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SANTA BARBARA PLANT



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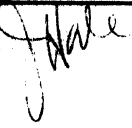


COMPUTER SYSTEMS GROUP  
SANTA BARBARA PLANT

2219 0144

B1800/B1700 MCP CONTROL SYNTAX

**PRODUCT SPECIFICATION**

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
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GENERAL MANAGER  
SANTA BARBARA PLANT

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MCP CONTROL SYNTAX  
I.P.S. 2219 0144 (A)

## INTRODUCTION

MCP CONTROL SYNTAX describes many of the areas of MCP II that change considerably from release to release and is a companion document to the MCP product specification 2212 5462, Master Control Program II. It contains six sections and an appendix, covering MCP communicates, declarations, halts, enhancements for the VII.0 release, program control attributes and SPO messages. Each section contains its own introduction; and entries, where possible, are indexed alphabetically.

## RELATED DOCUMENTATION

<u>Name</u> -----	<u>Number</u> -----
B1800/B1700 Software Operational Guide Master Control Program II	1068731 P.S. 2212 5462



COMMUNICATES

This section contains all the MCP communicates that are implemented at the Mark VII.0 release of MCP II. The Table of Contents sectionalizes them by number and the Alphabetic Index contains a named page reference for each individual communicate.

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---

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---

NOTE: ALL COMMUNICATES RETURN A VALUE OF  
30000000000000000000 OR 3000018000000000  
IN THE RS.REINSTATE.MSG.PTR UNLESS  
OTHERWISE SPECIFIED.

CI.VERB 00

CT.VERB 00  
ILLEGAL COMMUNICATE

READ = CI.VERB 01

READ (MICRO MCP)

----

CT.VERB 01  
CT.OBJECT FILE.NUMBER  
CT.ADVERB BIT  
0 REPORT & RETURN TO USER ON EOF  
1 REPORT & RETURN TO USER ON PARITY  
2 REPORT & RETURN TO USER ON INCOMPLETE I/O  
3 LENGTH ADDRESS PAIR IS PRESENT FOR RESULT MASK FIELD  
4-6 -  
7 STACKERS--STACKER # IS IN CT.3  
8-11 -  
CT.1 LOGICAL RECORD BIT LENGTH  
CT.2 LOGICAL RECORD BASE RELATIVE BIT ADDRESS  
CT.3 RANDOM FILE ACTUAL BINARY DISK KEY  
(RECORD NUMBER INSERTED BY MCP FOR SERIAL FILES)  
OR  
LENGTH OF KEY FOR REMOTE FILES  
CT.4 ADDRESS OF KEY FOR REMOTE FILES ONLY  
CT.5 LENGTH IN BITS OF RESULT MASK  
CT.6 BASE RELATIVE ADDRESS OF RESULT MASK FIELD  
REINSTATE.MSG.PTR VALUES  
0 GOOD READ  
1 END OF FILE  
2 I/O ERROR  
3 INCOMPLETE I/O  
4 IMPOSSIBLE SEARCH (RPG SEARCH OP)

WRITE = CT.VERB 02

WRITE (MICRO MCP)

-----

CT.VERB	02	
CT.OBJECT	FILE.NUMBER	
CT.ADVERB	BIT	
	0	REPORT & RETURN TO USER ON EOF
	1	REPORT & RETURN TO USER ON PARITY
	2	REPORT & RETURN TO USER ON INCOMPLETE I/O
	3	LENGTH ADDRESS PAIR IS PRESENT FOR RESULT MASK FIELD
	4-5	-
	6	QUEUE FILES: WRITE TO FRONT OF QUEUE ("STACK").
	7	STACKERS--STACKER # IS IN CT.3
	8-11	PRINTER SPACING (4 BIT VALUE)
		0 NO PAPER ADVANCE
		1 SKIP TO CHANNEL 1 AFTER PRINTING
		2 SKIP TO CHANNEL 2 AFTER PRINTING
		3 SKIP TO CHANNEL 3 AFTER PRINTING
		4 SKIP TO CHANNEL 4 AFTER PRINTING
		5 SKIP TO CHANNEL 5 AFTER PRINTING
		6 SKIP TO CHANNEL 6 AFTER PRINTING
		7 SKIP TO CHANNEL 7 AFTER PRINTING
		8 SKIP TO CHANNEL 8 AFTER PRINTING
		9 SKIP TO CHANNEL 9 AFTER PRINTING
		A SKIP TO CHANNEL 10 AFTER PRINTING
		B SKIP TO CHANNEL 11 AFTER PRINTING
		C SKIP TO CHANNEL 12 AFTER PRINTING
		D SKIP TO NEXT CHANNEL AFTER PRINTING
		E SINGLE SPACE AFTER PRINTING
		F DOUBLE SPACE AFTER PRINTING
CT.1		LOGICAL RECORD BIT LENGTH
CT.2		LOGICAL RECORD BASE RELATIVE BIT ADDRESS
CT.3		RANDOM FILE ACTUAL BINARY DISK KEY (RECORD NUMBER INSERTED BY MCP FOR SERIAL FILES) OR LENGTH OF KEY FOR REMOTE FILES
CT.4		ADDRESS OF KEY FOR REMOTE FILES ONLY
CT.5		LENGTH IN BITS OF RESULT MASK
CT.6		BASE RELATIVE ADDRESS OF RESULT MASK FIELD

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REINSTATE.MSG.PTR VALUES

0	GOOD WRITE
1	END OF FILE
2	I/O ERROR
3	INCOMPLETE I/O

SEEK = CI.VERB 03

SEEK (MICRO MCP)

----

CT.VERB	03
CT.OBJECT	FILE.NUMBER
CT.ADVERB	-
CT.1	-
CT.2	-
CT.3	RANDOM FILE ACTUAL BINARY DISK KEY

SORTER CONTROL = CI.VERB 04

SORTER CONTROL  
-----

CT.VERB	04	
CT.OBJECT	FILE.NUMBER	
CT.ADVERB	BIT	
	0-5	-
	6	POCKET SELECT
	7	STOP-FLOW
	8	BATCH-COUNT
	9	POCKET LIGHT
	10	-
	11	ENDORSE
CT.1	POCKET NUMBER	

SORTER READ = CI.VERB 05

SORTER READ (MICRO MCP)  
-----

CT.VERB	05	
CT.OBJECT	FILE.NUMBER	
CT.ADVERB	-	
CT.1	READ AREA BIT LENGTH	
CT.2	READ AREA BASE RELATIVE BIT ADDRESS	



OPEN (DM) = CI.VERB 06

OPEN (DM)

-----  
CT.VERB 06  
CT.OBJECT INVOKE NUMBER & PATH NUMBER  
CT.ADVERB BIT  
0 INCLUDES PACKID OF DICTIONARY  
1 -  
2 DM.STATUS FORMAT  
0=BINARY  
1=4-BIT DECIMAL  
3 ON EXCEPTION  
4 UPDATE  
5 REORGANIZATION ( REORG ONLY)  
6-11 -  
CT.1 DM.STATUS REGISTER BIT LENGTH  
CT.2 DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS  
CT.3 DATA BASE NAME BASE RELATIVE BIT ADDRESS  
CT.4 DATA BASE NAME BIT LENGTH  
CT.5 PACKID BASE RELATIVE BIT ADDRESS (BIT 0 OF  
CT.ADVERB = 1)  
CT.6 PACKID BIT LENGTH (BIT 0 OF CT.ADVERB = 1)

CLOSE (DM) = CI.VERB 07

CLOSE (DM)

-----  
CT.VERB 07  
CT.OBJECT -  
CT.ADVERB BIT  
0-1 -  
2 DM.STATUS FORMAT  
0=BINARY  
1=4-BIT DECIMAL  
3 ON EXCEPTION  
4-11 -  
CT.1 DM.STATUS REGISTER BIT LENGTH  
CT.2 DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS

OPEN = CI.VERB 00

OPEN

----

CT.VERB	08	
CT.OBJECT	FILE.NUMBER	
CT.ADVERB	BIT	
	0	INPUT
	1	OUTPUT
	2	NEW FILE
	3	PUNCH
	4	PRINT
	5	NO REWIND/INTERPRET (DATA RECORDERS)
	6	REVERSE/POCKET (CARD PUNCH)
	7	LOCK
	8	LOCKOUT
	9	REPORT FILE MISSING
	10	REPORT FILE LOCKED
	11	OVERRIDE NAMING CONVENTION AND SECURITY
REINSTATE.MSG.PTR	VALUES	
	0	GOOD OPEN
	1	FILE NOT PRESENT (INPUT DISK)
		PACK NOT PRESENT (OUTPUT DISK)
		NO MORE FILES ON MULTI-FILE REEL (TAPE)
	2	FILE LOCKED (DISK FILES ONLY)

CLOSE = CI.VERB 02

CLOSE

-----

CT.VERB	09	
CT.OBJECT	FILE.NUMBER	
CT.ADVERB	BIT	
	0	REEL
	1	RELEASE
	2	PURGE
	3	REMOVE
	4	CRUNCH
	5	NO REWIND
	6	OVERRIDE NAME CONVENTION AND SECURITY
	7	LOCK
	8	IF NOT CLOSED
	9	ROLLOUT
	10	AUDIT SWITCH
	11	TERMINATE

**POSITION (MICRO MCP (BACKUP FILES ONLY)) = CI.VERB 10**

**POSITION (MICRO MCP (BACKUP FILES ONLY))**  
-----

CT.VERB        10  
CT.OBJECT     FILE.NUMBER  
CT.ADVERB     BIT  
              0        REPORT & RETURN TO USER ON EOF  
              1        REPORT & RETURN TO USER ON PARITY  
              2        REPORT & RETURN TO USER ON INCOMPLETE I/O  
              3-7  
              8        POSITION TO END OF FILE  
              9        CT.1 CONTAINS PRINTER CHANNEL NUMBER  
              10       CT.1 CONTAINS RECORD COUNT AS A FIXED NUMBER  
              11       CT.1 CONTAINS RECORD NUMBER DESIRED  
CT.1           DEFINED BY BITS IN CT.ADVERB  
REINSTATE.MSG.PTR VALUES  
              0        GOOD POSITION  
              1        END OF FILE (OR END OF PAGE ON PRINTER)  
              2        I/O ERROR  
              3        INCOMPLETE I/O

**ACCESS FILE PARAMETER BLOCK (FPB) = CI.VERB 11**

**ACCESS FILE PARAMETER BLOCK (FPB)**  
-----

CT.VERB       11  
CT.OBJECT     FILE.NUMBER  
CT.ADVERB     BIT  
              0-10   -  
              11     0=READ  
                   1=WRITE  
CT.1           RECEIVING FIELD BIT LENGTH  
CT.2           RECEIVING FIELD BASE RELATIVE BIT ADDRESS

ACCESS FILE INFORMATION BLOCK (FIB) = CI.VERB 12

ACCESS FILE INFORMATION BLOCK (FIB)  
-----

CT.VERB        12  
CT.OBJECT     FILE.NUMBER  
CT.ADVERB     BIT  
              0-10 -  
              11     FORMAT  
                      0=CHARACTER  
                      1=BINARY  
CT.1           RECEIVING FIELD BIT LENGTH  
CT.2           RECEIVING FIELD BASE RELATIVE BIT ADDRESS

DATA OVERLAY = CI.VERB 13

DATA OVERLAY  
-----

CT.VERB        13  
CT.OBJECT     BASE RELATIVE BIT ADDRESS OF 76 BIT FIELD IN FORMAT OF :  
              4 BITS -  
              24 BITS BEGINNING ADDRESS  
              24 BITS ENDING ADDRESS  
              24 BITS RELATIVE DISK ADDRESS

**ACCESS DISK FILE HEADER (DFH) = CI.VERB 14**

**ACCESS DISK FILE HEADER (DFH)**  
-----

CT.VERB        14  
CT.OBJECT     BASE RELATIVE ADDRESS OF 30 CHARACTER FILE IDENTIFIER :  
                  PACK.ID CAT MFID CAT FID  
CT.ADVERB     BIT  
                  0-5     -  
                  6        IN-SECURE  
                  7-8     -  
                  9-11    0=WRITE  
                          1=READ  
                          2=READ & FORMAT IN BINARY  
                          3=READ & FORMAT IN CHARACTERS  
CT.1            RECEIVING FIELD BIT LENGTH  
CT.2            RECEIVING FIELD BASE RELATIVE BIT ADDRESS  
REINSTATE.MSG.PTR VALUES  
                  0        COMMUNICATE COMPLETE  
                  1        FILE NOT PRESENT

FIND/MODIFY (DM) = CI.VERB 15

FIND/MODIFY (DM)  
-----

CT.VERB	15	
CT.OBJECT		INVOKE NUMBER & PATH NUMBER OF THE PATH-NAME
CT.ADVERB	BIT	
	0	RETURN LIST HEADS (REORG ONLY)
	1	RETURN LOGICAL ADDRESS (REORG ONLY)
	2	DM.STATUS FORMAT 0=BINARY 1=4-BIT DECIMAL
	3	ON EXCEPTION
	4	-
	5	MODIFY
	6-10	SELECTION EXPRESSION
	0	NEXT
	1	PRIOR
	2	FIRST
	3	LAST
	4	NEXT AT
	5	CURRENT
	6	AT
	11	DATA SET SELECTION EXPRESSION
CT.1		DM.STATUS REGISTER BIT LENGTH
CT.2		DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS
CT.3		DATASET RECORD WORK AREA BIT LENGTH
CT.4		DATASET RECORD WORK AREA BASE RELATIVE BIT ADDRESS
CT.5		SEARCH KEY (CAT OF COMPONENT NAMES) BASE RELATIVE BIT ADR.
CT.6		INVOKE NUMBER & PATH NUMBER OF DATASET-NAME

**STORE (DM = CI.VERB 16**

**STORE (DM)**

-----

CT.VERB	16	
CT.OBJECT		INVOKE NUMBER & PATH NUMBER (SUBSET IF INSERT)
CT.ADVERB	BIT	
	0	INSERT
	1	-
	2	DM.STATUS FORMAT 0=BINARY 1=4-BIT DECIMAL
	3	ON EXCEPTION
	4	BEGIN TRANSACTION (NOT INSERT)
	5	INCLUDES.LIST.HEADS (REORG ONLY)
	6	END TRANSACTION (NOT INSERT)
	7	NO AUDIT (BEGIN OR END TRANSACTION ONLY)
	8	SYNC (END TRANSACTION ONLY)
	9	-
	10	STORE INDEXES ONLY (REORG ONLY)
	11	PSEUDO CREATE (REORG ONLY)
CT.1		DM.STATUS REGISTER BIT LENGTH
CT.2		DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS
CT.3		DATASET RECORD WORK AREA BIT LENGTH (NOT INSERT) INVOKE NUMBER & PATH NUMBER OF DATASET (INSERT)



**DELETE (DM) = CI-VERB 17**

**DELETE (DM)**  
-----

<b>CT.VERB</b>	<b>17</b>
<b>CT.OBJECT</b>	<b>INVOKE NUMBER &amp; PATH NUMBER (SUBSET IF REMOVE)</b>
<b>CT.ADVERB</b>	<b>BIT</b>
	<b>0 REMOVE</b>
	<b>1 -</b>
	<b>2 DM.STATUS FORMAT</b>
	<b>0=BINARY</b>
	<b>1=4-BIT DECIMAL</b>
	<b>3 ON EXCEPTION</b>
	<b>4-11 -</b>
<b>CT.1</b>	<b>DM.STATUS REGISTER BIT LENGTH</b>
<b>CT.2</b>	<b>DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS</b>
<b>CT.3</b>	<b>DATASET RECORD WORK AREA BIT LENGTH (NOT REMOVE)</b>
	<b>INVOKE NUMBER &amp; PATH NUMBER OF DATASET (REMOVE)</b>
<b>CT.4</b>	<b>DATASET RECORD WORK AREA BASE RELATIVE BIT ADDRESS (NOT INSERT)</b>

CREATE/RECREATE (DM) = CI.VERB 18

CREATE/RECREATE (DM)

-----  
CT.VERB        18  
CT.OBJECT     INVOKE NUMBER & PATH NUMBER  
CT.ADVERB     BIT  
              0        -  
              1        RECREATE  
              2        DM.STATUS FORMAT  
                      0=BINARY  
                      1=4-BIT DECIMAL  
              3        ON EXCEPTION  
              4-11     -  
CT.1           DM.STATUS REGISTER BIT LENGTH  
CT.2           DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS  
CT.3           DATASET RECORD WORK AREA BIT LENGTH  
CT.4           DATASET RECORD WORK AREA BASE RELATIVE BIT ADDRESS

SWITCH.TAPE.DIRECTION = CI.VERB 19

SWITCH.TAPE.DIRECTION

-----  
CT.VERB        19  
CT.OBJECT     FILE.NUMBER  
CT.ADVERB     BIT  
              0-7     NOT USED  
              8-11  0 = READ FORWARD  
                      1 = READ REVERSE  
                      4 = WRITE  
REINSTATE.MSG.PTR VALUES  
              0        GOOD SWITCH  
              1        FILE NOT OPEN  
              2        WRONG DIRECTION OR NOT A TAPE FILE  
              3        END OF FILE

TERMINATE (SIOP RUN) = CI.VERB 20

TERMINATE (STOP RUN)

-----  
CT.VERB 20

FREE (DM) = CI.VERB 21

FREE (DM)

-----

CT.VERB 21  
CT.OBJECT INVOKE NUMBER & PATH NUMBER  
CT.ADVERB BIT  
0-1 -  
2 DM.STATUS FORMAT  
0=BINARY  
1=4-BIT DECIMAL  
3 ON EXCEPTION  
4-11 -

CT.1 DM.STATUS REGISTER BIT LENGTH  
CT.2 DM.STATUS REGISTER BASE RELATIVE BIT ADDRESS

TIME/DATE/DAY = CI.VERB 22

TIME/DATE/DAY

-----

CT.VERB 22  
 CT.OBJECT BASE RELATIVE BIT ADDRESS OF WHERE TO PUT THE RESULT  
 CT.ADVERB BIT

0 1=DATE REQUESTED  
 1-2 FORMAT  
 0 YY/DDD (JULIAN)  
 1 MM/DD/YY  
 2 YY/MM/DD  
 3 DD/MM/YY  
 3-4 REPRESENTATION  
 0 BINARY  
 1 4-BIT DECIMAL  
 2 8-BIT DECIMAL  
 5 1=TIME REQUESTED  
 6-7 FORMAT  
 0 COUNTER  
 1 HH:MM:SS.S (24-HOUR CLOCK)  
 2 HH:MM:SS.S TT (12-HOUR CLOCK, TT=AM/PM)  
 8-9 REPRESENTATION  
 0 BINARY  
 1 4-BIT DECIMAL  
 2 8-BIT DECIMAL  
 10 1=TODAYS.NAME REQUESTED  
 11 -

NOTE : TODAYS.NAME RETURNS 9 CHARACTERS LEFT JUSTIFIED

FORMAT	BINARY	4-BIT DECIMAL	8-BIT DECIMAL
.....	.....	.....	.....
YY/DDD (JULIAN)	7+9=16	8+12=20	16+24=40
MM/DD/YY	4+5+7=16	8+8+8=24	16+16+16=48
YY/MM/DD	7+4+5=16	8+8+8=24	16+16+16=48
DD/MM/YY	5+4+7=16	8+8+=24	16+16+16=48
COUNTER	20	24	48
HH:MM:SS.S	5+6+6+4=21	8+8+8+4=28	16+16+16+8=56
HH:MM:SS.S TT	4+6+6+4+16=36	8+8+8+4+16=44	16+16+16+8+16=72
TODAYS.NAME			72 (9 CHAR, LEFT JUST.)

**INITIALIZER I/O = CT.VERB 23**

**INITIALIZER I/O**

-----

**CT.VERB 23**

**CT.OBJECT** BASE RELATIVE ADDRESS OF  
6 BYTE UNIT MNEMONIC  
OR  
I/O DESCRIPTOR

**CT.ADVERB** VALUE

- 0 ASSIGN UNIT TO THIS PROGRAM
- 1 RELEASE UNIT
- 2 LINK IN THE I/O DESCRIPTOR BUT DO NOT INITIATE
- 3 LINK IN THE I/O DESCRIPTOR AND INITIATE
- 4 LINK IN, INITIATE, WAIT, AND IGNORE  
EXCEPTIONS (NON-RELEASE MCPS ONLY)

5-11 -

**REINSTATE.MSG.PTR** VALUES

- IF CT.ADVERB=0 THEN
- PORT, CHANNEL AND UNIT OF DEVICE REQUESTED
- PORT BIT (3)
- CHANNEL BIT (4)
- FILLER BIT (1)
- UNIT BIT (4)
- ALL OTHER CASES RETURN 0

**WAIT (SNOOZE) = CI.VERB 24**

**WAIT (SNOOZE)**

-----

CT.VERB        24  
CT.OBJECT     LENGTH OF TIME IN 10THS OF A SECOND  
FUNCTION      PROGRAM IS PUT TO SLEEP FOR SPECIFIED LENGTH OF TIME

**ZIP = CI.VERB 25**

**ZIP**

---

CT.VERB        25  
CT.OBJECT     -  
CT.ADVERB     -  
CT.1          MESSAGE AREA BIT LENGTH  
CT.2          MESSAGE AREA BASE RELATIVE BIT ADDRESS  
REINSTATE.MSG.PTR VALUES  
              0      NO ERRORS IN ZIP TEXT  
              1      ZIPPED INVALID CONTROL CARD

**ACCEPI = CI.VERB 26**

**ACCEPT**

-----

CT.VERB        26  
CT.OBJECT     -  
CT.ADVERB     BIT  
              0      RETURN IF NO MESSAGE  
              1-11 -  
CT.1          MESSAGE AREA BIT LENGTH  
CT.2          MESSAGE AREA BASE RELATIVE BIT ADDRESS  
REINSTATE.MSG.PTR VALUES  
              0      MESSAGE OF LENGTH ZERO  
              0FFFFFF3 NO MESSAGE PRESENT  
              ANY OTHER VALUE LENGTH OF MESSAGE IN BITS

DISPLAY = CI.VERB 27

DISPLAY

-----

CT.VERB        27  
CT.OBJECT     -  
CT.ADVERB     8 BIT  
              0-10 -  
              11    0=CRUNCH BLANKS OUT OF MESSAGE  
                  1=PRINT MESSAGE AS IS  
CT.1           MESSAGE AREA BIT LENGTH  
CT.2           MESSAGE AREA BASE RELATIVE BIT ADDRESS

USE/RETURN = CI.VERB 28

USE/RETURN

-----

CT.VERB       28

SORT HANDLER = CI.VERB 29

SORT HANDLER

-----

CT.VERB       29  
CT.OBJECT     BASE RELATIVE ADDRESS OF SORT INFORMATION TABLE  
CT.ADVERB     BIT (12)  
              0 - SORT.RESTART  
              1 - SORT.DUPCHECK  
              2 - SORT.W1.PID  
              3 - SORT.W2.PID  
              4-11 FILLER  
CT.1           BASE RELATIVE BIT ADDRESS OF SORT KEY TABLE  
CT.2           INPUT FILE.NUMBER OR ADDR OF MERGE.INPUT.TABLE IF MERGE  
CT.3           OUTPUT FILE.NUMBER  
CT.4           TRANSLATE FILE.NUMBER OR NOT 0  
CT.5           -  
CT.6           DATA.ADDRESS (DELETE.KEY.TABLE)  
CT.7           IF (SORT.W1.PID := W1.PID.FLAG) THEN  
                 DATA.ADDRESS (W1.PID) ELSE 0  
CT.8           IF (SORT.W2.PID := W2.PID.FLAG) THEN  
                 DATA.ADDRESS (W2.PID) ELSE 0

**SDL IRACE = CI.VERB**

**SDL TRACE**

-----

CT.VERB        30  
CT.OBJECT     TRACE FLAGS

**EMULATOR TAPE (MICRO MCP) = CI.VERB 31**

**EMULATOR TAPE (MICRO MCP)**

-----

CT.VERB        31  
CT.OBJECT     FILE.NUMBER  
CT.ADVERB     BIT  
              0-2     OP.CODE  
                      0 = READ  
                      1 = WRITE  
                      2 = SPACE  
                      3 = REWIND  
                      4 = TEST  
              3-8     OP.CODE.VARIANT  
                      3 = REVERSE (READ, SPACE), ERASE (WRITE),  
                              TEST.WAIT.READY.NOT.REWIND (TEST)  
                      4 = ONE.RECORD (SPACE), TAPE.MARK (WRITE),  
                              TEST.WAIT.NOT.READY (TEST)  
                      5 = ODD.PARITY (READ, SPACE, WRITE)  
                      6 = NOISE (READ, SPACE)  
                      7-8 = NOT USED  
              9-11    SCHEDULING.VARIANTS  
                      9 = FETCH.RESULT  
                      10 = DONT.WAIT  
                      11 = REPORT AND RETURN ON IO ERROR  
  
CT.1            USER TAPE BUFFER BIT LENGTH  
CT.2            USER TAPE BUFFER BASE RELATIVE ADDRESS  
CT.3            USER ERROR MASK (BIT SET IMPLIES USER WILL HANDLE THE  
                              CORRESPONDING ERROR)  
              BIT  
              0            (MAY NOT USE)



1 (MAY NOT USE)  
2 NOT READY  
3 PARITY (NOT ON TEST)  
4 ACCESS (NOT ON TEST)  
5 TRANSMISSION (ON TEXT ONLY)  
6 END.OF.TAPE  
7 BEGINNING.OF.TAPE  
8 WRITE.LOCK.OUT  
9 END.OF.FILE (NOT ON TEST), UNIT.PRESENT (ON TEST)  
10 REWINDING  
11 TIME.OUT (NOT ON TEST)  
12-16 (MAY NOT USE)  
17 SHORT.RECORD  
18 LONG.RECORD  
19 DROPOUT  
20 INITIATE.LATE  
21 (MAY NOT USE)  
22 TRANSMISSION.ERROR.MEC  
23 TRANSMISSION.ERROR.MTC

CT.4 BASE RELATIVE ADDRESS OF USER'S 48 BIT RESULT  
BIT 0-23 OF RESULT CONTAIN THE RESULT DESCRIPTOR  
BIT 24-47 OF RESULT CONTAIN THE ACTUAL LENGTH

REINSTATE.MSG.PTR VALUES

0 = RESULT RETURNED  
1 = IO.ERROR  
2 = RESULT NOT AVAILABLE

COBOL PROGRAM ABNORMAL END = CI.VERB 32

COBOL PROGRAM ABNORMAL END

-----  
CT.VERB 32

SORT EOJ = CI.VERB

SORT EOJ

-----

CT.VERB 33  
CT.OBJECT FILE.NUMBER  
CT.ADVERB CLOSE TYPE  
CT.1 END-OF-FILE POINTER  
CT.2 RECORD SIZE

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CI.VERB 34 (UNUSED)

FREEZE/THAW RUN STRUCTURE = CI.VERB 35

FREEZE/THAW RUN STRUCTURE

-----  
CT.VERB        35  
CT.OBJECT     BIT 0 (HIGH ORDER BIT)  
              0=THAW  
              1=FREEZE

**COMPILE CARD INFORMATION - CI.VERB 36**

**COMPILE CARD INFORMATION**  
-----

CT.VERB        36  
48 BITS        SOL DESCRIPTOR (WHERE TO PUT INFO) IN FORMAT :  
                 16 BITS=LENGTH  
                 24 BITS=ADDRESS

RETURNS COMPILE CARD INFO IN FOLLOWING FORMAT :  
#CHARS    INFO

-----  
30        OBJECT NAME  
02        EXECUTE TYPE  
10        PACK.NAME OF THE RUNNING PROGRAM  
30        INTERPRETER NAME OF THE RUNNING PROGRAM  
10        INTRINSIC NAME (FAMILY)  
02        PRIORITY  
06        SESSION NUMBER  
06        JOB NUMBER  
20        1ST & 2ND NAMES OF RUNNING PROGRAM  
07        CHARGE NUMBER  
01        FILLER  
36 BITS    DATE AND TIME COMPILED  
04 BITS    FILLER  
10        USERCODE  
10        PASSWORD  
04        PARENT JOB NUMBER  
20        PARENT QUEUE IDENTIFIER  
01        LOG SPO

**DYNAMIC MEMORY BASE - CI.VERB 37**

**DYNAMIC MEMORY BASE**  
-----

CT.VERB        37  
                 VALUE IS RETURNED IN COMMUNICATE MESSAGE POINTER AS  
                 SELF RELATIVE DESCRIPTOR

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**MEMORY DUMP IO DISK = CI.VERB 38**

MEMORY DUMP TO DISK  
-----  
CT.VERB        38

**GEI SESSION NUMBER = CI.VERB 39**

GET SESSION NUMBER  
-----  
CT.VERB        39  
                SESSION IS PUT INTO RS.REINSTATE.MSG.POINTER

**DC.INITIALTE.IO = CI.VERB 40**

DC.INITIALTE.IO  
-----  
CT.VERB        40  
24 BITS        PORT  
24 BITS        CHANNEL  
24 BITS        BASE RELATIVE ADDRESS OF I/O DESCRIPTOR

**NDL/MACRO COMMUNICATES = CT.VERB 41**

**NDL/MACRO COMMUNICATES**  
-----

CT.VERB        41  
CT.OBJECT     INDICATES FUNCTION  
DESC1         BIT 1-48     MESSAGE AREA 1  
DESC2         BIT 49-96    MESSAGE AREA 2  
QUEUE.PTR     BIT 97-106   REMOTE FILE NUMBER OR STATION NUMBER

**DCWRITE**

**DCWRITE**  
-----

CT.OBJECT     11  
DESC1         RESULT AREA  
DESC2         DC.WRITE MESSAGE  
NOTE:         NUMBER AT SUBSTR(DESC2,6,2) IS MESSAGE TYPE  
               40=FINISH OPEN  
               41=NDL/MACRO PRESENT  
               42=ATTACH STATIONS TO REMOTE FILE  
               43=DETACH STATIONS FROM REMOTE FILE

**QUICK QUEUE WRITE (REMOTE FILES)**

**QUICK QUEUE WRITE (REMOTE FILES)**  
-----

CT.OBJECT     12  
DESC1         MESSAGE HEADER  
DESC2         MESSAGE  
RMT.FL        REMOTE FILE TO WHICH THE MESSAGE IS DESTINED

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**QUICK QUEUE WRITE (STATION NUMBER)**

**QUICK QUEUE WRITE (STATION NUMBER)**

-----  
CT.OBJECT    13  
DESC1        MESSAGE HEADER  
DESC2        MESSAGE  
ST.NR        STATION NUMBER

**ACCESS USERCODE FILE**

**ACCESS USERCODE FILE**  
-----

CT.VERB      42  
DESC          BIT 0-47 DESCRIPTOR TO PARAMETER LIST.

**PARAMETER LIST LAYOUT**

- | MODE | BIT (4)   |
|------|---|
| 0    | SET ALL PARAMETERS IN LIST EXCEPT USERCODE AND PASSWORD. THESE MUST BE SUPPLIED TO FIND CORRECT ENTRY.  |
| 1    | SET ALL PARAMETERS IN LIST EXCEPT INDEX. INDEX MUST BE SUPPLIED TO FIND ENTRY.  |
| 2    | SET OVERRIDE. USERCODE MUST BE PRESENT TO FIND ENTRY. THE OVERRIDE FIELD FOR ALL OCCURRENCES OF THIS USERCODE WILL BE SET.  |
| 3    | SET OVERRIDE. INDEX MUST BE SUPPLIED TO FIND ENTRY. THE OVERRIDE FIELD FOR ALL OCCURRENCES OF THIS USERCODE WILL BE SET.  |
| 4    | ADD ENTRY. ALL FIELDS HAVE TO BE SUPPLIED.  |
| 5    | DELETE ENTRY. USERCODE AND PASSWORD MUST BE SUPPLIED TO FIND ENTRY.   |
| 6    | INITIALIZE ALL OVERRIDE BITS.   |
| 7    | CHANGE BY USERCODE. ALL ENTRIES FOR A GIVEN USERCODE CAN BE CHANGED WITH ONE COMMUNICATE. USERCODE MUST BE PRESENT. PACK FIELD MUST NOT BE EQUAL TO ZERO TO CHANGE IT. CHARGE NUMBER MUST NOT BE EQUAL TO ZERO TO CHANGE IT. PRIORITY MUST NOT BE EQUAL TO ZERO TO CHANGE IT. |
| 8    | DELETE ALL RECORDS FOR A GIVEN USERCODE. USERCODE MUST BE PRESENT.  |
| 9    | SET ALL PARAMETERS IN LIST EXCEPT USERCODE AND PASSWORD. ONLY USERCODE HAS TO BE SUPPLIED BECAUSE SEARCH STOPS ON FIRST ENCOUNTER OF GIVEN USERCODE.  |
| 10   | CHANGE BY INDEX. INDEX MUST BE PRESENT. PRIORITY CAN BE CHANGED BY SETTING FIELD TO NON-ZERO. CHARGE CAN BE CHANGED BY SETTING CHARGE FIELD TO NON-ZERO. PASSWORD CAN BE CHANGED BY SETTING PASSWORD TO NON-ZERO.   |
| 11   | CLEAR PACK OVERRIDE FIELD FOR ALL OCCURRENCES OF THIS USERCODE. USERCODE MUST BE SUPPLIED.  |
| 12   | CLEAR PACK OVERRIDE BID FOR ALL OCCURRENCES OF THIS USERCODE. INDEX MUST BE SUPPLIED.   |

INDEX BIT (10)  
USERCODE CHARACTER (10)  
WHEN SET BY PROGRAM (MODE = 0, 2, 4, 5, 7, 8, 9, 11),  
THE USERCODE MAY OR MAY NOT CONTAIN PARENTHESES.  
IF PARENS ARE NOT FOUND, ONLY THE FIRST EIGHT  
USED.  
WHEN SET BY MCP (MODE = 1)  
USERCODE WILL ALWAYS CONTAIN PARENTHESES.  
PASSWORD CHARACTER (10)  
PACK NAME CHARACTER (10)  
CHARGE # BIT (24)  
PRIORITY BIT (4)  
PRIVILGD BIT (1)  
OVERRIDE BIT (1)  
REINSTATE.MSG.PTR VALUES  
0 NO ERRORS.  
1 ERROR ON INPUT: EITHER INDEX IS WRONG OR  
USERCODE/PASSWORD IS NOT PRESENT.  
2 "(SYSTEM)/USERCODE" FILE NOT IN "US" SLOT.

**CT.VERB 43 (UNUSED)**

**PROGRAM CALLER = CT.VERB 44**

PROGRAM CALLER

-----  
CT.VERB 44  
48 BITS SDL DESCRIPTOR  
24 BIT LENGTH OF TEXT  
24 BIT BASE RELATIVE ADDRESS OF TEXT

**STACK SIZE CHANGE = CT.VERB 45**

STACK SIZE CHANGE

-----  
CT.VERB 45  
CT.OBJECT CODEFILE-RELATIVE DISK ADDRESS OF NEW SPAD



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**LOAD.DUMP MESSAGE = CT.VERB 46**

**LOAD.DUMP MESSAGE**  
-----

CT.VERB	46
CT.OBJECT	BASE RELATIVE ADDRESS OF MESSAGE
CT.ADVERB	BIT
	0      1=LOADED    0=DUMPED
	1-11   -



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MESSAGE COUNT = CT.VERB 48

MESSAGE COUNT  
-----

CT.VERB 48  
CT.OBJECT FILE.NUMBER  
CT.ADVERB 0 DECIMAL FORMAT RESULTS IF TRUE  
COBOL ("PIC 999")  
ELSE BINARY (BIT (24))

1-11 -  
CT.1 RESULT FIELD LENGTH  
CT.2 BASE RELATIVE RESULT FIELD ADDRESS  
FUNCTION RETURN THE COUNT OF THE MESSAGES CONTAINED  
IN THE QUEUE-FILE SPECIFIED. IF THE OBJECT  
IS A QUEUE-FILE-FAMILY, THE COUNT WILL BE  
RETURNED AS A LEFT-JUSTIFIED ARRAY OF  
24-BIT COUNTS, ONE FOR EACH MEMBER OF  
THE FAMILY.

**DISK READER = CI.VERB 49**

**DISK READER**

-----

CT.VERB        49  
CT.OBJECT     BASE RELATIVE ADDRESS OF RECEIVER FIELD  
CT.ADVERB     PORT, CHANNEL AND UNIT OF DESIRED DISK  
CT.1          DISK ADDRESS  
CT.2          LENGTH (IN BITS) OF RECEIVER FIELD  
REINSTATE.MSG.PTR VALUES  
              0     READ DONE AS REQUESTED  
              1     READ NOT DONE

**RECOVERY COMPLETE = CI.VERB 50**

**RECOVERY COMPLETE**

-----

CT.VERB        50  
CT.OBJECT                                DATA BASE GLOBALS BASE RELATIVE BIT ADDRESS

**GET.ATTRIBUTES = CI.VERB 51**

**GET.ATTRIBUTES**

-----

CT.VERB        51  
CT.OBJECT     FILE NUMBER  
CT.ADVERB     COMMUNICATE LEVEL (MK 7.0 LEVEL=1)  
CT.1          TOTAL ATTRIBUTES (MUST BE 1 IN 7.0)  
CT.2          BASE RELATIVE ADDRESS OF ATTRIBUTE LIST

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SANTA BARBARA PLANT

2-34  
COMPANY CONFIDENTIAL  
MCP CONTROL SYNTAX  
2219 0144 (A) SEC. II

CHANGE.ATTRIBUTES = CT.VERB 52

CHANGE.ATTRIBUTES  
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CT.VERB	52
CT.OBJEXT	FILE NUMBER
CT.ADVERB	COMMUNICATE LEVEL (MK 7.0 LEVEL=1)
CT.1	TOTAL ATTRIBUTES (MUST BE 1 IN 7.0)
CT.2	BASE RELATIVE ADDRESS OF ATTRIBUTE LIST



```

• 02 PL.CONTINUE          CHAR (1)  X      CONTINUATION FLAG "C"
• 02 FILLER              CHAR (26) X
• 02 PL.INT              CHAR (1)  X
• 02 PL.VOL2             CHAR (4)  X      "VOL2"
• 02 PL.DATE.INITIALIZED CHAR (5)  X      INITIALIZING SYSTEM
• 02 PL.INIT.SYSTEM      CHAR (6)  X      DIRECTORY ADDRESS
• 02 PL.DISK.DIRECTORY   CHAR (8)  X      MASTER AOAILABLE TABLE
• 02 PL.MASTER.AVAIL     CHAR (8)  X      WORKING AVAILABLE TABLE
• 02 PL.DISK.AVAILABLE   CHAR (8)  X      0 = NORMAL
• 02 PL.INTEGRITY        CHAR (1)  X      1 = RECOVERY REQUIRED
• 02 PL.ERROR.COUNT      CHAR (6)  X
• 02 PL.SECTORS.XD        CHAR (6)  X      REMOVED SECTORS
• 02 PL.TEMP.TABLE       CHAR (8)  X      TEMP TABLE LINK
• 02 PL.PCD              CHAR (3)  X      LAST PORT, CHAN, DRIVE
• 02 PL.ASSIGNED.TO.BPS  CHAR (6)  X      BASE PACK SERIAL NUMBER
• 02 PL.SP.SEC.FLAGS     CHAR (8)  X      SPARE.SECTOR.TABLE FOR 225 DSK
• 02 FILLER              CHAR (23)
;#;X
  
```

**FILE HEADER**

```

DEFINE FILE.HEADER.DECLARATION AS #X
  FH.MAP(FILE.HEADER)#
FH.MAP(FILE.HEADER) AS #X
DECLARE 01 DUMMY REMAPS FILE.HEADER,X
  02 FH.USERS.RANDOM      BIT(8),X  FORMERLY FH.CORE.ADDR
  02 FH.NEWFILE           BIT(1),X  CLEARED WHEN NEW FILE IS FILED.
  02 FILLER               BIT(1),X
  02 FILLER               BIT(6),X
  02 FH.FILE.KIND         BIT(8),X
  02 FH.SELF              DSK.ADR,
  02 FH.NO.USERS          BIT (8),
  02 FH.USERS.OPEN.OUT    BIT (4),
  02 FH.OPEN.TYPE        BIT (4),
  02 FH.FILE.TYPE         BIT (4),
  
```

02	FH.PERMANENT	BIT (4),
02	FH.JOB.WAITING.ON.CLOSE	BOOLEAN,
02	FILLER	BIT(9), X DON'T USE UNTIL 1977
02	FH.HDR.SIZE	BIT(14),X LENGTH OF MYSELF IN BITS.
02	FILLER	BIT(4),X DON'T REUSE TILL 1977.
02	FH.RECORD.SIZE	BIT(20),X LENGTH IN BITS.
02	FILLER	BIT(4),X DON'T USE TILL 1977
02	FH.RCDS.BLOCK	BIT(20),X
02	FH.BLOCKS.AREA	WORD,
02	FH.SEGS.AREA	WORD,
02	FH.AREAS.ROST	BIT (12),
02	FH.AREA.CTR	BIT (12),
02	FH.EOF.POINTER	WORD,
02	FILLER	BIT(4),XDON'T USE TILL 1977
02	FH.BPS.NO	BIT(20),X
02	FH.BLOCK.COUNT	BIT(24),X DON'T USE TILL 1977. IGNORED 5.1.
02	FH.FORMAT	BIT(3),X HITHERTO =0. FOR RELEASE, =1.
02	FH.MPF	BIT(1),X HITHERTO 4 BITS.
02	FH.DBM.LINK	ADDRESS,
02	FH.CREATE.TIME	BIT(16),X HITHERTO 0. HENIGE'S GENEROSITY.
02	FH.DBM.DFH.NO	BIT(8),X HITHERTO 24 BITS.
02	FH.USER.INFO	WORD,
02	FH.SAVE.FACTOR	BIT (12),
02	FH.CREATION.DATE	BIT (16),
02	FH.ACCESS.DATE	BIT(16),X
02	FH.SER.NO	BIT(24),X DON'T REUSE TILL 1977. 5.1 IGNORE
02	FH.MPF.ADDR	DSK.ADR, X DONT REUSE TILL 1977
02	FILLER	BIT(1),
02	FH.UPDATE.VERSION	BOOLEAN,
02	FH.DMS.WRITE.CONTROL,	
	03 FH.DMS.TO.BE.WRITTEN	BOOLEAN,
	03 FH.DMS.CONTROLPOINT	BOOLEAN,
02	FH.VERSION	BIT(36), X YEAR,JDAY,TIME
02	FH.PROTECTION	BIT (2),X HOST RJE



02 FH.PROTECTION.IO  
02 FILLER  
02 FH.AREA.ADDRESS (105)  
03 FH.UNIT  
04 FH.PORT  
04 FH.CHAN  
04 FH.SER.NO.FLAG  
04 FH.EU  
03 FH.ADDR

BIT (2),X HOST RJE  
BIT (16),X HOST RJE  
DSK-ADR,  
BIT (12), X  
BIT (3), X  
BIT (4), X  
BOOLEAN, X  
BIT (4), X  
BIT (24);

#;X

### LABEL SIZE

DEFINE LBL.SIZE AS #640#;  
DEFINE

SCRATCH.TYPE AS #0#  
\* USER.TYPE AS #1# X  
\* BACKUP.TYPE AS #2# X  
\* LIBRARY.TYPE AS #3# X  
\* NOT.ANSI AS #0# X  
\* BOV AS #1# X  
\* BOF AS #2# X  
\* EOV AS #3# X  
\* EOF AS #4# X  
\* PFB AS #5# X  
\* LOST AS #7# X  
;

DEFINE STANDARD.LABEL.DECLARATION AS # X

DECLARE 01 DUMMY REMAPS L.LABEL.RECORD X  
\* 02 L.LABEL CHAR (9) X " LABEL 0"  
\* 02 L.MFID CHAR (7) X "  
\* 02 L.Z1 CHAR (1) X "0"  
\* 02 L.ID CHAR (7) X "  
\* 02 L.REEL CHAR (3) X "  
\* 02 L.DW CHAR (5) X DATE WRITTEN  
\* 02 L.CYCLE CHAR (2) X "00"  
\* 02 L.PID CHAR (5) X PURGE DATE  
\* 02 L.S CHAR (1) X SENTINEL (1 = END-OF-REEL)  
\* 02 L.BC CHAR (5) X BLOCK COUNT  
\* 02 L.RC CHAR (7) X RECORD COUNT  
\* 02 L.PB CHAR (1) X PRINT BACKUP FLAG

```
* 02 L.SERIAL CHAR (5) X SERIAL NUMBER
* 02 L.SYSTEM CHAR (5) X CREATING SYSTEM
* 02 L.BUFSIZE CHAR(8) X NEW FORMAT DECIMAL BLOCK SIZE
* 03 L.BSIZE BIT(24) X OLD FORMAT BINARY
* 03 L.RSIZE BIT(24) X OLD FORMAT BINARY
* 02 L.RECSIZE CHAR(8) X NEW FORMAT DECIMAL RECORD SIZE
* 02 L.MODE CHAR(1) X NEW FORMAT RECORDING MODE FOR
X TAPE FILE
```

; # ;

DEFINE ANSI.TAPE.DECLARATION AS #

DECLARE

```
01 DUMMY REMAPS ANSI.TAPE.LABEL CHAR(80)X
* 02 ID.AND.NUMBER CHAR(4) X
* 03 ID CHAR(3) X
* 03 NUMBER CHAR(1) X
* 02 FILLER CHAR (76) X
```

; # ; X

DEFINE VOL.HEADER.DECLARATION AS #

DECLAREX

```
01 DUMMY REMAPS ANSI.TAPE.LABEL X
* 02 FILLER CHAR(4) X
* 02 VOL.ID CHAR(6) X
* 02 ACCESSIBILITY CHAR(1) X
* 02 RFS CHAR(26) X SUPPOSED TO BE RESERVED BUT WE WILL
XUSE IT ANYWAY
* 03 MFID CHAR(17) X"0" IF NO MULTIPLE FILE ID
X"X0" FOR 17 IF SCRATCH
X"BACKUP" FOR BACKUP
* 03 SYS.SYMBOL CHAR(2) X "17"
* 03 TAPE.TYPE CHAR(1) X 0= SCRATCH
X 1= USER
X 2= BACKUP
X 3=LIBRARY
* 03 FILLER CHAR(6) X
* 02 OWNER.ID CHAR(14) X
* 02 FILLER CHAR(28)X
* 02 VERSION CHAR(1) X 1 FOR THIS STANDARD
```

; # ;

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DEFINE HEADER1.DECLARATION AS# X USE FOR HDR1,EOV1,EOF1  
DECLAREX

```

01 DUMMY REMAPS ANSI.TAPE.LABEL
, 02 FILLER CHAR(4)
, 02 FILE.ID CHAR(17)
, 02 FILE.SET.ID CHAR(6)
, 02 FILE.SECTION.NO CHAR(4)
, 02 FILE.SEQ.NO CHAR(4)
, 02 GENERATION.NO CHAR(4)
, 02 GENERATION.VERSION.NO CHAR(2)
, 02 CREATION.DATE CHAR(6)
, 02 EXPIRATION.DATE CHAR(6)
, 02 ACCESSIBILITY CHAR(1)
, 02 BLOCK.COUNT CHAR(6) XHDR1="000000",EOV & EOF = REAL THING
, 02 SYSTEM.CODE CHAR(13) X
, 02 FILLER CHAR(7) X RFS
; #;

```

```

DEFINE HEADER2.DECLARATION AS # XHDR2,EOV2,EOF2
DECLARE X
01 DUMMY REMAPS ANSI.TAPE.LABEL X
, 02 FILLER CHAR(4) X
, 02 RECORD.FORMAT CHAR(1) X F= FIXED,D=VARIABLE,S=SPANNED
, 02 BLOCK.LENGTH CHAR(5) X
, 02 RECORD.LENGTH CHAR(5) X
, 02 RESV.SYSTEM.USE CHAR(35) X
, 03 DENSITY CHAR(1) X 0=800, 1=556,2=200,3=1600
, 03 SENTINAL CHAR(1) X
, 03 PARITY CHAR(1) X 0= ALPHA(EVEN),1=BINARY(ODD)
, 03 EXT.FORM CHAR(1) X 0= UNSPECIFIED
X 1= BINARY
X 2= ASCII
X 3= BCL
X 4= EBCDIC
, 03 FILLER CHAR(31) X
, 02 FILLER CHAR(28) X RFS
; # ;

```

### COLD START VARIABLES

```

DEFINE CSV.SIZE AS #934#;
DECLARE COLD.START.VARIABLES TEMPLATE BIT (CSV.SIZE);
DEFINE CSV.ONE AS #,X
02 CLEAR.START.FLAGS BIT (40),
03 CS.WHICH BIT(4),
03 CS.TRACE BIT (4),
03 CS.INTERP BIT (4),
03 CS.MCP BIT (4),

```

03 CS.GISMO	BIT (4),
03 CS.INIT	BIT (4),
03 CS.EMULATE	BIT(4),
03 CS.MICRO.MCP	BIT (4),
02 NAME.TABLE	DSK.ADR,
02 INTERP.DIC.ENTRIES	WORD,
02 CS.SIZE	WORD,
02 DUMP.FILE	DSK.ADR,
02 CSV.COLD.START.LEVEL	BIT(24),
03 L61.NAME.TABLE	BIT(1),
03 FILLER BIT(23),	
02 MPF.TABLE	DSK.ADR,
02 LOG.MIX.INFO	DSK.ADR,
02 DISK.AVAIL	DSK.ADR,
02 DISK.DIRECTORY	DSK.ADR,
02 TEMP.TABLE	DSK.ADR,
02 SYSTEM.DRIVES	BIT (16),
03 SYSTEM.DRIVE	BOOLEAN,
02 AVL.TAB.DISP	BIT (64),
02 SY.DAY	BIT (5),
02 SY.MONTH	BIT (4),
02 SY.YEAR	BIT (7),
02 SY.JDAY	BIT (9),
02 SY.TIME	BIT (21),
03 SY.HOUR	BIT (5),
03 SY.MIN	BIT (6),
03 SY.SEC	BIT (6),
03 SY.10THSEC	BIT (4),
02 SY.12HOUR	BIT (5),
02 SY.DAYNAME	CHAR (9),
02 SY.MERIDIAN	CHAR (2),
02 SYSTEM.OPTIONS	BIT (80),

03 LOG.OPTION	BOOLEAN,
03 CHARGE.OPTION	BOOLEAN,
03 LIB.OPTION	BOOLEAN,
03 OPEN.OPTION	BOOLEAN,
03 TERM.OPTION	BOOLEAN,
03 TIME.OPTION	BOOLEAN,
03 DATE.OPTION	BOOLEAN,
03 CLOSE.OPTION	BOOLEAN,
03 PBT.OPTION	BOOLEAN,
03 PBD.OPTION	BOOLEAN,
03 BOJ.OPTION	BOOLEAN,
03 EOJ.OPTION	BOOLEAN,
03 SCHM.OPTION	BOOLEAN,
03 LAB.OPTION	BOOLEAN,
03 RMOV.OPTION	BOOLEAN,
03 DUMP.OPTION	BOOLEAN,
03 ZIPP.OPTION	BOOLEAN,
03 MEM.OPTION	BOOLEAN,X
03 SW01.OPTION	BOOLEAN,
03 SW02.OPTION	BOOLEAN,
03 SW03.OPTION	BOOLEAN,
03 PWS.OPTION	BOOLEAN,
03 DMS.OPTION	BOOLEAN,
03 RFAC.OPTION	BOOLEAN,
03 TRMD.OPTION	BOOLEAN,
03 DEBUG.OPTION	BOOLEAN,
03 DISP.OPTION	BOOLEAN,
03 SPOL.OPTION	BOOLEAN,X
03 RMSG.OPTION	BOOLEAN,
03 SQRM.OPTION	BOOLEAN,
03 TABS.OPTION	BOOLEAN,
03 BREL.OPTION	BOOLEAN,
03 MPRI.OPTION	BOOLEAN,
03 THRASHING.OPTION	BOOLEAN,
03 FLMP.OPTION	BOOLEAN,
03 VLCP.OPTION	BOOLEAN,
03 VLIO.OPTION	BOOLEAN,
03 BRGR.OPTION	BOOLEANX

#;X

DEFINE CSV.TWO AS #;X

02 FIRST.SCHED.ENTRY	DSK.ADR,
02 FIRST.WAITING.SCHED	DSK.ADR,
02 GISMO.TRACE.FLAGS	WORD,
02 SYS.PC	BIT (28),XARRAY OF SYS PORT,CHAN
03 SPC	BIT (7),
02 MIX.LIMIT	BIT(8)X
02 SPO.Q.CLEAR.START	BIT(60)X SPO.Q.POINTER, DOWN TO B
02 SPO.FLAGS	BIT(3)X

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```

, 03 SPO.DISPLAY.TIME          BOOLEANX
, 03 CRT.SPO.TRANSI            BOOLEANX
, 03 CRT.SPO.DIRN              BOOLEANX
,02 SPOLOG.LAST.AREA          BIT(1)X SPO.LOG.FULL
,02 SPO.SUPPRESS              BIT(1)X IF ON THE DISPLAY ONLY IO
,02 FILLER                    BIT(1)X
,02 SPOLOG.LAST.SECTORS       BIT(2)X NOT USED TILL 6.1
,02 SPOLOG.SIZE               BIT(16)X 14 BITS ARE ENOUGH.,
,02 NEXT.SPOLOG.REC          BIT(36) XNEXT SPOLOG SEGMENT,
, 02 CSV.CORRECTABLE.ERROR.TABLE.LENGTH BIT(16)X 40 + 32*#ENTRIES
,02 DUMP.FILE.SIZE            BIT(16)
;#%
DEFINE CSV.DECLARATION AS #X
DECLARE 01 DUMMY REMAPS COLD.START.VARIABLES
CSV.ONE
CSV.TWO
;#;%
```

**DISK COLDSIARI VARIABLES**

```
DEFINE DCSV.SIZE AS #935#;
DEFINE DCSV.DECLARATION AS #Z
DECLARE 01 DUMMY REMAPS DISK.CS.VARIABLES,
02 MASTER.IOAT DSK.ADR,
02 MASTER.DISK.AVAIL DSK.ADR,
02 NEXT.LOG.REC DSK.ADR,
02 LG.SIZE WORD,
02 NEXT.ELOG DSK.ADR,
02 ELOG.SIZE WORD,
02 JOB.NO WORD,
02 PBD.NO WORD,
02 SPO.Q.SIZE WORD,
02 CTLDCK.NO WORD,
02 LOG.NO WORD,
02 Q.DISK DSK.ADR,
02 TRACE.FPB DSK.ADR,
02 AUTO.MASK BIT(28),Z 4 OF 7 EACH=PRT PC
02 AB.NUMBER BIT(3),Z NUM OF SYSTEM/BACKUPS
02 FILLER BIT(5),Z
02 PBD.BLCKS.AREA WORD,
02 LG.LAST.AREA BOOLEAN,
02 ELOG.LAST.AREA BOOLEAN,
02 FILLER BIT (2),
02 PBD.DESIGNATION CHAR(10),
02 SPO.Q DSK.ADR,
02 PROTECTED.UNITS BIT (256),
    XARRAY OF 16 16 BIT ENTRIES OF UNITS TO BE PROTECTED THRU C/S
    X12 BITS FOR PCU
    X 2 BITS FOR LABEL TYPE
    X 0 = ANSII
    X 1 = UNLABELED
    X 2 = BURROUGHS
    X 1 BIT FOR TRANSLATE 0=EBCDIC 1=ASCII
    X 1 BIT TO INDICATE THAT A C/S HAS HAPPENED ON THIS UNIT
02 SYS.LOG NUMBER BIT (24),
02 JOB.ACCTING.NUMBER BIT (24),
02 SESSION.NR BIT (10),
02 XM.TABLE.DISK.ADDRESS DSK.ADR,
02 DCSV.NSEC.DISABL.THRASH.FAULT BOOLEAN,
02 DCSV.SAMPLING.INTERVAL BIT (6),
02 DCSV.OVERLAY.TARGET BIT (8)
;
#;X
```

```
DEFINE MEMORY.LINK.SIZE AS #179#;
DECLARE MEMORY.LINK TEMPLATE BIT(MEMORY.LINK.SIZE);
DEFINE MEMORY.LINK.DECLARATION AS #
DECLARE 01 DUMMY REMAPS MEMORY.LINK,
        2 ML.DISK                               DSK.ADR,
        2 ML.GROUP,
          3 ML.POINTER                           ADDRESS,
          3 ML.JOB.NUMBER                        BIT(16),
          3 ML.TYPE                              BIT(6),
          3 ML.SAVE                              BIT(1),
        2 ML.SIZE                               BIT(24),
        2 ML.PRIORITY.FIELD                    BIT(22),
          3 ML.DK.INTERVAL                       BIT(6),
          3 ML.CURRENT.OK.INT                   BIT(6),
          3 ML.INCOMING.PRIORITY               BIT(5),
          3 ML.RESIDENCE.PRIORITY             BIT(5),
            4 ML.RP.WHOLE                       BIT(4),
            4 ML.RP.FRACTION                   BIT(1),
        2 ML.FRONT                              BIT(24),
        2 ML.BACK                               BIT(24),
        2 ML.USAGE.BITS                         BIT(2),
          3 ML.PREVIOUS.SCAN.TOUCH            BIT(1),
          3 ML.CURRENT.SCAN.TOUCH             BIT(1);#;
```

```
USEC ML.DISK
    ,ML.POINTER
    ,ML.JOB.NUMBER
    ,ML.TYPE
    ,ML.SAVE
    ,ML.SIZE
    ,ML.FRONT
    ,ML.BACK
    ) OF MEMORY.LINK.DECLARATION;
```

```
DEFINE Q.ML.DECLARATION AS#DECLARE
    01 Q.MEMORY.LINK TEMPLATE
    ,    02 FILLER                               BIT(MEMORY.LINK.SIZE)
    ,    02 Q.ML.F.AVL                           ADDRESS
    ,    02 Q.ML.B.AVL                           ADDRESS
;#;
```

```
DEFINE
    TAKE.LO                                     AS#0#
    , TAKE.RIGHTMOST                           AS#1#
;
DEFINE % TYPES FOR "ML.TYPE"
    CODE AS %0#%
    , AVAILABLE AS %2#%
    , RN.S AS %3#%
```



```
• MCP.TEMP AS #4#X
• USER.FILE AS #5#X
• SEG.DICTV AS #6#X
• MICROCODE #7#X
• DICT.MASTER AS #8#
• QUEUE.DIRECTORY.TYPE
  AS #9#
• MSG.BUFFERV
  AS #10#
• MESSAGE.LIST.TYPE
  AS #11#
• TO.BE.FORGOTTEN AS #12#
• DATA.SEG AS #13#
• DBM.BUFFER AS #14#
• TERMINATING LINK AS #15#X
• MCP.PERM AS #16#X
• PSR.MEM AS #17#X
• MCP.IOAT AS #18#X
• DISK.HEADER AS #19#X
• PACK.MEM AS #20#X
• SD.CNTNR AS #21#X
• SCHED.MEM AS #22#X
• SORT.MEM AS #23#X
• DCH.MEM AS #24#X
• MICROCODE.NON.OVERLAYABLE AS #25#X
• QUEUE.AVL.BUF.V AS #26#
• DMS.DISK.HDR AS#27#X
• DMS.STRUCTURE AS#28#X
• DMS.TEMP AS #29#X
• DMS.GLOBALS AS #30#X
• DMS.TEMP.LOCK.DESCR AS #31#
• XM.MEMORY AS #32#
;X
```

### SYSTEM DESCRIPTORS

#### DECLARE

```
01 SYSTEM.DESRIPTOR TEMPLATE BIT(SY.SIZE);
DEFINE SY.DECLARATION AS #SY.DECL(SYSTEM.DESRIPTOR)#;X
DEFINE SY.DECL(X) AS #DECLAREX
01 DUMMY REMAPS X,X
02 SY.IN.USE BIT(1), X TO HELP MEMORY MANAGEMENT
02 SY.MEDIA BIT(1), X 0=DISK, 1=S-MEMORY
02 SY.LOCK BIT(1), X
02 SY.IN.PROCESS BIT(1), X TRUE IF THERE IS AN I/O IN
X PROCESS FOR THE INFORMATION
X REPRESENTED BY THIS DESCRIPTOR.
X IF TRUE, "SY.CORE" CONTAINS A
X POINTER TO THE I/O DESCRIPTOR.
```

```
02 SY.INITIAL          BIT(1),      X "ADDRESS" IS READ-ONLY MOTHER
                        X COPY, HENCE IF "WRITE" THEN GET
                        X NEW DISK AND REPLACE ADDRESS.
02 SY.FILE             BIT(1),      X THE OBJECT OF THIS DESCRIPTOR
                        X IS A FILE WHOSE USERCOUNT MUST
                        X BE DECREMENTED WHEN THIS
                        X DESCRIPTOR IS RETIRED.
02 SY.DK.FACTOR        BIT(3)       X MEMORY DECAY FACTOR
02 SY.SEG.PG           BIT(7),      X MEMORY ACTIVITY AUDITING
02 SY.TYPE             BIT(4),      X UNITS FOR SY.LENGTH.
                        X 0 = BITS
                        X 1 = DIGITS (4 BIT)
                        X 2 = CHARACTERS (8 BIT)
                        X 3 = NORMAL DESCRIPTORS
                        X 4 = DISK SEGMENTS
                        X 5 = SYSTEM DESCRIPTORS
                        X 6 = SYSTEM INTRINSIC
                        X 7 = INDIRECT REFERENCE
                        X ADDRESS GIVES RELATIVE
                        X DISPLACEMENT IN BITS
                        X (SIGNED NUMBER).
                        X 8= MICROS
02 SY.ADDRESS          BIT(36),     X
03 FILLER              BIT(12),     X PORT, CHANNEL AND UNIT.
03 SY.CORE             BIT(24),     X CORE, OR ADDRESS WITHIN UNIT.
02 SY.LENGTH          BIT(24);      X NUMBER OF UNITS, AS DETERMINED
                        X BY SY.TYPE.
                        X
#;
DEFINE ND.DECLARATION AS#
DECLARE
01 DUMMY REMAPS NORMAL.DESRIPTOR BIT(ND.SIZE),
02 ND.DK.FACTOR        BIT(3),
02 FILLER              BIT(6),
02 ND.CORE             BIT(24),
02 ND.TYPE             BIT(3),
02 ND.LENGTH          BIT(24);#;
```

**RUN STRUCIURE STAIUS TYPES**

```
DEFINE MAX.REASON AS #52#;
DEFINE % "RS.STATUS" TYPES
EXECUTING AS #0#
* NO.FILE AS #1#
* NO.USER.DISK AS #2#
* DUPLICATE.LIBRARY AS #3#
* DUPLICATE.INPUT.FILE AS #4#
* POSSIBLE.DUP AS #5#
* WAITING.FOR.HARDWARE AS #6#
* PROGRAM.STOPPED AS #7#
* WAITING.IO.COMPLETE AS #8#
* MTG.DATACOMM.MSG AS #9#Z
* WAITING.OVERLAY AS #10#
* WAITING.KBD.IN AS #11#
* HDWR.NOT.READY AS #12#
* WAITING.OPERATOR.ACTION AS #13#
* WAITING.CLOSE AS #14#
* WAITING.DS.OR.DP AS #15#
* NO.MPF.PACK AS #16#
* NO.FILE.ON.DISK AS #17#Z
* WAITING.FOR.LOCKED.FILE AS #18#
* WAITING.Q.IS.FULL AS #19#
* WAIT.STATUS AS #20#
* NOMEM.WAITING.COMM.Q AS #21#
```

• NOMEM.WAITING.READY.Q AS #22#  
• STOPPED.CQ AS #23#  
• STOPPED.RQ AS #24#  
• WAITING.TIME.COMM.Q AS #25#  
• WAITING.TIME.READY.Q AS #26#  
• WAITING.RECEIVE AS #27#  
• WTG.DATACOMM.OPN AS #28#X  
• TERMINATING AS #29#  
• IN.READY.Q AS #30#  
• IN.COMM.Q AS #31#  
• STOPPED.FOR.SORT AS #32#  
• WTG.DC.DSK.CMPLT AS #33#  
• WTG.DATACOMM.DSK AS #34#X  
• NO.CONTROLLER AS #35#X  
• NO.OUTPUT.PACK AS #36#  
• VSORT.QSORT.NOT.PRESENT AS #37#  
• NO.SORT.INPUT.FILE AS #38#  
• WAITING.CONTENTION AS #39#  
• WAITING.SYNCPOINT AS #40#  
• WAITING.RECOVERY AS #41#  
• WAITING.NEW.AUDIT AS #42#  
• WAITING.SORTER.IO AS #43#  
• TERMINATING.WAITING.IO AS #44#  
• CLOSING.WAITING.IO AS #45#  
• WAITING.FORMS AS #46#  
• NO.TRANSLATE.FILE AS #47#  
• MF.SEARCHING AS #48# X  
• NO.DMS.FILE AS #49#  
• NO.DMS.DICTIONARY AS #50#  
• WTG.DMS.REORGANIZATION AS #51#  
• WTG.INACTIVE.DATA.BASE AS #52#  
;

RUN STRUCTURE NUCLEUS

```
DEFINE RS.N.SIZE AS #2868#;
DECLARE RS.NUCLEUS TEMPLATE BIT (RS.N.SIZE);%
DEFINE RS.ONE AS #,%
02 RS.COMMUNICATE.MSG.PTR BIT (48) ,%
03 RS.ITYPE BIT(2),
03 RS.INMBR BIT(6),
03 RS.ILENGTH BIT(16),
03 RS.IADDRESS BIT(24),
02 RS.COMMUNICATE.LR ADDRESS,
02 RS.REINSTATE.MSG.PTR BIT(48) ,%
02 RS.MY.BASE ADDRESS ,%
02 RS.MY.LIMIT ADDRESS ,%
02 RS.MCP.BIT BOOLEAN,
02 RS.NIP BIT (32) ,%
02 RS.SEG.DIC.PTR BIT(24) ,%
02 RS.DATA.DIC ADDRESS ,%
02 RS.INTERP.ID BIT(5) ,%
02 RS.INTRINSICS.LOC BIT(10),
02 RS.M.MACHINE BIT(S.PAD.SIZE),%
02 RS.PRIORITY,
03 RS.PRIORITY.INTEGER BIT (4),
03 RS.PRIORITY.FRACTION BIT (4),
02 RS.STATE.LIGHT BIT (16),
03 RS.VARIABLE.LAMP.CPU BIT(2),
03 RS.VARIABLE.LAMP.CODE.OVLY BIT(2),
03 RS.VARIABLE.LAMP.DATA.OVLY BIT(2),
02 RS.NUMBER.FILES BIT (8),
02 RS.BOOLEANS WORD,
03 RS.IL BOOLEAN,
03 RS.UL BOOLEAN,
03 RS.OF BOOLEAN,
03 RS.FR BOOLEAN,
03 RS.FM BOOLEAN,
03 RS.OU BOOLEAN,
03 RS.OK BOOLEAN,
03 RS.RM BOOLEAN,
03 RS.MR BOOLEAN,
03 FILLER BIT (15),
02 RS.TYPE BIT (6),
02 RS.PAGED.DICT BIT(1),
02 RS.IN.TRANSACTION BOOLEAN, XDMS TRANSACTION STATE
02 RS.SORTER.FLOWING BOOLEAN,
02 RS.DM.OPERATION BOOLEAN,% 1=DM OP IN PROCESS
02 RS.DISABLE.INTERRUPTS BIT(6),
```

```
02 RS.FUTURE BIT (9),
02 RS.EXTERNAL.INTERRUPT.MASK BIT (9),X
03 RS.EXTERNAL.INTERRUPT.BIT BIT (1),
03 RS.DC.ID.COMPLETE BIT (1)X

#;X
DEFINE RS.TWO AS #,X
02 RS.Q.IDENT ADDRESS,
02 RS.LAST.OVLY ADDRESS,
02 RS.DATA.OVERLAYS ADDRESS,
02 RS.LAST.LINK ADDRESS,
02 RS.JOB.NUMBER.IN.DECIMAL BIT(16),
02 FILLER BIT(8),
02 RS.SER.NO WORD,
02 RS.EMULATOR.BITS BIT(4), X USED BY INTERP
02 RS.OVLY.DISK.PTR BIT(24),
02 RS.JOB.ACCTING.NO BIT(24),
02 RS.FIB.DIC BIT(24),
02 RS.TRACE ADDRESS, X TRACE INFO ADDRESS
02 RS.TRACE.FIB BIT(24),
02 RS.TRACE.BITS BIT(8),
02 RS.MEDIA BIT(1),
02 RS.LENGTH BIT(24),
02 RS.Q.LINK ADDRESS,
02 RS.STATUS BIT(24),
02 RS.JOB.NUMBER BIT(16),
02 FILLER BIT(8),
02 RS.CODE.OVLY.COUNT BIT(20),
02 RS.TIME BIT(20),
02 RS.PROG.PTR DSK.ADR,
02 RS.PAUSE WORD,
02 RS.DONT.REENTER BIT(1),
02 RS.SD.PTR.FLAG BIT(1),
02 RS.LINKS BIT(1),
02 RS.EMULATOR.TAPE BIT (1),X
02 RS.DISK DSK.ADR,
02 RS.ROLLOUT.COMPLETE BIT(1),
02 RS.ROLLOUT.IN.PROCESS BIT(1),
02 FILLER BIT(8),
02 RS.DICT.MEDIA BIT(1),
02 RS.APPARTITION BIT(1),
```

02 RS.SIZECHANGE	BIT(1),
02 RS.TO.BE.STOPPED	BIT (1),
02 RS.NOT.A.ROLLOUT.CANDIDATE	BIT(1),
02 RS.TO.BE.ROLLED.OUT	BIT(1),
02 RS.STOPPED	BIT(1),
02 RS.USE.FLAG	BIT(1),
02 RS.PSEUDO.READER	ADDRESS,
02 FILLER	BIT(24), % OVLY ACTUAL END
02 RS.OVLY.DESC	BIT(DESCRIPTOR.SIZE),
02 RS.MCP.USE	BOOLEAN,
02 RS.FILE	BIT (8),
02 RS.ROLLIN.IN.PROCESS	BIT(1),

#;

```
DEFINE RS.THREE AS #,  
  02 RS.TEMPORARY.FREEZE      BIT(1),  
  02 RS.BOJ.TO.EOJ.FREEZE    BIT(1),  
    02 RS.DATA.COMM          BIT(1),%  
  02 RS.UNIT.INDEX           ADDRESS,  
  02 RS.OVLY.DISK.BASE       DSK.ADR,  
  02 RS.LOG.PTR              DSK.ADR  
  02 RS.PATH.DIC             ADDRESS % DATA MANAGEMENT  
  02 RS.NMBR.PATHS          BIT(8)  
    02 RS.PROTECTED          BIT (1)  
    02 RS.PRIVILIGED        BOOLEAN,%  
    02 RS.ABORT              BIT (2)%  
    02 RS.SWITCHES          BIT(40)  
  2 RS.WAIT.LOC              ADDRESS,  
  2 RS.WAIT.LEN              BIT(12),  
  2 RS.NEXT.Q                BIT(24),  
  2 RS.M.PROBLEM             BIT(48),  
    5 RS.M.PROBLEM.TYPE      FIXED,  
    5 RS.M.PROBLEM.PARAMETER BIT(24),  
  2 RS.REPORT.EV.INX         BOOLEAN,  
  2 RS.INTERVENTION          BOOLEAN,  
  2 RS.DUMMY.EV              BIT(1),  
  2 FILLER                    BIT (1),  
  2 RS.SPO.Q.KEY             ADDRESS,  
  2 RS.EVENT.SPACE           BIT (24*15),  
  2 RS.MAX.TIME              BIT (24)  
    02 RS.PARENT.QUEUE       BIT (24),% HOST RJE  
    02 RS.LOG.SPO             BIT (1),% HOST RJE  
    02 RS.USERCODE           BIT (10),% HOST RJE  
    02 RS.SESSION            BIT (16),% HOST RJE  
    02 RS.PARENT.JOB.NR      BIT (16) % HOST RJE  
    02 FILLER                  BIT (8),  
    02 RS.DATA.OVLY.COUNT     BIT (20)  
  02 RS.NMBR.INVOKES         BIT(6)  
    02 RS.MEMORY.PRIORITY     BIT(5)
```

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3-19  
COMPANY CONFIDENTIAL  
MCP CONTROL SYNTAX  
2219 0144 (A) SEC. III

03 FILLER	BIT(4),
03 RS.HALF.PRIORITY	BIT(1),
02 RS.SWEEPS.BEFORE.DECAY	BIT(10),
02 RS.FORCED.SUSPENSION	BIT(1),
02 FILLER	BIT(8),
02 RS.DISPLACED	FIXED,
02 RS.PREVENT.MOVE	BIT(1)X
02 RS.ONLY.DISK.SIZE	BIT(24)X
02 RS.PRIOR.JOB.NO	BIT(16)
02 RS.DMS.GLOBAL	BIT(24)

#3X



```
DEFINE RS.N.DECLARATION AS #Z
DECLARE 01 DUMMY REMAPS RS.NUCLEUS
RS.ONE
RS.TWO
RS.THREE
;#;Z
DEFINE IO.DESCRIPTOR.MAP(IO.DESCRIPTOR) AS #
  DECLARE 01 DUMMY                                REMAPS IO.DESCRIPTOR
    * 02 IO.RESULT                                WORD
    * 03 IO.RESULT.BIT.1.2                        BIT (2)
    * 02 IO.LINK                                  ADDRESS
    * 02 IO.OP                                    WORD
    * 02 IO.BEGIN                                ADDRESS
    * 02 IO.END                                  ADDRESS
    * 02 IO.DISK.ADDRESS                         ADDRESS
    * 2 IO.M.EVENTS                              BIT(8)
    * 2 IO.MCP.IO                                BIT(16)
    * 02 IO.FIB                                   ADDRESS
    * 02 IO.FIB.LINK                             ADDRESS
    * 02 IO.BACK.LINK                            ADDRESS
    * 02 IO.PORT.CHAN                            BIT (7)
    * 03 IO.PORT                                 BIT (3)
    * 03 IO.CHANNEL                              BIT (4)
  #;
DEFINE IO.DESC.DECLARATION AS #IO.DESCRIPTOR.MAP(IO.DESC)#;
```



03 PROG.NAME.SECOND NAME, X  
X PROGRAMS SECOND NAME  
X  
X FOR COMPILATIONS - IN THE LOG COPY OF THE PPB  
X PROG.NAME.FIRST = COMPILERS FIRST NAME  
X PROG.NAME.SECOND = OBJECT PROGRAMS FIRST NAME  
X

02 PROG.INTRINSIC CHAR (20),  
03 PROG.INTRINSIC.DIRECTORY NAME,  
X PACK ID FOR INTRINSICS  
03 PROG.INTRINSIC.NAME NAME,  
X FAMILY NAME FOR INTRINSICS

02 PROG.INTERP.NAME CHAR(30), X  
03 PROG.INTERP.DIRECTORY NAME, X  
X PACK ID FOR INTERPRETER  
03 PROG.INTERP.NAME.FIRST NAME, X  
X FAMILY NAME FOR INTERPRETER  
03 PROG.INTERP.NAME.SECOND NAME, X  
X OFFSPRING NAME FOR INTERPRETER

02 PROG.PRIORITY BIT (4), X  
X PRIORITY IN THE MIX - COMPILER DEFAULT = 4

02 PROG.BEGINNING BIT (32), X  
X FIRST INSTRUCTION POINTER

02 PROG.STATIC.CORE WORD, X  
X LENGTH IN BITS OF MEMORY TO BE ALLOCATED  
X IMMEDIATELY AFTER THE BASE REGISTER  
X IF THERE EXISTS A DATA DICTIONARY, THEN THIS FIELD  
X MUST BE DESCRIBED BY ITS FIRST ENTRY. IF A DISK  
X ADDRESS IS PRESENT THERE THEN THE SPACE WILL NOT  
X ONLY BE ALLOCATED BUT ALSO FILLED FROM THAT  
X ADDRESS.

02 PROG.DYNAMIC.CORE WORD, X  
X DATA OVERLAY AREA IN BITS.

02 PROG.TOTAL.CORE WORD, X  
X SMALLEST AMOUNT OF MEMORY REQUIRED TO RUN - IN  
X BITS.  
X SHOULD BE EQUAL TO -  
X PROG.STATIC.CORE + PROG.DYNAMIC.CORE +  
X DATA DICTIONARY SIZE + FIB DICTIONARY SIZE

02 PROG.WORKING.SET WORD, X  
X AMOUNT OF MEMORY (IN BITS) NEEDED TO  
X RUN THE PROGRAM EFFICIENTLY

02 PROG.DATA.DIC BIT (NO.SIZE), X  
X DATA DICTIONARY

02 PROG.SEG.DIC BIT (NO.SIZE), X  
X SEGMENT DICTIONARY

02 PROG.FPB.ADDRESS ADDRESS, X  
X RELATIVE DISK ADDRESS OF THE FIRST FPB IN THE  
X PROGRAM FILE (RELATIVE TO THE PPB). ALL FPBS IN  
X THE PROGRAM MUST BE CONTIGUOUS.

02 PROG.FILES BIT (8), X  
X TOTAL NUMBER OF FILES - 255 MAX

02 PROG.VERSION.NO WORD, X  
X REVISION LEVEL OF PPB AND FPB-S

02 PROG.OVLY.SEG BIT (10), X  
X RESERVED FOR THE SDL OVERLAY HANDLER

02 PROG.FREEZER BIT(1), X  
X REQUESTS THAT PROGRAM NOT BE RELOCATED.

02 PROG.LINKS BIT(1), X  
X TELLS MCP WHETHER OR NOT MEMORY LINKS ARE  
X DESIRED IN THE DYNAMIC MEMORY AREA

02 PROG.TRACE BIT (8), X  
X TRACE FLAGS TO ENABLE TRACING FROM THE FIRST  
X EXECUTABLE INSTRUCTION.

02 PROG.SCHED.PRIORITY BIT (4), X  
X PRIORITY FOR SCHEDULING

02 PROG.VIRTUAL.DISK WORD, X  
X NUMBER OF DISK SEGMENTS DESIRED FOR DATA OVERLAY  
X IF = 0 AND DATA OVERLAYS ARE REQUIRED MCP WILL  
X USE 1000.  
X REQUESTS THAT PROGRAM NOT BE RELOCATED

02 PROG.IPB ADDRESS, X  
X IF THIS IS AN INTERPRETER, THEN THIS IS THE FILE  
X RELATIVE LOCATION OF THE INTERPRETER PARAMETERS.

02 PROG.DYNAMIC.SPACES BIT (8), X  
X MAX NUMBER OF SPACES TO BE ALLOCATED IN  
X PROG.DYNAMIC.CORE.  
X USED ONLY IF PROG.LINKS = 1.

02 PROG.M.MACHINES.LOC WORD, X  
X FOR CHANGE STACK SIZE COMMUNICATE.

02 PROG.NUM.M.MACHINES BIT (8), X  
X ONE FOR EACH CSS COMMUNICATE.

02 PROG.SWITCHES BIT(40), X  
X FOR RUN-TIME SWITCHES

02 PROG.PERMANENT.FLAGS,  
03 PROG.DMS BOOLEAN, X  
X THIS PROGRAM USES DMS.

03 PROG.INTERPRETER.CHECK.OVERRIDE BOOLEAN, X  
X USE THE ONE I SAID.

03 PROG.INTR.AGGR BIT(1), X  
X THIS PROG CALLS FOR INTRINSIC.AGGREGATE.

03 PROG.PROTECTED BOOLEAN, X  
X STOPS DS GT SW ST

```
02 PROG.COMPILER.LEVEL          BIT(8),  X
    X NEW LEVEL MEANS RECOMPILE REQ.
02 PROG.PROG.PTR                DSK.ADR,  X
    X ABSOLUTE ADDRESS OF THE PPB ON DISK
02 PROG.EXECUTE.TYPE           BIT (4),  X
    X 1 = EXECUTE
    X 2 = COMPILE AND GO
    X 3 = COMPILE FOR SYNTAX
    X 4 = COMPILE TO LIBRARY
    X 5 = COMPILE AND SAVE
    X 6 = GO PART OF COMPILE AND GO
    X 7 = GO PART OF COMPILE AND SAVE
02 PROG.EOJ.TYPE              BIT (4),  X
    X 0 = NORMAL EOJ
    X 1 = DS OR DP
    X 2 = ERROR CONDITION IN PROGRAM
    X 3 = ABORTED
    X 4 = RS-ED
02 PROG.GENERATOR.NAME        CHAR(30), X
03 PROG.GENERATOR.DIRECTORY   NAME,    X
    X PACK ID FOR COMPILER
03 PROG.GENERATOR.NAME.FIRST  NAME,    X
    X FAMILY NAME OF COMPILER
03 PROG.GENERATOR.NAME.SECOND NAME,    X
    X OFFSPRING NAME OF COMPILER
02 PROG.DATE.COMPILED         BIT(36)  X
    X COMPILATION DATE -
    X YEAR MONTH DAY HOUR MINUTE SECOND
#;X
DEFINE PPB.SPAD AS #,X
02 PROG.SPAD                  BIT (S.PAD.SIZE),X
    X M-MACHINE
02 PROG.CHARGE.NUMBER         WORD,    X
    X CHARGE NUMBER
02 PROG.PATH.DIC              ADDRESS, X
    X DATA MANAGEMENT PATH DICTIONARY ADDRESS
02 PROG.PATH.SIZE             BIT (20), X
    X LENGTH OF PATH DICT IN BITS
02 PROG.NMBR.PATHS            BIT (8),  X
    X TOTAL NUMBER OF PATHS - MAX=255
02 PROG.NMBR.INVOKES          BIT (4),  X
    X TOTAL NUMBER OF INVOKES - MAX=15
02 PROG.COMPILER.ATTRIBUTES   BIT(80), X
    X INTERP MUST HAVE THEM ALL.
02 PROG.BOOLEANS              BIT(4),  X
    X JUST LIKE IT SAYS
03 PROG.SORT                  BOOLEAN, X
    X 1 IF SORT PROGRAM
```

```
02 PROG.SORT.DATA          DSK.ADR,  X
                          X SORT PARAMETER ADDRESS
  2 PROG.RS.EV.LIST.SIZE   BIT(4),
02 PROG.MAX.TIME          WORD,
                          X MAXIMUM PROCESSOR TIME ALLOWED IN MINUTES
02 PROG.6.0.NMBR.INVOKES  BIT(6),
                          X EXPANDED MAXIMUM NUMBER OF DMS INVOKES - MAX = 63
02 PROG.NAME.TABLE        BIT(ND.SIZE),X
                          X USED FOR INTRINSIC AGGREGATES FOR NAMES CHECKING.
02 PROG.LAYOUT.TABLE.ADDRESS BIT(16),X
                          X CODEFILE-RELATIVE SEGMENT ADDRESS OF SDL LAYOUT TABLE
02 PROG.LAYOUT.TABLE.SIZE  BIT(12),X
                          X SDL LAYOUT TABLE SIZE IN SEGMENTS
  02 PROG.INTRIN.AGGR.USED  BIT(2),X
02 PROG.MEMORY.PRIORITY   BIT(4),
                          X PRIORITY FOR CODE SEGMENTS - SYSTEM DEFAULT = 4
02 PROG.SECONDS.BEFORE.DECAY BIT(10),
                          X NUMBER OF FRACTIONAL SECONO INTERVALS AFTER A SEGMENT
                          X IS LAST ACCESSED BEFORE THAT SEGMENTS MEMORY PRIORITY
                          X IS LOWERED.

02 FILLER                  BIT(330)
                          X RESERVED FOR MORE COMPILER GENERATED DATA

#;X
DEFINE SCHED.SIZE AS #990#;X
DEFINE PPB.SCHED AS #,X
  02 PROG.SCHED.LINK       DSK.ADR,  X
                          X SCHEDULE IS A LINKED LIST
  02 PROG.SCHED.PR.COPY    BIT (4),  X
                          X SCHEDULE PRIORITY
  02 PROG.SCHED.SIZE       WORD,      X
                          X TOTAL MEMORY REQUIRED FOR THIS JOB
                          X PROG.TOTAL.CORE
  02 PROG.JOB.NUMBER       BIT(16),  X
                          X JOB NUMBER - LIVES FROM SCHEDULE TO EOJ
  02 FILLER                BIT(8),  X
  02 PROG.FLAGS,          X
    03 PROG.UNCONDITIONAL  BIT(1),  X
                          X IF TRUE THEN RUN JOB EVEN IF PREDECESSOR ABORTS.
    03 PROG.DONT.REENTER   BIT(1),  X
                          X MY SEGMENT DICTIONARY IS NON.STANDARD.
    03 PROG.NODIF          BIT (1),X
                          X IF SPAWNED, CONTINUE IF SPANNER GOES AWAY
    03 PROG.WAIT.OPERATOR  BOOLEAN,  X
                          X WAITING FOR OPERATOR TO FS OR RS THIS JOB
  02 PROG.EX.AFTER.NAME    CHAR(30), X
                          X THE FOLLOWING NAMES ARE USED WHEN AN EX AFTER
                          X IS ENTERED AFTER THE FIRST PROGRAM IS ALREADY
                          X IN THE MIX
    03 PROG.EX.AFTER.DIRECTORY NAME,  X
                          X PACK ID FOR THE EX AFTER
```

03 PROG.EX.AFTER.NAME.FIRST NAME, %  
% FAMILY NAME OF THE EX AFTER  
03 PROG.EX.AFTER.NAME.SECOND NAME, %  
% OFFSPRING NAME OF THE EX AFTER  
02 PROG.REMOTE.JOB.STN BIT(8), %  
% STATION NO. OF RJE JOB.  
02 PROG.REMOTE.JOB BOOLEAN, %  
% FLAGS RJE (REMOTE) JOB  
02 PROG.SORT.JOB.NO BIT(24), %  
% JOB NO OF SORT INTRINSIC  
02 PROG.SPANNER BIT (1), %  
% THIS PROGRAM SPANNED ANOTHER ONE.  
02 PROG.SEG.DECAY.SET BIT(1),  
% THIS PROGRAM HAS HAD ITS NO.DK.FACTORS SET.  
02 FILLER BIT(1),  
% 1 BIT AVAILABLE  
02 PROG.JOB.ACCTING.NO BIT(24), %  
% THIS PROGRAMS UNIQUE ACCOUTING NUMBER  
02 FILLER BIT(8),  
02 PROG.PRIOR.JOB.NO BIT(16), %  
% PROGRAM CALLERS JOB NUMBER  
02 FILLER BIT(8), %  
02 PROG.SCHED.DATE BIT(36), %  
% YEAR MONTH DAY HOUR MINUTE SECOND.  
02 PROG.BOJ.DATE BIT(36), %  
% YEAR MONTH DAY HOUR MINUTE SECOND.  
02 PROG.EOJ.DATE BIT(36), %  
% YEAR MONTH DAY HOUR MINUTE SECOND.  
02 PROG.PROCESS.TIME BIT(24), %  
% TOTAL PROCESSOR TIME  
02 PROG.CODE.OVLY.COUNT BIT (24), %  
% NUMBER OF CODE (USER, INTERP + MICRO.MCP) OVERLAYS FOR  
% THIS PROGRAM. USED BY THE LOG.  
02 PROG.OBJ.NAME CHAR(30), %  
03 PROG.OBJ.DIRECTORY NAME, %  
% PACK ID FOR OBJECT CODE COMPILES ONLY  
03 PROG.OBJ.NAME.FIRST NAME, %  
% FAMILY NAME FOR OBJECT CODE COMPILES ONLY  
03 PROG.OBJ.NAME.SECOND NAME, %  
% OFFSPRING NAME FOR OBJECT CODE COMPILES ONLY  
02 PROG.PSEUDO.READER ADDRESS,  
% PSEUDO.READER TABLE ADDRESS  
02 PROG.PORT.CHAN BIT (7)  
% PORT AND CHANNEL OF THE DISK ON WHICH  
% THE MOTHER COPY RESIDES  
• 02 PROG.ME.FACTOR FIXED %  
• 02 PROG.PARENT.JOB.NR BIT(16) %  
% JOB NR OF WHO ZIPPED THIS ONE  
• 02 FILLER BIT(8) %  
• 02 PROG.PARENT.QUEUE BIT (24)%

```

      X PRESENCE INDICATES JOB SPAWNED. SPECIAL BOJ, EOJ AND BACKUP
      X FILE PRESENT MESSAGES WILL BE INSERTED INTO THIS QUEUE.
      X GENERAL SPO MESSAGES WILL BE PUT INTO THIS QUEUE IF
      X PROG.LOG.SPO IS ON.
• 02 PROG.LOG.SPO BIT (1)X
• 02 PROG.USER.CODE BIT (10)X
      X THIS WILL BE A RECORD POINTER, RELATIVE TO ZERO, INTO A DISK
      X FILE LABELED SYSTEM/USERCODES.
• 02 PROG.SESSION BIT (16)X
      X UNIQUE NUMBER ASSIGNED BY RJE. IT IS TO BE INSERTED INTO ANY
      X MESSAGES PASSED BACK THRU THE PARENT QUEUE.
  • 02 PROG.PRIVILIGED          BOOLEANX
      X PROGRAM RUNNING WITH A PRIVILIGED USERCODE
  • 02 PROG.MFID.CHGD          BIT (2)X
  • 02 PROG.PKID.CHGD          BIT (1)X
  • 02 PROG.OBJ.MFID.CHGD      BIT (2)X
  • 02 PROG.OBJ.PKID.CHGD      BIT (1)X
      X SET IF NAME CHANGED BY RJE. USED IN IDENTIFY MIX AND ECT
  • 02 FILLER                  BIT (9)X
• 02 PROG.DATA.OVLY.COUNT      BIT (24) X
      X NUMBER OF DATA OVERLAYS DONE BY THIS PROGRAM
      X USED BY THE LOG
#;
```

### FPB DECLARATIONS

```

DEFINE FPB.SIZE AS                #1263#;X
DEFINE FPB.DECLARATION AS #X
DECLARE 01 DUMMY REMAPS FPB,
  02 FPB.FILE.NAME                NAME,
      X INTERNAL FILE NAME
  02 FPB.NAMES                    CHAR (30),
  03 FPB.PACK.ID                  NAME,
      X PACK NAME
  03 FPB.MULTI.FILE.ID            NAME,
      X FAMILY NAME
  03 FPB.FILE.ID                  NAME,
      X OFFSPRING NAME
      10 FILLER                    CHARACTER(5),          X DMS
      10 FPB.AUDITFILE.NUMBER      CHARACTER(5),          X DMS
  02 FPB.HDWR                     BIT(6),
      X HARDWARE TYPE
  02 FPB.MODE                     BIT (4),
      X RECORDING MODE
  03 FPB.EVEN.PARITY              BOOLEAN,
      X 1 = EVEN
      X 0 = ODD
  03 FPB.CODE.TYPE                BIT (3),
      X 000 = EBCDIC
```



X 001 = ASCII  
X 010 = BCL  
X 011 = BINARY

02 FPB.BUFFERS BIT (24),  
XNUMBER OF BUFFERS REQUESTED-MAX=16,777,215

02 FPB.BACKUP BIT (2),  
X 00 = INVALID CASE  
X 01 = TAPE ONLY  
X 10 = DISK ONLY  
X 11 = EITHER TAPE OR DISK

02 FPB.BACKUP.OK BOOLEAN,  
XSEND TO BACKUP IF NECESSRY

02 FPB.HDWR.OK BOOLEAN,  
X SEND TO HARDWARE IF POSSIBLE

02 FPB.BOOLEANS BIT (24),  
03 FPB.FORMS BOOLEAN,  
X OUTPUT FILE REQUIRES SPECIAL FORMS

03 FPB.OPTIONAL BOOLEAN,  
X THIS IS AN OPTIONAL FILE

03 FPB.VARIABLE BOOLEAN,  
X THIS FILE CONTAINS VARIABLE LENGTH RECORDS

03 FPB.LOCK BOOLEAN,  
X LOCK THIS FILE AT TERMINATE TIME

03 FPB.COBOL BOOLEAN,  
X COBOL FILE - IMPLIED OPEN NOT ALLOWED

03 FPB.EOP BOOLEAN,  
X INDICATES PRESENCE OF END-OF-PAGE ACTION LABELS

03 FPB.DEFAULT BOOLEAN,  
X BLOCK.SIZE RECORD.SIZE ETC. TO BE FILLED IN BY THE MCP  
X FOR DISK FILES ONLY

03 FPB.PSEUDO BOOLEAN,  
XFLAGS CTLDCK AND PSEUDO READER FILES

03 FPB.RMT.KEY BOOLEAN,  
X KEY FIELD HAS BEEN ASSIGNED FOR NDL

03 FPB.NO.LABEL BOOLEAN,  
X IF SET USE FPB.UNIT.NAME AND IGNORE LABEL

03 FPB.WORK.FILE BOOLEAN, X  
X FORCE JOB NO. INTO THE MIDDLE OF THE MFID

03 FPB.QUEUE.FILE BOOLEAN,  
X IF 0 THEN SINGLE QUEUE IF 1 THEN MULTIPLE QUEUES

03 FPB.DMS.FLAG BOOLEAN,  
X DMS AUDIT FILE

03 FPB.LDDMP BOOLEAN,X  
XTHIS WILL BE A LIBRARY TAPE

03 FPB.EMULATOR.TAPE BOOLEAN,  
X NO MCP TAPE SERVICES PROVIDED

03 FPB.HEADER BOOLEAN,X  
X USERS REMOTE READS AND WRITES WILL INCLUDE THE HEADER

03 FPB.TRANSLATE BOOLEAN,  
X TRANSLATE ALL RECORDS USING FPB.TRANSLATE.NAME FILE

03 FPB.USER.BACKUP.NAME                    BOOLEAN,  
      % USE USER PRINT FILE NAME FOR NAME OF PRINTER BACKUP FILE  
      % RATHER THAN MCP GENERATED NAME.  
03 FPB.ATTRIBUTE.ERROR                    BIT(1),  
      % INDICATES WHETHER ERROR OCCURRED ON LAST  
      % FILE ATTRIBUTE REQUEST  
02 FPB.RECORD.SIZE                        WORD,  
      % MAX LOGICAL RECORD SIZE IN BITS  
02 FPB.RECORDS.PER.BLOCK                 WORD,  
      % NUMBER OF LOGICAL RECORDS PER PHYSICAL RECORD  
02 FPB.MAX.BLOCK.SIZE                    WORD,  
      % MAX PHYSICAL RECORD SIZE IN BITS FOR VARIABLE  
      % LENGTH RECORDS ONLY. NOT CONSULTED IF  
      % FPB.VARIABLE = 0  
02 FPB.ADVERB                             BIT (12),  
03 FPB.INPUT                             BOOLEAN,  
      %  
03 FPB.OUTPUT                            BOOLEAN,  
      %  
03 FPB.NEW                                BOOLEAN,  
      %  
03 FPB.WITH.PUNCH                        BOOLEAN,  
      %  
03 FPB.WITH.PRINT                        BOOLEAN,  
      %  
03 FPB.NO.REWIND                        BOOLEAN,  
      % DOUBLES WITH "WITH.INTERPRET".  
03 FPB.REVERSE                          BOOLEAN,  
      % DOUBLES WITH "WITH STACKERS".  
03 FPB.OPEN.LOCK                         BOOLEAN,  
      %  
03 FPB.OPEN.LOCKOUT                     BOOLEAN,  
      %  
03 FPB.REPORT.NO.FILE                    BOOLEAN,  
      %  
03 FPB.REPORT.LOCKED.FILE                BOOLEAN,  
      %  
03 FPB.OPEN.CODE                         BOOLEAN,  
      %  
      % ADVERB USED FOR IMPLIED OPENS  
02 FPB.LABEL                             BIT (48),  
      % DESCRIPTOR POINTING TO LABEL IN MEMORY  
03 FPB.LABEL.LENGTH                     WORD,  
      % SIZE OF LABEL IN BITS  
03 FPB.LABEL.ADDRESS                    ADDRESS,  
      % ADDRESS OF LABEL  
02 FPB.LABEL.USE                         BIT (32),  
      % SEGMENT AND DISPLACEMENT OF LABEL USE ROUTINE  
02 FPB.LABEL.TYPE                        BIT (4),  
      % 0 = DEFAULT ANSI LABEL



02 FPB.SYSTEM.BACKUP.BIT BIT (1),  
X TO IDENTIFY AUTO BACKUP PROGRAM, SYSTEM/BACKUP

02 FPB.REPETITIONS BIT(6),  
X NUMBER OF COPIES OF BACKUP FILE

02 FPB.OPEN WORD,  
X LAST TIME THIS FILE WAS OPENED

02 FPB.1ST.OPEN WORD,  
X 1ST TIME FILE WAS OPENED

02 FPB.RECORD.COUNT WORD,  
X NUMBER OF RECORDS ACCESSED SINCE LAST OPEN

02 FPB.BLOCK.COUNT WORD,  
X NUMBER OF BLOCKS ACCESSED SINCE LAST OPEN

02 FPB.NO.OPEN.AND.CLOSE BIT (16),  
X NUMBER OF OPENS AND CLOSES

02 FPB.CUMULATIVE WORD,  
X TOTAL OPEN TIME

02 FPB.ERRORS WORD,  
X NUMBER OF IRRECOVERABLE ERRORS

02 FPB.MCPDATA DSK.ADR,  
02 FPB.MCPINTERNAL BOOLEAN,  
X

02 FPB.BACKUP.ALREADY BOOLEAN,  
X THIS IS A BACKUP FILE - DO NOT PUT TO BACKUP AGAIN

02 FPB.NEW.FORMAT WORD,  
X THIS WILL = 2FFFFFF2 FOR THE NEW FORMAT  
X

02 FPB.FILE.TYPE BIT (4),  
X FILE TYPE TO BE USED AT CLOSE ON DISK FILES.  
X 0 = DATA  
X 3 = PSEUDO CARD  
X 7 = INTERPRETER  
X 8 = CODE  
X 9 = DATA  
X 12 = INTRINSIC  
X FILE TYPES 7,8 OR 12 CAUSE CLOSE TO MODIFY THE CLOSE  
X ADVERB TO CLOSE LOCK,CRUNCH

02 FPB.PSEUDO.RDR ADDRESS,  
X PSEUDO READER FOR THIS FILE

02 FPB.SAVE.HDWR BIT(6), XSAVE HDWR TYPE IF FILE  
X EVER CHANGED BY OPEN

02 FPB.INV.CHARS BIT(2), X  
X 0 = REPORT ALL INVALID CHARACTER LINES  
X 1 = REPORT ALL AND STOP AT THAT LINE  
X 2 = REPORT FIRST ONE ONLY  
X 3 = DONT REPORT ANY INVALID CHARACTERS

02 FPB.SERIAL CHAR (6), X  
X ALPHA-NUMERIC TAPE SERIAL ID

02 FPB.Q.FAMILY.SIZE BIT(8),  
X IF FPB.QUEUE.FILE IS SET, THIS FIELD IS NUMBER OF Q-S.

02 FPB.Q.MAX.MESSAGES BIT(8)

```

      Z MAXIMUM NUMBER OF MESSAGES IN ANY ONE QUEUE
* 02 FPB.TRANSLATE.NAME          CHARACTER(10)
      XTRANSLATE FILE NAME (*TRANSLATE*/FPB.TRANSLATE.NAME)
* 02 FPB.PROTECTION              BIT (2) Z  HOST RJE
      Z 0 = PUBLIC FILE
      Z 1 = PRIVATE FILE
      Z 2 = GUARD FILE
* 02 FPB.PROTECTION.IO          BIT (2)Z      HOST RJE
      Z 0 = I/O
      Z 1 = INPUT ONLY
      Z 2 = OUTPUT ONLY
* 2 FPB.MERGED.ATTRIBUTES      BIT(12)
* 5 FILLER                      BIT(1)        Z 0
* 5 FPB.MERGED.INPUTF          BOOLEAN       Z 1
* 5 FPB.MERGED.OUTPUTF         BOOLEAN       Z 2
* 5 FPB.MERGED.OPEN.OPTIONS    BIT(4)        Z 3 TO 6
* 10 FPB.MERGED.WITH.PUNCH     BOOLEAN       Z 3
* 10 FPB.MERGED.WITH.PRINT     BOOLEAN       Z 4
* 10 FPB.MERGED.WITH.INTERPRET  BOOLEAN     Z 5
* 10 FPB.MERGED.WITH.STACKERS  BOOLEAN     Z 6 DANGER
* 11 FPB.MERGED.REVERSEF       BOOLEAN     Z 6 DANGER
* 5 FPB.MERGED.LOCKF           BOOLEAN       Z 7
* 5 FPB.MERGED.LOCKOUTF        BOOLEAN       Z 8
* 5 FPB.MERGED.RRRNOFILE       BOOLEAN       Z 9
* 5 FPB.MERGED.RRRLOCK.FILE    BOOLEAN     Z 10
* 5 FPB.MERGED.OPENCODE        BOOLEAN     Z 11
* 02 FPB.MLTI.CHGID            BIT (2)Z
* 02 FPB.PKID.CHGID            BIT (1)Z
* 02 FPB.PROTOCOL              BIT(8)
      Z USED BY APPLICATION PROGRAM TO TELL MCS
      MESSAGE FORMAT
  ;
  ;Z
  
```

**IPB DECLARATIONS**

```

DEFINE IPB.SIZE AS #1440#;
DEFINE IPB.DECLARATION AS#
DECLARE 01 DUMMY REMAPS IPB BIT(1440),
        02 FILLER BIT(1192),
        02 IPB.HARDWARE CHAR(1),
        02 IPB.ARCHITECTURE.NAME CHAR(10),
        02 IPB.COMPILER.LEVEL BIT(8),
        02 IPB.MCP.LEVEL BIT(8),
        02 IPB.GISMO.LEVEL BIT(8),
        02 IPB.ARCHITECTURE.ATTRIBUTES BIT(80),
        02 FILLER BIT(56);
  ;
  
```

### HINTS

X THE FOLLOWING DECLARATIONS MUST ALWAYS REMAIN IN THE BEGINNING AND  
X THEIR ORDER MUST NOT BE CHANGED. THE FIRST THREE ARE RESERVED FOR THE  
X SOL INTERPRETER, THE REST ARE FOR THE DUMP ANALYZER.

X  
X THE FOLLOWING DECLARATIONS MUST ALWAYS REMAIN IN THE BEGINNING AND  
X THEIR ORDER MUST NOT BE CHANGED. THE FIRST THREE ARE RESERVED FOR THE  
X SOL INTERPRETER, THE REST ARE FOR THE DUMP ANALYZER.

X  
DECLARE HINTS BIT(2047);  
DEFINEX

DISK.TRACE.BLOCK.ADDR	AS	#SUBBIT(HINTS,0048,024)#X	HEX	030
. LOCN.MAKE.MCP.BE.HERE	AS	#SUBBIT(HINTS,0096,033)#X	HEX	060
. LOCN.INTERP.DICT	AS	#SUBBIT(HINTS,0129,024)#X	HEX	081
. KI.KO	AS	#SUBBIT(HINTS,0153,001)#X	HEX	099
. NO.REINSTATES	AS	#SUBBIT(HINTS,0154,001)#X	HEX	09A
. FIRE.UP.CONTROLLER	AS	#SUBBIT(HINTS,0155,001)#X	HEX	09B
. N.SECOND.COUNTER	AS	#SUBBIT(HINTS,0156,002)#X	HEX	09C
. MCP.LIMIT	AS	#SUBBIT(HINTS,0158,024)#X	HEX	09E
. HINTS.LAST.OVLY	AS	#SUBBIT(HINTS,0182,024)#X	HEX	0B6
. MICR.DEBUG.BIT	AS	#SUBBIT(HINTS,0206,1) #X	HEX	0CE
. Q.NOT.LOCKED	AS	#SUBBIT(HINTS,0207,001)#X	HEX	0CF
. DFH.DIR.AD	AS	#SUBBIT(HINTS,0208,024)#X	HEX	0D0
. AUTO.GUARD	AS	#SUBBIT(HINTS,0232,003)#X	HEX	0E8
. FIRE.SYSTEM.BACKUP	AS	#SUBBIT(HINTS,0235,003)#X	HEX	0EB
. FOUND.BACKUP.DESIGNATION	AS	#SUBBIT(HINTS,0238,001)#X	HEX	0EE
. TRACE.WORD	AS	#SUBBIT(HINTS,0243,024)#X	HEX	0F3
. TRACE.FLAG	AS	#SUBBIT(HINTS,0261,003)#X	HEX	105
. TRACE.OPT	AS	#SUBBIT(HINTS,0264,003)#X	HEX	108
. HINTS.FIRST.QUEUE	AS	#SUBBIT(HINTS,0267,024)#X	HEX	10B
. ADDR.OF.COLD.START.VAR	AS	#SUBBIT(HINTS,0291,024)#X	HEX	123
. MAXM	AS	#SUBBIT(HINTS,0339,004)#X	HEX	153
. ELOG.FULL	AS	#SUBBIT(HINTS,0343,001)#X	HEX	157
. NON.RELEASE.MCP	AS	#SUBBIT(HINTS,0344,001)#X	HEX	158
. GISMO.LEVEL	AS	#SUBBIT(HINTS,0345,008)#X	HEX	159
. PSR.CHANGE.BIT	AS	#SUBBIT(HINTS,0354,001)#X	HEX	162
. RELEASE.LEVEL	AS	#SUBBIT(HINTS,0355,008)#X	HEX	163
. FIRST.LINK	AS	#SUBBIT(HINTS,0363,024)#X	HEX	16B
. SYCOUNTER	AS	#SUBBIT(HINTS,0391,020)#X	HEX	187
. SY.CNTR.MSK	AS	#SUBBIT(HINTS,0411,020)#X	HEX	19B
. SY.PRIOR.TIME	AS	#SUBBIT(HINTS,0431,020)#X	HEX	1AF
. SYSTEM.PACK.INFO	AS	#SUBBIT(HINTS,0471,024)#X	HEX	1D7
. SYSTEM.UNIT	AS	#SUBBIT(HINTS,0502,012)#X	HEX	1F6
. SYSTEM.PORT.CHAN	AS	#SUBBIT(HINTS,0502,007)#X	HEX	1F6
. SYSTEM.PORT	AS	#SUBBIT(HINTS,0502,003)#X	HEX	1F6
. SYSTEM.CHANNEL	AS	#SUBBIT(HINTS,0505,004)#X	HEX	1F9
. SYSTEM.UNIT.EU	AS	#SUBBIT(HINTS,0510,004)#X	HEX	1FE
. CONSOUL.SWITCHES	AS	#SUBBIT(HINTS,0514,028)#X	HEX	202
. MICRO.TRACE.FLAG	AS	#SUBBIT(HINTS,0542,001)#X	HEX	21E

• PORT.CHANNEL.TABLE	AS #SUBBIT(HINTS,0567,192)#X	HEX	237
• BYPASS.CLEANUP	AS #SUBBIT(HINTS,0759,001)#X	HEX	2F7
• CONTRL.CRD.FLG	AS #SUBBIT(HINTS,0760,001)#X	HEX	2F8
• EXT.RESULT.DESC.CHAIN	AS #SUBBIT(HINTS,0761,024)#X	HEX	2F9
• T.FILES	AS #SUBBIT(HINTS,0785,008)#X	HEX	311
• MICR.COUNT	AS #SUBBIT(HINTS,0793,006)#X	HEX	319
• CHANGE.BIT	AS #SUBBIT(HINTS,0799,001)#X	HEX	31F
• RELEASE.VERSION	AS #SUBBIT(HINTS,0800,008)#X	HEX	320
• SCHEDULER.LOCKED	AS #SUBBIT(HINTS,0808,001)#X	HEX	328
• IOAT.POINTER	AS #SUBBIT(HINTS,0809,024)#X	HEX	329
• IOAT.END	AS #SUBBIT(HINTS,0833,024)#X	HEX	341
• SYSTEM.PAUSE.DESC	AS #SUBBIT(HINTS,0857,024)#X	HEX	359
• PSEUDO.TABLE.ADDRESS	AS #SUBBIT(HINTS,0881,024)#X	HEX	371
• DATE.SET	AS #SUBBIT(HINTS,0905,001)#X	HEX	389
• TIME.SET	AS #SUBBIT(HINTS,0906,001)#X	HEX	38A
• GISMO.OPTIONS	AS #SUBBIT(HINTS,0907,024)#X	HEX	38B
• CHECK.RA	AS #SUBBIT(HINTS,0907,001)#X	HEX	38B
• COMM.TRACE	AS #SUBBIT(HINTS,0908,001)#X	HEX	38C
• GISMO.TRACE	AS #SUBBIT(HINTS,0909,001)#X	HEX	38D
• XFER.24	AS #SUBBIT(HINTS,0910,001)#X	HEX	38E
• DMS	AS #SUBBIT(HINTS,0911,001)#X	HEX	38F
• READR.SORTR	AS #SUBBIT(HINTS,0912,001)#X	HEX	390
• ANY.MAG.TAPE	AS #SUBBIT(HINTS,0913,001)#X	HEX	391
• NRZ.MAG.TAPE	AS #SUBBIT(HINTS,0914,001)#X	HEX	392
• CASSETT	AS #SUBBIT(HINTS,0915,001)#X	HEX	393
• PAPER.TAPE	AS #SUBBIT(HINTS,0916,001)#X	HEX	394
• DATA.COMM	AS #SUBBIT(HINTS,0917,001)#X	HEX	395
• PORT.DEVICES	AS #SUBBIT(HINTS,0918,001)#X	HEX	396
• EXCHANGES	AS #SUBBIT(HINTS,0919,001)#X	HEX	397
• PORT.TRACE	AS #SUBBIT(HINTS,0920,001)#X	HEX	398
• B1720.CODE	AS #SUBBIT(HINTS,921,001)#X	HEX	399
• B1860.CODE	AS #SUBBIT(HINTS,0922,001)#X	HEX	39A
• MPROC.CODE	AS #SUBBIT(HINTS,0923,001)#X	HEX	39B
• B1830.CODE	AS #SUBBIT(HINTS,0924,001)#X	HEX	39C
• READ.AFTER.WRITE.CHECK	AS #SUBBIT(HINTS,0925,001)#X	HEX	39D
• PRIORITY.MEMORY.MGMT	AS #SUBBIT(HINTS,0926,001)#X	HEX	39E
• FIFO.MEMORY.MGMT	AS #SUBBIT(HINTS,0927,001)#X	HEX	39F
• THRASHING.COUNTING	AS #SUBBIT(HINTS,0928,001)#X	HEX	3A0
• DCH.SCRATCH.MEM.ADDR	AS #SUBBIT(HINTS,0931,024)#X	HEX	3A3
• S.MCP.TRACE	AS #SUBBIT(HINTS,0955,001)#X	HEX	3BB
• INTERRUPT.SWITCH.SET	AS #SUBBIT(HINTS,0956,001)#X	HEX	3BC
• DISABLE.INTERRUPT.SH	AS #SUBBIT(HINTS,0957,001)#X	HEX	3BD
• MEMORY.USAGE.BIT	AS #SUBBIT(HINTS,0958,001)#X	HEX	3BE
• MIN.MEMORY.SIZE	AS #SUBBIT(HINTS,0959,012)#X	HEX	3BF
• BEEN.THROUGH.MCP.BE.HERE	AS #SUBBIT(HINTS,0971,001)#X	HEX	3CB
• REMOTE.REROUTE	AS #SUBBIT(HINTS,0972,001)#X	HEX	3CC
• QUEUE.REROUTE	AS #SUBBIT(HINTS,0973,001)#X	HEX	3CD
• SPOLOG.NEEDS.TRANSFERING	AS #SUBBIT(HINTS,0978,001)#X	HEX	3D2
• INTERPRETER.TABLE.ADDR	AS #SUBBIT(HINTS,0979,036)#X	HEX	3D3
• SPO.PORT.CHAN	AS #SUBBIT(HINTS,1015,007)#X	HEX	3F7

• SPO.PORT	AS #SUBBIT(HINTS,1015,003)#Z	HEX	3F7
• SPO.CHANNEL	AS #SUBBIT(HINTS,1018,004)#Z	HEX	3FA
• KEYBOARD.SPO.DESC	AS #SUBBIT(HINTS,1022,024)#Z	HEX	3FE
• SPO.SQ.AD	AS #SUBBIT(HINTS,1046,24)#Z	HEX	416
• LAMP.FLAGS	AS #SUBBIT(HINTS,1086,024)#Z	HEX	43E
• LAMP.DISK.TABLE.ADDR	AS #SUBBIT(HINTS,1110,024)#Z	HEX	456
• VARIABLE.LAMP.ALL.USER.CPU	AS#SUBBIT(HINTS,1113,1)#Z		459
• VARIABLE.LAMP.ALL.USER.CODE.OVLY	AS#SUBBIT(HINTS,1114,1)#Z		45A
• VARIABLE.LAMP.ALL.USER.DATA.OVLY	AS#SUBBIT(HINTS,1115,1)#Z		45B
• VARIABLE.LAMP.SMCP.CPU.1ST.BIT	AS#SUBBIT(HINTS,1122,1)#Z		462
• VARIABLE.LAMP.SMCP.OVLY	AS#SUBBIT(HINTS,1128,2)#Z		468
• SEGMENT.HALT	AS #SUBBIT(HINTS,1134,004)#Z	HEX	46E
• HALT.MASK	AS #SUBBIT(HINTS,1138,024)#Z	HEX	472
• MMCP.SEGMENT.HALT	AS #SUBBIT(HINTS,1162,004)#Z	HEX	48A
• MMCP.HALT.MASK	AS #SUBBIT(HINTS,1166,024)#Z	HEX	48E
• COMPILE.TIME.OPTIONS	AS #SUBBIT(HINTS,1190,008)#Z	HEX	4A6
• RELEASE.VERSION.MCP	AS #SUBBIT(HINTS,1190,001)#Z	HEX	4A6
• DEBUG.OPTION	AS #SUBBIT(HINTS,1191,001)#Z	HEX	4A7
• CONTROL.MEMORY.SIZE	AS #SUBBIT(HINTS,1198,004)#Z	HEX	4AE
• MCP.VERSION.DATE	AS #SUBBIT(HINTS,1202,016)#Z	HEX	4B2
• MAIN.MEMORY.SIZE	AS #SUBBIT(HINTS,1218,012)#Z	HEX	4C2
• DM.GLOBALS	AS #SUBBIT(HINTS,1230,024)#Z	HEX	4CE
• QUEUE.ROOT.ADDRESS	AS #SUBBIT(HINTS,1254,024)#Z	HEX	4E6
• DC.CHAIN	AS #SUBBIT(HINTS,1302,024)#Z	HEX	516
• MESSAGE.LIST.TAIL	AS #SUBBIT(HINTS,1326,024)#Z	HEX	52E
• ABSOLUTE.S.MEM	AS #SUBBIT(HINTS,1350,012)#Z	HEX	546
• S.C.Q.EV	AS #SUBBIT(HINTS,1362,001)#Z	HEX	552
• M.C.Q.EV	AS #SUBBIT(HINTS,1363,001)#Z	HEX	553
• S.M.Q.EV	AS #SUBBIT(HINTS,1364,001)#Z	HEX	554
• S.I.Q.EV	AS #SUBBIT(HINTS,1365,001)#Z	HEX	555
• M.M.Q.EV	AS #SUBBIT(HINTS,1366,001)#Z	HEX	556
• M.I.Q.EV	AS #SUBBIT(HINTS,1367,001)#Z	HEX	557
• M.CAUSE.LOCK	AS #SUBBIT(HINTS,1368,001)#Z	HEX	558
• M.MCP.LR	AS #SUBBIT(HINTS,1374,024)#Z	HEX	55E
• M.NUMBER.PAGES	AS #SUBBIT(HINTS,1542,024)#Z	HEX	606
• TRACE.ADDR	AS #SUBBIT(HINTS,1566,024)#Z	HEX	61E
• M.MCP.Q.IDENT	AS #SUBBIT(HINTS,1590,008)#Z	HEX	636
• COMM.SPLITTER	AS #SUBBIT(HINTS,1598,072)#Z	HEX	63E
• MIKES.HALT.SPACE	AS #SUBBIT(HINTS,1670,096)#Z	HEX	686
• LAMP.CPU.BASE	AS #SUBBIT(HINTS,1766,001)#Z	HEX	6E6
• FIXED.LAMP.DISPLAY	AS #SUBBIT(HINTS,1767,001)#Z	HEX	6E7
• VAR.LAMP.BASE	AS #SUBBIT(HINTS,1768,001)#Z	HEX	6E8
• VAR.LAMP.CPU.OVLY	AS #SUBBIT(HINTS,1769,001)#Z	HEX	6E9
• VAR.LAMP.ID	AS #SUBBIT(HINTS,1770,001)#Z	HEX	6EA
• VAR.LAMP.BARGRAPH	AS #SUBBIT(HINTS,1771,001)#Z	HEX	6EB
• LAST.MEM.LINK	AS #SUBBIT(HINTS,1790,024)#Z	HEX	6FE
• SYSTEM.ID	AS #SUBBIT(HINTS,1862,012)#Z	HEX	746
• CPU.ID	AS #SUBBIT(HINTS,1862,004)#Z	HEX	746
• MEMORY.ID	AS #SUBBIT(HINTS,1866,004)#Z	HEX	74A
• IO.ID	AS #SUBBIT(HINTS,1870,004)#Z	HEX	74E



```
, ELOG.HERE AS #SUBBIT(HINTS,1874,024)#Z HEX 752
, QLOCK.COUNT AS #SUBBIT(HINTS,1898,004)#Z HEX 76A
, CHIP.TABLE.ADDRESS AS #SUBBIT(HINTS,1902,024)#Z HEX 76E
, MIX.MEMORY.PRIORITIES AS #SUBBIT(HINTS,1926,016)#Z HEX 786
, STOP.SCHED.INPUT AS #SUBBIT(HINTS,1942,001)#Z HEX 796
, NSEC.DISABL.THRASH.FAULT AS #SUBBIT(HINTS,1943,001)#Z HEX 797
, DISABLE.THRASHING.FAULT AS #SUBBIT(HINTS,1944,001)#Z HEX 798
, MCP.VARIABLE.MEM.PRIORITY AS #SUBBIT(HINTS,1945,005)#Z HEX 799
, MEM.SWEEP.PENDING AS #SUBBIT(HINTS,1952,001)#Z HEX 7A0
, SAMPLING.CLOCK AS #SUBBIT(HINTS,1953,006)#Z HEX 7A1
, SAMPLING.INTERVAL AS #SUBBIT(HINTS,1959,006)#Z HEX 7A7
, MEM.SWEEP.INTERVAL AS #SUBBIT(HINTS,1965,010)#Z HEX 7AD
, MAX.SWEEP.INTERVAL AS #SUBBIT(HINTS,1975,010)#Z HEX 7B7
, MEM.EXTEND.COUNT AS #SUBBIT(HINTS,1985,002)#Z HEX 7C1
, OVERLAY.COUNTER AS #SUBBIT(HINTS,1987,008)#Z HEX 7C3
, OVERLAY.TARGET AS #SUBBIT(HINTS,1995,008)#Z HEX 7C8
, MCP.SWEEPS.BEFORE.DECAY AS #SUBBIT(HINTS,2003,010)#Z HEX 7D3
, MEM.DUMP.COMPLETE AS #SUBBIT(HINTS,2013,001)#Z HEX 7DD
, FOUNTAIN AS #SUBBIT(HINTS,2022,024)#Z HEX 7E6
, CLEAR.START.REQD AS #SUBBIT(HINTS,2046,001)#Z HEX 8FE
```

```
;
& IF STACK.CHECK
DECLARE 01 THRESHOLD BIT(24), 01 PREVIOUS.LOW BIT(24);
& END
```

### HALIS

When a software-controlled halt occurs on a B1800/B1700 system, various registers are used to display information about the halt. The most important of these is the L REGISTER, which is considered the primary halt definition. Some halts display further descriptive information in other registers (usually X, Y and T).

The REGISTER is functionally divided into two portions.

- (1) The left-most 16 bits (bits 0-15) describe the specific program or routine that halted, as follows:

200002	SDL Interpreter
	STATE light ON -- MCP
	STATE light OFF -- Normal-state SDL program
202002	MICRO.MCP
20D002	GISMO
200F02	CLEAR/START
2000F2	SYSTEM/INIT
2B0002	BASIC Interpreter
2C0002	COBOL Interpreter
2E0002	RPG Interpreter
2F0002	FORTRAN Interpreter
250002	B500 Interpreter
211002	1130 Interpreter
214002	1401 Interpreter

- (2) The rightmost 8 bits (bits 16-23) give the halt identification. This portion of the halt code is dependent upon the specific routine that halted (given in bits 0-15).

### SDL INIERPREIER HALIS (L=20000xx2)

2012	Evaluation/Program Pointer Stack Overflow.
2022	Control Stack Overflow.
2032	Name/Value Stack Overflow.
2042	REMAPS size error.
2052	Invalid Parameter passed to a PROCEDURE.
2062	Invalid Substring (SUBBIT or SUBSTR).
2072	Invalid Subscript.
2082	Invalid Value returned from a TYPED PROCEDURE.
2092	Invalid CASE.

20A2 Divide by Zero.  
20B2 Invalid Index.  
20C2 Invalid Operator.  
20E2 Invalid Parameter in VALUE.DESRIPTOR.  
2102 Console Halt (INTERRUPT switch).  
2112 HALT Operator (T REGISTER contains further  
definition of the halt). Complete information  
on MCP halts is given below.  
2122 Write Out-of-Bounds.  
2132 No memory for MCP TRACE.  
21E2 Invalid Parameter in DYNAMIC Declaration.  
21F2 Invalid TRANSLATE.  
2352 1860 Console Cassette Data Error  
2372 1860 RWOAM detected

BASIC INTERPRETER HALTS (L=28000xx2)

2102 Console Halt (INTERRUPT switch)

COBOL INTERPRETER HALTS (L=2C000xx2)

2102 Console Halt (INTERRUPT switch)

RPG INTERPRETER HALTS (L=2E000xx2)

2102 Console Halt (INTERRUPT switch)

FORTRAN INTERPRETER HALTS (L=2F000xx2)

2102 Console Halt (INTERRUPT switch)

B500 INTERPRETER HALTS (L=25000xx2)

2102 Console Halt (INTERRUPT switch)

1130 INTERPRETER HALTS (L=21100xx2)

2102 Console Halt (INTERRUPT switch)

1401 INTERPRETER HALIS (L=21400xx2)

2102 Console Halt (INTERRUPT switch)

FIRMWARE HALIS (L=200E0xx2 OR 200E1xx2)

2022 Device on selected Channel is not disk  
(T=device id).  
2032 Control is not idle (T=control status).  
2042 Timeout while waiting for SERVICE REQUEST.  
(software timed).  
2052 Bad Reference Address (X=good, Y=bad, T=Port/Channel)  
2062 Bad status count after SERVICE REQUEST  
(T=control status).  
2072 Bad Result Descriptor (T=Result Descriptor).  
2082 Seek timeout (software timed).  
20A2 Memory parity error on I/O.  
20B2 Timeout while waiting for OP.COMPLETE.  
20C2 Exception condition after 15 retries  
(T=Result Descriptor).  
20F2 No disk found on system.  
2122 Insufficient memory for this routine.  
2132 Memory parity error after overlay.  
2142 Memory parity error (no diagnosis of Location).  
2152 NAME TABLE entry is empty.  
2172 SYSTEM/DUMPFILe disk address is zero.  
(DUMP option is probably reset).  
21C2 No SPD on system.  
21E2 Checksum error. T = SOFTWARE.ID  
2222 Cassette data error.  
2242 No empty channel for SC.SPD.  
2262 NAME TABLE is not proper level.  
2272 Other than test op to nonexistent port device.  
2282 Extended toggle entry point (load registers and  
hit start).  
2292 Dumpfile port-channel does not match system disk  
port-channel.  
2832 Optional GISMO segment required which does not  
exist in this version of GISMO.  
2862 Software compatibility problem.  
TE & TF contain values which identify the  
incompatible programs:  
1=SYSTEM/INIT  
2=GISMO  
3=MICRO.MCP  
4=MCP  
5=SDL Interpreter  
If TD=1 then X=Level, Y=Level  
If TD=7 then X="NEEDS", Y="HAS"

- 2872 Pseudo MAXM (LR bits 15-23) greater than real MAXM.
- 28A2 Not enough M.Memory.
- 28B2 Pseudo MAXS too large (X=pseudo MAXS, Y=maximum value we can use). Push START to use value in Y.
- 2902 S.Memory space needed, but area was XM-ed.
- 2912 Bad op to soft console.
- 2922 Soft console out of sync with driver.
- 2932 Time out on soft console.
- 2942 No service request on soft console.
- 2952 Soft console message without ETX.
- 2962 Test op to soft console returned unknown ID, see T

GISMO HALTS (L=20D00xx2)

- 2102 Console Halt (INTERRUPT switch).
- 2202 Reference Address error (X=good, Y=bad, TA=channel, TE-TF=control status). Push START to assume good address and continue.
- 2212 Irrecoverable Reference Address error (same register settings as halt 20D00202).
- 2222 Reference Address is zero (TB=channel, X=Reference Address).
- 2242 Unknown device id (TB=channel, X=Reference Address).
- 2252 Invalid device id for second OP.COMPLETE bit off (TB=Channel, X=Reference Address).
- 2262 Illegal request (STAND.ALONE GISMO).
- 2272 Pause on uninitialized Channel (TB=Channel, X=Reference Address).
- 2282 SOFT.ID seek complete problem (TB=Channel, X=Reference Address).
- 2292 Bad exchange entry in CHANNEL.TABLE (TE=Port, TF=Channel).
- 2302 INTERRUPT.QUEUE Overflow (X=number attempted, Y=maximum allowable).
- 2312 MLC hung (TE=Port, TF=Channel, X=Reference Address).
- 2322 Memory parity error detected by MLC. Push START to find parity error.
- 2332 M.WAIT: MCP waiting only on time or does not have S.I.Q.EV set in WAIT.LIST.
- 2342 Memory parity error (T=address of byte in error). Pushing START will force good parity at the address in T and start another scan of memory. If T=2FFFFFF2, then there was a read outside the physical bounds of memory or an intermittent parity error that could not be isolated.
- 2362 COMMUNICATE.WITH.GISMO: Bad verb (t=fa value when reading communicate).
- 2372 COMMUNICATE.WITH.GISMO: Bad adverb (X=Communicate

function, T=FA value when reading Communicate).

2382 COMMUNICATE.WITH.GISMO/GISMO.COMMUNICATE:  
Parameter list length error (T=FA address).

2392 GISMO.COMMUNICATE: Bad verb (X=verb).

2402 COMMUNICATE.WITH.GISMO/GISMO.COMMUNICATE:  
Call by non-MCP (T=LIMIT.REGISTER).

2412 USE.COMMUNICATE: Code not present.

2422 Deleted function (T=LIMIT.REGISTER, X=SWAPPER value).

2432 HI.PRI: MCP not in READY.0.

2442 MCP clobbered RS field (TB=Channel, X=Reference  
Address), or a Reference Address error halt  
because RFAC option was reset.

2462 Disk exchange EU.BUSY from non-busy EU.

2472 Hi-priority Interrupt request from MLC on  
DISPATCH.READ (T=Port/Channel, X=Reference  
Address+24).

2482 SOFT.IO: Hi-priority request for a non-sorter  
device (T=Channel, X=Reference Address,  
Y=RS field).

2502 Attempt to reinstate non present RS

2512 Part, Data Transfer on Disk Pack  
T=RD, X=Reference Address

2532 1860 Cass Data error at entry to GISMO.  
Y=STATE.FLAGS, X=LR

2542 1860 CPU multiple (parity). T=ELOG,  
Y=STATE.FLAGS, X=LR

2552 1860 RWOAM detected. T=0, Y=STATE.FLAGS,  
X=LR

2562 1860 RWOAM during memory scan to check location  
of parity error. Probably indicative of CPU  
failure. T, X, and Y are as they would have  
been had we halted for parity.

2572 1860 NON-CPU parity. T=ELOG, Y=Nothing, X=LR.  
If error was detected via port int (rather  
than ELOG) we wait for awhile to get ELOG. It  
may never be reported, and T will not have ELOG.  
NON.CPU.MULTIPLE on.

2582 In STAND.ALONE GISMO, 1860 correctable error in  
S memory. T=ELOG. Push START to continue  
processing; to suppress further reports, modify  
T Register prior to pushing START.

2592 Illegal op with verify variant. TB=CHANNEL,  
X=REF.ADR

2602 Service req from missing or ignored CHANNEL.  
TB = CHANNEL

2802 IQ: Queue empty but an MCP count not equal to zero.

2812 IQ: Queue empty but an IQ event is set.

2822 IQ: Queue not empty but total count is zero.

2832 IQ: Queue not empty but sub-queue count is zero.

2842 IQ: Queue not empty but event is reset.

2852 COMM: ITYPE=00, COMM=59.  
2862 Q.OUT: On READY.Q, not called by SCHEDULER.  
2872 Q.OUT: An MCP COMMUNICATE.Q not empty but event  
bit is reset.  
2882 HANG.RS: On time only, but clock is zero.  
2892 LRU: Old, presence bit reset.  
2902 ADJUST.INTERP: RS not MCP.  
2912 USE: See code.  
2922 USE: Not MCP who tried to transfer to USE.  
2932 USE: See code.  
2942 Bad event descriptor (T=RS).

MICRO.MCP HALTS (L=20200xx2)

2012 INT: OP.COMPLETE off.  
2022 INT: IO.MCP.ID is invalid.  
2032 CD: Block and S.IOC.  
2042 CD: IO.MCP.ID not USER.ID.  
2052 CD: USE.IT, not IOC.E.  
2062 CD: Not IOC.E and IOC set.  
(the above all halt with T=Reference Address,  
Y=Result Descriptor, X=M.EVENTS CAT IO.MCP.ID).  
2072 HANDLE.INT: Bad result (T=result from GISMO).  
2082 DISPATCH: Bad result (T=result from GISMO).  
2092 MMCP.COMM: Bad RS.COMMUNICATE.MSG.PTR.  
2102 MMCP.COMM: COMM.VERB not 1, 2, 3, or 10.  
2112 Irrecoverable error T=HEX.SEQ.NO  
2122 Conditional halt  
2132 On a delayed random I/O, RD indicates  
that the I/O has been initiated but  
MCP.ID is in an improper state  
2202 FETCH.MSG returned null empty  
2212 Incomplete prior dispatch  
2222 LF NEQ 1 after dispatch  
2232 Not POCKET.COMPLETE or DOUBLE.DOCUMENT  
2242 Not POCKET.COMPLETE or TOO.LATE.2.POCKET  
2752 M.I.Q.EV set.  
2762 IQE.VALID off.  
2772 IQE.MMCP off.  
2792 COMMUNICATE.WITH.GISMO not zero-relative.  
2802 Ex. SIOC but not BEEN.THROUGH.ERROR

**CLEARSIARI: IAPE=IQ=RUN MODE (L=00000000)**

Toggle entry point load registers, select run mode, start.

X = Disk port and channel  
Y = Printer port and channel  
T = Toggles

0 = Memory dump  
1 = Standalone program  
2 = Unused  
3 = TRACE.SWITCH  
4 = Experimental MCP  
5 = Experimental Init  
6 = Experimental Interpreter  
7 = Experimental GISMO  
8 = Experimental MMCP  
9 - 11 = Standalone program number  
12 = Halt at selected points in Init with L=HEX.SEQ.NO  
13 = Override the XM Table  
14 = Unused  
15 = Halt a second time for more entries

BR = GISMO trace flags, overrides those in Coldstart Variables.  
LR = Pseudo MAXS, Pseudo MAXM  
FA = Ignore soft IO channels  
FB = Keep specific GISMO segments, overrides discarding rules.

2282 Second Halt for more entries (LOAD and START):

X = Location to be temporarily XM-ed.  
Y = Length to be temporarily XM-ed.  
FB = More GISMO segments to be kept.

**MCP HALTS (L=00000112)**

When the MCP executes an explicit HALT instruction, the L REGISTER is set to 00000112 and a parameter is loaded into the T REGISTER to further define the nature of the halt. Usually, this parameter is the first six digits of a sequence number in the MCP itself; however, some halt conditions occur at more than one place in the MCP. These are given a common identifier, as follows:

T REGISTER	REASON
-----	-----
01111112	No memory



2Cxxxxx2  
2Dxxxxx2  
2Exxxxx2

Disk I/O Error

2000Cxx2

Systems Software Compatibility Error  
The low-order eight bits of the T REGISTER  
contains two 4-bit numbers identifying the two  
programs that are incompatible, as follows:

- 1 SYSTEM/INITIALIZER
- 2 GISMO
- 3 MICRO.MCP
- 4 SDL MCP
- 5 SDL Interpreter

All other halts point to a specific sequence number in the MCP.  
Unless otherwise noted, all halts are irrecoverable; a memory  
dump should be taken and submitted with supporting documentation  
and a B1700 Field Trouble Report.

T REGISTER  
-----

REASON  
-----

20432752	M.IN.M.OUT failed
20433152	Integrity of system disk is bad
20435502	Attempt to initiate in-process I/O
20438752	DISPATCH to invalid Port or Channel
20439082	QLOCK.COUNT overflow
20439092	QLOCK.COUNT underflow
20483662	Disk I/O did not complete in 10 seconds. Push START to retry.
20484752	MSG.TYPE=0 in S.MSG.Q
20484792	DISK.TRACE msg with release MCP
20613502	Invalid USERCODE
20613512	Tried to verify a usercode but no one is running
20613532	Tried to verify a usercode but no one is running
20613582	Tried to verify a usercode but no one is running
20639602	Could not find Pseudo Reader that was in use
20717942	Problem with skipping an empty area of a disk file
20717942	Call on GET.NEW.AREA with POSITION communicate is invalid
20717952	Could not update Base Pack header
20717962	Unrecognizable communicate called GET.NEW.AREA
20985862	Invalid parameters passed to PUT.QUEUE.MESSAGE
20989312	Irrecoverable error not handled by IO.ERROR
20989462	Checking for INV.CHAR in Pseudo Reader but there are no Readers

20996722	Invalid parameters passed to PUT.QUEUE.MESSAGE
20999482	Invalid parameters passed to PUT.QUEUE.MESSAGE
21006682	Incorrect interface between Q.DRIVER & Q.FILES
21007252	Incorrect interface between Q.DRIVER & Q.FILES
21009382	File not open not screened off by R.W.CALLER
21009392	File positioning not screened off by R.W.CALLER
21009462	Enhanced I/O not allowed
21015522	DISPATCH to invalid port or channel
21015552	MCP is lost during Punch Check Recovery
21015582	DISPATCH to invalid Port or Channel
21019612	Got an INTERRUPT from the MMCP
21020152	Memory parity on DISPATCH (Interrupt from Channel 15)
21026032	Invalid IO.TYPE - 24
21026912	In IOCOMPLETE procedure and I/O in question is not complete
21026922	Invalid IO.TYPE - 32
21027592	Begin address of I/O higher than MCP.LIMIT
21027742	DISPATCH to invalid Port or Channel
21029282	Invalid USERCODE
21097252	DISK.ADDR not part of Q.DISK
21097952	RETURN.Q.DISK - space already returned
21122282	Self-checking in Q.DISK.DRIVER
21122992	I/O Descriptor not complete
21123942	No message found
21127402	No message found
21136752	Queue memory link data structure broken
21138802	Queue must be empty here
21140572	No disk passed to RETURN.DISK
21140852	Incorrect use of CLOSE.QUEUE parameters
21154702	Queue FIB not in memory
21202682	Invalid return from CLOSE.QUEUE
21233052	Invalid parameters passed to OPEN.QUEUE
21239052	Invalid parameters passed to OPEN.QUEUE
21254652	Invalid parameters passed to CLOSE.QUEUE
21306352	Invalid parameters passed to PUT.QUEUE.MESSAGE
21306532	Invalid value returned from PUT.QUEUE.MESSAGE
21357922	Failed to Open QUEUE for AUTOBACKUP
21357932	Failed to Open QUEUE for AUTOBACKUP
21357942	Failed to Open QUEUE for AUTOBACKUP
21357952	Failed to Open QUEUE for AUTOBACKUP
21357982	Failed to QUEUE a message for AUTOBACKUP
21358082	Failed Receiving Msg from QUEUE for AUTOBACKUP
21358122	Failed Receiving Msg from QUEUE for AUTOBACKUP
21358132	Failed Receiving Msg from QUEUE for AUTOBACKUP
21358142	Failed Receiving Msg from QUEUE for AUTOBACKUP
21358172	Failed closing QUEUE for AUTOBACKUP
21403302	No such job scheduled
21405352	Scheduled a job that does not exist on disk
21415722	Invalid USERCODE
21460502	Cannot handle type INDIRECT in a Code Dictionary

21541552 CLUB.SOMEONE failed  
21713002 CLUB.SOMEONE failed  
21715402 Terminating a job that does not exist on disk  
21721252 Terminating a job that does not exist on disk  
21734332 No schedule entry for successor on unconditional  
execute  
21741662 Q.KEY stored in QPTR is now bad  
21756062 CLUB.SOMEONE failed  
21795952 No disk space available for ROLLOUT  
21805152 CLUB.SOMEONE failed  
21814632 Cannot find the file that we are currently using  
21821752 Sy.type = system.desc and sy.file on  
21897652 Bad call on OPEN.QUEUE  
21897672 Bad call on OPEN.QUEUE  
21903392 Bad call on OPEN.QUEUE  
21903402 Bad call on OPEN.QUEUE  
21903632 Bad call on GET.QUEUE.MESSAGE  
21903642 Bad call on GET.QUEUE.MESSAGE  
21903652 Bad call on GET.QUEUE.MESSAGE  
21903662 Bad call on GET.QUEUE.MESSAGE  
21964602 Invalid MICR Communicate  
22124662 System disk with no available disk space  
22124672 Cannot find an IOAT for this system disk  
22148302 DISPATCH to invalid Port or Channel  
22158772 A control did not respond to TEST OP after a  
10-second wait (at CLEAR/START). Push START  
once -- T will contain Port and Channel. Push  
START again -- T will contain I/O Descriptor  
address.  
22180682 SPO did not respond to a TEST OP  
22201772 CLEAR/START again (increased COLD.START.VARIABLES size  
22224582 Disk is not a system disk  
22247302 Failed to absolutize GISMO or SDL Interpreter  
22338822 I/O won't complete while trying to ready a disk  
22375742 SPO.QUEUE has been destroyed  
22378672 Invalid recursion in CONTROL.CARD.DRIVER  
22381732 CRT SPO had read data beyond the buffer limits  
22381902 Invalid recursion in CONTROL.CARD.DRIVER  
22431202 Bad value passed to HEADER.UPDATE  
22446252 Cannot find MPF.INFO.TABLE already in use  
22462652 Bad disk file header  
22473822 Cannot find entry in MPF.TABLE  
22474322 Cannot find MPF.INFO.TABLE already in use  
22632652 No disk available for temporary available table  
22730252 Bad entry passed to RETURN.DISK. Push start to  
resolve conflict and continue.  
22730262 Bad address passed to RETURN.DISK  
22730272 Zero Port and Channel passed to RET.DISK  
22730622 Bad disk address passed to RETURN.DISK  
22736392 Bad disk address passed to RETDSKENMASSE

22736432	RETURN.DISK problem. Push START to continue
22787182	Tape I/O did not complete after a 10-second wait. Push START once -- T will contain I/O Descriptor address. Push START again -- T will show whether QP was complete.
22921592	Unexpected return from GET.QUEUE.MESSAGE
22921612	Unexpected return from GET.QUEUE.MESSAGE
22921622	Unexpected return from GET.QUEUE.MESSAGE
22970662	NCR = " " in Scanner after reduce
23032832	Unexpected return from PUT.QUEUE.MESSAGE
23033052	Unexpected return from PUT.QUEUE.MESSAGE
23036652	Failed receiving msg from QUEUE for AB
23036672	Failed closing QUEUE for AB
23040422	Incorrect call on OPEN.QUEUE
23040432	Incorrect call on OPEN.QUEUE
23040592	Incorrect call on PUT.QUEUE.MESSAGE
23040602	Incorrect call on PUT.QUEUE.MESSAGE
23197712	Incorrect call on PUT.QUEUE.MESSAGE
23197722	Incorrect call on PUT.QUEUE.MESSAGE
23611552	Bad call on CLOSE.QUEUE
23932342	Invalid USERCODE
24217252	Bad Pseudo Reader chain
24262732	Verify USERCODE failed in "RV"
24298402	No disk available for available table
24335142	Bad entry in SPC.TABLE during SQUASH
24335172	No entry in AVL.TABLE segment
24335212	Bad virtual block number
24335412	RETURN.DISK failed
24335612	Problems in MERGE phase
24335862	Missing entry in SQ.FILE
24335882	Cannot RETURN.DISK while shrinking SQ.FILE
24335932	Cannot find an SQ.FILE area in SQ.DIRECTORY
24336032	Got the wrong buffer
24336042	File header disk address missing
24336062	File AREA.ADDRESS missing
24336082	CHILD.DIRECTORY address missing
24336102	Bad data block being returned to disk
24336112	Bad data block being returned to disk
24336302	Cannot RETURN.DISK for SQ.FILE.SPACE
25074492	Cannot find translate file that was already in use
25119952	Cannot find pack that is already in use
25126132	No space allocated for ANSI.BUFFER.SPACE
25128322	Illegal hardware type
25128562	Illegal hardware type
25239392	Missing file header for a multi-pack file
25240042	Cannot find pack that is already in use
25247192	Verify USERCODE failed when OPEN.SET.OVERRIDE
25249352	Pseudo Reader links are blown
25469902	QUEUE not a queue or not a disk queue

25470082 Cannot find disk  
25473562 Invalid parameters passed to OPEN.QUEUE  
25474312 Invalid parameters passed to CLOSE.QUEUE  
25474522 Invalid parameters passed to CLOSE.QUEUE  
25476532 Invalid parameters passed to PUT.QUEUE.MESSAGE  
25483732 Bad call on OPEN.QUEUE  
25484302 Cannot backtrack (CLOSE.QUEUE problem)  
25488762 Device is not a DATA.RECORDER  
25491042 Attempted to open DATA.RECORDER other than INPUT  
or OUTPUT  
25491462 Attempted to open DATA.RECORDER other than INPUT  
or OUTPUT  
25558202 Bad disk directory  
25565202 Irrecoverable disk I/O error on file header read  
25590052 No disk available for directory expansion  
25594032 Irrecoverable disk I/O error on file header read  
25672602 Partial block on Disk with no area allocated  
25675552 Could not update Base Pack header  
25713952 Could not power down Continuation Pack  
25716952 Cannot find Base Pack  
25731872 Lost a Disk File Header for a Pseudo Reader  
25734502 MPF.TABLE has been destroyed  
25788952 Blown Q.KEY in QUEUE file structure  
25818732 Invalid parameters passed to PUT.QUEUE.MESSAGE  
25820422 Invalid parameters passed to CLOSE.QUEUE  
25820812 Invalid parameters passed to CLOSE.QUEUE  
25835262 Failed to Queue a msg for AUTOBACKUP  
25855252 Q.KEY for SPO.QUEUE is blown  
25878622 FIB indicates partial block but block count = 0  
25905172 No label on multi-file tape  
25947662 Tape I/O did not complete after a 10-second wait.  
Push START once -- T will contain I/O Descriptor  
address. Push START again -- T will show whether  
OP was complete.  
26026132 Non-card device in CARD.STATUS  
26053622 SCHED.OUT failed  
26082102 Some I/O did not complete after a 10-second wait  
in the IO.ERROR routine. Push START once -- T will  
contain I/O descriptor address. Push START again --  
T will show whether OP was complete.  
26375302 Bad Port and Channel in Descriptor  
26375502 Bad Descriptor  
26386302 Structure has invalid DFH pointer  
26420502 Invalid AUDIT.EXCEPTION.STATUS value  
26444002 Invalid AUDIT.EXCEPTION.STATUS value  
26453602 Bad AUDIT.TYPE Length  
26454102 Bad STR.NUMBER Length  
26454302 Bad data descriptor  
26454502 Bad data descriptor  
26454702 Bad data descriptor

26455102	Bad DISK.L.ADDR Length
26455602	Bad DISK.L.ADDR Length
26456002	Bad DISK.L.ADDR Length
26501062	DMS Audit User Count is incorrect
26531132	DMS Audit User Count is incorrect
26534332	Files/Structures linked into globals at last OB close
26534732	OB dictionary not found on disk at DB close
26586372	Cannot find DFH area for data record of disk search
26587472	Interrupt with op incomplete in IO.CLEAN.UP
26587482	Interrupt with op in-process in IO.CLEAN.UP
26699402	Exception while backing out DMS operation
26737032	GET.RECORD requested address exceeds file bounds
26979722	The number of entries in a Fine Table exceeded
26986022	The number of entries in a Coarse Table exceeded
27042502	Could not find key
27103602	Invalid mix number in currents
27233702	No key match
27234062	Cannot find Index Sequential key to delete
27234202	Problem with WA.CT.ENTRY
27286402	Bad parameter (CASE 0)
27431012	WA.STR.ADDR equal zero with non-zero WA.REASON
27442002	DNC.MAIN invalid reason
27442802	DNC.MAIN invalid reason
27447602	DNC.MAIN invalid reason
27817102	Ran out of disk during DMS
27835252	Missing LOG file
27835402	Missing LOG file
27835422	Missing LOG file
27835442	No disk available for new LOG area. LOG option will be reset after CLEAR/START
27897842	Changed system disk without CLEAR/START
27932992	Invalid Queue parameter for Autobackup Queue
29904512	Invalid communicate (CODE overlay)
29906612	Invalid communicate (INTERPRETER overlay)
29906622	Invalid communicate (GISMO overlay)
29952532	Logical I/O problems
29952542	Cannot INTERVENE yet

COLDSTART HALIS

HALI CODE DESCRIPTION

- 1 Disk I/O error, hit Start once to get result descriptor.
- 2 Tape I/O error, hit Start once to get result descriptor.
- 3 Unexpected data or result descriptor from tape.
- 4 No tape control on system.
- 5 No disk control on system.
- 6 Disk not initialized in MARK 3.3 format.
- 7 Trying to coldstart user pack or cartridge.
- 8 Missing system tape. Make available and hit Start.
- 9 Missing files from tape. Hit Start until 20C00092 is displayed again to obtain list of missing file numbers:

- 1 = MCP11
- 1 = SDL/INTERP1S
- 3 = SDL/INTERP1M
- 4 = GISMO
- 5 = SYSTEM/INIT
- 6 = MCP11/MICRO.MCP
- 7 = SYSTEM/LOAD.DUMP
- 8 = FILE LOADER

- A. Missing device on dispatch.
- B. Insufficient disk for COLDSTART.
- C. Went past tape mark.
- D. Missing tape mark.
- E. No SPO control on system (Non-released).
- F. SPO not ready (Non-released).

## ENHANCEMENTS FOR VII.0

### PRIORITIZED MEMORY MANAGEMENT

Prioritized Memory Management, as it is implemented in the Mark VII.0 level of MCP II, can be defined as an automatic mechanism for detecting and eliminating thrashing on B1800/B1700 systems. Thrashing, as it exists in the B1800/B1700 environment, is an overcommitment of memory that results in a degradation, sometimes very serious, of the system's performance. Prioritized memory management is designed to eliminate thrashing by automatically notifying the operator when thrashing occurs, if the THRASHING option is set, and by allowing the operator a range of recourses to address the problem that has been identified.

No single memory management system is ideal for all situations. Consequently, the VII.0 memory management system is implemented on four separate levels of sophistication to minimize the possible impact of memory management on those who do not need or want it. Those who are satisfied with lower levels of this system need not be concerned with the details of higher levels. This approach also allows users to ease into the more sophisticated aspects of the new system smoothly without being forced into an all-or-nothing situation.

This section discusses the implementation of Prioritized Memory Management and also provides background information on general approaches to memory management and the GETSPACE routine as it has been implemented in MCP II prior to the VII.0 release.

#### DEFAULT LEVEL

The first (default) level of memory management implements the old "GETSPACE" algorithm (see "GETSPACE" ALGORITHM PRIOR TO 7.0 below) with the exception that the "victim selector" routine, which decides which piece of memory to de-allocate next, is microcoded. This change was made for ease of implementation with the higher levels of the new memory management system, and not for increased speed of operation. No increase in speed should be expected.



### Advantages

The advantages of this implementation are that:

1. Most users who are happy with the old "GETSPACE" algorithm should not notice any change when using this level of the new algorithm.
2. It requires the least amount of memory of any of the new memory management levels.

### Disadvantages

The disadvantages are that:

1. All the disadvantages of the old "GETSPACE" algorithm listed below are still there; i.e., no mechanism to detect thrashing, relative activity not known, job priority not considered, etc.
2. It requires 50 more bytes of non-overlayable memory than the old implementation of this algorithm, though the performance appears approximately equal.
3. Memory links are one byte larger. A rough estimate of the number of memory links in a system is one per thousand bytes of physical memory.

### SPO Messages

There are no SPO messages associated with the Level One implementation of VII.0 memory management.

### DEFAULT-THRESHOLD-THRASHING-MESSAGE LEVEL

The second level of the new memory management algorithm implements thrashing detection. The "victim selector" of the Default Level is still used. When GISMO, which is monitoring overlay activity, decides that thrashing is occurring which is not a temporary phenomenon, it sends a communicate to the S-MCP. The S-MCP does the following two things:

- a. Stops any more jobs from being automatically started. This can be overridden by using the "PS" SPO message to prod the schedule. Otherwise the schedule will not be automatically restarted until some job goes to to EOJ.
- b. Sends the following message to the SPO: "\*\*\*SYSTEM IS THRASHING, SCHEDULE STOPPED\*\*\*". This message is repeated every N.SECOND if thrashing continues, however, there is a SPO message (see below) to cause the thrashing warning to only be repeated once per job entered into or removed from the mix.

When the system is shifting from one working set to another, memory is often overcommitted for a short period of time. This condition is acceptable provided it does not persist for long. However, one installation may be willing to tolerate an overcommitment of memory for longer time intervals than another. Therefore, a mechanism is provided to adjust the sensitivity of the memory management system's thrashing detection mechanism. (See "MM O.T" SPO message below)

#### Advantage

The advantage of this level is that users will now know when their memory is overcommitted and therefore, be able to do a much better job of maintaining a mix of jobs which utilizes most of memory but does not cause thrashing to occur.

#### Disadvantage

The only disadvantage of this level is that 140 more bytes of non-overlayable memory are required, beyond the requirement of Level One.

#### SPO Messages

SPO messages associated with Level Two are the following:

SO THR                    Invokes Level Two of the new memory management system after the next Clear/Start. If the THR option is set, the initializer binds into GISMO the code to detect thrashing.

MM THRASH ON  
MM THRASH OFF            When THRASH is on, the thrashing message will

be redisplayed on the SPD once per N.SECOND as long as thrashing continues. This is the default value. When THRASH is off the thrashing warning message is displayed only each time a job is added to or removed from the mix as long as thrashing continues.

<Job#>ST EOJ

This message will stop the program indicated by <Job#> and automatically restart it when another program goes to EOJ. ST EOJ is useful when the system gets into a thrashing state. The operator can then use the "ST EOJ" message to stop jobs until the mix is not thrashing. These jobs will then be automatically resumed after other jobs go to EOJ. Of course a "<Job#>GO" message will restart a stopped job right away.

MN O.T <decimal #>

Sets the overlay target to <decimal #> which may vary between 4 and 31. The default value is 8. These values denote the number of overlays per item interval. One time interval, in this instance, is equivalent to 800 milliseconds. Higher values will make the thrashing detector less sensitive and lower values will make it more sensitive.

### PRIORITIZED-MEMORY LEVEL

The third level of the new memory management system implements the thrashing detection of Level Two with a new "victim selector" based on job priority and segment usage. The Prioritized-Memory Level is invoked by simply setting the "MPRI" option and Clear/Starting which causes the initializer to incorporate a different "victim selector" into GISMO.

In a "flat mix", one with all priorities equal, those segments which are actively in use will tend to stay in memory while those segments which are no longer being used will tend to be overlaid. This cannot be made an absolute policy in a memory management scheme based on segmentation due to problems of "geography". A very small inactive segment which has been allocated between two active segments may remain in memory longer than it otherwise would because of its location.

In a mix with varying priorities, those segments of high priority jobs which are actively in use will be protected from segments of lower priority jobs. When a high priority segment is not accessed for a period of time (equal to 1.2 seconds on the average) it is lowered to the priority of the next lower priority job in the system and is again protected at that priority for the same period of time, etc. If a segment is accessed at any time before being overlaid it is restored to its original priority. In this way segments of high priority jobs are protected from low priority jobs' segments and yet unused segments of any job tend to be overlaid.

### Advantages

There are two advantages to Level Two implementation:

1. Changes in job priority will protect active segments of higher priority jobs from being overlaid by segments of lower priority jobs.
2. All the advantages of Level Two listed above.

### Disadvantages

The disadvantages are that:

1. 150 more bytes of non-overlayable memory than that required by Level Two are required.
2. If jobs are run at varying priorities fragmentation of memory is increased.

### SPQ Messages

SD MPRI Invokes Prioritized-Memory Level of the new memory management system after the next Clear/Start. If the MPRI option is set the initializer binds into GISMO the code to detect thrashing as well as the prioritized "victim selector".

<Job#>PR <decimal #> Sets both the processor priority and the memory priority of the indicated job to <decimal #> which must be > 0 and < 15. Default value is 4.

<Job#>MP <decimal #> Sets only memory priority of the indicated job to <decimal #> which must be > 0 and <

15. Default value is 4. (The multipack SPO command which used to be "MP" is now "MU".)

<Job #>PP <decimal #> Sets only the processor priority of the indicated job to <decimal #> which must be > 0 and < 15. Default value is 4.

### PROLONGED-SEGMENT-DECAY LEVEL

The fourth level of the new memory management algorithm implements the protection of segments from overlay by segments of lower priority jobs for an extended period of time after they were last accessed. Level Four was devised primarily for datacomm users who had no way of insuring that key segments of their handlers and other jobs remained in memory. As a result response time suffered when low priority background jobs caused datacomm segments to be overlayed. It was not advisable to permit users to mark their segments as "save", however, the system discussed below is only a little short of that.

There are two aspects to protecting key segments. First, those segments which are to be protected for a prolonged period must be marked. The mechanism for accomplishing this task is a normal state program called "SYSTEM/MARK.SEGS". Below is a sample deck for marking three segments of the program "CANDE/HANDLER" as important and one segment which had previously been marked important as unimportant.

```
?EX SYSTEM/MARK.SEGS;  
?FILE CODE NAME CANDE/HANDLER;  
?FILE NEWCODE NAME CANDE/HND.MARKED;  
?DATA CARDS  
(0,1) 1 X MARK PAGE 0 SEGMENT 1 AS IMPORTANT  
      (0,3) 1 (1,7)1  
(0,5) 0 X MARK PAGE 0 SEGMENT 5 AS UNIMPORTANT  
?END
```

Note 1: For one level segment dictionaries only the segment number would be specified.

Note 2: A free format is used in specifying segments as important or unimportant.

"SYSTEM/MARK.SEGS" copies CANDE/HANDLER to CANDE/HND.MARKED, updates the disk copy of the segment dictionaries of CANDE/HND.MARKED, and produces a listing of all of the segments

of that program as they are currently marked. If no data cards are contained in the input file "CARDS", then a listing of the current status of segments of the object program is produced.

The second requirement for protecting key segments is to specify how long to retain them. This is done by setting the program attribute SECONDS.BEFORE.DECAY (abbreviated SB) to a value from 0 to 600. The priority of segments which have been marked as important will not be degraded until and unless those segments are not accessed for SB seconds. It should be noted that if SB = 0 for a particular job then both segments marked as important and unimportant will be treated the same. Furthermore, SECONDS.BEFORE.DECAY is completely subserviant to memory priority. A segment with a higher memory priority can overlay a segment with a lower memory priority no matter what the lower priority segment's SECONDS.BEFORE.DECAY is set to. SB simply determines how long after a segment was last accessed it will be able to retain a given priority.

In order to facilitate the use of SB where all segments of a particular program are to be considered important (i.e., a datacomm handler), SB should be set to a non-zero value and none of its segments should be marked as important. Under these conditions, all of the program's segments are protected from decay of its memory priority for SB seconds after it was last accessed.

#### Advantages

The advantages of Level Four are that:

1. Datacomm users will be able to guarantee that key segments of their handlers and other programs will not be overlaid by lower priority jobs for any fixed period of time between 0 and 600 seconds after they are last accessed.
2. Uses the same amount of memory and runs at the same speed as Level Three.

#### Disadvantages

The disadvantage of Level Four is that users of extended segment decay can lock up more memory than they really need and thereby degrade the performance of background jobs more than necessary.

### SPO Messages

**SECONDS.BEFORE.DECAY** A new program attribute, abbreviated as SB, which can be used with "MO" or "DY" or in an "EXECUTE" statement to set the seconds before decay for a program which has some segments marked as important. The value must be GEQ 0 and LEQ 600.

#### Examples:

```
MO <job#> SB 10;  
DY <job#> SB 15;  
EX CANDE/HANDLER SB 5;
```

## BACKGROUND FOR MEMORY MANAGEMENT CONCEPTS

### Memory Fragmentation

This is the failure to allocate all of memory for useful purposes. Two varieties of fragmentation, internal and external, occur depending on whether a system uses a paging or segmentation mechanism.

### Paging vs. Segmentation:

In a paging system all of memory is divided into equal sized pages. Therefore 100% of memory is assigned to a usable page and there is 0% external fragmentation. However, since memory requests are typically of varying sizes, the last page required to fulfill a memory request is usually not full. This is internal fragmentation.

In a system based on segmentation, segment sizes are variable so that only enough memory to satisfy a request is allocated. Therefore, no internal fragmentation exists in a segmented memory management system. However, some memory is required for a memory link to describe each segment. This is something less than 25 bytes per segment. A more serious problem is that areas of memory too small for anyone to use become available between two pieces of memory which are being used. This is external fragmentation.

Neither paging or segmentation is clearly superior to the other. Each has advantages and disadvantages. The primary advantage of paging is that it is straightforward from a memory management point of view. Segmentation, on the other hand, causes "geography" problems because external fragmentation checkerboards memory. However, segmentation provides a much more reasonable structuring of memory since only the space logically required for a given function is provided. Therefore, programmers need not be concerned with trying to structure their memory requirements into mod <page size> requests. And the less unnecessary details programmers have to think about the more quickly and accurately they can complete their actual tasks.

Burroughs has traditionally opted to use segmentation in its approach to memory management and the B1600/B1700 are no exception to this rule. Therefore, prioritized memory management is concerned with memory management schemes based on segmentation.

#### WORKING SET

This term refers to the set of all memory pages or segments which are accessed during a specific time interval. Using Denning's terminology the "working set" at time  $T$ ,  $W(T, t)$ , is the set of all segments accessed in the time interval from  $T - t$  to  $T$ . The working set for a specific job then is the set of segments which that job can use during the last time interval. The working set for the entire system is simply the sum of the working sets of all currently active jobs. The working set for a program and especially for the system as a whole can and often does change over successive time intervals as jobs go from one phase to another.

#### THRASHING

This is the condition which exists when the "working set" of the system does not fit in real memory. In order to bring in the next segment the system has to overlay a currently active segment. Then that segment has to be brought back in and another active segment must be overlaid, etc. System performance suffers tremendously when "thrashing" occurs. Throughput degradation of 100% is not unusual. In fact, in the worst case absolutely nothing except overlays gets done.



## "GETSPACE" ALGORITHM PRIOR ID 7.0

### Description

In order to understand the new memory management system and under what circumstances it might be useful, some familiarity with the old "GETSPACE" algorithm is required. The old algorithm is basically a round robin or first-in first-out memory management scheme. Overlayable memory is allocated starting from a "left-off pointer" which is then updated to point to the next lower segment in memory. Thus, the left-off pointer sweeps from high to low memory addresses until it hits the first link, at which time it starts from the last link again.

Save memory, which cannot be reassigned until it is explicitly forgotten, is allocated at the high end of memory so that it will tend to be pushed together, thereby cutting down the external fragmentation which save memory inherently creates.

### Advantages

1. External fragmentation of memory is minimized since small available chunks of memory tend to be swept up and used as the left-off pointer sweeps through memory.
2. Although a simplistic decision about who to deallocate is made, this decision is made quickly. This is a very important feature. If enough memory is available to contain the working set of the currently active jobs then the first priority of the memory management system is to get that working set in as quickly as possible.
3. Current users are accustomed to the old algorithm and many are satisfied with it either because they have learned to avoid its pitfalls or because it suits their needs well.

### Disadvantages

1. The most serious flaw of the old "GETSPACE" algorithm is that there is no mechanism to detect thrashing. Users have no clean way of determining when they have overcommitted their memory. They instead have to rely on elapsed time to tell them after the fact that their

system was performing poorly and even then thrashing is just one of several possible causes.

2. The relative activity of a segment or whether or not it is currently in use is not considered or even known when deciding to overlay that segment. Therefore, segments which are no longer in use may be retained while active segments are overlaid.
3. The priority of a job using a segment is not considered when deciding to overlay that segment. Therefore, segments of high priority jobs are not protected from being overlaid by segments of lower priority jobs. High priority datacomm jobs are a prime example of jobs which sometimes suffer because their segments are not protected from background jobs (notably compiles and LOAD.DUMPs).

### SPO Messages

There are no special SPO messages associated with the old "GETSPACE" algorithm.

### MEASUREMENT TOOLS (VII.0)

The VII.0 release of MCPII provides measurement tools through a facility called Console Lamps and through additional information in the System Log and in displays on the SPO. The debug version of GISMO turns the console lights into "lamps" by using the lights to represent various system activities. Through these console lamps, it is possible to determine when a selected disk unit is busy or when the MCP is performing a code overlay for a selected program specified by job number.

Through the lamps, users may monitor:

- I/O activity by channel or unit on a given channel
- Subsets of CPU activity that include:
  - Idle time
  - MMCP and scheduler time
  - SMCP time

- User time (by job number or total user time)
- Overlay activity of:
  - SMCP interpreter segments, SMCP segments, and MMCP segments
  - User code segments and user interpreter segments
  - User data

In terms of lamps, the B1700 and B1800 have the same console. The console contains 24 main exchange lights, 24 switches, and the state light. Users make monitor requests through the console switches on either console. However, the two processors do not have the same capabilities for displaying information through the lights. The B1700 allows only the state light to be controlled by the software. For this implementation, there is only one lamp. If any of the requested activities is in process, then the light is on. Otherwise, it is off.

The B1800 has two additional capabilities that may be used to enhance the display. The processor allows software control of the 24 exchange lights and it contains a hardware timer that can be used to accumulate a reasonably accurate account of the time involved in the activity. In this implementation, the 24 exchange lights are divided into two groups of lamps. The left 16 lamps are used as a "bar graph", and the right six are used as a "fixed" display of various activities. The remaining two are not used.

### INVOKING THE LAMPS

The lamps are made active under the following conditions:

- A 7.0 debug GISMO dated 8/1/77 or later must be used.
- Appropriate SPC options must be set.
- Appropriate console switches must be set.

### SPC OPTIONS

The implementation for the lamps adds six discardable segments to GISMO. Four system options control which of these segments are kept at Clear/Start time, and thus which of the lamp features may be used. The following two options are available to either processor. They control the segments which use only the state light for a lamp. These options are:

**VLIO** Allows specification and display of activity on the IO subsystem.

**VLCP** Displays CPU usage and overlay activity.

Setting of either of these options does not, in itself, cause any activities to be displayed; they only control which segments are to kept at Clear/Start time.

The following options are used only for the B1800 to control the main exchange lights:

**BRGR** The activities displayed on this graph are the same, at any given moment, as the ones being shown on the state lamp. Setting this option does not, by itself, cause anything to be shown; the console switches are used in the same manner described for the state lamp. This code is a "subsidiary" of the state lamp options; if both VLIO and VLCP are reset, this option is also considered reset.

**FLMP** When this option is set, the discardable segments of GISMO used in console-lamp displays are kept at Clear/Start time. Since there are no further options in this lamp group, keeping the code at Clear/Start time is all that is necessary to cause the display described later.

The following caveats should be noted about these options. If a system has been Clear/Started with the debug GISMO and any of the options have been set, the main exchange lights behave quite differently from normal. This behavior may fool the operator into believing that the system has broken down, but that, ordinarily is not the case. Another problem related to the options occurs if any of the options is set and the system is Clear/Started with a non-debug GISMO. The initializer will look for the segments requested by the options, will not find them, and will halt the system with 200F0832 in the L register. Though the halt is an encumbrance, it may be pushed through in order to Clear/Start.

### Specifying Activities to be Shown

Specifying an activity to be shown implies that whenever that activity is "in process", the STATE LAMP will be ON, and whenever that activity is not "in process", the STATE LAMP will be OFF.

Given that the appropriate discardable segments have been kept at Clear/Start time, the specifications for what is to be shown may be changed at any time. If the discardable segments supporting the activity specified have not been kept, specifications from the switches will be treated as "null", and no activities will be shown.

Activities are selected on the console switches from one of three groups: IO, CPU and Overlay. In order to make these selections, the switches must first be "enabled" for GISMO; this is done with the SPO message "SE4" (Switch Enable 4 (GISMO)). The switches then have these meanings (numbered left to right, 0 thru 23):

- 0 and 1 Are always the B1820 scale factor (see B1820, below).
- 2 When set, flags specifications for IO activity, and 3 through 23 are interpreted as discussed below, IO ACTIVITY.
- 3 When 2 is reset and 3 is set, the specifications are for CPU usage and 4 through 23 are interpreted as discussed below, CPU USAGE.
- 4 When 2 and 3 are reset and 4 is set, the specifications are for overlay activity, and 5 through 23 are interpreted as discussed below, OVERLAY ACTIVITY.

When 2, 3, and 4 are reset, the specifications are treated as "null" and no activities are shown (the STATE LAMP is always OFF).

### Summary of Switch Specifications

	0 1 2 3   4 5 6 7   8 9 0 1   2 3 4 5   6 7 8 9   0 1 2 3
IO	S-S 1 C   CHANNEL   UNITS (left to right, 0 thru 15)
CPU	S-S 0 1   U M I S   USER NUMBER (right justified)
OLAY	S-S 0 0   I S U U   USER NUMBER (left justified)
	O P D

S-S B1820 scale factor

C IO control activity  
 CHANNEL Channel number, 0 through 14 (hex E)

U User CPU usage  
 I Idle CPU  
 M Micro MCP and Micro Scheduler CPU usage  
 S SMCP CPU usage

SO Overlay of SMCP S-code and interp segs, MMCP segs  
 UP Overlay of User S-code and interp segs  
 UD Overlay of User data

IO ACTIVITY

	0 1 2 3   4 5 6 7   8 9 0 1   2 3 4 5   6 7 8 9   0 1 2 3
	S-S 1 C   CHANNEL   UNITS (left to right, 0 through 15)

Here it is specified that the STATE LAMP is to be ON when there is IO in process on the selected channel. The C bit (Control activity) and the Unit bits (Unit activity) have meaning dependent on the device bit as discussed below.

For channels other than DISK and MAG TAPE, the unit bits are ignored. Selecting the channel and setting the C bit will cause all activity through the channel to be shown.

For MAG TAPE, selecting the channel and setting the C bit will show all activity through the channel, regardless of which unit is involved. If the C bit is reset, then activity only for the unit(s) selected in the unit mask will be shown.

For DISK which does not have overlapped seeks (HPT, FLOPPY), the

specification is as for MAG TAPE.

For DISK that does have overlapped seeks (CARTRIDGE, PACK), it is possible that the channel will be "idle" when there is IO "in process"; that is, when a unit(s) is seeking. The C bit, when set, specifies that the STATE LAMP is to be on only when the channel is busy (will typically exclude seek time). When a unit(s) is selected in the unit mask, the STATE LAMP will be on whenever there is an IO "in process" for the unit(s), including the time the unit is seeking.

For exchanges, if the primary (lowest) channel is selected, all activity to the selected units will be shown, regardless of what channel in the exchange actually does the IO. The C bit will cause activity only on the selected channel to be shown. If a secondary channel is selected, then the unit mask is ignored (and no unit activity shown); the C bit will show activity through the selected channel.

Note: TEST operations (including TEST&WAITs) and PAUSE operations are never shown.

CPU USAGE

```
|-----|  
| 0 1 2 3 | 4 5 6 7 | 8 9 0 1 | 2 3 4 5 | 6 7 8 9 | 0 1 2 3 |  
|-----|-----|-----|-----|-----|-----|  
| S-S 0 1 | U M I S | USER NUMBER (right justified) |  
|-----|-----|-----|-----|-----|-----|
```

In this group are specifications that the STATE LAMP is to be ON during the execution on the CPU of:

- USER code
- Micro MCP and Micro Scheduler code
- IDLE CPU
- SMCP code

Any combination of the four may be specified; if all four are specified together, the STATE LAMP is always ON. If the USER bit is set, then if the user number field is zero, then the STATE LAMP is ON when any USER is running; if the user number field is non-zero, then the STATE LAMP is ON, during user time, only when the selected user is running. For example, if IDLE CPU and USER are selected, and the user number field is zero, then the STATE LAMP will be on when any user is running or the CPU is IDLE; if the user number field is non-zero, then the STATE LAMP will be on when the selected user is running or the CPU is IDLE.

Note: SOFTIO time (in GISMO) is not isolated and will appear as CPU time used by whoever was running when SOFTIO was invoked.

OVERLAY ACTIVITY

```
|-----|  
| 0 1 2 3 | 4 5 6 7 | 8 9 0 1 | 2 3 4 5 | 6 7 8 9 | 0 1 2 3 |  
|-----|-----|-----|-----|-----|-----|  
| S-S 0 0 | 1 S U U | USER NUMBER (right justified) |  
|         | O P C |  
|-----|
```

This group specifies that the STATE LAMP is to be ON when overlay is "in process"; that is, from the time that the overlay request is recognized by the SMCP until the overlay is complete (including any disk operations) and the requestor returned to the READYQ.

There are three types of overlay which may be shown:

- MCP overlays, including SMCP S-code overlay, SDL Interpreter segments requested for the SMCP, and Micro MCP overlays.
- User code overlays, including user S-code and Interpreter segments requested for a user.
- User data overlays.

When user code or user data overlays are requested, and the user number field is zero, then all user code and/or user data overlays are shown; if the user number field is non-zero, then user code and/or user data overlays are shown only for the selected job. For example, if MCP overlays and user code overlays are selected and the user number field is zero, then the STATE LAMP will be on when MCP overlay or any user code overlay is in process; if the user number field is non-zero then the STATE LAMP will be on when MCP overlay or user code overlay for the selected user is in process.

BAR GRAPH



Again, the activities that are currently being shown on the STATE LAMP are the ones that are displayed on the Bar Graph. The hardware timer is used to accumulate the time involved in the selected activities. At each interval N (its duration is discussed below), this time is converted to a percentage of N, and shown on the Bar Graph. Each lamp in the Bar Graph group represents 1/16th of the interval N (left to right, 0 to 100%), with these two restrictions:

- If the activity(s) occurred at all in the interval N, regardless of how little time it accumulated, at least the leftmost lamp will be on for the succeeding interval N.
- If the activity(s) did not occupy 100% of the interval N, the rightmost lamp will not be on for the succeeding interval N.

#### BAR GRAPH SCALE FACTOR (INTERVAL N)

The interval N acquires its duration from the SCALE FACTOR field in the console switches (leftmost two switches) according to the following table:

Switches	Interval N	Each lamp represents
00	400 milliseconds	25 milliseconds
01	800 milliseconds	50 milliseconds
10	1600 milliseconds	100 milliseconds
11	3200 milliseconds	200 milliseconds

For an example of what might be seen on the Bar Graph, assume that some particular user's CPU Usage is being shown on the STATE LAMP. Further assume that the SCALE FACTOR Switches are set at 01 (800 milliseconds).

Every 800 milliseconds the 16 lamps in the Bar Graph group of the console lamps will be changed to show what percentage of the just-ended 800 millisecond interval that user was executing on the CPU.

If the 24 lamps are (where 1=ON, 0=OFF, X=does not apply):

1111 0000 0000 0000 XXXX XXXX

then the user was executing on the CPU 25% of the previous 800 milliseconds (that is, 200 milliseconds).

If the lamps are:

1100 0000 0000 0000 XXXX XXXX

then the user was executing on the CPU 12.5% of the previous 800 milliseconds (that is, 100 milliseconds).

As another example, assume that activity on DPA and DPB are being shown on the STATE LAMP, and that the SCALE FACTOR is at 00 (400 milliseconds).

If the lamps are:

1111 1111 1111 0000 XXXX XXXX

then there was IO in process on either DPA or DPB 75% of the previous 400 milliseconds (that is, 300 milliseconds).

### FIXED LAMP DISPLAY

The rightmost six console lamps form the "fixed" display group. On these lamps six activities are shown exactly as they would have appeared, if selected, on the STATE LAMP. This group is completely independent of whatever is being shown (if anything) on the STATE LAMP and Bar Graph. There are no optional displays; setting the appropriate MCP option and Clear/Starting (thus causing the necessary segments to be kept) is sufficient to "turn on" this display. None of the other three options need be set.

The six activities displayed are (lamps numbered left to right, 0 through 23):

- 23 All user CPU Usage. The same as is shown on the STATE LAMP when user CPU usage is selected and the user number field is zero.
- 22 Micro MCP and Micro Scheduler.
- 21 IDLE CPU.
- 20 SNCP CPU Usage.
- 19 Any overlay in process. The same as is shown on the STATE

LAMP when all three of the overlay options are selected and the user number field is zero.

18 Any disk IO in process. Has no equivalence on the STATE LAMP. Here activity is shown for all disk channels and units on the system, whereas on the STATE LAMP only one channel may be shown at a time.

Lamps 20 through 23 are mutually exclusive. No two will be ON at the same time, and together they make up 100% of the CPU usage.

### JOB NUMBERS (VII.0)

Mix numbers have been replaced by job numbers. From schedule time to end-of-job, any reference to a job must be through one number--the job number. Job numbers begin with 0001 and continue through 9999, at which time the MCP will recycle back to 0001. A new number, Job Accounting Number, has been added to aid TABS and other log-handling programs. The Job Accounting Number can only be reset by COLDSTARTing. Previously, if a job called a sort, the sort came into the mix as the same mix number. If that job was DS-ed, all jobs with that mix number were DS-ed. By definition, job numbers must be unique, so sorts can no longer be hidden as they once were. Now, if a job calls a sort, the sort comes into the mix with its own job number and it is identified by the following message:

```
SORT/VSORT=38 80J. (#37) PR=4 TIME=18:38:17.6
```

where (#37) identifies the job number of the calling program.

Its corresponding end message is:

```
SORT/VSORT=38 EOJ. (#37) TIME=18:55:13.0
```

If, while the sort was running, either #37 or #38 were DS-ed, both would be terminated.

All occurrences of job numbers in the MCP have been cut in size to 16 bits or 4 characters, depending on its use.

## DISK ALLOCATION (VII.0)

In order to allow users to selectively allocate their disk storage, a new file attribute is being implemented in the VII.0 MCP. This attribute is used only by the DISK/ALLOCATOR utility program, which is discussed in the UTILITIES section below. The attribute allows the utility routine to allocate areas of user disk to specified files by disk address.

## SAVING S-MEMORY (VII.0)

Users can now mark selected memory locations as unusable through the "XM" SPO message. This feature is implemented as a function of the SYSTEM/INIT program and takes effect during Clear/Start. XM, without parameters, lists all entries in the XM Table and reports whether or not each entry is currently active, will be active upon the next Clear/Start, or could not be activated at the last Clear/Start. Any temporary XM entered through the toggles at Clear/Start is also listed, along with its temporary status.

At the transition from Tape to Run mode, toggles 13 and 15 in the I register, respectively, may be used to override the XM Table or to cause a second halt so that more entries may be added. When toggle 15 is set in I, more entries may be added through:

X = TEMPORARY XM LOCATION (in addition to table)  
Y = TEMPORARY XM LENGTH

The XM Table provides a complete list of all areas of memory which the initializer will attempt to remove from use at the next Clear/Start. Note, however, that the XM Table may be incomplete in describing current memory since deletions from the table are merely removed from the table. In the current design of this function, no attempt is made to prevent overlapping or duplicate entries. The advantage of this structure is that the users can reverse any entries they have made by entering the same entry preceded by a "--", e.g., XM- <previous entry>. Otherwise, users wishing to reverse entries would have to consider carefully how to return the table to its prior state.

The XM table, maintained in sorted order from low-to-high address, may contain a maximum of 28 entries. One entry is required as a terminator to the serial list of entries, and the

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last entry in the table is reserved for a temporary XM entry if it was entered at Clear/Start time.

The initializer has the responsibility of resolving XM Table entries which describe overlapping space and for maintaining the current status of all the entries in the table. The disk address of the table is contained in the disk cold start variables.

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### PROGRAM CONTROL ATTRIBUTES

Program Control Attributes are used to inquire about the attributes of a compiled program (object code file) or to control the execution or compilation of such programs. The syntax of such requests, including that for FILE statements which are part of compilations and executions, is given below. Some attributes, such as COMPILER, are described here only briefly since they are defined more fully in another section of this document.

Unless otherwise noted, each command is presumed to apply to both the library copy and the working copy of the program, as the syntax in figure 6.1 shows. If individual messages are restricted, e.g., LEVEL is only permitted with inquiry (QF or QP), the restriction(s) are noted. Except for SPD input, semicolons are required as terminators.

Each command, unless defined otherwise, is allowed with the syntax:

```

>----- EX ----- <program-name> ----->
>-- ? -->| | |----- CO -----|
          | |----- MO -----|
          | |----- QF -----|
          |
          |----- QP ----- <job-number> -----|
          |----- DY -----|

|<----- ; -----|
>>-- <attribute> ----->#
          |----- <value> -->| |-- ; --->|
          |-- = -->|
  
```

Figure 6.1 Program Control Attribute Syntax

Attributes in figure 6.1 fall into two classes, depending on which copy of the program the user wishes to modify: the library copy or the working copy. After a code file has been compiled to library, its attributes can be queried and/or permanently modified. Executing programs, i.e., working copies, can be queried or modified also. Any changes made to this copy of the program, however, affect only the working copy of the program. Modifications can be made to non-library code files in a compile-and-go situation through the OBJ (object) attribute. These modifications also affect a single execution of a program only.

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The execution of a program causes the MCP to create a working copy of the library file which can also be queried or modified, but only through the job number under which it is executing. Any changes to this copy of the program do not affect the library copy.

Valid program-control commands are developed from following the path of the arrow from its beginning (>) to its termination (#). In general, those commands which involve inquiry (QF, QP) do not require a control attribute value because the operating system will inform the user as to what the value is and those which involve modification, execution, or compilation ordinarily require a control-attribute value to be supplied, although there are some exception to this, as noted below. The attributes listed below are given in alphabetical order and any restrictions, in terms of the syntax in Figure 6.1, are noted. Those which are explained more fully in the SPD MESSAGES section of this document are only briefly defined in this section.

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**ABBR PROGRAM ATTRIBUTE**

**FUNCTION**

**AT ATTRIBUTES**

Queries the interpreter requirements of a compiled program (object code file). See ATTRIBUTES in EXPANDED DEFINITIONS.

**CG CHARGE**

Assigns a charge number into the log record for a program. CHARGE must be followed by an integer of seven digits or less (leading zeros assumed). If the CHRQ option is set in the MCP, the CHARGE statement must be used before the program will be scheduled. The CHARGE number is entered in the MCP log file and is available for subsequent analysis.

**DS DYNAMIC.SPACES**

Assigns the maximum number of overlays that will ever be present in a program's dynamic memory. The command reserves space in dynamic memory for memory links that will be associated with the overlayable data within a program. At run time, the MCP assigns a value of 10 to DYNAMIC.SPACES if the value is zero.

**FI FILE**

Interrogates the file attributes of a compiled program or overrides these compiled attributes at run time. See FILE in EXPANDED DEFINITIONS.

**FR FREEZE**

Prohibits rolling a program out to disk at any time during its execution, thereby remaining in the same memory location, regardless, until EOJ.



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<u>ABBR</u>	<u>PROGRAM ATTRIBUTE</u>	<u>FUNCTION</u>
ID	INTRINSIC.DIRECTORY	Used to specify the name of the pack on which the program's intrinsics are located. That information is used by the MCP. INTRINSIC.DIRECTORY must then be followed by the <disk-pack-id> of the disk on which the referenced intrinsic files reside.
IN	INTERPRETER	Assigns a specified interpreter for use by a program. The attribute is followed by the <file-identifier> of the interpreter which the operator wishes to use. Also abbreviated INTERP.
IT	INTRINSIC.NAME	Assigns another multifile-id to the intrinsic file requested by a program. Note that the file-name portion of the intrinsic-file-id may not be changed--it must remain as "AGGREGATE".
LE	LEVEL	Reports on the level of the compiler used to compile the program. This option can be used for queries only. See LEVEL in EXPANDED DEFINITIONS.
ME	MEMORY	Assigns a non-default dynamic memory size to a given program. MEMORY is followed by an <integer> which describes, in bits, the amount of memory requested. When MEMORY is used with COMPILE statements, the dynamic memory requested is reserved for the compiler, not the program compiled. This attribute cannot be modified dynamically (DY) in the working copy of the program.

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ABBR    PROGRAM    AIIRIBUIE

FUNCIION

MP    MEMORY.PRIORITY

Assigns the priority with which segments of an executing program are overlaid in memory. Lower-priority jobs are overlaid before ones with higher priorities. See also PR below and MP in the SPO MESSAGES section of this document.

When a MEMORY.PRIORITY of nine or greater is specified, the following action occurs in multiprogramming environment:

- a. If necessary, jobs which are running and which have a lower priority are "rolled out" of memory to disk in order to create space for the higher-priority jobs. This action is called "crashout".
- b. A high-priority job entered in the schedule will not automatically suspend any other high-priority job running in memory. However, the system operator may stop (ST) them.
- c. Upon termination of the high-priority job, the suspended programs will automatically be reinstated to memory.
- d. Maximum priorities for remote jobs that run under the security mechanism are determined by the maximum priority established for the particular usercode in the (SYSTEM)/USERCODE file. Attempts to ignore that priority cause the operating system to display an error message at the remote terminal.

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<u>ABB</u>	<u>PROGRAM ATTRIBUTE</u>	<u>FUNCTION</u>
MS	MEMORY.STATIC	Assigns a non-default static memory size to a program.
OV	OVERRIDE	<p>Bypasses the compatibility check normally made between a program and its interpreter. Compatibility is checked by the MCP for the following:</p> <ul style="list-style-type: none"> <li>a. HARDWARE.TYPE (U, S, or M), depending on the processor.</li> <li>b. MCP.LEVEL</li> <li>c. GISMO.LEVEL</li> <li>d. COMPILER.LEVEL</li> <li>d. ARCHITECTURE (i.e., correct interpreter name and attributes.)</li> </ul>
PA	PAD	Assigns new scratchpad settings in the program. See PAD in EXTENDED DEFINITIONS.
PP	PROCESSOR.PRIORITY	Specifies the priority with which programs in a multiprogramming environment are given access to the processor. The default value is four. See also PR below and PP in the SPO MESSAGES section of this document.
PR	PRIORITY	Specifies the operational priority (MP and PP) assigned to a given program in order to maximize output. When the VII.0 memory-management system is not invoked (MPRI=0), the operational priority specified is assigned to PROCESSOR.PRIORITY only. When the memory-management option is set

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**ABBR PROGRAM ATTRIBUTE**

**FUNCTION**

(MPRI=1), PR sets both MP and PP to the same value. (Memory management is discussed in the ENHANCEMENTS section of this document).

Priorities range in value from zero to fifteen (0-15), where zero is the lowest and fifteen is the highest. Jobs which are run at priorities of less than eight are governed by a mix-limit (see ML in SPO MESSAGES) which specifies the total number of active jobs (priority 8 or less) in a multiprogramming mix. When the mix is full, any new jobs must wait for an executing job to go to EOJ before it may begin processing.

Jobs which users wish to run at the higher priorities (9-15) in a multiprogramming mix of jobs, e.g., a text-editing program which allows remote editing, are not governed by the restrictions of the mix limit. They may enter the schedule at any time and begin processing.

**PT PROTECT**

Prevents accidental tampering with the executing program by causing the MCP to reject SPO commands that would impair its execution. The designated commands are: CL, DP, DS, QC, ST, and SW.

If a protected program reaches an abnormal termination, the MCP unlocks it automatically so that it may be DS-ed or DP-ed. The PROTECT attribute may not be specified in a MODIFY or DYNAMIC control instruction. It is allowed only with EXECUTE and COMPILE statements. See also PROTECT in EXPANDED DEFINITIONS and LP in SPO

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**ATTR PROGRAM ATTRIBUTE**

**FUNCTION**

**MESSAGES.**

**SB SECONDS.BEFORE.DECAY**

Specifies the minimum time, in seconds, before the memory priority (MEMORY.PRIORITY) of a program's code segment will be downgraded to the next lower priority. See also SB in SPO COMMANDS and PRIORITIZED MEMORY MANAGEMENT in the ENHANCEMENTS section of this document.

**SC SCHEDULE.PRIORITY**

Assigns priorities to programs in the schedule (i.e., awaiting execution). The maximum number for this attribute is 14. Jobs in the active schedule having the same assigned priority are further discriminated by the actual time the jobs have been in the schedule. Note: Once the program has been placed in the schedule, the SP console message must be used to change the scheduled priority.

**SM SWITCH =**

Allows the operator to set or reset any or all program switch(es) to the <value> specified. Ordinarily, switches are set to an integer value, but character values are permitted if the language in which the program is written permits a character value. Users must consult specific language manuals for the format of these respective declarations. If a particular switch is not referenced, then all (40 bits) are implied. This command requires an "=".

After a program has gone to BOJ, any queries or changes to the program's switches in the working copy of the program must be done

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**ABBR PROGRAM ATTRIBUTE**

**FUNCTION**

- through the SPO COMMANDS "TS" and "SW", respectively.
- TC TRACE <integer>** Activates the tracing features of the interpreter, provided the conditions for a trace have been met. See also GT and NT in the SPO MESSAGES section of this document.
- TI TIME** Specifies the maximum allowable processor time a job may accumulate. When a program exceeds the maximum run time specified by this attribute, it is DS-ed after a message is displayed on the console CRT. The integer specifies minutes in processor time, not elapsed time.
- UF UNFREEZE** Removes the FREEZE option, thus permitting it to be rolled out to disk when it is in an interrupted state.
- UV UNOVERRIDE** Resets the compatibility-check bypass caused by OVERRIDE.
- VI VIRTUAL-DISK** Changes the number of disk segments assigned by the compiler for saving data overlays during execution. The default size is 1000 segments.

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## RUN-TIME ATTRIBUTES

The following attributes are also used in program control but only during a single execution or compilation. They are therefore specified as a separate class. Illegal uses of these attributes are reported on the SPO by the operating system.

```
>----- EX ----- <program-name> ----->>
>-- ? -->| | |--- CO--->| |

|<-----|
>>-- <condit'l-attr> ----->>#
|----- <attribute-value> --->|
|-- = -->|
```

Figure 6.2 Conditional Control Attribute Syntax

## ATTR ATTRIBUTE

## FUNCTION

- |    |                       |  |
|----|-----------------------|--|
| AF | AFTER <program-name>  | Schedules a program (e.g., BETA) by program-name, not job-number, for execution or compilation after the termination of another program (e.g., ALPHA). When ALPHA reaches EOJ, BETA is placed in the active schedule for execution as soon as memory resources are available. If ALPHA was neither executing nor scheduled when BETA is scheduled, BETA remains in the waiting schedule until ALPHA is executed and reaches EOJ or until BETA is FS-ed by the system operator. |
| AN | AFTER-NUMBER <number> | Schedules a program (e.g., BETA) for execution or compilation after the termination of a particular job (e.g., 238). The value required, <number>, refers to the assigned job-number of an executing or scheduled program. When the job specified by job-number reaches EOJ, BETA is placed in the active schedule for execution as soon as  |

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memory resources are available. If <number> was only scheduled when BETA is scheduled, BETA remains in the waiting schedule until the specified job (e.g., 238) is executed and reaches EOJ or until BETA is FS-ed by the system operator.

CA CONDITIONAL

Inhibits a program from being executed unless its predecessor successfully reaches ECJ. CONDITIONAL is the system default and is implied in every AFTER, AFTER-NUMBER, and THEN scheduling of jobs. This attribute does not require a <value>.

CTL DCK

A unique <attribute-value>, not a <control-attribute>, which marks the beginning of a pseudodeck. The CTL DCK-value must follow the DATA-attribute (?DATA) and becomes a <file-id> under DATA (see DATA below and also LD in SPO MESSAGES).

DA DATA <file-id>

Identifies to the program that an input file is coming from a card reader with an external file name of <file-id>. The <file-id> value must conform to B1800/B1700 file-naming conventions.

END

Marks the end of a datafile, ordinarily, a card file.

ENDCTL

A unique <attribute-value>, not a <control-attribute>, which marks the end of a pseudodeck. The ENDCTL-value must follow the END-attribute (?END) and becomes a special <attribute-value> for END that is used only with pseudodecks. See also LD in SPO MESSAGES.



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HO HOLD

Allows the system operator to place a program into the waiting schedule until it is forced (FS-ed) into the active schedule. This attribute may not be used with MODIFY or DYNAMIC control statements and does not require a <value>.

OBJ

Modifies an object code file after compilation and before execution (e.g., in a COMPILE and GO situation). This attribute does not require a <value>.

STREAM <file-id>

Identifies, by name, the beginning of a punched card file. See STREAM in EXPANDED DEFINITIONS.

TERMINATE <file-id>

Identifies, by name, the end of a STREAM input file. See TERMINATE in EXPANDED DEFINITIONS.

TH THEN <file-id>

Schedules one program in relation to another, in same fashion as AFTER. THEN and AFTER (or AFTER.NUMBER) are mutually exclusive attributes, i.e., both cannot be used in the same execute string. The <value> of <file-id> must not violate B1800/B1700 file-naming conventions.

UC UNCONDITIONAL

Forces a program to be executed whether its predecessor successfully reached EOJ or not. UNCONDITIONAL must be specified; it is not a default condition. This attribute does not require a <value>.

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## EXPANDED DEFINITIONS

### ATTRIBUTES

```
*****
*
* ----- QF ---- <program-name> --- ATTRIBUTES ---->#
*           | |           |
* -- ? -->| | QF ->|
*
*****
```

ATTRIBUTES makes it possible to query the compiler attributes of a program. The ATTRIBUTES statement may only appear after a QF or QP statement.

Compiler attributes is an 80-bit field in the Program Parameter Block (PPB). This field is used by the compiler to indicate that the compiled program requires special features in its interpreter. This may be a special feature which is not in the normal interpreter, i.e., the COBOL MICR interpreter. This feature might also be a new S-op which has been added since the last S-machine level change (see LEVEL) as in the SDL EXTENDED ARITHMETIC ops. Generally, each bit indicates a special feature.

At BOJ time, the MCP will insure that the interpreter has all the attributes required by the object program. If the object program and interpreter are not compatible, the MCP will display a message containing a bit string of the missing attributes.

The compatibility check may be skipped by using the OVERRIDE control attribute.

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## FILE

### Format:

```
*****
*
*          |<-----,-----|
*          |
* >-- FILE -- <name> -- <attribute>----->#
* ?-| --          |----- <value>--|
*          |-- = -->|
*
*****
```

The FILE statement may be used to query or override various file attributes. Each element within the statement must be separated by at least one space, and the statement must be terminated by a semicolon or an end-of-text (EIX). If more than one card is required for a FILE statement, each of the continuation cards may have a question mark (?) in column one.

The FILE statement can be used with COMPILE, EXECUTE, MODIFY, DYNAMIC, QF, or QP statement. If the FILE statement follows a MODIFY statement, the MCP will modify the information in the program's File Parameter Block (FPB). If the FILE statement follows a COMPILE, EXECUTE or DYNAMIC statement, the MCP will modify the information in a working copy of the program's FPB so that the change will be in effect for only that run. If the FILE statement follows a QF or QP statement, the MCP will display the current setting of the FILE attributes listed.

The internal-file-id used in the FILE statement must refer to the name used in the program that opens the file. For example, if the external file-id is to be changed for this run only, the FILE statement would be as follows:

```
? EXECUTE <program-name>
? FILE <internal-file-id> NAME <file-id>;
```

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ABBR	FILE ATTRIBUTE	FUNCTION
ADV	ADVERB [=] <number>	The implied open adverb. Number is a 12-bit value with the following meanings: 0 = INPUT 1 = OUTPUT 2 = NEW 3 = WITH.PUNCH 4 = WITH.PRINT 5 = REWIND or WITH.INTERPRET 6 = REVERSE or WITH.STACKERS 7 = OPEN.LOCK 8 = OPEN.LOCKOUT 9 = Reserved 10 = Reserved 11 = Reserved
ALL	ALLOCATE.AT.OPEN	All of the areas requested by this file will be allocated at the time the file is opened.
ANS	ANSI	Defines the tape label type as ANSI (for non-released MCPs only).
ARE	AREAS [=] <integer>	The number of areas assigned to the file.
ASC	ASCII	The recording mode of the file is ASCII.
ATP	AUTOPRINT	Allow the file to go to auto backup. See also PB in SPO MESSAGES.
BAC	BACKUP	The output of the file will be allowed to go to backup. This sets BACKUP.DISK and BACKUP.TAPE.
BDK	BACKUP.DISK	Allows the file to go to disk backup.
BTP	BACKUP.TAPE	Allows the file to go to tape backup.

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ABBR	FILE ATTRIBUTE	FUNCTION
BCL	BCL	The recording mode of the file is BCL.
BIN	BINARY	The recording mode of the file is BINARY.
B.A	BLOCKS.AREA [=] <integer>	The number of blocks (physical records) to an area.
BUF	BUFFERS [=] <integer>	The number of buffers assigned to the file. The integer must be a positive number from 1 to 255.
CAS	CASSETTE	Identifies that the file to be processed is located on a cassette.
CPC	CARD.PUNCH	Identifies the device to which an output file is to be sent.
CPY	COPY	The entire File Parameter Block, except the internal file-id, will be copied to the receiving file's FPB and the internal file-id is not changed. The syntax for COPY is given below:

```

*****
*
* ----- COPY --- <file-id> ----->>
*      | |           |           |           |
* -- ? ->| |-- CPY -->|           |--- FROM --->|
*
*
* >>----- JOB.NUMBER -- <job-number> ----->#
*      | |-- JN ----->|           |
*      | |-- # ----->|           |
*      |           |           |
*      |           |           |
*      |-- PROGRAM.NAME -- <program-name> |
*      |-- PN ----->|
*
*****

```

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ABBR	FILE ATTRIBUTE	FUNCTION
CRD	CARD.READER	Identifies the device on which an input file is located.
CYL	CYLINDER.BOUNDARY	Each area of the disk file will start at the beginning of a CYLINDER when the file is directed to a disk pack or a disk cartridge. Not implemented yet.
DCG	DISK.CARTRIDGE	Identifies that the file to be processed is located on a disk cartridge.
DFL	DISK.FILE	Identifies that the file to be processed is located on disk.
DEF	DEFAULT	Overrides the record length and blocking factor declared for an input file. The input file's external label directs the MCP to use the record length and blocking factor that it finds in the file header for that <filename>. Note: if the input file is a disk file and the original input-file declaration was CARDS, DISK or DSK must be declared as the input hardware device; otherwise, the MCP is unable to locate the file. This is the only case in which a hardware declaration is also required.
DPC	DISK.PACK	Indicates that the file to be processed is located on a disk pack.
D.R	DELAYED.RANDOM	The file is to be accessed as DELAYED.RANDOM.
DRC	DATA.RECORDER.80	Indicates the device on which the input file is to be found or where to output the file.

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ABBV	FILE ATTRIBUTE	FUNCTION
DRI	DRIVE [=] <integer>	The file will be directed to the DRIVE or EU specified by the integer. The drive must be a system disk. The integer must be a positive number from 0 to 15.
DSK	DISK	The input or output file is located on disk, regardless of the compiled program declaration.
EBC	EBCDIC	The recording mode of the file is EBCDIC.
EMT	EMULATOR.TAPE	States that the program will do all of its own I/Os on tape and will use the emulator-tape communicate.
EOP	EOP	Allows the ON END-OF-FILE branch to be taken if the END-OF-PAGE is sensed.
EU	EU [=] <integer>	Same as DRIVE.
EVN	EVEN	The file will use EVEN parity.
EXT	EXTEND	Allows I/O sequential (disk) files to be extended beyond end-of-file. When a sequential file is opened I/O EXTEND, the current record pointer is incremented on successive writes and writes are allowed past end-of-file.  Without the EXTEND option, successive writes do not increment the current record pointer and writing past end-of-file is not allowed. If an attempt is made to write past end-of-file on an I/O sequential file which has been opened under the default method (NO EXTEND), a "DS" or "DP" condition is displayed in the SPO message: <file-name> DECLARED FILE SIZE EXCEEDED.

If an attempt is made to open an

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**ABBR FILE ATTRIBUTE**

**FUNCION**

I/O sequential file NEW without also specifying EXTEND, a "DS" or "DP" condition is displayed in the SPO message: <program-identifier> ATTEMPTED TO OPEN FILE IO SEQUENTIAL NEW WITHOUT EXTEND.

**FTP FILE.TYPE**

An output disk file will be assigned the specified type when it is closed and has been entered in the disk directory.

```

*****
*
* FILE.TYPE ----- DATA ----->#
* FTP ----->| |-- = ->| |--- CODE ----->|
* |--- INTERPRETER -->|
* | |-- INTERP --->| |
* | |-- INT ----->| |
* |--- INTRINSIC --->|
* |--- PSR.DECK ---->|
*
*****
    
```

**FMS FORMS**

The program will be suspended and the MCP will display a message for the operator to load special forms in the device (printer or punch) before the file is opened.

**HAR HARDWARE**

A printer or punch file will be allowed to go to the hardware device assigned.

**HDR HEADER**

First 50 characters of message read will be header information. If a file is opened with HEADERS, the program becomes an MCS.

**INC INCREMENT.DRIVE  
 INCREMENT.EU**

Each area of a disk file will start on the next disk drive (pack or cartridge) or EU (head-per-track). When the last system drive has been used, it will start over from drive



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**ABBR FILE ATTRIBUTE**

**FUNCTION**

zero. Not yet implemented.

**IMP IMPLIED-OPEN**

IMPLIED.OPEN denial set. (Also known as FP8.COBOLE).

**INP INPUT**

Implied open is INPUT.

**INV INVALID.CHARACTERS  
 [=] <integer>**

The <integer> may contain the value of 0, 1, 2 or 3, and determines the course of action for invalid character output to a train printer.

0 = Report all lines that contain invalid characters. The following message will be displayed for each occurrence:

FILE <file-name> IS PRINTING  
 INVALID CHARACTERS ON LP<x>.

1 = Report all lines that contain invalid characters and stop the program at that point. Not yet implemented.

2 = Report once that the file is printing invalid characters. The following message will be displayed:

FILE <file-name> IS PRINTING  
 INVALID CHARACTERS ON LP<x>.  
 (ONE TIME WARNING)

3 = Do not notify operator of invalid character output.

**ISL INPUT.SELECTIVITY**

Reads from remote files will return only messages from the station specified in the key portion of the read. Not yet implemented.



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**ABBR FILE ATTRIBUTE**

**FUNCTION**

ALLOCATE.AT.OPEN	OPEN.LOCKOUT
BACKUP	OPTIONAL
BACKUP.DISK	OUTPUT
BACKUP.TAPE	QUEUE.OLD
CYLINDER.BOUNDARY	REVERSE
DEFAULT	REWIND
EOP	TRANSLATE
FORMS	USER.BACKUP.NAME
HARDWARE	VARIABLE
HEADER	WITH.INTERPRET
INCREMENT.DRIVE	WITH.PRINT
INCREMENT.EU	WITH.PUNCH
IMPLIED.OPEN	WITH.STACKERS
INPUT	WORK.FILE
INPUT.SELECTIVITY	
LOCK	
MULTI.PACK	
NEW	

**NODIF**

An option that allows jobs executed (spawned) from a remote terminal to continue processing even when the MCS goes down. The output is routed to some other location, e.g., SPO or printer. When set, this option cannot be modified.

**NST NUMBER.STATIONS**

Maximum number of stations with which this file is to communicate.

**ODD**

The file will use ODD parity.

**OLK OPEN.LOCK**

Implied open is OPEN.LOCK.

**OLO OPEN.LOCKOUT**

Implied open is OPEN.LOCKOUT.

**OPT OPTIONAL**

Select OPTIONAL file.

**OUT OUTPUT**

Implied open is OUTPUT.

**PID PACK.ID [=]  
 disk-pack-id**

The name of the disk pack on which the file(s) is located. The identifier can be reset with a null string (""), e.g., PID "".

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<u>ABBR</u>	<u>FILE ATTRIBUE</u>	<u>FUNCTION</u>
PTL	PROTOCOL	The means by which a remote file tells a MCS whether or not it can accept a specified range of message formats.
PTP	PAPER.TAPE.PUNCH	Specifies output to a paper-tape-punch device.
PTR	PAPER.TAPE.READER	Specifies input from a paper-tape-reader device.
PRT	PRINTER	The output file is to be sent to an available printer.
PSE	PSEUDO	Makes a file pseudo type.
PTN	PROTECTION DEFAULT [=] PUBLIC PRIVATE	If a NEW file is created, it will have the protection specified. DEFAULT for running with a usercode is set by SYSTEM/MAKEUSER. Without a usercode, the default is PUBLIC. See also the MH input command.
PIO	PROTECT.IO I.O [=] INPUT OUTPUT	If a NEW file is created, it will have the input/output protection specified. Default is I.O. See also the MH SPO command.
QFO	QUEUE.OLD	Identifies an old queue as opposed to a new queue.
QFS	Q.FAMILY.SIZE [=] <integer>	The number of families (sub-queues) in this queue (maximum = 255).
QMX	Q.MAX.MESSAGES [=] <integer>	The maximum depth to which the queue is allowed to grow before suspending the writer (maximum = 255).
QUE	QUEUE	Identifies the file as a queue file.

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<u>ABBR</u>	<u>FILE ATTRIBUTE</u>	<u>FUNCTION</u>
R96	READER.96	Identifies input from a 96-column card reader.
RAN	RANDOM	Defines the access mode as random.
R.B	RECORDS.BLOCK [=] <integer>	The number of logical records per block for fixed-record-length files.
REE	REEL [=] <integer>	The value of the integer will determine the number of the first reel.
REM	REMOTE	Declares a file as a remote file.
REP	REPETITIONS [=] <integer>	Requests that <integer> copies of an individual printer backup be printed. The information is permanently stored as part of the file header but can be overridden (see PB in SPO MESSAGES). If the <integer> is greater than one, the output print file is automatically sent to backup disk or tape.
REV	REVERSE	Implied open is REVERSE.
REW	REWIND	Implied open is REWIND. Tape will not be rewound before being opened.
RPP	READER.PUNCH.PRINTER	Assigns an input or an output file to this hardware device.
RS2	READER.SORTER.2	Assigns an input file to this hardware device.
RSR	READER.SORTER	Assigns an input file to this hardware device.
RST	READER.SORTER.STATIONS	Declares the number of read heads on the reader-sorter. The allowable range is one to three (1-3).

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<u>ABBR</u>	<u>FILE ATTRIBUTE</u>	<u>FUNCTION</u>
RSZ	RECORD.SIZE <integer>	Declares that the record length of an input or an output file is of size <integer> bytes.
SAV	SAVE [=] <integer>	Only used by programs which remove files according to last access date. The <integer> specified by save factor is added to the creation date to determine the last "relative" access date.
SER	SERIAL	File is to be accessed sequentially.
SNO	SERIAL.NUMBER	The volume serial number of the tape to be used. Not yet implemented.
TAP	TAPE	Declares an output file is to be written on this hardware device (most general type of reference).
TPN	TAPE.NRZ	Declares that an output file is to be written in Non-Return-to-Zero (NRZ) tape mode only.
TP7	TAPE.7	Declares an output file for 7-track tape only.
TP9	TAPE.9	Declares that an output file is to be written in 9-track tape mode only.
TPE	TAPE.PE	Declares that an output file is to be written in Phase-Encoded (PE) tape mode only.
TRN	TRANSLATE	Soft translation is to be performed on each record as it is being transferred to or from the user's buffer.
TNM	TRANSLATE.NAME [=] <file-id>	Associates a translate table file with a file to be translated.

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<u>ABBR</u>	<u>FILE ATTRIBUTE</u>	<u>FUNCTION</u>
UNI	UNIT-NAME [=] <unit-mnemonic>	The file will be directed to the device specified by unit-mnemonic if opened output.
UNL	UNLABELED	There are to be no labels on this file.
U.N	USER.BACKUP.NAME	Overrides the default naming convention for backup print or punch files (e.g., BACKUP.PRT/<number>) and allows the user to name (U.N NAM <file-id>) the file. Also abbreviated as USER.NAME.
VAR	VARIABLE	The file to be processed contains variable-length records.
MIN	WITH.INTERPRET	Implied open is WITH.INTERPRET. Punched cards will be interpreted.
WPR	WITH.PRINT	Implied open is WITH.PRINT. Punched cards will be printed from buffer #2.
MPC	WITH.PUNCH	Implied open is WITH.PUNCH. Cards will be punched from buffer #1.
WST	WITH.STACKERS	Implied open is WITH.STACKERS. Cards will be stacker selected.
WFL	WORK.FILE	Assign a unique external file name based upon the combination of the name and the job-number. Allows multiple copies of the same program to run at the same time, with no "DUPLICATE-FILE" error condition existing.

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## LEVEL

### Format:

```
*****
*
* ----- QF <program-name> ----- LEVEL ---->#
*          |           |           |           --
* --- ? -->|           |-- QP <job-number> --->|
*
*****
```

The LEVEL attribute makes it possible to query the compiler level of a program. The LEVEL statement may appear only after a QF or QP statement.

The compiler LEVEL is an indication of what S-OPs generated by the compiler mean. If the meaning of an S-OP is changed or an S-OP is removed from the interpreter, the LEVEL is increased by 1 and the user is required to recompile his programs. The compiler LEVEL is not affected by the addition of a new S-OP as it is usually added as a new feature in the compiler ATTRIBUTES.

At BOJ the MCP will insure that the program and its interpreter are the same LEVEL. This check may be bypassed with the OVERRIDE control attribute.





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## PAD

### Format:

```

*****
*
*
* ----- <program-name> ----->
*      | | | |
* -- ? ->| | | - MO ->| |
*      | | | - QF ->| |
*      | |
*      |---- QP ---- <job-number> -->|
*
*
* >>--- PAD ----- <integer> --- A ---- <number> ----->#
*      --                | - B ->|
*
*****

```

The PAD attribute makes it possible to query or alter the program's initial scratch pad settings. The <integer> must be a positive number from 0 to 15 and specifies which scratch pad is to be accessed. The following letter (A or B) specifies which hemisphere is to be accessed. The <number> must be not more than 24 bits in length.

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## PROTECT

### Format:

```
*****
*
* ----- QP ----- <program-name> -- PT -->#
*          |         |         |
* --- ? --->|   |- EXECUTE ->|
*          --
*
*****
```

The PROTECT attribute protects the job from certain input messages. The PROTECT control statement may appear only after an EXECUTE or QP statement.

The following input messages are disallowed if the PROTECT flag is set:

CL, DS, DP, GT, ST or SW.

These messages may be entered from the remote console which spawned the job if the PROTECT flag is set.

If the job goes to DS or DP, the PROTECT flag is automatically reset to allow the DS or DP. See also the LP input message.

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## STREAM

### Format:

```
*****
*
* ---- ?STREAM ----- <file-identifier> ----->#
*
*****
```

The **STREAM** attribute informs the MCP to treat the sequence of cards that occurs between the **STREAM** and the **TERMINATE** as a data deck, regardless of the control instructions that actually occur on the cards. In this way, for example, compile and execute decks can be passed from a remote system to a host system for compilation or for execution. **STREAM** cannot be abbreviated.

A stream of data consists of all data cards contained between the stream beginning and the stream end, as delimited by the **STREAM** and **TERMINATE** control instructions. The **<file-identifier>** on the **TERMINATE** card must be the same as the **<file-identifier>** on the corresponding **STREAM** card in order to properly terminate the data stream; otherwise, the card reader will be left open.

**STREAM** and **TERMINATE** are somewhat analogous to **DATA CTLDCK** and **ENDCTL** used in pseudoreader loading, but are more generalized.

When reading a data stream, the exception branch is taken any time a card with a question mark (invalid character) occurs in column one of a card read. The MCP replaces column one of that card image with binary zeros (2002), prior to passing the card image to the reading program. The program receives the EOF branch only when the proper terminate card has been read.

### Example

```
?STREAM CARDS
?COMPILE TEST WITH COBOL LIBRARY
?CHARGE 123456
?FI CARDS NAME SOURCE/TEST DISK;
?EX TEST CHARGE 123456
?DA CARDIN
--- data cards ---
?END CARDIN
?TERMINATE CARDS
```

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TERMINATE

Format:

```

*****
*
* --- ?TERMINATE ----- <file-identifier> ----->#
*
*
*****

```

The TERMINATE attribute informs the MCP that the stream input file has reached an end-of-file (EOF). TERMINATE cannot be abbreviated.

The <file-identifier> specified on the terminate card must be the same as the one specified on the corresponding stream card in order to clear the card reader that has been assigned to the data stream. See STREAM above.

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## SPO MESSAGES

This section contains an alphabetized list of all the console printer or CRT (SPO) input messages implemented at the VII.0 release level of MCP II. Each message is syntaxed and explained, usually with examples included. Messages are indexed by the two-letter abbreviation that the user would normally use in a request to the MCP.

Messages are formatted for SPO application (CRT or TTY). If a message is to be entered through a card reader, it must be preceded by an invalid character (?) and terminated by a semicolon (;). Messages may be concatenated, as long as individual messages are delimited by semicolons. Maximum length for any message, or series of commands, is 160 characters, for SPO application.

Messages are evaluated, also, from the standpoint of the HOST/RJE application, since remote users are not allowed the full complement of SPO commands. Following the expansion of the two-letter command, and in the index, each message is designated as illegitimate, restricted, or legitimate where HOST/RJE usage is concerned. Restrictions are placed within parentheses. If the parentheses contain a dollar sign (\$), the command is invalid from a remote terminal; if the character is a pound sign (#), the command must be preceded by a usercode and password to be legal; and if the command is followed by neither of these, it is legal as it is defined.

The syntax of each SPO message is shown in railroad syntax, which implies the following assumptions:

A valid MCP command is developed from following the main line of syntax from its beginning (>) to its termination point (#). Where optional entries are concerned, the direction of flow proceeds down on the left-hand line and up on the right. Unless otherwise noted, optional entries are expected by the program in the order (top to bottom) in which they are presented. When no return line (<---) is given, the user must choose one of the options presented.

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Required entries occur on the main line of development; optional ones below the line. Required keywords appear in upper-case letters; variables in lower-case letters. Underlined portions of required keywords are acceptable abbreviations for the key words. Other abbreviations used are:

<u>Variable</u>	<u>Abbreviation</u>
identifier	id
multifile-identifier	mfid

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### INITIAL LETTERS A-E

#### AB (AUTOBACKUP) (\$)

```
*****
*   AB   *
*****
```

#### Format:

```
*****
*
* >-- AB ----->#
*      --      |                      |
*              |-- <integer> -----|
*              |-- <device specifier list> -----|
*
*****
```

<integer> ::= 0-4 number of SYSTEM/BACKUPS  
 (Maximum number = 4)

<device specifier list> ::= <unit> | -<unit> |  
 <unit> <device specifier list> |  
 -<unit> <device specifier list>

<unit> ::= LPA | LPB | LPC (IOAT UNIT\_NAME)

#### AUTOPRINT

The AUTO BACKUP mechanism retrieves backup disk files and prints them automatically, directing the output to designated printer(s). The function will not relieve the operator of the responsibility for matching jobs with their printer listings but the printing procedure will be automated. When AUTO BACKUP is invoked, a designated number of SYSTEM/BACKUPS will be executed. The names of "candidate" backup disk files are entered in a community queue file named "AUTOPRINT". Each SYSTEM/BACKUP in turn reads an entry in the queue file, maps the name on to an output printer file's FPB, and prints the file as in the case of a simple PB (FPB.REPETITIONS are honored). The backup files are removed after printing.

SYSTEM/BACKUPS remain in the mix as long as there are backup files to be printed and terminates when the AUTOPRINT queue is



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empty. A bit in the FPB, FPB.SYSTEM.BACKUP.BIT, gives SYSTEM/BACKUP special privileges in acquiring designated printers.

All backup disk files with an FPB.MULTI.FILE.ID equal to BACKUP.PRT (usercode for HOST/RJE) will be candidates for AUTO BACKUP. To bypass AUTO BACKUP, when the option is set, the user must specify a USER.BACKUP.NAME with an FPB.MULTI.FILE.ID not equal to BACKUP.PRT.

AUTO BACKUP is initiated by the MCP control string "AB". AB has three forms which are:

AB <integer> allows <integer> number of copies of SYSTEM/BACKUP to be executed, if or when appropriate.

Note: "AB 0" purges the AUTO PRINT queue and causes the program to terminate.

AB without parameters causes a display of the AB <integer> value and identification of the printers reserved for AUTO BACKUP.

AB <UNIT.NAME> reserves printers for AUTO BACKUP. "AB -<UNIT.NAME>" resets the option.

NOTE: It is the operator's responsibility to match the number of printers reserved for AUTO BACKUP with the number of SYSTEM/BACKUPS specified by AB <integer>. It would not be desirable, for example, to specify a multiple number of SYSTEM/BACKUPS while reserving a single printer for AUTO BACKUP. Likewise, nothing is gained from reserving more printers than SYSTEM/BACKUPS specified.

### FPB.AUTOPRINT

An FPB bit called FPB.AUTOPRINT has been added to allow avoidance of the AUTO BACKUP mechanism. If this bit is set (default is reset) the backup file created will not be retrieved by AUTO BACKUP.

The FPB.AUTOPRINT bit may be set/reset using file equation. NO ATP or NO AUTOPRINT sets the bit. Omitting NO resets the bit.

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```
>----- FILE -- <filename> ----- AUTOPRINT ----->#  
      |           | |           |  
      |--- NO --->| |----- ATP -----|
```

Note: The AUTOPRINT bit may be DY-ed while the file is open.

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AD (ADD) (2)

\*\*\*\*\*  
\* AD \*  
\*\*\*\*\*

Format:

```

*****
*
* >--- ADD ----->#
*   --  |-- TO <disk-pack-id> -->|           |           |
*           --                    |           |           |
*           |                       |           |           |
* |<-----|                       |           |           |
* |-- FROM <library-tape-id> ----- =/= -----|
*   ----                    |<----- , ----->|
*                               |-- <mfid> ----->|
*                               |-- /= ----->|
*                               |-- /<filename> ->|
*
*****

```

The AD (ADD) statement will cause a file or files on a library tape to be placed on disk only if the file is not already on disk. The =/= option causes every file on the tape to be added. The <mfid>/= option causes every file with the specified <mfid> to be added.

Example:

CARD	SPO
----	---
?AD TO USERPACK FROM LIBTAPE PAYROLL/=, ACCPAY/=, MASTER/FILE;	AD TO USER FROM LIB =/=
?AD FROM LIBRARY =/=;	AD TO USER FROM LIB MASTER/FILE, PAYROLL/=

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### AX (Response to ACCEPT)

```
*****
*   AX   *
*****
```

#### Format:

```
*****
*
* >--- <job-number> --- AX <input message> -----># *
*                               --                               *
*****
```

The AX message is a response to an ACCEPT message requested by an object program through the MCP.

All responses are assumed to be alphanumeric format. The input message starts in the first position after the AX on the input line, and continues until the END OF MESSAGE button is pressed.

If the End-of-Message is depressed immediately after the AX, the MCP fills the area in the requesting program with blanks.

#### Example:

```
632AX CHECK VOID IF OVER 500 DOLLARS
```

Input messages shorter than the receiving field in the program will be padded with trailing blanks. Longer messages will be truncated on the right.

The AX message has an unsolicited console feature in that the operator may enter as many AX message responses as needed for a given program prior to the actual ACCEPT. The AX messages must be entered in the order they will be used, since the queue is structured on a first-in, first-out basis.

The queue is automatically cleared at program EOJ or an abort.

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## BB (Backup Blocks per Area) (S)

```
*****
*   BB   *
*****
```

### Format:

```
*****
*                                     *
* >-- BB ----->#                 *
*      -- |                         | *
*          |-- <integer> -->|       *
*                                     *
*****
```

The BB input message allows the operator to specify the number of blocks to assign each area of a printer or punch backup disk file.

The value of the backup blocks per area is set to 200 by COLDSTART, and if the <integer> entered in the BB message is less than 5, a value of 200 is assigned by default.

If an <integer> is not entered with the BB message, the MCP displays the current setting of the backup blocks per area. At OPEN time, the MCP will use this number or the blocks per area specified in the file declaration, whichever is larger.

### Examples:

BB

BB 350

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**BD (Backup Designate) (\$)**

```
*****
*   BD   *
*****
```

**Format:**

```
*****
*
* >-- BD -----># *
*   --      |                | *
*           |-- <disk-pack-id> -->| *
*****
```

The BD input message allows the operator to designate a specific disk pack or disk cartridge for backup files.

When the BD message is entered without the <disk-pack-id> the MCP will cause the current setting of the default backup disk to be displayed.

If a null string ("") is entered as a <disk-pack-id>, the default backup disk is changed to the SYSTEM disk.

**Examples:**

BD (Responses: PBD DESIGNATION = SYSTEM DIRECTORY)

BD USERPACK

BD ""

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**BE (Display Backup Files) (#)**

```
*****
*   BF   *
*****
```

**Format:**

```
*****
*
* >-- BF ----- =/= -----># *
*   -- |           | |- <integer> -->| *
*       |-- <disk-pack-id> --| |- PRT/= ----->| *
*                                   |- PRN/= ----->| *
*                                   |- PCH/= ----->| *
*                                   |- DMP/= ----->| *
*****
```

The BF input message lists disk backup files and dumpfiles on the console printer. PRT/=, PCH/=, and DMP/= list all printer backup, punch backup, and dumpfiles on disk, respectively.

The =/= option lists all printer backup, punch backup and dumpfiles that are stored on system disk.

PRN and PRT are both to be assumed to mean printer backup files. That is, PRN and PRT are equivalent. The pack-identifier option designates backup files on a removable disk cartridge or pack which is specified by name (not by unit-id). Default specification is system disk, as mentioned above.

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**CC (Control Card)**

\*\*\*\*\*  
\* CC \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >-- CC -----> *  
* -- *  
*****
```

The CC input message is solely for the purpose of those who are former B3500 users. On the B3500, all control strings had to be preceded with CC. The B1800/B1700 systems ignore this message.



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**CD (List Card Decks in Pseudo Readers)**

\*\*\*\*\*  
\* CD \*  
\*\*\*\*\*

**Format:**

```
*****  
* * * * *  
* >-- CD -----># *  
* -- *  
* * * * *  
*****
```

The CD input message allows the system operator to obtain a list of the pseudo card files and their file numbers that have been previously placed on disk by SYSTEM/LDCONTRL.

The MCP displays the number of each pseudo deck and the first fifty (50) characters of the first card in the deck.

If a deck is in use, its name and the program using it are displayed.

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## CH (CHANGE) (#)

```
*****
*   CH   *
*****
```

### Format:

```
*****
*
*           |<-----, -----|
*           |                   |
* >-- CHANGE ---- <file-id1> ---- TO ---- <file-id2> ----->#
*           --                   --
*
*****
```

The CH input message changes the file identifier of a disk file, causing the file to be referenced by the new file identifier.

Any CHANGE statement affecting more than one file must have the file identifiers separated by commas.

The CHANGE statement will cause the MCP to change the file identifier of specified disk files from one name to another. If the file referenced in the CHANGE statement resides on a removable disk, the diskpack-id must precede the file identifier in order for the MCP to locate the proper file to change. The CHANGE statement is not allowed on a multipack file.

### Example:

CH may consist of additional cards (or lines on a SPO) for multiple changes. Termination will occur when a semicolon is detected. For example:

```
?CH A/B/C B/C/C, A/B/ C/D/, X Y, Z Q, ABC DEF;
```

If the CHANGE statement is entered and the MCP cannot locate the file or if the file is in use, the following message is displayed on the console printer (SPO):

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--<file identifier> NOT CHANGED . . . (reason) . . .

Error conditions (e.g., <file-identifier> NOT CHANGED . . . )  
that the MCP encounters are reported whether the LIB(RARY) option  
is set or not; however, the LIB(RARY) option must be set before  
the results of CH are displayed.

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**CL (Clear Unit) (\$)**

\*\*\*\*\*  
\* CL \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- CL ----- <unit-mnemonic> -----># *
*      -- *
*****
```

The CL input message allows the operator to clear a unit on the system because of an apparent system software loop or hardware malfunction. Any program using the unit that has been cleared using the CL message will be discontinued (DS-ed).

The CL message cannot be used with disk devices (DCx, DKx, DPx).

**Examples:**

CL LPA

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CM (Change System Software) (\$)

\*\*\*\*\*  
 \* CM \*  
 \*\*\*\*\*

Format:

```
*****
*
* >-- CM -- <software-mnemonic> ---- <program-id> -----># *
*      --          |                               | *
*                  |-- PURGE ----->| *
*                  ---- *
*****
```

The CM input message allows the operator to identify programs to the system for subsequent usage. The purpose of the CM message is to identify a file that contains the program to be used for a designated function as part of the system's software.

The resultant action of the CM message does not take effect until the next Clear/Start, except for Network Controllers and usercode files. For them, the effect is immediate.

The PURGE option removes the file from the designated NAME TABLE entry.

Refer to the Clear/Start procedure in the Software Operational Guide for a list of the system software mnemonics that are used in the NAME TABLE.

Example:

Delayed  
 -----

Immediate  
 -----

CM MX MCP/XYZ

CM C CANDE/HANDLER

The CM message at the next Clear/Start makes the program MCP/XYZ the experimental MCP. CANDE/HANDLER becomes the current Network Controller, providing no system software controller is active.

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CN (Change to Non-Trace System Software) (3)

(DEBUG Only)  
\*\*\*\*\*  
\* CN \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >--- CN -----># *  
* -- *  
*****
```

The CN input message allows the system operator to change the operating environment to non-trace system software after the next Clear/Start (if the DEBUG option is set).

**CAUTION**

The CN input message is "strictly" for system software development and debugging. It should not be used in the standard operating environment.



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CO and SA combines the execute and library options. The MCP will enter the program-name into the disk directory, and will leave the object program file on disk, as well as schedule the program for execution after error-free compilation. The program remains in the disk directory.

CO FO SY provides a diagnostic listing as the only output. This option does not enter the program-name into the disk directory or leave the program object file on disk. Some uses are as a debugging tool, first time compilation, or a new source listing.

Program-control attributes and file statements are discussed in Section Seven of this document.



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## CP (Compute)

```
*****
*   CP   *
*****
```

### Format:

```
*****
*
* >-- CP --- <integer1> ----- <integer2> -----># *
*   --                |-operator-|                |- ; -| *
*
*****
```

The CP input message allows the operator to perform simple arithmetic functions on the console printer, as well as decimal/hexadecimal conversion.

The valid operators recognized by the CP messages are as follows:

+	addition
-	subtraction
*	multiplication
/	division
M	MOD (remainder divide)

The semicolon (;) terminates the expression and must be the last entry when entered from a card reader.

The CP message will evaluate an arithmetic expression strictly on a left-to-right basis. Therefore, quantities contained in parentheses or brackets are invalid. Spaces are not used as delimiters and are ignored. Operands and intermediate results are considered positive integers, and overflow beyond 16777215 will be truncated.

The response is displayed in both decimal and hexadecimal formats.

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**Examples:**

**Request:** CP 23A2 \* 4 + 2F2

**Response:** CP:20000F72=247

**Request:** CP 2F2

**Response:** CP:200000F2=15

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**CQ (Clear Queue) (\$)**

```
*****
*   CQ   *
*****
```

**Format:**

```
*****
*
* >--- CQ -----># *
*   -- *
*****
```

The CQ input message causes all messages stored in the console printer queue to be cleared.

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CS (Change to Standard System Software) (S)

(DEBUG Only)  
\*\*\*\*\*  
\* CS \*  
\*\*\*\*\*

Format:

```
*****  
*  
* >--- CS -----># *  
* -- *  
*****
```

The CS input message allows the system operator to insure that during the next Clear/Start MCPII system software and firmware will be loaded on the system (if the DEBUG option is set).

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**CI (Change to Trace System Software) (I)**

(DEBUG Only)

\*\*\*\*\*  
\* CT \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- CT ----->#
*      --
*****
```

The CT Input message allows the system operator to change the operating environment to trace system software after the next Clear/Start (providing the DEBUG options has been set).

**CAUTION**

The CT input message is strictly for system software development and debugging. It should not be used in the standard operating environment.

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CU (Core Usage)

\*\*\*\*\*  
 \* CU \*  
 \*\*\*\*\*

Format:

```
*****
*
* >----- CU ----->#
* |-- <job-number> --| --
*
*****
```

CU (Core Usage), with a job-number, displays the amounts of save and overlayable memory (in bytes) in use by a program, and CU without a job-number displays system totals and the core usage for all programs in the mix. If the DEBUG option is set, an analysis of linked memory, certain run structure fields, total user code space, and size and location of user files will also be displayed. The examples below show printouts with both the DEBUG option reset (0) and set (1).

Examples:

CU (DEBUG=0)

-----

```
CORE USAGE : 19:40:33.4
SAVE = 29367 BYTES
OVERLAYABLE = 232275 BYTES
AVAIL = 89860 BYTES
DUMP/ANALYZER = 34 SAVE = 6020 BYTES, OVERLAYABLE = 24625 BYTES
SDL = 32, SAVE = 708 BYTES, OVERLAYABLE = 0 BITS, (ROLLED OUT).
DMPALL = 31, SAVE = 3347 BYTES, OVERLAYABLE = 724 BYTES
```

31CU

```
DMPALL = 31 SAVE = 3347 BYTES, OVERLAYABLE = 724 BYTES
```

32CU

```
SDL = 32 SAVE = 708 BYTES, OVERLAYABLE = 0 BITS (ROLLED OUT).
```

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34CU

DUMP/ANALYZER = 34 SAVE = 1003 BYTES, OVERLAYABLE = 16150 BYTES

CU (DEBUG = 1)  
 -----

CORE USAGE : 19:37:11.2  
 SAVE = 33500 BYTES  
 OVERLAYABLE = 228768 BYTES  
 AVAIL = 118390 BYTES  
 WITHIN LINKED MEMORY:  
 IN USE = 129257 BYTES  
 LARGEST OVERLAYABLE = 182572 BYTES  
 LARGEST AVAIL = 76921 BYTES  
 SAVE SPACE = 18880 BYTES  
 LINKED MEMORY = 247648 BYTES  
 FIRST.LINK = 20181EE2  
 LAST.LINK = 21FECF12  
 FENCE = 20204DA2  
 NUMBER OF LINKS = 196

613CU

COBOL = 613 PR = 4  
 COBOL = 613 LR = 21EE8202, BR = 21DE9842, LENGTH = 8680 BYTES.  
 COBOL = 613 MEDIA, STOPPED, INTERVENTION, DUMMY.EV = 1,0,0,1  
 COBOL = 613 ROLLOUT.COMPLETE, IN.PROCESS, TO.BE,  
 ROLLIN.IN.PROCESS = 1,0,0,0  
 COBOL = 613 RS.Q.IDENT, RS.NEXT.Q = WATE.Q, READY.Q  
 COBOL = 613 RS.STATUS = 10  
 COBOL = 613 RS.DISPLACED = 20000002, 00000000  
 COBOL = 613 RS.CODE.OVLY.COUNT = 16  
 COBOL = 613 RS.DATA.OVLY.COUNT = 0  
 COBOL = 613 CODE SPACE = 10701 BYTES.  
 COBOL = 613 FILES = 17  
 COBOL = 613 -6 AT 210D50E2 SIZE = 330 BYTES EXCLUDING DFH ON DISK  
 AT 2F200004AC2.  
 COBOL = 613 -5 AT 210DF612 SIZE = 330 BYTES EXCLUDING DFH ON DISK  
 AT 2F200004942  
 COBOL = 613 -4 AT 210B1F02 SIZE = 312 BYTES EXCLUDING DFH ON DISK  
 AT 2F200004872  
 COBOL = 613 -2 AT 21DC7D82 SIZE = 422 BYTES INCLUDING DFH AT  
 210D2882  
 COBOL = 613 --TOTAL.FILE.SPACE = 1395 BYTES  
 COBOL = 613 SAVE = 10864 BYTES, OVERLAYABLE = 10664 BYTES.

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**DB (Data Base) (1)**

\*\*\*\*\*  
\* DB \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- DB -----># *
*      -- |-- <data-base-name> -->| *
*
*****
```

DB gives the user the ability to interrogate the status of an active data base (if <data-base-name> is specified), or to get a list of the currently active data bases. If there are no active data bases, the MCP responds with:

NO ACTIVE DATA BASES

If a <data-base-name> is specified and that data base is not active, the MCP responds with:

DATA BASE <data-base-name> IS NOT ACTIVE

If the <data-base-name> is active, the MCP identifies the current status of the data base with:

```
DATA BASE <data-base-name> ACTIVE ---
<integer> OPERATIONS,
<integer> READS,
<integer> WRITES,
<integer> EXCEPTIONS
IN <time>
```

If no <data-base-name> is specified and any data bases are active, the MCP responds with a list of the active data bases.

ACTIVE DATA BASES ARE <data-base-name-1>  
[,<data-base-name-2>[...]]



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DD (\$)

(DEBUG Only)

\*\*\*\*\*  
\* DD \*  
\*\*\*\*\*

Format:

```
*****
*
* >--- DD -----># *
*      -- *
* *
*****
```

Note: Requires a special MCP and special firmware.

Information to be supplied.

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DE (Date of File) (2)

\*\*\*\*\*  
\* DF \*  
\*\*\*\*\*

Format:

```

*****
*
* >-- DF ----- <file-id> ----->| *
*   --   |                                     | *
*         |----- <mfid>/= --->| *
*         |-- <pack-id>/ --->| *
* * * * *
*****

```

The DF input message allows the operator to display on the console printer the compilation data and time for code and interpreter files, and the creation date for all other types of files.

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DM (Dump Memory and Continue)

```
*****
*   DM   *
*****
```

Format:

```
*****
*
* >----- DM -----># *
* |-- <job-number> -->|  -- *
*
*****
```

The DM input message allows the system operator to dump the contents of a program's memory space to disk for subsequent analysis by DUMP/ANALYZER. When the DEBUG option is not set (DEBUG = 0), DM without a job-number produces an error message.

Processing automatically continues when the dump is finished.

The DM message will create a file called DUMPFIL<integer>. The integer will be incremented by one each time a DM is performed in order to make each DUMPFIL unique.

The DUMPFIL may be printed by the DUMP/ANALYZER program. Refer to the "PM" message.

Example:

```
2 DM          X DEBUG = 0
DM           X DEBUG = 1
```

When the DEBUG option is set, DM without a job-number produces a SYSTEM dump and places it in the SYSTEM/DUMPFIL. The DUMPFIL may be printed with MCPII/ANALYZER via the PM message.

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**DP (Dump Memory and Discontinue)**

\*\*\*\*\*  
\* DP \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >--- <job-number> ---- DP -----># *  
* -- *  
*****
```

The DP input message allows the system operator to initiate a memory dump during a program's execution, and then abort that program.

The input of the DP message signals the MCP to halt program execution, dump memory out to disk, and abort the program as though a DM message had been entered immediately followed by a DS message.

**Example:**

1347 DP

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DR DT (Change MCP Date) (\$)

```
*****
*   DR   *
*   DT   *
*****
```

Format:

```
*****
*
* >--- DR ----- <mm/dd/yy> ---># *
* |  -- | *
* |    | *
* |- DT -| *
*  --  *
*****
```

The DR, DT input message allows the system operator to change the current date maintained by the MCP. For inquiry about the current date and time, the TD message is used (see TD in this section).

The MCP will accept only valid dates. The month entry must be between one and twelve, the day must be between one and thirty-one, and the year must be valid numeric digits. An invalid date or alphabetic input will produce an error message.

With the TABS option set, the date cannot be changed if there is a job in the schedule or in the mix.

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**DS (Discontinue Program)**

\*\*\*\*\*  
\* DS \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- <job-number> --- DS -----># *
*                               -- *
*****
```

The DS input message permits the system operator to discontinue the execution of a program.

The DS message may be entered at any time after the 80J and prior to EOJ.

The DS message signals the MCP to stop the program's execution and return the memory the program occupied to the system. Any files not previously entered into the disk directory are lost and the disk area occupied is returned to the disk available table. All other files are closed.

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**DU (DUMP) (#)**

```
*****
*   DU   *
*****
```

**Format:**

```
*****
*
* >--- DUMP ----->>
*   --  |-- FROM <disk-pack-id> -->|
*       --
*
* >>--- TO <library-tape-id> ----- =/= ----- ; ->#
*       --
*           |
*           |<----- , -----|
*           |-- <file-name> ----->|
*           |-- <mfid>/= ----->|
*           |-- <mfid>/<file-name> -->|
*
*****
```

The DUMP statement will cause one or more disk files to be placed on a library tape. The file is not removed from disk by the dump. The =/= option causes every file on the specified disk to be dumped. The <mfid>/= option causes every file with the specified family-name to be dumped. A maximum of 2248 files can be handled with one DUMP statement.

**Example:**

```
?DU TO SYS.TAPE
PAYROLL/=,
ACCPAY/=,
MASTER/FILE;
```

```
?DU FROM USER TO BACKUP=/=;
```

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**DY (DYNAMIC)**

\*\*\*\*\*  
\* DY \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >--- DY --- <job number> ----->#
*      --                |                |
*                        |-- <control attributes> -->|
*
*****

```

The DY input message allows modification of the working copy of a program that is already in the mix or scheduled for execution.

With one exception, DY will accept any statement that can be made with a MO (MODIFY), and only the working copy of the program will be altered. If the control attribute, however, involves FI (FILE) modifications, the user cannot modify it if the file is currently open. The file must have been closed with RELEASE, LOCK, PURGE, or REMOVE before dynamic modifications are allowed.



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**ED (Eliminate Pseudo Deck) (\$)**

\*\*\*\*\*  
\* ED \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* ---- ED ----- <integer> -----># *  
* -- *  
*****
```

The ED input message allows the system operator to eliminate a deck from a pseudo reader. This is equivalent to flushing the reader and then performing an RY message.

The deck will be eliminated from the pseudo reader and from the disk directory by the ED message.

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**EM (ELOG Message) (\$)**

\*\*\*\*\*  
\* EM \*  
\*\*\*\*\*

**Format:**

```
*****
*
* ---- EM --- <input-message> ----># *
*      --                               *
*****
```

The EM input message allows the operator to place a message into the ELOG.

The input-message starts in the first position after the EM on the input line and continues until the END OF MESSAGE is pressed.

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EI (ELOG Transfer) (I)

\*\*\*\*\*  
\* ET \*  
\*\*\*\*\*

Format:

```
*****  
*  
* ---- ET -----># *  
* -- *  
*****
```

The ET input message transfers the information in the file SYSTEM/ELOG to the file ELOG/#integer. The program SYSTEM/ELOGOUT is then executed label equating ELOG/#integer and prints the file.

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## EX (EXECUTE) (#)

```
*****
*   EX   *
*****
```

### Format:

```
*****
*
* >-- EXECUTE -- <program-name> -----># *
*      --                |                | *
*                        |-- <control-attributes> ->| *
*
*****
```

The EXECUTE statement instructs the MCP to call a program from the library for subsequent execution. EX must be the first statement in a set of control statements pertaining to the execution of a program.

If the program referenced in the EXECUTE statement resides on a removable disk cartridge or pack, the disk-pack-id must be part of the program name in order for the MCP to locate the correct file. If a disk-pack-id is omitted, the file is presumed to reside on system disk.

### Sample Card Deck:

```
? EX TEST
? DATA <file-identifier>
  ---data cards---
? END
```

The program named TEST is called out of the library on system disk and executed. The execution is from cards and the sample presumes that a card file is expected as input.

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INITIAL LETTERS E-Q

EM (Response to Special Forms) (S)

\*\*\*\*\*  
\* FM \*  
\*\*\*\*\*

Format:

```
*****
*
* >--- <job-number> --- FM -- <unit-mnemonic> -----># *
*
*****
```

The FM input message is a response to the "SPECIAL FORMS REQUIRED" message.

The unit-mnemonic designates which unit is to be assigned to the file.

The message

<program-name> = <job-number> SPECIAL FORMS REQUIRED FOR <file-id>

is displayed on the console printer requiring that a FM message be submitted by the system operator before the file can be opened. Should FM specify a backup device, tape or disk, a backup file will be created.

Example:

93 FM LPA  
94 FM DPB

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**EN (Display Internal File Name)**

```
*****
*   FN   *
*****
```

**Format:**

```
*****
*
* >--- FN -- <program-name> -- <external-file-id> -----># *
*   -- *
*****
```

The FN input message allows the system operator to display the internal file names of an object program.

The MCP lists on the console printer all the internal-file-names of the object program which have the specified external-file-identifier in the following format:

**Example:**

```
FN = <internal-file-identifier-1>
FN = <internal-file-identifier-2>
FN = ...
```

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FR (Final Reel of Unlabeled Tape File)

\*\*\*\*\*  
\* FR \*  
\*\*\*\*\*

**Format:**

```
*****
*                                     *
*  >-- <job-number> -- FR -----># *
*                                     *
*                                     *
*****
```

The FR input message gives the operator the ability to notify the MCP that the last reel of an unlabeled tape file has completed processing, and there are no more input reels to be read.

The FR message is a response to the message:

<job-number> NO FILE

This message is the result of an unlabeled tape file reaching the End-of-Reel; the FR message notifies the program that the file has reached EOF.

The FR message is also allowed labeled tape files in order to signal EOF without reading all of the reels of the file.

The FR message must be used with paper input files to signal EOF after all reels have been processed.

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## ES (Force from Schedule)

```
*****
*   FS   *
*****
```

### Format:

```
*****
*
* >--- FS ----- <job-number> ---># *
*      --          |           |          *
*                  |----- = ----->| *
*****
```

The FS input message is used to force jobs from the WAITING SCHEDULE into the ACTIVE SCHEDULE.

The Equal sign option will force all jobs into the ACTIVE SCHEDULE.

The HS message is used to place a job in the WAITING SCHEDULE.

### NOTE

The WAITING SCHEDULE is a schedule of jobs that are "waiting" to be placed in the ACTIVE SCHEDULE. For example, an EXECUTE with the attribute THEN or AFTER.NUMBER would place the program in the WAITING SCHEDULE.

The ACTIVE SCHEDULE are those jobs that have satisfied all the requirements for execution and are only waiting for memory space to run.

In order for a program to be in the "mix", it must have gone to BOJ.



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FW (File Waiting)

\*\*\*\*\*  
\* FW \*  
\*\*\*\*\*

Format:

```
*****
*
* >--- FW -----># *
*      -- *
*****
```

The FW input message is a unique HOST/RJE message. When HOST/RJE receives an input stream, that stream is preceded by a control card section which is passed by the program to the MCP. If this control string contains a command which causes a job to be scheduled and it also contains a ?DATA card, the MCP puts the job in the waiting schedule in a special status. If it were put in the active schedule, it would hang waiting for the card file. The MCP sends the schedule message back to HOST/RJE with an indicator saying that an FW is required when the card file has been built.

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GO (Resume Stopped Program)

\*\*\*\*\*  
\* GO \*  
\*\*\*\*\*

Format:

```
*****
*
* >--- <job-number> -- GO -----># *
*                               -- *
*****
```

The GO input message is used by the system operator to request resumption of a program that has been stopped (ST message).

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**GI (Enable Trace)**

```
*****
*   GT   *
*****
```

**Format:**

```
*****
*
* >--- <job-number> --- GI --- <integer> -----># *
*                               -- *
*****
```

The GI input message is used by the system operator to enable the tracing of normal-state programs. It places an integer into the program's run-structure nucleus that the interpreter can interrogate to determine what instructions are to be traced. The program must be using a trace version of its interpreter.

**The integer can be:**

- 0 = No trace
- 1 = Trace branch opcodes
- 2 = Trace store opcodes
- 4 = All other opcodes

or any sum of the above.

**Example:**

1111 GI 7

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**HS (Hold in Waiting Schedule)**

\*\*\*\*\*  
\* HS \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >--- HS ----- <job-number> -----># *
*      --          |                   | *
*                  |----- = ----->| *
*****

```

The HS input message will allow the system operator to place a HOLD on a specific job(s), thereby temporarily removing them from the Active Schedule.

The equal sign (=) option will place all jobs in the Active Schedule into the Waiting Schedule.

A job-number is assigned when a program is scheduled by the MCP.

A job that has been placed in the Waiting Schedule by a HS message will remain in the Waiting Schedule until FS-ed.

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**HW (Hold in Waiting Schedule until Job EQJ)**

\*\*\*\*\*  
\* HW \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- HW --- <job-number1> ---- <job-number2> -----# *
*      -- |           | *
*          |----- = ----->| *
*****
```

The HW input message allows the system operator to designate that certain jobs are to be placed in the Waiting Schedule, awaiting the EQJ of another job (by job-number).

The equal sign (=) option will place all jobs in the Active Schedule into the Waiting Schedule, and mark them as waiting for the completion of job-number-2.

A job that has been placed in the Waiting Schedule by a HW message will remain in the Waiting Schedule until job-number-2 reaches EQJ or until FS-ed by the operator.

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### IC (Interpreter Count) (\$)

```
*****
*   IC   *
*****
```

#### Format:

```
*****
*
* >--- IC -----># *
*   --          |          | *
*               |--- <integer> --| *
*
*****
```

The IC command is used to change the number of entries allocated in the MCP's interpreter dictionary. The maximum number of unique interpreters which can be associated with running jobs is bound at Clear/Start by the number of entries allocated by the system initializer (SYSTEM/INIT). The default set at COLDSTART is six (one each for GISMO, the micro-MCP and the SDL interpreter plus three for normal-state jobs).

The IC message allows the operator to change the number of slots to be allocated at the next (and subsequent) Clear/Starts. If <integer> is not given, the IC command will display the current Interpreter Count. If integer is specified, the field NUMBER.DIC.ENTITIES in COLD.START.VARIABLES (both memory and disk copies) will be changed to <integer>. <Integer> must be greater than or equal to 3 and less than or equal to 31.

Note: IC requires a null mix and schedule if <integer> is specified. Also, a Clear/Start is required following an IC which specifies <integer>.

#### Examples:

IC

IC 8

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## IL (Ignore Label)

```
*****
*   IL   *
*****
```

### Format:

```
*****
*
* >--- <job-number> -- IL ---- <unit-mnemonic> -----># *
*                --      |               |               *
*                |-- <# integer> -->|               *
*
*****
```

The IL input message allows the system operator to ignore the label on the file mounted on the designated unit.

The job-number must be used to identify the program. In a multiprogramming environment there may be more than one "NO FILE" condition at a time.

The IL message may be used in response to the following messages:

NO FILE ...

DUPLICATE INPUT FILE ...

<file-identifier> NOT IN DIRECTORY

It is assumed that the system operator knows that the file on the unit selected is the file needed regardless of the original file-identifier's location. If the unit-mnemonic specifies a disk, the directory on that drive will be searched for the required file-identifier. The #integer option is used to designate a pseudo-reader (by number) as the input drive.

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### KA (Analyze Disk Directory) (S)

\*\*\*\*\*  
 \* KA \*  
 \*\*\*\*\*

#### Format:

```
*****
*
* >-- KA ----->>
*      |                |
*      |-- <disk-pack-id>/ -->|
*
*      >>----- =/= ----->#
*      |                |
*      |-- DISKAVL/ ----->|
*      |                |
*      |-- <mfid>/ ----->|
*                        |-- <file-name> ----->|
*                        |----- = ----->|
*
*****
```

The KA input message allows the system operator to analyze the contents of a disk directory, including file area assignments. Incorrect syntax, e.g., KA =/-, is reported as an error on the console printer or CRT (SPO).

Inclusion of the disk-pack-id causes the MCP to list the requested information for the specified user disk pack or disk cartridge; otherwise, system disk is assumed.

Some examples of KA syntax are as follows:

KA =/=	displays available disk areas and all files. If KI.KO is set, then all 540 bits of each file header will be displayed.
KA DSKAVL/	displays available disk areas. If the KI.KO flag (hex 2992) is set, then absolute addresses and contents of every sector of the available table, as well as the temporary table are displayed.



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**KA <mfid>/=** displays all files with the family name <mfid>, as well as any single-name files called <mfid>. If KI.KO is set, then all 540 bits of each file header are displayed. If DEBUG is set, then the pack-information table is also displayed if a user pack is specified. A file header being in core will have both disk and core copies displayed.

**KA A/B** displays information for the specified file only.

**KA A** displays information for the specified file only.

KA will recover from and report on I/O errors on the disk available tables, file headers, and disk directories. This option is not available for user packs.

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## KB (Print SPOLOG) (1)

```
*****
*   KB   *
*****
```

### FORMAT:

```
*****
*
*  >--- KB ----- <number> -----># *
*      -- |                                     | *
*          |-- <user-option> ----->| *
*                                     |-- <number> -->| *
*
*
*****
```

KB allows the user to print the SPOLOG on the printer and to control the format of the display for both CRT SPO and TTY SPO.

**<n>** functions for both CRT and TTY SPO, simulating the output operation on the line printer if it is available and if KB LP ON has been specified. For CRT applications, <n> must have a value of 0-3 (See SCROLLING below); otherwise <n> ranges from zero to 199 and re-outputs all SPO messages stored in the latest <n> sectors on the SPO queue.

**DEF[AULT]** sets all options to standard format: KB SW 39; KB W 39; KB L 22; KB LP OFF; KB SUP; KB DIR 0; and KB TIME OFF.

**DIRN <n>** will cause the CRT SPO to display messages in reverse chronological order (default) if <n> = 0 or in normal chronological order if <n> = 1. Normal chronological order means that the most recent SPO messages will be displayed in the lower right-hand corner of the screen and previous messages will appear above the most recent one. Reverse chronological order means that the most recent message will be displayed in the upper left-hand corner (excluding the two-line input area) and older messages will appear below the more recent ones.

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- INP.LINES<n>** may be used, for CRT SPO only, to change the size of the input area reserved at the top of the screen. The default size of the input area is two lines. Using this message, the operator may set <n>, the number of lines to any value between two and sixteen included.
- Changing the size of the input area will have a resultant effect on the size of the output area. Increasing the size of the input area will decrease the size of the output area, proportionately.
- On the CRT SPO, the input area remains displayed on the screen and in the memory of the CRT itself until a different message is typed in. Therefore, if the operator has made an error in a long input message, after being told of the error by the MCP, he may not need to retype the entire message. It may be possible to simply move the cursor to the bad spot in the message by using the control keys provided on the keyboard for movement up, down, back, or ahead. After the error has been corrected, the message can be retransmitted in its error-free form. This option is not applicable to all messages.
- L** sets the number of lines of SPO output on CRT SPO, for bot one-column and two-column display.
- LP ON(OFF)** applies to both TTY and CRT SPO. "ON" will divert all output messages to an available line printer until the printer is grabbed by a user program or an MCP control function such as KA or KP. "OFF" will restore normal TTY or CRT SPO display. Default is "OFF".
- SPO0** is functional only if KI.KD is ON. It is equivalent to a KC on the 200 sectors of the SPO.0 on system disk.
- SUP[PRESS]** will suppress all messages on the screen except SPO input and SPO output.
- TIME ON(OFF)** functions for both TTY and CRT, to display

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with each message its "time stamp". The time of the occurrence of the event will be displayed in front of the message itself, and is always stamped on each message stored in the SPO Queue, regardless of whether the option is set or not. Time stamp display will reduce confusion when one is scrolling the CRT back and forth.

#### TRANSL [EO]

allows the TRANSLATE option for the CRT SPO to be set or reset. Setting the translate option to "1" means that upper-case SPO input (lower-case letters locked out) is returned (displayed) in lower-case letters, except for "L" which could possibly be confused with "1". "0" means that no translation of alphabetic characters will take place and is the default option set at Clear/Start time.

Translation will impose some compute overhead, and the response times of the CRT SPO will seem longer.

#### UNS[SUPPRESS]

will display all messages, including ZIP, QUEUE, control cards from card readers and pseudoreaders, etc.

#### W[IDTH] <n>

functions for both TTY and CRT SPO to modify the maximum number of characters per line to <n> characters. The range of <n> is 20 to 72 characters for TTY SPO, and 39 or 80 for CRT SPO, depending upon the default setting at Clear/Start time.

### SCROLLING

Scrolling allows the operator to review the history of the system's operation without requesting a hard copy of the SPO output. It is, in effect, an "instant replay" of the lines beyond the top of the screen. Scrolling is directed by the following options:

<ETX> will cause the SPO to return to the latest screenful of messages, thereby providing an escape from the scrolling mode. Other means of escaping the scrolling mode are MX, MY, or leaving the SPO in RCV. When the SPO is in RCV, the MCP will automatically

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take it out of scrolling mode and display current information.

0<ETX> same as <ETX> above.

1<ETX> causes the CRT screen to be scrolled backwards one full screen. When the previous screen has been displayed, entering another 1<ETX> will repeat the process. There is no limit to the number of times the operator may enter 1<ETX>; however, each screen will be less and less current, and eventually the SPO Queue will "wrap around" since the file is circular.

2<ETX> will cause the SPO to scroll forward by one disk sector of information. One disk sector may contain several lines of information; thus, the command means "scroll forward for a few lines".

3<ETX> will cause the SPO to scroll backward for a few lines to enable the user to salvage a message which may be split between two screens.



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**Examples:**

KP A/B 10.....Print 10 segments of file  
A/B

KP A/B.....Print 1 segment of file  
A/B

KP CCC/X/.....Print 1 segment of file A  
on pack CCC

KP DPA 25C2 15.....Print 15 segments from  
HEX LOC5C

KP DKA 1 200 10.....Print 10 segments on EU 1  
from DECIMAL LOC 200





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KI AD SPO.SQ

displays the address of some vital fields of the MCP. At present, only the SPO.SQ globals are displayed.

KO

writes the specified literal on disk (unit mnemonic) or in memory (MEM) at the specified location. It should be exercised with care, since it is a brute-force way to change data.

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MI (Disk Trace) (S)

(DEBUG Only)

\*\*\*\*\*  
 \* KT \*  
 \*\*\*\*\*

Format:

```
*****
*
* Format 1:
*
*
* KT -- NAME ----- <file-id> ----->#
* -- ---- |- = -| | | |
* |<-----| | |
* |----->|
* |-[1]-- RECORD.SIZE ----- <integer> -->|
* | ----- |- = -| |
* |
* |-[1]-- RECORDS.BLOCK ----- <integer> -->|
* | ----- |- = -| |
* |
* |-[1]-- PHYSICAL.RECORDS ----- <integer> -->|
* | ----- |- = -| |
* |
* |----- BUFFERS ----- <integer> -->|
* | ----- |- = -| |
* |
* |----- MASK ----- <six-digit hex literal> -->|
* |----- |- = -| |
*
*****
```

Note: The above attributes may be specified in any order.

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```

*****
*
*   Format 2:
*
*   KT -- MCP ----- NAME ----- <file-id> ----->#
*   --      ---          ---
*
*   |<-----|
*   |----->|
*
*   |
*   |-- MEM.TRACE ----->|
*   -----
*
*   Format 3:
*
*   KT --- CLOSE ----->#
*   --      -----
*
*****

```

KT opens a trace file with the name specified by the user. Unless the user requires a trace file with other than default parameters, Format 2 should be used. If Format 1 is used, record size, blocking factor, and the number of records required must be specified in integers greater than zero. The number of buffers defaults to one and all mask bits are set. Format 3, which applies to both options, is used to close the trace file.

All formats of the KT command require a special MCP and special firmware.

Format 2 (KT MCP <filename>) is the default method of opening a trace file. Users must supply only the filename if this form is used. The attributes of the trace file opened Format 2 are:

```

RECORD.SIZE = 50 characters
RECORDS.BLOCK = 10
BUFFERS = 2
PHYSICAL.RECORDS = 5000
MASK = 28000002

```

If MEM.TRACE is specified, a summary of the current memory configuration is dumped to the file for use by the MEMORY/MAP analyzer.

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Format 3 closes the trace file, and any new messages after the close are ignored. If the trace file exceeds the size of PHYSICAL.RECORDS, it is closed automatically.

See Appendix A for sample traces, and more detailed instructions in the use of the trace facility.

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**LC (Load Cassette) (\$)**

LC (Load Cassette) (\$)

\*\*\*\*\*  
\* LC \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >-- LC ----- =/= ----->#
*      --                |                |
*                        |-- <mfid>/= ----->|
*                        |-- <mfid>/file-id ----->|
*
*****

```

The LC message is used to load system programs (compilers, interpreters, object code, system software) from a cassette in the console cassette reader to disk with appropriate additions in the disk directory.

The LC message cannot be used to load a freestanding program that does not execute under the control of the MCP.

The LC message calls the program SYSTEM/LOAD.CAS which loads the files.

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## LD (Pseudo Load)

```
*****
*   LD   *
*****
```

### Format:

```
*****
*                                     *
* >-- LD ----->#                 *
*   --      |           |           *
*           |-- <string> -->|       *
*                                     *
*****
```

The LD input message is used to initiate the building of pseudo card deck(s) on disk to be processed by pseudo readers.

The LD message executes SYSTEM/LDCONTRL, an MCP utility program, which looks for a "?DATA CTLDCK" control statement that initiates the read.

The card deck's "file-id" is assigned by a "?DATA file-id" control statement preceding the data deck to be read. Each data deck that is loaded will be numbered consecutively along with its file-id which is used in opening the pseudo card files.

Terminating the LD function requires a "?END CTLDCK" control statement immediately following the last data deck that is to be read.

Users can create pseudodecks out of disk data files by file-equating CARD.IN (the internal name of SYSTEM/LDCONTRL's input file) to their disk files (See Example 2). Input statements must be terminated by either a semicolon (;) or a per cent sign (%) if the file is a sequenced disk file. If not, SYSTEM/LDCONTRL will scan the sequence number and errors will be reported.

### Example:

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The following example demonstrates how compile decks and a data deck can be loaded as pseudo card files to be used by pseudo readers.

```

-----
|
|
|
CONTROL DECK | DECK A | ? DATA CTLDCK
|             |     | --
|             |     | | ? COMPILE program-name COBOL SYNTAX
|             |     | | ? DATA CARDS
|             |     | |
|             |     | | data deck
|             |     | | ? END
|             |     | --
|             |     |
|             | DECK B | ? COMPILE program-name FORTRAN
|             |     | | ? DATA CARDS
|             |     | |
|             |     | | data deck
|             |     | | ? END
|             |     | --
|             | DECK C | ? DATA file-id
|             |     | |
|             |     | | data deck
|             |     | | ? END
|             |     | --
|             |     | ? ENDCTL
|
-----

```

Example 1

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```

-----
|
|
| DECK      --
|           | ? EX SYCOPY SW=1           X
| A         | ? DA CARDS                 X
|           | ? FI TAPE.1 NAM DIFFNAME;
|           | ? END                       X
|           --
|
| DECK      --
| B         | ? EX CHECK/LOAD.DUMP AFTER SYCOPY X
|           | ? FI T NAM DIFFNAME;
|           | ? FI LINE NO HAR REP 2;
|           | ? END                       X
|           --
|           ? ENDCTL
|
-----

```

Example 2



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LJ (Emulators Only) (\$)

\*\*\*\*\*  
\* LJ \*  
\*\*\*\*\*

Format:

```
*****
*
* >----- LJ -----># *
*           -- *
*****
```

The LJ input message is used to load a value into COLDSTART VARIABLES that is accessed by the SYSTEM/INIT program. The value loaded is the 81800/81700 Micro Emulator key. The integer may contain any value from zero to 15. The value is determined by the binary equivalents of:

- 1 = SYSTEM/INIT to load 81800/81700 Emulator
- 2 = Emulate
- 4 = Emulator to do its own I/O
- 8 = Load first 3KB of Emulator into Control Memory

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**LG LN (Transfer and Print Log) (\$)**

\*\*\*\*\*  
\* LG \*  
\* LN \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >----- LG ----->#
* | -- | |-- SPO --|
* | | |
* |-- LN --|
* --
*****
```

The LG, LN input message allows the system operator to transfer and print the log. The log files are numbered sequentially starting with LOG/#000001. The program SYSTEM/LOGOUT (TABS/LOGOUT if TABS is set) is executed, performing the necessary necessary file equate to print the log. The program SYSTEM/LOGOUT (or TABS/LOGOUT) must be in the disk directory in order for the MCP to accept the message.

If the SPO option is used, the new log file is SPOLOG/#000001 and the program is SYSTEM/SPOLOGOUT.

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## LO (LOAD) (#)

```
*****
*   LO   *
*****
```

### Format:

```
*****
*
* >-- LOAD ----- ; -># *
*   --   |- TO <disk-pack-id> -->|   |   | *
*       --   |   |   |   |   |   | *
* <-----|   |   |   |   |   | *
* --> FROM <library-tape-id> -- =/= ----->| *
*   ----   |<----- , -----| *
*           |- <mfid> ----->| *
*           |- /= ----->| *
*           |- /<filename> ->| *
* * * * *
*****
```

The LO (LOAD) statement will cause a file or files on a library tape to be placed on disk. If the file is already on disk, the old file will be removed.

The =/= option causes every file on the tape to be loaded, the <mfid>/= option is used to load every file with a specified family-name.

### Example:

```
LO FROM SYSTEM COBOL,
RPG, BASIC, (SYSTEM)/=;
```

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**LP (Lock Protection) (#)**

\*\*\*\*\*  
\* LP \*  
\*\*\*\*\*

**Format:**

```
*****
*                                     *
* >-- <job-number> ---- LP -----># *
*           |                   |     *
*           |-- LP- -->|           *
*****
```

The LP input message is used to prevent certain SPO messages from interfering with the execution of the program. A protection bit is set in the Run Structure Nucleus and, with this bit set, messages such as DS, DP, GT, ST, and SW will not affect the run structure. The bit can be set at execute time by including the PROTECTED (or PT) attribute in the control string. The bit can be set while the program is running through <job-number>LP. It is reset through <job-number>LP-.

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## LS (Log SPO) (§)

```
*****
*   LS   *
*****
```

### Format:

```
*****
*                                     *
* >----- LS -----># *
*           --           *
*                                     *
*****
```

The LS command causes a boolean to be set and carried with a control string and eventually a job. The function of the LS boolean is to cause all control messages (both input and output) to be inserted in the control queue (Note: a QU command is required in the control string prior to the LS command). In addition, the LS boolean has the effect of bypassing the local SPO except for error messages which require operator intervention, or if the RMSG option in the MCP is set. For example, the control string "QU X/Y LS EX DMPALL" would cause the following messages to be inserted into the control queue X/Y:

- a. The special schedule record message.
- b. A message containing the actual control string.
- c. The special BOJ message.
- d. The actual SPO BOJ message.
- e. The normal DMPALL display to the SPO.
- f. The ACCEPT message from DMPALL.
- g. Any input to DMPALL, and subsequent ACCEPTs from DMPALL.
- h. The special EOJ message.
- i. The actual SPO EOJ message.

**Note:** A job which has been spawned and has its LS boolean set may not spawn a job with the LS command.

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**LI (Load Translator) (L)**

\*\*\*\*\*  
\* LT \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >-- LI --- <unit-mnemonic> -----># *
*      --          |                          | *
*                  |-- <train-id> -----| *
*
*****

```

The LI input message is used to load specific translate tables into the printer controls (Printer-Control-5 and Printer-Control-2). The syntax of LI is different for each of the two controls: the B1247 control (Printer-Control-2) requires a switch setting on the printer itself and B1247-4 (Printer-Control-5) requires train identification, either by number or name. LI may be used to load a table into the control without Clear/Starting. The translate tables for Printer-Control-2 are contained in a file called SYSTEM/PRINTCHAIN, also located on system disk.

Which printer control is being used on a particular system can be determined from an ELOG listing for the system since DEVICE ID for printer controls is specified on the printout. The translate tables for Printer-Control-5 are located in a data file on system disk called SYSTEM/TRAINABLE that is created by the SYSTEM/BUILDTRAIN program.

Print-Control-5 (PC5) acknowledges train printers and has a buffering capability for storing translate tables for individual trains as used.

The printer must be ready and not in use by any program when a new translate table is to be loaded.

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**B1247 PRINTER CONTROL (DEVICE ID = 3103)**

If this control is used (not allowed for the 1100 LPM printers), the file SYSTEM/PRINTCHAIN will be built by the MCP on system disk. A translate table will be loaded from this file into the control based upon the setting of the Train Selector Switch on the printer, as shown in the following table:

SWITCH -----	CHARACTER SET -----
1	64-character EBCDIC
2	48-character EBCDIC
3	16-character EBCDIC
4	96-character EBCDIC
5	48-character FORTRAN
6	48-character B300/B500
7	48-character RPG
8	Undefined

The MCP will load the required table, according to the switch setting, the first time the printer goes ready following a Clear/Start. If it is necessary to change the character set later, all that is required is to mount the new train module in the printer, select the proper switch setting, make the printer ready, and enter the LT message to alert the MCP to the presence of the new character set.

Example:

LT LPA

**TRANSLATE TABLES (B1247-4 CONTROL)**

If this control is used, the file SYSTEM/TRAINABLE must be present on system disk. This file contains the translate tables for all "known" character sets (See the tables below). The MCP will select the specified translate table from the file and load it into the printer control.

For 400/750 LPM printers connected to the B1274-4 control, the train selector switch is ignored. The MCP will display

"LT" REQUIRED FOR <UNIT-MNEMONIC>

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on the SPO when the printer goes ready after Clear/Start. It will load a translate table only when ordered to do so through LT. Once loaded, the MCP will not change the translate table until told otherwise.

The first time that the 1100 LPM printer goes ready after Clear/Start, or any time the train module is changed, the MCP will automatically load the translate table specified in the train module.

The following tables show the various character sets contained in the SYSTEM/TRAINABLE file, along with their associated id numbers and names. In LT syntax, the train may be identified by either the ID NUMBER or the ID NAME.

\*\*\*\*\*400/750 LPM PRINTERS\*\*\*\*\*

ID NUMBER	ID NAME	CHARACTER SET
-----	-----	-----
130	FORTRAN48	48-character FORTRAN
131	B300/B500.48	48-character B300/B500
132	EBCDIC3.48	48-character EBCDIC-3
140	RPG48	48-character RPB
144	EBCDIC96	96-character EBCDIC
254	EBCDIC3.16	16-character EBCDIC-3
255	EBCDIC3.64	64-character EBCDIC-3

\*\*\*\*\*1100 LPM PRINTER\*\*\*\*\*

ID NUMBER	ID NAME	CHARACTER SET
-----	-----	-----
001	EBCDIC18	18-character EBCDIC
002	FORTRAN48	48-character FORTRAN
003	B300.B50048	48-character B300/B500
004	EBCDIC48	48-character EBCDIC
005	EBCDIC72	72-character EBCDIC
012	BCL72	72-character BCL
015	ASCII72	72-character ASCII
016	EBCDIC96	96-character EBCDIC
018	EBCDIC.A72	72-character ALPHA/EBCDIC
019	EBCDIC.N72	72-character NUMERIC/EBCDIC
020	RPG48	48-character RPG
021	OCR.A72	72-character OCR-A



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**MH (Modify Header) (#)**

\*\*\*\*\*  
\* MH \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- MH --- <file-name> --- <attribute> ----->>
* --
*
* >> --- <control variable> ----->>#
*
*****
```

The MH input message is used to change security attributes in the disk file header. Disk files created under the MCP-supported security mechanism contain bits in the disk file header that prevents access of the file under improper conditions, i.e., those which violate file security. This command allows the user to modify two bits: DFH.PROTECTION and DFH.PROTECTION.IO.

DFH.PROTECTION and DFH.PROTECTION.IO are set to PUBLIC and INPUT OUTPUT respectively unless a program has been executed under a usercode, in which case, the security mechanism is implemented and files are locked into the directory with the protection bits set.

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File attributes can be set or reset through the following attributes:

ATTRIBUTE -----	ABBREVIATION -----	CONTROL VARIABLE -----
PROTECTION	PTN	DEFAULT PUBLIC PRIVATE
PROTECT.IO	PIO	I.O INPUT OUTPUT
USER.COUNT	USR	<integer>

where integer is the USER.COUNT desired.

Note: DEBUG must be set for USR.

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**ML (Mix Limit) (\$)**

\*\*\*\*\*  
 \* ML \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >----- ML ----->#
*      -- | |
*          |--- <integer> -->|
*
*****
```

The ML input message allows the operator to specify the maximum number of jobs allowed in the mix at a priority of eight or less. ML without an integer displays the current limit. ML with an integer (1-63) changes the limit. COLDSTART sets the limit at 63.

ML is used in a multiprogramming environment to limit the number of lower-priority jobs that may run in the mix. When the mix limit has been reached, high-priority jobs (with a priority of nine or greater) are allowed into the active schedule regardless of the current mix limit. Lower-priority jobs, however, are automatically put into the waiting schedule and not allowed to actively execute on the system until another program(s) goes to EOI and reduces the number of active jobs to less than the maximum mix limit.

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MM (#)

```
*****
*   MM   *
*****
```

Format:

```
*****
*
* >--- MM --- THRASH ----- ON -----># *
*   -- |   --- |         |         | *
*       |         |--- OFF -->|         | *
*       |         |         |         | *
*       |--- O.T --- <decimal> ----->| *
*
*****
```

The MM message controls thrashing detection if the THR option is set (See Table of Options (TO) for a definition of this MCP option). When thrashing occurs, the schedule is not automatically restarted until some job goes to EOJ and the message SYSTEM IS THRASHING, SCHEDULE STOPPED appears on the SPO. MM allows the following optional settings:

MM THRASH ON

MM THRASH OFF

When THRASH is on, the thrashing message will be redisplayed on the SPO once per M-SECOND as long as thrashing continues. This is the default value. When THRASH is off, the thrashing warning message is displayed once each time a job is added to or removed from the mix as long as thrashing continues.

MM O.T <decimal #>

Sets the overlay target to <decimal #> which may vary between 4 and 31. The default value is 8. These values denote the number of overlays per time interval. One time interval, in this instance, is equivalent to 800 milliseconds. Higher values will make the thrashing detector less sensitive and lower values will make it more sensitive.

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## MO (MODIFY)

```
*****
*   MO   *
*****
```

### Format:

```
*****
*
* >-- MODIFY ---- <program-name> -- <control-attribute> ----># *
*   -- *
*****
```

The MODIFY message allows the user to permanently change attributes within a program. It has the same syntax as the EXECUTE statement but does not execute the program.

### Example:

```
?MO A/B PR 6
```

The above statement will permanently change the priority of program A/B to six.

The MODIFY statement can be used to change the following attributes:

CHARGE  
 DYNAMIC.SPACES  
 FILE  
 FREEZE  
 INTERPRETER  
 INTRINSIC.NAME  
 INTRINSIC.DIRECTORY

MEMORY  
 PRIORITY  
 SCHEDULE.PRIORITY  
 UNFREEZE  
 VIRTUAL.DISK

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**MP (Memory Priority)**

\*\*\*\*\*  
\* MP \*  
\*\*\*\*\*

**FORMAT:**

```

*****
*
* >-- <job-number> --- MP ----- <integer> -----># *
*           -- |           | *
*           |-- = -->| *
* *
*****

```

The MP input message reports the memory priority of the specified job or sets the memory priority of the specified job to the value specified by <integer> if the MPRI option is set. The MPRI option is part of the Prioritized-Memory system discussed in Section V of this document and defined in the system options listed under the T0 message.

The default value of <integer> is 4 and the range is 0-15.

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**MR (Close Output File with Purge)**

\*\*\*\*\*  
\* MR \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >--- <job-number> ---- MR -----># *  
* -- *  
*****
```

The MR input message gives the system operator the ability in a duplicate file situation to save the old file by purging the newly created file.

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**MU (List Multipack File Tables) (8)**

\*\*\*\*\*  
\* MU \*  
\*\*\*\*\*

**FORMAT:**

```
*****  
* >----- MU -----># *  
* -- *  
*****
```

The MU input message gives the operator the ability to interrogate the MCP's multipack file table which contains all multipack files that have been entered in the table since the last Clear/Start or RT message. If present, their absolute addresses on the system disk will be displayed if the DEBUG option is set.



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## MX (Display MIX)

```
*****
*   MX   *
*****
```

### Format:

```
*****
*                                     *
* >----- MX ----->#           *
*                                     *
*                                     *
*****
```

The MX input message allows a system operator to request that the MCP display on the console printer all the programs, and their job numbers, currently executing in the mix.

The MX response lists the memory and processes priority, program-names and job numbers of all programs currently running.

### Example:

MX

<program-name> = <job-number> PP=<integer> MP=<integer>

<program-name> = <job-number> PP=<integer> MP=<integer>

END MX

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**NC (Memory Chip Table) (\$)**

\*\*\*\*\*  
 \* NC \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >-- NC ----->#
*   -- | |
*   |--- <integer> -->|
*
*****
```

The NC input message allows the system operator to control how the table of failing memory chips is maintained.

If the integer is omitted, the current size of the table is reported. The value reported will be the size of the table following any subsequent Clear/Start. That value can be changed by using the NC <integer> option of the command.

The integer has the following meaning:

- 0 reports the current size of the table and sets the size following the next Clear/Start to the default size (one per 16KB).
- 1-255 specifies the number of locations to be used following the next Clear/Start. Integers greater than 255 exceed the maximum allowed for this command and default to 255 locations.

On machines without error-correcting memories, NC has no effect.

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**NI (Disable Trace)**

(DEBUG Only)

\*\*\*\*\*  
\* NT \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- <job-number> -- NT -----># *
*                               -- *
*****
```

The NT input message allows the operator to terminate program traces. The job-number of the program being traced is required. The MCP, upon receipt of this command, sets the trace integer in the program's Run Structure Nucleus to zero, and the trace is discontinued.

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**OE (Optional File Response)**

\*\*\*\*\*  
\* OF \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- <job-number> -- OF -----># *
*                --                *
*****
```

The OF input message is used in response to the NO FILE message. It informs the MCP that the specified file is "optional" and can be bypassed.

The OF message indicates that the file being requested is to be bypassed for this execution. Usage is restricted for input files that have been declared or label-equated (FILE control word) as OPTIONAL.

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**OK (Continue Processing)**

```
*****
*   OK   *
*****
```

**Format:**

```
*****
*                                     *
* >--- <job-number> -- OK -----># *
*                                     *
*                                     *
*****
```

The OK message is used by the system operator to direct the MCP to attempt to continue processing a program marked as WAITING.

The OK message should only be given after the necessary action has been taken to correct the problem that caused the program to be placed in WAITING status.

**Examples:**

```
<job-specifier> DUPLICATE INPUT FILES...
<job-specifier> DUPLICATE FILE ON DISK...
<job-specifier> NO DISK...
<job-specifier> NO MEMORY...
<job-specifier> FILE <file-identifier> NOT PRESENT
```

If the corrective action is not taken before the OK message is entered, the original output message is repeated.

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## OL (Display Peripheral Status)

```
*****
*   OL   *
*****
```

### Format:

```
*****
*                                     *
* >--- OL ----- <unit-mnemonic> -----># *
*           -- |-- <unit-type-code> ->! *
*               |----- PSR ----->! *
*                                     *
*****
```

The OL input message allows the system operator to interrogate the status of the system's peripheral units.

The unit-mnemonic option displays the status of a specific unit and, for disk devices, also reports on how many users are active on that unit.

The unit-type-code option displays the status of all peripherals of the same type. Unit-type-codes are the first two characters of a unit mnemonic.

Any invalid type unit used in the OL message will cause the MCP to display the following message:

NULL <unit-type-code> TABLE

The PSR option is used to interrogate the status of the pseudo readers on the system.

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Examples:

CDA NOT READY

MTC UNLABELED

DPA LABELED "USER" #123456

MTA LABELED "MASTER" (123456)

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OU (Specify Output Device)

\*\*\*\*\*  
\* OU \*  
\*\*\*\*\*

Format:

```
*****
*
* >-- <job-number> --- OU ---- <unit-mnemonic> ---># *
*                               -- *
*****
```

The OU input message is a response to direct an output file to a specified output device.

Example:

4 OU DPC

The OU is normally used in response to the "PUNCH RQD..." message to direct the file to backup.





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assumed.

Ordinarily, backup files are removed after they are printed or punched. Where user-named backup file (U.N NAM <name>) are concerned, however, a special condition exists: namely, they are not removed after they are printed or punched out unless the default condition is overridden. The default (no removal) can be changed by setting program switch two (SW2) to a non-zero value. When program switch two is set to a non-zero value (SW2=1), backup files are removed after printing/punching. These conditions also apply when AUTOBACKUP is set.

Format 2:

```

----- PB ----- <number> -->
      |  --  |
      |      |-- <unit-mnemonic> -->|
--- <us/pw> -->|

>>----->>
      |-- <output-device> -->|

>>-----#
|<-----|
|-- SAVE ----->|
|-- COPIES ----- <integer> ----->|
|          |-- = -->|
|
|----- SINGLE ----->|
|  |- DOUBLE -->|
|
|-- RECORD --- <integer-1> ----->|
|          |          |          |
|          |          |-- <integer-2> -->|
|
|-- KEY --- <compiler-name> ----->>
|          |          |
|          |-- <column> <length> -->|
|
>>--- RANGE <string-1> <string-2> ----->|
|          |          |
|          |-- EQUAL <string-3> -----|

```

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Format 2 causes the printing or punching of one printer or punch backup file, as specified by the integer. When this format is used, options can be used to control the output and action taken by SYSTEM/BACKUP. The options, in alphabetical order, are defined as:

### COPIES

Causes SYSTEM/BACKUP to produce <integer> copies of the specified backup file. One copy is the default if this option is not specified.

### DOUBLE

Causes SYSTEM/BACKUP to double-space the entire printer listing, overriding any carriage control specified in the backup file.

### KEY

Allows specification of a range of records to be printed or punched. A detailed description of the syntax is given next. All records in the file will be printed or punched if this option is omitted.

Use of the KEY option allows specification of a range of records to be printed or punched according to information within the records themselves (e.g., a sequence number). The portion of each record to be compared may be specified, as well as the information that will start and stop the output.

The <compiler-name> option causes automatic generation of the proper column number and length pair that corresponds to the sequence number field of the output listing produced by the specified compiler. The permissible compiler-names that can be used are: BASIC, COBOL, DASDL, FORTRAN, MIL, NDL, RPG, SDL and UPL.

The <column> specifies the beginning column number of the subfield to be used for the compare argument, and <length> specifies a length which must be greater than 0 and less than 10.

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The RANGE and EQUAL parameters specify the argument to which the subfield in each record is to be compared, and the action to be taken when a "true" comparison is detected. The strings can be either an integer(s) or an alphanumeric literal(s) enclosed within quote marks. When the comparison arguments are of different lengths, an integer string is either left-truncated or left zero-filled to the same length as the subfield; an alphanumeric literal is either right truncated or right space-filled to the same length as the subfield.

If RANGE is specified, printing or punching begins when an exact comparison is made between the subfield and <string-1>. The printing and punching continues until an exact comparison is made between the subfield and <string-2>, or until the end-of-file is reached, whichever occurs first.

If EQUAL is specified, printing or punching begins when an exact comparison is made between the subfield and <string-3>, and will continue until end-of-file is reached.

If <string-1> is equal to <string-2>, the entire backup file will be searched. Every record in which the designated subfield matches <string-1> is printed or punched.

Since the specified comparisons require an exact match between the string and the subfield, no sequential ordering of the backup file is assumed.

**NOTE:** If both the RECORD option and the KEY option are specified in the same statement, the comparisons specified by the KEY option will be made only within the range of records specified by the RECORD options. This defines the intersection of the two specifications.

## RECORD

Allows specification of a range of records to be printed or punched. Output will begin with the physical record specified by <integer-1> (the first record in the backup file is record number 1) and continue until the physical record specified by <integer-2>. If <integer-2> is omitted, end-of-file is assumed as the terminator. All records in the file are printed or punched if this option is omitted.

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### SAVE

Causes SYSTEM/BACKUP to leave the backup file on disk when the file is closed. The file will be removed from disk if this option is omitted. Tape backup files are always closed with release, so specification of SAVE is unnecessary.

### SINGLE

Causes SYSTEM/BACKUP to single-space the entire printer listing, overriding any carriage control specified in the backup file.

### <unit=nononic>

If this option is included, it must specify a printer (LP) or card punch (CO or CP), and must be the first option specified following the backup file number. It will cause SYSTEM/BACKUP to direct its output to the designated unit, if that unit is available.

### AUTO BACKUP

When Auto Backup is active, a copy of SYSTEM/BACKUP for each designated printer is executed. The names of the existing backup files are entered in a community queue file, AUTOPRINT. The names are read and written to OUTFILE's FPB. The individual file processing is the same as with a simple PB (PB 123). The backup files are removed after printing.

The AUTOBACKUP mechanism may be overridden for a particular backupfile during execution or compilation by specifying NO AUTOPRINT or (NO ATP). NO ATP sets a bit in the FPB called FPB.AUTOPRINT which, when set, prevents AUTOBACKUP from retrieving the specified backup file.

The FPB.AUTOPRINT bit may be set or reset when using file equation. By default, FPB.AUTOPRINT is reset. If the AUTOPRINT bit has been set, ATP resets the bit (allowing AUTOBACKUP to retrieve the file). Note: The AUTOPRINT bit may be dynamically

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modified (DY-ed) while the file is open.

The syntax for AUTOPRINT is defined as:

```
>-- FILE -- <filename> ----- AUTOPRINT ----->#  
--                               |-- NO -->|      |--- ATP ----->|
```

Examples:

PB 125

PB 17 LPA SAVE

PB DCC 4 RECORD 5

PB MTA =/=

PB 3 KEY COBOL RANGE 123 567

PB 2 KEY 7 6 EQUAL "ABC"

PB 53 RECORD 1 100 DOUBLE SAVE

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## PD (Print Directory) (#)

```
*****
*   PD   *
*****
```

### Format:

```
*****
*
* >-- PD ----- =/= -----># *
*      |-- <disk-pack-id> -->| |-- <file-name> ----->| *
*                                  |-- <mfid> ----->| *
*                                  |-- <mfid>/<file-name> -->| *
*
*****
```

The PD input message allows a system operator to request a list of all files on a disk directory or to interrogate a disk directory for a specific file(s).

The =/= format gives a complete listing of files in a specified or system disk directory. For partial or specific listings, the family-name or file-identifier format message is used.

If the file-identifier is not present in the disk directory the MCP will respond with the message: <file-identifier> NOT IN DIRECTORY

### Examples:

Does a file named COBOLZ reside on the system pack?

Request: PD COBOLZ

Response: PD = COBOLZ (affirmative response)

What files reside on the system pack?

Request: PD =/=

Response: PD = <file-identifier-1>

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PD = <file-identifier-2>

PD = ...

Does a family-name PAYROLL with a file-identifier QUARTERLY  
reside on a removable pack called MASTER?

Request: PD MASTER/PAYROLL/QUARTERLY

Response PD = MASTER/PAYROLL/QUARTERLY

Do the files ALPHA, BETA, CHARLIE, reside on the system pack?

Request: PD ALPHA, BETA, CHARLIE

Response: PD = ALPHA

PD = BETA

CHARLIE NOT IN DIRECTORY



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PG (Purge) (S)

\*\*\*\*\*  
\* PG \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- PG --- <unit-mnemonic> -----># *
*                               |-- <serial-number> --| *
*
*****
```

The PG message permits the system operator to purge a removable disk cartridge, disk pack, or magnetic tape.

A disk cartridge/pack that is purged will be marked as UNRESTRICTED with its disk pack-id remaining unchanged.

The serial-number is required when purging a disk, and must be a six-digit number matching the serial number of the pack being purged.

Magnetic tape must have a write ring in place in order to be PURGED.

The serial-number is not used when purging a tape, and the serial number in the tape label will not be changed. To assign or change a tape serial number, use the SN message.

**Examples:**

PG DPA 000456

PG MTC, MTD

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**PM (Print Memory Dump)**

\*\*\*\*\*  
 \* PM \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >--- PM ----->#
*           |                               |
*           |-- <integer> ----->|
*                               |-SAVE-|
*                               |- NC -|
*
*****
```

The PM input message allows a system operator to print the entire contents of memory or single program dump file.

A PM by itself will cause the execution of the MCPII/ANALYZER program which will analyze and print the contents of SYSTEM/DUMPFIL. (System Memory)

The "integer" option will cause the execution of the DUMP/ANALYZER program which will analyze and print the contents of DUMPFIL/integer. (Program Memory)

The programs DUMP/ANALYZER and MCPII/ANALYZER (MCPII) must be located on systems disk to perform a PM message.

The SAVE option will cause the DUMP/ANALYZER to leave the specified DUMPFIL on disk at EOJ; without this option, the DUMPFIL will be removed from disk.

The NC option informs DUMP/ANALYZER that the file to be analyzed contains the dump of a network controller.

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**PO (Power Off) (1)**

\*\*\*\*\*  
\* PO \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- PO ----- <unit-mnemonic> -----># *
*
*****
```

The PO input message informs the MCP that a removable disk pack or cartridge is to be removed from the system.

A system pack may not be powered off.

A PO message entered for a unit currently being used will cause the MCP to display the following message: <unit-mnemonic> HAS <integer> USERS

A PO message entered for a unit that is not currently in use will cause the message: <unit-mnemonic> MAY NOW BE POWERED DOWN

The PO message may be used on a multipack file base pack if there are no single-pack files in use at the time of the request.

The PO message may be used for any Model-5 tape drives attached to a MTC-4. In which case, the tape will be unloaded.

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PP (Processor Priority)

\*\*\*\*\*  
\* PP \*  
\*\*\*\*\*

Format:

```
*****
*
* >-- <job-number> -- PP ----- <integer> -----># *
*                               |         | *
*                               |-- = -->| *
*
*****
```

The PP input message sets the processor priority of the specified job to the integer selected only if the MPRI option is set. The MPRI option is part of the Prioritized-Memory management system discussed more fully in Section V of this document. The default value of integer is 4 and the range is 0-15.

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**PR (Change Priority)**

\*\*\*\*\*  
\* PR \*  
\*\*\*\*\*

**Format:**

```

*****
* >-- <job-number> -- PR ----- <integer> -----># *
*          -- |           | *
*          |-- = -->| *
* * *
*****

```

The PR input message allows the system operator to change or set the processor and memory priority of a program that is executing in a multiprogramming environment.

The default value of integer is 4 and the range of values is 0-15.

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**PS (Prod Schedule)**

\*\*\*\*\*  
\* PS \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >----- PS -----># *  
*          --          *  
*****
```

The PS input message gives the system operator the ability to request that the MCP attempt to execute the "top" entry in the ACTIVE SCHEDULE.

The normal function of the MCP checks the ACTIVE SCHEDULE at each EOJ or when a program is scheduled. The PS message will cause the MCP to check the ACTIVE SCHEDULE when the message is entered.

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**QC (Quit Controller) (1) \*\*\*\*\* \* QC \* \*\*\*\*\***

**Format:**

```
*****
*
* >----- QC -----># *
*           -- *
*****
```

The QC input message allows the system operator to bring the NDL-generated Network Controller to End-of-Job.

There can be only one NDL-generated Network Controller executing on the system. If any additional Network Controllers are executed the following message will be output:

**NETWORK CONTROLLER ALREADY RUNNING**

After entering the QC message and all activity in the NDL system has stopped, the Network Controller issues STOP codes to all attached stations and then goes to End-of-Job.

If a station for any reason is unable to receive its output messages, the Network Controller waits indefinitely.

With a MCS in the system, the QC message is invalid and its function should be performed within the MCS.

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**QE (Query File) (#)**

\*\*\*\*\*  
\* QF \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >-- QF --- <program-id> --- <control-attribute-id> -----># *  
*   -- *  
*****
```

The QE input message allows the system operator to interrogate a program on disk for the status of its control attributes.

**Examples:**

QE A/B CG

QE A/B FILE LINE BACKUP



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**QP (Query Program)**

\*\*\*\*\*  
\* QP \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- QP --- <job-number> --- <control-attribute-id> -----># *
* -- *
*****
```

The QP input message allows the system operator to interrogate a program while running on the system for the status of its control attributes.

**Examples:**

QP 14 PRIORITY

QP 15 CHARGE FREEZE

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## QU (Queue)

```
*****
*   QU   *
*****
```

### Format:

```
*****
*
* >--- QUEUE -- <name-1> -----># *
*      --                |                | *
*                        |-- /<name-2> ----| *
*
*****
```

The QU input message allows the user to designate a previously opened queue file as a control queue. The control queue provides a mechanism whereby the MCP can communicate to a controlling job on behalf of a spawned job, or in response to other control card commands which the controlling job may wish to receive. For example, the control string "QU X/Y EX DMPALL" will cause the MCP to insert into queue X/Y the following messages:

- a. A special schedule record message.
- b. A special BOJ message.
- c. Eventually, a special EOJ message.

The QU command may also be used to obtain MCP responses to normal SPD input messages. For example, the string "QU X/Y WY" would cause the standard output from the WY command to appear in queue X/Y.

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**RB RF (Remove Backup Files) (#)**

```
*****
*   RB   *
*   RF   *
*****
```

**Format:**

```
*****
*
* >--- RB ----- =/= ----->#
* | -- | |-- <disk-pack-id> -->| |<--- , -----|
* |   | |   |-- <integer> -->|
* |- RF -| |-- PRT/= ----->|
*   --   |-- PRN/= ----->|
*         |-- PCH/= ----->|
*         |-- DMP/= ----->|
*
*****
```

The RB or RF input message gives the system operator the ability to remove backup or dump files on disk.

The integer will remove the backup file (print, punch, or dump) specified by the integer.

The PRT/=, PCH/=, and PCH/= options will remove backup files of that respective type. PRN is equivalent to PRT.

The =/= option will remove all backup files from a specified or a system disk.

The disk-pack-identifier specifies that the backup files to be removed are on the designated removable disk.

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**RC (Recover Database) (3)**

\*\*\*\*\*  
\* RC \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >--- RC --- <database-name> ----->>
*   --
*
* >>----->#
*   |
*   |-- ON -- <pack id> -->| |<----- , ----|
*                               |
*                               |-- <file-id> -->|
*
*****

```

The RC message zips the execution of the data base recovery program, identifying the name of the data base that is to be recovered. The type of recovery to be done is defined by the information in the data base dictionary on the status of the data base.

RC allows an optional <pack-id> for those databases where the dictionary resides on a user disk as well as an optional file-list to indicate dump recovery of the specified data base files only. The <file-identifier>s are put into a parameter file similar to a LOAD.DUMP file. The address of this file is passed to the recovery program and SW4 is programmatically set to one (SW4=1) to indicate recovery of a partial database. There is no file list for Clear/Start, abort recovery, or full-dump recovery.

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**RD (Remove Pseudo Card Files) (S)**

\*\*\*\*\*  
\* RD \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- RD ----- <integer> ----># *
* -- |---- =/= ---->| *
*
*****
```

The RD input message allows the system operator to remove pseudo card files from disk.

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## RE (REmove) (#)

```
*****
*   RE   *
*****
```

### Format:

```
*****
*                                     *
*      |<-----,-----|          *
*      |                                     |          *
* >-- RE ----- <file-id> -----># *
*      -- |-- <pack-id> ->| |--- <mfid>/= ----->| *
*                                     |--- <mfid>/<family-name> ->| *
*                                     *
*****
```

The REMOVE input message is used to delete specified file(s) from the disk directory, making the file space available to the MCP. RE may delete any number of files; however, any statement affecting more than one file must have the file-identifiers separated by commas. Once a file has been removed, there is no means of recovering it.

The "/=" form will delete the main directory entry and in turn all the files in its subdirectory. If the file identifier referenced is located on a removable disk pack, the diskpack-id must precede the file identifier in order for the MCP to locate the correct file. When the diskpack-id is not included, the MCP assumes that the file resides on system disk.

RE may be continued to additional cards (lines) with the last "remove" terminated by a semicolon.

### Example:

Card	CRT SPO	TTY SPO
----	-----	-----
? RE A/A ,X,Y, Z/Z/Z;	RE A/A, X,Y, Z/Z/Z	RE A/A, X,Y, Z/Z/Z;

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RH (Reset Halts) (\$)

(DEBUG Only)

\*\*\*\*\*  
\* RH \*  
\*\*\*\*\*

Format:

```
*****
*                                     *
* >-- RH ----- S ----->#      *
*           |-- M --|                *
*                                     *
*****
```

The RH input message allows the operator to reset the CONDITIONAL-HALT flags for the SMCP if the S-option is set and the flags for the Micro-MCP if the M-option is set. The command also requires that the DEBUG option is on (set to one).

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RL (Relabel User Pack) (E)

\*\*\*\*\*  
\* RL \*  
\*\*\*\*\*

Format:

```

*****
*
* >-- RL --- <unit-mnemonic> --- <disk-pack-id> ----># *
* -- |----- R -----| *
* |----- U -----| *
*
*****

```

The RL input message gives the operator the ability to change the disk-pack-id and/or the type of user pack.



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RM (Remove Duplicate Disk File)

\*\*\*\*\*  
\* RM \*  
\*\*\*\*\*

Format:

```
*****
*
* >--- <job-number> -- RM ----->! *
*                               -- *
*****
```

The RM input message allows the system operator to remove a disk file from the disk directory in response to a DUPLICATE FILE ON DISK message.

The DUPLICATE FILE message is a result of a program trying to close a disk output file with the same name as a file already in the directory. This causes the program to go into a wait state. The RM message will remove the old file, close the new file, enter it in the directory, and continue processing.

Example:

421 RM

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RN (Assign Pseudo Readers) (#)

\*\*\*\*\*  
\* RN \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- RN ----- <integer> -----># *
*      -- *
*****
```

The RN message is used by the system operator to assign a specific number of pseudo card readers.

The RN message can be entered either before or after the creation of pseudo files.

It is the responsibility of the operator to determine the optimum number of pseudo readers in relation to the number of pseudo files to be processed.

By entering RN 0(zero) "all" pseudo card readers will be closed as soon as they are finished processing the file that they are presently reading.

The pseudo card readers may also be closed by performing a Clear/Start.

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## RO (Reset Option) (\$)

```
*****
*   RO   *
*****
```

### Format:

```
*****
*                                     *
*          |<----- , -----|      *
*          |                   |      *
* >-- RO ----- <option> -----># *
*   --                                     *
*                                     *
*****
```

The RO message allows the system operator to reset the options used to direct or control some of the MCP functions.

The MCP replies with a verification that the option has been reset after each RO input message.

LOG, CHR6, and SPOL options cannot be reset. The MCP message LOG LOCKED CHR6 LOCKED, or SPOL LOCKED will be displayed when an attempt has been made to reset these options.

The TO message may be entered to determine which options are set at any given time. The option indicator equals one when set and zero when reset. A complete list of the MCP options and their status will be displayed.

TIME and DATE options cannot be reset if TABS is set.

### Examples:

```
RO LIB
```

```
LIB=0
```

```
RO DATE, TIME
```

```
DATE=0
```

```
TIME=0
```

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**RP (Ready and Purge) (1)**

\*\*\*\*\*  
\* RP \*  
\*\*\*\*\*

**Format:**

```
*****
*
*          |<----- , -----|          *
*          |                   |          *
* --- RP ---- <unit-mnemonic> -----># *
*
*****
```

The RP message entered by the system operator will set a tape unit in READY status and PURGE the tape.

The RP message can be used for tape only.

**Examples:**

RP MTA

RP MTC, MTD

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## RS (Remove Jobs from Schedule)

```
*****
*   RS   *
*****
```

### Format:

```
*****
*
* >-- RS ----- =/= ----->#
*      --      |                               |
*              |<-----, -----|
*              |-- <job-number> -->|
*
*****
```

The RS input message will allow the system operator to remove a job from the schedule prior to its being entered in the MIX for execution.

The RS message can remove one or more jobs from the schedule.

The schedule number is the number assigned to the job by the MCP when it is entered into the schedule.

The job-number will be displayed by the MCP when the job is entered into the schedule if the SCHM option is set. The WS message will display the jobs in the schedule together with their job-numbers.

The "=/= " option will remove all jobs from the schedule.

If the requested program(s) are not in the schedule, the MCP will notify the operator that an invalid request has been entered.

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Example:

RS 33, 34, 35, 36

#33 RS-ED

#34 RS-ED

#35 RS-ED

36 NULL SCHEDULE

(job 36 not in schedule)

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**RT (Remove Multipack File Table) (\$)**

\*\*\*\*\*  
\* RT \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- RT --- <file-id> -----># *
*      -- *
* *
*****
```

The RT input message allows the operator to remove an entry from the multipack file table before Clear/Starting.

**Examples:**

RT USER/A/B

RT BASEPACK/MASTER/

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**RV (Pack Override) (\$)**

\*\*\*\*\*  
\* RV \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >--- US <usercode/password> --- RV -----># *  
*  
*****
```

The RV message is used to reset the pack override bit for individual entries in the (SYSTEM)/USERCODE file. It will reset the override bit for all occurrences of that usercode.

The override bit is automatically set ON when a user (usercode/password) signs on and the default pack, specified in the (SYSTEM)/USERCODE file, is not on-line. RV is used to reset (i.e., return to default) the override condition.

If the override bit is set for a particular usercode/password, an OV, indicating that the bit has been set, precedes the usercode-index entry in a listing of the (SYSTEM)/USERCODE file.



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**RX (Remove except) (S)**

\*\*\*\*\*  
 \* RX \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >-- RX --- <unit-mnemonic> ----->>
*      |                               |
*      |- <pack-id> ----->|
*
*
*      |<----- , -----|
*      |                               |
* >----- <file-id> ----->>#
*      |---- <nfid>/<file-id> -->| |
*      |---- <nfid>/= ----->| |-- ? END -->|
*
*****
```

All files on the specified disk will be removed unless the USER.COUNT is greater than zero, the file's permanent type equals 2F2, or the file name is included in the name list in the RX message. Any I/O error will abort the operation.

**Note:** RX must terminate with a semicolon or an ?END card. If a card reader exception occurs, e.g., the reader jams, RX can be stopped by input of a card with illegal syntax, e.g., RX A/B/C/D, thus forcing RX to abort. If the MCP reads an ETX before a semicolon or an ?END card, it returns an error message and terminates the command.

**Note:** The current release of MCP II allows the pack's serial number to be specified; in future releases it will be required.

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RY (Ready Peripheral) (S)

\*\*\*\*\*  
 \* RY \*  
 \*\*\*\*\*

Format:

```
*****
*
*          |<----- , -----|
*          |
* >-- RY --- <unit-mnemonic> ----->#
*
*
*
*****
```

The RY input message allows the system operator to ready a peripheral unit and make it available to the MCP.

Any number of units may be made ready with one RY message.

When a removable disk cartridge is attached to Disk Cartridge Control-1, the MCP must be notified of its presence with the RY message.

If the designated unit is not in use and is in the remote status, the RY message causes all exception flags maintained by the MCP for the specified unit to be reset. After the unit has been made ready, the MCP attempts to read a file label (input devices only).

Examples:

```
RY DPB
RY MTC
RY LPA, LPB
```

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INITIAL LETTERS S-Z

SD (Assign Additional System Drives) (I)

\*\*\*\*\*  
 \* SD \*  
 \*\*\*\*\*

Format:

```
*****
*
* >-- SD --- <unit-mnemonic> --- <serial-number> --->| *
*      -- *
*****
```

The SD input message gives the system operator the ability to assign additional system drives for the MCP.

The SD message, after verification of the serial-number, will PURGE the pack, and add it to the system packs already on the system.

At COLDSTART, there is only one system drive, so additional drives may be added by the SD message. Once a system has been added to the system, it "cannot" be removed without performing a COLDSTART.

The following message is displayed when the new system drive is linked to the system.

<unit-mnemonic> IS NOW A SYSTEM PACK--CLEAR START REQUIRED

Note: SD only applies to removable packs and cartridges.  
 All system drives must be of the same device type.

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## SE (Switch Enable) (§)

```
*****
*   SE   *
*****
```

### Format:

```
*****
*
* >-- SE ---- <integer> -----># *
*   -- *
*****
```

The value of the integer specifies the programs that are allowed to sense the Data Entry Switches, as follows:

Value of Integer -----	Program -----
0	Disable Switches
1	MCP
2	Normal-state Programs
4	Interpreters
8	GISMO

The integer may also be any sum of the above values, in which case multiple classes of programs are allowed to sense the Data Entry Switches.

Only SDL/UPL and MIL programs contain the source language constructs required to sense the Data Entry Switches. In both languages the CONSOLE SWITCHES construct is used, and provides the 24-bit image of the Data Entry Switches.

### Examples:

SE 2

SE 10

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**SH (Set Halts) (2)**

(DEBUG Only)

\*\*\*\*\*  
\* SH \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >-- SH ----- = -----># *
*   -- |-- S -->| |-- <integer> -->| *
*           |-- M -->| *
* *
*****

```

The SH input message allows the operator to force the SMCP (S) or the MMCP (M) to halt at CONDITIONAL-HALTs coded into the MCP. The integer option requests a specific halt and must be a six-digit hex number, e.g., 23932402.

The "=" option causes the MCP to halt at all CONDITIONAL-HALTs.

Note: DEBUG must be set.

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**SL (Set LOG) (S)**

\*\*\*\*\*  
 \* SL \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >-- SL ----- <integer-1> ----->#
*      |           |           |           |
*      |-- SPO -->|           |-- <integer-2> -->|
*
*****
```

The SL input message gives the operator the ability to set the LOG or SPOL(OG) options, and allocate the area required.

The integer-1 entry is the size of each area to be assigned to the LOG and cannot be less than 100 or greater than 1000 disk segments.

The integer-2 entry is optional and is the maximum number of area desired. It must be between 2 and 105, inclusive. Default is 25.

The MCP responds with the following message when an SL message has been entered:

LOG SPOLOG] NOW SET-CLEAR START REQUIRED

If there is not sufficient disk space for the first area of the log, the following message will be displayed:

NO SPACE TO BUILD LOG SPOLOG]

If integer-1 is zero and TABS is not set, the LOG SPOL] option will be reset and the log will be transferred (as though a TL message had been entered). A new SYSTEM/LOG SYSTEM/SPOLOG] is not created.

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**Examples:**

SL 1000  
SL 250 5  
SL 0  
SL SPO 100 105

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**SM (Set Database Parameters) (S)**

\*\*\*\*\*  
 \* SM \*  
 \*\*\*\*\*

**Format:**

```
*****
*
* >--- SM --- <data-base-name> ----->>
*   --                               |-- ON -- <pack-id> -->|
*
*   >>----->>#
*   | |-- SYNCPOINT ----->|   |-- <value> -->|   |
*   | |-- CONTROLPOINT -->|                               |
*   | |
*   |-- AUDIT ----->|
*                               |-- SET ----->|
*                               |-- RESET -->|
*
*****
```

The SM input message allows the operator to interrogate or set the database parameters, but only when the database is not active. The pack option is required if the database dictionary resides on a user pack. If a <value> is specified for CONTROLPOINT and SYNCPOINT or if SET or RESET is specified for AUDIT, the parameter is updated in the dictionary; otherwise the parameter is interrogated and displayed. Appropriate ranges are checked.



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**SN (Assign a Tape Serial Number) (\$)**

\*\*\*\*\*  
\* SN \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >-- SN -- <unit-mnemonic> -- <serial-number> -----># *
*      --                               I- ASCII -I *
*                                         I- ODD ---I *
*
*****
```

The SN input message is used to initialize (and purge) a magnetic tape, assigning a volume serial number to the tape label.

The SN message initialize a magnetic tape by putting a scratch ANSI label on the tape. Any tape that does not contain a valid ANSI label cannot be purged (PG message). This includes both unlabeled tapes and those that have the Burroughs standard label.

The serial-number is normally numeric, but any alphabetic or numeric string up to six characters in length is allowed. This serial number is placed in the label, and remains in the label even when the tape is purged. The serial number can be explicitly changed by another SN message.

The ASCII option forces the MCP to translate all labels on the tape to ASCII before writing them.

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The ODD option requests that the MCP write all volume and file labels in odd parity.

NOTE: MARK 6.0 MCPII does not recognize tapes generated with even parity labels. All tapes generated on MARK 6.1 which require MARK 6.0 accessibility should be created with odd parity labels.

Example:

SN MTA 123456

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## SO (Set Option) (1)

```
*****
*   SO   *
*****
```

### Format:

```
*****
*                                     *
*          |<-----,-----|       *
*          |                   |       *
* >--- SO ----- <option-name> -----># *
*                                     *
*                                     *
*****
```

The SO input message allows the system operator to set the options used to direct or control some of the MCP functions.

The MCP replies with a verification that the option has been set after each SO input message.

The LOG and SPOLLOG options cannot be set with an SO message. The MCP message "LOG LOCKED" or "SPOL LOCKED" will be displayed when an attempt has been made to set these options with an SO message.

The IO input message may be entered to determine which options are set at any given time. The option indicator equals one when set and zero when reset. A complete list of the MCP options and their status will be displayed.

TIME and DATE will be set automatically when the TABS option is set. TABS cannot be set if LOG is not set.

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SP (Change Schedule Priority)

\*\*\*\*\*  
\* SP \*  
\*\*\*\*\*

Format:

```
*****  
*  
* >--- SP -- <job-number> --- <integer> -----># *  
*  
*****
```

The SP input message provides a means for the system operator to change the schedule priority of a program currently in the schedule.

The schedule priority is separate from the job when it is in the mix.

The job-number will identify the program in the schedule that is to be affected by the SP message.

The integer in the SP message specifies the new priority that will be assigned to the program. Priorities may range from zero through fourteen, where zero is the lowest priority, fourteen is the highest priority, and four is the default.

To change the priority of a program in the schedule with a job-number of 33 to a priority of 7, for example, the following message would be used.

SP 33 7

This program would be selected from the schedule ahead of the programs with a lower priority.

The following message would be displayed after the MCP has rescheduled the priority of the job specified:

#33 SCHEDULE PRIORITY CHANGED TO 7

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## SQ (Squash Disk) (S)

```
*****
*   SQ   *
*****
```

### Format:

```
*****
*
* --- SQ ---- <unit-mnemonic> -----># *
* -- |---- DKx ----->| |-- <integer1> -->| | | *
*                                     | | *
* |<-----| | *
* |----->| *
*                                     |<-----| *
*                                     |-- SIZE ----->| *
*                                     |-- STOP ----->| *
*                                     |-- TIL -- <integer2> ----->| *
*                                     |-- TRACE -- <integer> ----->| *
*
*****
```

The SQ input message permits the system operator to initiate or terminate a "disk squash". When "squashing" a disk, the MCP attempts to move areas of data to numerically-lower disk addresses in order to alleviate disk checkerboarding.

The unit-mnemonic specified must be a disk device (DC, DK, or DP). If head-per-pack disk (DKx) is designated, integer-1 must be used to indicate the electronics unit (EU); integer-1 is not used with other types of disk.

A disk squash cannot be initiated if there are any jobs in the mix or in either schedule (WAITING or ACTIVE). Once the disk squash is initiated, only additional SQ input messages can be entered on the console printer. All card readers are inaccessible during the disk squash.

Both system and user disks can be squashed. With multiple system disks, only one drive or EU can be squashed at a time. The MCP automatically produces a KA listing of the specified disk both before and after the disk squash; therefore, a line printer must be available.

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If the TIL option is specified, the MCP will terminate the disk squash as soon as integer-2 contiguous sectors have been made available. Otherwise, the squash will continue until normal termination or until explicitly stopped by the operator with the STOP option. The MCP displays the largest area currently available whenever interrogated by the SIZE option. "TRACE 1" prints tracing information on the printer, which may be helpful for post-mortem analysis, if the MCP fails.

When the disk squash is terminated, the MCP displays the size of the largest area as well as the total number of sectors available on the designated disk.

Examples:

SQ DPA  
SQ DKB 1  
SQ DCC TILL 5000  
SQ DPB SIZE  
SQ DCA STOP

If the disk is in bad shape, SQ may halt in the middle, and a memory dump at that point may be inadequate for post-mortem analysis, unless "TRACE 1" has been specified. It is advisable to run DISKMAP/UTILITY before issuing a SQ.

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## SI (Suspend Processing)

```
*****
*   ST   *
*****
```

### Format:

```
*****
*
* --- <job-number> -- ST ----->| *
*                               -- |         | *
*                               |-- EOJ -->| *
*
*****
```

The ST input message provides a means for the system operator to temporarily suspend the processing of a program in a multiprogramming environment. The job-number identifies the program to be suspended.

The MCP will not suspend the program until all I/O operations in progress for that program have been completed. When the MCP suspends a program, it is rolled-out to disk and the memory it was using is returned to the MCP for reallocation. A suspended program will retain the peripherals assigned to it.

The EOJ option stops the program indicated by <job-number> and automatically restarts it when another program goes to EOJ. ST EOJ can be used when the system gets into a thrashing state. The operator enters the ST EOJ message to stop jobs until the mix is not thrashing. These jobs will then be automatically resumed after other jobs go to EOJ. A <job-number>GO message will restart a stopped job.

To restart a program after it has been suspended, the GO message must be used. If for some reason all of the conditions necessary for the program to run are not met when the GO message is issued, the MCP will not restart the program.

### Example:

823 ST

947 ST EOJ

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**SV (Save Peripheral Unit) (S)**

\*\*\*\*\*  
\* SV \*  
\*\*\*\*\*

**Format:**

```

*****
*
*          |<----- , -----|
*          |                   |
* >--- SV ----- <unit-mnemonic> ----->#
*
*
*****

```

The SV message allows the system operator to make a peripheral unit inaccessible to the MCP until a Clear/Start operation occurs, or an RY input message is used to ready the unit.

Any number of peripheral units may be saved with one SV input message.

When the SV message is entered and the unit is not in use, the specified unit is marked SAVED and "unit-mnemonic SAVED" is displayed by the MCP.

If the unit is in use, the MCP will respond with "unit-mnemonic TO BE SAVED" and will save the unit as soon as it is no longer being used.

**Example:**

SV LPA, CRA



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## SW (Set Switch)

```
*****
*   SW   *
*****
```

### Format:

```
*****
*
* >-- <job-number> -- SW ----- = ----- <value> ----># *
*                               -- |-- <integer> ----->| *
*                               |                               |- = -| | *
*
*
*****
```

The SW input message allows the system operator to set programmatic switches.

Program switches may also be set at schedule time by using the SWITCH control statement attribute.

The number must be a decimal digit from zero to nine (0-9) that references the switch to be set. To determine what switches are available, the specific language manual for the program for which the switches are being set must be referenced. If the "=" option is used, all ten switches are implied (40 bits of information).

The value is the value that the switch or switches will be assigned.

### Examples:

25 SW1 = 2F2

2 SW8 = 6

1473 SW = 201234567892

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**SZ (Session ZIP) (3)**

\*\*\*\*\*  
\* SZ \*  
\*\*\*\*\*

**Format:**

```
*****  
*  
* >-- SZ ----- <integer> -----># *  
* -- *  
*****
```

The SZ input message is mainly an RJE control card. It should not be invoked in the course of simple job spawning. The session number generated by an SZ command is carried with a "zipped" control string and applied to a job or mix of jobs depending on what other commands are in the control string. The primary function of the session number is to associate independent jobs into logically related groups. For example, HOST RJE assigns a session number to a physical site at log-on time and all jobs submitted from that site will contain identical session numbers, thus relating them to the originating remote site.

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**ID (Time and Date)**

\*\*\*\*\*  
\* TD \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- TD ----->#
*
*
*****
```

The ID input message allows the system operator to request that the MCP type the current values of the time and date.

The MCP displays the date and time in the following format:

DATE = mm/dd/yy TIME = hh:mm:ss.t

**Where:**

- hh - hours
- mm - minutes
- ss - seconds
- t - tenths of seconds

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### TG (Trace Gismo) (1)

(DEBUG Only)  
 \*\*\*\*\*  
 \* TG \*  
 \*\*\*\*\*

#### Format:

```
*****
*
* --- TG ----->|
* -- |-- <integer> -->|
*
*****
```

The TG input message allows the operator to set or interrogate a group of flags that instruct GISMO to trace various events on the system. TG, without parameters, will return the current settings of the trace flags. TG integer will set the flags.

The integer maps onto a 24-bit field used by GISMO to determine which functions will be placed in the trace table. If a bit is on, then the corresponding function is traced. The field is mapped as follows:

Bit	Function
---	-----
0	Channel 0
1	Channel 1
	.
	.
	.
14	Channel 14
15	GISMO functions
16	Port activity
17	User activity
18	MMCP activity
19	SMCP activity

Note that the system must be Clear/Started with the debug versions of GISMO and MMCP in order to invoke the use of these parameters. The DEBUG option must also be set.

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**II (Time Interrogation)**

\*\*\*\*\*  
\* TI \*  
\*\*\*\*\*

**Format:**

```
*****
*                                     *
* >-- <job-number> --- TI -----># *
*                                     *
*                                     *
*****
```

The TI input message allows the system operator to interrogate the MCP as to the amount of processor time the program has used up to the time the interrogation was made.

The job-number identifies the program for which the interrogation was requested.

The time is given in hours, minutes, seconds, and tenths of seconds.

**Example:**

84TI

COBOL: A/B = 84 CPU TIME = 00:03:15.7

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**IL (Transfer LOG) (I)**

\*\*\*\*\*  
\* TL \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- TL ----->#
*      -- (--- SPO ---)
*
*****
```

The TL input message allows the system operator to transfer the information in the SYSTEM/LOG or SYSTEM/SPOLOG to LOG/#<integer> or SPOLOG/#<integer>. To print the LOG or SPOLOG, refer to the LG command.

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**IQ (Display Options) (1)**

\*\*\*\*\*  
\* TO \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >-- TO ----->#
*      -- |                                     |
*          |<----- , -----|
*          |                                     |
*          |-- <option-name> --->|
*
*****

```

The TO input message allows the system operator to interrogate the status of the MCP options.

The TO message entered by itself will display all of the options and their settings.

A value of zero (0) indicates a reset (off) condition; a value of one (1) indicates a set (on) condition.

The DEBUG option allows the following messages to be used:

- CN
- CS
- CT
- DN----- (without a job-number)
- RH
- SH
- TG

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Example:

TO LOG, TIME

LOG = 1

TIME = 0

or:

OPTION	DEFINITION: WHEN OPTION IS SET
-----	-----
TO LOG	- Creates a disk file recording SPO activity.
CHRG	- Requires jobs to be charged to "account numbers".
LIB	- Reports all file maintenance activity.
OPEN	- Reports all file opens.
TERM	- DSeS any job that would normally get a DS or DP message.
TIME	- Requires time to be reset at Clear/Start.
DATE	- Requires date to be reset at Clear/Start.
CLOS	- Reports all file closes.
PBT	- Sends printer backup files to tape, by default.
PBD	- Sends printer backup files to disk, by default.
BOJ	- Reports beginning of job.
EOJ	- Reports end of job.
SCHM	- Reports all entries into the schedule.
LAB	- Reports all labels.
RNOV	- Removes duplicate disk files.
DUMP	- Creates a file called SYSTEM/DUMPFIL which allows memory dumps to be taken at Clear/Start.
ZIP	- Reports all ZIP communicates.
MEM	- Reports all NO MEM conditions.



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- DMS - Allows DMS to be run after the next Clear/Start. If this option is set, the initializer binds into GISMO the code that allows DMS activity.
- TRND - Same as TERM except does a DP instead of a DS. Takes precedence over TERM.
- DBUG - Enables the messages listed above.
- DISP - Reports Segment and Displacement on all DS-OP requests.
- SPOL - Creates a disk file of SPD (TTY) activity.
- RMSG - Forces all messages to the local SPD.
- SQRM - Disables micro-coded QUEUE and REMOTE file handling.
- BREL - Reports the release of backup files on the SPD. Users who do not want this information reported should not set this option.
- TABS - Activates TABS system. The LOG option must be set also.
- THR - Invokes Level Two of the new memory management system after the next Clear/Start. If the THR option is set, the initializer binds into GISMO the code to detect thrashing.
- MPRI - Invokes Prioritized-Memory Level of the new memory management system after the next Clear/Start. If the MPRI option is set, the initializer binds into GISMO the code to detect thrashing as well as the prioritized "victim selector".
- VLIO - Allows specification and display of activity on the IO subsystem.
- VLCP - Displays CPU usage and overlay activity.
- BRGR - Sets "bar graph" display, on 81800 only, to show the activities of the state lamp. If both VLIO and VLCP are reset, this option is also considered reset.
- FLMP - Must be set at Clear/Start for console lamps.

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TR (Time Change) (\$)

\*\*\*\*\*  
 \* TR \*  
 \*\*\*\*\*

Format:

```
*****
*
* >-- TR ----- <integer> -----># *
*      -- *
*****
```

The TR message allows the system operator to change the current value of the time maintained by the MCP.

The time specified by the integer is designated according to a 24-hour clock, and must be four digits in length.

This message is not accepted by the MCP if the value of the integer is greater than 2400 hours or the value is not numeric.

Example:

TR 1919

Sets the time in the MCP to 19:19

Time cannot be reset, also, when the TABS option is set and there are jobs either executing or scheduled.

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**IS (Test Switches)**

\*\*\*\*\*  
\* TS \*  
\*\*\*\*\*

**Format:**

```
*****
*
* --- <job-number> --- TS -----># *
*                               -- *
*****
```

The TS input message allows the system operator to test the program switches set by the SW console message or the SWITCH control statement attribute.

The output of the TS message is in hexadecimal format.

**Example:**

```
94 TS
PAYROLL/103=94 SWITCHES=001234567890
```

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### UL (Assign Unlabeled File)

```
*****
*   UL   *
*****
```

#### Format:

```
*****
*
* >-- <job-number> -- UL --- <unit mnemonic> -----># *
*               --                |-- integer ->| *
*
*
*****
```

The UL message allows the system operator to designate the unit on which a particular unlabeled input file is located in response to a "FILE NOT PRESENT" message from the MCP.

The UL message is used only if the unit designated is to be acted on as an unlabeled file. The MCP assumes the file on the designated unit is the file requested by the program that caused the "FILE NOT PRESENT" message.

The job-number must be used to identify the program to which the file is to be assigned. If integer is used, the MCP spaces forward "integer" blocks prior to reading the first data block into the object program. Tape marks are read as blocks. This is done at the time the file OPEN is performed. Zero is treated as a null entry, i.e., <job-number> UL MTA 0 is treated as UL MTA.

#### Example:

A program with a job-number of 1 calling for an unlabeled input tape file could be assigned a tape on a unit with the unit-mnemonic of MTA with the following UL message:

```
1 UL MTA
```

If the first three blocks on the tape are not desired, they can be skipped with the following UL message:

```
1 UL MTA 3
```

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## UN (UNLOAD) (#)

```
*****
*   UN   *
*****
```

### Format:

```
*****
*
* >--- UNLOAD ----- ; -># *
*   --      |-- FROM <disk-pack-id> -->| | | *
*           --          | | | *
* <-----| | | *
* --> TO <library-tape-id> -- =/= ----->| *
*   --          |<----- , -----| *
*               |-<mfid> -----| *
*               |- /= ----->| *
*               |- /<filename> -->| *
* *
*****
```

The UN (UNLOAD) statement will cause one or more disk files to be placed on a library tape. The file is removed from disk by this command. The =/= option causes every file on the specified disk is to be dumped. The family-name/= option causes every file with the specified family-name to be dumped. A maximum of 2248 files can be handled with one UNLOAD statement.

### Example:

```
?UN TO SYS.TAPE
PAYROLL/=,
ACCPAY/=,
MASTER/FILE;
```

```
UN FROM USER TO BACKUP =/=
```



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**WD (Display MCP Date)**

\*\*\*\*\*  
\* WD \*  
\*\*\*\*\*

**Format:**

```
*****
*
* >--- WD -----># *
*      --          *
*****
```

The WD input message permits the system operator to request the current date used by the MCP.

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### WM (Display Current MCP and Interpreter)

```
*****
*   WM   *
*****
```

#### Format:

```
*****
*                                     *
* >--- WM ----->#                 *
*      --                             *
*                                     *
*****
```

The WM input message allows the system operator to inquire which system software is currently being used since there can be more than one MCP, Interpreter, etc. residing on the system pack.

The reply to the WM message is in the following format:

```
MCP = <mcp-name><version-number> INTERP = <interpreter-name> GISMO =
<gismo-name> INIT = <initializer-name> MICRO.MCP = <micro.mcp-name>
NETWORK.CONTROLLER = <controller-name> USERCODE.FILE= <usercode-
file-name>
```

GISMO also contains:

```
<segment-name-1>
<segment-name-2>
.
.
.
<segment-name-n>
```



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### WS (Display Schedule)

```
*****
*   WS   *
*****
```

#### Format:

```
*****
*                                     *
* >--- WS --- <job-number> -----># *
*      -- |----- = -----|      *
*                                     *
*****
```

The WS input message allows the system operator to interrogate what program or programs are currently in the schedule and their status.

The job-number is assigned by the MCP as the program is entered into the schedule.

The MCP response to the WS message gives the program-name, schedule number, memory required in KB's, program priority, and the length of time the program has been in the schedule.

#### Example:

WS 4

ALPHA = 4 NEEDS 8 KB PR = 4 IN FOR 00:08:37.4

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**WI (Display MCP Time)**

\*\*\*\*\*  
\* WT \*  
\*\*\*\*\*

**Format:**

```
*****  
* * * * *  
* >--- WT -----># *  
* -- *  
* * * * *  
*****
```

The WT input message permits the system operator to request the current time used by the MCP. The reply is in the twenty-four hour clock format.

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**WH (List Contents of NAME TABLE) (\$)**

\*\*\*\*\*  
\* WH \*  
\*\*\*\*\*

**Format:**

```

*****
*
* >--- WH ----- /= ----->#
*      --          |-- N/= -->|
*                  |-- G/= -->|
*                  |-- I/= -->|
*                  |-- M/= -->|
*                  |-- S/= -->|
*                  |-- MM/= -->|
*                  |-- C/= -->|
*                  |-- U/= -->|
*
*****

```

The WH input message gives the operator the ability to list the different types of system software/firmware in the NAME/TABLE. It lists any individual entry with its appropriate id, e.g., WWMX lists the name of the Experimental MCP. It lists group entries through the /= syntax, e.g., WWM/= lists all MCP entries: M, MT, and MX. WH=/= will list the entire NAME TABLE.

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WY (Program Status Interrogation)

\*\*\*\*\*  
\* WY \*  
\*\*\*\*\*

**Format:**

```
*****  
* >----- WY -----># *  
* |-- <job-number> --| -- *  
* * * * *  
*****
```

The WY message allows the system operator to check the current status of one program or all the programs in a multiprogramming mix of jobs.

The job-number identifies the program in the mix that is to be checked and its status displayed on the console printer (SPO). If the job-number is omitted, the MCP will display the status of every program in the mix.

If the program is waiting for some type of operator action, the alternatives available to the operator will be identified.

**Examples:**

421WY

PAYROLL/PAY105=1 IL UL DS-NO FILE "PAYROLL/MASTER"

WY

COBOL; LISTER=1 EXECUTING

DMPALL=2 AX DS-WAITING FOR KEYBOARD INPUT

USER/ACCPAY/=3 WAITING FOR I/O COMPLETE ON "CARDS" (CRA)

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XC XD (Remove Segments) (\$)

```
*****
*   XC   *
*   XD   *
*****
```

**Format:**

```
*****
*
* >--- XC --- <unit-mnemonic> -----#
* |- XD -| | |
* |-----| |
* |<-----| |
* |----- <integer-2> --- <integer-3> -->|
* |-- <integer-1> ->|
*
*****
```

The XC and XD input message allow the removal of contiguous disk segments from the MCP tables of available disk space temporarily (XC) or permanently (XD).

The unit-mnemonic specified must be a disk device (DC, DK, or DP). If head-per-track disk (DKx) is specified, integer-1 must be used to indicate the electronic unit (EU). Integer-1 is not used when other types of disk are specified.

Integer-2 specifies the beginning segment address, and can be expressed in any format. If the operation is being performed on a disk cartridge (DCx), and the beginning segment address is not the address of the first segment in a track, the MCP will automatically adjust it backward to the beginning of the track, and will remove the entire track.

Integer-3 specifies the number of segments to be removed from use by the MCP. If the operation is being performed on a disk cartridge (DCx), the number of segments removed will always be a multiple of entire tracks. The MCP will make necessary adjustments, both in starting address and number of segments.

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The disk space to be removed must be available in order to be removed; therefore, if any portion of the space is occupied by files or headers, for example, the MCP will reject the request with the message:

REQUESTED SEGMENTS NOT REMOVED-NOT AVAILABLE

The requested disk space is permanently removed from use by the XD message. To return the removed segments a disk initialization (for disk packs or cartridges) or COLDSTART (for head-per-track disk) is required.

The XC message temporarily removes the disk space from use. The disk space is returned at the next CLEAR/START or, for user packs or cartridges, when the disk is powered down (PD message).

Examples:

XC DKA 0 200 1000

DISK SPACE REMOVED FROM 2EE00000C82 THRU 2EE00004AF2

XC DCC 2462 30

DISK SPACE REMOVED FROM 2EA20000402 THRU 2EA200007F2

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### XM (Remove Memory From System) (S)

```
*****
*   XM   *
*****
```

#### Format:

```
*****
*
* >--- XM ----->#
*
* | |
* |-- - ----->| |
*
* | |
* |-- <begin-address> -->| |
*
* | |
* |<-----|
*
* | |
* |-- <begin-address> -- <length> ----->|
*
*
*****
```

XM <begin address> <length> input message adds the address-length pair to the XM table on disk with a bit on to indicate that this XM will take effect at the next Clear/Start. The length is specified in bytes.

XM- <begin address> <length>] removes the entry from the XM table which has the same <begin address>. The <length>, if present, is ignored.

XM- removes all entries from the XM table.

XM lists all entries in the XM table including whether each entry is currently active, will be active on the next Clear/Start, or could not be activated on the last Clear/Start. Any temporary XM entered through the toggles at Clear/Start time will also be listed along with its temporary status.

No attempt is made to prevent the entry of overlapping or duplicate entries in the XM table. The advantage of this is that the user can reverse any entry he has made by simply entering the same entry preceded by a "--". If, instead, the entries in the XM

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table were combined to prevent any overlapping areas, a user wishing to reverse his last entry would have to carefully consider how to return the table to its prior state. In fact, unless the user listed the XM table before each new XM message it would sometimes be impossible to return the table to its prior state by inspection of its current state and the last XM message entered.

The XM table provides a complete list of all areas of memory which the initializer will attempt to remove from use at the next Clear/Start. Note, however, that the XM table may be incomplete in describing current memory since entries which have been deleted from the XM table may have been removed from use at the last Clear/Start.



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## ZQ (Zip Queue)

```
*****
*   ZQ   *
*****
```

### Format:

```
*****
*
* >-- ZQ --- <name-1> ----->| *
*   --                               |<-----| *
*                                   |-- /<name-2> --->| *
*
*****
```

The ZQ message is similar to QU(EUE) except that the queue specified is used exclusively for scheduling messages and data-card messages. Where the control queue may contain many messages concerning jobs, MCP responses to SPO commands, etc., the ZIP QUEUE command will only contain schedule records of jobs zip-executed by the controlling program and/or the data-card label message(s) if a DATA control card was encountered in the zip string.

This effectively allows the controlling program to be immediately aware of the fact that a job has been scheduled without having to scan through the general control queue for pertinent messages. In general, the control queue is designed for general communication, while the zip queue is specifically to be used for job-spanning control.

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