IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DHRKD-D-D

PRODUCT NAME: RK8E/RK8L DISK FORMATTER PROGRAM

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MAINTAINER: DIAGNOSTIC ENGINEERING

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1. ABSTRACT

THE RK8E/RK8L DISK FORMATTER PROGRAM IS DESIGNED TO WRITE AND CHECK THE FORMAT OF THE COMPLETE DISK CARTRIDGE.

ONLY STANDARD DEC SURFACE FORMAT IS AVAILABLE (I.E. SECTORS NUMBERED IN THE NORMAL NUMERICAL SEQUENCE 0, 1, 2, 3, 4, 5, ETC.).

2. RESTRICTIONS

THE RK8L CONTROL,WHICH CAN CONTROL UP TO 8 DRIVES,WILL NOT RUN WITH THE DW8E BUS ADAPTER. THE REASON FOR THIS STATEMENT IS THAT THE RK8L CONTRUL USES IOT0 FOR EXTENDED DRIVES 4-7 WHICH IS NOT AVAILABLE ON THE DW8E.

2.1 HARDWARE

A. PDP-8/E,8/F,8/M OR 8/A COMPUTER
   OTHER FAMILY OF 8 COMPATIBLE COMPUTER WITH NECESSARY DW8E BUS ADAPTER FOR RK8E CONTROL ONLY.

B. AT LEAST 4K OF READ/WRITE MEMORY. AT LEAST 8K OF MEMORY IS NEEDED FOR OPERATION OF THE CONSOLE PACKAGE.

C. ASR-33 TELETYPE OR EQUIVALENT

D. RK8E DISK CONTROL OR RK8L DISK CONTROL
E. RK05J OR RK05F DISK DRIVE(S)

NOTE: THE RK05F'S DRIVE IS CONSIDERED AS TWO SEPARATE UNITS. WHEN ANSWERING ALL QUESTIONS EACH SERPARATE UNIT MUST BE SPECIFIED: DSK0?, DSK1?, DSK2?, ETC.

2.2 PROGRAM STORAGE

THE PROGRAM UTILIZES OR OCCUPIES LOCATIONS 0000 TO 4177 OF THE CURRENT FIELD.

3. PRELIMINARY PROGRAMS

THE FOLLOWING PROGRAMS SHOULD BE RUN IF THE FORMATTER PROGRAM FAILS TO OPERATE CORRECTLY:

ALL BASIC AND EXTENDED MEMORY DIAGNOSTICS

FOR THE RK8E CONTROL,RUN THE RK8E DISKLESS CONTROL TEST AND THE RK8E DRIVE CONTROL TEST.

FOR THE RK8L CONTROL,RUN THE RK8L INSTRUCTION TEST.

4. OPERATOR AND/OR PROGRAM ACTION

4.1 STANDARD TEST PROCEDURE

A. LOAD THE PROGRAM INTO ANY R/W MEMORY BANK USING THE STANDARD BINARY LOADER TECHNIQUE.

B. TO RUN THE FORMATTER PROGRAM, FOLLOW THE PROCEDURE IN SECTION 4.4.

4.2 RK05J DRIVE CARTRIDGE MOUNTING PROCEDURE

THE FOLLOWING IS THE CORRECT CARTRIDGE MOUNTING PROCEDURE FOR THE RK05J DISK DRIVE. ANY DEVIATION ENCOUNTERED DURING THIS PROCEDURE WILL BE CONSIDERED AN ERROR CONDITION.

A. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION.

B. TURN AC POWER ON.

C. VERIFY THAT LIGHT LABELED "PWR" IS ON.

D. WAIT FOR LIGHT LABELED "LOAD" TO COME ON.

E. VERIFY THAT LIGHTS LABELED "RDY", "ON CYL", "FAULT", "WT", AND "RD" ARE OFF.

F. OPEN ACCESS DOOR.

G. INSERT CARTRIDGE.

H. CLOSE ACCESS DOOR.

I. SET SWITCH LABELED "RUN/LOAD" TO THE "RUN" POSITION.

J. WAIT FOR LIGHTS LABELED "RDY" AND "ON CYL" TO COME ON.

K. TOGGLE SWITCH LABELED "WT PROT" AND VERIFY THAT THE LIGHT LABELED "WT PROT" GOES ON AND OFF.

L. TOGGLE SWITCH LABELED "WT PROT" UNTIL LIGHT LABELED "WT PROT" GOES OFF.

M. VERIFY THAT LIGHTS LABELED "FAULT", "WT", "RD", AND "LOAD" ARE OFF.

4.3 RK05F DRIVE SETUP PROCEDURE

THE FOLLOWING IS THE CORRECT DRIVE SETUP PROCEDURE FOR THE RK05F DISK DRIVE. ANY DEVIATION ENCOUNTERED DURING THIS PROCEDURE WILL BE CONSIDERED AN ERROR CONDITION.

A. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION.

B. TURN AC POWER ON.

C. VERIFY THAT LIGHT LABELED "PWR" IS ON.

D. WAIT FOR LIGHT LABELED "LOAD" TO COME ON.

E. VERIFY THAT LIGHTS LABELED "RDY", "ON CYL", "FAULT", "WT", AND "RD" ARE OFF.

F. SET SWITCH LABELED "RUN/LOAD" TO THE "RUN" POSITION.

G. WAIT FOR LIGHTS LABELED "RDY" AND "ON CYL" TO COME ON.

H. TOGGLE SWITCH LABELED "WT PROT" AND VERIFY THAT THE LIGHT LABELED "WT PROT" GOES ON AND OFF.

I. TOGGLE SWITCH LABELED "WT PROT" UNTIL LIGHT LABELED "WT PROT" GOES OFF.

J. VERIFY THAT LIGHTS LABELED "FAULT", "WT", "RD", AND "LOAD" ARE OFF.

4.4 FORMAT PROGRAM

A. MAKE READY ALL DRIVES TO BE FORMATTED:

FOR RK05J DRIVES USE THE RK05 DRIVE MOUNTING PROCEDURE REFER TO SECTION 4.2.

FOR RK05F DRIVES USE THE RK05 DRIVE SETUP PROCEDURE REFER TO SECTION 4.3.

B. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION ON ALL DRIVES NOT BEING FORMATTED.

C. SET THE SWITCH REGISTER TO 0200 AND PRESS LOAD ADDRESS.

D. SET THE SWITCH REGISTER TO 0000.

E. IF IT IS DESIRED TO CHANGE THE IOT DEVICE CODES WITHIN THE PROGRAM (THEY ARE NORMALLY X74X), SET SWITCH REGISTER BIT 11 TO A "1".

F. IF CHANGE IOT CODES WAS SELECTED, SET SWITCH REGISTER BITS 3 TO 8 TO THE DESIRED IOT DEVICE CODE.

G. PRESS KEY START (KEY START IS KEY CLEAR AND THEN KEY CONTINUE ON A PDP8/E, PDP8/F, OR PDP8/M). IF SELECTING A PDP8/A (PRESS INIT AND THEN PRESS RUN). IF SELECTED, ALL IOT DEVICE CODES WITHIN THE PROGRAM WILL BE CHANGED. THE TTY WILL TYPE THE FOLLOWING PROGRAM NAME, INFORMATION, AND QUESTION.

RK8E/RK8L DISK FORMATTER PROGRAM

FOR ALL QUESTIONS ANSWER Y FOR YES OR N FOR NO.
FORMAT DISK 0?

H. IF THE OPERATOR DESIRES TO FORMAT DISK 0, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 1?

I. IF THE OPERATOR DESIRES TO FORMAT DISK 1, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 2?

J. IF THE OPERATOR DESIRES TO FORMAT DISK 2, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 3?

K. IF THE OPERATOR DESIRES TO FORMAT DISK 3, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 4?

L. IF THE OPERATOR DESIRES TO FORMAT DISK 4, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 5?

M. IF THE OPERATOR DESIRES TO FORMAT DISK 5, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 6?

N. IF THE OPERATOR DESIRES TO FORMAT DISK 6, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

FORMAT DISK 7?

O. IF THE OPERATOR DESIRES TO FORMAT DISK 7, TYPE Y FOR YES, OTHERWISE, N FOR NO, ON THE TTY KEYBOARD. THE FOLLOWING QUESTION WILL THEN BE TYPED ON THE TTY.

ARE YOU SURE?

P. TYPING N FOR NO WILL RESULT IN REPEATING ALL THE PREVIOUS QUESTIONS. TYPING Y FOR YES, WILL RESULT IN EXECUTION OF THE OPERATION SELECTED.

Q. PROGRAM EXECUTION IS APROX. 80 SECONDS PER DISK DRIVE. AFTER ALL DISKS SELECTED HAVE BEEN FORMATTED AND CHECKED THE TTY WILL TYPE THE FOLLOWING PASS COMPLETE MESSAGE AND

QUESTION,

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RK8E/RK8L DISK FORMATTER PASS COMPLETE
FORMAT SAME DISK(S) AGAIN?
```

R, IF THE OPERATOR DESIRES TO REPEAT THE OPERATION SELECTED, TYPE Y FOR YES, TYPING N FOR NO WILL RESULT IN A REPEAT OF THE INITIAL START-UP QUESTIONS.

4,5 SWITCH REGISTER SETTINGS

SWR11=0	DO NOT CHANGE IOT DEVICE CODES
SWR11=1	CHANGE IOT DEVICE CODES
SWR3-8	DESIRED IOT DEVICE CODE,

5, ERRORS

WHEN A RECOVERABLE ERROR OCCURS THE TTY WILL PRINT AN "ERROR HEADER" AND ERROR INFORMATION PERTAINING TO THE FAILURE.

POSSIBLE ERROR HEADERS ARE AS FOLLOWS,

```
DISK DATA ERROR
READ STATUS ERROR
WRITE STATUS ERROR
RECALIBRATE STATUS ERROR
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AFTER THE ERROR HEADER MENTIONED ABOVE IS TYPED THE TTY WILL PRINT SOME OF THE FOLLOWING ERROR INFORMATION PERTAINING TO THE FAILURE.

PC:	PROGRAM LOCATION OF FAILURE
GD:	EXPECTED INFORMATION
EX:	EXTENDED DRIVE BIT
CM:	SOFTWARE COMMAND REGISTER
ST:	CONTENTS OF STATUS REGISTER
DA:	SOFTWARE CYLINDER, SURFACE, AND SECTOR REGISTER
CA:	INITIAL CURRENT ADDRESS
AD:	ADDRESS OF DATA BREAK
DT:	DATA FOUND DURING DATA BREAK

AFTER THE ERROR INFORMATION IS TYPED THE TTY WILL TYPE ONE OF THE FOLLOWING QUESTIONS ASKING THE ERROR RECOVERY DESIRED.

A, IF THE ERROR WAS A RECALIBRATE ERROR THE FOLLOWING QUESTION

WILL BE TYPED.

TRY TO RECALIBRATE SAME DISK AGAIN?

TYPING A Y FOR YES WILL RESULT IN A REPEAT OF THE RE-CALIBRATE SEQUENCE ON THE DISK IN ERROR, TYPING N FOR NO WILL RESULT IN PROGRESSING TO THE NEXT AVAILABLE DISK.

B. IF THE ERROR WAS A WRITE ERROR THE FOLLOWING QUESTION WILL BE TYPED.

TRY TO FORMAT SAME CYLINDER AGAIN?

TYPING Y FOR YES WILL RESULT IN A REPEAT OF THE WRITE SEQUENCE ON THE CURRENT CYLINDER, TYPING N FOR NO WILL WILL IN PROGRESSING TO THE NEXT SEQUENCIAL CYLINDER.

C. IF THE ERROR WAS A READ OR CHECK ERROR THE FOLLOWING QUESTION WILL BE TYPED.

TRY TO CHECK SAME CYLINDER AGAIN?

TYPING A Y FOR YES WILL RESULT IN A REPEAT IN THE READ AND CHECK SEQUENCE ON THE CURRENT CYLINDER, TYPING A N FOR NO WILL RESULT IN PROGRESSING TO THE NEXT SEQUENCIAL CYLINDER.

6. PROGRAM DISCRIPTION

THE FORMATTING IS ACTUALLY A FUNCTION OF THE RK8E OR RK8L CONTROL AND DRIVE LOGIC. THE PROGRAM SIMPLY WRITES DATA ON EVERY SECTOR IN THE "WRITE ALL" MODE, THEN CHECKS THE DATA IN SUCH A WAY IN THE "READ DATA" MODE AS TO VERIFY THAT THE HEADER WORDS WRITTEN ON EVERY SECTOR ARE ALSO CORRECT. THE "READ DATA MODE" AUTOMATICALLY PERFORMS A CHECK HEADER FUNCTION.

THE FIRST TWO WORDS OF EVERY SECTOR ARE SET TO THE ABSULUTE DISK ADDRESS(I.E. COMMAND REGISTER BITS 9-11 AND CYLINDER, SURFACE, AND SECTOR BITS 0-11, RESPECTIVELY) AND THE REMAINDER OF THE DATA AREA TO ALL ZEROS WHEN THE DATA IS WRITTEN. ONLY THE FIRST TWO WORDS OF EVERY SECTOR(I.E. THE ADDRESSING INFORMATION) ARE CHECKED WHEN DATA IS READ IN THE "READ DATA" MODE.

7. APT-8 HOOKS

7.1 DESCRIPTION

TWO INTERFACES HAVE BEEN PROVIDED WHICH ALLOW THIS DIAGNOSTIC TO RUN UNDER THE STANDARD APT-8 SYSTEM. THESE INTERFACES ARE:

1. TIMING INTERFACE

2. ERROR INTERFACE

EACH WILL BE EXPLAINED IN DETAIL.

7.2 SETUP

ONLY HARDWARE CONFIGURATION WORD 2, ADDRESS 22, NEED BE ESTABLISHED. THE FOLLOWING INFORMATION MUST BE INDICATED:
1. SINGLE OR MULTIPLE DRIVE TESTING.
2. DRIVE OR DRIVES TO BE TESTED.
3. DIAGNOSTIC RUNNING UNDER APT-8.

IF SINGLE DRIVE TESTING BIT 5 OF ADDRESS 22 MUST BE SET TO A ONE (1) WITH BITS 6-11 CONTAINING THE DRIVE TO BE TESTED. IF MULTIPLE DRIVES ARE TO BE DONE BIT 5 MUST BE SET TO A ZERO (0) AND BIT 6-11 CONTAINING THE HIGHEST NUMBER DRIVE TO BE TESTED. WHEN MULTIPLE DRIVE TESTING ONLY A SPECIFIC NUMBER OF DRIVES CAN BE INDICATED. THE PROGRAM ASSUMES THE DRIVES ARE TO BE DONE BEGINNING WITH DRIVE ZERO (0) AND FINISHING WITH THE HIGHEST DRIVE INDICATED. IF MULTIPLE DRIVES OTHER THAN CONSECUTIVELY NUMBERED DRIVES BEGINNING WITH DRIVE ZERO (0) ARE TO BE DONE, THEY MUST BE DONE AS SINGLE DRIVES AND TESTED INDEPENDENTLY.

THE PROGRAM ALLOWS ONLY DRIVES ZERO (0) THROUGH SEVEN (7) TO BE TESTED AT THIS TIME.

BIT ZERO OF ADDRESS 22 MUST BE SET TO A ONE TO INDICATE THAT THE PROGRAM WILL RUN UNDER APT-8.

NOTE: IT SHOULD BE NOTED AT THIS TIME THAT WHILE RUNNING UNDER APT-8 THE HARDWARE SWITCH REGISTER IS INOPERATIVE. ONLY THE HALT AND SINGLE STEP SWITCH WILL EFFECT THE PROGRAM RUN.

7.3 APT-8 INTERFACES

7.3.1. TIMING

APT-8 IS NOTIFIED OF PROGRAM RUN BETWEEN .2 SEC AND 2.0 SEC ON A 1.2 MICROSECOND MEMORY CYCLE. THIS WILL ALLOW THE DIAGNOSTIC TO RUN WITHOUT CAUSING AN APT-8 TIMEOUT ERROR IF THE DIAGNOSTIC IS TO BE RUN ON THE SLOWER MOS MEMORY.

7.3.2. ERRORS

ONLY THE ERROR PC IS REPORTED TO APT-8 SYSTEM. ERRORS WHICH CAUSE A PROGRAMMED HALT CAUSE A TIMEOUT ERROR. IF A PROGRAMMED HALT SHOULD OCCUR, THE ERROR PC WILL APPEAR IN THE AC ON THE DEVICE UNDER TEST. PROGRAMMED HALTS ARE EXPLAINED EARLIER IN THIS DOCUMENT.

8. PROGRAM LISTING

9. CONSOLE PACKAGE ADDENDUM

9.1 DESCRIPTION

THE CONSOLE PACKAGE HAS BEEN ADDED TO THIS DIAGNOSTIC TO ALLOW THE PROGRAM TO RUN WITH NO HARDWARE SWITCH REGISTER AND TO HAVE COMMUNICATIONS WITH THE DIAGNOSTIC VIA A TERMINAL. THE DIAGNOSTIC CAN BE RUN IN TWO MODES WITH THE CONSOLE PACKAGE . 1) RUNNING WITH THE CONSOLE PACKAGE ACTIVE - THIS ALLOWS THE OPERATOR CONTROL OF THE DIAGNOSTIC THROUGH THE TERMINAL. THE DIAGNOSTIC WILL ASK FOR THE VALUE OF THE PSEUDO SWITCH REGISTER,BEFORE CONTINUING WITH EXECUTION OF THE DIAGNOSTIC. ALL ERRORS AND PASS COMPLETES WILL BE PRINTED AT THE TERMINAL. NO HALTS WILL BE EXECUTED.
2) CONSOLE PACKAGE NOT ACTIVE-THIS WILL RESULT IN THE NORMAL STANDALONE OPERATION OF THE PROGRAM AS DISCRIBED IN SECTIONS 1 THROUGH 8 OF THIS DOCUMENT.

9.2 RESTRICTIONS

1) RUNNING THE CONSOLE PACKAGE REQUIRES THAT THE PSEUDO SWITCH REGISTER BE USED.

2) ONCE RUNNING THE CONSOLE PACKAGE NONACTIVE AND NOW DESIRE TO RUN IT ACTIVE, ONE MUST RELOAD THE DIAGNOSTIC AND INITIALIZE FOR A ACTIVE CONSOLE PACKAGE.

9.3 INITIALIZATION

FOR A ACTIVE CONSOLE PACKAGE

1.) SET LOCATION 21 BIT0=0 TO INDICATE USE OF PSEUDO SWITCH REGISTER.

2.) SET LOCATION 22 BIT3=1 TO INDICATE CONSOLE PACKAGE ACTIVE.

FOR A NON ACTIVE CONSOLE PACKAGE

1.) SET LOCATION 21 BIT0=1 TO INDICATE NOT TO USE PSEUDO SWITCH REGISTER, BUT TO USE HARDWARE SWITCHES.

2.) SET LOCATION 22 BIT3=0 TO INDICATE CONSOLE PACKAGE NOT ACTIVE.

9.4 CONTROL CHARACTERS

CONTROL CHARACTERS ARE USED TO GIVE THE OPERATOR THE
ABILITY TO PERFORM THE FOLLOWING FUNCTIONS.
NOTE: THE PROGRAM WILL RESPOND TO THE CONTROL
CHARACTER IN FIVE (5) SECONDS OR LESS.

CONTROL C

THIS WILL START THE LOADER THAT IS
IN LOCATION 7600.

CONTROL R

THIS WILL RESTART THE PROGRAM AND
REASK THE SWITCH REGISTER QUESTION AS
DESCRIBED IN SECTION 9.6.

CONTROL E

THIS WILL CONTINUE THE PROGRAM FROM
AN ERROR IF ALLOWED BY THE DIAGNOSTIC
OR FROM A WAITING STATEMENT.

CONTROL L

THIS WILL SWITCH THE TERMINAL MESSAGES
FROM THE DISPLAY TO A LINE PRINTER.
TO RESTORE THE MESSAGES ON THE TERMINAL
CONTROL L MUST BE TYPED AGAIN.IF
NO PRINTER IS AVAILBLE AND CONTROL L
IS TYPED THE RESULT WILL BE THAT THE
CONSOLE PACKAGE WILL WAIT FOR CONTROL C OR R.
THE CONTROL L WILL OUTPUT TO THE LINE
PRINTER AND THE PROGRAM WILL
ATTEMPT TO CONTINUE AS IF A CONTROL E
WAS TYPED IN.

CONTROL D

THIS WILL ALLOW THE ABILITY TO CHANGE
THE SWITCH REGISTER DURING PROGRAM
OPERATION. TYPING THIS CHARACTER WILL RESULT
IN AN INTERIGATION OF THE SWITCH REGISTER
QUESTION AS DESCRIBED IN SECTION 9.6.

CONTROL S

THIS WILL STOP PROGRAM EXECUTION AND WAIT IN A
LOOP FOR A CONTINUE. THE ONLY WAY TO CONTINUE
WILL BE TO TYPE A CONTROL Q, R OR C .
THIS IS A NONPRINTING CHARACTER.

CONTROL Q

THIS IS TO CONTINUE A PROGRAM AFTER A CONTROL
S IS TYPED.THIS IS A NONPRINTING CHARACTER.

9.5 WAITING MESSAGE

THE WAITING MESSAGE IS USED TO ALLOW THE OPERATOR TIME
TO MAKE A DECISION AS TO WHAT CONTROL CHARACTER

TO TYPE. THIS MESSAGE MAY APPEAR AT THE END
OF PASS MESSAGE IF THE HALT ON PASS BIT IS SET.THE CONTROL
CHARACTERS MAY NOW BE USED TO PERFORM THE NEEDED FUNCTION.

THE WAITING MESSAGE MAY BE PRINTED AFTER A ERROR MESSAGE
IF THE HALT ON ERROR BIT IS SET.HERE AGAIN THE CONTROL
CHARACTERS MAY BE USED.
THE WAITING MESSAGE MAY BE PRINTED IF OPERATOR INTERVENTION
IS REQUIRED.

9.6 SWITCH REGISTER MESSAGE

THIS MESSAGE IS USED TO SETUP THE PSEUDO SWITCH REGISTER
BEFORE PROGRAM EXECUTION TAKES PLACE.THE SWITCH REGISTER
IS SETUP WHEN THE FOURTH CHARACTER IS ENTERED OR A CARRIAGE
RETURN IS TYPED

```
**************************************************************
SR=0000 4000
        ----
```

UNDER SCORING INDICATES OPERATOR RESPONSE

9.7 END OF PASS

THE NORMAL PROGRAM PASS COMPLETE AS DESCRIBED IN SECTION
4.4 IS USED.

9.8 ERRORS

THE STANDARD ERROR REPORTS AS DESCRIBED IN SECTION 5
OF THIS DOCUMENT WILL BE USED.

9.9 SWITCH REGISTER SETTINGS

THE STANDARD SWITCH SETTINGS AS DESCRIBED IN SECTION 4.5
OF THIS DOCUMENT WILL BE USED.

9.10 PARAMETER CONTROL WORDS

THE CONSOLE PACKAGE USES THE LOCATIONS 20 21 22 FOR THE
FOLLOWING PURPOSES.

LOCATION 20
PSEUDO SWITCH REGISTER

LOCATION 21
HARDWARE IDENTIFIER 1

LOCATION 22
HARDWARE IDENTIFIER 2

LOCATION 0021

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	USE PSEUDO SWITCHES	USE HARDWARE SWITCHES
1	2000	NO OPTION 1	HAS OPTION 1
2	1000	NO OPTION 2	HAS OPTION 2
3	400	NO 8A SIMULATOR	HAS 8A SIMULATOR
4	200	NO OPTION SIMULATOR	HAS OPTION SIMULATOR
5	100	NOT ON 8A XOR	ON 8A XOR
6	40	NOT PDP8-E TYPE CPU	PDP8-E TYPE CPU
7-11		8A MEMORY SIZE EX, 1K=00 2K=01 7K=06 32K=31	

LOCATION 0022

BIT	OCTAL VALUE	FUNCTION WHEN 0	FUNCTION WHEN 1
0	4000	NOT ON ACT8A LINE	ON ACT 8A LINE
1	2000	NOT ON ACT 8E LINE	ON ACT 8E LINE
2	1000	NOT YET DEFINED	
3	400	DEACTIVE CONSOLE PACKAGE	ACTIVE CONSOLE PACKAGE

9.11 LOCATION CHANGES

THE FOLLOWING LOCATIONS CAN BE CHANGED TO MEET THE SPECIFIC NEED FOR MODIFICATION OF THE DIAGNOSTIC.

3637 IS THE LOCATION SET FOR THE NUMBER OF FILLER CHARACTERS AFTER A CRLF SET TO FOUR (4)

```
                    /RK8E/RK8L DISK FORMATTER PROGRAM: MD-08-DMRKD-D
                    /MAINDEC-08-DMRKD-D-D
                    /
                    /
                6740    DLSC=6740                       /LOAD SECTOR COUNTER
                6741    DSKP=6741                       /SKIP ON TRANSFER DONE OR ERROR
                6742    DCLR=6742                       /CLEAR DISK CONTROL LOGIC
                6743    DLAG=6743                       /LOAD ADDRESS AND GO
                6744    DLCA=6744                       /LOAD CURRENT ADDRESS
                6745    DRST=6745                       /READ STATUS REGISTER
                6746    DLDC=6746                       /LOAD COMMAND REGISTER
                6747    DMAN=6747                       /LOAD MAINTENANCE
                        /
                4446    LDSC=JMS I      XXLDSC
                4430    IOTCHN=JMS I    XCHANG
                4431    LODTRK=JMS I    XWRTRK
                4432    REDDSK=JMS I    XRDTRK
                4433    RECAL=JMS I     XRESTR
                4434    RECEIV=JMS I    XWAIT
                4435    KILBUF=JMS I    XKLBUF
                4437    ERROR=JMS I     XERRO
                4440    RDSTAT=JMS I    XRDST
                4444    LDADD=JMS I     XLDAD
                4441    DSKSKP=JMS I    XSDKP
                4442    LDCMD=JMS I     XLDCM
                4443    LDCUR=JMS I     XLDCA
                4445    CLRALL=JMS I    XCLDR
                4447    PRNTER=JMS I    XPRN
                4450    OCTEL=JMS I     XFROCT
                4451    TWOCT=JMS I     XTOCT
                4436    TYPE=JMS I      XPRINT
                4452    CRLF=JMS I      XCRLF
                4424    APT8A=JMS I     XAPT8
                4425    TIME=JMS I      XTIME
                4427    TICK=JMS I      XTICK
                4426    KAERRO=JMS I    XAERRO
                        /
                0000    *0
                        /
          0000  0304            304                     /REV D
          0001  5001            5001
          0002  0002            0002
          0003  0003            0003
                        /
                0010    *10
                        /
          0010  0000    AUTO10, 0
                        /
          0011  0000    AUTO11, 0
                        /
                0020    *20
                        /
          0020  0000            0000                    /PSEUDO SWITCH REGISTER
          0021  4000            4000                    /CONTROL WORD 1
          0022  0000            0000                    /CONTROL WORD 2
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```
          0023  0000            0000                    /RESERVED
          0024  1125    XAPT8,  APT8
          0025  1557    XTIME,  KTIME
          0026  1600    XAERRO, AERRO
          0027  1530    XTICK,  KTICK
          0030  1463    XCHANG, CHANG
          0031  0600    XWRTRK, WRTTRK
          0032  1000    XRDTRK, REDTRK
          0033  1400    XRESTR, RESTOR
          0034  1327    XWAIT,  WAIT
          0035  0752    XKLBUF, KLBUF
          0036  1312    XPRINT, PRINT
          0037  0436    XERRO,  ERRO
          0040  0671    XRDST,  RDST
          0041  0740    XSDKP,  SDKP
          0042  0720    XLDCM,  LDCM
          0043  0700    XLDCA,  LDCA
          0044  0711    XLDAD,  LDAD
          0045  0745    XCLDR,  CLDR
          0046  0733    XXLDSC, XLDSC
          0047  1252    XPRN,   PRN
          0050  1227    XFROCT, FROCT
          0051  1200    XTOCT,  TOCT
          0052  1215    XCRLF,  UPONE
          0053  2201    XLOTRK, LOTRK
          0054  2220    XHITRK, HITRK
          0055  2200    BGNBUF, WRKBUF
          0056  0000    AMOUNT, 0
          0057  0000    SWITCH, 0
          0060  0003    K0003,  0003
          0061  0004    K4,     4
          0062  0007    K0007,  0007
          0063  0040    K0040,  0040
          0064  7465    M313,   -313
          0065  0277    K0277,  0277
          0066  0200    K0200,  0200
          0067  0260    K0260,  0260
          0070  4000    K4000,  4000
          0071  7735    K7735,  7735
          0072  7760    K7760,  7760
          0073  0400    K0400,  400
          0074  0037    K0037,  0037
          0075  6201    KCDF,   CDF
          0076  7774    M4,     -4
          0077  7770    M10,    -10
          0100  0000    DRIVNO, 0
          0101  0000    CHAR,   0
          0102  0000    LOWAD,  0
          0103  0000    HIGHAD, 0
          0104  0000    TRKCNT, 0
          0105  0000    DSKCNT, 0
          0106  0000    SBCNT1, 0
          0107  0000    STCNT1, 0
          0110  0000    STCNT2, 0
          0111  0000    STCNT3, 0
```

```
0112  0000    TCNTR1, 0
0113  0000    TCNTR2, 0
0114  0000    TCNTR3, 0
0115  0000    TCNTR4, 0
0116  0000    TCNTR5, 0
              /
0117  0000    GOREG2, 0
0120  0000    EXSIT,  0
0121  0000    CMREG,  0
0122  0000    STREG,  0
0123  0000    DAREG,  0
0124  0000    CAREG,  0
0125  0000    ADREG,  0
0126  0000    DTREG,  0
0127  0263    SGNTST, FRMDSK
0130  0000    MOMEMA, 0
0131  0000    DATCNT, 0
0132  7776    CLKCNT, -2
              /
0133  1623    XMOVE,  MOVE
0134  0000    LOCSED, 0
0135  0424    XEND,   ENDTST
0136  0000    SOFT,   0
0137  0140    ADPOT1, DSK0A
0140  0000    DSK0A,  0
0141  0000    DSK1A,  0
0142  0000    DSK2A,  0
0143  0000    DSK3A,  0
0144  0000    DSK4A,  0
0145  0000    DSK5A,  0
0146  0000    DSK6A,  0
0147  0000    DSK7A,  0
0150  0151    ADPOT2, DSK0B
0151  0000    DSK0B,  0
0152  0000    DSK1B,  0
0153  0000    DSK2B,  0
0154  0000    DSK3B,  0
0155  0000    DSK4B,  0
0156  0000    DSK5B,  0
0157  0000    DSK6B,  0
0160  0000    DSK7B,  0
0161  0000    PCOUNT, 0                       /USED ONLY IF ON APT
              /
      0200    *200
              /
0200  6224    BGN,    RIF
0201  3130            DCA     MOMEMA
0202  1130            TAD     MOMEMA
0203  1075            TAD     KCDF                    /MAKE MOMEDF
0204  3205            DCA     .+1
0205  7402            HLT                             /MAKE DF=IF
              /NOW TEST FOR APT SYSTEM
              /IF ON APT TERMINAL MESSAGES ARE SKIP
              /TO AVOID TIMING PROBLEMS WITH THE SYSTEM
0206  4424            APT8A                           /TEST FOR APT SYSTEM
```



```
0207  4777'           JMS     XC8PSW                  /GET SR=,
0210  4430            IOTCHN                          /CHANGE DEVICE TO SWR3=8
0211  4452            CRLF
0212  4452            CRLF
0213  4447            PRNTER                          /PRINT "RK8E/RK8L DISK FORMATTER PROGNAM"
0214  2045            MES1                            /MESSAGE 1 POINTER
0215  4452            CRLF
0216  4447            PRNTER                          /PRINT "FOR ALL QUESTIONS"
0217  2066            MES2                            /MESSAGE POINTER 2
0220  1077    ALLAGN, TAD     M10
0221  3107            DCA     STCNT1                  /COUNTER FOR AMOUNT OF DISKS
0222  3134            DCA     LOCSED
0223  3110            DCA     STCNT2
0224  4452    SAMAGN, CRLF
0225  4447            PRNTER                  /PRINT "FORMAT DISK ? "
0226  2117            MES3                            /MESSAGE POINTER 3
0227  1110            TAD     STCNT2
0230  1067            TAD     K0260
0231  4436            TYPE                            /TYPE DISK NUMBER
0232  1065    QUES1,  TAD     K0277
0233  4436            TYPE                            /TYPE ?
0234  1137            TAD     ADPOT1
0235  1110            TAD     STCNT2
0236  3111            DCA     STCNT3
0237  4434            RECEIV                          /WAIT FOR CHARACTER
0240  5244            JMP     NOTDSK                  /NO NOT THIS DISK
0241  5232            JMP     QUES1                   /NEITHER YES OR NO
0242  2134    WASDSK, ISZ     LOCSED
0243  7340            CLA CLL CMA
0244  3511    NOTDSK, DCA I   STCNT3                  /YES, WAS CLEAR DISK POINTER
0245  2110            ISZ     STCNT2                  /UPDATE POINTER
0246  2107            ISZ     STCNT1                  /COUNT DISKS
0247  5224            JMP     SAMAGN                  /ASK ABOUT NEXT
              /
0250  4452    DONE,   CRLF
0251  4447            PRNTER                          /PRINT "ARE YOU SURE ?"
0252  2126            MES4                            /MESSAGE POINTER 4
0253  4434            RECEIV                          /WAIT FOR CHARACTER
0254  5220            JMP     ALLAGN                  /NO, START ALL OVER
0255  5250            JMP     DONE                    /NEITHER TYPE ?
0256  1134            TAD     LOCSED
0257  7041            CIA
0260  7450            SNA                             /ANY DISKS
0261  5200            JMP     BGN                     /NO, OPERATOR ERROR
0262  3134            DCA     LOCSED                  /YES, AMOUNT LOCATED
              /
              /FIRST RECALIBRATE AND FORMAT IN WRITE ALL MODE
              /ALL DISK DRIVES SELECTED BY OPERATOR,, MAKE THE FIRST
              /TWO WORDS OF EVERY DISK SECTOR EQUAL TO THE
              /ABSOLUTE DISK ADDRESS.
              /
0263  4533    FRMDSK, JMS I   XMOVE                   /MOVE DISK POINTERS
0264  1134            TAD     LOCSED
0265  3856            DCA     AMOUNT
0266  1856            TAD     AMOUNT
```

```
0267  3105          DCA     DSKCNT          /COUNTER FOR AMOUNT OF DISKS
0270  3115          DCA     TCNTR4
0271  1150          TAD     ADPOT2
0272  3116          DCA     TCNTR5          /A FEW COUNTERS
0273  1516          TAD I   TCNTR5
0274  7640          SZA CLA                 /FORMAT THIS DISK
0275  5302          JMP     FORMAT          /YES, GO
0276  2116  NEXFRM, ISZ     TCNTR5          /NO, TRY NEXT
0277  2115          ISZ     TCNTR4
0300  5273          JMP     .-5
0301  7402          HLT                     /WHAT HAPPENED????
                /
0302  1115  FORMAT, TAD     TCNTR4
0303  0060          AND     K0003           /MASK OUT
0304  7104          CLL RAL                 /MAKE DISK NUMBER
0305  3100          DCA     DRIVNO
0306  1115          TAD     TCNTR4
0307  0061          AND     K4
0310  7640          SZA CLA
0311  1066          TAD     K0200
0312  3120          DCA     EXBIT           /SET EXTENDED DRIVE BIT
0313  4433          RECAL                   /RECALIBRATE THIS DRIVE
0314  5335          JMP     RENEX1          /RECALIBRATE NEXT EXISTING
0315  3102          DCA     LOWAD           /SETUP ADDRESS POINTER
0316  3103          DCA     HIGHAD          /SETUP ADDRESS POINTER
0317  1064          TAD     M313
0320  3104          DCA     TRKCNT          /COUNTER FOR AMOUNT OF TRACKS
                /
                /
0321  4427  WRTDSK, TICK                    /TIMING FOR APT IF NEEDED,
0322  7774          -4                      /OTHERWISE BOTH ARE SKIPPED
0323  4431          LOOTRK                  /FORMAT A TRACK
0324  5335          JMP     RENEX1          /TO NEXT DISK
0325  7300          CLA CLL
0326  1102          TAD     LOWAD
0327  1063          TAD     K0040
0330  3102          DCA     LOWAD           /UPDATE TO NEXT TRACK
0331  7630          SZL CLA                 /SET EXTENDED BIT
0332  2103          ISZ     HIGHAD          /YES
0333  2104          ISZ     TRKCNT          /UPDATE TRACK COUNTER
0334  5321          JMP     WRTDSK          /DO NEXT TRACK
0335  2105  RENEX1, ISZ     DSKCNT          /UPDATE DISK COUNTER
0336  5276          JMP     NEXFRM          /DO NEXT DISK
                /
                /ROUTINE TO CHECK ADDRESSING INFORMATION ON THE DISK,
                /THE FIRST TWO WORDS OF EVERY SECTOR SHOULD EQUAL
                /THE ABSOLUTE DISK ADDRESS, ALL OTHER DATA IS
                /NOT CHECKED.
                /
0337  1056  CHKDSK, TAD     AMOUNT
0340  3105          DCA     DSKCNT          /AMOUNT OF DISKS
0341  3115          DCA     TCNTR4
0342  1150          TAD     ADPOT2
0343  3116          DCA     TCNTR5
0344  1516          TAD I   TCNTR5          /SOFTWARE INFORMATION
```



```
0345  7640          SZA CLA                 /CHECK THIS DISK
0346  5353          JMP     CHKDAT          /CHECK THIS ONE
0347  2116  NEXCHK, ISZ     TCNTR5          /UPDATE FOR NEXT DISK
0350  2115          ISZ     TCNTR4
0351  5344          JMP     .-5
0352  7402          HLT                     /WHAT HAPPENED?????
                /
0353  1115  CHKDAT, TAD     TCNTR4
0354  0060          AND     K0003           /MASK OUT
0355  7104          CLL RAL                 /MAKE DRIVE NUMBER
0356  3100          DCA     DRIVNO
0357  1115          TAD     TCNTR4
0360  0061          AND     K4
0361  7640          SZA CLA
0362  1066          TAD     K0200
0363  3120          DCA     EXBIT           /SET EXTENDED DRIVE BIT
0364  4433          RECAL                   /RECALIBRATE
0365  5776*         JMP     RENEX2          /TRY NEXT DRIVE
0366  3102          DCA     LOWAD
0367  3103          DCA     HIGHAD          /SETUP STARTING DISK ADDRESS
0370  1064          TAD     M313
0371  3104          DCA     TRKCNT          /AMOUNT OF TRACKS TO DO
0372  5775*         JMP     CHECK
                /
0375  0400
0376  0414
0377  3456
      0400    PAGE
                /
0400  4427  CHECK,  TICK                    /TIMING FOR APT IF NEEDED,
0401  7774          -4                      /SKIPPED IF NOT REQUIRED,
0402  4432          READSK                  /READ AND CHECK ONE CYLINDER
0403  5214          JMP     RENEX2          /TO NEXT DISK
0404  7300          CLA CLL
0405  1102          TAD     LOWAD
0406  1063          TAD     K0040
0407  3102          DCA     LOWAD           /UPDATE TO NEXT CYLINDER
0410  7630          SZL CLA                 /TIME TO SET EXTENDED BIT
0411  2103          ISZ     HIGHAD          /YES, SET IT
0412  2104          ISZ     TRKCNT          /UPDATE CYLINDER COUNTER
0413  5200          JMP     CHECK           /CHECK NEXT ONE
0414  2105  RENEX2, ISZ     DSKCNT          /UPDATE DISK COUNTER
0415  5777*         JMP     NEXCHK          /CHECK NEXT
                /
                /
0416  1022          TAD     22
0417  0070          AND     K4000           /TEST FOR APT
0420  7650          SNA CLA                 /ARE WE?
0421  5224          JMP     ENDTST          /NO, NORMAL RUN
0422  2161          ISZ     PCOUNT          /INCREMENT PASS COUNT
0423  5776*         JMP     FRMDSK          /LOOP PROGRAM
0424  4452  ENDTST, CRLF
0425  4447          PRNTER                  /PRINT "PASS COMPLETE"
0426  2021          TEXEND
0427  4452          CRLF
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0430  4447          PRNTER                          /PRINT "TRY SAME SEQUENCE"
0431  2135          MES5
0432  4434          RECEIV                          /WAIT FOR INPUT FROM OPERATOR
0433  5775'         JMP     ALLAGN                  /NO, ASK AGAIN
0434  5227          JMP     .-5
0435  5776'         JMP     FRMDSK                  /TRY SAME SEQUENCE
                    /
                    /
                    /SUBROUTINE FOR "ERRORS," SCOPE LOOPS, AND
                    /ERROR TYPEOUTS.
                    /
0436  0000  ERRO,   0
0437  7301          CLA CLL IAC
0440  1236          TAD     ERRO                    /GET PC STORED
0441  3344          DCA     RETRN1                  /STORE FOR RETURN
0442  4426          KAERRO                          /NOTIFY APT OF ERROR IS NEED BE
0443  4452          CRLF
0444  4452          CRLF
0445  1636          TAD I   ERRO                    /GET TEXT POINTER
0446  0062          AND     K0007                   /MASK 9-11
0447  1352          TAD     HEDTAD                  /MAKE ERROR HEADER TAD
0450  3251          DCA     .+1
0451  7402          HLT                             /MODIFIED HEADER TAD
0452  3254          DCA     .+2
0453  4447          PRNTER                          /MODIFIED HEADER POINTER
0454  7402          HLT
0455  4452          CRLF
0456  4447          PRNTER                          /PRINT PC:
0457  1642          TEXPC
0460  1236          TAD     ERRO                    /GET PC POINTER
0461  4450          OCTEL                           /PRINT PC STORED
0462  1636          TAD I   ERRO                    /GET TEXT POINTER
0463  7104          CLL RAL
0464  7420          SNL
0465  5274          JMP     NTGD                    /NOT GD: REGISTER
0466  3236          DCA     ERRO
0467  4447          PRNTER                          /PRINT GD:
0470  1644          TEXGD
0471  1117          TAD     GDREG2
0472  4450          OCTEL                           /PRINT FOUR OCTAL
0473  7610          SKP CLA
0474  3236  NTGD,   DCA     ERRO
0475  4447          PRNTER
0476  1646          TEXEX
0477  1120          TAD     EXBIT
0500  7640          SZA CLA
0501  7001          IAC
0502  4450          OCTEL
0503  1345          TAD     XTEXT
0504  3350          DCA     PCNTR2
0505  1346          TAD     XREG
0506  3010          DCA     AUTO10
0507  1357          TAD     K7771
0510  3347          DCA     PCNTR1                  /COUNTER FOR    # OF HEADS
0511  7344          CLA CLL CMA RAL
```



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0512  3351          DCA     PCNTR3
0513  1236  STRAUT, TAD     ERRO                    /GET TEXT POINTER
0514  7500          SMA
0515  5336          JMP     NOTEX                   /NOT THIS ONE
0516  7104          CLL RAL
0517  3236          DCA     ERRO
0520  1350          TAD     PCNTR2                  /GET TEXT MESSAGE POINTER
0521  2350          ISZ     PCNTR2
0522  2350          ISZ     PCNTR2
0523  3325          DCA     .+2                     /STORE FOR PRNTER
0524  4447          PRNTER                          /PRINT XX:
0525  7402          HLT                             /MODIFIED TEXT POINTER
0526  1410          TAD I   AUTO10
0527  4450          OCTEL                           /PRINT FOUR OCTAL
0530  2351          ISZ     PCNTR3
0531  7610          SKP CLA
0532  4452          CRLF
0533  2347  AGAIN,  ISZ     PCNTR1
0534  5313          JMP     STRAUT                  /CHECK FOR NEXT XX:
0535  5744          JMP I   RETRN1                  /RETURN TO QUESTION
0536  7104  NOTEX,  CLL RAL
0537  3236          DCA     ERRO
0540  2350          ISZ     PCNTR2
0541  2350          ISZ     PCNTR2
0542  2010          ISZ     AUTO10
0543  5333          JMP     AGAIN
                    /
0544  0000  RETRN,  0
0545  1650  XTEXT,  TEXCM
0546  0120  XREG,   EXBIT
0547  0000  PCNTR1, 0
0550  0000  PCNTR2, 0
0551  0000  PCNTR3, 0
0552  1353  HEDTAD, TAD     HEDLST
0553  1664  HEDLST, ERTX1
0554  1675          ERTX2
0555  1705          ERTX3
0556  1717          ERTX4
0557  7771  K7771,  7771
                    /
0575  0220
0576  0263
0577  0347
      0600  PAGE
                    /
                    /ROUTINE TO FORMAT CYLINDER
                    /MAKE FIRST TWO WORDS OF EVERY SECTOR
                    /EQUAL TO DISK ADDRESS.
                    /
0600  0000  WRITRK, 0
0601  7330          CLA CLL CML RAR
0602  3117          DCA     GDREG2                  /SETUP COMPARE REGISTER
0603  4435          KILBUF                          /CLEAR BUFFER
0604  1071          TAD     K7735                   /AMOUNT OF SECTORS TO DO
0605  3112          DCA     TCNTR1                  /SETUP COUNTER
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0606  3113          DCA     TCNTR2                  /STARTING WITH 0
0607  1072          TAD     K7760                   /STOPPER
0610  3114          DCA     TCNTR3                  /SECTOR COUNTER POINTER STOP
0611  1113  LOOR1,  TAD     TCNTR2
0612  0074          AND     K0037                   /MASK SECTOR BITS
0613  1102          TAD     LOWAD                   /ADD IN CYLINDER
0614  3453          DCA I   XLOTRK                  /SETUP TRACK WORD IN BUFFER
0615  1120          TAD     EXBIT                   /ADD IN EXTENDED BIT
0616  1103          TAD     HIGHAD
0617  1100          TAD     DRIVNO                  /ADD IN DRIVE NUMBER
0620  3454          DCA I   XHITRK                  /SETUP TRACK WORD IN BUFFER
0621  1454          TAD I   XHITRK
0622  0270          AND     K7577
0623  1130          TAD     HOMEMA                  /CURRENT FIELD
0624  1267          TAD     K5000                   /FUNCTION WRITE ALL
0625  4442          LDCMD                           /LOAD COMMAND
0626  1120          TAD     EXBIT
0627  4446          LDSC                            /LOAD EXTENDED DRIVE BIT
0630  7200          CLA                             /CLEAR EXTENDED DRIVE BIT
0631  1055          TAD     BGNBUF
0632  4443          LDCUR                           /LOAD CURRENT ADDRESS
0633  1453          TAD I   XLOTRK
0634  4444          LDADD                           /LOAD TRACK AND GO
0635  4441          DSKSKP                          /SKIP ON FLAG
0636  5235          JMP     .-1                     /WAIT FOR FLAG
0637  4440          RDSTAT                          /READ STATUS
0640  1070          TAD     K4000
0641  7640          SZA CLA                         /WAS STATUS 0?
0642  5254          JMP     LOOER                   /ERROR, STATUS ON WRITE ALL
0643  2113          ISZ     TCNTR2
0644  2114          ISZ     TCNTR3                  /COUNT FIRST REVOLUTION
0645  7610          SKP CLA                         /STILL IN FIRST REV.
0646  3113          DCA     TCNTR2                  /SETUP FOR SECTOR "1"
0647  2113          ISZ     TCNTR2
0650  2112          ISZ     TCNTR1                  /UPDATE SECTOR COUNTER
0651  5211          JMP     LOOR1                   /TRY NEXT SECTOR
0652  2200          ISZ     WRTTRK
0653  5600          JMP I   WRTTRK                  /THIS CYLINDER DONE
0654  4437  LOOER,  ERROR                           /ERROR, STATUS
0655  3602          3602                            /TEXT POINTER
                    /
0656  4433          RECAL                           /CLEAR CONTROL AND DRIVE
0657  5600          JMP I   WRTTRK                  /TO NEXT DISK
0660  4452          CRLF
0661  4447          PRNTER                          /PRINT "TRY SAME AGAIN"
0662  1734          ERMES1
0663  4434          RECEIV                          /WAIT FOR YES OR NO
0664  5252          JMP     LOOER-2                 /WAS A NO TRY SAME CYLINDER
0665  5260          JMP     .-5                     /WAS NEITHER ASK AGAIN
0666  5201          JMP     WRTTRK +1               /YES, TRY NEXT
0667  5000  K5000,  5000
0670  7577  K7577,  7577
                    /
                    /
                    /SUBROUTINE TO READ STATUS REGISTER
```



```
                    /
0671  0000  RDST,   0
0672  6745  IOT5,   DRST                          /READ STATUS IOT
0673  7410          SKP
0674  4777' ERMLT5, JMS     XC8ERR                  /SKIP TRAP ERROR.
0675  3122          DCA     STREG                   /SAVE RESULTS
0676  1122          TAD     STREG
0677  5671          JMP I   RDST                    /EXIT
                    /
                    /SUBROUTINE TO LOAD CURRENT ADDRESS REGISTER
                    /
0700  0000  LDCA,   0
0701  3125          DCA     ADREG                   /SAVE IN ADDRESS
0702  1125          TAD     ADREG
0703  3124          DCA     CAREG                   /SETUP INITIAL CURRENT ADDRESS
0704  1125          TAD     ADREG
0705  6744  IOT4,   DLCA                          /LOAD CURRENT ADDRESS IOT
0706  5700          JMP I   LDCA                    /EXIT
0707  4777' ERMLT4, JMS     XC8ERR                  /SKIP TRAP ERROR.
0710  5307          JMP     .-1
                    /
                    /
                    /SUBROUTINE TO LOAD TRACK ADDRESS REGISTER
                    /
0711  0000  LDAD,   0
0712  3123          DCA     DAREG                   /SAVE OUTBOUND DATA
0713  1123          TAD     DAREG
0714  6743  IOT3,   DLAG                          /LOAD DISK ADDRESS REGISTER
0715  5711          JMP I   LDAD                    /EXIT
0716  4777' ERMLT3, JMS     XC8ERR                  /SKIP TRAP ERROR.
0717  5316          JMP     .-1
                    /
                    /
                    /SUBROUTINE TO LOAD COMMAND REGISTER
                    /
0720  0000  LDCM,   0
0721  3121          DCA     CMREG                   /SAVE OUTBOUND DATA
0722  3776' DCA     INMODE
0723  4775' JMS     XC8CKP                          /CHECK FOR CONTROL CHARACTERS.
0724  7200          CLA
0725  7200          CLA
0726  1121          TAD     CMREG
0727  6746  IOT6,   DLDC                          /LOAD COMMAND REGISTER
0730  5720          JMP I   LDCM                    /EXIT
0731  4777' ERMLT6, JMS     XC8ERR                  /SKIP TRAP ERROR.
0732  5331          JMP     .-1
                    /
                    /
                    /SUBROUTINE ISSUE "DLSC"
0733  0000  XLDSC,  0
0734  6740  IOT0,   DLSC
0735  5733          JMP I   XLDSC
0736  4777' ERMLT0, JMS     XC8ERR
0737  5336          JMP     .-1
```

```
                    /SUBROUTINE TO ISSUE "DSKP" DISK SKIP IOT
                    /
0740  0000  SDKP,   0
0741  6741  IOT1,  DSKP                          /DISK SKIP IOT
0742  7410        SKP                           /DID NOT SKIP
0743  2340        ISZ     SDKP
0744  5740        JMP I   SDKP                  /EXIT
                    /
                    /SUBROUTINE TO ISSUE "DCLR" CLEAR IOT
                    /
0745  0000  CLDR,   0
0746  6742  IOT2,  DCLR                         /DCLR "CLEAR IOT"
0747  5745        JMP I   CLDR                  /EXIT
0750  4777' ERMLT2, JMS     XC8ERR              /SKIP TRAP ERROR.
0751  5350        JMP     .-1
                    /
                    /ROUTINE TO ZERO WORK BUFFER
                    /
0752  0000  KLBUF,  0
0753  7340        CLA CLL CMA
0754  1055        TAD     BGNBUF                /START OF BUFFER -1
0755  3010        DCA     AUTO10                /SETUP AUTO INDEX
0756  1364        TAD     K7400
0757  3131        DCA     DATCNT                /SETUP COUNTER
0760  3410        DCA I   AUTO10                /CLEAR BUFFER
0761  2131        ISZ     DATCNT                /UPDATE COUNTER
0762  5360        JMP     .-2                   /NOT ALL CLEARED YET
0763  5752        JMP I   KLBUF                 /BUFFER CLEARED
0764  7400  K7400,  7400
                    /
0775  3641
0776  3676
0777  4087
      1000  PAGE
                    /
                    /
                    /ROUTINE TO READ AND CHECK A CYLINDER
                    /
1000  0000  REDTRK, 0
1001  1071        TAD     K7735
1002  3112        DCA     TCNTR1                /AMOUNT OF SECTORS TO DO
1003  3113        DCA     TCNTR2                /STARTING WITH 0
1004  1072        TAD     K7760
1005  3114        DCA     TCNTR3
1006  4435        KILBUF                        /CLEAR BUFFER
1007  7340  CHKR1,  CLA CLL CMA
1010  3136        DCA     SOFT                  /SETUP SOFT ERROR FLAG
1011  1055        TAD     BGNBUF
1012  4443        LDCUR                         /LOAD CURRENT ADDRESS
1013  1103        TAD     HIGHAD                /EXTENDED CYLINDER BIT
1014  1100        TAD     DRIVNO                /CURRENT DRIVE
1015  1130        TAD     HOMEMA                /CURRENT FIELD
1016  4442        LDCMD                         /LOAD COMMAND
1017  1120        TAD     EXBIT                 /LOAD EXTENDED DRIVE BIT
1020  4446        LDSC
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1021  7200        CLA                           /CLEAR EXTENDED DRIVE BIT
1022  1113        TAD     TCNTR2
1023  0074        AND     K0037                 /MASK SECTOR BITS OFF
1024  1102        TAD     LOWAD                 /ADD IN OTHER DISK ADDRESS
1025  4444        LDADD                         /LOAD AND GO
1026  4441        DSKSKP                        /DISK SKIP IOT
1027  5226        JMP     .-1                   /WAIT FOR FLAG
1030  4440        RDSTAT                        /READ STATUS
1031  1070        TAD     K4000                 /ADD IN FUDGE FACTOR
1032  7650        SNA CLA                       /SKIP IF ERROR
1033  5241        JMP     STAOK                 /STATUS O.K.
1034  1122        TAD     STREG                 /GET STATUS READ
1035  0777'       AND     K0010
1036  7650        SNA CLA                       /WAS IT A CRC
1037  5306        JMP     STAER                 /NO, JUST A HARD ERROR
1040  3136        DCA     SOFT                  /CLEAR SOFT ERROR FLAG
1041  1121  STAOK,  TAD     CMREG                /GET LAST COMMAND
1042  0062        AND     K0007
1043  1120        TAD     EXBIT                 /ADD EXTENDED DRIVE BIT
1044  7041        CIA
1045  1454        TAD I   XHITRK                /GET WORD READ FROM DISK
1046  7650        SNA CLA                       /SKIP IF ERROR
1047  5256        JMP     FRSTOK                /FIRST WORD O.K.
1050  1454        TAD I   XHITRK                /GET WORD
1051  3126        DCA     DTREG                 /SETUP ERROR PRINTER
1052  1121        TAD     CMREG
1053  0062        AND     K0007
1054  3117        DCA     GDREG2                /SETUP GOOD FOR PRINTER
1055  5303        JMP     DATER                 /NO, DATA ERROR
1056  1453  FRSTOK, TAD I   XLOTRK              /GET WORD READ
1057  7041        CIA
1060  1123        TAD     DAREG                 /COMPARE TO GOOD
1061  7650        SNA CLA                       /SKIP IF ERROR
1062  5271        JMP     DATOK                 /WORD O.K.
1063  2125        ISZ     ADREG                 /SETUP ERROR PRINTER
1064  1123        TAD     DAREG
1065  3117        DCA     GDREG2                /SETUP GOOD WORD FOR PRINTER
1066  1453        TAD I   XLOTRK                /GET WORD READ
1067  3126        DCA     DTREG                 /SETUP FOR PRINTER
1070  5303        JMP     DATER                 /DATA ERROR
1071  1136  DATOK,  TAD     SOFT                 /GET SOFT ERROR FLAG
1072  7650        SNA CLA                       /WAS IT CLEAR
1073  5306        JMP     STAER                 /YES, STATUS ERROR
1074  1113        TAD     TCNTR2
1075  1060        TAD     K0003                 /ADVANCE 3 SECTORS
1076  3113        DCA     TCNTR2
1077  2114        ISZ     TCNTR3
1100  5207        JMP     CHKR1                 /MORE TO FORMAT
1101  2288        ISZ     REDTRK
1102  5600        JMP I   REDTRK                /EXIT, O.K.
1103  1776' DATER,  TAD     K7741
1104  3313        DCA     TCHKT                 /SETUP TEXT POINTER
1105  5312        JMP     CHKER                 /ERROR
1106  1775' STAER,  TAD     K3000
1107  3313        DCA     TCHKT                 /SETUP TEXT POINTER
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```
1110  7330            CLA CLL CML RAR
1111  3117            DCA     GOREG2                  /SETUP GOOD STATUS PRINTER
1112  4437    CMKER,  ERROR                           /ERROR, READ DATA
1113  0000    TCMKT,  0                               /MODIFIED TEXT POINTER
1114  4433            RECAL                           /CLEAR CONTROL AND DRIVE
1115  5600            JMP I   REDTRK                  /TO NEXT DISK
1116  4452            CRLF
1117  4447            PRNTER                          /PRINT "TRY SAME AGAIN"
1120  2000            ERMES3
1121  4434            RECEIV
1122  5301            JMP     DATER -2                /CHECK NEXT
1123  5316            JMP     .-5                     /RE-PRINT
1124  5201            JMP     REDTRK +1               /TRY SAME AGAIN
                /
                /THIS ROUTINE WILL TEST FOR APT AND NOP CONSOLE
                /PACKAGE IF NEED BE
                /
1125  0000    APT8,   0
1126  1022            TAD     22
1127  7700            SMA CLA
1130  5725            JMP I   APT8
1131  1022            TAD     22
1132  0373            AND     K7377                   /ON APT, NOP CONSOLE PACKAGE
1133  3022            DCA     22
1134  1022            TAD     22
1135  0062            AND     K0007                   /ISOLATE DRIVE NUMBER OR
                                                      /NUMBER OF DRIVES TO BE DONE
1136  3107            DCA     STCNT1
1137  1022            TAD     22
1140  0774*           AND     K0100
1141  7650            SNA CLA                         /SINGLE DRIVE TESTING
1142  5353            JMP     MULDSK                  /NO,SEVERAL TO DO
1143  1137            TAD     ADPOT1                  /GET DISK POINTER
1144  1107            TAD     STCNT1                  /ESTABLISH DRIVE TO DO
1145  3107            DCA     STCNT1
1146  7340            CLL CLA CMA                     /-1
1147  3507            DCA I   STCNT1
1150  7340            CLL CLA CMA                     /ONE DISK TO DO
1151  3134            DCA     LOC8ED
1152  5527            JMP I   BGNTST
1153  1107    MULDSK, TAD     STCNT1                  /DRIVE TO BE DONE
1154  7040            CMA
1155  3107            DCA     STCNT1
1156  1137            TAD     ADPOT1                  /GET DISK POINTER
1157  1110            TAD     STCNT2                  /ESTABLISH DRIVE TO BE DONE
1160  3111            DCA     STCNT3
1161  2134            ISZ     LOC8ED
1162  7340            CLL CLA CMA
1163  3511            DCA I   STCNT3                  /DO THIS DRIVE
1164  2110            ISZ     STCNT2
1165  2107            ISZ     STCNT1
1166  5356            JMP     MULDSK+3                /MORE TO DO
1167  1134            TAD     LOC8ED
1170  7041            CIA
1171  3134            DCA     LOC8ED          /NUMBER TO BE DONE
```



```
1172  5527            JMP I   BGNTST
1173  7377    K7377,  7377
1174  1556
1175  1326
1176  1325
1177  1324
      1200      PAGE
                /
                /SUBROUTINE TO PRINT TWO OCTAL
                /
1200  0000    TOCT,   0
1201  3106            DCA     SBCNT1                  /SAVE AC
1202  1106            TAD     SBCNT1
1203  7010            RAR
1204  7012            RTR
1205  0062            AND     K0007
1206  1067            TAD     K0260
1207  4436            TYPE
1210  1106            TAD     SBCNT1                  /PRINT FIRST BYTE
1211  0062            AND     K0007
1212  1067            TAD     K0260
1213  4436            TYPE                            /PRINT SECOND BIT
1214  5600            JMP I   TOCT                    /EXIT
                /
                /
                /
                /ROUTINE TO DO CRLF
                /
1215  0000    UPONE,  0
1216  7300            CLA CLL
1217  1225            TAD     K0215
1220  4436            TYPE
1221  1226            TAD     K0212
1222  4436            TYPE
1223  4436            TYPE                            /TYPE ONE NULL
1224  5615            JMP I   UPONE
                /
1225  0215    K0215,  0215
1226  0212    K0212,  0212
                /
                /ROUTINE TO PRINT FOUR OCTAL
                /
1227  0000    FROCT,  0
1230  7006            RTL
1231  7006            RTL
1232  3215            DCA     UPONE
1233  1076            TAD     M4
1234  3200            DCA     TOCT
1235  1215            TAD     UPONE
1236  0062            AND     K0007
1237  1067            TAD     K0260
1240  4436            TYPE
1241  1215            TAD     UPONE
1242  7006            RTL
1243  7004            RAL
```

```
1244  3215            DCA     UPONE
1245  2200            ISZ     TOCT
1246  5235            JMP     .-11
1247  1321            TAD     K0240
1250  4436            TYPE
1251  5627            JMP I   FROCT
                      /
                      /SUBROUTINE TO PRINT TEXT
                      /
1252  0000    PRN,    0
1253  7300            CLA CLL
1254  1652            TAD I   PRN                     /GET POINTER
1255  2252            ISZ     PRN
1256  3227            DCA     FROCT
1257  1627            TAD I   FROCT
1260  0322            AND     K7700
1261  7450            SNA
1262  5306            JMP     EXIT
1263  7500            SMA
1264  7020            CML
1265  7001            IAC
1266  7012            RTR
1267  7012            RTR
1270  7012            RTR
1271  4436            TYPE
1272  1627            TAD I   FROCT
1273  0323            AND     K0077
1274  7450            SNA
1275  5306            JMP     EXIT
1276  1311            TAD     K3740
1277  7500            SMA
1300  1310            TAD     K4100
1301  1321            TAD     K0240
1302  4436            TYPE
1303  2227            ISZ     FROCT
1304  7300            CLA CLL
1305  5257            JMP     PRN+5
1306  7300    EXIT,   CLA CLL
1307  5652            JMP I   PRN

                      /
1310  4100    K4100,  4100
1311  3740    K3740,  3740
                      /
                      /ROUTINE TO TYPE
                      /
1312  0000    PRINT,  0
1313  6046            TLS
1314  6041            TSF
1315  5314            JMP     .-1
1316  6042            TCF
1317  7200            CLA
1320  5712            JMP I   PRINT
1321  0240    K0240,  0240
1322  7700    K7700,  7700
```



```
1323  0077    K0077,  0077
1324  0010    K0010,  10
1325  7741    K7741,  7741
1326  3600    K3600,  3600
                      /ROUTINE TO WAIT FOR KEY FROM OPERATOR
                      /
1327  0000    WAIT,   0
1330  7300            CLA CLL
1331  6032            KCC
1332  6031            KSF
1333  5332            JMP     .-1
1334  6036            KRB
1335  6046            TLS
1336  6041            TSF
1337  5336            JMP     .-1
1340  0370            AND     K0177
1341  1066            TAD     K0200
1342  3101            DCA     CHAR
1343  1101            TAD     CHAR
1344  3777'           DCA     CBCHAR
1345  2776'           ISZ     INMODE
1346  4775'           JMS     XCBCNT          /CHECK FOR CONTROL CHARACTERS.
1347  7200            CLA
1350  7200            CLA
1351  3776'           DCA     INMODE
1352  6032            KCC
1353  6042            TCF
1354  1101            TAD     CHAR
1355  7041            CIA
1356  1371            TAD     K0316
1357  7650            SNA CLA                         /WAS IT A NO
1360  5727            JMP I   WAIT                    /YES
1361  2327            ISZ     WAIT                    /UPDATE RETURN POINTER
1362  1101            TAD     CHAR
1363  7041            CIA
1364  1372            TAD     K0331
1365  7650            SNA CLA                         /WAS IT A YES
1366  2327            ISZ     WAIT                    /WAS A YES
1367  5727            JMP I   WAIT                    /WAS NEITHER
1370  0177    K0177,  0177
1371  0316    K0316,  0316
1372  0331    K0331,  0331
                      /
1375  3200
1376  3676
1377  3675
      1400            PAGE
                      /
                      /
                      /ROUTINE TO RECALIBRATE SELECTED DRIVE
                      /
1400  0000    RESTOR, 0
1401  7301            CLA CLL IAC                     /ENABLE CLEAR CONTROL
1402  4445            CLRALL                          /CLEAR CONTROL
1403  1100            TAD     DRIVNO                  /CURRENT DRIVE
```

```
1404  1130            TAD     HOMEMA                  /CURRENT FIELD
1405  4442            LDCMD                           /LOAD COMMAND
1406  1120            TAD     EXBIT
1407  4446            LOSC                            /LOAD EXTENDED DRIVE BIT
1410  7330            CLA CLL CML RAR                 /MAYBE EXPECTED STATUS
1411  3117            DCA     GDREG2                  /SETUP COMPARE REGISTER
1412  7326            CLA CLL CML RTL                 /ENABLE RECALIBRATE BIT
1413  4445            CLRALL                          /"RECALIBRATE"
1414  4441            DSKSKP                          /DISK SKIP IOT
1415  5214            JMP     .-1                     /WAIT FOR FIRST DONE FLAG
1416  4440            RDSTAT                          /READ STATUS
1417  1327            TAD     K2000
1420  7450            SNA                             /WAS IT BUSY AND DONE
1421  5225            JMP     RESTA                   /YES, THEN ITS O.K.
1422  1327            TAD     K2000                   /NO, THEN IT MUST BE JUST DONE
1423  7640            SZA CLA                         /WAS IT JUST DONE
1424  5243            JMP     RESTER                  /NO, ERROR
1425  4445  RESTA,   CLRALL                          /CLEAR STATUS
1426  1066            TAD     K0200                   /ENABLE SET SECOND DONE FLAG
1427  1121            TAD     CMREG                   /ORIGINAL COMMAND
1430  4442            LDCMD                           /LOAD COMMAND
1431  4441            DSKSKP                          /DISK SKIP IOT
1432  5231            JMP     .-1                     /WAIT FOR SECOND DONE
1433  4440            RDSTAT                          /READ STATUS
1434  1070            TAD     K4000
1435  7640            SZA CLA                         /WAS IT ONLY DONE FLAG
1436  5243            JMP     RESTER                  /NO, ERROR STATUS
1437  7301            CLA CLL IAC                     /ENABLE CLEAR CONTROL
1440  4445            CLRALL                          /CLEAR CONTROL
1441  2200            ISZ     RESTOR                  /UPDATE FOR GOOD RECALIBRATE
1442  5600            JMP I   RESTOR                  /RETURN
1443  4437  RESTER,  ERROR                           /ERROR, STATUS
1444  3603            3603                            /TEXT POINTER
                      /
1445  4452            CRLF
1446  4447            PRNTER                          /PRINT "TRY RECALIBRATE"
1447  1756            ERMES2
1450  4434            RECEIV                          /WAIT FOR INPUT
1451  5254            JMP     .+3                     /TRY NEXT EXISTING DISK
1452  5245            JMP     .-5
1453  5201            JMP     RESTOR +1               /TRY AGAIN
1454  7301            CLA CLL IAC
1455  1056            TAD     AMOUNT                  /GET AMOUNT ON SYSTEM
1456  7450            SNA                             /WAS THERE ONLY 1 LEFT
1457  5535            JMP I   XEND                    /LAST DISK
1460  3056            DCA     AMOUNT                  /MORE TO GO BUT CLEAR THIS ONE
1461  3516            DCA I   TCNTR5                  /CLEAR DISK POINTER
1462  5600            JMP I   RESTOR                  /TRY NEXT ONE
                      /
                      /
                      /ROUTINE TO CHANGE DEVICE CODES
                      /
1463  0000  CHANG,   0
1464  4777' CHANGR,   JMS     XCSSW                   /GET SWITCH REGISTER BITS,
1465  7010            RAR
```



```
1466  7620            SNL CLA                         /CHANGE DEVICE CODES?
1467  5663            JMP I   CHANG                   /NO,
1470  4777' CHANGR,   JMS     XCSSW                   /GET SWITCHES,
1471  0313            AND     A0770
1472  3314            DCA     CSAVE1                  /SAVE DESIRED
1473  1316            TAD     CCNTR1
1474  3315            DCA     CSAVE2
1475  1317            TAD     CHNPOT
1476  3200            DCA     RESTOR
1477  1600  CHANGR,   TAD I   RESTOR                  /GET ADDRESS POINTER
1500  3311            DCA     KWAIT
1501  1711            TAD I   KWAIT                   /GET OLD CODE
1502  0312            AND     A7007                   /MASK
1503  1314            TAD     CSAVE1                  /ADD IN DESIRED
1504  3711            DCA I   KWAIT                   /STORE DESIRED DEVICE CODE
1505  2200            ISZ     RESTOR                  /UPDATE POINTER
1506  2315            ISZ     CSAVE2                  /UPDATE CHANGE COUNTER
1507  5277            JMP     CHANGR
1510  5663            JMP I   CHANG                   /EXIT TO PROGRAM.
                      /
1511  0000  KWAIT,   0
1512  7007  A7007,   7007
1513  0770  A0770,   0770
1514  0000  CSAVE1,  0
1515  0000  CSAVE2,  0
1516  7771  CCNTR1,  7771
1517  1520  CHNPOT,  CHNPOT +1
1520  0734            IOT0
1521  0741            IOT1
1522  0746            IOT2
1523  0714            IOT3
1524  0705            IOT4
1525  0672            IOT5
1526  0727            IOT6
1527  2000  K2000,   2000
                      /
                      /THIS ROUTINE WILL GENERATE TIMING IF NEEDED BY THE APT SYSTEM
                      /
1530  0000  KTICK,   0
1531  7300            CLL CLA
1532  1022            TAD     22                      /GET HARDWARE CONFIGURATION
1533  0070            AND     K4000
1534  7650            SNA CLA                         /ON APT?
1535  5351            JMP     EXTICK                  /NO
1536  1730            TAD I   KTICK                   /GET TIMING VALUE
1537  3353            DCA     COUNT                   /ESATABLISH TIME
1540  2132            ISZ     CLKCNT
1541  5351            JMP     EXTICK                  /RETURN
1542  1353            TAD     COUNT                   /GET VALUE OF COUNTER
1543  3132            DCA     CLKCNT                  /STORE IT
1544  2354            ISZ     CNT                     /TIMING NEED BE DONE?
1545  5351            JMP     EXTICK
1546  4425            TIME
1547  1355            TAD     KCNT                    /TIMING VALUE
1550  3354            DCA     CNT                     /INIT SECOND COUNTER
```

```
1551  2330  EXTICK, ISZ     KTICK                   /MOVE BEYOND TIMING VALUE
1552  5738           JMP I   KTICK

1553  0000  COUNT,  0
1554  7776  CNT,    -2
1555  7776  KCNT,   -2
1556  0100  K0100,  0100
              /
              /
              /ROUTINE TO NOTIFY APT OF USE IF REQUIRED
              /
1557  0000  KTIME,  0
1560  6002           IOF                     /DISABLE INTERUPTS
1561  6214           RDF                     /GET PRESENT DATA FIELD
1562  1075           TAD KCDF
1563  3364           DCA .+1                 /ESTABLISHES CURRENT DATA FIELD
1564  7402           HLT
1565  6272           CIF 70                          /FIELD 7, LOCATION OF UV PROM
1566  4771           JMS I K6500
1567  7300           CLL CLA
1570  5757           JMP I KTIME
              /
1571  6500  K6500,  6500
              /
1577  3062
      1600  PAGE
              /
              /
              /THIS ROUTINE WILL NOTIFY APT OF AN ERROR AND SEND PC TO
              /APT SYSTEM. ALL ERRORS WILL RESULT IN PROGRAM HLT AND A TIME OUT ON
              /APT. APT WILL TAKE OVER FROM THERE.

              /
1600  0000  AERRO,  0
1601  6002           IOF                     /DISABLE INTERUPTS
1602  7200           CLA
1603  1022           TAD     22              /CHECK FOR APT SYSTEM
1604  7700           SMA CLA
1605  5600           JMP I   AERRO           /RETURN NOT ON APT
1606  1621           TAD I   KERRO           /GET PC
1607  3222           DCA SAVPC
1610  6214           RDF                     /GET CURRENT DATA FIELD
1611  1075           TAD KCDF
1612  3214           DCA .+2
1613  1222           TAD SAVPC
1614  7402           HLT                     /REPLACED WILL CURRENT DATA FIELD
1615  6272           CIF 70                  /CHANGE IF FOR APT RETURN TO FIELD 7
1616  5620           JMP I K6520             /NOTIFIES APT OF ERROR
1617  7402           HLT
              /
1620  6520  K6520,  6520
1621  0436  KERRO,  ERRO
1622  0000  SAVPC,  0
              /
              /
```



```
              /ROUTINE TO MOVE DISK POINTERS
              /
1623  0000  MOVE,   0
1624  1237           TAD     ADPT1
1625  3010           DCA     AUTO10

1626  1240           TAD     ADPT2
1627  3011           DCA     AUTO11
1630  1077           TAD     M10
1631  3241           DCA     MCNTR1
1632  1410           TAD I   AUTO10                  /FROM HERE
1633  3411           DCA I   AUTO11                  /TO THERE
1634  2241           ISZ     MCNTR1                  /4 POINTERS
1635  5232           JMP     .-3
1636  5623           JMP I   MOVE
              /
1637  0137  ADPT1,  DSK0A -1
1640  0150  ADPT2,  DSK0B -1
1641  0000  MCNTR1, 0
              /
              /
1642  2003  TEXPC,  TEXT    "PC:"
1643  7200
1644  0704  TEXGO,  TEXT    "GO:"
1645  7200
1646  0530  TEXEX,  TEXT    "EX:"
1647  7200
1650  0315  TEXCM,  TEXT    "CM:"
1651  7200
1652  2324  TEXST,  TEXT    "ST:"
1653  7200
1654  0401  TEXDA,  TEXT    "DA:"
1655  7200
1656  0301  TEXCA,  TEXT    "CA:"
1657  7200
1660  0104  TEXAD,  TEXT    "AD:"
1661  7200
1662  0424  TEXDT,  TEXT    "DT:"
1663  7200
              /
1664  2205  ERTX1,  TEXT    "READ STATUS ERROR"
1665  0104
1666  4023
1667  2401
1670  2425
1671  2340
1672  0522
1673  2217
1674  2200
1675  0411  ERTX2,  TEXT    "DISK DATA ERROR"
1676  2313
1677  4004
1700  0124
1701  0140
1702  0522
```

```
1703  2217
1704  2200
1705  2722    ERTX3,  TEXT    "WRITE STATUS ERROR"
1706  1124
1707  0540
1710  2324
1711  0124
1712  2523
1713  4005
1714  2222
1715  1722
1716  0000
1717  2205    ERTX4,  TEXT    "RECALIBRATE STATUS ERROR"
1720  0301
1721  1411
1722  0222
1723  0124
1724  0540
1725  2324
1726  0124
1727  2523
1730  4005
1731  2222
1732  1722
1733  0000
                /
1734  2422    ERMES1, TEXT "TRY TO FORMAT SAME CYLINDER AGAIN?"
1735  3140
1736  2417
1737  4006
1740  1722
1741  1501
1742  2440
1743  2301
1744  1505
1745  4003
1746  3114
1747  1116
1750  0405
1751  2240
1752  0107
1753  0111
1754  1677
1755  0000
1756  2422    ERMES2, TEXT "TRY TO RECALIBRATE SAME DISK AGAIN?"
1757  3140
1760  2417
1761  4022
1762  0503
1763  0114
1764  1102
1765  2201
1766  2405
1767  4023
1770  0115
```



```
1771  0540
1772  0411
1773  2313
1774  4001
1775  0701
1776  1116
1777  7700
2000  2422    ERMES3, TEXT "TRY TO CHECK SAME CYLINDER AGAIN?"
2001  3140
2002  2417
2003  4003
2004  1005
2005  0313
2006  4023
2007  0115
2010  0540
2011  0331
2012  1411
2013  1604
2014  0522
2015  4001
2016  0701
2017  1116
2020  7700
                /
2021  2213    TEXEND, TEXT    "RK8E/RK8L DISK FORMATTER PASS COMPLETE"
2022  7005
2023  5722
2024  1370
2025  1440
2026  0411
2027  2313
2030  4006
2031  1722
2032  1501
2033  2424
2034  0522
2035  4020
2036  0123
2037  2340
2040  0317
2041  1520
2042  1405
2043  2405
2044  0000
2045  2213    MES1,   TEXT "RK8E/RK8L DISK FORMATTER PROGRAM"
2046  7005
2047  5722
2050  1370
2051  1440
2052  0411
2053  2313
2054  4006
2055  1722
2056  1501
```

```
2057  2424
2060  0522
2061  4020
2062  2217
2063  0722
2064  0115
2065  0000
2066  0617    MES2,   TEXT "FOR ALL QUESTIONS, ANSWER Y FOR YES OR N FOR NO."
2067  2240
2070  0114
2071  1440
2072  2125
2073  0523
2074  2411
2075  1716
2076  2354
2077  4001
2100  1623
2101  2705
2102  2240
2103  3140
2104  0617
2105  2240
2106  3105
2107  2340
2110  1722
2111  4016
2112  4006
2113  1722
2114  4016
2115  1756
2116  0000
2117  0617    MES3,   TEXT "FORMAT DISK "
2120  2215
2121  0124
2122  4004
2123  1123
2124  1340
2125  0000
2126  0122    MES4,   TEXT "ARE YOU SURE?"
2127  0540
2130  3117
2131  2540
2132  2325
2133  2205
2134  7700
2135  0617    MES5,   TEXT "FORMAT SAME DISK(S) AGAIN?"
2136  2215
2137  0124
2140  4023
2141  0115
2142  0540
2143  0411
2144  2313
2145  5023
```



```
2146  5140
2147  0107
2150  0111
2151  1677
2152  0000
                /
      2200      PAGE
                /
      2200      WRKBUF=.
                /
      2200      HITRK=.
      2201      LOTRK=.+1
                /
      2577      ENDBUF=.+377
                /

                /CONSOL SRC -V2-R0- CONSOLE PACKAGE


                /LAS= CALL C8CASW OR JMS XC8SW
                /THIS WILL READ THE SWITCH REGISTER FROM THE PLACE SPECIFIED
                /BY LOCATION 20 BIT 0.


                /THE PROGRAM SHOULD CHECK FOR A CONTROL CHARACTER FROM THE TERMINAL
                /EVERY FIVE(5) SECONDS OR SOONER.

                /LOCATIONS THAT NEED TO BE SET UP FOR USING THE CONSOLE PACKAGE.

                /CNTVAL IN XC8PASS    THIS LOCATION DETERMINDS THE NUMBER OF
                /PROGRAM COMPLETIONS THAT ARE NEEDED BEFORE THE PASS MESSAGE IS TYPED
                /THE VALUE SHOULD PUT THE PASS MESSAGE OUT IN THE RANGE OF 1 TO 5 MINUTES.
                /THIS SHOULD BE A POSITIVE NUMBER.

                /C8STRT   THIS IS FOUND IN CNTRL ROUTINE CONTROL R PART
                /IT IS THE RETURN WHEN CONTROL R IS ENTERED (RESTART PROGRAM)
                /THE RETURN JUMPS TO XDOSW WHICH CONTAINS C8STRT SO PUT THE LABEL C8STRT
                /WHERE YOU WANT TO RESTART THE PROGRAM.


                /SETUP1 IN XC8ERR    THIS IS THE MASK BIT FOR HALT ON ERROR
                /PLACE THE CORRECT BIT IN THIS LOCATION FOR HALTING ON ERRORS.

                /SETUP2 IN XC8PASS   THIS IS THE MASK FOR HALT A END OF PASS.

                /THE CALL TABLE IS A CONDITIONAL ASSEMBLY.
                /TO ASSEMBLE THE CALL REMOVE THE / BEFORE CONSOL=0.
                /IN COMBINING THE CONSOL PACKAGE TO A DIAGNOSTIC,
                /THE CALL TABLE IS TO BE AT THE BEGINNING OF A PROGRAM.


                /CONSOL=0
      6661              PSKF=   6661
      6662              PCLF=   6662
```

```
                6663            PSKE=   6663
                6664            PSTB=   6664
                6665            PSIE=   6665
                6004            GTF=    6004
                7701            ACL=    7701
                6007            CAF=    6007
                7421            MQL=    7421
                7501            MQA=    7501
                        /
                3000    *3000
                        /
                        /**********************************************************************
                        /C8PASS
                        /THIS IS CALLED AT THE END OF EACH PROGRAM COMPLETION
                        /THE VALUE OF** CNTVAL** WILL BE DETERMINED BY THE TIME IT TAKES
                        /THE PROGRAM TO COMPLETE THIS MANY C8PASS TO BE IN THE 1 TO 4 MINUTE
                        /RANGE
                        /       C8PASS=JMS   XC8PAS
                        /EX, OF CALL            C8PASS
                        /               HLT             /HALT IF NON CONSOL PACKAGE
                        /               JMP     START1          /CONTINUE RUNNING THIS PROGRAM

                        /RETURN TO LOCATION CALL PLUS ONE WITH THE AC=0 IF NON CONSOL PACKAGE AND HLT
                        /IF CONTINUE TO RUN THEN RETURN TO CALL PLUS2 AC=0
                        /THE LOCATION SETUP2 IS THE MASK BIT FOR THE HALT AT END OF PASS
                        /CHECK THAT IT IS CORRECT FOR THE CURRENT PROGRAM

                        /CALLS USED BY XC8PAS ARE  CHKCLA-XC8CRLF-XC8OCTA-XC8SW-XC8PNT-XC8INQ-

        3000  0000    XC8PAS, 0
        3001  7200            CLA
        3002  4777'           JMS     CHKCLA          /IS WORD 22 BIT 3 ACTIVE CONSOLE?
        3003  5212            JMP     DOPACK          /IS CLASSIC
        3004  4776'           JMS     C8GET           /GET THE REGISTERS,
        3005  4262            JMS     XC8SW           /DEACTIVE CONSOL CHECK SR SETTING
        3006  0375            AND     (400            /FOR HALT ON END OF C8PASS
        3007  7640            SZA CLA                 /1= HALT 0 CONTINUE
        3010  5600            JMP I   XC8PAS          /GO TO HALT
        3011  5230            JMP     C8BY1           /CONTINUE ON RUNNING PROGRAM
        3012  4232    DOPACK, JMS     CKCOUT          /CLASS CHECK C8PASS COUNT
        3013  5230            JMP     C8BY1           /C8PASS COUNT NOT DONE REDO PROGRAM
        3014  2250            ISZ     PASCNT          /C8PASS COUNT DONE SET C8PASS COUNT
        3015  4774'           JMS     XC8CRLF
        3016  4303            JMS     XC8PNT          /C8PRNT BUFFER
        3017  3053            MESPAS                  /
        3020  1250            TAD     PASCNT          /GET NUMBER
        3021  4773'           JMS     XC8OCTA         /CONVERT IT TO ASCII
        3022  4774'           JMS     XC8CRLF         /DO A CARRIAGE RETURN
        3023  4776'           JMS     C8GET           /GET THE REGISTERS,
        3024  4262            JMS     XC8SW           /CHECK A HALT AT END OF C8PASS
        3025  0375    SETUP2, AND     (400            /MASK BIT
        3026  7640            SZA CLA                 /HALT =1 NO SKIP CONTINUE =0
        3027  4772'           JMS     XC8INQ          /STOP PROGRAM EXECUTION-LOOK FOR INPUT
```



```
        3030  2280    C8BY1,  ISZ     XC8PAS          /BUMP RETURN
        3031  5600            JMP I   XC8PAS
        3032  0000    CKCOUT, 0
        3033  1251            TAD     DOSET           /CHECK IF SET UP NEEDED
        3034  7640            SZA CLA                 /0=SET UP C8PASS COUNT VALUE
                                                      /1=C8PASS COUNT VALUE OK
        3035  5242            JMP     NOSET           /C8PASS COUNT VALUE ON
        3036  1252            TAD     CNTVAL          /GET COUNT VALUE FOR THIS PROG
        3037  7040            CMA                     /SET TO NEGATIVE
        3040  3247            DCA     DOCNT           /STORE IN HERE
        3041  2251            ISZ     DOSET           /INDICATE VALUE SET UP
        3042  2247    NOSET,  ISZ     DOCNT           /COUNT THE NUMBER OF PASSES
        3043  5230            JMP     C8BY1           /EXIT FOR ANOTHER PASS
        3044  3251            DCA     DOSET           /SET TO C8PRNT C8PASS
        3045  2232            ISZ     CKCOUT          /BUMP RETURN FOR
        3046  5632            JMP I   CKCOUT          /C8PASS C8TYPE OUT
        3047  0000    DOCNT,  0
        3050  0000    PASCNT, 0                       /
        3051  0000    DOSET,  0
        3052  0000    CNTVAL, 0
        3053  0410    MESPAS, TEXT    "DMRKDO  PASS "
        3054  2213
        3055  0404
        3056  4040
        3057  2001
        3060  2323
        3061  4000


                        /**********************************************************************

                        /C8CKSW

                        /THIS ROUTINE CAN BE USED INPLACE OF A READ THE SWITCHES LAS,
                        /ROUTINE THAT WILL CHECK WHERE TO READ THE
                        /C8 SWITCHES FROM IE, FROM PANEL OR PSEUDO SWITCH REGISTER
                        /THE SELECTION IS DETERMINED BY THE STATE OF BIT 0 IN LOCATION 21,

                                /C8CKSW=        JMS XC8SW
                                /EX,    JMS     XC8SW           /READ THE C8SWIT REGISTER
                                                                /RETURN WITH THE CONTENTS OF SWITCH REGISTER

                        /RETURN TO NEXT LOCATION FOLLOWING CALL WITH THE AC= TO VALUE OF C8SWIT SETTING

                        /CALLS USED ARE=XC8CKPA=


        3062  0000    XC8SW,  0
        3063  4771'           JMS     XC8CKPA         /GO CHECK THE IF ANY CONTRL
        3064  7000            NOP
        3065  1021            TAD     21              /GET WD FOR INDICATOR
        3066  7710            SPA CLA                 /CHECK IF FROM PANEL 4000
        3067  7614            7614                    /DO LAS AND SKIP GET FROM PANEL WITH LAS
```

```
3070  1020            TAD     20              /PSEUDU SWITCH
3071  5662            JMP I   XC8SW           /EXIT WITH STATUS BIT IN AC.


                /**********************************************************************

                /C8TTYI
                /THIS ROUTINE WILL LOOK FOR A INPUT FROM THE TERMINAL
                /AND REMOVE ANY PARITY BITS, THEN MAKE IT 8 BIT ASCI.
                /       C8TTYI= JMS XC8TTY
                /EX.    JMS     XC8TTYI         /READ CHAR FROM THE CONSOL DEVICE
                /       /                       /RETURN TO CALL PLUS ONE AC CONTAINS THE CHAR


                /CALLS USED -NONE- BUT C8CHAR IS OFF PAGE AND IN ROUTINE CALLED XC8ECHO

                /
                /
3072  0000      XC8TTY, 0
3073  6031            KSF                     /LOOK FOR KEYBOARD FLAG
3074  5273            JMP     .-1
3075  6036            KRB                     /GET CHAR
3076  0370            AND     (177            /MASK FOR 7 BITS
3077  1367            TAD     (200            /ADD THE EIGTH BIT
3100  3766'           DCA     C8CHAR          /STORE IT
3101  1766'           TAD     C8CHAR
3102  5672            JMP I   XC8TTY          /EXIT


                /**********************************************************************

                /C8PRNT

                /THIS ROUTINE WILL TYPE THE CONTENTS OF THE C8 PRINT BUFFER, THE LOCATION
                /OF THE BUFFER WILL BE IN THE ADDRS FOLLOWING THE CALL.   PRINTING OF THE BUFFER
                /WILL STOP WHEN A 00 CHAR IS DETECTED. CHARACTERS ARE PACKED 2 PER WORD.

                /       C8PRNT= JMS XC8PNT


                /EX.    JMS     XC8PNT                  /C8PRNT THE CONTENTS OF THE FOLLOWING BUFFER
                /       MES577                          /LOCATION OF C8PRNT BUFFER

                /C8PRNT WILL USE THE LOCATION FOLLOWING THE CALL AS THE POINTER FOR THE
                /C8PRNT ROUTINE,RETURN TO CALL PLUS TWO WITH AC= 0

                /CALLS USED ARE-XC8TYPE-XC8PNT


3103  0000      XC8PNT, 0
3104  7300            CLA CLL
3105  1703            TAD I   XC8PNT          /GET C8PRNT BUFFERS STARTING LOCATION
3106  3336            DCA     PTSTOR          /STORE IN PTSTOR
```



```
3107  2303            ISZ     XC8PNT          /BUMP RETURN
3110  1736      C8D01,  TAD I   PTSTOR          /GET DATA WORD
3111  0365            AND     (7700           /MASK FOR LEFT BYTE
3112  7450            SNA                     /CHECK IF 00 TERMINATE
3113  5703            JMP I   XC8PNT          /EXIT
3114  7500            SMA                     /IS AC MINUS
3115  7020            CML                     /MAKE CHAR A 300 AFTER ROTATE
3116  7001            IAC                     /MAKE CHAR A 200 AFTER ROTATE
3117  7012            RTR
3120  7012            RTR
3121  7012            RTR                     /PUT CHAR IN BITS 4-11 MAKE IT 8 BIT ASCII
3122  4764'           JMS     XC8TYPE         /C8PRNT IT ON CONSOLE
3123  1736            TAD I   PTSTOR          /GET DATA WORD
3124  0363            AND     (0077           /MASK FOR RIGHT BYTE
3125  7450            SNA                     /CHECK IF 00 TERMINATOR
3126  5703            JMP I   XC8PNT          //EXIT
3127  1362            TAD     (3740           /ADD FUDGE FACTOR TO DETERMINE IF 200
3130  7500            SMA                     /OR 300 IS TO BE ADD TO CHAR
3131  1361            TAD     (100            /ADD 100
3132  1360            TAD     (240            /ADD 200
3133  4764'           JMS     XC8TYPE         /C8TYPE ONLY BITS 4-11
3134  2336            ISZ     PTSTOR          /BUMP POINTER FOR NEXT WORD
3135  5310            JMP     C8D01           /DO AGAIN
3136  0000      PTSTOR, 0                     /STOR FOR C8PRNT BUFFER
                /**********************************************************************

                /C8PAUS
                /THIS ROUTINE WILL CHECK IF THE CONSOL PACKAGE IS ACTIVE,IF ACTIVE
                /IT WILL RETURN TO CALL PLUS ONE AC= 0, AND DO THAT INSTRUCTION.
                /IF THE CONSOL PACKAGE IS NOT ACTIVE THE CALL WILL BE REPLACED
                /WITH A 7402 HALT AND THEN RETURN TO THE HALT.

                /       C8PAUS= JMS XC8PAU
                /
                /
                /EX.            JMS     XC8PAUS         /CHECK IF ON ACTIVE CONSOL IF NOT HALT HERE
                /               ANYTHING                /RETURN HERE IF ON ACTIVE CONSOL
                /
                /

                /CALLS USED ARE -CHKCLA-


3137  0000      XC8PAU, 0
3140  7300            CLA CLL
3141  4777'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3142  5350            JMP     C8D03           /GO DO CONSOL PART RETURN CALL +1
3143  7040            CMA                     /DEACTIVE CONSOLE PACKAGE PUT HLT IN CALL
3144  1337            TAD     XC8PAU          /GET CORRECT RETURN ADDRS
3145  3337            DCA     XC8PAU          /SET UP RETURN
3146  1357            TAD     (7402           /GET CODE FOR HLT
3147  3737            DCA I   XC8PAU          /PUT HALT IN CALL LOCATION
3150  5737      C8D03,  JMP I   XC8PAU          /GO TO HALT OR RETURN TO NEXT LOCATION
```

```
3157  7402
3160  0240
3161  0100
3162  3740
3163  0077
3164  3677
3165  7700
3166  3675
3167  0200
3170  0177
3171  3641
3172  3435
3173  3600
3174  3623
3175  0400
3176  3424
3177  4000
      3200    PAGE
              /**********************************************************************

              /C8CNTR
              /THIS ROUTINE WILL CHECK FOR THE PRESENCE OF CONTROL CHARACTERS
              /IT WILL CHECK FOR THE FOLLOWING CHAR C-R-Q-L-S
              /       C8CNTR= JMS XC8CNT

              /EX.    JMS     XC8CNTR                 /CHECK FOR CONTROL CHARACTER
              /       JMP     ANYTHING                /LOC FOLLOWING CALL IS FOR CONTINUING THE PROGRAM
              /       JMP     ANYTHING                /LOC. IS FOR RETURN IF INMODE SET AND NOT CNTRL CHAR
              /

              /RETURN IS TO CALL PLUS ONE IF CONTINUE
              /RETURN IS TO CALL PLUS TWO IF INMODE SET AND NOT CONTROL CHAR
              /RETURN IS TO CALL PLUS TWO IF INMODE IS NOT SET AND NO
              /CONTROL CHAR *.THIS WILL PRINT THE CHARACTER AND A ?
              /CLEAR THE AC AND RETURN CALL+2.

              /CALLS USED ARE-CHKCLA-XC8TYPE-XC8CRLF-C8GET-UPARDW-XC8TYI-XC8PSW-
              /
              /
              /
3200  0000    XC8CNT, 0
3201  3777*           DCA     ACSAVE          /SAVE THE AC
3202  4776*           JMS     CHKCLA          /CHECK LOC,22 BITS FOR CONSOLE BIT
3203  5206            JMP     .+3             /ON ACTIVE CONSOLE
3204  1777*           TAD     ACSAVE          /DEACTIVE CONSOLEGET AC FOR RETURN
3205  5600            JMP I   XC8CNT          /EXIT NOT ON ACTIVE CONSOLE
3206  6004            GTF
3207  3775*           DCA     FLSAVE
3210  7501            MQA
3211  3774*           DCA     MQSAVE          /SAVE THE MQ
3212  3255            DCA     INDEXA          /SET DISPLACEMENT INTO TABLE B
3213  1257            TAD     XTABLA          /GET ADDRS OF TABLE A
```



```
3214  3256            DCA     GETDAT          /CONTAINS POINTER TO CONTROL CHAR
3215  1656    REDOA,  TAD I   GETDAT          /GET CONTROL CHAR FROM TABLE
3216  7450            SNA                     /CHECK FOR A 0 END OF TABLE
3217  5226            JMP     DONEA           /END OF TABLE NO CONTROL CHAR
3220  1773*           TAD     C8CHAR          /COMPARE CHAR TO CONTROL CHAR
3221  7650            SNA CLA                 /0 IF MATCH
3222  5243            JMP     GOITA           /MATCH
3223  2255            ISZ     INDEXA          /NO MATCH NOT END OF TABLE REDO
3224  2256            ISZ     GETDAT          /BUMP INDEX FOR EXIT WHEN CONTROL FOUND
3225  5215            JMP     REDOA           /BUMP GETDAT FOR COMPARE OF NEXT CNTRL CHAR.
3226  1772*   DONEA,  TAD     INMODE          /CHECK IF PROGRAM EXPECTS CHAR
3227  7640            SZA CLA                 /1=CHAR EXPECTED  0= NO CHAR EXPECTED
3230  5240            JMP     EXITA           /CHAR EXPECTED
3231  1773*           TAD     C8CHAR          /GET CHAR = NOT CONTROL + NOT EXPECTED
3232  4771*           JMS     XC8TYPE         /C8PRNT CHAR
3233  1370            TAD     (277            /GET CODE FOR "?"
3234  4771*           JMS     XC8TYPE
3235  4767*           JMS     XC8CRLF
3236  2200            ISZ     XC8CNT          /BUMP RETURN
3237  5600            JMP I   XC8CNT          /EXIT CALL+2
3240  2200    EXITA,  ISZ     XC8CNT          /BUMP RETURN FOR MAIN PROGRAM CHECK OF CHAR
3241  1773*           TAD     C8CHAR          /PUT CHAR IN AC.
3242  5600            JMP I   XC8CNT          /EXIT
3243  1773*   GOITA,  TAD     C8CHAR          /GET THE CONTENTS OF CHAR
3244  1366            TAD     (100            /ADD 100 TO FORM A GOOD ASCII CHARACTER
3245  3773*           DCA     C8CHAR          /RESTORE COFFECT CHAR
3246  1260            TAD     XTABLB          /GET START OF TABLE B
3247  1255            TAD     INDEXA          /GET NOW FAR INTO TABLE
3250  3254            DCA     GOTOA           /STORE IT
3251  1654            TAD I   GOTOA           /GET THE ROUTINE STARTTING ADDRESS
3252  3254            DCA     GOTOA           /STORE IT IN HERE
3253  5654            JMP I   GOTOA           /GOTO CONTROL CHAR ROUTINE
3254  0000    GOTOA,  0000                    /ADD OF CNTRL ROUTINE TO EXECUTE
3255  0000    INDEXA, 0000                    /DISPLACEMENT INTO CNTRL TABLE
3256  0000    GETDAT, 0000                    /LOCATION OF ADDRS OF CONTROL CHAR.
3257  3261    XTABLA, TABLA                   /ADDRS OF TABLEA
3260  3271    XTABLB, TABLB                   /ADDRS OF TABLEB
3261  7575    TABLA,  7575                    /CNTRL C BACK TO MONITOR 203
3262  7564            7564                    /CNTRL L SWITCH ERROR PRINTTING DEVICE 214
3263  7557            7557                    /CNTRL Q START DISPLAYING CHAR. AGAIN 221
3264  7556            7556                    /CNTRL R BACK TO BEGINNING OF PROGRAM 222
3265  7555            7555                    /CNTRL S STOP SENDING CHAR TO DISPLAY WAIT FOR CNTRL Q 223
3266  7573            7573                    /CNTRL E CONTINUE WITH PROGRAM 205
3267  7574            7574                    /CONTROL D CHANGE SWITCH REGISTER ON FLY
3270  0000            0000

3271  3347    TABLB,  CNTRLC
3272  3336            CNTRLL
3273  3300            CNTRLQ
3274  3311            CNTRLR
3275  3320            CNTRLS
3276  3344            CNTRLE
3277  3400            CNTRLD
              /
              /CONTROL Q
```

```
                    /START SENDING CHAR. TO THE DISPLAY
                    /THIS WILL RETURN CONTROL TO CALL THAT WAS SET BY
                    /THE CALL FOR CONTROL S.
                    /
3300  3772'  CNTRLQ, DCA     INMODE          /SET SOFT FLAG FOR UNEXPECTED CHAR
3301  1334           TAD     C8SETS          /CHECK IF CONTROL S TYPED IN
3302  7640           SZA CLA
3303  5306           JMP     BYKETR          /CONTROL S TYPED IN
3304  4765'          JMS     C8GET           /NO CONTROL S TYPED PREVIOUSLY
3305  5600           JMP I   XC8CNTR         /LEAVE VIA CNTR ENTRY ADDRESS
3306  3334   BYKETR, DCA     C8SETS          /CLEAR THE SOFT FLAG
3307  4765'          JMS     C8GET           /RESTORE REGISTERS
3310  5735           JMP I   C8RETR          /EXIT TO ADDRESS SET BY CONTROL S
                    /
                    /
                    /CONTROL R
                    /GO TO THE QUESTION C8SWIT
3311  3764'  CNTRLR, DCA     TTYLPT          /CLEAR THE TYPE FLAG SET TO TTY
3312  3334           DCA     C8SETS          /CLEAR SOFT FLAG FOR CNTRL S
3313  3772'          DCA     INMODE
3314  4763'          JMS     UPAROW          /PRINT THE " AND C8CHAR
3315  3762'  C8BY4,  DCA     C8SWST          /CLEAR FLAG FOR CNTRL D OR R
3316  5717           JMP I   XDOSW           /GO TO ADDRS OF C8SWIT
3317  0200   XDOSW,  BGN                     /DOSW IS LABEL FOR C8SWIT QUESTION
                    /
                    /
                    /CONTROL S
                    /STOP SENDING CHAR. TO DISPLAY UNTIL A ^Q IS RECEIVED
                    /
                    /
3320  1334   CNTRLS, TAD     C8SETS          /IF1 DO NOT STORE IN C8RETR
3321  7640           SZA CLA
3322  5326           JMP     C8DD7           /DONT SET UP C8RETR
3323  7001           IAC                     /MAKE RETURN CALL PLUS 2
3324  1200           TAD     XC8CNT          /GET RETURN FOR THIS CALL
3325  3335           DCA     C8RETR          /STORE IT HERE FOR USE BE CNTROL Q
3326  2334   C8DD7,  ISZ     C8SETS          /SET FLAG TO SAVE CALL
3327  4761'          JMS     XC8TTYI                 /LOOK FOR THE INPUT
3330  4765'          JMS     C8GET           /GET REGISTERS
3331  4200           JMS     XC8CNTR                 /CHECK FOR THE CONTROL CHAR
3332  7200           CLA
3333  5320           JMP     CNTRLS          /IF NOT A CNTRL Q R C REASK
3334  0000   C8SETS, 0
3335  0000   C8RETR, 0
                    /
                    /SWITCH OUTPUT FROM ONE OUTPUT DEVICE TO ANOTHER - THE TWO OUTPUTS ARE THE
                    /CONSOLE AND THE PRINTER WITH DEVICE CODE 66.
                    /
                    /
3336  1764'  CNTRLL, TAD     TTYLPT          /GET PRESENT C8SWIT INDICATOR
3337  7040           CMA                     /COMPLEMENT IT
3340  3764'          DCA     TTYLPT          /STOR NEW C8SWIT
3341  4763'          JMS     UPAROW          /C8PRNT ^ AND CHAR ON NEW DEVICE
3342  4765'          JMS     C8GET           /RESTORE THE REGISTERS
3343  5600           JMP I   XC8CNT          /EXIT
```



```
                    /
                    /CONTROL E
                    /CONTINUE RUNNING FROM A INQUIRE OR ERROR
                    /
                    /
3344  4763'  CNTRLE, JMS     UPAROW          /PRINT THE CONTROL CHAR
3345  4765'          JMS     C8GET           /GET THE REGISTERS
3346  5600           JMP I   XC8CNT          /RETURN TO CALL PLUS ONE
                    /
                    /CONTROL C
                    /RETURN TO MONITOR CONTROL C
3347  3764'  CNTRLC, DCA     TTYLPT          /CLEAR THE LPT FLAG TO PRINT ON DISPLAY
3350  4763'          JMS     UPAROW          /C8PRNT ^ AND LETTER IN CHAR
3351  6203           CDF CIF                 /GO TO 0 FLD
3352  6007           CAF                     /CLEAR THE WORLD
3353  5760           JMP I   (7600           /GO TO DIAGNUSTIC MONITOR
                    /*****************************************************************
                    /
                    /
                    /
3360  7600
3361  3072
3362  3545
3363  3415
3364  3721
3365  3424
3366  0100
3367  3623
3370  0277
3371  3677
3372  3676
3373  3675
3374  4123
3375  4124
3376  4000
3377  4122
      3400    PAGE
                    /
                    /CONTROL D
                    /CHANGE THE SWITCH REGISTER ANYTIME CNTRL D AND RETURN TO
                    /THE PROGRAM RUNNING.

3400  4215   CNTRLD, JMS     UPAROW
3401  1213           TAD     C8SETD          /CHECK IF THE RETURN ADDRS IS SAFE
3402  7640           SZA CLA
3403  5207           JMP     C8DD11          /DO NOT CHANGE THE RETURN ADDRS
3404  1777'          TAD     XC8CNT          /GET THE RETURN ADDRS AND SAVE IT
3405  3214           DCA     C8RETD          /SAVE THE RETURN HERE
3406  2213           ISZ     C8SETD          /INDICATE RETURN SAVED DONT DISTROY
3407  4256   C8DD11, JMS     XC8PSW                  /GO CHANGE THE SWITCH REGISTER
3410  3213           DCA     C8SETD          /CLEAR THE FLAG
3411  4224           JMS     C8GET           /RESTORE THE AC MQ LINK ETC
```

```
3412  5614          JMP I   C8RETD          /RETURN TO THE PROGRAM
                    /
3413  0000    C8SETD, 0
3414  0000    C8RETD, 0


                    /THIS WILL TYPE A UP ARROW AND THE CHAR IN C8CHAR.

3415  0000    UPAROW, 0                     /C8PRNT THE "^" AND THE CHAR C8TYPED IN
3416  1376          TAD     (336            /CODE FOR ^
3417  4775'         JMS     XC8TYPE
3420  1774'         TAD     C8CHAR          /C8TYPE THE CHAR
3421  4775'         JMS     XC8TYPE
3422  4773'         JMS     XC8CRLF
3423  5615          JMP I   UPAROW          /EXIT


                    /**********************************************************************

3424  0000    C8GET,  0
3425  7200          CLA
3426  1772'         TAD     MQSAVE
3427  7421          MQL                     /RESTORE MQ
3430  1771'         TAD     FLSAVE
3431  7004          RAL                     /RESTORE THE LINK
3432  7200          CLA
3433  1770'         TAD     ACSAVE          /RESTORE THE AC
3434  5624          JMP I   C8GET           /GET THE REGISTERS


                    /**********************************************************************

                    /C8INQU
                    /C8INQU ROUTINE WILL PRINT A WAITING
                    /AND THE PROGRAM IS EXPECTING A CONTROL CHAR INPUT
                    /IF CONTINUE FROM CONTROL CHAR RETURN IS CALL PLUS ONE
                    /IF NO CONTROL CHAR ENTERED THEN WAITING IS REPRINTED
                    /AND PROGRAM WAITS FOR A CONTROL CHAR AGAIN.

                    /       C8INQU =        JMS XC8INQ

                    /EX.    JMS     XC8INQ                  /C8 WILL PRINT A WAITINGAND WAIT FOR INPUT
                    /       DO ANYTHING                     /RETURN IS CALL PLUS ONE AC =0 CONTINUE

                    /CALLS USED ARE -CHKCLA-XC8PNT-XC8TYI-C8GET-XC8CNTR-

3435  0000    XC8INQ, 0
3436  7300          CLA CLL
3437  4767'         JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3440  7410          SKP                     /ACTIVE CONSOLE PACKAGE
3441  5635          JMP I   XC8INQ          /NOT CONSOLE LEAVE
```



```
3442  4766'         JMS     XC8PNT
3443  3451          WATMES                  /INQUIM WAITTING
3444  4765'         JMS     XC8TTYI         /GET CHARACTER
3445  4224          JMS     C8GET
3446  4777'         JMS     XC8CNTR         /CHECK IF CONTROL CHARACTER
3447  5635          JMP I   XC8INQ          /EXIT AND CONTINUE
3450  5236          JMP     XC8INQ+1        /REASK
3451  2701    WATMES, TEXT    "WAITING "
3452  1124
3453  1116
3454  0740
3455  0000


                    /**********************************************************************

                    /C8SWIT

                    /ROUTINE WILL CHECK IF CONSOL IS ACTIVE IF IT IS ACTIVE DISPLAY
                    /SW QUESTION , IN NOT ACTIVE IT WILL NOT PRINT THE SW QUESTION BUT
                    /RETURN TO CALL PLUS ONE AC=0,
                    /C8SWIT WILL SET UP THE PSEUDO SWITCH
                    /REGISTER WITH THE NEW DATA ENTERED
                    /
                    /       C8SWIT =        JMS XC8PSW

                    /EX.            JMS     XC8PSW          /SET UP PSEUDO C8SWIT REGISTER IF
                                                            /ON THE CONSOL PACKAGE. RETURN IS CALL PLUS ONE AC = 0

                    /CALLS USED ARE -CHKCLA-XC8PSW-XC8PNT-XC8OCTA-XC8TYPE-

3456  0000    XC8PSW, 0
3457  4767'         JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3460  7410          SKP                     /ACTIVE CONSOLE
3461  5656          JMP I   XC8PSW          /DEACTIVE CONSOLE PACKAGE
                                            /RETURN WITHOUT ASKING PSEUDO SWITCH
3462  1345          TAD     C8SWST          /IS THE SOFT FLAG SET FOR SWITCH?
3463  7640          SZA CLA                 /SKIP IF ONE ENTRY AT ATIME OK
3464  5764'         JMP     C8SY4           /SECOND ENTRY WITH OUT A EXIT GO TO SW QUESTION
3465  2345          ISZ     C8SWST          /FIRST ENTRY SET FLAG
3466  4766'   C8NOPS, JMS     XC8PNT          /C8PRNT SR=
3467  3547          MESA
3470  1020          TAD     20              /GET CONTENTS OF SW
3471  4763'         JMS     XC8OCTA         /CONVERT IT TO ASCII
3472  1362          TAD     (40             /GET SPACE
3473  4775'         JMS     XC8TYPE
3474  2761'         ISZ     INMODE          /SET FLAG FOR CHAR EXECTED
3475  4760'         JMS     XC8ECHO         /LOOK FOR INPUT
3476  4315          JMS     TSTCHA          /NOT CONTROL TEST IT IS LEGAL
3477  1774'         TAD     C8CHAR          /STORE NEW CHAR IN SW REG
3500  3020          DCA     20

3501  1357          TAD     (-3             /GET A MINUS 3
3502  3346          DCA     TMPCNT          /STORE IN TEMP COUNT
```

```
3503  4760*  GETCH1, JMS     XC8ECHO         /GET NEXT CHAR
3504  4315           JMS     TSTCHA          /CHECK IF CR + GOOD CHAR
3505  1020           TAD     20              /GET C8SWIT REGISTER
3506  7106           RTL CLL                 /ROTATE IT LEFT 3 PLACES
3507  7004           RAL
3510  1774*          TAD     C8CHAR          /GET CHAR + ADD IT TO PREVIOUS CONTENTS
3511  3020           DCA     20              /SAVE NEW CONTENTS
3512  2346           ISZ     TMPCNT          /BUMP COUNT
3513  5303           JMP     GETCH1          /JMP BACK + GET NEXT CHAR
3514  5342           JMP     ENDIT           /END 4 CHAR GETYPED IN
3515  0000   TSTCHA, 0
3516  7041           CIA                     /CMPL CHAR IN AC
3517  1356           TAD     (215            /TEST IF IT IS A CARRIAGE RETURN
3520  7650           SNA CLA                 /SKIP IN NOT CR.
3521  5342           JMP     ENDIT           /WAS CARRIAGE RETURN
3522  1774*          TAD     C8CHAR          /NOT CR, GET CHAR
3523  1355           TAD     (-260           /CHECK IF IT IS IN RANGE
3524  7710           SPA CLA                 /IF NOT POSITIVE C8ERR CHAR SMALLER THEN 260
3525  5336           JMP     ERR1            /C8ERR = CHAR TOO SMALL
3526  1774*          TAD     C8CHAR          /GET CHAR
3527  1354           TAD     (-270           /GET A -270 + CHECK IF IT IS LARGER THEN 7
3530  7700           SMA CLA                 /SKIP IF LESS THEN 7
3531  5336           JMP     ERR1            /C8ERR ON CHAR NOT IN RANGE
3532  1774*          TAD     C8CHAR          /GET CHAR
3533  0353           AND     (7              /MASK FOR RIGHT BYTE
3534  3774*          DCA     C8CHAR          /STORE IN CHAR
                                             /GET CHAR IN AC
3535  5715           JMP I   TSTCHA          /EXIT
3536  1352   ERR1,   TAD     (277            /C8PRNT
3537  4775*          JMS     XC8TYPE         /?
3540  4773*          JMS     XC8CRLF         /
3541  5266           JMP     C8RDPS          /EXIT + ASK AGAIN
3542  4773*  ENDIT,  JMS     XC8CRLF         /DO A CR LF
3543  3345           DCA     C8SWST          /CLEAR THE PSW ENTRY FLAG
3544  5656           JMP I   XC8PSW          /EXIT ROUTINE
3545  0000   C8SWST, 0

3546  0000   TMPCNT, 0
3547  2322   MESA,   TEXT    "SW= "
3550  7540
3551  0000


3552  0277
3553  0007
3554  7510
3555  7520
3556  0215
3557  7775
3560  3663
3561  3676
3562  0040
3563  3600
3564  3315
3565  3072
```



```
3566  3103
3567  4000
3570  4122
3571  4124
3572  4123
3573  3623
3574  3675
3575  3677
3576  0336
3577  3200
      3600     PAGE

               /C8OCTA

               /OCTAL TO ASCII CONVERSION
               /THIS ROUTINE WILL TAKE THE OCTAL NUMBER IN THE AC AND CONVERT IT TO ASCII
               /THE RESULT WILL BE PRINTED ON THE CONSOL TERMINAL
               /       C8OCTA* JMS XC8OCT
               /
               /EX,    JMS     XC8OCTA         /AC CONTAINS NUMBER TO BE CHANGE
               /       RETURN IS TO CALL PLUS ONE AC=0
               /
               /CALLS USED ARE =XC8TYPE=


3600  0000   XC8OCT, 0
3601  7106           CLL RTL
3602  7006           RTL                     /POSITION THE FIRST CHAR FOR PRINTING
3603  3221           DCA     C8TMP1          /SAVE CORRECT POSITIONED WORD HERE
3604  1377           TAD     (-4
3605  3222           DCA     C8CKP           /STORE COUNTER IN HERE
3606  1221   C8OD4,  TAD     C8TMP1          /GET FIRST NUMBER
3607  0376           AND     (0007           /MASK
3610  1375           TAD     (260            /ADD THE PRINT CONSTANT
3611  4277           JMS     XC8TYPE         /TYPE THE NUMBER
3612  1221           TAD     C8TMP1          /
3613  7006           RTL
3614  7004           RAL                     /PUT NEXT NUMBER IN POSITION
3615  3221           DCA     C8TMP1          /STORE IT
3616  2222           ISZ     C8CKP           /DONE YET WITH FOUR NUMBERS
3617  5206           JMP     C8OD4           /NOT YET DO MORE
3620  5600           JMP I   XC8OCT          /DONE WITH FOUR
3621  0000   C8TMP1, 0
3622  0000   C8CKP,  0


               /*****************************************************************

               /C8CRLF
               /C8TYPE CR AND LF WITH FILLERS FOLLOWING EACH LF AND CR
               /
               /       C8CRLF* JMS XC8CRL
               /
               /EX,    JMS     XC8CRLF         /C8PRNT A CR AND LF WITH FILL
               /                               /RETURN TO CALL PLUS ONE AC =0
```

```
                    /CALLS USED ARE =XC8TYPE=

3623  0000  XC8CRLF,0
3624  7300        CLA CLL
3625  1374        TAD     (215            /GET CODE FOR CR
3626  4277        JMS     XC8TYPE
3627  1237        TAD     FILLER
3630  7040        CMA
3631  3240        DCA     FILCNT          /STORE FILLER IN HERE
3632  1373        TAD     (212            /GET CODE FOR LF
3633  4277  C8D02, JMS     XC8TYPE
3634  2240        ISZ     FILCNT          /CHECK ON FILLER CHAR
3635  5233        JMP     C8D02           /TYPE A NON PRINTING CHAR
3636  5623        JMP I   XC8CRL          /EXIT
3637  0004  FILLER, 0004                  /FILLER SET FOR 4 CHAR
3640  0000  FILCNT, 0                     /COUNTER FOR FILL


                    //*************************************************************
                    /C8CKPA
                    /THIS ROUTINE WILL CHECK IF A CHARACTER WAS ENTERED FROM THE
                    /TERMINAL. IFTHE FLAG IS SET AND THE CONSOLE PACKAGE IS
                    /ACTIVE A CHECK IS MADE TO DETERMIND IF IT IS A CONTROL CHAR.
                    /IF IT WAS A CUNTROL CHAR THEN ITS CUNTROL FUNCTION IS PERFORMED.
                    /IF NOT A CONTROL CHARACTER OR A CONTROL B=D-L=D= IT WILL DO
                    /THE CUNTROL FUNCTION AND RETURN TO CALL PLUS 2.
                    /A NON CONTROL CHARACTER WILL BE PRINTEDAND A "?" IT WILL RETURN TO
                    /CALL PLUS 2.
                    /IF NO FLAG IS SET OR THE CONSUL IS NOT ACTIVE THE RETURN IS TO
                    /CALL PLUS 1.

                    /       C8CKPA= JMS     XC8CKP

                    /EX.    JMS     XC8CKPA                 /CALL TO CHECK IF CONTROL CHAR SET
                    /       ANYTHING(SKIP)          /RETURN IF NOT FLAG OR NOT CONSOLE ACTIVE
                    /       ANYTHING(JMP EXIT SKIP CHAIN)   /RETURN IF NOT CONTROL OR CONTINUE CONTROL

                    /CALLS USED ARE =XC8TTYI=XC8CNTR=C8GET=

3641  0000  XC8CKP, 0
3642  3772' C8BY1,      DCA     ACSAVE          /SAVE THE AC
3643  6004        GTF                     /SAVE THE FLAGS
3644  3771'       DCA     FLSAVE          /SAVE THE FLAGS
3645  7501        MQA                     /PUT MQ IN AC
3646  3770'       DCA     MQSAVE          /SACE THE MQ
3647  6031        KSF                     /CHECK THE KEYBOARD FLAG
3650  5261        JMP     C8BY3           /EXIT TO CALL PLUS 1
3651  4767'       JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
3652  7410        SKP                     /ACTIVE CONSOLE PACKAGE
```



```
3653  5261        JMP     C8BY3           /EXIT TO CALL PLUS 1
3654  4766'       JMS     XC8TTYI         /GET THE CHAR
3655  4765'       JMS     C8GET           /GET THE FLAGS
3656  4764'       JMS     XC8CNTR         /CHECK IF CONTROL  CHAR.
3657  7000        NOP                     /RETURN IF A CONTINUE CHAR.
3660  2241        ISZ     XC8CKP          /BUMP RETURN FOR CALL PLUS 2
3661  4765' C8BY3, JMS     C8GET           /GET REGISTERS
3662  5641        JMP I   XC8CKP          /SAY GUOD BY

                    //*************************************************************

                    /C8ECHO
                    /THIS ROUTINE WILL LOOK FOR A CHAR FROM THE KEYBOARD.  STORE IT IN LOCATION CHAR
                    /CHECK IF IT WAS A CONTROL CHARACTER - SET INMODE - PRINT CHARACTER

                    /       C8ECHO =        JMS XC8ECH
                    /EX.    JMS     XC8ECHO         /LOOK FOR CONSOL CHAR C8PRNT IT
                                                    /RETURN CALL PLUS ONE AC = CHAR C8TYPED IN

                    /CALLS USED ARE =XC8TTYI=XC8CNTR=C8GET=XC8ECH=XC8TTYPE

                    /
3663  0000  XC8ECH, 0
3664  4766'       JMS     XC8TTYI         /WAIT FOR CHAR FROM KEYBOARD
3665  4765'       JMS     C8GET           /RESTORE THE REGISTERS
3666  2276        ISZ     INMODE          /SET INMODE IDENTIFING THIS AS A EXPECTED CHAR
3667  4764'       JMS     XC8CNTR         /GO CHECK IF IT IS A CONTROL CHAR
3670  5663        JMP I   XC8ECH          /WAS A CONTROL CHAR - CONTINUE RUNNING
3671  4277        JMS     XC8TYPE         /NOT A CONTROL CHAR C8PRNT IT
3672  3276        DCA     INMODE          /CLEAR FLAG THAT CHAR EXPECTED
3673  1275        TAD     C8CHAR          /GET CHAR IN AC
3674  5663        JMP I   XC8ECH          /EXIT
3675  0000  C8CHAR, 0
3676  0000  INMODE, 0

                    /*************************************************************

                    /C8TYPE
                    /THIS ROUTINE WILL C8PRNT ON THE CONSOLE OR THE LPT WITH DEVICE CODE 66.
                    /
                    /       C8TYPE= JMS XC8TYP

                    /EX.    JMS     XC8TYPE         /C8PRNT THE CHAR IN THE AC.
                            /                       /RETURN CALL PLUS ONE AC =0000
                                                    /DO NOT CLEAR THE LINK IN THIS ROUTINE NEEDED BYC8OCT

                    /CALLS USED ARE =C8HANG=XC8CNTR=XC8PNT=XC8CRLF=XC8INQU=

3677  0000  XC8TYP, 0
3700  3320        DCA     PNTBUF          /STORE CHAR
3701  1321        TAD     TTYLPT          /CHECK 0=TTY 7777=LPT
3702  7640        SZA CLA
3703  5312        JMP     XOOLPT          /DO OUT PUT ON LPT
3704  1320        TAD     PNTBUF
```

```
3705  6046          TLS
3706  6041          TSF
3707  5306          JMP     .-1
3710  6042          TCF
3711  5316          JMP     C8BY5
3712  1320    XDOLPT, TAD     PNTBUF          /GET CHAR
3713  6666          PSTB    PCLF            /C8PRNT IT
3714  4322          JMS     C8HANG          /CHECK KEYBOARD IF HUNG
3715  6662          PCLF                    /CLEAR THE FLAG
3716  7600    C8BY5,  7600                    /CLEAR THE AC
3717  5677          JMP I   XC8TYP          /EXIT
3720  0000    PNTBUF, 0
3721  0000    TTYLPT, 0


3722  0000    C8HANG, 0
3723  7200          CLA             /
3724  1316          TAD     C8BY5           /GET CONSTANT 7600
3725  3320          DCA     PNTBUF          /PNTBUF IS NOW A COUNTER
3726  6661          PSKF                    /SKIP ON PRINTER DONE
3727  7410          SKP                     /NOT DONE YET
3730  5722          JMP I   C8HANG          /SAW FLAG DONE
3731  2345          ISZ     C8CONT          /FIRST COUNTER FAST ONE
3732  5326          JMP     .-4             /CHECK IF FLAG SET YET
3733  2320          ISZ     PNTBUF          /MADE 4096 COUNTS ON FAST COUNTER
3734  5331          JMP     .-3             /KEEP IT UP FOR 5 SEC
3735  1764'         TAD     XC8CNTR         /GET THE RETURN ADDRESS IN CONTROL
3736  3322          DCA     C8HANG          /SAVE IT IN HANG
3737  3321          DCA     TTYLPT          /ALLOW PRINTING ON TTY
3740  4763'         JMS     XC8PNT
3741  3746          MESHANG                 /LPT ERROR
3742  4223          JMS     XC8CRLF
3743  4762'         JMS     XC8INQU         /PRINT WAITING
3744  5722          JMP I   C8HANG          /CONTINUE TO SAVE ADDRESS
3745  0000    C8CONT, 0                     /COUNTER FOR TIMER
3746  1420    MESHANG,TEXT    "LPT ERROR"
3747  2440
3750  0522
3751  2217
3752  2200

3762  3435
3763  3103
3764  3200
3765  3424
3766  3072
3767  4200
3770  4123
3771  4124
3772  4122
3773  0212
3774  0215
3775  0260
3776  0007
3777  7774
```



```
4000    PAGE
        /*********************************************************************
        /*********************************************************************

        /THIS ROUTINE WILL CHECK LOCATION 22 THE HARD WARE CONFIG WORD.
        /TO SEE IF THE CONSOLE BIT 3 )400) IS SET IF SET THEN RETURN
        /TO CALL PLUS TWO FO A ACTIVE CONSOLE PACKAGE AC=0
        /IF NOT SET THEN TO CALL PLUS ONE FOR A DEACTIVE CONSOLE PACKAGE.


4000  0000    CHKCLA, 0
4001  7200          CLA
4002  1022          TAD     22              /GET THE CUTENTA OF LOCATION 22
4003  0377          AND     (400            /MASK FOR BIT 3 (400
4004  7650          SNA CLA                 /
4005  2200          ISZ     CHKCLA          /ACTIVE CONSOLE PACKAGE RETURN
                                            /CALL PLUS ONE (1) FOR ACTIVE
4006  5600          JMP I   CHKCLA          /DEACTIVE CONSOLE PACKAGE RETURN
                                            /CALL PLUS TWO (2)

        /C8ERR
        /THIS ROUTINE WILL DETERMINE WHAT TO DO WHEN A C8ERR IS ENCOUNTERED
        /WILL CHECK IF CLASSIC SYSTEM, WILL CHECK C8SWIT REGISTERS,
        /       C8ERR=  JMS XC8ERR
        /EX,    JMS     XC8ERR          /GO TO C8ERR CALL IF NOT CONSOL
        /                               /RETURN IS CALL PLUS ONE AC =0000

        /CALLS USED ARE =CHKCLA=XC8CRLF=XC8SW=XC8INQU=XC8PNT=XC8OCTA=


4007  0000    XC8ERR, 0
4010  6002          IOF
4011  3322          DCA     ACSAVE          /SAVE AC
4012  6004          GTF
4013  3324          DCA     FLSAVE          /SAVE THE FLAGS
4014  7501          MQA
4015  3323          DCA     MQSAVE          /SAVE THE MQ
4016  7340          CLA CLL CMA             /SUBTRACT A 1 FOR TRUE LOCATION
4017  1207          TAD     XC8ERR          /GET RETTURN LOCATION
4020  3321          DCA     PCSAVE          /SAVE ADD OF C8ERR CALL
4021  4200          JMS     CHKCLA          /CHECK LOC.22 BIT 3 CONSOL BIT
4022  7410          SKP                     /ACTIVE CONSOLE PACKAGE
4023  5263          JMP     NTCLAS          /NOT CLASSIC SYSTEM
4024  4776'         JMS     C8GET           /GET THE REGISTERS,
4025  4775'         JMS     XC8SW           /CHECK SWITCH REG FOR BIT THAT INDICATES
                                            /NO ERROR MESSAGE
4026  0374    SETUP1, AND     (0000           /MASK FOR BIT FOR NO ERROR PRINTING
                                            /IF THIS ERROR MESSAGE IS TO ALWAYS
                                            /BE PRINTED LEAVE AND VALUE AT 0000
4027  7640          SZA CLA                 /SKIP IF BIT IS 0 PRINT ERROR MESSAGE
4030  5255          JMP     C8DO10          /DO NOT PRINT
4031  4773'         JMS     XC8CRLF
4032  4772'         JMS     XC8PNT
4033  4075          ERRMES                  /PRINT THE ERROR MESSAGE
4034  4772'         JMS     XC8PNT
```

```
4035  4105            MESPC                   /PRINT THE PC STSTEMENT
4036  1321            TAD     PCSAVE
4037  4771'           JMS     XC8OCTA         /CONVENT 4 DIGIT PC TO ASCII
4040  4772'           JMS     XC8PNT
4041  4110            MESAC                   /PRINT THE AC MESS
4042  1322            TAD     ACSAVE
4043  4771'           JMS     XC8OCTA
4044  4772'           JMS     XC8PNT
4045  4113            MESMQ                   /PRINT MQ
4046  1323            TAD     MQSAVE
4047  4771'           JMS     XC8OCTA
4050  4772'           JMS     XC8PNT
4051  4116            MESFL                   /PRINT FL
4052  1324            TAD     FLSAVE
4053  4771'           JMS     XC8OCTA
4054  4773'           JMS     XC8CRLF
4055  4776'  C8DD10,  JMS     C8GET           /GET THE REGISTERS,
4056  4775'           JMS     XC8SW           /CHECK SWITCH REGISTER
4057  7610            SKP CLA                 /SKIP IF BIT 0 SET
4060  5273            JMP     C8BY2           /LEAVE
4061  4770'           JMS     XC8INQ          /GO TO THE INQUIRE ROUTINE
4062  5273            JMP     C8BY2           /LEAVE
4063  4776'  NTCLAS,  JMS     C8GET           /GET THE REGISTERS,
4064  4775'           JMS     XC8SW           /CHECK PSEUDO SWITCH REGISTER
                                              /CHECK THE C8SWIT REGISTER
4065  7610            SKP CLA                 /SKIP IF HALT
4066  5607            JMP I   XC8ERR          /NO HALT CONTINUE
4067  1367            TAD     (7402           /CODE FOR HLT
4070  3721            DCA I   PCSAVE          /PUT IT IN CALL LOC,
4071  4776'           JMS     C8GET
4072  5721            JMP I   PCSAVE          /EXIT  TO CALL AND HALT
4073  4776'  C8BY2,   JMS     C8GET           /GET THE REGISTERS
4074  5607            JMP I   XC8ERR
4075  0410    ERRMES, TEXT    "DMRKDO  FAILED "
4076  2213
4077  0404
4100  4040
4101  0601
4102  1114
4103  0504
4104  4000
4105  4040    MESPC,  TEXT    "  PC:"
4106  2003
4107  7200
4110  4040    MESAC,  TEXT    "  AC:"
4111  0103
4112  7200
4113  4040    MESMQ,  TEXT    "  MQ:"
4114  1521
4115  7200
4116  4040    MESFL,  TEXT    "  FL:"
4117  0614
4120  7200
4121  7777    PCSAVE, 7777
4122  7777    ACSAVE, 7777
```



```
4123  7777    MQSAVE, 7777
4124  7777    FLSAVE, 7777

                $$$
4167  7402
4170  3435
4171  3600
4172  3103
4173  3623
4174  0000
4175  3062
4176  3424
4177  0400
```

```
0000  11110000  11000000  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  00000000  00000111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111000  00000111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000001

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000

2200
2300

2400
2500

2600
2700

3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  10000001  11111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11110000  11111111  11111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3700  11111111  11111111  11111111  11111111  11111111  11100000  00111111  11111111
```



```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11111000  00000000  00000000  00000000  00000001  11111111

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
```

```
A0770   1513        CHKCLA  4000        DSK5B   0156        INMODE  3676
A7007   1512        CHKDAT  0353        DSK6A   0146        IOT0    0734
ACL     7701        CHKDSK  0337        DSK6B   0157        IOT1    0741
ACSAVE  4122        CHKER   1112        DSK7A   0147        IOT2    0746
ADPOT1  0137        CHKR1   1007        DSK7B   0160        IOT3    0714
ADPOT2  0150        CHNPOT  1517        DSKCNT  0105        IOT4    0785
ADPT1   1637        CKCOUT  3032        DSKP    6741        IOT5    0672
ADPT2   1640        CLDR    0745        DSKSKP  4441        IOT6    0727
ADREG   0125        CLKCNT  0132        DTREG   0126        IOTCHN  4430
AERRO   1600        CLRALL  4445        ENDBUF  2577        K0003   0060
AGAIN   0533        CMREG   0121        ENDIT   3542        K0007   0062
ALLAGN  0220        CNT     1554        ENDTST  0424        K0010   1324
AMOUNT  0056        CNTRLC  3347        ERHLT0  0736        K0037   0074
APT8    1125        CNTRLD  3400        ERHLT2  0750        K0040   0063
APT8A   4424        CNTRLE  3344        ERHLT3  0716        K0077   1323
AUTO10  0010        CNTRLL  3336        ERHLT4  0707        K0100   1556
AUTO11  0011        CNTRLO  3300        ERHLT5  0674        K0177   1370
BGN     0200        CNTRLR  3311        ERHLT6  0751        K0200   0066
BGNBUF  0055        CNTRLS  3320        ERMES1  1734        K0212   1226
BGNTST  0127        CNTVAL  3052        ERMES2  1736        K0215   1225
BYRETR  3306        COUNT   1553        ERMES3  2000        K0240   1521
C8BY1   3030        CRLF    4452        ERR1    3556        K0260   0067
C8BY2   4073        CSAVE1  1514        ERRMES  4075        K0277   0065
C8BY3   3661        CSAVE2  1515        ERRO    0436        K0316   1371
C8BY4   3315        DAREG   0123        ERROR   4437        K0331   1372
C8BY5   3716        DATCNT  0131        ERTX1   1664        K0400   0073
C8CHAR  3675        DATER   1103        ERTX2   1675        K2000   1527
C8CKP   3622        DATOK   1071        ERTX3   1705        K3600   1526
C8CONT  3745        DCLR    6742        ERTX4   1717        K3740   1511
C8DO1   3110        DLAG    6743        EXBIT   0120        K4      0061
C8DO10  4055        DLCA    6744        EXIT    1506        K4000   0070
C8DO11  3407        DLDC    6746        EXITA   3240        K4100   1510
C8DO2   3633        DLSC    6740        EXTICK  1551        K5000   0667
C8DO3   3150        DMAN    6747        FILCNT  3640        K6500   1571
C8DO4   3606        DOCNT   3047        FILLER  3637        K6520   1620
C8DO7   3326        DONE    0250        FLSAVE  4124        K7377   1173
C8GET   3424        DONEA   3226        FORMAT  0302        K7400   0764
C8HANG  3722        DOPACK  3012        FRMDSK  0263        K7577   0670
C8RDP8  3466        DOSET   3051        FROCT   1227        K7700   1322
C8RETD  3414        DRIVNO  0100        FRSTUK  1056        K7735   0071
C8RETR  3335        DRST    6745        GDREG2  0117        K7741   1325
C8SETD  3413        DSK0A   0140        GETCM1  3503        K7760   0072
C8SETS  3334        DSK0B   0151        GETDAT  3256        K7771   0557
C8SWST  3545        DSK1A   0141        GOITA   3243        KAENRO  4426
C8TMP1  3621        DSK1B   0152        GOTOA   3254        KCDF    0075
CAF     6007        DSK2A   0142        GTF     6004        KCNT    1555
CAREG   0124        DSK2B   0153        HEDLST  0553        KERRO   1621
CCNTR1  1516        DSK3A   0143        HEDTAD  0552        KILBUF  4435
CHANG   1463        DSK3B   0154        HIGHAD  0103        KLBUF   0752
CHANGR  1477        DSK4A   0144        HITRK   2200        KTICK   1530
CHAR    0101        DSK4B   0155        HOMEMA  0130        KTIME   1557
CHECK   0400        DSK5A   0145        INDEXA  3255        KWAIT   1511
```



```
LDAD    0711        PRNTER  4447        TEXST   1652        XRDST   0040
LDADD   4444        PSIE    6665        TICK    4427        XRDTRK  0032
LDCA    0700        PSKE    6663        TIME    4425        XREG    0546
LDCM    0720        PSKF    6661        TMPCNT  3546        XRESTR  0033
LDCMD   4442        PSTB    6664        TOCT    1200        XSDKP   0041
LDCUR   4443        PTSTOR  3156        TRKCNT  0104        XTABLA  3257
LDSC    4446        QUES1   0232        TSTCMA  3515        XTABLB  3260
LOC8ED  0134        RDST    0671        TTYLPT  3721        XTEXT   0545
LODER   0654        RDSTAT  4440        TWOCT   4451        XTICK   0027
LODR1   0611        RECAL   4433        TYPE    4436        XTIME   0025
LODTRK  4431        RECEIV  4434        UPARUW  3415        XTOCT   0051
LOTRK   2201        REDDSK  4432        UPONE   1215        XWAIT   0034
LOWAD   0102        REDOA   3215        WAIT    1547        XWRTRK  0031
M10     0077        REDTRK  1000        WASDSK  0242        XXLDSC  0046
M313    0064        RENEX1  0335        WATMES  3451
MQ      0076        RENEX2  0414        WRKBUF  2200
MCNTR1  1641        RESTA   1425        WRTDSK  0521
MES1    2045        RESTER  1443        WRTTRK  0600
MES2    2066        RESTOR  1400        XAERNO  0026
MES3    2117        RETRN1  0544        XAPT8   0024
MES4    2126        SAMAGN  0224        XC8CKP  3641
MES5    2135        SAVPC   1622        XC8CNT  3200
MESA    3547        SBCNT1  0106        XC8CNL  3623
MESAC   4110        SDKP    0740        XC8ECH  3663
MESFL   4116        SETUP1  4026        XC8ERR  4007
MESMAN  3746        SETUP2  3025        XC8INQ  3435
MESMQ   4113        SOFT    0136        XC8OCT  3600
MESPAS  3053        STAER   1106        XC8PAS  3000
MESPC   4105        STAOK   1041        XC8PAU  3157
MOVE    1623        STCNT1  0107        XC8PNT  3103
MQA     7501        STCNT2  0110        XC8PSW  3456
MQL     7421        STCNT3  0111        XC8SW   3062
MQSAVE  4123        STRAUT  0513        XC8TTY  3072
MULDSK  1153        STREG   0122        XC8TYP  3677
NEXCHK  0347        SWITCH  0057        XCHANG  0030
NEXFRM  0276        TABLA   3261        XCLDR   0045
NOSET   3042        TABLB   3271        XCRLF   0052
NOTDSK  0244        TCHKT   1113        XDOLPT  3712
NOTEX   0536        TCNTR1  0112        XDOSW   3317
NTCLAS  4063        TCNTR2  0113        XEND    0135
NTGD    0474        TCNTR3  0114        XERRO   0057
OCTEL   4450        TCNTR4  0115        XFROCT  0058
PASCNT  3050        TCNTR5  0116        XHITRK  0054
PCLF    6662        TEXAD   1660        XKLBUF  0035
PCNTR1  0547        TEXCA   1656        XLDAD   0044
PCNTR2  0550        TEXCM   1650        XLDCA   0043
PCNTR3  0551        TEXDA   1654        XLDCM   0042
PCOUNT  0161        TEXDT   1662        XLDSC   0733
PCSAVE  4121        TEXEND  2021        XLOTRK  0053
PNTBUF  3720        TEXEX   1646        XMOVE   0133
PRINT   1312        TEXGO   1644        XPRINT  0036
PRN     1252        TEXPC   1642        XPRN    0047
```

ERRORS DETECTED: 0

LINKS GENERATED: 132

RUN-TIME: 4 SECONDS

3K CORE USED