60449200

CONTROL DATA CORPORATION

509

NOS VERSION 1 SYSTEMS PROGRAMMER'S INSTANT

CDC® COMPUTER SYSTEMS:
CYBER 170 SERIES
CYBER 70
MODELS 71, 72, 73, 74
6000 SERIES

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REVISION RECORD	
REV	DESCRIPTION
A	Manual released. Reflects NOS 1.0 at PSR
(07-18-75)	level 404.
B	Revised to update manual to NOS 1.1 at PSR
(03-02-76)	level 419 to make typographical and technical
	corrections. New features, as well as
	changes, deletions, and additions to informa-
	tion in this manual are indicated by bars in
	the margin or by a dot near the page number
	if the entire page is affected. This edition
	obsoletes all previous editions.
C	Revised to update manual to NOS 1.2 at PSR
(01-10-77)	level 439 and to make typographical and
	technical corrections. Sections 5 (Instruc-
	tions) and 6 (External Function Codes) have
	been removed. The information previously in
	these sections is available in the following
	manuals: CYBER 170 Computer System Codes
	(pub. no. 60420010); 6000/CYBER 70 Series
	Codes Manual (pub. no. 60149100); and 3000
	Series Peripheral Equipment Codes Manual
	(pub. no. 60113400). This edition obsoletes
	all previous editions.
D	Revised to update manual to NOS 1.3 at PSR
(08-07-78)	level 472 and to make typographical and
	technical corrections. New features include
	user access to ECS, 580 PFC support, ATS/

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REVISION RECORD (CONTD)

REV	DESCRIPTION
	block ID support, enhanced preserved file
	recovery, on-line reconfiguration of RMS,
	844 full tracking, Interactive Facility sup-
	port, PF utility RAM improvements, CDC
	CYBER Interactive Debug support, user file
	privacy,control use of password, CCL
	support, and network products support. This
	edition obsoletes all previous editions.
E	Revised to update manual to NOS 1.4 at PSR
(07-13-79)	level 498 and to make typographical and
	technical corrections. New features include
	on-line ECS diagnostic support; expanded
	ECS status information; 7155/885 disk drive
	support; deadstart from mass storage; CDC
	CYBER 170 Series, Model 176 support; and
	16-word PFC support. This revision obso-
	letes all previous editions.
F	Revised to update manual to the first correc-
(03-31-80)	tive code release following NOS 1.4 and to
	include Mass Storage Subsystem support and to
	make typographical and technical corrections.
	This revision obsoletes all previous
	editions.
XDEL	section 5,6 deleted.
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	RECEIVED
	844 layout 3-69.1
	04 SEP 1980
	DAVID E. LEE
	recall periodic/auto 419
	system sector 3-34,35,36

LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual, are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

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PREFACE

Network Operating System (NOS) Version 1.4 provides network capabilities for time-sharing and transaction processing, in addition to local and remote batch processing on CDC® CYBER 170 Series Computer Systems; CDC CYBER 70 Series, Models 71, 72, 73, and 74 Computer Systems; and CDC® 6000 Series Computer Systems.

AUDIENCE

This manual provides condensed descriptions of console commands; systems oriented control statements; central memory tables; and function requests for analysts, programmers, and operators. The user of this manual should have a thorough knowledge of NOS.

CONVENTIONS

Extended memory for the CDC CYBER 170 Models 171, 172, 173, 174, 175, 720, 730, 750, and 760 is extended core storage (ECS). Extended memory for CDC CYBER 170 Model 176 is large central memory (LCM) or large central memory extended (LCME). ECS and LCM/LCME are functionally equivalent, except as follows:

- LCM/LCME cannot link mainframes and does not have a distributive data path (DDP) capability.
- LCM/LCME transfer errors initiate an error exit, not a half exit. Refer to the COMPASS Reference Manual for complete information.

Model 176 supports direct LCM/LCME transfer COMPASS instructions (octal codes 014 and 015). Refer to the COMPASS Reference Manual for complete information.

In this manual, the acronym ECS refers to all forms of extended memory on the CDC CYBER 170 Series. However, in the context of a multimainframe environment or DDP access, Model 176 is excluded.

RELATED PUBLICATIONS

Descriptions of NOS control statements and character sets are contained in the NOS Version 1 Applications Programmer's Instant, publication number 60436000.

The following manuals provide more detailed descriptions of these subjects.

Control Data Publication	Publication Number
COMPASS Version 3 Instant	60492800
COMPASS Version 3 Reference Manual	60492600
CYBER 70/Model 71 Computer System Reference Manual	60453300
CYBER 70/Model 72 Computer System Reference Manual	60347000
CYBER 70/Model 73 Computer System Reference Manual	60347200
CYBER 70/Model 74 Computer System Reference Manual	60347400
CYBER 170 Computer System Codes	60420010
CYBER 170 Computer System Models 720, 730, 750, 760, and 176 (Level B) Hardware Reference Manual	60456100
CYBER 170 Computer Systems Reference Manual	60420000
ECS Description/Programming Manual	60347100
Manual Abstracts Guide to NOS Software Manuals	84000420
NOS Version 1 Installation Handbook	60435700
NOS Version 1 Operator's Guide	60435600
NOS Version 1 Reference Manual Volume 1	60435400
NOS Version 1 Reference Manual Volume 2	60445300
NOS Version 1 System Maintenance Reference Manual	60455380

Control Data Publication	Publication Number
3000 Series Peripheral Equipment Codes Manual	60113400
6000/CYBER 70 Series Codes Manual	60141900
6400/6500/6600 Computer Systems Reference Manual	60100000

DISCLAIMER

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features or undefined parameters.

CONTENTS

CONSOLE COMMANDS

SYSTEM DISPLAY (DSD) COMMANDS

DSD DESCRIPTION

DSD is an interpretive display driver. When a console operator is typing a command, DSD completes the command as soon as it recognizes enough characters to establish the uniqueness of the command. Moreover, DSD does not accept or display illegal characters.

DISPLAY SELECTION

The system displays can be selected by the console command

xy. (CR)

where x and y represent the letter designations of the displays; x appears on the left screen and y appears on the right. If x and y are identical, both screens display the same information.

Letter Designation	Display	Description
A	Dayfile	Chronological history of operation; includes the system (A, .) display, the account (A, ACCOUNT FILE.) display, and the error log (A, ERROR LOG.) display.
B	Job status	Current status of all jobs assigned to control points.
C, D	Central memory	Portions of the contents of central memory in five groups of four octal digits and their display code equivalents.

Letter Designation	Display	Description
E	Equipment status	Status of peripheral devices; includes the equipment status table (E, . or E, A.) display, the mass storage configuration (E, C.) display, the mass storage table (E, M.) display, the resource mounting preview (E, P.) display, and the tape status (E, T.) display.
F, G	Central memory	Portions of the contents of central memory in four groups of five octal digits and the display code equivalents.
H	File name table (FNT)	Lists, by type, † all files in the system: CM Common file. FA Fast-attach file. IN Input file. LI Library file (read-only common file). LO Local file. PM Direct access permanent file. PR Print file. PT Primary terminal file. PH Punch file. RO Rollout file. SY System file. S1 Special file type 1. S2 Special file type 2. S3 Special file type 3. TE Timed/event rollout file.

†If an asterisk follows the file type mnemonic, the file is locked.

Letter Designator	Display	Description
I	BATCHIO status	Status of central site unit record devices.
J	Control point status	Displays the status of a specified control point.
K, L	CPU program-mable	Dynamic operator/CPU program communication.
M	ECS display	Contents of ECS.
N	File display	Contents of any file in FNT.
O	Transaction status	Status of transaction sub-system; includes the task library directories (O, TA.) display, the transaction terminal status (O, TR.) display, and the sub-control point status (O, SU.) display.
P	PP communi-cations area	Current contents of PPU registers.
Q	Queue status	Status of input/output/ rollout queues.
R	Export/ Import status	Status of Export/Import subsystem operations.
S	System control information	Parameters used to control job flow.
T	Time-sharing status	Status of time-sharing job processing.
Y	Monitor functions	Lists all monitor mnemonics and codes.
Z	Directory	List of the letter desig-nators and description of all DSD displays.

SPECIAL FIRST CHARACTER ENTRIES

* Alternates display control between DSD and DIS each time * key is pressed.

= Alternates left screen display between its absolute and relative setting (applicable only to memory displays C, D, F, G, or M).

\+ Advances left screen display as follows:

Memory (C, D, F, G, or M)	Advances display address by 40_8.
E	Advances to next page of equipment status display.
H	Advances to next page of FNT display.
N	Advances file displayed by one sector.
P	Advances to next page of P display.
R, T	Advances to next page of R or T display.
A, J, K, L	Advances control point number of control-point oriented display.

\- Changes left screen display as follows:

Memory (C, D, F, G, or M)	Decrements display address by 40_8.
E	Advances equipment status display by one page.
H	Advances FNT display one page.
N	Backspaces file displayed by one sector.
P	Decrements one page of P display.
R, T	Decrements one page of R or T display.
A, J, K, L	Decrements control point number of control-point oriented display.

right blank (display)	Advances left screen display sequence established by SET command.
/	Advances left screen memory display by the value in the lower 18 bits of the first word displayed.
(	Advances right screen as described for + key.
)	Changes right screen as described for - key.
CR (carriage return)	Sets repeat entry flag. The subsequent entry is processed but not erased after completion. Flag is cleared by pressing the left blank (erase) key.

CONTROL CHARACTERS

left blank (erase)	Clears current keyboard entry and any resultant error messages.
BKSP (clear)	Deletes last character typed and clears error messages.
CR (carriage return)	Initiates processing of entered command.

SYSTEM DISPLAY COMMANDS

DISPLAY, xxx. Displays file with FNT ordinal xxx on the left screen N display.

H, x. Specifies the type of files to appear on the H display:

x		
	A	All files.
	C	Common files.
	I	Input files.
	L	Local files.
	O	Output files.
	P	Punch files.
	R	Rollout files.
	T	Timed/event rollout files.

m,n. Sets control-point oriented display m (A, C, D, F, G, J, K, or L) to display only control point n information.

n Control point number.

xz,aaaaaa. x Letter designation of a storage display (C, D, F, G, or M).

z Type of display modification:

z=0-3 Changes the specified group to display the eight words beginning at location aaaaaa.

z=4 Changes the entire display to display the memory contents beginning at location aaaaaa.

z=5 Increments the display by aaaaaa locations.

z=6 Decrements the display by aaaaaa locations.

aaaaaa Location parameter (as explained previously).

SET,ssss. Preselects left screen display sequence.

ssss Letter designating any four DSD displays. Pressing the right blank key after SET is entered causes each display to appear on the left console screen in the sequence specified by ssss.

DAYFILE COMMANDS

A.	Resets the A display to the beginning of the system dayfile buffer.
A,.	Resets the A display to the system dayfile when the error log dayfile, account dayfile, or one of the control point dayfiles is currently being displayed.
A,n.	Displays the dayfile buffer for control point n.
A,ACCOUNT FILE.	Displays the account dayfile buffer on the left console screen.
A,ERROR LOG.	Displays the error log dayfile buffer on the left console screen.
ACCOUNT, xx. †	Requests that account dayfile be dumped to equipment xx. If xx is omitted, the dayfile is dumped to the print queue.
DAYFILE,xx. †	Requests that the system dayfile be dumped to equipment xx. If xx is omitted, the dayfile is dumped to the print queue.
ERRLOG,xx. †	Requests that error log dayfile be dumped to equipment xx. If xx is omitted, the dayfile is dumped to the print queue.

JOB PROCESSING CONTROL COMMANDS

n.CKP.	Requests checkpoint of job at control point n.
CPxx,yy.	Assigns a numeric identifier yy to card punch xx.
CRxx,yy.	Assigns a numeric identifier yy to card reader xx.

† Equipment identifier xx applies only to tapes and disks. It is not supported for unit record equipment.

DELAY, t_1 xxxx, . . . , t_n xxxx.

Changes system delay parameters:

t_i	Delay
JSxxxx	Job scheduler delay interval in seconds.
CRxxxx	CPU recall period in milliseconds.
ARxxxx	PPU auto recall interval in milliseconds.
CSxxxx	CPU job switch interval in milliseconds.

JS, CR, AR, and CS may not be set to zero.

n. DROP. Drops the job currently assigned to control point n.

ENID, yy, zzz. Enters identifier; assigns a numeric identifier yy ($0\text{-}67_8$) to the batch or system origin print or punch type file specified by FNT ordinal zzz.

n. ENPR, xx. Enters CPU priority xx ($1\text{-}70_8$) for job currently assigned to control point n.

n. ENQP, xxxx. Enters queue priority of xxxx (MNPS to MXPS) for the job currently assigned to control point n.

ENPR, xxxx, yyy. Enters a priority of xxxx for a file specified by FNT ordinal yyy.

ENQP, xxxx, yyy. Enters queue priority of xxxx for a queue type file specified by FNT ordinal yyy.

n. ENTL, xxxxx. Enters time limit of xxxxx for job currently assigned to control point n.

FORMxx, ff. Assigns forms code, ff, to the line printer or card punch identified by equipment number xx. Forms code consists of two alphanumeric characters or null entry.

n. KILL. Drops the job currently assigned to control point n with no exit processing.

LOAD, xx, yy. Requests that a job be loaded from equipment xx. Job is assigned identifier yy ($0\text{-}67_8$).

LPxx, yy.
or
LRxx, yy.
or
LSxx, yy.
or
LTxx, yy.

Assigns identifier yy ($0\text{-}67_8$) to the line printer identified by equipment number xx.

MSAL, t=ord_1, ..., ord_n.

Provides mass storage allocation to control which files go to each nonremovable mass storage device (limit of one file type per entry with multiple device ordinals permitted).

t	File Type
B	LGO.
D	Dayfile.
I	Input.
L	Local.
O	Output.
P	Primary.
R	Rollout.
S	Secondary rollout.
T	Temporary.

ord_i = EST ordinal of a nonremovable mass storage device. If a file type is specified without assigning a device ordinal, the system assigns the file type to an existing temporary device with a t=T attribute.

n.OVERRIDE. Drops jobs performing operations unaffected by n.DROP, n.KILL, or n.STOP. The console keyboard must be unlocked.

PURGE, xxx. Purges queue type file identified by FNT ordinal xxx from the system.

PURGEALL, t. Purges all files of queue type t from the system:

t	File Type
I	Input.
O	Output.
P	Punch.
R	Rollout.
T	Timed/event rollout.

QUEUE, ot, qt, qp_1xxxx, ..., qp_nxxxx. Alters the queue priorities associated with the input, rollout, and output queues.

ot	Job Origin Type
SY	System.
BC	Local batch.
TX	Time-sharing.
EI	Remote batch.
MT	Multiterminal.

ot	Job Class Type
NS	Network supervisor.

qt	Job Queue Type
IN	Input.
RO	Rollout.
OT	Output.

qp	Queue Priority
LPxxxx	Lowest priority at which a job can enter the queue and still be aged (MNPS≤xxxx≤ MXPS).
OPxxxx	Original (entry) priority; the entry associated with the job when it initially enters the specified queue.
UPxxxx	Highest priority a job can reach in the specified queue; aging stops when this priority is reached.
INxxxx	Number of scheduler cycles before incrementing the job priority by one.

n. RERUN, xxxx. Terminates the job currently assigned to control point n, then reruns the job from the beginning with a queue priority of xxxx (MNPS≤xxxx≤MXPS). Job is not rerun if NORERUN control is set.

ROLLIN, xxx. Allows job identified by FNT ordinal xxx to be scheduled to an available control point by assigning it maximum queue priority (MXPS).

n. ROLLOUT. Removes job currently assigned to control point n and places it in the rollout queue; job is not scheduled back to a control point automatically.

n. ROLLOUT, xxxx. Removes job currently assigned to control point n and places it in the rollout queue for xxxx job scheduler delay intervals; job is automatically scheduled back to a control point at this time.

SERVICE, ot, $p_1$xxxx, . . . , $p_n$xxxx. Alters the service limits associated with each job origin and class type.

ot	Job Origin Type
SY	System.
BC	Local batch.
TX	Time-sharing.
EI	Remote batch.
MT	Multiterminal.

ot	Job Class Type
NS	Network supervisor.

p_i	Service Limits
PRxx	CPU priority ($1-77_8$).
CPxxxx†	CPU time slice (milliseconds * 100_8).
CMxxxx†	Central memory time slice in seconds.
NJxxxx†	Maximum number of active jobs of the time-sharing origin type.
FLxxxx†	Maximum field length/100_8 for any job of the specified job origin type.
AMxxxx†	Maximum field length/100_8 for all jobs of the specified job origin type.
ECxxxx†	Maximum ECS/1000_8 for any job of the specified job origin type.
EMxxxx†	Maximum ECS/1000_8 for all jobs of the specified job origin type.
FCx	Number of permanent files allowed:

x	Limit Value††
0	Unlimited
1	10
2	20
3	30
4	40
5	50
6	100
7	Unlimited

†Only the last four digits entered are used.
††All values are in octal.

CSx — Cumulative size in PRUs allowed for all indirect access permanent files:

x	Limit Value†
0	Unlimited
1	1000
2	2000
3	5000
4	10000
5	50000
6	100000
7	Unlimited

FSx — Size in PRUs allowed for individual indirect access permanent files:

x	Limit Value†
0	Unlimited
1	10
2	20
3	30
4	40
5	50
6	60
7	Unlimited

DSx — Size in PRUs allowed for individual direct access permanent files:

x	Limit Value†
0	Unlimited
1	1000
2	2000
3	5000
4	10000
5	50000
6	100000
7	Unlimited

† All values are in octal.

The following job control commands are used to respond to a job currently assigned to a control point.

n.CFO.ccc...ccc.	Allows the operator to send message ccc...ccc (36 characters maximum) to the program currently assigned to control point n.
n.COMMENT.ccc...ccc. or n. *ccc...ccc.	Enters comment ccc...ccc (120 characters maximum) in the dayfile for control point n.
n.GO.	Clears the pause bit at control point n.
n.OFFSWx.	Turns off sense switch ($1 \leq x \leq 6$) at control point n.
n.ONSWx.	Turns on sense switch ($1 \leq x \leq 6$) at control point n.

The following job control commands apply only to time-sharing origin jobs.

DIAL,nnnn,ccc...ccc.	Sends message ccc...ccc (48 characters maximum) to terminal currently using line number nnnn.
MESSAGE,ccc...ccc.	Changes current header message that is output to terminal when user logs in to ccc...ccc (48 characters maximum). †
WARN.	Clears message entered by the WARN, ccc...ccc. command.
WARN,ccc...ccc.	Sends message ccc...ccc (48 characters maximum) to all terminals currently logged into the system.

†For IAF, the message is displayed only at the IAF control point.

n.ASSIGN,xx. Assigns equipment xx to job at control point n.

FORMAT,xx. Toggles format pending status for device xx. If this status bit is set, the command sets the full initialize status bit. If the format pending status bit is being cleared, the full initialize status bit is not changed. The console must be unlocked before entry of this command is permitted.

DOWN,CHxx.
or
DOWN,CHxx,EQyy. Discontinues use of channel xx for all tape and mass storage I/O operations. If channel xx is the only channel available to a mass storage device, its use will not be discontinued for that device. If EQyy is specified, as in the second form of the command, channel xx is discontinued only for mass storage equipment yy.

INITIALIZE,xx,op. Toggles initialize option op for mass storage device xx. The operator enters the INITIALIZE command for each device to be initialized and then assigns the K display. If the user decides not to initialize the device specified, initialize status can be cleared by entering K.CLEAR. This command is not valid if local unload status is set for device xx.

Device characteristics are:†

Device Definition Option	Description
FM=	A one- to seven-character family name; if TY=X, one- to seven-character pack name.
UN=	A one- to seven-character user number (to clear user number, use UN=NULL).
TY=F	Initialized device is a family device.

†Device characteristics may be changed only if OP=AL.

Device Definition Option	Description
TY=X	Initialized device is an auxiliary device.
OP=	Initialization option:

Option	Description
AL	All preserved files.
FT	Full track device.
HT	Half track device.
PF	Permanent files.
QF	Inactive queued files.
DF	Inactive dayfile.
AF	Inactive account file.
EF	Inactive error log.
FP	Format pack (initialization does not occur until format pending is cleared).

DM=	A three-digit device mask (0 to 377_8).
SM=	A three-digit secondary mask (0 to 377_8).
NC=	Octal number of catalog tracks (power of 2).
EQ=	EST ordinal of device to be initialized.
NP=	Number of physical units to be included in a multispindle device; default is 1.
DN=	A two-digit octal device number (1 to 77) that uniquely identifies the device in its permanent file family.

Track Flawing Option	Description
RTK	Converts input physical address to a logical address and sets TRT to indicate that track is a reserved, flawed track.
TTK	Input is the same as for RTK, but track reservation is toggled.
STK	Performs the same function as RTK except that input address is a logical address.

After all necessary parameters have been entered for a specific device, the K. GO. command is entered to begin initialization.

MOUNT, xx. Clears local and global unload status for mass storage device xx and reactivates the device.

OFFxx. Logically turns off device xx.

ONxx. Logically turns on device xx.

REDEFINE, xx. Requests reconfiguration of mass storage device xx. The operator enters the REDEFINE command for each device to be reconfigured and then assigns the K display. If the user decides not to reconfigure the device specified, reconfiguration status can be cleared by entering K. CLEAR.

Reconfiguration Parameter	Description
CU=	A one- to two-digit number of current unit.
RU=	A one- to two-digit number of replacement unit.
ES=	A one- to two-digit number of equipment on which replacement unit is defined.
UP=	A one-digit unit position within equipment.

Reconfiguration Parameter	Description
CH=	A one- to four-digit channel number for unit being added to a null equipment.
OP=	Reconfiguration option:

Option	Description
A	Add unit RU at position UP.
D	Delete unit CU from equipment.
R	Replace unit CU with unit RU.
S	Switch unit CU with unit RU from equipment ES.

After all necessary parameters have been entered for a specific device, the K.GO. command is entered to begin reconfiguration.

SCRATCH, xx. Indicates that magnetic tape unit xx should be used to satisfy a request for a scratch VSN tape. The VSN is displayed as SCRATCH although the original VSN is used when the tape is assigned. If the tape is written, the original VSN is retained and not made scratch.

TEMP, xx. Reverses current set or clear condition of temporary file status for mass storage device xx.

TRAINxx,y. Assigns or changes print train identification of line printer defined by EST ordinal xx. y field represents print train number.

y	Print Train
1	596-1
2,3	Reserved for future use (default to 596-1)
4,5	596-5
6,7	596-6

UNLOAD,xx. Logically removes a magnetic tape unit xx or removable mass storage device xx from the operating environment while the operator dismounts a tape or disk pack. This command is illegal if entered from a machine with initialize pending for the specified mass storage device.

UP,CHxx. or UP,CHxx, EQyy. Reverses effect of DOWN command for channel xx and resumes normal use of the channel for all tape and mass storage I/O operations. If EQyy is specified, channel xx is made available only to mass storage equipment yy.

VALIDATE,xx. Causes validation of mass storage tables associated with device xx. The device must be available mass storage and the MS VALIDATION option must have been selected at deadstart.

VSN,xx. Clears current VSN for tape unit xx and checks if a VSN is specified on that tape; valid only if the unit is not currently assigned.

VSN,xx, aaaaaa. Assigns one- to six-character VSN aaaaaa to magnetic tape unit xx.

VSN,xx, Assigns a scratch VSN to magnetic tape unit xx. The VSN is displayed as SCRATCH, and if the tape is written, the VSN in the VOL1 label is written as a scratch VSN destroying any previous VSN.

BATCHIO EQUIPMENT CONTROL COMMANDS

BKSPxx.	Backspaces print file on BATCHIO equipment xx, one logical record.
BKSPxx, yy.	Backspaces print file on BATCHIO equipment xx, yy logical records.
BKSPFxx.	Backspaces print file on BATCHIO equipment xx, one file.
BKSPFxx, yy.	Backspaces print file on BATCHIO equipment xx, yy files.
BKSPRUxx, yy.	Backspaces print file on BATCHIO equipment xx, yy sectors.
CONTINUExx.	Resumes printing on BATCHIO equipment xx.
ENDxx.	Terminates current operation on BATCHIO equipment xx.
ENDxx, yy.	Terminates current operation on BATCHIO equipment xx; yy is subtracted from the repeat count specified for that equipment. If yy is greater than the current repeat count, the repeat count is cleared.
REPEATxx.	Repeats the current operation on BATCHIO equipment xx one time.
REPEATxx, yy.	Repeats the current operation on BATCHIO equipment xx the number of times specified by yy (maximum is 77_8).
RERUNxx.	Terminates current operation on BATCHIO equipment xx and reenters the job in the correct queue at a default queue priority.
RERUNxx, yy.	Terminates current operation on BATCHIO equipment xx and reenters the job in the correct queue with queue priority yy00.
SKIPxx.	Skips forward one logical record on print file on BATCHIO equipment xx.
SKIPxx, yy.	Skips forward yy logical records on print file on BATCHIO equipment xx.
SKIPFxx.	Skips forward to next file mark on print file on BATCHIO equipment xx.

SKIPFxx, yy. Skips forward yy files on print file on BATCHIO equipment xx.

SKIPRUxx, yy. Skips forward yy sectors on print file on BATCHIO equipment xx. yy is limited to 10_8 sectors (current buffer size) plus number of sectors remaining in buffer (that is, if buffer is full, $yy \leq 20_8$).

STOPxx. Stops printing on BATCHIO equipment xx.

SUPPRESSxx. Suppresses automatic printer carriage control on BATCHIO equipment xx (must be line printer).

SUBSYSTEM CONTROL COMMANDS

n. CDCffff.† Calls the CDC CYBER Database Control System (CDCS) to control point n.

n. EXPORTL. Calls Export/Import to control point n; punch files disposed are as follows:

Entry	Response
n. ONSW1.	Sends all punch files to local batch card punch.
n. ONSW2.	Purges all punch files.

IAFffff. † or TELEX. Calls the time-sharing subsystem to control point 1; control options are as follows:

Entry	Response
1. ONSW1.	When time-sharing subsystem is terminated (with a 1. STOP command), enters users into recover state and inhibits restarting operations.
1. ONSW2.	Enables time-sharing subsystem to use the delay queue feature.

†Characters ffff are optional; if required, installations must supply the one to four alphanumeric characters to be used.

Entry	Response
1.ONSW3.	Aborts time-sharing subsystem on all abnormal conditions.
1.ONSW4.	Enables dump on normal termination.
1.ONSW5.	Calls DMP, which dumps information to OUTPUT and releases OUTPUT after time-sharing subsystem is dropped or aborted (default).
1.ONSW6.	Releases OUTPUT file containing dump information written after time-sharing subsystem is dropped or aborted.

n.IDLE. Idles subsystem currently assigned to control point n. This command can also be entered to drop any job with a queue priority greater than MXPS+1.

n.IO. Calls BATCHIO to control point n; control option is:

Entry	Response
n.ONSW1.	Lines producing printer print errors are not flagged or retried.

n.MAGNET. Calls the magnetic tape subsystem to control point n.

n.MSSffff† Calls the mass storage subsystem to control point n.

n.NAMffff.† Calls the Network Access Method (NAM) to control point n.

n.RBFffff.† Calls the Remote Batch Facility (RBF) to control point n. NAM must be active at a control point to use RBF.

STIMULATOR. or STMffff.† Calls stimulator subsystem to last control point.

†Characters ffff are optional; if required, installations must supply the one to four alphanumeric characters to be used.

n.STOP. Drops (terminates) subsystem currently assigned to control point n. This command can also be entered to drop any job with a queue priority greater than MXPS+1 (console keyboard must be unlocked).

TAFffff.† Calls the transaction subsystem to control point 2; control options are as follows:

Entry	Response
2.ONSW4.	Attempt recovery after the transaction subsystem is dropped or aborted.
2.ONSW5.	Dump entire field length and release OUTPUT after transaction subsystem is dropped or aborted.
2.ONSW6.	Print job dayfile upon termination.

TELEX. Refer to IAF. command.

SYSTEM CONTROL COMMANDS

AUTO. Calls specific subsystems to control points and initiates automatic job processing.

BLITZ. Drops all jobs but subsystems (console keyboard must be unlocked).

CHECK POINT SYSTEM. Rolls out all jobs and transfers contents of central memory tables to mass storage.

DATE. yy/mm/dd. Changes current system date (console keyboard must be unlocked):

yy	Year (0-99)
mm	Month (1-12)
dd	Day (1 through number of days in month)

†Characters ffff are optional; if required, installations must supply the one to four alphanumeric characters to be used.

DEBUG. Toggles the current set or clear condition of debug mode; debug mode provides system origin privilege to validated users and allows modifications to be made to the running system (console keyboard must be unlocked).

n.DIS. Calls DIS to control point n.

ENABLE,x.
or
DISABLE,x. Enables or disables one of the following options.

x	Result
ACCOUNT	Enables or disables processing of VAL= entry point programs (USER, CHARGE, FAMILY). If ACCOUNT is disabled, the control statement is sent to the dayfile and processing continues at the next control statement.
AUTOROLL	Enables or disables automatic rollout of jobs.
BATCHIO	Enables or disables BATCHIO subsystem.
CDCS	Enables or disables system control point version of CDCS.
EI200	Enables or disables Export/Import.
FILE STAGING	Enables or disables staging of MSS resident permanent files to disk.
IAF	Enables or disables Interactive Facility.
MAGNET	Enables or disables magnetic tape subsystem.

x	Result
MS VALIDATION	Enables or disables automatic verification of mass storage tables.
MSS	Enables or disables MSS.
MSS MASTER	Enables or disables master MSSEXEC.
NAM	Enables or disables NAM.
PF VALIDATION	Enables or disables verification of BOI/EOI on preserved files.
PRIORITY AGING	Enables or disables priority aging.
RBF	Enables or disables RBF.
REMOVABLE PACKS	Enables or disables automatic label checking for mass storage devices defined as removable.
SECONDARY USER CARDS	Enables or disables use of more than one user statement in a job stream (console keyboard must be unlocked).
TAF	Enables or disables Transaction Facility.
TELEX	Enables or disables time-sharing subsystem.
USER ECS	Enables or disables the scheduling of jobs that access the user area of ECS (console must be unlocked).

VALIDATION	Enables or disables the running of jobs without USER control statement (console keyboard must be unlocked). If validation is disabled, USER statement, if present, will be processed as defined in the x=ACCOUNT feature. Jobs will run if no USER statement exists. (Access to magnetic tapes, permanent files, and removable packs is not allowed.)
ENGR.	Toggles the current set or clear condition of ENGINEERING mode. ENGINEERING mode allows PPU/hardware diagnostics and FORMAT/FDP to run (the console keyboard must be unlocked).
IDLE.	Disables automatic job processing.
IDLEFAMILY, xx.	Allows jobs to access the family on the equipment specified by EST ordinal xx, and causes all new jobs and USER statements for the family to be rejected. Thus, the new jobs are not scheduled, batch jobs stay in the input queue, and interactive jobs are not allowed to be logged in.
K.ccc...ccc. or L.ccc...ccc.	Allows entry of data ccc...ccc in CPU buffer for control point to which the K or L display is assigned.
LOCK.	Locks the console keyboard.
MAINTENANCE.	Performs the same function as the AUTO command but also assigns several maintenance routines at available control points and runs them with minimum queue and CPU priorities.
STEP.	Sets monitor in step mode; stops all central memory I/O operations and prevents the system from processing PPU requests when the next monitor function is encountered.

STEP, xx. or STEP, xx, b, v.	Sets step mode for monitor function xx; stops all central memory I/O operations and prevents the system from processing PPU requests when function xx is encountered. If b is present, step mode is set for monitor function xx with byte b equal to value v.
n. STEP. or n. STEP, xx. or n. STEP, xx, b, v.	Sets monitor in step mode for control point n. If xx is present, step mode is set for monitor function xx. If b is present, step mode is set for monitor function xx with byte b equal to value v.
TIME. hh. mm. ss.	Changes current system time (console must be unlocked): hh Hour (00-23) mm Minute (00-59) ss Second (00-59)
UNLOCK.	Unlocks the console keyboard; keyboard must be unlocked for the following commands. • All channel control commands. • All memory entry commands. • BLITZ. • DATE. yy/mm/dd. • DEBUG. • DISABLE, SECONDARY USER CARDS. • DISABLE, VALIDATION. • ENABLE, SECONDARY USER CARDS. • ENABLE, VALIDATION. • ENGR. • FORMAT, xx. • n. OVERRIDE. • n. STEP. • n. STEP, xx. • n. STOP. • STEP. • STEP, xx. • TIME. hh. mm. ss. • UNSTEP.

UNSTEP.	Clears step mode (console must be unlocked).
X. name. or X. name (ccc...ccc) or X. name, xxxxx.	Calls a system program or utility specified by name to an available control point. Second form is used if parameters are to be passed. Third form is used if a field length, xxxxx, different from the default is required.
99.	Disables or enables syntax overlay processing.

MEMORY ENTRY COMMANDS

aaaaaa, yyy...yyy. or aaaaaa± yyy...yyy.	Changes contents of absolute central memory location aaaaaa to yyy... yyy (20 digits).†
n. aaaaaa, yyy...yyy. or n. aaaaaa± yyy...yyy.	Changes contents of central memory location aaaaaa to yyy...yyy (20 digits). Location aaaaaa is relative to reference address (RA) for control point n. †
aaaaaa, b, yyyy. or aaaaaa±b, yyyy.	Changes the contents of byte b at absolute central memory location aaaaaa to yyyy. †, ††
n. aaaaaa, b, yyyy. or n. aaaaaa±b, yyyy.	Changes the contents of byte b at central memory location aaaaaa to yyyy. Location aaaaaa is relative to the RA for control point n. †, ††

†The second form of the command is used when it is necessary to change successive memory locations. + increments aaaaaa by 1 while - decrements aaaaaa by 1.

††Each memory location consists of five 12-bit bytes, numbered 0 through 4 from left.

aaaaaa, Dyyy...yyy. or aaaaaa± D yyy...yyy.	Changes the contents of absolute central memory location aaaaaa to display code characters yyy...yyy (left-justified, zero-filled).†
n. aaaaaa, D yyy...yyy. or n. aaaaaa± D yyy...yyy.	Changes the contents of central memory location aaaaaa to display code characters yyy...yyy (left-justified, zero-filled). Location aaaaaa is relative to RA for control point n.†
Eaaaaaaa, yyy...yyy. or Eaaaaaaa± yyy...yyy.	Changes contents of absolute extended core storage (ECS) location aaaaaaa to yyy...yyy (20 digits).†
n. Eaaaaaaa, yyy...yyy. or n. Eaaaaaaa± yyy...yyy.	Changes contents of ECS location aaaaaaa to yyy...yyy (20 digits). Location aaaaaaa is relative to ECS reference address (RAE) for control point n.†
Eaaaaaaa, b, yyyy. or Eaaaaaaa± b, yyyy.	Changes contents of byte b at absolute ECS location aaaaaaa to yyyy.†, ††
n. Eaaaaaaa, b, yyyy. or n. Eaaaaaaa± b, yyyy.	Changes contents of byte b at ECS location aaaaaaa to yyyy. Location aaaaaaa is relative to the RAE for control point n.†, ††
Eaaaaaaa, D yyy...yyy. or Eaaaaaaa± D yyy...yyy.	Changes contents of absolute ECS location aaaaaaa to display code characters yyy...yyy (left-justified, zero-filled).†

† The second form of the command is used when it is necessary to change successive memory locations. + increments aaaaaaa by 1 while - decrements aaaaaa by 1.

†† Each memory location consists of five 12-bit bytes, number 0 through 4 from left.

n. Eaaaaaaa, D yyy...yyy. or n. Eaaaaaaa±D yyy...yyy.	Changes contents of ECS location aaaaaaa to display code characters yyy...yyy (left-justified, zero-filled). Location aaaaaaa is relative to RAE for control point n.†

CHANNEL CONTROL COMMANDS

ACNcc.	Activates channel cc.
DCHcc.	Drops channel cc.
DCNcc.	Deactivates channel cc.
FCNcc.	Outputs a zero function code (no activity) to channel cc.
FNCcc, xxxx.	Outputs function code xxxx to channel cc.
IANcc.	Inputs to pseudo A register from channel cc.
LDC, nnnn.	Loads pseudo A register with nnnn (normally a peripheral equipment function code).
MCHcc.	Master clears and removes all 3000-series peripheral equipment selections on channel cc (6681 function code 1700_8 is issued).
OANcc.	Outputs contents of pseudo A register to channel cc.

†The second form of the command is used when it is necessary to change successive memory locations. + increments aaaaaaa by 1 while - decrements aaaaaaa by 1.

KEYBOARD MESSAGES

ILLEGAL ENTRY.	Command is not accepted by DSD. Operator must either correct or re-enter the command.
DISK BUSY.	DSD is waiting for an overlay to be loaded from a mass storage device.
PPU BUSY. †	DSD is waiting for a PP to be assigned so that it can process a command.
MTR BUSY. †	DSD is waiting for a response from the system.

JOB DISPLAY (DIS) COMMANDS

DIS DESCRIPTION

Unlike DSD, DIS is not interpretive. The operator must complete every entry manually and signal DIS to act upon the message by pressing the carriage return key.

DIS is brought to a control point by any of the following methods.

- Control statement in the form DIS.
- Operator call to DIS by typing n. DIS. for the job active at control point n.
- Operator call to DIS by typing X. DIS, f1. (f1 is field length desired) or X. DIS.

†If preceded by LOG - , the command has been executed but not logged in the system dayfile and/or error log.

DISPLAY SELECTION

xy. (CR) Brings the x and y displays to the left and right screens, respectively.

The right screen display must be B, C, D, N, T, or U.

Letter Designation	Display	Description
A	Dayfile	Dayfile messages and files attached to control point.
B	Control point status	Job status, control statements, and exchange package.
C, D	Data storage	Five groups of four octal digits per group with display code translation.
F	Data storage	Four groups of five octal digits with display code translation.
G	Program storage	Four groups of five octal digits per group with COMPASS mnemonic translation.
H	Job files	File name table entries for this control point.
M	ECS memory	Five groups of four octal digits per group with display code translation.
N	Blank screen	Blank screen.

Letter Designation	Display	Description
T, U	Text display	Displays text from central memory in coded lines (240 words for T; 300 words for U).
V	Central memory buffer	Displays 512 words directly from central memory.
Y	Monitor functions	Displays mnemonics and values of all monitor functions.
Z	Directory	Lists DIS directory.

OTHER SYSTEM DISPLAY COMMANDS

m, xxxx.	If m is one of the letters C, D, F, or G, xxxx is the bias address for the managed table display.
SET, ssss...s.	Sets the left screen display sequence; ssss...s consists of one to eight display identifiers. The sequence is toggled by the right blank key.

SPECIAL FIRST CHARACTER ENTRIES

*	If DSD has relinquished the main display console to DIS, * acts as a quick hold, and DIS drops the display channel so that DSD can use it.
=	Toggles memory references between absolute and relative.
+	Advances memory displays (C, D, F, G, M, T, and U) and L display by 40_8.
-	Decrements memory displays (C, D, F, G, M, T, and U) by 40_8. Advances L display by 40_8.
right blank	Advances left screen display sequence established by SET command.

/	Advances left screen memory display address by the values in the lower 18 bits of the first word displayed.
(	Breakpoint program to (P+1).
)	Breakpoint program to (P-1).
8	Advances left screen managed table pointer.
9	Decrements left screen managed table pointer.
CR (carriage return)	Sets repeat entry flag. The subsequent entry is processed but not erased after completion.
	Reads control statement buffer automatically and executes until completion or an error is detected (same as RCS command).

CONTROL CHARACTERS

left blank (erase)	Clears entry line and error message (if one exists).
BKSP (backspace key)	Deletes last character entered and clears error message (if one exists).
CR (carriage return)	Initiates processing of command.

KEYBOARD ENTRIES

BEGIN, xxx.	Sets AUTO mode and calls CCL procedure xxx.
BKP, xxxxxx.	Breakpoints to address xxxxxx. Central processor execution begins at current value of P and stops when P=xxxxxx and DIS is the only PP active at user's control point.
BKPA, xxxxxx.	Breakpoints to address xxxxxx. Central processor execution begins at current value of P and stops when P=xxxxxx.
CALL, xxx.	Sets AUTO mode and calls KCL procedure xxx.
DCP.	Drops the central processor and displays the exchange package on the B display.

DIS.	Reloads main DIS overlay.
DROP.	Drops DIS; does not drop the job if there are control statements remaining in the buffer (unless the error flag is set).
ELS. ccc...ccc.	Enters control statement ccc...ccc in the control statement buffer after the last control statement, if there is space.
ENAi, xxxxxx.	Sets register Ai=xxxxxx in the exchange package area.
ENBi, xxxxxx.	Sets register Bi=xxxxxx in the exchange package area.
ENEM, m.	Sets CPU program exit mode to m ($0 \leq m \leq 7$).
ENFL, xxxxxx.	Sets FL=xxxxxx. xxxxxx$\geq$ 10000 if user ECS is assigned.
ENFLE, xxxx.	Sets ECS field length (FLE) to xxxx000. If xxxx>0, (set by ENFL) must be $\geq$ 10000.
ENP, xxxxxx.	Sets P=xxxxxx.
ENPR, xx.	Sets job CPU priority to xx ($1 \leq xx \leq 70_8$).
ENS. ccc...ccc.	Allows entry of control statement ccc...ccc as the next unprocessed statement in the control statement buffer; ENS clears control statement buffer of previous statements.
ENTL, xxxxx.	Sets the job time limit to xxxxx. 77777_8 is infinite.
ENXi, xxxxx xxxxx xxxxx xxxxx.	Sets register Xi=xxxxx xxxxx xxxxx xxxxx in the exchange package area.
ENXi, Lzzz ...zzz.	Sets register Xi to zzz...zzz, left-justified.
ENXi, Dccc ...ccc.	Sets register Xi to ccc...ccc display code characters.
ENXi, b, zzzz.	Sets byte b of register Xi to zzzz.
ERR.	Sets error flag, terminates execution, and clears AUTO mode if set.
GO.	Restarts a program which has paused.
HOLD.	DIS relinquishes the display console, but the job is held at the present status.

M. ccc... ccc.	Enters ccc... ccc as a program command. Data is stored at RA+ CCDR.
N. ccc... ccc.	Sets DIRECT CPU INPUT mode. Characters entered from the keyboard are passed one character at a time, right-justified, directly into central memory at RA+CCDR.
OFFSWx.	Turns off sense switch x for the job ($1 \leq x \leq 6$).
ONSWx.	Turns on sense switch x for the job ($1 \leq x \leq 6$).
O26.	Calls O26 to the control point.
RCP.	Requests central processor. Depending on job priority, execution begins at the address specified by the P register.
RCS.	Sets AUTO mode and initiates automatic control statement processing.
RNS.	Reads and processes the next control statement in the DIS control statement buffer.
ROLLOUT.	Places job in the rollout queue until the job scheduler rolls it in.
ROLLOUT, xxxx.	Places job in rollout queue for xxxx job scheduler delay intervals; job is automatically rolled back in after this period of time.
RSS.	Reads the next control statement and stops prior to CPU execution.
RSS, ccc... ccc.	Reads statement ccc... ccc and stops before execution.
SCS.	Clears AUTO mode and stops automatic control statement processing.
T, xxxxxx.	Changes the T display to start at address xxxxxx.
U, xxxxxx.	Changes the U display to start at address xxxxxx.
UCC=c.	Sets the uppercase character to c.
V, xxxxxx.	Changes the V display to start at address xxxxxx.

X. ccc... ccc.	Processes ccc... ccc as the next control statement.
* xxx.	If an asterisk is followed by a blank and xxx is encountered during automatic control statement processing, xxx is interpreted as a direct DIS command rather than a control statement.
xxxx.	xxxx is processed as a control statement if it is not a recognizable DIS command.
xz, aaaaaa.	Refer to description under DSD System Display Commands.

MEMORY ENTRY COMMANDS

aaaaaa, yyy... yyy. or aaaaaa+ yyy... yyy.	Changes the contents of the central memory word at aaaaaa (relative to its RA) to yyy... yyy. Leading zeros may be dropped. †, ††
aaaaaa, b, yyyy. or aaaaaa+b, yyyy.	Changes the contents of the byte b at central memory location aaaaaa to yyyy. Each location consists of five 12-bit bytes, numbered 0 through 4 from the left. †, ††
aaaaaa, Dyyy... yyy. or aaaaaa+ Dyyy... yyy.	Changes the contents of central memory location aaaaaa to display code characters yyy... yyy (left-justified, zero-filled). †, ††
aaaaaa, Lyyy... yyy. or aaaaaa+ Lyyy... yyy.	Changes the contents of central memory location aaaaaa, left-justified, to yyy... yyy. †, ††

†The second form of the command performs the same function but leaves the address at aaaaaa+1, allowing immediate entry for the next memory location.

††If in absolute mode, the entry is at CM location aaaaaa.

aaaaaa, In, yyyyy. or aaaaaa+ In, yyyyy.	Changes the contents of instruction n (0-3 from left) at central memory location aaaaaa to yyyyy; yyyyy may be 15- or 30-bit instruction. †, ††
Eaaaaaaa, yyy...yyy. or Eaaaaaaa+ yyy...yyy.	Changes the contents of the ECS word at aaaaaaa (relative to its RAE) to yyy...yyy. Leading zeros may be dropped. †, †††
Eaaaaaaa,b, yyyy. or Eaaaaaaa+b, yyyy.	Changes the contents of byte b at ECS location aaaaaaa to yyyy. Each location consists of five 12-bit bytes, numbered 0 through 4 from left. †, †††
Eaaaaaaa, Dyyy...yyy. or Eaaaaaaa+ Dyyy...yyy.	Changes the contents of ECS location aaaaaaa to display code characters yyy...yyy (left-justified, zero-filled). †, †††

PP CALL COMMANDS

Keyboard Entry	Description	Format of PP Call Initiated
nam.	Calls PP program nam to control point n.	18/3Lnam, 6/n, 36/0
nam, xxx.	xxx is a parameter required by the PP program nam. n is control point.	18/3Lnam, 6/n, 18/0, 18/xxx
nam, xxx, yyy.	xxx and yyy are parameters required by the PP program nam. n is control point.	18/3Lnam, 6/n, 18/xxx, 18/yyy

† The second form of the command performs the same function but leaves the address at aa...a+1 allowing immediate entry for the next memory location.

†† If in absolute mode, the entry is at CM location aaaaaa.

††† If in absolute mode, the entry is at ECS location aaaaaaa.

KEYBOARD MESSAGES

ILLEGAL ENTRY.	Command cannot be processed.
REPEAT ENTRY.	Command in control statement buffer is repeated each time carriage return is pressed; cleared by left blank key.
OUT OF RANGE.	Memory entry address is greater than the field length.
SYSTEM BUSY - DISK.	DIS is waiting for an overlay to be loaded from a mass storage device.
SYSTEM BUSY - PPU.	DIS is waiting for a PP to be assigned in order to process the keyboard entry.
JOB ACTIVE.	Previous request not completed.
AUTO MODE.	Control statement buffer is read automatically. Automatic control statement processing can be selected by the RCS command or by pressing the . key.
DIRECT CPU INPUT.	N. command has been entered, and all data entered from the keyboard is being passed directly to central memory.

FILE EDITOR (O26) COMMANDS

O26 DESCRIPTION

O26 enables the user to create or edit a file from the console. A central memory buffer is used to store and edit the display code lines before writing the file. Like DSD, O26 is interpretive.

SPECIAL FIRST CHARACTER ENTRIES

0	Sets insert at 1st line.
1	Sets insert at 4th line on screen.
2	Sets insert at 8th line on screen.
3	Sets insert at 12th line on screen.
4	Sets insert at 16th line on screen.
5	Sets insert at 20th line on screen.
6	Sets insert at 24th line on screen.
7	Sets insert at 32nd line on screen.
8	Sets insert 8 at insert line.
9	Sets insert 9 at insert line.
+	Displays next page.
-	Backs up 18 lines or to start of buffer.
*	Holds display and returns control to DSD. When * is entered under DSD, control returns to O26.
/	Starts or stops roll.
(	Advances insert by one line.
)	Decrements insert by one line.
=	Clears insert flag.
,	Finds insert line and starts display at insert marker.
.	Deletes the line following the insert line.
CR (carriage return)	Sets REPEAT ENTRY flag.
space	Sets the characters P. into buffer.

MESSAGES

FORMAT ERROR.	A format error has been detected during translation of the entry.
PPU BUSY.	Request was ignored by the system.
DISK BUSY.	Waiting for O26 overlay.
ILLEGAL FL REQUEST.	FL request is greater than 377700_8.
NOT IN LINE.	Character was not found by the replace character commands.
REPEAT ENTRY.	Entry is not cleared after execution.
RECORD TOO LONG.	Record read does not fit into buffer.
FILE NOT ON MASS STORAGE.	Rewrite request on nonmass storage file.
NO RANDOM ADDRESS	Rewrite request issued with random address not initialized.
PRU SIZE MODIFIED.	Rewrite request executed with modified PRU size, as compared to original record size.

SYSTEM COMMANDS

DIS.	Writes the buffer, rewinds the file, and transfers control back to DIS.
DROP.	Writes the buffer, rewinds the file, and drops the display unit.
ERR.	Sets error flag at control point.
GO.	Clears pause flag.
HOLD.	Releases display to DSD.
XDIS.	Transfers control back to DIS. Buffer is not written and file is not rewound.
XDROP.	Drops display unit; does not write file.

FILE COMMANDS †

BKSP. lfn.	Backspaces file lfn one logical record. If lfn is missing, previously specified file is used.
BKSPRU, x.	Backspaces current file x physical records.
BKSPRU. lfn.	Backspaces file lfn one PRU. If lfn is missing, previously specified file is used.
FILE. lfn.	Changes name of current file to lfn.
RC. lfn.	Reads compile file. Rewinds, reads, and rewinds file lfn. If lfn is missing, set file name to COMPILE. Set scan tab to 6.
READ. lfn.	Clears buffer and rewinds, reads, and rewinds lfn. If lfn is missing, previously specified file is used.
READI. lfn.	Skips to end-of-information, backspaces twice, and reads last logical record of information on lfn. If lfn is missing, previously specified file is used.
READN. lfn.	Reads file lfn with no rewind. If lfn is missing, previously specified file is used; stops read on buffer full or end-of-record encountered.
READNS. lfn.	Reads file lfn nonstop with no rewind. If lfn is missing, previously specified file is used; stops read on buffer full or end-of-file encountered.
RETURN. lfn.	Returns file lfn. If lfn is missing, previously specified file is returned to system.
REWIND. lfn.	Rewinds file lfn. If lfn is missing, previously specified file is used.
RFR. lfn.	Clears buffer and rewinds and reads file lfn. If lfn is missing, previously specified file is used.
RI. lfn.	Rewinds, reads, and rewinds file lfn. If lfn is missing, file INPUT is read.

† For these commands, if no file was previously specified, INPUT is used.

RLR. lfn.	Clears buffer and reads last record on file lfn. If lfn is missing, previously specified file is used.
RNR. lfn.	Clears buffer and reads next record on file lfn. If lfn is missing, previously specified file is used.
RO. lfn.	Clears buffer and rewinds, reads, and rewinds file lfn. If lfn is missing, file OUTPUT is used. Sets word scan to words 4, 8, 12.
RPR. lfn.	Reads previous record from file lfn (that is, backspaces twice and reads).
RWRITE.	Rewrites current record in place; valid only if last operation was a read.
SKIPEI. lfn.	Skips to end-of-information on lfn. If lfn is missing, previously specified file is used.
UNLOAD. lfn.	Unloads tape specified by lfn. If lfn is missing, previously specified tape is unloaded.
WRITE. lfn.	Writes buffer on file lfn. If lfn is missing, previously specified file is used.
WRITEF. lfn.	Writes buffer on file lfn and places an EOF mark after the data written. If lfn is missing, previously specified file is used.
WRITEW. lfn.	Writes data from start of buffer up to insert line on file lfn. If lfn is missing, previously specified file is used.

LINE ENTRY AND DATA MOVE

Commands that read a subsequent line for character merging (A., L., M., and N.) save that line in the DUP buffer. This line can be referenced at a later time with the D. command.

A.ccc...ccc	Merges specified characters with the line following insert marker except for tabbed or spaced-over area up to carriage return.
C.ccc...ccc	Enters specified characters into buffer; ccc...ccc may consist of up to 90 characters.
COPY.	Copies data block starting at insert 8 and ending at insert 9 into block at insert marker.
DEL.	Deletes all lines after insert marker If insert is not set, deletes all lines.
D,*.	Deletes block from insert 8 through insert 9.
D.ccc...ccc	Merges line from DUP buffer with characters ccc...ccc of keyboard buffer. Tab rules for A. command apply.
E.ccc...ccc	Merges characters ccc...ccc with remainder of characters in DUP buffer except for tabbed or spaced-over area.
E.ccc...ccc	Merges characters ccc...ccc with remainder of characters in DUP buffer except for tabbed or spaced-over area.
L.ccc...ccc	Merges characters ccc...ccc with remainder of following line except for tabbed or spaced-over area.
M.ccc...ccc	Merges characters ccc...ccc with remainder of following line.
MOVE.	Moves data starting at insert 8 and ending at insert 9 into block starting at insert marker.
N.ccc...ccc	Merges characters ccc...ccc with following line except for tabbed area.
P.ccc...ccc	Enters characters ccc...ccc into buffer (up to 90 characters). User can set data entry mode by typing P. or typing a space.

DISPLAY, TAB, SCAN CONTROL COMMANDS

DFL.	Displays first line.
DLL.	Displays last part of file.
DS,.	Displays first line.
TAB,x,y,...,z	Sets tabs x,y,...,z. If x equals 0, the command clears all tabs. Default is TAB,11,18,30,73.
SCAN,x,y,...,z	Sets word scan to x,y,...,z. If x equals 0, the command clears scan.

LINE, RECORD SEARCH COMMANDS

F.ccc...ccc	Searches for matching field in line. Search is end-around.
GET,lfn. rname.	Searches file lfn for record rname. If lfn is missing, previously specified file is used.
GET. rname.	Clears buffer and searches current file for record rname.
GETR,lfn. rname.	Reads random file lfn for TEXT record rname. If lfn is missing, previously specified file is used.
GETR. rname.	Gets random record rname from current file. If a record of that name and type TEXT exists, reads that record.
GTR,lfn. rname.	Reads random file lfn for record rname. If lfn is missing, previously specified file is used.
GTR. rname.	Gets random record rname from current file. If a record of that name and type TEXT exists, reads that record; otherwise, reads record rname of any type.
LIST.	Lists directory of current file.
LIST,lfn.	Lists directory of file lfn. If lfn is missing, previously specified file is used.
S.ccc...ccc	Starting with the first line displayed, searches for a line beginning with the characters ccc...ccc. Search is end-around.

REPLACE COMMANDS

RC, x, c.	Replaces character position x of line following insert marker with character c (extend line if necessary).
RM/ aaa...aaa/ bbb...bbb/	Replaces multiple; works the same way as RS command, but if a replacement took place and REPEAT ENTRY is set, this command does not advance to next line.
RS/ aaa...aaa/ bbb...bbb/	Replaces character string aaa...aaa from the following line with character string bbb...bbb. The / can be any delimiting character.
R, x. / aaa...aaa/ bbb...bbb/	Replaces character string aaa...aaa from the following line starting with character position x with character string bbb...bbb. The / can be any delimiting character.

MISCELLANEOUS COMMANDS

ENFL.	Sets field length to buffer size plus 1000_8.
ENFL, xxxxx.	Sets field length to $xxxxx_8$.
LC.	Toggles lowercase mode flag.
OUT.	Transfers output files to output queue. NOS processes the output files without waiting for O26 to terminate.
UCC=c	Sets uppercase control character to c. If c is missing, clears the uppercase control character. To enter a character which has been previously specified as the uppercase control character, enter that character twice.

To enter:	Enter uppercase control character and:
$	S
≡	0
[	1
]	2
%	3
≠	4
→	5
∨	6
∧	7
↑	Q
↓	W
<	E
>	R
≤	T
≥	Y
⌐	U
;	I
≠	=
∧	A
<	(
>	)
≤	+
≥	-
;	,
:	Z

CONTROL STATEMENTS

ASDEBUG

ASDEBUG(p_1,p_2, ...p_n) — Resolves inconsistencies reported by the ASVAL utility by updating appropriate entries in the CSU maps and/or MSF catalogs; and copies data from selected MSF files or cartridges to disk.

p_i	Description
I=lfn	File containing directives to ASDEBUG.
I	Same as I=COMPILE.
I omitted	Same as I=INPUT.
L=lfn	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
Z	Directives are contained on ASDEBUG control statement. The I parameter is ignored.
Z omitted	Directives are contained on the file specified by the I parameter.

Directive statements must be specified on separate lines in a directive file. Directive statements are of the following form:

OP=directive,p_1,p_2,...,p_n.

When the Z parameter is used each directive statement must be preceded by a separator (/) and terminated by a period as follows:

ASDEBUG(Z)/directive statement$_1$./directive statement$_2$.

Directive	Description
OP=RS	Reads selected streams of a cartridge in a specified drawer or identified by its VSN or X,Y coordinates. The CS parameter specifies the CSU where the cartridge resides. The range of streams to be read is specified by the SL and SU parameters. The streams are written to the file specified by the PF parameter.
OP=RF	Reads the file for which the alternate storage address is specified by the FO, ST, and CS parameters. The file is written to the file specified by the PF parameter.
OP=RP	Clears flags in the MSF catalog and releases MSF space for the chain with alternate storage address specified by the FO, ST, and CS parameters.
OP=RC	Removes a CSU map entry selected by XI, YI, and CS parameters that does not have a corresponding FCT entry.
OP=RL	Removes an MSF catalog entry selected by FO and CS parameters that is not linked properly to the CSU map.

The ASDEBUG directive parameters follow:

Pi	Description
CS=id	CSU identifier of the CSU to be used; i is a letter from A to M.
CS	Same as CS=A.
CS omitted	Same as CS=A.
D=d	Input drawer slot to be used; $0 \leq d \leq 7$. Not valid if V=vsn or XI=n is specified.
D	First available input drawer slot is to be used.

Pi	Description
D omitted	V=vsn or XI=n and YI=m must be specified.
FM=family	Family to be processed.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
FO=ord	MSF catalog ordinal indicating the file to be read or the chain whose space is to be released.
FO omitted	FO=ord must be specified for OP=RF, OP=RP, and OP=RL.
PF=pfn	File to which the MSF image (streams or file) is to be copied. Each stream copied is separated by an end of record. This file is defined under the user's current family and user index.
PF	Same as PF=ZZZZBUG.
PF omitted	Same as PF=ZZZZBUG.
SB=sub	Subfamily to be used; $0 \leq sub \leq 7$.
SB	Same as SB=0.
SB omitted	Same as SB=0.
SL=i	Stream with which OP=RS begins its copying; $0 \leq i \leq 15$; $i \leq j$ (refer to SU=j).
SL	Same as SL=0.
SL omitted	Same as SL=0.
ST=s	Stream with which OP=RF begins its reading or OP=RP begins its releasing.
ST omitted	ST=s must be specified for OP=RF and OP=RP.
SU=j	Stream with which OP=RS ends its copying; $0 \leq j \leq 15$; $i \leq j$ (refer to SL=i).

p_i	Description
SU	Same as SU=15.
SU omitted	Same as SU=15.
V=vsn	Volume serial number of the cartridge to be used; not valid if D=d, D, XI=n, or YI=m is specified.
V omitted	D=d or D, or XI=n and YI=m must be specified.
XI=n	XI coordinate of the cubicle where the cartridge to be read resides; $0 \leq n \leq 57$ and $n \neq 30$. YI=m must also be specified. D=d, D, or V=vsn must not be specified.
XI omitted	D=d, D, or V=vsn must be specified.
YI=m	YI coordinate of the cubicle where the cartridge to be read resides; $0 \leq m \leq 36$ and $m \neq 18$. XI=n must also be specified. D=d, D, or V=vsn must not be specified.
YI omitted	D=d, D, or V=vsn must be specified. XI, YI must be specified for OP=RC.

NOTE

- MSSEXEC must be running when ASDEBUG is run.
- Only one copy of ASDEBUG can be run at one time.
- ASDEBUG, ASVAL, and ASLABEL cannot be run at the same time.

ASDEF

ASDEF(p_1,p_2) — Creates system files for MSS processing.

p_i	Description
CS=id	CSU identifier of the CSU for which a CSU map is to be created (id=A,B,...,M).
CS	Same as CS=A.
CS omitted	No CSU map is to be created. FM=family or FM must be specified.
FM=family	Family for which MSF catalogs are to be created, one catalog for each subfamily.
FM	Same as FM=system default family.
FM omitted	No MSF catalogs are to be created. CS=id or CS must be specified.

ASLABEL

ASLABEL(p_1,p_2, ...,p_n) — Manages cartridge assignment and cubicle allocation in a CSU.

p_i	Description
I=lfn	File containing directives to ASLABEL.
I	Same as I=COMPILE.
I omitted	Same as I=INPUT.
L=lfn	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.

P_i	Description
Z	Directives are contained on the ASLABEL control statement. The I parameter is ignored.
Z omitted	Directives are contained on the file specified by the I parameter.

Directive statements must be specified on separate lines in a directive file. Directive statements are of the following form:

OP=directive,p_1,p_2,...,p_n.

When the Z parameter is used, each directive statement must be preceded by a separator (/) and terminated by a period as follows:

ASLABEL(Z)/directive statement$_1$./directive statement$_2$.

Directive	Description
OP=AC	Adds a CSU to a subfamily.
OP=RC	Removes a CSU from a subfamily.
OP=AB	Adds a cubicle to a subfamily, the pool, or the reserved area.
OP=RB	Removes a cubicle from a subfamily, the pool, or the reserved area.
OP=AM	Adds a cartridge to a subfamily or pool.
OP=RM	Transfers a cartridge from a subfamily to a pool or output drawer; or transfers a cartridge from a pool to the output drawer.
OP=RS	Restores a cartridge to its cubicle.
OP=FX	Writes a scratch label on a cartridge and adds the cartridge to the pool.
OP=IB	Sets or clears the inhibit allocation flag in the MSF catalog entry for the specified cartridge.

The ASLABEL directive parameters follow:

Pi	Description
CS=id	CSU identifier of the CSU to be used by ASLABEL (id=A,B,...,M).
CS	Same as CS=A.
CS omitted	Same as CS=A.
D=d	Input drawer slot from which ASLABEL picks the cartridge; valid only with OP=AM, OP=RS, or OP=FX.
D	First not-empty input drawer slot is to be used; valid only with OP=AM, OP=RS, or OP=FX.
D omitted	Same as D.
FM=family	Family to/from which ASLABEL adds/removes a cartridge or CSU. With OP=FX this parameter specifies the family to which the cartridge is assigned.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.
LT	CSU map and MSF catalog entries are to be updated, even though the cartridge is lost and its label cannot be updated; valid only with OP=RM.
LT omitted	If LT is omitted, the cartridge is lost, and OP=RM is specified, an error message is issued and ASLABEL aborts.
N=n	Number of cartridges or cubicles to be added, removed, or repaired; $1 \leq n \leq 2000$; not valid if PT=R is specified. If V=vsn is specified, n must be 1.
N	Same as N=1.
N omitted	Same as N=1.

Pi	Description
OF	Inhibit allocation flag in the MSF catalog is to be cleared; valid only with OP=IB.
ON	Inhibit allocation flag in the MSF catalog is to be set; valid only with OP=IB.
PK=pkloc	Location from which the cartridge or cubicle is to be picked; not valid if V=vsn is specified.

pkloc	Description
D	Cartridge is to be picked from the specified input drawer slot (D=d). PK=D is valid only with OP=AM, OP=RS, or OP=FX.
F	Cartridge or cubicle is to be picked from the specified family (FM=family) and subfamily (SB=sub). PK=F is valid only with OP=RM or OP=RB.
P	Cartridge or cubicle is to be picked from the pool. PK=P is valid only with OP=AM, OP=RM, or OP=RB. PK=P is not valid if PT=P is specified.
R	Cubicle is to be picked from the reserved area of the CSU. PK=R is valid only with OP=RB.

PK	Same as PK=P.
PK omitted	Same as PK=P.

Pi	Description
PT=ptloc	Location into which the cartridge or cubicle is to be put.

ptloc	Description
D	Cartridge is to be put into the first available output drawer slot. PT=D is valid only with OP=RM.
F	Cartridge or cubicle is to be put into the specified family (FM=family) and subfamily (SB=sub). PT=F is valid only with OP=AM or OP=AB.
P	Cartridge or cubicle is to be put into the pool. PT=P is valid only with OP=AM, OP=RM, or OP=AB. PT=P is not valid if PK=P is specified.
R	Cubicle is to be put into the reserved area of the CSU. PT=R is valid only with OP=AB.

PT	Same as PT=P.
PT omitted	Same as PT=P.
SB=sub	Subfamily to/from which ASLABEL adds/removes a cartridge or CSU; $0 \leq sub \leq 7$. With OP=FX this parameter specifies the subfamily to which the cartridge was assigned.
SB	Same as SB=0.
SB omitted	Same as SB=0.
V=vsn	Volume serial number of the cartridge to be added, removed, or repaired; not valid if PK=x is specified. If V=vsn is specified, N must be 1.

p_i	Description
V	Volume serial number of the cartridge is not specified.
V omitted	Same as V.
$XI=x_1$	Column of the CSU to be added or removed; $0 \leq x_1 \leq 57$ and $x_1 \neq 30$; valid only with OP=AB or OP=RB.
$YI=y_1$	Row of the CSU to be added or removed; $0 \leq y_1 \leq 36$ and $y_1 \neq 18$; valid only with OP=AB or OP=RB.
$XI=x_1$, $YI=y_1$	X and Y coordinates of the cubicle to be added or removed; valid only with OP=AB or OP=RB.
$XI=x_1$, $YI=y_1$, $XF=x_2$, $XF=y_2$	Rectangle of cubicles to be added or removed; cubicles with X coordinates between x_1 and x_2 and Y coordinates between y_1 and y_2 are included; valid only with OP=AB or OP=RB. At most, 100 cubicles can be included in the rectangle. $x_1, x_2 \leq 57$; $y_1, y_2 \leq 36$; $x_1 < x_2$; $y_1, < y_2$. XF and YF must both be specified, if either is specified. XF and YF cannot be specified unless both XI and YI are specified.
XI and YI omitted	With OP=AB the next available cubicle closest to top (for assignment to a family) or the bottom (for assignment to the pool) is to be selected. With OP=RB the first empty assigned cubicle is to be selected.

ASMOVE

ASMOVE(p_1,p_2, ...,p_n) Determines which files should be resident on disk, on MSF, or on both.

p_i	Description
FM=family	Family to be used by ASMOVE.
FM	Same as FM=system default family.
FM omitted	Same as FM=system default family.

Pi	Description
L=lfn	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
RD=yymmdd	Last access date. All files not accessed after day yymmdd are to be released from disk.
RD omitted	No files are to be released.
RO	Report only. ASMOVE does not release files from disk and does not send requests to MSSEXEC to destage or destage/release files.
RO omitted	Disk space is to be released and requests are to be sent to MSSEXEC, if appropriate.
RT=hhmmss	Last access time. All files not accessed after time hhmmss of the day specified by the RD parameter are to be released.
RT	Same as RT=000000 (midnight).
RT omitted	Same as RT=000000 (midnight).
TM=mode	Deselects or selects test mode.

mode	Description
N	Deselect test mode. The pseudo release flag is cleared and disk images for all files from the selected family which were previously pseudo released are really released from disk. Normal release processing is performed for all files selected for release by this ASMOVE run.

Pi	Description
	mode: Y — Select test mode. Pseudo release is performed for all files selected for release by this ASMOVE run.
TM omitted	Normal release processing is to be performed for files that do not have the pseudo release flag set. Files with the pseudo release flag set are treated as if they have been released.

The following options for ASMOVE redefine the values of the weight factors (installation parameters) used in the algorithms that select files to be destaged or released. Unless otherwise stated, for each of these options the installation-defined value is multiplied by the integer value n, n≥0.

Option	Description
DB=n	n x the installation-defined DB weight factor is to be used as the preferred residence value for destage decisions for files with a PR=M attribute.†
DB	Same as DB=1.
DB omitted	Same as DB=1.
DC=n	n x the installation-defined weight factor is to be used as the preferred residence value for destage decisions for files with a PR=N attribute.†
DC	Same as DC=1.
DC omitted	Same as DC=1.

† The file owner specifies the preferred residence attribute via the PR parameter and the backup requirement via the BR parameter on the DEFINE or CHANGE statement (refer to volume 1 of the NOS Reference Manual).

Option	Description
DL=n	n x the installation-defined length weight factor is to be used as the length weight factor for destage decisions.
DL	Same as DL=1.
DL omitted	Same as DL=1.
DT=n	n x the installation-defined time weight factor is to be used as the time weight factor for destage decisions.
DT	Same as DT=1.
DT omitted	Same as DT=1.
DV=n	n x the installation-defined destage control value is to be used as the destage control value.
DV	Same as DV=1.
DV omitted	Same as DV=1.
MN=n	n x installation-defined minimum length threshold is to be used as the minimum allowable size in disk PRUs (64 words) for MSF files.
MN	Same as MN=1.
MN omitted	Same as MN=1.
MX=n	n x installation-defined maximum length threshold is to be used as the maximum allowable size in disk PRUs for MSF files.
MX	Same as MX=1.
MX omitted	Same as MX=1.

ASUSE

ASUSE generates the following reports:

Report	Contents
Basic usage report	Lists general information about the use of each CSU in a subfamily.
Optional report A	Identifies cartridges with a specified number of streams available for assignment.†
Optional report B	Identifies cartridges with flags set in the MSF catalog.
Optional report C	Lists the contents of a CSU as described in the CSU map.
Optional report D	Lists detailed cartridge status information on each entry in the MSF catalog.
Optional report E	Lists detailed cartridge and stream status information on each entry in the MSF catalog.

ASUSE(p_1,p_2, ...,p_n) — Produces reports on the availability of space on MSF cartridges and the allocation of cubicle space within a CSU.

p_i	Description
CS=id	CSU identifier of the CSU to be used. Up to 13 CSUs can be selected by the letters A through M. For example, CS=ACJG selects CSU A, C, G, and J.
CS	Same as CS=ABCDEFGHIJKLM.
CS omitted	Same as CS=ABCDEFGHIJKLM.
FM=family	Family to be reported on.
FM	Same as FM=system default family.

†A cartridge that has the lost cartridge flag, inhibit allocation flag, or excessive write parity errors flag set is considered as having zero streams available for allocation regardless of the number of unallocated streams on the cartridge.

Pi	Description
FM omitted	Same as FM=system default family.
L=lfn	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
OP=op†	Type of report to be produced.

op	Description
A	Optional report A and basic usage report.
B	Optional report B and basic usage report.
C	Optional report C and basic usage report.
D	Optional report D and basic usage report.
E	Optional report E and basic usage report.

OP	Basic usage report only is to be produced.
OP omitted	Same as OP.
SB=sub	Subfamily to be reported on. Up to eight subfamilies can be selected by the numbers 0 through 7. For example, SB=0273 selects subfamilies 0, 2, 3, and 7.
SB	Same as SB=01234567.
SB omitted	Same as SB=01234567.
SL=n	Minimum number of streams available for assignment; valid only with optional report A. Cartridges with n or more streams available are reported. $0 \leq n \leq 16$, $n \leq m$ (refer to SU=m).

†Multiple options can be specified (for example, OP=AB).

p_i	Description
SL	Same as SL=0.
SL omitted	Same as SL=0.
SU=m	Maximum number of streams available for assignment; valid only with optional report A. Cartridges with m or less streams available are reported. $0 \leq m \leq 16$, $n \leq m$ (refer to SL=n).
SU	Same as SU=16.
SU omitted	Same as SU=16.

ASVAL

ASVAL(p_1,p_2, ...,p_n) Performs release processing and reports problems with the current MSS system files.

p_i	Description
AM	The CSU map for the CSU specified by the CS parameter is to be analyzed in addition to the MSF catalogs; not valid if RF=lfn or RF is specified.
AM=	Same as AM.
AM omitted	CSU maps are not to be analyzed.
CS=id	CSU identifier of the CSU to be used. Up to 13 CSUs can be selected by the letters A through M. For example, CS=ACJG selects CSU A, C, G, and J.
CS	Same as CS=ABCDEFGHIJKLM.
CS omitted	Same as CS=ABCDEFGHIJKLM.
FM=family	Family to be analyzed; not valid if the RF option is specified.
FM	Same as FM=system default family; not valid if the RF option is specified.

Pi	Description
FM omitted	Same as FM=system default family, if the RF option is not specified. The family on the Release Data File is used, if the RF option is specified.
FX=n	Error threshold. If the total error count is greater than n, neither release processing nor problem fixing is performed.
FX	Same as FX=0.
FX omitted	Same as FX=0.
L=lfn	File on which listable output is to be written.
L	Same as L=OUTPUT.
L=0	No output file is to be generated.
L omitted	Same as L=OUTPUT.
RF=lfn	File which contains the release data file.
RF	Same as RF=ZZZZRDF.
RF omitted	Current versions of the MSF catalogs are to be analyzed.
RL	Release processing is to be performed; valid only if the RF option is specified.
RL omitted	No release processing is to be performed.
SB=subs	Subfamilies to be processed. Up to eight subfamilies can be selected by the numbers 0 through 7. For example, SB=723 selects subfamilies 2, 3, and 7.
SB	Same as SB=01234567.
SB omitted	Same as SB=01234567.

p_i	Description
ST=n	Scattered file criterion. Files are indicated as scattered if they are contained on at least n more cartridges than the minimum number needed to contain them. The minimum number of cartridges is the quotient of (number of streams + 15)/16; the remainder is ignored.
ST	Same as ST=0. That is, files are scattered if they are contained on more than the minimum number of cartridges needed to contain them.
ST omitted	Same as ST=0.

DFLIST

DFLIST. Catalogs all dayfiles which have been made permanent by the DFTERM utility.

DFTERM

DFTERM(p_1,p_2, ...,p_n) Terminates an active or inactive dayfile and retains it as a direct access permanent file.

p_i	Description
DN=device number or FM=family name	Device or family of devices on which the inactive dayfile resides, or on which the new dayfile resides if the active dayfile is terminated. Default is the device on which the current dayfile resides. A two-digit logical device number (1 to 77_8), or one- to seven-character family name.

p_i	Description
FT=file type	Type of dayfile to be terminated by DFTERM:

file type	Description
ACCOUNT	Account dayfile.
DAYFILE	System dayfile.
ERRLOG	Error log dayfile.

This entry also causes the RM and DN options to be updated to reflect the current family and device number of the dayfile specified by FT. If omitted, DAYFILE is assumed.

L=listfile	Name of file (one to seven characters) to receive output. If omitted, OUTPUT is assumed.
NM=name	A one- to five-character name of direct access file on which the terminated dayfile is written. DFTERM adds a two-character prefix indicating the type of dayfile being terminated (DF, AC, ER). If omitted, DFTERM supplies the name.
OP=option	Specifies whether active or inactive dayfiles are to be terminated (default is OP=A).

option	Description
A	Active dayfiles.
I	Inactive dayfiles.

The following specifications alter DFTERM processing (appear only on the control statement).

p_i	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

DLFP

DLFP(p_1,p_2, ...,p_n) — Calls the debug log file processor.

p_i	Description
I=lfn_1	Read directives from file lfn_1. If I is omitted, INPUT is assumed.
I=0	No directives are to be input.
L=lfn_2	List output is written on file lfn_2. If L is omitted, OUTPUT is assumed.
B=lfn_3	Read debug log file from file lfn_3. If B is omitted, ZZZZZDN is assumed.
D	Stop processing current directive record if it contains errors and skip to next record. If D is omitted, the job aborts when a directive record error is detected.

Directive	Description
BD=yymmdd	Only messages logged on or after the specified date (yymmdd) are to be output.
BT=hhmmss	Only messages logged on or after the specified time (hhmmss) are to be output.
C	Only messages with the CANCEL flag set in the application block header are to be output.
CN=n	Only synchronous and asynchronous supervisory messages and data blocks relating to connection number n are to be output. $1 \leq n \leq 255$.
DN=	For system use only.
E	Only messages with the error bit set in the supervisory message are to be output.

Directive	Description
ED=yymmdd	Messages logged on or after the specified date (yymmdd) are not to be output.
ET=hhmmss	Messages logged on or after the specified time (hhmmss) are not to be output. If the debug log file contains more than one day's messages, searching terminates after the first occurrence of the specified time.
F	Only messages with the No Format Effector flag set in the application block header are to be output.
LE=n	Specifies the maximum length in CM words of each message to be output. $1 \leq n \leq 410$. Default is 10.
NM=n	Specifies a maximum of n messages are to be output. $0 \leq n \leq 1000000$.
P	Only messages with the Parity Error flag set or Auto Input Mode flag set in the application block header are to be output.
PF=hh	Only supervisory messages with PFC equal to hh are to be output. hh is two hexadecimal numbers ($00 \leq hh \leq FF$).
PS=hhxx	Only supervisory messages with PFC/SFC equal to hhxx are to be output. hhxx is four hexadecimal numbers ($0000 \leq hhxx \leq FFFF$).
R	Only messages with the response bit set in the supervisory message are to be output.
SM=n	No messages are to be output until after the n^{th} message is found which satisfies all the other directive options. $0 \leq n \leq 1000000$.

Directive	Description
U	Only messages with the Input Block Undeliverable flag set in the application block header are to be output.
X	Only messages with the Transparent Data flag set in the application block header are to be output.

DSDI

DSDI(p_1,p_2, ...,p_n) Calls the deadstart dump interpreter.

p_i	Description
I=lfn$_1$	Read directives from file lfn$_1$. If I is omitted, INPUT is assumed.
F=lfn$_2$	Read express dump from file lfn$_2$. If F is omitted, DUMP is assumed.
L=lfn$_3$	List output is written on file lfn$_3$. If L is omitted, OUTPUT is assumed.
D	Create random dump file. If D is omitted, no random dump file is created.
PD=n	Print density is n lines per inch, where n may be 3, 4, 6, or 8. If omitted, n=6. If n is omitted, n=8 is assumed.
Z	The DSDI control statement contains input directives.
P	Use low central memory pointers from running system. If omitted, use low central memory pointers from express deadstart dump (EDD) file.
NR	EDD file is not rewound before processing.

File Control Directives	Description
DISPOSE,un.	Dispose alternate output.
OUTPUT,lfn.	Begin alternate output.
READ,lfn,rec.	Read alternate input.
REWIND,lfn.	Rewind file lfn.

File Print Directives	Description
EJ,nn.	Eject if not nn lines.
EJOFF.	Turn off auto eject.
EJON.	Turn on auto eject.
PD,n.	Preset print density.
*.ccc...ccc	Enter subtitle comment.

Hardware Register Dump Directives	Description
SC.	CDC CYBER 170 status/control register.
XP.	Execute exchange package.

Memory Dump Directives	Description
CM.	Specifies central memory dump.
EC.	Specifies extended core storage dump.
C,fwa,lwa+1.	Dumps memory in instruction parcel format (four groups of five octal digits formatted for terminals).†
D,fwa,lwa+1.	Dumps memory in byte format (five groups of four octal digits formatted for terminals).†

† Produces output suitable for listing at an interactive terminal.

Memory Dump Directives	Description
E,fwa,lwa+1.	Dumps memory in word format (four words per line).
AP,n_1,n_2, ...,n_n.	Analyzes PP number n_i.
P,n_1,n_2, ...,n_n.	Dumps PP n_i in block format.
Q,n_1,n_2, ...,n_n.	Dumps PP n_i in line format.
Q,n,fwa,lwa+1.	Dumps PP n in line format for terminals.†
PF,n_1,n_2, ...,n_n.	Dumps first level PP n_i in block format.
QF,n_1,n_2, ...,n_n.	Dumps first level PP n_i in line format.
RA,addr.	Specifies that subsequent C, D, and E directives will dump memory locations relative to reference address addr.
RAC,n.	Specifies that subsequent C, D, and E directives will dump memory locations relative to reference address of control point n.
MPP.	Dumps correct logical PP if the logical position of PP00 has been changed prior to full dump to tape.
MPP,n.	Dumps correct logical PP if the logical position of PP00 was moved to PPn via a deadstart panel program.
PMS.	Reads S/C register dump to determine the current value of PP memory select switches and correct logical PP to be dumped if PP00 position has been changed prior to full dump to tape.

†Produces output suitable for listing at an interactive terminal.

CMR Dump Directives	Description
LC.	Dumps contents of low central memory.
CP,n_1/ops_1, n_2/ops_2, ...,n_n/ ops_n.	Causes control point area n_i to be dumped (formatted for terminals).†

ops_i	Description
X	Exchange package and parameter summary (default).
T	Detailed dump (default).
A	Job dayfile buffer (default).
F	Attached files (default).
C	Field length in C format.
D	Field length in D format.
E	Field length in E format.
G	Control point area in C format.
H	Control point area in D format.
I	Control point area in E format.
P	Attached PPs.
Omitted	Selects options A, F, T, and X.

†Produces output suitable for listing at an interactive terminal.

CMR Dump Directives	Description
CPO,ops.	Selects new default list options for CP directive as specified by ops.
PP.	Dumps PP communication areas (formatted for terminals).
DP.	Dumps dayfile buffer pointers.
EST.	Dumps equipment status table.
FNT.	Dumps FNT interlock table and file name table.
MST.	Dumps mass storage tables.
MST,eq_1, eq_2,..., eq_n.	Dumps mass storage tables on equipment eq_i.
JC.	Dumps job control parameters.
ACCOUNT.	Dumps ACCOUNT dayfile buffer.
DAYFILE.	Dumps SYSTEM dayfile buffer.
ERRLOG.	Dumps ERRLOG dayfile buffer.
DDB.	Dumps dayfile dump buffer.
EPB.	Dumps ECS/PP buffer.
MTR.	Dumps CPUMTR.
RPL.	Dumps resident peripheral library.
RCL.	Dumps resident central library.
PLD.	Dumps peripheral library directory.
CLD.	Dumps central library directory.

Subsystem Dump Directives	Description
MAGNET,ops.	Dumps areas of memory most frequently analyzed when a malfunction within MAGNET occurs specified by ops (default is all options).

ops	Description
P	1MT.
Q	Queue table.
U	Unit descriptor tables (UDT).

EI200,ops. Dumps areas of memory most frequently analyzed when a malfunction within EI200 occurs specified by ops (default is all options).

ops	Description
L	Low core pointer words.
T	Terminal tables.
P	1ED, 1LS, and XSP.
O	PP overlays.

BATCHIO,ops. Dumps areas of memory most frequently analyzed when a malfunction within BATCHIO occurs specified by ops (default is all options).

ops	Description
B	Buffer points.
P	1CD, 1IO, QAP, QAC, and DSP.

Subsystem Dump Directives	Description
IAF,ops. or TELEX,ops.	Dumps areas of memory most frequently analyzed when a malfunction occurs within the Interactive Facility (IAF) or the Time-Sharing Module (TELEX) as specified by ops (default is all options).

ops	Description
C	Command table.
E	Reentry table.
P	IAF- or TELEX-related PPs.
T	Terminal tables.

FAMILY

FAMILY(familyname)	Changes the family name associated with the job.
familyname	A one- to seven-character name of a family of permanent file devices. If omitted, the default family name is assumed. An alternate family introduced into the system without a VALIDUs file can be specified with 0 (zero) for familyname. For SYOT jobs only.

FNTLIST

FNTLIST(p_1, p_2,...,p_n — Lists detailed information about active queued I/O files.

p_i	Description
DF=fm	Family name of the destination remote batch site of the files to be listed.
UN=un	User number logged on at the remote site specified by the DF parameter whose remote batch files are to be listed.
FM=fm	Family of devices on which the files reside.
DN=dn	Device number on which the files reside; dn is a two-digit octal number.
DS=dv-ex or DS=dv	Destination device type and characteristic.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column binary.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

Pi	Description
	External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

† Not supported. Provided for NOS/BE compatibility.

p_i	Description
FC=forms code	Forms code of the files.

forms code	Description
fc_1	One to three specific forms codes (two alphanumeric characters each).
fc_1/fc_2	
$fc_1/fc_2/fc_3$	
**	Null forms code.
fc_1-fc_2	Range of forms codes; $fc_1 < fc_2$; ** is lowest possible value.

ID=id_1 or ID=id_1-id_2	A two-digit octal identifier or range of identifiers of the files.
JN=jn	A seven-character job name or four-character banner name of the file(s).
JC=job statement name	A one- to seven-character name on job statement that, with the JN specification, uniquely identifies the job to be listed.
ot=ft	The job origin type (ot) and corresponding file type (ft) to be listed.

ot	Description
BC	Local batch and system.
EI	Remote batch.

ft	Description
IN	Input.
PR	Print.

Pi	Description
	ft — Description
	PH — Punch.
	ALL — All file types for specified origin.
	NONE — No files for specified origin.
L=lfn	A one- to seven-character name of the output file; default is OUTPUT.
LO=lop	The type of listing wanted.
	lop — Description
	F — Full listing.
	S — Condensed listing.

The following specifications alter FNTLIST processing (entered only from a control statement).

Pi	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

INSTALL

INSTALL(lfn, EQxx)	Installs running system or user specified deadstart file from mass storage onto RMS deadstart device.
lfn	Name of file (assigned to control point) to be installed as system deadstart file. Default file name is SYSTEM. File name lfn cannot be SDF. Calling job must be system origin or validated for system origin privileges.
xx	EST ordinal of RMS device on which lfn is to be installed.

LDLIST

LDLIST(p_1,p_2, ...,p_n) Lists all queue files present on a QDUMP dump tape.

p_i	Description
FC=forms code	Forms code of files to be listed. Default is ALL.

forms code	Description
fc	Two alphabetic characters, AA through AF.
*	All forms codes from AG to 99.
NULL	The null forms code.
ALL	All forms codes.

FN=file name	File name of dump or load file. If not specified, default is FN=QFILES.
L=listfile	Name of file (one to seven characters) to receive output. If omitted, OUTPUT is assumed.
ME=type	Device to load from or dump to:

type	Description
MT	Seven-track tape.
NT	Nine-track tape.
MS	Mass storage device.

If MT or NT and a tape is not preassigned, the installation default density is used.

NF=number	Decimal number of media files to skip. Default value is 0.
SC=number	Decimal number of queue files to skip during LDLIST before beginning the list operation. If not specified, no files are skipped.

p_i	Description
TID=identifier	The destination terminal identifier for remote batch origin files.
VSN=number	Volume serial number of the tape to list from (valid only if ME=MT or ME=NT has been specified).
I=lfn	Name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after processing the control statement parameters and can only be entered from the control statement.

LOADBC

LOADBC(p_1) Requests system controlware be loaded on disk.

p_i	Description
C=xx	Specifies disk channel on which system controlware is to be loaded.

MODVAL

MODVAL(p_1,p_2, ...,p_n) Creates, modifies, or queries VALIDUs.

p_i	Description
I=lfn_1	File containing input data (default INPUT).
P=lfn_2	Specifies old validation file that is to be updated (defult VALIDUs).
N=lfn_3	Specifies interim file that becomes newly created validation file (default NEWVAL).
S=lfn_4	Source data for each user number is written to file lfn_4 (default SOURCE).

P_i	Description
U=lfn$_5$	File containing the available user indices for the current VALIDUs file (default VALINDs).
L=lfn$_6$	File to receive list output (default OUTPUT).
CV	Specifies convert VALIDUs option.
SI	Source input for create.
RP	Passwords not specified on create run.
D	No abort on directive errors.
FA	Forces attach of VALIDUs and VALINDs (SYOT only).
FM=name	Indicates family name user wishes MODVAL to access (SYOT only).
SP	Suppresses generation of application (AP) directives from bits 47 through 24 of the access word.
OP=C	Specifies create option.
OP=U	Specifies update option.
OP=Z	Statement update option.
OP=I	Specifies inquire option.
OP=R	Reformats the validation file by purging all files of each deleted user.
OP=S	Specifies a source run that returns the validation file specified by the P identifier on the file specified by the S keyword.
OP=K	K display option.
OP=L	Reads the validation file, sorts the copy by user number, and writes it to the output file.
LO=E	List errors; used with OP=C, OP=U, or OP=Z.

Pi	Description
LO=A	Sorts by user number; used with OP=L.
LO=N	Sorts by user index; used with OP=L.
LO=L	Catalog file lfn_2 instead of VALIDUs; used with OP=L.
LO	E and N options.
LO=AL	A and L options.
LO=NL	N and L options.
LO=EN	E and N options.

/usernum,$ident_1$=$data_1$, $ident_2$=$data_2$,..., $ident_n$=$data_n$ — Specifies MODVAL input directives.

Identifier	Description
PW=passwrd	A one- to seven-character password; minimum length of password is specified by the installation (default is four).
UI=nnnnnn	User index.
SC=nn	Security count.
AB=ansback	A 1- to 10-character answerback code (TELEX only).
MT=nn	Number of magnetic tapes allowed.
RP=nn	Number of removable packs allowed.
TL=nn	Index to maximum CPU time.
DF=nn	Index to maximum number of MESSAGE requests.
CC=nn	Index to maximum number of batch control statements.
OF=n	Index to maximum number of print and punch files.
CP=nn	Index to number of punched cards allowed.

Identifier	Description
LP=nn	Index to number of printed lines allowed.
EC=nn	Index to maximum ECS memory.
SL=nn	Index to SRU limit.
CM=nn	Index to maximum CM.
NF=n	Index to maximum number concurrent files.
MS=nn	Index to maximum number mass storage PRUs.
DB=n	Index to maximum number deferred batch jobs.
AW=xxxx	Permission bits in access word (each bit has a meaning).
AP=yyyy	Application bits in access word (each bit has a meaning).
CAB=oldab, newab	New answerback code (TELEX only).
PN=projnum	A 1- to 20-alphanumeric character project number.
CN=chrgnum	A 1- to 10-alphanumeric character charge number.

The following identifiers can be used only in update and K-display options.

Identifiers	Description
DAC=usernum	Deletes user number from VALIDUs file.
FUI=nnnnnnr	Changes or inserts user index.

The following identifiers control permanent file access for the individual user.

Identifier	Description
FC=n	Maximum number of indirect access permanent files.
CS=n	Cumulative size of all indirect access permanent files.

Identifier	Description
FS=n	Maximum size allowed for a single indirect access permanent file.
DS=n	Size allowed for single direct access file.

The following identifiers manipulate fields describing the user's terminal.

Identifier	Description
PX=tran	Transmission mode (TELEX only).
RO=nn	Rubout count (TELEX only).
PA=prty	Terminal parity (TELEX only).
TT=term	Terminal type (TELEX only).
TC=chset	Terminal character set.
IS=subsy	Initial subsystem.

NDA

NDA(p_1,p_2,..., p_n) — Analyzes and lists network processor unit (NPU) dumps.

p_i	Description
DN=dn	Decimal number (1 to 540) assigned by the Network Supervisor to a dump to be analyzed.
NPU=npuname	A one- to seven-character name of the network processing unit whose dumps are to be analyzed.
LO=lop	One or more listing options as follows:

lop	Description
0 (or blank)	Suppress listing.
R	List registers.
M	List macro memory.

If parameter is omitted, LO=RM is assumed.

p_i	Description
B=bbbbbb	A one- to six-digit hexadecimal address within the NPU macro memory at which to begin the dump report. Default is the actual beginning of the dump.
E=eeeeee	A one- to six-digit hexadecimal address within the NPU macro memory at which to end the dump report. Default is the actual end of the dump.
NR	No release of the dump file after NDA processing. If omitted, the dump file is purged.

PFATC

PFATC(p_1,p_2, ...,p_n) Catalogs permanent file archive file(s).

p_i	Description
T=t	A one- to seven-character name of the file from which PFATC reads archive files. Default name is TAPE.
LO=lop	Specifies the type of output records desired. Default is no output.

lop	Description
T	Lists all files processed.
E	Lists errors.
S	Lists cumulative statistics for catalog.
C	Lists all files in catalog for system.

L=lfn	Name of file on which reports are to be written. Default is OUTPUT.
OP=op	Specifies the options which control the processing of files.

p_i	Description

op	Description
C	Makes selection according to time of creation.
A	Makes selection according to time of last access.
M	Makes selection according to time of last modification.
B	Denotes that the time specified on the TM and DT parameters is time before which all files meeting the criteria of the C, A, or M option are processed.
I	Selects indirect access files only.
D	Selects direct access files only.

NT	Specifies a nine-track archive tape. Default value is seven-track (MT). If MT or NT and a tape is not reassigned, the installation default density is used.
NR	Cancels all rewinds for the operation in which it is specified. Default is to rewind before and after processing.
SF=sf	A one- to two-digit number which specifies the number of archive files to skip before processing begins. Default is 0.
N=n	A one- to two-digit number which specifies the number of archive files on an archive tape to process. If set to 0, one file will be processed. Default is 0.
DT=yymmdd	Specifies the date to be used with C, A, M, or B option. Default is current date if OP=A, C, or M is specified; otherwise, it is 0. DT=yymmdd cannot be used if AD, AT, BD, or BT parameter has been specified.

Pi	Description
TM=hhmmss	Specifies the time to be used with C, A, M, or B option. Default is 0. TM=hhmmss cannot be used if AD, AT, BD, or BT parameter has been specified.
AD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose correspondig dates are after the specified date. Default is current date. AD=yymmdd cannot be used if DT, TM, OP=B parameter has been specified.
AT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are after the specified time. Default is midnight. AT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
BD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are before the specified date. Default is current date if BT=hhmmss is specified; otherwise, it is 0 (no before date). BD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
BT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are before the specified time. Default is midnight if BD=yymmdd is specified; otherwise, it is no before time. BT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
UI=ui	Limits processing to files located under this user index. Default is 0 (no user index limiting).

p_i	Description
PF=pfn	A one- to seven-character name which specifies the permanent file name for which processing is desired. Default is no name.
UN=un	Specifies the one- to seven-character user number. Default is no name.

PFCAT

PFCAT(p_1,p_2, ...,p_n) Produces a cataloged directory of file information derived from catalog tracks on a permanent file device.

p_i	Description
FM=fm	A one- to seven-character name of the family of permanent file devices to be cataloged. Default is normal system family name.
PN=pn	A one- to seven-character name of the auxiliary device to be cataloged. Default is no name.
DN=dn	A one- or two-digit octal number which identifies one specific device within a family that is to be cataloged.
LO=lop	Specifies the type of output records desired. Default is no output.

lop	Description
T	Lists all files processed.
E	Lists errors.
S	Lists cumulative statistics for catalog.
C	Lists all files in catalog for system.

L=lfn	Name of file on which reports are to be written. Default is OUTPUT.
OP=op	Specifies the options which control the processing of files.

Pi	Description

op	Description
C	Makes selection according to time of creation.
A	Makes selection according to time of last access.
M	Makes selection according to time of last modification.
B	Denotes that the time specified on the TM and DT parameters is a dividing time before which all files meeting the criteria of the C, A, or M option are processed.
I	Selects indirect access files only.
D	Selects direct access files only.

DT=yymmdd — Specifies the date to be used with C, A, M, or B option. Default is current date if OP=A, C, or M is specified; otherwise, it is 0. DT=yymmdd cannot be used if AD, AT, BD, or BT parameter has been specified.

TM=hhmmss — Specifies the time to be used with C, A, M, or B option. Default is 0. TM=hhmmss cannot be used if AD, AT, BD, or BT parameter has been specified.

AD=yymmdd — Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are after the specified date. Default is current date. AD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.

AT=hhmmss — Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are after the specified time. Default is midnight. AT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.

p_i	Description
BD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are before the specified date. Default is current date if BT=hhmmss is specified; otherwise, it is 0 (no before date). BD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
BT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are before the specified time. Default is midnight if BD=yymmdd is specified; otherwise, it is no before time. BT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
UI=ui	Limits processing to files located under this user index. Default is 0 (no user index limiting).
PF=pfn	A one- to seven-character name which specifies the permanent file name for which processing is desired. Default is no name.
UN=un	Specifies the one- to seven-character user number which is associated with the PN parameter. Default is no name.

PFCOPY

PFCOPY(p_1,p_2, ...,p_n) — Extracts files from an archive file and copies them to one or more files at a control point.

p_i	Description
T=t	A one- to seven-character name of the file used to read archive files. Default name is TAPE.

pi	Description
LO=lop	Specifies the type of output records desired. Default is LO=E.

lop	Description
T	Lists all files processed.
E	Lists errors.
S	Lists cumulative statistics for catalog.
C	Lists all files in catalog for system.

L=lfn — Name of file on which reports are to be written. Default is OUTPUT.

OP=op — Specifies the options which control the processing of files.

op	Description
C	Makes selection according to time of creation.
A	Makes selection according to time of last access.
M	Makes selection according to time of last modification.
B	Denotes that the time specified on the TM and DT parameters is time before which all files meeting the criteria of the C, A, or M option are processed.
I	Selects indirect access files only.
D	Selects direct access files only.
Q	Files are copied with a record containing the catalog entry (10_8 words) and any permit information (may be empty) preceding the data for the file.

p_i	Description
NT	Specifies a nine-track archive tape. Default value is seven-track (MT). If MT or NT and a tape is not preassigned, the installation default density is used.
NR	Cancels all rewinds for the operation in which it is specified. Default is to rewind before and after processing.
SF=sf	A one- or two-digit number which specifies the number of archive files to skip before processing begins. Default is 0.
N=n	A one- or two-digit number which specifies the number of active files on an archive tape to process. If set to zero, one file will be processed. Default is 0.
DT=yymmdd	Specifies the date to be used with C, A, M, or B option. Default is current date if OP=A, C, or M is specified; otherwise, it is 0. DT=yymmdd cannot be used if AD, AT, BD, or BT parameter has been specified.
TM=hhmmss	Specifies the time to be used with C, A, M, or B option. Default is 0. TM=hhmmss cannot be used if AD, AT, BD, or BT parameter has been specified.
AD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are after the specified date. Default is current date. AD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
AT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are after the specified time. Default is midnight. AT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.

Pi	Description
BD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are before the specified date. Default is current date if BT=hhmmss is specified; otherwise, it is 0 (no before date). BD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
BT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are before the specified time. Default is midnight if BD=yymmdd is specified; otherwise, it is no before time. BT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
UI=ui	Limits processing to files located under this user index. Default is 0 (no user index limiting).
PF=pfn	A one- to seven-character name which specifies the permanent file name for which processing is desired. Default is no name.
MF=mf	Specifies that all the files extracted from the archive tape are to be copied to the local file specified by the master file name (one to seven characters). Default is no name.
UN=un	Specifies the one- to seven-character user number. Default is no name.

PFDUMP

PFDUMP(p_1,p_2, ...,p_n) — Copies permanent files to backup storage (an archive file).

p_i	Description
FM=fm	Family name to be dumped. Default is normal system family name.
PN=pn	Pack name to be dumped. Default is no name.
DN=dn	Device number identifying a device within a family. If the device is a master device, all files cataloged on the device (regardless of what device they reside on) are dumped. If the device is not a master device, all files residing on the device are dumped. If the DN parameter is omitted, DN=0 is assumed, and all permanent files in the family are dumped.
TD=tdn	Device number identifying a device within a family. All files residing on the device are dumped. All files cataloged on the device but residing on another device are also dumped. If the TD parameter is omitted, TD=0 is assumed, and all permanent files in the family are dumped.
T=t	A one- to seven-character name of the file used to store archive files. Default name is TAPE.
LO=lop	Specifies the type of output records desired. Default is no output.

lop	Description
T	Lists all files processed.
E	Lists errors.
S	Lists cumulative statistics for catalog.
C	Lists all files in catalog for system.

p_i	Description
L=lfn	Name of file on which reports are to be written. Default is OUTPUT.
OP=op	Specifies the options which control the processing of files.

op	Description
C	Makes selection according to time of creation.
A	Makes selection according to time of last access.
M	Makes selection according to time of last modification.
B	Denotes that the time specified on TM and DT parameters is time before which all files meeting the criteria of the C, A, or M option are processed.
I	Selects indirect access files only.
D	Selects direct access files only.
P	Purges after dump (SYOT only).
EO	Purges if mass storage errors found.
S	Suppress staging of MSF resident files to disk for dump.

NT	Specifies a nine-track archive tape. Default value is seven-track (MT). If MT or NT and a tape is not preassigned, the installation default density is used.
NR	Cancels all rewinds for the operation in which it is specified. Default is to rewind before processing.

Pi	Description
SF=sf	A one- or two-digit number which specifies the number of archive files to skip before processing begins. Default is 0.
NU	No unload option. Archive file is not returned following dump. This option is selected for any tape files that PFDUMP requests.
DT=yymmdd	Specifies the date to be used with C, A, M, or B option. Default is current date if OP=A, C, or M is specified; otherwise, it is 0. DT=yymmdd cannot be used if AD, AT, BD, or BT parameter has been specified.
TM=hhmmss	Specifies the time to be used with C, A, M, or B option. Default is 0. TM=hhmmss cannot be used if AD, AT, BD, or BT parameter has been specified.
AD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are after the specified date. Default is current date. AD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
AT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are after the specified time. Default is midnight. AT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
BD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are before the specified date. Default is current date if BT=hhmmss is specified; otherwise, it is 0 (no before date). BD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.

Pi	Description
BT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are before the specified time. Default is midnight if BD=yymmdd is specified; otherwise, it is no before time. BT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
UI=ui	Limits processing to files located under this user index. Default is 0 (no user index limiting).
PF=pfn	A one- to seven-character name which specifies the permanent file name for which processing is desired. Default is no name.
VF=vf	A one- to seven-character name which indicates the name of a file on which PFDUMP stores a duplicate of the archive file it creates. Default name is PFVER.
v	Produces a verification file that is a duplicate of the archive file it creates. Default is no verify file written.
UN=un	Specifies the one- to seven-character user number which is associated with the packname parameter. Default is no name.
SD	Set date option. Sets the date and time of the dump in a special sector on the device being dumped. This allows the release of disk space associated with files which are dumped, if copies of the files also exist on the MSF.
RD=rdf	One- to seven-character name of the release data file (RDF) to be created by PFDUMP. RDF is used as input to the ASVAL utility. Default is no file written.

PFLOAD

PFLOAD(p_1,p_2, ...,p_n)

Archive files produced by the PFDUMP utility can be loaded back onto the permanent file system with this utility.

p_i	Description
FM=fm	Family name to be loaded. Default is normal system family name.
PN=pn	Pack name to be loaded. Default is no name.
DN=dn	Device number identifying a device within a family. If the device is a master device, all files cataloged on the device (regardless of what device they reside on) are loaded. If the device is not a master device, all files residing on the device are loaded. If the DN parameter is omitted, DN=0 is assumed, and all permanent files in the family are loaded.
TD=tdn	Device number identifying a device within a family. All files residing on the device are loaded. All files cataloged on the device but residing on another device are also loaded. If the TD parameter is omitted, TD=0 is assumed, and all permanent files in the family are loaded.
T=t	A one- to seven-character name of the file used to read archive files. Default name is TAPE.
LO=lop	Specifies the type of output records desired. Default is no output.

Pi	Description

lop	Description
T	Lists all files processed.
E	Lists errors.
S	Lists cumulative statistics for catalog.
C	Lists all files in catalog for system.

L=lfn — Name of file on which reports are to be written. Default is OUTPUT.

OP=op — Specifies the options which control the processing of files.

op	Description
C	Makes selection according to time of creation.
A	Makes selection according to time of last access.
M	Makes selection according to time of last modification.
B	Denotes that the time specified on the TM and DT parameters is time before which all files meeting the criteria of the C, A, or M option are processed.
I	Selects indirect access files only.
D	Selects direct access files only.
R	Selects replace option. Files being loaded from an archive tape replace files in the permanent file system for which there is a matching file name (SYOT only).

Pi	Description
	op — Description
	N — Noninitial load.
	E — Extracts catalog image record (CIR) only.
	O — Omits CIR processing. PFLOAD skips the CIR for the specified archive file and performs a normal load (nonincremental).
	EO — Purges if mass storage errors found.
	Z — Clears the alternate storage address of the file being loaded. Normally used when loading individual files from backup.
NT	Specifies a nine-track archive tape. Default value is seven-track (MT). If MT or NT and a tape is not preassigned, the installation default density is used.
NR	Cancels all rewinds for the operation in which it is specified. Default is to rewind before and after processing.
SF=sf	A one- or two-digit number which specifies the number of archive files to skip before processing begins. Default is 0.
N=n	A one- or two-digit number which specifies the number of archive files on an archive tape to process. If set to 0, one file will be processed. Default is 0.
UD	Sets the utility control date and time for the file being loaded. This ensures the file will be included in the next incremental dump. Normally used when loading individual files from backup.

Pi	Description
DT=yymmdd	Specifies the date to be used with C, A, M, or B option. Default is current date if OP=A, C, or M is specified; otherwise, it is 0. DT=yymmdd cannot be used if AD, AT, BD, or BT parameter has been specified.
TM=hhmmss	Specifies the time to be used with C, A, M, or B option. Default is 0. TM=hhmmss cannot be used if AD, AT, BD, or BT parameter has been specified.
AD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are after the specified date. Default is current date. AD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
AT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are after the specified time. Default is midnight. AT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.
BD=yymmdd	Specifies the date to be used with C, A, or M option. Selects files whose corresponding dates are before the specified date. Default is current date if BT=hhmmss is specified; otherwise, it is 0 (no before date). BD=yymmdd cannot be used if DT, TM, or OP=B parameter has been specified.
BT=hhmmss	Specifies the time to be used with C, A, or M option. Selects files whose corresponding times are before the specified time. Default is midnight if BD=yymmdd is specified; otherwise, it is no before time. BT=hhmmss cannot be used if DT, TM, or OP=B parameter has been specified.

p_i	Description
UI=ui	Limits processing to files located under this user index. Default is 0 (no user index limiting).
PF=pfn	A one- to seven-character name which specifies the permanent file name for which processing is desired. Default is no name.
DI=di	All files being processed by PFLOAD are loaded to this user index. Default is 0 (no destination index).
DD=dd	Specifies the device number where files are to be loaded when their original device is no longer defined in the system. Default is 0.
UN=un	Specifies the one- to seven-character user number which is associated with the PN parameter.

PROFILE

PROFILE(p_1,p_2, ...,p_n) — Creates, updates, and inquires about a project profile file.

p_i	Description
I=lfn_1	File lfn_1 contains input data (default is INPUT).
L=lfn_2	File lfn_2 receives output (default is OUTPUT).
P=lfn_3	File lfn_3 is project profile file (default is PROFILa).
S=lfn_4	File lfn_4 receives PROFILE source data for OP=S (default is SOURCE).
FM=name	Indicates the family name the user wishes PROFILE to access.
CN=cnum	Charge number inquire (OP=I).

p_i	Description
PN=pnum	Project number inquire (OP=I).
CV	Convert option.
OP=C	Create option.
OP=K	K-display option.
OP=R	Restructure run.
OP=S	Source run.
OP=L	List option (used with LO).
OP=U	Updates project profile file.
OP=T	Time-sharing update.
OP=I	Inquire option.
LO=F	Specifies all PROFILa file data.
LO=C	Specifies all PROFILa file charge numbers.
LO=P	Specifies all PROFILa file and project numbers.
LO=FM	PROFILa file data accessible by master user.
LO=CM	Lists charge numbers accessible by master user.
LO=PM	Lists project numbers accessible by master user.

Directives used in the following format add or update information on each charge number.

/chargenum,dir_1, dir_2,...,dir_n Specifies PROFILE directives dir_i for charge number chargenum.

dir_i	Description
ACN=cn	Adds or activates charge number.
AD=n	SRU constant.
APN=pn	Adds or activates project number.

dir_i	Description
ARn=x	Current number of resource units the project has used for each installation accumulator n ($1 \leq n \leq 8$).
AUN=un	Adds user number.
CEX=yymmdd.	Charge number expiration date.
CN=cn	Charge number (same as/chargenum).
DCN=cn	Deactivates charge number.
DPN=pn	Deactivates project number.
DUN=un	Deletes user number.
IRn=x	Index for default value of installation limit register n ($1 \leq n \leq 8$).
ISL=x	Index for default value of the SRU installation limit register.
ISV=x	Index for SRU validation limit.
LRn=x	Maximum number of resource units the project can use for each installation limit register n ($1 \leq n \leq 8$).
MU=mun	Master user number.
M1=n	Index to SRU multiplier to weight calculated system resources.
M2=n	Index to SRU multiplier to weight input/output usage.
M3=n	Index to SRU multiplier to weight central memory field length usage.
M4=n	Index to SRU multiplier to weight extended core field length usage.
PCL=pcl	Project count limit.
PEX=yymmdd.	Project number expiration date.
PN=pn	Project number.
SIA=sia	SRU installation accumulator.

dir_i	Description
SIL=sil	SRU installation limit register.
SMA=sma	SRU master user accumulator.
SML=sml	SRU master user limit register.
TI=ti	Time of day before which user cannot use project number.
TO=to	Time of day after which user cannot use project number.

QALTER

QALTER(p_1,p_2, ...,p_n)	Alters routing of active queued output files; purges active queued I/O files.

The first group of parameters listed specifies the selection criteria for the files to be altered; the second group specifies the changes to be made and the output desired.

p_i	Description
DF=fm	Family name of the destination remote batch site to which the files are destined.
UN=un	User number logged on at the remote site specified by the DF parameter.
FM=fm	Family of devices containing the files.
DN=dn	Device containing the files; dn is a two-digit octal number.
DS=dv-ex or DS=dv	Destination device type and characteristic.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.

Pi	Description

dv	Description
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column binary.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

† Not supported. Provided for NOS/BE compatibility.

Pi	Description
FC=forms code	Forms code of the files.

forms code	Description
fc_1 fc_1/fc_2 $fc_1/fc_2/fc_3$	One to three specific forms codes (two alphanumeric characters each).
**	Null forms code.
fc_1-fc_2	Range of forms codes; $fc_1 \leq fc_2$; ** is lowest possible value.

ID=id_1 or ID=id_1-id_2	A two-digit octal identifier or range of identifiers of the files.
JN=jn	A seven-character job name or four-character banner name of the files.
JC=job statement name	A one- to seven-character name on job statement that, with the JN specification, uniquely identifies the job to be altered.
ot=ft	The job origin type (ot) and corresponding file type (ft) to be altered.

ot	Description
BC	Local batch and system.
EI	Remote batch.

ft	Description
IN	Input.
PR	Print.

Pi	Description

ft	Description
PH	Punch.
ALL	All file types for specified origin.
NONE	No files for specified origin.

The following parameters specify the changes to be made and the output desired.

Pi	Description
L=lfn	A one- to seven-character name of the output file; default is OUTPUT.
LO=lop	The type of listing wanted.

lop	Description
F	Full listing.
S	Condensed listing.

NDF=new destination family	New destination family name associated with selected remote batch output files.
NFC=new forms code	Alters forms code of print or punch file. New forms code can be two alphanumeric characters or ** (the null forms code).
NID=new file id	Alters file identifier of system or local batch origin files. The new id must be between 0 and 67_8.
NPR=new queue priority	Alters file priority; new priority is a one- to four-digit octal number.
NRC=c	Alters file repeat count; new repeat count is a one- to two-digit number (0 through 37_8).
NUN=new user number	New destination user number associated with selected remote batch output files.

p_i	Description
OP=option	Alters the origin type or purges the selected queue files.

option	Description
BC	Change to local batch.
EI	Change to remote batch.
NC	No change.
PR	Purge files.

If omitted, OP=NC assumed.

The following specifications alter utility processing (entered only from the control statement).

p_i	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

QDUMP

QDUMP(p_1,p_2, ...,p_n) Dumps selected I/O queue files from a single device, a family of devices, or all devices on the system.

p_i	Description
DA=date	Processing date, in the form yymmdd. If omitted, queue files created 5 days prior to the current date are processed.
DN=device number	A two-digit logical device number (1 to 77_8). FM option must be entered and must precede the DN option. Default is all devices.

Pi	Description
FM=family name	Processing is restricted to queue files in specified family. If omitted, queue files on all devices in all families are processed.
FN=file name	File name of dump or load file. Default is QFILES.
FS=file size	File size range in PRUs/10_8.
FU=family name	Family name under which the queue files to be processed were created. If omitted, queue files created by users in all families are processed.
ID=identifier	A two-digit octal identifier (0 to 77_8) indicating that only I/O queue files assigned that identifier are processed. If omitted, queue files having any identifier are processed.
JN=jobname	Job name of I/O queue files. Job name may be entered in either a seven-character job name or a four-character banner name (first four characters of jobname).
L=listfile	Name of file (one to seven characters) to receive output. If omitted, this information is written to file OUTPUT.
ME=type	Device to load from or dump to:

type	Description
MT	Seven-track tape.
NT	Nine-track tape.
MS	Mass storage device.

If MT or NT and a tape is not preassigned, the installation default density is used.

MI=machine id	A one- or two-character machine id indicating the mainframe under which the queue files to be processed were created. Default is current machine id.

Pi	Description
NF=number	Decimal number of media files to skip. Default is 0.
ot=ft	Selects job origin type (ot) and corresponding file type (ft) to be processed.

ot	Description
BC	Batch.
EI	Remote batch.
SY	System.

ft	Description
IN	Input.
PR	Print.
PH	Punch.
SF	Installation defined special file types.
ALL	All file types selected for specified origin.
NONE	No file types selected for specified origin.

TID=identifier	The destination terminal identifier for remote batch origin files.
TP=type	Indicates type of files to dump. Default is ALL.

type	Description
A	Active files.
I	Inactive files.
ALL	Both active and inactive files.

Pi	Description
UI=user index	User index under which I/O queue files were created. If omitted, queue files having any user index are processed.
VSN=number	Volume serial number of tape from which to dump. This entry is valid only if ME=MT or ME=NT has been specified.
DS=dv-ex or DS=dv	Device selection criteria for output files. Device codes include the following.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.

† Not supported. Provided for NOS/BE compatibility.

Pi	Description

ex	Description
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

FC=forms code Forms code for printed or punched output. Default is ALL.

forms code	Description
fc	Two alphabetic characters, AA through AF.
*	All forms codes from AG to 99.
NULL	No forms code selected.
ALL	All forms codes selected.

The following specifications alter QDUMP processing (entered only from the control statement).

p_i	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

QLIST

QLIST(p_1,p_2, ...,p_n) — Lists inactive I/O queue files.

p_i	Description
DA=date	Processing date, in form yymmdd. If omitted, all inactive queue files are listed.
DN=device number	A two-digit logical device number (1 to 77_8). FM option must be entered and must precede the DN option. Default is all devices.
FM=family name	Processing is restricted to queue files in specified family. If omitted, queue files on all devices in all families are processed.
FS=file size	File size range in PRUs/10_8.
FU=family name	Family name under which the queue files to be processed were created. If omitted, queue files created by users in all families are processed.
ID=identifier	A two-digit octal identifier (0 to 77_8) indicating that only I/O queue files assigned that identifier are processed. If omitted, queue files having any identifier are processed.

Pi	Description
JN=jobname	Job name of I/O queue files. Jobname may be entered in either a seven-character job name or a four-character banner name (first four characters of jobname).
L=listfile	Name of file to receive output. Default is OUTPUT.
MI=machine id	A one- or two-character machine id indicating the mainframe under which the queue files to be processed were created. Default is current machine id.
ot=ft	Selects job origin type (ot) and corresponding file type (ft) to be processed.

ot	Description
BC	Batch.
EI	Remote batch.
SY	System.

ft	Description
IN	Input.
PR	Print.
PH	Punch.
SF	Installation defined special file types.
ALL	All file types selected for specified origin.
NONE	No file types selected for specified origin.

TID=identifier	The destination terminal identifier for remote batch origin files.

p_i	Description
UI=user index	User index under which I/O queue files were created. If omitted, queue files having any user index are processed.
DS=dv-ex or DS=dv	Device selection criteria for output files. Device codes include the following.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.

†Not supported. Provided for NOS/BE compatibility.

Pi	Description

ex	Description
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

FC=forms code — Forms code for printed or punched output. Default is ALL.

forms code	Description
fc	Two alphabetic characters, AA through AF.
*	All forms codes from AG to 99.
NULL	No forms code selected.
ALL	All forms codes selected.

The following specifications alter QLIST processing (entered only from the control statement).

Pi	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

QLOAD

QLOAD(p_1,p_2, ...,p_n) — Processes dump files generated by QDUMP or other utilities using same format.

p_i	Description
DA=date	Processing date, in form yymmdd. If omitted, queue files created 5 days prior to current date are processed.
DD=dd	Specifies device to which to load queues. DF parameter must be specified before entering DD parameter.
DF=family	Specifies which family of devices to load.
FN=file name	File name of dump or load file. Default is QFILES.
FS=file size	File size range in PRUs/10_8.
FU=family name	Family name under which the queue files to be processed were created. If omitted, queue files created by users in all families are processed.
ID=identifier	A two-digit octal identifier (0 to 77_8) indicating that only I/O queue files assigned that identifier are processed. If omitted, queue files having any identifier are processed.
JN=jobname	Job name of I/O queue files. Jobname may be entered in either a seven-character job name or a four-character banner name (first four characters of jobname).
L=listfile	Name of file to receive output. Default is OUTPUT.

Pi	Description
ME=type	Device to load from or dump to. type — Description MT — Seven-track tape. NT — Nine-track tape. MS — Mass storage device. If MT or NT and a tape is not preassigned, the installation default density is used.
MI=machine id	A one- or two-character machine id indicating the mainframe under which the queue files were created. If not specified, the default is current machine id.
NF=number	Decimal number of media files to skip. Default is 0.
OP=option	Specifies whether the loaded queues are to be active or inactive. Default is OP=A. option — Description A — Active queues are specified. I — Inactive queues are specified.
ot=ft	Selects job origin type (ot) and corresponding file type (ft) to be processed. ot — Description BC — Batch. EI — Remote batch. SY — System.

Pi	Description

ft	Description
IN	Input.
PR	Print.
PH	Punch.
SF	Installation defined special file types.
ALL	All file types selected for specified origin.
NONE	No file types selected for specified origin.

SC=number — Decimal number of queue files to skip before beginning the queue selection.

TID=identifier — The destination terminal identifier for remote batch origin files.

UI=user index — User index under which I/O queue files were created. If omitted, queue files having any user index are processed.

VSN=number — Volume serial number of tape from which to load.

DS=dv-ex or DS=dv — Device selection criteria for output files. Device codes include the following.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.

Pi Description

dv	Description
SB	Punch system binary.
P8	Punch 80 column.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

† Not supported. Provided for NOS/BE compatibility.

p_i	Description
FC=forms code	Forms code for printed or punched output. Default is ALL.

forms code	Description
fc	Two alphabetic characters, AA through AF.
*	All forms codes from AG to 99.
NULL	No forms code selected.
ALL	All forms codes selected.

The following specifications alter QLOAD processing (entered only from the control statement).

p_i	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

QMOVE

QMOVE(p_1,p_2, ...,p_n)	Moves I/O queues from one mass storage device to another.

p_i	Description
DA=date	Processing date, in form yymmdd. If omitted, queue files created 5 days prior to current date are processed.
DD=dd	Specifies the device to which the queues are moved.
DF=family	Specifies family to which queues are moved (must be specified).

Pi	Description
DN=device number	A two-digit logical device number (1 to 77_8). FM option must be entered and must precede the DN option. Default is all devices.
FM=family name	Processing is restricted to queue files in specified family. If omitted, queue files on all devices in all families are processed.
FS=file size	File size range in PRUs/10_8.
FU=family name	Family name under which the queue files were created. If omitted, queue files created by users in all families are processed.
ID=identifier	A two-digit octal identifier (0 to 77_8) indicating that only I/O queue files assigned that identifier are processed. If omitted, queue files having any identifier are processed.
JN=jobname	Job name of I/O queue files. Jobname may be entered in either a seven-character job name or a four-character banner name (first four characters of jobname).
L=listfile	Name of file to receive output. Default is OUTPUT.
MI=machine id	A one- or two-character machine id indicating the mainframe under which queue files were created. If not specified, the default is current machine id.
OP=option	Specifies whether the loaded queues are to be active or inactive. Default is OP=A.

option	Description
A	Active queues are specified.
I	Inactive queues are specified.

Pi	Description
ot=ft	Selects job origin type (ot) and corresponding file type (ft) to be processed.

ot	Description
BC	Batch.
EI	Remote batch.
SY	System.

ft	Description
IN	Input.
PR	Print.
PH	Punch.
SF	Installation defined special file types.
ALL	All file types selected for specified origin.
NONE	No files types selected for specified origin.

TID=identifier	The destination terminal identifier for remote batch origin files.
TP=type	Type of files to move. Default is ALL.

type	Description
A	Active files.
I	Inactive files.
ALL	Both active and inactive files.

UI=user index	User index under which I/O queue files were created. If omitted, queue files having any user index are processed.

Pi	Description
DS=dv-ex or DS=dv	Device selection criteria for output files. Device codes include the following.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.

†Not supported. Provided for NOS/BE compatibility.

p_i	Description

ex	Description
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

FC=forms code — Forms code for printed or punched output. Default is ALL.

forms code	Description
fc	Two alphabetic characters, AA through AF.
*	All forms codes from AG to 99.
NULL	No forms code selected.
ALL	All forms codes selected.

The following specifications alter QMOVE processing (entered only from the control statement).

p_i	Description
I=lfn	Specifies name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

QREC

QREC(p_1,p_2, ...,p_n) — Deactivates or activates selected I/O queue files; purges inactive queue files.

p_i	Description
DA=date	Processing date, in form yymmdd. If omitted, queue files created 5 days prior to current date are processed.
DN=device number	A two-digit logical device number (1 to 77_8). FM option must be entered and must precede the DN option. Default is all devices.
FM=family name	Processing is restricted to queue files in specified family. If omitted, queue files on all devices in all families are processed.
FS=file size	File size range in PRUs/10_8.
FU=family name	Family name under which the queue files were created. If omitted, queue files created by users in all families are processed.
ID=identifier	A two-digit octal identifier (0 to 77_8) indicating that only I/O queue files assigned that identifier are processed. If omitted, queue files having any identifier are processed.
JN=jobname	Job name of I/O queue files. Jobname may be entered in either a seven-character job name or a four-character banner name (first four characters of jobname).
L=listfile	Name of file to receive output. Default is OUTPUT.
MI=machine id	A one- or two-character machine id indicating the mainframe under which queue files were created. If not specified, the default is current machine id.

P_i	Description
OP=option	Processing option. Default is OP=RI.

option	Description
RI	Activates (requeues) selected inactive I/O queue files and ignores remaining inactive queue files.
RP	Activates (requeues) selected inactive I/O queue files and purges remaining inactive queue files.
PI	Purges selected inactive I/O queue files and ignores remaining inactive queue files.
DI	Indicates that the selected active I/O queue files are made inactive (entries are removed from the FNT and added to the IQFT file) and remaining active queue files are ignored.

ot=ft

Selects job origin type (ot) and corresponding file type (ft) to be processed.

ot	Description
BC	Batch.
EI	Remote batch.
SY	System.

Pi

Description

ft	Description
IN	Input.
PR	Print.
PH	Punch.
SF	Installation defined special file types.
ALL	All file types selected for specified origin.
NONE	No files types selected for specified origin.

UI=user index

User index under which I/O queue files were created. If omitted, queue files having any user index are processed.

DS=dv-ex
or
DS=dv

Device selection criteria for output files. Device codes include the following.

dv	Description
NONE	No device code specified.
PR	Any print file.
LR	580-12 printer.
LS	580-16 printer.
LT	580-20 printer.
SB	Punch system binary.
P8	Punch 80 column.
PB	Punch binary.
PU	Punch coded.
PL	Plotter.

Pi	Description
	External characteristics codes include the following.

ex	Description
A4†	ASCII graphic 48-character-set print train.
B4†	BCD 48-character-set print train.
B6	CDC graphic 63/64-character-set print train.
A6	ASCII graphic 63/64-character-set print train.
A9	ASCII graphic 95-character-set print train.
PU	Punch coded.
SB	Punch system binary.
80COL	Punch 80 column binary.
O26	Punch O26.
O29	Punch O29.
ASCII	Punch ASCII.

FC=forms code — Forms code for printed or punched output. Default is ALL.

forms code	Description
*	All forms codes from AG to 99.

†Not supported. Provided for NOS/BE compatibility.

p_i	Description

forms code	Description
NULL	No forms code selected.
ALL	All forms codes selected.

TID=identifier	Destination terminal identifier for remote batch origin files.

The following specifications alter QREC processing (entered only from the control statement).

p_i	Description
I=lfn	Name of alternate input file containing K-display utility commands and/or option parameters. Its directives are processed after the control statement parameters.
NK	Suppresses K display.

SYSEDIT

SYSEDIT(p_1,p_2, ...,p_n)	Performs modifications to the system library.

p_i	Description
I=lfn$_1$	Directive input is on file lfn$_1$. Default is INPUT.
B=lfn$_2$	Replacement records are on file lfn$_2$. Default is LGO.
L=lfn$_3$	List output is on file lfn$_3$. Default is OUTPUT.
R	Restores to initial deadstart system.
R=n	Restores to copy n of the system.
R=0	No system file restoration.

p_i	Description
C	Checkpoints the system following SYSEDIT.
Z	SYSEDIT control statement contains input directives.

Directive	Description
*AD,nn,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n	Specifies alternate device to be used instead of the system device(s) for storing ABS, OVL, and PP type routines; nn is either EST ordinal or device type.
*CM,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n	Defines record rec_i of type ty_i as being central memory resident.
*MS,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n	Defines record rec_i of type ty_i as being mass storage resident.
*DELETE,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n	Deletes record rec_i of type ty_i from system library. Type ty_i=ULIB is ignored; user libraries cannot be deleted. *DELETE can be shortened to *D.
*FILE,lfn,NR	Defines file lfn as a file containing system changes. If NR is not present, lfn is rewound before processing.
*FL,ty_1/rec_1-fl_1,ty_2/rec_2-fl_2,...,ty_n/rec_n-fl_n	Load rec_i of type ty_i with field length of fl_i where fl_i is $FL/100_8$.
*IGNORE,ty_1/rec_1,ty_2/rec_2,...,ty_n/rec_n	Do not process record rec_i of type ty_i when it appears on the system change file.
*PROC,rec_1,rec_2,...,rec_n	Defines record rec_i of type TEXT or PROC as procedure file.

Directive	Description
*RENAME, oe_1-ne_1, oe_2-ne_2, ...,oe_n-ne_n	Renames CPU entry names oe_i to ne_i.
*PPSYN,nam/ nam_1,nam_2, ...,nam_n	Adds entries to system library to provide synonym nam_i for PPU program nam.
*SC,ty_1/ rec_1,ty_2/ rec_2,..., ty_n/rec_n	Defines record rec_i of type ty_i as product set format control statements.

VALNET

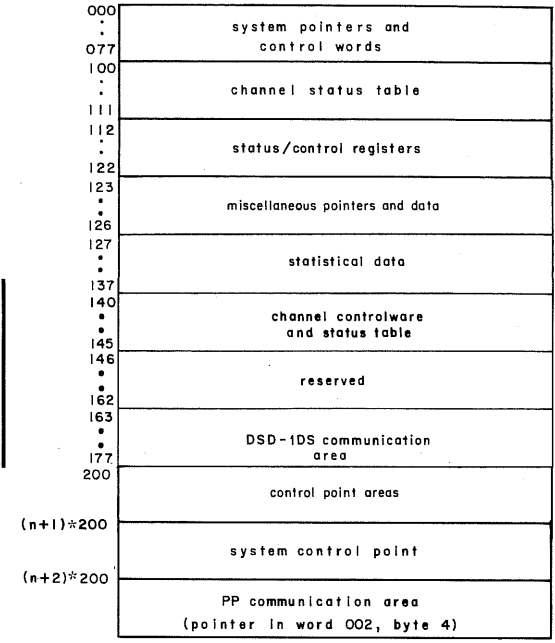
VALNET(p_1,p_2, p_3) — Validates syntax and logic of a terminal network description file.

p_i	Description
P=lfn_1	Terminal network description file name. If the file name is omitted, COMPILE is diagnosed. If the P parameter is omitted, NETWid is diagnosed.
L=lfn_2	Output file for diagnostics specified by a file name or one of the following: lfn_2 — Description (blank) — Diagnostics put on LIST. 0 — No listing produced. The default output file is OUTPUT.
NR	No rewind of the network description file before processing.

CENTRAL MEMORY

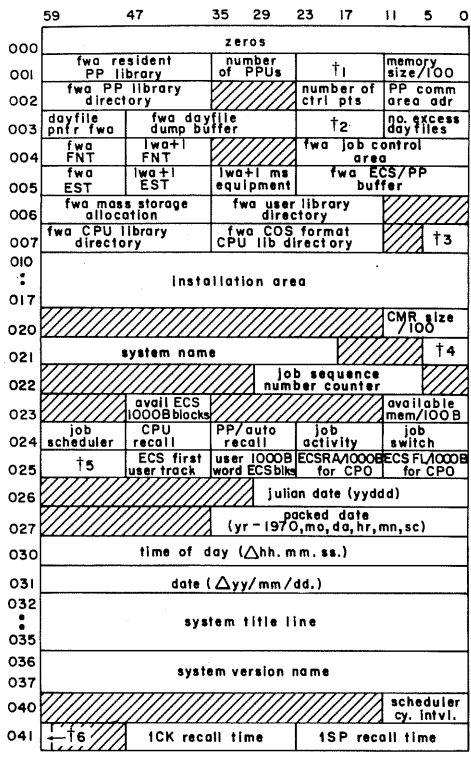
CENTRAL MEMORY RESIDENT

CENTRAL MEMORY LAYOUT

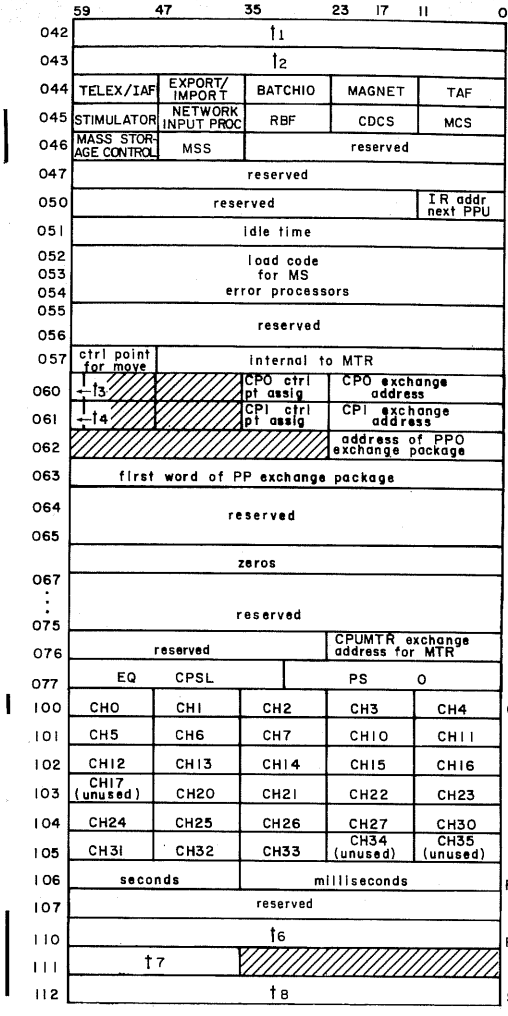


dayfile buffer pointers (pointer in word 003, byte 0)
equipment status table (EST) (pointer in word 005, byte 0)
file name/file status table (pointer in word 004, byte 0)
FNT interlock table (pointer in word 004, byte 1)
CDC CYBER 176 exchange package area
mass storage allocation area
mass storage tables (MST)
job control area
dayfile buffers
dayfile dump buffer
ECS/PP buffer
CPUMTR
resident peripheral library (RPL)
resident central library (RCL)
peripheral library directory (PLD)
central library directory (CLD)
system user library directory (LBD)

POINTERS AND CONSTANTS

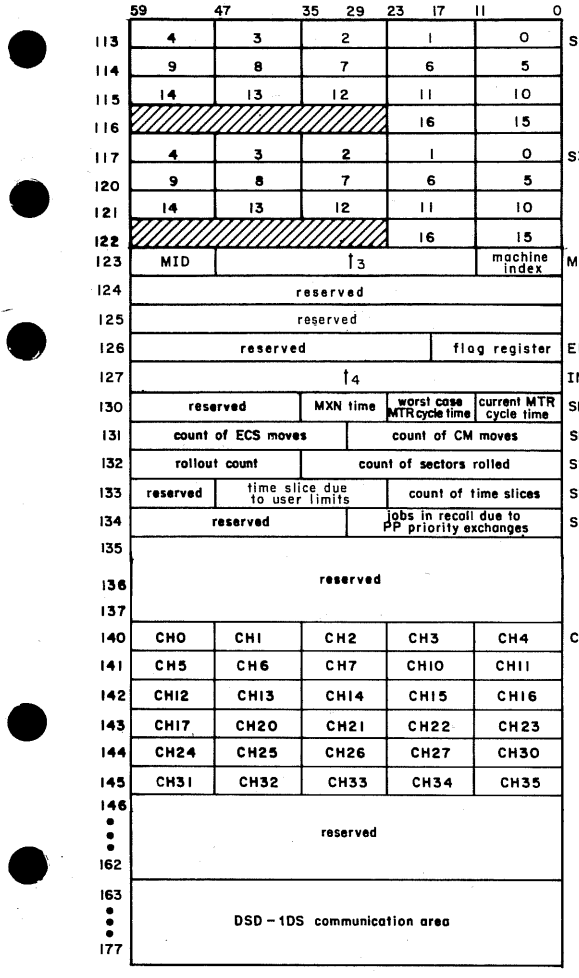


Ref	Bit No.	Description
†1	23-20	Unused.
	19-18	CDC CYBER 176 CPU type: 0 = Not a CDC CYBER 176. 1 = CDC CYBER 176 Model A. 2 = CDC CYBER 176 Model B. 3 = CDC CYBER 176 Model C.
	17	Set if 2x PPs are selected.
	16	Set if machine type is CDC CYBER 170.
	15	Set if CMU is present.
	14	Set if CEJ/MEJ option is available.
	13	Set if CPU0 has an instruction stack.
	12	Set if CPU1 is present.
†2	23-12	Nonzero if dayfile dump is disabled.
†3	5-0	ACCFAM FL/100.
†4	5-3	LIBDECK number.
	2-0	Recovery mode.
†5	59-48	Reserved.
†6	59	Scheduler active flag.


59 47 35 23 17 11 0
042 ↑1 IPRL
043 ↑2 SSTL
044 TELEX/IAF EXPORT/IMPORT BATCHIO MAGNET TAF SSCL
045 STIMULATOR NETWORK INPUT PROC RBF CDCS MCS
046 MASS STORAGE CONTROL MSS reserved
047 reserved
050 reserved IR addr next PPU PPAL
051 Idle time
052 053 054 load code for MS error processors MSEL
055 056 reserved
057 ctrl point for move internal to MTR CMCL
060 ←↑3 CP0 ctrl pt assig CP0 exchange address ACPL
061 ←↑4 CP1 ctrl pt assig CP1 exchange address
062 address of PP0 exchange package PXPP
063 first word of PP exchange package
064 065 reserved
ZERL zeros
067 075 reserved
076 reserved CPUMTR exchange address for MTR MTRL
077 EQ CPSL PS 0 CPSL
100 CH0 CH1 CH2 CH3 CH4 CTIL ↑5
101 CH5 CH6 CH7 CH10 CH11
102 CH12 CH13 CH14 CH15 CH16
103 CH17 (unused) CH20 CH21 CH22 CH23
104 CH24 CH25 CH26 CH27 CH30
105 CH31 CH32 CH33 CH34 (unused) CH35 (unused)
106 seconds milliseconds RTCL
107 reserved
110 ↑6 PFNL
111 ↑7
112 ↑8 SCRL

Ref	Bit No.	Description
†1	59-54	Index for CPU1 multiplier.
	53-48	Index for CPU0 multiplier.
	47-36	Secondary rollout sector threshold.
	35	Keypunch mode (0=O26, 1=O29).
	34-25	Unused.
	24	System character set mode (0=63, 1=64 character set).
	23-12	Assumed conversion mode (2= ASCII/USASI, 3=EBCDIC).
	11-6	Assumed 9-track tape density (3=800, 4=1600, 5=6250).
	5	Assumed tape type (7-track=0, 9-track=1).
	4-0	Assumed seven-track density (1=200, 2=556, 3=800).
†2	59-56	Reserved for CDC use.
	55	Disable MSS master mode.
	54	Disable file staging.
	53	Disable user ECS.
	52	Disable PF validation.
	51-50	Disable MS validation.
	49	Ignore USER statement.
	48	Disable account verification.
	47	Disable BATCHIO.
	46	Disable TELEX/IAF.
	45	Disable EI200.
	44	Disable MAGNET.
	43	Disable TAF/TS.
	42	Disable removable device checking.
	41	Disable queue protect.
	40	Disable secondary user statements.
	39	Disable SCP facility.
	38	Disable TAF.
	37	Disable NAM.
	36	Disable RBF.
	35	Disable subcontrol points.
	34	Disable MCS.
	33	Disable CDCS.
	32	Disable MSS executive.
	31-15	Reserved for CDC use.
	14	ENGINEERING switch.
	13	Console initial lock status.
	12	DEBUG switch.
	11-0	Reserved for installation use (local).
†	59	Set if CPU0 is off.
†	59	Set if CPU1 is off.

Ref	Bit No.	Description
†5	--	Channel status table; one byte per channel, each with the following bit descriptions.
		Bit / **Description**
		11 — Set if channel requested.
		10-7 — PP number of requesting PP.
		6 — Set if channel not available.
		5-0 — PP assigned.
†6	59-56	Reserved.
	55	Total PF system interlock.
	54	Request total PF system interlock.
	53-48	PF activity count.
	47-18	Reserved.
	17-12	Default family equipment number.
	11-6	Alternate family count.
	5-1	Reserved.
	0	Word interlock.
†7	59-48	Seconds left until label check.
	47-36	Seconds left until devices checkpointed.
†8	59	Set to inhibit MTR from calling 1MB for S/C register error processing.
	58	Set if error processing ignored at deadstart.
	57	Set to allow MTR to accept DSRM function for emergency step from 1MB, and to prevent DSD from allowing UNSTEP command to be entered.
	56	Set to indicate MTR has set step mode on request from 1MB (emergency step).
	55-36	Unused.
	35-24	Real-time clock from RTCL, in seconds/1000_8, at which the last threshold count or time interval was exceeded for single SECDED errors.
	23-12	SECDED count.
	11-0	Threshold count.

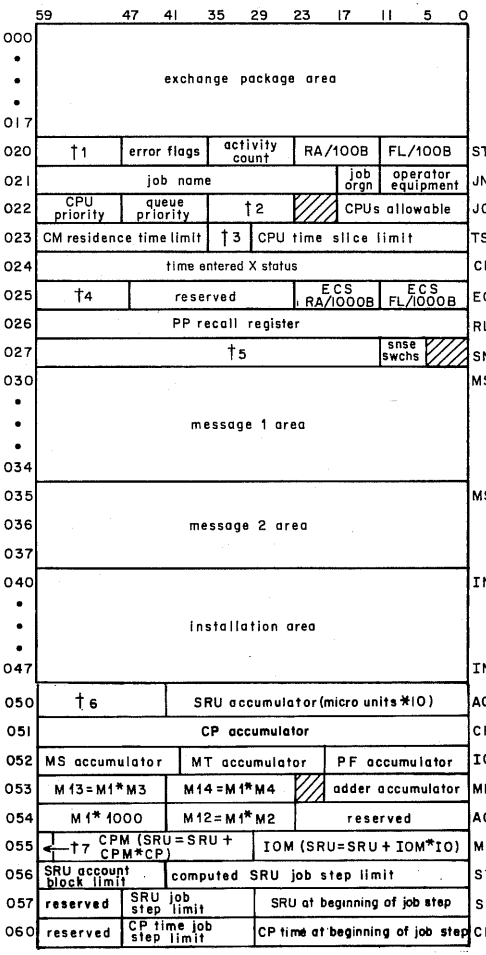

59 47 35 29 23 17 11 0
113 4 3 2 1 0 S16L ↑1
114 9 8 7 6 5
115 14 13 12 11 10
116 16 15
117 4 3 2 1 0 S36L ↑2
120 9 8 7 6 5
121 14 13 12 11 10
122 16 15
123 MID ↑3 machine index MMFL
124 reserved
125 reserved
126 reserved flag register EFRL
127 ↑4 INWL
130 reserved MXN time worst case MTR cycle time current MTR cycle time SDOL
131 count of ECS moves count of CM moves SDIL
132 rollout count count of sectors rolled SD2L
133 reserved time slice due to user limits count of time slices SD3L
134 reserved jobs in recall due to PP priority exchanges SD4L
135
136 reserved
137
140 CH0 CH1 CH2 CH3 CH4 CCTL ↑1
141 CH5 CH6 CH7 CH10 CH11
142 CH12 CH13 CH14 CH15 CH16
143 CH17 CH20 CH21 CH22 CH23
144 CH24 CH25 CH26 CH27 CH30
145 CH31 CH32 CH33 CH34 CH35
146
reserved
162
163
DSD – 1DS communication area
177

Ref	Bit No.	Description
†1	--	The channel 16 S/C register contents, words 0 through 16 (bits 0-203).
†2	--	The channel 36 S/C register contents, words 0 through 16 (bits 0-203).
†3	47-42	Reserved.
	41-36	Equipment number of link device.
	35	Set if this machine has DATI recovery interlock.
	34-30	Unused.
	29-24	Count of devices with initialize pending that have not been checkpointed.
	23-20	Machines active.
	19-16	Machines down.
	15-12	Machine mask.
†4	59-15	Unused.
	14	Disable priority evaluation.
	13	Disable job scheduler.
	12	Disable autoroll.
	11-2	Unused.
	1	Fatal mainframe error flag.
	0	System control point (SCP) subsystem abort interlock.
†5	--	Channel controlware and status table; one byte per channel, each with the following bit descriptions:

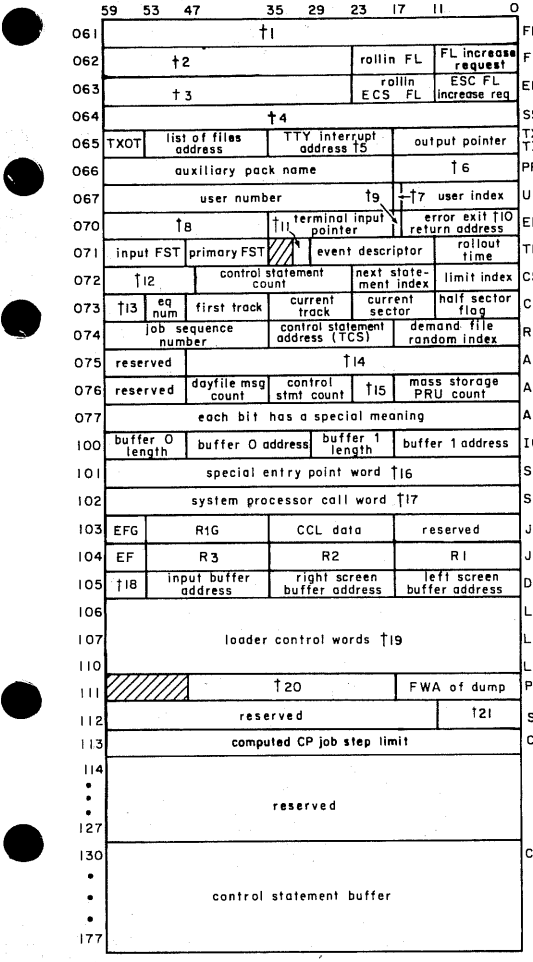
Bit	Description
11-4	Reserved
3-0	Value for controlware type.

Value	Definition
3	FMD (7155)
2	FT (7154/7152)
1	HT (7054/7154/7152)
0	No controlware on channel.

CONTROL POINT AREA



Ref	Bit No.	Description
†1	59	CPU W status.
	58	CPU X status.
	57	CPU auto recall (I status).
	56	CPU subcontrol point active status.
	55-54	Unused.
	53	Job advancement flag.
	52-48	Number of PPs assigned to job.
†2	35-33	CPU status for rollout.
	32-25	Unused.
	24	Set if rollout is requested.
†3	35	Set if CPU time slice is active.
	34-30	Queue control (0=input, 1=rollout).
†4	59-51	Job control flags (reserved).
	50	Return private user files.
	49	Set privacy ID on new files.
	48	Preserve ECS over job steps.
	47	FNT interlock.
†5	59	Reserved.
	58	O26/O29 punch mode.
	57	Set if OVERRIDE required to drop job.
	56-36	Unused.
	35-24	Reserved for installation use.
	23-15	Reserved.
	14	Subsystem idledown flag.
	13	NOGO flag.
	12	PPU pause flag.
†6	Limit flags:	
	59	Time validation limit.
	58	Time limit.
	57	SRU validation limit.
	56	SRU limit.
	55	Control statement limit.
	54-48	Reserved.
	Overflow flags:	
	47	MS accumulator.
	46	MT accumulator.
	45	PF accumulator.
	44	AD accumulator.
	43-42	Reserved.
†7	59	Disable SRU accumulation if set.


59 53 47 35 29 23 17 11 0
061 †1 FPFW
062 †2 rollin FL FL increase request FLCW
063 †3 rollin ECS FL ESC FL increase req ELCW
064 †4 SSCW
065 TXOT list of files address TTY interrupt address †5 output pointer TXSW,TIOW, TIAW,LOFW
066 auxiliary pack name †6 PFCW
067 user number †9 †7 user index UIDW
070 †8 †11 terminal input pointer error exit †10 return address EECW,TINW
071 input FST primary FST event descriptor rollout time TFSW,TERW
072 †12 control statement count next state-ment index limit index CSPW
073 †13 eq num first track current track current sector half sector flag CSSW
074 job sequence number control statement address (TCS) demand file random index RFCW
075 reserved †14 ALMW
076 reserved dayfile msg count control stmt count †15 mass storage PRU count ACLW
077 each bit has a special meaning AACW
100 buffer 0 length buffer 0 address buffer 1 length buffer 1 address ICAW
101 special entry point word †16 SEPW
102 system processor call word †17 SPCW
103 EFG R1G CCL data reserved JCDW
104 EF R3 R2 R1 JCRW
105 †18 input buffer address right screen buffer address left screen buffer address DBAW
106 LB1W
107 loader control words †19 LB2W
110 LB3W
111 †20 FWA of dump PPDW
112 reserved †21 SSOW
113 computed CP job step limit CPLW
114 • • • 127 reserved
130 • • • 177 control statement buffer CSBW

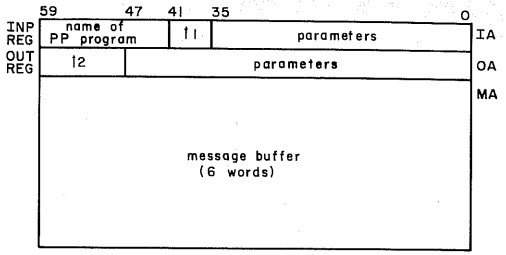
Ref	Bit No.	Description
†1	59	Set when first charge processed.
	58	Set if second entry in level-3 block.
	57	Set if application accounting in process.
	56	Set if validated for application accounting.
	55-48	Reserved.
	47-36	SRU validation limit.
	35-24	FNT ordinal of PROFILE file.
	23-12	Track of level-3 block.
	11-0	Sector of level-3 block.
†2	59-48	Maximum field length (MFL) for current job step.
	47-36	Initial running field length; always less than or equal to MFL (value of zero indicates system field length control).
	35-24	Maximum field length for entire job; MAX FL is upper bound on MFL.
†3	59-48	Maximum ECS field length (MFL) for current job step.
	47-36	Initial running ECS field length; always less than or equal to MFL (value of zero indicates system ECS field length control).
	35-24	Maximum ECS field length for entire job; MAX FL is upper bound on MFL.
†4	59-48	Rollout indicators (one bit per subsystem) indicating the user job is a candidate for normal rollout.
	47-0	Connection indicators (four bits per subsystem) representing particular subsystem the user job is communicating with.
†5	35-17	Previous error flag value if bit 58 set in word EECW indicating extended RPV mode.
†6	17-12	Family EST ordinal.
	11-0	Indexes into tables of limits.
	11-9	Limit for size of direct access files.
	8-6	Limit for number of permanent files.
	5-3	Limit for cumulative size of indirect access files.
	2-0	Limit for size of indirect access files.

Ref	Bit No.	Description
†7	17	Set if charge statement is required.
†8	59	No exit flag.
	58	Extended RPV mode.
	57	Interrupt handler in progress flag (extended RPV mode only).
	56	Set if one-time error previously entered (extended RPV mode only).
	55-48	Unused.
	47	For nonextended RPV mode, set if bits 46-36 are error flag instead of reprieve error option.
	46-36	Error flag or reprieve error option for nonextended RPV mode.
	47-36	Mask bits for extended RPV mode.
†9	17	Job reprieved.
†10	17-0	RPV parameter block address (extended RPV mode only).
†11	30	Valid event descriptor present.
†12	59-54	Job class.
	53-48	Reserved.
	47	Set if EOR is on control statement file.
†13	59	Set if information is for INPUT file.
	58	Skip to EXIT flag.
	57-54	Unused.

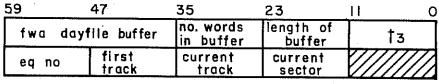
Ref	Bit No.	Description
†14	47-45	Magnetic tapes.
	44-42	Removable packs.
	41-39	Deferred batch jobs.
	38-36	Local files.
	35-30	Time limit.
	29-24	SRU limit.
	23-18	Field length.
	17-12	ECS field length.
	11-6	Lines printed.
	5-0	Cards punched.
†15	23-18	Disposed output count.
†16	59	Set indicates presence of entry points.
	58-54	Reserved.
	53	Set if ARG= entry point present.
	52	Set if DMP= entry point present.
	51	Set if SDM= entry point present.
	50	Set if SSJ= entry point present.
	49	Set if VAL= entry point present.
	48	Set if SSM= entry point present.
	47-36	Reserved.
	35	Restart flag.
	34	Reserved.
	33	Suppress DMP= if control statement call.
	32	Create DM* file only flag.
	31	Dump FNTs with control point area.
	30	Leave DM* file unlocked.
	29-18	DMP= FL/100 (if field is 0, dump entire FL).
	17-0	SSJ= parameter block address.
†17	For input:	
	59-42	Entry point if RA+1 request, 770000_8 if control statement call.
	41	Special program request active (1AJ only).
	40	Clear RA+1 upon completion.
	39	If set, parameter list is in bits 35-0; if clear, address of parameter list is in bits 17-0.
	38	Does not start CPU at completion of control statement call (1AJ only).
	37	DMP= initiation in progress.
	36	Unused.
	35-0	Refer to description of bit 39.
	For output:	
	59-36	Unused.
	35-24	Status return.
	23-0	Unused.

Ref	Bit No.	Description
†18	59	Disable dumps.
	58-56	Unused.
	55	ECS common memory manager flag.
	54	CM common memory manager flag.
†19	LB1W:	
	59	Use default map options if not set.
	58	Reserved.
	57	Local map option X.
	56	Local map option E.
	55	Local map option B.
	54	Local map option S.
	53	Reduce flag.
	52-36	Reserved.
	35-24	CDC CYBER Interactive Debug control byte.
	23-0	Global library set indicators (6-bit fields): 00 End of library set. 01-76 LBD ordinal of system library. 77 User library; logical file name of first user library in LB3W; logical file name of second user library in LB2W.
	LB2W, LB3W:	
	59-0	Either logical file name of second (LB2W) or first (LB3W) user library, or a collection of 6-bit global library set indicators.
†20	47-36	ECS FL of program making DMP= call.
	35-24	Field length of program making DMP= call.
	23-18	Dump word count.
†21	12	Swap out (SF.SWPO) in progress.
	11-0	Subsystem outstanding connection count.

PP COMMUNICATION AREA



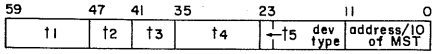
DAYFILE BUFFER POINTERS



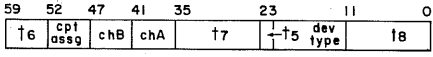
Ref	Bit No.	Description
†1	41	Set if called with auto recall.
	40-36	Control point assignment.
†2	59	Reissue monitor function.
	58	Not used.
	57	DSD/MTR interlock.
	56-54	Reserved.
	53-48	Function code.
†3	11-0	Interlock byte (0 = no dump in progress; 1 = dump in progress).

Equipment Status Table (ETS) Formats

Mass Storage Device



Nonmass Storage Device (3000 Type Equipment)



Ref	Bit No.	Description
†1	59	Set to indicate mass storage device
	58	Set if device has copy of system.
	57	Set if shared device.
	56	Set if removable device.
	55	Set if 844/885 disk type equipment.
	54	Set if device is not currently available for access.
	53	Set if equipment is down.
	52-48	Reserved.
†2	47	Channel down bit.
	46-42	Alternate channel.
†3	41	Channel down bit.
	40-36	Primary channel.
†4	For 844/885 disk type equipment:	
	35-24	Zero.
	For other equipment types:	
	35-33	Physical equipment number.
	32-30	Zero.
	29-27	Device selection for connect code.
	26-24	First physical unit for device.
†5	23	ON/OFF flag (set if access not allowed).

Ref	Bit No.	Description
†6	59	Unused.
	58	Allocatable device.
	57-56	Unused.
	55	Set if 580 PFC printer.
	54	Set if V carriage control processed.
	53	Set if equipment is down.
†7	For unit record equipment:	
	35-24	Forms code.
	For other equipment:	
	35-30	Channel D.
	29-24	Channel C.
†8	For magnetic tape equipment:	
	11-9	Equipment number.
	8-4	Flags:
		01 GCR (1600/6250) tape unit.
		02 Disable block-ID (66x only).
		04 Reserved.
		10 67x tape unit.
		20 66x tape unit.
	3-0	Unit number.
	For other equipment types:	
	11-9	Controller number.
	8-6	Print train (if applicable).
	5-0	Unit number.
	For unit record equipment:	
	5-0	ID number.

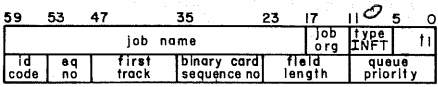
Equipment Codes

Code	Description
CP	Card punch (3446/3644-415).
CR	Card reader (3447/3649-405).
CS	MSS cartridge selector.
CT	MSS cartridge transport.
DE	Extended core storage. †
DI-n	Half-track disk storage subsystem (7x54-844-21).
DJ-n	Half-track disk storage subsystem (7x5x-844-4x/44).
DK-n	Full-track disk storage subsystem (7154-844-21).
DL-n	Full-track disk storage subsystem (715x-844-4x).
DM-n	Half-track disk storage subsystem (7155-885).
DP	Distributive data path to ECS.
DQ-n	Full-track disk storage subsystem (7155-885).
DS	Display console.
LP	Line printer.
LR	Line printer (580-12).
LS	Line printer (580-16).
LT	Line printer (580-20).
MS	Mass storage device.
MT	Magnetic tape drive (seven-track).
NE	Null equipment.
NP	255x Host Communications Processor
NQ	NPS stimulator entry.
NT	Magnetic tape drive (nine-track).
ST	Remote batch multiplexer (6676 or 2550-100).
TS	NSTIM/ASTIM multiplexer (6676).
TT	Time-sharing multiplexer (6676, 6671, or 2550-100).

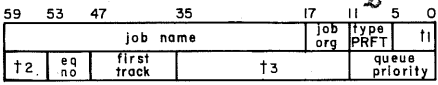
† ECS subequipment values exist in associated MST. The values are in word DILL (byte 3) and further define the type of ECS equipment.

File Name/File Status Table (FNT/FST) Entry

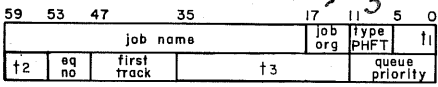
File in Input Queue



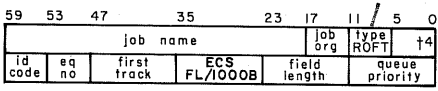
File in Print Queue



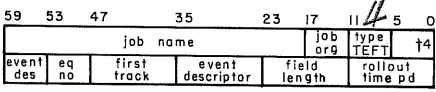
File in Punch Queue



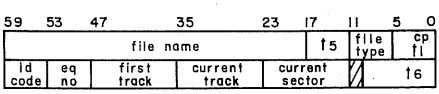
File in Rollout Queue



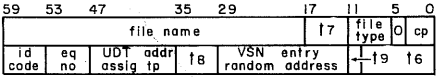
File in Timed/Event Rollout Queue



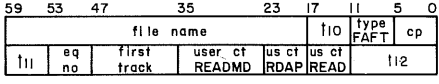
Mass Storage Files
Not in Input, Print, Punch, or Rollout Queue



Magnetic Tape Files



Fast Attach Permanent Files



Ref	Bit No.	Description
†1	5	Set if system sector contains control information.
	4-0	Zero when the file is in queue; otherwise, contains control point assignment.
†2	59-57	Device selection field.
	56-54	External characteristics.
†3	35-33	Forms code.
	32-12	Terminal identification (TID).
†4	5	Set if user job has subsystem connection (either long term connection or wait response).
	4-0	Zero when the file is in queue; otherwise, contains control point assignment.
†5	17	Unused.
	16	Set if extend-only file.
	15	Set if alter-only file.
	14	Set if execute-only file.
	13	Unused.
	12	Write lockout.

Ref	Bit No.	Description
†6	10	Unused.
	9	Indicates the track interlock status of LIFT files (mass storage only).
	8	Set if file is opened.
	7	Set if file is written since last open.
	6	Set if file is written on.
	5-4	Unused.
	3-2	Read status (0 = incomplete read, 1 = EOR, 2 = EOF, 3 = EOI).
	1	Set if last operation write.
	0	Clear if busy status.
†7	17-14	Unused.
	13	Set if opened.
	12	Write lockout.
†8	35-32	Data format: 0 I 1 SI 2 F 3 S 4 L
	31-30	Reserved.
†9	11	Set if labeled tape.
†10	17	Unused.
	16	Set if modify.
	15	Set if append.
	14	Set if execute.
	13	Set if write.
	12	Set if read.
†11	59-54	Fast attach entry index in ECS (if globally fast attach), 0 if local fast attach file.
†12	11-9	Write attach mode (7 = write, 3 = modify, 1 = append).
	8-1	Unused.
	0	Clear if busy status.

File Types

Files in Queues

Type	Value	Description
INFT	0	Input.
ROFT	1	Rollout.
PRFT	2	Print.
PHFT	3	Punch.
TEFT	4	Timed/event rollout.

Special Queue Files

Type	Value	Description
S1FT	5	Special file type 1.
S2FT	6	Special file type 2.
S3FT	7	Special file type 3.

Other Files

Type	Value	Description
LIFT	10	Library.
PTFT	11	Primary terminal.
PMFT	12	Direct access permanent file.
FAFT	13	Fast attach file.
SYFT	14	System.
LOFT	15	Local.

Job Origin Codes

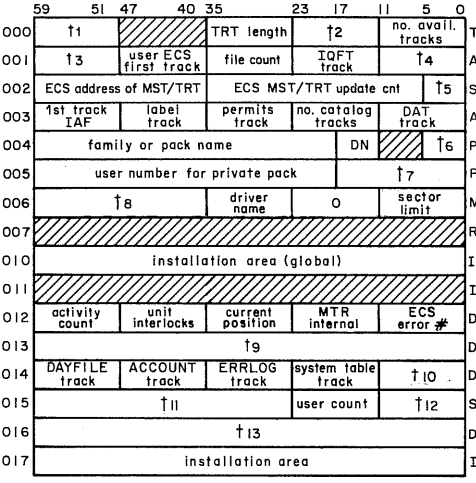
Type	Value	Description
SYOT	0	System.
BCOT	1	Local batch.
EIOT	2	Remote batch.
TXOT	3	Time-sharing.
MTOT	4	Multiterminal.

Mass Storage Allocation (MSA) Area

	59	47	0
000	last temp eq	temporary devices†	
001	last input eq	input file devices†	
002	last output eq	output file devices†	
003	last rollout eq	rollout file devices†	
004	last dayfile eq	user dayfile devices†	
005	last primary eq	primary file devices†	
006	last local eq	local file devices†	
007	last LGO eq	LGO file devices†	
008	last secondary rollout eq	secondary rollout file devices†	

†Bit 47-eq is set for each equipment with the allocation type selected.

Mass Storage Table (MST)



Ref	Bit No.	Description
†1	59-48	Number of tracks on device.
†2	23	NOS format MST.
	22-12	First available track word pointer.
†3	59	CTI present.
	58	System deadstart file present.
	57	Catalog track overflow (O).
	56-52	Reserved.
	51-48	Global interlock (machine mask).
†4	11	Redefinition requested flag.
	10-7	Redefinition reply bits (machine masks).
	6	Set if sector of local areas is present.
	5	Unload (all machines).
	4	Device error idle status: 0 No error. 1 Error detected on device.
	3-0	Permanent file utility active (machine mask).

Ref	Bit No.	Description
† 5	5-4	Reserved.
	3-0	Interlock (machine mask).
† 6	5-3	Relative unit in multiunit device.
	2-0	Number of units in multiunit device.
† 7	17	Catalog track contiguous with label track.
	16	Reserved.
	15-8	Secondary device mask.
	7-0	Device mask.
† 8	59	Removable (R).
	58	Auxiliary permanent file device (X).
	57	Sixteen-word PFC device.
	56	Device last checkpointed on MMF system (in label section only).
	55-48	DAT entry index.
	47	Half track status (1=half, 0=full)
	46	Release reservation when channel released.
	45	Reserved.
	44-36	Single-unit sector limit.
† 9	59-48	Mass storage allocation flags.
	47	715x controller present on second channel.
	46-42	Second channel in CMRDECK in definition of EQ.
	41	715x controller present on first channel.
	40-36	First channel in CMRDECK in definition of EQ.
	35-24	Unused.
	23-22	Reserved.
	21	Maintenance mode set (ECS).
	20-18	Memory type: 0 No CPU. 1 ECS I. 2 ECS II. 3 LCME. 4-7 Reserved.

Ref	Bit No.	Description
	17-15	CPU type: 0 No CPU path. 1 ECS. 2 LCME. 3-7 Reserved.
	14-12	PP path type: 0 No DDP. 1 DC145 parity enhanced DDP. 2 DC135 DDP. 3-7 Reserved.
	11-6	Unused.
	5-0	Algorithm index for 844/885 disk monitor function.
† 10	11	Family idle down status.
	10-0	Family activity count.
† 11	59	Format pack (844/885 disk equipment).
	58	Half/full track initial requeues.
	57	Initialize permanent files (I).
	56	Initialize IQFT (I).
	55	Initialize DAYFILE (I).
	54	Initialize ACCOUNT (I).
	53	Initialize ERRLOG (I).
	52	Initialization (HT/FT) (I).
	51	Unloaded in this machine (L).
	50	Checkpoint requested (C).
	49	TEMP (T).
	48	Alternate system device (A).
	47-42	Reserved.
	41-36	Error status.
	35-24	A two-character machine identification.
† 12	11-6	Multiple equipment link.
	5-3	Original number of units.
	2	Device in use.
	1	Local utility interlock.
	0	Local area interlock.
† 13	59	Redefinition in progress (drive reserved).
	58	Null equipment indicator.
	57-54	Reserved.
	53-48	Number of units minus 1.
	47-0	Unit list, ordered right to left, six bits per unit.

Track Reservation Table (TRT)

Word Format

Ref	Bit No.	Description
†1	11-8	Each bit set indicates corresponding byte (0 through 3) is first track of a preserved file.
	7-4	Track interlock bits.
	3-0	Track reservation bits.

Track Link Byte (Format 1)

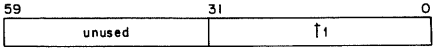
Bit	Contents
11	Set.
10-0	Next track in track chain.

Track Link Byte (Format 2)

Bit	Contents
11	Clear.
10-0	End of chain (EOI sector in file).

Machine Recovery Table (MRT)

Word Format



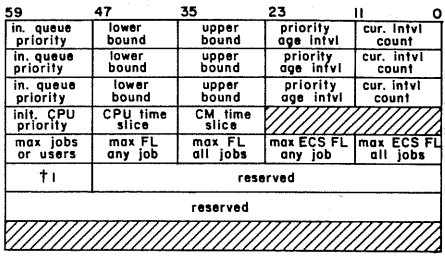
Ref	Bit No.	Description
†1	31-0	Each bit represents one logical track (bits 10-5 of the logical track number denote the word number in the MRT and bits 4-0 are the bit numbers within the word).

The meaning of the MRT bit depends upon the state of the track interlock bit in the TRT.

Track Interlock Bit	MRT Bit	Description
0	0	Track is not interlocked or it is local to another machine.
0	1	First track of a file is local to this machine.
1	0	Track is interlocked by another machine.
1	1	Track is interlocked by this machine.

Job Control Area (JCB)

One for each origin type and job class

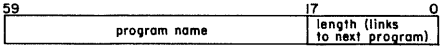


Ref	Bit No.	Description
†1	59-48	Index into tables of limits.
	59-57	Index a table of limits for size of each direct access file.
	56-54	Index a table of limits for number of permanent files.
	53-51	Index a table of limits for cumulative size of indirect access files.
	50-48	Index a table of limits for size of each indirect access file.

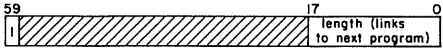
Libraries/Directories

Resident CPU Library (RCL)

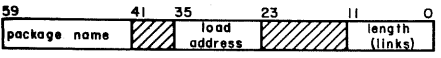
Type OVL



Type ABS



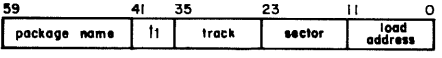
Resident PP Library (RPL)



PP Library Directory (PLD)

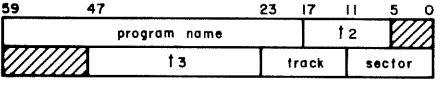
CM Resident

Non-CM Resident

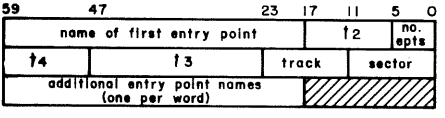


CPU Library Directory (CLD)

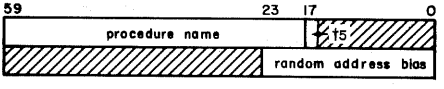
Type OVL



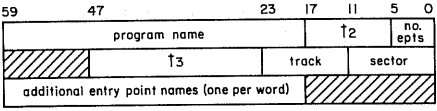
Type ABS



Type PROC

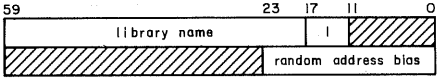


Type REL



User Library Directory (LBD)

Type ULIB



Ref	Bit No.	Description
† 1	41-36	Alternate device or system device equipment number.
† 2	17-15	Unused.
	14	Relocatable record flag.
	13	NOS/BE record flag.
	12	Unused.
	11-6	Alternate device equipment number.
†3	47-24	If program is CM resident, field contains the absolute address in RCL. If program is assigned to alternate system device, field has mass storage address of copy on system device.
†4	59-48	FL required (use of bits 59 and 58 indicate MFL= entry point).
†5	17	Set if CCL procedure.

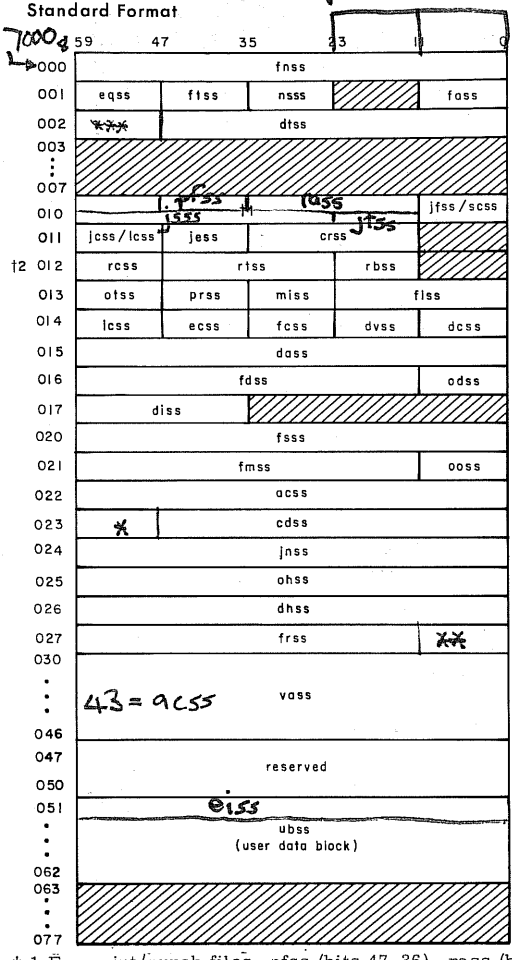
* 11/0, 1/recovery flag (sys sect format) is correct

** 1/data in ubss, 10/0, 1/file placed in queue

*** 12/enhanced EOI flag

SYSTEM SECTOR FORMAT

Standard Format



† 1 For print/punch files, pfss (bits 47-36), rass (bits 35-12); for input files, jsss (bits 59-36), bits 35-24 unused, jtss (bits 23-12).

† 2 For input files, bits 59-18 are defined as terminal name (tnss).

The following apply to all system sectors.

0	fnss	FNT entry.
	eqss	Equipment number.
	ftss	First track.
1	nsss	Next sector.
	fass	Address of FST entry.
	dtss	Last modification date and time
2		(packed format).

set up by WSS

The following apply to input files only.

	jsss	Job sequence number.
10	jtss	Job time limit.
	jfss	Job flags.
	jcss	Job statement CM field length.
11	jess	Job statement ECS field length.
	crss	Cards read.
12	tnss	Terminal name.

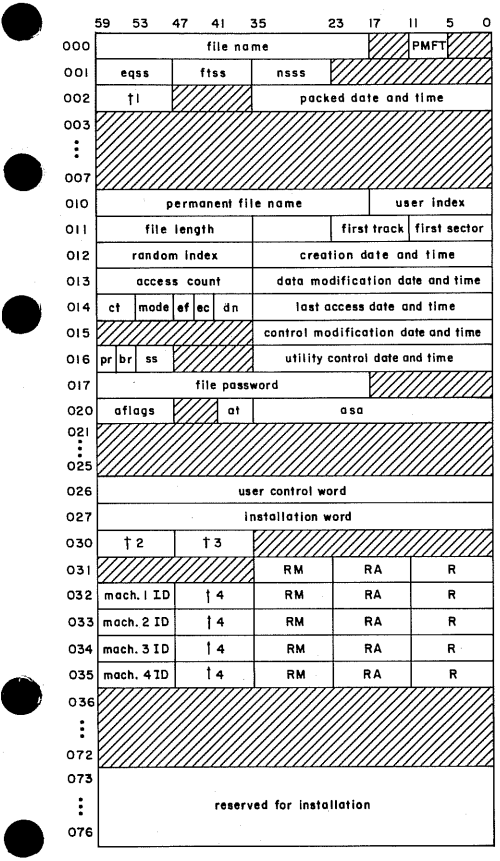
The following apply to print/punch files only.

	pfss	Punch format.
10	rass	Random address of dayfile.
	scss	Spacing code for 580 PFC support.
11	lcss	Lines or statement limit index.
	rcss	Repeat count.
12	rtss	Random index.
	rbss	Requeue number.

The following apply to all queued files.

	otss	Origin type.
13	prss	Priority.
	miss	Machine ID.
	flss	File size (sectors/10g).
	icss	Internal characteristics.
	ecss	External characteristics.
14	fcss	Forms code.
	dvss	Device code.
	dcss	NOS/BE device code.
15	dass	Destination user number.
	fdss	Destination family name.
16	odss	Family ordinal of destination (future).
	diss	Destination terminal identification (TID).
	fsss	FST entry.
	fmss	Family name of creator.
17	ooss	Family ordinal of creator (future).
	acss	User number of creator.
	cdss	Queued file creation date and time.
	jnss	Job statement name.
	ohss	Origination host name (future).
	dhss	Destination host name (future).
	frss	File routing control.
	vass	Account file validation block.
	ubss	User block. eiss

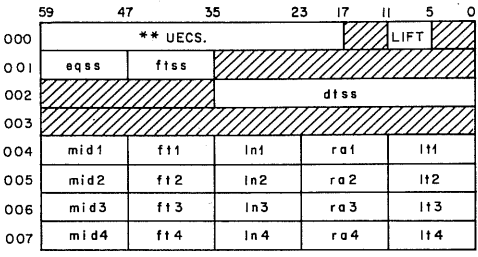
Direct Access File System Sector Format



	eqss	Equipment number.
	ftss	First track.
	ucss	Current user counts: RM READMD users. RA READAP users. R READ users.

Ref	Bit No.	Description
†1	59-49	Zero.
	48	Set if enhanced EOI sector present.
†2	59-55	Reserved.
	54	File currently attached by system utility.
	53	File has been purged.
	52	File can be shortened (W mode).
	51	File can be rewritten (W or M mode).
	50	Zero.
	49	File can be extended (W, M, or A mode).
	48	Zero.
†3	47-36	Fast attach (40xx); upper bit set indicates file is in fast attach mode and lower six bits (41-36) contain index into FAT table if file is global fast attach.
†4	47-38	Zero.
	37	Local utility attach flag (file attached by system utility in this MF).
	36	Local write flag (file attached in W, M, or A mode in this MF).

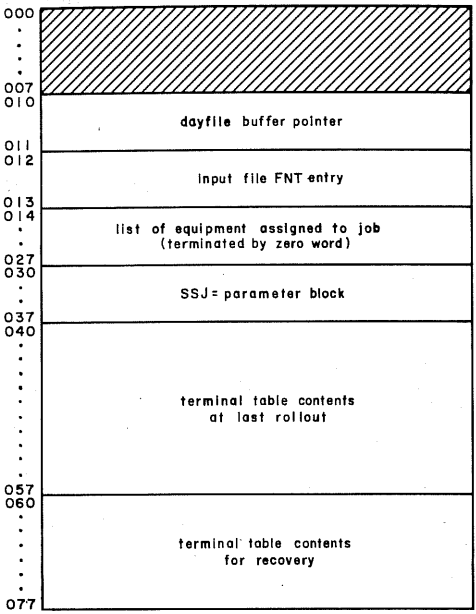
ECS Direct Access Chain



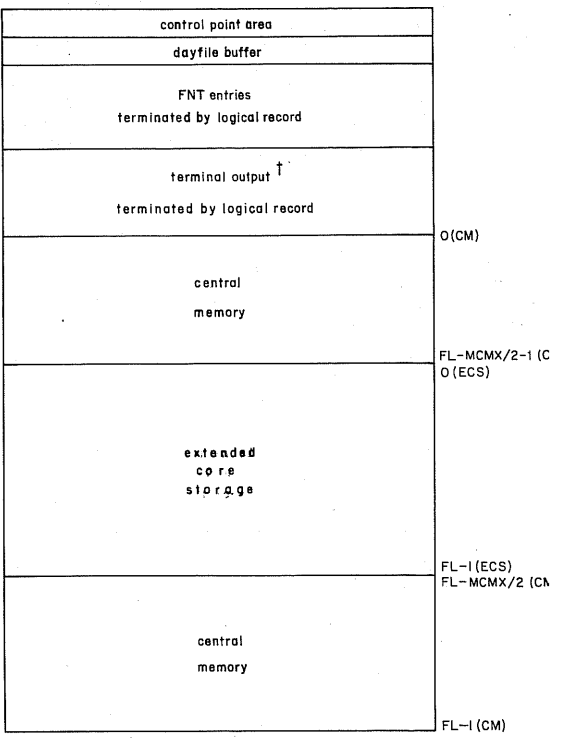
eqss	Equipment number.
ftss	First track.
dtss	Last modification date and time (packed format).
mid	Machine ID.
ft	First track of subchain.
ln	Length of ECS block.
ra	RAE of ECS block.
lt	Last track of subchain.

ROLLOUT FILE

System Sector

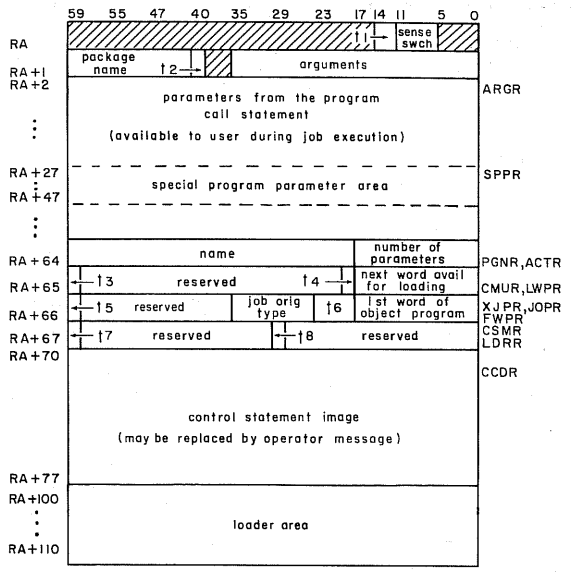


File Format



† This part of the rollout file is used only for TXOT jobs.

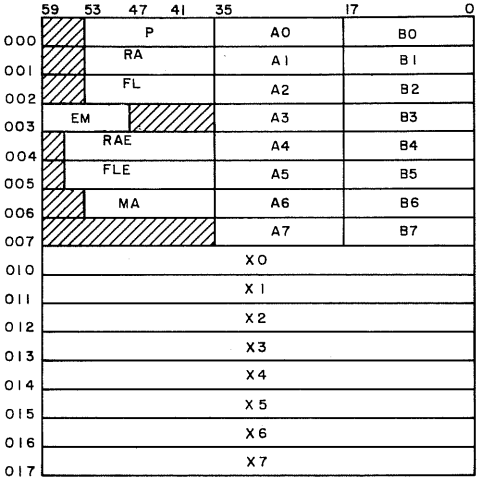
JOB COMMUNICATION AREA



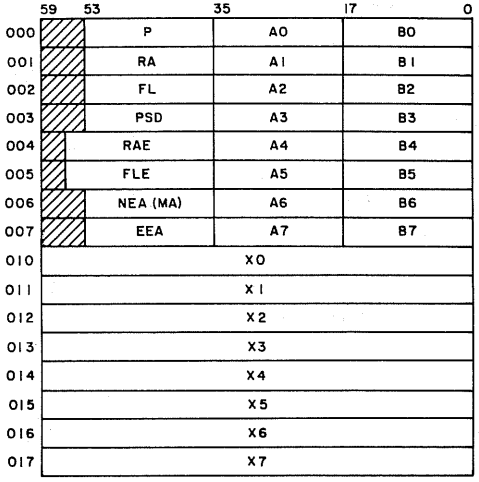
Ref	Bit No.	Description
†1	14	CFO bit if console forced operator command is allowed.
	13	Subsystem idledown flag.
	12	Pause flag.
†2	40	Auto recall.
†3	59	Set if compare/move unit (CMU) is present.
†4	18	Set if load from system library.
†5	59	Set if CEJ/MEJ option is available.
†6	23-20	Reserved.
	19	Set if program called from DIS.
	18	RSS bit.
†7	59	Set indicates system is in 64-character set mode.
†8	29	Set if load has completed.

EXCHANGE PACKAGE AREA

Exchange package area for CDC CYBER 170 Series, Models 171, 172, 173, 174, 175, 720, 730, 750, and 760; CDC CYBER 70 Series, Models 71, 72, 73, and 74; and CDC 6000 Series Computer Systems.



Exchange package area for CDC CYBER 170 Series, Model 176 Computer Systems.



The exchange package area fields apply to all NOS computer systems unless otherwise noted.

Field	Description
P	Program address.
Ai	Address registers.
Bi	Increment registers.
RA	Reference address for central memory.
FL	Field length for central memory.
EM†	Exit modes. An exit mode is selected by setting the appropriate bit and disabled by clearing the appropriate bit.

Bit	Description
59	CM data error. ††
58	CMC input error. ††
57	ECS flag register operation parity error. ††
56-53	Not used.
52-51	Hardware error exit status bits. †††
50	Indefinite operand.
49	Operand out of range.
48	Address out of range.

PSD†††† Program status designator (PSD) register.

Bit	Description
53	Exit mode flag.
52	Monitor mode flag.
51	Step mode flag.
50	Indefinite mode flag.
49	Overflow mode flag.
48	Underflow mode flag.
47	LCME (ECS) error condition.
46	CM error condition.
45	LCME block range condition.
44	CM block range condition.
43	LCME direct range condition.
42	CM direct range condition.
41	Program range condition.
40	Not used.
39	Step condition.
38	Indefinite condition.
37	Overflow condition.
36	Underflow condition.

† Does not apply to CDC CYBER 170 Series, Model 1
†† CDC CYBER 170 Series, Models 171, 172, 173, 174, 175, 720, 730, 750, and 760 only.
††† CDC CYBER 70 Series, Model 74 only.
†††† CDC CYBER 170 Series, Model 176 only.

Field	Description
RAE	Reference address for ECS.
FLE	Field length for ECS.
MA	Monitor address.
NEA†	Normal exit address.
EEA†	Error exit address.
Xi	Operand registers.

ERROR FLAGS

Error flag	Mnemonic	Description
1	ARET	Arithmetic error.
2	PSET	Program stop.
3	PPET	PP abort.
4	CPET	CPU abort.
5	PCET	PP call error.
6	TLET	Time limit.
7	FLET	File limit.
10B	TKET	Track limit.
11B	SRET	SRU limit.
12B	FSET	Forced error.
13B	ODET	Operator drop.
14B	RRET	Operator rerun.
15B	OKET	Operator kill.
16B	SSET	Subsystem abort.
17B	ECET	ECS parity error.
20B	PEET	CPU parity error.
21B	SYET	System abort.
22B	ORET	Override error condition.

† CDC CYBER 170 Series, Model 176 only.

MASS STORAGE LABEL FORMAT

DEVICE LABEL TRACK FORMAT

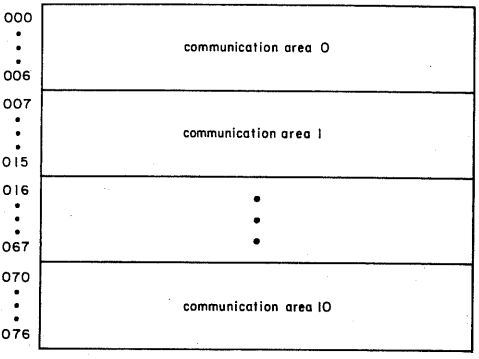
000	label sector
001 • • • 012	track reservation table
013	sector of local information (2-word entries)
014	device information sector
015	intermachine communication area (ECS label track only)
016	MMF environment tables (ECS label track only)
017	CPUMTR storage move area for ECS (ECS label track only)

DEVICE LABEL SECTOR FORMAT

000 001 002	reserved		
003	label level	equipment type	reserved
004 005 006 007	reserved		
010 • • • 027	NOS MST		
030 • • • 077	unused		

MULTIMAINFRAME TABLES

INTERMACHINE COMMUNICATION AREA

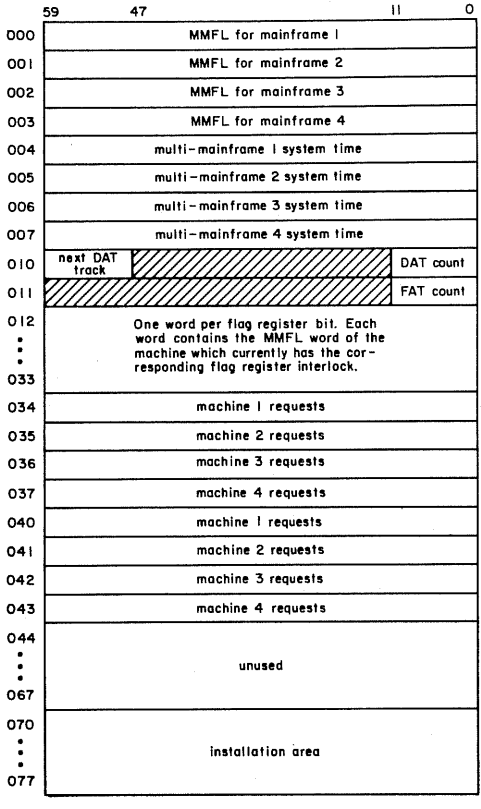


Each communication area has the following format.

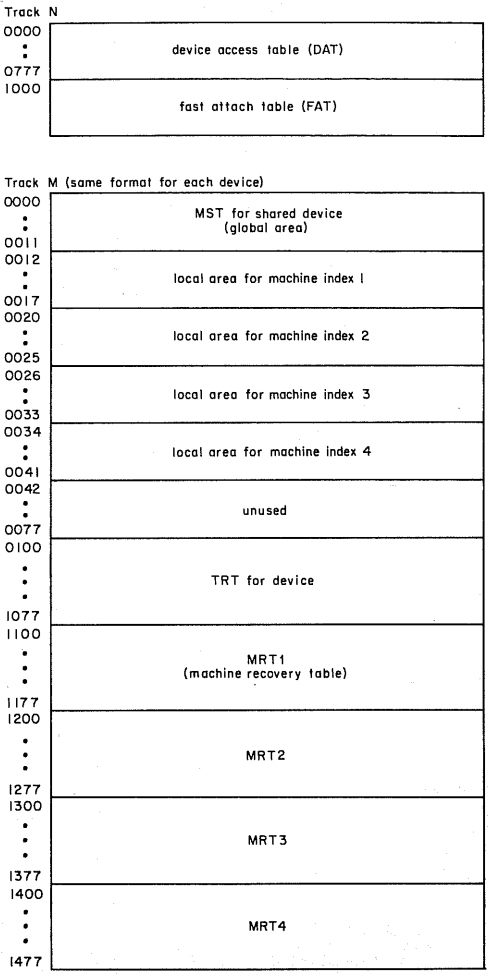
	59–47	35	23–11	0
000	FN	MI	MP	MD
001	message word 1			
002	message word 2			
003	message word 3			
004	message word 4			
005	message word 5			
006	message word 6			

FN	Intermachine function number.
MI	Machine initiating request.
MP	Machines to process request.
MD	Machines done processing request.

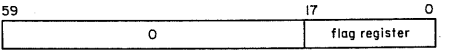
Sector 16_8 of the ECS label track is defined as follows:



MMF - DAT TRACK CHAIN (ECS)

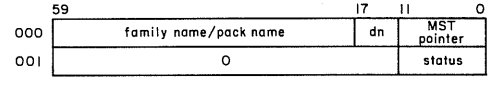


MMF - ECS FLAG REGISTER FORMAT



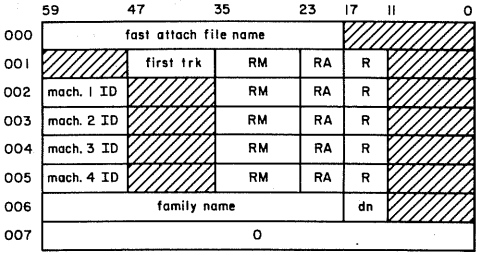
Bit Set	Name	Description
17-12	---	Reserved.
11	COMI	CPUMTR intermachine communication request present.
10	CIRI	CPUMTR interlock recovery.
9	FATI, PFNI	FAT and PFNL interlock.
8	IFRI	Intermachine function request interlock.
7	BTRI	Block transfer in progress.
6	PRSI	Deadstart ECS preset in progress
5	DATI	Device access table interlock.
4	TRTI	TRT interlock; machine specified by bits 3-0 is requesting a TRT interlock.
3-0	---	Machine mask indicating which machine has TRT interlock bit set.

DEVICE ACCESS TABLE (DAT) ENTRY



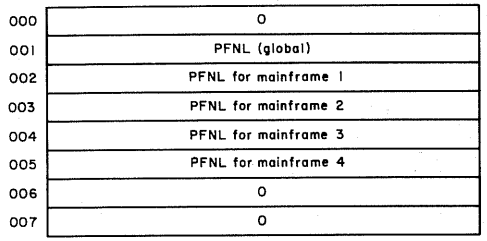
dn	Device number.
MST pointer	If zero, device is not shared.
status	Bits 11-5 are reserved, bit 4 is set if recovery is in progress, and bits 3-0 are machine mask of machines accessing device.

FAST ATTACH TABLE (FAT) ENTRY - GLOBAL



RM READMD users.
RA READAP users.
R Read/write users.
dn Device number.

PFNL ENTRY FORMAT - GLOBAL

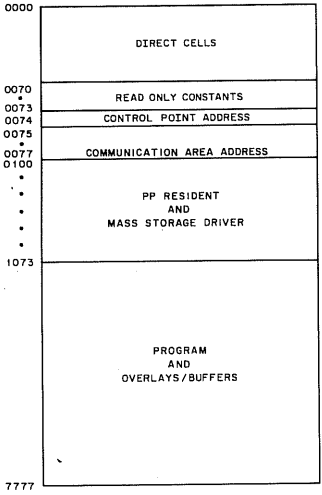


The first entry of the FAT is an eight-word entry of PFNL words in the preceding format.

PP MEMORY LAYOUT

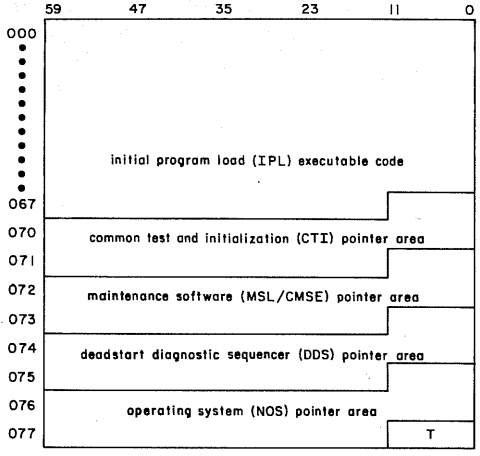
POOL PROCESSORS

(PP2 through PP11 on 10 PP machines; PP2 through PP11 and PP20 through PP31 on 20 PP machines.)†



† PP numbers are in octal notation.

DISK DEADSTART SECTOR FORMAT



T = IPL transfer address −1 (7420_8)

COLDSTART FROM CARD READER PANEL SETTINGS FOR 667 OR 669 TAPE UNITS

Word on Panel	Setting				Octal
0001	111	101	1cc	ccc	75CC
0002	111	111	0cc	ccc	77CC
0003	fff	000	000	000	F000
0004	000	000	000	000	0000
0005	111	111	0cc	ccc	77CC
0006	001	100	000	000	1400
0007	111	100	0cc	ccc	74CC
0010	111	001	0cc	ccc	71CC
0011	111	110	110	100	7664
0012	000	000	0tt	ttt	00TT
0013	rrr	ppp	xxx	xxx	RPXX
0014	eee	010	11u	uuu	E2UU

COLDSTART FROM TAPE UNIT PANEL SETTINGS FOR 667 OR 669 TAPE UNITS

Word on Panel	Setting				Octal
0001	111	101	ttt	ttt	75TT
0002	011	110	001	101	3615
0003	001	000	001	100	1014
0004	001	111	000	001	1701
0005	000	101	111	110	0576
0006	111	111	ttt	ttt	77TT
0007	000	000	11u	uuu	00UU
0010†	000	011	000	000	0300

† The remainder of the panel is not used.

COLDSTART FROM CARD READER PANEL SETTINGS FOR 844/885 DISK UNITS

Word on Panel	Setting				Octal
0001	111	101	1cc	ccc	75CC
0002	111	111	0cc	ccc	77CC
0003	fff	000	000	000	F000
0004	000	000	000	000	0000
0005	111	111	0cc	ccc	77CC
0006	001	100	000	000	1400
0007	111	100	0cc	ccc	74CC
0010	111	001	0cc	ccc	71CC
0011	111	110	110	100	7664
0012	000	000	0tt	ttt	00TT
0013	rrr	ppp	xxx	xxx	RPXX
0014	eee	011	uuu	uuu	E3UU

COLDSTART FROM DISK UNIT PANEL SETTINGS FOR 844/885 DISK UNITS

Word on Panel	Setting				Octal
0001	000	000	000	000	0000
0002	111	101	1tt	ttt	75TT
0003	111	111	0tt	ttt	77TT
0004	eee	001	vvv	vvv	E1VV
0005	111	111	0tt	ttt	77TT
0006	eee	011	uuu	uuu	E3UU
0007	111	100	0tt	ttt	74TT
0010	111	001	0tt	ttt	71TT
0011	111	011	000	001	7301
0012	rrr	ppp	xxx	xxx	RPXX
0013	rrr	ppp	xxx	xxx	RPXX
0014	000	000	000	000	0000

DP	Distributive data path to ECS
DS	Display console
LP	Line printer (512 or 580)
LQ	Line printer (3555-512)
LR	Line printer (580)
MD-n	Disk drive [(3853-1)-841]
MS	Mass storage device
MT	Magnetic tape drive (7-track)
NT	Magnetic tape drive (9-track)
NE	Null equipment
ST	Remote batch multiplexer (6671)
TT	Time-sharing multiplexer (6676 or 6671)

DEADSTART PANEL SETTINGS AND OPTIONS

DEADSTART PANEL SETTINGS FOR 657 OR 659 TAPE UNITS

Word on Panel	Setting				Octal
0001	111	101	ttt	ttt	75TT
0002	111	111	ttt	ttt	77TT
0003	fff	000	00v	vvv	F0VV
0004	111	111	ttt	ttt	77TT
0005	000	000	001	000	0010
0006	111	111	ttt	ttt	77TT
0007	001	100	000	000	1400
0010	111	100	ttt	ttt	74TT
0011	111	001	ttt	ttt	71TT
0012	110	100	000	000	6400
0013	www	xxx	xxx	yyy	WXXY
0014	rrr	ppp	sss	sss	RPSS
0015 †	000	000	000	000	0000

† Setting of word 0015 does not apply for CDC CYBER or 6000 series. Words 0016 through 0020 are not currently used by the system.

DEADSTART PANEL SETTINGS (COLDSTART) FOR 667 OR 669 TAPE UNITS

Word on Panel	Setting				Octal
0001	111	101	ccc	ccc	75CC
0002	111	111	ccc	ccc	77CC
0003	eee	000	000	000	E000
0004	010	100	000	000	2400
0005	010	100	ttt	ttt	24TT
0006	111	111	ccc	ccc	77CC
0007	001	100	uuu	000	14U0
0010	111	100	ccc	ccc	74CC
0011	111	001	ccc	ccc	71CC
0012	111	110	110	100	7664
0013	www	xxx	xxx	yyy	WXXY
0014	rrr	ppp	sss	sss	RPSS
0015 †	000	000	000	000	0000

DEADSTART PANEL SETTINGS (WARMSTART) FOR 667 OR 669 TAPE UNITS

Word on Panel	Setting				Octal
0001	111	101	ttt	ttt	75TT
0002	011	110	001	101	3615
0003	001	000	001	100	1014
0004	010	100	000	000	2400
0005	010	100	000	000	2400
0006	111	111	ttt	ttt	77TT
0007	000	010	110	uuu	026U
0010	111	100	ttt	ttt	74TT
0011	111	001	ttt	ttt	71TT
0012	110	100	000	000	6400
0013	www	xxx	xxx	yyy	WXXY
0014	rrr	ppp	sss	sss	RPSS
0015 †	000	000	000	000	0000

† Setting of word 0015 does not apply for CDC CYBER 70 or 6000 series. Words 0016 through 0020 are not currently used by the system.

WARMSTART PANEL SETTINGS FROM CHANNEL WITH ACTIVE PP (CDC CYBER 170 SERIES ONLY)

Word on Panel	Setting				Octal
0001	001	100	000	010	1402
0002	111	011	0tt	ttt	73TT
0003	000	000	001	111	0017
0004	111	101	1tt	ttt	75TT
0005	111	111	0tt	ttt	77TT
0006	eee	ddd	ddd	ddd	EDDD
0007	111	100	0tt	ttt	74TT
0010	111	001	0tt	ttt	71TT
0011	111	011	000	001	7301
0012	000	000	000	000	0000
0013	rrr	ppp	xxx	xxx	RPXX
0014	000	000	000	000	0000
0015	000	000	000	000	0000
0016	000	000	000	000	0000
0017	000	000	000	000	0000
0020	111	001	001	010	7112

WARMSTART PANEL SETTINGS FROM CHANNEL WITH ACTIVE PP (CDC 6000 AND CDC CYBER 70 SERIES ONLY)

Word on Panel	Setting				Octal
0001	001	100	000	010	1402
0002	111	011	0tt	ttt	73TT
0003	000	000	001	011	0013
0004	111	101	1tt	ttt	75TT
0005	111	111	0tt	ttt	77TT
0006	eee	ddd	ddd	ddd	EDDD
0007	111	100	0tt	ttt	74TT
0010	111	001	0tt	ttt	71TT
0011	111	011	000	001	7301
0012	rrr	ppp	xxx	xxx	RPXX
0013	000	000	000	000	0000
0014	111	001	001	010	7112

WARMSTART PANEL SETTINGS FROM CHANNEL WITH NO ACTIVE PP

Word on Panel	Setting				Octal
0001	000	000	000	000	0000
0002	000	000	000	000	0000 †
0003	000	000	000	000	0000 †
0004	111	101	1tt	ttt	75TT †
0005	111	111	0tt	ttt	77TT
0006	eee	ddd	ddd	ddd	EDDD
0007	111	100	0tt	ttt	74TT
0010	111	001	0tt	ttt	71TT
0011	111	011	000	001	7301
0012	rrr	ppp	xxx	xxx	RPXX
0013	rrr	ppp	xxx	xxx	RPXX
0014	000	000	000	000	0000

†If a 6681 data channel converter is the first equipment on the channel or if it precedes the deadstart device controller, words 2, 3, and 4 must be set as follows:

Word	Setting				Octal
0002	111	101	1tt	ttt	75TT
0003	111	111	0tt	ttt	77TT
0004	010	001	000	000	2100

KEY TO PANEL SETTINGS

		1	Switch up.
		0	Switch down.
CC	/	ccc ccc	Card reader channel number.
DDD	/	ddd ddd ddd	Deadstart function; dependent on device type:
26U	/	010 11u uuu	667/669 tape units.
12U	/	001 01u uuu	67X tape units (800 bpi).
3UU	/	011 uuu uuu	844/885 disk units (warmstart).
1VV	/	001 vvv vvv	844/885 disk units (coldstart).
E	/	eee	Tape/disk unit controller number.
F	/	fff	Card reader controller number.
TT	/	ttt ttt	Tape/disk channel number.
U	/	uuu	Tape/disk unit number.

WORD 12 AND/OR 13 OPTIONS

R	/	rrr = 0	Level 0 (initial) deadstart; no recovery (All PP and CM confidence tested).
		= 1	Level 1 recovery deadstart; the system, all jobs, all active files, and permanent files are recovered from checkpoint information on mass storage (All PP and CM confidence tested).
		= 2	Level 2 recovery deadstart; all jobs, active files, and permanent files are recovered from checkpoint information on mass storage; system is loaded from deadstart tape (All PP and CM confidence tested).

	= 3	Level 3 recovery deadstart; the system, all jobs, and active files are recovered from central memory tables; permanent files are also recovered (Memory confidence testing occurs in PPs only).
P / ppp	Bit 8	Unused.
	Bit 7 = 1	Save PP0 in CM during express deadstart dump.
	Bit 6 = 1	Display CMRDECK.
XX / xxx xxx	CMRDECK number.	

The following deadstart panel setting transfers the contents of PP0 to another PP.

Word on Panel	Setting				Octal
0001	010	000	000	000	2000
0002	111	111	111	110	7776
0003	111	011	ppp	ppp	73PP
0004	000	000	000	000	0000
0005	000	011	000	000	0300

PP / ppp ppp — PP to which transfer is to be made.

MASS STORAGE DATA ORGANIZATION

EXTENDED CORE STORAGE (ECS)

NOS accesses ECS I and ECS II as a single device.

• Equipment type	DE/DP. †
• Sectors/track	16.
• Tracks/device	121 - 125K of ECS I. 242 - 250K of ECS I. 484 - 500K of ECS I. 968 - 1,000K of ECS I. 1,937 - 2,000K of ECS I. 126 - 131K of ECS II. 252 - 262K of ECS II. 504 - 524K of ECS II. 1,008 - 1,048K of ECS II. 2,016 - 2,097K of ECS II.
• Words of data/device	123,904 - 125K of ECS I. 247,808 - 250K of ECS I. 495,616 - 500K of ECS I. 991,232 - 1,000K of ECS I. 1,983,488 - 2,000K of ECS I. 129,024 - 131K of ECS II. 258,048 - 262K of ECS II. 516,096 - 524K of ECS II. 1,032,192 - 1,048K of ECS II. 2,064,384 - 2,097K of ECS II.
• Maximum data rate	80K words per second for PP transfers. 160K words per second for 2X PPs.

† ECS subequipment values are in associated MST. The values are in word DILL (byte 3) and further define the type of ECS equipment.

- Address mapping:

System		Physical	
Unit	Bits	Unit	Bits
Track	0-10	Address	0-20
Sector	0-3		

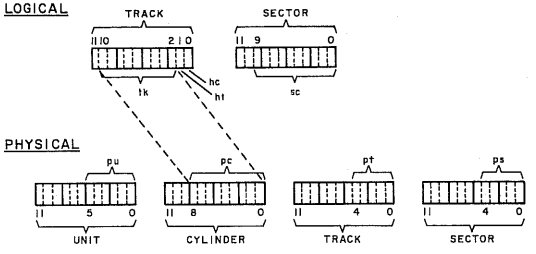
Formula:

$(T_{0-10} \times 2020_8) + (S_{0-3}) = \text{linkage word}$

$(T_{0-10} \times 2020_8) + 20_8 + (S_{0-3} \times 100_8) = \text{data}$

7x5x/844-21 DISK STORAGE SUBSYSTEMS (HALF TRACK)

- Equipment type — DI
- Sectors/track — 107 x n
- Tracks/device — 1632
- Words/device — 11,175,936 x n
- Maximum data rate — 46.1K words per second



int(x) = Integer portion of x.

rem(x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 8 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
ht	Half track bit (bit 1 of logical track).
hc	Half cylinder bit (bit 0 of logical track).
a	Intermediate result.

$lu = int(sc/153_8)$.

$a = ht + 2 * rem\ (sc/153_8)$.

$ps = rem\ (a/30_8)$.

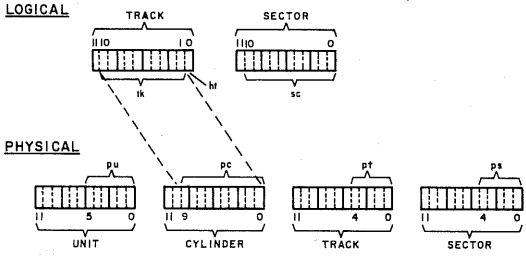
$pt = hc * 11_8 + int\ (a/30_8)$.

pc = tk (bits 10 through 2).

pu = Obtained from physical unit list in DDLL MST wor

7x5x/844-41/-44 DISK STORAGE SUBSYSTEMS (HALF TRACK)

- Equipment type — DJ
- Sectors/track — 227 x n
- Tracks/device — 1640
- Words/device — 23,825,920 x n
- Maximum data rate — 46.1K words per second



int(x) = Integer portion of x.

rem (x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 9 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
ht	Half track bit (bit 0 of logical track).
a	Intermediate result.

lu = int ($sc/343_8$).

a = ht + 2*rem ($sc/343_8$).

pt = int ($a/30_8$).

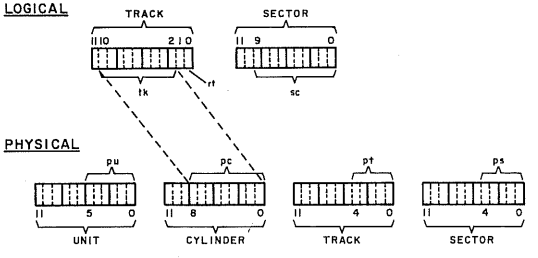
ps = rem ($a/30_8$).

pc = tk (bits 10 through 1).

pu = Obtained from physical unit list in DDLL MST word.

7152/7154/844-21 DISK STORAGE SUBSYSTEMS (FULL TRACK)

- Equipment type — DK
- Sectors/track — 112 x n
- Tracks/device — 1632
- Words/device — 11,698,176 x n
- Maximum data rate — 92.16K words per second



int(x) = Integer portion of x.

rem (x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 8 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
rt	Relative track in physical cylinder (bits 1 and 0 of logical track).

$lu = int(sc/160_8)$.

$ps = rem[(rtx162_8 + rem(sc/160_8))/30_8]$.

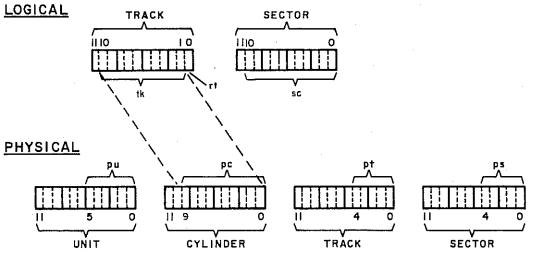
$pt = int[(rtx162_8 + rem(sc/160_8))/30_8]$.

pc = tk (bits 10 through 2).

pu = Obtained from physical unit list in DDLL MST word

715x/844-41/-44 DISK STORAGE SUBSYSTEMS (FULL TRACK)

- Equipment type — DL
- Sectors/track — 227 x n
- Tracks/device — 1640
- Words/device — 23,825,920 x n
- Maximum data rate — 92.16K words per second



int (x) = Integer portion of x.

rem (x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 9 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
rt	Relative track in physical cylinder (bit 0 of logical track).

$lu = int(sc/343_8)$.

$ps = rem[(rt*345_8 + rem(sc/343_8))/30_8]$.

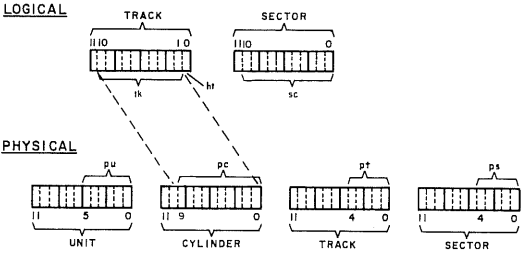
$pt = int[(rt*345_8 + rem(sc/343_8))/30_8]$.

pc = tk (bits 10 through 1).

pu = Obtained from physical unit list in DDLL MST word.

7155/885 DISK STORAGE SUBSYSTEMS (HALF TRACK)

• Equipment type	DM
• Sectors/track	640 x n ($1 \leq n \leq 3$)
• Tracks/device	1682
• Words/device	68,894,720 x n
• Maximum data rate	61.44K words per second



int(x) = Integer portion of x.

rem (x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 9 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
ht	Half track bit (bit 0 of logical track).

lu = int ($sc/1200_8$).

pt = int ($sc/20_8$).

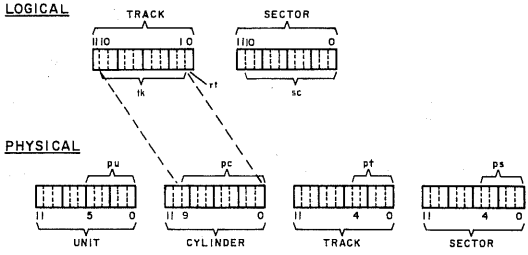
ps = ht + rem ($sc/20_8$).

pc = tk (bits 10 through 1).

pu = Obtained from physical unit list in DDLL MST wor

7155/885 DISK STORAGE SUBSYSTEMS (FULL TRACK)

- Equipment type — DQ
- Sectors/track — 640 x n ($1 \leq n \leq 3$)
- Tracks/device — 1682
- Words/device — 68,894,720 x n
- Maximum data rate — 122.88K words per second



int (x) = Integer portion of x.

rem (x/y) = Remainder of x divided by y.

tk	Logical track.
sc	Logical sector.
pu	Physical unit number (bits 5 through 0).
pc	Physical cylinder number (bits 9 through 0).
pt	Physical track number (bits 4 through 0).
ps	Physical sector number (bits 4 through 0).
lu	Logical unit.
rt	Relative track in physical cylinder (bit 0 of logical track).

$lu = int (sc/1200_8)$.

$ps = rem (sc/40_8)$.

$pt = rt*24_8 + int (sc/40_8)$.

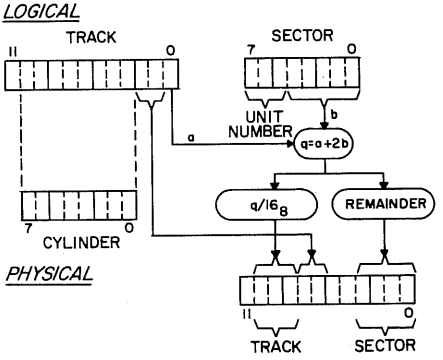
pc = tk (bits 10 through 1).

pu = Obtained from physical unit list in DDLL MST word.

3553—1/841—N MULTIPLE DISK DRIVES

The system accesses the 3553-1 and n 841's as a single device. n may range from 1 through 8.

- Equipment type MD
- Sectors/track 32 x n
- Tracks/device 1600
- Words/device 3,276,800 x n
- Maximum data rate 17.8K words per second
- Address mapping:



- Equipment connect code e01u
  - e = 3553-1 equipment number
  - u = unit number

3-69.1
~~3-60.1~~

~~3-41~~

DEL

FUNCTION REQUESTS

PP FUNCTION REQUESTS

The following list provides a quick reference to monitor function mnemonics and related codes.

Mnemonic	Code	Mnemonic	Code
ABTM	36	RCHM	12
ACTM	52	RCLM	46
CCAM	37	RCPM	47
CCHM	03	RDCM	50
CEFM	40	REMM	13
CKSM	71	REQM	14
CSTM	70	RJSM	17
DCHM	04	RLMM	66
DCPM	41	ROCM	15
DEPM	27	RPPM	53
DEQM	05	RPRM	16
DFMM	06	RSJM	54
DLKM	63	RSTM	21
DPPM	44	RTCM	55
DRCM	30	SCPM	31
DSRM	23	SEQM	10
DSWM	33	SFBM	56
DTKM	43	SFIM	42
EATM	32	SPLM	61
ECSM	45	STBM	57
ECXM	24	TDAM	64
IAUM	51	TGPM	25
JACM	62	TIOM	65
LCEM	67	TSEM	26
LDAM	72	UADM	60
PIOM	74	VMSM	73
PRLM	11		

MTR FUNCTIONS

A PP sets one of the following codes in the output register when a system request is made. The system replies to the request with a word in the output register as shown.

01 Reserved

02 Reserved

03 Check Channel — CCHM

Request: OR 0003 cccc **** **** ****

cccc Channel number.

Reply: OR 0000 cccc 000r **** ****

cccc Channel assigned if r is 1.

r
- 1 Channel assigned.
- 0 Channel not assigned.

04 Drop Channel — DCHM

Request: OR 0004 00ch **** **** ****

ch Channel number.

Reply: OR 0000 0000 0000 0000 0000

05 Drop Equipment — DEQM

Request: OR 0005 00eq **** **** ****

eq Equipment number.

Reply: OR 0000 0000 0000 0000 0000

Hung PP occurs for any of the following conditions.

- Illegal equipment number.
- Undefined equipment.
- Equipment not reserved.
- Equipment is mass storage.

06 Process Dayfile Message — DFMM

Request: OR 0006 00mc wwww **** ****

mc Message control:

- 0 Message to system dayfile, control point dayfile, control point message buffer.
- 1 Normal message with no message at control point (NMSN).
- 2 Message to system dayfile only, with job name from message (JNMN).
- 3 Message to control point dayfile only (CPON).

4 Message to account file only (ACFN).

5 Message to account file, with job name from message (AJNN).

6 Message to error log only (ERLN).

7 Message to error log only, with job name from message (EJNN).

If bit 5 of mc is set, the dayfile buffers are flushed after the message is issued. If bit 4 of mc is set, the dayfile buffers are left busy after the message is issued.

wwww Word count minus one of message.

MB Dayfile message continuation; message begins in MB and is terminated by a zero byte. (Message cannot exceed six words.)

If message is completed:

Reply: OR 0000 0000 **** **** ****

If dayfile buffer is full:

Reply: OR 0000 dddd ffff **** ****

dddd Pointer address of buffer to be dumped.

ffff Length minus 3 of dump buffer.

Intermediate processing (buffer busy): OR 0006 wwww cccc tttt iiii rrrr

wwww Option word (option obtained from table of message processing codes).

cccc Word count of message data.

tttt Number of words transferred.

iiii Buffer index.

rrrr Reentry address.

07 Reserved

10 Set Equipment Parameters — SEQM

Request: OR 0010 00eq 00sf pppp qqqq

eq — Equipment number.

sf — Subfunction code:

- 00 On equipment.
- 01 Off equipment.
- 02 Set channels for access.
- 03 Set equipment mnemonic.
- 04 Set byte 0 of EST.
- 05 Set byte 1 of EST.
- 06 Set byte 2 of EST.
- 07 Set byte 3 of EST.
- 10 Set byte 4 of EST.

pppp — Channels of access for subfunction 02, equipment mnemonic for subfunction 03, and not used for subfunctions 00 and 01. Mask for EST byte for subfunctions 04-10. Mask must have ones to save data and zeros to change data.

qqqq — Not used for subfunctions 00-03. New data for EST byte for subfunctions 04-10. Data position must match mask.

Reply: OR 0000 0000 0000 0000 0000

Hung PP occurs for an illegal equipment.

11 Pause for Storage Relocation — PRLM

Request: OR 0011 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

12 Request Channel — RCHM

Request: OR 0012 bbaa ddcc **** ****

aa	First channel choice.
bb	Second channel choice.
cc	Third channel choice.
dd	Fourth channel choice.

Reply: OR 0000 00ch **** **** ****

ch	Channel assigned.

NOTE

Storage move may occur while this request is pending.

13 Request Exit Mode — REMM

Request: OR 0013 eeee **** **** ****

eeee	Exit mode.

Reply: OR 0000 0000 0000 0000 0000

14 Request Equipment — REQM

Request: OR 0014 00eq **** **** ****

eq	Equipment number.

Reply: OR 0000 00st **** **** ****

st	eq	If equipment is assigned.
	0	If equipment is not available.

15 Roll Out Control Point — ROCM

Request: OR 0015 00cp **** **** ****

cp	Control point number.

Reply: OR 0000 0000 0000 0000 0000

16 Request Priority — RPRM

Request: OR 0016 pppp 000t **** ****

pppp Priority.

t Flags:

Bit	Description
0	Type of priority to change: 0 if CPU priority and 1 if queue priority.
1	Range check for queue priority: 0 if no check requested and 1 if check requested.
2	Zero.
3	Set queue priority unless present priority is < MNPS or > MXPS. If queue priority cannot be set, present priority is returned in OR+1.

Reply: OR 0000 ssss 0000 0000 0000

ssss Present queue priority if t=3 flag is set and present priority is < MNPS or > MXPS.

17 Request Job Sequence Number — RJSM

Request: OR 0017 **** **** **** ****

Reply: OR 0000 00ss ssss ss00 ****

ss...s Display code sequence number.

20 Reserved

21 Request Storage — RSTM

Request: OR 0021 ffff xxxx **** ****

	ffff	Field length request (100_8-word blocks for CM request and 1000_8-word blocks for ECS request).
	xxxx	0 CM request. 1 ECS request.

Reply: OR 0000 xxxx 0000 0000 0000

	xxxx	If zero, request is honored; if nonzero, storage is not available.

Hung PP occurs if ECS is requested and user ECS is not defined.

NOTE

Storage move may occur while this request is pending.

22 Reserved

23 DSD Request — DSRM

This function is honored only from DSD.

Request: OR 0023 00rr **** **** ****

rr Request:

- 00 Set monitor step.
- 01 Step monitor.
- 02 Enter date and time.
- 03 Set emergency step.

Reply: OR 0000 0000 0000 0000 0000

24 ECS Transfer — ECXM

Request: OR 0024 00xx xxxx r*** ****

xxxxxx Response control; zero if respond to PP and nonzero if respond to CM address xxxxxx.

r
- 0 Read request.
- 1 Write request.

MB wwww **** aaaa **** eeee

wwww Number of words to transfer.

aaaa Relative address/100_8.

eeee Relative ECS address/1000_8.

Reply: If xxxxxx is 0:

OR 0000 zzzz 0000 0000 0000

zzzz Zero if no errors and 7777_8 if errors in transfer.

If xxxxxx nonzero:

OR 0000 0000 0000 0000 0000

(xxxxxx) 0000 yyyy 0000 0000 0000

yyyy Zero if no errors and 7777_8 if errors occurred.

25 IAF/TELEX Get Pot — TGPM

Request: OR 0025 **** **** **** ****

Reply: OR 0000 pppp 0000 0000 0000

pppp Pot pointer; 0 if pot unavailable.

26 Process IAF/TELEX Request — TSEM

Request: OR 0026 **** **** **** ****

MB IAF/TELEX request.

Reply: OR 0000 0000 0000 0000 0000

27 Disk Error Processor — DEPM

Request: OR 0027 00ec 00op *llll* sfun

ec Error code.

op Operator code (read or write).

llll Address of linkage bytes in PP.

sfun Status/function:

Bits	Description
11-0	Device function code if function timeout error (ec=FT).

MB (t4-CM).

MB+1 LDAM address.

MB+2 Bits 59-48 exit address to main driver and bits 47-0 disk address message.

MB+3 Bits 59-0 disk address message.

MB+4 Bits 59-48 first linkage byte from sector read, bits 47-36 second linkage byte, and bits 35-0 reserved.

MB+5 Bits 54-48 error exit address, bits 47-36 RDCT, bits 35-24 STSA, bits 23-12 UERP, and bits 11-0 SLM.

Reply: OR 0000 MSFW **** **** ****

MB Bits 59-0 dayfile message.

MB+1 Bits 59-0 dayfile message.

MB+2 Bits 59-0 dayfile message.

MB+3 Bits 59-0 dayfile message.

MB+4 Bits 59-0 dayfile message.

MB+5 Bits 59-48 7EP flags, bits 47-36 incremented retry count, bits 35-24 RDSX or WDSX exit address, and bits 23-0 LJM *RETRY ADDR*.

30 Driver Recall CPU — DRCM

Request: OR 0030 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

31 Select CPUs Allowable for Job Execution — SCPM

Request: OR 0031 000c **** **** ****

c	0	Any CPU.
	1	CPU 0 only.
	2	CPU 1 only.

Reply: OR 0000 0000 0000 0000 0000

32 Enter/Access System Event Table — EATM

Request: OR 0032 000f **** **ee eeee

f	0	Enter event.
	1	Return event count.
	2	Return events to message buffer.
eeeeee	Event	

Reply: OR 0000 000s **** **** **** (f=0)

s	Zero if event entered.

OR 0000 cccc **** **** **** (f=1)

cccc	Count of events in table presently.

OR 0000 cccc **** **** wwww (f=2)

cccc	Count of events in table presently.
wwww	CM word count of events returned ≥ 1.

33 Driver Seek Wait — DSWM

Request: OR 0033 **** **** ffff ****

MB 00t4 00t5 00t6 00t7 chrv

MB+1 00lu 00pu **** **** ****

MB+2 00ty 0000 0000 0000 00tm

ffff Status flags:

- 0 Drop channel and release software unit interlock.
- 1 Request channel without unit interlock.
- 2 Seek in progress.
- 4 Storage move wait or unit switch.
- 10 Hardware drive reserved.
- 11 Request/select channel, software unit interlock, and system equipment (if bit 5 of chrv is set).
- 2000 Controller reserved.

t4-t7 PP direct cells.

chrv Channel reservation control. If bit 5 is set, system device selection is enabled. Bits 4-0 nonzero if channel t4 reserved.

lu Logical unit if ffff ≥ 4.

pu Physical unit if ffff ≥ 4.

ty Last reserve type waiting on ffff=(10 or 2000).

tm Time starting reserve wait ffff=(10 or 2000).

Intermediate processing: OR 0033 00lu 00pn 0000 cpfg

MB 00t4 00t5 00t6 00t7 0001

lu Logical unit.

pn PP number.

cp Control point number (bits 13-7).

	fg	40	System selection needed.
		20	Unit interlock needed.
		10	Dual channel selection needed.
	t4-t7	PP direct cells.	

Reply: OR 0000 chrv 0012 xxrp ****

MB 00t4 00t5 00t6 00t7 00cs

chrv	Address of channel reservation control word in PP memory.	
12	General status function.	
rp	Return parameter:	
	rp	cs if status is error free.
	rp	7000 +ec if error (ec = disk error code).
t4	Selected channel.	
t5	Selected equipment (if system selection requested).	
cs	0 if channel returned. 1 if channel assigned.	

A hung PP condition results if any of the following occurs.

- Invalid equipment number (eq).
- Equipment not mass storage.
- Invalid channel number (ch).
- Channel not assigned to PP.

CPUMTR FUNCTIONS

36 Abort Control Point — ABTM

Request: OR 0036 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

37 Change Control Point Assignment — CCAM

Request: OR 0037 ffnn **** **** ****

ff — Flags:

Bit	Description
11	Set if job name at new control point is not required.
10	Set if job advance flag is set at new control point.
9	If set, reject change if move flag is set; if not set and move flag is set on the new control point, a PRLM is entered in OR after change.

nn — New control point number.

Reply: OR 0000 00mm 0000 0000 0000

mm

0	Control point changed.
≠ 0	Control point not changed.

40 Change Error Flag — CEFM

Request: OR 0040 c0ef pppp **** ****

c — If zero, change error flag at current control point; if nonzero, change error flag at specified control point.

ef — Error flag to set.

pppp — Control point number of desired control point (needed only if c ≠ 0).

Reply: OR 0000 0000 0000 0000 0000

PP hung occurs if the specified control point does not have a job assigned to it or if ef=0 and the error flag at the control point is 0.

41 Drop CPU From Control Point — DCPM

Request: OR 0041 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

42 Set FNT Interlock — SFIM

Request: OR 0042 aaaa ffff 0000 0000

aaaa Address of FST or FNT.

ffff Function:

- 0 Clear FNT interlock.
- 1 Set FNT interlock.
- 2 Clear FNT interlock and FNT/FST.
- 3 Set FNT interlock (verify FNT).

MB+0 eeee eeee eeee eeee eeee

ee...e FNT entry (function 3 only).

Reply: OR 0000 ssss **** **** ****

ssss Status:

- 0 Interlock set/clear.
- 1 Incorrect interlock status.
- 2 FNT entry does not match that in message buffer.

TFSW in control point cleared if FST address=job input FST address (function 2 only).

43 Drop Tracks — DTKM

Request: OR 0043 00eq tttt ssss ****

eq Equipment number.

If bit 10 of the equipment byte is set (20eq), the tracks to be dropped are local to another mainframe.

If bit 11 of the equipment byte is set (40eq), the checkpoint bit for this device is set upon completion of the function.

tttt First track.

If bit 11 of tttt=1, all tracks from tttt to end of chain are dropped.

If bit 11 of tttt=0, all tracks after tttt are dropped and ssss is inserted in track byte.

ssss Sector number.

Reply: OR 0000 0000 0000 00nn nnnn

nnnnnn Number of sectors contained in the tracks dropped.

PP hung occurs if any of the tracks to be dropped are not reserved.

44 Drop PP — DPPM

Request: OR 0044 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

45 ECS Transfer — ECSM

Read/Write ECS Sector

Request: OR 0045 wcaa aaaa sppp pppp

wc Word count-1.

aaaaaa Absolute CM address.

s Subfunction:

0 Read relative ECS (RRES).

1 Write relative ECS (WRES).

ppppppp Relative ECS address.

Read/Write ECS Words

Request: OR 0045 wcaa aaaa sppp pppp

wc Number of words to transfer minus one.

aaaaaa CM address to transfer to or from.

s Subfunction:

2 Read up to 100_8 ECS words (RECS).

3 Write up to 100_8 ECS words (WECS).

ppppppp ECS address to transfer to or from.

Set/Clear Flag Register Bit

Request: OR 0045 wc** **** s*** ****

wc — Bit position in flag register to be manipulated. A nonzero status is returned in byte 1 of the output register if the function cannot be performed.

s — Subfunction:

- 4 Test and set flag register bit (SFRS).
- 5 Unconditionally clear flag register. bit (CFRS).

Read ECS According to List

Request: OR 0045 **aa aaaa s*** ****

aaaaaa — A list of addresses and word counts is located at aaaaaa. Each word in the list has the following format and the list is terminated by a zero word. (The data is read starting at aaaaaa + 20 octal.)

**** **** **wc aaaa aaaa

- wc — Number of ECS words to read.
- aa...a — ECS address to read from.

s — 6 Read ECS according to list (RELS).

Reply (for all subfunctions):

OR 0000 ssss **** aaaa aaaa

ssss — Status (zero if no errors, 7777_8 if ECS error occurred during the transfer).

aa...a — ECS address that the error occurred at.

From periodic recall

46 Recall CPU — RCLM

X→W

Request: OR 0046 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

47 Request CPU — RCPM

From auto recall

I→W

Request: OR 0047 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

PP hung can occur if control point is not in I status.

50 Request Data Conversion — RDCM

Request: OR 0050 000c 0m0w **** ****

c	If c=0, the value to convert is in MB+0. If c=1 through 6, c is the number of values to convert in MB+0 through MB+5. If c=7, the value to convert is a 60-bit number in MB+0 and conversion is in F20.3 format.
m	MB word containing quarter nanounits to be recalculated as milliunits (if c=0 or 7, m is ignored). If m=1, MB+0 is recalculated; if m=2, MB+1 is recalculated, etc.
w	MB word containing SRU value to be divided by 10,000 (if c=0, w is ignored). If w=1, MB+0 is divided; if w=2, MB+1 is divided, etc. If c=7 and w≠0, w is a flag indicating that the quarter-nanosecond units are to be converted to CDC CYBER 176 CPU clock cycles.

MB+0 nnnn nnnn nnnn nnnn nnnn

MB+1 nnnn nnnn nnnn nnnn nnnn

.
.

MB+5 nnnn nnnn nnnn nnnn nnnn

nn...n is a 30-bit or 60-bit integer. If a 30-bit integer, upper 30 bits are ignored.

Reply: OR 0000 0000 0000 0000 0000

MB+0 cccc cccc cccc cccc cccc

MB+1 cccc cccc cccc cccc cccc

.
.

MB+5 cccc cccc cccc cccc cccc

cc...c is display code conversion in F10.3 format.

If c=7, the value in MB+0 is converted to F20.3 format and returned as follows:

OR 0000 0000 0000 0000 0000

MB+0 cccc cccc cccc cccc cccc

MB+1 cccc cccc cccc cccc cccc

MB+2 **** **** **** **** ****

.
.

MB+5 **** **** **** **** ****

cc...c is display code conversion in F20.3 format.

Hung PP occurs if c> 7, m> 6, or w> 6.

51 Interlock and Update — IAUM

Request: OR 0051 ***s mode **ff ffff

s Subfunction:

- 0 Attach fast attach file (AFAS).
- 1 Return fast attach file (RFAS).
- 2 Increment PF activity count (IPAS).
- 3 Decrement PF activity count (DPAS).
- 4 Set PF system interlock requested bit (SIRS).

5 Clear PF system interlock requested bit (CIRS).
6 Set PF system interlock bit (SPIS).
7 Clear PF system interlock bit (CPIS).
10 Increment permanent file family count (IPFS).
11 Decrement permanent file family count (DPFS).
12 Enter intermachine message request (IFRS).

mode Mode to attach file in.

ffffff FST address of local fast attach file.

This function is used to interlock and update fields (not related to a specific device) that reside in CMR and also reside in ECS for multimainframe.

This function can result in PP hung for the following.

- Illegal function code.
- Illegal FST address (AFAS/RFAS).
- Illegal mode number (AFAS/RFAS).
- No compare on FNT entry (AFAS).
- IFRS option requested when not in MMF mode.

Reply: OR 0000 stat **** **** ****

stat Status:

0 Normal completion.
1 Function cannot be completed at this time, because the fast attach file is attached in a conflicting mode or the PF system interlock or request for interlock is set.
2 Fast attach read count overflow/underflow or PF activity count is too great (IPAS) or PF activity count underflow (DPAS).

MB+0 Contains the global FST if the request was AFAS (0) and stat = 1.

This function may be rejected if the flag register bit interlocking IAUM requests is set by another machine. When this happens, bit 59 of OR is set, indicating to PPR to reissue the request.

52 Accounting Functions — ACTM

Account block begin (option ABBF)

Request: OR 0052 0001 **** **** ****
MB aaaa bbbb cccc dddd eeee
aaaa SRU M1 multiplier.
bbbb SRU M2 multiplier.
cccc SRU M3 multiplier.
dddd SRU M4 multiplier.
eeee SRU adder.

Reply: OR 0000 0000 0000 0000 0000

Compute SRU working multipliers (option ABSF)

Request: OR 0052 0002 **** **** ****

Reply: OR 0000 0000 0000 0000 0000

Account block change (option ABCF)

Request: OR 0052 0003 **** **** ****
MB aaaa bbbb cccc dddd eeee
aaaa SRU M1 multiplier.
bbbb SRU M2 multiplier.
cccc SRU M3 multiplier.
dddd SRU M4 multiplier.
eeee SRU adder.

Reply: OR 0000 0000 0000 0000 0000

Compute and convert elapsed SRUs (option ABEF)

Request: OR 0052 0004 **** **** ****
MB+0 **** aaaa aaaa aaaa aaaa
MB+1 **** bbbb bbbb bbbb bbbb
aa...a Old SRU value.
bb...b New SRU value.

Reply: OR 0000 0000 0000 0000 0000
MB cccc cccc cccc cccc cccc
cc...c Display code SRU, F10.3 format.

Compute accounting accumulators (option ABVF)

Request: OR 0052 0005 **** **** ****

MB+0 **** ssss ssss ssss ssss

MB+1 **** **** **cc cccc cccc

MB+2 iiii iiii iiii iiii iiii

MB+3 **** **** **** *aaa aaaa

ss...s SRU value.

cc...c CPU time.

ii...i I/O accumulators.

aa...a Application adder.

Reply: MB+0 ssss ssss ssss ssss ssss

MB+1 cccc cccc cccc cccc cccc

MB+2 dddd dddd dddd dddd dddd

MB+3 tttt tttt tttt tttt tttt

MB+4 pppp pppp pppp pppp pppp

MB+5 aaaa aaaa aaaa aaaa aaaa

The following values are in display code, F10.3 format.

ss...s SRU value.

cc...c CPU time.

dd...d Mass storage activity.

tt...t Magnetic tape activity.

pp...p Permanent file activity.

aa...a Application adder activity.

Increment accumulator (option ABIF)

Request: OR 0052 0006 **** **** **fr

MB+0 **** **** **ii iiii iiii

MB+1 vvvv vvvv vvvv vvvv vvvv

f Operation flag (0=add, 1=subtract).

r Request count (1-3).

ii...i Increment to apply.

vv...v Accumulator value.

Reply: OR 0000 0000 0000 0000 0000

MB+0 **** **** **xx xxxx xxxx

MB+1 **** **** **yy yyyy yyyy

xx...x New value first operation.

yy...y New value second operation.

The SRU accumulator value is first converted to an integer number and then integer addition or subtraction is performed. If the converted accumulator value is less than 1, 1 is used. The upper half of the words containing the increments are preserved in the upper half of the reply.

Application program accumulator (option ABUF)

Request: OR 0052 0007 **** **** ****

MB+0 **** **** aaaa aaaa aaaa

MB+1 **** **** **bb bbbb bbbb

aa...a CPU time (initial).

bb...b CPU time (ending).

Reply: OR 0000 0000 0000 0000 0000

MB cccc cccc cccc cccc cccc

cc...c Display code CPU seconds, F10.3 format.

The total CPU time used is calculated, the CPU multiplier is factored out, then the CPU time is converted to a display code number in the F10.3 format.

53 Request PP — RPPM

Request: OR 0053 **** **** **** ****

MB Input register for PP

Reply: OR 0000 ssss **** **** ****

ssss Address of assigned PPs input register.

Zero if no PP is assigned.

54 Request Job Scheduler — RSJM

Request: OR 0054 **** **** **** ****

Reply: OR 0000 0000 0000 0000 0000

55 Request Track Chain — RTCM

Request: OR 0055 c*eq tttt *sss ssss

c	Equipment checkpoint flag (bit 47).
eq	Equipment number; if zero, the best equipment available is selected.
tttt	Current track if eq is nonzero; device selection parameter if eq is zero as follows:

0	TMPS	Temporary device.
1	INPS	Input file device.
2	OUTS	Output file device.
3	ROLS	Rollout file device.
4	DAYS	User dayfile device.
5	PRIS	Primary file device.
6	LOCS	Local file device.
7	LGOS	LGO file device.

ss...s	Sector count requested (bits 16 through 0). If ss...s=-1 (77...6), request all available tracks on device.

Reply: OR 0000 00eq **** **** tttt

eq	Equipment number.
tttt	First track assigned.

A PP hung condition results if any of the following occurs.

- Equipment not mass storage or out of EST.
- ECS address of MST set when not multimainframe mode.
- Current track is not reserved or is linked to another track.
- Device selection parameter is out of range.

56 Set File Busy — SFBM

Request: OR 0056 **** **** eqaa aaaa

eq	If eq is nonzero, set the equipment number field of the FST to eq. The FST is not set busy, but a reject is returned if the FST is already busy.
aaaaaa	Address of file status word.
MB	Value compare with file name word (aaaaaa-1).

Reply: OR 0000 ssss **** **** ****

ssss	0	File was set busy.
	1	File is busy.
	2	Comparison failed.

Comparison is not performed if aaaaaa is not within the file name table.

57 Set Track Bit — STBM

Request: OR 0057 i0eq pppp ssss ****

i	If bit 46 (i=2) is set, subfunction code 25 is ignored when I/O queue protect is disabled.
eq	EST ordinal of device to process.

ssss Subfunction:

- 00 Set track flawed status (STFS).
- 01 Clear track flawed status (CTFS).
- 02 Set track interlock bit (STIS).
- 03 Clear track interlock bit (CTIS).
- 04 Set preserved file bit (SPFS).
- 05 Clear preserved file bit (CPFS).
- 06 Update TRT from ECS (UTRS).
- 07 Set device interlock (SDIS).
- 10 Interlock IQFT track (IIQS).
- 11 Set IQFT track (SIQS).
- 12 Set global MST bit at ACGL (SGBS).
- 13 Clear global MST bit at ACGL (CGBS).
- 14 Set local MST bit at STLL (SLBS).
- 15 Clear local MST bit at STLL (CLBS).
- 16 Increment user count field (IUCS).
- 17 Decrement user count field (DUCS).
- 20 Set error code (SERS).
- 21 Clear device interlock (CDIS).
- 22 Increment family count in MST (IFCS).
- 23 Decrement family count in MST (DFCS).
- 24 Toggle family idle status in MST (TFIS).
- 25 Test global MST bit (TGBS).

pppp Parameter depending on subfunction:

ssss	Description
01-05	Track number (if bit 11 of eq field is set, set checkpoint bit; if bit 10 of eq field is set, ignore this function if I/O queue protect is disabled).
10	IQFT track number.
12-15	Bit number in word.
20	Error code.
22	Bit number in word.

This function performs MST and TRT updates. CPUMTR performs these functions since MST/TRT may reside in ECS if running in a multimainframe mode and the copies in ECS need to be updated also.

Reply: OR 0000 000s **** **** ****

s Status (0 if normal completion, 1 if request will set a bit or field which is already set).

If the function cannot be completed because the MST/TRT is interlocked, bit 59 of OR is set, indicating to PPR to reissue the request.

Reply (subfunction 25):

OR 0000 byt4 byt0 byt1 byt2

byt4 Byte 4 of MST word ACGL.
byt0 Byte 0 of MST word ACGL.
byt1 Byte 1 of MST word ACGL.
byt2 Byte 2 of MST word ACGL.

For the indicated subfunctions, CPUMTR performs the corresponding MST/TRT manipulations.

Subfunction	Manipulation
0-13	Read entire TRT and words 0, 1, and 2 of MST from ECS.
14-17	Write entire local area to ECS.
21	Write entire TRT and first three words of MST to ECS.

PP hung can result from the following occurrences.

- Track is not reserved (CTFS, STIS, CTIS, SPFS, CPFS, IIQS).
- Track is not interlocked (CTIS).
- Track is not preserved (CPFS).
- Track is not flawed (CTFS).
- Track information is nonzero (STFS).

60 Update Accounting and Drop PP — UADM

Request: OR 0060 wwww dddd 0000 0000

MB+0 opop aaaa bbrr 00ii iiii

MB+1 opop aaaa bbrr 00ii iiii

.
.
.

MB+5 opop aaaa bbrr 00ii iiii

wwww Word count of options in MB+0 through MB+5.

dddd Drop PP flag:

0 Drop PP.
1 Do not drop PP.

opop	Options:
	00 Increment low core register.
	02 Increment low core register by one.
	04 Decrement low core register by one.
	06 Decrement low core register.
	10_8 Increment control point register.
	12_8 Increment control point register by one.
	14_8 Decrement control point register by one.
	16_8 Decrement control point register.
	20_8 Increment control point accounting register and perform input/output SRU calculation.
	30_8 Increment control point accounting register and perform application accounting SRU calculation.
	40_8 Set control point register to value iiiiii.
aaaa	Word address of the register (must be within the range of addresses 10_8 through 130_8).
bb	Low order bit address of the field to increment or decrement (0 through 59).
rr	Width of the register (1 through 59 bits).
iiiiii	18-bit signed value of an increment (If the operation is a decrement and the value is negative, the operation is an increment; a similar situation applies for increments).

Reply: OR 0000 eeee 0000 0000 0000

MB Unchanged.

eeee	Error indication underflow on the register increment or decrement. (Bit 0 set indicates the operation at MB+0 was in error, bit 1 set indicates MB+1 and so on.)

PP hung occurs for any of the following conditions.

- Too many requests.
- If control point update and address not between STSW and CSBW.
- If low core update and address is greater than or equal to CRTL.
- Illegal subfunction.
- Request count is zero, and drop PP option was not selected.

61 Search Peripheral Library — SPLM

Request: OR 0061 **** **nn nnnn ****

nnnnnn	PP package name.

Reply: OR 0000 00dd tttt ssss aaaa (PLD)

OR 0000 01pp pppp *llll* aaaa (RPL)

OR 0000 02nn nnnn *llll* aaaa (SFP)

dd	Alternate or system equipment number.
tttt	Track.
ssss	Sector.
aaaa	Load address.
pppppp	Program address.
llll	Program length.
nnnnnn	SFP package address.

PP hung occurs when a 6xx or 7xx program is not found.

62 Job Advancement Control — JACM

Request: OR 0062 000s **** **** ****

s	0	Clear job advancement flag.
	1	Clear job advancement flag and control point area words associated with releasing control point.
	2, 3	Same as for 0 and 1, respectively, except that PPU is dropped.
	4	If no activity, or if CPU activity and/or PPU in recall plus rollout flags are set, then set job advancement flag, drop CPU, and call 1AJ to advance the job.

Reply: OR 0000 0000 0000 0000 0000

63 Delink Tracks — DLKM

Request: OR 0063 00eq ffff nnnn ℓℓℓℓ

eq	Equipment number.
	If bit 11 of the equipment byte is set (40eq), then the checkpoint bit for this device is set upon completion of the function.
ffff	Track onto which nnnn is linked (bit 11 of ffff must be clear).
nnnn	Track to be linked to ffff.
ℓℓℓℓ	Last track in chain to drop.

Reply: OR 0000 0000 0000 0000 0000

64 Transfer Data To/From Job-From/To Message Buffer — TDAM

Request: OR 0064 000r qqqq wwaa aaaa

r	0	Read.
	1	Write.
	2	Set completion bit specified at aaaaaa.
qqqq		Queue priority of job.
ww		Number of words to transfer.
aa...a		If zero, use subsystem receiving buffer pointer at RA.SSC; if nonzero, specifies relative address of receiving buffer.

MB Up to six words of data to be sent or to be read from job.

Reply: OR 0000 000s 0000 0000 0000

s	0	Operation complete.
	1	Move in progress.
	2	Not ready for data.
	3	Reject (write request to nonzero first word).
	4	Inactive.

65 Tape I/O Processor — TIOM

Request: OR 0065 uuuu iiii mmcc cccc

uuuu	MAGNET unit descriptor table address to be cleared.
iiii	1/t, 11/accounting increment. t=0 for blocks read. t=1 for blocks written.
mm	Accounting multipliers.
cc...c	FET completion code.

MB 0000 0000 0000 0000 0000

Reply: OR 0000 ssss uuuu uuuu uuuu

ssss	0	Operation complete.
	1	Function must be reissued, but uu...u must not be reset on reissue.
uu...u		Unchanged.

66 Request Limit — RLMM

Request: OR 0066 ssss 0000 00vv vvvv

ssss Subfunction code:

0	Clear overflow flags (RLCO).
1	Increment time limit (RLIT).
2	Increment SRU limit (RLIS).
3	Start job step (RLJS).
4	Set time limit (RLTL).
5	Set SRU limit (RLSL).

vvvvvv Value of increment or limit requested.

Reply: OR 0000 0000 0000 0000 ffff

ffff Flags depending on subfunction:

Subfunction	ffff
0	Bits 11-7, zero; 6-0 specify overflow flags in SRUW before clearing bits 47-41.
1, 2	Error flag (zero if no errors).
3, 4, 5	Zero.

A PP hung condition occurs if an illegal subfunction code is encountered.

67 Load Central Program — LCEM

Request: OR 0067 00aa aaaa pppp pppp

aa...a User-specified load address.

pp...p Program location:

- If ECS resident, pp...p is tttt ssss:

  tttt Track.
  ssss Sector.

- If CM resident, pp...p is 00cc cccc:

  cc...c CM address.

Reply: OR 0000 00ff ffff 00ℓℓ ℓℓℓℓ (normal)

ff...f First word address of load.

ℓℓ...ℓ Last word address of load.

OR 0000 7777 eeee 00aa aaaa (error)

eeee Error flag.

aa...a Address in error:

eeee=0	ECS read error.
eeee≠0, aa...a≠0	Illegal load address.
eeee≠0, aa...a=0	Insufficient field length.

70 Clear Storage — CSTM

Request: OR 0070 rrww wwww 00aa aaaa

rr=0 Address(es) absolute.

rr=1 Address(es) relative to RA.

rr=2 If clearing ECS and address is absolute.

rr=3 If clearing ECS and address is relative to control point.

NOTE

When clearing ECS, word count is the number of 1000_8 word blocks, and the FWA is divided by 1000_8.

rr=4 Set CPA FNT interlock (ECSW word bit 47) and clear FNT/FST entry (absolute CM).

ww...w Word count.

aa...a First word address (if zero, MB contains list of addresses and word count terminated by a zero word).

MB+i 0000 00ww wwww 00aa aaaa

MB+n 0000 0000 0000 0000 0000

ww...w Word count for area i (i=0 to n-1).

aa...a FWA for area i.

Reply: OR 0000 0000 0000 0000 0000

71 Checksum Specified Area — CKSM

Request: OR 0071 00ff ffff 00ℓℓ ℓℓℓℓ

ffffff — Absolute first word address of checksum area.

ℓℓ...ℓ — Absolute last word address + 1 of checksum area.

MB Checksum compare value.

Reply: OR 0000 0000 0000 0000 ssss

ssss — Status:

- 0 Calculated checksum equals specified checksum.
- ≠0 Calculated checksum does not equal specified checksum.

MB Calculated checksum.

72 Load Disk Address — LDAM

CPUMTR selects the correct algorithm to use for disk address conversion based on the algorithm index contained in the MST of the equipment being processed.

Request: OR 0072 **** **** **** ****

MB **** 00eq ltlt lsls ****

eq	Equipment.
ltlt	Logical track.
lsls	Logical sector.

Reply: OR 0000 0000 0000 ffff rsrs

MB **** 00eq ltlt lsls ****

MB+1 001u pupu pcpc ptpt psps

MB+2 0000 0000 0000 0000 0000

ffff	Status flags:	
	0004	Storage move request or multi-unit device.
	0110	Request channel if not reserved.
	7000+ EC	Error detected. EC=NRDE if redefinition. EC=ADDE if address error.
rsrs	Remaining sector count for lulu (used internally by driver).	
eq	Equipment.	
ltlt	Logical track.	
lsls	Logical sector.	
lu	Control point address + logical unit.	
pupu	Physical unit	
pcpc	Physical cylinder.	
ptpt	Physical track.	
psps	Physical sector.	

PP hung occurs if illegal algorithm index in MST.

73 Validate Mass Storage — VMSM

Request: OR 0073 00eq tttt ssss ****

- eq — EST ordinal of device to process.
- tttt — Track.
- ssss — Subfunction:
  - 00 — Obtain device interlock and validate mass storage tables (VEIS).
  - 01 — Validate mass storage tables (VEQS).
  - 02 — Verify track chain beginning with track tttt (VTCS).

Reply: OR 0000 00st **** **** ****

- st — Status:
  - 00 — No error.
  - 01 — Track count error.
  - 02 — PF count error.
  - 04 — Error in permits chain.
  - 10 — Error in catalog chain.
  - 20 — Error in indirect chain.

74 PP I/O Via CPUMTR — PIOM

Request: OR 0074 **** **** 00fn baba

MB 00t4 00t5 t6t6 t7t7 ****

- fn — Subfunction code as defined in COMSCPS.
  - 0 — Request ECS buffer (REBS).
  - 1 — Read sector (RESS)
  - 2 — Write sector (WESS).
- baba — Relative buffer address in PP I/O buffers.
- t4-t7 — PP direct cells.

Reply: OR 0000 ecec 0000 0000 baba

- ecec — Error code. (7777=ECS error.)

CPU FUNCTION REQUESTS

The CPU issues the following requests to the system as needed. These requests are processed directly by CPUMTR.

ABT — ABORT CONTROL POINT

Request: AB T00 0000 0000 0000

CPM — RESIDENT CPM FUNCTIONS

Request: CP M00 ffff 00pp pppp

ffff Function number.

pp...p Parameter.

END — TERMINATE CURRENT CPU PROGRAM

Request: EN D00 0000 0000 0000

LDR — REQUEST OVERLAY LOAD

Request: LD R00 0000 00aa aaaa

aaaaaa Specifies address of parameters for overlay load.

LDV — REQUEST LOADER ACTION

Request: LD V00 0000 0000 0000

Request: LD V00 0000 00aa aaaa

aaaaaa Specifies address of parameters for overlay load.

LOD — REQUEST AUTOLOAD OF RELOCATABLE FILE, FILE NAME IN (64_8)

Request: LO D00 0000 0000 0000

MEM — REQUEST MEMORY

Request: ME M00 tttt ttaa aaaa

tttttt Type of request:

0	CM (abort if not available).
1	ECS (abort if not available).
2	CM (do not abort if not available).
3	ECS (do not abort if not available).

aaaaaa Address of request word.

Request word: vvvv vvvv vv** **** **bb

vv...v Value of FL request. If zero, return current field length. If negative (-1), return maximum field length. For other values:

Type	Value	Description
CM	> 0	Lower 17 bits indicate FL; bit 18 is no-reduce override.
ECS	> 0	ECS FL.
ECS	- 0	Release all ECS FL.

bb Status bits 00r c0x:

r	Clear CMM status.
c	Indicates CMM type request.
x	Completion bit.

Response: ffff ffff ff00 0000 0001

ff...f Field length or maximum FL.

A monitor call error can occur for the following.

- Illegal address.
- Clear CMM status with r=1 and c=0.
- Clear CMM status with r=1 and c=1 and CMM job step status not set.

A CMM error is issued by 1MA if job step CMM status is set and a memory change request is issued that does not have the c bit set.

MSG — SEND MESSAGE TO SYSTEM

Request: MS Gr0 aaaa 00ff ffff

r	Recall (if desired).
aaaa	Message option.
0	System dayfile.
1	Console line 1.
2	Console line 2.
3	Job dayfile.
4	Error log (system origin or SSJ= only).
5	Account log (SSJ= only).
6	System dayfile. †
7	Job dayfile. †
ffffff	Address of message.

PFL — SET (P) AND CHANGE FIELD LENGTH

Request: PF L00 pppp ppff ffff

pppppp	New (P).
ffffff	New FL.

† Provided for compatibility with NOS/BE.

RCL — PLACE PROGRAM ON RECALL

If the programmer desires recall until system recall delay has expired:

Request: RC L00 0000 0000 0000

If the programmer desires recall until bit 0 is set:

Request: RC L20 0000 00aa aaaa

aaaaaa	Program is placed on recall until bit 0 of aaaaaa is set.

RFL — REQUEST FIELD LENGTH

Request: RF L00 aaaa aanf ffff

aaaaaa	Address of status response.
n	No-reduce override.
ff...f	Field length; if ff...f=0, current field length is returned.

Reply: 0000 ffff ff00 0000 0001

ff...f	Field length.

RSB — READ SUBSYSTEM PROGRAM BLOCK

Request: RS Br0 00qq qqss ssss

r	1	Auto recall selected.
qqqq		Subsystem queue priority; if qqqq=0, block is read from absolute core memory or relative to caller's control point area.
ss...s		Address of status word in format.

Status word: 0000 wwww aaaa aabb bbbb

wwww	Number of words to be read.

aa...a Address to read from in subsystem, low core, or control point area. If address is in subsystem, data must be within field length. If address is in low core, data must be within size of CMR. If address is in control point area, data must be within bounds of control point area.

bb...b Address of buffer to receive data. [If (bb...b) < 0, read is from absolute memory; if (bb...b) ≥ 0, read is relative to caller's control point area].

Reply: rrrr wwww aaaa aabb bbbb

rrrr
- 4000 Transfer is successfully completed.
- 2000 Subsystem is not present.

wwww Number of words to be read.

aa...a Address to read from in subsystem.

bb...b Address of buffer to receive data.

SIC — SEND INTERCONTROL POINT BLOCK TO SUBSYSTEM PROGRAM

Request: SI Cr0 bbbb bbss ssss

r
- 1 Auto recall selected.

bb...b Address of buffer to be transferred to subsystem.

ss...s Address of status word in format.

Status word: nnnn nnqq q00 0000 0000

nn...n Buffer number of subsystem for transfer.

qqqq Destination subsystem queue priority.

Reply: nnnn nnqq qqrr rrrr rrrr

nn...n Buffer number of subsystem for transfer.

qqqq Destination subsystem queue priority.

rr...r
- 1 Transfer completed successfully.
- 3 Destination subsystem is not present in the system.
- 5 Subsystem buffer is full, subsystem is being moved, or subsystem job is advancing.
- 7 Block length as specified in first word is larger than that permitted by the subsystem.
- 11 Destination buffer is undefined by subsystem.

SPC — PROCESS SPECIAL REQUEST

This function can process special PP requests from any subsystem with queue priority of MXPS+1 or above. It provides the following capabilities.

- PP programs with names starting with 1 (such as 1TA) can be called.
- If no PP is available, control is returned to the running program.

Request: SP C00 0000 00aa aaaa

aa...a Address of PP request.

Reply: aa...a is not cleared if no PP is available.

TIM — REQUEST SYSTEM TIME

Request: TI M00 rrrr 00ff ffff

rrrr	Function number.
ff...f	Address for response.

For rrrr=0, the system replies with the accumulated CPU time as follows:

Reply: 2sss ssss ssss ssss mmmm

ss...s	Seconds.
mmmm	Milliseconds.

For rrrr=1, the system replies with the current date in display code format as follows:

Reply: byy.mm.dd

b	Blank character.
yy	Year minus 1900.
mm	Month.
dd	Day.

For rrrr=2, the system replies with the current time of day in display format as follows:

Reply: bhh.mm.ss.

b	Blank character.
hh	Hours (00 to 23).
mm	Minutes.
ss	Seconds.

For rrrr=3, the system replies with the current Julian date as follows:

Reply: 0000 0000 00yy yydd dddd

yyyy	Year minus 1900 in display code.
dddddd	Day (001 to 365) in display code.

For rrrr=4, the system replies with the real time in the following format:

Reply: 0000 0000 ssss ssss ssss

ss...s	Seconds * 4096.

For rrrr=5, the system replies with the elapsed time since deadstart as follows:

Reply: ssss ssss mmmm mmmm mmmm

ss...s	Seconds.
mm...m	Milliseconds.

For rrrr=6, the system replies with the current date and time in binary packed format as follows:

Reply: 0000 0000 yymo ddhh mmss

yy	Year minus 1970.
mo	Month.
dd	Day.
hh	Hours.
mm	Minutes.
ss	Seconds.

For rrrr=7, the system replies with the accumulated SRUs as follows:

Reply: 0000 0000 uuuu uuuu uuuu

uu...u	SRUs in milliunits.

For rrrr=11_8, the system replies with the number of CPU clock cycles used by the job (CDC CYBER 176 only) as follows:

Reply: 2000 cccc cccc cccc cccc

cc...c	CDC CYBER 176 CPU clock cycles.

If the request is made on a system other than CDC CYBER 176, the system replies as follows:

Reply: 6000 0000 0000 0000 0000

For rrrr=12_8, the system replies with the number of CPU clock cycles since deadstart (CDC CYBER 176 only) as follows:

Reply: 2000 cccc cccc cccc cccc

cc...c	CDC CYBER 176 CPU clock cycles.

If the request is made on a system other than CDC CYBER 176, the system replies as follows:

Reply: 6000 0000 0000 0000 0000

XJP — INITIATE SUBCONTROL POINT

Request: XJ P00 tttt ttaa aaaa

tttttt — CPU time limit (in milliseconds) for subcontrol point.

aaaaaa — Address of subcontrol point exchange package.

Reply:	Register	Bits	Contents
	X2	59-0	Quarternano units† of CPU time used by caller before control was given to subcontrol point.
	X6	59-48	2000_8 + ef. ef Error flag set by control point.
	X7	59-0	Quarternano units† of CPU time used by subcontrol point.

XJR — PROCESS EXCHANGE JUMP REQUEST

Request: XJ R00 ffff 00aa aaaa

ffff — Function code.

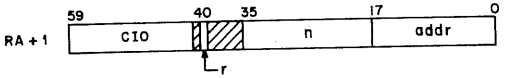
- 0 Start job with exchange package at aaaaaa.
- 1 Save current exchange package at aaaaaa.

aaaaaa — Address of exchange package.

†Quarternano units = $(1/4 \times 10^{-9})$ CPU multiplier.

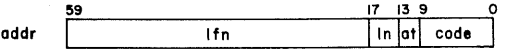
CIO - COMBINED INPUT/OUTPUT

Call:



r	Auto recall, if desired.
n	Count for skip operations.
addr	Address of the FET.

FET Format:



lfn — Logical file name.

ln — Level number ($0 \leq ln \leq 17_8$) for an EOR/EOF operation on the file (bits 17 through 14):

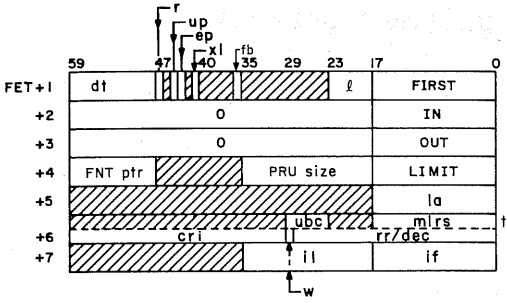
0	EOR operation.
$1\text{-}16_8$	Same as level 0.
17_8	EOF operation.

at — Status information returned by CIO (bits 13 through 10):

01	End of reel/end of device (bit 10).
02	Parity error (bit 11).
11_8	Other error (applies only to mass storage files; refer to FET+6, dec field).

code — Request/return code (bits 9 through 0):

Bit	Description
9	EOI bit.
4-3	Binary 10 if EOR; binary 11 if EOF.
1	0 if coded file; 1 if binary file.
0	Completion bit (set when operation is complete).



dt	Device type.
r	Random processing bit (bit 47). (This bit is set if random processing will be performed on the mass storage file; r is checked only if $\ell \neq 0$.)
up	User processing bit (bit 45). (This bit is set if the user processes magnetic tape end-of-reel conditions; up is checked only if $\ell \neq 0$.)
ep	Error processing bit (bit 44). (This bit is set if the user processes errors; for disk files, ep is checked only if $\ell \geq 2$.)
xl	Extended label processing (bit 41). (xl is 0 for standard label processing and 1 for extended label processing.)
fb	File flush bit (bit 36).
ℓ	FET length-5.
FIRST	First address of buffer.
IN	Next input address.
OUT	Next output address.
LIMIT	Limit address of buffer.
la	Address of a list of random addresses used with READLS or RPHRLS mass storage operations.

† These fields apply only to S and L format tapes.

ubc — Unused bit count for S and L format tapes.

mlrs — Maximum logical record size for S and L format tapes.

cri — Current random index (for mass storage files only).

w — Random rewrite request (for mass storage files only).

rr/dec

rr — Random request (for mass storage files only).

If rr ≠ 0, and the request is a read request, rr is the random index.

If rr ≠ 0, w=0, and the request is a write request, rr is the address for return of random index (the write operation is at the current position).

If rr ≠ 0, w=1, and the request is a write request, rr is the random index.

dec — Detail error return code (for mass storage files only):

Code	Type of Error
x001	Parity error.
x002	Address error.
x003	Device status error.
x004	6681 function reject or function code issued to mass storage device timed out with no response.
x005	Device reserved.
x006	Device not ready.
4007	Track limit (device full).

After an error, the file is positioned at the erroneous PRU. If the operation was a read and the system has verified that the proper PRU was read (although it probably contains incorrect data), then x in the code is 0 and the data is placed in the buffer; otherwise, x is 4. If the file is random, the current random index is set as usual.

il — Length of random index area (for mass storage files only).

if — First-word address of random index area (for mass storage files only).

OPEN Functions

Code	Name	Description
100	READNR	Read, no rewind.
104	WRITENR	Write, no rewind.
120	NR	No rewind.
120	ALTERNR	Alter, no rewind.
140	READ	Read and rewind.
144	WRITE	Write and rewind.
160	ALTER	Alter and rewind.
300	REELNR	Read reel, no rewind.
340	REEL	Read reel and rewind.

CLOSE Functions

Code	Name	Description
130	NR	No rewind.
150	REWIND	Rewind.
170	UNLOAD	Rewind and unload.
174-	RETURN	Rewind (decrement scheduled tape units).
330	NR	No rewind.
350	REWIND	Rewind.
370	UNLOAD	Rewind and unload.

CLOSER Functions

Code	Name	Description
330	NR	No rewind.
350	default	Rewind.
370	UNLOAD	Rewind and unload.

Read and Write Functions

Code	Name	Description
000	RPHR	Reads physical record.
004	WPHR	Writes physical record.
010	READ	Buffer read.
014	WRITE	Buffer write.
020	READSKP	Reads skip.
024	WRITER	Writes end of record.
034	WRITEF	Writes end of file.
200	READCW	Nonstop read of PRUs bounded by control words.
204	WRITECW	Nonstop write of PRUs bounded by control words.
210	READLS	Reads nonstop with list (mass storage only).
214	REWRITE	Buffer rewrite in place (mass storage only).
224	REWRITER	End-of-record rewrite in place (mass storage only).
230	RPHRLS	Reads PRUs with list (mass storage only).
234	REWRITEF	End-of-file rewrite in place (mass storage only).
250	READNS	Reads nonstop until buffer is full or EOF or EOI.
260	READN	Reads data from an S or L formatted tape. Reads until buffer full or EOF or EOI.
264	WRITEN	Writes nonstop on S or L formatted tape.
600	READEI	Reads information until buffer full or EOI.

File Positioning Functions

Code	Name	Description
040	BKSP	Backspaces file one logical record.
044	BKSPRU	Backspaces user-specified number of PRUs.
050	REWIND	Rewinds file.
060	UNLOAD	Rewinds and unloads file (if mass storage file, same as RETURN).
070	RETURN	Releases file space and releases file from job control.
110	POSMF	Positions multifile tape set to member of set.
114	EVICT	Releases file space.
240	SKIPF	Skips forward user-specified number of records or files.
240	SKIPFF	Skips forward user-specified number of records or files.
240	SKIPEI	Positions file at EOI.
640	SKIPB	Backspaces file user-specified number of records.
640	SKIPFB	Backspaces file user-specified number of files.

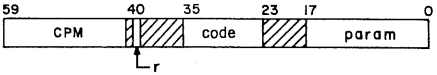
Data Transfer Macros

Name	Function
READC	Reads coded line from I/O buffer to working buffer.
WRITEC	Writes coded line from working buffer to I/O buffer.
READH	Reads coded line with space fill from I/O buffer to working buffer.
WRITEH	Writes coded line, deleting all trailing spaces from working buffer to I/O buffer.
READO	Reads one word from I/O buffer to X6.
WRITEO	Writes one word from X6 to I/O buffer.

Name	Function
READS	Reads line image to character buffer.
WRITES	Writes line image from character buffer.
READW	Fills working buffer from I/O buffer.
WRITEW	Writes data from working buffer to I/O buffer.

CPM - CONTROL POINT MANAGER

Call:



r Auto recall bit (must be set).

code CPM function code.

param Parameter for the function.

Functions

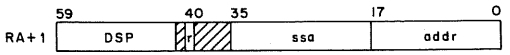
Code	Name	Description
000	SETQP	Sets job queue priority.
001	SETPR	Sets job CPU priority.
002	MODE	Sets exit mode flags.
003	SETASL	Sets account block SRU limit.
	SETJSL	Sets job step SRU limit.
	SETTL	Sets CPU time limit for job step.
004	EREXIT	Sets error exit address; when job aborts, control is returned to this address.
005	CONSOLE	Transfers information to/ from console.
006	ROLLOUT	Rolls out job.
007	NOEXIT	Suppresses processing of EXIT statement if job aborts.
010	SETSSM	Sets secure system memory.
011	ONSW	Sets sense switches for user job.

Code	Name	Description
012	OFFSW	Clears sense switches.
013	GETJN	Gets job name.
014	GETQP	Gets job queue priority.
015	GETPR	Gets job CPU priority.
016	GETEM	Gets exit mode control.
017	GETASL	Gets account block SRU limit.
	GETJSL	Gets job step SRU limit.
	GETTL	Gets job step time limit.
020	---	Sets demand file random index (SSJ= only).
021	SETUI	Sets user index (SYOT only).
022	SETLC	Sets first loader control word.
023	SETRFL	Sets initial field length for job step.
024	GETJCR	Gets last error flag and job control registers.
025	SETJCR	Sets job control registers.
026	SETSS	Sets subsystem (TXOT only).
027	GETJO	Gets job origin code.
030	GETJA	Gets job accounting information.
031	USECPU	Specifies CPU to be used.
032	USERNUM	Returns user number.
033	GETFLC	Reads CM FL control word.
034	EESET	Enters event in system event table (SYOT only).
035	PACKNAM	Writes default pack name in control point area.
036	PACKNAM	Gets pack name from control point area.
037	GETSS	Gets subsystem (TXOT only).
040	VALID	Validates user number (SSJ= only).
041	FAMILY	Enters family name (SYOT only).

Code	Name	Description
042	---	Special CHARGE functions (SSJ= only).
043	DISSJ	Disables SSJ (SSJ= only).
044	VERSION	Returns version name.
045	GETLC	Gets first loader control word.
046	GETGLS	Gets global library set.
047	SETGLS	Sets global library set.
050	MACHID	Returns 2-character machine ID.
051	GETACT	Returns job activity information.
052	SETMFL	Sets job step maximum field length boundary.
053	DISSR	Disables SRU accumulation (SSJ= only).
	RENSR	Enables SRU accumulation (SSJ= only).
054	---	Sets job class (SYOT only).
055	GETFLC	Reads ECS FL control word.
056	---	Validates user (SYOT only).
057	GETPFP	Reads permanent file parameters.
060	SETPFP	Sets permanent file parameters (SYOT only).
061	GETLOF	Reads list of files address.
062	SETLOF	Sets list of files address.
063-072	Reserved	Reserved for CPUMTR.
073	---	Decrements family user count (SYOT only).
074	GETJCI	Reads job control information.
	SETJCI	Sets job control information.
075	PROTECT	Sets/clears ECS FL preservation over job steps and/or user file privacy.
076	SETOV	Sets/clears override flag (SSJ= only).
077	---	Initiates application program accounting.

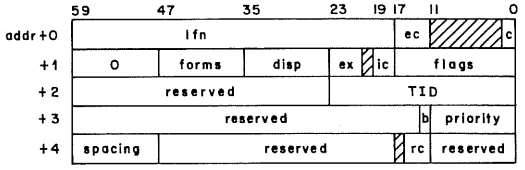
DSP - DISPOSE PROCESSOR

Call:



r	Auto recall bit (must be set).
ssa	System sector address (SSJ= only and SYOT only).
addr	First word address of parameter block.

The user must define the following parameter block before issuing the DSP call or ROUTE macro.



lfn	Local file name of file to be routed.
ec	Error code.
c	Completion bit.

forms Forms code/input flags:

Bits	Description
47-46	Unused.
45	Do not protect input file.
44	Reserved.
43	Send file to input queue even if job statement error.
42-36	Reserved.

disp Disposition code:

Code	Description
IN	Release file to input queue.
LP	Print on any printer.
LR	Print on 580-12 printer.
LS	Print on 580-16 printer.
LT	Print on 580-20 printer.
PB	Punch system binary.
PH	Punch coded.
PL	Plotter.
PR	Same as LP.
PU	Same as PH.
P8	Punch 80-column binary.
SB	Same as PB.
SC	Rescind prior routing, change file to LOFT.

ex External characteristics:

Value	Print File	Punch File
0	(default)	(default)
1	Unused	SB
2	A4†	80COL
3	B4†	Unused
4	B6	O26
5	A6	O29
6	A9	Unused
7	Reserved	Reserved

ic Internal characteristics:

Value	Description
0	Display code
1	ASCII code
2	Binary
3	Reserved

†Not supported. Provided for NOS/BE compatibility.

flags — Each bit indicates a parameter is specified:

Bit	Description
17	File name assigned by system is returned to addr+0, bits 59-18.
16	Unused.
15	Spacing code.
14	Repeat count.
13	Reserved.
12	No dayfile message, return error code to addr+0, bits 17-12.
11	Reserved.
10	Forms code.
9	Priority.
8	Internal characteristics.
7	External characteristics.
6-5	Reserved.
4	Disposition code.
3	Reserved.
2	TID.
1	Route to central site.
0	End-of-job (deferred route).

TID — For routing to remote batch queue, contains the complement of the address of a two-word block specifying family name and user number. For routing to local batch queue, contains an ID code.

b — Set if priority specified.

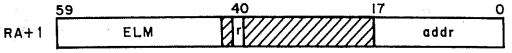
priority — Specifies priority for output files if greater than 7760_8.

spacing — Spacing code.

rc — Repeat count.

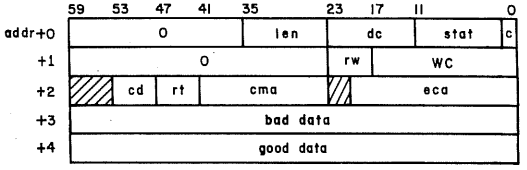
ELM — ERROR LOG MESSAGE PROCESSOR

Call:



r	Auto recall bit.
addr	Address of parameter block for call.

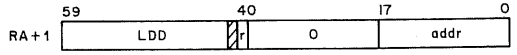
The 5-word parameter block must be defined as follows:



len	Length of error block.
dc	Device code (EC=ECS).
stat	Status: 1 Dayfile message limit.
c	Completion bit.
rw	Read/write flag: 1 Read. 2 Write.
wc	Word count of block transfer.
cd	Recovery conditions: 0 Block reread recovered. 1 Single word reads recovered. 2 Data not recovered.
rt	Retry count.
cma	CM address of transfer.
eca	ECS address of transfer.

LDD — LOAD FAST DYNAMIC LOAD DIRECTORIES

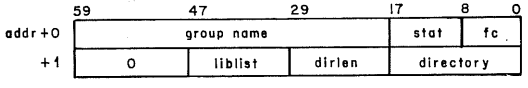
Call (LOADD macro or RA+1):



r — Auto recall bit.

addr — Address of parameter block.

The parameter block consists of two words in the following format.



group name — Name of group of capsules or CCL procedures.

stat — Status of call:

Value	Description
0	Function complete without error.
1	Illegal function code.
2	Bad directory address or length.
3	Bad liblist address or length.
1x	Unknown liblist entry or file nonmass storage.
2x	Directory space too small.

fc — Function code (bit zero set upon completion):

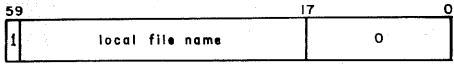
Value	Description
0	Specifies capsule (CAP).
404_8	Specifies procedure (PROC).

liblist — Address of list of libraries to be searched after global library set.

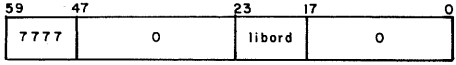
dirlen — Length of area to receive generated directory.

directory — Address of area to receive generated directory.

The generated directory has one of the following formats. For a local file library the format is:

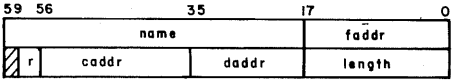


For a system library the format is:



libord — The library ordinal of the library containing the capsule or procedure.

For each capsule or procedure found that belongs to the given group, LDD makes the following entry in the directory.



faddr — Address, relative to the beginning of the directory, of the word containing the file entry associated with this capsule or procedure.

r — Residence of capsule or procedure:

0	Mass storage.
1	Mass storage and CM.
2	Mass storage and ECS.

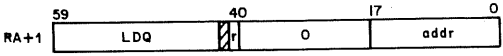
caddr — CM or ECS address of capsule or procedure.

daddr — Disk address (relative PRU) of capsule or procedure.

length — Length of the capsule or procedure, including header, code image, and relocation and linking information, but excluding the prefix table.

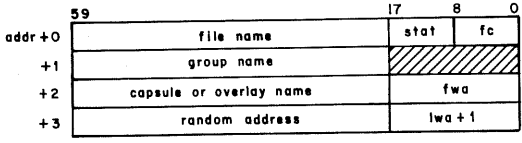
LDQ — LOAD QUICKLY

Call (LOADQ macro or RA+1):



r	Auto recall bit.
addr	Address of parameter block.

The 4-word parameter block must be defined as follows:



file name	Name of file containing capsule or overlay.
stat	Status of LDQ call (ignored during request). Upon completion of call, stat is set to one of the following values.

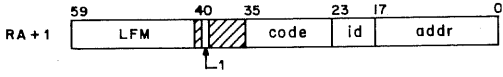
Value	Description
0	Function completed without error.
1	Illegal function code.
2	Bad address (must have fwa $\leq$ lwa+1 $\leq$ field length).
3	Nonexistent file or file not on mass storage.
4	Bad disk address (out of file bounds).
5	Capsule or overlay not found at specified location.
6	Insufficient space provided for capsule or overlay.

If either errors 5 or 6 occur, the contents of the loadable area are undefined.

fc	Function code: 0 Load capsule. 2 Load overlay. LDQ sets bit zero to one when the request is complete.
group name	Name of capsule group; zero for overlay load.
capsule or overlay name	Name of desired capsule or overlay.
fwa	First word address of the area into which the capsule or overlay is to be read.
random address	Location of capsule or overlay on specified file.
lwa+1	Last word address plus 1 of area for capsule or overlay.

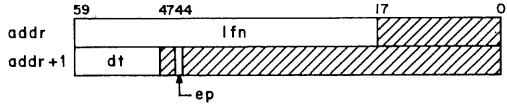
LFM - LOCAL FILE MANAGER

Call:



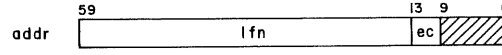
code	Function code.
id	File id number (refer to SETID, function code 017).
addr	Address of the FET.

FET format:



lfn	File name.
dt	Device type.
ep	Error processing bit (bit 44).

After the request is completed, the first word of the FET contains the following information.



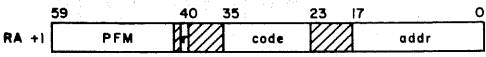
ec	Error code.

Functions

Code	Name	Description
000	RENAME	Renames local file.
001	ASSIGN	Accesses library file.
002	COMMON	Changes file type to library.
004-7, 016, 030	RELEASE	Releases file to user-specified output queue.
010	LOCK	Sets write lockout bit for file.
011	UNLOCK	Clears write lockout bit for file.
012	STATUS	Obtains last status of file.
013	STATUS	Returns current position and status of file.
014	REQUEST	Requests operator assignment of equipment to file.
015	REQUEST	Assigns file to user-specified equipment.
017	SETID	Sets identifier code for file.
020	ASSIGN	Accesses library file.
021	ACCSF	Attaches control statement file as read-only file (SSJ= only).
022	ENCSF	Replaces the control statement file.
023	PSCSF	Positions control statement file.
024	LABEL	Assigns file to tape and processes tape.
025	GETFNT	Generates table of FNT/FST entries for all local files.
026	---	Requests tape assignment (SSJ= only).
027	---	Enters VSN file entry (SSJ= only).
031	PRIMARY	Changes primary file.
032	FILINFO	Returns information about a file.

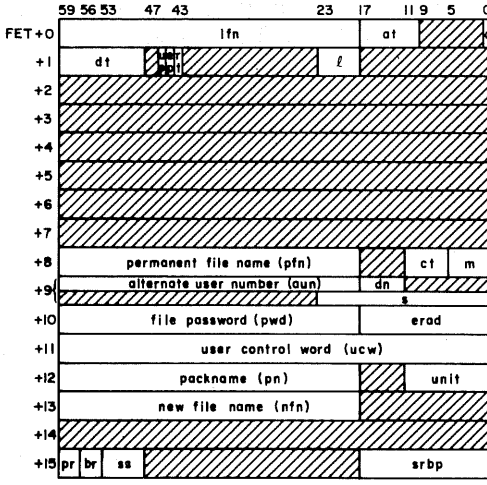
PFM - PERMANENT FILE MANAGER

Call:



r	Auto recall bit (must be set).
code	Function code.
addr	Address of the FET.

FET format:

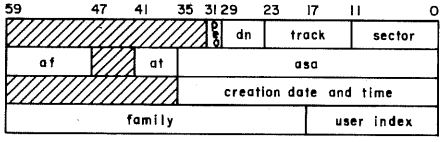


lfn	Local file name.
at	Abnormal termination code.
c	Bit 0 is set to 1 upon completion of request.
dt	Device type.

†If alternate user number is not specified in a macro call, word 9 of the FET contains the name of the alternate catalog.

up	User processing bit (bit 45).
ep	Error processing bit (bit 44).
rt	Real-time parameter bit (bit 43).
ℓ	FET length minus 5.
pfn	Permanent file name.
ct	File category.
m	File access mode.
un	Alternate user number.
dn	Device number for CATLIST option.
s	Number of PRUs desired.
pwd	Optional file password.
erad	Error message return address.
ucw	User control word.
pn	Pack name of auxiliary device.
unit	Number of units.
nfn	New file name.
ss	Subsystem.
pr	Preferred residence for file.
br	Backup requirement for file.
srbp	Special request block pointer.

Special request block format:



peo	PFC entry ordinal (ordinal of PFC entry within catalog sector).
dn	Device number for master device.
track + sector	Disk address of catalog entry for file.
af	Alternate storage status flags (for SETAF).
at + asa	Alternate storage type and alternate storage address for file.

creation date and time	Packed date and time file was created.
family	Family to which file belongs.
user index	User index under which file is saved.

Functions

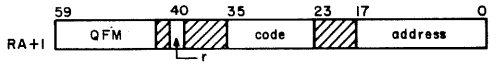
Code	Name	Description
001, CCSV	SAVE	Saves copy of temporary file as indrect access permanent file.
002, CCGT	GET	Generates temporary copy of indirect access permanent file.
003, CCPG	PURGE	Removes file from permanent file system.
004, CCCT	CATLIST	Provides catalog information.
005, CCPM	PERMIT	Grants permission to alternate user to access private file.
006, CCRP	REPLACE	Purges old file and saves new file as indirect access permanent file.
007, CCAP	APPEND	Appends contents of working files to indirect access permanent file.
010, CCDF	DEFINE	Specifies file as direct access permanent file.
011, CCAT	ATTACH	Attaches direct access permanent file to user's control point.
012, CCCG	CHANGE	Alters parameters associated with permanent file.
013, CCUA	ATTACH†	Attaches the specified direct access permanent file to the user's control point. The utility attach flag is set in the file's system sector.

†Special request; SYOT and SSJ= required for this function.

Code	Name	Description
014, CCSA	SETASA†	Sets alternate storage address into the catalog entry of the specified file.
015, CCAF	SETAF†	Sets alternate storage flags into the catalog entry of the specified file.
016, CCSD	SETDA†	Sets disk address of local file into the catalog entry of the specified permanent file. Permanent file may not already reside on disk. Local file must reside on appropriate permanent file device.
017, CCDD	DROPDS†	Drops all disk space associated with the specified file. File must have a valid copy on alternate storage.
020, CCAN	ASSIGNPF†	Assigns a local file to the appropriate direct access permanent file device for the specified family and user index.
021, CCOD	OLD	Generates a primary file type (PTFT) temporary copy of indirect access permanent file.

QFM-QUEUE FILE MANAGER

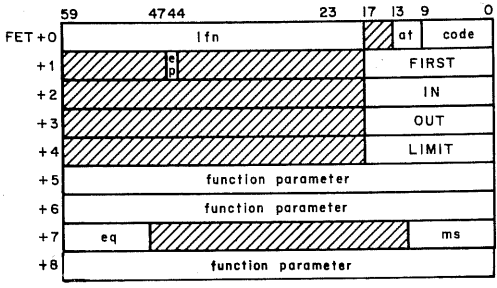
Call:



r	Auto recall bit (must be set).
code	Function code.
addr	Address of FET for the call.

†Special request; SYOT and SSJ= required for this function.

FET format:



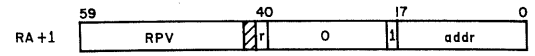
lfn	File name.
at	Abnormal termination code.
code	Completion code.
ep	Error processing bit.
eq	Equipment number.
ms	Mass storage error code.

Functions

Code	Name	Description
001	---	Attaches preserved file.
002	---	Detaches preserved file.
003	---	Purges preserved file.
004	---	Sets IQFT file.
005	---	Initializes IQFT file.
006	---	Requeues FNT/FST list.
007	---	Releases FNT/FST list.
010	---	Dequeues list.
015	RERUN	Sets rerun status.
016	NORERUN	Clears rerun status.
017	SUBMIT	Releases file to input queue.
020	---	Assigns file using MSAL control.

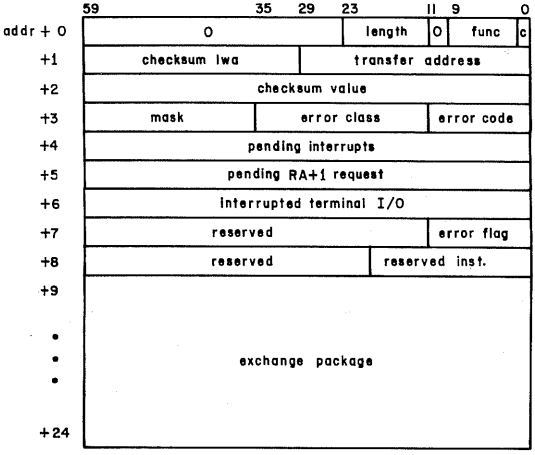
RPV — REPRIEVE PROCESSOR

Call:



r	Auto recall bit (must be set).
addr	First word address of the parameter block.

The format of the parameter block is as follows:



length	Length of the parameter block including the exchange package area (minimum of 25 words).
func	Function code: 1 Setup. 2 Program mode resume. 3 Reset. 4 Interrupt handler mode resume.
c	Completion bit.
checksum	End of area to be checksummed.
lwa	If 0, no checksum is desired.

transfer address — Address to which control is transferred when an interrupt is processed.

checksum value — Either set to the checksum of the indicated area when RPV is called or compared against the computed checksum (if checksum lwa is specified) when a reprievable error is processed.

mask — Mask bits to be set by call:

mask	Description
001	CPU error exit.
002	PP call error.
004	SRU limit.
010	Operator termination.
020	PP abort.
040	CPU abort.
100	Normal termination.
200	Terminal interrupt.

If the entire mask field is zero, all reprieve processing is cleared.

error class — Set to the value of the mask bit which intercepts the indicated error (that is, if error x is intercepted by mask bit n, bit n in the error class field is set).

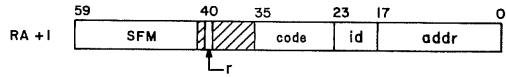
error code — Octal code indicating error encountered.

error code	Description
0	Normal termination.
1	Time limit.
2	CPU error exit.
3	PP abort.
4	CPU abort.
5	PP call error.
6	Operator drop.
7	Operator kill.
10	Operator rerun.
11	Control statement error.
12	ECS parity error.
15	Auto recall error.
16	Job hung in auto recall.
17	Mass storage limit.
20	PP program not in library.
21	I/O limits.
40	Terminal interrupt.

pending interrupts	Used to queue pending interrupts (that is, the nth error code sets bit n in this field).
interrupted terminal I/O	Contains interrupted input request if an interrupt occurs while a terminal input request is pending.
error flag	Value of the operating system error flag at the time of the interrupt (refer to Error Flags, section 3).
reserved inst.	This area is reserved for use by the installation.
exchange package	A copy of the exchange package at the time of the interrupt (unchanged from the executing package at the time of the error). This is the exchange package that is used when the interrupt handler is started.

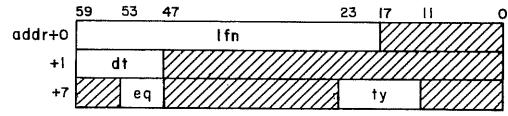
SFM - SYSTEM FILE MANAGER

Call:



r	Auto recall bit.
code	Function code.
id	File identification number.
addr	Address of the FET for the file.

FET format:



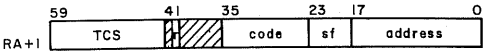
lfn	File name.
dt	Device type.
eq	Equipment number.
ty	Dayfile type: 1 System dayfile. 2 Account dayfile. 3 Error log dayfile.

Functions

Code	Name	Description
000	---	Terminates active dayfile (SSJ= only).
001-3, 005	DAYFILE	Accesses system, account, error log, and user dayfiles.
004	ESYF	Enters file attached to control point as a system file.
006	RDVT	Obtains device type.
007	---	Protects active dayfile (SSJ= only).
010	---	Clears dayfile byte (SSJ= only).
011	ENFA	Enters local fast attach file (SSJ= only).
012	DFAT	Deletes fast attach file (local or global, SSJ= only).
014	---	Attaches inactive dayfile.
015	ENFA	Enters global fast attach file (SSJ= only).
016	ENFA	Enters link global fast attach file (SSJ= only).
017	---	Changes (DM*) file to ROFT file type (SSJ= only).
020	GETDI	Retrieves device information sector from specified device (SSJ= only).
021	SETDI	Sets information in device information sector of specified device (SSJ= only).

TCS-TRANSLATE CONTROL STATEMENT

Call:



r — Auto recall bit (bit 40).

code — Function code:

Code	Macro
004	CONTROL
005	EXCST

sf — Subfunction code for CONTROL macro; field not used for EXCST macro:

sf	Action
00	Read control statement, advance pointer.
01	Read control statement if not local file call.
02	Read control statement. (If local file call, set bit 17 of $RA+65_8$.)
4x	Product set format.

address — FWA of buffer to store or read control statement.

Functions

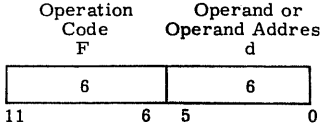
Code	Name	Description
004	CONTROL	Reads next control statement in control statement stream and transfers it to specified address.
005	EXCST	Specified buffer contains control statement.

INSTRUCTIONS

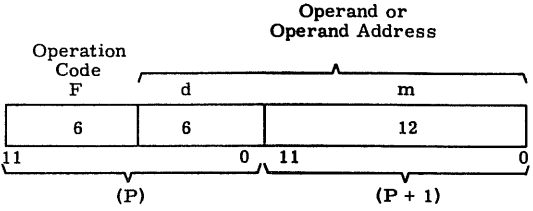
PERIPHERAL PROCESSOR (PPU) INSTRUCTION FORMATS

PPU INSTRUCTION FORMATS

An instruction may have a 12-bit or a 24-bit format. The 12-bit format has a 6-bit operation code F and a 6-bit operand or operand address d.



The 24-bit format uses the 12-bit quantity m, which is the contents of the next program address (P+1), with d to form an 18-bit operand or operand address.



SYMBOLS USED IN PPU INSTRUCTION LISTINGS

d	Implies d itself
(d)	Implies the contents of d
((d))	Implies the contents of the location specified by d
m m	Implies m itself used as an address
m + (d)	Contents of d is added to m to form an operand (jump address)
(m + (d))	Contents of d is added to m to form the address of the operand
dm	Implies an 18-bit quantity with d as the upper 6 bits and m as the lower 12 bits

PPU INSTRUCTION EXECUTION TIMES

All times are given in multiples of 1000 nanoseconds. Execution times are PPU times only. Instructions that interact with the CPU or CM do not include the time required by the CPU or CM to respond.

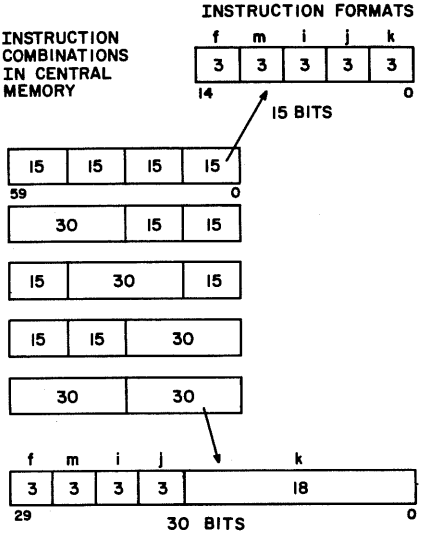
F	Description	PPU
00	Pass	1
01	Long jump to m + (d)	2-3
02	Return jump to m + (d)	3-4
03	Unconditional jump d	1
04	Zero jump d	1
05	Nonzero jump d	1
06	Plus jump d	1
07	Minus jump d	1
10	Shift d	1
11	Logical difference d	1
12	Logical product d	1
13	Selective clear d	1
14	Load d	1
15	Load complement d	1
16	Add d	1
17	Subtract d	1
20	Load dm	2
21	Add dm	2
22	Logical product dm	2
23	Logical difference dm	2
24	Pass	1
25	Pass	1
260	Exchange jump CPU d	1

F	Description	PPU
261	Monitor exchange jump CPU d to (A)	1
262	Monitor exchange jump CPU d to (MA)	1
270	Read program address of CPU d	1
30	Load (d)	2
31	Add (d)	2
32	Subtract (d)	2
33	Logical difference (d)	2
34	Store (d)	2
35	Replace add (d)	3
36	Replace add one (d)	3
37	Replace subtract one (d)	3
40	Load ((d))	3
41	Add ((d))	3
42	Subtract ((d))	3
43	Logical difference ((d))	3
44	Store ((d))	3
45	Replace add ((d))	4
46	Replace add one ((d))	4
47	Replace subtract one ((d))	4
50	Load (m + (d))	3-4
51	Add (m + (d))	3-4
52	Subtract (m + (d))	3-4
53	Logical difference (m + (d))	3-4
54	Store (m + (d))	3-4
55	Replace add (m + (d))	4-5
56	Replace add one (m + (d))	4-5
57	Replace subtract one (m + (d))	4-5

F	Description	PPU
60	Central read from (A) to d	minimum of 6
61	Central read (d) words from (A) to m	6 plus 5/word
62	Central write to (A) from d	minimum of 6
63	Central write (d) words to (A) from m	6 plus 5/word
64	Jump to m if channel d active	2
65	Jump to m if channel d inactive	2
66	Jump to m if channel d full	2
67	Jump to m if channel d empty	2
70	Input A from channel d	2
71	Input (A) words to m from channel d	5 plus 1/word
72	Output from A on channel d	2
73	Output (A) words from m on channel d	5 plus 1/word
74	Activate channel d	2
75	Disconnect channel d	2
76	Function (A) on channel d	2
77	Function m on channel d	2

CENTRAL PROCESSOR (CPU) INSTRUCTION FORMATS

CPU INSTRUCTION FORMATS



SYMBOLS USED IN CPU INSTRUCTION LISTINGS

A	One of eight address registers (18 bits)
B	One of eight index registers (18 bits); B0 is fixed and equal to zero
fm	Instruction code (6 bits)
i	Specifies which of eight designated registers (3 bits); is also used in 03x instructions as part of a 9-bit operation code.
j	Specifies which of eight designated registers (3 bits)
jk	Constant, indicating number of shifts to be taken (6 bits)
k	Specifies which of eight designated registers (3 bits)
K	Constant, indicating branch designation or operand (18 bits)
X	One to eight operand registers (60 bits)

INSTRUCTION EXECUTION TIMES
CDC CYBER 70/MODELS 72, 73, 74

All times are given in multiples of 100 nanoseconds.

Octal Code	Description	M72	M73	M74 CPU0	M74 CPU1
00	Stop	-	-	-	-
01	Return jump to K	24	21	13	21
011	Read extended core storage	-†	-†	-†	-†
012	Write extended core storage	-†	-†	-†	-†
013	Central exchange jump	49	46	-	-
02	Go to K + (Bi)	16††	13††	14	15
030	Go to K if (Xj) = zero	16††	13††	9	15
031	Go to K if (Xj) ≠ zero	16††	13††	9	15
032	Go to K if (Xj) = positive	16††	13††	9	15
033	Go to K if (Xj) = negative	16††	13††	9	15
034	Go to K if (Xj) is in range	16††	13††	9	15
035	Go to K if (Xj) is out of range	16††	13††	9	15
036	Go to K if (Xj) is definite	16††	13††	9	15
037	Go to K if (Xj) is indefinite	16††	13††	9	15
04	Go to K if (Bi) = (Bj)	16††	13††	8	15
05	Go to K if (Bi) ≠ (Bj)	16††	13††	8	15
06	Go to K if (Bi) ≥ (Bj)	16††	13††	8	15
07	Go to K if (Bi) < (Bj)	16††	13††	8	15
10	Transmit (Xj) to Xi	8	5	3	5
11	Logical product of (Xj) and (Xk) to Xi	8	5	3	5
12	Logical sum of (Xj) and (Xk) to Xi	8	5	3	5
13	Logical difference of (Xj) and (Xk) to Xi	8	5	3	5

†Refer to ECS Description/Programming Manual.
††If the jump conditions are not present, requires only n cycles (for M72, n=8 and for M73, n=5).

Octal Code	Description	M72	M73	M74 CPU0	M74 CPU1
14	Transmit (Xk) comp. to Xi	8	5	3	5
15	Logical product of (Xj) and (Xk) comp. to Xi	8	5	3	5
16	Logical sum of (Xj) and (Xk) comp. to Xi	8	5	3	5
17	Logical difference of (Xj) and (Xk) comp. to Xi	8	5	3	5
20	Shift (Xi) left jk places	9	6	3	6
21	Shift (Xi) right jk places	9	6	3	6
22	Shift (Xk) nominally left (Bj) places to Xi	9	6	3	6
23	Shift (Xk) nominally right (Bj) places to Xi	9	6	3	6
24	Normalize (Xk) in Xi and Bj	10	7	4	7
25	Round and normalize (Xk) in Xi and Bj	10	7	4	7
26	Unpack (Xk) to Xi and Bj	10	7	3	7
27	Pack Xi from (Xk) and Bj	10	7	3	7
43	Form jk mask in Xi	9	6	3	6
30	Floating sum of (Xj) and (Xk) to Xi	14	11	4	11
31	Floating difference of (Xj) and (Xk) to Xi	14	11	4	11
32	Floating DP sum of (Xj) and (Xk) to Xi	14	11	4	11
33	Floating DP difference of (Xj) and (Xk) to Xi	14	11	4	11
34	Round floating sum of (Xj) and (Xk) to Xi	14	11	4	11
35	Round floating difference of (Xj) and (Xk) to Xi	14	11	4	11
36	Integer sum of (Xj) and (Xk) to Xi	9	6	3	6
37	Integer difference of (Xj) and (Xk) to Xi	9	6	3	6

Octal Code	Description	M72	M73	M74 CPU0	M74 CPU1
40	Floating product of (Xj) and (Xk) to Xi	60	57	10	57
41	Round floating product of (Xj) and (Xk) to Xi	60	57	10	57
42	Floating DP product of (Xj) and (Xk) to Xi	60	57	10	57
44	Floating divide (Xj) by (Xk) to Xi	60	57	29	57
45	Round floating divide (Xj) by (Xk) to Xi	60	57	29	57
46	Pass	6	3	1	3
47	Sum of 1's in (Xk) to Xi	71	68	8	68
50	Sum of (Aj) and K to Ai	-†	-†	3	-††
51	Sum of (Bj) and K to Ai	-†	-†	3	-††
52	Sum of (Xj) and K to Ai	-†	-†	3	-††
53	Sum of (Xj) and (Bk) to Ai	-†	-†	3	-††
54	Sum of (Aj) and (Bk) to Ai	-†	-†	3	-††
55	Difference of (Aj) and (Bk) to Ai	-†	-†	3	-††
56	Sum of (Bj) and (Bk) to Ai	-†	-†	3	-††
57	Difference of (Bj) and (Bk) to Ai	-†	-†	3	-††
60	Sum of (Aj) and K to Bi	8	5	3	5
61	Sum of (Bj) and K to Bi	8	5	3	5
62	Sum of (Xj) and K to Bi	8	5	3	5
63	Sum of (Xj) and (Bk) to Bi	8	5	3	5
64	Sum of (Aj) and (Bk) to Bi	8	5	3	5
65	Difference of (Aj) and (Bk) to Bi	8	5	3	5
66	Sum of (Bj) and (Bk) to Bi	8	5	3	5
67	Difference of (Bj) and (Bk) to Bi	8	5	3	5

†When i=0, time=6 minor cycles; i=1-5, 12 minor cycles; i=6 or 7, 10 minor cycles.

††When i=0, time=6 minor cycles; i=1-5, 14 minor cycles; i=6 or 7, 12 minor cycles.

Octal Code	Description	M72	M73	M74 CPU0	M74 CPU1
70	Sum of (Aj) and K to Xi	9	6	3	6
71	Sum of (Bj) and K to Xi	9	6	3	6
72	Sum of (Xj) and K to Xi	9	6	3	6
73	Sum of (Xj) and (Bk) to Xi	9	6	3	6
74	Sum of (Aj) and (Bk) to Xi	9	6	3	6
75	Difference of (Aj) and (Bk) to Xi	9	6	3	6
76	Sum of (Bj) and (Bk) to Xi	9	6	3	6
77	Difference of (Bj) and (Bk) to Xi	9	6	3	6

INSTRUCTION EXECUTION TIMES CDC 6400/6500/6600

All times are given in multiples of 100 nanoseconds.

Octal Code	Description	6500 and 6400	6600
00	Stop	-	-
01	Return jump to K	21	13
011	Read extended core storage	††	††
012	Write extended core storage	††	††
02	Go to K+(Bi)	13	14
030	Go to K if (Xj)=zero	13 †††	9†
031	Go to K if (Xj) ≠ zero	13 †††	9†
032	Go to K if (Xj) = positive	13 †††	9†
033	Go to K if (Xj) = negative	13 †††	9†
034	Go to K if (Xj) is in range	13 †††	9†
035	Go to K if (Xj) is out of range	13 †††	9†

†Modify the execution time (T) according to this table.

	Branch	No Branch
Loop (in stack)	T	T+2
Jump (out of stack)	T+6	T+5

††Refer to ECS Description/Programming Manual.
†††No branch condition requires 5.

Octal Code	Description	6500 and 6400	6600
036	Go to K if (Xj) is definite	13††	9†
037	Go to K if (Xj) is indefinite	13††	9†
04	Go to K if (Bi)=(Bj)	13††	8†
05	Go to K if (Bi)≠(Bj)	13††	8†
06	Go to K if (Bi)≥(Bj)	13††	8†
07	Go to K if (Bi)<(Bj)	13††	8†
10	Transmit (Xj) to Xi	5	3
11	Logical product of (Xj) and (Xk) to Xi	5	3
12	Logical sum of (Xj) and (Xk) to Xi	5	3
13	Logical difference to (Xj) and (Xk) to Xi	5	3
14	Transmit (Xk) comp. to Xi	5	3
15	Logical product of (Xj) and (Xk) comp. to Xi	5	3
16	Logical sum of (Xj) and (Xk) comp. to Xi	5	3
17	Logical difference of (Xj) and (Xk) comp. to Xi	5	3
20	Shift (Xi) left jk places	6	3
21	Shift (Xi) right jk places	6	3
22	Shift (Xk) nominally left (Bj) places to Xi	6	3
23	Shift (Xk) nominally right (Bj) places to Xi	6	3
24	Normalize (Xk) in Xi and Bj	7	4
25	Round and normalize (Xk) in Xi and Bj	7	4
26	Unpack (Xk) to Xi and Bj	7	3
27	Pack Xi from (Xk) and Bj	7	3
43	Form jk mask in Xi	6	3
30	Floating sum of (Xj) and (Xk) to Xi	11	4
31	Floating difference of (Xj) and (Xk) to Xi	11	4
32	Floating DP sum of (Xj) and (Xk) to Xi	11	4
33	Floating DP difference of (Xj) and (Xk) to Xi	11	4

† Modify the execution time (T) according to this table.

	Branch	No Branch
Loop (in stack)	T	T+2
Jump (out of stack)	T+6	T+5

†† No branch condition requires 5.

Octal Code	Description	6500 and 6400	6600
34	Round floating sum of (Xj) and (Xk) to Xi	11	4
35	Round floating difference of (Xj) and (Xk) to Xi	11	4
36	Integer sum of (Xj) and (Xk) to Xi	6	3
37	Integer difference of (Xj) and (Xk) to Xi	6	3
40	Floating product of (Xj) and (Xk) to Xi	57	10
41	Round floating product of (Xj) and (Xk) to Xi	57	10
42	Floating DP Product of (Xj) and (Xk) to Xi	57	10
44	Floating divide (Xj)	57	29
45	Round floating divide (Xj) by (Xk) to Xi	57	29
46	Pass	3	1
47	Sum of 1's in (Xk) to Xi	68	8
50	Sum of (Aj) and K to Ai	†	3
51	Sum of (Bj) and K to Ai	†	3
52	Sum of (Xj) and K to Ai	†	3
53	Sum of (Xj) and (Bk) to Ai	†	3
54	Sum of (Aj) and (Bk) to Ai	†	3
55	Difference of (Aj) and (Bk) to Ai	†	3
56	Sum of (Bj) and (Bk) to Ai	†	3
57	Difference of (Bj) and (Bk) to Ai	†	3
60	Sum of (Aj) and K to Bi	5	3
61	Sum of (Bj) and K to Bi	5	3
62	Sum of (Xj) and K to Bi	5	3
63	Sum of (Xj) and (Bk) to Bi	5	3
64	Sum of (Aj) and (Bk) to Bi	5	3
65	Difference of (Aj) and (Bk) to Bi	5	3
66	Sum of (Bj) and (Bk) to Bi	5	3
67	Difference of (Bj) and (Bk) to Bi	5	3
70	Sum of (Aj) and K to Xi	6	3
71	Sum of (Bj) and K to Xi	6	3
72	Sum of (Xj) and K to Xi	6	3
73	Sum of (Xj) and (Bk) to Xi	6	3
74	Sum of (Aj) and (Bk) to Xi	6	3
75	Difference of (Aj) and (Bk) to Xi	6	3
76	Sum of (Bj) and (Bk) to Xi	6	3
77	Difference of (Bj) and (Bk) to Xi	6	3

†When i = 0, time = 6
i = 1-5, time = 12
i = 6-7, time = 10

INSTRUCTION EXECUTION TIMES
CDC CYBER 170/MODELS 172, 173, 174

All times are given in multiples of 50 nanoseconds.

Octal Code	Description	M172	M173/ 174	Notes
00xxx	Error exit to MA or program stop	-	-	-
010xK	Return jump to K	35	28	-
011jK	Block copy (Bj) + K words from ECS to CM	-	-	3
012jK	Block copy (Bj) + K words from CM to ECS	-	-	3
013jK	Central exchange jump to (Bj) + K	44	37	-
02ixK	Jump to (Bi) + K	28	21	-
030jK	Branch to K if (Xj)=0	28	21	1
031jK	Branch to K if (Xj)≠0	28	21	1
032jK	Branch to K if (Xj) positive	28	21	1
033jK	Branch to K if (Xj) negative	28	21	1
034jK	Branch to K if (Xj) in range	28	21	1
035jK	Branch to K if (Xj) out of range	28	21	1
036jK	Branch to K if (Xj) definite	28	21	1
037jK	Branch to K if (Xj) indefinite	28	21	1
04ijK	Branch to K if (Bi) = (Bj)	28	21	1
05ijK	Branch to K if (Bi) ≠ (Bj)	28	21	1
06ijK	Branch to K if (Bi) ≥ (Bj)	28	21	1
07ijK	Branch to K if (Bi) < (Bj)	28	21	1
10ijj	Transmit (Xj) to Xi	10	3	-
11ijk	Logical product of (Xj) and (Xk) to Xi	12	5	-
12ijk	Logical sum of (Xj) and (Xk) to Xi	12	5	-
13ijk	Logical difference of (Xj) and (Xk) to Xi	12	5	-
14ikk	Transmit complement of (Xk) to Xi	10	3	-

Octal Code	Description	M172	M173/ 174	Notes
15ijk	Logical product of (Xj) and comp of (Xk) to Xi	12	5	-
16ijk	Logical sum of (Xj) and comp of (Xk) to Xi	12	5	-
17ijk	Logical difference of (Xj) and comp of (Xk) to Xi	12	5	-
20ijk	Left shift (Xi) by jk	12	5	-
21ijk	Right shift (Xi) by jk	12	5	-
22ijk	Left shift (Xk) nominally (Bj) places to Xi	12	5	-
23ijk	Right shift (Xk) nominally (Bj) places to Xi	12	5	-
24ijk	Normalize (Xk) to Xi and Bj	13	6	-
25ijk	Round normalize (Xk) to Xi and Bj	13	6	-
26ijk	Unpack (Xk) to Xi and Bj	12	5	-
27ijk	Pack (Xk) and (Bj) to Xi	12	5	-
30ijk	Floating sum of (Xj) and (Xk) to Xi	17	10	-
31ijk	Floating difference of (Xj) and (Xk) to Xi	17	10	-
32ijk	Floating DP sum of (Xj) and (Xk) to Xi	17	10	-
33ijk	Floating DP difference of (Xj) and (Xk) to Xi	17	10	-
34ijk	Round floating sum of (Xj) and (Xk) to Xi	17	10	-
35ijk	Round floating difference of (Xj) and (Xk) to Xi	17	10	-
36ijk	Integer sum of (Xj) and (Xk) to Xi	12	5	-
37ijk	Integer difference of (Xj) and (Xk) to Xi	12	5	-
40ijk	Floating product of (Xj) and (Xk) to Xi	64	57	-
41ijk	Round floating product of (Xj) and (Xk) to Xi	64	57	-
42ijk	Floating DP product of (Xj) and (Xk) to Xi	64	57	-
43ijk	Form mask of jk bits to Xi	12	5	-

Octal Code	Description	M172	M173/ 174	Notes
44ijk	Floating divide (Xj) by (Xk) to Xi	64	57	-
45ijk	Round floating divide (Xj) by (Xk) to Xi	64	57	-
46000	No operation (pass)	10	3	-
464jK	Move indirect	-	-	4, 5
465	Move direct	-	-	4, 6
466	Compare collated	-	-	4, 7
467	Compare uncollated	-	-	4, 8
47ikk	Population count of (Xk) to Xi	72	65	-
50ijK	Set Ai to (Aj) + K	-	-	2
51ijK	Set Ai to (Bj) + K	-	-	2
52ijK	Set Ai to (Xj) + K	-	-	2
53ijk	Set Ai to (Xj) + (Bk)	-	-	2
54ijk	Set Ai to (Aj) + (Bk)	-	-	2
55ijk	Set Ai to (Aj) - (Bk)	-	-	2
56ijk	Set Ai to (Bj) + (Bk)	-	-	2
57ijk	Set Ai to (Bj) - (Bk)	-	-	2
60ijK	Set Bi to (Aj) + K	11	4	-
61ijK	Set Bi to (Bj) + K	11	4	-
62ijK	Set Bi to (Xj) + K	11	4	-
63ijk	Set Bi to (Xj) + (Bk)	11	4	-
64ijk	Set Bi to (Aj) + (Bk)	11	4	-
65ijk	Set Bi to (Aj) - (Bk)	11	4	-
66ijk	Set Bi to (Bj) + (Bk)	11	4	-
67ijk	Set Bi to (Bj) - (Bk)	11	4	-
70ijK	Set Xi to (Aj) + K	12	5	-
71ijK	Set Xi to (Bj) + K	12	5	-
72ijK	Set Xi to (Xj) + K	12	5	-
73ijk	Set Xi to (Xj) + (Bk)	12	5	-
74ijk	Set Xi to (Aj) + (Bk)	12	5	-
75ijk	Set Xi to (Aj) - (Bk)	12	5	-
76ijk	Set Xi to (Bj) + (Bk)	12	5	-
77ijk	Set Xi to (Bj) - (Bk)	12	5	-

Timing notes for CDC CYBER 170/Models 172, 173, 174:

1. 5 cycles if jump condition not present
2. if i = 0, (model 172, 12 cycles) (models 173 and 174, 5 cycles)
   i = 1 through 5, (model 172, 27 cycles) (models 173 and 174, 20 cycles)
   i = 6 or 7, (model 172, 17 cycles) (models 173 and 174, 10 cycles)
3. Refer to ECS timing information in volume 3 of publication no. 60347100.
4. Formulas (given in notes 5 through 8) for instruction execution times give only approximate times. The formulas do not consider conflicting demands for the use of central memory (CM) by the peripheral processors (PPs), second CP or extended core storage (ECS). These demands plus memory bank conflicts make the formulas useful only as best-case calculations.

   Formula term explanations for notes 5 through 8 are:

   T = Time required for instruction execution in nanoseconds
   N = Number of words to be moved in instruction
5. Execution time for model 172:

   T = [(N-4) x 400] + 3250 nanoseconds, for N > 6
   T = 2450 nanoseconds, for N = 1
   T = 4050 nanoseconds, for N = 6

   Execution time for models 173 and 174:

   T = [(N-4) x 400] + 2550 nanoseconds, for N > 6
   T = 1750 nanoseconds, for N = 1
   T = 3350 nanoseconds, for N = 6
6. Execution time for models 172 through 174:

   T = 900 + move direct instruction execution time nanoseconds
7. Execution time for model 172:

   T = N x 400 + 2350 nanoseconds, for N > 1
   T = 2600 nanoseconds, for N = 1

   Execution time for models 173 and 174:

   T = N x 400 + 1650 nanoseconds, for N > 1
   T = 1900 nanoseconds, for N = 1
8. Execution time for models 172 through 174:

   T = 1450 + compare uncollated instruction execution time = N x 0.4 + 3.1 nanoseconds

INSTRUCTION EXECUTION TIMES
CDC CYBER 170/MODEL 175

All times are given in multiples of 25 nanoseconds.

Octal Code	Description	M175	Notes
00xxx	Error exit to MA or program stop	-	-
010xK	Return jump to K	28	1, 2, 3
011jK	Block copy (Bj) + K words from ECS to CM	[(Bj)+K] 4	4, 5, 6, 7, 9
012jK	Block copy (Bj) + K words from CM to ECS	[(Bj)+K] 4	4, 5, 6, 7, 9
013jK	Central exchange jump to (Bj) + K (monitor flag set)	91	1, 2, 4
013xx	Central exchange jump to MA (monitor flag not set)	91	1, 2, 4
02ixK	Jump to (Bi) + K	26	1, 2, 3, 8, 18
030jK	Branch to K if (Xj) = 0	26	1, 2, 3, 10, 11, 18
031jK	Branch to K if (Xj) ≠ 0	26	1, 2, 3, 10, 11, 18
032jK	Branch to K if (Xj) positive	26	1, 2, 3, 10, 11, 18
033jK	Branch to K if (Xj) negative	26	1, 2, 3, 10, 11, 18
034jK	Branch to K if (Xj) in range	26	1, 2, 3, 10, 11, 18
035jK	Branch to K if (Xj) out of range	26	1, 2, 3, 10, 11, 18
036jK	Branch to K if (Xj) definite	26	1, 2, 3, 10, 11, 18
037jK	Branch to K if (Xj) indefinite	26	1, 2, 3, 10, 11, 18
04ijK	Branch to K if (Bi) = (Bj)	26	1, 2, 3, 10, 11, 18
05ijK	Branch to K if (Bi) ≠ (Bj)	26	1, 2, 3, 10, 11, 18

Octal Code	Description	M175	Notes
06ijK	Branch to K if (Bi) $\geq$ (Bj)	26	1, 2, 3, 10, 11, 18
071ijK	Branch to K if (Bi) < (Bj)	26	1, 2, 3, 10, 11, 18
10ijj	Transmit (Xj) to Xi	2	8, 12, 13
11ijk	Logical product of (Xj) and (Xk) to Xi	2	8, 12, 13
12ijk	Logical sum of (Xj) and (Xk) of Xi	2	8, 12, 13
13ijk	Logical difference of (Xj) and (Xk) to Xi	2	8, 12, 13
14ikk	Transmit complement to (Xk) to Xi	2	8, 12, 13
15ijk	Logical product of (Xj) and complement of (Xk) to Xi	2	8, 12, 13
16ijk	Logical sum of (Xj) and complement of (Xk) to Xi	2	8, 12, 13
17ijk	Logical differerence of (Xj) and complement of (Xk) to Xi	2	8, 12, 13
20ijk	Left shift (Xi) by jk	2	8, 12, 13
21ijk	Right shift (Xi) by jk	2	8, 12, 13
22ijk	Left shift (Xk) nominally (Bj) places to Xi	2	8, 12, 13
23ijk	Right shift (Xk) nominally (Bj) places to Xi	2	8, 12, 13
24ijk	Normalize (Xk) to Xi and Bj	3	8, 12, 13
25ijk	Round normalize (Xk) to Xi and Bj	3	8, 12, 13

Octal Code	Description	M175	Notes
26ijk	Unpack (Xk) to Xi and Bj	2	8, 12, 13
27ijk	Pack (Xk) and (Bj) to Xi	2	8, 12, 13
30ijk	Floating sum of (Xj) and (Xk) to Xi	4	8, 12, 13
31ijk	Floating difference of (Xj) and (Xk) to Xi	4	8, 12, 13
32ijk	Floating double-precision sum of (Xj) and (Xk) to Xi	4	8, 12, 13
33ijk	Floating double-precision difference of (Xj) and (Xk) to Xi	4	8, 12, 13
34ijk	Round floating sum of (Xj) and (Xk) to Xi	4	8, 12, 13
35ijk	Round floating difference of (Xj) and (Xk) to Xi	4	8, 12, 13
36ijk	Integer sum of (Xj) and (Xk) to Xi	2	8, 12, 13
37ijk	Integer difference of (Xj) and (Xk) to Xi	2	8, 12, 13
40ijk	Floating product of (Xj) and (Xk) to Xi	5	8, 12, 13, 14
41ijk	Round floating product of (Xj) and (Xk) to Xi	5	8, 12, 13, 14
42ijk	Floating double-precision product of (Xj) and (Xk) to Xi	5	8, 12, 13, 14
43ijk	Form mask of jk bits to Xi	2	8, 12, 13
44ijk	Floating divide (Xj) by (Xk) to Xi	20	8, 12, 13, 15

Octal Code	Description	M175	Notes
45ijk	Round floating divide (Xj) by (Xk) to Xi	20	8, 12, 13, 15
460xx	Pass	1	
47ikk	Population count of (Xk) to Xi	2	8, 12, 13
50ijK	Set Ai to (Aj)+K	23	2, 3, 8, 16, 17, 18
51ijK	Set Ai to (Bj)+K	23	2, 3, 8, 16, 17, 18
52ijK	Set Ai to (Xj)+K	23	2, 3, 8, 16, 17, 18
53ijk	Set Ai to (Xj)+(Bk)	23	2, 3, 8, 16, 17, 18
54ijk	Set Ai to (Aj)+(Bk)	23	2, 3, 8, 16, 17, 18
55ijk	Set Ai to (Aj) - (Bk)	23	2, 3, 8, 16, 17, 18
56ijk	Set Ai to (Bj)+(Bk)	23	2, 3, 8, 16, 17, 18
57ijk	Set Ai to (Bj) - (Bk)	23	2, 3, 8, 16, 17, 18
60ijK	Set Bi to (Aj)+K	2	8, 12, 13
61ijK	Set Bi to (Bj)+K	2	8, 12, 13
62ijK	Set Bi to (Xj)+K	2	8, 12, 13
63ijk	Set Bi to (Xj)+(Bk)	2	8, 12, 13
64ijk	Set Bi to (Aj)+(Bk)	2	8, 12, 13
65ijk	Set Bi to (Aj) - (Bk)	2	8, 12, 13
66ijk	Set Bi to (Bj)+(Bk)	2	8, 12, 13
67ijk	Set Bi to (Bj) - (Bk)	2	8, 12, 13
70ijK	Set Xi to (Aj)+K	2	8, 12, 13
71ijK	Set Xi to (Bj)+K	2	8, 12, 13
72ijK	Set Xi to (Xj)+K	2	8, 12, 13
73ijk	Set Xi to (Xj)+(Bk)	2	8, 12, 13
74ijk	Set Xi to (Aj)+(Bk)	2	8, 12, 13
75ijk	Set Xi to (Aj) - (Bk)	2	8, 12, 13
76ijk	Set Xi to (Bj)+(Bk)	2	8, 12, 13
77ijk	Set Xi to (Bj) - (Bk)	2	8, 12, 13

Timing notes for CDC CYBER 170/Model 175:

1. All previous instruction fetches are completed.
2. No CM conflicts or SAS backup caused by CM conflicts exist.
3. No PPS request occurs.
4. All operating registers are free.
5. ECS is not busy.
6. All ECS banks have completed previously initiated read/write cycles.
7. Time does not include start-up time.
8. The requested operating register(s) is free.
9. Time assumes no ECS record gaps.
10. If the address is in the IAS, the execution time is 3 clock periods.
11. If the branch conditions are not met, the execution time is 2 clock periods.
12. The requested destination register(s) input data path is free during the required clock period.
13. After the instruction has issued to the functional unit, no further delay is possible.
14. The multiply unit is free.
15. The divide unit is free.
16. If i=0, execution time is 2 clock periods, and no storage reference is required. If i=1 through 5, execution time is 23 clock periods, and a storage reference is required. If i=6 or 7, execution time is 2 clock periods, and a storage reference continues after instruction execution.
17. After the instruction has issued to the increment unit, no further delays are possible in the delivery of data to the Ai register. However, CM conflicts may delay the resulting storage reference.
18. If memory enable is present when the address is gated into SAS, one additional clock period is required.

EXTERNAL FUNCTION CODES

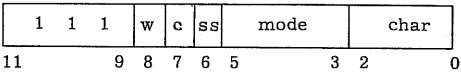
EXTERNAL FUNCTION CODES AND STATUS RESPONSES

STATUS/CONTROL REGISTER

Descriptor Function	Description
0YYY	Read word YYY
1XXX	Test bit XXX
2XXX	Clear bit XXX
3XXX	Test and clear bit XXX
4XXX	Set bit XXX
5XXX	Test and set bit XXX
6000	Clear all bits
7000	Test error bits

SYSTEM CONSOLE DISPLAY

Select Word



w	= 0	Single screen display†
	= 1	Simultaneous screen display†
c	= 0	Console 0
	= 1	Console 1
ss	= 0	Left screen
	= 1	Right screen
mode	= 0	Character mode
	= 1	Dot mode
	= 2	Keyboard input request
char	= 0	64 characters/line
	= 1	32 characters/line
	= 2	16 characters/line

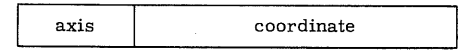
†Applicable to CDC CYBER 170 series only.

SELECT CODES

Console 0	Console 1	Description
7000	7200	Select 64 characters/line, left screen
7001	7201	Select 32 characters/line, left screen
7002	7202	Select 16 characters/line, left screen
7010	7210	Select 512 dots/line
7020	7220	Select keyboard input
7100	7300	Select 64 characters/line, right screen
7101	7301	Select 32 characters/line, right screen
7102	7302	Select 16 characters/line, right screen

Data Word

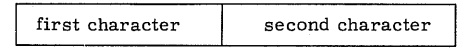
Dot Mode



11 9 8 0

axis = 6 x axis
= 7 y axis

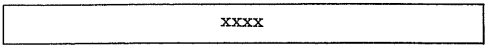
Character mode



11 6 5 0

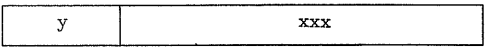
6681/6684 DATA CHANNEL CONVERTER (3000 SERIES INTERFACE)

Equipment Select



xxxx = 2000 select converter
= 2100 deselect converter

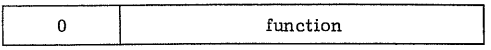
Mode I Connect Word



y = 4 Connect external equipment 4.
= 5 Connect external equipment 5.
= 6 Connect external equipment 6.
= 7 Connect external equipment 7.

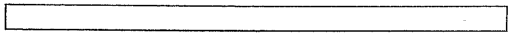
xxx = Unit to be connected

Mode I Function Word



function = 9-bit function code

Mode II Function Word



11 0

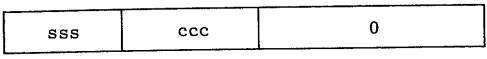
Connect:	1000	Select 668X to output a 12-bit connect code
Function:	1100	Select 668X to output a 12-bit function code to external equipment already selected
Status:	1200	668X status request
	1300	External equipment status request
Status reply:	xxx1	Reject (internal or external)
	xxx2	Internal reject
	xxx4	Transmission parity error
	1xxx	Abnormal end of operation (for xx4x I/O function code)
	xx1x - 2xxx	Eight interrupt lines
	4xxx	Parity error on data channel
Data I/O:	14a0	Input to end-of-record
	15a0	Input until PP sends inactive signal
	16a0	Output until PP sends inactive signal
		a=6 Deactivate option code (for controllers with interrupt override signal)
		a=4 Deactivate option code (for controllers without interrupt override signal)
		A 1 in the lowest bit of data I/O codes negates BCD conversion. The BCD negated is normal mode of operation.
	1700	Master clear

Data Word

11 0

6682/6683 SATELLITE COUPLER

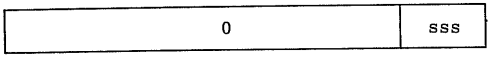
Equipment Select



sss = Select code established at installation for the 6682/6683.

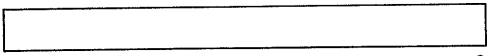
ccc = 0 Output
= 1 Input
= 2 Status request

Status



sss = 1 Output channel request
= 2 Input channel request
= 4 Busy

Data Word



6411/6414 AUGMENTED I/O BUFFER AND CONTROLLER

All instructions are the same as 6000 peripheral processors except:

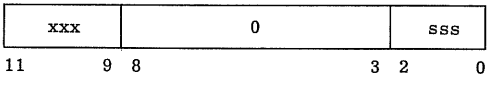
26 ETN d	Extended core transfer; initiate extended core storage operation
27 ESN d	Read extended core coupler status

Status Reply: (Read into upper 3 bits of peripheral processor A register)

Bit 17	Extended core storage transfer in progress
Bit 16	Parity error occurred during last read extended core storage operation
Bit 15	At least one address of the last extended core storage transfer was not available (power off, in maintenance mode, address not in system).

6671 DATA SET CONTROLLER

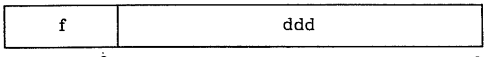
Function Select Word



xxx = Setting of the equipment number switches

sss = 1 Select output
= 2 Select status request
= 3 Select input

Controller Data Word Function Codes

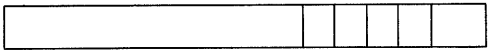


f = 0 Do nothing.
= 1 Enables receiver section of the DSC to resync.
= 2 Turns off carrier.
= 3 Turns off carrier and allows receiver to resync.
= 4 Turns on the carrier. Must be appended to all data words.
= 5 Turns on the carrier and resyncs the reciever.
= 6 Resyncs the receiver and enables the carrier, and disconnects the telephone connection.
= 7 Resyncs the receiver and enables the telephone connections for data transmissions.

ddd = Data to be transmitted if f is equal to 4 or 6.

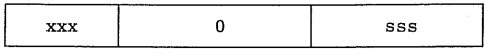
If only bit 8 of the controller data word is set, a modem is disconnected. This is used when output operation has failed in the middle of a character.

Status Word



Bit 0 = Lost data
1 = Input required
2 = Channel A selected (always 1)
3 = Not used
4 = Output failure
5 = Memory parity

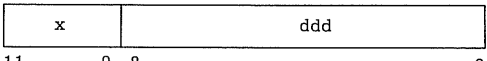
Function Select Word



xxx = Equipment select switch setting

sss = 1 Select output
= 2 Select status request
= 3 Select input

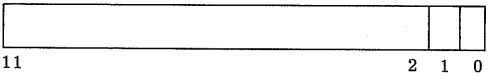
I/O Control Codes



x = 6 Disconnect modem
= 4 Output required

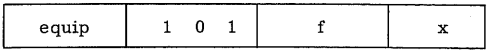
ddd = Data, when x is set to 4; otherwise, it is zero

Status Word Format



Bit 0 = Service failure
1 = Input required
2 = Channel A reserved

External Function Code Word

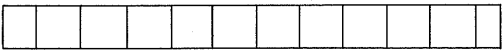


equip = Equipment number

f = 0 Request status-all
= 1 Request status
= 2 Select
= 3 Clear
= 4 Select transmit
= 5 Select receive
= 6 Clear interrupt word received status bit

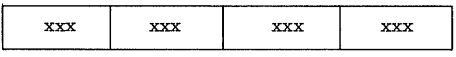
x = Number assigned to the selected DSC, except in status-all request where x=4.

Status DSCx Word



Bit 0 = Interrupt received
1 = DSC busy
2 = Sync word not acknowledged
3 = Cyclic error
4 = Receive and $\overline{COO}$
5 = Transmit and $\overline{CS}$
6 = $\overline{IT}$ + $\overline{COO}$
7 = This bit added when DSC is selected, but is physically disconnected
8 = Not used
9 = Not used
10 = Full and receive
11 = Empty and transmit

Status-all Word



xxx = 1 Full and receive
= 2 Empty and transmit
= 4 Error

FUNCTION CODES

0000	Connect
0001	Seek, 1:1 interlace
0002	Seek, 2:1 interlace
0003	I/O length
0004	Read
0005	Write
0006	Write verify
0007	Read checkword
0010	Operation complete
0011	Disable reserve
0012	General status
0013	Detailed status
0014	Continue
0015	Drop seeks
0016	Format packs
0017	On-sector status
0020	Drive release
0021	Return cylinder address
0022	Set/clear flow
0024	Gap sector - read
0025	Gap sector - write
0026	Gap sector - write verify
0027	Gap sector - read checkword
0030	Read factory data
0031	Read utility map
0414	Start memory load

GENERAL STATUS WORD

Bit	Description
11	Abnormal termination
10	Dual access coupler reserved
9	Nonrecoverable error
8	Recovery in progress
7	Checkword error
6	Correctable address error
5	Correctable data error
4	DSU malfunction
3	DSU reserved
2	Miscellaneous error
1	Busy
0	Noncorrectable data error

DETAILED STATUS (bits set in 12-word block)

Word	Bits	Description
1	11-4	Strobe/offset retry count
	3	Disk address specified by PP does not compare with address field read from disk sector
	2	Incorrect cylinder number read
	1	Incorrect track number read
	0	Incorrect sector number read
2	11	Checkword error occurred reading address field
	10	Address field read from disk sector cannot be corrected
	9	Checkword error occurred reading data field
	8	Data field read from disk sector cannot be corrected
	7-0	Number of sectors within current data block that were successfully processed
3	11-4	Lower eight bits of PP command causing detailed status block
	3	Compare operation for address field or data field did not complete
	2	Write verify operation failed; data field is in error
	1	Not used
	0	Channel parity error (6TPP only)
4	11-6	Controlware revision number (6TPP only)
	5-0	DSU number
5	11-3	Cylinder number
	2-0	Track number (continues in word 6)
6	11-10	Track number (continued from word 5)
	9-5	Sector number
	4	Sector flaw bit
	3	Track flaw bit
	2	Factory data sector
	1	Utility map
	0	Zero

Word	Bits	Description
7	11	Invalid command
	10	Sector length error
	9	Lost data
	8	Sync error (address field)
	7	DSC memory parity error
	6	DSC hardware error
	5	Defective factory sector
	4	Defective track
	3	Defective sector
	2	Sync error (data field)
	1	Deadman timer expired
	0	Utility flaw map overflow
8	11	Zero
	10-0	11-bit correction vector
9	11	Sector alert
	10	DSU seek error
	9	DSU busy
	8	DSU selected
	7	DSU ready
	6	DSU on-line
	5	Not used
	4	Amplitude monitor 3
	3	Amplitude monitor 2
	2	DSU end of cylinder
	1	Amplitude monitor 1
	0	Track index
10	11	On cylinder
	10	Seek error
	9	Disk pack unsafe
	8	Sector mark
	7	Seek error
	6	DSU negative voltages more positive than normal
	5	DSU positive voltages more negative than normal
	4	Current fault
	3	Read and write operation attempted simultaneously
	2	DSC attempted a data transfer when DSU was not on cylinder
	1	Not used
	0	DSU logic temperature is normal

Word	Bits	Description
11	11	DSU power supply temperature is normal
	10	Spindle motor is on
	9	DSU power sequencing is not under control of DSC
	8	DSU start switch is on
	7	Disk pack brush cycle is in progress
	6	Heads are loaded
	5	Sector block is in position to sense sector disk
	4	Disk pack is mounted
	3-0	Upper 4 bits of 16-bit address of the first bit of a correctable read error
12	11-0	Lower 12 bits of 16-bit address of a correctable read error

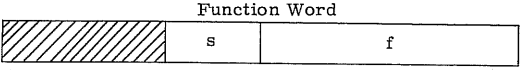
DISTRIBUTIVE DATA PATH

Function	Code	Address Bit 23	Address Bit 22	Address Bit 21
Block read ECS	5001	0	0	0
Block write ECS	5002	0	0	0
Select status	5004	0	0	0
Master clear port	5010	0	0	0
Read ECS, one reference	5001	0	1	0
Select maintenance mode	5001	0	0	1
Function flag register	5001	1	X	X

Status Bits (Function Code 5004):

Bit	Description
0	ECS abort
1	ECS accept
2	ECS parity error
3	ECS write selected
4	Channel parity error
5	6640 parity error

Function Word



f = Function code

s = Subfunction code

General Status Word

al	cs	nu	noi	wr	ut	oc	tm	eot	lp	ub	ur
11	10	9	8	7	6	5	4	3	2	1	0

Field		Value	Description
al	- Alert	1	Error detected
cs	- Coupler status	1	Status originated in coupler
nu	- No unit	1	No unit connected
noi	- Noise	1	Block shorter than minimum
wr	- Write ring	1	Write ring in tape reel
ut	- Unit type	0, 1	0=7-track, 1=9-track
oc	- Odd count	1	Odd number of entries read
tm	- Tapemark	1	Tapemark read or written
eot	- End of tape	1	Tape at end of tape marker
lp	- Load point	1	Tape at load point marker
ub	- Unit busy	1	Tape is in motion
ur	- Unit ready	1	Unit loaded and ready

Function Code	Subfunction Code	Function Name	General Status Returned
01		Release Unit	
02		Clear All Reserves	
03		Clear Opposite Reserve	
05	0	Opposite Parity Mode	
05	1	Opposite Density	
06	0	Select Normal Read Clip	
06	1	Select High Read Clip	
06	2	Select Low Read Clip	
06	3	Select Hyper Read Clip	
07	0	Nominal Read Sprocket Delay	
07	1	Increase Read Sprocket Delay	
07	2	Decrease Read Sprocket Delay	
10	0	Rewind	Yes
10	1	Rewind/Unload	Yes
11		Stop Motion	Yes
12	0	General Status	Yes
12	1	Detailed Status	
12	2	Cumulative Status	
12	3	Units Ready Status	
13	0	Forespace	Yes
13	1	Backspace	Yes
13	2	Long Forespace	Yes
13	3	Long Backspace	Yes
14	0	Controlled Forespace	Yes
14	1	Controlled Backspace	Yes
15	0	Search Tapemark Forward	Yes
15	1	Search Tapemark Backward	Yes
16	0	Erase Reposition	Yes
16	1	Erase Reposition to Erase	Yes
17	0	Write Reposition	Yes
17	1	Write Reposition to Erase	Yes

Function Code	Subfunction Code	Function Name	General Status Returned
2x	0	Connect Unit	
30		Format Unit	Yes
31	1	Code Translation Table 1 to Processor Memory	Yes
31	2	Code Translation Table 2 to Processor Memory	Yes
31	3	Code Translation Table 3 to Processor Memory	Yes
32	1	Load Read RAM	Yes
32	2	Load Write RAM	Yes
32	3	Load Read/Write RAM	Yes
33	1	Copy Read RAM	
33	2	Copy Write RAM	
34		Format TCU Status	Yes
35		Copy TCU Status	
36		Send TCU Command	Yes
40	0	Read Forward	Yes
40	1	Read Backward	Yes
40	3	Read Backward with Odd Length Parity	Yes
41	0	Reread Forward	Yes
41	1	Reread Backward	Yes
41	3	Reread Backward with Odd Length Parity	Yes
42		Repeat Read	Yes
50	0	Write	Yes
50	2	Write Odd Length	Yes
51		Write Tapemark	Yes
52	0	Erase	Yes
52	1	Erase to End of Tape	Yes

DETAILED STATUS (bits set in 8-word block)

Word	Bits	Description
1	11	During read, EOR signal was not received before next frame and all data registers were full or during write, an EOR signal was not received and data was not available for writing next frame
	10	Unerased flux changes were detected at a low read clip setting
	9	Error detected requiring that block be reread or rewritten
	8	Unerased flux changes were detected in interlock gap prior to current operation
	7	Unerased flux changes detected at low read clip setting after write operation or normal clip setting after read
	6	Data not available at write access time and within next 0.4 inch of tape
	5-0	Nonzero indicates fatal error code detected
2	11	Too many frames written before first frame was read
	10	More frames were read than were written
	9	Fewer frames read than written
	8	Frame containing all zeros was read (7-track NRZI only)
	7	LRCC had even vertical parity (9-track NRZI only)
	6	One or more frames have incorrect vertical parity
	5	One or more tracks had odd longitudinal parity (NRZI only)
	4	CRCC parity error (9-track NRZI only)
	3	Unexpected frames detected before longitudinal check character or postamble

Word	Bits	Description
	2	Excessive phase mode skew occurred
	1	Velocity of tape varied more than 7 percent after reaching operation speed
	0	Missing or defective postamble detected
3	11	Interblock gap lengthened during write by more than 0.2 inch
	10	Odd (NRZI) or even (PHASE) number of frames read or written
	9	Postamble detected during phase read or write
	8	More than four frames of skew occurred during phase read
	7	Opposite channel in 2x8 configuration is inoperable
	6	More than one frame of skew detected during phase read
	5	A 1 was detected in bit 6 of one or more translated characters read from tape
	4	Unit lost tape loop
	3	Air pressure fault
	2	Current in erase head is abnormal
	1	Unit failed to load
	0	Temperature in unit is near automatic power cutoff
4	11	Correction was attempted to tracks indicated in bits 8 through 0 of this word
	10	CRC detected error reading or writing
	9	More than one track was in error during read operation
	8-0	Data correction attempted on tracks identified by corresponding bits

DETAILED STATUS (bits set in 8-word block)

Word	Bits	Description
1	11	During read, EOR signal was not received before next frame and all data registers were full or during write, an EOR signal was not received and data was not available for writing next frame
	10	Unerased flux changes were detected at a low read clip setting
	9	Error detected requiring that block be reread or rewritten
	8	Unerased flux changes were detected in interlock gap prior to current operation
	7	Unerased flux changes detected at low read clip setting after write operation or normal clip setting after read
	6	Data not available at write access time and within next 0.4 inch of tape
	5-0	Nonzero indicates fatal error code detected
2	11	Too many frames written before first frame was read
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	9	Fewer frames read than written
	8	Frame containing all zeros was read (7-track NRZI only)
	7	LRCC had even vertical parity (9-track NRZI only)
	6	One or more frames have incorrect vertical parity
	5	One or more tracks had odd longitudinal parity (NRZI only)
	4	CRCC parity error (9-track NRZI only)
	3	Unexpected frames detected before longitudinal check character or postamble

Word	Bits	Description
	2	Excessive phase mode skew occurred
	1	Velocity of tape varied more than 7 percent after reaching operation speed
	0	Missing or defective postamble detected
3	11	Interblock gap lengthened during write by more than 0.2 inch
	10	Odd (NRZI) or even (PHASE) number of frames read or written
	9	Postamble detected during phase read or write
	8	More than four frames of skew occurred during phase read
	7	Opposite channel in 2x8 configuration is inoperable
	6	More than one frame of skew detected during phase read
	5	A 1 was detected in bit 6 of one or more translated characters read from tape
	4	Unit lost tape loop
	3	Air pressure fault
	2	Current in erase head is abnormal
	1	Unit failed to load
	0	Temperature in unit is near automatic power cutoff
4	11	Correction was attempted to tracks indicated in bits 8 through 0 of this word
	10	CRC detected error reading or writing
	9	More than one track was in error during read operation
	8-0	Data correction attempted on tracks identified by corresponding bits

Word	Bits	Description
5	11	Forward tape motion if zero, backward if set
	10-8	Tape speed; 1=100 ips, 2=150 ips, 4=200 ips
	7-6	Tape density; 0=200 or 556 cpi, 1=800 cpi, 2=1600 cpi
	5	Access error
	4	Unit write and erase currents are on
	3-0	Unit cable connector address in the tape control unit
6	11-9	Not used
	8-4	Largest noise block length in frames
	3-0	Number of blocks passed over during the last operation
7, 8	11-0	24-bit frame count field

3518/3528 MAGNETIC TAPE CONTROLLER

FUNCTION CODES

0000	Release
0001	Binary
0002	Coded
0003	556 cpi density
0004	200 cpi density
0005	Clear
0006	800 cpi density
0007	1600 cpi density
0010	Rewind
0011	Rewind unload
0012	Backspace
0013	Search filemark forward/search tapemark forward
0014	Search filemark reverse/search tapemark reverse
0015	Write end-of-file mark/write tape mark
0016	Skip bad spot
0020	Interrupt on ready
0021	Release interrupt on ready
0022	Interrupt on end of operation
0023	Release interrupt on end of operation
0024	Interrupt on abnormal end of operation
0025	Release interrupt on abnormal end of operation
0040	Clear reverse read
0041	Set reverse read
0042	Clear memory mode
0043	Set memory mode
0044	Clear conversion mode

0045	Set conversion mode
0051	Clear opposite channel (used in 2x8 only)
0056	Clear status 2, return to status 1
0057	Set status 2

STATUS CODES

STATUS 1

xxx1	Ready
xxx2	R/W control busy
xxx4	Write enable
xx1x	File mark/tape mark detected
xx2x	Load point
xx4x	End of tape
x1xx	Density
x2xx	Density
x4xx	Lost data
1xxx	End of operation
2xxx	Alert (further defined in status 2)
4xxx	Tape unit reserved for other control (used in 2x8 only)

STATUS 2

xxx1	Transverse and/or longitudinal parity error
xxx2	Memory parity error
xxx4	Memory flag bit error
xx1x	CRC error
xx2x	Multitrack phase error or uncorrectable CRC error (NRZI)
xx4x	Character fill 7/9 track
	Not used Not used Not used
1xxx	End of operation
2xxx	Alert
3xxx	Tape unit reserved for other control (not used in 1x8)

3446/3644 CARD PUNCH CONTROLLER

FUNCTION CODES

0000	Release and disconnect
0001	Negate BCD to Hollerith conversion
0002	Release negate BCD to Hollerith conversion
0003	Select offset stacker †
0004	Check last card
0005	Clear
0020	Select interrupt on ready and $\overline{\text{Busy}}$
0021	Release interrupt on ready and $\overline{\text{Busy}}$
0022	Select interrupt on end of operation
0023	Release interrupt on end of operation
0024	Select interrupt on abnormal end of operation
0025	Release interrupt on abnormal end of operation

STATUS CODES

xxx1	Ready
xxx2	Busy
x1xx	Fail to feed
x2xx	Ready and $\overline{\text{Busy}}$ interrupt
x4xx	End of operation interrupt
1xxx	Abnormal end of operation interrupt
2xxx	Compare error
4xxx	Reserved (by other channel) † †

†Applicable to 415 Card Punch

† †3644 only

FUNCTION CODES

0000	Release and disconnect
0001	Negate Hollerith to internal BCD conversion
0002	Release negate Hollerith to internal BCD conversion
0004	Set gate card
0005	Clear
0020	Select interrupt on ready and $\overline{\text{Busy}}$
0021	Release interrupt on ready and $\overline{\text{Busy}}$
0022	Select interrupt on end of operation
0023	Release interrupt on end of operation
0024	Select interrupt on abnormal end of operation
0025	Release interrupt on abnormal end of operation

STATUS CODES

xxx1	Ready
xxx2	Busy
xxx4	Binary card
xx1x	File card
xx2x	Fail to feed or stacker full or jam
xx4x	Input tray empty
x1xx	End of file
x2xx	Ready and $\overline{\text{Busy}}$ interrupt
x4xx	End of operation interrupt
1xxx	Abnormal end of operation interrupt
2xxx	Read compare or preread error or illegal suppress assembly
4xxx	Reserved (for other channel) †

†3649 only

FUNCTION CODES

0000,0040†	Release and disconnect
0001	Single space
0002	Double space
0003	Advance to last line
0004	Page eject
0005	Auto page eject
0006	Suppress space
0010	Clear format selection
	Select format tape level for postprint spacing:
0011	Level 1
0012	Level 2
0013	Level 3
0014	Level 4
0015	Level 5
0016	Level 6
0020	Select preprint spacing
	Select format tape level for preprint spacing:
0021	Level 1
0022	Level 2
0023	Level 3
0024	Level 4
0025	Level 5
0026	Level 6
0030	Select interrupt on ready and $\overline{\text{Busy}}$
0031	Release interrupt on ready and $\overline{\text{Busy}}$
0032	Select interrupt on end-of-operation
0033	Release interrupt on end-of-operation
0034	Select interrupt on abnormal end-of-operation
0035	Release interrupt on abnormal end-of-operation

†3256/3659 only

STATUS CODES

xxx1	Ready
xxx2	Busy
xx1x	Paper out
xx2x	Last line of form
x2xx	Ready and busy interrupt
x4xx	End-of-operation interrupt
1xxx	Abnormal end-of-operation interrupt
2xxx	Error †
4xxx	Reserved (by other channel) ††

3555—1 LINE PRINTER CONTROLLER/580 LINE PRINTER

FUNCTION CODES

0000	Release and disconnect
0001	Single space
0002	Double space
0003	Advance to last line
0004	Page eject
0005	Auto page eject
0006	Suppress space
0007	Conditional clear format
0010	8 line select
0011	6 line select
0012	Fill image memory
0013	Select extended array
0014	Clear extended array
0020	Select interrupt on ready and not busy
0021	Clear interrupt on ready and not busy
0022	Select interrupt on end-of-operation

†3256 equipped with error checking option only.

††3659 only

0023	Clear interrupt on end-of-operation
0024	Select interrupt on abnormal end-of-operation
0025	Clear interrupt on abnormal end-of-operation
0026	Reload memory enable
0030	Clear format selections (postprint spacing mode)
0031	Select format level 1 for postprint line spacing
0032	Select format level 2 for postprint line spacing
0033	Select format level 3 for postprint line spacing
0034	Select format level 4 for postprint line spacing
0035	Select format level 5 for postprint line spacing
0036	Select format level 6 for postprint line spacing
0037	Select format level 7 for postprint line spacing
0040	Select format level 8 for postprint line spacing
0041	Select format level 9 for postprint line spacing
0042	Select format level 10 for postprint line spacing
0043	Select format level 11 for postprint line spacing
0044	Select format level 12 for postprint line spacing
0050	Preprint spacing mode
0051	Select format level 1 for preprint line spacing
0052	Select format level 2 for preprint line spacing
0053	Select format level 3 for preprint line spacing
0054	Select format level 4 for preprint line spacing
0055	Select format level 5 for preprint line spacing

0056	Select format level 6 for preprint line spacing
0057	Select format level 7 for preprint line spacing
0060	Select format level 8 for preprint line spacing
0061	Select format level 9 for preprint line spacing
0062	Select format level 10 for preprint line spacing
0063	Select format level 11 for preprint line spacing
0064	Select format level 12 for preprint line spacing
0065	Maintenance status mode. Refer to Maintenance Status Codes for signals sent over the status lines when in this mode. †
0066	Clear maintenance status mode †

STATUS CODES

xxx1	Ready
xxx2	Busy
xxx4	Compare fault
xx1x	Paper fault
xx2x	Last line of form
xx4x	Format tape level 9
x1xx	Memory busy
x2xx	Ready and $\overline{\text{Busy}}$ interrupt
x4xx	End-of-operation interrupt
1xxx	Abnormal end-of-operation interrupt
2xxx	Print error
4xxx	6/8 line coincident

†Applicable to 580 Line Printer only.

MAINTENANCE STATUS CODES†

xxx1	Internal train home signal
xxx2	Internal train subscan signal
xxx4	Six line-per-inch emitter pulse
xx1x	Eight line-per-inch emitter pulse
xx4x	Paper motion in low speed slew
xx2x	Internal timing emitter signal
x1xx	Start paper motion
x2xx	Stop paper motion
x4xx	Printer busy

3553 DISK STORAGE CONTROLLER

CONNECT CODES

n0du††	Connect 3553 and storage unit

†Applicable to 580 Line Printer only.

††n=equipment number of controller
d=device type (1=disk drive and 2=disk file)
u=logical unit number of storage device.

FUNCTION CODES

0000	Channel release
0001	Restore
0005	Clear
0007	Drive release
0010	Load address at 1:1 interlace
0011	Return address
0012	Load address at 2:1 interlace†
0014	Load address at 4:1 interlace†
0016	Load address at 8:1 interlace†
0020	Select interrupt on ready and $\overline{\text{Busy}}$
0021	Release interrupt on ready and $\overline{\text{Busy}}$
0022	Select interrupt on end-of-operation
0023	Release interrupt on end-of-operation
0024	Select interrupt on abnormal end-of-operation
0025	Release interrupt on abnormal end-of-operation
0026	Select interrupt on opposite channel release
0027	Release interrupt on opposite channel release
0030	Select interrupt on end-of-seek
0031	Release interrupt on end-of-seek
0040	Read
0041	Write
0042	Search compare
0043	Masked search compare
0044	Checkword verify
0045	Read checkword
0050	Magnitude search (record$\leq$buffer)
0051	Magnitude search (record$\geq$buffer)
0052	Equality search (record=buffer)
0053	Buffer mode
0054	End-of-record mode

†3553-2 only

STATUS CODES

xxx1	Ready
xxx2	Busy
xxx4	Abnormal/unavailable
xxx6	Unit reserved
xx10	On sector
xx14	Address error
xx20	No compare
xx24	Operation error (8553-2) Lost data (3553-1)
xx40	End-of-record
xx44	Checkword error
x1x0	Write lockout on read (normal)
x1x4	Write lockout on write (abnormal)
x2xx	Positioner ready
x4xx	End-of-operation interrupt
1xxx	Abnormal end-of-operation interrupt
2xxx	Seek interrupt
4xx0	Reserved
4xx4	Defective track

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