IBM Field Engineering Handbook

System/360 Operating System

S229-3169-3

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System/360 Operating System

S229-3169-3

Fourth Edition (July 1971)
This is a major revision of, and obsoletes, S229-3169-2. The manual has been rewritten to reflect numerous additions and changes, and should be reviewed in its entirety. Changes are continually made to the specifications herein; any such changes will be reported in subsequent revisions or FE Supplements.

A handbook binder is available as a FE part in Mechanicsburg under Part Number 453559.

This manual has been prepared by IBM Systems Development Division, Field Engineering Technical Operations, Dept. H71, PO Box 390, Poughkeepsie, New York, 12602. A form for readers' comments is provided at the back of this publication. If the form has been removed, comments may be sent to the above address.

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Status Byte

Bit	Name	Description
0	Attention	Request Button
1, 2	Not Used	
3	Busy	
4	Channel End	
5	Device End	
6	Unit Check	Defined by Sense Byte
7	Unit Exception	Read Cancel Button

Sense Byte

Bit	Name	Description
0	Command Reject	Invalid Command
1	Intervention Required	Not Ready
2	Bus-out Check	Parity Error on Bus-out
3	Equipment Check	Typewriter Parity Error
4-7	Not Used	

2250

Status Byte

Bit	Name
0	Attention
1, 2	Unused
3	Busy
4	Channel End
5	Device End
6	Unit Check
7	Unused

Sense Byte 0

Bit	Name
0	Command Reject
1	Intervention Required
2	Bus-out Check
3	Equipment Check
4-7	Unused

Sense Byte 1

Bit	Name
0	Light Pen Detect
1	End Order Sequence
2	Character Mode
3-7	Unused

Sense Byte 2

Bit	Name
0, 1, 2	Unused
3-7	High-order Buffer Address Counter

Sense Byte 3

Bit	Name
0-5	Low-order Buffer Address Counter
6, 7	Unused

Note: Sense bytes 2 and 3 will be zero if the buffer is running when sense command is issued.

1442
2501
2520

Status Byte

Bit	Name	Description
3	Busy	
4	Channel End	
5	Device End	
6	Unit Check	-- further explained by sense byte
7	Unit Exception	-- EOF and last card has been read

Sense Byte

Bit	Name	Description
0	Command Reject	
1	Intervention Required	-- not ready
2	Bus-out Check	
3	Equipment Check	-- reader check, punch check, invalid card code punched and data error on CE read or write.
4	Data Check	-- invalid card code on read
5	Overrun Check	

1443

Status Byte

Bit	Name	Description
0, 1, 2	Not Used	
3	Busy	Command stored or status stacked.
4	Channel End	
5	Device End	
6	Unit Check	Channel 9 sensed in carriage tape.
7	Unit Exception	Channel 12 sensed in carriage tape.

Sense Byte

Bit	Name	Description
0	Command Reject	Because read-backward command was received, or because more than 3 line spaces were requested, or because skip to channel 0, 13, 14, or 15 was received.
1	Intervention Required	Printer not ready because forms check-ran out or jammed, or stop key or carriage stop key pressed, or cover interlock open.
2	Bus-out Check	Parity error on bus-out during initial selection with command-out tag up, or data transfer with service-out tag up.
3	Equipment Check	Printer malfunction because of buffer register parity error or typebar synchronization error.
4 & 5	Typebar Selection	Changed only by repositioning the typebar-character indicator switch. 0 0 52-character set 0 1 13-character set 1 0 39-character set 1 1 63-character set
6	Channel 9	Hole sensed in channel 9 of carriage control tape during last write or control command.
7	Channel 12	Hole sensed in channel 12 of carriage control tape during last write or control command.

1403
2540

Status Byte

Bit	Name	Description
0	Not Used	
1	Not Used	
2	Not Used	
3	Busy	
4	Channel End	
5	Device End	
6	Unit Check	Further defined by Sense Byte
7	Unit Exception	Reader -- last card Read and Stacked Printer -- Channel 12 sensed -- further defined by Sense Byte

Sense Byte

Bit	Name	Description
0	Command Reject	
1	Intervention Required	Not Ready
2	Bus-out Parity	Parity of command on Bus-out
3	Equipment Check	Parity Error in Control Unit or Device
4	Data Check	On Reader Invalid Card Code. On PFR also.
5	UCS Parity	Printer UCS Parity Error.
6		Reader 2 reads no feed. Punch Only PFR.
7		Printer -- Channel 9. Reader Punch -- not used.

2311
2314
2321
2302
2303

Status Byte

Bit	Name	Description
0	Attention	Not Used
1	Status Modifier	Used with Search and Control Unit Busy.
2	Control Unit End	The control unit has finished an operation.
3	Busy	Indicates addressed access mechanism is moving or used in conjunction with Status Modifier to indicate Control Unit Busy.
4	Channel End	The control unit has received all the data from the channel needed to do the operation called for and the channel is freed.
5	Device End	Indicates that an access mechanism is free to be used.
6	Unit Check	Indicates that a control unit or programming error or device hardware check has been detected.
7	Unit Exception	End-of-File.

Sense Information Summary

Position	Condition
Byte 0	
Bit	
0	Command Reject includes Invalid Command, Invalid Sequence, and File Protected.
1	Intervention Required
2	Bus-out Parity
3	Equipment Check
4	Data Check
5	Overrun
6	Track Condition Check
7	Seek Check
Byte 1	
Bit	
0	Data check in count field; also causes Byte 0, Bit 4 (Data Check) to be turned on.
1	Track Overrun. Indicated on Write.
2	End of Cylinder
3	Invalid Sequence also causes Command Reject (Byte 0, Bit 0) to be turned on.
4	No Record Found
5	File Protected also causes Command Reject (Byte 0, Bit 0)
6	Missing Address Marker also causes Data Check (Byte 0, Bit 4)
7	Overflow Incomplete
Byte 2	
Bit	
0	Unsafe
1	Not Used
2	Serializer/Deserializer Check } Also turn on Equipment
3	Not Used } Check Byte 0, Bit 3
4	ALU Check
5	Unselected Status

Byte 3

Bit	2311	2321	2302	2303	2314
0	Ready	Drive Ready	Access Ready		Busy
1	On Line	Drive Operative	Access Operative		On Line
2	Unsafe	Read Safety	Read Safety		Unsafe
3	----------	Write Safety	Write Safety		Not Used
4	On Line	Strip Ready	On Line	On Line	Pack Change
5	End of Cylinder	Invalid Address	----------		End of Cylinder
6	----------	Auto Restore	----------		Not Used
7	Seek Incomplete	CE Cell Located	CE Cylinder Located		Seek Incomplete

Position Condition

Byte 4

Module Identification - Sense Byte 4

The following shows the code used for module identification of disk drives. Bits 0 and 1 (shown as X) are not used.

Sense Byte 4	Disk Drive
XX000000	A
XX000001	B
XX000010	C
XX000011	D
XX000100	E
XX000101	F
XX000110	G
XX000111	H
XX001000	J
XX001111	Module not defined

Byte 5

This byte is zero at all times except when overflow incomplete occurs (Byte 1, Bit 7). When overflow incomplete occurs, this byte has one of the following configurations:

00000110 - A read command was in progress when the overflow incomplete interrupt occurred.

00000101 - A non-formating write command was in progress.

00100101 - A search equal key data command was in progress, and the compare is equal to this point.

01000101 - A search high key data command was in progress, and the compare is equal to this point.

01100101 - A search high or equal key data command was in progress, and the compare is equal to this point.

01010101 - Any search key data was in progress and the compare is low, or a search equal key data was in progress and the compare is unequal to this point (i. e., it has already been determined that no status modifier would be set on the entire logical record.)

01110101 - A search high or high-equal key data command was in progress, and the compare is high to this point (i. e., it has already been determined that a status modifier would be set on the logical record).

2803
2400

Status Byte

Bit	Name	Description
0	Attention	Not used.
1	Status Modifier	Present with busy to indicate TCU busy.

Status Byte (Continued)

Bit	Name	Description
2	Control Unit End	Signaled by the TCU: (a) At completion of operations during which a TCU busy was indicated. (b) At the completion of a control immediate operation during which a unit check or unit exception is detected.
3	Busy	When presented without bit 1 (status modifier bit), indicates that the tape unit is busy.
4	Channel End	Indicates that a read, read backward, write, mode set or sense has been completed, or that a control command has been accepted.
5	Device End	Indicates that the tape unit has completed operation at TU level of command. Device end indicated with channel end at the completion of command. 2800 2400
5	Unit Check	Set whenever: (a) Any bit is on in sense byte 0. (b) Tape unit performing read backward, backspace record or backspace file into or at load point. (c) A rewind and unload is completed at the TCU level.
	Unit Exception	Set when: (a) A write, WTM or ERG operation is performed in the end of tape area. (b) A tape mark is sensed during a read, read backward, forward space record, or backspace record.

Sense Bytes

Sense Byte 0

Bit	Name	Description
0	Command Reject	Set when a write, write tape mark, or erase command is addressed to a file protected tape unit, or a data converter on mode set command is recognized on a TCU without the data converter feature. In this case the mode set is executed for parity, density, and translator.
1	Intervention Required	Set whenever status A is inactive. See "Sense Byte 2."

Sense Bytes (Continued)

2	Bus-out Check	Set whenever even parity appears on bus-out during data transfer in initial selection or write operations.
3	Equipment Check	Set whenever an equipment check occurs. See "Sense Byte 5."
4	Data Check	Set when a data check occurs. See "Sense Byte 4."
5	Overrun	Set if service is requested, but data cannot be transferred during a read, write, or read backward operation.
6	Word Count Zero	Set during a write operation if transfer of data is prevented before the first byte of data.
7	Data Converter Check	See "Data Conversion Feature."

2803

Sense Byte 1

Bit	Name	Description
0	Noise	
1	Status A	The meanings and responses of status A and status B are:
2	Status B	

Tape Unit Status A	Tape Unit Status B	Tape Unit Status	Response to Initial Selections
0	0	Non-existent TU	Unit check
0	1	Not ready	Unit check
1	0	Ready and not rewinding	Clear status
1	1	Ready and rewinding	Busy

3	Seven-track	The selected tape unit has the seven-track feature installed.
4	Load Point	The selected tape unit is at load point.
5	Selected and Write Status	The selected tape unit is in write status.
6	File Protect	The selected tape unit is in the file protected status.
7		The selected TU is not compatible.

Sense Byte 2

This sense byte contains the track-in-error indicator bits that are set at the end of a read, or read-backward command if a data check has been encountered. Bits 6 and 7 on together indicate either more than one error or no error found.

Sense Byte 3

Bit	Name	Description
0	R/W VRC	A VRC check occurred during a read or read-backward operation. Indicator is not set after an overrun or after receipt of a stop command.
1	LRCR	An LRCR check occurred during write, write tape mark, read and read backward.
2	Skew	Excessive skew detected during a read back check on a write, write tape mark or erase operation.
3	CRC	A cyclic redundancy check occurred during a read or read-backward operation.

2803

Bit	Name	Description
4	Skew Register VRC	A character with incorrect parity detected in skew register during write, write tape mark, and erase operation.
5		1,600 BPI set in TU.
6	Backward	
7	C Compare	C compare is an equipment check.

Note: Data checks include bits 0-4. Any will set data check in sense byte 1 (bit 4).

Sense Byte 4

Bit	Name	Description
0	Echo	The tape unit failed to generate an echo pulse in response to a write pulse.
1	Reject TU	Selected tape unit failed to respond to set read or set write status when instructed, or became not ready during execution of a tape motion operation.
2,3,4	Read Clock, Write Clock, Delay Counter	Associated clock has malfunctioned.
5,6,7	Sequence Indicators C, B, and A	These indicators are maintenance aids. They set only in the event of a machine failure and cause a unit check.

Note: Sense byte 4 and bit 7 of sense byte 3 are equipment checks and are normally the result of machine failure.

STATISTICS TABLE

The statistics table contains the statistical data required to maintain statistical data records. It is used by IBM-supplied error routines and the statistical data recorder (SDR) of SER.

The statistics table has the following characteristics:

1. Creation: The statistics table is created at system generation time.

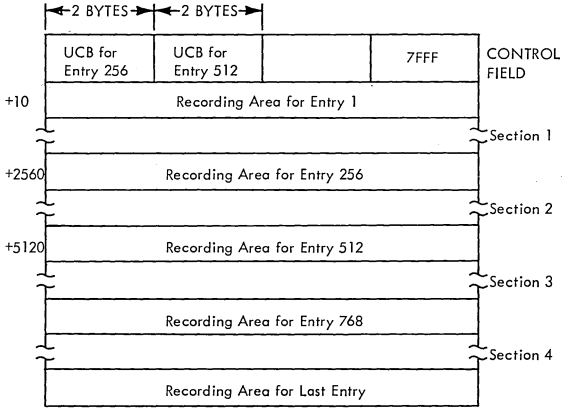
2. Storage Area: The table resides, as a permanent part of the resident supervisor, in protected resident storage (when protection is available).

3. Size: The statistics table contains a 10-byte control field (the first entry) and one 10-byte entry for each device. A 2314 is considered to be nine devices.

4. Means of Access: The UCB pointers in the control field are used to determine the section of the table in which the desired entry is located. If the desired entry is in other than section 1, a multiple of 256 (256 for section 2, 512 for section 3, etc.) is added to the STATAB index in the UCB. This is then multiplied by ten and added to the starting address of the statistics table to give the address of the proper entry. When the desired entry is in section 1, the STATAB index itself is multiplied by ten and added to the address of the statistics table. For the 2314, the low-order four bits of the fifth sense byte are also added to the STATAB index to get the correct entry.

5. Format: The format of each entry in the table varies with the type of device. The first 8 bytes of an entry contain statistical data; the last 2 bytes are a work area used by error routines. The device type formats are shown in "Statistics Table Entry Formats"; note that the work area is not shown:

STATISTICS TABLE INTERVENTION



Unit Record Equipment

1052 2150	Temporary Read Failures	Temporary Write Failures
1015 1285 1402		Bus-Out Check
1442 1404 2201	Equipment Check	Overrun
1403 1443	Device-Dependent	Device-Dependent
2501 2520 2671		
2701 2702		
7770 7772 2250		
2260 1053 2280 2282		

1 byte

2400 Tape Series

1052 2150	Temporary Read Failures	Temporary Write Failures
1015 1285 1402		Bus-Out Check
1442 1404 2201	Equipment Check	Overrun
1403 1443	Word Count 0	Data Converter Check
2501 2520 2671	R/W Vertical Redundancy Check	Longitudinal Redundancy Check
2701 2702	Skew	Cyclic Redundancy Check
7770 7772 2250	Skew Reg VRC	Noise
2260 1053 2280 2282		

1 byte

2841 Control Unit

Temporary Read Failures	Temporary Write Failures
	Bus-Out Check
Equipment Check	Overrun
Track condition	Seek Check
Unsafe	
Serializer/ Deserializer	Control Unit Tag Line
Arithmetic Logical Unit	
Missing Address Marker	

1 byte

2820 Control Unit

Temporary Read Failures	Temporary Write Failures
	Bus-Out Check
Equipment Check	
Track Condition Check	
	Track Overrun
No Record Found	

1 byte

2280

Temporary Read Failures	Temporary Write Failures
	Bus-Out Check
Equipment Check	
Byte Count 0	
Recorder Forced Gap	
	Graphics
Work Area	
Work Area	

1 byte

OS SERVICE AID PROGRAMS

SERVICE AID DESCRIPTION

Service aids are designed to facilitate easier, quicker, and more efficient diagnosis or repair of a programming problem. There are PTF service aids (SAPGM PTF) and class A service aids.

HOW TO LOCATE SERVICE AIDS

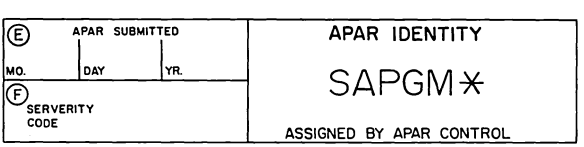
Announcement and maintenance information for service aids is maintained in RETAIN and in the Early Warning System's Program Symptom Index (EWS PSI) under the component ID of SAPGM for PTF service aids, and DN554 for class A service aids.

SAPGM	SACOREZAP0	COREZAP0 IN-CORE SUPERZAP AVAIL AS PTF 1114-00	04A10 01114 XX.X
SAPGM	SADELINK0	DELINK0 WITH MODULE EXPANSION ABILITY AVAIL AS PTF 1112-00	04A10 01112 XX.X
SAPGM	SADELINK01	OC5ABEND, OR WRONG COND CODE WHEN RET TO SYS	04B09 01112 XX.X
SAPGM	SAEXTEND20	EXTEND VER 2 AVAIL FOR 18.0 AS PTF 3605-00006-902	06C09 00006 XX.X

Detailed service aid information for program features, considerations, application, output, and messages is contained in Systems Reference Library, S/360 Service Aids, GC28-6719 for class A programs, and in PTF documentation for service aids distributed as PTF's (SAPGM PTF's).

HOW TO REPORT SERVICE AID TROUBLES

Service aid malfunctions not already reported in RETAIN can be reported through the normal APAR channels. Service aids with class A service are sent in the same way as any class A APAR. Service aid PTF's (SAPGM PTF's) are handled the same as class A APAR's except that the APAR identity box is marked SAPGM:



* SAPGM PTF's are intended to be tools for FE personnel only. APAR's will not be accepted from non-FE personnel.

Route APAR's for service aids to APAR CONTROL, P.O. Box 390, Dept. D54, Poughkeepsie, N.Y. 12602. San Jose originated aids go to IBM APAR PROC., Dept. E13, San Jose, Calif. 95114.

HOW THIS HANDBOOK IS ORGANIZED FOR SERVICE AIDS

This handbook is a reference aid only. It lists highlights for each service aid, and a brief summary of required JCL and control statements. The handbook assumes the reader is familiar with service aid details.

COREZAP	SAPGM PTF (note 1)
DELINK	SAPGM PTF (note 1)
EXTEND	SAPGM PTF (note 2)
FABDUMP	SAPGM PTF (note 2)
FLOWEDIT	SAPGM PTF (note 2)
IEHTRACE	SAPGM PTF (note 3)
IMAPTFLE (TLKEDT)	Class A
IMAPTFLS (PTFLIST)	Class A
IMASPZAP (SUPERZAP)	Class A
IMBMDMAP (LMODMAP)	Class A
IMCJQDMP (JOBQDUMP)	Class A
IMDPRDMP (PRNTDMP)	Class A
IMDSADMP (RESDUMP)	Class A
ISAMDUMP	SAPGM PTF (note 3)
REFMT	SAPGM PTF (note 1)
TFLOW	SAPGM PTF (note 2)
VABDUMP	SAPGM PTF (note 2)

Notes:

1. These PTF's are supported by FE Technical Operations, Dept. H71, Poughkeepsie, N.Y.

2. These PTF's are supported by Systems Development Division, Dept. D54, Poughkeepsie, N.Y.

3. These PTF's are supported by FE Technical Operations, Dept. B56, San Jose, Calif.

COREZAP

COREZAP is supported by FE Technical Operations, Dept. H71, Poughkeepsie. COREZAP:

1. Verifies data in main storage.
2. Modifies data in main storage.
3. Dumps data in main storage.

JCL

//GO	EXEC	PGM=COREZAP [,PARM=LINECNT=nn]	Default nn is 55
//SYSPRINT	DD	SYSOUT=A	Print output
//SYSIN	DD	*	Control input

Control Statements

* comments	Asterisk (*) in col 1, with a blank in col 2, denotes a comment card that can be placed anywhere.
NAME NUCLEUS	Provides absolute addressing until next NAME or RESET verb.
NAME nnnnnnnn	Identifies module or ENTRY name nnnnnnnn to be operated on.
BASE bb	bb is hex value to be subtracted from address for NAME module.
INDEX bb	bb is hex value to be added to address for NAME module.
VERIFY ff dd	ff is hex offset to where hex data dd is to be compared.
VER ff dd	Shortened form of VERIFY ff dd.
REPLACE ff dd	ff is hex offset to where hex data dd is to be inserted.
REP ff dd	Shortened form for REPLACE ff dd.
RESET	Group delimiter. Resets NOGO switch. Simulates EOF.
DUMPB ff cc	DUMP before changes. ff is offset to start dump for cc bytes.
DUMP ff cc	Shortened form for DUMPB ff cc.
DUMPA ff cc	DUMP after changes. ff is offset to start dump for cc bytes.

Comments

DELINK

DELINK is supported by FE Technical Operations, Dept. H71, Poughkeepsie. DELINK:

1. Produces object module from load module.
2. Creates ESD for noneditable modules.
3. Expands module size for patch area.

JCL

//GO	EXEC	PGM=DELINK	
//SYSPRINT	DD	SYSOUT=A	Message output
//SYSPUNCH	DD	UNIT=00D	Object module output data set
//SYSLIB	DD	DSN=SYS1.SVCLIB, DISP=SHR	Origin of module to DELINK
//SYSIN	DD	*	Control statement input

Control Statements

Col 1 (each field delimited by at least one blank)
[>] module-name [CSECT-name] [new-size]

>(0-8-6 punch) -- Optional. Indicates that the module is to be expanded in size.

module-name -- Member name of the load module within the SYSLIB data set that is to be operated on by DELINK.

CSECT-name -- Optional unless > is in column 1. Identifies the control section within the module-name to be converted to an object module and produced on SYSPUNCH. Any added space is padded with blanks.

new-size -- Optional unless> is in column 1. Size is a 1-8 digit decimal number or 1-6 digit hex number (X'nnnnnn'). The size is the total size of the CSECT.

EXTEND

EXTEND is supported by Systems Development Division, Dept. D54, Poughkeepsie. EXTEND:

1. Increases the size of the system trace table.
2. Selectively shuts off an MVT trace table.
3. Dynamically SNAP-SHOTs the trace table.

JCL

//GO	EXEC	PGM=EXTEND [,PARM=(NOMSG,nnnn)] [,REGION=xxK]
//SYSLIB	DD	DSN=SYS1.SVCLIB, DISP=SHR IGG019X0 must be in SVCLIB.
//SNAPS	DD	SYSOUT=A, SPACE=(1024,(nn,50))

NOMSG -- Nullifies all operator communication, including the SNAP function. EXTEND terminates automatically after the first job ABEND's.

EXTEND (Continued)

nnnn -- A decimal number requesting that the maximum number of trace table entries be built. This depends on available storage (see REGION). Either NOMSG or nnnn may appear alone in the PARM field. If nnnn is omitted, all available space is automatically used for a trace table in the REGION.

REGION -- Assigns the necessary amount of table space to EXTEND:

For MVT or MP, REGION = (64e + 7200) ÷ 1024K
For MFT, PARTITION = (16e + 5100) ÷ 1024K
where e = desired number of trace table entries.

SPACE -- On the SNAPS DD card, must be sufficient to contain the desired number of SNAP shots of an extended trace table when a system WTR is being used (i.e., SYSOUT).

$$nnn = \frac{(138 \times \text{number of trace entries} \times \text{number of SNAP shots})}{1024}$$

Assignment directly to a printer (e.g., UNIT = 00 E) eliminates space considerations, and speeds output.

FABDUMP

FABDUMP is supported by SDD, Dept. D54, Poughkeepsie. Highlights are:

1. Formats data management control blocks.
2. Includes information for each open data set.
3. Blocks are formatted for each DDNAME.
4. Blocks included are: DEB, DCB, IOB, ICB, and UCB.

FABDUMP is applied to the system as module IGC0X05A in SYS1.SVGLIB. FABDUMP must be "connected" to ABDUMP by a SUPERZAP:

SUPERZAP "connection" for release 20 (microfiche IEAAAD02)

NAME	IGC0205A	Consult microfiche for displacements on releases other than 20.
VERIFY	03D4 F3F0	
REP	03D4 E7F0	

Example Output (right hand 16 bytes of each control block not shown)

```
MYDATA   DEB 03FC34  00000180  0403FCA4  C8000000  00000000  ....
                     5800222C  00000003  00030003  00030001  ....
                     0D000244  090002B5  0D0002B8  00001308  ....

         DCB 017698  00000000  00000000  00000000  000072E0  ....
                     04000001  00000000  0040D008  0003FC34  ....
                     00000000  00000000  00480000  00000001  ....

         UCB 00222C  0440FF88  0191000C  012B0100  00F1F9F1  ....
                     F0F00803  00320100  00000000  00000000  ....
```

Note: IOB not formatted because the preceding example is for an EXCP DCB.

FLOWEDIT

FLOWEDIT is supported by SDD, Dept. D54, Poughkeepsie. FLOWEDIT:

1. Formats and prints trace output from TFLOW service aid.
2. Can specialize data reduction by a user exit.
3. Can start edit and print at nth record.

JCL

//GO	EXEC	PGM=FLOWEDIT [,PARM='MSG=YES,BLOCKNO=nnnn, LINECT=yy,USR=ccc']
//SYSPRINT	DD	UNIT=00E Print data set. Can be SYSOUT.
//SYSUT1	DD	UNIT=2400,LABEL=(,NL),VOL=SER=TFLOW,DISP=OLD Trace input.

MSG -- NO is default if this keyword is omitted. YES causes messages to be written to the system console for manually controlling the SYSUT1 trace input tape. A reply, END, terminates FLOWEDIT.

BLOCKNO -- nnnn is 1 to 4 decimal digits specifying the physical record at which block processing is to be resumed. Default is 1 if the keyword is omitted and MSG=NO.

LINECT -- yy is 1 to 2 decimal digits specifying the number of lines to be printed per page on SYSPRINT. Default is 50 if the keyword is omitted.

USR -- ccc is a 1 to 8 character load module name of the exit program to be loaded by FLOWEDIT. User exits are explained in the detailed writeup, and are not discussed in this handbook.

IEHTRACE

IEHTRACE is supported by FE Technical Operations, Dept. B56, San Jose. IEHTRACE:

1. Provides a module flow or branch sequence trace.
2. May be invoked at job step initiation time.
3. May be invoked dynamically by the problem program.

JCL

//GO	EXEC	PGM=IEHTRACE,PARM='a,b,c,d,e,f'
//TRACEOUT	DD	SYSOUT=A
//.....	(DD cards for program that is being traced)	

PARM -- the parameters are positional:

a = option bytes (two bytes)
b = name of program to be traced.
c = number of trace entries (default of 1600 bytes).
d = RB name.
e = compare address.
f = parameters to be passed to program that is being traced.

Options -- Byte 0:

Bit 0 = 0 -- Not last entry.
Bit 0 = 1 -- Last entry.
Bit 1 = 0 -- Enable the trace program.
Bit 1 = 1 -- Disable the trace program.
Bit 2 = 0 -- Do not delete until step termination.
Bit 2 = 1 -- Delete trace from core.
Bit 3 = 0 -- Trace only the task that invoked the trace program.
Bit 3 = 1 -- Trace all tasks.
Bit 4 = 0 -- Provide a branch trace.
Bit 4 = 1 -- Provide an RB queue name trace.
Bit 5 = 0 -- Do not invoke SNAP routine.
Bit 5 = 1 -- Invoke SNAP routine.
Bit 6 = 0 -- Trace problem program mode only.
Bit 6 = 1 -- Trace problem program and supervisor mode.
Bit 7 = 0 -- Do not trace across a LINK SVC if bit 6 = 0.
Bit 7 = 1 -- Trace across a LINK SVC if bit 6 = 0.

Byte 1:

Bit 0 -- Reserved.
Bit 1 = 1 -- Interrupt trace.
Bit 2 = 1 -- Force dump at end.
Bit 3 = 0 -- Reserved.
Bit 4 = 1 -- Record RB name in the trace table.
Bits 5-7 -- Reserved.

IMAPTFLE (TLKEDT)

IMAPTFLE is a class A program contained in SYS1.DN554 with DPPID distribution. IMAPTFLE:

1. Automatically produces JCL for PTF's.
2. JCL is tailored to target system.
3. Requires SYSGEN stage 1 output for target system.

JCL

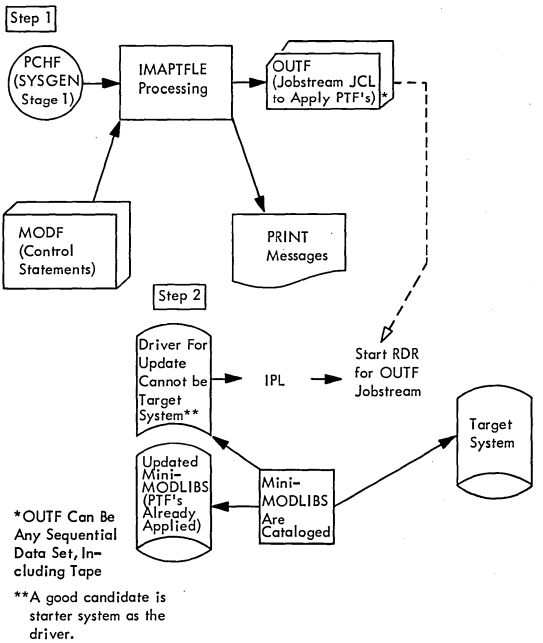
//GO	EXEC	PGM=IMAPTFLE	Formerly called TLKEDT.
//PRINT	DD	SYSOUT=A	Message data set.
//OUTF	DD	UNIT=00D	Output JOB stream from IMAPTFLE.
//PCHF	DD	UNIT=2400,LABEL=(,NL),DISP=OLD,VOL=SER=SYSGEN,	
//		DCB=(-)	
		SYSGEN stage 1.	
//MODF	DD	*	Control statement input.

Control Statements (150 maximum per execution)

Col 1	Col 10	Col 19-71
Module-name	SSI	Comments, if any.

Module-name -- Name for which IMAPTFLE scans in the NAME cards of the stage 1 input (described by the PCHF DD card).

SSI -- SSI (from PTF cover letter) for the module. For example, PTF 360S-40069-008 "hits" module IEKQSM and the SSI for that module is 04114069.



IMAPTFLS (PTFLIST)

IMAPTFLS is a class A program contained in SYS1.DN554 with DPPID distribution. IMAPTFLS:

1. Lists modules with a PTF or local fix applied.
2. Lists PTF numbers contained in the system.
3. Summarizes data set physical characteristics.

JCL

//GO	EXEC	PGM=IMAPTFLS	Formerly called PTFLIST.
//SYSPRINT	DD	SYSOUT=A	Listing output data set.
//anyname1	DD	DSN=library-to-analyze, DISP=SHR	A DD for each library to analyze for PTF's.
//LISTREST	DD	DUMMY	Optional. Specific DD cards follow:
//anyname2	DD	DSN=library-to-list-all, DISP=SHR	A DD for each library to list completely.

IMAPTFLS (Continued)

anyname1 -- The DD card(s) that appear before the LISTREST DD card should describe data set(s) that are to be analyzed for any PTF/local fix(es) applied. The analysis is printed.

LISTREST -- Appears only if all SSI information for data sets in DD cards following LISTREST are to be completely listed.

anyname2 -- The DD card(s) that appear after the LISTREST DD card should describe data set(s) whose SSI is to be completely printed.

The "anyname" DD cards can have any DD name except LISTREST or SYSXXXXX (must not begin with the letters SYS because IMAPTFLS ignores this type of statement.)

IMASPZAP (SUPERZAP)

IMASPZAP is a class A program contained in SYS1.DN554 with DPPID distribution. IMASPZAP:

1. Inspects/modifies data in a load module of a PDS.
2. Inspects/modifies data in specific records of a DASD data set.
3. Dumps entire data set, specific members of a PDS, or a record.

JCL

//GO	EXEC	PGM=IMASPZAP	Formerly SUPERZAP.
//SYSPRINT	DD	SYSOUT=A	Output print data.
//SYSLIB	DD	DSN=dsname,DISP=OLD,... (VOL,UNIT,etc)	Library to "hit". (Note 1)
//SYSIN	DD	*	Input control.

Control Statements
(when [CSECT] is omitted, the first CSECT in member is assumed)

* comments	Asterisk in col 1 with a blank in col 2 denotes a comment card that can be placed anywhere.
NAME member [CSECT]	Identifies a csect within a load module (member) for VERIFY, REP, SETSSI.
VERIFY location data	Location is hex offset (in multiple of 2) to where hex data is to be compared.
REP location data	Location is hex offset (in multiple of 2) to where hex data is to be inserted.
SETSSI xxyynnnn	Updates SSI in directory for member in NAME statement (Note 2).
DUMP member [CSECT]	Dump in hex. No RLD/ESD included. CSECT= 'ALL' for entire member.
DUMPT member [CSECT]	Same as DUMP, except that EBCDIC and instruction mnemonics are included.
CCHHR ccchhhhrr(hex)	Identifies a data record from SYSLIB for VERIFY, REP.
ABSDUMP ccchhhhrr / ccchhhhrr / member / ALL	Hex dump of all records. Can be by start/stop address, by member, or whole data set.
ABSDUMPT	Same as ABSDUMP, except EBCDIC and instruction mnemonics included.
BASE nn	nn is subtracted from the location specified on any subsequent VERIFY, REP.
CONSOLE	IMASPZAP operation is switched to the console. Reply 'END' to switch back.

Notes:

1. When the SYSLIB data set to be accessed is the VTOC, code DSN = FORMAT4.DSCB.

2. If SETSSI is not used, IMASPZAP automatically sets the local fix flag in SSI.

IMBMDMAP (LMODMAP)

IMBMDMAP is a class A program contained in SYS1.DN554 with DPPID distribution. IMBMDMAP:

1. Produces maps showing CSECT's, entry points, locations and references.
2. Maps nucleus, any load modules or link pack area of MFT or MVT.
3. Maps consist of ESD and RLD items sorted numerically and alphabetically.
4. Link pack map consists of CDE entries sorted as in 5.
5. Basic map produces only the numeric listing by ESD.

JCL

//GO	EXEC	PGM = IMBMDMAP [, PARM = ' LINKPACK, BASIC, DEBUG, xxxxxx']
//SYSPRINT	DD	SYSOUT=x Print Data Set.
//anyname	DD	DSN=dsname(member), One for each Module DISP=SHR to be Mapped.
//SNAPDUMP	DD	SYSOUT=x Must be included if 'DEBUG' is specified.
//SYSABEND	DD	SYSOUT=x If 'DEBUG' is specified and an ABEND dump is desired.

LINKPACK -- Specifies that map of the link pack area MVT/MFT is to be produced. In order to obtain a map of all LINKPACK modules, a map of the nucleus currently in core must be run concurrently.

BASIC -- Specifies that only the ESD numeric listing is to be produced.

DEBUG -- See IMBMDMAP service aid details.

xxxxxx -- 1 to 6 character hex address specifies that the map is to be relocated to an address other than zero. This will affect all maps in that execution except the SYS1.NUCLEUS data set.

IMCJQDMP (JOBQDUMP)

IMCJQDMP is a class A program contained in SYS1.DN554 with DPPID distribution. IMCJQDMP:

1. Provides a formatted dump of SYS1.SYSJOBQE.
2. Operates independently (stand-alone); contents of job queue are unchanged.
3. Output is directed to tape or printer.
4. Provides ability to select specific QCR's and/or jobnames.

IPL after WAIT state, press request key. Program prints:

```
ENTER O=XXXD, Q=YYY(, S) OR PRESS INTERRUPT KEY FOR O=00E, Q=191
```

Reply (or press EXT INTRPT key for default).

```
O=xxxd, Q=yyy, SELECT
```

IMCJQDMP (Continued)

xxx -- The address of the output device.

d -- Indicates output device type; if omitted, assumes that a 1403 Printer is being used. (T = Tape)

yyy -- The device on which the SYS1.SYSJOBQE has been mounted.

SELECT -- Indicates selective rather than full printing, and the message:

```
SPECIFY SELECT PARAMETERS
```

will be issued.
QCR=, JOBNAME=, and END are the parameters.

QCR -- The QCR parameters are mutually exclusive.

ASB

CLASS = y -- Where y is replaced with A through O.

FREE

OLD

RJE

SYSOUT = x -- Where x is replaced with one of the 36 output classes.

JOBNAME = (w, x, y, z) -- Up to four jobnames may be specified.

END -- When all requests have been fulfilled, reply with this parameter.

When using tape for output, IMCJQDMP writes 121-byte records on nonlabeled tape, the first character of which is a machine control character. IEBPTPCH may be used to print the tape with the following SYSUT1 DD and IEBPTPCH control cards:

```
//SYSUT1  DD  UNIT=2400,LABEL=(,NL),VOL=SER=JQDMP,
//              DISP=(OLD,KEEP),DCB=(RELFM=F,BLKSIZE=121,
//              LRECL=121)

                PRINT   PERFORM = M
```

IMDPRDMP (PRNTDMP)

IMDPRDMP is a class A program contained in SYS1.DN554 with DPPID distribution. IMDPRDMP:

1. Formats and prints the output produced from IMDSADMP.
2. Formats similar to a system ABEND dump.
3. Control information may be entered from reader or console.
4. Optionally uses direct-access workfile for faster access to DUMP.

JCL

//GO	EXEC	PGM=IMDPRDMP,PARM='a,T, BUFnnn,S,FREEnnn,LINECNT=nn	Formerly PRNTDMP.
//TAPE	DD	DSN=DUMP1,VOL=SER=DUMPIN, LABEL=(,NL), DISP=OLD,UNIT=2400	Input.
//PRINTER	DD	SYSOUT=A	Primary output.
//SYSPRINT	DD	SYSOUT=A	Message data set.
//SYSUT1	DD	UNIT=SYSDA,SPACE= (2052,(n,10))	n=(coresize/2048)+1
//SYSUT2	DD	DSN,SPACE=(2052,(n,10)),DISP	For SYS1.DUMP.
//SYSWAP	DD	(Refer to TSO Procedure)	TSO swap data set.
//SYSIN	DD	*	Control cards.

PARM: a -- Program action to be taken in event of exceptional condition.

0 -- Print nucleus if format error, permanent I/O error, or program check.

1 -- Print the tape if error is as specified above (DEFAULT).

2 -- Read next card from SYSIN (if present) or request control verbs from operator if error is as specified above.

T -- Causes a WTOR requesting a dump title and number.

BUFnnn -- Maximum buffers for reading tape. Actual number is determined by available core. Each buffer is 2052 bytes. nnn may be any number from 1 to 255. Default assigned is 255.

S -- Causes a WTOR. A reply of STOP ceases operation on the current tape and the operator can begin new operations. S is ignored on PCP.

FREEnnn -- Available space for work area in region default = 8K
nnn = number of K bytes

LINECNT=nn -- Number of lines per page on output.

Control Statements

Function verbs:

NEWDUMP	Defines new dump input data sets.
NEWTAPE	Requests that current tape be dismounted and a new tape accepted.
GO	Requests the default format verbs. The GO verb may be altered by the previous use of the ONGO verb. The defaults are QCBTRACE, LPAMAP, FORMAT, and PRINT ALL. The GO verb must be last on a card or in a reply.
ONGO	Sets the default verb set for the GO verb. The parameters may consist of any of the format verbs separated by commas with a PRINT and its parameters last. The ONGO verb must be last on a card or in a reply and must be separated from its parameters by at least one blank.
TITLE	Sets the title used at the top of each page of the DUMP. The verb and the parameter must be separated by at least one blank. This verb must be the last on a card or in a reply.
END	Terminates IMDPRDMP. All subsequent verbs are ignored.
CVT = {hhhhhh / P}	Allows operator to specify address of CVT in the dump system if X'4C' was destroyed.
CVT = P	Specifies that the value in X'4C' of the current system is used.
CVT = hhhhhh	hhhhhh is a one to six digit hex address of the CVT.

Format verbs:

QCBTRACE	Requests a trace of the QCB's of the dumped system.

TSO	Print TSO Dump.
LPAMAP	Requests a map of the modules in the link pack area.
FORMAT	Requests formatting similar to SYSABEND for major control blocks for all job step and system tasks in the dumped system.
PRINT	Determines which areas of core are printed in the unformatted portion of the dump. The verb and the first parameter must be separated by at least one blank. Multiple parameters must be separated by commas.
ALL	Causes nucleus, SQS, and all allocated regions to be printed.
CURRENT	Prints only the core associated with the current task.
NUCLEUS	Prints the nucleus and SQS and both prefixes for MP65.
STORAGE = (beg1,end1,... ...begn,begn)	Prints storage located between each 'beg,end' pair. Addresses should be in hex. If an ending address is omitted, all core is printed starting with the 'beg' address. If STORAGE is specified with no parameters, all core storage is printed.
JOBNAME = (name1,name2,... ...name10)	Core associated with each specified jobname will be printed. A maximum of ten (10) may be specified.
F03	Prints core associated with any task terminated by DAR.

Notes:

1. All verbs must be separated by commas.
2. Verbs and their parameters may be entered from console in uppercase or lowercase. Abbreviations are acceptable for all verbs except FILEnn. Any truncation of the correct spelling is acceptable.

Sample

```
//IMDPRDMP  JOB   19,SAPGM,MSGLEVEL=1
//GO        EXEC  PGM=IMDPRDMP,PARM='2,T'
//TAPE      DD    DSN=DUMP,VOL=SER=IBM,LABEL=(,NL),DISP=
                  (OLD,KEEP)
//                UNIT=2400
//PRINTER   DD    SYSOUT=A,SPACE=(CYL,(10,1))
//SYSPRINT  DD    SYSOUT=A
//SYSUT1    DD    UNIT=SYSDA,DISP=NEW,SPACE=(2052,(257,10))
//SYSABEND  DD    SYSOUT=A
//SYSIN     DD    *
ONGO      L,F,P NUCLEUS,CURRENT
GO
 NEWTAPE,
 GO FILE01,
 Q, END
/*
```

IMDSADMP (RESDUMP)

IMDSADMP is a class A program contained in SYS1.DN554 with DPPID distribution.

1. High-speed or low-speed stand-alone dumps.
2. High-speed dumps can be printed by IMDPRDMP.
3. Tape output can only be on 9-track.
4. IMDSADMP is accomplished in two stages.
5. Stage 1 is a macro that punches control cards for stage 2.
6. Stage 2 initializes the desired tape or direct-access volume.

Prototype

Symbol* IMDSADMP IPL=,START=,TYPE=,PROTECT=,OUTPUT=

*Must not be used for IPL=TAPE.

IPL	Describes type of device upon which the dump program resides. If IPL = TAPE is selected, all keywords (except PROTECT and CPU) are ignored, TYPE = HI is generated and OUTPUT goes to the same volume on which the dump program resides.
TAPE	Generates a high-speed dump to reside on and be IPL'ed from tape.
ddd	Specifies that the dump program resides on and is IPL'ed from a direct-access device. ddd is the address of a device that must be mounted during stage 2 initialization.
191	The default for the IPL keyword.
START	Determines the starting location from which the stand-alone dump program is loaded into core. Valid only if TYPE = LO is also coded. For TYPE = HI, START = X'80' is assigned.
nnn	Specifies a decimal number. Should be 584 or higher.
X'hhh'	Specifies a hexadecimal address. Should be X'248' or higher.
X'F00'	The default value assigned.
TYPE	Specifies the version of dump desired:
HI	Specifies that a high-speed dump program is desired. Output is core image.
LO	Specifies that a low-speed dump program is desired. Output is EBCDIC to tape or printer. LO is the default value.
PROTECT	Specifies whether the storage protect feature is available on the CPU on which the stand-alone dump program is executed: NO - Storage Protect is not available. YES - Storage Protect is available. YES is the default.

OUTPUT	Specifies the output device on which the dump is to be taken. (For TYPE=HI, OUTPUT must be a tape device: Tttt - The device address of the tape output device. Pppp - The device address of the printer output device. P00E - The default.
CPU =	Defines the IBM System/370 or System/360 (DEFAULT). For MP systems, indicate CPU=xxx, MP.
CONSOLE =	Specifies the console address and type. (1052, 3066, 3210, 3215, 5450)

ISAMDUMP

ISAMDUMP is supported by FE Technical Operations, Dept. B56, San Jose. ISAMDUMP:

1. Provides a formatted dump of an ISAM data set.
2. Is executed independently or from a problem program with LINK macro.

JCL

//GO	EXEC	PGM=ISAMDUMP, PARM='IPOTLxxMxx'	
//ISAMDUMP	DD	DSN=ISAM, DCB=DSORG=IS, DISP=OLD	ISAM data set
//		UNIT=SYSDA, VOLUME=SER=SCRTCH	To be dumped
//ISAMPRT	DD	SYSOUT=A	Dump output

PARM: I - High level indexes are dumped.

P - Prime data records, track indexes, and cylinder overflow records are dumped.

O - Independent overflow records are dumped.

T - Track index entries are dumped without prime data records or cylinder overflow records.

Lxx - Causes the last xx prime cylinders to be dumped.

Mxx - Causes the last xx independent overflow cylinders to be dumped.

'IPO' are the default parameters. The parameters may be used in any combination and in any order.

REFMT

REFMT is supported by FE Technical Operations, Dept. H71, Poughkeepsie. REFMT:

1. Reformats DAR dumps in SYS1.DUMP to allow IMDPRDMP formatting.
2. Optionally resets SYS1.DUMP after reformatting.
3. Allows IMDPRDMP processing directly from direct access (no tape).

JCL

//GO	EXEC	PGM=REFMT[, PARM = 'RESET']	Code PARM to reset SYS1.DUMP
//SYSPRINT	DD	SYSOUT=A	Output messages
//SYSUT1	DD	DSN=SYS1.DUMP,DISP=SHR	DAR dump data set
//SYSUT2	DD	DSN=DARDUMP,UNIT=SYSDA, DISP=(,CATLG),	Reformatted data set
//		SPACE=(2052,(N,10))	n=(coresize/2048)+1

SYSUT1 is an example of a core image dump on direct access (cataloged).

SYSUT2 is an example of a reformatted dump to a direct-access data set. The reformatted output is then processed by IMDPRDMP as follows:

Post Processing by IMDPRDMP

//GO	EXEC	PGM=IMDPRDMP	Default PARM='1, BUF255'
//SYSPRINT	DD	SYSOUT=A	Messages
//PRINTER	DD	UNIT=00E	Formatted dump. Can be SYSOUT.
//SYSUT1	DD	DSN=DARDUMP,DISP=OLD	From REFMT output (See note).
//SYSIN	DD	*	Input control statements.
GO			Defaults to Q,L,F,P ALL
END			End control stream
/*			

Note: SYSUT1 should not be UNCATLG or DELETEd until dump output is verified.

TFLOW

TFLOW is supported by SDD, Dept. D54, Poughkeepsie. Highlights are:

1. Continuously traces system interrupts and module flow.
2. No trace table required in system -- TFLOW is self-hooking.
3. Very low degradation on system throughput.
4. User exit capability and user trace facility.

JCL
(High dispatching priority should be assigned to TFLOW)

//GO	EXEC	PGM=TFLOW, TIME=1440, PARM='ALL DEFAULT, FETCH, PCI, USR=nnnn'
//SYSLIB	DD	DSN=SYS1.SVCLIB, DISP=SHR IGG019X0 must be in SVCLIB.
//TRACEOUT	DD	UNIT=2400, LABEL=(,NL), VOL=SER=TFLOW, DISP=(,KEEP) trace output. Trace output tape may be labeled. If 7-track, code DCB=(TRTCH=C).

TFLOW (Continued)

ALL	Optional. Trace starts immediately, including start I/O traces.
DEFAULT	Optional. Mutually exclusive with ALL. Trace starts when IBMTEST, step GO, is active. Start I/O is included. If neither ALL nor DEFAULT is coded, operator messages request information for: start I/O trace, jobname to start trace, stepname to start trace if a jobname was selected, and YES or NO to stop trace on an ABEND for jobname.
FETCH	Normally, program FETCH activity is not traced (fills trace output with information not normally needed). Code this parameter if a FETCH trace is desired.
PCI	PCI is not normally traced because of the critical timing of PCI appendages. Code this parameter if a PCI trace is desired; system result may be unpredictable.
USR	nnnn is a 1 to 8 character module name that is LOADed by TFLOW as an exit program. Exits are not explained in this handbook.

Control Message

```
TFLOW-TO MANUALLY CONTROL TRACING, REPLY AT ANY TIME WITH ON,
OFF, END OR CNT
```

The above message is a WTOR and is always outstanding at execution. It provides the user with a manual method of control. END terminates TFLOW. CNT causes the physical block count for the current TRACEOUT volume. This count can serve as a "checkpoint" to determine where to start editing with the data reduction service and FLOWEDIT. TFLOW terminates with a dump if ABE reply is given. The physical block count is automatically printed every 200 blocks written on TRACEOUT.

VABDUMP

VABDUMP is supported by SDD, Dept. D54, Poughkeepsie. Highlights are:

1. Formats data management control blocks.
2. Includes information for each open data set.
3. Blocks are formatted for each DDNAME.
4. Blocks included are DEB, DCB, IOB, ICB, and UCB.

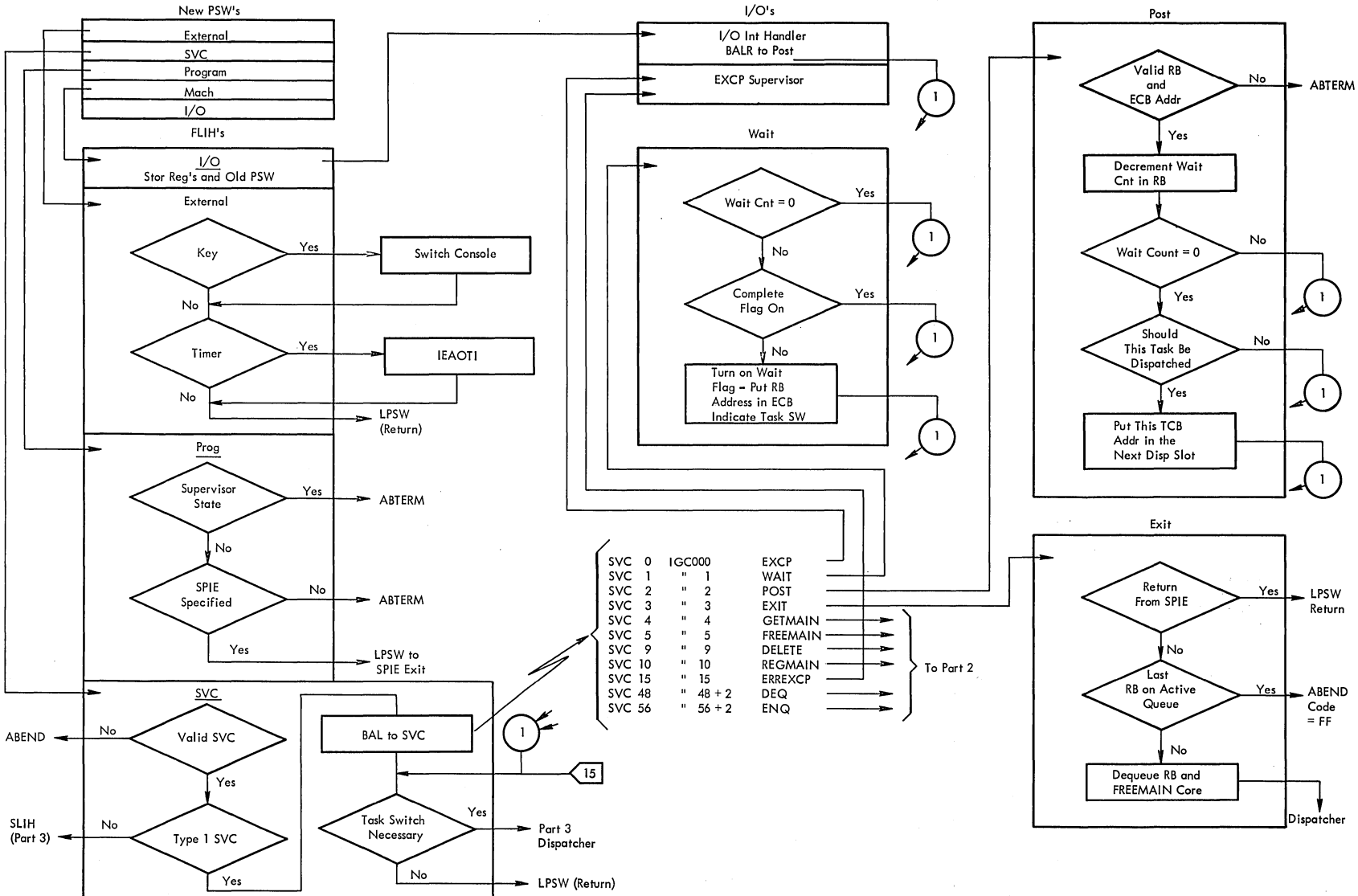
VABDUMP is applied to the system as module IGC0V05A in SYS1.SVCLIB and must be "connected" to ABDUMP by a SUPERZAP:

SUPERZAP "connection" for release 20 (microfiche IEAQAD02)

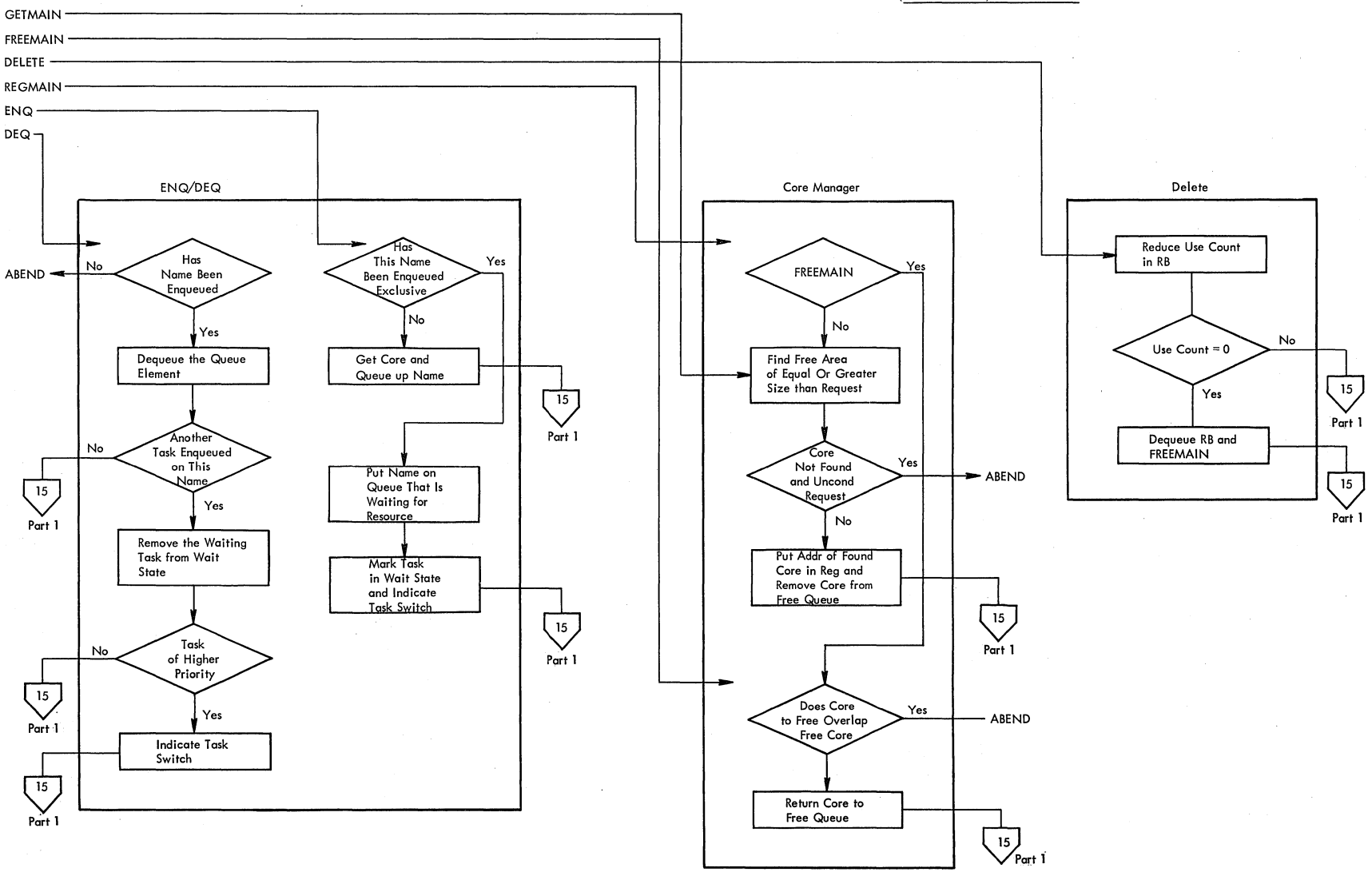
```
NAME      IGC0205A
VERIFY    030C   F3F0        (031A for 20.1)
REP       030C   E5F0
DUMPT     IGC0205A
```

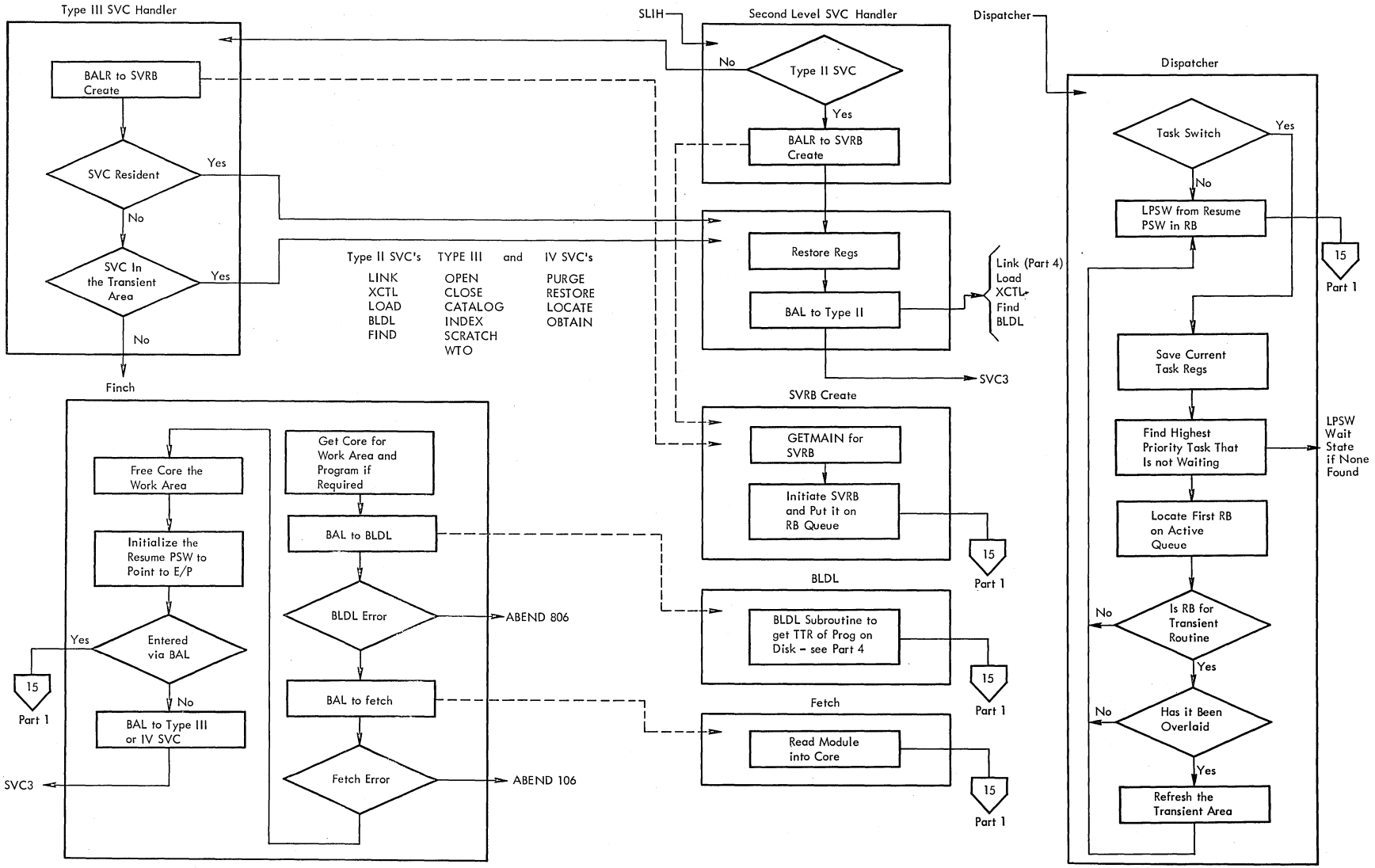
Example Output (right hand 16 bytes of each control block not shown)

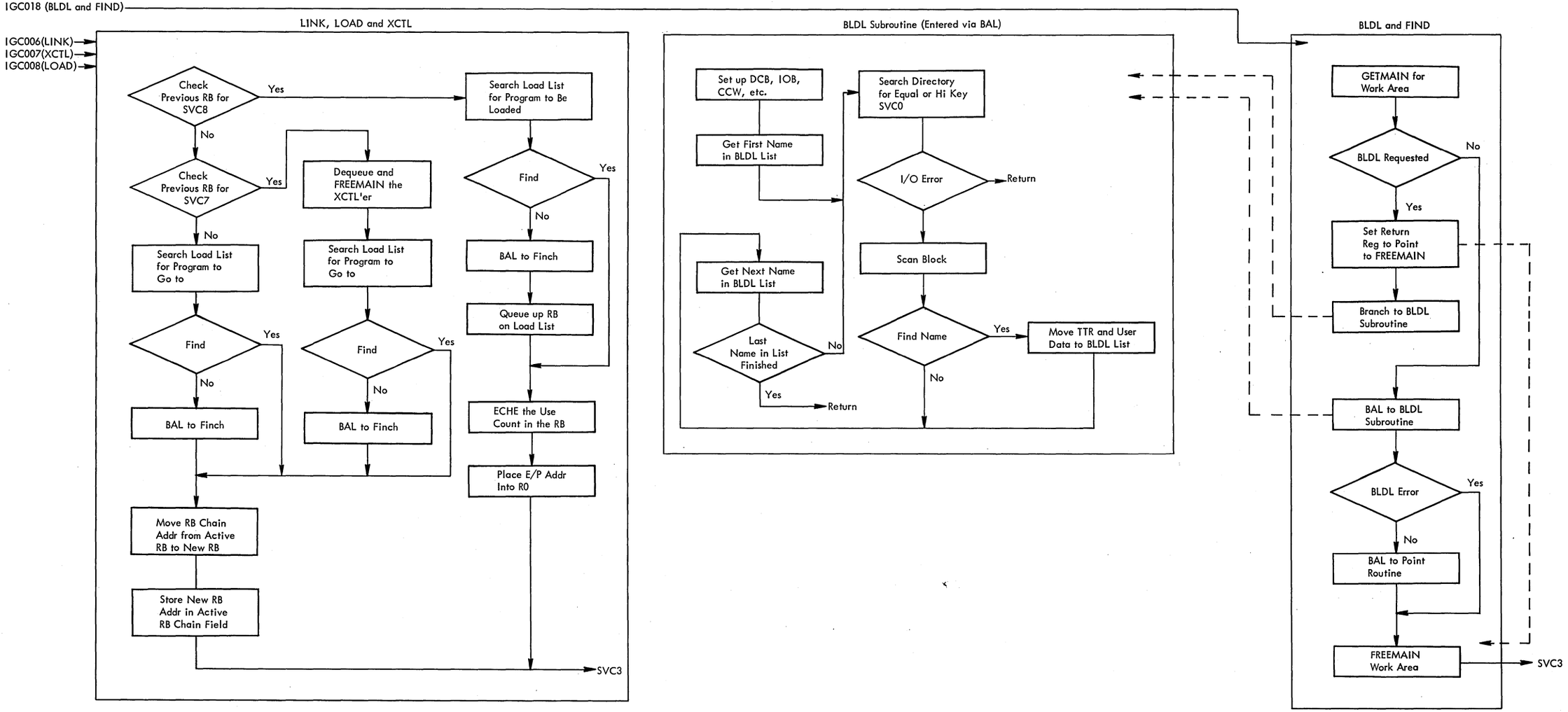
```
MYDATA   DEB   03FCA4   04000180  0403FD14  C8000000  0F000000
                        1800222C  00000003  00010003  00020002
                        0003FAF8  000054B8  8000559C  00001308

         DCB   017638   00000000  14000000  00030001  000072E0
                        04000001  80000000  002C0050  0C03FCA4
                        28050040  4203F760  0003F918  0003F8C8

         IOB   03F710   00000048  7F000000  0003F760  0003F7A8
                        0003F748  00017638  00000000  00000000
                        0803F748  00000000  08000000  00000000
```

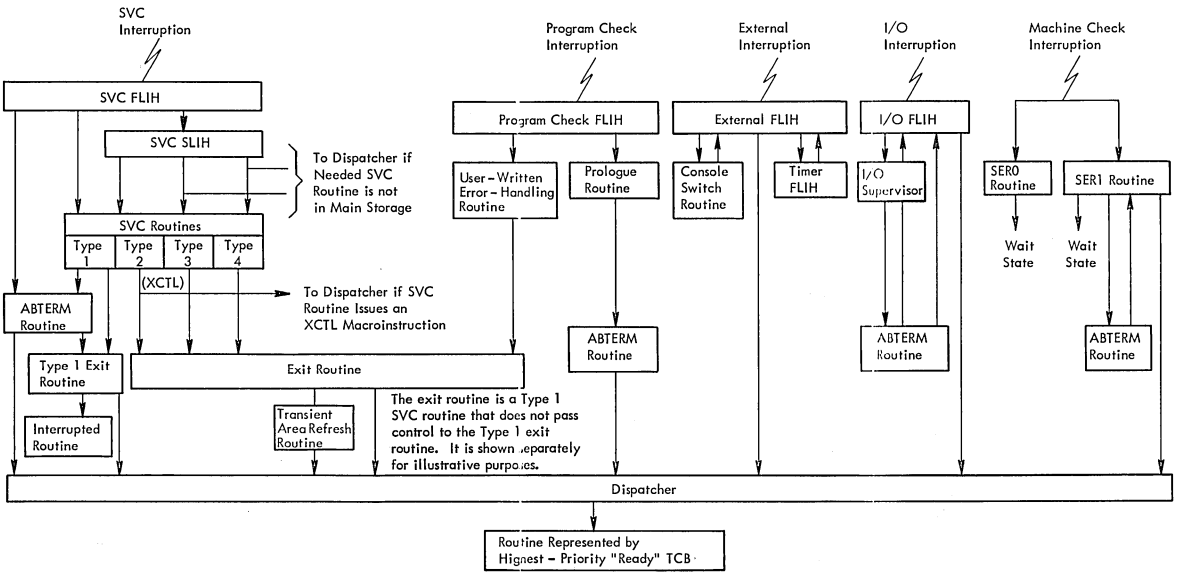


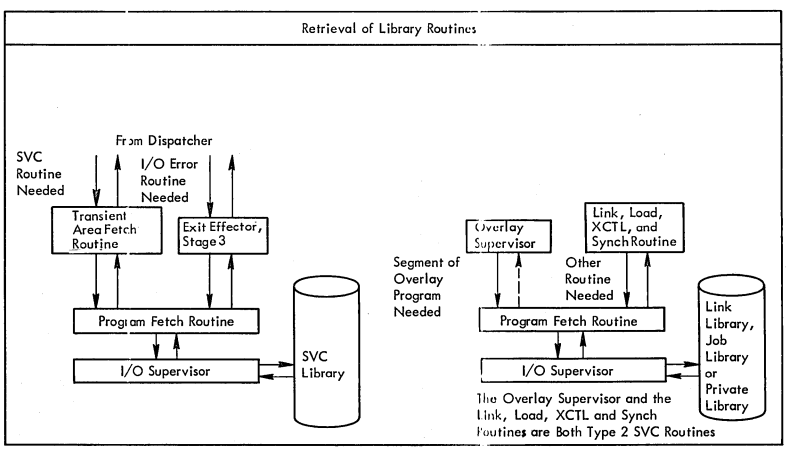
GENERAL FLOW DIAGRAMS

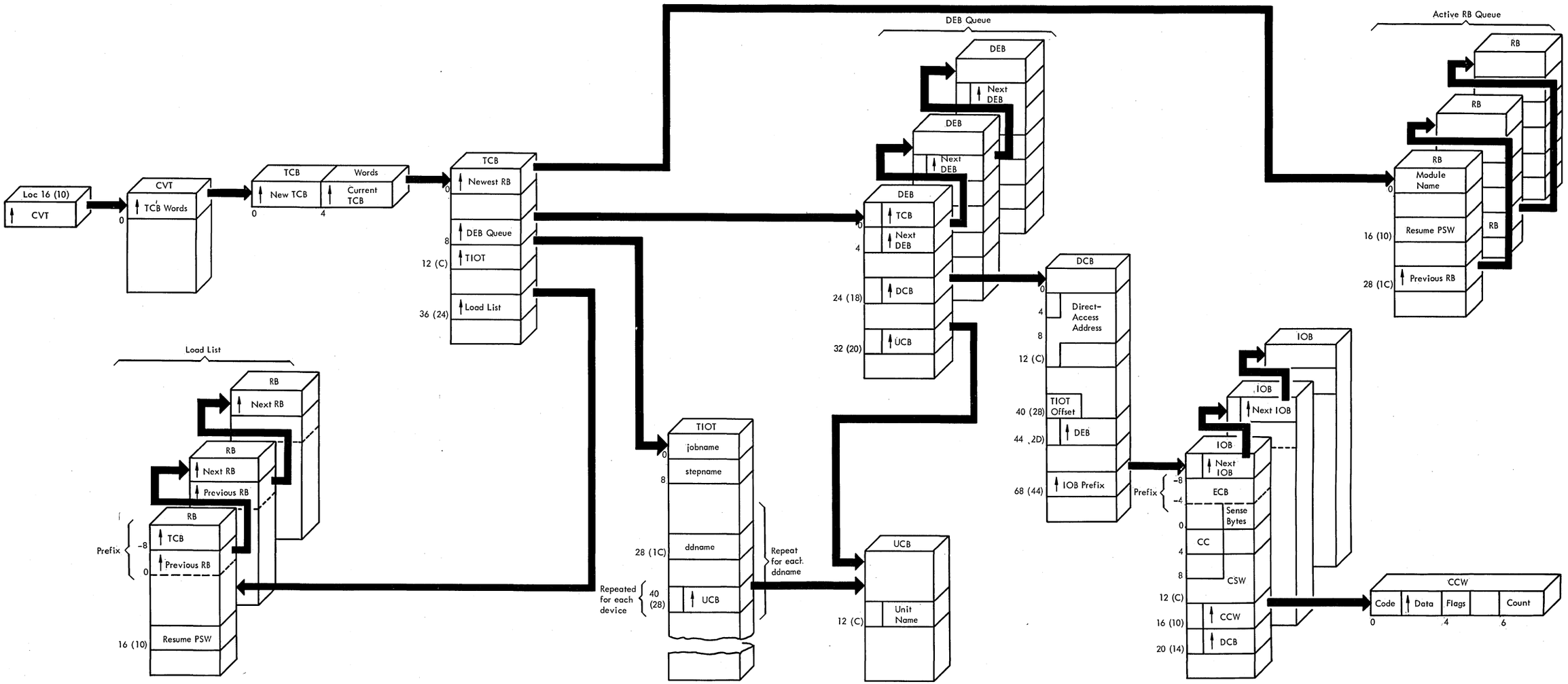

GETMAIN
FREEMAIN
DELETE
REGMAIN
ENQ
DEQ
ENQ/DEQ
Has Name Been Enqueued
No
ABEND
Yes
Dequeue the Queue Element
Another Task Enqueued on This Name
No
15
Part 1
Yes
Remove the Waiting Task from Wait State
Task of Higher Priority
No
15
Part 1
Yes
Indicate Task Switch
15
Part 1
Has This Name Been Enqueued Exclusive
Yes
No
Get Core and Queue up Name
15
Part 1
Put Name on Queue That Is Waiting for Resource
Mark Task in Wait State and Indicate Task Switch
15
Part 1
Core Manager
FREEMAIN
Yes
No
Find Free Area of Equal Or Greater Size than Request
Core Not Found and Uncond Request
Yes
ABEND
No
Put Addr of Found Core in Reg and Remove Core from Free Queue
15
Part 1
Does Core to Free Overlap Free Core
Yes
ABEND
Return Core to Free Queue
15
Part 1
Delete
Reduce Use Count in RB
Use Count = 0
No
15
Part 1
Yes
Dequeue RB and FREEMAIN
15
Part 1

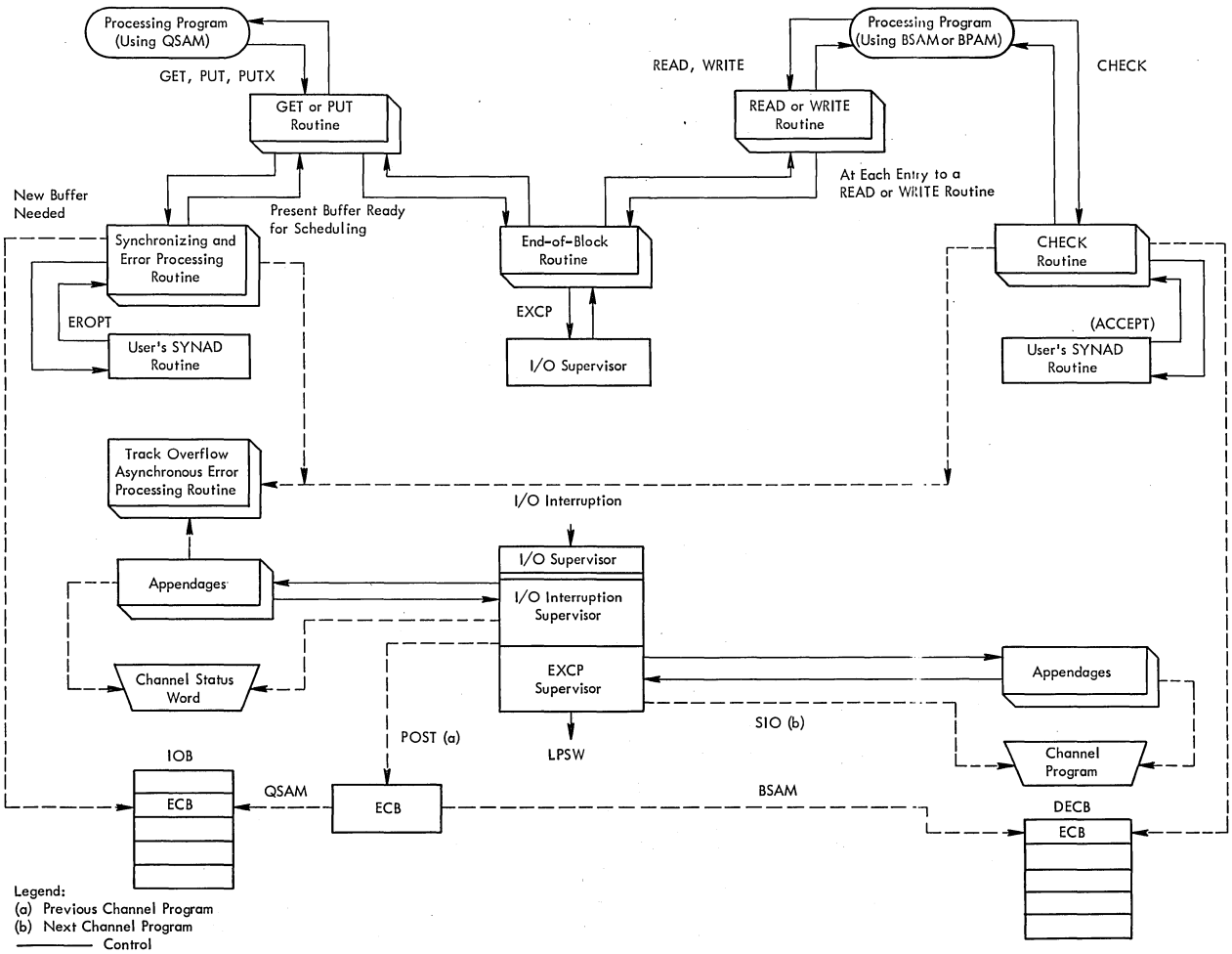

Type III SVC Handler
BALR to SVRB Create
SVC Resident
Yes
No
SVC In the Transient Area
Yes
No
Finch
SLIH
Second Level SVC Handler
No
Type II SVC
Yes
BALR to SVRB Create
Restore Regs
BAL to Type II
Link (Part 4) Load XCTL Find BLDL
SVC3
Type II SVC's
LINK
XCTL
LOAD
BLDL
FIND
TYPE III and IV SVC's
OPEN
CLOSE
CATALOG
INDEX
SCRATCH
WTO
PURGE
RESTORE
LOCATE
OBTAIN
Free Core the Work Area
Initialize the Resume PSW to Point to E/P
Entered via BAL
Yes
No
15
Part 1
BAL to Type III or IV SVC
SVC3
Get Core for Work Area and Program if Required
BAL to BLDL
BLDL Error
ABEND 806
BAL to fetch
Fetch Error
ABEND 106
SVRB Create
GETMAIN for SVRB
Initiate SVRB and Put it on RB Queue
15
Part 1
BLDL
BLDL Subroutine to get TTR of Prog on Disk - see Part 4
15
Part 1
Fetch
Read Module into Core
15
Part 1
Dispatcher
Dispatcher
Task Switch
Yes
No
LPSW from Resume PSW in RB
15
Part 1
Save Current Task Regs
Find Highest Priority Task That Is not Waiting
LPSW Wait State if None Found
Locate First RB on Active Queue
No
Is RB for Transient Routine
Yes
No
Has it Been Overlaid
Yes
Refresh the Transient Area


IGC018 (BLDL and FIND)
LINK, LOAD and XCTL
IGC006(LINK)
IGC007(XCTL)
IGC008(LOAD)
Check Previous RB for SVC8
Yes
No
Search Load List for Program to Be Loaded
Check Previous RB for SVC7
Yes
No
Dequeue and FREEMAIN the XCTL'er
Search Load List for Program to Go to
Search Load List for Program to Go to
Find
Yes
No
BAL to Finch
Find
Yes
No
BAL to Finch
Find
Yes
No
BAL to Finch
Queue up RB on Load List
ECHE the Use Count in the RB
Place E/P Addr Into R0
Move RB Chain Addr from Active RB to New RB
Store New RB Addr in Active RB Chain Field
SVC3
BLDL Subroutine (Entered via BAL)
Set up DCB, IOB, CCW, etc.
Get First Name in BLDL List
Search Directory for Equal or Hi Key SVC0
I/O Error
Return
Scan Block
Get Next Name in BLDL List
Last Name in List Finished
No
Yes
Return
Find Name
Yes
No
Move TTR and User Data to BLDL List
BLDL and FIND
GETMAIN for Work Area
BLDL Requested
No
Yes
Set Return Reg to Point to FREEMAIN
Branch to BLDL Subroutine
BAL to BLDL Subroutine
BLDL Error
Yes
No
BAL to Point Routine
FREEMAIN Work Area
SVC3

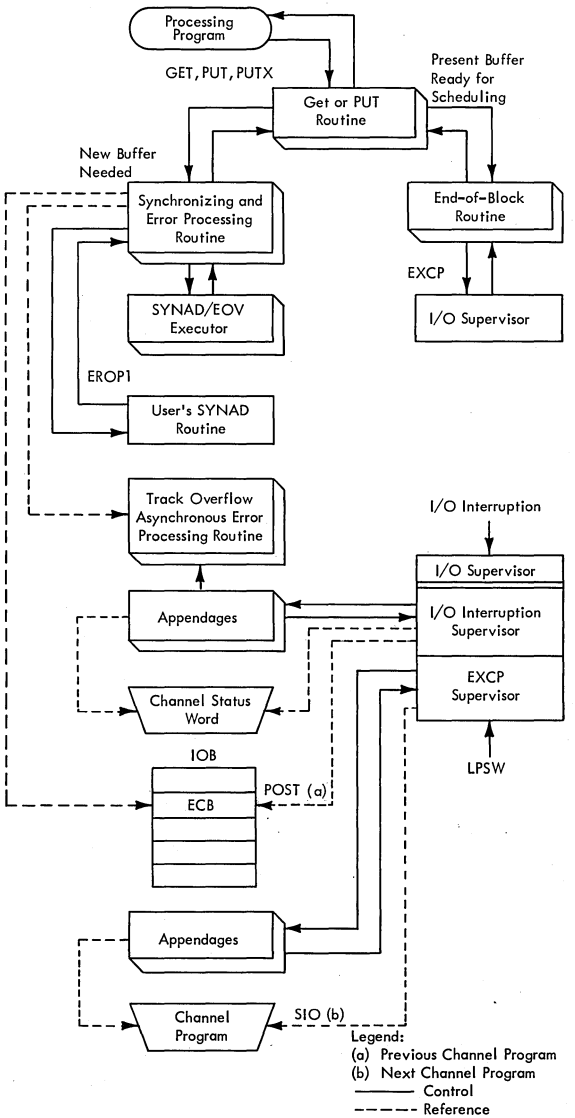

SVC Interruption
SVC FLIH
SVC SLIH
To Dispatcher if Needed SVC Routine is not in Main Storage
SVC Routines
Type 1
Type 2
Type 3
Type 4
(XCTL)
To Dispatcher if SVC Routine Issues an XCTL Macroinstruction
ABTERM Routine
Type 1 Exit Routine
Exit Routine
Interrupted Routine
Transient Area Refresh Routine
The exit routine is a Type 1 SVC routine that does not pass control to the Type 1 exit routine. It is shown separately for illustrative purposes.
Program Check Interruption
Program Check FLIH
User-Written Error-Handling Routine
Prologue Routine
ABTERM Routine
External Interruption
External FLIH
Console Switch Routine
Timer FLIH
I/O Interruption
I/O FLIH
I/O Supervisor
ABTERM Routine
Machine Check Interruption
SER0 Routine
SER1 Routine
Wait State
Wait State
ABTERM Routine
Dispatcher
Routine Represented by Highest-Priority "Ready" TCB


Retrieval of Library Routines
From Dispatcher
SVC Routine Needed
I/O Error Routine Needed
Transient Area Fetch Routine
Exit Effector, Stage 3
Program Fetch Routine
I/O Supervisor
SVC Library
Segment of Overlay Program Needed
Overlay Supervisor
Link, Load, XCTL, and Synch Routine
Other Routine Needed
Program Fetch Routine
I/O Supervisor
Link Library, Job Library or Private Library
The Overlay Supervisor and the Link, Load, XCTL and Synch Routines are Both Type 2 SVC Routines

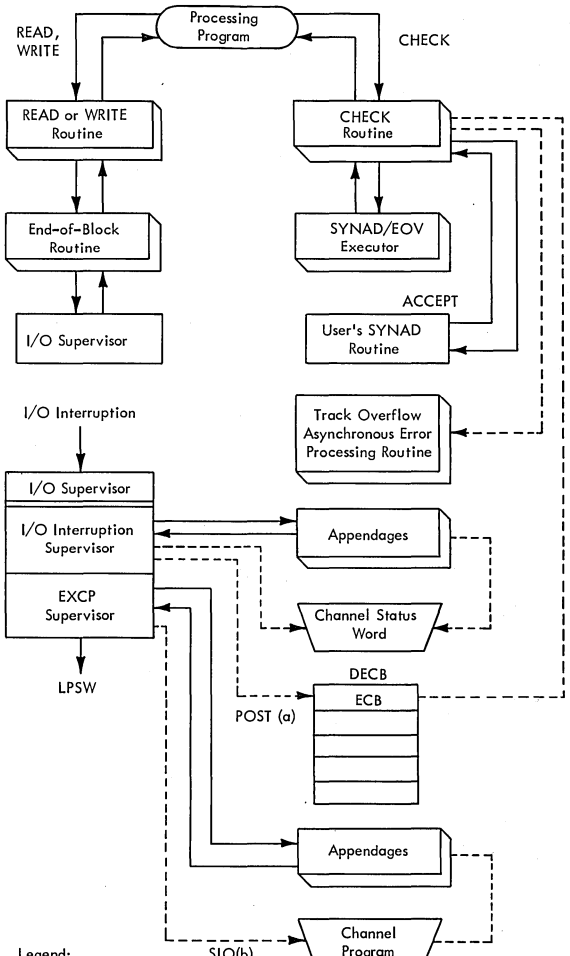

Loc 16 (10)
CVT
CVT
TCB Words
0
TCB
New TCB
Words
Current TCB
0
4
TCB
Newest RB
0
DEB Queue
8
TIOT
12 (C)
Load List
36 (24)
DEB Queue
DEB
Next DEB
DEB
Next DEB
DEB
TCB
Next DEB
DCB
UCB
0
4
24 (18)
32 (20)
Active RB Queue
RB
RB
RB
Module Name
0
Resume PSW
16 (10)
RB
Previous RB
28 (1C)
Load List
RB
Next RB
RB
Next RB
Previous RB
RB
TCB
Previous RB
Prefix
-8
0
Resume PSW
16 (10)
TIOT
jobname
0
stepname
8
ddname
28 (1C)
UCB
40 (28)
Repeated for each device
Repeat for each ddname
UCB
Unit Name
12 (C)
DCB
0
Direct-Access Address
4
8
12 (C)
TIOT Offset
40 (28)
DEB
44 (2D)
IOB Prefix
68 (44)
IOB
IOB
Next IOB
IOB
Next IOB
Prefix
-8
-4
ECB
Sense Bytes
0
CC
4
8
CSW
12 (C)
CCW
16 (10)
DCB
20 (14)
CCW
Code
Data
Flags
Count
0
4
6

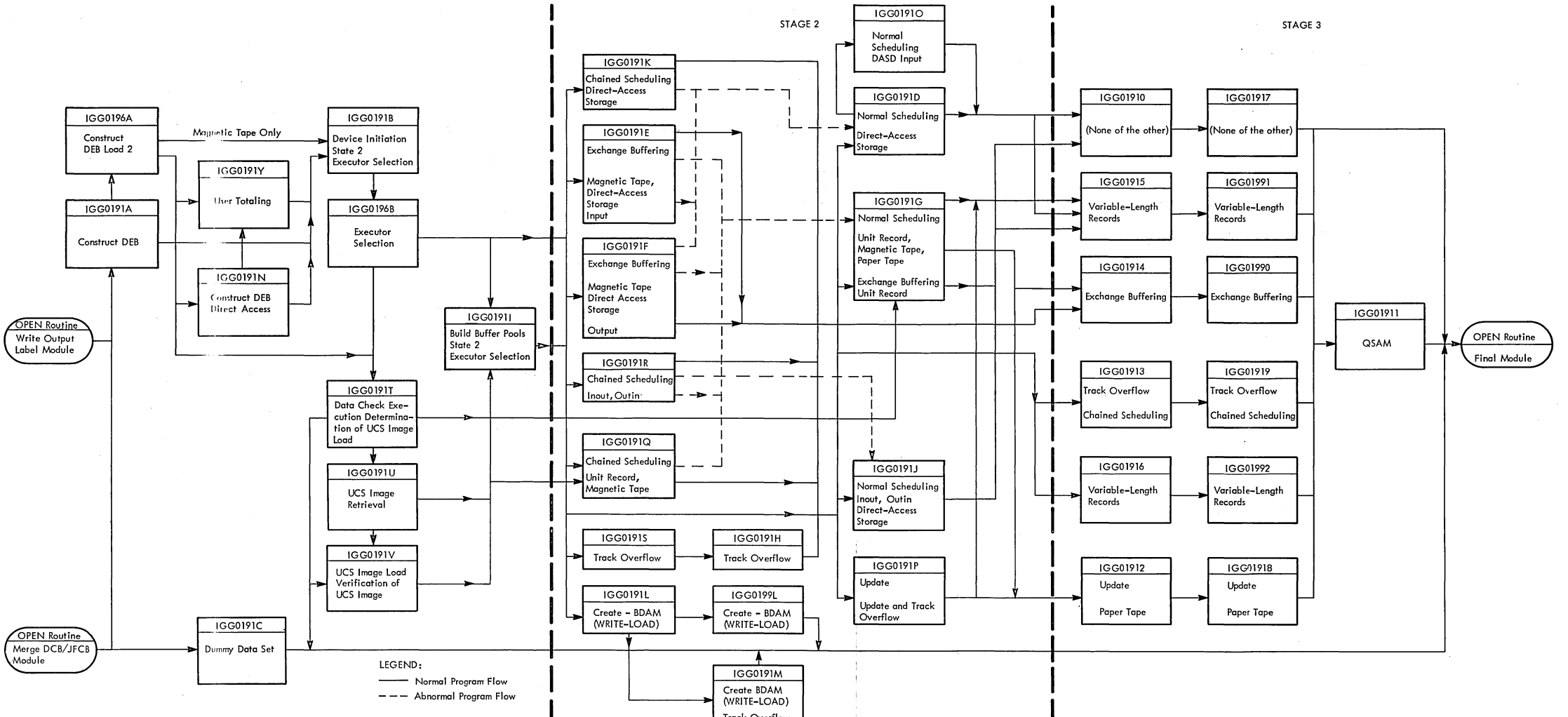

Processing Program (Using QSAM)
GET, PUT, PUTX
GET or PUT Routine
New Buffer Needed
Present Buffer Ready for Scheduling
Synchronizing and Error Processing Routine
EROPT
User's SYNAD Routine
End-of-Block Routine
EXCP
I/O Supervisor
Processing Program (Using BSAM or BPAM)
READ, WRITE
READ or WRITE Routine
At Each Entry to a READ or WRITE Routine
CHECK
CHECK Routine
(ACCEPT)
User's SYNAD Routine
Track Overflow Asynchronous Error Processing Routine
I/O Interruption
I/O Supervisor
I/O Interruption Supervisor
EXCP Supervisor
Appendages
Channel Status Word
Appendages
POST (a)
LPSW
SIO (b)
Channel Program
IOB
ECB
QSAM
ECB
BSAM
DECB
ECB
Legend:
(a) Previous Channel Program
(b) Next Channel Program
Control
Reference

FLOW OF CONTROL IN QSAM



FLOW OF CONTROL IN BSAM




STAGE 2
STAGE 3
IGG0196A
Construct DEB Load 2
Magnetic Tape Only
IGG0191B
Device Initiation State 2 Executor Selection
IGG0191Y
User Totaling
IGG0191A
Construct DEB
IGG0196B
Executor Selection
IGG0191N
Construct DEB Direct Access
OPEN Routine
Write Output Label Module
IGG01911
Build Buffer Pools State 2 Executor Selection
IGG0191T
Data Check Execution Determination of UCS Image Load
IGG0191U
UCS Image Retrieval
IGG0191V
UCS Image Load Verification of UCS Image
OPEN Routine
Merge DCB/JFCB Module
IGG0191C
Dummy Data Set
IGG0191K
Chained Scheduling Direct-Access Storage
IGG0191E
Exchange Buffering
Magnetic Tape, Direct-Access Storage Input
IGG0191F
Exchange Buffering
Magnetic Tape Direct Access Storage
Output
IGG0191R
Chained Scheduling
Inout, Outin
IGG0191Q
Chained Scheduling
Unit Record, Magnetic Tape
IGG0191S
Track Overflow
IGG0191H
Track Overflow
IGG0191L
Create - BDAM (WRITE-LOAD)
IGG0199L
Create - BDAM (WRITE-LOAD)
IGG0191M
Create BDAM (WRITE-LOAD)
Track Overflow
IGG0191O
Normal Scheduling DASD Input
IGG0191D
Normal Scheduling
Direct-Access Storage
IGG0191G
Normal Scheduling
Unit Record, Magnetic Tape, Paper Tape
Exchange Buffering
Unit Record
IGG0191J
Normal Scheduling
Inout, Outin
Direct-Access Storage
IGG0191P
Update
Update and Track Overflow
IGG01910
(None of the other)
IGG01915
Variable-Length Records
IGG01914
Exchange Buffering
IGG01913
Track Overflow
Chained Scheduling
IGG01916
Variable-Length Records
IGG01912
Update
Paper Tape
IGG01917
(None of the other)
IGG01991
Variable-Length Records
IGG01990
Exchange Buffering
IGG01919
Track Overflow
Chained Scheduling
IGG01992
Variable-Length Records
IGG01918
Update
Paper Tape
IGG01911
QSAM
OPEN Routine
Final Module
LEGEND:
Normal Program Flow
Abnormal Program Flow

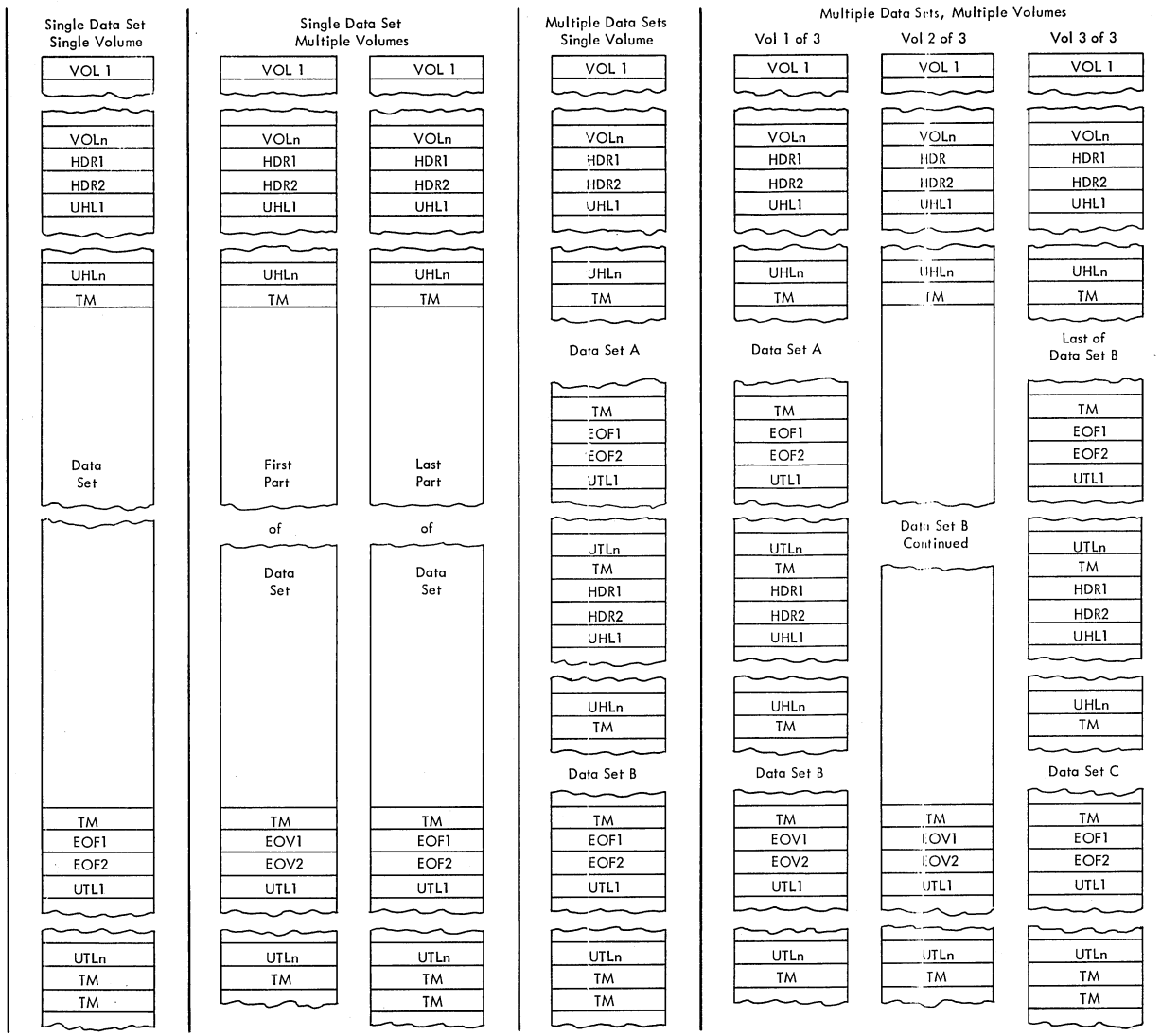
DIRECT ACCESS LABEL TRACK (TRK 0, CYL 0)

H A	R0 Track Descriptor	R1 24 Bytes IPL Record*	R2 144 Bytes IPL2 Record	R3 80 Bytes Volume Label	R4 **

*Non-IPL Volume: PSW X'0006000000000000F'
CCW1 X'0300000000000001'
CCW2 X'0000000000000000'
IPL Volume: PSW X'0000000000000000'
CCW1 X'06003A9860000060'
CCW2 X'08003A9800000000'

**R4 on 2301 or 2314 contains IPL program; otherwise, IPL program (IEAIPL00) is placed on Track 1.

MAGNETIC TAPE



DEVICE ALLOCATION FOR NEW DATA SETS -- DECISION CHART

If request is		and data set is		then it can be satisfied with a volume that is:							
				Permanently Resident			Reserved			Removable	
specific	nonspecific	temporary	nontemporary	Public	Private	Storage	Public	Private	Storage	Public	Private
x		x		x	x	x	x	x	x	x	x
x			x	x	x	x	x	x	x	x	x
	x	x		x		x	x		x	x	
	x		x			x			x	(See Note)	
1) Vol=Ser: 2) Vol=Ref to Another DS in Job Step or to the Catalog Old DS Must Always Use Specific Req	No Vol Serial is Stated or Implied Only for New DS	1) No DSNAME 2) &DSNAME 3) Disp=(New, Delete) 4) Add Card That Refers Back to Any of These	1) Old Data Sets 2) Disp Keep or CATLG	These Volumes Are Never Available for Dismounting by the System. 1) Nondismountable (2301, 2302) 2) IPL Vol 3) LINKLIB, PROCLIB or JOBQE Volumes 4) Via PRESRES			Not Available for Dismounting until an Unload CMD Is Issued. 1) Via PRESRES 2) Via a MOUNT CMD			These Volumes Are at the Disposition of the System. 1) All Other DA Volumes	

Note: This type of request is satisfied by a public removable volume that is made private.

ALLOCATION CHARACTERISTICS

A STORAGE volume is:

Designated in PRESRES.
A volume for which the mount command has been given with a USE parameter of STORAGE (i.e., MOUNT 191, USE=STORAGE).

A PRIVATE volume:

Designated in PRESRES.
Requested with the PRIVATE subparameter specified, and the volume is removable.
Was requested nonspecifically for a nontemporary data set and the request had to be satisfied with a removable volume.
A volume for which the mount command has been given with a USE parameter of PRIVATE (i.e., MOUNT 191, USE=PRIVATE).

A PUBLIC volume is:

Designated in PRESRES.
A removable volume that has not been made PRIVATE.
A volume for which the mount command has been issued with a USE parameter of PUBLIC (i.e., MOUNT 191, USE=PUBLIC).

OPERATING SYSTEM/360 COMPONENTS

Program Identification	Program Name	Common Module Prefix	FE Service Number
360S-AL-531	ALGOL F	IEX	001531
360S-AS-036	Assembler E	IET	001036
360S-AS-037	Assembler F	IEU	001037
360S-CB-524	COBOL F	IEQ	001524
360S-CB-545	USAS COBOL	IKF	001606
360S-CI-505*	Primary Control Program:		001505
	Supervisor, I/O Supervisor, NIP	IEA	
	I/O Supervisor	IEC	
	Master Scheduler	IEE	
	Job Scheduler	IEF	
	Transient SVC Routines	IGC	
	I/O Error Routines	IGE	
	Checkpoint/Restart	IHJ	
360S-CI-514	Starter System		001514
360S-CI-534	Starter System/2314 Resident		001534
360S-CI-535*	MVT		001535
360S-CO-503	COBOL E	IEP	001503
360S-CQ-513	BTAM	IGG	001513
360S-CQ-519	QTAM	IGG	001519
360S-DM-508*	Primary Data Management:	IGG	001508
	Access Methods	IGG	
	I/O Error	IGE	
360S-DM-509	Basic Direct Access Method	IGG	001509
360S-DN-527	SER0, SER1, EREP for Mod 40, 50, 65, 75	IFB	001527
360S-DN-533	OLTEP	IFD	001533
360S-DN-539	Recovery Management, Mod 65	IGF	001539
360S-DN-554	Service Aids	IMA, IMB, IMC, IMD	001610
360S-ED-510	Linkage Editor E	IEW	001510
360S-ED-521	Linkage Editor F	IEW	001521
360S-FO-092	FORTRAN IV E	IEJ	001092
360S-FO-500	FORTRAN IV H	IEK	001500
360S-FO-520	FORTRAN IV G	IEY	001520
360S-IO-523	Graphic Programming Services	IFF	001523
360S-IO-526	ISAM	IGG	001526
360S-LD-547	Loader	IEW	001547
360S-LM-501	FORTRAN E Library	IHC	001501
360S-LM-504	COBOL E Library	IHD	001504
360S-LM-512	PL/I Subroutine Library	IHE	001512
360S-LM-525	COBOL F Library	IHD	001525
360S-LM-532	ALGOL F Library	IHI	001532
360S-LM-537	Graphic Subroutine Program	IKA	001537
360S-LM-542	1130/360 Data Transfer	IKD	001542
360S-LM-546	USAS COBOL Library	ILB	001546
360S-NL-511	PL/I F	IEM	001511
360S-PT-516	TESTRAN	IEG	001516
360S-RC-536	Remote Job Entry	IHK	001536
360S-RC-541	Graphic Job Processor	IKA	001541
360S-RC-543	Satellite Graphic Job Processor	IKD	001543
360S-RG-038	Report Program Generator	IES	001038
360S-SM-023	Sort/Merge	IER	001023
360S-UT-506*	Utilities:		001506
	Data Set Utilities	IEB	
	System Utilities	IEH	
	EREP	IFC	
	Update Analysis	IHG	
360S-UT-507*	Independent Utilities	IBC	001507

Program Identification	Program Name	Common Module Prefix	FE Service Number
360C-CV-710	FORTRAN TO PL/I LCP for OS	IPB	008710
360C-CV-711	ALGOL TO PL/I LCP for OS	IPA	008711
360C-CV-712	COBOL TO PL/I LCP for OS	IPC	008712
360C-CV-713	COBOL TO USA COBOL LCP	IKL	008713
360C-EU-734	7094 Emulator	IIN	008734

*See "OS/360 Subcomponents" for breakdown.

OPERATING SYSTEM/360 SUBCOMPONENTS

OS/360 Control Program Components are divided into the following subcomponents:

CA505/CA535 - Disk Error Routines	001550/001593
CB505/CB535 - Unit Record Error Routines	001551/001594
CC505/CC535 - Tape Error Routines	001552/001595
CD505/CD535 - 1419-1275 Error Routines	001553/001596
CE505/CE535 - 12xx Error Routines	001554/001597
CF505/CF535 - 2495 Error Routines	001555/001598
CG505/CG535 - Checkpoint Restart	001608/001609
CN505/CN535 - SMF	001548/001549
C2505/C2535 - Supervisor	001556/001599
C3505/C3535 - IOS	001557/001600
C4505/C4535 - Graphics Operator Console Support	001558/001601
C5505/C5535 - Scheduler	001559/001602
C6505/C6535 - Link Edit Overlay Supervisor and Fetch	001560/001603
C7505/C7535 - SYSOUT Writer	001561/001604
C9505/C9535 - SYSGEN	001562/001605

OS/360 Program Component DM508 is divided into the following seven subcomponents:

D1508 - Open/Close/EOV	001563
D2508 - Access Methods	001564
D3508 - Catalog	001565
D4508 - DADSM	001566
D5508 - Optical Readers (12xx)	001567
D6508 - Magnetic Ink Readers (1419-1275)	001568
D7508 - DM Checkpoint/Restart	001569

OS/360 Utilities Component is divided into the following subcomponents:

UA506 - IEBEDIT	001570
UB506 - IEBUPDAT	001571
UC506 - IEBCOMPR	001572
UD506 - IEHIOSUP	001573
UE506 - IHGUAP	001574
UF506 - IEHUCSLD	001575
UG506 - IEBTCRIN	001576
UH506 - IEHATLAS	001577
UJ506 - IEFSTATR	001578
UK506 - IEHDASDR	001579
U1506 - IEHMOVE	001580
U2506 - IEBUPDTE	001581
U3506 - IEBCOPY	001582
U4506 - IEBGENR	001583
U5506 - IEHLIST	001584
U6506 - IEBISAM	001585
U7506 - IEHPROGM	001586
U8506 - IEBPTPCH	001587
U9506 - IEHINITT	001588
U0506 - IEBDG	001589

Independent Utilities Component is divided into the following three subcomponents:

U2507 - IBCDMPRS	001590
U3507 - IBCDASDI	001591
U4507 - IBCRCVRP	001592

ABEND CODES

ABEND 001-0CX

001 CHECK, GET, PUT: I/O ERR (no SYNAD, EROPT = ABE, or were not specified).
002 WRITE, PUT: Record too large for device or access method; record length greater than BLKSIZE.
008 CHECK: Register 13 incorrect or not pointing to save area.
013 OPEN: DCB incorrect; no member found; no directory allocation.
020 OPEN: A, K, I missing in DCBMACRF.
025 BDAM: DCBSQND outside task.
026 BDAM: DCBXARG incorrect.
030 OPEN: DCBMACRF invalid for ISAM.
031 QISAM: I/O ERR (no SYNAD specified).
032 OPEN: DCBMACRF invalid.
033 OPEN: I/O ERR (reading highest index; EOF incorrect; DCBMSHI not in task).
034 OPEN: DCBSMSI or DCBMSHI invalid.
035 OPEN: DCBMSWA or DCBSMSW invalid.
036 OPEN: No primary allocation; DSCB invalid.
037 OPEN: Inadequate buffers.
038 OPEN: Index area too small; multivolume.
039 SCAN: End of data (no EODAD specified).
03A CLOSE: I/O ERR (attempting to write format 2 DSCB).
03B OPEN: Format 2 DSCB invalid.
03D OPEN: DSORG is not ISAM; volume serial specified is incorrect.
03E OPEN: Format 2 of DSCB indicated invalid operation.
056 GAM: UCB invalid for graphics.
057 GAM: Same as 056.
061 CLOSE: GACB not SPARED in closing task.
062 GAM: INGSP null argument exceeded.
063 GAM: Double cancel by 2250 operator.
090 OPEN: UCB is not TP.
091 OPEN: Unsupported control unit in UCB.
092 OPEN: Unsupported terminal control or unsupported adapter in UCB.
093 OPEN: Unsupported terminal in UCB.
094 OPEN: Unsupported feature or mode in UCB.
095 OPEN: All lines in line group not identical.
096 OPEN: BFTEK = D; no BUFCB; no BUFNO/BUFL.
097 OPEN: I/O directory full.
098 OPEN: UCB does not match options.
0A0 OPEN: DCBTRMAD missing.
0A1 OPEN: DCBSOWA missing.
0A2 OPEN: DDNAME not same as process entry in terminal table.
0A3 QTAM: Message queues data set filled.
0A4 QTAM: I/O ERR in CHKPT (insufficient space; I/O error on format).
0A5 OPEN: DCB opened twice.
0A6 OPEN/CLOSE: OPEN/CLOSE sequence invalid.
0A7 OPEN: I/O ERR in CHKPT (DCB opened early; I/O ERR on restart).
0B0 SCHEDULER: I/O Err (I/O error on SYS1.SYSJOBQE).
0CX PROGCHK: PROG CHK other than 0F1 and 0F2. X = program interrupt code.

X	Interrupt Cause
1	Operation
2	Privileged Operation
3	Execute
4	Protection
5	Addressing
6	Specification
7	Data

X	Interrupt Cause
8	Fixed-Point Overflow
9	Fixed-Point Divide
A	Decimal Overflow
B	Decimal Divide
C	Exponent Overflow
D	Exponent Underflow
E	Significance
F	Floating-Point Divide

0F1 PROGCHK: IOS program check.
0F2 PROGCHK: Type 1 SVC program check.
0F3 MACHCHK: I/O ERR (machine check occurred).
100 EXCP: I/O ERR (device not operational).
101 WAIT: Events exceeded ECB's.
102 POST: Invalid ECB address.
103 EXIT: Invalid ECB; RB address incorrect.
106 LINK/LOAD/ATTACH/XCTL: I/O ERR (reg 15 indicator: 0C = incorrect scatter, 0D = incorrect record type, 0E = incorrect address, 0F = I/O error).
113 OPEN: I/O ERR (JFCB had I/O error; EXLST not specified in Type = J).
117 CLOSE: I/O ERR (tape positioning error).
122 NORMAL: Operator issued CANCEL and DUMP.
124 WTL: Text buffer less than 5; reg 1 not fullword boundary.
126 TESTRAN: TESTRAN CSECT modified.
128 EXTRACT: Invalid list.
12A ATTACH: Freeing sharing subpool.
12C CHAP: Invalid TCB address; not subtask.
12D OVLY: SEGTAB entry 3 and 4 incorrect.
130 DEQ: DEQ specified without previous ENQ.
131 TESTRAN: TESTRAN CSECT modified.
137 EOV: I/O ERR (I/O error at EOV).
138 ENQ: Two consecutive ENQ's.
13E DETACH: DETACH specified for nonterminated task.
13F CHKPT: I/O ERR (failed in RESTART).
140 RDJFCB: I/O ERR (attempting to read JFCB).
155 SWAP: User issued SVC X'55'.
201 WAIT: ECB address invalid.
202 POST: Invalid RB address.
207 XCTL: Used XCTL instead of RETURN.
20A MSS: Storage error (MSS found storage allocated to task when working with region).
213 OPEN: I/O ERR (DSCB could not be read or was not present).
214 CLOSE: I/O ERR (I/O error on tape).
217 CLOSE: I/O ERR (BTAM close; I/O error on JFCB).
222 NORMAL: Operator issued CANCEL.
228 EXTRACT: Invalid list.
22A ATTACH: Subpool number greater than 127 was specified.
22C CHAP: Invalid TCB address.
22D OVLY: Invalid address in SEGTAB or ENTAB.
230 DEQ: Invalid name length.
237 EOV: Label verification error.
238 ENQ: Invalid name length.
23E DETACH: Invalid TCB address.
240 RDJFCB: Incorrect parameter list or exit list.
2F3 RESTART: ERR* (system failure on job).
2FD ROLL: ERR* (unsuccessful ROLLOUT).
2FE ROLL: ERR* (unsuccessful ROLLIN).
2FF NORMAL: Request for ABEND.
301 WAIT: Another wait for this ECB.
305 FREEMAIN: Storage not in subpool.
308 LOAD: Identify macro used in a nonidentify system.
30A FREEMAIN: Storage not in subpool.
313 OPEN: I/O ERR (error in reading format 3 DSCB).
314 CLOSE: I/O ERR (error in reading DSCB).
317 CLOSE: I/O ERR (error in reading DSCB).
322 NORMAL: Time exceeded the time specified.
326 TESTRAN: Number of statements exceeded limit.
328 EXTRACT: TCB specified was not for an immediate subtask.

ABEND 0F1-338 (Continued)

32D OVLY: I/O ERR (reading segment from library).
330 DEQ: RMC specified in problem state.
331 TESTRAN: Incorrect return in TEST OPEN.
337 EOD: EODAD not specified.
338 ENQ: SMC specified in problem state.

ABEND 400-937

400 EXCP: Invalid or nonmatching IOB, DCB, DEB, ECB.
406 LINK: LINK, ATTACH or XCTL specified for only loadable module.
40A FREEMAIN: Attempted to release all of subpool 0.
413 OPEN: I/O ERR (VOL or UNIT missing in the DD specification; DD specification was not met; I/O error during OPEN).
414 CLOSE: I/O ERR (reading or writing DSCB).
417 CLOSE: I/O ERR (writing updated DSCB).
422 SCHED: Insufficient QUEUE space for job.
425 SEGWT: Attempted to load exclusive segment.
426 TESTRAN: Output requested exceeds limit.
42A ATTACH: Invalid ECB.
430 DEQ: Invalid parameter list.
431 TESTRAN: Symbol table and control dictionaries could not be read.
437 EOV: DEBID field not equal to TCBPKF.
438 ENQ: Invalid parameter list.
504 GETMAIN: Invalid list.
505 FREEMAIN: Invalid list.
506 LINK: Insufficient core for TSTRN or OVLY SUPV.
513 OPEN: More than one OPEN issued to same tape unit.
514 CLOSE: I/O ERR (reading JFCB).
522 TIME: All tasks in job step exceeded wait time.
526 TESTRAN: TEST OPEN not issued before TSTRN control.
530 DEQ: Requestor did not issue the ENQ.
531 TESTRAN: No DD specification for TEST OPEN.
537 EOV: Concatenated to nonallocated tape.
604 GETMAIN: Invalid parameters or FQEL.
605 FREEMAIN: See 604.
606 LINK: Available core is insufficient.
60A MSS: R-format FREE/GET with invalid list or FQEL.
613 OPEN: I/O ERR (label missing; tape positioning error).
614 CLOSE: I/O ERR (writing EOF).
626 TESTRAN: MACH CHK* (error occurred while tracing).
637 EOV: I/O ERR (reading label; writing tape mark; tape positioning error).
700 EXCP: I/O ERR (sense command issued).
704 GETMAIN: List mode allowed only in MVT.
705 FREEMAIN: See 704.
706 LINK: Module not executable.
713 OPEN: RETPD not expired and operator replied 'not U'.
714 CLOSE: I/O ERR (while label processing).
717 CLOSE: I/O ERR (Type - T specified while label processing).
737 EOV: I/O ERR (DSCB missing; I/O error).
804 GETMAIN: Insufficient core; requested 0 bytes in PCP or MFT.
806 LINK: I/O ERR (program missing; I/O error).
80A GETMAIN: R-format used (see 804).
813 OPEN: While label is being verified.
826 TESTRAN: Floating-point feature not on CPU.
837 EOV: I/O ERR (while reading or writing JFCB).
904 GETMAIN: For inactive program, FQE is not aligned on doubleword boundary.
905 FREEMAIN: See 904.
906 LINK: Use count exceeded 255.

90A FREEMAIN (R): See 904.
913 OPEN: Password violation.
926 TESTRAN: MACH CHK* (occurred when attempting to return).
937 EOV: I/O ERR (password violation; failure while reading DSCB on second volume).

ABEND A03-FXX

A03 RETURN: Attempted to terminate when subtasks not completed.
A04 GETMAIN: Inactive program overlaps free area.
A05 FREEMAIN: Attempted to overlap free areas.
A06 LINK: Previous request for load module exists.
A0A REGMAIN: See A04, A05.
A13 OPEN: I/O ERR (hit load point while positioning tape).
A14 CLOSE: I/O ERR (In release of unused direct-access space).
A26 TESTRAN: Invalid return address.
B04 GETMAIN: Subpool number greater than 127.
B05 FREEMAIN: See B04.
B06 LINK: I/O ERR (system error task tried to terminate, terminated user instead).
B0A REGMAIN: See B04, B05.
B13 OPEN: I/O ERR (UCS print image not read or loaded in reg 15).
B14 CLOSE: I/O ERR (error during STOW).
B37 EOV: No space available, unable to dismount.
C03 RETURN: Tried to terminate, unable to close DCB's.
C04 GETMAIN: Invalid hierarchy.
C06 LINK: I/O ERR XCTL (see B06).
C13 OPEN: I/O ERR (JFCB, label, Format 3, Format 1 nonreadable on concatenated D/S, GRAPHICS DCB attempted OPEN twice).
D03 RETURN: Attempted return still enqueued.
D05 FREEMAIN: Attempted to free SYSQUEUE space outside task.
D0A REGMAIN: See D05.
D13 OPEN: DCB not specified as graphics.
D14 CLOSE: Graphics DCB opened by other task.
D23 WTO: List, not word boundary.
D2D OVLY: Invalid record type in segment.
D37 EOV: No secondary quantity.
E04 GETMAIN: SQA space not available.
E13 OPEN: DCBGNCP invalid.
E23 WTOR: Reply ECB address invalid.
E2D OVLY: Invalid address in segment.
E37 EOV: PDS out of space; insufficient volumes.
FXX SUPVR: No XX SVC in system.

Notes:

1. I/O error implies, but does not always define, the cause of ABEND as being a true I/O error.

2. All other ABEND codes imply, but do not always define, the cause of ABEND as a specification, parameter violation, etc.

*Specification and I/O errors do not apply.

WAIT STATE CODES

001 IPL/NIP: Not operational on SYSRES (reg 10 = UNIT; if NIP, fourth byte in PSW = FF).
002 IPL/NIP: I/O did not start, CSW valid (reg 10 = UNIT; if NIP, fourth byte in PSW = FF).
003 IPL/NIP: I/O not initiated, CSW invalid (reg 10 = UNIT; if NIP, fourth byte in PSW = FF).
004 IPL/NIP: I/O not initiated, CSW invalid (reg 10 = UNIT; if NIP, fourth byte in PSW = FF).
005 IPL/NIP: Unit check (if IPL, fourth byte in PSW = 00; 4C = addr of CCW; reg 10 = UNIT).
006 IPL/NIP: INTF CNTL, CHNL CNTL, CHNL DATA, CHNL CHAIN, or program check occurred (if NIP, fourth byte in PSW = FF).
007 NIP: Console not available.
008 NIP: Record not found (reg 10 = UNIT).
009 NIP: File mask violated (reg 10 = UNIT).
00F IPL: Cannot find IPL program.
010 NIP: End of cylinder (reg 10 = UNIT).
011 NIP: Track condition check occurred (reg 10 = UNIT).
012 NIP: Prefix switches both same.
013 NIP: Partition switches not in same position; direct access went RDY to NOT RDY or vice versa.
014 NIP: Storage error did not cause machine check.
015 NIP: Storage box enable switches not same.
016 NIP: Upper 4k bytes of storage bad.
017 IPL/NIP: Unit check during sense (reg 10 = UNIT; if NIP, fourth byte in PSW = FF).
018 IPL: Nucleus too big.
019 IPL: Program interrupt, machine check.
020 NIP: IEAMP650 could not be found or I/O error occurred while trying.
021 NIP: I/O error on console (reg 1 = IOB).
0E2 SUPVR: Machine check or channel check and SER0 or SER1 not in system. Run SEREP.
A01 MCH: IGF003W/S, MCH had machine check during error recovery. If S-type message, run SEREP.
A02 MCH: RMS/85 had machine check.
A03 MCH: IGF004W/S, MCH had program check. If S-type message, run SEREP.
A04 MCH: IGF006W/S, MCH could not load transient. If S-type message, run SEREP.
A05 MCH: IGF002W, nonretryable, recoverable failure within SUPVR.
A06 MCH: IGF001W, nonrecoverable failure in SUPVR.
A07 MCH: IGF006W/S, CC does not equal 0 from SYSRES.
A08 MCH: Same as A07, but on TIO.
A09 MCH: IGF006W/S, CC does not equal 1 while attempting to clear with TIO.
A0A CCH: IGF013W/S, inboard record built, but CCH not able to complete or was not present.
A0B MCH: IGF012W/S, machine check during CCH processing.
A0D MCH: IGF0105, machine not Mod 65 or 85.
A0E MCH: IGF0115, MCH not properly initialized by NIP.
A10 MCH: IGF006W/S, I/O ERR during MCH in IGFASR0A.
A12 MCH: IGF006W/S, I/O ERR during MCH in IGFASR1A.
A13 MCH: IGF014I/S, I/O ERR during MCH.
A14 MCH: IGF015I/W/S, I/O ERR during MCH.
A15 MCH: Machine check occurred while saving system environment.
A21 MCH: Both CPU's had MACH CHKS simultaneously.
A22 MCH: MCH failed to complete recovery processing before time-out on second CPU.
E00 CONSOLE: I/O ERR on console.
E02 CONSOLE: I/O ERR on 2250 console.

E04 GETMAIN: SQA had less than 144 bytes.
F02 I/O: IOS detected system error.
F05 SER: Unrecoverable error has been recorded.
F06 SER: Machine check occurred while writing SER record.
F07 SER: Machine checks occurring while trying to write SER record.
F08 SER: SER0 unable to write record; I/O ERR.
F09 SER: Unable to write SER record because of header record error or insufficient space.
F0A SER: Unable to load nonresident module of SER0.
F0D SER1: I/O ERR while trying to write SER record or CPU error.

Comments:

SVC		Description		Register Contents		Module Name*
Dec	Hex	Macro/SVC	Type	Reg 0	Reg 1	MFT/MVT
0	0	EXCP	1		†IOB	A – IEAAIH00/ A – IEAQFX00
1	1	WAIT	1	Event Count	†ECB	A – IEAPWT00/ L – IEAQSY50
2	2	POST	1	Comp Code	†ECB	A – IEAAPT00/ L – IEAQSY50
3	3	EXIT	1			A – IEAAPT00/ L – IEAQSY50
4	4	GETMAIN	1		† Parm List	A – IEAAMS00/ A – IEAQGM00
5	5	FREEMAIN	1		† Parm List	A – IEAAMS00/ A – IEAQGM00
6	6	LINK **	2			A – IEAATC00/ L – IEAQLK00
7	7	XCTL **	2			A – IEAATC00/ L – IEAQLK00
8	8	LOAD	2	†(† Entry Point)	†DCB	A – IEAATC00/ L – IEAQLK00
9	9	DELETE	1	† Program Name		L – IEAHDL00/ L – IEAQLK00
10	A	REGMAIN	1	Subpool No. (0), Length (1-3)	† Area to be Freed	A – IEAAMS00/ L – IEAQGM00
11	B	TIME	1		Time Units Code	L – IEA0RT00/ L – IEAQRT00 (Note 1)
12	C	SYNCH	2	Reg 15 Contents	Branch Addr	L – IEAASY00/ L – IEAQLK00
13	D	ABEND	4		Comp Code	L – IEAGAB00/ L – IEAQAB00
14	E	SPIE	3		†PICA	L – IEAAPX00/ L – IEAQTB00
15	F	ERREXCP	1		†RQE	A – IEAA1H00/ A – IEAQFX00
16	10	PURGE	2		† Parm List	L – IECIPR12/ L – IECIPR16
17	11	RESTORE	3		†IOB Chain	L – IGC0001G
18	12	BLDL	2	† Build List	†DCB	A – IGC018/ L – IECPFND1
19	13	OPEN	4		† Parm List	L – IGC00011
20	14	CLOSE	4		† Parm List	L – IGC00020
21	15	STOW	3	† Parm List	†DCB	L – IGC0002A
22	16	OPEN TYPE = J	4		† Parm List	L – IGC0002B
23	17	CLOSE TYPE = T	4		† Parm List	L – IGC0002C
24	18	DEVTYPE	3		†DD NAME	L – IGC0002D
25	19	TRKBAL	3		†DCB	L – IGC0002E
26	1A	CATALOG	4		† Parm List	L – IGC0002F
27	1B	OBTAIN	3		† Parm List	L – IGC0002G
28	1C	CVOL	4		†DCB or UCB	L – IGC0002H
29	1D	SCRATCH	4	†UCB	† Parm List	L – IGC00021

* A = assembled module name.
L = microfiche module name and implies that it has been Link Edited or moved into system.

** Reg 15 † Parm List

SVC		Description		Register Contents		Module Name*
Dec	Hex	Macro/SVC	Type	Reg 0	Reg 1	MFT/MVT
30	1E	RENAME	4	†UCB	†Parm List	L – IGC00030
31	1F	FEOV	4		†DCB	L – IGC0003A
32	20	ALLOC	4		†UCB List	L – IGC0003B
33	21	IOHALT	3		†UCB	L – IGC0003C
34	22	MGCR	4	Indicator	Indicator	L – IEE0303D
35	23	WTO	4		†Message	L – IEECVWTO
36	24	WTL	4		†Message	L – IEE0303F
37	25	SEGLD	2	IF = 0 SEGLD	†SEG– NAME	L – IEWSVOVR/ L – IEWSUOVR
38	26	TTROUTER	2			L – IGC038
39	27	LABEL	3		† Parm List	L – IGC0003I
40	28	EXTRACT	1		† Parm List	L – IEAAXR00/ L – IEAQTR00
41	29	IDENTIFY	3	†Entry Point	†Entry Point	L – IEAAID00/ L – IEAQTD00
42	2A	ATTACH **	2		†PP Parm List	L – IEAAAT00/ L – IEAQAT00 (Note 2)
43	2B	CIRB	2	†Entry Point	Work Area Size, IF NEG DIRB	L – IEAAEF00
44	2C	CHAP	1	Priority	†TCB	NOP/ L – IEAQTB00 (Note 3)
45	2D	OVLYBRCH	2		Reg 15 = Entry Point	L – IEWSVOVR/ L – IEWSUOVR
46	2E	TTIMER	1		1 : CANCEL	L – IEA0ST00/ L – IEAQST00
47	2F	STIMER	2	†Exit	†Timer Interval	L – IE0ST00/ L – IEAQST00
48	30	DEQ	2		† QCB	L – IEAGENQ2/ L – IEAQENQ2
49	31	TTOPEN	3			A – IGC0004I
50	32	NOP	–			N/A
51	33	SNAP	4		† Parm List	L – IEAAAD00/ L – IEAQAD00
52	34	RESTART	4		† DCB	L – IEFVSMBR
53	35	RELEX	3	†KEY	† DCB	L – IGC0005C
54	36	DISABLE***	2			L – IGC054
55	37	EOV	4	†IOB	†DCB	L – IGC0005E
56	38	ENQ	2		† Parm List	L – IEAGENQ2/ L – IEAQENQ2
57	39	FREEDBUF	3	†DECB	† DCB	L – IGC0005G
58	3A	RELBUF	1		† DCB	L – IGC058
59	3B	OLTEP	3	† Parm List	Code	L – IGC0005I
60	3C	STAE	3	Flag	† Parm List	L – IEAAST00
61	3D	TTSAV	3		† Parm List	L – IGC0006A
62	3E	DETACH	1		† TCB	L – IEAGED02/ L – IEAQED02
63	3F	CHKPT	4		† DCB	L – IHJACP00
64	40	RDJFCB	3		† Parm List	L – IGC0006D
65	41	QWAIT△	2		† RECB	L – IECKQQ01
66	42	BTAM TEST	4		† IOB	L – IGC0006E
67	43	QPOST△	2		† RECB	L – IECKQQ01
68	44	SYNADEF	4	Return Code	† Buffer	L – IGC0006H

** Reg 15 † SUP. Parm List
*** Reg 2 † DECB
△ Reg 2 † QUEUE

SVC		Description		Register Contents		Module Name*
Dec	Hex	Macro/SVC	Type	Reg 0	Reg 1	MFT/MVT
69	45	BSP	3		†DCB	L - IGC0006I
70	46	GSERV	2		†Parm List	L - IGC070
71	47	BUFSERVICE	3		†Parm List	L - IGC0007A
72	48	CHATR	4		†Parm List	L - IEECMCTR
73	49	SPAR	3		†Parm List	L - IGC0007C
74	4A	DAR	3		†Parm List	L - IGC0007D
75	4B	DQUEUE	3		†Parm List	L - IGC0007E
76	4C	IFBSTAT	3			L - IFBSTAT
77	4D	QTAM TEST	4		†Parm List	L - IGC0007G
78	4E	DISP SPACE	3	†UCB	†MSG Area	L - IGC0007H
79	4F	STATUS	1	Mask (0 - 1), Type (2 - 3)	†TCB	L - IEAQSETS
80	50	IKASVC	3	†Parm List	CCT	L - IKASVC
81	51	SETPRT	4		†Parm List	L - IGC0008A
82	52	DASDR	4		†Parm List	L - IGC0008B
83	53	SMFWTM	3		†Message	L - IEESMF8C
84	54	GRAPHICS	1	†UCB		L - IGC084
85	55	SWAP				L - IGC0008E
86	56	ATLAS	4		†Parm List	L - IGC0008F
87	57	DOM	3	IFZERO IFNEG	MSG ID †MSG List	L - IEECXDOM
88	58	MOD 88	3	Routing Code	†DCB	L - IGC0008H
89	59	EMSRV	3		†Parm List	L - IGC0008I
90	5A	XQMNGR	4	†ECB/IOB List	†QMPA	L - IEFXQM00
91	5B	VOLSTAT	3	†DCB	0 = Close Issued 0 ≠ EOV Issued	L - IGC0009A
92	5C	TCB-EXCP		TCB Address	IOB Address	TSO
93	5D	TGET/TPUT		(See Note 4)		
94	5E	Q Control		EC Parm Address	Parm Address	
95	5F	TSIP		TJID/EC		
96	60	STAX			Parm Address	
97	61	TEST		EC/TCB Address	Parm Address	
98	62	PROTECT			Parm Address	
99	63	DYNAMIC DD			Parm Address	
100	64	FIB		Caller ID	Parm Address	
101	65	QTIP		EC	Save Area Address	

Notes:

1. With no hardware timer, all systems L - IEA0RT10

2. MFT with subtasking, A - IEAQAT00

3. MFT with subtasking, L - IEAQCH00

4. Reg 0

Bits		
	0-3	Reserved
	4-15	TJID
	16-32	Buffsize

Reg 1

Bits		
	0	1 = TGET
		0 = TPUT
	1-2	Reserved
	3	1 = No Hold
		0 = Hold
	4	1 = Break
		0 = No Break
	6-7	00 = Edit
		01 = ASIS
		10 = CTRL
	8-31	Address of Buffer

Comments:

SYSTEM/360 OPERATING SYSTEM REGISTER USAGE

General Register	Supervisor	IOS	Open/ Close/EOV	Fetch, Link, XCTL Load
0		@ TCB	Work/Par	
1		@ RQE	Work/Par	
2		@ IOB	DCB	@ Linkor's RB
3	@ CVT	@ DEB	Base	@ CVT
4	@ TCB	@ DCB	@ Work Area	@ TCB
5	@ RB	Base	@ Par List	@ SVRB
6	@ SVC	Unit Addr	@ WTG	@ Work
7		@ UCB	@ Curr Par	Base
8		Link	@ Curr WTG	Return
9		Char	@ TIOT	Branch
10		Work	@ UCB	@ Linkee's RB
11		Work		@ Work
12		Work/Link		@ Linkee's Name
13		Log Ch Wd		
14	@ T1 Exit	Link		
15		Appn Base		

Note: Reg 2 does not always point to the DCB for OPEN/CLOSE/EOV.

Symbol	Save Sequence	User
IORGSAV	2-9	IO FLIH
PDSAV	10-1	IO FLIH and Ext FLIH
PISAV	10-9	PC FLIH
SVCSAV	0-15	SVC FLIH
IEAEXSAV	2-9	EXT FLIH

HOW TO FIND

IORGSAV: Location 7D (address portion of I/O new PSW) contains the address of I/O FLIH. The two-byte ADCON of IORGSAV is located 10 bytes from the entry point.

PISAV: IORGSAV + 20(hex).

PDSAV: PDSAV is IORGSAV + 60(hex) bytes.

IEAEXSAV: IORGSAV.

SVCSAV: Location hex 65 (the address portion of SVC new PSW) contains the address of SVC FLIH. The two-byte ADCON for SVCSAV is located two bytes from the entry.

Comments:

SYSTEM ENQ/DEQ NAMES

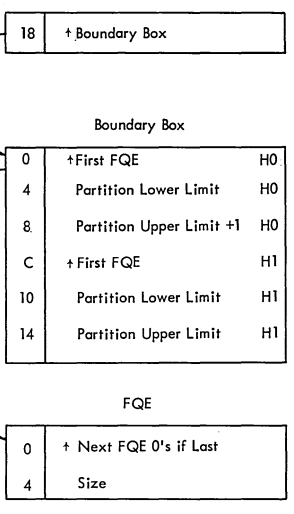
Major	Minor	Use
SYSDSN	dsname	Used by scheduler for each non-temporary DSNAME specified in the DD statements of a job.
SYSIEECT	IEEWQE	Used by scheduler when all console buffers are full.(IEECVWT0)
SYSIEECT	IEERQE	Used by scheduler when the number of outstanding reply requests is at the system limit.
SYSIEFSD	Q1	Used by queue manager during processing of ENQ/DEQ to protect queue control records (QCR's).
SYSIEFSD	Q2	Used by the queue manager during processing of assign and delete to protect QCR's.
SYSIEFSD	Q3	Used by queue manager during processing of 'no space in job queue' condition.
SYSIEFSD	Q4	Used by device allocation while using resident unit control blocks (UCB's).
SYSIEFSD	Q5	Used by device allocation, job and step termination, and SYSOUT writer while using UCB's. (IEFSD42Q)
SYSIEFSD	Q6	Used by initiator while processing pending STOPINIT commands.
SYSIEFSD	Q7	Used by master scheduler to permit cancelling of a system output writer during device allocation.
	CPOWAIT	Used by writer when deleting output Q entries.
	SP	Used to ENQUE on a small partition. (IEESD599)
SYSIEA01	IEA	Used by ABEND 5 to obtain exclusive use of the dump data set.
SYSIEA0A	IEA	Used by ABEND and SNAP to gain access to a dump data set.
SYSVTOC	X'C0'	Used by DADSM to provide VTOC integrity.
	ucbptr BB (6 bytes)	(BB is for bin number 2321.)
SYSPSWRD	PASSWORD	Used by OPEN/EOV to assure serial update to the security data set. (IGG0190Q)

SYSDSNbb	SYSCTLG	Used by CATALOG for system catalog integrity.
SYSIGGLG	ucbptr-BCCHHR (8 bytes)	Used by BDAM for read/write exclusive.
SYSIEFAR	WD	Used by the accounting data set writer (Module IEFWAD). See Systems Reference Library, IBM System/360 Operating System, System Programmer's Guide, GC28-6550.
SYSJMPCH	BATRM	Used by INIT to gain access to GCB chain. (IEE0703D)
SYSIEWL	(Dsname for SYSLMOD)	Used by linkage editor.
SYSCTLG	SYSCTLG	Used by catalog management to ensure catalog integrity.
SYSIEC16	F0	Used by SVC 16 (PURGE) to get exclusive use of caller's DEB chain.
SYSIGGLG	R0	Used by BDAM to get exclusive control of R0 (capacity record).
SYSSMF01	BUF	For use of the SMF buffer.

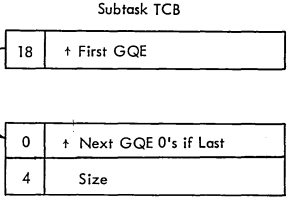
MODULES USING ENQ/DEQ

Module Name	Enq Minor
IEESD562	Q1
IEESD563	Q1
IEESD564	Q1
IEESD565	Q1
IEEVACTL	Q7
IEFQASGQ	Q2 and Q3
IEFQDELQ	Q2
IEFQMDQQ	Q1
IEFQMNQQ	Q1
IEFSD079	CPO WAIT
IEFSD160	Q2 and BATRM
IEFSD161	Q2 and Q6 and BATRM
IEFSD166	Q2 and Q6
IEFSD171	Q5
IEFSD21Q	Q4 and Q5
IEFSD22Q	Q5
IEFSD31Q	Q5
IEFSD41Q	Q4 and Q5
IECIPR16	X'F0'
IEAQTM02	IEA
IGG0553E	SYSVTOC

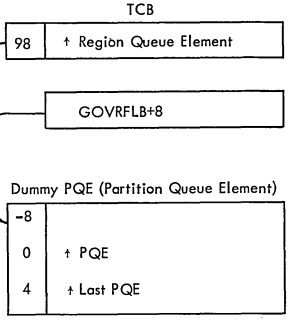
MFT AND PCP



MFT WITH SUBTASK



MVT



PQE (Partition Queue Element)

0	↑FBQE↑PQE if None
4	↑Last FBQE↑PQE if None
8	↑Next PQE 0's if Last
C	↑Previous PQE 0's if First
10	↑TCB 0's if From Unassigned Core
14	Size
18	↑Start of Region

FBQE (Free Block Queue Element)

0	↑Next FBQE↑PQE if Last
4	↑Previous FBQE↑PQE if First
8	Size

TCB

18	↑SPQE

SPQE (Subpool Queue Element)

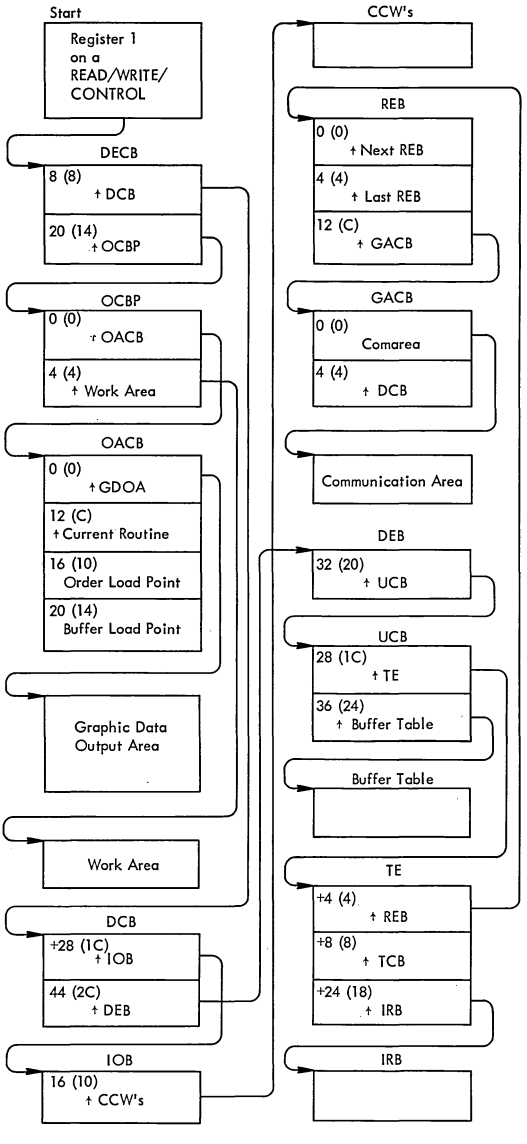
0	↑Next SPQE	
4	SPID	↑DQE

DQE (Descriptor Queue Element)

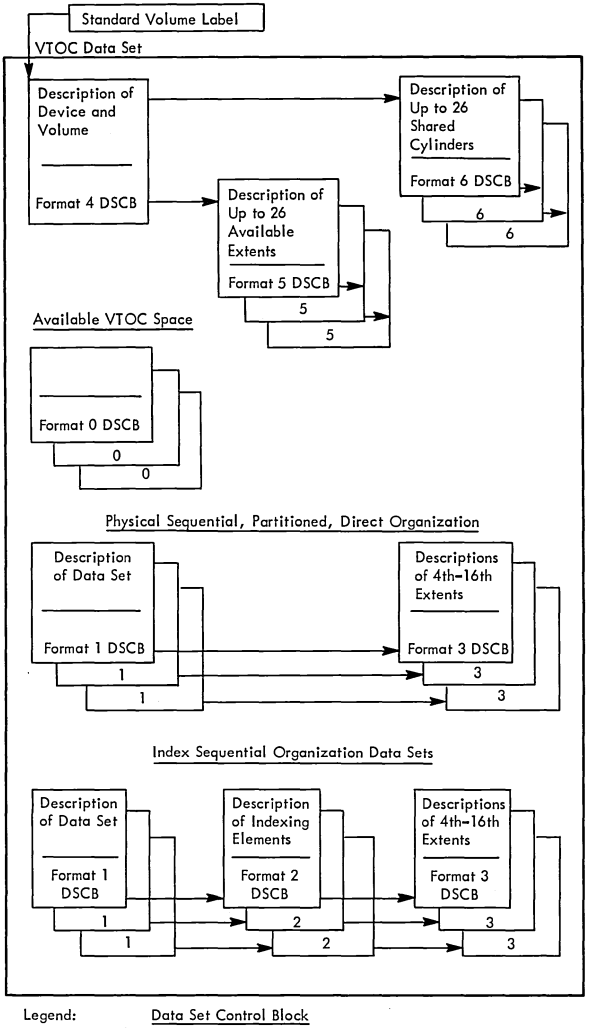
0	↑FQE
4	↑Next DQE 0's if Last
8	Address of Block
C	Size

FQE (Free Queue Element)

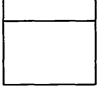
0	↑Next FQE 0's if Last
4	Size


Start
Register 1 on a READ/WRITE/ CONTROL
DECB
8 (8) † DCB
20 (14) † OCBP
OCBP
0 (0) † OACB
4 (4) † Work Area
OACB
0 (0) † GDOA
12 (C) † Current Routine
16 (10) Order Load Point
20 (14) Buffer Load Point
Graphic Data Output Area
Work Area
DCB
+28 (1C) † IOB
44 (2C) † DEB
IOB
16 (10) † CCW's
CCW's
REB
0 (0) † Next REB
4 (4) † Last REB
12 (C) † GACB
GACB
0 (0) Comarea
4 (4) † DCB
Communication Area
DEB
32 (20) † UCB
UCB
28 (1C) † TE
36 (24) † Buffer Table
Buffer Table
TE
+4 (4) † REB
+8 (8) † TCB
+24 (18) † IRB
IRB

VOLUME TABLE OF CONTENTS



Legend: Data Set Control Block



TRACE TABLE

HOW TO USE TRACE TABLE

The tracing routine is a System/360 Operating System optional feature that can be used as a debugging and maintenance aid. The tracing routine and its table can be included in the control program during the system generation process. This is done using the TRACE option in the SUPRVSOR macro-instruction. The format of this option requires supplying the number of entries in the table. Each table entry can contain information relating to one of the traced conditions. When the last entry in the table is filled, the next entry overlays the first.

The tracing routine can be bypassed by placing any value in byte location 20 (14 hex). To resume tracing byte location 20 (14 hex) must be reset to zero. The tracing routine is also bypassed during abnormal termination procedures.

PCP AND MFT TRACE TABLE FORMAT

The tracing routine stores, in a table, information pertaining to the following conditions:

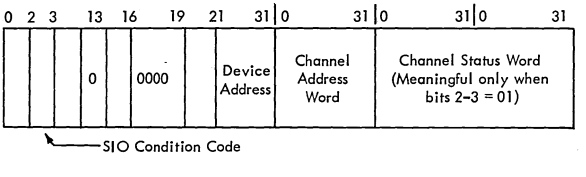
00 = SIO instruction execution
41 = SVC interruption
40 = I/O interruption
4F = Task switch (MFT only)

20 (X'14') is a pointer to three fullwords consisting of:

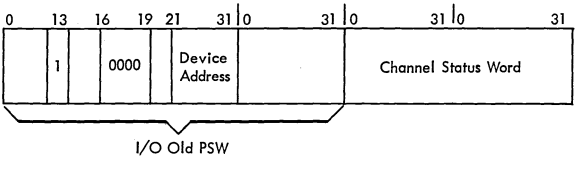
Address of Last Entry	Address of Table Beginning	Address of Table End

Each trace table entry consists of four fullwords.

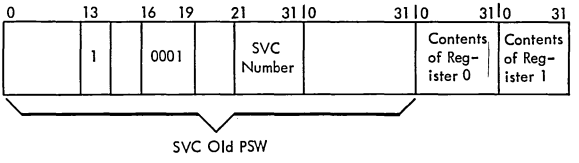
SIO Instruction



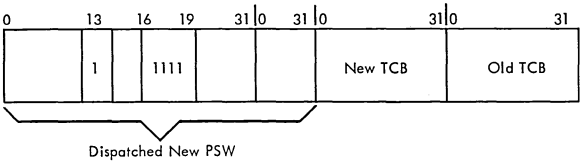
I/O Interruption



SVC Interruption



Task Switch



MVT TRACE TABLE FORMAT

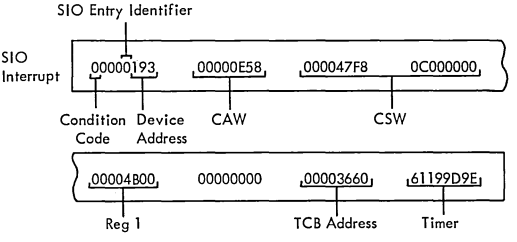
The address of the trace table is contained in a 12-byte field whose address is at hex location 54 and in secondary CVT. The format of the field is:

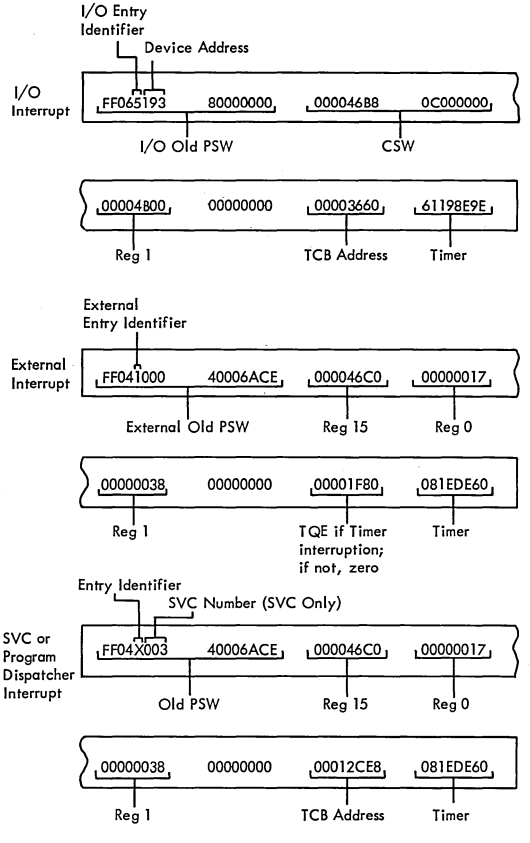
Address of Last Entry	Address of Table Beginning	Address of Table End

The fifth character of each entry determines the type of entry as indicated below.

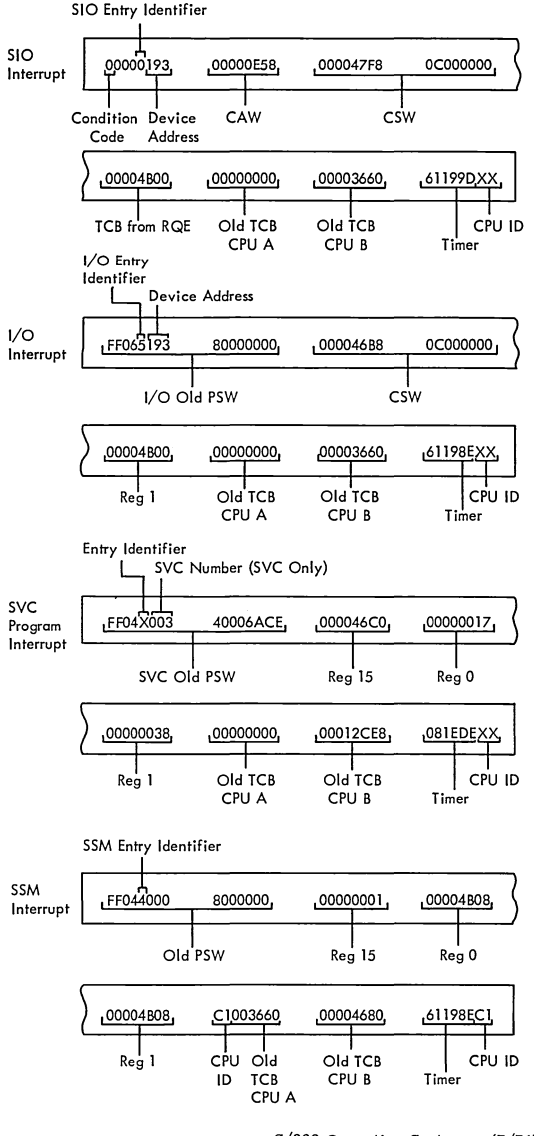
0 = SIO interrupt
1 = External interrupt
2 = SVC interrupt
3 = Program interrupt
4 = SSM program interrupt (MP65)
5 = I/O interrupt
D = Dispatcher interrupt

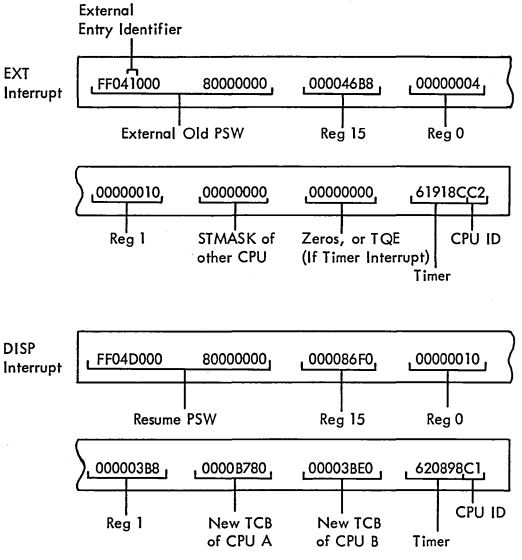
Each trace table entry consists of eight fullwords.




I/O Entry Identifier
Device Address
I/O Interrupt
FF065193
80000000
000046B8
0C000000
I/O Old PSW
CSW
00004B00
00000000
00003660
61198E9E
Reg 1
TCB Address
Timer
External Entry Identifier
External Interrupt
FF041000
40006ACE
000046C0
00000017
External Old PSW
Reg 15
Reg 0
00000038
00000000
00001F80
081EDE60
Reg 1
TQE if Timer interruption; if not, zero
Timer
Entry Identifier
SVC Number (SVC Only)
SVC or Program Dispatcher Interrupt
FF04X003
40006ACE
000046C0
00000017
Old PSW
Reg 15
Reg 0
00000038
00000000
00012CE8
081EDE60
Reg 1
TCB Address
Timer

Comments:


SIO Entry Identifier
SIO Interrupt
00000193
00000E58
000047F8
0C000000
Condition Code
Device Address
CAW
CSW
00004B00
00000000
00003660
61199DXX
TCB from RQE
Old TCB CPU A
Old TCB CPU B
Timer
CPU ID
I/O Entry Identifier
Device Address
I/O Interrupt
FF065193
80000000
000046B8
0C000000
I/O Old PSW
CSW
00004B00
00000000
00003660
61198EXX
Reg 1
Old TCB CPU A
Old TCB CPU B
Timer
CPU ID
Entry Identifier
SVC Number (SVC Only)
SVC Program Interrupt
FF04X003
40006ACE
000046C0
00000017
SVC Old PSW
Reg 15
Reg 0
00000038
00000000
00012CE8
081EDEXX
Reg 1
Old TCB CPU A
Old TCB CPU B
Timer
CPU ID
SSM Entry Identifier
SSM Interrupt
FF044000
8000000
00000001
00004B08
Old PSW
Reg 15
Reg 0
00004B08
C1003660
00004680
61198EC1
Reg 1
CPU ID
Old TCB CPU A
Old TCB CPU B
Timer
CPU ID


External
Entry Identifier
EXT
Interrupt
FF041000
80000000
000046B8
00000004
External Old PSW
Reg 15
Reg 0
00000010
00000000
00000000
61918CC2
Reg 1
STMASK of
other CPU
Zeros, or TQE
(If Timer Interrupt)
CPU ID
Timer
DISP
Interrupt
FF04D000
80000000
000086F0
00000010
Resume PSW
Reg 15
Reg 0
000003B8
0000B780
00003BE0
620898C1
CPU ID
Reg 1
New TCB
of CPU A
New TCB
of CPU B
Timer

Comments:

UCB LOOKUP TABLE

The UCB lookup table is used by the I/O interruption supervisor to obtain the address of the UCB associated with an I/O interruption.

The UCB lookup table has the following characteristics:

1. Creation: The table is created at system generation time.
2. Storage Area: The table resides, as a permanent part of the resident supervisor, in protected resident storage (when protection is available).
3. Size: The size of the table is dependent upon the number and the unit addresses of I/O devices, control units, and physical channels attached to the system.
4. Means of Access: The table values are used in the algorithm routine. (See "Logical Channel Word Table".) The table is addressed by the CVT. The algorithm (shown as follows) is used to obtain the address of the UCB.

IECILK1 + 3-bit channel address ⟶ K
IECILK1 + 4-bit control unit address + K ⟶ L
IECILK2 + 2 (4-bit device address) + 2L ⟶ the actual UCB address
THE ⟶ reads "is the address of."

For a system in which the value of IECILK1 exceeds 255, the L_n field is 2 bytes, and the algorithm is:

IECILK1 + 4-bit channel address ⟶ K
IECILK1 + 2 (4-bit logical control unit address) + K ⟶ L *
IECILK2 + 2 (4-bit logical device address) + 2L ⟶ UCB address

IECILK1
is the starting address of the UCB lookup table.

IECILK2
is the starting address of the UCB address list portion of the UCB lookup table.

K
is the index value obtained from the channel portion of the UCB lookup table.

L
is the index value obtained from the control unit portion of the UCB lookup table.

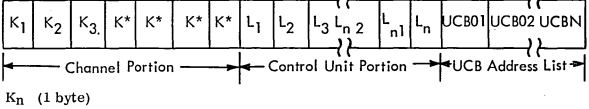
Actual UCB address
is the 2-byte address of the UCB associated with the I/O interruption. This address is obtained from the UCB address list portion of the UCB lookup table.

* Where channel ADDR greater than 6 is generated use:

IECILK1 + 2 (4-bit logical control unit address) + 2K⟶L

Note: The addresses of both the IECILK1 and the IECILK2 are contained in the CVT.

UCB LOOKUP TABLE FORMAT (SEGMENTED)



K_n (1 byte)
The channel portion contains index values that are relative to the starting address of the entire UCB lookup table.

L_n (2 bytes)
The control unit portion contains index values that are relative to the starting address of the UCB address list.

UCB_n (2 bytes)
The UCB address list contains the addresses of the UCB's in the system.

HOW TO FIND SPECIFIC I/O DEVICE UCB

CVT + 36 DEC (24 hex) is pointer to IECILK1.

CVT + 40 DEC (28 hex) is pointer to IECILK2.

Assume IECILK1 is at 1620.

Assume IECILK2 is at 1644.

Assume that the UCB for unit 191 is to be located.

'K' is Channel Index Value.

'L' is Unit Index Value.

IECILK1 + 3 Bit Chan Addr = Addr of K
1620 + 1 = 1621
Location 1621 contains 10

IECILK1 + 4 Bit Unit Addr + K = Addr of L
1620 + 9 +10 = 1639
Location 1639 contains 1F

IECILK2 + 2(Device Addr) + 2(L) = Pointer to Beginning
1644 + 2(1) + 2(1F) = of 191 UCB
1644 + 2 +3E = 1684
Location 1684 contains 1994
(1994 is beginning of UCB for 191).

Comments:

HOW TO FIND ASSOCIATED LOGICAL CHANNEL WORD

CVT PTR (+140) to LCW Table

$$+ 8 \begin{pmatrix} \text{UCB+10} \\ \text{LCH TAB} \end{pmatrix} = \text{LCW}$$

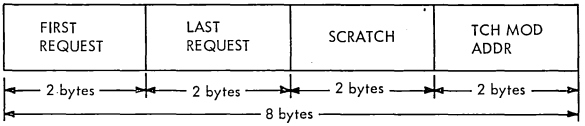
LOGICAL CHANNEL WORD TABLE

The logical channel word table consists of the logical channel words that control the logical channel queues. It is used by the I/O supervisor and the I/O purge and SVC purge routines.

The logical channel word table has the following characteristics:

1. Creation: The table is created at system generation time.
2. Storage Area: The table resides, as a permanent part of the resident supervisor, in protected resident storage (when protection is available).
3. Size: The table contains one 8-byte logical channel word per logical channel queue.
4. Means of Access: Find the start of the LCW table in CVT + 8C; add to this pointer the value of the LCHTAB byte in the UCB (UCB + A) multiplied by eight.

The format of a logical channel word is:



FIRST REQUEST (2 bytes)
These two bytes contain either an address or an index value to the first request element in the logical channel queue.

LAST REQUEST (2 bytes)
These two bytes contain either an address or an index value to the last request element in the logical channel queue.

SCRATCH (2 bytes)
This field is used as a temporary storage area for an address or index value. The field is used when more than one logical channel queue for a physical channel is searched in order to find the highest priority I/O request with which to restart the channel.

TCH MOD ADDR (2 bytes)
This field addresses the device-dependent test channel module.

Notes:

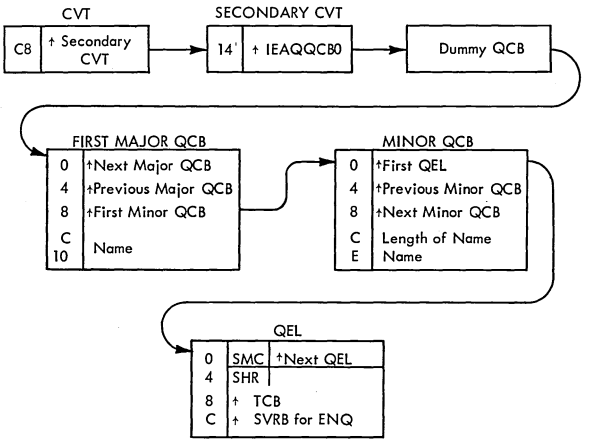
1. When a logical channel queue is void, the FIRST REQUEST field contains a dummy link address of hex FFFF and the LAST REQUEST field contains the address of that logical channel word.
2. When there is only one request element in the queue, both FIRST REQUEST and LAST REQUEST contain the address of that element.

HOW TO FIND QCB's IN MVT

A. Locate CVT + C8 which is the pointer to secondary CVT.

B. Secondary CVT + 14 (hex) is the pointer to IEAQQCB0 which is the first major QCB. IEAQQCB0 is the name for LMODMAP reference.

MVT



HOW TO FIND RESIDENT BUILD LIST -- IECPFNDI

A. Pick up CVT pointer in loc 10 hex.

B. Add 20 hex to this pointer. This is CVTPRLTV pointer.

C. Locate CVTPRLTV entry -4.

D. This is pointer to resident build list.

E. Format of resident build list is:

0-1	No. of entries
2-3	Length of each entry
4-43	Entry #1
44-?	Entry #2, etc.

Normal length of each entry is 40 bytes. See System/360 Operating System Supervisor -- Data Management Instructions, GC28-6647.

HOW TO FIND THE ENTRY POINT OF TYPE I & II SVC's IN MFT II OR PCP

A. Pick up the instruction address from the SVC New PSW at 60 hex.

B. Starting at the location in Step A, search for the first LM instruction (98 89 0XXX).

C. The pointer to the SVC table is at address XXX (Step B).

D. The pointer to the SVC prefix table is at address XXX+4 (Step B). The pointer to the SVC FLIH is at address XXX+8 (Step B).

E. Add the SVC number (hex) to the address of the SVC prefix table.

F. Pick up the byte value pointed to by the result of Step E.

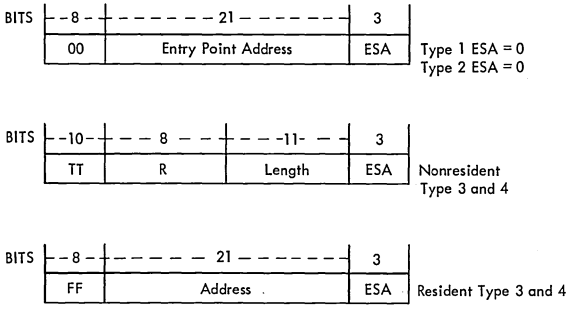
G. Multiply the value picked up in Step F by 4 if TRSVCTBL was specified at SYSGEN, or, if the system is MVT or M65MP; otherwise, multiply by 3.

H. Add the results of Step G to the address of the SVC table (determined in Step C).

I. The value computed in Step H points to a 3-byte address constant which is the SVC routine entry point.

Note that all entry points are on a doubleword boundary. The three low-order bits in the entry address are not part of the actual address. Bits 5 and 6 equal number of doublewords in register save area in SVRB. Bit 7 indicates an SVRB is needed.

SVC TABLE FORMAT



HOW TO FIND THE ENTRY POINT OF TYPE I & II SVC's IN MFT II OR PCP

1. Using a cross-reference map of the nucleus, locate IBMORG. This is the address of the SVC table. Each entry (word) corresponds to the SVC number (beginning at 0). Example: SVC 0 = 1st word, SVC 1 = 2nd word.

2. When a cross-reference is not available, location X'60' contains the address of the E/P to the SVC-FLIH. Note the address of the first BALR + 2 on register 2.

3. Locate a load multiple 98682xxx Register 2 + the displacement xxx + 4 points to IBMORG.

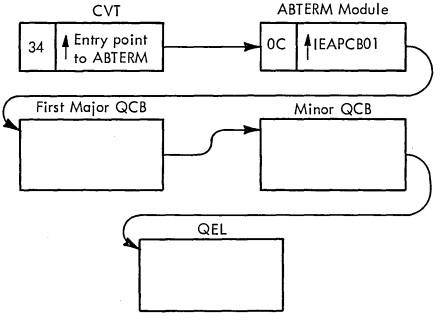
4. Follow procedure in Step 1.

HOW TO FIND QCB's IN MFT

A. Locate CVT + 34 (hex) which is the pointer to the entry point of ABTERM. (See "How to Find QCB's in MVT").

B. The entry point of ABTERM + 0C is the pointer to IEAQCB01.

C. IEAQCB01 is the first major QCB and has the name HEADQCB. IEAQCB01 is the name for LMODMAP reference.



HOW TO FIND RESIDENT SVC LOAD LIST AND RAM LIST IN MFT

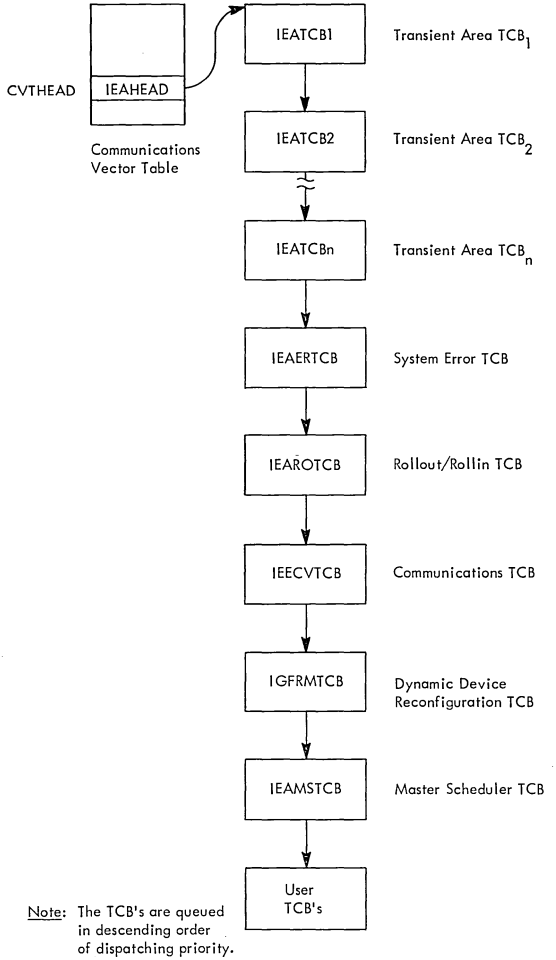
The resident SVC load list and RAMLIST pointers are two fullwords located before the constant IGG019 (C9C5C5 F0F1F9). The pointers are known as IEAARSV1 and IEAARAM4, respectively, and may be located from these names in LMODMAP. These constants are defined in IGC007,8 or LINK, XCTL and LOAD code if SYSGEN listing is available for MFT.

HOW TO FIND TCB's IN MVT SYSTEM

A. Locate CVT using 10 hex or 4C hex.

B. CVT + A0 hex is CVTHEAD which is the pointer to the highest priority TCB. Each TCB points to the next lower dispatching priority TCB at offset 74 (hex).

POSITIONS OF PERMANENT SYSTEM TCB's ON TCB QUEUE -- MVT



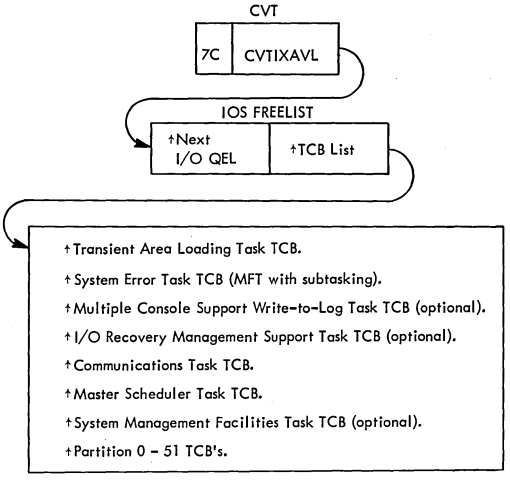
Note: The TCB's are queued in descending order of dispatching priority.

HOW TO FIND PARTITION TCB's IN MFT

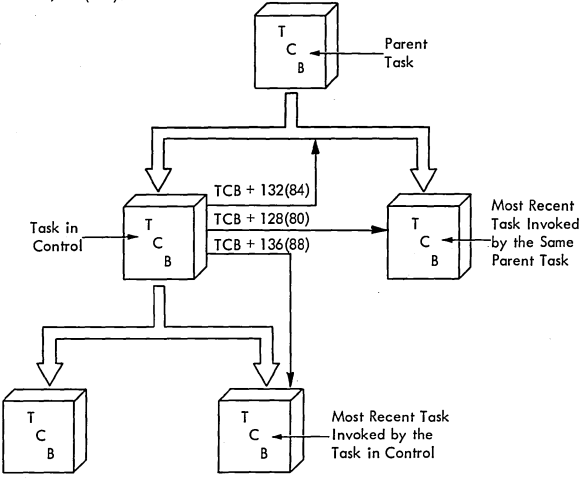
A. Locate CVT pointer (10 hex or 4C hex).

B. CVT + 7C is CVTIXAVL which points to IOS FREELIST.

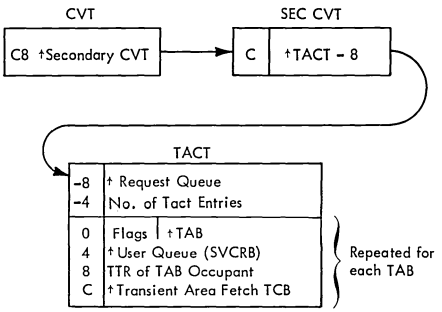
C. IOS FREELIST + 4 is the pointer to the first address in a list of TCB addresses.



D. Subtask TCB's, if present, can be found by using partition TCB's + 80, 84, 88 (hex).

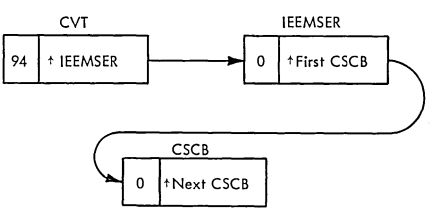


HOW TO FIND TRANSIENT AREA BLOCKS-- SVC TRANSIENT AREAS IN MVT



To locate transient area in MFT, find constant IEAAXSNT in an IMBMDMAP (LMODMAP) map of the nucleus; this constant is the transient area.

HOW TO FIND A CSCB (POINTERS IN HEX)



Comments:

ABDUMP PARAMETER LIST

(Pointed to by Reg 1)

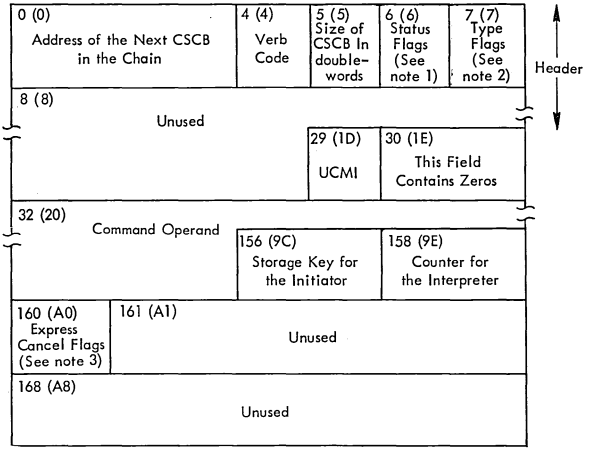
0(0) ID	1(1) 0	2(2) Option Flags
4(4) 0	5(5) Pointer to DCB	
8(8) 0	9(9) Pointer to TCB	
12(C) 0	13(D) Pointer to Storage List	

DESCRIPTION OF OPTION FLAGS

Byte	Bit	Symbolic Name	Meaning (when bit is set)
2	0	PFABEND	0 = ABEND request; 1 = SNAP request.
	1	PFTCB	TCB address is given.
	2	PFSUPDAT	Display all supervisor data.
	3	PFTRACE	Display trace table (if possible).
	4	PFNUC	Display the nucleus.
	5	PFSNAP	Snapshot list is given.
	6	PFID	ID given.
	7	PFQCB	Display the QCB's.
3	0	PFSAVE	Save area (see next flag).
	1	PFSAVE2	0 = display entire save area; 1 = display headings only.
	2	PFREGS	Display registers on entry to ABEND or SNAP.
	3	PFLPA	Display link pack area.
	4	PFJPA	Display job pack area.
	5	PFPSW	Display PSW on entry to ABEND or SNAP.
	6	PFSPALL	Display all subpools less than subpool 128.
	7		Reserved bit.

COMMAND SCHEDULING CONTROL BLOCK

CSCB-INPUT
(Mapped by IEECHAIN)



Notes:

CSCB is created by IGC0803D, DSECT in IEFSD 263.

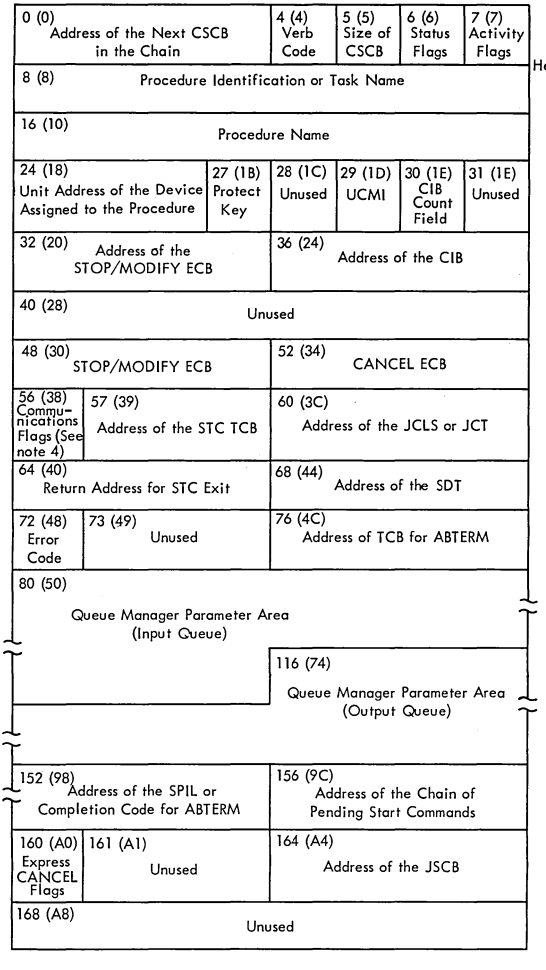
1. Status Flags
   - Bit 0 - Assignment pending.
   - Bit 1 - Reserved.
   - Bit 2 - On means H1 specified on CM.
     Off means H0 specified on CM.
   - Bit 3 - On means default to H0.
     Off means no default.

   The following four bits determine the function to be performed by SVC 34 when R1 contains the complemented address of the CSCB:
   - Bit 4 - Add this CSCB to the chain.
   - Bit 5 - Delete this CSCB from the chain.
   - Bit 6 - Free this CSCB's core.
   - Bit 7 - Execute branch entry to ABTERM.

2. Type flags indicating activity involved
   - Bit 0 - Reserved.
   - Bit 1 - Reserved.
   - Bit 2 - Initiator waiting for work.
   - Bit 3 - Special.
   - Bit 4 - Cancelable job step.
   - Bit 5 - Cancel communication switch.
   - Bit 6 - Cancelable (MFT11).
   - Bit 7 - System assigned procedure (MFT11).

3. Express cancel SYSOUT flags
   - Bit 0=1=All specified.
   - Bit 1=1=In specified.
   - Bit 2=1=Out specified.
   - Bit 3=1=Hold Q specified.
   - Bit 4=1=Specific queue.
   - Bit 5=1=Dump specified.
   - Bit 6=1=End scan switch.
   - Bit 7=1=Cancel all SYSOUT.

CSCB-CONTROL



4. Bit 0 Stop.
   Bit 1 Reader return with in-core JCT communication switches.
   Bit 2 Writer pause dataset.
   Bit 3 Writer pause forms.
   Bit 4 System task.
   Bit 5 No data set integrity.
   Bit 6 Reserved.
   Bit 7 Reserved.

CSCB VERB CODES

Command		Code
START	(S)	04
MOUNT	(M)	0C
LOG	(L)	1C
WRITELOG	(W)	20
SET	(T)	24
VARY	(V)	28
UNLOAD	(U)	2C
HALT	(Z)	3C
STOP	(P)	40
MODIFY	(F)	44
CANCEL	(C)	48
MONITOR	(MN)	64
SEND		A0
DISPLAY	(D)	68
HOLD	(H)	6C
RELEASE	(A)	70
RESET	(E)	74
DEFINE	(N)	78
QUIESCE	(Q)	60
*MSG		78
*CENOUT		7C
*BRDCST		80
*USERID		84
*SHOW		88

*RJE Commands

COMMUNICATION VECTOR TABLE
(Pointed to by X'10'; mapped by CVT)

-8 RSVD	-6 CVTMDL Model ID
-4 (-4) CVTRELNO Reserved	
0 (0) CVTTCBP Pointer to Address for Next and Current TCB	
4 (4) CVT0EF00 Address of Routine to Schedule Asynchronous Exits	
8 (8) CVTLINK Address of DCB for SYS1.LINKLIB	
12 (C) CVTJOB Address of Work Queue Control Blocks	
16 (10) CVTBUF Address of Buffer for Resident Console Interruption Routine	
20 (14) CVTXAPG Address of IOS Appendage Table	
24 (18) CVT0VL00 Address of Entry-Point of Address Validity Checking Routine	
28 (1C) CVTPCNVT Address of Entry-Point of Routine for Converting Relative Track Address to Absolute	
32 (20) CVTPRLTV Address of Entry-Point of Routine for Converting Absolute Track Address to Relative	
36 (24) CVTILK1 Address of Channel and Control Unit Section in UCB Lookup Table	
40 (28) CVTILK2 Address of UCB Address List Portion in UCB Lookup Table	
44 (2C) CVTXTLER Address of Entry-Point to XCTL Routine for Systems Error Routines	
48 (30) CVTSYSAD Address of System Residence Volume Entry in UCB Table	

52 (34) CVTBTERM Address of Entry-Point of ABTERM Routine	
56 (38) CVTDATE Current Date in Packed Decimal	
60 (3C) CVTMSLT PCP: Address of Master Resident Core MFT, MVT: Address of Master Scheduler Resident Data Area	
64 (40) CVTZDTAB Address of I/O Device Characteristic Table	
68 (44) CVTXITP Address of Error Interpreter Routine	
72 (48) CVTDAR Address of the I/O Control Block Complex Accessed by DAR	
76 (4C) CVT0FN00 Entry-Point Address to FINCH	
80 (50) CVTEXIT An SVC 3 Instruction	82 (52) CVTBRET A BCR 15, 14 Instruction
84 (54) CVTSVDCB Address of DCB for SYS1.SVCLIB	
88 (58) CVTTPC Address of Pseudo Clock for Timer Routine	
92 (5C) CVTPBLDL Address of BAL Entry-Point to BLDL Routine	
96 (60) CVTSJQ Address of Selected Job Queue	
100 (64) CVTCUCB Address of Table with Console UCB Address (UCM)	
104 (68) CVTQTE00 Address of Timer Enqueue Routine	
108 (6C) CVTQTD00 Address of Timer Dequeue Routine	

112 (70)	CVTSTB Address of I/O Device Statistics Table
116 (74)	CVTDCB System Configuration, Address of DCB for SYS1.LOGREC (see note 1)
120 (78)	CVTIOQET Address of Request Element Table
124 (7C)	CVTIXAVL Address of IOS Freelist Pointer
128 (80)	CVTNUCB Lowest Storage Address Not in Nucleus
132 (84)	CVTBOSV Address of Program Fetch Routine
136 (88)	CVT0DS Address of Entry-Point of Dispatcher
140 (8C)	CVTILCH Address of Logical Channel Word Table
144 (90)	CVTIERLC Address of Asynchronous Exit Queue
148 (94)	CVTMSER PCP: Address of Major QCB MFT, MVT: Address of Master Scheduler Resident Data Area
152 (98)	CVT0PT01 Address of Branch Entry-Point for Post Routine
156 (9C)	CVTTRMTB Address of Terminal Table for QTAM
160 (A0)	CVTHEAD Address of Highest Priority TCB in Ready Queue
164 (A4)	CVTMZ00 Highest Storage Address in Machine
168 (A8)	CVT1EF00 Address of IRB Creation Routine

172 (AC) CVTQOCR PCP: Reserved MFT, MVT: Address of a GFX Parameter List Word, or Zeros		
176 (B0) CVTQMWR PCP: Reserved MFT, MVT: Address of Queue Manager's Communication Data Area		
180 (B4) CVTSNCTR PCP, MFT, MVT: Serial Number Counter	182 (B6) CVTOPTA Flags (see note 2)	183 (B7) Reserved
184 (B8) PCP: CVTCRTTR - TTR of JCT for Restart	187 (BA) PCP: CVTSTUSA (see note 3)	
CVTQCDSR MFT: (without Link Library Option) - Reserved (with Link Library Option) - Reenterable Load Module Queue Search Routine Address MVT: CDE Search Routine Address		
188 (BC) PCP: Reserved CVTQLPAQ MFT: (without Link Library Option) - Reserved (with Link Library Option) - Reenterable Load Module Queue Address MVT: Address of Top CDE in LPA Queue		
192 (C0) CVTMPCVT PCP, MFT: Reserved MVT: Address of M65MP Secondary CVT		
196 (C4) CVTSMCA PCP: Must be Zeros MFT, MVT: Address of the SMCA		
200 (C8) CVTABEND PCP, MFT: Reserved MVT: Address of Secondary CVT		
204 (CC) CVTUSER PCP, MFT, MVT: Field Available to the User 207 (CF)		

MFT, MVT Extension

208 (D0) CVTQSPET Address of Release Main Storage Routine		
212 (D4) CVTQABST MFT: Reserved MVT: An SVC 13 Instruction	214 (D6) CVTLNKSC MFT with Subtasking: An SVC 6 Instruction (LINK) MVT: Reserved	
216 (D8) CVTTSCE MFT: Address of TSCE MVT: Address of First TSCE 219 (DB)		
220 (DC) Reserved		
224 (E0) CVTRMS RMS Work Area		
228 (E4) (TSO) TSFLGS	229 (E5) (TSO) Address of TSCVT	

232 (E8) (TSO)	Address of XCVT
236 (EC)	Reserved
236 (F0) TCAM Flags	237 (F1) Address of TCAM CVT

MFT with Subtasking Extension

244 (F4) CVTTSKS Maximum No. of TCB Address Table Entries	245 (F5) CVTTAT Pointer to Partition 0 TCB Address Table
248 (F8) CVTSYST Number of Sysgened TCB's	

Notes:

1. CVTDCB — System configuration.

   10 MVT - Uniprocessing.
   14 MVT - Multiprocessing.
   20 MFT
   40 PCP

2. CVTOPTA

xxx.	MFT, MVT (indicates which RMS options are present):
1...	Channel Check Handler (CCH).
.1..	Alternate Path Retry (APR).
..1.	Dynamic Device Reconfiguration (DDR).
...1	NIP is executing.
.... 1...	MFT with subtasking.
.... .x..	MVT (hierarchy Support option indicator):
.... .1..	Hierarchy Support is included.
.... .0..	Hierarchy Support is not included.
.... ..xx	Reserved bits.

3. CVTSTUSA — PCP: Status byte A.

xxxx ...x	Reserved bits.
.... 1...	A requested automatic checkpoint/restart was initiated for the job step that caused ABEND processing.
.... .1..	A requested automatic step restart was initiated for the job step that caused ABEND processing.
.... ..1.	DD DATA statement in input stream. The bit is set to 0 when the data following the statement is completely read.

Comments:

SECONDARY COMMUNICATIONS VECTOR TABLE

(Pointed to by CVT)

This table appears in module IEAQET00, beginning at symbolic location IEABEND.

4 bytes
0(0) SCVTPGTM Address of EOT Purge Timer Routine (IEAQPGTM)
4(4) SCVTPGWR Address of WTOR Purge Routine (IEECVPRG)
8(8) SCVTSPET Address of Release Main Storage Routine (IEAQSPET)
12(C) SCVTACT Address of TACT (IEAQTAQ)
16(10) SCVTERAS Address of EOT Erase Phase Routine (IEAQERA)
20(14) SCVTQCBO Address of QCB Origin (IEAQQCBO)
24(18) SCVTPGEQ Address of ENQ/DEQ Purge Routine (IEA0EQ01)
28(1C) SCVTRMBR Address of REGMAIN Branch Entry (RMBRANCH)
32(20) SCVTPGIO Address of SVC Purge Routine (IGC016)
36(24) SCVTRACE Address of Trace Routine Switch (IECXTRA)
40(28) SCVTTASW Address of Task Switching Routine (IEA0DS02)
44(2C) SCVTCDCL Address of CDCONTRL in Common Subroutines of Contents Supervision (IEAQCS02)
48(30) SCVTLFRM Branch Entry Point to the FREEMAIN Routine (FMBRANCH)
52(34) SCVTPABL Address of Release Loaded Programs Routine in EOT (IEAQABL)

4 bytes	
56(38)	SCVTDQTC Address of Dequeue TCB Routine in EOT (IEADQTCB)
60(3C)	SCVTHSKP Address of CDHKEEP in the CDEXIT Routine (CDHKEEP)
64(40)	SCVTRPTR Address of Trace Table Pointers (TRPTR)
68(44)	SCVTGMBR List Format GETMAIN Branch Entry Point (GMBRANCH)
72(48)	SCVTAUCT Transient Area User Count (TAUSERCT)
76(4C)	SCVTROCT Address of Rollout Counters (IEARCTRS)
80(50)	SCVTROQ Address of Rollout Queue (IEAROQUE)
84(54)	SCVTRIRB Address of Rollout IRB (IEAROIRB)
88(58)	SCVTRTCB Address of Rollout TCB (IEAROTCB)
92(5C)	SCVTCOMM Address of Communications Task Routine (IEECVCTW) for Damage Assessment Routines (DAR)
96(60)	SCVTABLK Entry to ABTERM Routine (SCEDWAIT) for Damage Assessment Routines (DAR)
100(64)	SCVTNFND Entry to Transient Area Handler Routine (IBNOTFND) for Damage Assessment Routines (DAR)
104(68)	SCVTSWT Zero
108(6C)	SCVTMSSQ Address of GOVRFLB
112(70)	SCVTCTCB Address of Communications Task TCB (IEECVTCB)
116(74)	SCVTETCB Address of System Error TCB (IEAERTCB)
120 (78)	SCV RXL Address of TSO Region Extent List

COMMUNICATIONS VECTOR TABLE - MULTIPROCESSING
(Pointed to by CVT)

MPCVT

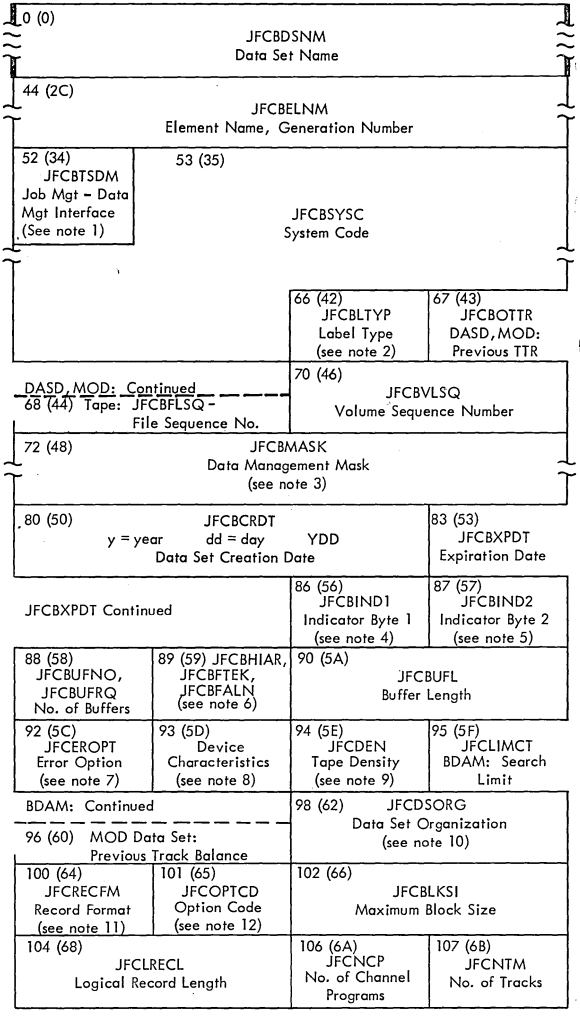
0(0)	CVTAFFLK (see note)
4(4)	CVTSTPTR Address of SHOLDTAP Routine
8(8)	CVTWTTCB Address of Dispatcher Wait Task
12(C)	CVTTKRM Address of Task Removal Routine (TEST DSP)
16(10)	CVTGOV Address of GOVRFLB Table
20(14)	CVTIOTIO Address of Multiprocessing Unit TIO Routine in IOS
24(18)	CVTTIOTCH Address of Multiprocessing Unit TCH Routine in IOS
28(1C)	CVTSTOR Address of Notify Storage On-line Routine
32(20)	CVTVRYOF Address of Deferred Vary Storage Off-line Routine

Note:

CVTAFFLK

Byte 0	Affinity byte
Hex C1	CPU A is executing disabled.
Hex C2	CPU B is executing disabled.
Hex 00	Neither CPU is executing disabled.
Byte 1	Lock byte
Hex FF	Supervisor code has been locked.
Hex 00	The lock is not set.
Bytes 2-3	Reserved.

JOB FILE CONTROL BLOCK
(Mapped by IEFJFCBN)



Notes:

1. JFCBTSDM — Job management/data management interface.

1...	Data set is cataloged.
.1..	Volume serial list has been changed.
..1.	Data set is a SYSIN or SYSOUT.
...1	A job step is to be restarted. (This job had ABEND processing for a data set opened for MOD.)
.... 1...	Do not write back the JFCB during OPEN processing.
.... .1..	Do not merge DSCB or label fields into this JFCB.
.... ..1.	Do not merge DCB fields into this JFCB.
....1	The patterning DSCB is complete.

2. JFCBLTYP — Label type.

	Code	
xxx.		Reserved bits.
...1	BLP	Bypass label processing.
.... 1.1.	SUL	User label.
.... .1..	NSL	Nonstandard label.
.... ..1.	SL	Standard label.
....1	NL	No label.

3. JFCBMASK — Data management mask.

Byte 0 — Reserved for future use.

Byte 1

1...	DCB modification bit; also called 2321 write check bit. Set to 1 when DCBOPTCD is modified for write checking.
.1..	Reserved for future use.
..1.	Number of tracks per master index (NTM) field modified: ISAM. Program-controlled interruption (PCI) field modification: TCAM.
...1	Number of tracks for cylinder overflow (CYLOF) field modified: ISAM.
.... 1...	Relative key position (RKP): ISAM. Number of bytes reserved in the buffer (RESERVE) field modified: TCAM.
.... .1..	ISAM DBUFN.
.... ..1.	Number of channel programs (NCP): ISAM.
....1	EROPT (ISAM/QSAM).

Byte 2

1...	Logical record length (LRECL), ISAM/QSAM.
.1..	Limit for extended search (LIMCT), BDAM.
..1.	Number of channel programs (NCP), BSAM.
...1	Blockage (BLKSI). Size of buffer (BUFSIZE) field modified: TCAM.
.... 1...	Option code (OPTCD).
.... .1..	Record format (RECFM) field merged from JFCB to DCB.

Notes:

Byte 2 (Continued)

.... ..1.	Density (DEN).
....1	Buffering technique/buffer alignment (BUFTEK/BFALN). Number of I/O instructions to be issued before a WAIT (GNCP), GAM; field merged from JFCB to DCB. Maximum number of buffers (BUFMAX) field modified: TCAM.

Byte 3

1...	Buffer length (BUFL).
.1..	Number of buffers (BUFNO).
..1.	Key length (KEYLE) field merged from JFCB to DCB; tape recording technique for seven-track tape (TRTCH) field modified.
...1	Number of bytes of user-provided work areas (SOWA), -TAM; field merged from JFCB to DCB.
.... 1...	Relative priority to be given to sending and receiving operations (CPRI), -TAM; field merged from JFCB and DCB. Percentage of nonreuseable disk message queue records (THRESH) field modified (TCAM).
.... .1..	Number of seconds of intentional delay between passes through a polling list (INTVL), -TAM; field merged from JFCB to DCB.
.... ..1.	Logical record length (LRECL) field merged from JFCB to DCB.
....1	Data set organization (DSORG) field merged from JFCB to DCB. Note: Module IGG0190S, the final module of the OPEN routine, stores the first 4 bytes of JFCBMASK in DEBDCBMK.

Byte 4

1...	JFCB modification switch. When set, indicates JFCB must be written back. Read JFCB switch.
.1..	DSCB modification switch. When set, indicates DSCB must be written back.
..1.	Null data set indicator.
...1	Concatenation indicator.
.... x...	Reserved for future use.
.... .1..	NOP required. Password required.
.... ..x.	Reserved for future use.
....x	Reserved for future use.

Byte 5

1...	When bits 0 and 1 = 11: Create SL. When bits 0 and 2 = 11: Destroy SL.
.1..	Set on when standard labeled tape required.
..1.	Nonstandard labeled or unlabeled tape required. Overwrite SL.

Notes:

Byte 5 (Continued)

...1	When bits 3 and 4 = 11: Label conflict. Dual density check required.
.... 1...	User label function indicated. Reject switch set during UL processing only.
.... .1..	User label function indicated.
.... ..1.	When bits 5 and 6 = 00: TCLOSE called user label routine. When bits 5 and 6 = 01: CLOSE called user label routine for direct access. OPEN called user label routine for tape. When bits 5 and 6 = 10: OPEN called user label routine for direct access. CLOSE called user label routine for tape. When bits 5 and 6 = 11: EOV called user label routine.
....1	Interface between OPEN and EOV; set on when an L-type volume serial number has been generated.

Byte 6

1...	Set to 1 by job scheduler if LABEL=(,,,IN) is specified on DD card.
.1..	Set to 1 by job scheduler if LABEL=(,,,OUT) is specified on DD card.
..x.	Reserved for future use.
...1	Indicates whether to change DISP in JFCB from NEW to MOD.
.... xxxx	Reserved for future use.

Byte 7

1...	Second pass switch. Indicates that a second pass through IGG0199A is necessary.
.xxx xxxx	Reserved for future use.

4. JFCBIND1 — Indicator byte 1.

11..	Release external storage.
..11	Data set has been located.
.... 11..	New volume has been added to the data set.
.... ..1.	Data set is a member of a generation data group.
....1	Data set is a member of a partitioned data set.

5. JFCBIND2 — Indicator byte 2.

01..	OLD data set.
10..	MOD data set.
11..	NEW data set.
..01	Data set security.
.... 1...	Shared.
.... .1..	Delete this JFCB before allocation for a restarted generation data group.
.... ..1.	Storage volume requested.
....1	Temporary data set.

Notes:

6. JFCBHIAR,
JFCBFTEK,
JFCBFALN

	Code	
x... .x..		For access methods other than QTAM Buffer pool location, coded in the DD statement:
0... .0..	0	Hierarchy 0 main storage.
0... .1..	1	Hierarchy 1 main storage.
.xxx		Buffering technique:
.1..	S	Simple buffering.
.11.	A	Logical record interface for BSAM locate mode.
..1.	R	VS format BDAM data set is to be processed.
...1	E	Exchange buffering.
.... ..xx		Buffer alignment:
.... ..10	D	Doubleword boundary.
.... ..01	F	Fullword, not a doubleword boundary.

7. JFCEROPT — Error option. Disposition of permanent errors if user returns from a synchronous error exit. (QSAM)

1...	Accept.
.1..	Skip.
..1.	Abnormal end of task.
...x xxxx	Reserved bits.

8. Device characteristics field.

The content of this one-byte field depends upon the device in use.

MAGNETIC TAPE

JFCTRTCH — Tape recording technique for 7-track tape.

	Code	
0010 0011	E	Even parity.
0011 1011	T	BCD/EBCDIC translation.
0001 0011	C	Data conversion.
0010 1011	ET	Even parity and translation.

DIRECT-ACCESS STORAGE

JFCKEYLE — Direct-access key length.

CARD READER, CARD PUNCH

JFCMODE — Mode of operation.

	Code	
1000	C	Column binary mode.
0100	E	EBCDIC mode.

JFCSTACK — Stacker Selection.

	Code	
.... 0001	1	Stacker 1
.... 0010	2	Stacker 2

Notes:

PRINTER

JFCPRTSP — Normal printer spacing.

	Code	
0000 0001	0	No spacing.
0000 1001	1	Space one line.
0001 0001	2	Space two lines.
0001 1001	3	Space three lines.

PAPER TAPE

JFCCODE — Conversion code.

	Code	
1000 0000	N	No conversion.
0100 0000	I	IBM BCD.
0010 0000	F	Friden.
0001 0000	B	Burroughs.
0000 1000	C	National Cash Register.
0000 0100	A	ASCII (8-track).
0000 0010	T	Teletype.

9. JFCDEN — Tape density for 2400 Series magnetic tape units.

	Code	7-track	9-track
0000 0011	0	200 bpi	-
0100 0011	1	556 bpi	-
1000 0011	2	800 bpi	800 bpi
1100 0011	3	-	1600 bpi

10. JFCDSORG — Data set organization being used.

Byte 1

	Code	
1...	IS	Indexed sequential organization.
.1..	PS	Physical sequential organization.
..1.	DA	Direct organization.
...x xx..		Reserved bits.
.... ..1.	PO	Partitioned organization.
....1	U	Unmovable - the data contains location dependent information.

Byte 2

0...	GS	Graphics organization.
.xxx xxxx		Reserved bits.

Notes:

11. JFCRECFM — Record format.

	Code	
10..	F	Fixed.
01..	V	Variable.
11..	U	Undefined.
..1.	T	Track overflow.
...1	B	Blocked: may not occur with undefined (U).
.... 1...	S	Fixed-length record format: Standard blocks; no truncated blocks or unfilled tracks are embedded in the set. Variable-length record format: Spanned records.
.... .10.	A	ASA control character.
.... .01.	M	Machine code control character.
.... .00.		No control character.
....0		Always zero.

12. JFCOPTCD — Option codes.

QSAM, BSAM, BPAM

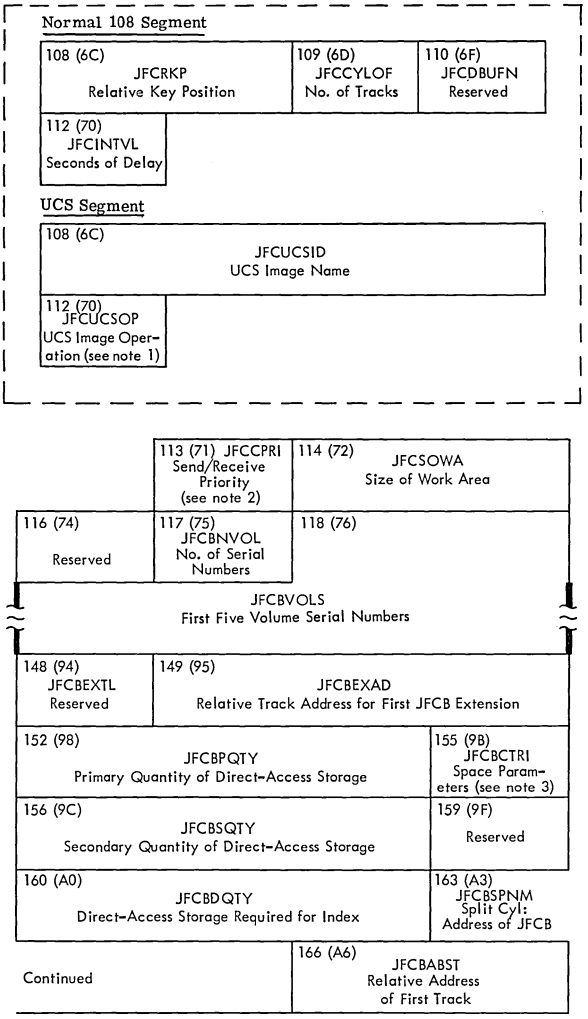
	Code	
1...	W	Write-validity check.
.1..	B	Bypass EOF recognition.
	U	1403 Printer with UCS feature: Allow a data check caused by an invalid character.
..1.	C	Chained scheduling using the program controlled interruption.
...1	H	Hopper-empty exit (Optical Reader, BSAM).
...1	O	On-line correction (Optical Reader, QSAM).
.... .1..	Z	For magnetic tape devices, use reduced error recovery procedure. (EXCP also)
.... ..1.	T	BSAM, QSAM only: User totaling.
.... x..x		Reserved bits.

BISAM, QISAM

	Code	
1...	W	Write-validity check.
.x.. .x..		Reserved bits.
..1.	M	Master indexes.
...1	I	Independent overflow area.
.... 1...	Y	Cylinder overflow area.
.... ..1.	L	Delete option.
....1	R	Reorganization criteria.

BDAM

	Code	
1...	W	Write-validity check.
.1..		Track overflow.
..1.	E	Extended search.
...1	F	Feedback.
.... 1...	A	Actual addressing.
.... .xx.		Reserved bits.
....1	R	Relative block addressing.


Normal 108 Segment
108 (6C) JFCRKP Relative Key Position
109 (6D) JFCCYLOF No. of Tracks
110 (6F) JFCDBUFN Reserved
112 (70) JFCINTVL Seconds of Delay
UCS Segment
108 (6C) JFCUCSID UCS Image Name
112 (70) JFCUCSOP UCS Image Operation (see note 1)
113 (71) JFCCPRI Send/Receive Priority (see note 2)
114 (72) JFCSOWA Size of Work Area
116 (74) Reserved
117 (75) JFCBNVOL No. of Serial Numbers
118 (76)
JFCBVOLS First Five Volume Serial Numbers
148 (94) JFCBEXTL Reserved
149 (95) JFCBEXAD Relative Track Address for First JFCB Extension
152 (98) JFCBPQTY Primary Quantity of Direct-Access Storage
155 (9B) JFCBCTRI Space Parameters (see note 3)
156 (9C) JFCBSQTY Secondary Quantity of Direct-Access Storage
159 (9F) Reserved
160 (A0) JFCBDQTY Direct-Access Storage Required for Index
163 (A3) JFCBSPNM Split Cyl: Address of JFCB
Continued
166 (A6) JFCBABST Relative Address of First Track

168 (A8) JFCBSBNM Main Storage Address of JFCB - Suballocate		171 (AB) JFCBDRLH Data Block Length
Continued	174 (AE) JFCBVLCT Volume Count	175 (AF) JFCBSPTN Split Cyl: No. of Tracks

Notes:

1. JFCUCSOP — Operation of the UCS image to be loaded.

x.x. xxxx	Reserved bits.
.1..	UCS image is to be loaded in the FOLD mode.
...1	UCS image is to be verified.

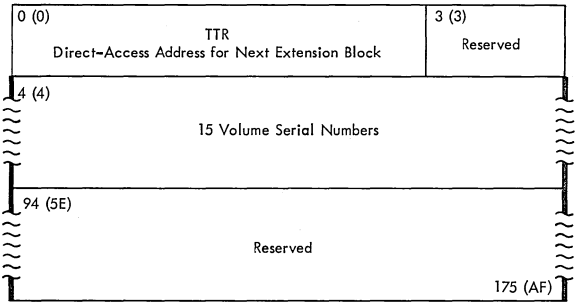
2. JFCCPRI — QTAM: Priority between send and receive operations.

	Code	
1...	S	Send priority.
.1..	E	Equal priority.
..1.	R	Receive priority.
...x xxxx		Reserved bits.

3. JFCBCTRI — Space parameters.

00..	ABSTR request.
01..	Average block length request.
10..	TRK request.
11..	CYL request.
..xx	Reserved bits.
.... 1...	CONTIG request.
.... .1..	MXIG request.
.... ..1.	ALX request.
....1	ROUND request.

JFCB EXTENSION BLOCK



0 (0)	JSCBWTP PCP, MFT, MVT: Address of the Write-to-Programmer Work Area
4 (4)	JSCBCSCB MFT, MVT: Address of the Command Scheduling Control Block

Comments:

PICA - PROGRAM INTERRUPTION CONTROL AREA

0 (0)	1 (1)
PICAPRMK (See note 1)	PICAEXIT Address of User's Routine to be Given Control When an Interruption of Specified Type Occurs
4 (4) Interruption Mask (See note 2)	

Notes:

1. PICAPRMK — Program mask.

0000 1...	Fixed-point overflow.
0000 .1..	Decimal overflow.
0000 ..1.	Exponent underflow.
0000 ...1	Significance.

2. Byte 1 — Interruption mask.

	Number	
01..	1	Operation.
0.1.	2	Privileged operation.
0..1	3	Execute.
0... 1...	4	Protection.
0... .1..	5	Addressing.
0... ..1.	6	Specification.
0... ...1	7	Data.

Byte 2

1...	8	Fixed-point overflow (maskable).
.1..	9	Fixed-point divide.
..1.	10	Decimal overflow (maskable).
...1	11	Decimal divide.
.... 1...	12	Exponent overflow.
.... .1..	13	Exponent underflow (maskable).
.... ..1.	14	Significance (maskable).
....1	15	Floating-point divide.

Comments:

PROGRAM INTERRUPTION ELEMENT (PIE)

Doubleword Boundary

0 (0) Flags (See note)	1 (1) PIEPICA Address of the current PICA
4 (4) PIEPSW PI Old PSW Stored at Program Interrupt Time	
12 (C) PIEGR14 Save Area for Register 14	
16 (10) PIEGR15 Save Area for Register 15	
20 (14) PIEGR0 Save Area for Register 0	
24 (18) PIEGR1 Save Area for Register 1	
28 (1C) PIEGR2 Save Area for Register 2	

Note:

1...	The task cannot accept any more PI's. (This bit is set whenever a user PI exit routine is entered. It is reset by the SVC exit routine.) This bit is called the first-time logic switch.
.xxx xxxx	Reserved bits.

Comments:

QUEUE CONTROL BLOCK

MAJOR QCB

0 (0) Address of Next Major QCB (If Last, Equals Zero)
4 (4) Address of Previous Major QCB (If First, Equals IEAQQCB)
8 (8) Address of First Minor QCB on Queue of Minors
12 (C) Major QCB Name (First Four Characters)
16 (10) Major QCB Name (Last Four Characters)

MINOR QCB

<table>
<tr><td colspan="3">0 (0)
Address of the First QEL on the QEL Queue</td></tr>
<tr><td colspan="3">4 (4)
Address of the Previous Minor QCB (If First, Equals Major QCB)</td></tr>
<tr><td colspan="3">8 (8)
Address of the Next Minor QCB (If Last, Equals Zero)</td></tr>
<tr><td>12 (C)
Length of QCB Name</td><td>13 (D)
QCBPKF
(See note)</td><td>14 (E)
Minor QCB Name (Variable in Length From 1-255 Characters)</td></tr>
<tr><td colspan="3"></td></tr>
</table>

Note: QCBPKF -- If field is FF, the name is known to the entire system. If field is 00, 10, 20, 30, or F0, it is the protection key of the TCB under which the request was enqueued. In this case, the name is known only to the the job step.

QUEUE ELEMENT (QEL)

0 (0) SMC (See note 1)	1 (1) Address of Next QEL Zero if This is Last QEL
4 (4) CODE (See note 2)	5 (5) Address of Previous QEL Address of Minor QCB if This QEL is First on QEL Queue
8 (8) Address of TCB That was Current When ENQ Macroinstruction was Issued	
12 (C) Address of SVRB for ENQ Routine	

Notes:

1. SMC — Indicates whether the QEL represents a request for "must complete" status.

   X'20' — Represents a "system must complete" request.
   X'10' — Represents a "step must complete" request.
   X'00' — Represents "must complete" status not requested.

2. CODE

   0... .... — An exclusive request.
   1... .... — A shared request.
   .1.. .... — If shared DASD is included in the system, a UCB address appears at byte 12 of this QEL. This QEL is associated with a RESERVE macroinstruction, instead of an ENQ macroinstruction.

Comments:

PARAMETER LIST ELEMENT (FOR THE ENQ/DEQ ROUTINES)

0 (0) LISTEND (See note 1)	1 (1) LMINOR (See note 2)	2 (2) PARMCDS (See note 3)	3 (3) Return (See note 4)
4 (4) Major Name The Address of the Major Resource Name (Qname).			
8 (8) Minor Name The Address of the Minor Resource Name (Rname).			
12 (C) Address of UCB			

Notes:

1. LISTEND — Indicates the last element in the parameter list. The last element must have hex FF in this field. All other elements in the list may have any other value.

2. LMINOR — The length of the minor name whose address is at offset 8, or zero. If LMINOR contains zero, the length of the minor name is assumed to be in the first byte of the name field whose address is at offset 8. In this case, the length byte does not include its own length.

3. PARMCDS — ENQ/DEQ parameters.

0...	Exclusive request.
1...	Shared request.
.0..	Minor name is known only to job step.
.1..	The scope of the minor name is SYSTEM.
..1.	Set must complete = SYSTEM.
...1	Set must complete = STEP.
.... .xxx	RETURN.
.... .000	RET = NONE.
.... .001	RET = HAVE.
.... .011	RET = USE.
.... .111	RET = TEST.
.... 1...	Reserve macro issued (and bit 1 = 0)

4. RETURN — Return code field for codes returned to the issuer of the ENQ or DEQ macroinstruction.

Comments:

PROGRAM EXTENT LIST (LRB, LPRB, PRB)

+0 (+0)	XLISTLH0 Length of Program Extent in Hierarchy 0
+4 (+4)	XLISTLH1 Length of Program Extent in Hierarchy 1
+8 (+8)	XLISTAH0 Address of Program Extent in Hierarchy 0
+12 (C)	XLISTAH1 Address of Program Extent in Hierarchy 1

FRB

-8 (-8)	XRBSUC Pointer to RB of Previously Loaded Program	
-4 (-4)	XRBPRE Pointer to RB of Program Loaded Immediately After This One	
0 (0)	XRBNM Program Name (See note 1)	
8 (8) XRBSZ		10 (A) XRBSTAB (See note 2)
12 (C)	XRWTL Address of Most Recent Wait List Element	
16 (10)	XREQ Pointer to the TCB of the Requesting Task	
20 (14)	XRTLPRB Pointer to the LPRB Built by FINCH	

Notes:

1. XRBNM

Contents of this field depend on the use of this block. The use of this request block is shown by bits 0-3 of byte 1 of the XSTAB field at offset 10 (dec), A (hex).

LPRB, LRB, PRB, FRB
Program name.

IRB
For timer, first byte contains flags; for all other uses, first byte contains no meaningful information.

Notes:

SIRB
8-character name of the error routine currently occupying the 400 hex byte I/O supervisor transient area.

SVRB
Type 2 SVC:
No meaningful information.
Type 3 or 4 SVC:

Bytes 0-3: TTRN address, on the SVC library, of the load module. N, the concatenation number, is 0.

Bytes 4-7: Four digit number of the form ysss. y = number of the current phase of the routine. (First or only phase: y = 0). sss = SVC number in unpacked decimal (signed) form.

2. XRBSTAB — Flag bytes.

Byte 1

xxxx .... These bits are used to distinguish between the LPRB, LRB, PRB, FRB, IRB, SIRB, and the SVRB. The bits have the following definitions:

0000 .... PRB -- The program was not loaded via a LOAD macroinstruction, and does not have minor entries identified via an IDENTIFY macroinstruction.

0001 .... PRB -- The program was not loaded via a LOAD macroinstruction, and does have minor entries identified via an IDENTIFY macroinstruction.

0010 .... LPRB -- The program was loaded via a LOAD macroinstruction, and does not have minor entries identified via an IDENTIFY macroinstruction.

0011 .... LPRB -- The program was loaded via a LOAD macroinstruction, and does have minor entries identified via an IDENTIFY macroinstruction.

0100 .... IRB.

0101 .... FRB.

1000 .... SIRB.

1100 .... SVRB -- The program is a type 2 SVC routine or a type 3 or 4 SVC routine that has not yet been loaded.

1101 .... SVRB -- The program is a type 3 or 4 SVC routine that has been loaded.

1110 .... LPRB -- This block describes a minor entry identified via an IDENTIFY macroinstruction.

1111 .... LRB.

.... 1... The type 3 or 4 SVC routine is resident.

.... .1.. A checkpoint may be taken in a user exit from this SVC routine.

.... ..1. LRB, LPRB, PRB: The program was hierarchy-block loaded. A program extent list exists.

....1 Refreshable module.

Notes:

	Byte 2	FRB only:
	0...	Module being loaded is reentrant.
	1...	Module being loaded is not reentrant.
	.0..	The finch routine has not executed a GETMAIN macroinstruction.
	.1..	The finch routine has executed a GETMAIN macroinstruction.
	..x. xxxx	Reserved bits.
	Byte 2	All RB's except FRB's:
	1...	XRBLNK field points to the TCB.
	.1..	Active program.
	..1.	Registers 2-14 to be restored from XRBREG.
	...1	Reenterable or reusable program.
	.... 00..	IRB has no interrupt queue elements.
	.... 01..	IRB has interrupt queue elements which are request elements.
	.... 10..	MFT only: This is a dummy LPRB in a partition for a program in the reenterable load module area. The LPRB for the program is in the reenterable load module area.
	.... 11..	IRB has interrupt queue elements that are not request elements.
	.... ..1.	Request block storage is to be freed when program returns.
	1	Wait on less than the number of specified events.
	0	Wait on a single event or all of the specified events.
3.	XRBQ	IRB: Address of a 12-byte or 16-byte request element. LPRB: Address of an LPRB describing an entry identified via the IDENTIFY macroinstruction. PRB: Address of an LPRB describing an entry identified via the IDENTIFY macroinstruction. SIRB: Address of a 12-byte or 16-byte request element. SVRB: For type 3 and type 4 SVC's, this field contains the size of the program in bytes.

STAE CONTROL BLOCK (SCB)

0 (0) Reserved	1 (1) Address of Previous SCB or Zero, if First SCB
4 (4) Address of STAE Exit Routine	
8 (8) Reserved	9 (9) Address of STAE Exit Routine Parameter List
12 (C) Flags (See note)	13 (D) Address of RB

Note:

FLAGS	STAE flags.
1...	SCB is not cancelled by exit routine when XCTL is issued.
.1..	ISAM/TAM switch.
..xx xxxx	Reserved bits.

Comments:

0 (0) SMCAOPT SMF Options (See note 1)	1 (1) SMCAMISC Miscellaneous Indicators (See note 2)	2 (2) SMCATOFF SMF TIOT Offset
4 (4) SMCATIOT Address of the Master Scheduler TIOT		
8 (8) SMCAJWT Job Wait Time Limit		
12 (C) SMCABUF One-Half SMF Buffer Size		
16 (10) SMCASID System Identification		18 (12) SMCAMDL CPU Model Number
20 (14) SMCABUFP Address of the SMF Buffer		
24 (18) SMCAPDEV Volume Serial Number of Primary SMF Data Set		
Continued	30 (1E) SMCAPSTA Primary Device Status (See note 3)	31 (1F) SMCAPDAR Primary Device Address
Continued	34 (22) SMCAPLBL Primary Label Status (See note 4)	35 (23) SMCAXORY Contains an X or Y
36 (24) SMCAPDCB Address of Primary DCB		
40 (28) SMCAADEV Volume Serial Number of Alternate SMF Data Set		
	46 (2E) SMCASTA Alternate Device Status (See note 5)	Alternate Device Address
Continued	50 (32) Alternate Label Status (See note 6)	51 (33) Contains an X or Y
62 (34) SMCAADCB Address of Alternate DCB		
56 (38) SMCAWECB SMF Writer ECB		

60 (3C) SMCABECB SMF Buffer ECB			
64 (40) SMCASGWR Number of Record Segments Required for Logical Record			
68 (44) SMCASGFT Number of Record Segments That Fit into Data Set			
72 (48) SMCAWAIT Accumulated Wait Time			
80 (50) SMCAENDI Data Set Was/ Was Not Found (See note 7)	81 (51) SMCAENOP SMF Open Data Set Switch	82 (52) Reserved	83 (53) Reserved
84 (54) SMCAWRTP Optimum Buffer Write Point			
88 (58) SMCAXCTL Address of XCTL Name			
92 (5C) DCB Pointer (Zeros)			
96 (60) SMCAXNAM XCTL Name			
104 (68) SMCASWA Switches (See note 8)	105 (69) SMCASWB Reserved	106 (6A) SMCASWC Reserved	106 (6B) SMCASWD Reserved
108 (6C) SMCADSTM Time and Date Data Sets are Full Data Not Recorded After this Time			
116 (74) SMCADSCT Count of Lost Records 119 (77)			

Notes:

1. SMCAOPT — Contains the SMFDEFLT options selected at initialization time.

1...	Job accounting.
.1..	Step accounting.
..1.	User exits will be taken.
...1	Data set accounting.
.... 1...	Volume accounting.
...1 .1..	Tape error statistics by volume (ESV) accounting to be included in SMF record types 14 and 15 for tape data sets.
...1 ..1.	Type 17 records maintained for temporary data sets.
....x	Reserved bit.

Notes:

2. SMCAMISC — Miscellaneous indicators.

x...	Type of SMF recording requested.
.x..	SYS1.MAN data set is/is not present.
1...	SMF and user recording requested.
0...	Only user records to be recorded.
.0..	SYS1.MAN data set is not present.
.1..	SYS1.MAN data set present.
...1	SMF data set to be opened.
.... ..0.	Left-half of buffer in use.
.... ..1.	Right-half of buffer in use.
..x. xx.x	Reserved bits.

3. SMCAPSTA — Primary SMF data set device status.

1...	Data set is not available for recording.
..1.	This is a direct-access device.
...1	The data set is empty.
.... ..1.	Device address is defined.
....1	Volume serial number is defined.
.x.. xx..	Reserved bits.

4. SMCAPLBL — Label status of the primary SMF data set.

xxxx x...	Reserved bits.
.... .1..	Nonstandard label (NSL).
.... ..1.	Standard label (SL).
....1	No label (NL).

5. SMCASTA — Alternate SMF data set device status.

1...	Data set is not available for recording.
..1.	This is a direct-access device.
...1	The data set is empty.
.... ..1.	Device address is defined.
....1	Volume serial number is defined.
.x.. xx..	Reserved bits.

6. Label status of the alternate SMF data set.

xxxx x...	Reserved bits.
.... .1..	Nonstandard label (NSL).
.... ..1.	Standard label (SL).
....1	No label (NL).

7. SMCAENDI — Communication field

00	Data set (X or Y) was found.
01	Data set (X or Y) was not found.

8. SMCASWA — Indicator bits.

.1..	Both data sets are full; SMF is not recording.
..1.	OPEN failure on SMF data set. SMF is not recording.
...1	Next allocation must be for a direct-access device.
.... 1...	Allocation search is by volume serial number.
.... .1..	SMF halt-end-of-day is processing.
.... ..1.	Entry to the writer is for a space check of the data set.
....1	Entry to the writer is for data set switching only.
x...	Reserved bit.

0 (0)		3 (3)
	TCTQA Reserved	TCTSW TCT Switches (See note)
4 (4)	TCTTCB Initiator TCB Address	
8 (8)	TCTCRTBL TCT Storage Table Starting Address	
12 (C)	TCTIOTBL TCT I/O Table Starting Address	
16 (10)	TCTPOOL Subpool Number and Size of TCT	
20 (14)	TCTUTL MFT: Zeros MVT: Address of User Time Limit Routine (IEFUTL)	
24 (18)	TCTUDATA Address of User Parameter List	
28 (1C)	TCTJMR Address of the Job Management Record	
32 (20)	TCTUSO MFT: Zeros MVT: Address of User Output Limit Routine (IEFUSO)	
36 (24)	TCTSTOF Step Time Extension Overflow Field	
40 (28)	TCTSACT Total Step Time Extension	
44 (2C)	TCTWLMT Job or Step Maximum Wait Time Limit	

PROCESSOR STORAGE TABLE

48 (30) TCTLWM Highest Address Allocated From Bottom of Region	
52 (34) TCTHWM Lowest Address Allocated From Top of Region	
56 (38) TCTMINC Minimum Difference Between TCTHWM and TCTLWM in 2K Blocks	58 (3A) TCTRSZ Region Request in 2K Blocks
60 (3C) TCTRBC Accumulated Rollout Obtained Storage	62 (3E) TCTMBC Total Rollout Obtained Storage

HIERARCHY SUPPORT - STORAGE TABLE

64 (40) TCTLWM Highest Address Allocated From Bottom of Region	
68 (44) TCTHWM Lowest Address Allocated From Top of Region	
72 (48) TCTMINC Minimum Difference Between TCTHWM and TCTLWM in 2K Blocks	74 (4A) TCTRSZ Region Request in 2K Blocks
76 (4C) TCTRBC Accumulated Rollout Obtained Storage	78 (4E) TCTMBC Total Rollout Obtained Storage 79 (4F)

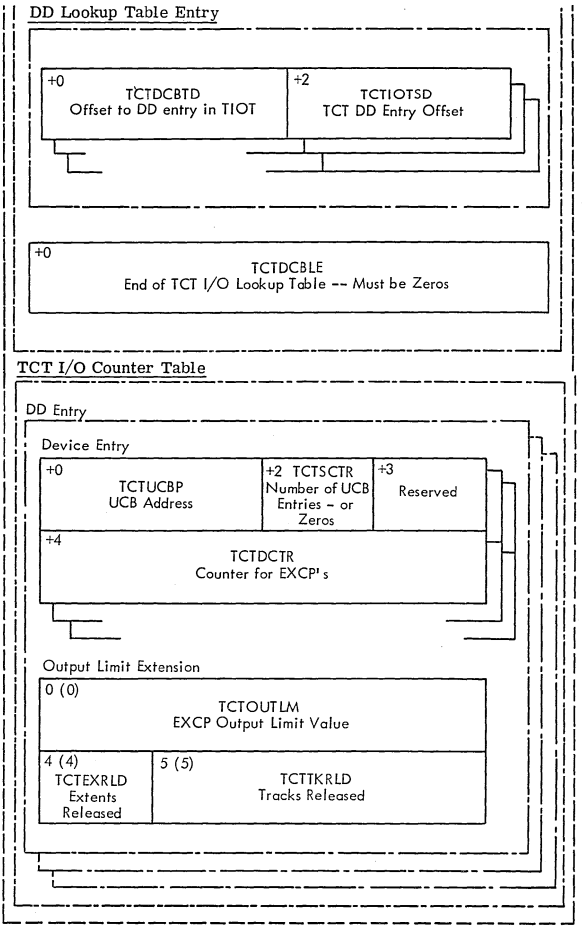
Note:

TCTSW	Timing control table switches.
0...	TQE contains step time.
1...	TQE contains job time.
.xxx xxxx	Reserved bits.

TCT EXTENSION

TCT I/O Lookup Table

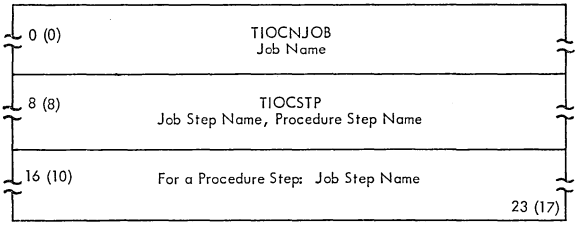
0 (0) TCTPLEXT Subpool Number and Size of TCT Extension (See note)	
4 (4) TCTSZLKP Size of TCT I/O Counter Table	6 (6) Reserved



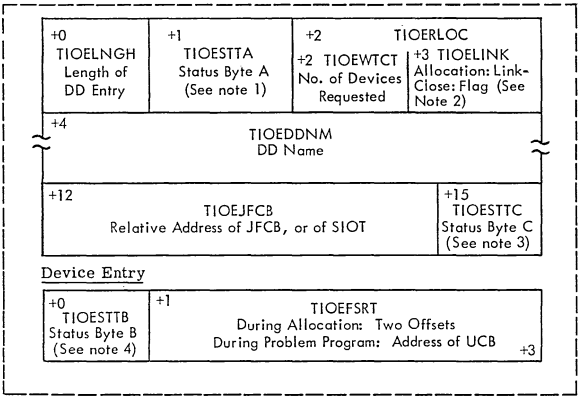
Note:

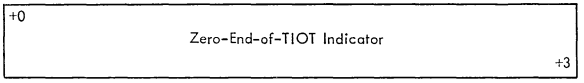
TCTPLEXT	Subpool and TCT I/O table size.
Byte 1	Subpool in which the TCT I/O table resides.
Byte 2-4	Size in bytes of the TCT I/O table.

TASK INPUT/OUTPUT TABLE



DD ENTRY





Comments:

Notes:

1. TIOESTTA — Status byte A.

x... .x..	Tape label processing to be performed:
0... .0..	NL, BLP.
0... .1..	SL, SUI.
1... .0..	NSL.
.1..	During allocation: Split cylinder primary. (This is the first DD entry for a split cylinder.) During step termination: No unallocation necessary.
..1.	During allocation: Split cylinder secondary. (This is not the first DD entry for a split cylinder.) During step termination: Rewind but no unloading.
...1	JOBLIB indicator.
.... 1...	DADSM allocation necessary.
.... ..1.	Tape data sets - rewind/unload the tape volume.
....1	Tape data sets - rewind the tape volume.

2. TIOELINK

	During allocation: Link to the appropriate prime split, unit affinity, volume affinity or suballocate TIOT entry. After CLOSE:
1...	This is a SYSOUT data set that contains data.
.xxx xxxx	Reserved bits.

3. TIOESTTC — Status byte C. Used during allocation only. Set to zeros at end of allocation.

1...	Secondary suballocate.
.1..	Deferred mount.
..1.	Primary unit affinity.
...1	Secondary unit affinity.
.... 1...	Primary volume affinity.
.... .1..	Secondary volume affinity.
.... ..1.	Primary suballocate.
....1	Secondary suballocate.

4. TIOESTTB — Status byte B.

	During allocation and during problem program:
1...	Data set is on device.
.1..	Data set uses device.
..1.	Device violates separation.
...1	Volume serial present.
.... 1...	Setup message required.
.... .x..	Disposition:
.... .1..	Retain unloaded volume if unload required.
.... .0..	Delete unloaded volume if unload required.
.... ..1.	Unload required.
....1	Verification required.

TIMER QUEUE ELEMENT (TQE)

0 (0) TQEFLGS Indicators (See note)	1 (1) TQETCB Address of TCB
4 (4) Zeros	5 (5) TQEFLNK Address of Next Queue Element
8 (8) Zeros	9 (9) TQEBLNK Address of Preceding Queue Element
12 (C) TQEVAL Time of Expiration/Time Remaining	
16 (10) TQELHPSW First Word of Current PSW - Used When TQE Serves as IRB	
20 (14) TQESAV Used to Save Contents of TQEVAL When TQE is Converted from TASK to REAL	
24 (18) TQESAADR Address of Processing Program Save Area	
28 (1C) Zeros	TQEEXIT Address of Timer Asynchronous Exit Routine
32 (20) TQEGRS Register Save Area - Used When TQE Serves as IRB	
96 (60) TQEECB Used for Interruption Queue Element When TQE Serves as IRB (16 bytes) TQEIQE Used for ECB When WAIT Parameter is Given in STIMER Macro-Instruction	

Note:

TQEFLGS

1...	Timer element is not on timer queue.
.1..	Local TOD option is used.
..xx	
..00	TUINTVL requested.
..01	BINTVL requested.
..10	Reserved.
..11	DECINTVL requested.
.... 1...	Interval is completed.
.... .1..*	Exit Specified.
.... ..xx	
.... ..00	Task request.
.... ..01	Wait request.
.... ..10*	Supervisory element.
.... ..11	Real request.
.... .110	Denotes the midnight supervisory timer element.

TSCE - MFT (NO SUBTASKING)

0 (0) FIRST - Address of the First Time-Slice TCB on the TCB Queue
4 (4) LAST - Address of the Last Time-Slice TCB on the TCB Queue
8 (8) NEXT - Address of the Next Time-Slice TCB to be Dispatched
12 (C) LENGTH - Time-Slice Length (See note 1)

TSCE - MFT WITH SUBTASKING

0 (0) Highest Dispatching Priority	1 (1) FIRST - Address of the First Time-Slice TCB
4 (4) Lowest Dispatching Priority	5 (5) LAST - Address of the Last Time-Slice TCB
8 (8) NEXT - Address of the Next Time-Slice TCB	
12 (C) LENGTH - Time-Slice Length (in Milliseconds)	

TSCE - MVT

0 (0) Dispatching Priority	1 (1) Address of First TCB
4 (4) 0	5 (5) Address of Last TCB
8 (8) 0	9 (9) Address of Next TCB to be Dispatched
12 (C) TSCE Flags (See note 2)	13 (D) Length of Time-Slice

Notes:

1. Time-slice length originally set in milliseconds, then converted by NIP to 26-microsecond units.
2. TSCE Flags.

   1... .... Last TSCE.
   .xxx xxxx Reserved bits.

M65MP PREFIX

-4	-3	-1
UCBFL3 M65MP Flags (See note 1)	Reserved	M65MP Flags (See note 2)

COMMON SEGMENT

0 (0)	1 (1)	2 (2)	3 (3)
SRTEJBNR Internal Job No. (See note 3)	SRTECHAN Allocation Channel Mask	UCBID Identifier X'FF'	SRTESTAT Status Byte A (See note 5)
4 (4) UCBCHA Channel Address (See note 6)	5 (5) UCBUA Unit Address	6 (6) UCBFL1 Flag Byte 1 (See note 7)	7 (7) UCBDTI Index to Device Table
8 (8) UCBETI Error Routine Key Zoned No.	9 (9) UCBSTI X'10' = Statistics Table Index	10 (A) UCBLCI Channel Table Index	11 (B) UCBATI Attention Table Index
12 (C) UCBWGT Flags and Mask (See note 8)	13 (D) UCBNAME Unit Name		
16 (10) UCBTYP Device Type (See note 9)			
20 (14) UCBLTS Last Request Element		22 (16) UCBSNS Sense Information (See note 4)	

DEVICE - VARIABLE SEGMENT UCS

24 (18) UCBUCSID UCS Image Name	
28 (1C) UCBUCSOP UCS Image Format (See note 10)	29 (1D) Reserved 31 (1F)

Graphic Device

24 (18) Additional Sense Information	26 (1A) Use Count	27 (1B) (GCB) Control Byte
28 (1C) Task Entry Address		
32 (20) Restart Address		
36 (24) Device Index	37 (25) Buffer Table Address 39 (27)	

Notes:

1. UCBFL3 — Model 65 multiprocessing flags.

Byte 1

0...	No alternate control units exist.
1...	Alternate control units exist.
...1	CPU A uses an HIO instruction for this device.
..1.	CPU B uses an HIO instruction for this device.
.... 0...	CPU A last used an SIO instruction for this device.
.... 1...	CPU B last used an SIO instruction for this device.
.... ..1.	CPU B has no path to this device.
....1	CPU A has no path to this device.
.x.. .x..	Reserved bits.

Bytes 2-3 — Reserved.

2. M65MP flags.

.... ..1.	One-bit switch used by processing modules (always 0 on exit.)
....0	Device on-line at IPL.
....1	Device off-line at IPL.

3. SRTEJBNR — Internal job identification.

xxxx	Job protection key - set if the mounted volume is to be retained or is to contain a passed data set.
.... 00..	Zeros.
.... ..1.	Set during device allocation if the volume is to be demounted and is retained or contains a passed data set. Causes job name in demount message.
....1	Set during device allocation if the volume to be mounted is to be retained or is to contain a passed data set.

4. For BTAM: Second byte of UCBSNS field will be X'FF' if a permanent error has occurred since OPEN. This indicates to the message writer that sense information for the I/O error message must be obtained from the IOB.

Notes:

5.	SRTESTAT	Status byte A
		Nonconsole devices and console device without MCS:
	0...	Device is off-line.
	1...	Device is on-line.
	11..	Device status is to be changed from on-line to off-line, and either allocation is enqueued on devices or the device is allocated.
	.1..	Device status is to be changed from on-line to off-line.
	..1.	The mount status of the volume on this device is reserved.
	...1	UNLOAD operator command has been addressed to this device; the device is not yet unloaded.
	.... 1...	Device is allocated.
	.... .1..	The mount status of the volume on this device is permanently resident.
	.... ..1.	One of the following: System residence device. Primary console.
	1	One of the following: Standard labels have been verified for this tape volume. This is an alternate console.
		Console devices with MCS - Status during execution of a vary command:
	10.. 0.01	Device status is to be changed from on-line unallocated to on-line active console, and allocation is enqueued on devices.
	10.. 0.11	Device status is to be changed from on-line active console to on-line.
	10.. 1.01	Device status is to be changed from on-line allocated to on-line active console. The status will be changed when the device is no longer allocated.
	11.. 0.00	Device status is to be changed from on-line unallocated to off-line, and allocation is enqueued on the device.
	11.. 1.00	Device status is to be changed from on-line allocated to off-line.
	11.. 0.11	Device status is to be changed from on-line active console to off-line.
		Console devices with MCS - Status after execution of a vary command:
	00.. 0.00	Device is off-line.
	10.. 0.00	Device is on-line and unallocated.
	10.. 1.00	Device is on-line and allocated.
	10.. 0.10	Device is an on-line active console.

Notes:

6. UCBCHA — Channel address.

1...	Halt I/O.
.1..	Status modifier.
..xx x...	Reserved bits.
.... .xxx	Channel address - binary number.

7. UCBFL1 — Flag byte 1.

1...	Busy - device status.
.1..	Not ready - device status.
..x.	Post flag:
..0.	No channel program is being executed using this device.
..1.	A channel program using this device has not yet been posted as having completed.
...1	After a channel-end status a separate device-end status occurred with an error indication. (IOB-intercept flag.)
.... 1...	Busy - control unit status.
.... .xx.	Direct-access storage devices:
.... .01.	Stand-alone channel program of I/O supervisor is being or was executed (arm seeking).
.... .11.	User's channel program is being executed (data transfer).
	Telecommunications devices:
.... .01.	Inhibit HIO instruction because the line is in receive status.
....1	I/O error routine is in control of this device. No other I/O operations are permitted on this device.

8. UCBWGT — Flags and channel mask.

1...	SYSIN.
.1..	SYSOUT.
..1.	Assumed that this device is to be allocated for a public volume request.
...1	Rewind command has been addressed to this magnetic device by I/O support.
.... xxxx	I/O supervisor path mask (used where there are two or more paths to a device):
.... 1...	Primary path to the device is inoperative.
.... .1..	Optional path 1 to the device is inoperative.
.... ..1.	Optional path 2 to the device is inoperative.
....1	Optional path 3 to the device is inoperative.

9.

UCBTYP				
Byte 1		Byte 2	Byte 3	Byte 4
IOS Flags	Model Code	Optional Features	Device Class	Unit Type
Bit 0 Reserved 1 Over-runable 2 1 Burst 0 Byte 3 Data Chain	Bit 1442/2520 7-0 Read/Punch 1 Punch Only	Bit 0 - UCS 1-6 - Reserved 7 - Card Image	X'08' Unit Record	Hex 01 2540 Card Reader. 02 2540 Card Punch. 03 1442 Card Read Punch. 04 2501 Card Reader. 05 2520 Card Read Punch. 08 1403 Printer (models N1,2,3,7) and 1404 Printer (continuous form support only). 0A 1443 Printer (model N1 only). 10 2671 Paper Tape Reader. 18 2495 Tape Cartridge Reader. 1A 1285 Optical Reader. 1B 1287 Optical Reader. 1C 1288 Optical Reader. 1D 1419 Primary Control Unit. 1E 1419 or 1275 Secondary Control Unit. 1F 1275 Primary Control Unit. 20 1052 Printer-Keyboard. 21 2150 Console.
Bit 0 Reserved 1 Over-runable 2 1 Burst 0 Byte 3 Data Chain	Bit 4,6,7-Reserved 5 - PE	Bit 0 - 7-track 1 - Data Convrt 2 - Dual Density 3-7 - Reserved	X'80' Magnetic Tape	Hex 01 2400

UCBTYP				
Byte 1		Byte 2	Byte 3	Byte 4
IOS Flags	Model Code	Optional Features	Device Class	Unit Type
Bit 0 Reserved 1 Over-runable 2 1 Burst 0 Byte 3 Data Chain	Bit 4-7 - 0000	Bit 0 - Scan 1 - Track Overflow 2 - Sharable Between Two or More CPU's	X'20' Direct Access	Hex 01 2311 02 2301 03 2303 04 2302 05 2321 08 2314
Refer to Systems Reference Library, IBM S/360 Operation System, System Control Blocks, GC28-6628	Refer to Systems Reference Library, IBM S/360 Operation System, System Control Blocks, GC28-6628	Refer to Systems Reference Library, IBM S/360 Operation System, System Control Blocks, GC28-6628	X'10' Display	Hex 02 2250 03 2260 04 1053 05 2280 06 2282 07 Mod 85 Console
Bit 0 Reserved 1 Over-runable 2 1 Burst 0 Byte 3 Data Chain	Hex X1 1050 1030 83B3 TWX WTTA 2260 X2 1060 115A X3 X4 2740 X5 2741C BSC1 X6 2741P BSC2 X7 BSC3	Bit 0 Auto Call 1 Auto Poll 2 Checking (2740 only) (Dual Communication Interface 2701 SDA-II) 3 Automatic Answering 4,5 10 - Station Control (2740 only) 01 - Transmit Control (2740 only) (Dual Code 2701 SDA-II) 11 - Optical Image Unit (2760 only)	X'40' Communications	Hex 1X IBM Type I 2X IBM Type II 3X IBM TTY 4X TTY Type I 5X TTY Type II 6X WTTA 7X Synch Type I 8X IBM Type III 9X Synch Type II X1 2702 X2 2701 X3 2703

BSC1 is nonswitched point-to-point.
BSC2 is switched point-to-point.
BSC3 is nonswitched multipoint.

10. UCBUCSOP — Format of the UCS image in the buffer.

1... .... — UCS image is the default image.
.1.. .... — UCS image is in the fold mode.
..xx xxxx — Reserved bits.

UCB TAPE CARTRIDGE READER (2495)

24 (18)
UCBCRWKA Address of the Tape Cartridge Reader UCB Extension

OPTICAL READER (1285, 1287, 1288)

24 (18)
UCBCRWKA Address of the Optical Reader Extension

MAGNETIC TAPE

24 (18)			
Additional Sense Information			
28 (1C)			
SRTEVOLI Volume Serial No.			
		34 (22) SRTESTAB Status Byte B (See note 1)	35 (23) SRTEDMCT Vol M Sw, DCB Count (See note 2)
36 (24) SRTEFSCT Sequence Count		38 (26) SRTEFSEQ Sequence No.	
40 (28)			
Message ID's or Data Set Serial Number			
		46 (2E) Reserved	
48 (30) UCBVOPT Option Bits (See note 3)	49 (31) UCBXTN Address of the Magnetic Tape Extension		

Notes:

1. SRTESTAB — Status byte B - volume status.

x...	Volume sharability:
0...	Sharable.
1...	Not sharable.
..1.	Additional volume label processing.
...1	Private - volume use status.
.... 1...	Public - volume use status.
.... .1..	Storage volume.
.... ..1.	JOBLIB on this volume.
....1	If MCS, demount or mount messages at offset 40-45. OPEN deletes the messages and turns this bit off.
.x.. .xx.	Reserved bits.

2. SRTEDMCT

	Any scheduler:
0...	No volume has been mounted.
1...	Volume mounted; no volume processing performed.
	SL open routine:
1...	Label not standard or serial; not correct.
0...	Standard label and correct serial verified.
1...	NSL open routine:
0...	Label not standard.
	Processing program:
	Nonstandard label verified.
1...	NL open routine:
0...	Standard label found.
0...	No standard label found.
	BLP open routine:
.xxx xxxx	Volume label has not been processed.
	Number of DCB's open for this volume.

3. UCBVOPT — Volume statistics option bits.

00..	Neither error volume analysis (EVA) nor error Statistics by volume (ESV) records kept.
01..	Only EVA records kept.
110.	ESV, or ESV and EVA records kept; ESV records sent to SYS1.MAN (X or Y) data set.
111.	ESV, or ESV and EVA records kept; ESV records sent to console.
...1	An error recovery procedure has control.
.... 1...	An ESV record has been issued for this volume because of an EOV condition.

Comments:

DIRECT ACCESS STORAGE DEVICE (EXCEPT DATA CELL DRIVE)

24 (18) Additional Sense Information		
28 (1C) SRTEVOLI Volume Serial No.		34 (22) SRTESTAB Status Byte B (See note 1) / 35 (23) SRTEDMCT No. of DCB's Open
36 (24) SRTEFSCT Relative Address of VTOC		
40 (28) UCBSQC RESERVE Count for Shared DASD	41 (29) UCBDVRES Device Reservation Indicator	42 (2A) UCBRQESV Address of RQE
44 (2C) UCBFL4 (See note 2)	45 (2D) UCBORSV Address of the DEB	
48 (30) UCBSKA Direct-Access Address of Last Seek		
56 (38) SRTEUSER No. of Users	57 (39) SRTEECBA Direct-Access ECB Address	
60 (3C) Address of the Direct-Access UCB Extension 63 (3F)		

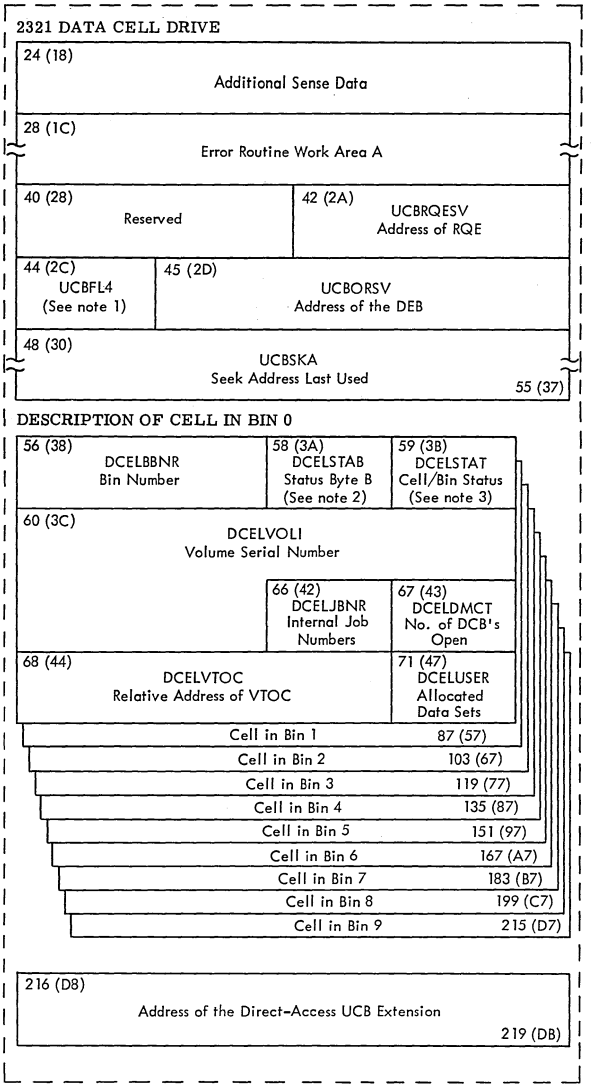
Notes:

1. SRTESTAB — Status byte B - volume status.

x...	Volume sharability:
0...	Sharable.
1...	Not sharable.
.xx.	Reserved bits.
...1	Private - volume use status.
.... 1...	Public - volume use status.
.... .1..	Storage - volume use status.
.... ..1.	Joblib data set is on this volume.
....1	Control volume - a catalog data set is on this volume.

2. UCBFL4 — Flag byte.

1...	Mount request issued.
.1..	Volume serial verification routine is in control.
..1.	First entry of volume serial verification routine.
...1	Label on alternate track; alternate track procedure in progress.
.... 1...	Volume verified.
.... .xxx	Number of requests for device from first user on the queue.


2321 DATA CELL DRIVE
24 (18)
Additional Sense Data
28 (1C)
Error Routine Work Area A
40 (28)
Reserved
42 (2A)
UCBRQESV
Address of RQE
44 (2C)
UCBFL4
(See note 1)
45 (2D)
UCBORSV
Address of the DEB
48 (30)
UCBSKA
Seek Address Last Used
55 (37)
DESCRIPTION OF CELL IN BIN 0
56 (38)
DCELBBNR
Bin Number
58 (3A)
DCELSTAB
Status Byte B
(See note 2)
59 (3B)
DCELSTAT
Cell/Bin Status
(See note 3)
60 (3C)
DCELVOLI
Volume Serial Number
66 (42)
DCELJBNR
Internal Job Numbers
67 (43)
DCELDMCT
No. of DCB's Open
68 (44)
DCELVTOC
Relative Address of VTOC
71 (47)
DCELUSER
Allocated Data Sets
Cell in Bin 1
87 (57)
Cell in Bin 2
103 (67)
Cell in Bin 3
119 (77)
Cell in Bin 4
135 (87)
Cell in Bin 5
151 (97)
Cell in Bin 6
167 (A7)
Cell in Bin 7
183 (B7)
Cell in Bin 8
199 (C7)
Cell in Bin 9
215 (D7)
216 (D8)
Address of the Direct-Access UCB Extension
219 (DB)

DIRECT ACCESS UCB EXTENSION -
NOT CONTIGUOUS TO THE UCB PROPER

+104 (68) Error Recovery Work Area (The first valid field of this extension is at offset 104)
+144 (90) Overflow Work Area (Present When Overflow Specified) +183 (B7)

2495 UCB EXTENSION - NOT CONTIGUOUS TO THE UCB PROPER

0 (0) Retry CCW1
8 (8) Retry CCW2
16 (10) Retry CCW3
24 (18) CSW Save Area

OPTICAL READER - UCB EXTENSION - NOT CONTIGUOUS TO UCB

0 (0) Data Chk Counter	1 (1) Incorrect Length Counter	2 (2) Equipment Check Counter	3 (3) Reserved
4 (4) Reserved			

MAGNETIC TAPE - UCB EXTENSION -
NOT CONTIGUOUS TO THE UCB

0 (0) UCBROR CCW for Read-Opposite Recovery			
8 (8) UCBSUM (See note 4)		10 (A) UCBTRT Read Threshold	11 (B) UCBTWT Write Threshold
12 (C) UCBTR Temporary Read Errors	13 (D) UCBTW Temporary Write Errors	14 (E) UCBSIO No. of Start I/O Operations	
16 (10) UCBPR Permanent Read Errors	17 (11) UCBPW Permanent Write Errors	18 (12) UCBNB No. of Noise Blocks	19 (13) Reserved
20 (14) UCBERG No. of Erase Gaps		22 (16) UCBCLN No. of Cleaner Actions	

MAGNETIC TAPE - UCB EXTENSION -
NOT CONTIGUOUS TO THE UCB

Notes:

1. UCBFL4 — A flag byte.

1...	Mount request issued.
.1..	Volume serial verification routine is in control.
..1.	First entry of volume serial verification routine.
...1	Label on alternate track; alternate track procedure in progress.
.... 1...	Volume verified.
.... .xxx	Number of requests for device from first user on the queue.

2. DCELSTAB — Status byte B - volume status.

x...	Volume sharability:
0...	Sharable.
1...	Not sharable.
.xx.	Reserved bits.
...1	Private - volume use status.
.... 1...	Public - volume user status.
.... .1..	Storage - volume use status.
.... ..1.	Joblib data set is on this volume.
....1	Control volume; catalog on this volume.

3. DCELSTAT — Cell/bin status.

1...	Bin on-line; normal cell mounted.
0...	Bin off-line or a ballast cell mounted.
.1..	Reserved bits.
..1.	Reserved; mount status is reserved.
...1	UNLOAD; bin not yet unloaded.
.... 1...	Bin is allocated.
.... .1..	Permanently resident.

4. UCBSUM — Volume statistics update mask.

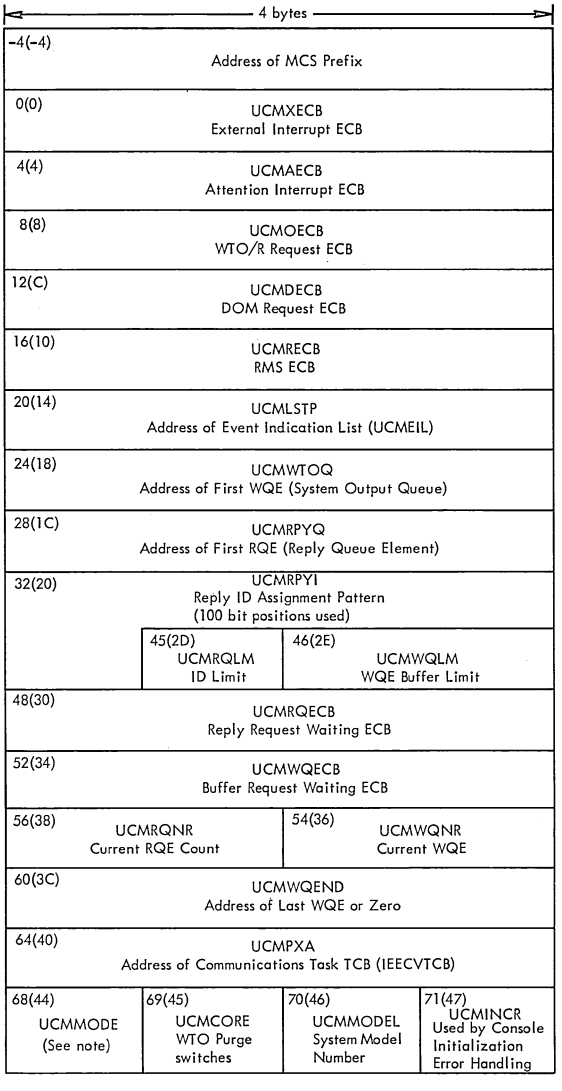
Byte 1

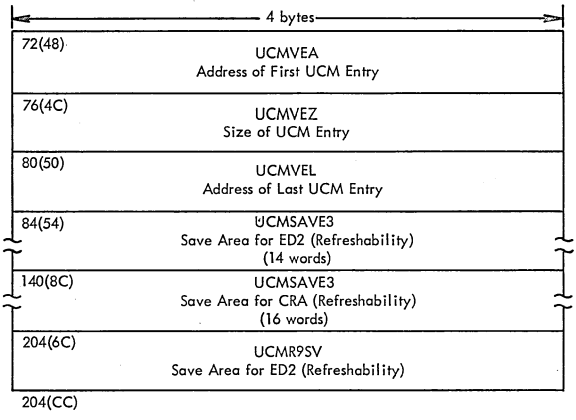
1...	Update temporary read errors.
.1..	Update temporary write errors.
..00	Start I/O counter position.
.... 1...	Update permanent read errors.
.... .1..	Update permanent write errors.
.... ..1.	Update noise blocks counter.
....x	Reserved bit.

Byte 2

00..	Erase gap counter position.
..00	Cleaner action counter position.
.... xxxx	Reserved bits.

UNIT CONTROL MODULE (UCM) BASE





Note: UCMMODE Mode Flags with the following meanings:

X'08': UCMAMFA -- Accept VARY command with MSTCONS operand from any MCS secondary console.

X'04': UCMAMFA -- Only graphic consoles exist.

X'02': UCMMCS -- MCS generated with system.

X'01': UCMFIX -- MFT mode.
X'00': -- MVT mode.

UCM ENTRY INDIVIDUAL DEVICE MAP

<table>
<tr><td colspan="4">4 bytes</td></tr>
<tr><td colspan="4">0(0)
UCMECB
Address of I/O Completion ECB or I/O Completion ECB for 2740</td></tr>
<tr><td colspan="4">4(4)
UCMSRB
Address of Resident Processor Module</td></tr>
<tr><td colspan="4">8(8)
UCMDCB
Address of DCB</td></tr>
<tr><td colspan="4">12(C)
UCMUCB
Address of UCB</td></tr>
<tr><td colspan="4">16(10)
UCNAME
Processing Module Name</td></tr>
<tr><td>24(18)
UCMSTS
Status Flags
(See note 1)</td><td>25(19)
UCMATR
Attribute Flags
(See note 2)</td><td>26(1A)
UCMID
Unique Entry ID</td><td>27(1B)
Reserved</td></tr>
<tr><td colspan="4">28(1C)
UCMXB
Address of DCM (Graphics) or Zeroes</td></tr>
<tr><td colspan="2">32(20)
UCMRTCD
Routing Codes Assigned
to this Console</td><td colspan="2">34(22)
Reserved</td></tr>
<tr><td colspan="4">36(24)
UCMOUTQ
Address of Output Queue</td></tr>
<tr><td colspan="2">40(28)
UCMAUTH
Command Code Authorization</td><td colspan="2">42(2A)
UCMDISP
Disposition Flags
(See note 3)</td></tr>
<tr><td colspan="4">44(2C)
UCMALTEN
Address of Alternate Input UCM Entry</td></tr>
<tr><td colspan="4">48(30)
UCMOAOEN
Address of Alternate Output</td></tr>
<tr><td colspan="4">52(34)
UCMWLAST
Address of Last WQE Entry Serviced in Output Queue</td></tr>
<tr><td colspan="4">56(38)
UCMCOMPC
Address of Other Device if Console is Composite</td></tr>
<tr><td colspan="2">60(3C)
UCMMSG
Message Flags
(See note 4)</td><td>62(3D)
UCMXOR
Set to Zeroes</td><td>63(3E)
UCMDEVICE
Device Control
(See note 5)</td></tr>
</table>

Notes:

1. UCMSTS Status flags with the following meanings:

X'80':	UCMAF	-- attention pending.
X'40':	UCMPF	-- output pending.
X'20':	UCMBF	-- device busy.
X'10':	UCMCF	-- CLOSE pending.
X'08':	UCMTF	-- OPEN pending.
X'04':	UCMTB	-- dequeue appropriate output queue entries.

2. UCMATR Attribute flags with the following meanings:

X'80':	UCMOF	-- WTO support.
X'40':	UCMIF	-- attention support.
X'20':	UCMXF	-- external interrupt support.
X'10':	UCMUF	-- device active.
X'08':	UCMLF	-- load flag.
X'04':	UCMDF	-- device status to change.

3. UCMDISP Disposition flags with the following meanings:

X'80':	UCMDISPA	-- master console.
X'40':	UCMDISPB	-- hard copy device/console.
X'20':	UCMDISPC	-- graphics.
X'10':	UCMDISPD	-- output only.

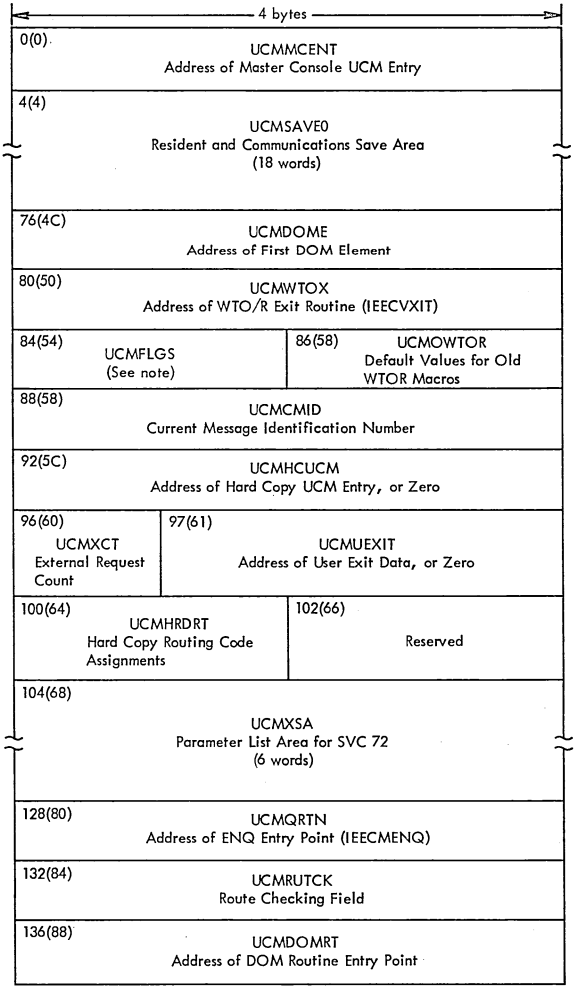
4. UCMMSG Message type flags with the following meanings:

X'80':	UCMMSGA	-- monitor jobnames requested.
X'40':	UCMMSGB	-- monitor status requested.
X'08':	UCMMSGE	-- SHOW requested.
X'04':	UCMMSGF	-- MONITOR SESS requested.

5. UCMDEVC Device control flags with the following meanings:

X'80':	UCMDEVA	-- full screen on graphic console.
X'40':	UCMDEVB	-- prepare command issued.
X'20':	UCMDEVC	-- tested for console switch.
X'10':	UCMDEVD	-- DOM issued.
X'08':	UCMDEVE	-- I/O complete.
X'04':	UCMDEVF	-- modified DCM for DOM.
X'02':	UCMDEVG	-- halt I/O issued on 2740.

MULTIPLE CONSOLE SUPPORT PREFIX TO UNIT CONTROL MODULE (UCM) BASE



4 bytes	
140(8C)	UCMTPPTR Address of Save Area for 2740 Device Support Processor or Zero
144(90)	UCMNPECB NIP ECB (Posted when NIP routine's hard copy can be written)
148(94)	Address of MCS Prefix Area (UCMMCENT)

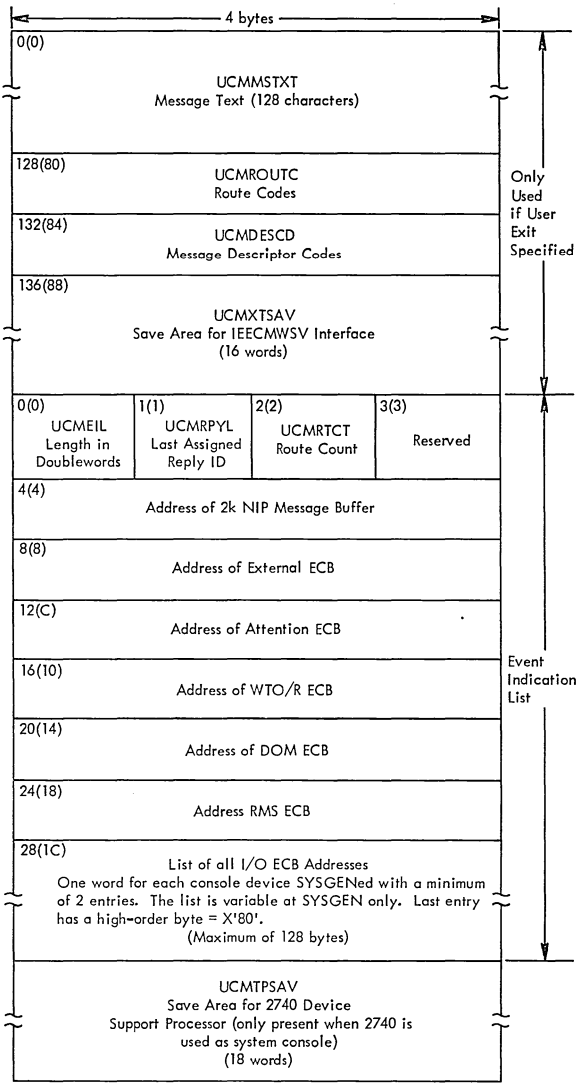
Note: UCMSFLGS System control flags with the following meanings:

First Byte

X'80': UCMSYSA -- reserved.
X'40': UCMSYSB -- hard copy support required.
X'20': UCMSYSC -- commands to hard copy.
X'10': UCMSYSD -- console switch for master.
X'08': UCMSYSE -- no consoles exist.
X'04': UCMSYSF -- graphic consoles exist.
X'02': UCMSYSG -- hard copy device SYSLOG.
X'01': UCMSYSH -- timer present and operative.

Second Byte

X'80': UCMSYSI -- WQE housekeeping needed.
X'40': UCMSYSJ -- hard copy to be written.
X'20': UCMSYSK -- new console composite.
X'10': UCMSYSL -- OPEN being issued to ring console bell.
X'08': UCMSYSM -- failing console composite.
X'04': UCMSYSN -- Model 85 operator console with CRT display.
X'02': UCMSYSO -- dummy attention by WTL.


4 bytes
0(0)
UCMMSTXT
Message Text (128 characters)
128(80)
UCMROUTC
Route Codes
132(84)
UCMDESCD
Message Descriptor Codes
136(88)
UCMXTSAV
Save Area for IEECMWSV Interface
(16 words)
Only Used if User Exit Specified
0(0)
UCMEIL
Length in Doublewords
1(1)
UCMRPYL
Last Assigned Reply ID
2(2)
UCMRTCT
Route Count
3(3)
Reserved
4(4)
Address of 2k NIP Message Buffer
8(8)
Address of External ECB
12(C)
Address of Attention ECB
16(10)
Address of WTO/R ECB
20(14)
Address of DOM ECB
24(18)
Address RMS ECB
28(1C)
List of all I/O ECB Addresses
One word for each console device SYSGENed with a minimum of 2 entries. The list is variable at SYSGEN only. Last entry has a high-order byte = X'80'.
(Maximum of 128 bytes)
Event Indication List
UCMTPSAV
Save Area for 2740 Device
Support Processor (only present when 2740 is used as system console)
(18 words)

WRITE QUEUE ELEMENT (WQE) FORMAT
FOR MULTIPLE CONSOLE SUPPORT

0(0) WQEUSE Use Count	1(1) WQELKPTR Address of Next WQE	
4(4) WQENBR Message Length		
8(8) WQETXT Message Text (128 bytes maximum)		
136(88) WQEXA (See note 1)	137(89) WQETJID TSO User-ID	139(8B) WQEAVAIL (See note 2)
140(8C) WQEXB Reserved for RORI		
144(90) WQERTCT Routed WQE CNT	145(91) WQESEQN 24 Bit ID Sequence Number	
148(94) WQEMCSP (See note 3)		150(96) WQEMSGTP (See note 4)
152(98) WQEROUT Routing Codes		Reserved
156(9C) WQECMID UCM Entry ID	157(9D) WQEPKE TCB Key of WTO Issuer	158(9E) Reserved
160(A0) WQEDESCD Descriptor Codes		162(A2) Reserved
164(A4) WQETIME Timer Element		

WRITE QUEUE ELEMENT (WQE) FORMAT FOR MULTIPLE CONSOLE SUPPORT (Continued)

Notes:

Description of Flags

1. WQEXA Disposition flags with following meanings:

   X'80': WQEPURGE -- purge.
   X'40': WQEQFHC -- queue for hard copy.
   X'20': WQERQE -- RQE exists for this WQE.
   X'10': WQEQDFHC -- queued for hard copy.
   X'08': WQEXWTOR -- WQE created for WTOR.

2. WQEAVAIL Buffer flags with the following meanings:

   X'80': RQEBUFA -- buffer is free.
   X'40': RQEBUFB -- buffer is in use.
   X'20': -- reserved.
   X'10': RQEBUFD -- buffer obtained dynamically.
   X'08': RQEBUFE -- buffer has been serviced.

3. WQEMCSF MCS flags with the following meanings:

   First Byte

   X'80': WQEMCSA -- routing or descriptor codes exist.
   X'40': WQEMCSB -- UCM entry identifier passed in register 0.
   X'20': WQEMCSC -- command response (includes hard copy).
   X'10': WQEMCSD -- WQE WQEMSGTP field to be used for message identification.
   X'08': WQEMCSE -- accepted reply to a WTOR.
   X'04': WQEMCSF -- broadcast to all active consoles.
   X'02': WQEMCSG -- queue for hard copy only.
   X'01': WQEMCSH -- queue to UCM entry passed in register 0.

   Second Byte

   X'80': WQEMCSI -- time stamp exists in message text.
   X'04': WQEMCSN -- bypass hard copy queuing.
   X'02': WQEMCSO -- reserved for DOM function.
   X'01': WQEMCSP -- reserved for graphics.

4. WQEMSGTP Message flags with the following meanings:

   First Byte

   X'80': WQEMSGTA -- MONITOR JOBNAMES.
   X'40': WQEMSGTB -- MONITOR STATUS.
   X'08': WQEMSGTE -- DISPLAY SHOW.
   X'04': WQEMSGTF -- MONITOR SESS.

   Second Byte

   Reserved

DCB - SAM (Pointed to by DEB)

DEVICE INTERFACE SEGMENT

Direct-Access Storage Devices

0 (0)		
DCBRELAD PDS: TTRN of Member SYS1.LOGREC: Address of Parameter Table		
4 (4) DCBKEYCN Keyed Block Constant	5 (5) DCBFDAD Full Direct-Access Address	
	13 (D) DCBDVTBL Address of Device Table Entry	
16 (10) DCBKEYLE Key Length	17 (11) DCBDEVT Device Type (see note 1)	18 (12) DCBTRBAL Bytes Left in Current Track 19 (13)

Magnetic Tape

0 (0)			
Reserved			
12 (C)			
DCBBLKCT Block Count			
16 (10) DCBTRTCH Tape Recording Technique (see note 2)	17 (11) DCBDEVT Device Type X'81' = 2400	18 (12) DCBDEN Tape Density (see note 3)	19 (13) Reserved

Paper Tape

8 (8) DCBLCTBL Translate Table Address			
12 (C) Reserved			
16 (10) DCBCODE Paper Tape Code (see note 4)	17 (11) DCBDEVT Device Type X'50' = 2671	18 (12) Reserved	19 (13) Paper Tape Flags (see note 5) 19 (13)

Card Reader, Card Punch

16 (10) DCBMODE, DCBSTACK Code, Stacker (see note 6)	17 (11) DCBDEVT Device Type (see note 7)	18 (12) Reserved 19 (13)	

Printer

16 (10) DCBPRTSP Spacing (see note 8)	17 (11) DCBDEVT Device Type (see note 9)	18 (12) (PRTOV Mask) Overflow Mask (see note 10)	19 (13) Reserved

Notes:

1. DCBDEVT — Device type

0010 0001	2311 Disk Drive.
0010 0010	2301 Parallel Drum.
0010 0011	2303 Serial Drum.
0010 0100	2302 Disk Storage.
0010 0101	2321 Data Cell Drive.
0010 1000	2314 Disk Storage Facility. Note: If ISAM Data Set Bit 2 = 0

2. DCBTRTCH — Tape recording technique for 7-track tape.

	Code	
0010 0011	E	Even parity.
0011 1011	T	BCD/EBCDIC translation.
0001 0011	C	Data conversion.
0010 1011	ET	Even parity and translation.

Notes:

3. DCBDEN — Tape density - 2400 Series magnetic tape units.

	Code	7-tracks	9-tracks
0000 0011	0	200 bpi	-
0100 0011	1	556 bpi	-
1000 0011	2	800 bpi	800 bpi
1100 0011	3	-	1600 bpi

4. DCBCODE — Paper tape code being used. The appropriate translate table is made available.

	Code	
1000 0000	N	No conversion.
0100 0000	I	IBM BCD.
0010 0000	F	Friden.
0001 0000	B	Burroughs.
0000 1000	C	National Cash Register.
0000 0100	A	ASCII (8-track).
0000 0010	T	Teletype.

5. Paper tape flags.

xxx.	Reserved bits.
...1	Invalid character in last record read.
.... 1...	End-of-record character reached in translation.
.... .1..	End-of-record character detected during READ.
.... ..1.	Uppercase translate.
.... ..0.	Lowercase translate.
....1	Error detected on READ.

6. DCBMODE, DCBSTACK

	Code	
xxxx		Mode of operation for 1442 Card Read Punch:
1000	C	Column binary mode.
0100	E	EBCDIC mode.
.... xxxx		Stacker selection:
.... 0001	1	Stacker 1.
.... 0010	2	Stacker 2.

7. DCBDEVT — Device type.

0100 0011	1442 Card Read Punch.
0100 0001	2540 Card Reader.
0100 0010	2540 Card Punch.
0100 0100	2501 Card Reader.
0100 0101	2520 Card Read Punch.

Notes:

8. DCBPRTSP — Number indicating normal printer spacing.

	Code	
0000 0001	0	No spacing.
0000 1001	1	Space one line.
0001 0001	2	Space two lines.
0001 1001	3	Space three lines.

9. DCBDEVT — Device type.

0100 1000	1403 Printer and 1404 Printer (continuous form support only).
0100 1010	1443 Printer.

10. Test-for-printer overflow mask (PRTOV mask)

	Code	
0010 0000	9	Test for Channel 9 overflow.
0001 0000	12	Test for Channel 12 overflow.

1419/1275

Before OPEN	
0 (0)	DCBSSID
Stacker Select Routine Name	

After OPEN			
0 (0) Reserved	DCBWTOID - WTO Identification Number (MCS Support) PCI MICB Address (After First READ)		
4 (4) Reserved	DCBSSAD Address of User's Stacker Select Routine		
8 (8) DCBMRFG (see note 1)	DCBIMAGE Address of User's Image Address Area		
12 (C) DCBMRIND (see note 2)	DCBECBLT Address of ECB List		
16 (10) DCBMRFLG Flag Byte (see note 3)	17 (11) DCBDEVT Device Type (see note 4)	18 (12) DCBAPPIN Situation Indicator for Appendage	19 (13) Reserved

OPTICAL READER

0 (0) Reserved	1 (1) DCBWTOID WTO Identification Number (MCS Support)		
4 (4) Reserved	5 (5) DCBERRCN Address of Optical Reader Error Counters		
8 (8) Reserved	9 (9) DCBDSPLY address Address of DSPLY Module		
12 (C) Reserved	13 (D) DCBRDLNE/DCBRESCN Address of RDLNE or RESCN Module		
16 (10) DCBORBYT Access Method Work Area (see note 5)	17 (11) DCBDEVT Device Type (see note 6)	18 (12) DCBEIB Optical Reader Error Indicator Byte (see note 7)	19 (13) Reserved

Notes:

1. DCBMRFG — Buffer indicator.

xx..	A binary counter that indicates into which buffer status information is to be posted.
..xx xxxx	Reserved bits.

2. DCBMRIND — Indicator and counter byte.

xxx.	A binary counter of the number of documents read after disengage.
...1	DCB was altered when SYNAD routine was entered due to secondary control unit (SCU) error.
.... 1...	Pocket light has been turned on.
.... .1..	Pocket light 0-6 is being set on.
.... ..1.	Error recovery procedure (ERP) is executing for the primary control unit (PCU).
....1	Error recovery procedure (ERP) is executing for the secondary control unit (SCU).

3. DCBMRFLG — Flag byte.

1...	First or second secondary control unit (SCU) command chain is being used.
.1..	Debugging mode in use.
..1.	Disengage requested by the user.
...1	Disengage requested.
.... xx..	A binary counter indicating first, second, or third primary control unit (PCU) command chain is being used.
.... ..1.	A Write-to-Operator (WTO) message must be deleted.
....1	Unit exception.

Notes:

4. DCBDEVT — Device type.

0101 1101	1419 Magnetic Character Reader.
0101 1111	1275 Optical Reader Sorter.

5. DCBORBYT — Optical reader byte used by BSAM/QSAM.

1...	SYNAD in control
.1..	End of file (EOF).
..1.	Buffers primed (QSAM).
...x xxxx	Reserved bits.

6. DCBDEVT — Device type.

0101 1010	1285 Optical Reader.
0101 1011	1287 Optical Reader.
0101 1100	1288 Optical Reader.

7. DCBEIB — Error indicator byte.

.1..	1287 or 1288 unable to locate reference mark.
..1.	1287: A stacker-select command was given after the allotted time had elapsed. The document has been put in the reject pocket. 1288 unformatted only: End-of-page has occurred.
...1	A nonrecoverable error has occurred.
.... 1...	An equipment check resulted in an incomplete READ.
.... .1..	A wrong-length record condition has occurred.
.... ..1.	QSAM: The operator entered characters from keyboard. BSAM: A hopper-empty condition has occurred.
....1	A data check has occurred.
x...	Reserved bit.

COMMON INTERFACE

20 (14) DCBBUFNO Number of Buffers	21 (15) DCBBUFCB Address of Buffer Pool Control Block
24 (18) DCBBUFL Buffer Length	26 (1A) DCBDSORG Data Set Organization (see note 1)
28 (1C) DCBIOBAD FLAGS (note 2)	29 (1D) DCBIOBAD Address of IOB Prefix When Chained Scheduling is Used or When 1419/1275 is Used QSAM: Address of the old DEB (note 2) 31 (1F)

FOUNDATION EXTENSION

32 (20)	33 (21)
DCBHIARC, DCBFTEK, DCBBFALN (see note 3)	DCBEODAD Address of User's EOF Routine
36 (24) DCBRECFM Record Format (see note 4)	37 (25) DCBEXLST Address of User's Exit List 39 (27)

Notes:

1. DCBDSORG — Data set organization to be used.

   Byte 1

	Code	
1...	IS	Indexed sequential organization.
.1..	PS	Physical sequential organization.
..1.	DA	Direct organization.
...x xx..		Reserved bits.
.... ..1.	PO	Partitioned organization.
....1	U	Unmovable.

   Byte 2

1...	GS	Graphics organization.
.xxx xxxx		Reserved bits.

2. DCBIOBAD

   Byte 1

1...	Only one device allocated to this data set.
.1..	Update complete, free old DEB.
..10	Update to take place.
..11	No update to take place.
..01	Old DEB address must be saved.

   Bytes 2-3 — Address of old DEB.

3. DCBBFALN
   DCBBFTEK
   DCBHIARC

	Code	
x... .x..		Buffer pool location:
0... .1..		Hierarchy 0 main storage.
1... .0..		Hierarchy 1 main storage.
.xxx		Buffering technique:
.110		Logical record interface for QSAM Locate.
.010		Track overflow for BDAM access.
.100		Simple buffering.
.001		Exchange buffering.
.... x...		Reserved bit.
.... ..xx		Buffer alignment:
.... ..10		Doubleword boundary.
.... ..01		Fullword, not a doubleword, coded in DCB.
.... ..11		Fullword, not a doubleword coded in DD.

Notes:

4. DCBRECFM — Record format.

	Code	
10..	F	Fixed record length.
01..	V	Variable record length.
11..	U	Undefined record length.
..1.	T	Track overflow.
...1	B	Blocked records.
.... 1...	S	Fixed-length record format: Standard blocks. Variable-length record format: Spanned records.
.... .10.	A	ASA control character.
.... .01.	M	Machine control character.
.... .00.		No control character.
....1		KEYLEN specified in DCB macro.

FOUNDATION

Before OPEN

40 (28)		
DCBDDNAM DD Statement Name		
48 (30) DCBOFLGS Flags for OPEN (see note 1)	49 (31) DCBIFLG Error Flags for IOS (see note 2)	50 (32) DCBMACR Type of I/O Macro-instruction and Options (see note 3) 51 (33)

After OPEN

40 (28)		42 (2A)
DCBTIOT Offset to DD Entry in TIOT		DCBMACRF Type of I/O Macro-instruction and Options (see note 3)
44 (2C) DCBIFLGS Error Flags for IOS (see note 2)	45 (2D) DCBDEBAD Address of DEB	
48 (30) DCBOFLGS Flags for OPEN (see note 1)		

Notes:

1. DCBOFLGS — Flags used by the open routine.

1...	Last I/O operation was a WRITE.
0...	Last I/O operation was a READ or POINT.
.1..	Last I/O operation was in read-backward mode.
..1.	Close routine for concatenation.
...1	OPEN
.... 1...	Problem program concatenation.
.... .1..	Tape mark read.
.... ..0.	User exit taken.
.... ..1.	Return from user exit.
....1	DCB to be processed.

2. DCBIFLG — Used by I/O supervisor in communicating error conditions and in determining corrective procedures.

00..	Not in error procedure.
01..	Error correction in process.
11..	Permanent error condition.
..10	Channel 9 printer carriage tape punch sensed.
..01	Channel 12 printer carriage tape punch sensed.
.... 00..	Always use I/O supervisor error routine.
.... 11..	Never use I/O supervisor error routine.
.... 01..	Never use I/O supervisor error routine.
.... 10..	Never use I/O supervisor error routine.
.... ..xx	Reserved bits.

3. DCBMACRF

Byte 1 — EXCP access method.

	Code	
1...		Execute Channel Program (EXCP).
.1..		Foundation extension present with EXCP.
..1.		Appendages required with EXCP.
...1		Common interface present with EXCP.
.... 1...		Block count is accurate.
.... .xxx		Reserved bits.

Byte 2

xxxx		Reserved bits.
.... 1...		Five-word device interface present with EXCP.
.... .1..		Four-word device interface present with EXCP.
.... ..1.		Three-word device interface present with EXCP.
....1		One-word device interface present with EXCP.

Byte 1 — BSAM - Input.

00..		Always zero for BSAM.
..1.	R	READ.
...x x..x		Reserved bits.
.... .1..	P	POINT (implies NOTE).
.... ..1.	C	CNTRL 0.

Notes:

Byte 2 — BSAM - Output.

	Code	
00..		Always zero for BSAM.
..1.	W	WRITE.
.... 1...	L	Load mode BSAM (create BDAM data set).
.... .1..	P	POINT (implies NOTE).
.... ..1.	C	CNTRL.
....1		A user-provided segment work area for a create BDAM format VS data set is present.
...x		Reserved bit.

Byte 1 — QSAM - Input.

0...		Always zero for QSAM.
.1..	G	GET.
..0.		Always zero for QSAM.
...1	M	Move mode.
.... 1...	L	Locate mode.
.... .1..	T	Substitute mode.
.... ..1.	C	CNTRL.
....1	D	Data mode.

Byte 2 — QSAM - Output.

0...		Always zero for QSAM.
.1..	P	PUT
..0.		Always zero for QSAM.
...1	M	Move mode.
.... 1...	L	Locate mode.
.... .1..	T	Substitute mode.
.... ..1.	C	CNTRL.
....1	D	Data mode.

Byte 1 — BPAM - Input.

00..		Always zero for BPAM.
..1.	R	READ.
.... .1..	P	POINT (implies NOTE).
...x x.xx		Reserved bits.

Byte 2 — BPAM - Output.

00..		Always zero for BPAM.
..1.	W	WRITE.
.... .1..	P	POINT (implies NOTE).
...x x.xx		Reserved bits.

Byte 1 — BISAM.

00.0 0...		Always zero for BISAM.
..1.	R	READ.
.... .1..	S	Dynamic buffering.
.... ..1.	C	CHECK.
....x		Reserved bit.

Byte 2 — BISAM

00.0 0000		Always zero for BISAM.
..1.	W	WRITE.

Notes:

Byte 1	Code	QISAM
0.0. .0..		Always zero for QISAM.
.1..	G	GET.
...1	M	Move mode of GET.
.... 1...	L	Locate mode for GET.
.... ..xx		Reserved bits.

Byte 2		QISAM
1...	S	SETL.
.1..	P	PUT or PUTX.
..0.		Always zero for QISAM.
...1	M	Move mode of PUT.
.... 1...	L	Locate mode of PUT.
.... .1..	U	Update in place (PUTX).
.... ..1.	K	SETL by key.
....1	I	SETL by ID.

Byte 1		BDAM
00..		Always zero for BDAM.
..1.	R	READ.
...1	K	Key segment with READ.
.... 1...	I	ID argument with READ.
.... .1..	S	System provides area for READ (dynamic buffering).
.... ..1.	X	Read exclusive.
....1	C	CHECK macroinstruction.

Byte 2		BDAM
00..		Always zero for BDAM.
..1.	W	WRITE.
...1	K	Key segment with WRITE.
.... 1...	I	ID argument with WRITE.
.... .x..		Reserved bit.
.... ..1.	A	Add type of WRITE.
....1		A user-provided segment work area for a format VS data set is present.

Comments:

ACCESS METHOD SEGMENTS

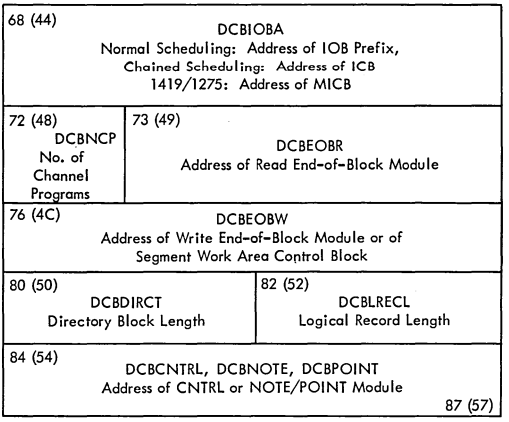
EXCP Access Method Interface

	49 (31) Reserved
52 (34) DCBOPTCD Option Codes (see note 1)	Reserved
60 (3C) DCBEOEA ID of End-of-Extent Appendage	62 (3E) DCBPCIA ID of Program-Controlled-Interruption Appendage
64 (40) DCBSIOA ID of SIO Appendage	66 (42) DCBCENDA ID of Channel-End Appendage
68 (44) DCBXENDA ID of Abnormal-End Appendage	70 (46) Reserved 71 (47)

BSAM, BPAM, Interface

	49 (31) DCBREAD, DCBWRITE Address of Read or Write Module		
52 (34) DCBOPTCD Option Codes (see note 2)	53 (35) DCBCHECK Address of Check Module		
56 (38) DCBIOBL IOB Length	57 (39) DCBSYNAD Address of User's Synchronous Error Routine		
60 (3C) DCBCIND1 Condition Flags (see note 3)	61 (3D) DCBCIND2 Condition Flags (see note 4)	62 (3E) DCBBLKSI Maximum Block Size	
64 (40) DCBWCPO Write Channel Program Offset	65 (41) DCBWCPL Write Channel Program Length	66 (42) DCBOFFSR Read CCW Offset	66 (43) DCBOFFSW Write CCW Offset

BSAM, BPAM, Interface (Cont'd)



Notes:

1. DCBOPTCD — Option codes.

	Code	
xxxx x.xx		Reserved bits.
.... .1..	Z	For magnetic tape devices, use reduced error recovery procedure.

2. DCBOPTCD — Option codes.

	Code	
1...	W	Write-validity check (DASD).
.1..	U	Allow a data check caused by an invalid character (1403 Printer with UCS feature).
..1.	C	Chained scheduling using the program controlled interruption.
...1	H	Optical Reader: Hopper empty exit.
.... .1..	Z	For magnetic tape devices, use reduced error recovery procedure.
.... ..1.	T	User Totaling (BSAM only).
.... x..x		Reserved bits.

3. DCBCIND1 — Condition indicators.

1...	Track overflow in use.
.1..	Search direct.
..1.	End of volume - used by EOB routines.
...1	End of volume - used by channel-end appendage routines.
.... xxxx	Reserved bits.

Notes:

4. DCBCIND2 — Condition indicators.

1...	Partitioned data set: STOW has been performed. Sequential data set: Update.
.1..	Direct organization data set: Last I/O was a write-record zero. Sequential data set: UPDATE EOF is indicated.
..1.	PUT entered from CLOSE while in update mode (QSAM only).
...1	Permanent I/O error.
.... 1...	OPEN acquired buffer pool.
.... .1..	Chained scheduling being supported.
.... ..1.	FEOV bit.
....0	Always set to 0 for BSAM/BPAM.

Comments:

QSAM ACCESS METHOD INTERFACE

	49 (31) DCBGET, DCBPUT Address of GET or PUT Module		
52 (34) DCBOPTCD Option Codes (see note 1)	53 (35) DCBGERR, DCBPERR Address of Synchronizing Routine		
56 (38) DCBIOBL IOB Length	57 (39) DCBSYNAD Address of User's Synchronizing Routine		
60 (3C) DCBCIND1 Condition Flags (see note 2)	61 (3D) DCBCIND2 Condition Flags (see note 3)	62 (3E) DCBBLKSI Maximum Block Size	
64 (40) DCBWCPO Write Channel Program Offset	65 (41) DCBWCPL Write Channel Program Length	66 (42) DCBOFFSR Read CCW Offset	67 (43) DCBOFFSW Write CCW Offset
68 (44) DCBIOBA Address of IOB Prefix (when normal scheduling is used) Address of ICB (when chain scheduling is used)			
72 (48) DCBEOBAD, DCBLCCW Address of End of Buffer or of Last CCW in List			
76 (4C) (see note 5)	DCBRECAD, DCBCCCW Address of Current or Next Logical Record or CCW		
80 (50) X'01' If TRUNC Entry Point Entered — DCBQSWS		82 (52) DCBLRECL Logical Record Length	
84 (54) DCBEROPT Error Option Flags (see note 4)	85 (55) DCBCNTRL Address of CNTRL		
88 (58) Reserved		90 (5A) DCBPRECL Physical Record Length	
92 (5C) DCBEOB Address of End-of-Block Module			95 (5F)

Notes:

1. DCBOPTCD — Option codes.

	Code	
1...	W	Write-validity check (DASD).
.1..	U	Allow a data check for an invalid character (1403 with UCS).
..1.	C	Chained scheduling using the program controlled interruption.
...1	O	Optical Reader: On-line correction.
.... .1..	Z	For magnetic tape devices, use reduced error recovery procedure.
.... ..1.	T	User Totaling.
.... x..x		Reserved bits.

2. DCBCIND1 — Condition indicators.

1...	Direct access: Track overflow in use. 2540 Card Punch: Data set opened but no data written.
.1..	Search direct.
..1.	End of volume - used by EOB routines.
...1	End of volume - used by channel-end appendage routines.
....1	Exchange buffering supported.
.... xxx.	Reserved bits.

3. DCBCIND2 — Condition indicators.

1...	STOW has been performed.
.1..	Last I/O was a write-record zero.
..1.	CLOSE in process.
...1	Permanent I/O error.
.... 1...	OPEN acquired buffer pool.
.... .1..	Chained scheduling supported.
.... ..1.	FEOV bit.
....1	This is a QSAM DCB.

4. DCBEROPT — Error option.

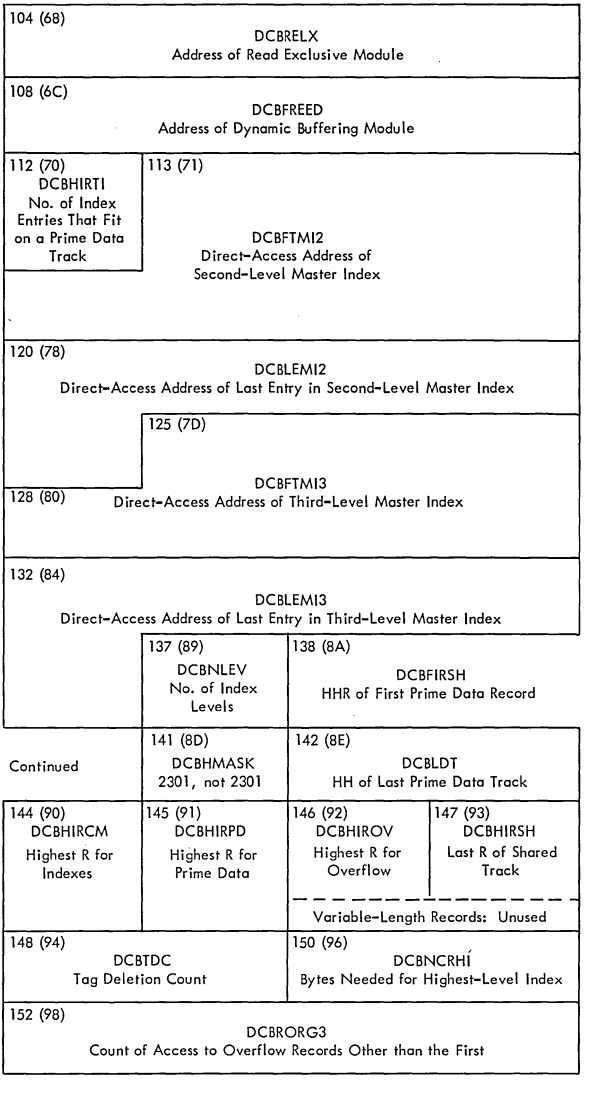
	Code	
1...	ACC	Accept.
.1..	SKP	Skip.
..1.	ABE	Abnormal end of task.
...x xxxx		Reserved bits.

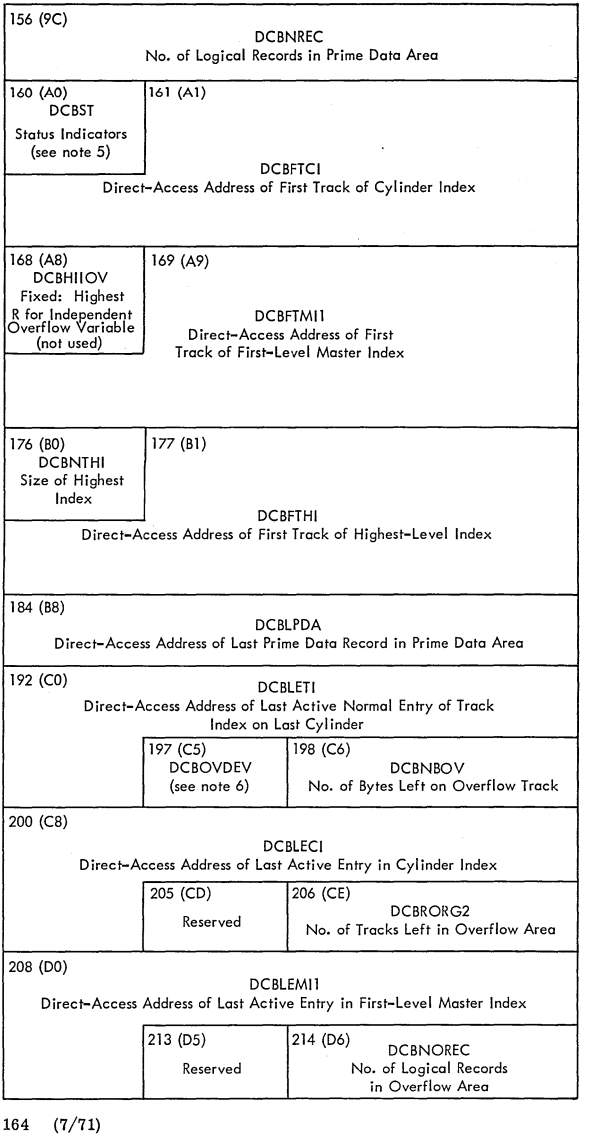
5. DCBRECAD — Simple buffering (Spanned record format):

1000	TRUNC macro has been issued.
0100	First entry from OPEN for RECFM=VS.
1111	RELSE macro has been issued.

ACCESS METHODS INTERFACE-ISAM

	49 (31) DCBGET, DCBPUT Address of GET or PUT Module		
52 (34) DCBOPTCD Option Code (see note 1)	53 (35) DCBMAC DCBMACRF Overflow (see note 2)	54 (36) DCBNTM Index Size	55 (37) DCBCYLOF No. of Overflow Tracks
56 (38) DCBSYNAD Address of User's Synchronous Error Routine			
60 (3C) DCBRKP Relative Key Position		62 (3E) DCBBLKSI Block Size	
64 (40) DCBMSWA Address of Work Area			
68 (44) DCBSMSI Size of Area for Highest Level Index		70 (46) DCBSMSW Size of Work Area	
72 (48) DCBNCP No. of Channel Programs	73 (49) DCBMSHI Address of Area for Highest Level Index		
76 (4C) DCBSETL BISAM: Address of CHECK Module QISAM: Address of SETL Module			
80 (50) DCBEXCD1 Condition Flags (see note 3)	81 (51) DCBEXCD2 Condition Flags (see note 4)	82 (52) DCBLRECL Logical Record Length	
84 (54) DCBESETL Address of ESETL Routine			
88 (58) DCBLRAN Address of READ K or WRITE K or Read Exclusive Module			
92 (5C) DCBLWKN Address of WRITE KN Module			
96 (60) DCBRELSE Work Area for Register Contents			
100 (64) DCBPUTX Work Area for Register Contents			


104 (68)
DCBRELX
Address of Read Exclusive Module
108 (6C)
DCBFREED
Address of Dynamic Buffering Module
112 (70)
DCBHIRTI
No. of Index Entries That Fit on a Prime Data Track
113 (71)
DCBFTMI2
Direct-Access Address of Second-Level Master Index
120 (78)
DCBLEMI2
Direct-Access Address of Last Entry in Second-Level Master Index
125 (7D)
DCBFTMI3
128 (80)
Direct-Access Address of Third-Level Master Index
132 (84)
DCBLEMI3
Direct-Access Address of Last Entry in Third-Level Master Index
137 (89)
DCBNLEV
No. of Index Levels
138 (8A)
DCBFIRSH
HHR of First Prime Data Record
Continued
141 (8D)
DCBHMASK
2301, not 2301
142 (8E)
DCBLDT
HH of Last Prime Data Track
144 (90)
DCBHIRCM
Highest R for Indexes
145 (91)
DCBHIRPD
Highest R for Prime Data
146 (92)
DCBHIROV
Highest R for Overflow
147 (93)
DCBHIRSH
Last R of Shared Track
Variable-Length Records: Unused
148 (94)
DCBTDC
Tag Deletion Count
150 (96)
DCBNCRHI
Bytes Needed for Highest-Level Index
152 (98)
DCBRORG3
Count of Access to Overflow Records Other than the First


156 (9C)
DCBNREC
No. of Logical Records in Prime Data Area
160 (A0)
DCBST
Status Indicators (see note 5)
161 (A1)
DCBFTCI
Direct-Access Address of First Track of Cylinder Index
168 (A8)
DCBHIIOV
Fixed: Highest R for Independent Overflow Variable (not used)
169 (A9)
DCBFTMII
Direct-Access Address of First Track of First-Level Master Index
176 (B0)
DCBNTHI
Size of Highest Index
177 (B1)
DCBFTHI
Direct-Access Address of First Track of Highest-Level Index
184 (B8)
DCBLPDA
Direct-Access Address of Last Prime Data Record in Prime Data Area
192 (C0)
DCBLETI
Direct-Access Address of Last Active Normal Entry of Track Index on Last Cylinder
197 (C5)
DCBOVDEV
(see note 6)
198 (C6)
DCBNBOV
No. of Bytes Left on Overflow Track
200 (C8)
DCBLECI
Direct-Access Address of Last Active Entry in Cylinder Index
205 (CD)
Reserved
206 (CE)
DCBRORG2
No. of Tracks Left in Overflow Area
208 (D0)
DCBLEMII
Direct-Access Address of Last Active Entry in First-Level Master Index
213 (D5)
Reserved
214 (D6)
DCBNOREC
No. of Logical Records in Overflow Area

216 (D8) DCBLIOV Direct-Access Address of Last Record in Overflow Area	
224 (E0) DCBRORG1 No. of Full Cylinder Overflow Areas	226 (E2) Reserved
228 (E4) DCBWKPT1 Pointer to Work Area or Channel Program	
232 (E8) DCBWKPT2 Pointer to Work Area or Channel Program	
236 (EC) DCBWKPT3 Pointer to Work Area or Channel Program	
240 (F0) DCBWKPT4 Pointer to Work Area or Channel Program	
244 (F4) DCBWKPT5 Pointer to Work Area or Channel Program	
248 (F8) DCBWKPT6 Pointer to Work Area or Channel Program 251 (FB)	

Notes:

1. DCBOPTCD — Option codes.

	Code	
1...	W	Write-validity check.
.1..	U	Full-track index WRITE.
..1.	M	Master indexes.
...1	I	Independent overflow area.
.... 1...	Y	Cylinder overflow area.
.... ..1.	L	Delete option.
....1	R	Reorganization criteria.
.... .x..		Reserved bit.

2. DCBMAC — Extension of the DCBMACRF field for ISAM.

	Code	
xxxx ...x		Reserved bits.
.... 1...	U	Update for READ.
.... .1..	U	Update type of WRITE.
.... ..1.	A	Add type of WRITE.

Notes:

3.	DCBEXCD1	First byte in which exceptional conditions detected in processing data records are reported to the user.
	1...	Lower key limit not found.
	.1..	Invalid device address for lower limit.
	..1.	Space not found.
	...1	Invalid request.
	.... 1...	Uncorrectable input error.
	.... .1..	Uncorrectable output error.
	.... ..1.	Block could not be reached (input).
	1	Block could not be reached (update).
4.	DCBEXCD2	Second byte in which exceptional conditions detected in processing data records are reported to the user.
	1...	Sequence check.
	.1..	Duplicate record.
	..1.	DCB closed when error was detected.
	...1	Overflow record.
	.... 1...	PUT: length field of record larger than length indicated in DCBLRECL.
	xxx	Reserved bits.
5.	DCBST	Status indicators.
	1...	Single schedule mode.
	.1..	Key sequence checking is to be performed.
	..1.	Loading has been completed. Set to 1 by the close routine and to 0 by the first execution of the put routine.
	...1	The extension of the data set begins on a new cylinder.
	.... x...	Reserved bit.
	.... .1..	First macroinstruction not yet received.
	.... ..1.	Last block full.
	1	Last track full.
6.	DCBOVDEV	Device type for independent overflow.
	0000 0001	2311 Disk Drive.
	0000 0010	2301 Parallel Drum.
	0000 0011	2303 Serial Drum.
	0000 0100	2302 Disk Storage.
	0000 0101	2321 Data Cell Drive.
	0000 1000	2314 Disk Storage Facility.

DCB -- BDAM INTERFACE

	49 (31) DCBREAD, DCBWRITE Address of Read or Write Module
52 (34) DCBOPTCD Option Codes (see note)	53 (35) DCBCHECK Address of Check Module
56 (38) DCBSYNAD Address of SYNAD Routine	
60 (3C) Reserved	62 (3E) DCBBLKSI Maximum Block Size
64 (40) DCBIOBSQ Address of First IOB on Unscheduled Queue	
68 (44) DCBSQND Address of Last IOB on Unscheduled Queue	
72 (48) DCBIOBUQ Address of First IOB on Unposted Queue	
76 (4C) DCBUQND Address of Last IOB on Unposted Queue	
80 (50) Reserved	81 (51) DCBLIMCT No. of Tracks/No. of Relative Blocks to be Searched
84 (54) DCBXCNT	85 (55) DCBXARG Address of Read Exclusive List
88 (58) DCBDRDX Address of Read Exclusive Module	
92 (5C) DCBDFOR Address of Format Module	
96 (60) DCBDFBK Address of Feedback Module	
100 (64) DCBDYNB Address of Dynamic Buffer Module or of the Segment Work Area	

Note:

DCBOPTCD Option Codes.

	Code	
1...	W	Write-validity check.
.1..		Track overflow.
..1.	E	Extended search.
...1	F	Feedback.
.... 1...	A	Actual addressing.
.... .1..		Dynamic buffering.
.... ..1.		Read exclusive.
....1	R	Relative block addressing.

DCB - QTAM

WTTA INTERFACE

16 (10) DCBBQFLG WTTA Flags (see note 1)	17 (11) DCBWTEOM EOM Character	18 (12) DCBWTEOT EOT Character	19 (13) DCBWTPAD No. of Padding Characters

DATA SET INTERFACE

Line Group

20 (14) DCBBUFRQ Buffers Requested	21 (15) DCBCLPS Address of the LPS Routine	
24 (18) DCBINTVL Intentional Interval	25 (19) DCBACLOC Offset	26 (1A) DCBDSORG Data Set Organization First Byte = X'10' is CX Line Group
28 (1C) DCBDEVTP Device Type	29 (1D) DCBIOBAD Address of First IOB	
32 (20) DCBCPRI Priority (see note 2)	33 (21) DCBLCBAD Base for Addressing LCB's	
36 (24) DCBEIOBX Size of the LCB	37 (25) DCBEXLST Address of the Exit List	39 (27)

Processing Program Message Queue

20 (14) DCBBUFRQ Buffers to be Filled	21 (15) DCBTRMAD Address of the Terminal Name
24 (18) DCBSOWA Size of the Work Area	26 (1A) DCBDSORG Data Set Organization First Byte = X'04' is MQ (PP MSG Q)
28 (1C) DCBSEGAD Address of Current Segment	
32 (20) DCBEODAD Address of the EODAD Routine	
36 (24) DCBRECFM Record Format (see note 3)	37 (25) DCBEXLST Address of the Exit List 39 (27)

DASD Message Queue, Checkpoint

20 (14) DCBBUFNO Reserved	21 (15) DCBBUFCB Address of Terminal Table
24 (18) DCBBUFL Length of the Data	26 (1A) DCBDSORG Data Set Organization First Byte = X'08' is CQ (DA MSG Q)
28 (1C) DCBIOBAD Address of the IOB 31 (1F)	

Comments:

FOUNDATION

Before OPEN

40 (28) DCBDDNAM DD Statement Data Set Name		
48 (30) DCBOFLGS Open Routine Flags (see note 4)	49 (31) DCBIFLGS I/O Supervisor Flags (see note 5)	50 (32) DCBMACR Macroinstructions (see note 6) 51 (33)

After OPEN

40 (28) DCBTIOT Offset in TIOT Table to DD Entry		42 (2A) DCBMACRF Macroinstruction (see note 6)
44 (2C) DCBIFLGS I/O Supervisor Flags (see note 5)	45 (2D) DCBDRBAD Address of the DEB	
48 (30) DCBOFLGS Open Routine Flags (see note 4)	49 (31) DCBREAD, DCBWRITE, DCBGET, DCBPUT Address of the Access Modules 51 (33)	

EXTENSION

Line Group

52 (34) DCBKSTAT Error Threshold
56 (38) DCBCPOLL Polling List Origin First Byte = X'08' is WTTA 59 (3B)

DCBCPOLL
DCBCPOLL
DCBCPOLL

Processing Program Message Queue

52 (34) DCBRECRD Not Used
56 (38) DCBSYNAD Address of the SYNAD Routine
60 (3C) DCBEOBLK Not Used 63 (3F)

Notes:

1. DCBBQFLG — WTTA flag byte.

x... .xxx	Reserved bits.
.1..	WRU feature is to be used.
..1.	IAM feature is to be used.
...1	WRU feature is to be used in the Send Header subgroup.
.... 1...	WRU feature is to be used in the End Send subgroup.

2. DCBCPRI — Communication priority. Relative priority to be given to sending and receiving operations.

	Code	
xxxx x...		Reserved bits.
.... .1..	R	Receiving has priority.
.... ..1.	E	Receiving and sending have equal priority.
....1	S	Sending has priority.

3. DCBRECFM — Record format.

	Code	
0000 0010	R	Record.
0000 0100	G	Message.
0000 1000	S	Segment.

4. DCBOFLGS — Flags used by OPEN.

xxx. xxx.	Reserved bits.
...1	Opening has been successfully completed.
....1	This bit is set to 1 by an I/O support routine if the DCB is to be processed by that routine.

5. DCBIFLGS — Used by IOS in communicating error conditions and in determining error procedures.

00..	Not in error procedure.
01..	Error correction in process.
11..	Permanent error condition.
..10	Channel 9 printer carriage punch.
..01	Channel 12 printer carriage punch.
.... 00..	Always use IOS error routine.
.... 11..	Never use IOS error routine.
.... 10..	Never use IOS error routine.
.... 01..	Never use IOS error routine.
.... ..xx	Reserved bits.

6. DCBMACRF — Macroinstruction reference.

Byte 1

x..x xxxx	Reserved bits.
.1..	PUT for message queue.
..1.	WRITE for line group.

Byte 2

x..x xxxx	Reserved bits.
.1..	GET for message queue.
..1.	READ for line group.

DCB - BTAM

WTTA INTERFACE

16 (10) DCBBQFLG WTTA Flags (see note 1)	17 (11) DCBWTEOM EOM Character	18 (12) DCBWTEOT EOT Character	19 (13) DCBWTPAD Number of Pad-ding Characters

Common Interface

20 (14) DCBBUFNO Number of Buffers	21 (15) DCBBUFCB Address of Buffer Pool Control Block	
24 (18) DCBBUFL Buffer Length		26 (1A) DCBDSORG Data Set Organization First Byte = X'10' is CX TP Line Group
28 (1C) DCBDEVTP Index to Device Entry in Device I/O Directory	29 (1D) DCBIOBAD Base for Addressing IOB's	

Foundation Extension

32 (20) DCBHIARC, DCBBFTEK Buffering Tech-nique (see note 2)	33 (21) DCBBERROP Error Recovery Procedures (see note 3)	34 (22) DCBBUFCT Max Buffers (Dynamic Buffering)	35 (23) Reserved
36 (24) DCBEIOBX Size of IOB	37 (25) DCBEXLST Address of User-provided Exit List		

FOUNDATION

Foundation Before OPEN

40 (28) DCBDDNAM Name From DD Statement		
48 (30) DCBOFLGS Open Flags (see note 4)	49 (31) DCBIFLG IOS Error Flags (see note 5)	50 (32) DCBMACR Type of I/O Macroinstruction and Options (see note 6)

Foundation After OPEN

40 (28) DCBTIOT Offset to DD Entry in TIOT		42 (2A) DCBMACRF Type of I/O Macroinstruction and Options (see note 6)
44 (2C) DCBIFLGS IOS Error Flags (see note 5)	45 (2D) DCBDEBAD Address of DEB	
48 (30) DCBOFLGS Open Flags (see note 4)		

BTAM Interface

48 (30)	49 (31) DCBREAD, DCBWRITE Address of Read/Write Module
52 (34) DCBLERB Address of Line Error Block	

Notes:

1. DCBBQFLG — WTTA flag byte.

x..x xxxx	Reserved bits.
.1..	WRU feature to be used.
..1.	IAM feature to be used.

2. DCBHIARC, DCBBFTEK

	Code	
x... .x..		Buffer pool location, coded in the DCB macroinstruction.
0... .1..	0	Hierarchy 0 main storage.
1... .0..	1	Hierarchy 1 main storage.
.xxx ..xx		Reserved bits.
.... x...		Buffering technique:
.... 1...	D	Dynamic buffering.

3. DCBERROP — Error recovery procedure.

	Code	
xxx.		Reserved bits.
...1	T	On-line test facilities to be used.
.... 1...	C	Threshold and cumulative error counts to be maintained.
.... .1..	W	Text-write errors to be retried.
.... ..1.	R	Text-read errors to be retried.
....0	E	Basic error procedures to be followed.
....1	N	No error recovery procedures to be followed.

Notes:

4. DCBOFLGS — Flags used by the open routine.

xxx. xx.x	Reserved bits.
...1	OPEN has been successfully completed.
.... ..0.	Set to 0 by an I/O support function when that function takes a user exit. (It is set to 0 to inhibit other I/O support functions from processing this particular DCB.)
.... ..1.	Set to 1 on return from the user exit to the I/O support function that took the exit.

5. DCBIFLG — Flags used by I/O supervisor to communicate error conditions and to determine corrective procedures.

00..	Not in error procedure.
01..	Error correction in process.
11..	Permanent error condition.
..10	Channel 9 printer carriage tape punch sensed.
..01	Channel 12 printer carriage tape punch sensed.
.... 00..	Always use I/O supervisor error routine.
.... 01..	Test IOS mask (IMSK) for error procedure.
.... 11..	Never use I/O supervisor error routine.
.... 10..	(OPEN sets
.... 01	these bits.)
.... ..xx	Reserved bits.

6. DCBMACR — Macroinstruction reference.

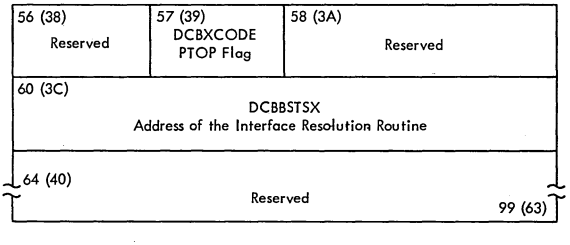
Byte 1

xx.x xxxx	Reserved bits.
..1.	READ.

Byte 2

xx.x xxxx	Reserved bits.
..1.	WRITE.

BSC INTERFACE-BEFORE OPEN



BSC INTERFACE-AFTER OPEN

56 (38) DCBXMODE BSC Transmission Mode (see note 1)	57 (39) DCBXCODE Control Station Flag Transmission Code (see note 2)	58 (3A) DCBBSRSV DLE	59 (3B) DCBBSWBT
60 (3C) DCBBSTSX DLE	61 (3D) DCBBSSTX STX	62 (3E) DCBBSTEX DLE	63 (3F) DCBBSETX ETX
64 (40) DCBBSAK0 ACK-0		66 (42) DCBBSAK1 ACK-1	
68 (44) DCBBSENQ ENQ	69 (45) DCBBSNAK NAK	70 (46) DCBBSETB ETB	71 (47) DCBBSDLE DLE
72 (48) DCBBSEOT EOT	73 (49) DCBBSSYN SYN, DLE, ETB		
76 (4C) DCBBSONL SOH %		78 (4E) DCBBSSAK WACK	
80 (50) DCBBSRVI DLE @		82 (52)	
Reserved			
			99 (63)

Notes:

1. DCBXMODE — Mode of transmission for binary synchronous communication (BSC).

.1..	Intermediate block checking is to be performed.
..1.	Transmission is through a 2701 Data Adapter Unit Dual Communication Interface B.
.... 1...	Transmission is in code B for a 2701 Data Adapter Unit Dual Code Feature.
x..x .xxx	Reserved bits.

2. DCBXCODE — BSC control station flag, transmission code.

x...	BSC control station flag.
0...	This is the control station.
1...	This is the remote station.
.x..	If PTOP is specified in the SYSGEN procedure:
.1..	Schedule an asynchronous exit to the interface resolution routine.
..1. 1...	6-bit Transcode is being used.
...1 .1..	USASCII transmission code is being used.
.... 00..	EBCDIC transmission code is being used.
.... ..xx	Reserved bits.

DCB - GAM
(Pointed to by DEB)

GRAPHIC DEVICE INTERFACE

0 (0)		
Reserved		
12 (C) DCBBRSA Buffer Restart Address	14 (E) DCBGTYPE Basic/Express (see note 1)	15 (F) Reserved
16 (10) DCBBFRST Buffer Start Address	18 (12) DCBBFRSZ Buffer Size	19 (13)

COMMON INTERFACE

20 (14)	
Reserved	
	26 (1A) DCBDSORG Data Set Organization First Byte = Zeros Second Byte = X'80' is GS
28 (1C) DCBIOBAD Address of First IOB	31 (1F)

FOUNDATION EXTENSION

32 (20) DCBGNCP No. of I/O Instructions Before WAIT	33 (21) DCBPOLST Address of DCB List for Polling
36 (24) Reserved	37 (25) DCBEXLST Address of User's Exit List 39 (27)

FOUNDATION

Before Open

40 (28) DCBDDNAM Name from DD Statement		
48 (30) DCBOFLG Open Flags (see note 2)	49 (31) DCBIFLG IOS Error Flags	50 (32) DCBMACR Type of Macroinstruction and Options (see note 3) 51 (33)

After Open

40 (28) DCBTIOT Offset to DD Entry in TIOT		42 (2A) DCBMACRF Type of I/O Macroinstruction and Options (see note 3)
44 (2C) DCBIFLGS IOS Error Flags	45 (2D) DCBDEBAD Address of DEB	
48 (30) DCBOFLGS Open Flags (see note 2)	49 (31) DCBGIOCR Address of I/O Control Routine	51 (33)

Notes:

1. DCBGTYPE — Type of buffer management and attention handling.

   00 Express.
   01 Basic.

2. DCBOFLG — Flags used by the open routine.

1...	Last I/O operation was a GWRITE.
0...	Last I/O operation was a GREAD.
.x..	Reserved bit.
..1.	Set to 1 by EOV when it calls the close routine for concatenation of data sets with unlike attributes.
...1	An OPEN has been successfully completed.
.... 1...	Set to 1 by a problem program to indicate a concatenation of unlike attributes.
.... .1..	Tape mark has been read.
.... ..0.	Set to 0 by an I/O support function when that function takes a user exit. It is set to 0 to inhibit other I/O support functions from processing this particular DCB.
.... ..1.	Set to 1 on return from the user exit to the I/O support function that took the exit.
....1	Set to 1 by an I/O support function if the DCB is to be processed by that function.

3. DCBMACR — Major macroinstructions and their associated options.

   Byte 1

0010	Read operation to be performed.
.... 0010	Control operation to be performed with the read operation.

   Byte 2

0010	Write operation to be performed.
.... 0010	Control operation to be performed with the write operation.

DATA EXTENT BLOCK

DEB - ORDINARY
(Pointed to by TCB)

APPENDAGE TABLE

-36 (-24) DEBEOEA Address of End-of-Extent Appendage
-32 (-20) DEBSIOA Address of Start I/O Appendage
-28 (-1C) DEBPCIA Address of PCI Appendage
-24 (-18) DEBCEA Address of Channel-End Appendage
-20 (-14) DEBXCEA Address of Abnormal-End Appendage -17 (-11)

DEB PREFIX

-16 (-10) DEBWKARA I/O Support Work Area	-15 (-F) DEBDSCBA Address of DSCB
-8 (-8) DEBDCBMK DCB Modification Mask	
-4 (-4) DEBLNGTH Length of DEB in doublewords	-3 (-3) Reserved -1 (-1)

Comments:

BASIC SECTION

0 (0) DEBNMSUB No. of Subroutines	1 (1) DEBTCBAD Address of TCB	
4 (4) DEBAMLNG Acc M S'n Length	5 (5) DEBDEBAD Address of Next DEB	
8 (8) DEBOFLGS Data Set Status (see note 1)	9 (9) DEBIRBAD Address of IRB	
12 (C) DEBOPATB Type of I/O (see note 2)	13 (D) DEBQSCNT PURGE - Quiesce Count	14 (E) Reserved
16 (10) DEBNMEXT No. of Extents	17 (11) DEBUSRPG Address of First IOB in User Purge Chain	
20 (14) DEBPRIOR Priority	21 (15) DEBECBAD Address of Parameter List to Find Purge ECB	
24 (18) DEBPROTG, DEBDEBID Protection Key, DEB Id (see note 3)	25 (19) DEBDCBAD Address of DCB	
28 (1C) DEBEXSCL Extent Scale	29 (1D) DEBAPPAD Address of I/O Appendage Vector Table 31 (1F)	

Notes:

1. DEBOFLGS — Data set status flags.

01..	Disposition is OLD.
10..	Disposition is MOD.
11..	Disposition is NEW.
..1.	End of volume (EOV), or end of file (EOF).
...1	Disk: Release unused external storage. Tape: Emulator tape with second generation format.
.... 1...	DCB modification.
.... .1..	Disk: Split cylinder. Tape: 7-track emulator tape with possible mixed parity records.
.... ..1.	Nonstandard labels.
....1	For magnetic tape devices, use reduced error recovery procedure.

Notes:

2. DEBOPATB — The method of input/output processing and the disposition that is to be performed when an end-of-volume condition occurs.

1...	MVT: Set by ABEND. Indicates a SYSABEND or SYSUDUMP.
.0..	Always zero.
..01	REREAD.
..11	LEAVE.
.... 0000	INPUT.
.... 1111	OUTPUT.
.... 0011	INOUT.
.... 0111	OUTIN.
.... 0001	RDBACK.
.... 0100	UPDAT.

3. DEBPROTG, DEBDEBID

xxxx	Protection key.
.... 1111	A hex F to identify this block as a DEB.

ISAM SECTION

32 (20) DEBNIEE No. of Extents	33 (21) DEBFIEAD Address of First Index Extent
36 (24) DEBNPEE No. of Extents	37 (25) DEBFPEAD Address of First Prime Data Area Extent
40 (28) DEBNOEE No. of Extents	41 (29) DEBFOEAD Address of First Overflow Extent
44 (2C) DEBDISAD Address of Privileged Module	47 (2F)

DEVICE DEPENDENT SECTION

Unit Record, Magnetic Tape Devices Section

32 (20) DEBDVMOD Device Modifier (see note)	DEBUCBAD Address of UCB 35 (23)

Telecommunication Devices

32 (20) Reserved	33 (21) DEBUCBAD Address of UCB 35 (23)

DEBUCBAD

Direct-Access Storage Device Section

+0 DEBDVMOD File Mask	+1 DEBUCBAD Address of UCB
+4 DEBBINUM Bin Number	+6 DEBSTRCC Cylinder Start Address
+8 DEBSTRHH Read or Write Track Start Address	+10 DEBENDCC Cylinder End Address
+12 DEBENDHH Read or Write Track End Address	+14 No. of Tracks Allocated in this Extent +15

EXCP Access Method, BSAM, QSAM Dependent Section

+0 DEBVOLSQ Volume Sequence Number	+2 DEBVOLNM No. of Volumes

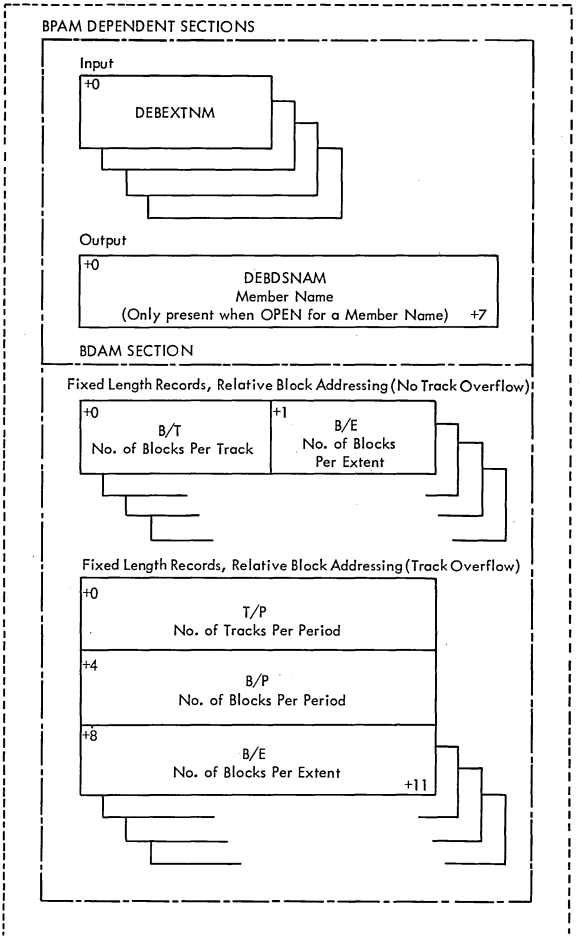
+4 DEBDSNM (Only present when OPEN for a Member Name) +11

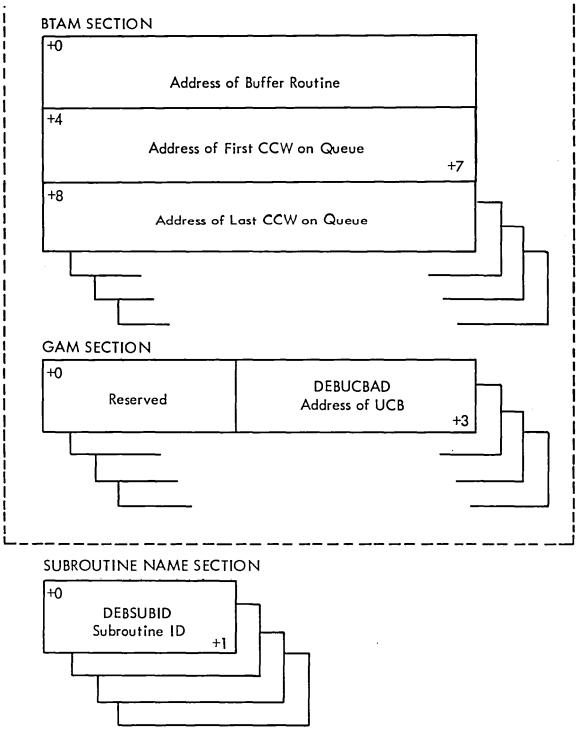
+4 Reserved	+5 Address of User Totaling Save Area (Only present if User Totaling Specified in DCB) +7

Note:

DEBDVMOD — Device modifier.

Magnetic tape -- SET MODE operation code.
Unit record -- not used.


BPAM DEPENDENT SECTIONS
Input
+0
DEBEXTNM
Output
+0
DEBDSNAM
Member Name
(Only present when OPEN for a Member Name)
+7
BDAM SECTION
Fixed Length Records, Relative Block Addressing (No Track Overflow)
+0
B/T
No. of Blocks Per Track
+1
B/E
No. of Blocks
Per Extent
Fixed Length Records, Relative Block Addressing (Track Overflow)
+0
T/P
No. of Tracks Per Period
+4
B/P
No. of Blocks Per Period
+8
B/E
No. of Blocks Per Extent
+11


BTAM SECTION
+0
Address of Buffer Routine
+4
Address of First CCW on Queue
+7
+8
Address of Last CCW on Queue
GAM SECTION
+0
Reserved
DEBUCBAD
Address of UCB
+3
SUBROUTINE NAME SECTION
+0
DEBSUBID
Subroutine ID
+1

MESSAGE PROCESS QUEUE
Prefix

-16 (-10) Work Area	-15 (-F) DSCB Address
-8 (-8) DCB Mask	
-4 (-4) Length of DEB	-3 (-3) Reserved -1 (-1)

Basic Section

0 (0) Reserved	1 (1) Address of TCB
4 (4) Reserved	5 (5) Address of Next DEB
8 (8) Reserved	
	17 (11) Address of Next Record
20 (14) Reserved	21 (15) Address of Next Process Program DEB
24 (18) ID X'0F'	25 (19) Address of DCB
28 (1C) Reserved	29 (1D) Address of DEB + 48
32 (20) First Word of Dummy LCB 35 (22)	

Queue Control Block

36 (24) Reserved	37 (25) Address of Dummy Entry
40 (28) Reserved	
	45 (2D) Address of QPRIRITY Subtask 47 (2F)

Buffer Request Block

48 (30) Reserved	
52 (34) Priority	53 (35) Reserved
56 (38) Op Code X'08'	57 (39) Address of QCB for DASD Process Q
60 (3C) Hex Code X'07'	61 (3D) Address of DEB + 32 63 (3F)

64 (40) Size of Work Area	66 (42)
Reserved	87 (57)

DESTINATION QUEUE

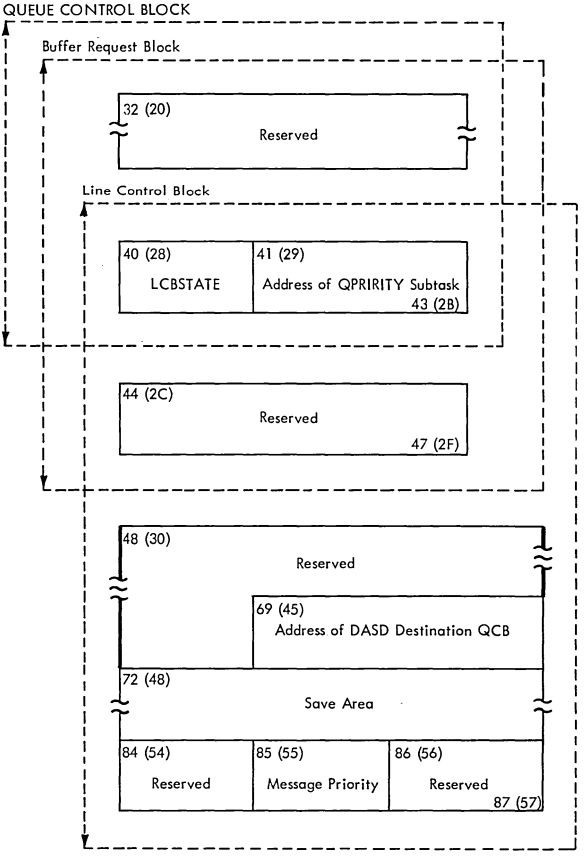
Prefix

-16 (-10) Work Area	-15 (-F) DSCB Address
-8 (-8) DCB Mask	
-4 (-4) Length	-3 (-3) Reserved -1 (-1)

Basic Section

0 (0) Reserved	1 (1) Address of TCB
4 (4) Reserved	5 (5) Address of Next DEB
8 (8) Reserved	21 (15) Address of Next DEB
24 (18) ID X'0F'	25 (19) Address of DCB
28 (1C) Reserved 31 (1F)	

Comments:


QUEUE CONTROL BLOCK
Buffer Request Block
32 (20)
Reserved
Line Control Block
40 (28)
LCBSTATE
41 (29)
Address of QPRIRITY Subtask
43 (2B)
44 (2C)
Reserved
47 (2F)
48 (30)
Reserved
69 (45)
Address of DASD Destination QCB
72 (48)
Save Area
84 (54)
Reserved
85 (55)
Message Priority
86 (56)
Reserved
87 (57)

DECB - BSAM

0 (0) DECSDECB Event Control Block	
4 (4) DECTYPE or DCBPTR Type of I/O Request Ptr to Next DECB (see note 1)	6 (6) DECLNGTH Length of Key and Data
8 (8) DECDCBAD Address of DCB	
12 (C) DECAREA Address of Key and Data or of User-specified Channel Program	
16 (10) DECIOBPT Address of IOB 19 (13)	
20 (14) DECNXADR Address of Next Address Feedback Field	

DECB - GAM

0 (0) DECBECB ECB	
4 (4) DECBTYPE Type of Input/Output Operation (see note 1)	
8 (8) DECBDCB DCB Address	
12 (C) DECBADDR Area Address/DCBZ Address	
16 (10) DECBHEX Error Code	17(11) DECBCNT CSW Residual Count on Certain Errors
20 (14)	21 (15) DECBOCBP OCBP Pointer
24 (18)	25 (19) DECBSTRT Start Address of Control Orders
28 (1C) DECBUNIT Unit Index	29 (1D) DECBBUFF Buffer Address

DECB - BISAM

0 (0) DECBECB Event Control Block		
4 (4) DECBTYP1 Options (see note 2)	5 (5) DECBTYP2 Type of I/O (see note 3)	6 (6) DECBLGTH No. of Bytes Read or Written
8 (8) DECBDCBA Address of DCB		
12 (C) DECBAREA Storage Address for Record		
16 (10) DECBLOGR Address of Logical Record		
20 (14) DECBKEY Address of Key Portion of Record		
24 (18) DECBEXC1 Exceptional Condition Codes (see note 4)	25 (19) DECBEX2 Exceptional Condition Codes (see note 5)	

Notes:

1. DECTYPE — Type of I/O request.

   Byte 1 — Type of length operand:

   1... .... — S-coded for length.
   .xxx xxxx — Reserved bits.

   Byte 2 — Type of operation.

   1... .... — READ SF.
   .1.. .... — READ SB.
   ..1. .... — WRITE SF.
   ...1 .... — WRITE SD.
   .... x.x. — Reserved bits.
   .... .1.. — WRITE SZ.
   ..1. ...1 — WRITE SFR.

2. DECBTYP1 — Options.

   xxxx xx.. — Reserved bits.
   .... ..1. — Length coded as 'S'.
   ....1 — Area coded as 'S'.

3. DECBTYP2 — Type of I/O request.

   1... .... — READ K.
   .x.x ..xx — Reserved bits.
   ..1. .... — READ KU.
   .... 1... — WRITE K.
   .... .1.. — WRITE KN.

Notes:

4. DECBEXC1 — Exceptional condition code.

1...	Record not found.
.1..	Record-length check.
..1.	Space not found in which to add a record.
...1	Invalid request.
.... 1...	Uncorrectable I/O error.
.... .1..	Unreachable block.
.... ..1.	Overflow record.
....1	Duplicate record presented for inclusion in the data set.

5. DECBEXC2 — Exceptional condition code.

.... ..1.	Execution of the last channel program was instituted by an asynchronous routine.
....	Previous macroinstruction was READ KU.
xxxx xx..	Reserved bits.

Comments:

0 (0)	DECSDECB Event Control Block (see note 1)	
4 (4)	DECTYPE Type of I/O Request (see note 2)	6 (6) DECLNGTH Length of Data
8 (8)	DECDCBAD Address of DCB	
12 (C)	DECAREA Address of the Data	
16 (10)	DECIOBPT Address of the IOB	
20 (14)	DECKYADR Address of the Key	
24 (18)	DECRECPT Address of Block Reference Field	
28 (1C)	DECNXADR Address of the Next Address Feedback Field	31 (1F)

Notes:

1. DECSDECB — Event control block.

Byte 1	Waiting for event completion.
1...	Waiting for completion of event.
.xxx xxxx	Reserved bits.
Byte 2-4	Address of the request block for the program waiting for completion of the event.
Byte 1	After event completion.
x.xx xxxx	Reserved bits.
.1..	Event has completed.
Byte 2	
1...	Record not found.
.1..	Record-length check.
..1.	Space not found.
...1	Invalid request.
.... 1...	Uncorrectable I/O error.
.... .1..	End of data.
.... ..1.	Uncorrectable error other than an I/O error.
....1	A READ with exclusive control was not preceded by a WRITE with exclusive control.

Byte 3

x...	Reserved bit.
.1..	A WRITE macroinstruction was addressed to an input data set.
..1.	An extended search was specified with the DCBLIMCT field set to zero.
...1	The block requested is not within the data set.
.... 1...	A write-by-identification (DI) addressed record zero.
.... .1..	A search-on-key (DK) was specified with the DCBKEYLE field set to zero or without an address for the key.
.... ..1.	A macroinstruction used an option not set in the DCB.
....1	The key for the fixed-length record to be added begins with hex FF.

Byte 4 — Reserved.

2. DECTYPE — Type of I/O request.

Byte 1

1...	Verify.
.1..	Overflow.
..1.	Extended search.
...1	Feedback.
.... 1...	Actual addressing.
.... .1..	Dynamic buffering.
.... ..1.	Read exclusive.
....1	Relative block addressing.

Byte 2

1...	S-coded for key address.
.1..	S-coded for block length.
....x	Reserved bit.
.... x...	Type of operation:
.... 0...	WRITE.
.... 1...	READ.
.... .x..	Type of search argument:
.... .0..	ID.
.... .1..	Key.
.... ..1.	Add option of write operation.
..11	RU is suffixed to the type, indicating that next address can be either a record or a capacity record, whichever occurred first.
...1	R is suffixed to the type, indicating that the next address is specified.

0 (0) LINEDECB Always Zero		
4 (4) Reserved	5 (5) Op Code for Current Seg	6 (6) Length of Input Area for Initial Read
8 (8) Address of DCB		
12 (C) Address of Data in Buffer		
16 (10) Reserved		
20 (14) No. Messages Received	21 (15) Address of Currently Active Entry in Polling List	
24 (18) Reserved	25 (19) Index, in DEB, to UCB	26 (1A) Reserved
28 (1C) Reserved		
32 (20) Address of Addressing Characters in Terminal Entry		
36 (24) Reserved	37 (25) Address of Polling List 39 (27)	

0 (0) DECSDECB Event Control Block		
4 (4) DECTYPE Programming, Indicators, Code (see note 1)		6 (6) DECBLNGTH Buffer Length, Message Area Length
8 (8) DECBUFCT Buffer Count (see note 2)	9 (9) DECDCBAD DCB Address	
12 (C) DECAREA Buffer Address, Message Area Address		
16 (10) DECSENS0 Sense Byte	17 (11) DECSENS1 Reserved	18 (12) DECCOUNT CSW Residual Count
20 (14) DECCMCOD, DECENTRY Error Command, Terminal List Address		
24 (18) DECFLAGS Operations Status (see note 3)	25 (19) DECRLN Relative Line No.	26 (1A) DECRESPN Addressing Response, VRC/LRC Response
28 (1C) DECTPCOD Operation (see note 4)	29 (1D) DECERRST I/O Error Status (see note 5)	30 (1E) DECCSWST CSW Status
32 (20) DECADRPT Address of Previous Entry in Addressing List		
36 (24) DECPOLPT Contents Depend on Use of Autopoll, Programmed Polling, or BSC (see note 6)		

BSC Extension

40 (28) Reserved	42 (2A) DECWLNG Data Area Length
44 (2C) DECWAREA Data Area Address 47 (2F)	

Notes:

1. DECTYPE — Programming indicators.

Byte 1

1...	READ, using Autopoll. (OLT: OLT requested by ONLTST macro).
.0..	OLT only: test MSG sent.
.1..	OLT only: test MSG received.
..xx x...	Reserved bits.
.... .1..	S-coded for terminal entry.
.... ..1.	S-coded for area.
....1	S-coded for length.

Byte 2

	Command Code	
00	TB	Write break.
01	TI	Read initial.
02	TI	Write initial.
03	TT	Read continue.
04	TT	Write continue.
05	TV	Read conversational.
06	TV	Write conversational.
07	TP	Read repeat (other than WTTA).
07	TE	WTTA: Read continue with identification exchange.
08	TA	Write positive acknowledgment.
09	TS	Read skip.
0A	TN	Write negative acknowledgment.
	TN	Write disconnect (TWX).
	TR	Write reset (BSC).
0B	TB	Read buffer.
0C	TL	Write at line address.
	TIO	Write initial optical.
	TIO	Write initial transparent block (BSC)
0D	TIV	Write initial conversational.
	TTA	Read continue with leading acknowledgment.
0E	TS	Write erase.
	TCO	Write invitational optical.
	TTE	Write continue transparent clock (BSC)
0F	TTV	Write continue conversational.
10	TD	Write disconnect.
11	TC	Read connect.
12	TIX	Write initial transparent.
	TVO	Write conversational optical.
13	TTL	Read continue with leading graphics.
14	TTX	Write continue transparent.
15	TQ	Read inquiry.
16	TQ	Write inquiry.
17	TPL	Read repeat with leading graphics.
19	TIQ	Read initial inquiry.
1A	TW	Write wait before transmitting.
1B	TRV	Read interrupt.
1C	TC	Write connect.
1D	TIVX	Write initial conversational transparent.
1E	TCW	Read connect with tone.
1F	TTVX	Write continue conversational transparent.
82	TIR	Write initial with reset.
83	TTR	Read continue with reset.
84	TTR	Write continue with reset.
85	TVR	Read conversational with reset.
86	TVR	Write conversational with reset.

Notes:

1. DECTYPE - continued

Byte 2

	Command Code	
87	TPR	Read repeat with reset.
8C	TLR	Write at line address with reset.
8E	TSR	Write erase and reset.
92	TIXR	Write initial transparent with reset.
94	TTXR	Write continue transparent with reset.

2. DECBUFCT — Contains a running count of buffers obtained by BTAM for the current read operation (dynamic buffering only). Use differs during BSC and 2760 on-line test.

3. DECFLAGS — Operation status.

xxx.	One of the following: Start-stop operations. Reserved bits. BSC operations:
1...	WACK received.
.1..	Acknowledgment other than ACK-0 or ACK-1 received.
..1.	Wrong acknowledgment received.
...1	One of the following: TWX 33/35 terminal, BSC terminal: Incorrect ID received. Autopoll: Index byte received does not match an active byte. BSC network: Contention occurred. WTTA: Contention occurred.
.... 1...	READ, dynamic buffering: No buffer available (message lost).
.... .1..	One of the following: OPENLST, POLLING: Negative response to polling received, and end of list reached. WRAPLST: All entries are inactive. Addressing: Negative response to addressing received. WTTA: Last message received ended with EOT or time-out. 2741 power off or other intervention required.
.... ..1.	WTTA: Message ended with WRU signal. BSC stations: Reverse interrupt (RVI) sequence was received (see also bit 1). 2741 write operation was ended by terminal interrupt.
....1	WTTA: Last message ended with WRU. BSC: STX-ENQ (ABORT) sequence received.

Notes:

4.

DECTPCOD		Terminal type
		Note: Bit 0 = 1 if last CCW.
00		On-line test.
01		Disable when DISABLE is the first command of a channel program. Dial. Enable. Prepare. Write EOA EOT EOT EOT. Write wait before transmitting.
	WTTA	Write leading graphics.
02		Sense. Write control characters Ⓓ Ⓒ Ⓒ Ⓒ before selection. Write EOT sequence before polling or addressing. Write response to text.
	2740, Basic	Write Ⓓ and 15 idle characters.
	2760, 1050	Write Ⓓ Prefix o.
03		Write polling, addressing, or broadcast characters. Poll.
	TWX	Write turnaround sequence.
	TWX, BSC	Write CPU-ID sequence.
	BSC	Write ENQ.
04	2740	Sense.
	w/st.c	(w/st.c. - with station control), write space
	2260R	Write 2848 command.
	83B3	Write FIGS shift.
	1030	Write 1.
	WTTA	Write WRU. Write identification. Write padding characters. Write letter shift characters.
05		Read response to polling.
06		Read response to addressing.
07	TWX, BSC, WTTA	Read ID response.
08	1030 1050 2740 1060 2260	Write end-of-addressing character after addressing.
	BSC	Write response to inquiry. Write response to text.
	2760	Write EOB.
09		NOP or TIC after poll in a READ with SSALST, SSAWLST, AUTOLST, or AUTOWLST.
0A		Read index (autopoll). Read response to polling (programmed polling).
0B	BSC	Read inquiry.

Notes:

4. DECTPCOD - continued

0C	BSC	Read response to inquiry.
10	2260R	Write at line address.
11		Read or write text.
	2760	Write frame-change characters.
12		Read skip or TIC for dynamic buffering.
13	BSC	Write end-of-transparent-text characters.
20		Start-stop read response to text.
21		All reset commands.
22		Read skip.
23		Write break.
24		Any command issued during OPEN, LOPEN or CLOSE (set address, enable, disable and set mode).
25	BSC	Read response to text.
40-4C 50-53 61-65		The last CCW executed was the first Read or Write Text CCW to be executed in a channel program using dynamic buffering.
80-8C 90-93 A1-A5		The last CCW in a channel program was executed.

5. DECERRST — I/O error status flags.

1...	SIO resulted in a condition code of 3.
.1..	Undefined error condition.
..1.	An error condition occurred during an I/O operation initiated by the error recovery routines.
...1	Diagnostic write/read operation ended because of error (2701 only).
.... 1...	Disable command issued to a switched-connected line by error recovery routine because of permanent error on that line.
.... .xxx	Reserved bits.

6. DECPOLPT — One of the following:

Programmed polling:
Address of the current entry in the polling list.

Autopoll:
Byte 1: Indexed to current entry in polling list.
Bytes 2-4: Address of polling list.

BSC on-line test:
Address of text data.

BSC extension:
Fields are present only for BSC used only in leading graphics and conversational type operations.

+0 (0) (see note 1)	+1 (1) (see note 2)
W C	

Notes:

1.

	Awaiting completion of an event:
1...	W - Waiting for completion of an event.
	After completion of an event:
.1..	C - The event has completed.
..xx xxxx	Completion code.

One of the following completion codes appears at the completion of a channel program:

Access Methods Other Than BTAM

7F	Channel program has terminated without error. (CSW contents useful.)
41	Channel program has terminated with permanent error. (CSW contents useful.)
42	Channel program has terminated because a direct-access extent address has been violated. (CSW contents do not apply.)
44	Channel program has been intercepted because of permanent error associated with device end for previous request. The intercepted request may be reissued. (CSW contents do not apply.)
48	Request element for channel program has been made available after the channel program has been purged. (CSW contents do not apply.)
4F	Error recovery routines have been entered because of direct-access error but are unable to read home address or record 0. (CSW contents do not apply.)

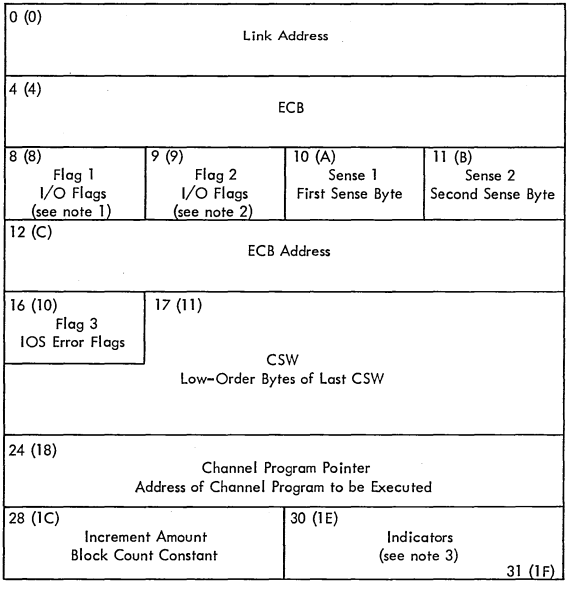
BTAM

7F	Completed normally.
41	Completed with an I/O error.
48	Enable command halted, or, I/O operation purged.

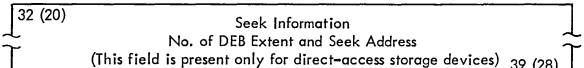
2.

	Awaiting completion of an event:
	Request block address.
	After completion of the event:
	Zeroes, or remainder of completion code.
	RESETPL issued on this line.

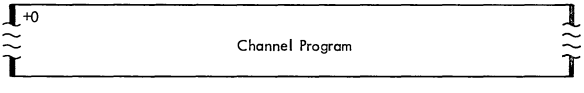
INTERRUPTION CONTROL BLOCK (ICB)



DIRECT-ACCESS STORAGE DEVICES



CHANNEL PROGRAM



Notes:

1. Flag byte 1.

00..	No chaining.
01..	Command chaining.
10..	Data chaining.
11..	Both command and data chaining.
..1.	Error routine in control.
...1	Device is to be repositioned.
.... 1...	Cyclic redundancy check (CRC) needed (tape only).
.... .1..	Exceptional condition. If this bit is on after control has been returned from the error routine, the error is considered permanent.
.... ..1.	IOB unrelated flag (i.e., nonsequential).
....0	START.
....1	RESTART.

2. Flag byte 2.

1...	Halt I/O has been issued.
.1..	Sense is not performed until the device is free.
..1.	IOB has been purged.
...1	Home address (R0) record is to be read.
.... xxx.	Internal I/O supervisor error correction flags.
....1	QSAM error recovery routine in control for a 2540 Punch with three buffers.

3.

1...	Special volume-full indicator signifying end-of-tape mark or reflective spot sensed along with a read or write error.
.xxx xxxx	Reserved bits (always zero).

0 (0)	(See note)
100 (64)	JFCB
276 (114)	ECB
280 (118)	IOB
320 (140)	DEB
364 (16C)	DCB
368 (170)	CCW's
464 (1D0)	XCTL Work Area (EOV only)
501 (1FS)	Switch for EOV
502 (1F6)	Work Area for Volume Serials (OPEN and EOV)
526 (20E)	Additional Work area (EOV only)

Note: This field contains one of the following:

Volume Label	80 bytes
File Label #1	80 bytes
File Label #2	80 bytes
DSCB Data Portion (FMT 1)	96 bytes
DSCB Key Portion (FMT 3)	44 bytes
DSCB Data Portion (FMT 3)	96 bytes
Variable MSG Area	max 100 bytes

PREFIX

BDAM - BFTEK = R and RELFM = VS

-8 (-8) DEQIND (see note 2)	-7 (-7) DEQIOB Address of IOB to Dequeue Tracks of Spanned Record
-4 (-4) SWAPTR Address of the Segment Work Area	

GAM, QISAM

-4 (-4) Event Control Block -1 (-1)

QSAM, BSAM, BPAM - Normal Scheduling

-8 (-8) I/O Flags (see note 1)	-7 (-7) Address of Next IOB
-4 (-4) Event Control Block -1 (-1)	

QSAM, BSAM - Chained Scheduling

-16 (-10) FLAG1 I/O Indicators (see note 3)	-15 (-F) Reserved	-14 (-E) INNOP Offset to Last I/O for Input	-13 (-D) OUTNOP Offset to Last I/O for Output
-12 (-C) Event Control Block			
-8 (-8) FIRSTICB Address of First ICB			
-4 (-4) Last NOP Address -1 (-1)			

IOB (Continued)

0 (0) IOBFLAG1 I/O Flags (see note 4)	1 (1) IOBFLAG2 I/O Flags (see note 5)	2 (2) IOBSENS0 First Sense Byte	3 (3) IOBSENS1 Second Sense Byte
4 (4) IOBECBCC Completion Code	5 (5) IOBECBPT Address of ECB		
8 (8) IOBFLAG3 I/O Error Flags (see note 15)	9 (9) IOBCSW Seven Low-Order Bytes of Last CSW		
16 (10) IOBSIOCC SIO Condition Code	17 (11) IOBSTART Address of Channel Program		
20 (14) Reserved	21 (15) IOBDCBPT Address of DCB		
24 (18) IOBRESTR PURGE Chain/CCHH/Command, Channel Program			
28 (1C) IOBINCAM (use varies) (see note 6)	30 (1E) IOBERRCT No. of Error Retries (see note 16) 31 (1F)		

EXTENSION

BTAM

32 (20) IOBUCBX UCB Index	33 (21) IOBWORK Error Routine and ONLTT Routine Work Area		
	37 (25) Special Return Code (BSC, ERP only)	38 (26) IOBRCVPT Rcvd Ack Pointer (BSC only)	39 (27) IOBSNDPT Sent Ack Pointer (BSC only)
40 (28) IOBERCCW (8 bytes) For Start-Stop -- Dummy CCW For BSC -- First CCW Built by ERP			
48 (30) IOBERINF (8 bytes) For Start-Stop -- Failing CCW For BSC -- Second CCW Data Addr Points to Failing CCW			
56 (38) BSC: Sense Byte from Error	BSC: Failing CCW (Bytes 2-8) For Start-Stop: Failing CCW Stored Here		
64 (40) IOBCPA Channel Program Error			

GAM

32 (20) IOBUCBX UCB Index	33 (21) Reserved
36 (24) Status Indicators (see note 7)	37 (25) IOBNXTPT Address of Next Available IOB
40 (28) IOBCCW List of CCW's 71 (47)	

Direct-Access Storage Devices

32 (20) IOBSEEK No. of DEB Extent and Seek Address (This field may be present only for direct-access storage devices) 39 (27)

BSAM, QSAM, BPAM

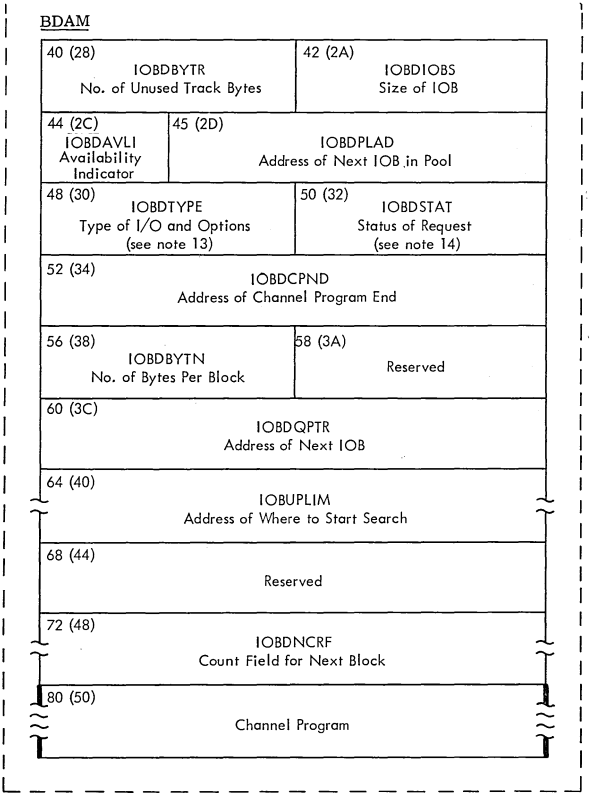
+0 Channel Program
Additional Search Addresses (This field may be present only for direct-access storage devices)

QISAM

40 (28) W1IEXTEN, W1OEXTEN Appendage Codes (see note 8) 41 (29)

BISAM

40 (28) IOBCCWAD Fixed-Length Record: Address of First CCW Variable-Length Records: Buffer Address			
44 (2C) IOBINDCT Queue Indicators (see note 9)	45 (2D) IOBUNSQR Reason Queue Unscheduled (see note 10)	46 (2E) IOBAPP Appendage Codes (see note 11)	47 (2F) IOBASYN Asynchronous Code (see note 12)
48 (30) IOBCOUNT Write Check Count	49 (31) IOBCHAD Forward Chain Address		
52 (34) IOBBCHAD Backward Chain Address 55 (37)			


BDAM
40 (28)
IOBDBYTR
No. of Unused Track Bytes
42 (2A)
IOBDIOBS
Size of IOB
44 (2C)
IOBDAVLI
Availability
Indicator
45 (2D)
IOBDPLAD
Address of Next IOB in Pool
48 (30)
IOBDTYPE
Type of I/O and Options
(see note 13)
50 (32)
IOBDSTAT
Status of Request
(see note 14)
52 (34)
IOBDCPND
Address of Channel Program End
56 (38)
IOBDBYTN
No. of Bytes Per Block
58 (3A)
Reserved
60 (3C)
IOBDQPTR
Address of Next IOB
64 (40)
IOBUPLIM
Address of Where to Start Search
68 (44)
Reserved
72 (48)
IOBDNCRF
Count Field for Next Block
80 (50)
Channel Program

Notes:

1. Flag byte.

1...	PRTOV has occurred.
.1..	A write operation is in process.
..1.	A read operation is in process.
...1	Update flag. Set on, together with bit 1 of this byte, to show that the block is to be updated. Can only occur if the OPEN parameter is UPDAT.
.... 1...	IOB being used for backspace, control, or note/point operation.
.... .1..	QSAM Locate Mode.
.... ..x.	Reserved bits.
....1	This is the first IOB.

2. DEQIND

1...	Track containing spanned records being dequeued.
.xxx xxxx	Reserved bits.

3. FLAG1 — I/O indicators.

xxxx x...	Reserved bits.
.... .1..	Error has been processed once by abnormal-end appendage routine.
.... ..1.	Restart channel.
....1	Set when a program controlled interruption (PCI) occurs.

4. IOBFLAG1 — Flag byte 1.

00..	No chaining.
01..	Command chaining.
10..	Data chaining.
11..	Both command and data chaining.
..1.	Error routine in control.
...1	Device is to be repositioned.
.... 1...	Cyclic redundancy check (CRC) needed (tape only).
.... .1..	Exceptional condition. After the error routine returns and this bit is on, the error is considered permanent.
.... ..1.	IOB unrelated flag (i.e., nonsequential).
....0	START.
....1	RESTART.

5. IOBFLAG2 — Flag byte 2.

1...	Halt I/O has been issued.
.1..	Sense is not performed until the device is free.
..1.	IOB has been purged.
...1	Home address (R0) record is to be read.
.... xxx.	Internal I/O supervisor error correction flags.
....1	QSAM -- error recovery in control for a 2540 Punch with three buffers. BTAM -- RESETPL macroinstruction was used.

Notes:

6. IOBINCAM — QSAM, BSAM, EXCP access method -- Normal scheduling: Value used to increment block count field in DCB for magnetic tape. Chained Scheduling: zeros.

BTAM

1...	SAD or ENABLE issued by OPEN resulted in a permanent I/O error.
.1..	This IOB is currently in use by an I/O operation.
..1.	RVI received.
.... 1...	Error Routine in Control.
...x .xx.	Reserved bits.
....1	Line is under on-line test operation.

7. Status indicators.

0...	IOB available.
1...	IOB not available.
.xxx xxxx	Reserved bits.

8. W1IEXTEN, W10EXTEN — Appendage codes for both normal and abnormal channel end conditions.

Code	
0	Operation completed was a READ.
4	Operation completed was a SETL (K or I).
8	Operation completed was a WRITE.
12	Operation completed was a CHECK.
16	Operation completed was a REWRITE.
20	Operation completed was a RECHECK.

9. IOBINDCT — Indicators.

1...	Remove channel program from queue.
.1..	Unscheduled queue.
..0.	DECBAREA + 6 points to overflow record data.
..1.	DCBMSWA points to overflow record key followed by data.
...0	DECBKEY points to overflow record key.
...1	DCBMSWA + 8 points to overflow record key.
.... xxx.	Reserved bits.
....0	Normal channel end has occurred.
....1	Abnormal channel end has occurred.

10. IOBUNSQR — Reason for unscheduled queue.

1...	Channel program CP1 or CP2 busy.
.1..	No CP4, CP5, or CP6 available.
..1.	No CP7 available.
...1	WRITE KN is in effect (unscheduled IOB is for WRITE KN).
.... 1...	WRITE KN is in effect (unscheduled IOB is for READ or WRITE KN).
.... .xxx	Reserved bits.

Notes:

11. IOBAPP

Code	
4	Completion of CP14 part 2 (fixed-length records with user work area).
7	Completion of CP1 or CP2 for WRITE KN.
8	Completion of CP8.
9	Completion of CP10A for true insert or CP14 part 2 (variable-length records) for EOF Extension.
10	Completion of CP10B for true insert or CP14 part 2 (variable-length records) when part 1 has been executed.
11	Completion of CP10B for addition to end of data set.
12	Completion of CP14 or CP14 part 1 (fixed-length records with user work area and variable-length records) for setups 1, 2, and 5 (asynchronous routine codes 9, 10, and 13).
13	Completion of CP14 or CP14 part 1 (fixed-length records with user work area and variable-length records) for setups 3, 4, and 6 (asynchronous routine codes 11, 12, and 14).
14	Completion of CP15.
15	Completion of CP16 for setup 2 (search overflow chain for last overflow record in the chain: addition to end of data set).
16	Completion of CP16 for setup 3 (search overflow chain for record which logically precedes or is equal to new record to be added: true insertion).
17	Completion of CP17 when used for track index only or CP14 part 2 (variable-length records) when part 1 has not been executed (no overflow).
18	Completion of CP17 when used for track index and when it is to be continued for higher level indexes.
19	Completion of CP17 when it is to be started or continued for higher level indexes.
20	Completion of CP9A, or CP11A, or CP12A, or CP13A, or CP12AV.
21	Completion of CP9B, or CP11B, or CP12B, or CP13B, or CP12BV.
22	Completion of CP9C or CP123W or CP123WV.
23	Completion of CP10A for addition to end of data set.
24	Completion of CP12C or CP13C.

12. IOBASYN — Asynchronous routine code.

READ or WRITE K:

Code	
0	Successful completion of CP4-5-6.
1	Do an EXCP.
2	Successful completion of CP7.
3	Successful completion of CP1 or CP2.
4	Unsuccessful completion of CP4-5-6.
6	Unsuccessful completion of CP7.
7	Unsuccessful completion of CP1 or CP2.

Notes:

12. IOBASYN - continued

WRITE KN:

Code

1 Scheduled to do an EXCP that could not be done in an appendage routine because a different device (UCB) was involved.

8 Scheduled upon the successful or unsuccessful completion of a WRITE KN macro.

9 Scheduled to set up and execute CP14 when a record is bumped from a prime data track as a result of a new record being placed on that track (setup 1).

10 Scheduled to set up and execute CP14 when a new record is to be added to the end of the data set; the last track is full, and no overflow chain currently exists for the last track (setup 2).

11 Scheduled to set up and execute CP14 when a new record is to be added to the end of the data set; the last track is full, but an overflow chain does already exist for the last track (setup 3).

12 Scheduled to set up and execute CP14 when a new record is a true insert and is to go in the middle of an overflow chain (setup 4).

13 Scheduled to set up and execute CP14 when a new record is a true insert and is to become the first record in an already existing overflow chain (setup 5).

14 Scheduled to set up and execute CP14 when a new record is a true insert and has a key equal to that of the key of a record marked for deletion in the overflow chain. The new record simply replaces the deleted record (setup 6).

15 Variable-length records only: Scheduled to set up and execute CP14 when more than one record is bumped from a prime data track (setup 1).

16 Variable-length records only: Scheduled to set up and execute CP14 Extension to write an EOF mark in independent overflow.

13. IOBDTYPE — Type of request and specified options.

Byte 1

1...	Verify.
.1..	Overflow.
..1.	Extended search.
...1	Feedback.
.... 1...	Actual addressing.
.... .1..	Dynamic buffering.
.... ..1.	Read exclusive.
....1	Relative block addressing.

Notes:

13. IOBDTYPE - continued

Byte 2

1...	Key address coded as 'S'.
.1..	Block length coded as 'S'.
..11	RU is suffixed to the type, indicating that next address can be either a record or a capacity record, whichever occurred first.
...1	R is suffixed to the type, indicating that the next address is specified.
.... 1...	Read request.
.... 0...	Write request.
.... .1..	Key type.
.... .0..	ID type.
.... ..1.	Add type.
....1	RELEX macro issued.

14. IOBDSTAT — Status of the request.

Byte 1

1...	Abnormal completion.
.1..	On extended search, the next extent is on a new volume. The ASI routine must issue the EXCP macro; the end-of-extent appendage cannot.
...1	On extended search, indicates to the relative block conversion routine that the second pass of a two-pass conversion routine has completed.
.... 1...	For exclusive control request, indicates that a record has been enqueued.
.... .1..	A buffer has been assigned to this input/output block.
.... ..1.	IOB being used to add a variable (V) or undefined (U) type record to the data set.
....1	Indicates to the dynamic buffering routine that it was entered from, and is to return control to, the start I/O appendage module.
..x.	Reserved bit.

Byte 2

1...	Block not found on indicated track.
.1..	Length of block was incorrect.
..1.	No space found to write a new block.
...x	Reserved bit.
.... 1...	READ OP resulted in a data check not corrected by IOS error retry.
.... .1..	Request completed, but block is an end-of-data set record.
.... ..1.	Indicates error that cannot be attributed to any other cause as indicated by this byte.
....1	No match found on the read-exclusive list.

Notes:
15. IOBFLAG3

	1	2	3	4	5	6	7
1052, 2150		Wrt Err Cnt	Bus Out Cnt	Cntrl Bit M1	Msg Type	Cntrl Bit M0	Log Out Flag
2540/ 2821	Ind 1	Entry Flag	Read Err Cnt	Bus Out Cnt	Punch Retry	Msg Type	QSAM Cnt	Log Out Flag
1403/ 1443		IOB Entry Flag	Load Gen in UCS Parity	Bus Out Cnt		Msg Type		Log Out Flag
1442, 2501 2520		IOB Entry Flag	Read Err Cnt	Bus Out Cnt	Data Chk Flag	Msg Type	Over- run Cnt	Log Out Flag
2671, 2822		Eq Chk Count		Bus Out Cnt		Msg Type		Log Out Flag
2400	Noise Msg Given	IOB Entry Flag	Tape Clean Bit	Cont Flag		Msg Type	Cont Unit Busy	Log Out
2321 (2841)	IND 1	Trk Cond Flag	No Rec Fnd	Pick Flag	Re- Store Flag	Msg Type	Sweep Flag	Log Out Flag
All Other DA DVCS	IND 1	Trk Cond Flag	No Rec Fnd	Bus- Out Err Cnt	Re- Store Flag	Msg Type		Log Out Flag
2250 All TP Devices						Msg Type		Log Out Flag
2260 (1053)						Msg Type		Log Out Flag
2280, 2282						Msg Type		Log Out Flag

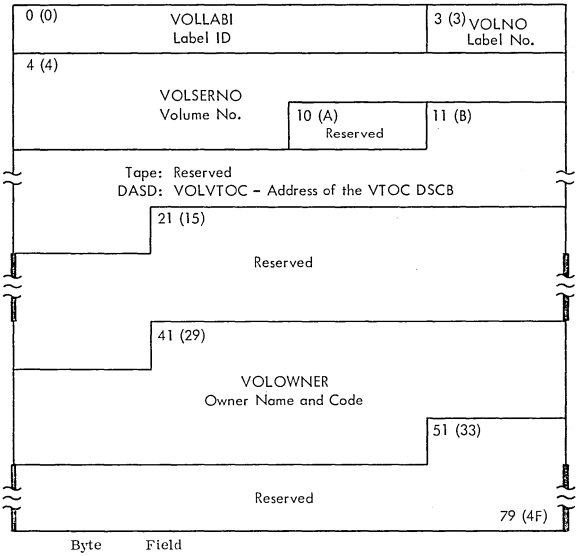
16. IOBERRCT

Byte 0	BTAM ERP retry count.
Byte 1	Return indicator for ERD X'14'

VOLUME LABEL

The 80-character volume label identifies the volume and volume owner. This label is the first record on magnetic tape volumes. On 9-track tape, it is written in EBCDIC; on 7-track tape, in BCD.

On direct-access volumes, the volume label is the third record following the two IPL records. The label is recorded in EBCDIC.



Offset	Byte Length	Field Name	Field Description, Contents, Meaning
0(0)	3	VOLLABI	Label identifier must be VOL.
3(3)	1	VOLNO	Volume label sequence number.
4(4)	6	VOLSERNO	Volume serial number.
10(A)	1		Reserved (must be recorded as EBCDIC zero).
11(B)	5		Magnetic tape: reserved (must be recorded as blanks).
11(B)	5	VOLVTOC	Direct-access storage: CCHHR address of the VTOC DSCB on this volume.
16(10)	5		Reserved (must be recorded as blanks).
21(15)	20		Reserved (must be recorded as blanks).
41(29)	10	VOLOWNER	Owner name and address code for the volume owner.
51(33)	29		Reserved (must be recorded as blanks).

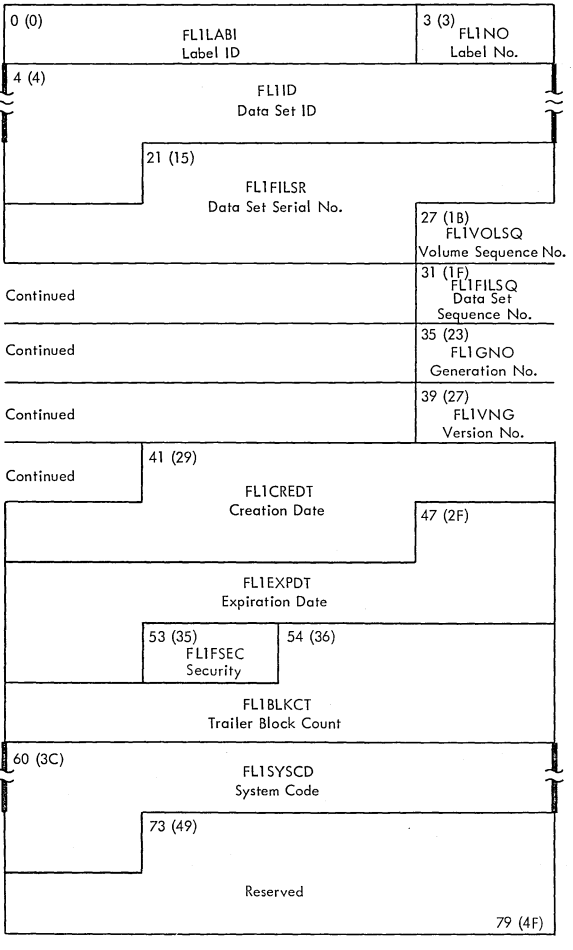
DATA SET LABELS -- MAGNETIC TAPE

The blocks of information that serve as labels for data sets residing on magnetic tape are the data set label 1 and the data set label 2. Each block is 80 bytes long and is written in EBCDIC characters in main storage and on 9-track tape, and in BCD characters on 7-track tape.

A set of a data set label 1 and a data set label 2, together with user labels (if used), makes up header labels, end-of-volume trailer labels, and end-of-data set trailer labels.

See "Data Set Label 1 (FL1)" and "Data Set Label 2 (FL2)".

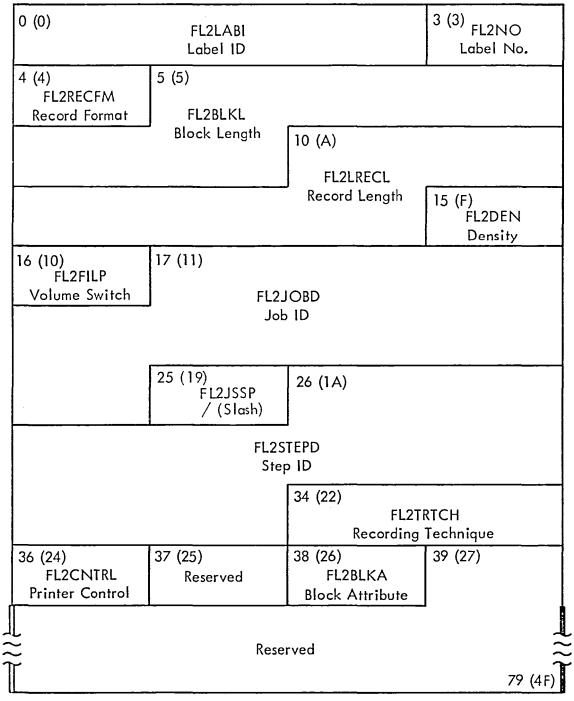
DATA SET LABEL 1 -- FL1



DATA SET LABEL 1 -- FL1 (Continued)

Offset	Byte Length	Field Name	Field Description, Contents, Meaning
0(0)	3	FL1LABI	Label identifier: HDR - header label. EOV - end-of-volume trailer label. EOF - end-of-data set trailer label.
3(3)	1	FL1NO	Data set label number is 1.
4(4)	17	FL1ID	Data set identifier.
21(15)	6	FL1FILSR	Data set serial number. Same as the code that appears in the VOLSERNO field of the initial volume label of the first or only volume of the data set or multidata set aggregate.
27(1B)	4	FL1VOLSQ	Volume sequence number. Indicates the relationship between the volume on which this data set is recorded and the volume on which the data set begins.
31(1F)	4	FL1FILSQ	Data set sequence number. Indicates the position of the data set relative to the first data set in a multidata set aggregate.
35(23)	4	FL1GNO	Generation number of the data set.
39(27)	2	FL1VNG	Version number of a generation of the data set.
41(29)	6	FL1CREDT	Creation date -- year and day: b = blank yy = year (00-99) ddd = day (001-366)
47(2F)	6	FL1EXPDT	Expiration date. Expressed in the same format as creation date.
53(35)	1	FL1FSEC	Data set security indicator: F0 - Data set is not security-protected. F1 - Data set is security-protected.
54(36)	6	FL1BLKCT	Unused in header labels (must be zero). In trailer labels, the number of blocks in this data set volume.
6(3C)	13	FL1SYSCD	System code identifying the programming system.
73(49)	7		Reserved (must be recorded as blanks).

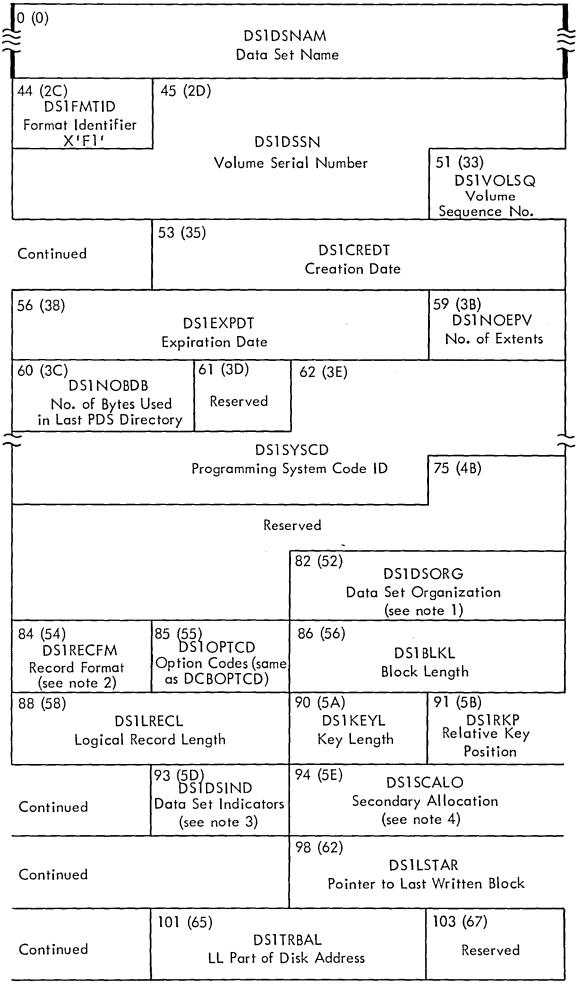
DATA SET LABEL 2 -- FL2

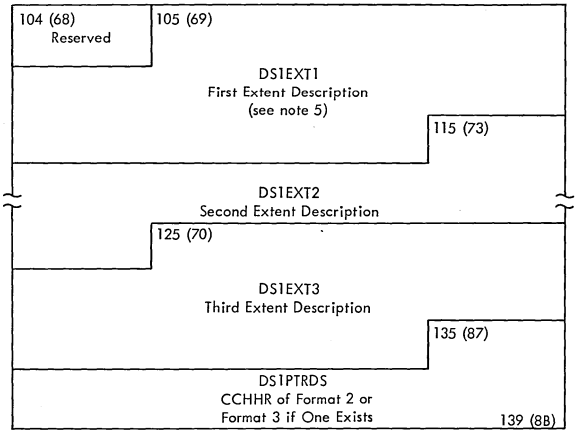


Offset	Byte Length	Field Name	Field Description, Contents, Meaning
0(0)	3	FL2LABI	Label identifier: HDR - header label. EOV - end-of-volume trailer label. EOF - end-of-data set trailer label.
3(3)	1	FL2NO	Data set label number is 2.
4(4)	1	FL2RECFM	Record format: F - fixed length. V - variable length. U - undefined length.
5(5)	5	FL2BLKL	Block length (depends on record format): F - block length. V - maximum block length. U - maximum block length.

Offset	Byte Length	Field Name	Field Description, Contents, Meaning
10(A)	5	FL2LRECL	LRECL (depends on the record format): F - record length. U - zero. V unspanned } maximum record length V spanned } (up to 32,756). V spanned - 99999 (maximum record length greater than 32,756).
15(F)	1	FL2DEN	Tape density. 2400 Series magnetic tape devices: EBCDIC 7-track 9-track 0 200 bpi - 1 556 bpi - 2 800 bpi 800 3 - 1600
16(10)	1	FL2FILP	Data set position: EBCDIC 1 Volume switch previously occurred. 0 No volume switch has occurred.
17(11)	8	FL2JOBD	Job identification.
25(19)	1	FL2JSSP	Slash (/).
26(1A)	8	FL2STEPD	Step identification.
34(22)	2	FL2TRTCH	7-track 2400 Series magnetic tape devices: Cb - data conversion feature used. Eb - even parity used. Tb - BCD to EBCDIC translation required. ET - even parity and BCD to EBCDIC translation required. bb - odd parity and no translation required.
36(24)	1	FL2CNTRL	Printer control. Denotes carriage control: A - ASA control characters. M - machine control characters. b - records do not contain control characters.
37(25)	1		Reserved.
38(26)	1	FL2BLKA	Block attribute: B - blocked records. S - spanned records. R - records are both blocked and spanned. b - records are neither blocked nor spanned.
39(27)	41		Reserved (must be recorded as blanks).

DSCB - FORMAT 1





Notes:

1. DS1DSORG — Data set organization.

Byte 1

	Code	
1...	IS	Indexed sequential organization.
.1..	PS	Physical sequential organization.
..1.	DA	Direct organization.
...x xx..		Reserved bits.
.... ..1.	PO	Partitioned organization.
....1	U	Unmovable: the data contains location-dependent information.

Byte 2

xxxx xxxx — Reserved bits.

2. DS1RECFM — Record format.

	Code	
10..	F	Fixed-length record format.
01..	V	Variable-length record format.
11..	U	Undefined-length record format.
..1.	T	Track overflow.
...1	B	Blocked: may not occur with undefined (U).
.... 1...	S	Fixed length; variable length: spanned records.
.... .10.	A	ASA control character.
.... .01.	M	Machine control character.
.... .00.		No control character.
....0		Always zero.

Notes:

3. DS1DSIND — Data set indicators.

1...	Last volume on which data set resides.
..1.	Block length: multiple of 8 bytes.
...1	Data set is security-protected by a password.
.x.. xxxx	Reserved bits.

4. DS1SCALO — Secondary allocation.

Allocation parameters.
Type of request issued for the initial allocation and to be used for subsequent extensions.
Original request was:

Byte 1

00..	In tracks relative to a specific location. No secondary allocation is allowed.
01..	In blocks (physical records).
10..	In tracks.
11..	In cylinders.
..xx	Reserved bits.
.... 1...	For a contiguous extent.
.... .1..	For the maximum contiguous extent on the volume.
.... ..1.	For the five (or less) largest extents that are greater than or equal to a specified minimum.
....1	In records, to be rounded up to a cylinder boundary.

Byte 2-4 — Secondary allocation quantity.

5. DS1EXT1 — Extent description for the first extent.
This extent description is also used in format 3 and 4 DSCB's.

Data set extent type indicator.

Byte 1

00	Following 9 bytes do not indicate any extent.
01	Extent contains the data blocks.
02	Extent is an overflow area.
04	Extent is an index area.
40	First extent describes the user label extent.
80	Extent described is sharing cylinders.
81	Extent on cylinder boundaries.

Byte 2 — Extent sequence number (M)

Bytes 3-6 — Lower limit of extent (CCHH)

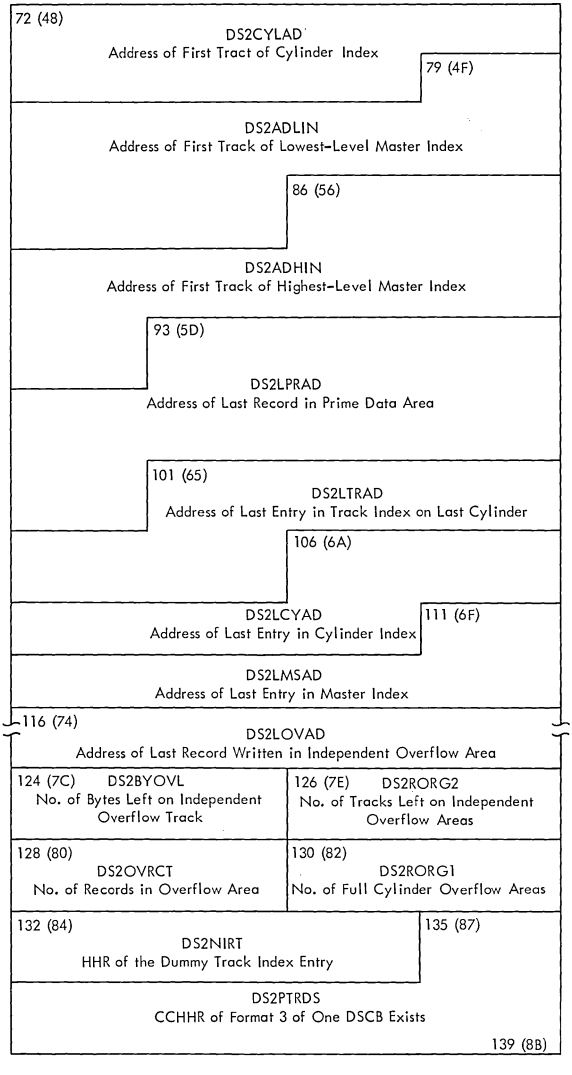
Bytes 7-10 — Upper limit of extent (CCHH)

0 (0) Hex Code X'02'	1 (1) DS22MIND Starting Address of Second-Level Master Index		
8 (8) DS2L2MEN Ending Address of Second-Level Master Index			
	13 (D) DS23MIND Starting Address of Third-Level Master Index		
20 (14) DS2L3MIN Ending Address of Third-Level Master Index			
	25 (19) Reserved		
44 (2C) DS2FMTID Format Identifier	45 (2D) DS2NOLEV No. of Index Levels	46 (2E) DS2DVIND Master Index for These Many Tracks	47 (2F) DS21RCYL HHR of First Data Record on Each Cylinder
Continued		50 (32) DS2LTCYL HH of Last Data Record on Each Cylinder	
52 (34) DS2CYLOV No. of Tracks in Overflow	53 (35) DS2HIRIN Highest R of High-Level Index	54 (36) DS2HIRPD Highest R of Prime Data	55 (37) DS2HIROV Highest R of Overflow Tracks
56 (38) DS2RSHTR Last Data Record R on Shared Track	57 (39) DS2HIRTI Highest R of Track Index	58 (3A) DS2HIIOV Fixed: Highest R for Independent Overflow Tracks Variable: Unused	59 (3B) DS2TAGDT No. of Delete Records
Continued	61 (3D) DS2RORG3 No. of References to Succeeding Overflow Records		
64 (40) DS2NOBYT No. of Bytes for Highest-Level Index		66 (42) DS2NOTRK No. of Bytes	67 (43) DS2PRCTR No. of Records in Prime Data Area
Continued			71 (47) DS2STIND Indicators (see note)

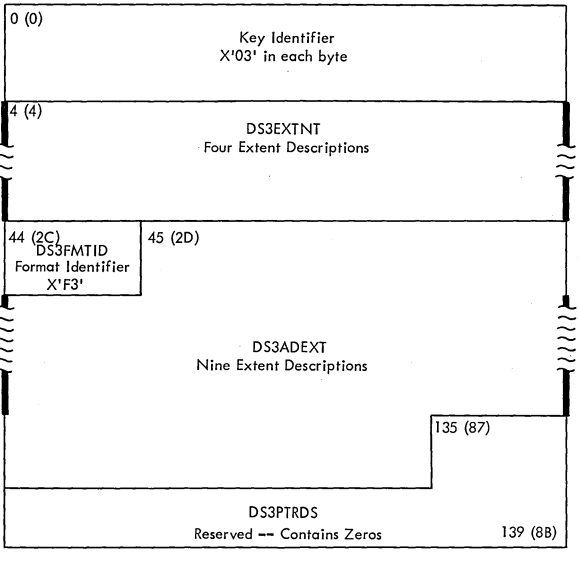
Note:

DS2STIND — Status indicators.

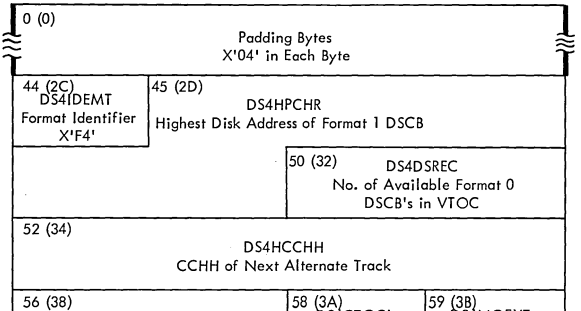
x..x xx..	Reserved bits.
.1..	Key sequence checking is to be performed.
..1.	An initial load has been completed.
.... ..1.	Last block full.
....1	Last track full.


72 (48)
DS2CYLAD
Address of First Tract of Cylinder Index
79 (4F)
DS2ADLIN
Address of First Track of Lowest-Level Master Index
86 (56)
DS2ADHIN
Address of First Track of Highest-Level Master Index
93 (5D)
DS2LPRAD
Address of Last Record in Prime Data Area
101 (65)
DS2LTRAD
Address of Last Entry in Track Index on Last Cylinder
106 (6A)
DS2LCYAD
Address of Last Entry in Cylinder Index
111 (6F)
DS2LMSAD
Address of Last Entry in Master Index
116 (74)
DS2LOVAD
Address of Last Record Written in Independent Overflow Area
124 (7C) DS2BYOVL
No. of Bytes Left on Independent Overflow Track
126 (7E) DS2RORG2
No. of Tracks Left on Independent Overflow Areas
128 (80)
DS2OVRCT
No. of Records in Overflow Area
130 (82)
DS2RORG1
No. of Full Cylinder Overflow Areas
132 (84)
DS2NIRT
HHR of the Dummy Track Index Entry
135 (87)
DS2PTRDS
CCHHR of Format 3 of One DSCB Exists
139 (8B)

DSCB - FORMAT 3



DSCB - FORMAT 4



DEVICE CONSTANTS

60 (3C) Reserved		62 (3E) DS4DEVSZ No. of Logical Cylinders or No. of Tracks	
continued		66 (42) DS4DEVTK Device Track Length	
68 (44) DS4DEVI Constant for Keyed Block	69 (45) DS4DEVL Constant for Last Block	70 (46) DS4DEVK Constant for no Key in Block	71 (47) DS4DEVFG No. of Directory Blocks Per Track (see note 2)
72 (48) DS4DEVTL Device Tolerance		74 (4A) DS4DEVDT No. of DSCB's on a Track	75 (4B) DS4DEVDB No. of Directory Blocks Per Track

76 (4C) Reserved	
100 (64) DS4F6PTR Direct-Access Address of First Format 6 DSCB	
105 (69) DS4VTOCE Extent Description of the VTOC	
115 (73)	
Reserved	139 (8B)

Notes:

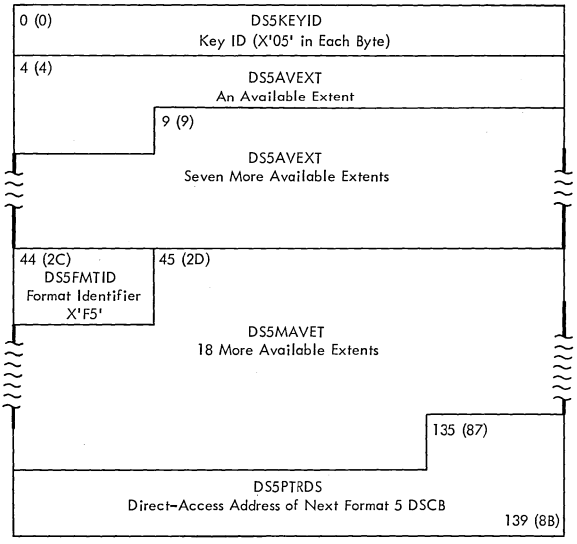
1. DS4VTOCI — VTOC indicators.

1...	Either no format 5 DSCB's exist or they do not reflect the true status of the volume.
.... 1...	Accurate format 5 and 6 DSCB's now exist and bit 0 has been turned off. This volume may contain data sets produced by IBM System/360 Disk Operating System; IBM System/360 Operating System access methods may not be able to process these data sets.
.... .1..	A DADSM function has been prematurely terminated. Possible VTOC errors exist.
.xxx ..xx	Reserved bits.

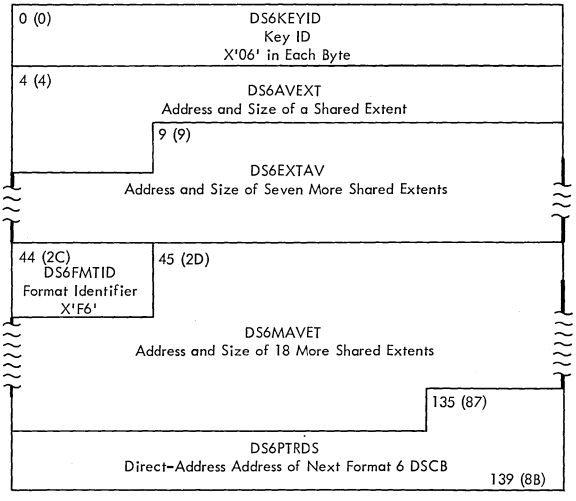
2. DS4DEVFG — Flag byte.

xxxx xxx.	Reserved bits.
....1	A tolerance factor must be applied to all but the last block of the track.

DSCB - FORMAT 5



DSCB - FORMAT 6



0 (0) LCBSTATE State of Block (see note 1)	1 (1) LCBENDOP Incoming: Contents of Reg 14, Outgoing: Address of LCB of Line
4 (4) LCBCECB Op Code	5 (5) LCBRCADD Track Address of Last Correctly Transmitted Segment

RECEIVE SCHEDULER STCB

8 (8) LCBSCHAD Address of First Waiting QTAM Subtask for This LCB	
12 (C) LCBCPRI Priority	13 (D) LCBSCHLK Link Field

16 (10) LCBCHDR Disk Address of the Current Message Header		19 (13) LCBCSEG Message Segment
Continued	22 (16) LCBNASEG Track Address of Last Message Received	

Continued	25 (19) LCBSORCE Address of Head of Chain of LCB's
28 (1C) LCBMSGPR Priority	29 (1D) LCBDESTQ Address of Destination QCB
32 (20) LCBMPLRT Scan Address	33 (21) LCBCLPCI Address of Last PCI
36 (24) LCBCLCCW Address of Last BRB	
40 (28) LCBERRST Line Errors (see note 2)	42 (2A) LCBBRKCT Last Status, Time of Interruption
44 (2C) LCBTTIWD Address of Terminal Table Entry	46 (2E) LCBDLPTR Address of Next Entry in Distriblist

Comments:

Notes:

1. LCBSTATE — State of line control block.

00	Inactive.
01	Free.
02	Partial message in queue.
04	Send.
08	Receive.
10	Initiate.
20	Converse.
40	Recall.
80	Cleanup.

2. LCBERRST

Byte 1

1...	Invalid destination code.
.1..	Terminal inoperative.
..1.	Sequence number high.
...1	Sequence number low.
.... x...	Reserved bits.
.... .1..	Incomplete header.
.... ..1.	Invalid source code.
....1	Should not occur error.

Byte 2

1...	Transmission error.
.1..	Timeout exceeded.
..1.	Breakoff error.
...1	Insufficient buffers.
.... 1...	Message not sent.
.... .1..	Control unit failure.
.... ..xx	Reserved bits.

Comments:

INPUT/OUTPUT BLOCK

48 (30) LCBFLAG2, IOBFLAG1 Status Bits	49 (31) LCBFLAG2, IOBFLAG2 Delay Bits (see note 1)	LCBSENSE	
		50 (32) IOBSENS0 SENSE Status	51 (33) IOBSENS1 SENSE Status
52 (34) LCBECBPT, IOBECBPT Not Used by QTAM			
56 (38) LCBCSW, IOBCSW Channel Status			
64 (40) LCBIOCC, IOBSIOCC SIO Condition	65 (41) LCBSTART, IOBSTART Address of First CCW		
68 (44) Reserved	69 (45) LCBDCBPT, IOBDCBPT Address of DCB		
72 (48) LCBRESTR, IOBRESTR Address of CCW for Message Transfer			
76 (4C) LCBINCAM, IOBINCAM (see note 2)		78 (4E) LCBERRCT, IOBERRCT Breakoff Counter	79 (4F)

80 (50) LCBUCBX Index	81 (51) LCBPTEMP Message Priority	82 (52) LCBTRST Offset to EOB Character
84 (54) LCBPOLCT Count	85 (55) LCBPOLPT Address of Active Entry	
88 (58) LCBERCCW CCW Built by ERP Routine		95 (5F)
96 (60) LCBCPA Channel Program Area		

LINE ERROR BLOCK

0 LERACTR Transmissions Counter			
4 LERACDR Data Checks Counter		6 LERACIR Interventions Counter	
8 LERACTO Timeouts Counter		10 LERTHTR Transmissions Counter	11 LERTHDC Data Check Counter
12 LERTHIR Intervention Counter	13 LERTHTO Timeout Counter	14 Reserved	15

Notes:

1. LCBFLAG2,
   IOBFLAG2 — Flag bits.

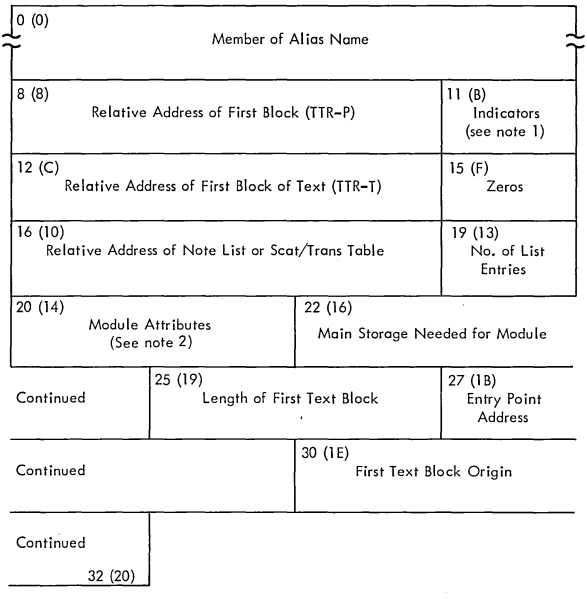
xxxx xxx.	Status bits used by the I/O Supervisor.
....x	Flag bit used by QTAM.
....1	Line is to be polled using the autopoll feature.

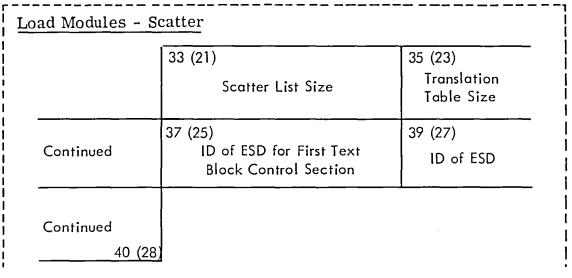
2. LCBINCAM,
   IOBINCAM

Byte 1	01	Line trying to send.
	02	Dial line not available.
	04	Polling or addressing error. WTTA:
	08	Halt I/O instruction has been used.
	10	EOT character received.
	40	WRU character received.
Byte 2	00	Used by ERP.

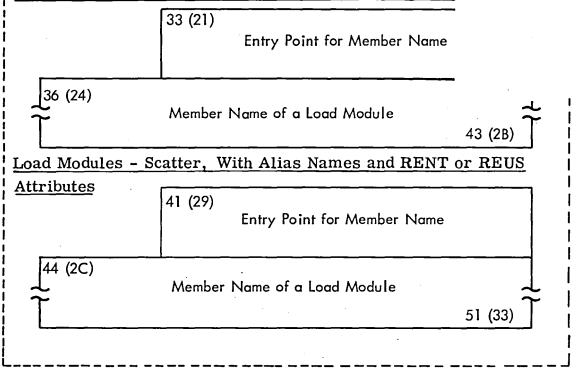
Comments:

PDS DIRECTORY ENTRY
(Output From Linkage Editor)
ALL LOAD MODULES





Load Modules With Alias Names and RENT or REUS A



Notes:

1.

Bit	State	Meaning
0	1	Name is an alias in the first field.
1-2	variable	Number of TTR's in the user data field.
3-7	variable	Length of user data field in halfwords.

2. Attributes

Byte 1

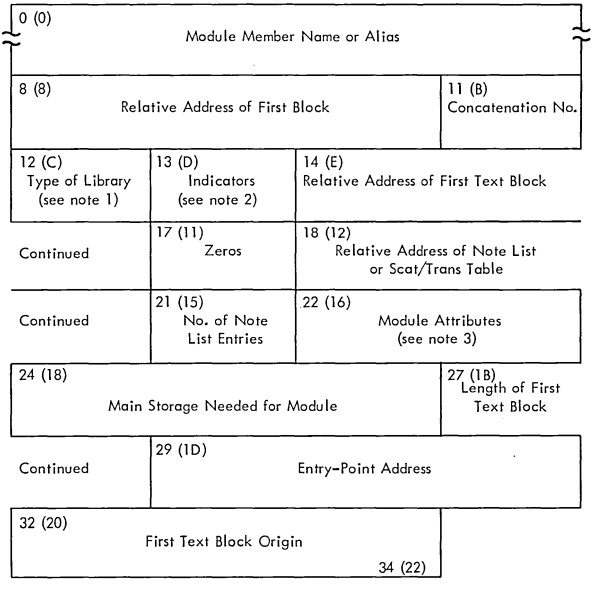
1...	Reenterable.
.1..	Reusable.
..1.	In overlay structure.
...1	Module to be tested - TESTRAN.
.... 1...	Only loadable.
.... .1..	Scatter format.
.... ..1.	Executable.
....1	Module contains no RLD items and only one block of text.
....0	Module contains multiple records with at least one block of text.

Byte 2

1...	Module can be processed only by F-level of Linkage Editor.
0...	Module can be processed by all levels of Linkage Editor.
.1..	Linkage Editor assigned origin of first text block is zero.
.0..	Linkage Editor assigned origin of first text block is not zero.
..1.	Entry point assigned by Linkage Editor is zero.
...1	Module contains no RLD items.
.... 1...	Module cannot be reprocessed by Linkage Editor.
.... .1..	Module contains TESTRAN symbol cards.
.... ..1.	Module created by Linkage Editor F.
....1	Refreshable module.

PDS DIRECTORY ENTRY (Continued)

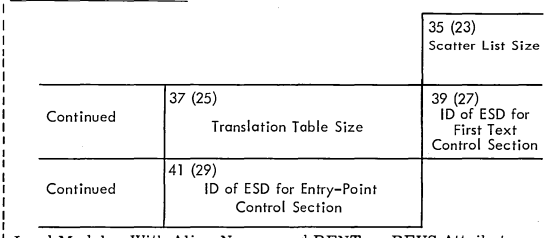
ALL LOAD MODULES (After BLDL)



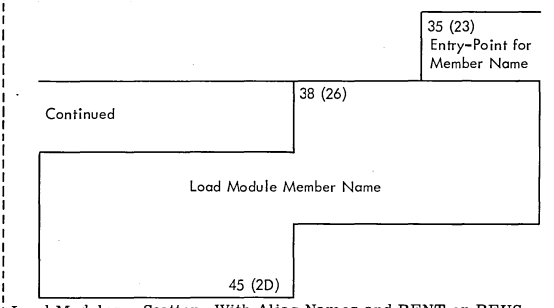
Note: PDS entry after BLDL is the same as before BLDL except that bytes 11 (B) and 12 (C) have been added. Therefore, all following fields are displaced by 2 bytes.

Comments:

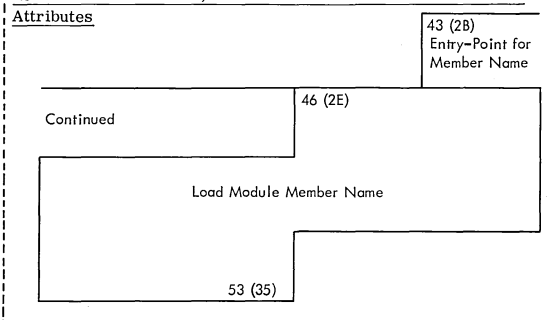
Load Module - Scatter



Load Modules With Alias Names and RENT or REUS Attributes



Load Modules - Scatter, With Alias Names and RENT or REUS Attributes



Notes:

1. Library

This byte is normally zeros. If the DCB operand in the BLDL macroinstruction was specified as zero, this byte contains a 1 if the name was found in the link library, and a 2 if the name was found in the job library.

2.

Bit	Setting	Meaning
0		Name is an alias in the first field.
1-2	variable	Number of TTR's in the user data field.
3-7	variable	Length of user data field in halfwords.

3. Attributes

Byte 1

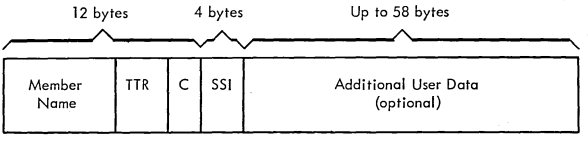
1...	Reenterable.
.1..	Reusable.
..1.	In overlay structure.
...1	Module to be tested - TESTRAN.
.... 1...	Only loadable.
.... .1..	Scatter format.
.... ..1.	Executable.
....1	Module contains no RLD items and only one block of text.
....0	Module contains multiple records with at least one block of text.

Byte 2

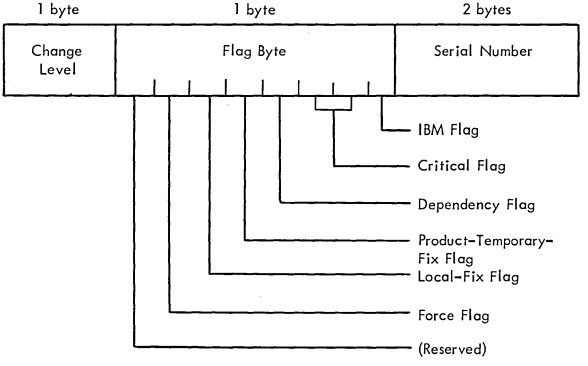
1...	Module can be processed only by F level of Linkage Editor.
0...	Module can be processed by all levels of Linkage Editor.
.1..	Linkage Editor assigned origin of first block of text is zero.
.0..	Linkage Editor assigned origin of first block of text is not zero.
..1.	Entry point assigned by Linkage Editor is zero.
...1	Module contains no RLD items.
.... 1...	Module cannot be reprocessed by Linkage Editor.
.... .1..	Module contains TESTRAN symbol cards.
.... ..1.	Module created by Linkage Editor F.
....1	Refreshable module.

SYSTEM STATUS INDEX

SSI Bytes in Macro and Symbolic Libraries



Format of SSI Bytes



Critical Flag:
00 - Not critical.
01 - Might require complete regeneration.
10 - Might require partial regeneration.
11 - Reserved for future use.

SEGMENT TABLE

0 (0) TEST Ind	Bit 1 = 0: Not in Test Bit 1 = 1: In Test	1 (1) Address of Data Control Block (DCB) Used to Load Module *		
4 (4) 0		5 (5) Address of Note List *		
8 (8) Last Segment Number of Region 1		9 (9) Highest Segment No. in Storage-Region 1	10 (A). Last Segment Number of Region 2	11 (B) Highest Segment No. in Storage-Region 2
12 (C) Last Segment Number of Region 3		13 (D) Highest Segment No. in Storage-Region 3	14 (E) Last Segment Number of Region 4	15 (E) Highest Segment No. in Storage-Region 4
16 (10) Address of ECB to be Posted When SEGLD Request has been Serviced *				
20 (14) Reserved *				
24 (18) Previous Segment Number for Segment 1		25 (19)		Status Indctr
28 (1C) Previous Segment Number for Segment 2		29 (1D) Address of Entry Table Entry (When Caller Chain Exists) *		Status Indctr
Previous Segment Number for Segment N		Address of Entry Table Entry (When Caller Chain Exists) *		Status Indctr

4 bytes

Comments:

TEST indicator:
Specifies that this module is "under test" using TESTRAN. Initialized by program fetch routine.

Highest segment number in storage:
Initially set to 00 except for region 1 which is initially set to 01 by Linkage Editor.

Status indicator:
Indicates the status of this segment, with the last two bits of the entry table address field as follows:

00 -- segment is in main storage as a result of a branch to the segment.
10 -- segment is in main storage; no caller chain exists.
01 -- segment is not in main storage, but is scheduled to be loaded.
11 -- segment is not in main storage.

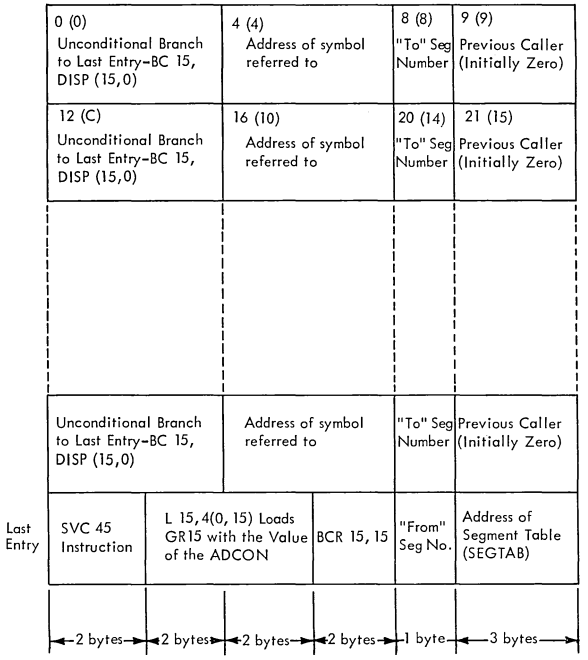
The status indicator for segment 1 is initially set to 10. All others are initially set to 11.

*Set to zero by Linkage Editor.

Note: "Region" refers to the regions of a multiregion overlay structure, not to a job-step's region of main storage (see Systems Reference Library, OS Linkage Editor, GC28-6538).

Comments:

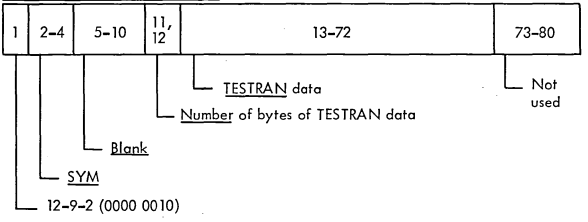
ENTRY TABLE



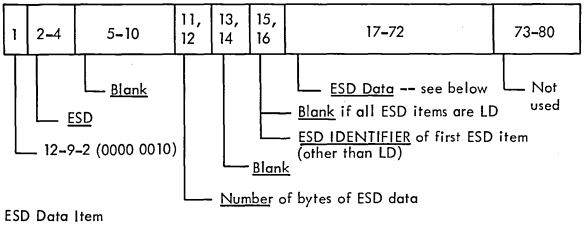
Note: DISP is the displacement, in bytes, of this entry from the last entry. "to" segment number is the number of the segment containing the symbol referred to. "from" segment number is the number of the segment that contains this entry table.

Comments:

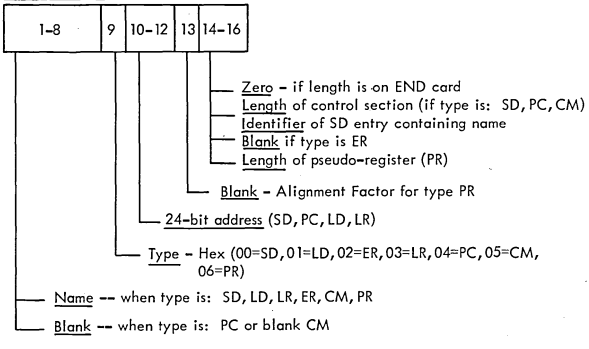
SYM Input Record (Card Image)



ESD Input Record (Card Image)



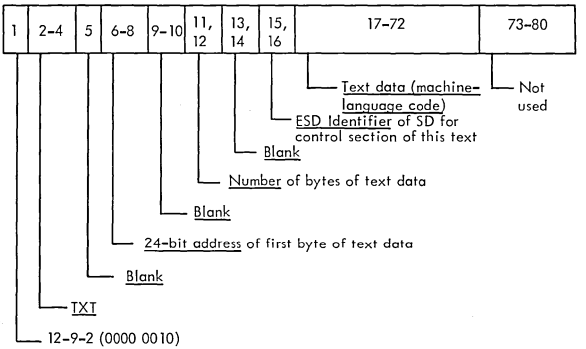
ESD Data Item



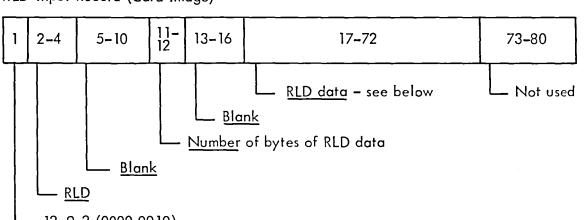
Note:

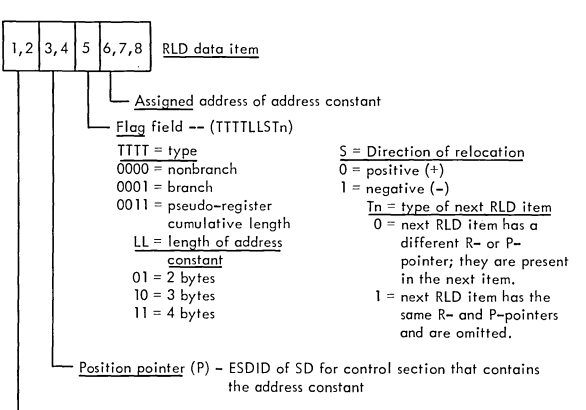
SD = Section Definition
LD = Label Definition
ER = External Reference
LR = Label Reference
PC = Private Code
CM = Common
PR = Pseudo - Register

TEXT Input Record (Card Image)

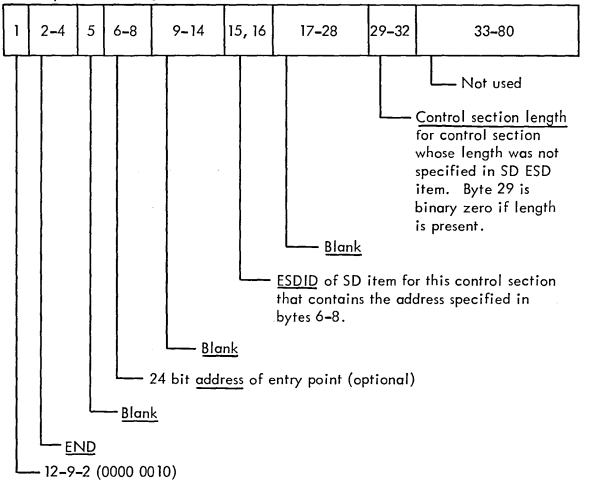


RLD Input Record (Card Image)

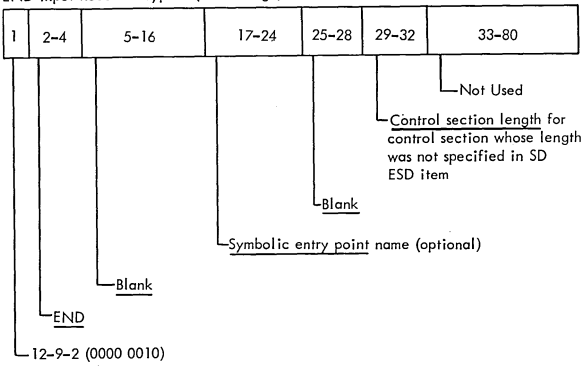




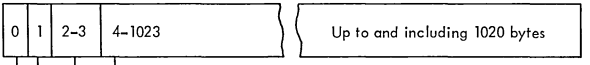
END Input Record - Type 1 (Card Image)



END Input Record - Type 2 (Card Image)



SCATTER/TRANSLATION RECORD



Data - may contain translation table, translation table and scatter table, or scatter table only.

Count - in bytes, of data field.

Zero - one byte of binary zeros.

Identification - identifies this as a scatter-translation record; bit configuration is 0001 0000.

Translation Table

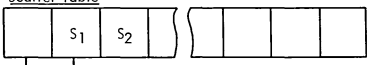
Padding (2 bytes) - if necessary, to force fullword boundary alignment of scatter table.

Pointer (2 bytes) - to the scatter table entry that contains the address of the control section containing this CESD entry. Number of translation table entries = number of CESD entries + 1. Pointer is zero if its corresponding CESD entry is not SD, PC, CM or LR.

Zero - 2 bytes of binary zeros

Note: One 2-byte entry for each external symbol.

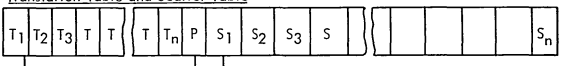
Scatter Table



Assigned address (4 bytes) - of a control section (SD, PC or CM) (one entry for each CSECT).

Zero - 4 bytes of binary zeros.

Translation Table and Scatter Table



Scatter data

Padding (2 bytes) -- if necessary, to align scatter table to a fullword boundary.

Translation data

Note: Translation table follows extent list in main storage. Translation table entries are two bytes in length; scatter table entries are four bytes in length.

Legend for Types of Entries in Composite External Symbol Dictionary (CESD)

SD = section definition
LR = label reference
PC = private code
CM = common

CONTROL RECORD

Length of control section - specifies the length of the control section (in bytes) to which the text in the following record belongs (2 bytes).

CESD entry number - specifies the composite external symbol dictionary entry that contains the control section names of the control section that contains this text (2 bytes).

Channel Command Word (CCW) - could be used to read the text record that follows. The data address field contains the Linkage Editor assigned address of the first byte of text in the text record that follows (8 bytes).

Count - contains two bytes of binary zeros. The count field contains the length of the record.

Count - in bytes of the control information (CESD ID, length of control section) following the CCW field (2 bytes).

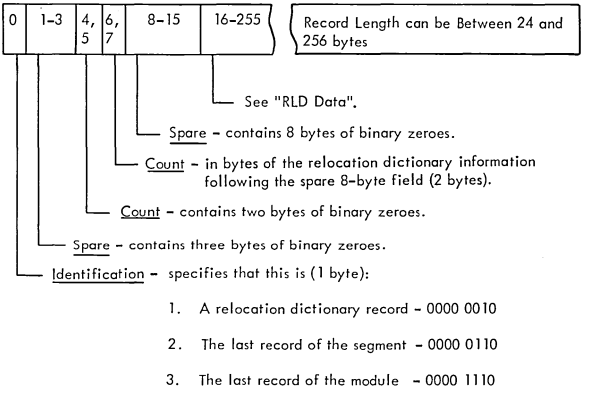
Spare - contains three bytes of binary zeros.

Identification - specifies that this is (1 byte):

1. A control record - 0000 0001
2. The control record that precedes the last text record of this overlay segment - 0000 0101
3. The control record that precedes the last text record of the module - 0000 1101

Comments:

RELOCATION DICTIONARY (RLD) RECORD



Comments:

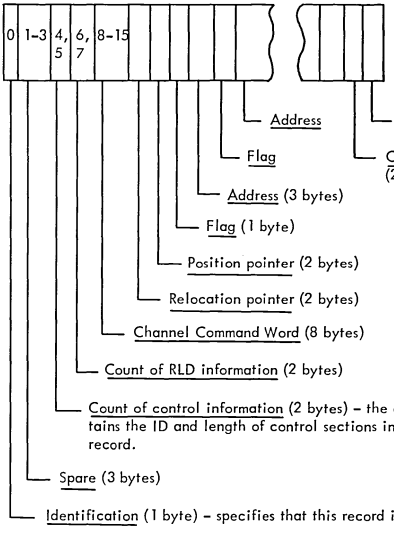
Address – Linkage Editor assigned address of the address constant (3 bytes).

Flag – specifies miscellaneous information as follows:
(1 byte -- when byte format is xxxxLIST):
xxxx specifies the type of this RLD item (address constant)
0000 -- nonbranch type in assembler language, a DC A (name)
0001 -- branch type (in assembler language, a DC V (name)
0010 -- pseudo-register displacement value
0011 -- pseudo-register cumulative displacement value
1000 and 1001 -- this address constant is not to be relocated because it refers to an unresolved symbol.
LL specifies the length of the address constant
01 -- two byte
10 -- three byte
11 -- four byte
S specifies the direction of relocation
0 -- position
1 -- negative
T specifies the type of RLD item following this one
0 -- the following RLD item has a different relocation and/or position pointer
1 -- the following RLD item has the same relocation and position pointers as this one, and is omitted.

Position pointer – contains the entry number of the CESD entry (or translation table entry) that indicates in which control section the address constant is (2 bytes).

Relocation pointer – contains the entry number of the CESD entry (or translation table entry) that indicates the value of the symbol to be used in the computation of the value of the address constant (2 bytes).

CONTROL AND RELOCATION DICTIONARY RECORD



1. A control and RLD record - 0000 0011
2. A control and RLD record that is followed by the last text record of a segment - 0000 0111
3. A control and RLD record that is followed by the last text record of a module - 0000 1111

Note: For detailed descriptions of the data fields see "Relocation Dictionary Record", and "Control Record".

The record length varies from 20 to 260 bytes.

Comments:

PROGRAM FETCH WORK AREA -- (DISPLACEMENTS IN BYTES) (PCI)

Displacement	Definition	Length
0 (0)	IOB	8 fullwords
32 (20)	IOB Seek Address	2 fullwords
40 (28)	Seek Buffers (4)	12 fullwords
88 (58)	Search and TIC CCW's	3 doublewords
112 (70)	RLD Buffer 1	33 doublewords
376 (178)	Channel Program 1	5 doublewords
416 (1A0)	RLD Buffer 2	33 doublewords
680 (2A8)	Channel Program 2	5 doublewords
720 (2D0)	RLD Buffer 3	33 doublewords
984 (3D8)	Channel Program 3	5 doublewords
1024 (400)	I/O ECB	1 fullword
1028 (404)	ECB	1 fullword
1032 (408)	Buffer Table Pointer	2 fullwords
1040 (410)	Buffer Table	9 fullwords
1076 (434)	Register Save Area	16 fullwords
1140 (474)	Address of Translation Table	1 fullword
1144 (478)	Address of Scatter List	1 fullword
1148 (47C)	Address of R-Pointer	1 fullword
1152 (480)	Address of P-Pointer	1 fullword
1156 (484)	Boundary Word for Relocation	1 fullword
1160 (488)	Fetch Flags	2 fullwords
1168 (490)	ECB List	2 fullwords
1176 (498)	Last Table Entry	1 fullword

DESCRIPTION OF FETCH FLAGS

Byte	Content	Meaning
0		Reserved.
1	FF	Program is being scatter-loaded.
	00	Program is being block-loaded.
2	FF	All buffers are full.
	0F	Channel-end appendage routine is unable to restart a channel program because all buffers were full when the channel-end interruption occurred.

PROGRAM FETCH BUFFER TABLE

0 (0) Buffer Code	1 (1) Pointer to Next Entry (12)	4 (4) TIC Command	5 (5) Address of Channel Program 2	8 (8) Zero	9 (9) Address of Buffer 1
12 (C) Buffer Code	13 (D) Pointer to Next Entry (24)	16 (10) TIC Command	17 (11) Address of Channel Program 3	20 (14) Zero	21 (15) Address of Buffer 2
24 (18) Buffer Code	25 (19) Pointer to First Entry (0)	28 (1C) TIC Command	29 (1D) Address of Channel Program 1	32 (20) Zero	33 (21) Address of Buffer 3

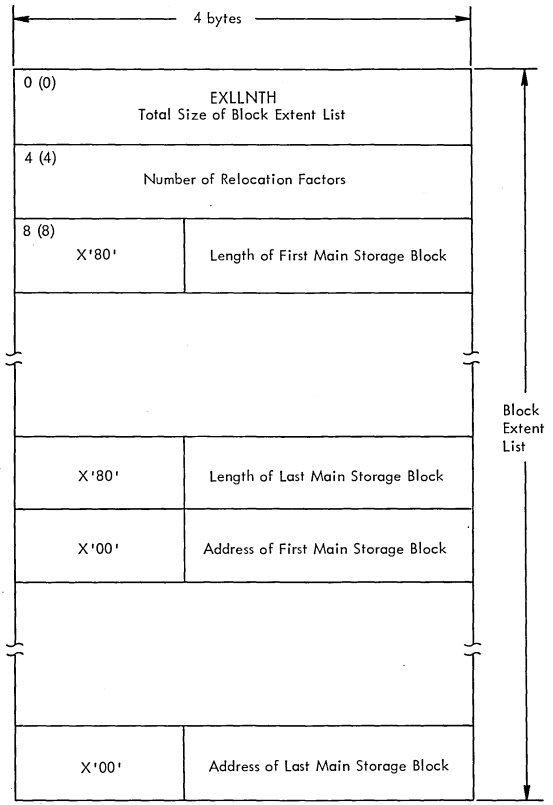
Note: Each entry contains 12 bytes.

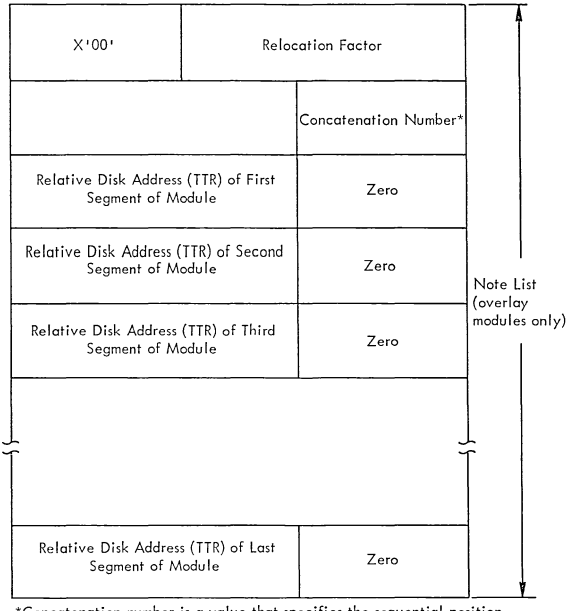
DESCRIPTION OF BUFFER CODES

Content	Meaning
00	Buffer Empty
80	Buffer Full

Comments:

BLOCK EXTENT LIST AND NOTE LIST

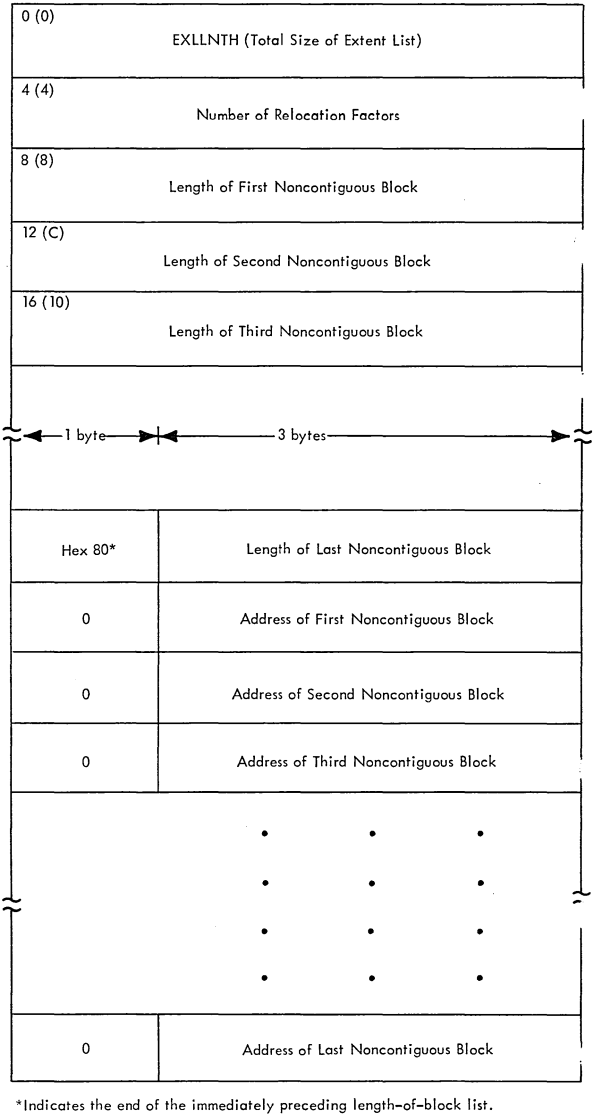




*Concatenation number is a value that specifies the sequential position of this data set in a group of concatenated data sets.

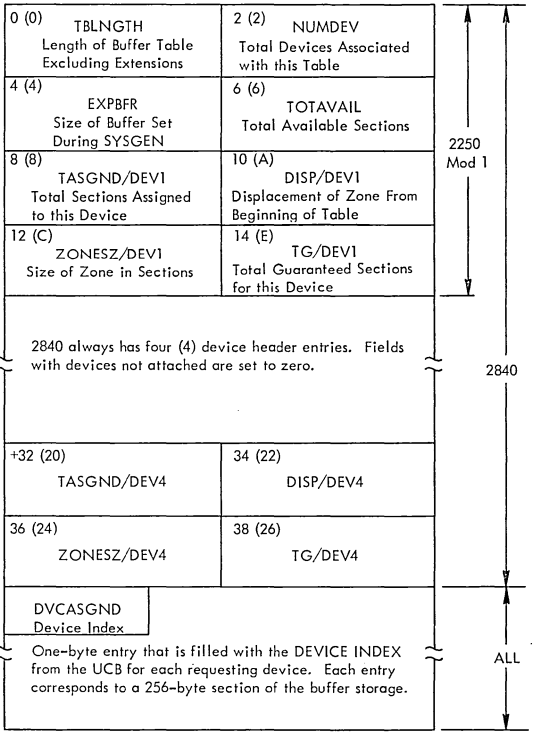
Comments:

SCATTER EXTENT LIST



*Indicates the end of the immediately preceding length-of-block list.

BUFFER TABLE -- GAM



GACB - GRAPHIC ATTENTION CONTROL BLOCK

0 (0) Com Area Address (User-Specified)		
4 (4) DCB Address (User-Specified)		
8 (8) PFMSK (User-Specified)		
12 (C) ATTNTYP (User-Specified)		
16 (10) EP1 (Entry Point of User's Attention Routine)		
20 (14) EP2 (Internal Use of ATTNINQ MODE = R)		
24 (18) SAVE13 (Save Area Pointer for ATTNINQ)		
28 (1C) PFKMSK Save Area		
32 (20) ATTNTYP Save Area		
36 (24) ECB (Used by ATTNINQ MODE = W)		
40 (28) Associated REB Address		
44 (2C) 2260 Offset	45 (2D) LP Restart	Flags
48 (30) ATTNINQ Address		
52 (34) Reserved		55 (37)

OACB - OUTPUT AREA CONTROL BLOCK

0 (0) SLOA Starting Location of Output Area
4 (4) LOA Length of Output Area
8 (8) AORP Address of Overflow Routine
12 (C) CRSA Current Routine Start Address
16 (10) OLP Order Load Point
20 (14) BLP Buffer Load Point 23 (17)

OCBP - OUTPUT CONTROL BLOCK POINTER

0 (0) OACB Pointer
4 (4) Work Area Pointer

Comments:

REB - ROUTINE ENTRY BLOCK

0 (0) RTNF Pointer to Next Lower REB (Zeros if None Lower)	
4 (4) RTNB Pointer to Next Higher REB or to TE if Last REB	
8 (8) RTNUCB Address of UCB or Pointer to a List of UCB's	
12 (C) RTNGACB Address of the Associated GACB	
16 (10) RTNIRB Address of Associated IRB	
20 (14) RTNFLGS Status of REB	22 (16) PRTY Attention Routine Priority
24 (18) RTNQ1 Address of an IQE for the Internal Data Queue; When EP = 0 in GACB	
28 (1C) RTNQ2 Address of the Next IQE for the Internal Data Queue	
32 (20) RTNTCB Address of the TCB Associated with this REB	
36 (24) Reserved	39 (27)

Comments:

TE - TASK ENTRY BLOCK

0 (0)	Reserved
4 (4)	TEREB Address of REB That Points to This TE
8 (8)	TETCB Address of TCB
12 (C)	TECAN Indicates Control Function of CANCEL Key Operation
16 (10)	TEUSECNT Number of UCB's Currently Open for This TE
20 (14)	TEFLGS Status of TE
24 (18)	TEGARIRB Associated IRB for the GAR Routine
28 (1C)	TEGEIR Address of Graphic Entry Interface Routine 31 (1F)

Comments:

PIB - PARTITION INFORMATION BLOCK

0 (0) CSCB Address of Pending Command	
4 (4) ECB Address ECB to be Posted When Partition is Quiesced for Redefinition	
8 (8) "No Work" ECB for the Initiator	
12 (C) Status Bits - A (See note 1)	13 (D) Address of Current Job Step CSCB
16 (10) Status Bits - B (See note 2)	17 (11) SPIL Address
20 (14) CSCB Address of Current Task in Partition	
24 (18) Protection Key	25 (19) Job Class Codes (See note 3)
28 (1C) CSCB Address of Suspended Reader	
32 (20) Direct SYSOUT Control Block Chain Pointer DSOCB	
36 (24) Internal Queue Status Bits (See note 4)	37 (25) Address of Internal Queue of Job Names to be Restarted
40 (28) Job Step Timing Status Bits (See note 5)	41 (29) Address of Job Step TQE
44 (2C) Count Active Subtasks	45 (2D) Address of RB, Most Recently Loaded Module JBAQ

Notes:

1. Status Bits A

0...	Stop initiator.
1...	START INIT issued.
.1..	Partition active.
..1.	Pending command.
...1	Transient reader operating.
.... 1...	Partition to be terminated by IEFSD599.
.... .1..	Partition involved in redefinition.
.... ..1.	System assigned transient reader in this partition.
....1	Problem program is running.

2. Status Bits B

1...	Logical tracks added for initiator.
.1..	LOT block exists.
..1.	SPIL has been created.
.... 1...	Unending task present in partition.
...x .xxx	Reserved bits.

3. Job class codes: Contains one to three codes for the partition, arranged in descending numerical order.

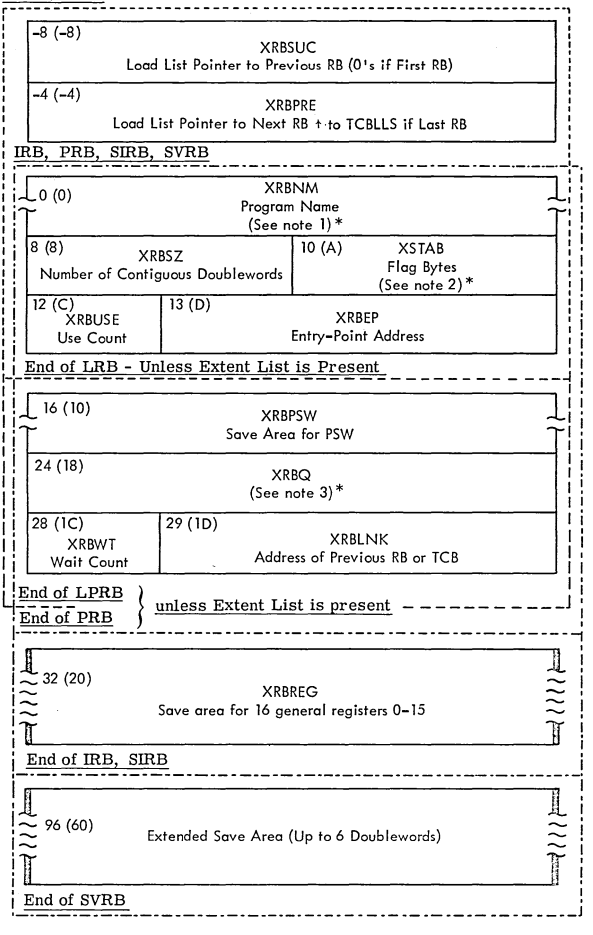
4. Status Bits — Internal queue.

1...	A large partition in which the DSDR processing step for a small partition is to be executed.
.1..	A restart reader has been started in place of a user-assigned reader.
..1.	A DEFINE command has been received and the partition is processing jobs on its internal queue.
...x xxxx	Reserved bits.

5. Status Bits — Job step timing.

1...	Job step TQE is being used for job step timing.
.1..	Indicates to INIT that the step being terminated was timed.
..xx xxxx	Reserved bits.

LPRB, LRB



*See notes under "Program Extent List (LRB, LPRB, PRB)".

REQUEST ELEMENT TABLE -- 12 STAR

The elements in the request element table are used by the I/O supervisor to represent active or queued I/O requests. The unused elements in the table are available for incoming I/O request representation.

The request element table has the following characteristics:

1. Creation: The table is created at system generation time.

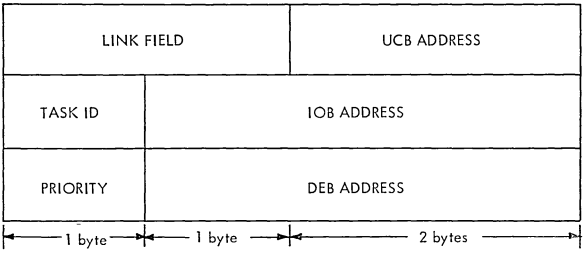
2. Storage Area: It resides, as a permanent part of the resident supervisor, in protected resident storage (when protection is available).

3. Size: The total number of request elements in the table is defined at system generation time. The request element table for a system in which MVT is excluded contains a 12-byte request element for the maximum number of I/O requests expected at any one time; and for a system in which MVT is included, a 16-byte request element.

4. Means of Access: The active request elements are addressed by the LAST REQUEST field in the associated UCB. The available request elements are contained in the freelist, which is addressed by the freelist pointer in the CVT. The queued request elements are within the particular logical channel queue referred to by the logical channel word.

5. Format: The I/O supervisor is concerned with all information in a request element. The format of a 12-byte and 16-byte request element is as follows:

Format of a 12-byte Request Element



LINK FIELD (2 bytes)
This is a 2-byte link field used to link the request elements that are members of a particular queue or belong to the freelist.

UCB ADDRESS (2 bytes)
This field addresses the UCB associated with the queued I/O request.

TASK ID (1 byte)
This byte contains the task control block identification of the task that originally initiated the I/O request.

IOB ADDRESS (3 bytes)
This field contains the address of the IOB associated with the I/O request.

PRIORITY (1 byte)
This byte contains the priority of the I/O request represented by this request element. The priority is assigned at open time according to the priority of the associated task.

DEB ADDRESS (3 bytes)
This field contains the address of the DEB associated with the data set for this I/O request.

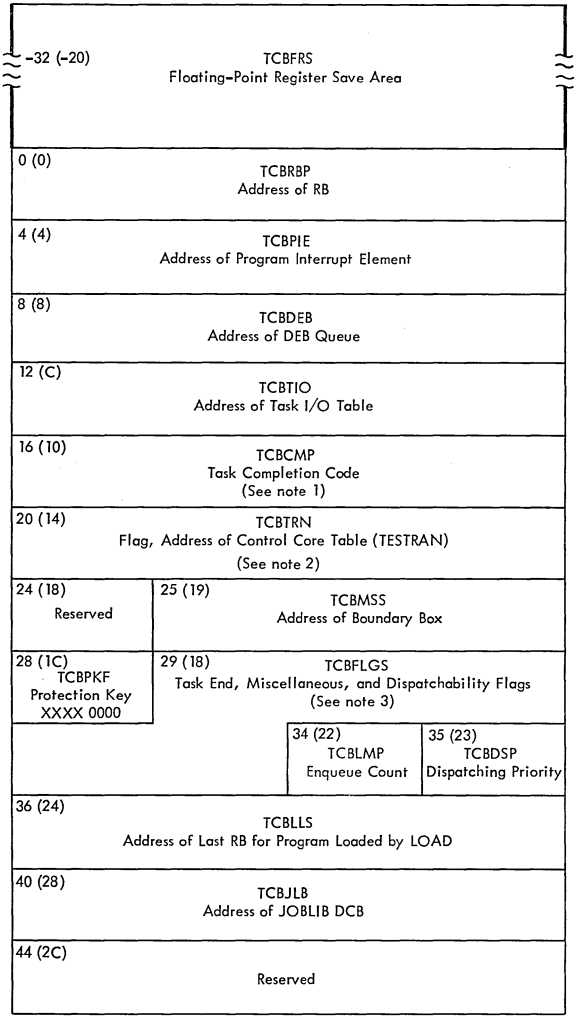
SPIL - SMALL PARTITION INFORMATION LIST

0 (0) (ECBA) Event Control Block	
4 (4) (ECBB) Event Control Block	
8 (8) (ECBC) Event Control Block	
12 (C) Address of Small Partition TCB	
16 (10) Status Bits (See note)	17 (11) Reserved
20 (14) Address of Allocate Parameter List (In Large Partition) if a Problem Program; TIOT, if a Reader or Writer	
24 (18) Address of CSCB for Writer	
28 (1C) ECB List for DEQUEUE	
68 (44) Address of LINK Parameter List (In Large Partition)	
72 (48) Address of 3-Word Parameter List for IEESD590 and IEESD591	
76 (4C) Step Time Remaining for Problem Program Executing in a Small Partition	

Note:

Status Bits

1...	A START writer command has been entered.
.1..	A START reader command has been entered.
..1.	A SPIL pointer has been stored in the PIB.
...1	Problem program has requested termination.
.... 1...	Indicative dump was requested.
0000 0000	START INIT was entered.


-32 (-20)
TCBFRS
Floating-Point Register Save Area
0 (0)
TCBRBP
Address of RB
4 (4)
TCBPIE
Address of Program Interrupt Element
8 (8)
TCBDEB
Address of DEB Queue
12 (C)
TCBTIO
Address of Task I/O Table
16 (10)
TCBCMP
Task Completion Code
(See note 1)
20 (14)
TCBTRN
Flag, Address of Control Core Table (TESTRAN)
(See note 2)
24 (18)
Reserved
25 (19)
TCBMSS
Address of Boundary Box
28 (1C)
TCBPKF
Protection Key
XXXX 0000
29 (18)
TCBFLGS
Task End, Miscellaneous, and Dispatchability Flags
(See note 3)
34 (22)
TCBLMP
Enqueue Count
35 (23)
TCBDSP
Dispatching Priority
36 (24)
TCBLLS
Address of Last RB for Program Loaded by LOAD
40 (28)
TCBJLB
Address of JOBLIB DCB
44 (2C)
Reserved

48 (30)	TCBGRS General Register Save Area
112 (70) TCBIDF TCB Identifier	113 (71) TCBFSA Address of First Program Save Area
116 (74)	TCBTCB Zeros
120 (78)	TCBTME Address of Timer Element
124 (7C)	Reserved
128 (80)	Reserved (Note 5)
132 (84)	Reserved (Note 5)
136 (88)	Reserved (Note 5)
140 (8C)	Reserved (Note 5)
144 (90)	Reserved (Note 5)
148 (94)	Reserved (Note 5)
152 (98)	Reserved (Note 5)
156 (9C)	Reserved (Note 5)

160 (A0) TCBNSTAE STAE Flags Address of Current STAE Control Block	
164 (A4) Reserved	
168 (A8) TCBUSER User Field	
172 (AC) TCBDAR DAR Flags (See note 4)	173 (AD) Reserved
176 (B0) Reserved	
180 (B4) Reserved	181 (B5) TCBJSCB Address of the JSCB Minus 252

Notes:

1. Byte 1 — A flag byte field containing indicators used or set by the ABEND SVC.

1...	A dump has been requested.
.1..	Presently reserved, but set to indicate step ABEND for MVT compatability (see MVT use of this bit).
..1.	Some problem storage was overlaid by the second load of ABEND. A first load overlay is indicated in TCBFLGS field.
...x	Reserved bit.
.... 1...	A double ABEND has occurred.
.... .1..	A dump message (WTO) is to be issued to the operator.
.... ..1.	Scheduler is to print an indicative dump.
....1	An ABEND message is provided that may be printed by ABDUMP.

Bytes 2-4 — System completion code in first 12 bits; user completion code in last 12 bits.

2. TCBTRN — A byte used for flags as described.

...x xxxx	Reserved bits.
1...	Both TESTRAN and decimal simulator programs being used on a Mod 91 machine.
.1..	Suppresses taking checkpoints for this step.

Notes:

3. TCBFLGS — Flag byte fields.

Byte 1

1...	Abnormal termination in progress.
.1..	Normal termination in progress.
..1.	ABEND was initiated by the resident abnormal termination routine.
...1	Recursion through ABEND is permitted.

Byte 2

1...	System task: ABEND prohibited for this task.
.xxx x.xx	Reserved bits.
.... .1..	Dump processing has been initiated in ABEND.

Byte 3

xx.x ...x	Reserved bits.
..1.	Exit effector: System error routines already operating for this task.
.... 1...	Floating-point registers exist.
.... .1..	Job scheduler routines in process.
.... ..1.	XCTL routine is changing the storage protection key in the PSW from zero to the one used by the problem program.

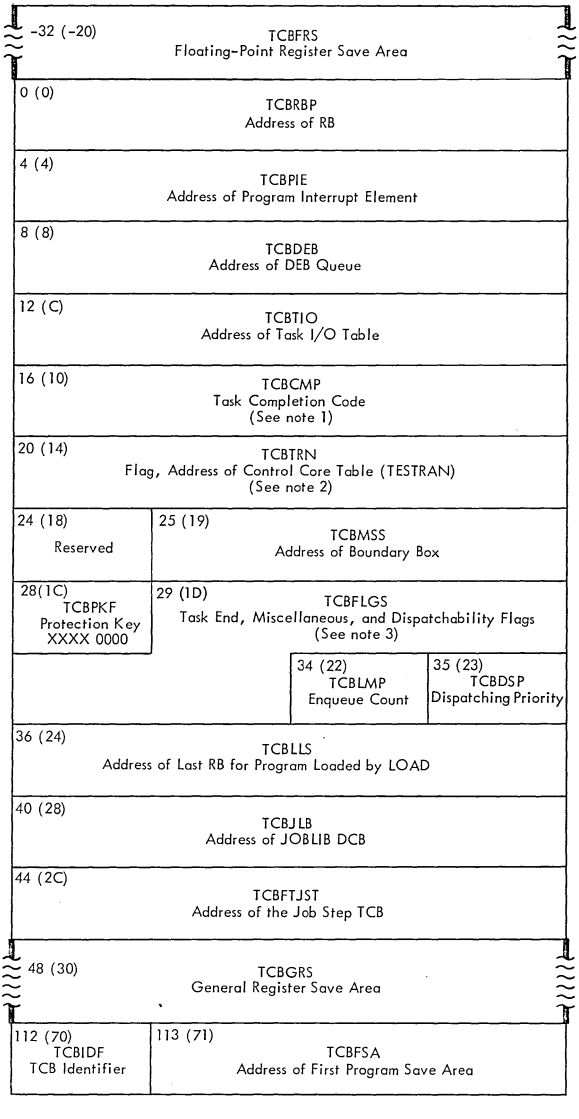
Byte 4 — Reserved.

Byte 5 — Reserved.

4. TCBDAR — Damage assessment routine (DAR) flags.

1...	Primary DAR recursion - DAR failure while writing core image dump.
.1..	Secondary DAR recursion - DAR failure while attempting to reinstate failing region/partition.
..1.	Only a dump has been requested.
...1	A recursion is permitted in CLOSE after DAR processing is completed.
.... 1...	Problem program storage has been overlaid to process DAR.
.... .xxx	Reserved bits.

5. Bytes — 128 (80) to 159 (9F) are overlayed by other system control blocks to save main storage space.


-32 (-20)
TCBFRS
Floating-Point Register Save Area
0 (0)
TCBRBP
Address of RB
4 (4)
TCBPIE
Address of Program Interrupt Element
8 (8)
TCBDEB
Address of DEB Queue
12 (C)
TCBTIO
Address of Task I/O Table
16 (10)
TCBCMP
Task Completion Code
(See note 1)
20 (14)
TCBTRN
Flag, Address of Control Core Table (TESTRAN)
(See note 2)
24 (18)
Reserved
25 (19)
TCBMSS
Address of Boundary Box
28(1C)
TCBPKF
Protection Key
XXXX 0000
29 (1D)
TCBFLGS
Task End, Miscellaneous, and Dispatchability Flags
(See note 3)
34 (22)
TCBLMP
Enqueue Count
35 (23)
TCBDSP
Dispatching Priority
36 (24)
TCBLLS
Address of Last RB for Program Loaded by LOAD
40 (28)
TCBJLB
Address of JOBLIB DCB
44 (2C)
TCBFTJST
Address of the Job Step TCB
48 (30)
TCBGRS
General Register Save Area
112 (70)
TCBIDF
TCB Identifier
113 (71)
TCBFSA
Address of First Program Save Area

116 (74) TCBTCB Address of Next Lower Priority TCB	
120 (78) TCBTME Address of Timer Element	
124 (7C) TCBPIB Partition Type and Address of PIB (See note 4)	
128 (80) TCBNTC Address of Previous TCB on Subtask Queue (Sister) (See note 8)	
132 (84) TCBOTC Address of Originating TCB (Mother) (See note 8)	
136 (88) TCBLTC Address of Last TCB on Subtask Queue (Daughter) (See note 8)	
140 (8C) TCBIQE Address of IQE for ETXR Routine (See note 8)	
144 (90) TCBECB Address of ECB Posted on Task Completion (See note 8)	
148 (94) Reserved (See note 8)	
152 (98) TCBFTLMP Limit Priority	153 (99) TCBFTFLG Flag Bytes (See note 5)
156 (9C) Reserved (See note 8)	
160 (A0) TCBNSTAE STAE Flags Address of Current STAE Control Block	
164 (A4) Reserved	165 (A5) TCBTCT Address of the TCT

168 (A8) TCBUSER User Field	
172 (AC) TCBDAR DAR Flags (See note 6)	173 (AD) TCBNDSP Secondary Nondispatchability Bits (See note 7)
176 (B0) Reserved	
180 (B4) Reserved	181 (B5) TCBJSCB Address of the JSCB Minus 252

Notes:

1. TCBCMP — Task completion code.

Byte 1	A flag byte field containing indicators used or set by the ABEND SVC.
1...	A dump has been requested.
.1..	Presently reserved, but set to indicate step ABEND for MVT compatability (see MVT use of this bit).
..1.	Some problem program storage was overlaid by the second load of ABEND. A first load overlay is indicated in TCBFLGS field.
...x	Reserved bit.
.... 1...	A double ABEND has occurred.
.... .1..	A dump message (WTO) is to be issued to the operator.
.... ..1.	Scheduler is to print an indicative dump.
....1	An ABEND message is provided that may be printed by ABDUMP.
Bytes 2-4	System completion code in first 12 bits; user completion code in last 12 bits, or return code if normal return from exit.

2. TCBTRN — A byte used for flags as described.

.... xxxx	Reserved bits.
1...	Both TESTRAN and decimal simulator programs being used on a Mod 91 machine.
.1..	Suppresses taking checkpoints for this step.
..1.	Job step TCB. This is a graphics foreground job or the graphic job processor.
...1	This is a 7094 emulator task on a Mod 85.

Notes:

3. TCBFLGS — Flag byte fields.

Byte 1

1...	Abnormal termination in progress.
.1..	Normal termination in progress.
..1.	ABEND was initiated by the resident abnormal termination routine.
...1	Recursion through ABEND is permitted.
.... 1...	Graphics abnormal termination routine has been entered for this task.
.... .1..	CLOSE initiated by ABEND.
.... ..1.	Problem program storage has been overlaid to process ABEND.
....1	Prohibit queuing of asynchronous exits for this task.

Byte 2

1...	System task: ABEND prohibited for this task.
.x1. ..x.	Trace has been stopped.
...1	Task has issued a 'system-must-complete' and set all other tasks in the system nondispatchable.
.... 1...	Task has issued a 'step-must-complete' and turned off all other tasks in the step.
....1	This task is a member of a time-sliced group.

Byte 3

xx.x ...x	Reserved bits.
..1.	Exit effector: System error routines already operating for this task.
.... 1...	Floating-point registers exist.
.... .1..	Job scheduler routines in process.
.... ..1.	XCTL routine is changing the storage protection key in the PSW from zero to the one used by the problem program.

Byte 4 — Reserved.

Byte 5 — (If any bit in this byte is 1, the task is nondispatchable.)

....1	Primary nondispatchability bit. This bit is set to 1 if any of the secondary nondispatchability bits (offset 173 through 175) is set to 1. This bit is set to 0 if a secondary nondispatchability bit is set to 0 and all other secondary nondispatchability bits are 0.
xxxx xxx.	Reserved bits.

Notes:

4. TCBPIB — A field used for two items of information (partition type).

Byte 1

00..	System task partition.
01..	Reader partition.
10..	Writer partition.
11..	Processing program partition.
..1.	Large partition.
..0.	Small partition.
...1	CPU timing stopped by FINCH until transient is loaded.
.... ..1.	Writer partition, used by ABEND. Required by transient writer, but also used by resident writer.
....1	Scheduler in control. Bit turned off when TIOT written on SYSJOBQE. Used by ABEND.
.... xx..	Reserved bits.

Bytes 2-4 — Address of the partition information block (PIB).

5. TCBFTFLG — Without subtasking: Reserved. With subtasking: Flag bytes.

Byte 1

.... .1..	Top task in tree of abnormally terminating tasks.
.... ..1.	Abnormal termination dump has been completed.
....1	Task is enqueued on dump data set.
xxxx x...	Reserved bits.

6. TCBDAR — Damage assessment routine (DAR) flags.

1...	Primary DAR recursion - DAR failure while writing core image dump.
.1..	Secondary DAR recursion - DAR failure while attempting to reinstate failing partition.
..1.	Only a dump has been requested.
...1	A recursion is permitted in CLOSE after DAR processing is completed.
.... 1...	Problem program storage has been overlaid to process DAR.
.... .xxx	Reserved bits.

Notes:

7.	TCBNDSP	Secondary nondispatchability bits.
	TCBNDSP1	If any bit in these bytes is 1, the primary nondispatchability bit (offset 33.7) is 1, and the task is nondispatchable.
	xx..	Damage assessment routine bits.
	1...	The task is temporarily nondispatchable.
	.1..	The task is permanently nondispatchable.
	..xx	Recovery management support and system error recovery bits.
	..1.	The task is temporarily nondispatchable.
	..11	The task is permanently nondispatchable.
	 xxxx	Reserved bits.
	TCBNDSP2	ABDUMP is processing.
	1...	(MFT with subtasking)
	1	The dump data set is being opened.
	.xxx xxx.	Reserved bits.
	TCBNDSP3	
	1...	Task has been terminated (MFT with subtasking).
	.1..	Task to be terminated by ABEND (MFT with subtasking).
	..xx xxxx	Reserved bits.
8.		Bytes 128 (80) to 159 (9F) are overlayed by other control blocks to save main storage.

DQE (DESCRIPTOR QUEUE ELEMENT)

0 (0) Reserved	1 (1) FQEPTR Pointer to First Free Area
4 (4) Reserved	5 (5) DQEPTR Pointer to Next DQE
8 (8) DQEHRID (see note)	9 (9) Block Address (Address of First 2k Block)
12 (C) Reserved	13 (D) Length (Multiple of 2k Bytes)

Note:
DQEHRID

0000 0000	DQE describes core obtained from hierarchy 0.
0000 0001	DQE describes core obtained from hierarchy 1.

FQE (FREE QUEUE ELEMENT)

0 (0) Reserved	1 (1) FQEPTR Pointer to Next Lower Free Area
4 (4) Reserved	5 (5) Length Number of Bytes in Free Area

AQE (ALLOCATED QUEUE ELEMENT)

0 (0) Reserved	1 (1) AQEPTR Pointer to Next Allocated Area
4 (4) Reserved	5 (5) Length Number of Bytes in Allocated Area

GOVRFLB (ORIGIN LIST FOR MAIN STORAGE QUEUES)

0 (0) Reserved (see note 2)	SQBOUND Address of First Byte Beyond System Queue Area
4 (4) Reserved	DQESQES Address of the DQE Describing the System Queue Area
8 (8) Reserved	PQEPTR Address of a dummy PQE minus 8 bytes. The dummy PQE points to the PQE describing unassigned main storage (storage not assigned to any region).
12 (C) Reserved	SZDPRS Amount of Storage Available in Hierarchy 0 After NIP
16 (10) Reserved	SZDLCS Amount of Storage Available in Hierarchy 1 After NIP
20 (14) COUNT (see note 1)	VQEPTR (M65MP only) Address of the First VQE Describing Storage Areas Scheduled for Removal in a Multiprocessing System (Zero if no VQE's Exist)

Notes:

1. The number of 'Vary Storage, Off-line' commands in master scheduler region.

2. Bit 0 = 1 Tasks have been set nondispatchable for lack of SQS.

PQE (PARTITIONED QUEUE ELEMENT)

0 (0) PQEFFBQE Address of First FBQE in the Region			
4 (4) PQEBFBQE Address of Last FBQE in the Region			
8 (8) PQEFPQE Address of Next PQE			
12 (C) PQEBPQE Address of Preceding PQE			
16 (10) PQETCB Address of TCB for the Job Step			
20 (14) PQESIZE Size of Region in 2k Multiples			
24 (18) PQEREGN Address of First Byte of This Region			
28 (1C) PQERFLGS (see note 2)	29 (1D) PQEHRID (see note 3)	30 (1E) Reserved	31 (1F) Reserved

2. PQERFLGS — Rollout flags.

0...	Space described by this PQE is owned.
1...	Space described by this PQE is borrowed.
01..	Region has been rolled out.
0.1.	Region has been borrowed.
...1	Region cannot be rolled in because of machine check.
.... xxxx	Reserved bits.

3. PQEHRID — Description of hierarchy identifier.

0000 0000	PQE describes a region in hierarchy 0.
0000 0001	PQE describes a region in hierarchy 1.

FBQE (FREE BLOCK QUEUE ELEMENT)

0 (0) Reserved	1 (1)	FWDPTR Pointer to Next Higher FBQE
4 (4) Reserved	5 (5)	BCKPTR Pointer to Next Lower FBQE
8 (8) Reserved	9 (9)	SIZE Number of Bytes in 2k Blocks

DPQE (DUMMY PARTITION QUEUE ELEMENT)

0 (0) Address of First PQE in Chain
4 (4) Address of Last PQE in Chain

SPQE (SUBPOOL QUEUE ELEMENT)

0 (0) Flags (see note 1)	1 (1) SPQEPTR Pointer to the Next SPQE
4 (4) SPID (see note 2)	5 (5) DQEPTR Pointer to the First DQE (see note 3)

Notes:

1.
1...	Subpool is shared.
0...	Subpool belongs to associated task.
.1..	Last SPQE on the queue.
..1.	Subpool is shared with another task.
...x xxxx	Reserved bits.

2.

Subpool No.	Signifies Request for:	Storage Key Assignment	Comments
246	Region	0 storage protection key (when storage-assigned protect key of subpool is assigned)	Signifies request to free existing region and assign new region.
247	Region	0 storage protection key (when storage-assigned protect key of subpool is assigned)	Signifies request to assign new region or free existing region.
248	Region	0 storage protection key (when storage-assigned protect key of subpool is assigned)	Signifies request from rollout/rollin routine to assign a region.
0-127	Space within region	Job step storage protection key (reset to 0 when space is freed)	When subpool 0 is requested by programs executing in supervisor state, subpool 252 is assigned.
250	Space within region	Job step storage protection key (reset to 0 when space is freed)	When requested by programs executing in supervisor state, subpool 0 is assigned.
251	Space within region	Job step storage protection key (reset to 0 when space is freed)	
252	Space within region	0 storage protection key	
253	Space within system queue area	0 storage protection key	Assigned space will be freed when task terminates.
254	Space within system queue area	0 storage protection key	Assigned space will be freed when job step terminates.
255	Space within system queue area	0 storage protection key	Assigned space must be explicitly freed.

3. If Subpool is shared, this is the address of the "owning" SPQE.

REQUEST ELEMENT TABLE -- 16 STAR

LINK FIELD (2 bytes)
This is a 2-byte link field used to link the request elements that are members of a particular queue or belong to the freelist.

UCB ADDRESS (2 bytes)
This field addresses the UCB associated with the queued I/O request.

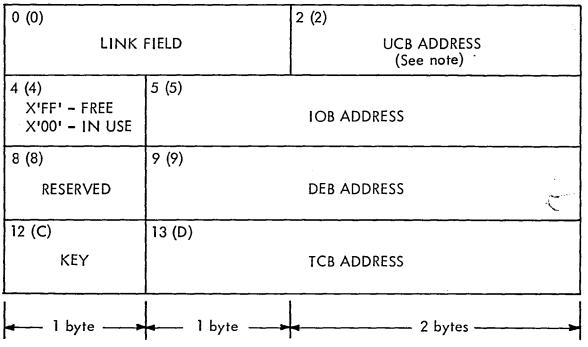
IOB ADDRESS (3 bytes)
This field contains the address of the IOB associated with the I/O request.

DEB ADDRESS (3 bytes)
This field contains the address of the DEB associated with the data set for this I/O request.

KEY (1 byte)
This field contains the protect key associated with the request.

TCB ADDRESS (3 bytes)
This field contains the address of the task control block for the task that initiated the I/O request.

Format of a 16-byte Request Element



Note: Bit 15 = 1 Request for error processing.

INTERRUPTION QUEUE ELEMENT (IQE)

Bytes 0	Reserved	IQELNK (1)	IQEPARAM (4)	
8	Reserved	IQEIRB (9)	Reserved (12)	IQETCB (13)
Rollout/Rollin Parameter List (Optional) 16	RPLTCB		Reserved (20)	RPLSZPQE (21)

Description of Fields

IQELNK: Address of the next IQE on the IQE queue.

IQEPARAM: The parameter that is to be passed to the asynchronous exit routine.

IQEIRB: Address of the IRB that is to be scheduled because of this request.

IQETCB: Address of the TCB with which this request is associated.

RPLTCB: Address of the TCB for the task requiring or releasing an extension to a region.

RPLSZPQE: Size of region requested (rollout request), or address of PQE describing area (rollin request).

CONTENTS DIRECTORY ENTRY
(Pointed to by RB)

0 (0) CDATTR Attribute Field (See note 1)	1 (1) CDCHAIN Address of Next CDE on Queue
4 (4) CDROLL Reserved	5 (5) CDRBP Request Block Address
8 (8) CDNAME Module Name	
16 (10) CDUSE Use/Responsibility Count	17 (11) CDENTPT Entry Point Address
20 (14) CDATTR2 Attribute Field (See note 2)	21 (15) CDXLMJP Extent List Address or Major CDE Address 23 (17)

Notes:

1. CDATTR — Attribute field.

1...	Module is resident in the link pack area.
.1..	Module is being fetched.
..1.	Module is reenterable.
...1	Module is serially reusable.
.... 1...	Module may not be reused.
.... .1..	This is a minor CDE.
.... ..1.	Module is in the job pack area.
....1	Module is not only loadable.

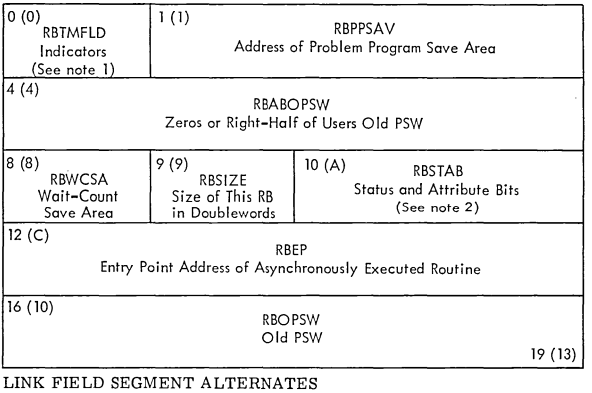
2. CDATTR2 — A second attribute field.

.1..	Module is inactive and may be released.
..1.	An extent list has been built for the module.
...1	This CDE contains a relocated alias entry point address.
.... 1...	The module is refreshable.
.... .1..	Overlay.
x... ..xx	Reserved bits.

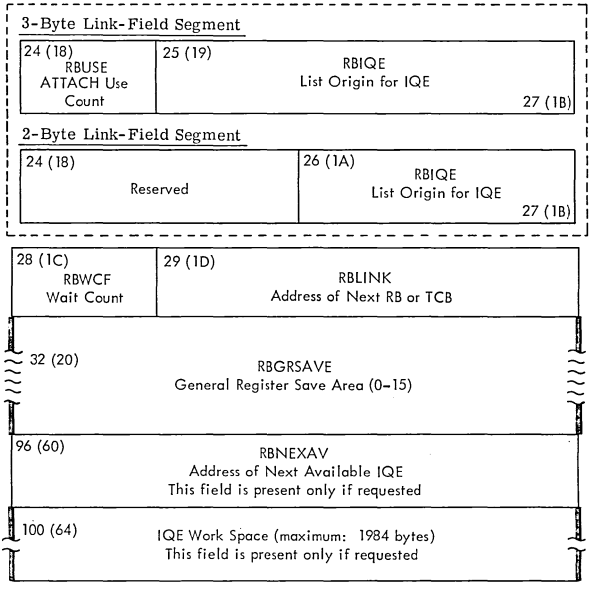
LOAD LIST ELEMENT (LLE)

0	0	Zero	Addr of First Byte of Next Element on Load List
4	4	Responsibility Count No. of Req for Mod Via Load Macroinst	Address of CDE for the Module

INTERRUPTION REQUEST BLOCK -- MVT



LINK FIELD SEGMENT ALTERNATES



Notes:

1. RBTMFLD — Indicators for the timer routines. When there are no timer routines, this field is zero.

1...	Timer element not on queue.
.1..	Local time-of-day option is used.
..00	Time interval requested in timer units.
..01	Time interval requested in binary form.
..11	Time interval requested in decimal form.
.... 1...	Interval has expired.
.... .1..	Midnight Supervisor Timer Element
.... ..00	Task Request
.... ..01	Wait Request
.... ..10	Supervisor Element
.... ..11	Real Request

2. RBSTAB — Status and attribute bits.

Byte 1

00..	Program request block (PRB).
01..	Interrupt request block (IRB).
10..	System interrupt request block (SIRB).
11..	Supervisor request block (SVRB).
..x. xxxx	Reserved bits.
...1	SVRB for transient SVC.

Byte 2

1...	RBLINK field points to TCB.
.1..	Program is active; applies to IRB or SIRB.
...1	The IRB is for an ETXR exit routine.
..x.	Reserved bit.
.... 00..	Request queue element is not to be returned.
.... 01..	IRB has queue elements for asynchronously executed routines that are RQE's.
.... 10..	IQE is not to be returned at EXIT.
.... 11..	IRB has queue elements for asynchronously executed routines that are IQE's.
.... ..1.	Request block storage can be freed at exit.
....0	Wait for a single event or a number of events.
....1	Wait for a number of events that is less than the total number of events waiting.

0 (0) Reserved		
4 (4) RBABOPSW Zero or Right-Half of User's Old PSW		
8 (8) RBWCSA Wait-Count Save Area	9 (9) RBSIZE Size of This RB in Doublewords	10 (A) RBSTAB Status and Attribute Bits (See note 1)
12 (C) RBCDFLGS Contents Control Flags (See note 2)	13 (D) RBCDE Address of Contents Directory Entry for This Module	
16 (10) RBOPSW Old PSW		
24 (18) Always Zero	25 (19) RBPGMQ Address of RB for Same Serially Reusable Programs	
28 (1C) RBWCF Wait Count	29 (1D) RBLINK Address of Next RB or TCB 31 (1F)	

Notes:

1. RBSTAB — Status and attribute bits.

Byte 1

00..	Program request block (PRB).
01..	Interruption request block (IRB).
10..	System interruption request block (SIRB).
11..	Supervisor request block (SVRB).
..x. xxxx	Reserved bits.
...1	SVRB for transient type 3 or 4 SVC routines.

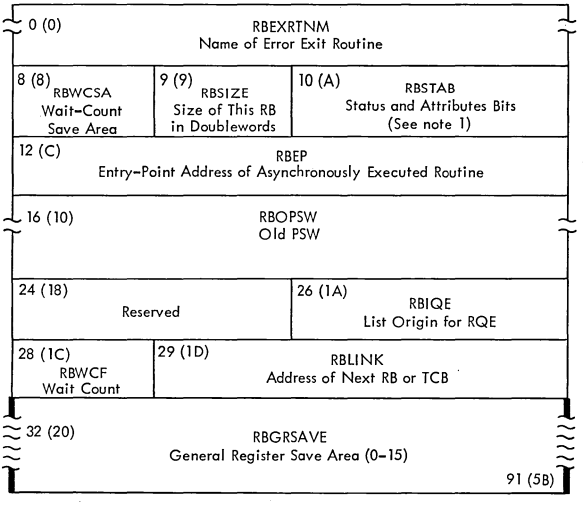
Byte 2

1...	RBLINK field points to TCB.
.1..	Program is active (applies to IRB or SIRB).
..xx	Reserved bits.
.... 00..	Request queue element is not to be returned to freelist when exit is taken.
.... 01..	IRB has queue elements for asynchronously executed routines that are RQE's.
.... 11..	IRB has queue elements for asynchronously executed routines that are IQE's.
.... ..1.	Request block storage can be freed at exit.
....0	Wait for a single event or a number of events.
....1	Wait for a number of events that is less than the total number of events waiting.

2. RBCDFLGS — Control flags.

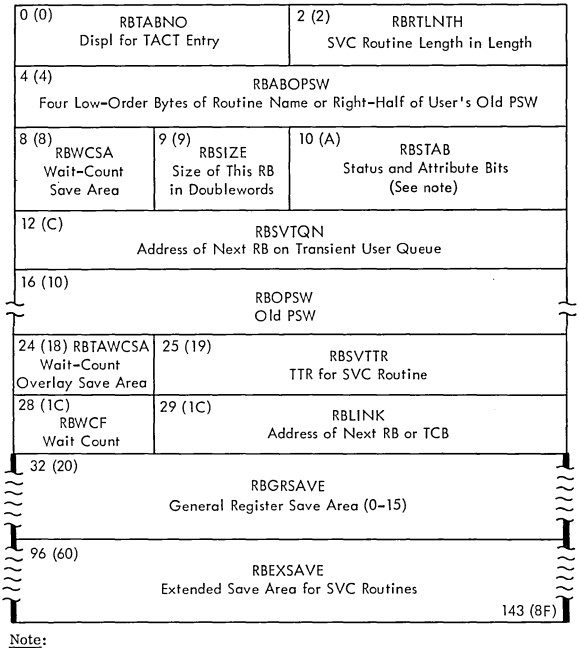
xxxx	Reserved bits.
.... 1...	Work area exists.
.... .1..	SYNC macroinstruction requested.
.... ..1.	XCTL macroinstruction requested.
....1	LOAD macroinstruction requested.

SYSTEM INTERRUPTION REQUEST BLOCK -- MVT



Comments:

SUPERVISOR REQUEST BLOCK -- MVT --
TRANSIENT SVC ROUTINES



Note:

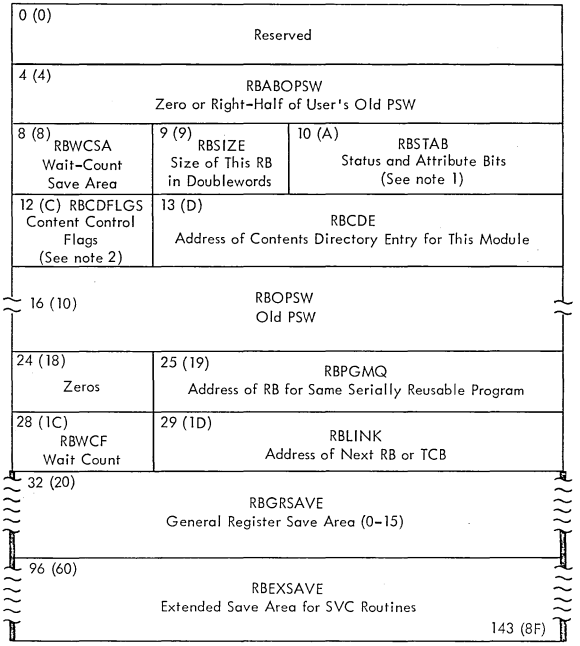
RBSTAB — Status and attribute bits.

Byte 1

00..	Program request block (PRB).
01..	Interruption request block (IRB).
10..	System interruption request block (SIRB).
11..	Supervisor request block (SVRB).
..x. x.xx	Reserved bits.
...1	SVRB for transient SVC routines.
.... .1..	A checkpoint may be taken in a user exit from this SVC routine.

Byte 2

1...	RBLINK field points to TCB.
.1..	Program is active (applies to IRB or SIRB).
..xx	Reserved bits.
.... 00..	Request queue element is not to be returned.
.... 01..	IRB has queue elements for asynchronously executed routines that are RQE's.
.... 11..	IRB has queue elements for asynchronously executed routines that are IQE's.
.... ..1.	Request block storage can be freed at exit.
....0	Wait for a single event or all of a number of events.
....1	Wait for a number of events that is less than the total number of events waiting.


0 (0)
Reserved
4 (4)
RBABOPSW
Zero or Right-Half of User's Old PSW
8 (8)
RBWCSA
Wait-Count Save Area
9 (9)
RBSIZE
Size of This RB in Doublewords
10 (A)
RBSTAB
Status and Attribute Bits (See note 1)
12 (C) RBCDFLGS
Content Control Flags (See note 2)
13 (D)
RBCDE
Address of Contents Directory Entry for This Module
16 (10)
RBOPSW
Old PSW
24 (18)
Zeros
25 (19)
RBPGMQ
Address of RB for Same Serially Reusable Program
28 (1C)
RBWCF
Wait Count
29 (1D)
RBLINK
Address of Next RB or TCB
32 (20)
RBGRSAVE
General Register Save Area (0-15)
96 (60)
RBEXSAVE
Extended Save Area for SVC Routines
143 (8F)

Notes:

1. RBSTAB — Status and attribute bits.

Byte 1

00..	Program request block (PRB).
01..	Interruption request block (IRB).
10..	System interruption request block (SIRB).
11..	Supervisor request block (SVRB).
..x. x.xx	Reserved bits.
.... .1..	A checkpoint may be taken in a user exit from this SVC routine.
...1	SVRB for transient SVC routines.

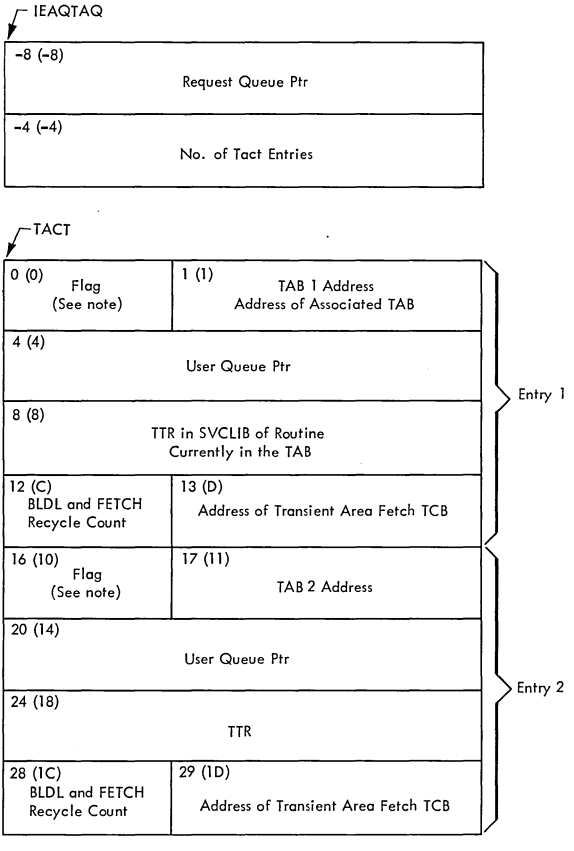
Byte 2

1...	RBLINK field points to TCB.
.1..	Program is active (applies to IRB or SIRB).
..xx	Reserved bits.
.... 00..	Request queue element is not to be returned.
.... 01..	IRB has queue elements for asynchronously executed routines that are RQE's.
.... 10..	IQE is not to be returned at EXIT.
.... 11..	IRB has queue elements for asynchronously executed routines that are IQE's.
.... ..1.	Request block storage can be freed at exit.
....0	Wait for a single event or all of a number of events.
....1	Wait for a number of events that is less than the total number of events waiting.

2. RBCDFLGS — Control flags.

xxxx x...	Reserved bits.
.... .1..	SYNC macroinstruction requested.
.... ..1.	XCTL macroinstruction requested.
....1	LOAD macroinstruction requested.

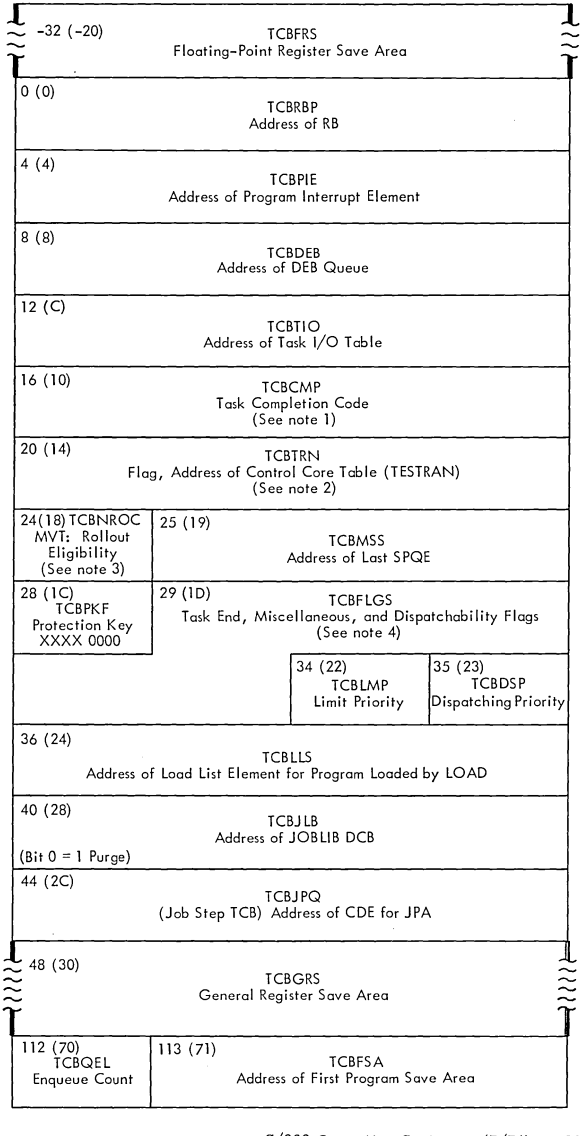
TRANSIENT AREA CONTROL TABLE (TACT)



Note: Each transient area block (TAB) in the system has one four-word entry.

Contents

Flags: X'40' - TAB is being loaded.
X'20' - TAB is free (unoccupied).
X'00' - TAB is being used.


-32 (-20)
TCBFRS
Floating-Point Register Save Area
0 (0)
TCBRBP
Address of RB
4 (4)
TCBPIE
Address of Program Interrupt Element
8 (8)
TCBDEB
Address of DEB Queue
12 (C)
TCBTIO
Address of Task I/O Table
16 (10)
TCBCMP
Task Completion Code
(See note 1)
20 (14)
TCBTRN
Flag, Address of Control Core Table (TESTRAN)
(See note 2)
24(18) TCBNROC
MVT: Rollout
Eligibility
(See note 3)
25 (19)
TCBMSS
Address of Last SPQE
28 (1C)
TCBPKF
Protection Key
XXXX 0000
29 (1D)
TCBFLGS
Task End, Miscellaneous, and Dispatchability Flags
(See note 4)
34 (22)
TCBLMP
Limit Priority
35 (23)
TCBDSP
Dispatching Priority
36 (24)
TCBLLS
Address of Load List Element for Program Loaded by LOAD
40 (28)
TCBJLB
Address of JOBLIB DCB
(Bit 0 = 1 Purge)
44 (2C)
TCBJPQ
(Job Step TCB) Address of CDE for JPA
48 (30)
TCBGRS
General Register Save Area
112 (70)
TCBQEL
Enqueue Count
113 (71)
TCBFSA
Address of First Program Save Area

116 (74) TCBTCB Address of Next Lower Priority TCB	
120 (78) TCBTME Address of Timer Element	
124 (7C) TCBJSTCB PCP: Reserved Address of 1st TCB for Job Step	
128 (80) TCBNTC Address of Previous TCB on Subtask Queue (Sister)	
132 (84) TCBOTC Address of Originating TCB (Mother)	
136 (88) TCBLTC Address of Last TCB on Subtask Queue (Daughter)	
140 (8C) TCBIQE Address of IQE for ETXR Routine	
144 (90) TCBECB Address of ECB Posted on Task Completion	
148 (94) Reserved	
152 (98) TCBPQE Address of Region Dummy PQE Minus 8	
156 (9C) TCBAQE Address of Allocated Queue Element	
160 (A0) STAE Flags	161 (A1) TCBNSTAE Address of Current STAE Control Block (See note 7)

164 (A4) Reserved	165 (A5) TCBTCT Address of the TCT
168 (A8) TCBUSER User Field	
172 (AC) TCBDAR DAR Flags (See note 5)	173 (AD) TCBNDSP Secondary Nondispatchability Bits (See note 6)
176 (B0) Reserved	
180 (B4) Reserved	181 (B5) TCBJSCB Address of the JSCB

Notes:

1. Byte 1 — A flag byte field containing indicators used or set by the ABEND SVC.

   `1... ....` A dump has been requested.
   `.1.. ....` A step ABEND has been requested.
   `..xx xxxx` Reserved bits.

   Bytes 2-4 — System completion code in first 12 bits; user completion code in last 12 bits (or return code if normal return from exit).

2. TCBTRN — A byte used for flags as described.

   `1... ....` Both TESTRAN and decimal simulator programs being used on a Mod 91 machine.
   `.1.. ....` Suppresses taking checkpoints for this step.
   `..1. ....` Job step TCB: This is a graphics foreground job or the graphic job processor.
   `...1 ....` This is a 7094 emulator task on a Model 85.
   `.... xxxx` Reserved bits.

3. TCBNROC — Job step TCB: Rollout eligibility.

   `00` This job step may be rolled out.
   `nz` This job step may not be rolled out. (nz - A nonzero digit.)

Notes:

4. TCBFLGS

Byte 1

1...	Abnormal termination in progress.
.1..	Normal termination in progress.
..1.	Enter erase routine in ABEND when ABEND is in control again.
...1	Enter purge routine in ABEND when ABEND is in control again.
.... 1...	Graphics abnormal termination routine is in control of this task. (Bit 7 of byte 3 must also be on.)
.... .1..	Top task in tree being abnormally terminated.
.... ..1.	Abnormal termination dump has been completed.
....1	Asynchronous exits cannot be scheduled.

Byte 2

1...	Dump data set being opened.
.1..	Initiator TCB: Second job step interval has expired.
..1.	Job step TCB: Job step can cause rollout.
...1	System must complete. Current task can be performed; other tasks in system cannot.
.... 1...	Step must complete. Other tasks in job step cannot be performed.
.... .1..	Job step TCB: SYSABEND already open.
.... ..1.	ETXR exit requested by attaching task.
....1	Task is a member of a time-sliced group.

Byte 3

1...	All PSW's for this task in supervisor state.
.1..	Job step TCB: Job step has invoked rollouts that are still in effect.
..1.	ABEND operands have been saved in TCBCMP field.
...1 ...x	OPEN issued for SYSABEND. (See bit 7.)
.... 1..x	ABDUMP in process for this task (see bit 7).
.... .1..	Job step TCB: No abnormal termination dumps can be provided within this job step.
.... ..1x	CLOSE has been issued during ABEND processing (see bit 7).
...x x.x1	Valid reentry to ABEND indicated if bits 3, 4, or 6 of this byte or bit 4 of byte 29 is also on.

Notes:

Byte 4	If any bit in this byte is 1, the task is nondispatchable.
1...	Set by ABDUMP.
.1..	Set by SER1.
..1.	Supply of I/O request queue elements exhausted.
...x xx..	Reserved bits.
.... ..1.	M65 multiprocessing: Task has been set nondispatchable by one CPU to prevent any CPU from working on it.
....1	ABEND routine was entered by this task while DCB for SYSBEND was being opened for another task.
Byte 5	If any bit in this byte is 1, the task is nondispatchable.
1...	Terminated.
.1..	To be terminated by ABEND.
..1.	A routine of this task has issued an unconditional GETMAIN which must be satisfied by rollout of another job step.
...1	The job step has been rolled out.
.... 1...	Another task is in system-must-complete status.
.... .1..	Another task in this job step is in step-must-complete status.
.... ..1.	Initiator task: Request for a region or SQS could not be satisfied.
....1	Primary nondispatchability bit. This bit is set to 1 if any of the secondary nondispatchability bits (offset 173 through 175) is set to 1. This bit is set to 0 if a secondary nondispatchability bit is set to 0 and all other secondary nondispatchability bits are 0.

5.	TCBDAR	Damage assessment routine (DAR) flags.
	1...	Primary DAR recursion - DAR failure while writing core image dump.
	.1..	Secondary DAR recursion - DAR failure while attempting to reinstate failing region/partition.
	..1.	Only a dump has been requested.
	...1	A recursion is permitted in CLOSE after DAR processing is completed.
	.... 1...	Problem program storage has been overlaid to process DAR.
	xxx	Reserved bits.

Notes:

6. TCBNDSP — Secondary nondispatchability bits.

TCBNDSP1 — If any bit in these bytes is 1, the primary nondispatchability bit (offset 33.7) is 1, and the task is nondispatchable.

xx..	Damage assessment routine bits.
1...	The task is temporarily nondispatchable.
.1..	The task is permanently nondispatchable.
..xx	Recovery management support and system error recovery bits.
..1.	The task is temporarily nondispatchable.
..11	The task is permanently nondispatchable.
.... 1...	DAR has set the task temporarily nondispatchable in allocation.
.... .xxx	Reserved bits.

TCBNDSP2 — Reserved.

TCBNDSP3 — Reserved.

7. STAE — Flags

1...	ABEND entered because of an error during STAE processing.
.1..	STAE routine invoked purge I/O with the quiesce I/O option.
..1.	The current SCB has the XCTL=YES option.
...1	SCB created by a program that is scatter-loaded.
.... 1...	Purge I/O did not successfully quiesce I/O, but I/O was halted.
.... .1..	Program using STAE is in supervisor mode.
.... ..1.	STAE user requested that a retry be scheduled but that RB chain not be purged.
....1	Retry routine and parm list addresses are valid.

WTG (WHERE-TO-GO) TABLE

0 (0) Name of Load Module			
8 (8)			
12 (C)		TTR of First TXT	
16 (10) Record			
20 (14)		Attributes	
24 (18) Total Contiguous Main Storage Required for this Module			Length of
28 (1C) First TXT Record	WTG TBL Length in Doublewords	WTG Path (See Note)	
32 (20) IDTTR of Access Method Executor Required for DCB 1			
36 (24) Work Area Address for DCB 1			
40 (28) Table of IDTTR's: (One 8-byte entry per DCB) IDTTR of OPEN/CLOSE Load Module to Receive Control from the Executor			
	Not Used		

Note:

WTGPATH Bit Settings: This description of the WTGPATH bits should be used with the module flow diagrams. Although modules IGG0190Y and IGG0200Z build the WTGPATH, the bits are turned off and set on again by other modules as processing progresses.

Byte	Bit	Indicates	Routine
WTGPATH+0	0	Unlabeled tape module.	Open
		Back to NSL output module--controls re-execution of NSL output volume verification.	Open
		Requires partial release of, or entry from, module 200T.	Close
		SL tape output label creation needed.	TClose
	1	NSL input processing required.	Open
		NSL tape.	Close
	2	Labeled tape positioning.	Open
	3	OMODVOL1 needed.	Open
		2321 - parallel-mount processing (module 190) required.	Open
		NSL output module required.	Open
	4	Input SL tape processing required.	Open
		Module 200A required.	Close

	5	Security checking required. NSL input tape. Direct access module required. Direct access module required.	Open Open Close TClose
	6	Direct access or tape processing required. BPAM concatenation. Input or output tape positioning.	Open Open Close
	7	NSL tape output processing. Tape label processing.	Close Close
WTGPATH+1	0	Reserved for later use.	
	1	Unlabeled tape positioning. More than five volumes.	Open Open
	2	Parallel mounting.	Open
	3	Open positioning switch. Used to show whether 190R has been entered during processing. Bit is tested in 190R and if off, 190R has been entered for the first time. 2321 data cell indicator; set by IGG0199I to show IGG0199J is needed.	Open Open Open
	4	User labels to be processed. It is on only during user label processing.	Open, Close, TClose
	5	Reserved for later use.	
	6	Recheck bit; set on so load 0A will be called and so this DCB will be processed again. Recheck switch indicates NSL volume must be remounted and checked.	Open Open
	7	190R switch--indicates entry to 190K (tape output) was from 190R.	Open

VARY QUEUE ELEMENT (VQE)

The VQE describes the main storage area to be logically removed from a Model 65 multiprocessing system due to a vary storage off-line command. The address of the vary queue is located in the GOVRFLB table.

0 (0) 0	1 (1) Address of Next VQE on Vary Queue
4 (4) 0	5 (5) Lower Address of Area Specified in Vary Command
8 (8) 0	9 (9) Length of Area Specified in Vary Command
12 (C) 0	13 (D) ECB - Posted by FREEPART

Comments:

656 (29C) † MP65CVT		
672 (2A0) Channel Availability Table (See note 1)		
	686 (2AE) PTRIGGER (See note 2)	687 (2AF) CPUSTAT (See note 3)
688 (2B0) PREFIX2 (Address)		
		695 (2B7) IOCPUID (See note 4)
696 (2B8) CPUID (See note 5)		
700 (2BC) STMASK (See note 6)		
704 (2C0) IEATCBP TCB Doubleword		
712 (2C8) PREFTMRA CPU Timer (See note 7)		
	718 (2CE) CONSOLID Address of 1052 for This CPU	
768 (300) FSSEMAP (See note 8)		

Notes:

1.

Channel	Byte 0	Byte 1
6	0001 0110	0000 0000
5	0001 0101	0000 0000
4	0001 0100	0000 0000
3	0001 0011	0000 0000
2	0001 0010	0000 0000
1	0001 0001	0000 0000
0	0001 0000	0000 0000

Byte 0 indicates channel status and number; byte 1 indicates control unit/device address. The channel availability table contains an entry for each channel.

Byte 0	Setting	Meaning
Bit 0	0	Channel not busy.
	1	Channel is busy.
Bit 1	0	Channel is operational.
	1	Channel is not operational.
Bit 2	0	Channel is attached to system.
	1	Channel is not attached to system.
Bit 3	0	Channel is initialized.
	1	Channel is not initialized.

2. PTRIGGER

Hex '40'	If prefix trigger log bit, bit 2 of byte X '88' is 0; prefix switch is disabled.
Hex 'D7'	If prefix trigger log bit is 1, prefix switch is enabled.

3. CPUSTAT — Status of CPU.

0000 0000	Multisystem with two CPU's.
0000 0001	Partitioned.
0000 0010	Multisystem with one CPU.

4. IOCPUID — CPU that started last I/O operation.

x'00 00 00 00'	CPU A.
x'00 00 00 08'	CPU B.

5. CPUID — ID of CPU to which this PSA belongs.

X'C1'	CPU A.
X'C2'	CPU B.

Notes:

6. STMASK — Shoulder tap mask.

Byte 1

1...	Pending. Previous external interrupt not completed processing (request for task switch if only bit on).
.1..	Enter dispatcher.
..1.	Ring bell and wait.
...1	Channel check being processed by MCH.
....1	Request for HIO.
.... xxx.	Reserved bits.

Byte 2

xxxx xxxx	Reserved bits.

Byte 3

1...	Quiesce command.
.1..	Vary CPU command.
..xx xxxx	Reserved bits.

Byte 4

1...	Start I/O on channel 0.
.1..	Start I/O on channel 1.
..1.	Start I/O on channel 2.
...1	Start I/O on channel 3.
.... 1...	Start I/O on channel 4.
.... .1..	Start I/O on channel 5.
.... ..1.	Start I/O on channel 6.
....x	Reserved bit.

7. PREFTMRA — Timer prefix field.

Zeros	Timer active.
Pointer to Prefix 2	Timer inactive.

8. FSSEMAP — Fail soft storage element map.

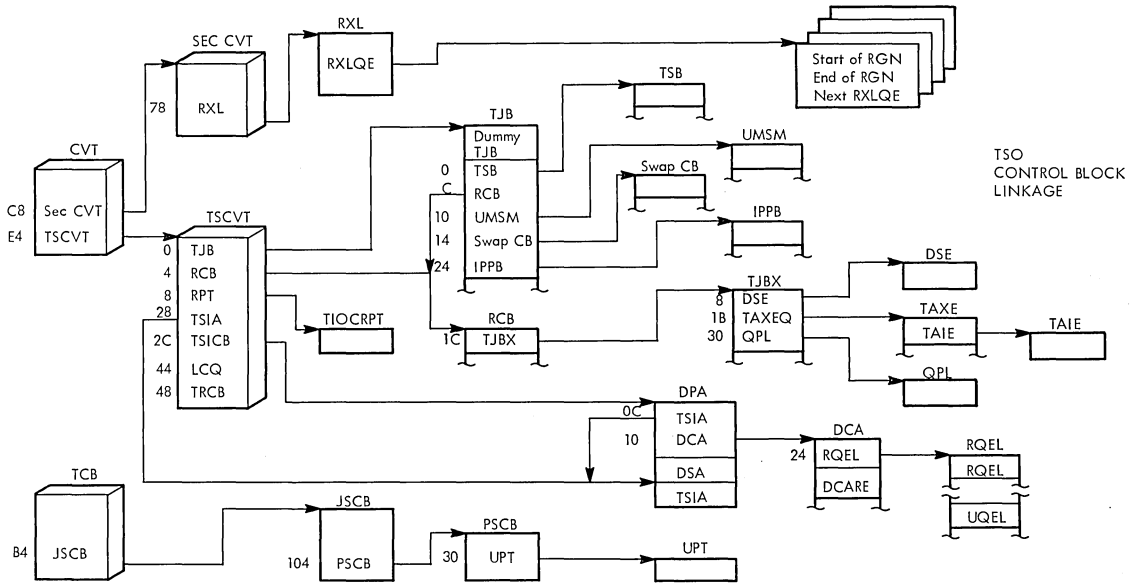
The FSSEMAP is a 128-byte (1024 bits) field at hex location 300 in a multiprocessing system. Each 2k block of main storage is described by two bits that can have the following values:

Setting	Indication
00	Normal (described by an FBQE or PQE).
10	Reserved.
01	Reserved.
11	Logically removed from the system (not described by an FBQE or PQE).

Given a main storage address (X), the corresponding 2k block (b) is:

$$b = \frac{X}{2048}$$ (Disregard remainder).

The number (n) of the first of the two bits that describe the 2k block is: n = 2*b.



CONTROL BLOCKS -- TSO

DISPATCHER SUBTASK TRACE (DTRACE)

Trace Control Word. (Pointed to by AVT + X'224')

0 (0) Address of Next Entry in Table
4 (4) Address of First Entry in Table
8 (8) Address of Last Entry in Table
C (12) Reserved

DTRACE ENTRY FORMAT

0 (0) Priority of Dispatched Element	1 (1) Address of Dispatched Element
4 (4) Entry Point of Dispatched Subroutine	
8 (8) Flag of Dispatched QCB	9 (9) Address of Dispatched QCB
C (12) MCPL (See Note)	D (13) Address of Dispatched STCB

Note: MCPL used by TCAM dispatcher to activate a routine.

Value (Hex)	Definition
06, 08, 0A	Routine at the address specified.
0C	Leased receive scheduler.
0E	SEND scheduler
10	GET scheduler.
12	PUT scheduler.
14	GET FIFO scheduler
16	LOG scheduler.
18	Dial receive scheduler.
1A	Buffered terminal scheduler.
1C	Retrieve scheduler.
1E	Local receive scheduler.

A DTRACE entry with a priority =00 and a pointer to the dummy QCB (AVT + 2BC) indicates a TCAM wait state entered.

TSO Module Component/Function ID's

TSO module names take the form of IKJccfff where IKJ represents the TSO subsystem, cc represents the component ID, and fff represents the function ID and module number. Below is a list of TSO functions and the minimum character configuration of component/function ID (ccfff) needed to identify a module to that function. (ex: IKJEAD02; IKJ represents TSO subsystem, EAD represents the TSO driver as noted below and 02 in this case represents a specific TSO driver function).

ccfff	Function
EAD	Driver
EAI	TSIP
EAR	RCT
EAS	SWAP
EAT	TSC
EBC	Copy
EBE	EDIT
EBF	FORMAT
EBL	LIST
EBM	MERGE
EFA	ACCOUNT
EFD00	DAIR
EFD20	FREE
EFD30	ALLOC
EFE	EXEC
EFF	Foreground init background
EFG	CALL
EFH	HELP
EFP	PARSE
EFR	RUN
EFT00/07	TMP
EFT25	TMP STAE
EFT30	STACK
EFT35	Services Messages
EFT40	PUTLINE
EFT45	PUTGEY
EFT55	GETLINE
EG	TEST
EHAL	LISTALC
EHCIR	CATLG INFO RTN
EHCT	LISTCAT
EHDEF	DEFAULT RTN
EHDEL	DELETE
EHDS	LISTDS
EHMEM	MEMBERS RTN
EHPRO	Protect

TSO Module Component/Function ID's (Continued)

ccfff	Function
EHREN	RENAME
EUP	ASM PROMPTER
EYP	FORT PROMPTER
FAE	TRACE WTR STAE
FAP	TRACE WTR PROCESSOR
FAT	TRACE WTR
FCB	COBAL
GY	GOFORT
KF	COBOL PROMPTER
LKL	LINK/LOADGO PROMPTER
NC	ITF INTERFACE

Comments:

TSIP ENTRY CODES

Code		Caller	Reason	Reg 0	Reg 1
D	X				
0	0	Prob Prog	Prob Prog Mode Entry	0	8 CHAR CMND ADR
1	1	TS Timr Exit Rtn	End of Time Slice	0	
2	2	TGET/TPUT	User Waiting for Term I/O	TJID	Bit-0 1 = INPUT 0 = OUTPUT
3	3	RCT	User in Non I/O Wait	0	
4	4	DEQ, TIOC, TSLIH, WTOR, SNTE, ATN.	Out of Core User Ready-swap In	TJID	
5	5	RCT	Restored Used in Long-swap Out	TJID	
6	6	ENQ	User In Must Complete	0	Time EST
7	7	DEQ	User No Longer In Must Complete	0	
8	8	Dispatcher	Dispatch Background Task		
9	9	Dispatcher	Dispatch SYS Task		
10	A	Dispatcher	Dispatch TS Task		
11	B	Dispatcher	Dispatch SYS Wait		
12	C	RCT Quiesce	Quiesce Started	TJID	
13	D	RCT Quiesce	Quiesce Complete	TJID	# FBQE's
14	E	TSC Swap	Swap Out Started	TJID	Swap SZ/ DEV Code
15	F	TSC Swap	Swap Out Completed	TJID	
16	10	TSC Swap	Swap In Started	TJID	
17	11	TSC Swap	Swap In Complete	TJID	
18	12	RCT Restore	Restore Started	TJID	
19	13	RCT Restore	Restore Complete	TJID	
20	14	Reserved			
21	15	Reserved			= EMTYLN 1 = Non-Empty LN
22	16	Reserved			
23	17	Reserved			

TSIP ENTRY CODES (Continued)

Code D	Code X	Caller	Reason	Reg 0	Reg 1
24	18	Reserved			
25	19	LOGON	To Pass LOGON Info for Accounting	0	ACCNT INFO
26	1A	TS Time Exit RTN and Set CMND	Alter Time of Day	0	TOD VAL
27	1B	TSC (INIT)/RCT (RGN Modify)	Specify Region Size		RGN ID RGN Size
28	1C	Reserved			
29	1D	RCT	TJID to be Released	TJID	
30	1E	LOGON/LOGOFF	Put User In RGN Selected by Entry Code 1F	TJID	RGN ID
31	1F	TSC/LOGON	Obtain RGN ID Approp to Size	TJID	RGN Size
32	20	TSC Swap	Swap In Failed	TJID	Bit 0 = NOTLGN 1 = LOGON
33	21	TSC Swap	Swap Out Failed	TJID	Failed USR TJID
34	22	TIOC	TGET/TPUT Was Satisfied		Bit 0 = TGET 1 = TPUT Bit 1 = All Data Transferred 1 = Partial Data Xfered
35	23	TIOC	Attention *Not Line Delete*		Bit 0 = NOEXIT 1 = EXIT
36	24	TIOC	I/O Error	TJID	
37	25	TIOC	Disconnect Terminal	TJID	
38	26	Reserved			
39	27	Reserved			
40	28	RCT/TSC	Region Failed		RGN ID
41	29	Trans Area Hndlr	Do Not Swap User	TJID	

TSIP ENTRY CODES (Continued)

Code		Caller	Reason	Reg 0	Reg 1
D	X				
42	2A	Trans Area Hndlr	Allow Swap Out of User	TJID	
43	2B	LOGOFF	Update Acct. Info for LOGOFF	TJID	
44	2C	FE Serviceability Aid			
	2D	ENQ	User In ENQ WT, Swap Out	TJID	0

***** REG 0 ALSO CONTAINS ENTRY CODE *****

Comments:

DRIVER CONTROL AREA (DCA)

Contains the current status of the TSO system, system parameters and control information, and information for each TSO region.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	1	DCA#RGNS	Number of regions used by TSO.
1	1	. 1	DCAIFLGS	Control information.
		1...	DCAIWAIT	Ignore wait estimate.
		.1..	DCAIRACT	Ignore region activity.
		..1.	DCAICORE	Ignore core occupancy.
		...1	DCAISWPL	Ignore swap load.
		.... 1...	DCAIAQST	Ignore average queue service time.
		.... .1..	DCAIBKGD	Ignore background TSO ratios.
		.... ..1.	DCAIPRTY	Ignore scheduling of priority.
		1	DCAICRQL	Ignore current RQEL.
2	2	. . 1	DCA#HPT	Region number currently at high priority.
3	3	. . . 1	DCABKGD	Percentage of background time requested.
4	4	2	DCA#UQEL	Number of UQEL's allocated.
6	6	. . 1	DCAFLAGS	Indicators.
		xxxx xx..		Reserved.
		..	DCAFRUNS	Defines type of task running.
		00	DCAFBAC	Background task.
		01	DCAFSYS	System task.
		10	DCAFWAI	Wait task.
		11	DCAFTSU	TSO user.
7	7	. . . 1	DCA#RUNR	Region number of task if TSO is running.
8	8	4	DCAKWAIT	Decay constant for wait estimate.
12	C	4	DCAKWAI2	Decay constant for wait estimate +1.
16	10	4	DCAKRACT	Decay constant for region activity.
20	14	4	DCAKRAC2	Decay constant for region activity + 1.
24	18	4	DCATSTME	CPU time used by TSO.
28	1C	4	DCABKTME	CPU time available to background.
32	20	4	DCALTOD	Time-of-day of last TSO dispatcher entry.
36	24	4	DCAQELS	Address of RQEL/UQEL area.
40	28	4	DCAUQEL0	Address of 'virtual' UQEL for TJID=0.

DRIVER CONTROL AREA REGION EXTENSION (DCARE)

Contains information pertaining to a single TSO region. There is one DCARE for each TSO region.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	2	DCAR#USR	Number of users in region.
2	2	. . 2	DCAR#RDY	Number of ready users in region.
4	4	2	DCARSIZE	Region size in units of 2k.
6	6	. . 1	DCARNHPT	Next high priority region.
7	7	. . . 1	DCARFLGS	Region flags.
		1...	DCARNOL	No log-ons allowed for this region.
		.xxx xxxx		Reserved.
8	8	4	DCARHTME	Amount of time this task can run as high priority task.
12	C	4	DCARTMIN	Time-of-day current user was swapped-in.
16	10	4	DCARTSWP	Time-of-day when current user should be swapped-out.
20	14	2	DCARTRQ	Offset of first RQEL.
22	16	. . 2	DCARCRQ	Offset of current RQEL.
24	18	4	DCARACT	Region activity estimate.
28	1C	4	DCARCPUT	Amount of CPU time used since user was swapped-in.
32	20	4	DCARUSTM	Time-of-day of last update of user's swap-in time.

DRIVER PARAMETER AREA (DPA)

Contains the parameter information which is passed to the driver by TSIP.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
0	0	2	DPATJID	TSO job ID.
2	2	. . 1	DPARES	Reserved.
3	3	. . . 1	DPAENT	Entry code.
4	4	4	DPAVAR	Contents of register 1 on entry to TSIP or return information for TSIP caller.
8	8	4	DPATOD	Time-of-day requested by Driver.
12	C	4	DPATSIA	Address of TSIA.
16	10	4	DPADCA	Address of DCA.
20	14	4	DPASILF2	Address of entry point of system initiated log-off routine.
24	18	72	DPASAVE	Driver save area.

Comments:

ENVIRONMENT CONTROL TABLE (ECT)

Contains user environment information for communication between command processors, subroutines, and the TSO subsystem.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	1	ECTRCDF	High-order bit indicates command processor has abnormally terminated.
1	1	. 3	ECTRTCD	Return code from last command processor. Abnormal termination code if ECTRCDF is set.
4	4	4	ECTIOWA	Address of input/output work area.
8	8	1	ECTMSGF	High-order bit set means delete second-level messages.
9	9	. 3	ECTSMSG	Address of second-level message chain.
12	C	8	ECTPCMD	Primary command name.
20	14	8	ECTSCMD	Subcommand name.
28	1C	1	ECTSWS	Indicators.
		1...	ECTNOPD	No operands exit in command buffer.
		.x..		Reserved.
		..1.	ECTATRM	Command processor terminated by TMP DETACH with STAE.
		...1	ECTLOGF	LOGON/LOGOFF command processor has requested TMP to log-off user.
		.... 1...	ECTNMAL	No user messages (MAIL) to be received at log-on.
		.... .1..	ECTNNOT	No broadcast NOTICES to be received at log-on.
		xx		Reserved.
29	1D	. 3		Reserved.

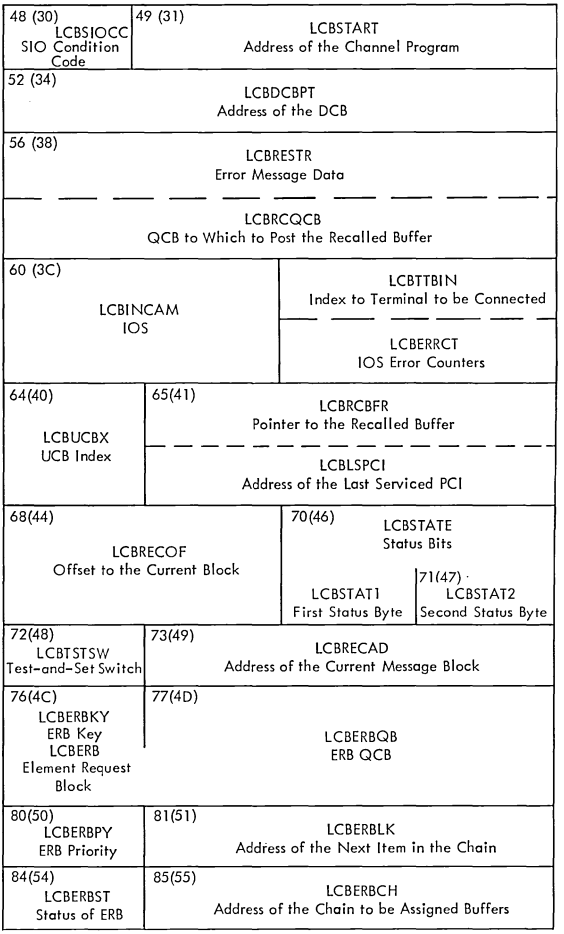
INTERPARTITION POST BLOCK (IPPB)

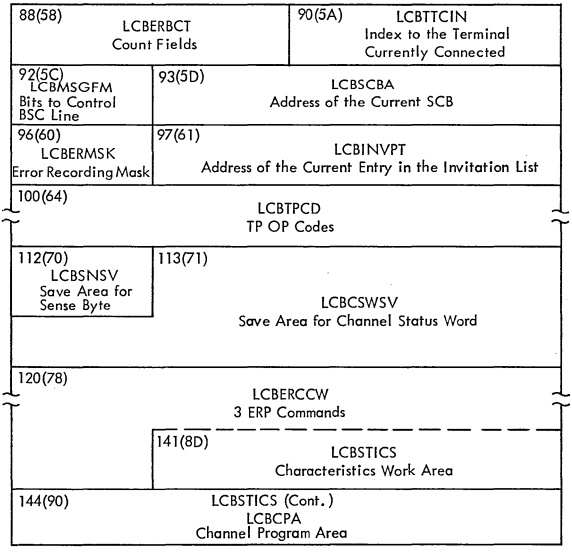
Created when an interpartition post is given to a user job not currently in main storage. Used to notify TSIP that this job is ready to be swapped-in.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	IPPBTJQ	Address of next IPPB for this TJB.
4	4	4	IPPBECB	Address of ECB to be posted.
8	8	4	IPPBCODE	Post code.
12	C	4	IPPBRATH	Reserved.

IEDQLCB

0 (0) LCBKEY Element Key of Buffer LCBRCB Resource Control Block	1 (1) LCBQCBA Address of the QCB		
4 (4) LCBPRI Priority of Buffer	5 (5) LCBLINK Link Field of Buffer		
8 (8) LCBRSKEY Receive Scheduler Key	9 (9) LCBSTCBA Address of the First STCB When LCB is a QCB		
12 (C) LCBRSPRI Receive Scheduler Priority	13 (D) LCBRSLNK Address of the Next Item in the Chain		
16 (10) LCBEOLTD End of List Time Delay		18 (12) LCBTDL Time Delay Queue Offset	19 (13) LCBTSOB TSO Status Bits
20 (14) LCBCHAIN Disposition Status Bits	21 (15) LCBINSRC In-source Chain		
24 (18) LCBNTXT Save Area for PRFNTXT	25 (19) LCBSCBDA Address of the SCB Directory LCBLNENT TNT Offset to Line Entry		
28 (1C) LCBISZE Count of Idles Reserved	29 (1D) LCBFSBFR First Buffer Assigned to this LCB LCBLSBFR Last Buffer Assigned to this LCB		
32 (20) LCBFLAG1 IOS Flags 1	33 (21) LCBFLAG2 IOS Flags 2	34 (22) LCBSENS0 Sense Byte 0	35 (23) LCBSENS1 Sense Byte 1
36 (24) LCBECBCC Completion Code	37 (25) LCBECBPT Address of the ECB		
40 (28) LCBFLAG3 IOS Flags 3	41 (29) LCBCSW Last Channel Status Word		


48 (30)
LCBSIOCC
SIO Condition Code
49 (31)
LCBSTART
Address of the Channel Program
52 (34)
LCBDCBPT
Address of the DCB
56 (38)
LCBRESTR
Error Message Data
LCBRCQCB
QCB to Which to Post the Recalled Buffer
60 (3C)
LCBINCAM
IOS
LCBTTBIN
Index to Terminal to be Connected
LCBERRCT
IOS Error Counters
64(40)
LCBUCBX
UCB Index
65(41)
LCBRCBFR
Pointer to the Recalled Buffer
LCBLSPCI
Address of the Last Serviced PCI
68(44)
LCBRECOF
Offset to the Current Block
70(46)
LCBSTATE
Status Bits
LCBSTAT1
First Status Byte
71(47)
LCBSTAT2
Second Status Byte
72(48)
LCBTSTSW
Test-and-Set Switch
73(49)
LCBRECAD
Address of the Current Message Block
76(4C)
LCBERBKY
ERB Key
LCBERB
Element Request Block
77(4D)
LCBERBQB
ERB QCB
80(50)
LCBERBPY
ERB Priority
81(51)
LCBERBLK
Address of the Next Item in the Chain
84(54)
LCBERBST
Status of ERB
85(55)
LCBERBCH
Address of the Chain to be Assigned Buffers



Offset	Name	Bytes	Description
0 (0)	LCBRCB	8	Resource control block for this LCB.
0 (0)	LCBKEY	1	Key field of the RCB.
1 (1)	LCBQCBA	3	QCB address.
4 (4)	LCBPRI	1	Priority of the RCB.
5 (5)	LCBLINK	3	Address of the next element in the chain in which this RCB is currently located.
8 (8)	LCBRSKEY	1	Receive scheduler key field.
9 (9)	LCBSTCBA	3	Address of the first STCB when the LCB is functioning as a QCB.
12 (C)	LCBRSPRI	1	Receive scheduler priority field.

Offset	Name	Bytes	Description
13 (D)	LCBRSLNK	3	Address of the next item in the chain in which this STCB currently resides.
16 (10)	LCBEOLTD	2	End of the invitation list time delay interval.
18 (12)	LCBTDL	1	Time delay queue offset to QCB address for LCB = X'14'.
19 (13)	LCBTSOB	1	TSO status byte:

Name	Bits	Value	Meaning
LCBPREP	0	X'80'	Prepare on line.
LCBWRBRK	0	X'80'	Write break in progress.
LCBTSBUF	1	X'40'	Buffer has TSO prefix.
LCBSATRD	2	X'20'	Simulated attention request.
LCBSOPL	3	X'10'	Start of polling list.
LCBREAD	4	X'08'	Reading partial line.
LCBCIRCD	5	X'04'	Circle D sent to 2741.
LCBINHBN	6	X'02'	Use inhibits for this terminal.
LCB2741N	7	X'01'	2741 on 2741/1050 line.

Offset	Name	Bytes	Description
20 (14)	LCBCHAIN	1	Disposition status byte:

Name	Bits	Value	Meaning
LCBSCRNN	0	X'80'	Screen change requested.
LCBSCRNF	0 Off	X'7F'	Mask to specify no screen change requested.
LCBEXCP	1	X'40'	Delay EXCP until association.
LCBERMSG	2	X'20'	ERP message waiting.
LCBNOPTY	3	X'10'	Text retry not possible.
LCBUREQN	4	X'08'	Unit request in progress.
LCBUREQF	4 Off	X'F7'	Mask to specify that a unit request is not in progress.
LCBBFRSZ	5	X'04'	Queue management flag.
LCBTETEN	6	X'02'	User requested tete-a-tete.
LCBTETEF	6 Off	X'FD'	Mask to specify that tete-a-tete is not requested.
LCBABRTN	7	X'01'	Abort sequence must be sent.
LCBABPTF	7 Off	X'FE'	Mask to specify that an abort sequence is not required.

21 (15)	LCBINSPC	3	In-source chain.
24 (18)	LCBNTXT	1	Temporary save area for PRFNTXT.
25 (19)	LCBSCBDA	3	Address of the SCB directory.
26 (1A)	LCBLNENT	1	Termname table offset to the line entry.
28 (1C)	LCBISZE	1	Count of idles (reserve characters) reserved.

IEDQLCB (Continued)

Offset	Name	Bytes	Description
29 (1D)	LCBFSBFR	3	First buffer assigned to this LCB.
29 (1D)	LCBLSBFR	3	Last buffer assigned to this LCB.
32 (20)	LCBFLAG1	1	IOS flags 1.
33 (21)	LCBFLAG2	1	IOS flags 2.
34 (22)	LCBSENS0	1	Sense byte 0.
35 (23)	LCBSENS1	1	Sense byte 1.
36 (24)	LCBECBCC	1	Completion code.
37 (25)	LCBECBPT	3	ECB address.
40 (28)	LCBFLAG3	1	IOS flags 3.
41 (29)	LCBCSW	7	Last CSW.
48 (30)	LCBSIOCC	1	SIO condition code.
49 (31)	LCBSTART	3	Address of the channel program.
52 (34)	LCBDCBPT	4	Address of the corresponding DCB.
56 (38)	LCBRESTR		Start of error message data.
56 (38)	LCBRCQCB	4	Address of the QCB to which recalled buffers are to be tposted.
60 (3C)	LCBINCAM	2	IOS.
62 (3F)	LCBTTBIN	2	Index of the terminal to be connected.
62 (3F)	LCBERRCT	2	IOS error counters.
64 (40)	LCBUCBX	1	UCB index.
65 (41)	LCBRCBFR	3	Pointer to a recalled buffer.
65 (41)	LCBLSPCI	3	Address of the last serviced PCI.
68 (44)	LCBRECOF	2	Offset to the start of the buffer translation routine.
70 (46)	LCBSTATE	2	Status bits.
70 (46)	LCBSTAT1	1	First status byte - bit definitions are as follows:

Name	Bits	Value	Meaning
LCBRCLLN	0	X'80'	Recall being performed.
LCBRCLLF	0	X'7F'	Mask to specify that no
	Off		recall is being performed.
LCBCTLMD	1	X'40'	Line is in control mode.
LCBCVRSP	1	X'40'	First BSC output conversational block.
LCBOCNI	2	X'20'	Non-immediate operator control operation is in progress.
LCBINITN	3	X'10'	Receiving initiate mode message.
LCBINITF	3	X'EF'	Mask to specify no
	Off		initiate mode message.
LCBCONT	4	X'08'	Continue or reset operation in progress.
LCBFREEN	5	X'04'	Line is free.
LCBFREEF	5	X'FB'	Mask to specify that the
	Off		line is not free.
LCBRECBN	6	X'02'	Line is receiving.
LCRSENDN	7	X'01'	Line is sending. (Line is stopped if bits 5, 6, & 7 are off.)

Offset	Name	Bytes	Description
71 (47)	LCBSTAT2		Second status byte - bit settings are as follows:

Name	Bits	Value	Meaning
LCBTRACE	0	X'80'	I/O trace active for this line.
LCBLOCK	0	X'80'	Line is in lock mode.
LCBTRCOF	0	X'7F'	Mask to specify that I/O
	Off		trace is not active for this line.
LCBMSGNN	1	X'40'	MSGGEN or startup
	Off		message.
LCBMSGNF	1	X'BF'	Mask to specify that this
	Off		is not a MSGGEN or startup message.
LCBBEOTN	2	X'20'	EOT from a buffered terminal (no EOM).
LCBBEOTF	2	X'DF'	Mask to specify a regular EOM if EOT
	Off		from a buffered terminal.
LCBSNDPR	3	X'10'	Send priority switch set by the send scheduler.
LCBNFGPR	4	X'08'	Negative response to polling.
LCBSYNC	5	X'04'	Line is binary synchronous.
LCBDIAL	6	X'02'	This is a dial LCB.
LCBRESP	7	X'01'	A response needs to be sent to this line.

Offset	Name	Bytes	Description
72 (48)	LCBTSTSW	1	Test-and-set switch:

Name	Bits	Value	Meaning
LCBCONCT	0	X'80'	Connection established.

73 (49)	LCBRECAD	3	Address of the current message block.
76 (4C)	LCBERB	4	Start of the ERB for this LCB.
76 (4C)	LCBERBKY	1	Element request block key field.
77 (4D)	LCBERBQE	3	Address of the QCB to which this ERB is currently tposted.
80 (50)	LCBERBPY	1	ERB priority.
81 (51)	LCBERBLK	3	Address of the next item in the chain in which this ERB currently resides.
84 (54)	LCBERBST	1	ERB status - bit settings are as follows:

Name	Bits	Value	Meaning
LCBMSG	0	X'80'	End of initiate mode.
LCBEOMSG	1	X'40'	End of message read from disk.
LCBRDERR	2	X'20'	Logical read error.
LCBRDERF	2 Off	X'DF'	Mask to specify no read error.
LCBINQ	3	X'10'	ERB is waiting for buffers from IEDQHM.
LCBERROR	5	X'04'	Error on the send side.
LCBPRCPG	6	X'02'	After the initial request is satisfied, tpost the ERB to the QCB specified in LCBRCQCE.
LCBCOMPL	6	X'02'	Disk request is complete.
LCBDLNKN	7	X'01'	Delink switch - ERB is not tposted, but is eligible to be tposted.
LCBDLNKF	7 Off	X'FF'	Mask to specify that the ERB is tposted, so PCI cannot tpost.

85 (55)	LCBERBCH	3	Address of the chain to be assigned buffers.
88 (58)	LCBERRCT	2	Count fields.
90 (5A)	LCBTTCIN	2	Index to the terminal that is currently connected.
92 (5C)	LCBMSGFM	1	Bits to control the BSC line.

Name	Bits	Value	Meaning
LCBNAK	0	X'80'	Request to send a NAK response.
LCBACK1	1	X'40'	ACK counter.

The following two bits indicate whether a scan of line control has been accomplished and the type of line control received.

LCBVSTRT	2	X'20'	Valid start sequence.
LCBRSTRT	3	X'10'	Error start sequence.
LCBTTD	4	X'08'	Temporary time delay received.
LCBENQ	5	X'04'	ENQ received.
LCBEOT	6	X'02'	EOT first character.
LCBOLT	7	X'01'	Address of the current SCB.

Offset	Name	Bytes	Description
93 (5D)	LCBSCBA	3	Address of the current SCB.
96 (60)	LCBERMSK	1	Error recording mask.
97 (61)	LCBINVPT	3	Address of the current entry in the invitation list.
100 (64)	LCBTPCD	12	TP operation codes.
112 (70)	LCBSNSV	1	Save area for the sense byte.
113 (71)	LCBCSWSV	7	Save area for the CSW.
120 (78)	LCBERCCW	24	Three ERP commands.
141 (8D)	LCBSTICS	3	Characteristics work area.
144 (90)	LCBCPA	8	Channel program area.

USER QUEUE ELEMENT (UQEL)

Represents the running job, and contains information about the current interaction, recent history, swapping load, and other data which can be used for scheduling time among the users. The UQEL also contains the location of accounting information for the user.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	2	UQELNUQL	Offset to next older UQEL (or RQEL).
2	2	. . 2	UQELPUQL	Offset to next younger UQEL (or RQEL).
4	4	1	UQELFLGS	Indicators.
		0...	UQLIND	Indicates this is a UQEL (always zero).
		.1..	UQLTIO	User in terminal I/O wait.
		..1.	UQLSWPI	User is being swapped-in.
		...1	UQLSWPO	User is being swapped-out.
		.... 1...	UQLMC	Must complete user in SMC.
		.... .1..	UQLASAP	Swap-out as soon as possible.
		.... ..1.	UQLREMV	Remove user from RQEL chain.
		1	UQLNQD	UQEL is already enqueued.
5	5	. 1	UQELRGN#	Region number for this user.
6	6	. . 1		Reserved.
7	7	. . . 1	UQELNSCT	Count of "do not swap" occurrences.
8	8	4	UQELTCO	Total main storage occupancy since last interaction.
12	C	4	UQELWAIT	Percentage wait estimate.
16	10	2	UQELSIZE	Swap load in 2,048-byte units.
18	12	. . 2	UQELRQEL	Offset to RQEL on which UQEL is enqueued.
20	14	1		Reserved.
21	15	. 3	UQELACCT	Address of accounting information.
24	18	4	UQELITOD	Initial time-of-day when user logged on.

QUEUE CONTROL BLOCK

A queue control block (QCB) is used to regulate the sequential use of elements among requesting tasks. Every queue, or item, that is waiting for service in the system is associated with a QCB. There is a master destination QCB for every destination message queue. There is another type of queue control block, called a priority QCB, for each priority level applicable for each destination QCB. The first priority QCB begins at a displacement of 40 (X'28') from the beginning of the destination QCB.

Note: There is no priority QCB for a TSO dedicated line. The QCB is truncated at the displacement 40 (X'28').

A QCB has three primary fields: a pointer to the element chain, a link address, and a pointer to the STCB chain. The element chain consists of any elements, other than the requesting resource on the ready queue, that the subtask represented by the STCB chain might need to process. The link field is used to point to another item when a QCB is on a higher queue. The STCB chain consists of pointers to the routines that are associated with the QCB.

The address of the destination QCB is in the TRMDESTQ field of the terminal table entry which is, in turn, pointed to by the termname table entry. The address of the termname table is in the AVTRNMPT field of the address vector table. The LCBSCBDA field of the line control block points to the station control block. Within an SCB is a pointer (SCBDESTO) to the queue control block.

Storage is allocated for the QCB at assembly time. The QCB is initialized partially at assembly time and partially at open time.

The figures below are the formats of the master destination queue control block and the priority QCB; descriptions of the fields follow the illustrations.

RESOURCE CONTROL BLOCK

The resource control block (IEDQRECB) is a two-word prefix to an element that allows the TCAM dispatcher to determine the disposition of an element and to determine the QCB to which an element will be tposted. Each element in the TCAM system is represented by a resource control block. The first word of the RCB is a pointer to the QCB with which the element is associated; the second word is a link field which, when the element is on a chain, points to the next item on the chain. The first word in the associated QCB may point to the RCB.

Storage is allocated for the RCB at open time for the line group or for the application program. The RCB is initialized at open time and is modified when elements are passed in the system.

Following is the format of a resource control block: descriptions of the fields follow the illustration.

IEDQRECB

0 (0) RECBKEY Key Field	1 (1) RECBQCBA QCB Address
4 (4) RECBPRI Priority	5 (5) RECBLINK Link Field

Offset	Name	Bytes	Description
0 (0)	RECBKEY	1	Key field.
1 (1)	RECBOCBA	3	Address of the QCB to which this RCB is tposted.
4 (4)	RECBPRI	1	Priority of this RCB.
5 (5)	RECBLINK	3	Address of the next RCB in the chain in which this RCB is currently located.

Master Queue Control Block DSECT: IEDQQCB

0 (0) QCBDSFLG Flag Byte	1 (1) QCBELCHN Element Chain		
4 (4) QCBPRI Priority	5 (5) QCBLINK Pointer to the Next STCB in a Chain		
8 (8) QCBSTVTO Index to the Entry in the Subtask Vector Table	9 (9) QCBSTCHN STCB Chain		
12 (C) QCBSTPRI Priority of the STCB	13 (D) QCBSLINK Pointer to the Next STCB in a Chain		
16 (10) QCBEOLDT Interrupt Time		18 (12) QCBRETCT TSO Retry Counters QCBLKRLN Lock Relative Line Number	19 (13) QCBSTAT Status of this QCB
20 (14) QCBSCBOF Offset to the Proper SCB	21 (15) QCBINSRC Chain of Source LCBs Currently Sending Initiate Mode Msgs		
	QCBSATCT Sim ATTN Output Line Count	22 (16) QCBTSOF2 Second TSO Flag Byte	23 (17) QCBTSOF1 First TSO Flag Byte
24 (18) QCBINTVL Interval for Poll Delay		26 (1A) QCBMSGCT Count of Messages in this Queue	

The following is for the master QCB:

Offset	Name	Bytes	Description
0 (0)	QCBDSFLG		Flags that indicate a specific destination QCB to the dispatcher and the message queues data set that is to receive the messages for the destination - bit definitions are as follows:

Name	Bits	Value	Meaning
QCBFQCB	6	X'02'	Indicates a QCB.
QCBREUS	3	X'10'	Indicates reusable disk queuing.
QCBNREUS	2	X'20'	Indicates nonreusable disk queuing.
QCBDISK	2,3	X'30'	Disk queues are used.
QCBCORE	1	X'40'	Flag for main storage queues:
	1,3	X'50'	Indicates main storage queues with backup on reusable disk.
	1,2	X'60'	Indicates main storage queues with backup on nonreusable disk.

1 (1)	QCBELCHN	3	Element chain pointer - contains the address of the QCB to be tposted when this QCB is removed from the time delay queue.
4 (4)	QCBPRI	1	Priority.
5 (5)	QCBLINK	3	Pointer to the next STCB in a chain.
8 (8)	QCBSTVTO	1	Index to an entry in the subtask vector table.
9 (9)	QCBSTCHN	3	STCB chain pointer.

Offset	Name	Bytes	Description
12 (C)	QCBSTPRI	1	Priority of the STCB.
13 (D)	QCBSLINK	3	Pointer to the next STCB in a chain.
16 (10)	QCBEOLDT	2	Interrupt time.
18 (12)	QCBRETCT	1	TSO retry counters.
18 (12)	QCBIKPLN	1	Lock relative line number.
19 (13)	QCBSTAT	1	Status of this QCB - bit settings are as follows:

Name	Bits	Value	Meaning
QCBEOM	0	X'80'	End of message sent.
QCBTRMHO	1	X'40'	Terminal was held.
QCBBUFRD	2	X'20'	Buffered terminal.
QCBSEND	3	X'10'	Sending to a buffered terminal.
QCBRECEV	4	X'08'	Receiving from a buffered terminal.
QCBSCHDL	5	X'04'	Put in the time delay queue when inactive.
QCBCLOCK	6	X'02'	On=clock, off=interval.
QCBTIME	7	X'01'	Delay greater than 12 hours.

20 (14)	QCBSCBOF	1	Offset to the proper SCB for this transmission; X'00' unless this line has buffered terminals.
21 (15)	QCBINSRC	3	Chain of source LCB's currently sending initiate mode messages to this destination queue.
21 (15)	QCBSATCT	1	Simulated attention output line count - TSO.
22 (16)	QCBTSOF2	1	Second TSO flag byte - bit settings are as follows:

Name	Bits	Value	Meaning
QCBINHBN	0	X'80'	Use inhibits with this terminal.
QCBBUFQ	1	X'40'	TCAM buffer being held.
QCBPOSTO	2	X'20'	QCB tposted to itself.
QCBDSSMI	3	X'10'	Start MI character sent - TSO.
QCBSATCH	5	X'04'	Simulated attention by character.
QCBSATTI	6	X'02'	Simulated attention by time.
QCBSATLC	7	X'01'	Simulated attention by line.

Offset	Name	Bytes	Description
23 (17)	QCBTSOF1	1	First TSO flag byte - bit settings are as follows:

Name	Bits	Value	Meaning
QCBWRBRK	0	X'80'	Issue a write break.
QCBTGET	1	X'40'	TGET request.
QCBTPUT	2	X'20'	TPUT request.
QCBNOBUF	3	X'10'	Insufficient buffers.
QCBSATRD	4	X'08'	Simulated attention read request.
QCBPARTO	5	X'04'	Partial output line.
QCBDELAY	6	X'02'	QCB in time delay queue.
QCBDISC	7	X'01'	User to be logged off.

24 (18)	QCBINTVL	2	Interval for poll delay.
26 (1A)	QCBMSGCT	2	Count of messages in this queue.
28 (1C)	QCBPREN	4	Address of the terminal table entry if this is a QCB for a process entry.
28 (1C)	QCBPRLVL	1	Highest priority level message.
29 (1D)	QCBLKRRN	3	Lock relative line number; link field for the QCB when it is on the time delay queue.
29 (1D)	QCBCARCT	1	Carriage position count.
30 (1E)	QCBTJID	2	TSO job identification.
32 (20)	QCBRELLN	1	Relative line number for the line this QCB represents.
33 (21)	QCBDCBAD	3	Address of the DCB.
34 (22)	QCBFLAG	1	QCB status bits - bit settings are as follows:

Name	Bits	Value	Meaning
QCBTSSES	0	X'80'	TSO session in progress.
QCBNOBRK	1	X'40'	No reverse break feature.
QCBREAD	2	X'20'	Read has priority.
QCBRSRV	3	X'10'	Reusability serviced.
QCBTERMO	4	X'08'	Queue by terminal.
QCBSDFFO	5	X'04'	Currently sending a FIFO message.
QCBPROC	6	X'02'	This QCB is for a process entry.
QCBCKPT	7	X'01'	Flag for checkpoint.

37 (25)	QCBQBACK	3	Queue-back message chain.

SUBTASK CONTROL BLOCK

The Subtask Control Block (IEDQSTCB) is a variable length table that represents the routine that performs the work of the TCAM system. The purpose of an STCB is to cause a routine to be executed. The TCAM dispatcher uses the STCB to determine the entry point of a subtask that is waiting for work. The address of the STCB is in the third word of the QCB.

Storage is allocated for the STCB at various times depending upon the type of QCB containing the STCB address. If the QCB is a destination QCB, storage is allocated for the STCB at assembly time. If the QCB is in a line control block or is a read-ahead QCB, storage is allocated for the STCB at open time for the line group or for the application program DCB. If the QCB is in the AVT, storage is allocated at assembly time. In cases where the QCB is a prefix to a module, storage is allocated for the STCB at assembly time.

In the same manner, initialization of the STCB depends upon the related QCB. If the QCB is a destination QCB, the STCB is initialized at assembly time but is modified at open time for the DCB to which it is related. If the QCB is in the LCB or is a read-ahead QCB, the STCB is initialized at open time. If the QCB is in the AVT, the STCB is initialized at assembly time and at link-edit time. If the QCB is a prefix to a module, the STCB is initialized at assembly time.

RECOVERY EXTENT LIST (RXL)

Contains information describing the location and type of storage failure within the TSO or TCAM subsystems.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	RXLTSLPA	Address of TSO link pack area.
4	4	4	RXLRXLQ	Address of first TSO/RMS RXLQE.

RECOVERY EXTENT LIST QUEUE ELEMENT (RXLQE)

Describes the bounds of the TSC region, the TCAM region, and each TSO user's region. Created at TSC and RCT initialization, there is one element for each region.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	1	RXLQFLG1	Indicators.
		....		Queue element is inactive.
		1...	RXLQFACV	If bit is on, queue element is active. Set at START TS and reset at MODIFY TSO by TSC.
		.1..	RXLQFTSC	Queue element describes TSC region. Set at START TSO by TSC.
		..1.	RXLQFTCM	Queue element describes TCAM region. Set at START TSO by TSC.
		...1	RXLQFRCT	Queue element describes user region. Set at START TSO by TSC.
		 xxxx		Reserved.
1	1	. 3	RXLQCBLK	Address of control block for this region. Address of TSC's TCB for TSC region. Address of TCAM's TCB for TCAM region. Address of RCB for TSO user region. (The address in this field depends on the bit set in RXLQFLG1).
4	4	4	RXLQRGLO	Starting address of this region.
8	8	4	RXLQRGHI	Ending address of this region.
12	C	4	RXLQLSHI	Ending address of LSQA for this region.
16	10	4	RXLQRXLQ	Address of next RXLQE. Zero, if this is last element.

REGION CONTROL BLOCK (RCB)

Contains information that is unique to each time-sharing region, such as size of region and region number. The RCB is created at TSC initialization.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	RCBRCT	Address of RCT's TCB.
4	4	4	RCBECB	ECB waited on by the RCT.
8	8	4	RCBDIECB	ECB posted when the RCT terminates.
12	C	2	RCBTJID	Terminal job ID for current TSO job executing in region.
14	E	. 2	RCBRSIZE	Size of this TSO region (in 2k blocks).
16	10	2	RCBLSQSZ	Size of LSQA for this region (in 2k blocks).
18	12	. 1	RCBNMBR	Region number assigned to this region.
19	13	. . 1	RCBPKEY	Protection key of current TSO job in this region.
20	14	1	RCBUMSMN	Number of UMSM entries.
21	15	. 1	RCBFLG	First byte of RCB flags.
		1...	RCBFQU	User whose TJID is in RCB should be quiesced
		.1..	RCBFSO	User whose TJID is in RCB should be swapped-out.
		..1.	RCBFSI	User whose TJID is in RCB should be swapped-in.
		...1	RCBFRS	User whose TJID is in RCB should be restored.
		.... 1...	RCBOCAB	Out-of-core abnormal termination processing requested.
		.... .x..		Reserved.
		.... ..1.	RCBFAT	User requested an attention exit.
		1	RCBFND	RCT should return normally to TSC.
22	16	. . 1	RCBFLG2	Second byte of RCB flags.
		1...	RCBFSE	Swap I/O has completed.
		.1..	RCBSTOP	Region stop requested.
		..1.	RCBACTV	Indicates active RCT.
		...1	RCBSTR1	Indicates region start requested. Attach an RCT.
		.... 1...	RCBSTR2	Indicates region start requested. Create log-on image.
		.... .1..	RCBDEAD	The region had abnormally terminated.
		.... ..1.	RCBLOGPR	A log-on image is being restored by IKJEAR03.
		x		Reserved.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
23	17	. . . 1	RCBFREQE	Used to save number of FBQE's.
24	18	2	RCBUTTMQ	TT map queue address of location of log-on image on swap data set.
26	1A	. . 2	RCBCUSE	Number of users currently logged-on in this region.
28	1C	4	RCBEXTNT	Address of TJBX.
32	20	4	RCBUMSM	Address of UMSM describing this region.
36	24	4	RCBSDCB	Address of Swap DCB (SWAPCB).
40	28	4	RCBPQE	Address of PQE pointer in SQA for RCT's region initialization.
44	2C	12	RCBPRG	SVC purge I/O parameter list.
56	38	4	RCBQPL	Address of QPL.
60	3C	4	RCBSTECB	ECB waited on by TSC. Used to indicate end of RCT processing in event of subsystem failure.
64	40	1	RCBRCOVR	Flags indicating current state of RCT for recovery purposes in event of subsystem failure.
		....	RCBRCOV0	IKJEAR01 initialization in progress.
		.... .1..	RCBRCOV1	IKJEAR01 main control processing in progress.
		.... 1...	RCBRCOV2	Control has been passed to IKJEAT07.
		.... 11..	RCBRCOV3	Control has been passed to IKJEAR03.
		...1	RCBRCOV4	Control has been passed to IKJEAR04.
		...1 .1..	RCBRCOV5	Control has been passed to IKJEAR02.
		...1 1...	RCBRCOV6	RCT is terminating. RCBCUSE is equal to zero.
		...1 11..	RCBRCOV7	RCT is terminating. RCBCUSE is not equal to zero.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
65	41	. 1	RCBRSFLG	Flags indicating current state of RCT for out-of-core abnormal termination.
		1...	RCBSTRT	Indicates RESTORE has started.
		.1..	RCBTCBDN	Indicates TCB's have been requeued.
		..1.	RCBQELCM	Indicates QEL restore processing has been completed.
		...1	RCBTQECM	Indicates TQE restore processing has been completed.
		.... 1...	RCBRQIQC	Indicates RQE and IQE restore processing has been completed.
		.... .1..	RCBIORSC	Indicates I/O restore processing has been completed.
		.... ..1.	RCBWTORC	Indicates WTOR restore processing has been completed.
		1	RCBTACMP	Indicates transient area restore processing has been completed.
66	42	. . 1	RCBQUFLG	Flags indicating current state of RCT for out-of-core abnormal termination.
		1...	RCBQUSTR	Indicates QUIESCE started.
		.1..	RCBIOSTR	Indicates first entry to I/O purge routine has been completed.
		..1.	RCBTADON	Indicates transient area QUIESCE has been completed.
		...1	RCBWTORD	Indicates WTOR QUIESCE processing has been completed.
		.... 1...	RCBQELDN	Indicates QEL QUIESCE processing has been completed.
		.... .1..	RCBIODON	Indicates second entry to I/O purge routine has been completed.
		.... ..1.	RCBTQEDN	Indicates TQE QUIESCE processing has been completed.
		1	RCBRQIQD	Indicates RQE and IQE QUIESCE processing has been completed.
67	43	. . . 1	RCBSWTCH	Indicators.
		.1..	RCBSWTON	Set and reset by IKJEAT07 to indicate method of locating user's control blocks. Search by TCB and TJID.
		..1.	RCBEXTRN	IKJEAR02 or IKJEAR03 is using an external routine.
		...1	RCBRMSAL	Solid machine check has occurred in the user's region.
		.... 1...	RCBRMS1U	Intermittent machine check has occurred in the user's region.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
68	44	1	RCBCONID	Console ID of start or modify command.
69	45	. 1	RCBSTAEN	Index value used to schedule STAE retry routines for the RCT.
		....	RCBSTAE0	STAE retry routine 0.
		.... .1..	RCBSTAE1	STAE retry routine 1.
		.... 1...	RCBSTAE2	STAE retry routine 2.
		.... 11..	RCBSTAE3	STAE retry routine 3.
		...1	RCBSTAE4	STAE retry routine 4.
		...1 .1..	RCBSTAE5	STAE retry routine 5.
		...1 1...	RCBSTAE6	STAE retry routine 6.
		...1 11..	RCBSTAE7	STAE retry routine 7.
70	46	. . 2		Reserved.

REGION QUEUE ELEMENT (RQEL)

Used to represent each of several service queues for a region. Each RQEL contains information necessary to schedule time among the users on this queue, to determine when a user is no longer eligible to be on the queue, and to locate the next queue to be serviced.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	2	RQELTUQL	Offset to oldest UQEL on this queue (top). If no UQEL, points to RQEL.
2	2	. . 2	RQELBUQL	Offset to newest UQEL on this queue for current cycle (bottom).
4	4	1 1... .... .1.. .... ..xx xxxx	RQELFLGS RQLIND RQLLAST	Indicators. Indicates this is an RQEL. This is the last RQEL for this region. Reserved.
5	5	. 1		Reserved.
6	6	. . 2	RQELCUQL	Offset to UQEL for user currently in main storage.
8	8	2	RQELTUQP	Offset to oldest UQEL to be placed on this queue at end of current service cycle. Zero if there are no UQELs.
10	A	. . 2		Reserved.
12	C	2	RQEL#CYC	Number of service cycles given to this queue each time the RQEL is serviced. Zero indicates the queue is to be serviced until empty.
14	E	. . 2	RQELCYC#	Number of service cycles left to give.
16	10	2	RQELSIZE	Swap load threshold (units of 2,048 bytes). No UQEL on this queue should have a swap load greater than this threshold.
18	12	. . 2	RQEL#USR	Number of users on this queue including pending user.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
20	14	4	RQELTCO	Total main storage occupancy threshold (total time the user occupied this region since last interaction).
24	18	4	RQELAQST	Desired average service time for this queue. Used to compute major time slice for each cycle.
28	1C	4	RQELTSLC	Time slice for this cycle. Major time slice given to each UQEL on this queue for this cycle.
32	20	4	RQELMSLC	Minimum major time slice for this queue.

TERMINAL I/O COORDINATOR REFERENCE POINTER TABLE (TIOCRPT)

Contains information required by the TIOC to manage the terminals.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	TIOCFBFF	Pointer to beginning of queue of free TSO buffers.
4	4	2	TIOCNBF	Total number of TSO buffers in the system.
6	6	. . 2	TIOCNFBF	Number of free TSO buffers.
8	8	2	TIOCBFSZ	Size (in bytes) of each TSO buffer.
10	A	. . 2	TIOCLDCU	Number of terminals that were connected to the system when TIOCAOMX and TIOCAIMX were last calculated.
12	C	2	TIOCOMAX	Maximum number of output buffers allowed to each terminal at START TSO time. Exceeding this number results in an QWAIT condition.
14	E	. . 2	TIOCIMAX	Maximum number of input buffers allowed to each terminal at START TSO time. Exceeding this number results in an LWAIT condition.
16	10	2	TIOCOWTH	The number of buffers that can be placed on the output queue and not result in an QWAIT condition. (QWAIT can be removed when TSBNOBF $\leq$ TIOCOWTH.)
18	12	. . 2	TIOCRSTH	The number of buffers that can be placed on the input queue and not result in an LWAIT condition. (LWAIT can be removed when TSBNIBF $\leq$ TIOCRSTH.)
20	14	1	TIOCFLG	One byte of flags.
		1...	TIOCSYLW	System in LWAIT condition. No new receive operations are initiated for any terminals until sufficient TSO buffers are returned to the free queue. Terminals presently in the receive state are locked upon completion of the current message.
		.xx.		Reserved.
		...1	TIOCTJBF	A TPUT with TJID found no TSO buffers.
		.... 1...	TIOCNOBF	A TPUT found no TSO buffers on either free queue or output queue.
		.... .1..	TIOCLOW	Log-off is waiting for TIOC to finish processing.
		xx		Reserved.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
21	15	. 1	TIOCUSCH	Percentage of change in number of logged-on users that cause TIOCAIMX and TIOCAOMX to be recalculated.
22	16	. . 2	TIOCOSCT	TIOC user count.
24	18	2	TIOCAOMX	Maximum number of output buffers allowed each terminal. (Recalculated after each log-on or log-off/hangup situation.)
26	1A	. . 2	TIOCAIMX	Maximum number of input buffers allowed each terminal. (Recalculated after each log-on or log-off/hangup situation.)
28	1C	2	TIOCUSLW	Number of buffers that must always be on the free queue to ensure that at any time there is a sufficient number of free buffers remaining for output. Less than this amount results in a system LWAIT condition.
30	1E	. . 2	TIOCUSSL	Number of users that constitutes slack time.
32	20	1	TIOCTSBS	Size of each TSB (in bytes).
33	21	. 3	TIOCTSB	Pointer to the TSB table. The TSB's are in one contiguous area of main storage.
36	24	48	TIOCSAVE	Disabled save area used by QTIP modules (SVC 101).
84	54	4	TIOCLECB	Log-off waits on this ECB until TIOC finishes processing the last user.

TERMINAL STATUS BLOCK (TSB)

Contains TIOC information concerning the status of a terminal. Obtained during initialization of TSO, there is one TSB for each TSO user.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	1	TSBSTAT	Status flags:
		1...	TSBINUSE	This TSB is being used.
		.1..	TSBLWAIT	The keyboard is locked since the maximum number of buffers allowed for input has been reached or exceeded.
		..1.	TSBDSPLY	A display screen device is being used.
		...1	TSBNOBUF	A TPUT found no TSO buffers.
		.... 1...	TSBITOFF	Prohibit nonsupervisory interterminal messages from reaching this terminal.
		.... .1..	TSBDISC	Denotes log-off has completed.
		.... ..x.		Reserved.
		1	TSBATNLD	Attention can be used for deleting input lines.
1	1	. 3	TSBTJB	Pointer to the TJB for this terminal job.
4	4	1	TSBFLG1	One byte of flags:
		1...	TSBANSR	Attention simulation has been requested.
		.1..	TSBOFLSH	Output trailer queue is to be flushed.
		..1.	TSBOWIP	An output wait is in progress. A TPUT is in progress. All other TPUT requests must wait until this one completes.
		...1	TSBWOWIP	A TPUT is waiting for another TPUT to complete.
		.... 1...	TSBIFLSH	The input queue is being flushed.
		.... .1..	TSBTJOW	A TPUT with TJID encountered a TPUT in progress.
		.... ..x.		Reserved.
		1	TSBTJBF	A TPUT with TJID found no TSO buffers.
5	5	. 3	TSBWTCB	Address of TCB for task waiting on TSBECB.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
8	8	1	TSBLNSZ	Physical line size of this terminal.
9	9	. 3	TSBOTBFP	Pointer to remaining buffers of TSO message currently being written by TSOUTPUT. This queue may at times contain only trailer buffers.
12	C	1	TSBNOBF	Number of buffers on this terminal's output queues (includes both output and output-trailer queues).
13	D	. 3	TSBOBFP	Pointer to this terminal's output queue.
16	10	1	TSBFLG2	One byte of flags:
		1...	TSBBIPI	Terminal has been prompted with the incomplete message the user was entering when a breakin occurred.
		.1..	TSBAUTON	Automatic prompting requested.
		..1.	TSBBRKIN	A breakin TPUT has interrupted an input message causing a partial line.
		...1	TSBAULST	Automatic line numbering has been started.
		.... 1...	TSBAUTOC	Automatic character prompting has been started.
		.... .1..	TSBSTAUT	Terminal is to be sent the next line number.
		.... ..1.	TSBSATN1	These bits together indicate the number of characters used for simulated attention (1-4 indicated by 0-3).
		1	TSBSATN2	
17	11	. 3	TSBITBFP	Pointer to a queue of input trailer buffers. This queue is created when a TGET is issued with a length specification less than the actual length of the incoming message. The rest of the message is put in this queue. The next TGET gets data from these buffers rather than the buffers on the input queue.
20	14	1	TSBNIBF	Number of buffers on the input queues (includes both input and input-trailer queues).
21	15	. 3	TSBIBFP	Pointer to the input buffer queue.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
24	18	1	TSBFLG3	One byte of flags:
		1...	TSBATTN	Attention has been ignored for a terminal job in QWAIT.
		.1..	TSBTJMSG	A TPUT with TJID is being processed by TCAM.
		..1.	TSBSPIT	Stop prompting after TCLEARQ or STBREAK until keyboard is unlocked.
		...1	TSBNBKSP	Next character to be moved from a user's work area to a TSO buffer is a backspace.
		 xxxx		Reserved.
25	19	. 3	TSBQCB	Pointer to the destination QCB for this terminal.
28	1C	4	TSBECB	Event control block waited on by TPUT with TJID when the TPUT routine cannot immediately complete its operation because: 1. A TPUT is already in progress, or 2. There are no TSO buffers available.
32	20	2	TSBWTJID	TJID of job waiting on TSBECB.
34	22	. . 2	TSBSTCC	A two-byte field containing:
			TSBLNDCC	The line-delete character.
			TSBCHDCC	The character delete character.
36	24	2	TSBATNLC	Number of successive output lines between simulated attention reads.
38	26	. . 2	TSBATNTC	Number of consecutive one-second intervals between simulated attention reads during which the keyboard is locked, and no output is sent.
40	28	1	TSBLNNO	Screen length (number of lines) for display station.
41	29	. 1		Reserved.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
42	30	. . 2	TSBASRCE	Equivalent of PRFSRCE in a TCAM buffer prefix. Contains information such as polling index, that is to be put in TCAM buffers when a message is sent to the terminal.
44	2C	4	TSBATNCC	Character string to be used for simulated attention.
48	30	4	TSBAUTOS	Starting and current input line number for automatic line numbering. Prompting characters for automatic character prompting.
52	34	4	TSBAUTOI	Increment value for automatic line numbering.
56	38	4	TSBERSDS	Character string used to clear screen of display station.

TIME-SHARING COMMUNICATION VECTOR TABLE (TSCVT)

A secondary CVT for communications between time-sharing components and between MVT and time-sharing components.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	TSCVTTJB	Address of TJB table.
4	4	4	TSCVTRCB	Address of RCB table.
8	8	4	TSCVTRPT	Address of reference pointer table (TIOCRPT).
12	C	2	TSCVTFLG	Flags indicating function requested of TSC.
		1...	TSCSWPND	Swap ended.
		.1..	TSCSWPBG	Swap should be started.
		..1.	TSCLOGON	A log-on is to be processed.
		...1	TSCDISC	A disconnect is to be processed.
		 xxxx		Reserved.
		xxxx xxxx		Reserved.
14	E	. . 2	TSCVTFL1	Flags indicating function requested of TSC.
		1...	TSCSSTOP	System stop requested. TSC is stopping.
		.1..	TSCRSTOP	Region stop requested.
		..1.	TSCASTOP	Abnormally terminated - Stop TS flag. Set by TSO/RMS if TCAM encounters a machine check. Set by TCAM STAE exit routine if TCAM abnormally terminates.
		...x xxxx		Reserved.
		xxxx xxxx		Reserved.
16	10	4	TSCVTSDC	Address of first DCB for swap data set.
20	14	2	TSCVTCUS	Current number of users logged on TSO.
22	16	. . 2	TSCVTLUS	Current limit of users logged on TSO.
24	18	2	TSCVTNTJ	Number of TJB's-TSB's initially allocated by TSO.
26	1A	. . 2	TSCVTSZU	Size of TJB.

TIME-SHARING COMMUNICATION VECTOR TABLE (TSCVT) (Continued)

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
28	1C	2	TSCVTCTR	Number of RCB's initially allocated by TSO.
30	1E	. . 2	TSCVTMUS	Maximum number of users logged on TSO. Set by start and modify commands.
32	20	4	TSCVTSAV	Address of TSSAVE.
36	24	4	TSCVTECB	Address of TSECB.
40	28	4	TSCVTSIA	Address of TSIA.
44	2C	4	TSCVTICB	Address of TSICB.
48	30	4	TSCVTI01	Address of entry point IKJEAI01 (TSIP branch entry).
52	34	4	TSCVTTQE	Address of TQE for TSO time slicing.
56	38	4	TSCVTI02	Address of entry point IKJEAI02 in TSO dispatcher.
60	3C	4	TSCVTI03	Address of entry point IKJEAI03 in TSO dispatcher.
64	40	4	TSCVTD02	Address of entry point IKJEAD02 in driver.
68	44	4	TSCVTLCQ	Address of top element on log-on communication queue.
72	48	4	TSCVTTRB	Address of trace control block chain.
76	4C	4	TSCVTLPA	Address of first CDE in TSO link pack area.
80	50	4	TSCVTSLF	Address of IKJEFLF (system initiated log-off).
84	54	4	TSCVTTSC	Address of TSC's TCB.
88	58	4	TSCVTSPL	Address of OS start parameter list.

TIME-SHARING COMMUNICATION VECTOR TABLE (TSCVT) (Continued)

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
92	5C	2	TSCVTRSZ	Minimum region size for log-on.
94	5E	. . 2		Reserved.
96	60	4	TSCVTSVT	SVC table entry for TSIP before START TSO.
100	64	4	TSCVTSVQ	SVC table entry for QTIP before START TSO.
104	68	4	TSCVTABN	Address of out-of-core abnormal termination (IKJEAT07).
108	6C	4	TSCVTD03	Address of entry point IKJEAD03 in driver.
112	70	4	TSCVTFLM	Address of entry point IKJEFLM.
116	74	4	TSCVTQTP	Address of entry for QTIP - IKJGGQT1.
120	78	4	TSCVTT08	Address of entry point IKJEAT08.
124	7C	4	TSCVTDMP	Address of TSDMP - IKJTSDMP.
128	80	4	TSCVTT06	Address of TCB for IKJEAT06.
132	84	4	TSCVTLS3	Address of entry point IKJEFLS3.

TIME-SHARING EVENT CONTROL BLOCK (TSECB)

Consists of the event control block table for all TSO supervisory program ECB's.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
0	0	4	TSCECB	ECB used to post TSC.
4	4	4	TSCECB1	ECB used to post IKJEAT06.
8	8	4	TSCECB2	Termination ECB used by IKJEAT06.
12	C	4	TSCECB3	ECB waited on by IKJEAT03 during log-on image processing. Posted by IKJEAR02 and IKJEAI00.

TIME-SHARING INTERFACE AREA (TSIA)

Contains the information generated by the TSO driver which is used to direct the operation of the TSO system.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	1	TSIASTAT	TSO subsystem status indicators.
		1...	TSIATMS	New time-of-day requested.
		.1..	TSIAPRI	Region of highest priority has been changed. Region number field contains ID of region to become highest priority.
		..1.	TSIAMOD	Modification is requested to region status. Each region entry must be checked to determine the change status.
		...1	TSIABKL	Make background task last.
		 xxxx		Reserved.
1	1	. 1	TSIARGN	Region number of highest priority.
2	2	. . 1	TSIACURR	Current dispatching priority of TSO task group.
3	3	. . . 1	TSIAASGN	Assigned dispatching priority of TSO task group.
4	4	4	TSIATOD	Time-of-day of next entry to driver.
8	8	1	TSIARST	Region status indicators for region #1.
		1...		Reserved
		.1..	TSIAQUI	QUIESCE. Swap-out current user.
		..1.	TSIARES	Restore. Swap-in specified user.
		...x xxxx		Reserved.
9	9	. 1		Reserved.
10	A	. . 2	TSIATJD	TJID for region #1 associated with request.
xx	xx	4		Region status indicators and TJID for region #n where n equals the number of regions specified.

TIME-SHARING INTERFACE CONTROL BLOCK (TSICB)

Contains the driver parameter area (DPA), a save area, and the time-sharing interface area (TSIA).

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
0	0	96	TSICBDPA	Driver parameter area.
96	60	72	TSICBRSV	Driver save area for TSIP.
168	A8	0	TSICBTSI	Beginning of TSIA.

Comments:

TIME-SHARING JOB BLOCK (TJB)

Contains information about the job status of a TSO which must be retained in main storage when the job is swapped-out.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
0	0	4	TJBTSB	Address of TSB for this job. Zero if started by operator.
4	4	1	TJBATTN	Number of unprocessed attentions for this job.
5	5	. 1	TJBSTAX	Number of unprocessed STAX exits.
6	6	. . 1	TJBSTAT	First byte of status indicators.
		1...	TJBNJB	This TJB is currently unused.
		.1..	TJBINCOR	User is in region.
		..1.	TJBLOGON	Set at dial-up to request log-on.
		...1	TJBIWAIT	Terminal job is in input wait.
		.... 1...	TJBOWAIT	Terminal job is in output wait.
		.... .1..	TJBSILF	System-initiated log-off indicates RCT should invoke IKJEAT07.
		.... ..1.	TJBDISC	Disconnect the terminal line.
		1	TJBSILF2	System-initiated log-off processing in progress.
7	7	. . . 1	TJBSTAT2	Second byte of status indicators.
		1...	TJBHUNG	User hung up data set without logging off.
		.1..	TJBHOLD	User in QWAIT due to hold option.
		..1.	TJBOCAB	TSO failure resulting in out-of-core abnormal termination.
		...1	TJBRNAV	User cannot be logged off because of machine check in region or no region large enough.
		.... 1...	TJBSURSV	On next swap-in, do not mark swap unit available for use.
		.... .1..	TJBQUIS	QUIESCE functions have started for the user.
40	28	.... ..1.	TJBUSRR	User is ready to run.
		1	TJBDEAD	Used by IKJEAT07 to indicate abnormal termination recursion.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
8	8	4	TJBEXTNT	Address of TJBX.
12	C	4	TJBRCB	Address of RCB for this region.
16	10	4	TJBUMSM	Address of UMSM for this region.
20	14	4	TJBSDCB	Address of swap DCB (SWAPCB) for this region.
24	18	2	TJBUTTMQ	Offset in TT map of TT map queue for this user.
		1...	TJBUTTMP	Indicates parallel swap.
26	1A	. . 1	TJBRSTOR	Restore flags.
		1...	TJBOWP	Post output wait. Ends QWAIT condition.
		.1..	TJBIWP	Post input wait. Ends IWAIT condition.
		..x.		Reserved.
		...1	TJBLOGP	Post log-on ECB.
		.... 1...	TJBLWAIT	User in long wait. Swap out if not made ready by RESTORE processing.
		.... .x.x		Reserved.
		.... ..1.	TJBFAT	An attention exit has been requested for the user.
27	1B	. . . 1	TJBUMSMN	Number of map entries in UMSM.
28	1C	8	TJBUSER	User ID for this job owner. Padded right with blanks.
36	24	4	TJBIPPB	IPPB chain of ECB's to be posted by RESTORE.
40	28	1	TJBNEWID	Region ID into which this user should be logged on. Zero if region is selected by the driver.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
41	29	. 1	TJBFLUSL	STAX level of last STAX issued with NOPURGE option.
42	2A	. . 2	TJBTJID	Terminal job ID.
44	2C	1	TJBMONI	Monitor command indicating information requested.
		1...	TJBMDSN	DSnames.
		.1..	TJBMJBN	Jobnames.
		..1.	TJBMSES	Session.
		...1	TJBMSPA	Space.
		.... 1...	TJBMSTA	Status.
		.... .1..	TJBGETBF	TPUT should attempt to obtain additional buffers for the user before entering a wait condition.
		xx		Reserved.
45	2D	. 1		Reserved.
46	2E	. . 2	TJBLINE	Binary representation of the unit address of the line being used.

TIME-SHARING JOB BLOCK EXTENSION (TJBX)

Contains status information about each TSO job. The TJBX is obtained by the RCT during initialization, and is swapped-out with the job.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
0	0	4	TJBXFST	Address of log-on TCB which is first in user TCB subgroup.
4	4	4	TJBXLAST	Address of last TCB in user TCB subgroup.
8	8	4	TJBXDSE	Address of DSE used by TSO's dynamic allocation.
12	C	4	TJBXSVRB	Address of first SVRB removed from transient area user queues.
16	10	4	TJBXRQE	Address of first RQE removed from the asynchronous exit queue (AEQA).
20	14	4	TJBXIQE	Address of first IQE removed from the asynchronous exit queue (AEQJ).
24	18	4	TJBXTAXE	Queue of TAXEs used to schedule attention exits.
28	1C	4	TJBXLECB	Log-on ECB posted by RCT.
32	20	8	TJBXPSWD	User's log-on password. If blank, not required.
40	28	4		Reserved.
44	2C	4	TJBXAIQE	Address of attention IQE currently being processed.
48	30	4	TJBXQPL	Address of QPL.
52	34	2	TJBXNQPE	Number of entries in QPL.
54	36	. . 2	TJBXNTCB	Number of TCB's active in user job step.
56	38	2	TJBXLQPL	Length of QPL.

Offset Dec	Offset Hex	Bytes and Alignment	Field Name	Field Description
58	3A	. . 1	TJBXHBFL	Current value of last HOLDBUF level used by IKJEAX00.
59	3B	. . . 1		Reserved.
60	3C	4	TJBXACT	TTR of ACT on SYSJOBQE.
64	40	4	TJBXAECB	Address of log-on/log-off ECB until log-on processing. Then CSCB CANCEL ECB after CSCB is created.
68	44	4	TJBXKEYA	Address of protection key save area used and obtained by the RCT.

USER MAIN STORAGE MAP (UMSM)

Contains entries describing the allocated main storage of each TSO job. The UMSM is used by the swap routine.

Offset		Bytes and		
Dec	Hex	Alignment	Field Name	Field Description
0	0	2	UMSMBG	Two high-order bytes of beginning address of a segment of main storage to be swapped.
2	2	. . 2	UMSMLN	Two high-order bytes of three-byte length value or segment of main storage to be swapped.
These two fields are repeated for the number of entries contained in the UMSM.				

APPENDIX I. SYSTEMS REFERENCE LIBRARY (OS PUBLICATIONS)

Title	Order Number
OS VTOC Overlay for LISTVTOC Function	SM08-0033
S/360 Operator's Reference Guide	SR20-1078
S/360 Catalog of Programs	GC20-1619
OS PSM's	G220-2004
S/360 Models 25, 30, 40, 50, 65, 75, 85	G520-2114
FE Microfiche Handbook	S229-0014
OS FE Handbook	S229-3169
OS Exercise Deck	SV25-6463
OS Introduction	GC28-6534 GCB8-6534 (fiche)
OS Concepts and Facilities	GC28-6535 GCB8-6535 (fiche)
OS Job Control Language	GC28-6539 GCB8-6539 (fiche)
OS Operator's Guide	GC28-6540 GCB8-6540 (fiche)
OS Service Aids	GC28-6719
OS System Programmer's Guide	GC28-6550 GCB8-6550 (fiche)
OS Storage Estimates	GC28-6551 GCB8-6551 (fiche)
OS System Generation	GC28-6554 GCB8-6554 (fiche)
OS System Control Blocks	GC28-6628 GCB8-6628 (fiche)
OS Job Control Language Charts	GC28-6632
OS Master Index	GC28-6644 GCB8-6644 (fiche)
OS Programmer's Guide to Debugging	GC28-6670 GCB8-6670 (fiche)
OS Tape Labels	GC28-6680
OS Checkpoint/Restart Planning Guide	GC28-6708 GCB8-6708 (fiche)
OS System Management Facilities Planning	GC28-6712
OS Release 18 Guide	GC28-6718
S/360 System Summary	GA22-6810
S/360 Principles of Operation	GA22-6821
S/360 Bibliography	GA22-6822
OS Maintenance Program	GC27-6918 GCB7-6918 (fiche)
OS Introduction to Main Storage Hierarchy Support for 2361 Core Storage	GC27-6942 GCB7-6942 (fiche)
OS 7094 Emulator for Model 85	GC27-6944 GCB7-6944 (fiche)

APPENDIX I. (Continued)

Title	Order Number
ALGOL	
OS ALGOL to PL/I LCP	GC33-2000
OS ALGOL Programmer's Guide	GC33-4000 GCC3-4000 (fiche)
OS ALGOL Language	GC28-6615
ASSEMBLER	
OS Assembler F Programmer's Guide	GC26-3756 GCB6-3756 (fiche)
OS Assembler Language	GC28-6514 GCB8-6514 (fiche)
OS Assembler E Programmer's Guide	GC28-6595 GCB8-6595 (fiche)
AUTOMATIC TESTING PROGRAMS	
OS TESTRAN	GC28-6648 GCB8-6648 (fiche)
OLTEP	GC28-6650 GCB8-6650 (fiche)
COBOL	
OS COBOL to PL/I LCP	GC33-2001
COBOL Differences	GC28-6395 GCB8-6395 (fiche)
OS USASI COBOL Language	GC28-6396
OS USAS COBOL	GC28-6399
OS COBOL ANS Version 3	GC28-6406
OS COBOL Language	GC28-6516 GCB8-6516 (fiche)
COBOL General Information	GF28-8053
CONTROL PROGRAM	
OS Data Management Macroinstruction Planning for 1419	GN21-5111
OS Messages and Codes	GC28-6631 GCB8-6631 (fiche)
OS Supervisor and Data Management Services	GC28-6646 GCB8-6646 (fiche)
OS Supervisor and Data Management Instructions	GC28-6647 GCB8-6647 (fiche)
OS Model 65 Shared Main Storage Multiprocessing	GC28-6671
OS Planning for Rollout/Rollin	GC27-6935 GCB7-6935 (fiche)
OS Planning for MFT II	GC27-6939 GCB7-6939 (fiche)

APPENDIX I. (Continued)

Title	Order Number
OS Planning for Display Operator Consoles	GC27-6950
FORTRAN	
OS FORTRAN to PL/I LCP	GC33-2002
OS FORTRAN IV Language	GC28-6515 GCB8-6515 (fiche)
OS FORTRAN IV Library Subprograms	GC28-6596 GCB8-6596 (fiche)
OS FORTRAN IV E Programmer's Guide	GC28-6603 GCB8-6603 (fiche)
Basic FORTRAN IV Language	GC28-6629 GCB8-6629 (fiche)
OS FORTRAN IV G and H Programmer's Guide	GC28-6817 GCB8-6817 (fiche)
FORTRAN Library Subprograms	GC28-6818
OS/1130 FORTRAN IV Subroutines for Data Transmission	GC27-6937
GRAPHICS	
OS Graphic Programming Services for 2250 Display Unit	GC27-6909 GCB7-6909 (fiche)
OS Basic Graphic Programming Services 2260 Display Station	GC27-6912 GCB7-6912 (fiche)
OS Graphic Programming Services for 2280 and 2822 Film Units	GC27-6927 GCB7-6927 (fiche)
OS Graphic Subroutine Package for FORTRAN IV, COBOL, and PL/I	GC27-6932 GCB7-6932 (fiche)
OS Users Guide for Job Control for 2250 Display Unit	GC27-6933 GCB7-6933 (fiche)
OS/1130 Users Guide for Job Control 2250	GC27-6938 GCB7-6938 (fiche)
LINKAGE EDITOR	
OS Linkage Editor	GC28-6538 GCB8-6538 (fiche)
PL/I	
OS PL/I F Planning Guide	GC33-0002
PL/I Introduction Guide for FORTRAN Users	SC20-1637
PL/I Introduction to Compile-Time Facilities	SC20-1689
OS PL/I Subroutine Library, Computational Subroutines	GC28-6590 GCB8-6590 (fiche)
OS PL/I F Programmer's Guide	GC28-6594 GCB8-6594 (fiche)
PL/I Primer	SC28-6808
PL/I F Reference Manual	GC28-8201 GCB8-8201 (fiche)

Title	Order Number
REMOTE JOB ENTRY	
OS Remote Job Entry	GC30-2006 GCC0-2006 (fiche)
OS Remote Job Entry Planning for IBM 2770 Remote Job Entry Support	GC30-2015
REPORT PROGRAM GENERATOR	
OS Report Program Generator	GC24-3337
Report Program Generator Translator	GC26-5999
SORT/MERGE	
OS Sort/Merge	GC28-6543
OS Sort/Merge Timing Estimates	GC28-6662 GCB8-6662 (fiche)
OS Sort/Merge Timing Estimates for 2420 Planning Guide	GC28-6707
TELECOMMUNICATIONS	
OS/DOS Planning for Improved BTAM Support - BSC	GC30-1005
OS QTAM Message Processing Program Services	GC30-2003 GCC0-2003 (fiche)
OS BTAM	GC30-2004 GCC0-2004 (fiche)
OS QTAM Message Control Program	GC30-2005 GCC0-2005 (fiche)
S/360 Introduction to Teleprocessing	GC30-2007
OS BTAM Planning for IBM 2741	GC30-2009 GCC0-2009 (fiche)
OS BTAM Planning for IBM 2760	GC30-2017
OS Planning for Telecommunication Access Methods	GC30-2020
TIME SHARING	
OS Time Sharing Option - TSO Assembler	GC26-3734
OS Time Sharing Option - COBOL Prompter	GC28-6404
OS Time Sharing Option - TSO Planning	GC28-6698
OS Time Sharing Option - Facilities PL/I	GC28-6827
OS Time Sharing for Interactive Terminal Basic	GC28-6828
UTILITIES	
OS Planning for Utilities	GC21-5003
OS Utilities	GC28-6586

Title	Order Number
ALGOL	
ALGOL to PL/I LCP	GY33-7006
ALGOL F Compiler	GY33-8000
ASSEMBLER	
Assembler E	GY26-3598
Assembler F	GY26-3700
AUTOMATIC TESTING PROGRAMS	
TESTRAN	GY28-6611
OLTEP	GY28-6651
COBOL	
USA STANDARD COBOL	GY28-6395
COBOL to PL/I LCP	GY33-7007
CONTROL PROGRAM	
Sequential Access Method	GY28-6604
Introduction to Control Program Logic	GY28-6605
Catalog Management	GY28-6606 GY26-8013(TNL)
DASD Space Management	GY28-6607
I/O Support Open/Close/EOV	GY28-6609
Fixed Task Supervisor	GY28-6612
Job Management	GY28-6613
I/O Supervisor	GY28-6616
BDAM	GY28-6617
Indexed Sequential Access Method	GY28-6618
MVT Control Program Logic Summary	GY28-6658
MVT Supervisor	GY28-6659
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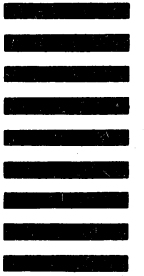

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(U.S.A. only)

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