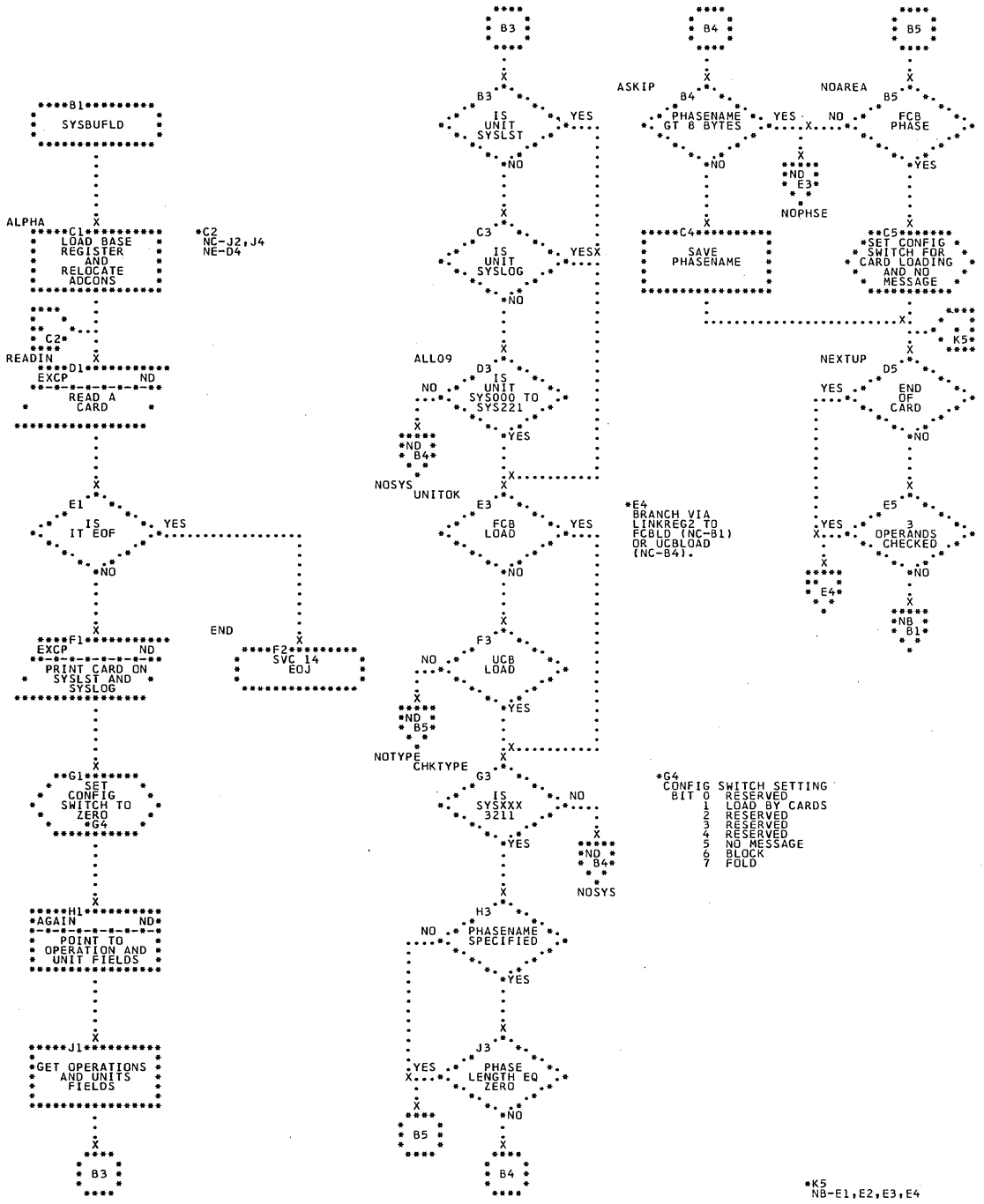


Chart NB. SYSBULFD - Set CONFIG Switch
Refer to Chart 20.

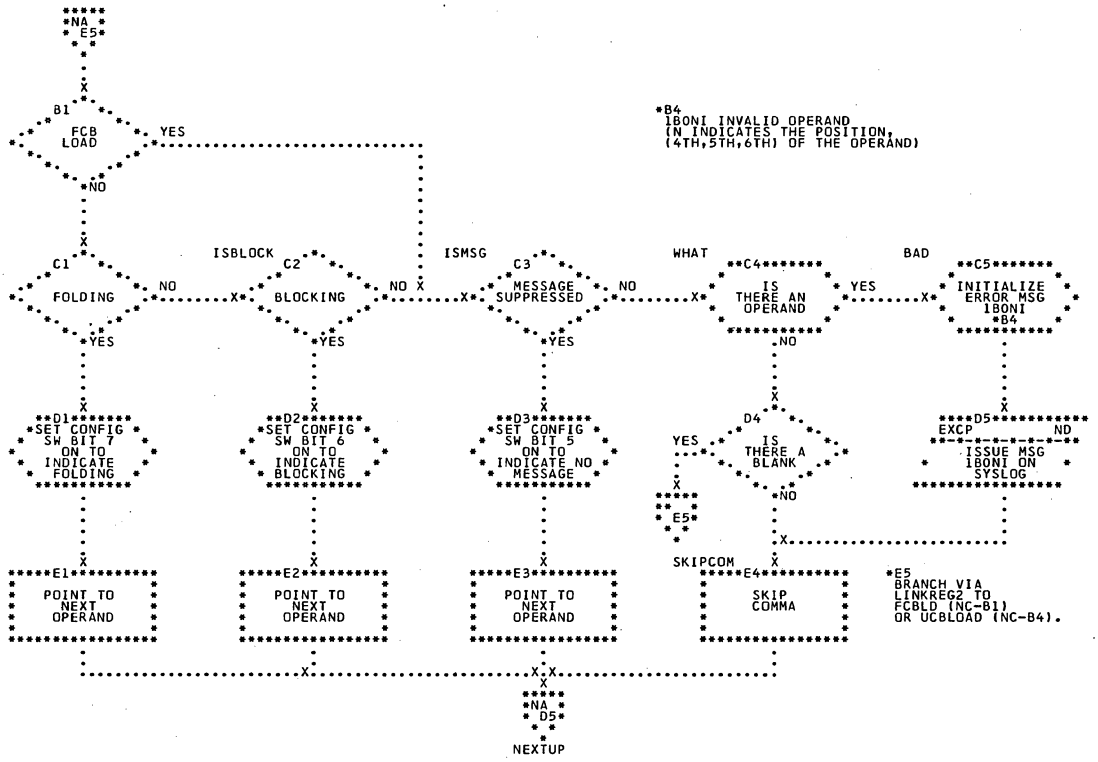


Chart NC. SYSBUFLD - FCB and UCSB Buffer Loads
Refer to Chart 20.

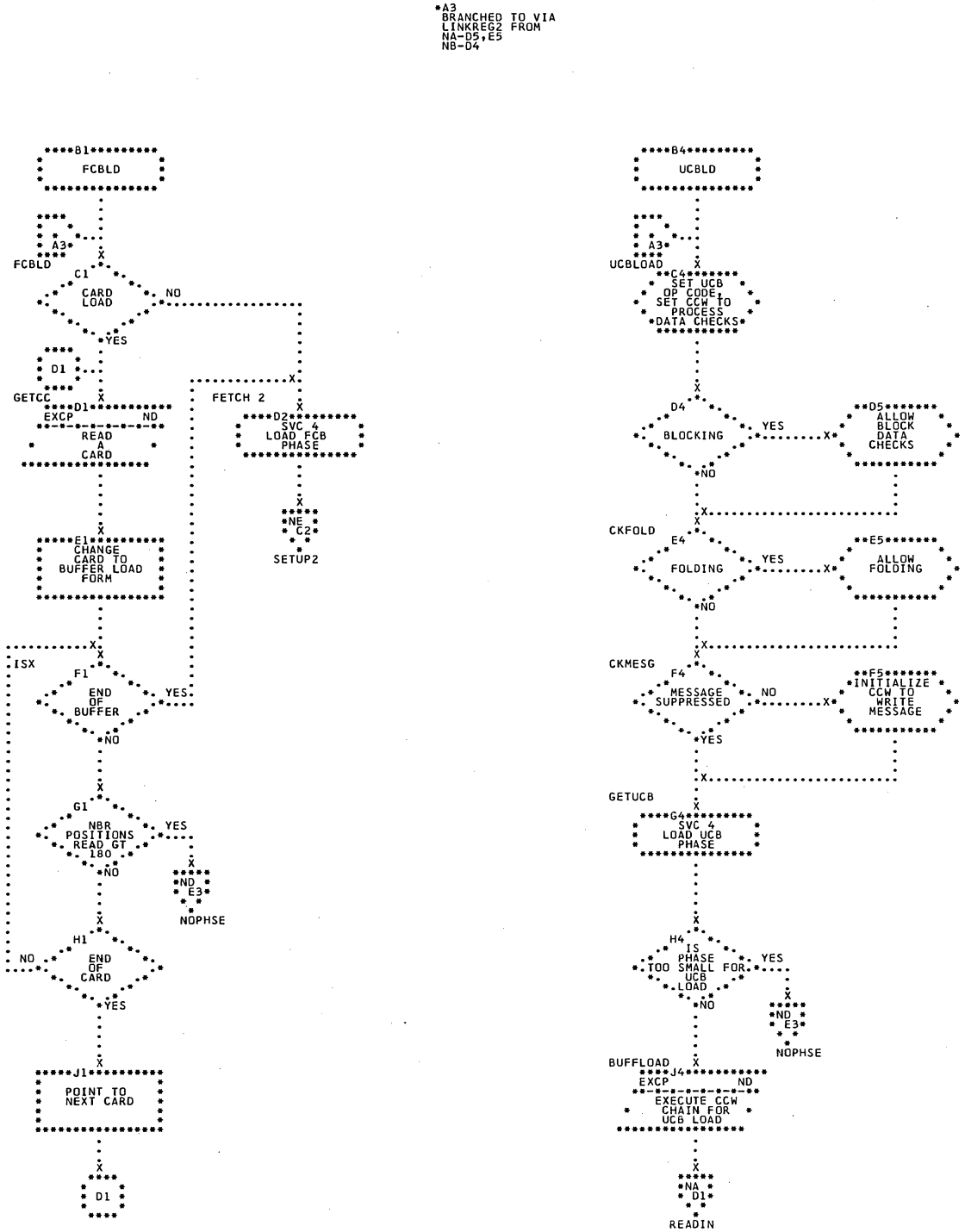


Chart ND. SYSBUFLD - Miscellaneous Subroutines
Refer to Chart 20.

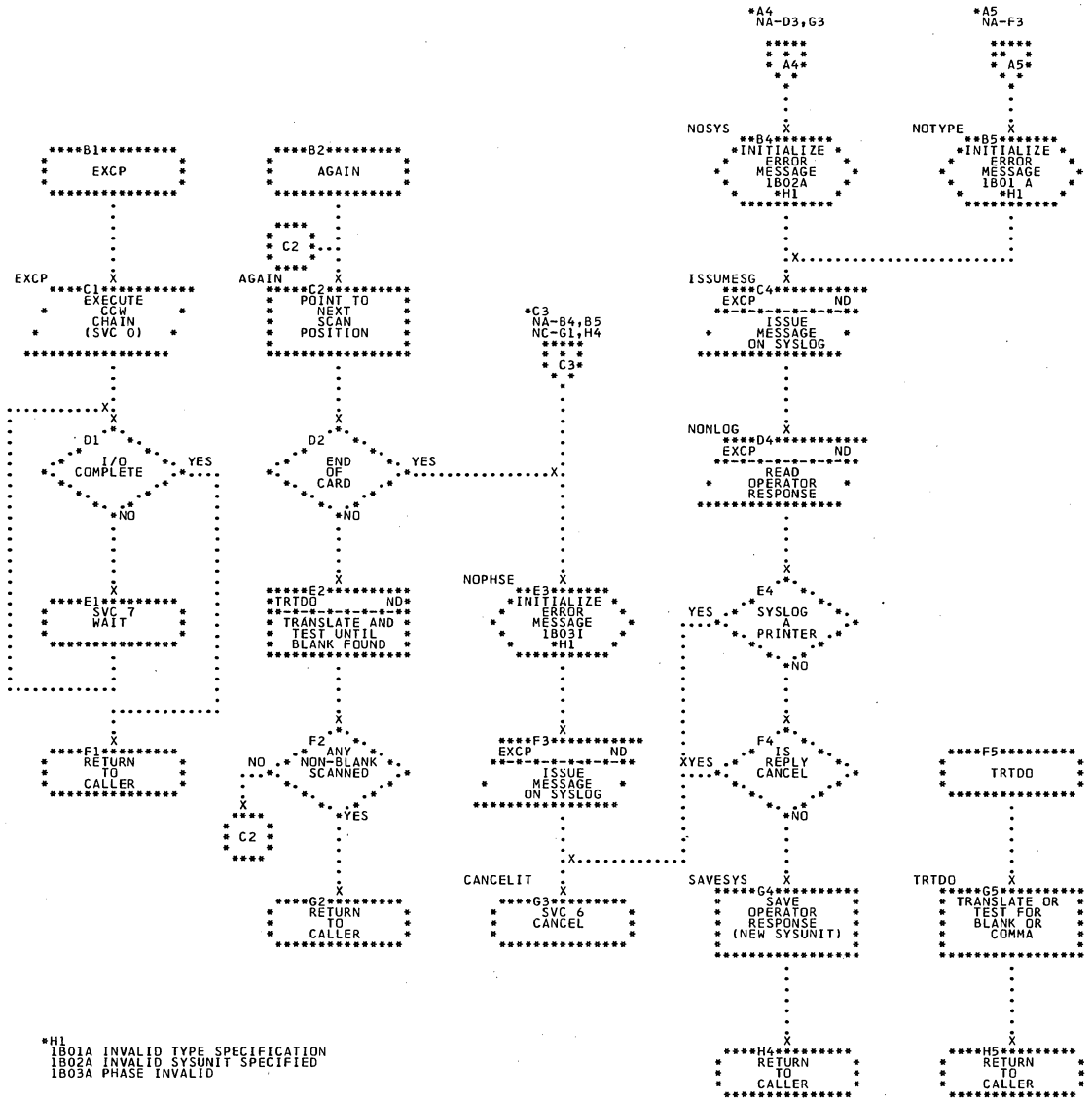


Chart NE. SYSBUFF1 - Verify Forms Are Positioned at Channel 1
Refer to Chart 21.

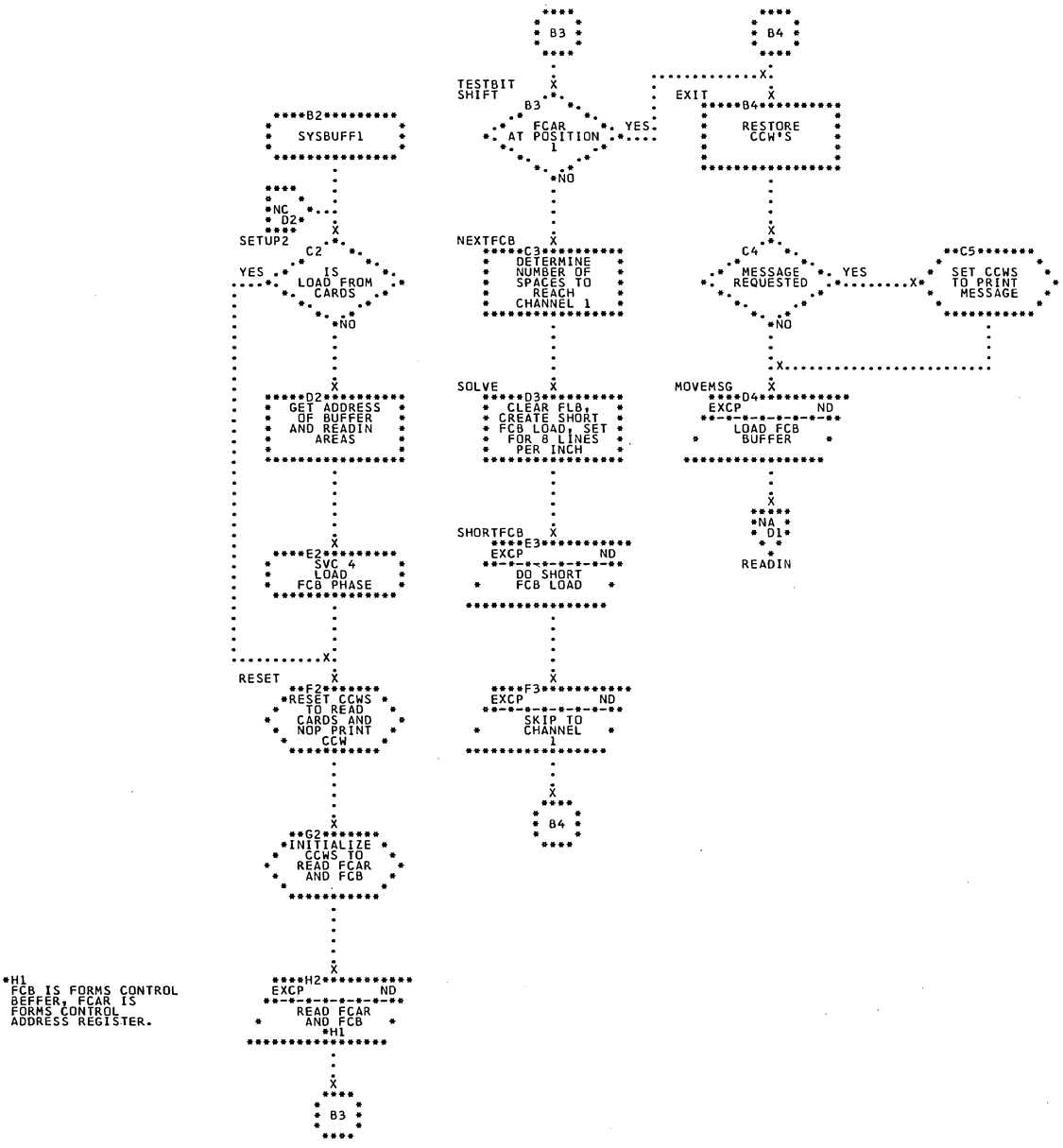


Chart NF. $$BUFLDR - Load UCSB and FCB
Refer to Chart 21.

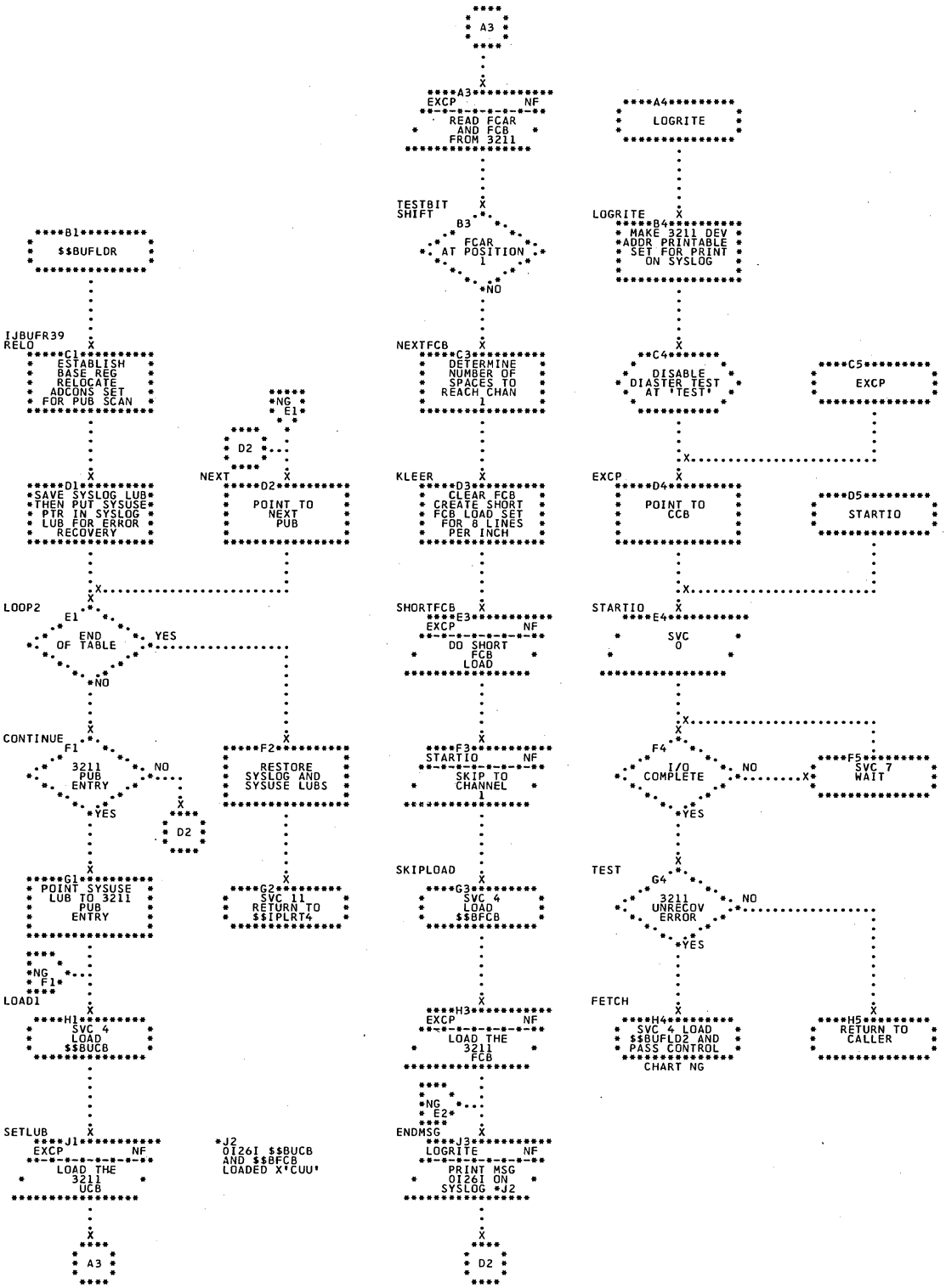
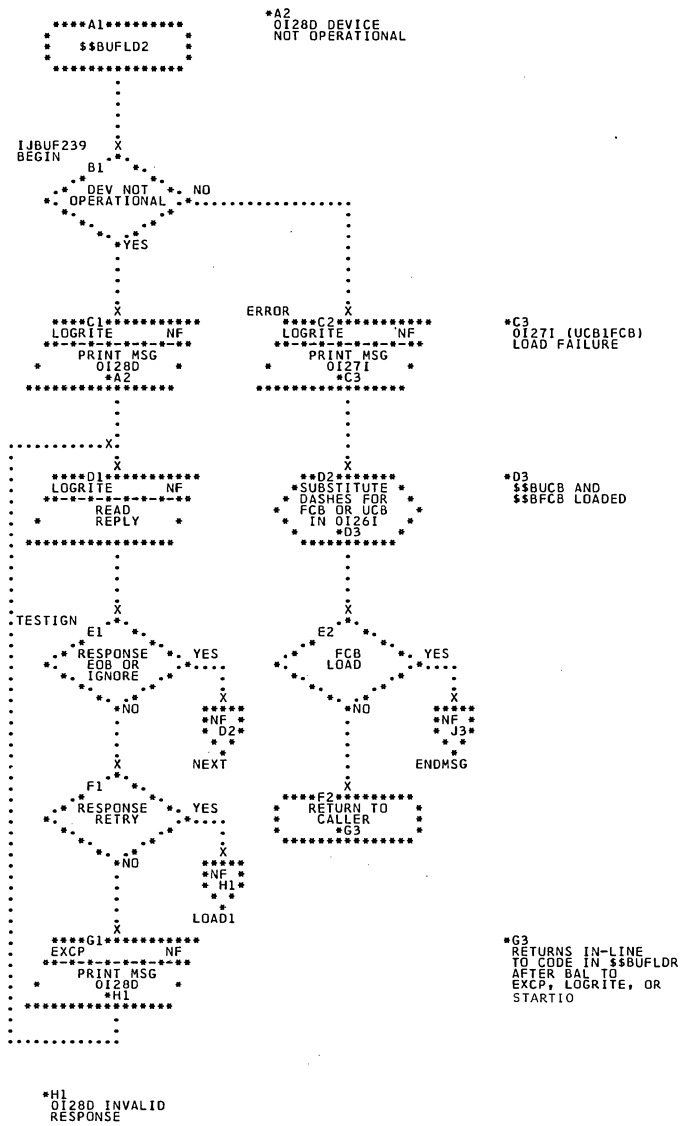


Chart NG. $$BUFLD2 - 3211 Buffer Load Error Subroutine
Refer to Chart 21.



Appendix A: Label List

LABEL	CHART
AAAGET	ABA
ABORT	FB
ABORT	KA
ABORT	KF
ABORT	KH
ACCEPT	EQ
ADRSET	KA
AGAIN	NC
ALLDONE	MD
ALLIN	FA
ALLTRACE	EA
ALLTRACE	ED
ALLTRACE	EG
ALL09	NA
ALPHA	NA
ALREADY	KG
APENDAGE	KC
ARND	JA
ARND	MA
AROUND	MJ
AROUND10	JD
AROUND12	JT
AROUND13	AC
AROUND13	JT
AROUND14	AF
AROUND4	JR
AROUND5	JR
ASCHECK	LK
ASDHIGH	LL
ASEQUAL	LK
ASEQUAL6	LK
ASHIGH	LM
ASKIP	NA
ASK4AID	AA
ASKAAA	ABA
ASKAID	AA
ASKODQST	AB
ASKSVCQS	AB
ASMOVE	LM
ASMOVE6	LM
ASSIGNER	FA
AUTOOP	FC
BACKUP	KC
BAD	NB
BADCARD	AE
BADREC	ME
BADUNIT	JS
BALCONV	LA
BALERROR	MB
BALRD	LA
BALRD1	LB
BALRD2	LB
BALRD3	LC
BALRD4	LC
BALRD7	LD
BALRD8	LE
BALRD8A	LF
BALUPDT	MB
BCROFF	FD
BCRSW	FD
BCTLOOP	AK
BEGIN	CB
BEGIN	CD
BEGIN	FA
BEGIN	NG
BITEDT	JR
BITMOVE	JT
BJF	FF
BLK	GE
BLK1	LJ
BLNKCHK	AD
BLNKCHKC	AE
BOPLY	CD
BOPLY	EP
BOPLY	EQ
BPUT	BC
BRLINK	LH
BRNCH1	EA
BRNCH1	ED
BRNCH1	EG
BRNCH2	EA
BRNCH2	ED
BRNCH2	EG
BUFFLOAD	NC
BUMPPTR	DA
BYPASS	KK
BYPASS	LJ
BYPASS	LN
BYTE1	JL
BYTE2	JL
BYTE3	JN
BYTE4	JQ
BYTE5	JB
BY1	KD
BY7	JJ
CANCELIT	ND
CANCRTN	AF
CARDREAD	HA
CCHCNURT	MH
CCH2RTN	MG
CDERRLOG	AE
CHCKRECS	KG
CHECK	MB
CHECKAS	LM
CHECKEND	KF
CHECKN2	ME
CHECKTAB	LK
CHEKER	CB
CHEKKEY	HA
CHKATOF	AK
CHKDOBR	JD
CHKHDR	MA
CHKMORE	AE
CHKRESP	MJ
CHKSUB	JE

CHKTYPE	NA
CHK0T09	AK
CHZROREC	MD
CIEDCHK	JE
CIEDONE	JD
CIEOFF	JF
CIEPHASE	JE
CIEREAD	JD
CIERESET	JF
CIERSET2	JF
CIESTORE	JC
CIE1	JE
CIE1CK	JE
CIE2CHK	JE
CKCHARIN	AK
CKCLEAR	HB
CKCQP	DB
CKCQP	DD
CKCQP	EC
CKCQP	EF
CKDEVCE1	CA
CKDEVCE1	CB
CKDEVCE1	CD
CKDEVCE1	EN
CKDEVCE1	EN
CKDEVCE1	ER
CKDEVCE2	CA
CKDEVCE2	CB
CKDEVCE2	CD
CKDEVCE3	CA
CKDEVCE3	CD
CKDEVST	DB
CKDEVST	DD
CKDEVST	EC
CKDEVST	EF
CKENTRY	EC
CKENTRY	EF
CKFOLD	NC
CKFORC14	MF
CKFOR145	MG
CKMESG	NC
CKNEXT	LG
CKOS2715	MD
CKOUTOD	AC
CKREC	BC
CKSETEND	ME
CKTR	BC
CKWSSWON	MD
CK2715S	JD
CLEAR	CB
CLEAR	CD
CLEAR	DC
CLEAR	DE
CLEAR	EC
CLEAR	EF
CLEAR	ER
CLEARN1	MH
CLEAR1	MB
CLRTPLBL	MJ
CNCLREAD	HA
CNVRT	GF
CNVRT2	GF
CNVTCUU	AK
CNV2715	MF
COMLOOP	JM
COMMON	JQ
COMMON2	JM
COMMON3	JD
COMMON5	JQ
COMP	JR
COMP	LL
COMPARE	FC
COMPARE	JM
COMPARE1	FE
COMPCD	BC
CONS	GC
CONT	LG
CONTINU	MF
CONTINUE	EE
CONTINUE	MC
CONTINUE	NF
CONTUE	HC
CONVERT	AK
CONVERT	FE
CONVERT	GE
CONVERT	MD
CONVERTA	FE
CONV4	LJ
COREDUMP	FC
COUNT	LG
COZERO	FD
CPUDUMMY	ME
CPUIDREC	MH
CQCHCK	FF
CRDINP	AD
CUPRINT	LL
CURTN	LF
CUTOHEX	LJ
CUUCNVT	AK
CUUOKEX	AK
CUUPUBCK	AK
CUURESP	AB
DASDTST	LJ
DASDTST	LN
DATARD1	FL
DBLSCHK	AD
DBLSTYPE	AD
DECPHAAA	ABA
DEFAULT	HB
DEFAULT1	HA
DENS	GE
DEVASSGN	FA
DEVIN	GB
DEVOUT	GB
DEVTST	CB
DEVTST	CD
DEVTST	EQ
DISK	GC
DISK	GE
DISKIN	GE
DMPTST	EN
DOIT	CE
DOIT	EB
DOIT	EF
DOIT	EP

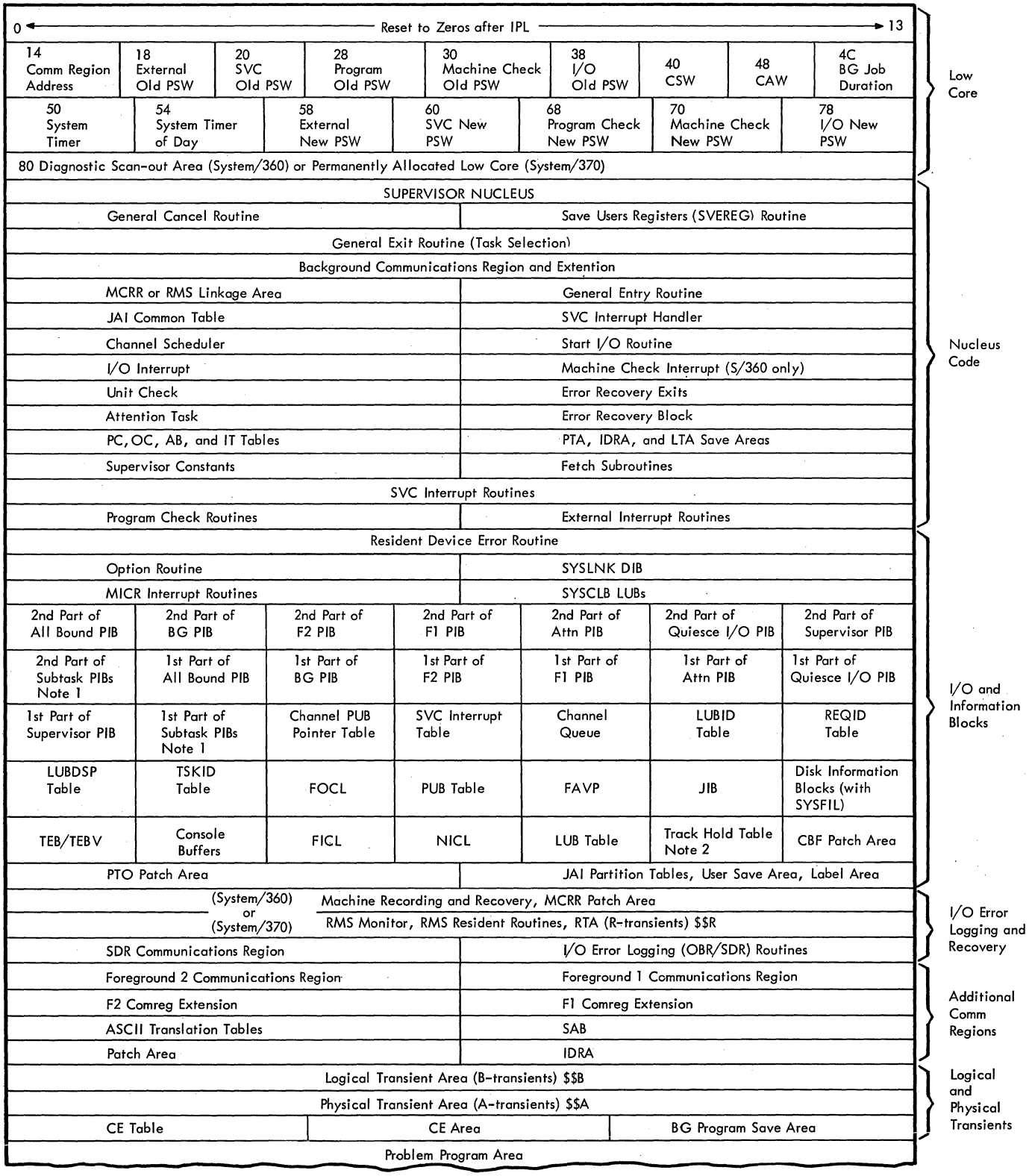
OFFA	JB
OKIGN	EB
OKIGN	EE
OKIGN	EH
OMITTED	HD
OMMON2	JM
ONLIES	ABA
OPASTRK	JQ
OPBACK	JQ
OPBITS	JR
OPBLNK	JQ
OPEXIT	JR
OPEXOR	JS
OPINDEX	JQ
OPLOAD	JU
OPLOGUNT	JS
OPMVCBT	JR
OPMVCCTR	JQ
OPMVCHEX	JQ
OPMVCOM	JQ
OPNONO	JR
OPPARITY	JU
OPPRINT	JQ
OPTIME	JT
OPTION	HC
OPTIONS	ABA
OPUNPK	JT
OS15ONLY	MD
OS2715CV	MF
OUT	CD
OUT	EH
OUT	ER
OUT	FE
OUT	GC
OUTAREA	BA
OUTCALL	KK
OUTLBL	GD
OUTPUT	CE
OUT1	KC
OVERFLOW	EN
OVFLIND	CB
OVFLIND	CD
OVFLIND	EN
OVFLIND	ER
PAGE	GE
PASSNO	LL
PHASEBEG	LK
PIBSAVDP	FF
POINT	JB
POINT	LK
PRECON	FD
PRG100	LM
PRINT	DB
PRINT	DD
PRINT	GB
PRINTDK1	FL
PROCESS	KA
PROCESS	LK
PROCF	LL
PROCF1	LL
PROCGTAB	LM
PROCTAB	LL
PROGUNTS	JS
PRROUT	JJ
PRT	LH
PRT	LN
PRTCD	AJ
PRTEST	LL
PRTGET	AB
PRTVAL	AJ
PUBCHCK	FF
PUBCOMP	AK
PUNCHRT	FB
PUT	BA
PUTIN	CC
PUTLINE	KH
QTAMFRMT	BF
QTAMREC	BF
RCDPRO	JC
RDCELOOP	KF
RDCELOOP	KH
RDPRT	AJ
READ	FE
READ	GE
READ	LK
READ	MB
READAAA	ABA
READD	GC
READDISK	MA
READIN	NA
READLOOP	KA
READON	MB
READREC	JJ
READROUT	HA
READSTAT	HE
READTPE	GC
READY	HC
READ1	FA
RECERROR	MB
REDUCE	FC
REGSCON	FE
RELD	BD
RELLOP	KB
RELO	FA
RELO	NF
RELOAD	BA
RELOC	ED
RELOC	EG
REOPTION	HA
RESET	MD
RESET	NE
RESPOF2	AH
RESTORE	FB
RESTSET	DB
RESTSET	DD
RESTSET	EB
RESTSET	ED
RESTSET	EG
RET	GB
RET	GC
RETNPONT	KH
RETN2715	JB
RETURN	BB
RETURN2	MF
RETURN3	MG

SUBDUPCK	HB
SUBLOOP	HB
SUBRETRN	HB
SUPRZ	GF
SVCCNVT	AH
SVCENT	EQ
SVCENTER	DA
SVCENTRY	EA
SVCENTRY	EM
SVCENTRY	EQ
SVCERR	AH
SVCERRCD	AH
SVCGET	AB
SVCIGN	AB
SVCINIT	EB
SVCINIT	ED
SVCINIT	EG
SVCINIT	EQ
SVCK	DB
SVCK	DD
SVCK	EB
SVCK	EE
SVCK	EH
SVCPT	EA
SVCPT	ED
SVCPT	EG
SVCRESP	AH
SVCSCD	AB
SVSET	DA
SVSET	DB
SVSET	DD
SVSET	EB
SVSET	EE
SVSET	EH
SVTST	DA
SWOFF	FE
SWTCHTST	EB
SWTCHTST	EE
SWTCHTST	EH
SW1	AJ
SW14	AE
SW15	AH
SW6	AJ
SW8	AJ
SYSBUFF1	NE
SYSBUFLD	NA
SYSTIO	FD
TABL	LN
TAPLAB	FL
TCLR	JD
TEST	NF
TESTBIT	NE
TESTBIT	NF
TESTENT	LM
TESTEOF	FB
TESTG100	LM
TESTIGN	NG
TESTIO1	FC
TESTIO2	FD
TEST1	DA
TEST1	DB
TEST1	DD
TEST1	ED
TEST1	EG
TEST100	LL
TEST2	DA
TEST2	DB
TEST2	DD
TEST2	ED
TEST2	EG
TEST3	DA
TEST3	DB
TEST3	DD
TEST3	ED
TEST3	EG
THEPUT	BA
THIL01	JG
THIL02	JG
THIL03	JG
THIL04	JH
THIL00	JG
TIFLFT	LE
TIFLFT	LK
TIMCVRT	ME
TIMEDATA	LJ
TIME2715	MF
TIO1	FE
TIO3	FE
TMECNVRT	ME
TM1	LK
TM2	LK
TPE	GB
TPEIN	GE
TRAILER	MC
TRAILRCK	MA
TRANSFCH	AG
TRCIGNCD	AG
TRCIGNIC	AG
TRTDO	ND
TRUE4	JH
TRY	CC
TRY	CE
TRY	DC
TRY	DE
TRY	EC
TRY	EF
TRY	ER
TRYPT	CC
TRYPT	DB
TRYPT	DD
TRYPT	EC
TRYPT	EF
T00	JG
TSTCOMB	LF
TST2	LF
TYPECK	JE
TYPEMACH	JF
T1OUT	LA
T1OUT-6	LA
T2	LB
T2715	JG
T2OUT	LA
T3	LB
T3OUT	LA
T4OUT	LA

Appendix B: Error Message Cross Reference

MESSAGE	CHART
0I26I	NF
0I27I	NG
0I28D	NG
1B0nI	NB
1B01A	ND
1B02A	ND
1B03I	ND
3E10I	JA, MJ
3E11D	HA
3E12D	HA
3E13D	HA, MJ
3E14A	HA
3E15A	MC, MJ
3E16A	HC
3E18I	MB
3E20I	LG
3E22I	JA
3E25I	HA, MA
3E26I	HA
3E27I	HA
3E28I	HA
3E29I	HA
3E30I	LL
3E31A	MJ
4C10D	AA
4C11D	AB, AJ
4C12D	AB, AJ
4C13D	AD, AG, AJ
4C14D	AD, AG
4C15D	AB, AD, AH
4C16D	AD, AH
4C17D	ABA, AC, AF, AG
4C18I	AA
4C19I	AC
4C20D	AC, AG
4C21A	AD
4C22A	ABA, AE, AF, AG, AJ
4C23D	AD
4C24A	AL, CB, CD, DC, DE, EC, EF, EQ
4C25I	AC
4C26I	BC
4C27D	ABA
4C28D	AD
4C40A	FA
4C41A	FA
4C42A	FA
4C43A	FA
4C44A	FB
4C45A	FB
4C46A	FA
4R00I	GA
4R01I	GB
4R02A	GB
4R03I	GB
4R04A	GB
4R05I	GB
4R06I	GB
4R07I	GB
4R09D	GC
4R09I	GA

Appendix C: Reference Figures



Note 1: Total of 9 subtasks PIBs generated.
Note 2: Maximum of 225 entries generated.

Figure 39. Supervisor Storage Allocation

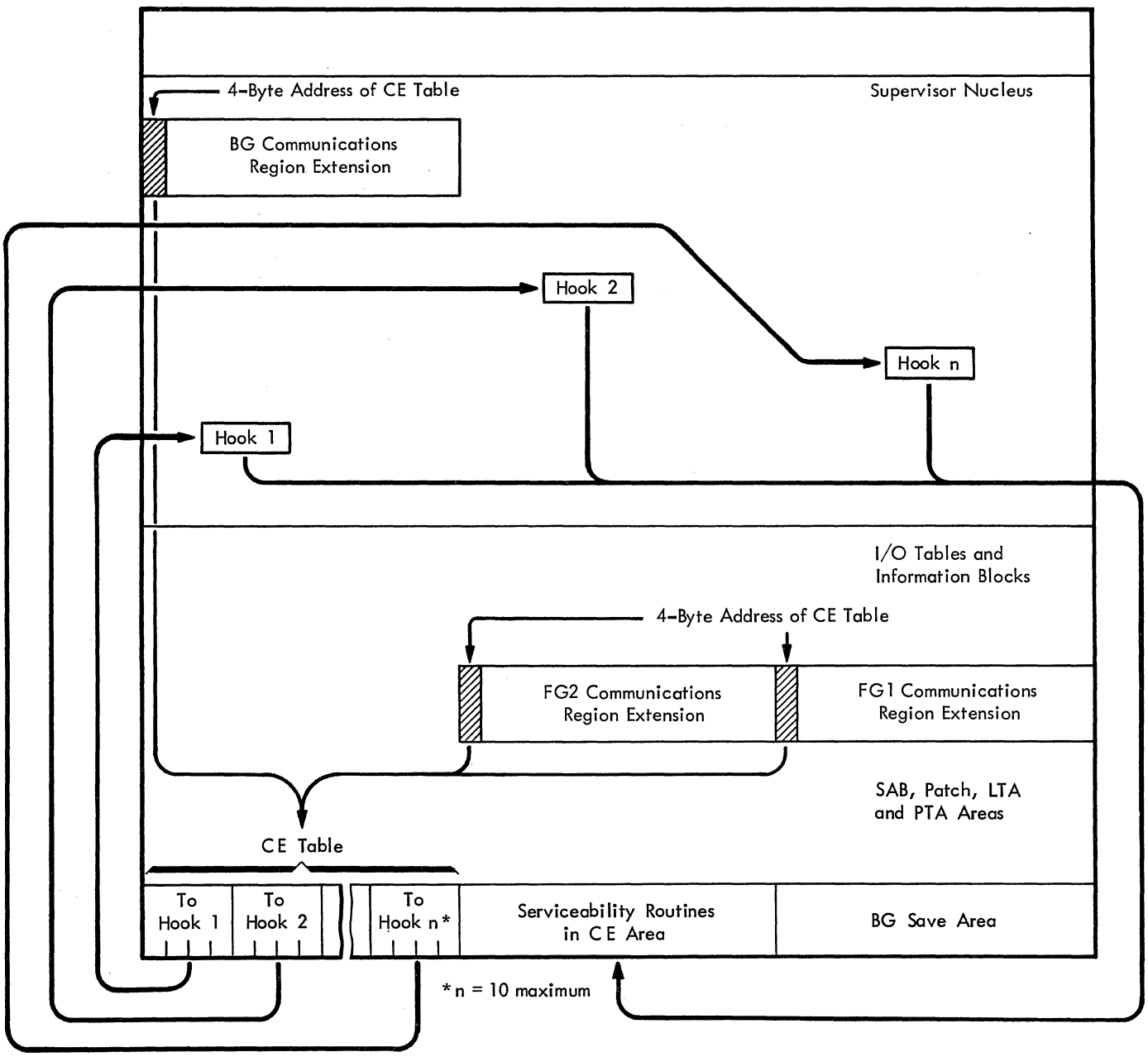


Figure 40. Accessing CE Serviceability and PDAID Routines

Macro Supported	SVC		Function
	Dec.	Hex.	
EXCP	0	0	Execute channel programs.
FETCH	1 2 3	1 2 3	Fetch any phase. Fetch a logical transient (B-transient). Fetch or return from a physical transient (A-transient).
LOAD	4	4	Load any phase.
MVCOM	5	5	Modify supervisor communications region.
CANCEL	6	6	Cancel a problem program or task.
WAIT	7	7	Wait for a CCB or TECB.
	8	8	Transfer control to the problem program from a logical transient (B-transient).
LBRET	9	9	Return to a logical transient (B-transient) from the problem program after an SVC 8.
SETIME	10*	A	Set timer interval.
	11 12 13	B C D	Return from a logical transient (B-transient). Logical AND (Reset) to second job control byte (displacement 57 in communications region). Logical OR (Set) to second job control byte (displacement 57 in communications region).
EOJ	14	E	Cancel job and go to job control for end of job step.
	15	F	Same as SVC 0 except ignored if CHANQ table is full. (Primarily used by ERP).
STXIT (PC)	16*	10	Provide supervisor with linkage to user's PC routine for program check interrupts.
EXIT (PC)	17*	11	Return from user's PC routine.
STXIT (IT)	18*	12	Provide supervisor with linkage to user's IT routine for interval timer interrupts.
EXIT (IT)	19*	13	Return from user's IT routine.
STXIT (OC)	20*	14	Provide supervisor with linkage to user's OC routine for external or attention interrupts (operator communications).
EXIT (OC)	21*	15	Return from user's OC routine.
	22* 23*	16 17	The first SVC 22 seizes the system for the issuing program by disabling multiprogram operation. The second SVC 22 releases the system (enables multiprogram operation). Load phase header. Phase load address is stored at user's address.
SETIME	24*	18	Provide supervisor with linkage to user's TECB and set timer interval.
	25* 26* 27*	19 1A 1B	Issue HALT I/O on a teleprocessing device, or HALT I/O on any device if issued by OLTEP. Validate address limits. Special HIO on teleprocessing devices.

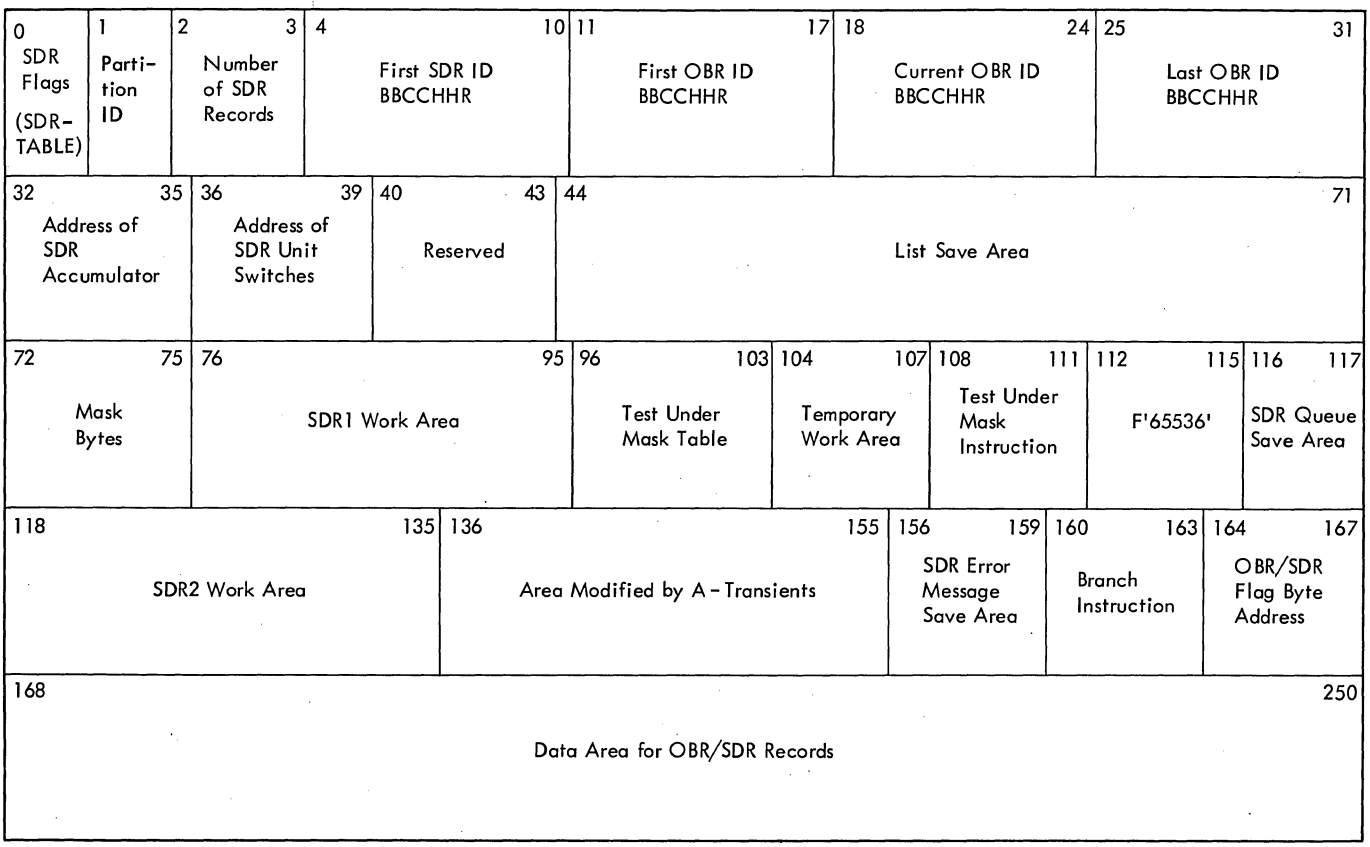
* = optional

Figure 41. DOS Supervisor Calls (Part 1 of 2)

Macro Supported	SVC		Function
	Dec.	Hex.	
EXIT (MR)	28*	1C	Return from user's stacker select routine (MICR type devices only).
	29*	1D	Provide return from multiple wait macros WAITF and WAITM (except MICR type devices).
QWAIT	30*	1E	Wait for a QTAM element.
QPOST	31*	1F	Post a QTAM element.
	32	20	(Reserved).
	33	21	Reserved for internal macro COMRG.
	34	22	Reserved for internal macro GETIME.
HOLD	35*	23	Hold a track for use by the requesting task only.
FREE	36*	24	Free a track held by the task issuing the FREE.
STXIT (AB)	37*	25	Provide supervisor with linkage to user's AB routine for abnormal termination of a task.
ATTACH	38*	26	Initialize a subtask and establish its priority.
DETACH	39*	27	Perform normal termination of a subtask. It includes calling the FREE routine to free any tracks held by the subtask.
POST	40*	28	Inform the system of the termination of an event and ready any waiting tasks.
DEQ	41*	29	Inform the system that a previously enqueued resource is now available.
ENQ	42*	2A	Prevent tasks from simultaneous manipulation of a shared data area (resource).
	43*	2B	Provide supervisor support for external creation and updating of SDR records.
	44*	2C	Provide supervisor support for external creation of OBR records.
	45*	2D	Provide emulator interface.
	46*	2E	Provide OLTEP with the facility to operate in supervisory state.
	47*	2F	Provide return from wait multiple WAITF for MICR type device.
	48	30	(Reserved)
	49	31	(Reserved)
	50	32	Reserved for LIOCS error recovery.
	51*	33	Return phase length at OLTEP request.

* = optional

Figure 41. DOS Supervisor Calls (Part 2 of 2)



Key to SDR Communications Region Displacements:

0 SDR Flags:

Bit 0: Key of OBR
1: RDE option
2: Initial IPL time
3: RF option = NO, recording is suppressed
4: RF option = CREATE
5: RF option = YES
6: Error while recording
7: Recorder file ready

Set and tested by Job Control.

1 Set by EREP transient $$BSDRUP to identify the partition making the call for EREP recording.

Settings: X'10' if EREP is running in BG.
X'20' if EREP is running in F2.
X'30' if EREP is running in F1.
X'01' with one of the above if recorder file is ready.
X'00' with one of the above if recorder file is not ready.

2 Initial number of SDR records specified. If SDR record count is not specified, the file is formatted for OBR records only ($JOBCTLM, see IPL and Job Control PLM, GY24-5086).

4 Disk address of first SDR record.

11 Disk address of first OBR record.

18 Disk address of current OBR record.

25 Disk address of last OBR record.

Figure 42. SDR Communications Region (SDRTABLE) (Part 1 of 2)

Key to SDR Communications Region Displacements:

32 Address of SDR accumulator area which contains half-byte counters and accumulated error conditions.

36 Address of SDR unit switches.

SDR switch byte (1 for each PUB):
X'80' - Update operations complete
X'40' - Counters on external file overflowed
X'20' - I/O error during write
X'08' - SDR update half-byte counters routine required
X'04' - Update SDR record routine required
Other - Reserved

When entry contains X'01000000', indicates MCRR, no SDR supported.

40 Reserved.

44 SDR1 register save area.

72 Mask formats for interpretive error accumulator, SDR1:

X'FF' - End of update
X'FE' - Bypass counter
X'FD' - Set up 'OR' condition to previous counter
X'FC' - Ignore list item
Other - Test bit in error queue

76 Used by the interpretive error accumulator routine to process list passed by OBR/SDR A-transient.

96 Used by the interpretive error accumulator routine.

104 Used by the interpretive error accumulator routine for address alignment.

108 Executed by the interpretive error accumulator routine.

112 Loop counter for the SDR counter update.

116 Save area for pointers to entries in the SDR error queue.

118 Work area where half byte error counters are unpacked and updated.

136 List of devices passed to the SDR processor from $$ANERAD.

156 Used by SDR/OBR recorder phases to pass error message displacements and disk error addresses in event of an error.

160 Entry point from OBR/SDR A-transients. Branches to label SDRMM.

164 Pointer into the OBR/SDR unit switches. Status posted by recorder phases. (See byte 36).

168 OBR and SDR records formatted by the recorder phases.

Figure 42. SDR Communications Region (SDRTABLE) (Part 2 of 2)

KEY	FIELD	SIZE	DESCRIPTION
	Channel & Unit	2 Bytes	Last Record X'FFFE' Available Record X'FFFF'
	Poll Characters	4 Bytes	
DATA	FIELD	SIZE	DESCRIPTION
	Type	1 Byte	Device Type from PUB Table
	Characteristics	1 Byte	X'40' if Switchable Device X'02' if Burst on MPX Channel X'01' if 7 Track Tape
	Counters *	16x2 Bytes	Error Counters
	Reserved	2 Bytes	
	Guard	1 Byte	X'FF'
	RECORD CAPACITY - 43 Bytes Total		

Note:

Device Type	Records/Track
2311	29
2314	38

*The SDR processor will expand each of the sixteen half-byte in-core counters into two-byte counters on the disk. There can be thirteen errors on a device before updating the disk; the capacity of the two-byte expansion is 32767 errors before overflow is reached.

Figure 43. SDR Record Format

```
******                                    ******
**      LIST FOR UNSUPPORTED DEVICE         **
******                                    ******

UNSUP   EQU   *
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK SENSE,0,5          OVERRUN
        SDRMSK END                END OF LIST
LUNSUP  EQU   *-UNSUP             LENGTH OF LIST

******                                                              ******
**      LIST FOR CHARACTER READER DEVICES 1285/1287/1412/1419         **
******                                                              ******

CHAR    EQU   *
        SDRMSK SENSE,0,0          COMMAND REJECT
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,5          OVERRUN
        SDRMSK END                END OF LIST
LCHAR   EQU   *-CHAR              LENGTH OF LIST

******                                    ******
**      LIST FOR UNIT RECORD DEVICES        **
******                                    ******

UNIT    EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK END                END OF LIST
LUNIT   EQU   *-UNIT              LENGTH OF LIST

******                                  ******
**      LIST FOR 1052 CONSOLE             **
******                                  ******

CONSL   EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK SENSE,0,5          OVERRUN
        SDRMSK END                END OF LIST
LCONSL  EQU   *-CONSL             LENGTH OF LIST

******                                    ******
**      LIST FOR 2540 READER,PUNCH          **
******                                    ******

RDPCH   EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK BYPASS             SKIP THIS COUNTER
        SDRMSK SENSE,0,6          UNUSUAL COMMAND SEQUENCE
        SDRMSK END                END OF LIST
LRDPCH  EQU   *-RDPCH             LENGTH OF LIST
```

```
******                                    ******
**      LIST FOR 2400 TAPE SERIES           **
******                                    ******

TAPE    EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK SENSE,0,5          OVERRUN MASK
        SDRMSK SENSE,0,6          WORD COUNT ZERO
        SDRMSK SENSE,0,7          DATA CONVERTER CHECK
        SDRMSK SENSE,3,0          R/W VERTICAL REDUNDANCY CHECK
        SDRMSK SENSE,3,1          LONGITUDINAL REDUNDANCY CHECK
        SDRMSK SENSE,3,2          SKEW MASK
        SDRMSK SENSE,3,3          CYCLIC REDUNDANCY CHECK
        SDRMSK SENSE,3,4          SKEW REGISTER VRC MASK
        SDRMSK SENSE,1,0          NOISE MASK
        SDRMSK END                END OF LIST
LTAPE   EQU   *-TAPE              LENGTH OF LIST

******                                    ******
**      LIST FOR DASD 2311/2314/2321        **
******                                    ******

DASD    EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,3          EQUIPMENT CHECK
        SDRMSK SENSE,0,5          OVERRUN
        SDRMSK SENSE,0,6          TRACK CONDITION
        SDRMSK SENSE,0,7          SEEK CHECK
        SDRMSK SENSE,2,0          UNSAFE
        SDRMSK BYPASS             BYPASS THIS COUNTER
        SDRMSK SENSE,2,2          SERIALIZER/DESERILIZER
        SDRMSK SENSE,2,3          CONTROL UNIT TAG LINE
        SDRMSK SENSE,2,4          ALU CHECK
        SDRMSK BYPASS             BYPASS THIS COUNTER
        SDRMSK SENSE,1,6          MISSING ADDRESS MARKER
        SDRMSK END                END OF LIST
LDASD   EQU   *-DASD              LENGTH OF LIST

***                                      ***
*       2495 TAPE CARTRIDGE READER       *
***                                      ***

CARTAP  EQU   *
        SDRMSK SENSE,0,1          INTERVENTION REQUIRED
        SDRMSK SENSE,0,2          BUS-OUT CHECK
        SDRMSK SENSE,0,6          POSITION CHECK
        SDRMSK END
LCARTAP EQU   *-RDPCH             LENGTH OF LIST
```

Figure 44. SDR Device List Example (from $$ANERAD listing)

GENERAL FORMAT

FIELD	SIZE	CONTENT/DESCRIPTION
Record Type	1 Byte	x'01' identifies OBR record.
Date	4 Bytes	In packed decimal form: 00YYDDDF = (Year, julian Date, Zone)
Time	4 Bytes	System time of day.
Program ID	8 Bytes	Name of JOB (in a Batched partition), or program name.
First CCW	8 Bytes	First CCW of failing chain.
Failing CCW	8 Bytes	CCW on which error occurred.
Channel & Unit	2 Bytes	
CSW	8 Bytes	
Sense	6 Bytes	Device sense bytes.
	6 Bytes	Reserved for new sense.
Seek Address	6 Bytes	BBCCHH
Device Type	4 Bytes	Device type as stored in PUB table, mode setting, and characteristics.
Poll Characters	4 Bytes	
Logical Unit	2 Bytes	
Volume ID	6 Bytes	
Reserved	2 Bytes	
Guard Byte	1 Byte	X'FF'

RECORD CAPACITY - 80 Bytes Total

Note: Device Type	Records/Track
2311	25
2314	40

IBM 3211 FORMAT

FIELD	SIZE	CONTENT/DESCRIPTION
Record type	1 Byte	X'01' identifies OBR record.
Date	4 Bytes	Format is 00YYDDDZ (Year, julian Date, Zone in packed
Time	4 Bytes	System time of day.
Job ID	8 Bytes	Program name, or job in batched partition.
First CCW	8 Bytes	First CCW in failing chain.
Failing CCW	8 Bytes	CCW on which error occurred.
Channel & Unit	2 Bytes	Failing device address.
CSW	8 Bytes	
Sense	6 Bytes	Six sense bytes produced by 3211.
	6 Bytes	Reserved.
Device type	4 Bytes	First two bytes taken from bytes 4, 5 of 3211 PUB entry.
Logical unit	2 Bytes	
Parity error locations	8 Bytes	Up to 8 parity error locations in the print line buffer (one byte per location, X'01' to X'96').
Contents of parity error locations	8 Bytes	Contents of positions referenced in parity error locations.
Flag	1 Byte	Flag contains:
Device ID	1 Byte	X'FF' = 3211 OBR record indicator.
Guard byte	1 Byte	X'FF' designates end of record.

Figure 45. OBR Record Formats

MCRRPSW1 (See Note)

0 (Hexadecimal Displacement) 0 (Decimal Displacement)	8 8	10 16	14 20
MCRR | PSW Reentrant Address of MCRR Routine	MCRR | PSW Address of MCRR Routine	Address of Channel Failure Routine	Address of Machine Check Routine
XXXXXXXX	XXXXXXXX	XXXX	XXXX

Key to displacement:

0	Machine Check Recording and Recovery PSW. Loaded to enable machine check interrupts. Second word (displacement 4-7) contains reentrant address (MCRETURN) to MCRR routine.
8	Machine Check Recording and Recovery PSW. Loaded to enable machine check interrupts. Second word (displacement 12-15) contains initial address (MCRRRTN) of the MCRR routine.
16	Address of channel failure routine (MACHEK1).
20	Address of machine check routine (MACHEK).

Note: MCRRPSW1 is the label of the first byte of the MCRR Linkage Table.

Figure 46. Machine Check Recording and Recovery (MCRR) Linkage Table

Record 1:

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'02' CIE Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'30', X'40', or X'50'
Date	4 Bytes	In packed decimal form: 00YYDDDF = (Year, julian Date, Zone)
Time	4 Bytes	System time of day
Program ID	8 Bytes	C'XXXXXXXX' Job name
10 Active Devices	20 Bytes	X'cuu' First 10 active devices on Channel
First CCW	8 Bytes	First CCW of failing chain
Failing CCW	8 Bytes	CCW on which error occurred
CSW	8 Bytes	
Failing Device	2 Bytes	X'cuu'
Logout	12 Bytes	Mod 30 core bytes X'80'-X'8B' Mod 40 core bytes X'80'-X'8B' Mod 50 core bytes X'80'-X'8B' or X'88'-X'93'
Indicator	1 Byte	X'01' OBR full log bit - Mod 50 only Unused Models 30 & 40
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Bytes Total	

Record 2: Models 40 & 50 only

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'02' CIE Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'40' or X'50'
Logout	75 Bytes	Mod 40 core bytes X'8C'-X'D6'
	or	
	55 Bytes	Mod 50 core bytes X'8c'-X'D6' or
	20 Bytes	Mod 50 core bytes X'95'-X'CB' Mod 50 only - Unused with short record.
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Bytes Total	

Figure 47. Machine Check Recording and Recovery (MCRR) Record Formats (Part 1 of 4)

Record 3: Models 40 & 50 only

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'02' CIE Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'40' or X'50'
Logout	75 Bytes	Mod 40 core bytes X'D7'-X'121'
		Mod 50 core bytes X'D7'-X'121'
	75 Bytes	Unused for Partition Log-Out
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Bytes Total	

Record 4: Models 40 & 50 only

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'02' CIE Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'40' or X'50'
Logout	34 Bytes	Mod 40 core bytes X'122' - X'143'
	2 Bytes	Mod 50 core bytes X'122'-X'123'
Unused	41 Bytes	Mod 40
	73 Bytes	Mod 50
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Bytes Total	

Figure 47. Machine Check Recording and Recovery (MCRR) Record Formats (Part 2 of 4)

Record 1:

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'04' CPU Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'30', X'40', X'50'
Date	4 Bytes	In packed decimal form: 00YYDDDF = (Year, julian Date, Zone)
Time	4 Bytes	System time of day
Program ID	8 Bytes	C'XXXXXXXX' Job name
10 Active Devices	20 Bytes	X'cuu' First 10 active I/O units on channel
PSW	8 Bytes	Machine check old PSW
G.P. Registers	28 Bytes	Registers 0-6
Unused	3 Bytes	
End of Record	1 Byte	X'FF'

RECORD CAPACITY - 80 Byte Total

Record 2:

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'04' CPU Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'30', X'40', X'50'
G.P. Registers	36 Bytes	Registers 7-15
F.P. Registers	32 Bytes	0, 2, 4, 6
Unused	7 Bytes	
End of Record	1 Byte	X'FF'

RECORD CAPACITY - 80 Byte Total

Record 3:

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'04' CPU Record ID
Record Number	2 Bytes	X'nnNN' n of N Records
Model Number	1 Byte	X'30', X'40', X'50'
Logout	12 Bytes	Mod 30 core bytes X'80'-X'8B'
	75 Bytes	Mod 40 core bytes X'80'-X'CA'
		Mod 50 core bytes X'80'-X'CA'
Unused	63 Bytes	(Model 30 only)
End of Record	1 Byte	X'FF'

RECORD CAPACITY - 80 Byte Total

Figure 47. Machine Check Recording and Recovery (MCRR) Record Formats (Part 3 of 4)

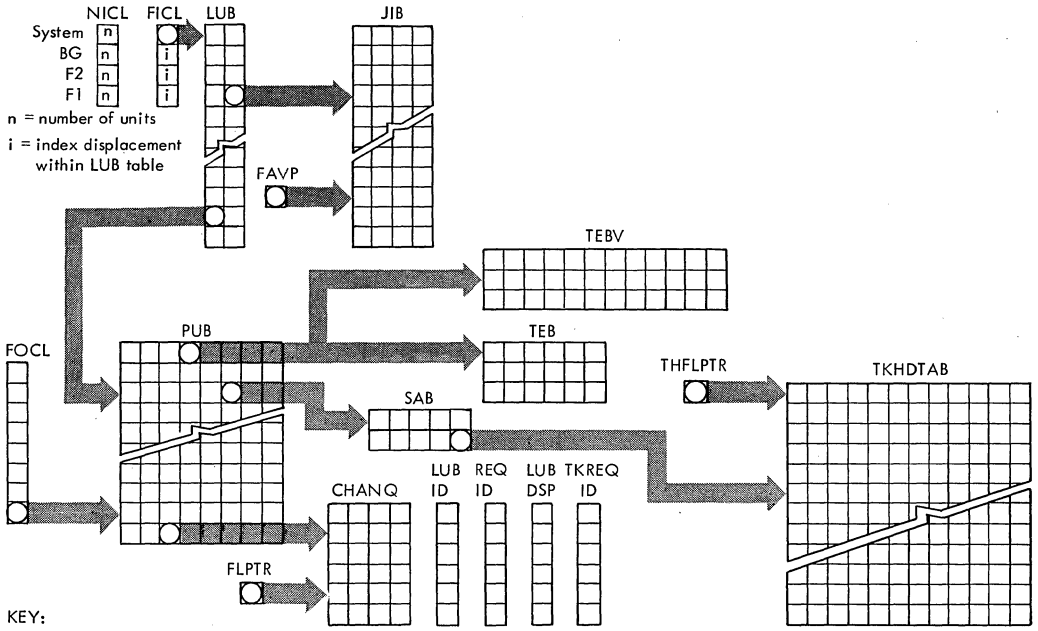
Record 4: Models 40 & 50 only

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'04' CPU Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'40' or X'50'
Logout	75 Bytes	Mod 40 core bytes X'CB'-X'115'
		Mod 50 core bytes X'CB'-X'115'
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Byte Total	

Record 5: Models 40 & 50 only

ENTRY	SIZE	CONTENT/DESCRIPTION
Record ID	1 Byte	X'04' CPU Record ID
Record Number	2 Bytes	X'nnNN' n of N records
Model Number	1 Byte	X'40' or X'50'
Logout	46 Bytes	Mod 40 core bytes X'116'-X'143'
	14 Bytes	Mod 50 core bytes X'116'-X'123'
Parities	12 Bytes	Registers parities (Mod 50 only)
Unused	29 Bytes	Mod 40
	49 Bytes	Mod 50
End of Record	1 Byte	X'FF'
	RECORD CAPACITY - 80 Byte Total	

Figure 47. Machine Check Recording and Recovery (MCRR) Record Formats (Part 4 of 4)



KEY:

NICL (Number in Class) : The first byte contains the number of system class units. The second, third, and fourth bytes contain the number of programmer class units (BG, F2, F1) (Figure 49).

FICL (First in Class) : The first byte points to the first system class unit in the LUB table. (Always the first LUB table entry.) The second byte points to the first programmer class unit in the LUB table BG area. The third points to the first programmer class unit in the LUB table F2 area. The fourth points to the first programmer class unit in the LUB table F1 area (Figure 49).

LUB (Logical Unit Block) Table : The first byte points to a PUB table entry (if the logical unit is assigned) or contains X'FF'. The second byte points to a JIB table entry or contains X'FF' (Figure 49).

PUB (Physical Unit Block) Table : The first two bytes contain the channel and unit address of the physical device; the third a CHANQ pointer; the fourth a TEB pointer; the fifth device type codes; the sixth a device characteristic code or a SAB pointer; the seventh the channel scheduler flag; and the eighth has the job control flag (See Figure 51).

FOCL (First on Channel List) : The first byte points to the first PUB (highest priority) on channel zero. The next byte points to the first PUB (highest priority) on channel one, etc. A hexadecimal FF indicates the associated channel is not supported.

TEB (Tape Error Block by Unit) : One TEB is built for each tape unit at supervisor generation time if tape error statistics by unit are required (Figure 52).

TEBV (Tape Error Block by Volume) : One TEBV is built for each tape unit at supervisor generation time if tape error statistics by volume are required (Figure 53).

FAVP (First Available Pointer) : A one-byte pointer to the next available JIB entry.

JIB (Job Information Block) : The first two bytes contain extent or LUB information. The third contains ownership and JIB flags. The fourth contains JIB chaining information (Figure 50).

CHANQ (Channel Queue) Table : The first byte contains the chain field (a pointer to the next in queue). The last three bytes contain the CCB address (Figure 54).

LUBID (LUB Identification) : A one-byte pointer to the LUB making the I/O request.

REQID (Requestor Identification) : A one-byte pointer to the program containing the CCB (Figure 54).

LUBDSP (LUB Displacement) : A one-byte value equal to the absolute LUB number (CCB byte 7).

FLPTR (Free List Pointer) : A one-byte pointer to the next free entry in the channel queue (Figure 54).

SAB (Seek Address Block) : A four-byte (BCCH) address that is the current disk address of the device plus a fifth byte that contains a Track Hold Table pointer of X'FF'. If the Track Hold function is not supported, the fifth byte contains X'00'.

TKHDTAB (Track Hold Table) : The first byte contains a pointer to the next available entry (or X'FF'); bytes 2 - 4 have CCB address of the requesting task; bytes 5 - 10 have a disk address (BBCCHH) of track being held; byte 11 has key of owning track; and byte 12 has two uses: bit 0=1 means a task is waiting for the track, and bits 4 - 7 count the number of holds on the track. (Figure 55). Note: The number of holds is one more than the value of bits 4 - 7 of the last byte.

THFLPTR (Track Hold Free List Pointer) : A one-byte pointer to the next free entry in the Track Hold Table.

TKREQID (Track Requestor Identification) : A one-byte pointer to the PIB of the task requesting I/O.

Figure 48. I/O Table Interrelationship

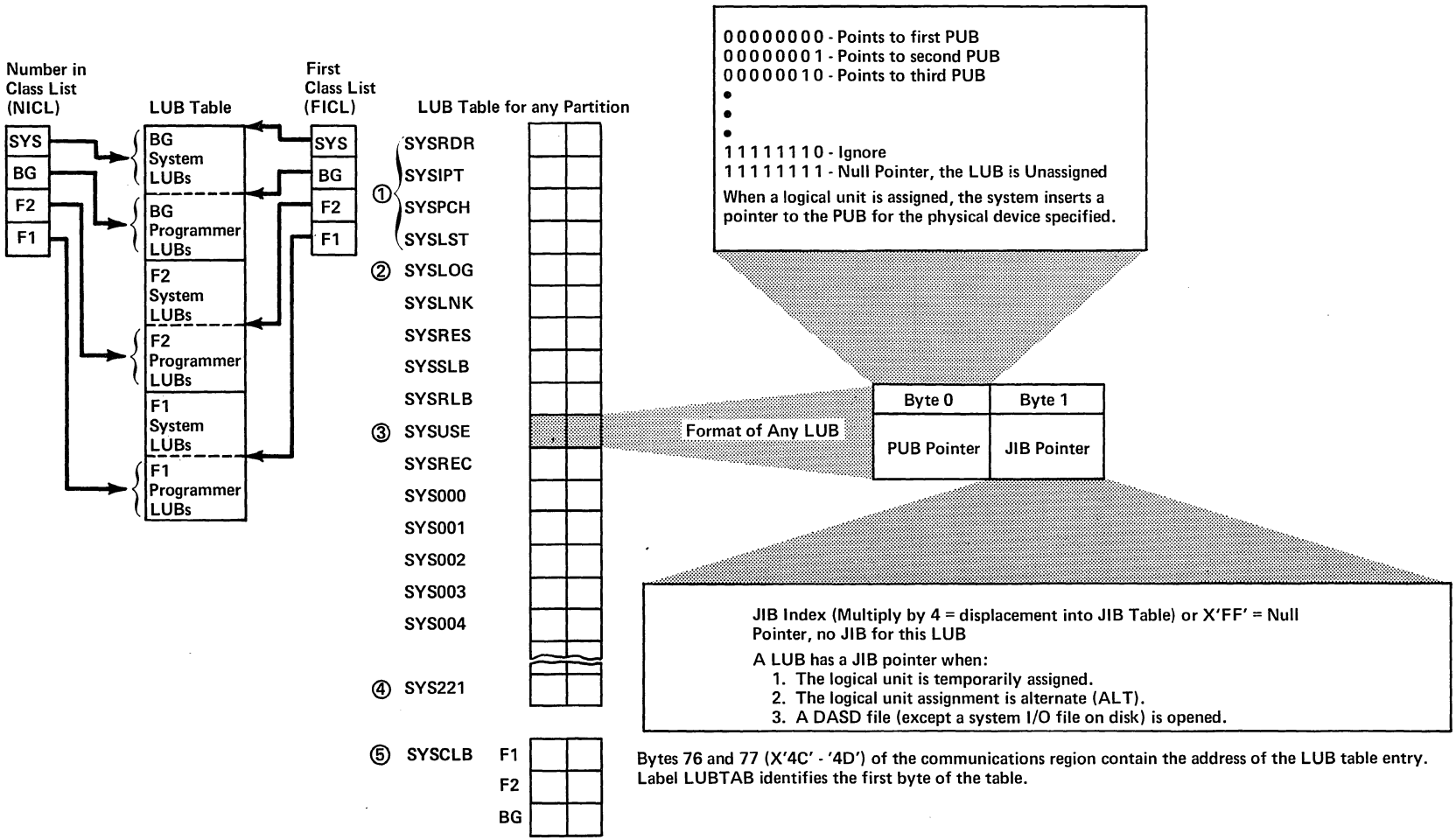


Figure 49. Logical Unit Block (LUB) Table

① When in Single Program Initiation mode (Foreground 1 or 2): Must be unit record device and can be referenced by the program.

② When in Single Program Initiation mode (Foreground 1 or 2): Can be referenced by the program.

③ SYSUSE may be called SYSCTL in error recovery messages.

④ The maximum number of programmer logical units in the system is 222 if MPS = BJF, or 244 if MPS = YES or NO.

⑤ The SYSCLB (Private Core Image Library) LUB entry functions the same as other LUB entries, but is not part of the LUB Table. To locate the SYSCLB LUB in supervisor, perform the following steps:

1. Divide the PIK by 8.
2. Subtract the result in step 1 from the address of the PIB extension block.
3. If option AP = YES, the result of step 2 is the location of SYSCLB LUB. If option AP = NO, add 16 (for the all-bound PIBX) to the result of step 2.

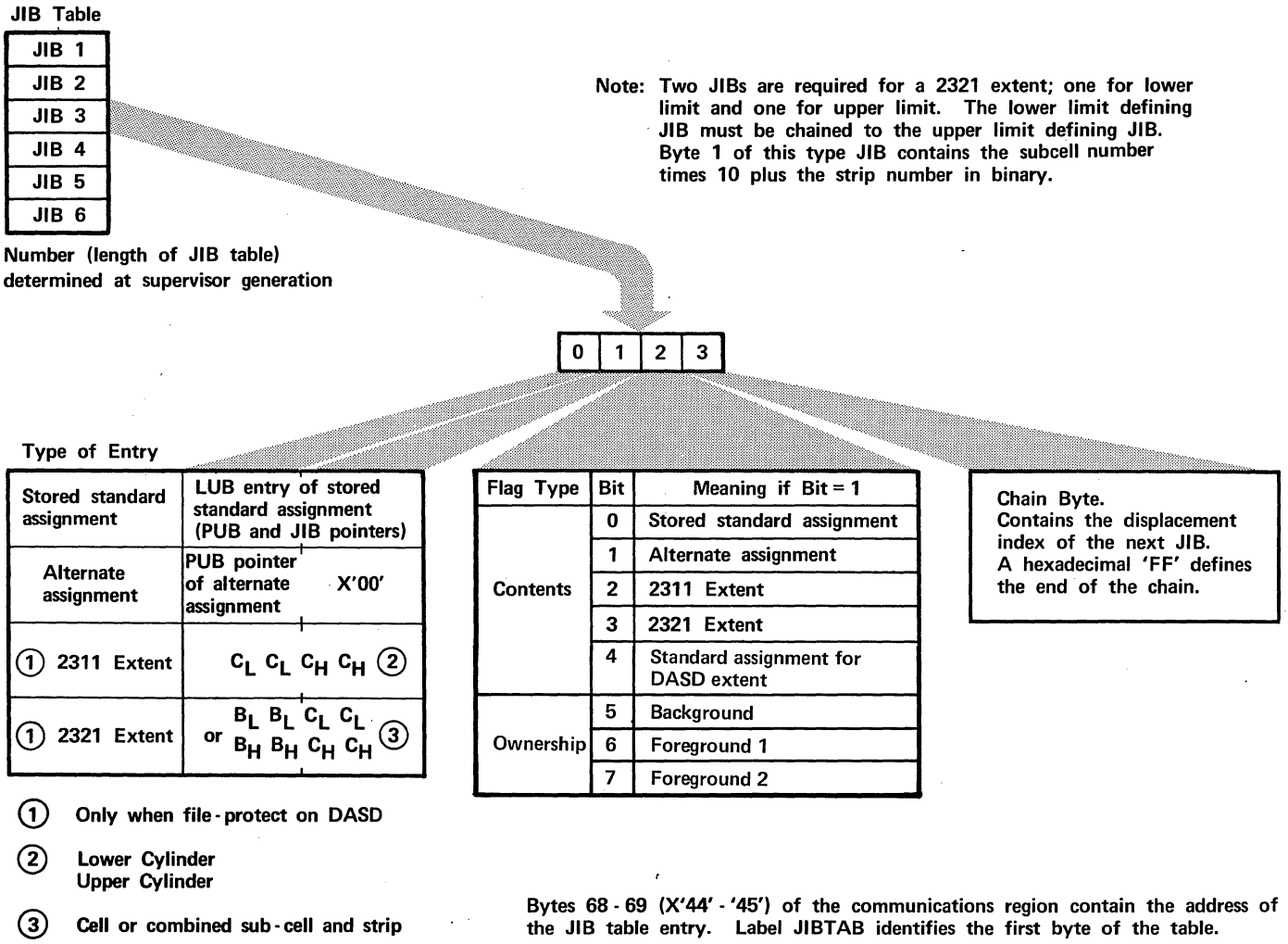
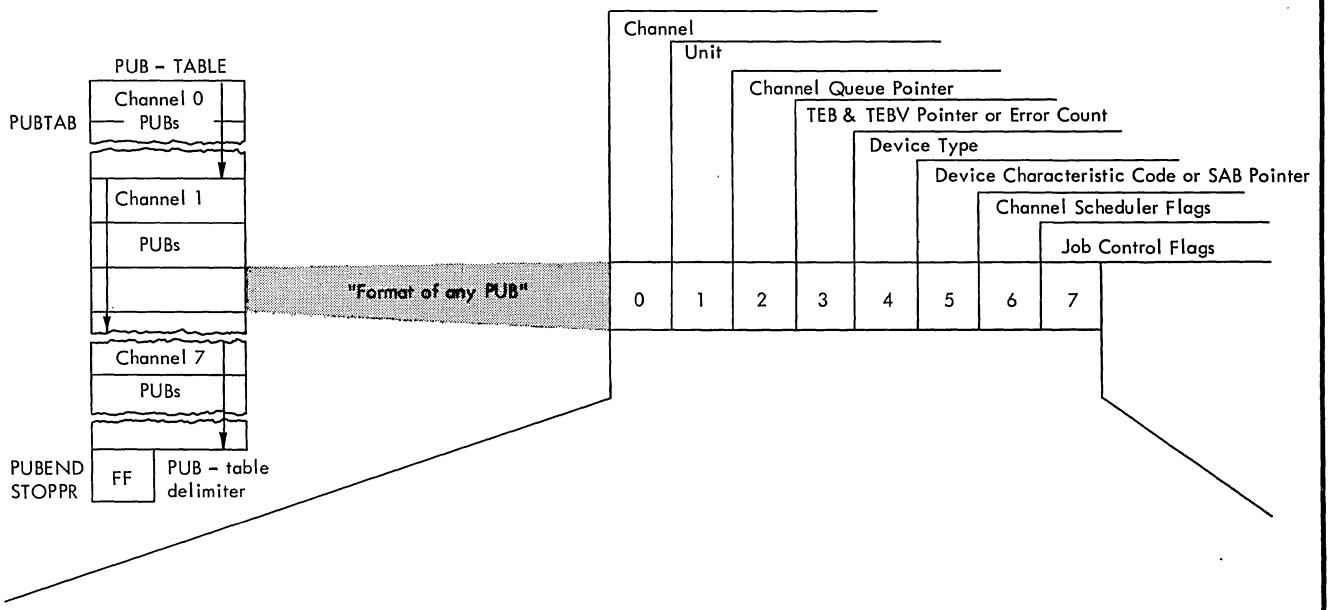


Figure 50. Job Information Block (JIB) Table



BYTE 0 - Channel number. (Hex 0-7, FF=NULL)

BYTE 1 - I/O device unit number. (HEX 1F= 1052, HEX 80= magnetic tape unit 0 ...)

BYTE 2 - HEX 0, 1, 2, ... points to the first channel queue entry for this device.

BYTE 3 - If device is a magnetic tape unit* and TEBs and/or TEBVs are specified, this byte is a TEB/TEBV pointer (HEX 1, 2, 3 ...)

If device is a magnetic tape unit* but neither TEBs nor TEBVs are specified, this byte is an error counter.

If device is not a magnetic tape unit*, this byte is an error counter.

BYTE 4 - See Figure 61 for device type codes.

BYTE 5 - SS of the MODE=parameter in the DVCGEN macro for tape unit. (See Figure 62.)

For DASD with seek separation, this byte is used as the SAB pointer. With track hold but not seek separation supported, this byte contains a pointer to the Track Hold Table entry or X'FF' (with both SKSEP and TRKHLD specified, the track hold pointer is found in the SAB entry).

For MICR type devices, this byte indicates the external interrupt line is in use.

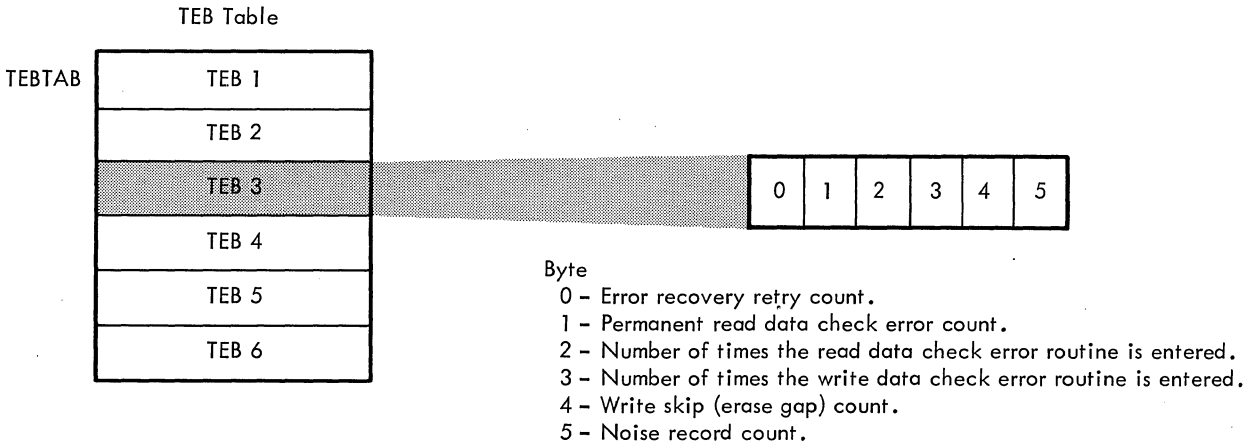
BYTE 6 -
Bit 0: 1 = Device busy
1: 1 = Switchable device
2: 1 = EOJ for SYSRDR or SYSIPT
3: 1 = I/O error queued for recovery
4: 1 = Operator intervention required
5: 1 = Device end posting required
6: 1 = Burst device on MPX
7: 1 = 7-track tape unit

BYTE 7 -
Bit 0-4: standard MODE assignment for 7-track tape (all ones if not tape, all zeros if device is down).
5: device is assigned to a background job
6: device is assigned to a foreground 1 job
7: device is assigned to a foreground 2 job

NOTE: A null is generated for each device to be supported by the supervisor. Standard physical unit assignments are made to the PUB table at supervisor generation time. PUBs are ordered by channel and priority within a channel.

Bytes 64 and 65 (X'40' - '41') of the communications region contain the address of the PUB table entry. Label PUNTAB identifies the first byte of the table.
*2400 series or 3420 Magnetic Tape Units or 2495 Tape Cartridge Reader (TEBs); 2400 series or 3420 Magnetic Tape Units only (TEBVs)

Figure 51. Physical Unit Block (PUB) Table



One TEB is generated for each 2400 series or 3420 magnetic tape or 2495 Tape Cartridge Reader unit if the FOPT macro contains the TEB = n parameter. Job control resets each TEB at normal or abnormal End-of-Job. An unused TEB contains HEX'FF0000000000'. A TEB is referenced from byte 3 of a magnetic tape unit PUB.

Bytes 70 and 71 (X'46' - '47') of the communications region contain the address of the TEB table entry. Label TEBTAB identifies the first byte of the table.

Figure 52. Tape Error Block (TEB) Table

Decimal Displacement	Label	Byte Length	Description
			(TEBV Status Block portion of TEBV Table, see Note 1)
0	TEBLEN	1	Length of TEBV Error Block (for each Error Block generated)
1	TSBLEN	1	Length of TEBV Status Block (4, 6, or 22 bytes, see Note 1)
2	EVARTH	1	EVA Read Error Threshold
3	EVAWTH	1	EVA Write Error Threshold
...	.....	...	... ...
4	TEBSTAT	1	DASD ESTV File Status
5	TEBUDC	1	ESTVFLE Label Update Counter
...	.....	...	... ...
6	TEBDEV	1	Data Set Device Code
7	UPXTNT	4	Disk Address of Upper Extent of Data Set (cchh)
11	TEBRPT	1	Number of Records per Track
12	NXTESR	5	Disk Address of Next Available Space for Data Record (cchhr)
17	ESTVLABL	5	Pointer to ESTVFLE Label in VTOC (cchhr)
...	.....	...	... ...
			(TEBV Error Block portion of TEBV Table, see Note 2)
22	TEBV	1	Status Indicator (giving status of posting and writing error conditions)
23		1	Usage Indicator (X'00'=TEBV Error Block in use, X'FF'=Error Block generated but not serving any tape unit)
24		1	Retry Counter
25		1	Permanent Read Errors
26		1	Temporary Read Errors
27		1	Temporary Write Errors
28		1	Erase Gaps
29		1	Noise Blocks
30		1	Permanent Write Errors
31		1	Cleaner Actions
32		2	Number of Start I/Os
34		6	Volume Serial Number (volume ID)
...	.....	...	... ...
40 (repeat bytes 22-39 for each TEBV Error Block)			

Figure 53. TEBV Table Showing Status Block and Error Blocks (Part 1 of 2)

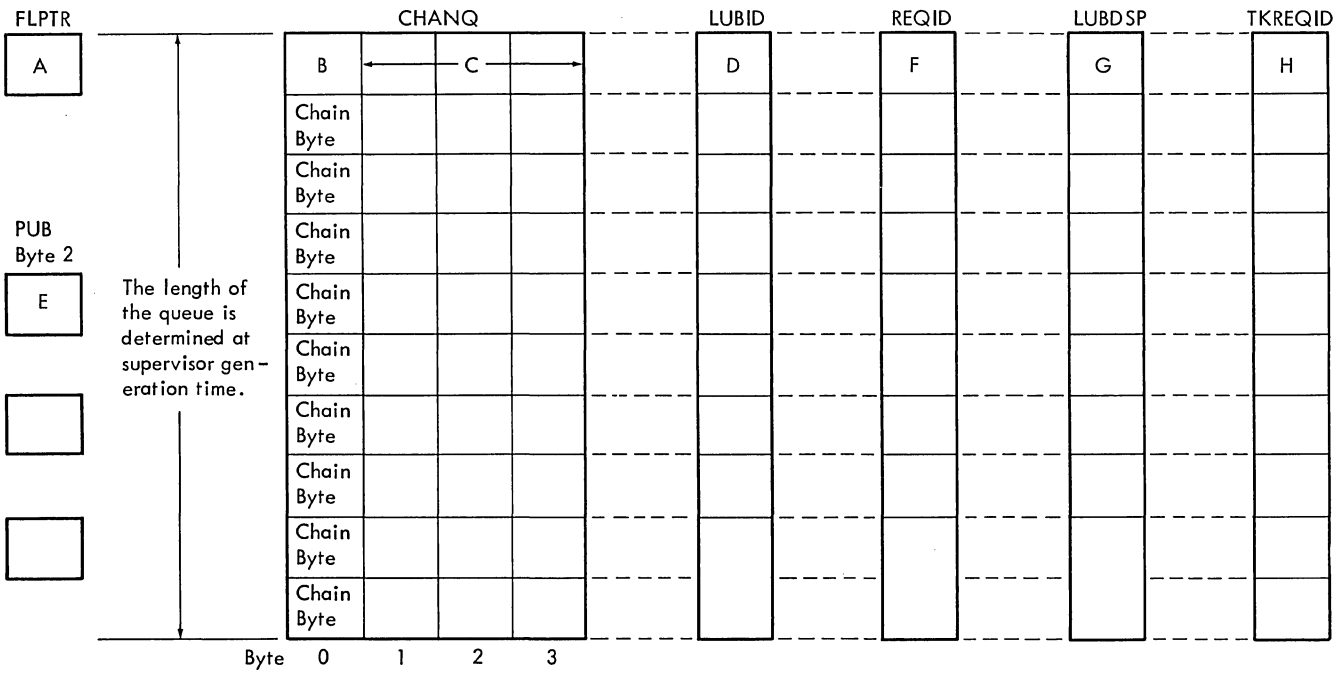
Note 1: The TEBV (Tape Error Block by Volume) Table is composed of one Status Block and (n) Error Blocks, and is addressed symbolically by label TEBVTAB.

Supervisor generation options in the FOPT macro determine the size of the TEBV Status Block at generation time:

- When EVA is chosen without ESTV, the TEBV Status Block is four bytes long (bytes 0-3), followed by TEBV Error Blocks, so that bytes 4-21 are omitted.
- When ESTV output is to SYSLOG, the TEBV Status Block is six bytes long (bytes 0-5), followed by TEBV Error Blocks, so that bytes 6-21 are omitted.
- When ESTV output is to DASD, the TEBV Status Block is 22 bytes long (bytes 0-21, such as shown in this Figure), followed by TEBV Error Blocks.

Note 2: The number of TEBV Error Blocks generated corresponds to the (n) parameter of the FOPT macro for TEB, TEBV, or EVA options. A TEBV Error Block always contains 18 bytes, as shown in bytes 22-39 of this Figure. Therefore, the TEBV Table is composed of one TEBV Status Block (with its byte length dependent on supervisor generation options, as described in Note 1), followed by (n) number of 18-byte TEBV Error Blocks.

Figure 53. TEBV Table Showing Status Block and Error Blocks (Part 2 of 2)



KEY

A — The free list pointer contains a displacement index to a free list entry within the channel queue. The free list is a group of entries that function in essentially the same manner as a device queue. When the free list pointer contains a hexadecimal FF, it indicates that no more free list entries are available.

B — The first byte of the channel queue entry (chain byte) contains a pointer (displacement index) to the next channel queue entry for that device. A hexadecimal FF indicates the last channel queue entry for that device. New requests on a given device are queued at the end of a given device queue.

C — CCB address for the specified device.

D — A pointer (displacement index) to the entire LUB table identifying the logical unit making the I/O request. This is doubled to get the actual displacement into the full LUB table.

E — Contains a pointer (displacement index) to the first channel queue entry for a specific device (Figure 51).

F — Contains a code identifying the program making the I/O request. The one-byte entry is called a RID (Requestor Identification). The RID indicates what program the CCB belongs to. The RID is in the form X'nk'.

n = user-storage protection key (supervisor = 0, BG = 1, F2 = 2, F1 = 3).
k = 0 for all user requests and all supervisor CCBs, where n = 0.
k = 1 for supervisor CCBs to SYSLOG that bypass ID prefix.
k = 2 for a fetch CCB.
nk = FF for any unused channel queue entries.

G — Contains X'FF' if the LUB is nonsystem class, or contains the displacement index within the partition LUB if it is a system class LUB.

H — Contains X'FF', or the displacement into the PIB table for the PIB of the task requesting I/O.

Bytes 108-109 (X'6C'-'6D') of the communications region contain the address of the LUBID Table. Label LUBIDTAB identifies the first byte of the table. The addresses of the other tables are not at fixed locations. They can be found in the program listing cross-reference by using the labels CHANQ, REQIDTAB, LUBDSPTB, and TSKIDTAB.

Figure 54. CHANQ, LUBID, REQID, LUBDSP, and TKREQID Tables

X'FF' or Pointer	CCB Address	Address of Held Track (BBCCHH)	Key of Task	Flag and Counter
X	XXX	XXXXXX	X	X

Byte 0 1 4 10 11

Byte	Explanation
0	X'FF' or pointer to next available entry in the table. This is also placed in the PUB table, byte 5.
1-3	Address of CCB associated with the task requesting the hold.
4-9	Disk address of the track being held (in the form BBCCHH).
10	Key of the task owning the track.
11	Bit 0 on indicates a task is waiting for this track. 1-3 Unused 4-7 counter of number of holds on the track.

Figure 55. Track Hold (TKHDTAB) Table

COMREG*

Displacement hexadecimal	0	8	0A	0C	17	18	20	24	28	2C
Displacement decimal	0	8	10	12	23	24	32	36	40	44
	Date	Address of PPBEG	Address of EOSSP	Problem Program Use	UPSI Byte	Job Name	Highest Storage Address of the Partition	End Address of Last Phase Fetched or Loaded	Address of Uppermost Byte of Phase with Highest Ending Address	Label Area Length
	XXXXXXXX	XX	XX	XXXXXXXXXXX	X	XXXXXXXX	XXXX	XXXX	XXXX	XX

Displacement hexadecimal	2E	30	34	35	36	37	38	39	3A	3B	3C	3E
Displacement decimal	46	48	52	53	54	55	56	57	58	59	60	62
	PIK (PID)	End of Storage Address	Machine Confg. Byte	System Confg. Byte	Standard Language Translator I/O Options	Dump, Log and ASCII Options	Job Control Byte	Linkage Control Byte	Language Translator Control Byte	Job Duration Indicator Byte	Disk Address of Label Cylinder	Address of FOCL
	XX	XXXX	X	X	X	X	X	X	X	X	XX	XX

Job Control Switches

Displacement hexadecimal	40	42	44	46	48	4A	4C	4E	4F	58	5A	5C
Displacement decimal	64	66	68	70	72	74	76	78	79	88	90	92
	Address of PUB	Address of FAVP	Address of JIB	Address of TEB	Address of FICL	Address of NICL	Address of LUB	Line Count for SYSLST	System Date	LIOCS Comm. Bytes	Address of 1st Part of PIB Table	ID Number of Last Checkpoint
	XX	XX	XX	XX	XX	XX	XX	X	XXXXXXXXX	XX	XX	XX

Displacement hexadecimal	5E	60	62	64	66	68	6A	6C	6E
Displacement decimal	94	96	98	100	102	104	106	108	110
	Length of LUB ID Queue = No. of Channel Queue Entries	Address of Disk Information Block (DIB)	Address of Error Recovery Block	Address of PC Option Table less 8 bytes	Address of IT Option Table less 8 bytes	Address of OC Option Table less 8 bytes	Key of Program with Timer Support	Address of the LUBID Queue	Logical Transient Key
	XX	XX	XX	XX	XX	XX	XX	XX	XX

Displacement hexadecimal	70	7C	7E	80	84	86	87	88
Displacement decimal	112	124	126	128	132	134	135	136
	Supervisor Constants	Address of 2nd Part of PIB Table	Address of MICR DTF Table (PDTABB)	Address of QTAM Vector Table	Address of BG Comm. Region	Option Indicator	System Configuration Byte 2	Pointer to Comm. Region Extension
	XXXXXXXXXXXX	XX	XX	XXXX	XX	X	X	XXXX

* The address of the communications region is in fixed location X'14' - X'17'.

Displacement values illustrated can be used to access the listing and/or the key that follows the figure. The key offers more detailed information about each area when necessary.

Figure 56. Supervisor Communications Region (Part 1 of 5)

Key to Communications Region Displacements:

0 MM/DD/YY or DD/MM/YY obtained from the job control date statement. Format controlled by COMREG + 53 (System Configuration Byte, date convention bit 0).

8 Address of the problem program area.

10 Address of the beginning of the problem program area. Y (EOSSP)=Y (PPBEG) if the storage protection option has not been selected. Y (EOSSP) equals the first main storage location with a storage protection key of 1, if storage protection is supported.

12 User area. If seek separation option is specified, bytes 12 and 13 are used at IPL time for the address of the seek address block.

23 User program switch indicator.

24 Job name set by the job control program from information found in the job statement.

32 Address of the uppermost byte of the problem program area as determined by the IPL program (Clear storage routine determines the address, ENDRD routine of $$A$IPL2 stores it.), or the address of the uppermost byte of the partition as determined during processing of the ALLOC statement.

36 Address of the uppermost byte of the last phase of the problem program fetched or loaded. The initial value (as shown) is overlaid by the first fetch or load to the problem program area.

40 Highest ending main-storage address of the phase among all the phases having the same first four characters as the operand on the EXEC statement. For the background partition only, job control builds a phase directory of these phases. The address value may be incorrect if the program loads any of these phases above its link-edited origin address. If the EXEC statement has no operand, job control places in this location the ending address of the program just link-edited.

44 Length of the problem program label area.

46 Program Interrupt Key - PIK (if asynchronous processing is not supported): Value is equal to the displacement from the start of the PIB table to the PIB for the task.

OR

Partition Identifier - PID (if asynchronous processing is supported): Value is hex 10, 20, or 30 to identify the partition in which a maintask or a subtask is running. (See the communications region extension, displacement 18, for the PIK in an asynchronous processing supervisor.)

First byte - always zero.
Second byte - contains the key of the program that was last enabled for interrupts, or the partition identifier in an AP supervisor.

Task	PIK (PID) Value
*All Bound	X'00'
BG	X'10'
*F2	X'20'
*F1	X'30'
Attn Rtn	X'40'
Quiesce I/O	X'50'
Supervisor	X'60'

*These tasks do not exist in a non-MPS supervisor.

48 Logical end of main storage address.

Figure 56. Supervisor Communications Region (Part 2 of 5)

Key to Communications Region Displacements:

52 Machine Configuration Byte (Values set at supervisor generation time.)

Bit 0: 1 = Storage protect feature
0 = No storage protect feature
1: 1 = Decimal feature
0 = No decimal feature
2: 1 = Floating-point feature
0 = No floating-point feature
3: 1 = Physical transient overlap option
0 = No physical transient overlap option
4: 1 = Timer feature
0 = No timer feature
5: 1 = Channel switching device
0 = No channel switching device
6: 1 = Burst mode on multiplex channel support
0 = No burst mode on multiplex channel support
7: Reserved

53 System Configuration Byte

Bit 0: 1 = DDMMYY, 0 = MMDDYY (Date convention bit set at generation time by STDJC)
1: 1 = Multiprogramming environment
0 = Batch job environment
2: 1 = DASD file-protect supported
0 = No file-protect support for DASD
3: 1 = DASD SYSIN - SYSOUT
0 = No DASD SYSIN - SYSOUT
4: 1 = Teleprocessing
0 = No teleprocessing
5: 1 = Batch job in foreground
0 = No BJF
6: 1 = Asynchronous processing
0 = No AP
7: 1 = Track Hold
0 = No Track Hold

54 This byte contains the standard language translator I/O options (set by the STDJC macro).

Bit 0:	DECK option	1 = yes, output object modules on SYSPCH
1:	LIST option	1 = yes, output source module listings and diagnostics on SYSLST
2:	LISTX option	1 = yes, output hexadecimal object module listings on SYSLST (compilers only)
3:	SYM option	1 = yes, output symbol tables on SYSLST/SYSPCH
4:	XREF option	1 = yes, output symbolic cross reference list on SYSLST
5:	ERRS option	1 = yes, output diagnostics on SYSLST (compilers only)
6:	CHARSET option	1 = 48, input on SYSIPT is 48 or 60 character set
7:	Reserved	

55 This byte contains the standard supervisor options for abnormal EOJ and control statement display, and the indicator for the presence of the ASCII-EBCDIC and EBCDIC-ASCII translation tables.

Bit 0:	Always on	
1:	DUMP option	1 = yes, dump registers and storage on SYSLST
2:	Reserved	
3:	LOG option	1 = yes, list all control statements on SYSLST
4-6:	Reserved	
7:	ASCII option	1 = yes, ASCII supported

Figure 56. Supervisor Communications Region (Part 3 of 5)

Key to Communications Region Displacement:

56 Job control byte

Bit 0: 1 = Job Accounting Interface (JA) not supported
0 = Job Accounting Interface (JA) is supported
1: 1 = Return to caller on LIOCS disk open failure
0 = Do not return to caller on LIOCS disk open failure
2: 1 = Job control input from SYSRDR
0 = Job control input from SYSLOG
3: 1 = Job control output on SYSLOG
0 = Job control output not on SYSLOG
4: 1 = Cancel job
0 = Do not cancel job
5: 1 = Pause at end-of-job step
0 = No pause at end-of-job step
6: 1 = SYSLOG is not a 1052
0 = SYSLOG is a 1052
7: 1 = SYSLOG is assigned to the same device as SYSLST
0 = SYSLOG is not assigned to the same device as SYSLST

57 Linkage control byte

Bit 0: 1 = SYSLNK open for output
0 = SYSLNK not open for output
1: 1 = $ or FG program phase deleted, renamed, or cataloged (flag bit for $MAINEOJ)
2: 1 = Allow EXEC
0 = Suppress EXEC
3: 1 = Catalog linkage editor output
0 = Do not catalog linkage editor output
4: 1 = Supervisor has been updated
0 = Supervisor has not been updated
5: 1 = Executing in AUTOTEST mode
0 = Not executing in AUTOTEST mode
6: 1 = Reallocate or condense in progress
7: 1 = Fetch $MAINEOJ at end of job to update system directory
0 = Do not fetch $MAINEOJ at end of job for update

58 Language processor control byte. This is a set of switches used to specify nonstandard language translator options. The switches within the byte are controlled by job control OPTION statements and when set to 1, override standard options. The format of this byte is identical to the stnadard option byte (displacement 54) with one exception: Bit 7 in this byte is used to indicate to LIOCS that the rewind and unload option has been specified.

59 Job duration indicator byte

Bit 0: 1 = Within a job condition
0 = Outside a job condition
1: 1 = Dump on an abnormal end-of-job condition
0 = No dump on abnormal EOJ
2: 1 = Pause at EOJ step
0 = No pause at EOJ
} Set by Attention Routine for Job Control
3: 1 = Job control output on SYSLST
0 = Output not on SYSLST
4: 1 = Job is being run out of sequence with a temporary assignment for SYSRDR
0 = Conditions for 1 setting not met
5: 1 = PCIL is being condensed
0 = PCIL is not being condensed
6: Reserved
7: 1 = Batch command just issued
0 = Condition for 1 setting did not occur

Figure 56. Supervisor Communications Region (Part 4 of 5)

Key to Communications Region Displacements:

60 Binary disk address of the volume label area (label cylinder).

62 → 76 As illustrated (Figures for information blocks, I/O tables, and pointers begin at Figure 21 which refers to more detailed Figures).

78 Set to the value nn specified in the LINES = nn parameter of the STDJC macro.

79 The format of the system date contained within this field is determined by the IPL program from information supplied in the date convention byte (displacement 53). Bytes 85-87 contain the day count.

88 Bytes reserved for use by LIOCS. Transient dump programs insert a key to indicate to the LIOCS end-of-volume routine, $$BCMT07, that it was called by a B-transient.

90 Address of the first part of the program information block (PIB) table. (See Figures 18 and 19).

92 ID number of the last checkpoint. Temporary indicator of file protected DASD. Used at IPL time, when DASDFP is specified.

94 Length of the LUBID queue (in bytes). This equals the number of channel queue entries. It can also be used to access the REQID, LUBDSP, and TKREQID queues: (See Figure 17 - GY24-5151).

96 Address of disk I/O position data. This is the starting address of the disk information block (DIB) table (See Figure 17).

98 Address of the beginning of the error recovery block. The error recovery block contains addresses of error recovery exits, error recovery queue information that can be used by physical transients routines, and defines storage for the error queue entries (See Figure 43 - GY24-5151).

100 → 104 Option Tables. (See Figure 13 - GY24-5151).

106 Key of the program (BG, F2, or F1) that has timer support.

108 Address of LUBID queue. (See Figure 17 - GY24-5151).

110 Logical Transient Key (LTK) contains the same value as the PIK (PID) (Displacement 46) when the logical transient is requested. When the transient area is not in use, LTK is equal to zero. The SVC 2 routine sets the LTK. The SVC 11 routine resets the LTK.

112 Supervisor constants:

DOLLARBO	(4 bytes) = C'$$BO'
SSKADR	(5 bytes) = XL5'0'
LTAREA	(3 bytes) = Adcon of LTSVPT, logical transient save pointer

124 Address of second part of program information block (PIB) table (See Figure 20).

126 Address of PDTABB, table of DTF addresses for MICR support.

128 Address of QTAM vector table (IJLQTTAD).

132 Address of background communications region.

134 Option Indicator Byte

Bit 0: 1 = MCRR indicated for OBR writer
0 = No MCRR indicated for OBR writer
1: 1 = EU interface active
0 = EU interface not active
2: 1 = TP request
0 = No TP request
3: 1 = Supervisor support for only 9-track tape
0 = Supervisor does not support 9-track tape exclusively
4: Reserved
5: 1 = RETAIN/370 support generated
0 = RETAIN/370 support not generated
6-7: Reserved

135 System Configuration Byte 2

Bit 0: 1 = PCIL supported
0 = PCIL not supported
1-7: Reserved

136 Pointer to communications region extension (See Figure 11).

Figure 56. Supervisor Communications Region (Part 5 of 5)

BGXTNSN (See Note)

0 (Hexadecimal Displacement) 0 (Decimal Displacement)	4 4	8 8	0C 12	10 16	12 18	14 20	18 24	1C 28	20 32
CE Table Address	Track Hold Table Address (THTABAD)	Difference Between 1st and 2nd Part of PIB Table (PIBDIFF)	AB Termination Table Address - 8 (ABPTR)	ID of Task Owning LTA (LID)	ID of Task Running (PIK)	Task Requester ID Table Address (TKIDPTR)	Address Used by QTAM (MVCFLD	SDR Table Address (SDRTABLE)	TEBV Table Address (TEBVTAB)
XXXX	XXXX	XXXX	XXXX	XX	XX	XXXX	XXXX	XXXX	XXXX

24 (Hexadecimal Displacement) 36 (Decimal Displacement)	28 40	2C 44	30 48	34 52	38 56	3C 60
OLTEP Linkage Address	RMS Linkage Address (RASLINK)	ASCII-EBCDIC Translation Table Address	(Reserved)	JAI Common Table Address (ACCTCOMN)	JAI Partition Table Address (ACCTxx)	&SYSPARM Field Address
XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Key to displacements:

0 CE Table Address.

4 Track Hold Table Address (THTABAD).

8 Difference between addresses of first part of PIB table and second part of PIB table (PIBDIFF).

12 Abnormal Termination Table Address (minus 8) (ABPTR).

16 Identification (LID) of the task owning the Logical Transient Area. Contains same value as PIK (displacement 18) when LTA is in use. Contains zero when LTA is not in used.

18 Program Interrupt Key (PIK) if asynchronous processing is supported. Value is equal to the displacement of the start of the PIB table to the PIB of the main task or subtask being selected (running).
First byte - zero
Second byte - contains the displacement into the PIB table for a maintask or a subtask.
Maintask - PIK value is hex 10, 20, or 30.
Subtask - PIK value is hex 70, 80, 90, . . . F0.

20 Task Requester ID Table Address (TKIDPTR).

24 MVCFLD address used by QTAM.

28 Statistical Data Recorder Table Address (SDRTABLE).

32 Tape Error Blocks by Volume Table Address (TEBVTAB).

36 Pointer to OLTEP Linkage Addresses.

40 RMS Linkage Area Address (RASLINK).

44 ASCII - EBCDIC Translation Table Address.

48 (Reserved).

52 JAI Common Table Address (ACCTCOMN).

56 JAI Partition Table Address (ACCTxx; where xx = BG, F2, or F1).

60 Address of &SYSPARM Field.

Note: If communications regions are generated for the foreground partitions, the labels in those extensions will be F2XTNSN and F1XTNSN. The extensions, wherever used, are generated by the COMMNEX macro. Following the background extension (and immediately preceding the MCRR Linkage Table) is a six-byte area. The first four bytes are the address of the background save area (BGSAV), and the last two bytes are the value 4,096, used to restore base registers.

Figure 57. Communications Region Extensions

PIB TABLE

Byte Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	= 16 Byte Length
All Bound PIB	Flag Byte See A *	Reserved	SP Prefix		Branch Instruction to the All Bound Routine							Reserved					
Problem Program PIB (Note 1)	Flag Byte See B *	Cancel Code (Fig.63)	SYSLOG ID (BG, F2, or F1)		NOP Instruction (CR)	Address of the Partition Save Area			Number of Core Blocks (Note 2)	Address of the Origin of the Partition			PIB Assign Flag See D *	User LUB Index	Number of Program LUBs	Flag Byte See C *	
Attention PIB	Flag Byte See E *	Cancel Code (Fig.63)	SYSLOG ID (AR)		Branch Code (BC)	Active=Address of Save Area Inactive=Remainder of BC Instruction			Switch Byte See F *	Logical Transient Bucket (contains save area address)			X'07' See D *	Reserved	Address of the Logical Transient		
Quiesce PIB	Flag Byte See A *	Cancel Code (Fig.63)	C'/&'		Branch Instruction to Quiesce I/O Routine				Scratch Byte X'00'	X'00'	Channel PUB Table Index Values X'04'	X'08'	X'0C'	X'10'	X'14'	X'18'	
Supervisor PIB	Flag Byte See A *	Cancel Code (Fig.63)	SP Prefix		Branch Instruction to General Exit Routine				Address of SYSRES PUB		Length of Error Queue Entry		Constants to Clear Bytes 2-5 of CCB X'1F'	X'05'	X'00'	X'00'	
Subtask PIB for AP (Note 3)	Flag Byte See B *	Cancel Code (Fig.63)	SYSLOG ID (BG, F2, or F1)		NOP Instruction	Address of the Save Area			Number of Core Blocks (Note 2)	Address of the Origin of the Main Task			PIB Assign Flag See D *	User LUB Index	Number of LUBs	Flag Byte See C *	

Note 1: Three problem program PIBs are built in this sequence when the MPS or BJF feature is selected as a generation option: { Background PIB, Foreground 2 PIB, Foreground 1 PIB }

When a batch-only environment is established at generation time, the All Bound and Foreground PIBs are excluded from the table, and only one (BG) problem program PIB is built. However, the X'20' bytes that F2 and F1 PIBs normally occupy (between PIBBG and PIBAR) are filled with 32 bytes of DIBs data.

Note 2: Number is in multiples of 2K for F2 and F1. BG is always 10K (X'0A').

Note 3: Total of nine subtask PIBs are generated, and only when AP is specified at generation time.

* See Figure 59 for flag byte expansions A, B, C, D, E and F.

Bytes 90 and 91 (X'5A'-'5B') of the communications region contain the address of the first part of the PIB Table. Label PIBTAB identifies the first byte of the table.

Figure 58. First Part of Program Information Block (PIB) Table (See Figure 60 for Second Part)

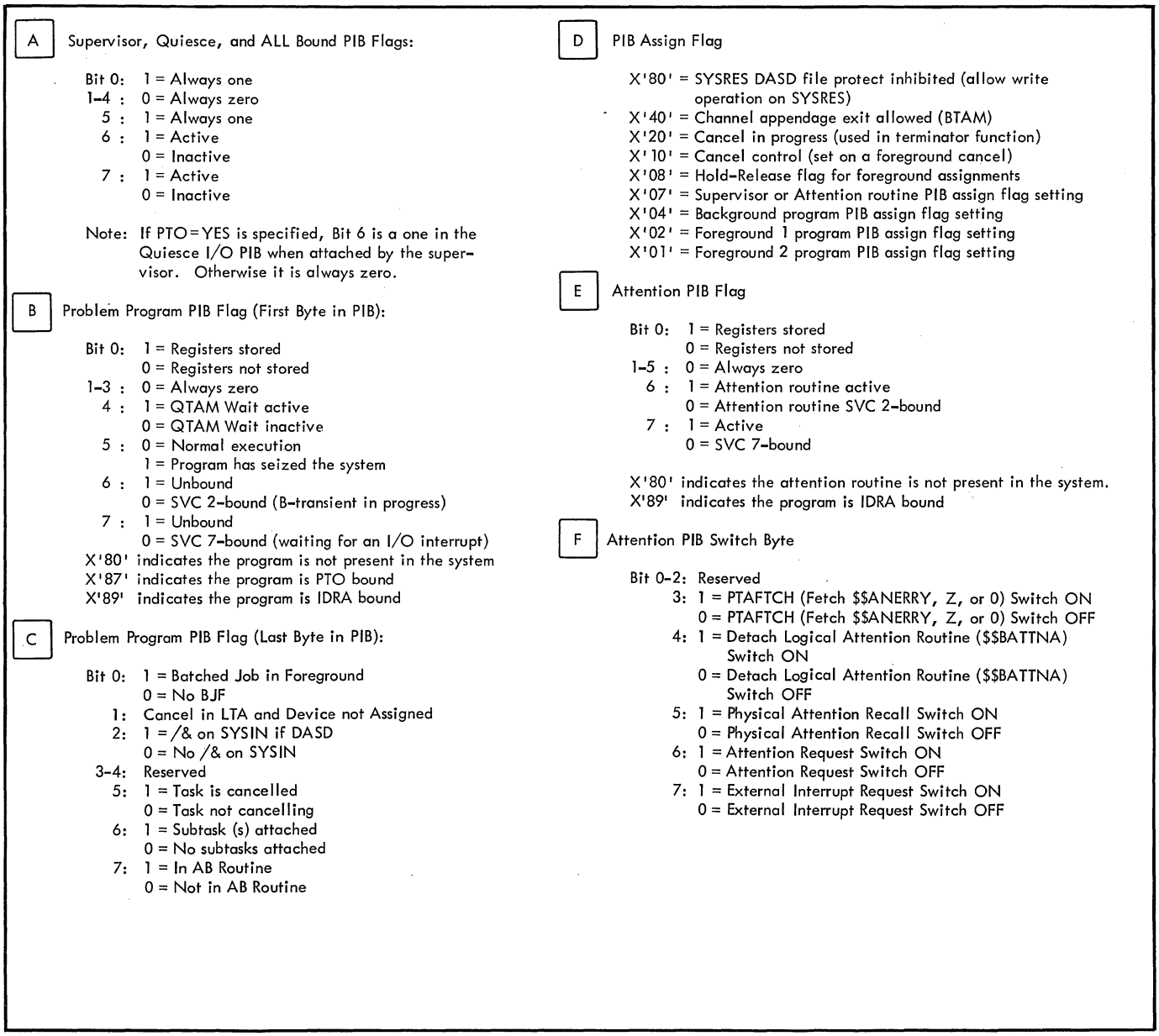


Figure 59. PIB Flag Expansions

Byte Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	= 16 Byte Length
All Bound PIB			Reserved				H'16' Priority of All Bound PIB (Lowest)			Reserved			H'0' All Bound PIB Displacement		Reserved		
Background PIB	Address of BG Comm. Region		System LUB Index		Reserved		Priority of BG PIB (Note 4)		Address of Termination ECB, if any, or F'0'				X'0010' BG PIB Displacement		Reserved		
FG2 PIB (Note 1)	Address of Area Comm. Region (Note 2)		System LUB Index		Reserved		Priority of F2 PIB (Note 4)		Address of Termination ECB, if any, or F'0'				X'0020' F2 PIB Displacement		Reserved		
FG1 PIB (Note 1)	Address of Area Comm. Region (Note 2)		System LUB Index		Reserved		Priority of F1 PIB (Note 4)		Address of Termination ECB, if any, or F'0'				X'0030' F1 PIB Displacement		Reserved		
Attention PIB	Address of BG Comm. Region		0	0	Reserved		H'3' Priority of Attention PIB		F'0'				X'0040' Attention PIB Displacement		Reserved		
Quiesce I/O PIB			Reserved				H'2' Priority of Quiesce I/O PIB		F'0'				X'0050' Quiesce PIB Displacement		Reserved		
Supervisor PIB			Reserved				H'1' Priority of Supervisor PIB (Highest)		F'0'				X'0060' Supervisor PIB Displacement		Reserved		
Subtask PIB (Note 3)	Address of Area Comm. Region		System LUB Index		Reserved		Priority of Subtask (Note 4)		ECB Address for Subtask, or F'0'				PIB Displacement of Maintask		Reserved		

Note 1. Generated only if MPS is specified.

Note 2. Always background communications region except when MPS = BJF.

Note 3. Total of nine subtasks generated, and only when AP is specified.

Note 4. Will be filled in with halfword indicating the relative priority of task in the system (range H'4' to H'15', the lower the number the higher the priority).

Bytes 124 and 125 (X'7C'-'7D') of the communications region contain the address of the second part of the PIB table. Label PIB2AD identifies the first byte of the table. The second part of PIB table comes before the first part in storage allocation. Refer to Supervisor Storage Allocation, figure 39.

Figure 60. Second Part of Program Information Block (PIB) Table

Card Code	Actual Device	Dev. Type X'nn'	Device Type
2400T9	9-track 2400 Series Magnetic Tape Units	50	Magnetic Tape Units
	9-track 3420 Magnetic Tape Units		
2400T7	7-track 2400 Series Magnetic Tape Units		
	7-track 3420 Magnetic Tape Units		
2495TC	2495 Tape Cartridge Reader	51	Tape Cartridge Reader
1442N1	1442N1 Card Read Punch	30	Card Readers - Punches
2520B1	2520B1 Card Read Punch	31	
2501	2501 Card Reader	10	Card Readers
2540R	2540 Card Reader	11	
2540P	2540 Card Punch	21	Card Punches
2520B2	2520B2 Card Punch	20	
1442N2	1442N2 Card Punch	22	
2520B3	2520B3 Card Punch	20	
1403	1403 Printer	40	Printers
1403U	1403 Printer with UCS Feature	42	
3211	3211 Printer	43	
1404	1404 Printer	40	
1443	1443 Printer	41	
1445	1445 Printer	41	
1050A	1052, 3210, or 3215 Printer-Keyboard	00	
UNSP	Unsupported Device	FF	Unsupported. No burst mode on multiplexor channel
UNSPB	Unsupported Device	FF	Unsupported with burst mode on multiplexor channel
2311	2311 Disk Storage Drive	60	DASD
2314	2314 Direct Access Storage Facility	62	
	2319 Disk Storage Facility		
2321	2321 Data Cell Drive	61	
1412**	1412 Magnetic Character Reader	75	MICR - Magnetic Ink Character Recognition Devices and Optical Reader/Sorters
1419**	1419 Magnetic Character Reader	72	
	1255 Magnetic Character Reader		
	1259 Magnetic Character Reader		
1419P**	1419 Dual Address Adapter Primary Control Unit	73	
1419S**	1419 Dual Address Adapter Secondary Control Unit	74	
2701*	2701 Data Adapter Unit	D0	Teleprocessing lines A = SAD0 command when enabling the line B = SAD1 command when enabling the line C = SAD2 command when enabling the line D = SAD3 command when enabling the line
2702 A, B, C, D		D1	
2703	2703 Transmission Control	D2	
2955	2955 Data Adapter Unit	D7	Data link for RETAIN/370
2671	2671 Paper Tape Reader	70	Paper Tape Reader
1285	1285 Optical Reader	76	Optical Readers
1287	1287 Optical Reader	77	
1288	1288 Optical Page Reader		
1017	1017 Paper Tape Reader with 2826 Control Unit Model 1	78	Paper Tape Reader
1018	1018 Paper Tape Punch with 2826 Control Unit Model 1	79	Paper Tape Punch
2260	2260 or 2265 Display Station	C0	Display Station
7770	7770 Audio Response Unit	D3	Audio Response Units
7772	7772 Audio Response Unit	D4	
1017TP	1017 Paper Tape Reader with 2826 Control Unit Model 2	D5	Paper Tape Reader
1018TP	1018 Paper Tape Punch with 2826 Control Unit Model 2	D6	Paper Tape Punch

Note: The codes used in the DVCGEN macros are the same codes used in IPL statements.

* For other teleprocessing devices, see IBM System/360, DOS BTAM and QTAM PLMs, GY30-5001 and GY30-5002.

** This device type code is also used for the 1270/1275 optical reader/sorters.

Figure 61. Device Type Codes

Density (Bytes per inch)	Parity	Convert Feature	Translate	SS Code *
200	odd	on	off	10
200	odd	off	off	30
200	odd	off	on	38
200	even	off	off	20
200	even	off	on	28
556	odd	on	off	50
556	odd	off	off	70
556	odd	off	on	78
556	even	off	off	60
556	even	off	on	68
800	odd	on	off	90
800	odd	off	off	B0
800	odd	off	on	B8
800	even	off	off	A0
800	even	off	on	A8
800	dual density nine-track			C8
1600	dual density nine-track			C0

* Refer to PUB Table (Figure 51), byte 5.

Figure 62. Density Data

Cancel Code (hex)	Message Code	Descriptive Part of Message (or Condition)	Label
10	----	Normal EOJ	ERR10
17	0S02I	(Same as 23 but causes dump because subtasks were attached when maintask issued CANCEL macro)	-----
18	----	(Eliminates cancel message when maintask issues DUMP macro with subtasks attached)	
19	0P74I	I/O Operator Option	-----
1A	0P73I	I/O Error	-----
1B	0P82I	Channel Failure	ERRGO
1C	0S14I	CANCEL ALL Macro	ERR1C
1D	0S12I	Maintask Termination	ERR1D
1E	0S13I	Unknown ENQ Requestor	ERR1E
1F	0P81I	CPU Failure	ERRGO
20	0S03I or 0S11I	Program Check	ERR20
21	0S04I or 0S09I	Illegal SVC	ERR21
22	0S05I or 0S06I	Phase Not Found	ERR22
23	0S02I	Program Request	ERR23
24	0S01I	Operator Intervention	ERR24
25	0P77I	Invalid address or insufficient core allocation to a partition.	ERR25
26**	0P71I	SYSXXX Not Assigned (unassigned LUB code)	ERR26
27	0P70I	Undefined Logical Unit (invalid LUB code in CCB)	ERR27
28	----	(QTAM cancel in progress)	EXT02
30	0P72I	Reading Past /& Statement (on SYSRDR or SYSIPT)	ERR30
31	0P75I	I/O Error Queue Overflow (error queue overflow or no CHANQ entry available for ERP)	ERR31
32	0P76I	Invalid DASD Address (disk) Irrecoverable I/O Error (tape)	ERR32
33	0P79I	No Long Seek (disk)	ERR33
34	0P84I	I/O Error during fetch (unrecoverable I/O error during fetch of non$ phase)	ERRGO
35	0P85I	Job Control Open Failure	-----
40	----	(load $$BEOJ)	EXT02
80	----	(cancel occurred in LTA)	EXT02
FF	0P78I	Unrecognized Cancel Code	-----
FF*	0P83x	Supervisor Catalog Failure	-----

All cancel-codes except in connection with DUMP-macro (code=X'00' is not a true cancel-condition) initially have a value X'40' higher than indicated above, but the X'40' bit is stripped by the SUPVR before fetching the Terminator. In addition to recognizing the cancel-codes above, the Terminator also recognizes the same codes with the X'80' bit on. The X'80' bit is tested for by $$BEOJ and subsequently reset.

*This cancel code is not significant in case of a supervisor catalog failure, because the system is placed in a wait state without any further processing by the Terminator. Thus, there is no conflict between this cancel code and the preceding X'FF' cancel code.

**If the CCB is unavailable, the logical unit is SYSxxx.

Figure 63. Cancel Codes and Messages

Displacement	Label	Description
0-15	(ACCTCOMN) ACCTSVRG	Temporary register save area.
16-17	ACCTSVRX	Save area for remainder of overhead counter times distributed by partition on exit.
18-19	ACCTSVRE	Save area for remainder of all-bound counter times distributed by partition on entry.
20-23	ACCTPCNT	Count of partitions using JAI.
24	ACCTSAID	Owner of physical transient area*.
25	ACCTFAID	Interrupted program*.
26	ACCTRAID	Active program*.
27	ACCTSWCH	Accounting switches: if bit = 1, true; if bit = 0, not true. bit 0 - cancel accounting bit 1 - no active partitions bit 2 - catalog in process bit 3 - alternate label area bit 4 - IPL indicator bit 5 - $JOBACCT in F1 bit 6 - $JOBACCT in F2 bit 7 - $JOBACCT in BG
28-31	ACCTIME	Start time of current accounting interval, in complement format.
32-33	ACCTRESC	Reserved.
34-35	ACCTUSEP	Address of user save area (ACCTUSER).
36-39	ACCTBLES	Address of BG Job Accounting Table.
40-43	- - - - -	Address of F2 Job Accounting Table if BJF; otherwise zero.
44-47	- - - - -	Address of F1 Job Accounting Table if BJF; otherwise zero.
48-53	ACCTSEAS	Seize blocks; serve as overlapped Event Control Blocks. TS Bit | (reserved) | Wait Bit 1 | PIK 1 | Wait Bit 2 | PIK 2 1st ECB 2nd ECB TS Bit: X'00' = no $JOBACCT running X'FF' = $JOBACCT active
54-55	ACCTUSEL	Length of user save area, set with 4th operand of global AG39.

*Note: X'00' = all bound, X'10' = BG, X'20' = F2, X'30' = F1, X'40' = overhead and FG if SPI.

Figure 64. Job Accounting Interface Common Table (ACCTCOMN)

Displacement	Label	Description
0-3	ACCTWK1* (ACCTABLE)*	Work area used in SIO update.
4-7	ACCTWK2	Work area used with ACCTWK1 in start/stop time routine
8-11	ACCTSVPT	Job card pointer; address of job card field following jobname.
12	ACCTPART	ID of partition in charge (partition switch name).
13	ACCTRES2	Reserved.
14-15	ACCTLEN	Length of SIO area = 6n + 1, where n = number of devices for this partition in SYSGEN option JA = (n1, n2, n3).
16-21	ACCTLOAD	Label area instruction; moves JAI label area address to OPEN/CLOSE transients.
22-23	ACCTRES3	Reserved.
24-27	ACCTLADD	Address of alternate label area.
28-31	ACCTCPUT	Counter for CPU time elapsed in a jobstep, counted in 300ths of a second.
32-35	ACCTOVHT	Counter for overhead time; time not charged to any partition.
36-39	ACCTBNDT	Counter for all-bound time; system wait state time divided between running partitions.
40-47	ACCTSVJN	Save area for job name during simulated EOJ.
		JOB ACCOUNTING TABLE (user's portion of Partition Table)
48-55	ACCTJBNM	Job name; taken from job card.
56-71	ACCTUSRS	User information; 16 bytes from Job card.
72-73	ACCTPTID	Partition ID; 'BG', 'F2', or 'F1' in EBCDIC format.
74	ACCTCNCL	Cancel code; see Cancel Codes and Messages (Figure 32).
75	ACCTYPER	Type of record: 'S' = job step, 'L' = last step of job.
76-83	ACCTDATE	Date in format specified at SYSGEN (MM/DD/YY or DD/MM/YY).
84-87	ACCTSTRT	Start time of job, in packed decimal (OHHMMSSF; F = sign).
88-91	ACCTSTOP	Stop time of job, in same format as ACCTSTRT
92-95	ACCTRES	Reserved.
96-103	ACCTEXEC	Phase name; taken from execute card.
104-107	ACCTHICR	High core address of active program phase, from COMREG.
108-111	ACCTIMES	CPU time elapsed in a job step; counted in 300ths of a second.
112-115	------	Overhead time; elapsed time not charged to any partition, in 300ths of a second.
116-119	------	All-bound time; system wait state time divided between running partitions, in 300ths of a second.
120	ACCTSIOS	SIO tables: 6 bytes for each device specified by SYSGEN options, as follows: 2 bytes for device address (Ocuu), 4 bytes for count of SIOs in current jobstep.
———	------	Overflow byte: normally X'20', but is X'30' if more devices are used within a partition than specified by SYSGEN options.

*Note: DSECT ACCTABLE symbolically addresses the JAI Partition Tables with labels as shown. Each partition in which JAI is supported has its own JAI Partition Table, labeled ACCTBG, ACCTF2, ACCTF1, for active partitions BG, F2, and F1 respectively.

Figure 65. Job Accounting Interface Partition Table (ACCTxx*)

Figure 66. RMS Machine Check Record on SYSREC

Record 1	0 Machine Check ID (X'10')	1-2 Record Sequence Counter	3 CPU Model Number	4 Reserved	5-7 CPU Serial	8-9 CPU ID	10-11 MCEL Length	12-15 Date	16-19 Time of day in 300ths of a second Timer units	20-27 Reserved	28-35 Job ID	36-43 Machine Check Old PSW	44-77 Reserved	78 Damage Assessment	79 End of Record Indicator (X'FF')
Record 2	0-3 (Same as Record 1)			4 Sub Class Codes	5 Tense Codes	6-7 Error and Validity Codes	8-11 Extended Logout Length	12-19 Reserved	20-23 Failing Storage Address	24-25 Region Code ECC Information	26-27 Region Code Control Word Address	28-78 Reserved			79 (Same as Record 1)
Record 3	0-3 (Same as Record 1)			4-48 Reserved								49-78 Floating Point Register Area			79 (Same as Record 1)
Record 4	0-3 (Same as Record 1)			4-5 Floating Point Regs Save Area (Continued)		6-69 General Registers Save Area							70-78 Control Registers Save Area		79 (Same as Record 1)
Record 5	0-3 (Same as Record 1)			4-58 Control Registers Save Area							59-78 MCEL (Machine Check Extended Logout)				79 (Same as Record 1)
Record 6-17	0-3 (Same as Record 1)			4-78 MCEL (Machine Check Extended Logout)											79 (Same as Record 1)
Record 18	0-3 (Same as Record 1)			4-75 MCEL (Machine Check Extended Logout)										76-78 Reserved (X'000000')	79 (Same as Record 1)

* Note: The Model 155 uses Records 1-18, as shown. The Model 145 uses only Records 1-8. In Record 8 for the Model 145, Bytes 0-3 are the same as Record 1, Bytes 4-25 contain the remainder of the MCEL (Machine Check Extended Logout) area, and the remainder of the record is not used.

Displacement	0	1	2	3	4-11	12-15	16-19	20-27	28-43	44-51
Label	CCKEY	CCN1	CCN2	CCMOD	CCCPUID	CCDATE	CCTIME	CCNAME	CCAIOU	CCFCCW
Record 1 *	Record ID	Record Number	Total Records	CPU Model Code	CPU ID Information	Date	Time of Day	Job Name	Active I/O Units	Failing CCW

Displacement	52-59	60-63	64-65	66	67-69	70-73	74-77	78	79
Label	CCCSW	CCECSW	CCDEVTYP	CCCHID	CCCUA	CCMPI		CCSYSCON	CCGUARD
Record 1 (continued)	CSW	Extended CCW	Device Type	Channel ID	Control Unit	Multi-processing Information	Reserved	System Condition Byte	Guard Byte X'FF'

Displacement	0-3	4-78	79
Record 2	Same as Record 1	Channel Logout Area	Same as Record 1

Displacement	0-3	4-24	25-78	79
Record 3	Same as Record 1	Channel Logout Area	Unused	Same as Record 1

* Note: Only Record 1 is written for the Model 155.
Record 1 is also addressed symbolically as CCREC with the logout data area, Bytes 4-78, addressed as CCLOGD.

Figure 67. RMS Channel Check Record on SYSREC

Appendix D: Microfiche Cross-Reference Index

The index gives the relationship of core-image phase names, relocatable module names, microfiche labels, and microfiche identification numbers.

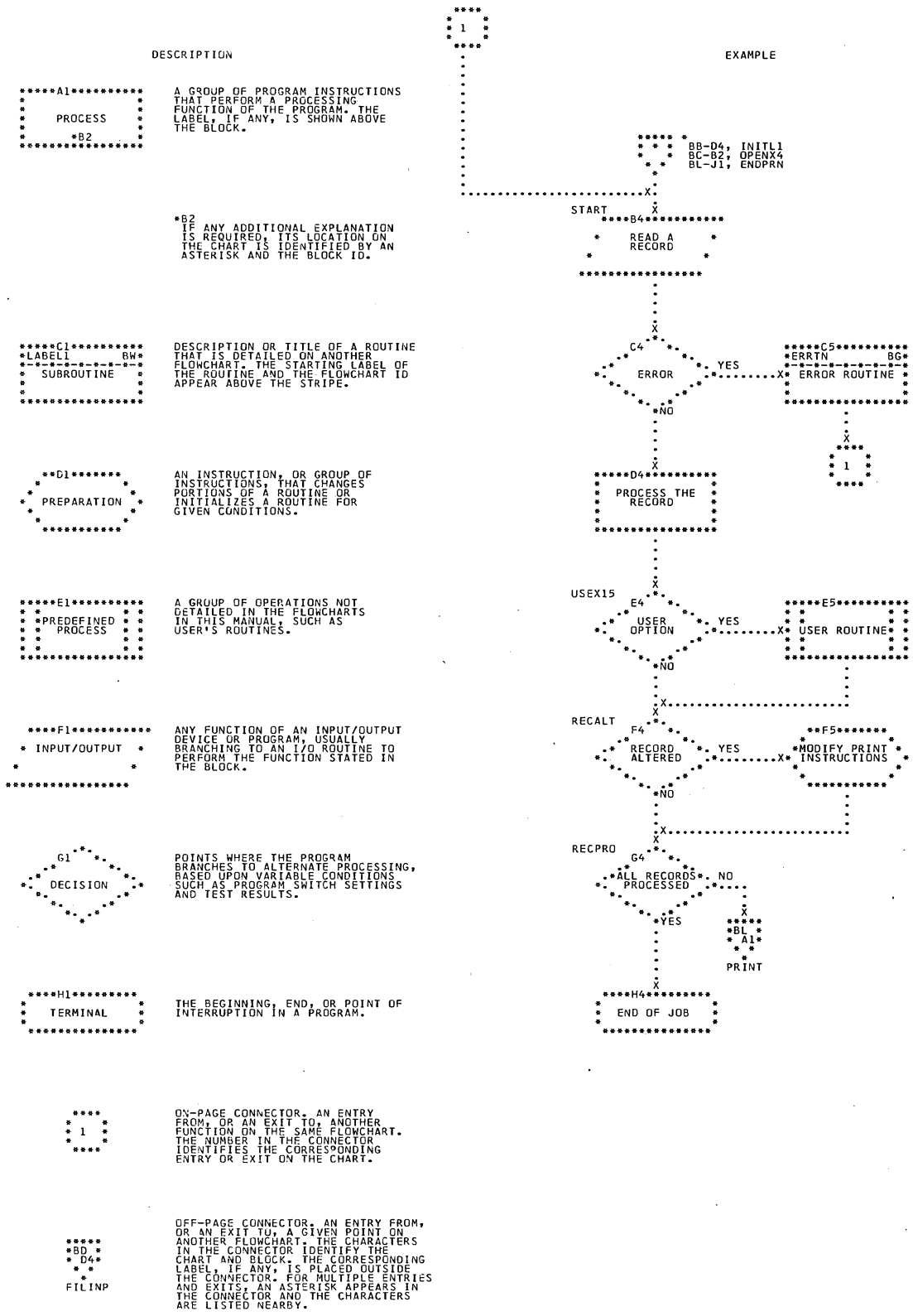
An asterisk indicates the microfiche label. If the microfiche label differs from both the phase and the module name, it is so indicated in parentheses.

When a phase or module takes up more than one microfiche card, the identification number of only the first card is shown.

For the complete microfiche cross-reference index, see Introduction to DOS Logic, listed in the Preface.

Core Image Phase Name	Relocatable Module Name	Card ID
$$BPDAID*	None	CTL.172.50
$$BSDRUP*	None	CTL.185.00
$$BUFLDR*	None	CTL.187.15
$$BUFLD2*	None	CTL.187.20
DUMPGEN	IJBDMPGN*	CTL.187.50
DUMPGEN1	IJBDMPGN*	CTL.187.50
EREP	IJBEREP*	CTL.193.00
EREPASSM	IJBEASSM*	CTL.188.00
EREPCI30	IJBECI30*	CTL.189.00
EREPCI40	IJBECI40*	CTL.190.00
EREPCI45	IJBECI45*	CTL.190.50
EREPCI50	IJBECI50*	CTL.191.00
EREPCI55	IJBECI55*	CTL.191.50
EREPCLR	IJBECLR*	CTL.192.00
EREPEDIT	IJBEDIT*	CTL.192.50
EREPHIST	IJBEHIST*	CTL.192.75
EREPIFA	IJBEIFA*	CTL.198.80
EREPIPL	IJBEIPL*	CTL.198.90
EREPLOG1	IJBELOG1*	CTL.229.00
EREPLOG2	IJBELOG2*	CTL.230.00
EREPLOG3	IJBELOG3*	CTL.231.00
EREPLOG4	IJBELOG4*	CTL.232.00
EREPLOG5	IJBELOG5*	CTL.232.50
EREPLOG6	IJBELOG6*	CTL.232.55
EREPLOG7	IJBELOG7*	CTL.232.60
EREPLOG8	IJBELOG8*	CTL.232.65
EREPLOG9	IJBELOG9*	CTL.232.70
EREPLST	IJBELST*	CTL.232.75
EREPMC30	IJBEMC30*	CTL.234.00
EREPMC40	IJBEMC40*	CTL.235.00
EREPMC45	IJBEMC45*	CTL.235.50
EREPMC50	IJBEMC50*	CTL.236.00
EREPMC55	IJBEMC55*	CTL.236.50
EREPMPX	IJBEMPX*	CTL.236.70
EREPOBR	IJBEROBR*	CTL.194.00
EREPSEL	IJBESEL*	CTL.195.50
EREPSDR	IJBERSDR*	CTL.195.00
EREP2715	IJBE2715*	CTL.200.00
ESTVFMT	IJBESTFM*	CTL.196.00
ESTVMT	IJBESTMT*	CTL.197.00
ESTVPR	IJBESTPR*	CTL.198.00
ESTVUT	IJBESTUT*	CTL.199.00
LSERV	IJBLSERV*	CTL.228.50
PDAID	IJBPDAID*	CTL.241.50
PDAIDFTT*	None	CTL.246.00
PDAIDFTP*	None	CTL.247.00
PDAIDFTW*	None	CTL.248.00
PDAIDGTT*	None	CTL.249.00
PDAIDGTP*	None	CTL.250.00
PDAIDGTW*	None	CTL.251.00
PDAIDITP*	None	CTL.252.00
PDAIDITT*	None	CTL.253.00
PDAIDITW*	None	CTL.254.00
PDAIDQTT*	None	CTL.255.00
PDAIDQTW*	None	CTL.256.00
PDLIST	IJBPDLST*	CTL.241.70
SYSBUFF1	IJBSBUFF*	CTL.242.50
SYSBUFLD	IJBSBUFF*	CTL.242.50

Appendix E: Explanation of Flowchart Symbols



Glossary

For a more complete list of data processing terms, refer to IBM Data Processing Techniques, A Data Processing Glossary, GC20-1699.

American National Standard Label Format: The tape file format used when the label is written in the ASCII mode.

ASCII (American National Standard Code for Information Interchange): A 128-character, 7-bit code. The high-order bit in the System/360 8-bit environment is zero.

CCH (Channel Check Handler): A feature that assesses System/370 channel errors to determine if the system can continue operations.

channel inboard error: An error that occurs between one I/O device and the central processing unit.

chronological area of the recorder file: The area of the recorder file (IJSYSRC) where error records are printed as they occur. The record types included are: OBR, MCRR, MCAR, CCH, BTAM, QTAM, and 2715 error records. This area is present on both the System/360 and System/370 recorder files and differs from the SDR area where cumulative errors are recorded by device type.

core image library: A SYSRES area (or a device of the same type as SYSRES) that stores programs processed by the linkage editor. Each program is in a form that can be executed in main storage.

core wrap mode: The method of operation that records the events of a trace in main storage. It is the default process when no output device for the trace has been specified. The contents can be displayed by either a dump program or manually from the console.

data set security: A feature that provides protection for disk files. A data secured file cannot be accidentally accessed by a problem program.

DOS (Disk Operating System): A disk resident system that provides operating system capabilities for 16K and larger IBM System/360 and System/370 systems.

DOS Volume Statistics: A facility that monitors and records the number of temporary read and write errors on currently accessed tape volumes. This facility has two options, Error Statistics by Tape Volume (ESTV) and Error Volume Analysis (EVA).

EREP (Environmental Recording, Editing and Printing): A program that processes the data contained on the system recorder file.

ESTV (Error Statistics by Tape Volume): One of the two options of the DOS Volume Statistics. With ESTV Support, the system collects data on tape errors by volume for any tape volumes used by the system.

EVA (Error Volume Analysis): One of the two options of the DOS Volume Statistics. With this option, the system issues a message to the operator when a number of temporary read or write errors (specified by the user at system generation time) has been exceeded on a currently accessed tape volume.

FCB (Forms Control Buffer): The buffer in the IBM 3811 Printer Control Unit that stores carriage information for the IBM 3211 Printer.

fetch:
1. To bring a program phase into main storage from a core image library for immediate execution.
2. The routine that retrieves requested phases and loads them into main storage.
3. The name of a macro instruction (FETCH) used to transfer control to the system loader.
4. To transfer control to the system loader.

F/L Trace (Fetch/Load Trace): A program that records information about phases and transients as they are called from a core image library.

FOLD: A SYSBUFLD control card operand that indicates that all hexadecimal bytes printed by the IBM 3211 Printer are treated as if bits 0 and 1 are ones. For example, this allows an uppercase A to print when X'01', X'41', X'81', or X'C1' is sent to the printer.

GSVC Trace (Generalized Supervisor Calls Trace): A program that records SVC interrupts as they occur. All or a selected group of SVCs can be traced.

IDRA (Independent Directory Read-in Area): A resident area, created by a supervisor option, into which the system reads core

image library directories for fetch and load operations. Using IDRA frees the physical transient area to perform error recovery procedures.

IOCS (Input/Output Control System): A group of macro instruction routines provided by IBM for handling the transfer of data between main storage and external storage devices.

I/O (Input/Output) Error Logging: The process of recording OBR and SDR records on the system recorder file.

I/O Trace (Input/Output Trace): A program that records I/O device activity for all or a selected group of I/O devices.

job accounting interface: A function that accumulates accounting information for each job step to: charge usage of the system, help plan new applications, and help supervise system operation more efficiently.

LSERV (Label Cylinder Display): A program that formats a listing of the label cylinder located on SYSRES. LSERV can run in any partition and outputs the list on SYSLST, which may be assigned to disk, tape, or printer.

MCAR (Machine Check Analysis and Recording): A feature that records System/370 machine check interrupt error information on the system recorder file and then attempts to recover from the interrupt.

MCI (Machine Check Interrupt): The interrupt that occurs if the central processing unit fails to operate.

MCRR (Machine Check Recording and Recovery): The recording of pertinent data on the system recorder file after either a machine check interrupt or a channel inboard error occurred on System/360 Model 30, Model 40, or Model 50.

nonstandard labels: Labels that do not conform to the System/360 standard label specifications. They can be any length, need not have a specified identification, and do not have a fixed format.

object module: One or more control sections in relocatable, nonexecutable form. An object module must be processed by the linkage editor before it can be executed in the system.

OBR (Outboard Recorder): A feature that records pertinent data on the system recorder file when an unrecoverable I/O error occurs.

overlay: A program segment (phase) that is loaded into main storage. It replaces all or part of a previously retrieved section.

PCIL (Private Core Image Library): A file referenced in the same manner and for the same purposes as the system core image library, but distinct from the system core image library. PCIL increases available core image library space to enable compiling, linkage editing, and executing in the foreground partition, when a private core image library is assigned to that foreground partition.

PDAID (Problem Determination Aids): Programs that trace a specified event when it occurs during the operation of a program. The traces provided are QTAM Trace, I/O Trace, F/L Trace, and GSVC Trace.

phase: The smallest complete unit that can be referenced in a core image library. Each program overlay is a complete phase. If the program has no overlays, the program itself is a complete phase.

private library: A relocatable, core image, or source statement library that is separate and distinct from the system library.

problem determination: A procedure or process (provided by IBM) that the user can follow after an error message to determine that cause of that error. (See PDAID)

QTAM trace: A routine that records certain supervisor and I/O activities on tape or in main storage.

RDE (Reliability Data Extractor): A function that provides hardware reliability data that is analyzed by IBM.

RMS (Recovery Management Support): A feature for System/370 that consists of the MCAR (machine check analysis and recording) and CCH (channel check handler) functions. RMS gathers information about System/370 hardware reliability and attempts certain error recovery operations. RMS is a part of the entire reliability, availability, and serviceability support for System/370.

SDR (Statistical Data Recorder): A feature that records the cumulative error status of an I/O device on the system recorder file.

SORTED DSERV: A program that gives you an alphamerically sorted listing of any or all of the library directories.

stand-alone dump: A program that displays the contents of main storage from a minimum of 8K bytes to a maximum of 16384K bytes.

It helps to determine that cause of an error.

system recorder file: The file that is used to record hardware reliability data.

UCS (Universal Character Set): A printer feature that permits the use of a variety of character arrays.

UCSB (Universal Character Set Buffer): A buffer in a printer control unit that stores the code equivalents of the characters on an interchangeable print chain or train cartridge.

Index

Indexes to systems reference library manuals are consolidated in the publication, DOS Master Index, GC24-5063. For additional information about any subject listed below, refer to other publications listed for the same subject in the Master Index.

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