IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DHRKC-H-D

PRODUCT NAME: RK8E/RK8L DATA RELIABILITY PROGRAM

DATE RELEASED: FEBRUARY, 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

AUTHOR: JOHN VROBEL/WILLIAM HEAVEY

TABLE OF CONTENTS

1. ABSTRACT

THE RK8E/RK8L DATA RELIABILITY PROGRAM IS DESIGNED PRIMARILY AS AN ACCEPTANCE TEST TO VERIFY DISK DATA TRANSFERS WITHIN THE DISK SYSTEM.

THE "ACCEPT MODE" OF OPERATION VERIFIES THE CAPABILITY OF TRANSFERRING A TOTAL 3 X 18(9) BITS OF DATA TO AND FROM EACH INDIVIDUAL DISK DRIVE ON THE DISK SYSTEM.

THE "MANUAL INTERVENTION MODE" IS AVAILABLE AS A HARDWARE DEBUGGING AID TO ALLOW THE OPERATOR TO SELECT DATA PATTERNS, TRANSFER LENGTHS, AND ADDRESSING.

(NOTE: LOCATION 0 CONTAINS REVSION LEVEL (IN ASCII) OF PROGRAM ON PROGRAM LOAD).

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 CONTROL USES IOTS FOR EXTENDED DRIVES 4-7 WHICH IS NOT AVAILABLE ON THE DW8E.

2.1 HARDWARE

A. PDP-8/A, 8/E, 8/F, OR 8/M COMPUTER OR OTHER FAMILY OF 8 COMPATIBLE COMPUTER WITH NECCESSARY DW8E BUS ADAPTER.

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

C. ASR-33 TELETYPE OR EQUIVALENT

D. RK8E OR RK8L DISK CONTROL

E. RK05J OR RK05F DISK DRIVE(S)

F. FORMATTED 2288 BPI-16 SECTOR PACK(S).

NOTE: THE RK05F DISK DRIVE IS CONSIDERED AS TWO SEPARATE UNITS. WHEN ANSWERING ALL QUESTIONS THE SEPARATE DRIVES MUST BE SPECIFIED. DSK0?, DSK1?, DSK2?, ETC.

2.2 PROGRAM STORAGE

THE PROGRAM OCCUPIES OR UTILIZES LOCATION 0000 TO LOCATION 7577 OF FIELD 0. ALL EXTENDED MEMORY LOCATIONS, IF AVAILABLE, ARE UTILIZED FOR TESTING.

2.3 PRELIMINARY PROGRAMS

THIS PROGRAM REQUIRES A FORMATTED CARTRIDGE ON ALL DRIVES TO BE TESTED.

ALL BASIC AND EXTENDED MEMORY DIAGNOSTICS SHOULD BE RUN PRIOR TO RUNNING THIS PROGRAM.

RK8E CONTROL: RUN THE RK8E DISKLESS CONTROL TEST AND THE RK8E/RK8L DISK FORMATTER IF THIS DIAGNOSTIC FAILS TO OPERATE PROPERLY.

RK8L CONTROL: RUN THE RK8L INSTRUCTION TEST AND THE RK8E/RK8L FORMATTER IF THIS DIAGNOSTIC FAILS TO OPERATE PROPERLY.

2.4 EXECUTION TIME

THE PROGRAM EXECUTION TIME (I.E. PASSING 3 X 10(9) BITS OF DATA ON A DISK DRIVE), IS APROX. 4 HOURS PER DISK DRIVE ON A 4K MEMORY SYSTEM OR APROX. 3.5 HOURS PER DISK DRIVE ON SYSTEMS WITH EXTENDED MEMORY.

3. SWITCH REGISTER SETTINGS

SWR0=1 LOOP ON WRITE SEQUENCE.

SWR1=1 LOOP ON READ SEQUENCE.

SWR2=1 INHIBIT ALL ERROR TYPEOUTS

SWR3=1 TYPE "STATUS-COMPLETE" REPORT.

SWR4=1 PROGRAM STOP ON HALT.

SWR5=1 DRIVE DISCONNECT AFTER PASS COMPLETION.

SWR6=1 PERFORM ONLY "OVERLAP SEEKS", DO NOT EXECUTE DATA BREAKS.

4. OPERATOR AND/OR PROGRAM ACTION

4.1 STANDARD TEST PROCEDURE

A. START AS SPECIFIED THROUGH OUT THIS DOCUMENTATION IS KEY CLEAR AND THEN KEY CONTINUE ON PDP8/E, PDP8/M, AND PDP8/F COMPUTERS.

B. LOAD THE PROGRAM INTO MEMORY FIELD 0 USING THE STANDARD BINARY LOADER TECHNIQUE.

C. IF IT IS DESIRED TO CHANGE THE IOT CODES WITHIN THE PROGRAM, FOLLOW THE PROCEDURE IN SECTION 4.6.

D. RUN THE ACCEPTANCE MODE OF DATA RELIABILITY WITH ALL DRIVES AND MEMORY AVAILABLE BY FOLLOWING THE PROCEDURE

IN SECTION 4.4.

E. THE MANUAL INTERVENTION MODE, SECTION 4.5, MAY BE USED FOR TROUBLE SHOOTING, IF DESIRED.

F. IF POSSIBLE SWR4=1 SHOULD ALWAYS BE USED TO STOP THE PROGRAM.

G. IF THE PROGRAM HAS BEEN STOPPED DUE TO SWR4=1, THE PROGRAM CAN BE RESTARTED, AND THE INITIAL STARTUP QUESTIONS BYPASSED, BY USING 0205 AS THE RESTART ADDRESS.

H. FOR THE ABSOLUTE LOCATIONS OF ALL KNOWN HALTS IN THIS PROGRAM, ACCESS PAGE 1-22 OF THE PROGRAM LISTING.

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 TO DISK DRIVE ON.

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

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

E. VERIFY THAT THE 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 THE 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 THE LIGHT LABELED "WT PROT" IS OFF.

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

4.3 RK05F DRIVE SETUP PROCEDURE

THE FOLLOWING IS THE CORRECT 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 RK8E/RK8L DATA RELIABILITY (ACCEPT MODE)

A. MAKE READY ALL DRIVES TO BE TESTED USING THE RK05J DRIVE CARTRIDGE MOUNTING PROCEDURE SECTION 4.2 OR THE RK05F DRIVE PROCEDURE IN SECTION 4.3.

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

C. VERIFY THAT AC POWER IS ON, ON ALL DRIVES NOT BEING TESTED.

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

E. SET THE SWITCH REGISTER TO 0000 AND PRESS START.

F. THE OPERATOR MAY SET SWR5=1 IF IT IS DESIRED TO HAVE THE PROGRAM AUTOMATICALLY DISCONNECT EACH DISK DRIVE AS EACH MAKE THEIR PASS COMPLETION. (NOTE: IF SWR5=0, ALL DISK DRIVES WILL CONTINUE TO RUN AFTER THEIR PASS COMPLETION)

G. THE TTY WILL PRINT THE FOLLOWING PROGRAM NAME AND QUESTION,

```
RK8E/RK8L DATA RELIABILITY
EXTENDED R/W MEMORY (0-7)?
```

THE OPERATOR SHOULD THEN TYPE THE AMOUNT OF EXTENDED READ/WRITE MEMORY BANKS NUMBERED SEQUENCIALLY FROM BANK 0, AS INDICATED BY THE TTY QUESTION.

H. THE TTY WILL PRINT THE FOLLOWING QUESTION(S), ASKING THE

DESIRED DISK DRIVE(S) TO BE USED IN TESTING.

```
EXERCISE DISK0?
EXERCISE DISK1?
EXERCISE DISK2?
EXERCISE DISK3?
EXERCISE DISK4?
EXERCISE DISK5?
EXERCISE DISK6?
EXERCISE DISK7?
```

FOR THE QUESTION(S) ABOVE, TYPE Y FOR YES, IF IT IS DESIRED TO TEST THE DISK DRIVE IN QUESTION, OTHERWISE, TYPE N FOR NO.

I. THE TTY WILL PRINT THE FOLLOWING QUESTION.

```
ACCEPT MODE?
```

THE OPERATOR SHOULD THEN TYPE Y FOR YES TO RUN THE ACCEPTANCE MODE OF OPERATION.

J. THE TTY WILL PRINT THE FOLLOWING QUESTION.

```
ARE YOU SURE?
```

IF THE OPERATOR IS CERTAIN OF THE AMOUNT OF MEMORY, THE DISK DRIVE(S) SELECTED, AND THE MODE OF OPERATION, TYPE Y FOR YES. TYPING N FOR NO WILL RESULT IN A REPEAT OF ALL MESSAGES AND QUESTIONS ENCOUNTERED THUS FAR.

K. THE PROGRAM SHOULD START TESTING THE DISK DRIVE(S) AND MEMORY SELECTED.

L. THE "STATUS-COMPLETE" TYPEOUT SHOULD OCCUR UPON PASS COMPLETION OF EACH DISK DRIVE. ALL OTHER TYPEOUTS OR HALTS WILL BE CONSIDERED AS AN ERROR CONDITION. SEE SECTION 5.5 FOR "STATUS-COMPLETE" TYPEOUT.

M. A SUCCESSFUL PASS COMPLETE ON A DISK DRIVE WILL BE CONSIDERED AS NO "HARD" ERRORS AND NO MORE THAN ONE (1) "SOFT" ERROR PER PASS COMPLETE.

N. IF ANY ERRORS DO OCCUR, THE OPERATOR SHOULD ACCESS SECTION 5 IN THIS DOCUMENTATION.

4.5 RK8E/RK8L DATA RELIBILITY (MANUAL INTERVENTION MODE)

THE MANUAL INTERVENTION MODE IS AVAILABLE AS A TROUBLE SHOOTING AID AND SHOULD ONLY BE USED FOR SUCH PURPOSES, IF DESIRED.

A. MAKE READY ALL DISK DRIVES TO BE TESTED USING THE RK05J DRIVE CARTRIDGE MOUNTING PROCEDURE SETION 4.2. OR THE RK05F DRIVE PROCEDURE SECTION 4.3.

B. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION ON

ALL DRIVES NOT BEING TESTED.

C. VERIFY THAT AC POWER IS ON, ON ALL DRIVES NOT BEING TESTED.

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

E. SET THE SWITCH REGISTER TO 0000 AND PRESS START.

F. THE TTY WILL PRINT THE FOLLOWING PROGRAM NAME AND QUESTION.

```
RK8E/RK8L DATA RELIABILITY
EXTENDED R/W MEMORY (0-7)?
```

THE OPERATOR SHOULD THEN TYPE THE AMOUNT OF EXTENDED READ/WRITE MEMORY BANKS NUMBERED SEQUENCIALLY FROM BANK 0, AS INDICATED BY THE TTY QUESTION.

G. THE TTY WILL PRINT THE FOLLOWING QUESTION(S), ASKING THE DESIRED DISK DRIVE(S) TO BE USED IN TESTING.

```
EXERCISE DISK0?
EXERCISE DISK1?
EXERCISE DISK2?
EXERCISE DISK3?
EXERCISE DISK4?
EXERCISE DISK5?
EXERCISE DISK6?
EXERCISE DISK7?
```

FOR THE QUESTION(S) ABOVE, TYPE Y FOR YES, IF IT IS DESIRED TO TEST THE DISK DRIVE IN QUESTION, OTHERWISE, TYPE N FOR NO.

H. THE TTY WILL PRINT THE FOLLOWING QUESTION.

```
ACCEPT MODE?
```

THE OPERATOR SHOULD THEN TYPE N FOR NO TO RUN THE MANUAL INTERVENTION MODE OF OPERATION.

I. THE TTY WILL THEN PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT MEMORY FIELD, RATHER THAN THE NORMAL RANDOM FIELD SELECTION.

```
FIELD?
```

IF THE OPERATOR DESIRES TO SELECT A CONSTANT FIELD, TYPE Y FOR YES, OTHERWISE, TYPE N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO TYPE THE DESIRED FIELD IN OCTAL (0-7).

J. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT TRACK, RATHER THAN THE NORMAL RANDOM TRACK SELECTION.

```
TRACK?
```

IF THE OPERATOR DESIRES TO SELECT A CONSTANT TRACK, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED, THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO INPUT THE DESIRED TRACK ADDRESS (00000-14537).

K. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT HALF BLOCK OR FULL BLOCK TRANSFERS, RATHER THAN THE NORMAL RANDOM SELECTION.

BLOCK LENGTH?

IF THE OPERATOR DESIRES TO CHANGE THE BLOCK LENGTH, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO TYPE THE BLOCK LENGTH DESIRED (0=256 WORD BLOCK OR 1=128 WORD BLOCK).

L. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT NUMBER OF SECTORS TO BE TRANSFERED, RATHER THAN THE NORMAL RANDOM SECTOR SELECTION.

EXTRA SECTORS?

IF THE OPERATOR DESIRES TO SELECT A CONSTANT AMOUNT OF SECTORS, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE, AND WAIT FOR THE OPERATOR TO TYPE IN THE EXTRA SECTORS DESIRED (00-17). (NOTE: IF THE FIELD AND THE BLOCK LENGTH PREVIOUSLY SELECTED WAS 0, THE AMOUNT OF EXTRA SECTORS WILL BE LIMITED TO 07. OTHERWISE THE MAXIMUM AMOUNT IS LIMITED TO 17.)

M. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A DATA PATTERN, RATHER THAN NORMAL RANDOM DATA SELECTION.

DATA?

IF THE OPERATOR DESIRES TO SELECT A DATA PATTERN, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED, THE TTY WILL DO A "CRLF" AND WAIT FOR THE OPERATOR TO TYPE IN 12 OCTAL DATA WORDS TO BE USED IN TESTING.

N. THE TTY WILL PRINT THE FOLLOWING QUESTION.

ARE YOU SURE?

IF THE OPERATOR IS CERTAIN OF THE INFORMATION SELECTED, TYPE Y FOR YES, TYPING N FOR NO WILL RESULT IN A REPEAT OF ALL MESSAGES AND QUESTIONS ENCOUNTERED THUS FAR.

P. THE PROGRAM SHOULD START EXECUTING THE OPERATIONS SELECTED.

R. IF ERRORS ARE ENCOUNTERED, ACCESS SECTION 5 IN THIS DOCUMENTATION.

4.6 CHANGE PROGRAM DEVICE IOT CODES

THE PROGRAM NORMALLY RECOGNIZES DEVICE IOT CODE X74X. TO CHANGE THE DEVICE IOT CODES WITHIN THE PROGRAM:

A. SET THE SWITCH REGISTER TO 0204 AND PRESS LOAD ADDRESS.

B. SET THE SWITCH REGISTER TO 0000, SET SWITCH REGISTER BITS 3-8 TO THE DESIRED DEVICE IOT CODE, AND PRESS START.

C. THE PROGRAM WILL CHANGE THE DEVICE IOT CODES WITHIN THE PROGRAM AND THEN HALT.

D. PRESSING KEY CONTINUE WILL START THE PROGRAM AT LOCATION 0200 (SEE SECTIONS 4.4 OR 4.5 FOR OPERATION INSTRUCTIONS).

5. ERRORS

5.1 USEFUL INFORMATION

ALL STATUS ERRORS WILL BE REPORTED AS STATUS ERRORS. ALL DATA ERRORS WILL BE REPORTED AS DISK DATA ERRORS.

WHEN DATA IS BEING READ OFF THE DISK AND A CRC ERROR OCCURRES THE PROGRAM WILL REPORT THE ERROR AS A READ STATUS ERROR. THE PROGRAM WILL THEN CHECK THE DATA READ FOR DATA ERRORS. IF DATA ERRORS EXIST THEY WILL BE REPORTED AS DISK DATA ERRORS.

5.2 ERROR HALTS

ERROR HALTS FOR WHICH THERE ARE NO ERROR TYPEOUTS ARE LISTED AND DEFINED AS FOLLOWS.

BIGSTP	MASTER ERROR HALT FOR ALL OF THE FOLLOWING ERROR STOPS. WHEN THE COMPUTER HALTS THE AC REGISTER WILL INDICATE THE PC OF THE FAILING ERROR STOP.
INTER1	NO DISK INTERRUPT
ERHLT0	SKIP TRAP FOR IOT "DLSC"
ERHLT2	SKIP TRAP FOR IOT "DCLR"
ERHLT3	SKIP TRAP FOR IOT "DLAG"
ERHLT5	SKIP TRAP FOR IOT "DRST"
ERHLT6	SKIP TRAP FOR IOT "DLDC"
BADHLT	CHECKSUM FAILED BUT WORD-BY-WORD COMPARE WORKED

NODSKS	NO DISKS AVAILABLE TO RUN
FLDHLT	PROGRAM WILL ONLY RUN IN FIELD 0

FOR THE ABSOLUTE LOCATIONS OF THE HALTS LISTED ABOVE, ACCESS PAGE 1-22 OF THE PROGRAM LISTING.

5.3 ERROR TYPEOUTS

WHEN AN ERROR OCCURRES THE PROGRAM WILL PRINT AN "ERROR HEADER" WHICH WILL SPECIFY THE PARTICULAR TYPE OF ERROR FOUND AT THE TIME OF THE FAILURE.

POSSIBLE "ERROR HEADERS" ARE AS FOLLOWS.

WRITE STATUS ERROR
READ STATUS ERROR
DISK DATA ERROR
RECALIBRATE STATUS ERRUR

AFTER THE "ERROR HEADER" MENTIUNED ABOVE IS TYPED, THE PROGRAM WILL PRINT THE FOLLOWING ERROR INFORMATION FOUND AT THE TIME OF THE FAILURE, PERTAINING TO THE FAILURE. POSSIBLE TYPEOUTS ARE AS FOLLOWS.

PC: PROGRAM LOCATIUN OF THE ACTUAL FAILURE.

ST: CONTENTS OF THE STATUS REGISTER.

EX: EXTENDED DRIVE BIT

CM: SOFTWARE COMMAND REGISTER.

IA: INITIAL SOFTWARE DISK ADDRESS REGISTER OR THE CYLINDER, SURFACE, AND SECTOR BITS.

DA: FINAL SOFTWARE DISK ADDRESS REGISTER OR THE CYLINDER, SURFACE, AND SECTOR BITS.

CA: SOFTWARE INITIAL CURRENT ADDRESS

WC: SOFTWARE INITIAL WORD COUNT

FW: SOFTWARE FINAL WORD COUNT

AS: SECTOR IN ERROR ON THE PARTICULAR CYLINDER AND SURFACE IN QUESTION.

WA: WORD ADDRESS WITHIN THE SECTOR IN ERROR

AD: BREAK ADDRESS OF DATA BREAK IN COMPUTER.

DG: EXPECTED DATA

DB: DATA FOUND DURING DATA BREAK.

5.4 ERROR RECOVERY AND ERROR DISCONNECT

WHEN A READ, WRITE, OR DISK DATA ERROR OCCURRES(SEE SECTION 5.3), THE PROGRAM WILL TRY TO REPEAT THE FAILING SEQUENCE FOUR (4) TIMES. IF THE ERROR HAS OCCURRED FOUR (4) TIMES SIMULTAINIOUSLY, THE ERROR WILL BE CONSIDERED AS A NON-RECOVERABLE ERROR, THE "ERROR HEADER" WILL BE CHANGED TO INDICATE "NON-RECOVERABLE" ERROR, ANOTHER DISK ADDRESS WILL BE SELECTED FOR TESTING. IF A "SOFT" ERROR SHOULD OCCUR ON A TRACK, THE PROGRAM WILL RETRY THE READ SEQUENCE (64) TIMES BEFORE SELECTING ANOTHER TRACK FOR TESTING.(NOTE:THIS 64 RETRYS ON "SOFT" ERRORS WILL BE TERMINATED ON A "HARD" ERROR).

POSSIBLE NON-RECOVERALBLE ERROR HEADERS ARE AS FOLLOWS.

```
NON-RECOVERABLE READ STATUS ERROR
NON-RECOVERABLE WRITE STATUS ERROR
NON-RECOVERABLE DISK DATA ERROR
```

IF A NON-RECOVERABLE READ OR WRITE ERROR SHOULD OCCUR, THE DISK IN QUESTION WILL THEN BE RECALIBRATED (RESTORED TO CYLINDER 0). IF THE RECALIBRATE SEQUENCE FAILS, THE DISK DRIVE IN ERROR WILL BE DISCONNECTED BY THE PROGRAM AND NO LONGER BE TESTED.

THE FOLLOWING "DISCONNECT" AND "STATUS-COMPLETE" TYPEOUTS SHOULD OCCUR.

```
RECALIBRATE ERROR DISCONNECT!
DISK X DISCONNECTED!
DSK HARD SOFT COMP
 X  0030 0010 0001
 X  0240 5670 0001
```

IF ALL DISKS ON THE SYSTEM HAVE BEEN DISCONNECTED DO TO RECALIBRATE ERRORS THE FOLLOWING TYPEOUT WILL OCCUR AND THE PROGRAM WILL HALT.

```
DISK SYSTEM SHUT DOWN, NO DISKS TO RUN!
```

5.5 STATUS-COMPLETE TYPEOUT AND PASS COMPLETE DISCONNECT

ALL ERRORS AND PASS COMPLETES ARE TALLIED BY THE PROGRAM PER DISK DRIVE.

THE FOLLOWING IS AN EXAMPLE OF THE "STATUS-COMPLETE" TYPEOUT THAT WILL OCCUR WHEN SWR3=1 INDICATING TYPE THIS REPORT, A PASS COMPLETE OCCURRES ON A DRIVE UNDER TEST, OR A DRIVE IS DISCONNECTED DO TO A RECALIBRATE ERROR.

```
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

```
X  XXXX XXXX XXXX
```

THE TYPEOUT AS MENTIONED ABOVE IS DESCRIBED AS FOLLOWS.

DSK	DISK DRIVE IN QUESTION.
HARD	ALL ERRORS OTHER THAN THAT DEFINED AS A SOFT ERROR.
SOFT	A READ CRC STATUS ERROR WITH BAD DATA PER TRANSFER WITH RECOVERY POSSIBLE WITHIN FOUR (4) RETRYS. (NOTE: FOUR (4) CONSECUTIVE RETRYS WILL BE CONSIDERED AS A NON-RECOVERABLE ERROR OR A "HARD" ERROR).
COMP	PASS COMPLETES. <3 X 10(9) BITS>

IF SWR5=1 INDICATING "DISCONNECT ON PASS COMPLETION", AND A DISK DRIVE UNDER TEST MAKES A PASS COMPLETION, THE FOLLOWING TYPEOUT WILL OCCUR AND THE DRIVE WILL BE DISCONNECTED.

```
DISK X PASS COMPLETE!
DISK X DISCONNECTED!
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

IF SWR5=0 INDICATING DON'T "DISCONNECT ON PASS COMPLETION", AND A DISK DRIVE UNDER TEST MAKES A PASS COMPLETION, THE FOLLOWING TYPEOUT WILL OCCUR AND THE DRIVE WILL CONTINUE TO RUN.

```
DISK X PASS COMPLETE!
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

IF SWR5=1 AND ALL DRIVES HAVE MADE THEIR PASS COMPLETION AND HAVE BEEN DISCONNECTED, THE FOLLOWING TYPEOUT WILL OCCUR AND THE COMPUTER WILL HALT.

```
DISK SYSTEM SHUT DOWN, NO DISKS TO RUN!
```

5.6 TYPICAL ERROR TYPEOUTS

THE FOLLOWING IS AN EXAMPLE OF AN "ERROR HEADER" AND ERROR TYPEOUT THAT COULD HAVE OCCURRED ON A WRITE STATUS ERROR. (NOTE CRC IN THE STATUS INDICATOR "ST:")

```
WRITE STATUS ERROR
PC:2371 ST:4010 EX:0001 CM:4000 IA:0001 DA:0002
CA:3600 WC:7000 FW:0000
```

THE FOLLOWING IS AN EXAMPLE OF AN ERROR TYPEOUT THAT COULD HAVE OCCURRED IF THE STATUS REGISTER FAILED ON A SEEK ONLY FUNCTION.

```
        SEEK STATUS ERROR
        PC:2076 ST:4002 EX:0001 CM:3000 DA:4007
```

THE FOLLOWING IS A TYPICAL EXAMPLE OF AN "ERROR HEADER" AND ERROR TYPEOUT THAT COULD HAVE OCCURRED ON A DISK DATA ERROR. (NOTE: ADDITION DATA ERRORS IN BUFFER)

```
        DISK DATA ERROR
        PC:1674 ST:4010 EX:0001 CM:1432 IA:1035 DA:1021
        CA:0001 WC:5000 FW:7400
        AS:0015 WA:0007 AD:0010 DG:0537 DB:0536
        AS:0015 WA:0077 AD:0100 DG:7777 DB:7776
        AS:0016 WA:0002 AD:0405 DG:6167 DB:6166
```

6. RESTRICTIONS

ALL DISK DRIVES SHOULD BE SET TO THE LOAD POSITION THAT ARE NOT BEING TESTED.

7. TROUBLE SHOOTING INFORMATION

IOT	FUNCTION
6740 DLSC	LOAD SECTOR COUNTER AND EXTENDED DRIVE BIT FOR RK8L.
AC	
0-3	LOAD THE DESIRED AMOUNT OF SECTORS TO BE TRANSFERRED WITH THE BINARY VALUE IN AC BITS 0-3.
4	EXTENDED DRIVE BIT FOR DRIVES 4-7
6741 DSKP	"SKIP" SKIP IF TRANSFER DONE FLAG OR ERROR FLAG IS SET.
6742 DCLR	"CLEAR" FUNCTION IS REGULATED BY AC BITS 10 AND 11. THE AC IS THEN CLEARED.

AC10	AC11	
0	0	CLEAR THE AC AND STATUS REGISTER.
0	1	CLEAR THE AC, CONTROL, AND MAJOR REGISTERS. THIS INSTRUCTION WILL STOP THE CONTROL EVEN IF IT IS WRITING A HEADER. THIS IS THE ONLY INSTRUCTION THAT CLEARS MAINTENANCE MODE.

1 0	CLEAR AC, RECALIBRATE DISK DRIVE, AND CLEAR STATUS REGISTER.
6743 DLAG	"LOAD DISK ADDRESS AND GO" LOAD THE DISK CYLINDER, SURFACE, AND SECTOR FROM THE AC, CLEAR THE AC, AND DO THE COMMAND IN THE COMMAND REGISTER.
AC --	
0-6	CYLINDER
7	SURFACE (1=UPPER) (0=LOWER)
8-11	SECTOR
6744 DLCA	"LOAD CURRENT ADDRESS" LOAD THE CURRENT ADDRESS FROM AC. THE AC IS THEN CLEARED.
AC --	
0-11	CURRENT ADDRESS
6745 DRST	"READ STATUS" CLEAR THE AC AND READ THE CONTENTS OF THE STATUS REGISTER INTO THE AC.
AC --	
0	TRANSFER DONE
1	READY TO SEEK, READ, OR WRITE.
2	NOT USED
3	SEEK FAIL
4	DISK FILE READY
5	CONTROL BUSY ERROR
6	TIME OUT ERROR
7	WRITE LOCK ERROR
8	CRC ERROR
9	DATA RATE ERROR
10	DRIVE STATUS ERROR
11	CYLINDER ADDRESS ERROR
6746 DLDC	"LOAD COMMAND" LOAD THE COMMAND REGISTER FROM AC, CLEAR THE AC, AND CLEAR THE STATUS REGISTER.
AC --	
0-2=0	READ DATA
0-2=1	READ ALL
0-2=2	WRITE LOCK
0-2=3	SEEK ONLY
0-2=4	WRITE DATA

0-2:5	WRITE ALL
0-2:6	NOT USED
0-2:7	NOT USED
3	ENABLE INTERRUPT
4	ENABLE SET TRANSFER DONE ON SEEK DONE
5	HALF BLOCK 128 WORDS
6	EXTENDED MEMORY ADDRESS
7	EXTENDED MEMORY ADDRESS
8	EXTENDED MEMORY ADDRESS
9	UNIT SELECT
10	UNIT SELECT
11	EXTENDED CYLINDER ADDRESS

6747 DMAN — "MAINTENANCE IOT" LOAD THE MAINTENANCE REGISTER FROM THE AC. THE FUNCTION IS REGULATED BY THE AC BITS. MAINTENANCE MODE CAN ONLY BE CLEARED BY DCLR "CLEAR CONTROL".

AC

0	ENTER MAINTENANCE MODE
1	ENABLE SHIFT TO LOWER BUFFER
2	AC BIT 10, CRC REGISTER, AND THE LOWER DATA BUFFER ARE CONNECTED AS A SHIFT REGISTER. AC BIT 10 DATA SHIFTS TO THE CRC, THE CRC SHIFTS TO THE LOWER DATA BUFFER.
3	SHIFT COMMAND REGISTER TO THE LOWER DATA BUFFER.
4	SHIFT THE SURFACE AND SECTOR REGISTER TO THE LOWER DATA BUFFER.
5	SHIFT AC 10 DATA TO THE UPPER DATA BUFFER. THE UPPER BUFFER SHOULD SINK IN THE SILO WHEN FULL.
6	ONE SINGLE CYCLE BREAK REQUEST. DIRECTION IS REGULATED BY FUNCTION IN THE COMMAND REGISTER.
7	CLEAR AC THEN READ THE LOWER DATA BUFFER TO THE AC.
8	NOT USED.
9	NOT USED.
10	USED AS DATA WITH OTHER BITS IN THE MAINTENANCE MODE.
11	NOT USED

8. PROGRAM DESCRIPTION (ACCEPT MODE)

THE FOLLOWING IS BRIEF DESCRIPTION OF THE STEPS TAKEN BY THE PROGRAM WHEN RUNNING THE ACCEPT MODE.

A. A RANDOM FIELD IS GENERATED. IF FIELD GENERATED IS A NON-EXISTING FIELD, THE MAXIMUM FIELD AVAILABLE WILL BE USED.

B. A RANDOM BLOCK LENGTH IS GENERATED (128 OR 256 WORD SECTORS).

C. A RANDOM AMOUNT OF SEQUENCIAL SECTORS TO TRANSFER IS GENERATED. IF THE FIELD PREVIOUSLY SELECTED WAS AN EXTENDED FIELD OR IF HALF BLOCK TRANSFERS WERE SELECTED (128 WORD SECTORS), THE AMOUNT OF SECTORS WILL BE LIMITED TO 17(8). IF THE FIELD SELECTED WAS FIELD 0 AND IF FULL BLOCK TRANSFERS WERE SELECTED(256 WORD SECTORS), THE AMOUNT OF SECTORS WILL BE LIMITED TO 7(8).

D. A RANDOM STARTING SECTOR WILL BE GENERATED. THE RANDOM AMOUNT OF EXTRA SECTORS PREVIOUSLY GENERATED WILL BE ADDED TO THIS STARTING SECTOR, DETERMINING THE ACTUAL LENGTH OF THE DATA TRANSFER. IF THE STARTING SECTOR WAS 14 AND THE AMOUNT OF EXTRA SECTORS WAS 6, SECTORS 14, 15, 16, 17, 00, 01, AND 02 WILL BE USED FOR TRANSFERING DATA.

E. AN INITIAL SOFTWARE WORD COUNT WILL BE CALCULATED.

F. AN INITIAL RANDOM CURRENT ADDRESS WILL BE GENERATED. IF THE FIELD PREVIOUSLY GENERATED WAS FIELD 0, THE CURRENT ADDRESS WILL BE LIMITED WITHIN THE END OF THE PROGRAM +4000 LOCATIONS.

G. THE BUFFER SELECTED WILL BE FILLED WITH RANDOM DATA, CHECKSUMMED, AND THE CHECKSUM SAVED. (NOTE: BUFFER IS DEPENDENT ON FIELD, WORD COUNT, BLOCK LENGTH, AND CURRENT ADDRESS PREVIOUSLY SELECTED.)

H. THE PROGRAM WILL THEN POLE THE DISK DRIVES. DRIVE SELECTION IS SEQUENTIAL, THAT IS DISK0, DISK1, DISK2, ETC.

I. DATA WILL BE WRITTEN ON THE SELECTED DISK DRIVE TO COMPLETE THE SEEK OPERATION USING THE RANDOM PARAMETERS GENERATED ABOVE. AS DATA IS WRITTEN, A BACK GROUND PROGRAM WILL CLEAR THE BUFFER AREA ALREADY WRITTEN ON THE DISK.

J. WHEN THE WRITE AND CLEAR IS COMPLETE, DATA WILL BE READ OFF THE CURRENT DRIVE INTO THE BUFFER AREA. AS DATA IS READ, A BACK GROUND PROGRAM WILL CHECKSUM THE BUFFER INFORMATION ALREADY READ OFF THE DISK.

K. WHEN THE READ AND CHECKSUM IS COMPLETE, THE CHECKSUM FOUND WILL BE COMPARED TO THE CHECKSUM SAVED PREVIOUS TO THE WRITE OPERATION. IF CHECKSUMS DO NOT COMPARE OR IF A CRC ERROR HAS OCCURRED, A WORD BY WORD COMPARE WILL BE MADE TO DETERMINE AND TYPE OUT THE BAD DATA FOUND.

L. STEPS A-H WILL BE REPEATED AND THE DRIVE POLE WILL BE STARTED AT THE CURRENT DRIVE +1.

M. FOR ALL POSSIBLE ERRORS, SEE SECTION 5 IN THIS DOCUMENT.

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 INITILIZE FOR A ACTIVE CONSOLE PACKAGE.

9.3 INITIALIZATION

FOR A ACTIVE CONSOLE PACKAGE

1.) SET LOCATION 21 BIT0=0 TO INDICATE USE 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 SETION 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 AVAIBLE 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 EXECTUION 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 PASS COMPLETE TYPEOUT AS DESCRIBED IN SECTION
5.5 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 3
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 FIELD 1 LOCATIONS CAN BE CHANGED TO MEET THE SPECIFIC NEED FOR MODIFICATION OF THE DIAGNOSTIC.

0246 IS THE LOCATION FOR THE VALUE OF THE NUMBER OF PROGRAM PASSES NEED TO PRINT THE END OF PASS MESSAGE.

1037 IS THE LOCATION SET FOR THE NUMBER OF FILLER CHARACTERS AFTER A CRLF SET TO FOUR (4)

10. APT-8 HOOKS

10.1 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 EXLPAINED IN DETAIL.

10.2 SETUP

THE FOLLOWING INFORMATION MUST BE INDICATED DURING THE INITIAL PROGRAM START UP.
1. SINGLE OR MULTIPLE DRIVE TESTING.
2. DRIVE OR DRIVES TO BE TESTED.
3. DIAGNOSTIC RUNNING UNDER APT-8.
4. THE AMOUNT OF MEMORY IN 1K INCREMENTS.

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 MUST 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 DUNE AS SINGLE DRIVES AND TESTED INDEPENDANTLY.

THE PROGRAM ALLOWS DRIVES 0-7 TO BE SELECTED. USER SHOULD NOT EXCEED 0-3 DRIVES FOR THE RK8E CONTROL.

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.

AMOUNT OF MEMORY IN 1K INCREMENTS SHOULD BE STORED IN BITS 7-11 OF LOCATION 21. AN ADDITION OF 1 TO THE NUMBER OF BITS IN 7-11 INCREASES MEMORY SIZE BY 1K. EX. 4K=3;8K=7
REMEMBER TO RETAIN STATUS OF BIT0 WHEN MODIFYING LOCATION 21.

APT-8 INTERFACES:

10.3.1. 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 ON THE SLOWER MOS MEMORY.

10.3.2. ERRORS

ONLY THE DRIVE IN ERROR IS REPORTED TO APT-8 SYSTEM. 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.

11. PROGRAM LISTING

```
                        /RK8E/RK8L DATA RELIABILITY PROGRAM: MD-08-DHRKC-H
                        /
                        /MAINDEC-08-DHRKC-H-L
                        /
                        /COPYRIGHT 1972,1975,1976,1977 DIGITAL EQUIP. CORP.
                        /
                        /MAYNARD, MASS. 01754
                        /
0001                            FIELD   1
                        /
                        /CONSOL SRC-V2-R8- CONSOLE PACKAGE
                        /
                        /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 XDDSW 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.


0000    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
                /
0020    *20
                /
0020 0000   F1SWR,  0
0021 4000   F1OP1,  4000
```



```
0022 0000   F1OP2,  0
                /
                IFDEF CONSOL <


0024    *24

4424            C8PASS= JMS I   .
0024 0200                XC8PAS         /C8 PASS COMPLETION ROUTINE
4425            C8CKSW= JMS I   .
0025 0262                XC8SW          /CHECK SW REG SETTING
4426            C8TTYI= JMS I   .
0026 0272                XC8TTY         /FETCH CONSOL CHAR
4427            C8CNTR= JMS I   .
0027 0400                XC8CNT         /CHECK FOR CONTROL CHAR
4430            C8PRNT= JMS I   .
0030 0303                XC8PNT         /C8 PRINT A BUFFER
4431            C8SWIT= JMS I   .
0031 0656                XC8PSW         /SET UP PSEUDO SW, REG
4432            C8OCTA= JMS I   .
0032 1000                XC8OCT         /CONVENT TO ASCII AND PRINT
4433            C8CRLF= JMS I   .
0033 1023                XC8CRL         /DO A CARRIGE RETURN LINE FEED
4434            C8ECHO= JMS I   .
0034 1063                XC8ECH         /CHECK INPUT CHAR
4435            C8TYPE= JMS I   .
0035 1077                XC8TYP         /C8 PRINT ONE CHAR
4436            C8ERR=  JMS I   .
0036 1207                XC8ERR         /C8 ERROR  HANDLER
4437            C8INQU= JMS I   .
0037 0635                XC8INQ         /LOOK FOR OPERATOR INTERVENTION
4440            C8CKPA= JMS I   .
0040 1041                XC8CKP         /CHECK IF CONTROL CHAR
4441            C8PAUS= JMS I   .
0041 0337                XC8PAU         /IF CONSOL PACKAGE RETURN CALL PLUS ONE
                                        /IF NOT USING CONSOL REPLACE CALL WITH
                                        /A HLT AND THEN GO TO THE HALT

                /*********************************************************************
                        /*20                    /PSEUDO SWITCH REGISTER

                        /*21                    /HARDWARE INDICATORS
                                                /4000=USE FRONT PANEL SWITCH REGISTER
                                                /0000=USE THE PSEUDO SWITCH REGISTER LOC,20

                        /*22                    /SYSTEM CONFIGURATION
                                                /4000=CONSOL PACKAGE SET ACTIVE
                                                /0000=CONSULE PACKAGE SET DEACTIVE

                        /*23                    /RESERVED FOR FUTURE USE
                /
0200    *200
                /
                /*********************************************************************
                /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, OR 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-

0200  0000    XC8PAS, 0
0201  7200            CLA
0202  4777'           JMS      CHKCLA          /IS WORD 22 BIT 3 ACTIVE CONSOLE?
0203  5212            JMP      DOPACK          /IS CLASSIC
0204  4776'           JMS      C8GET           /GET REGISTERS.
0205  4262            JMS      XC8SW           /DEACTIVE CONSOL CHECK SR SETTING
0206  0375            AND      (400            /FOR HALT ON END OF C8PASS
0207  7640            SZA CLA                  /1= HALT 0 CONTINUE
0210  5600            JMP I    XC8PAS          /GO TO HALT
0211  5230            JMP      C8BY1           /CONTINUE ON RUNNING PROGRAM
0212  4232    DOPACK, JMS      CKCOUT          /CLASS CHECK C8PASS COUNT
0213  5230            JMP      C8BY1           /C8PASS COUNT NOT DONE REDO PROGRAM
0214  2250            ISZ      PASCNT          /C8PASS COUNT DONE SET C8PASS COUNT
0215  4774'           JMS      XC8CRLF
0216  4303            JMS      XC8PNT          /C8PRNT BUFFER
0217  0253            MESPAS                   /
0220  1250            TAD      PASCNT          /GET NUMBER
0221  4773'           JMS      XC8OCTA         /CONVERT IT TO ASCII
0222  4774'           JMS      XC8CRLF         /DO A CARRIAGE RETURN
0223  4776'           JMS      C8GET           /GET REGISTERS.
0224  4262            JMS      XC8SW           /CHECK A HALT AT END OF C8PASS
0225  0375    SETUP2, AND      (400            /MASK BIT
0226  7640            SZA CLA                  /HALT =1 NO SKIP CONTINUE =0
0227  4772'           JMS      XC8INQ          /STOP PROGRAM EXECUTION-LOOK FOR INPUT
0230  2200    C8BY1,  ISZ      XC8PAS          /BUMP RETURN
0231  5600            JMP I    XC8PAS
0232  0000    CKCOUT, 0
0233  1251            TAD      DOSET           /CHECK IF SET UP NEEDED
0234  7640            SZA CLA                  /0=SET UP C8PASS COUNT VALUE
                                               /1=C8PASS COUNT VALUE OK
0235  5242            JMP      NOSET           /C8PASS COUNT VALUE ON
0236  1252            TAD      CNTVAL          /GET COUNT VALUE FOR THIS PROG
0237  7040            CMA                      /SET TO NEGATIVE
0240  3247            DCA      DOCNT           /STORE IN HERE
0241  2251            ISZ      DOSET           /INDICATE VALUE SET UP
0242  2247    NOSET,  ISZ      DOCNT           /COUNT THE NUMBER OF PASSES
0243  5230            JMP      C8BY1           /EXIT FOR ANOTHER PASS
```



```
0244  3251            DCA      DOSET           /SET TO C8PRNT C8PASS
0245  2232            ISZ      CKCOUT          /BUMP RETURN FOR
0246  5632            JMP I    CKCOUT          /C8PASS C8TYPE OUT
0247  0000    DOCNT,  0
0250  0000    PASCNT, 0                        /
0251  0000    DOSET,  0
0252  0000    CNTVAL, 0
0253  0410    MESPAS, TEXT     "DHRKCH  PASS "
0254  2213
0255  0310
0256  4040
0257  2001
0260  2323
0261  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-


0262  0000    XC8SW,  0
0263  4771'           JMS      XC8CKPA         /GO CHECK THE IF ANY CONTRL
0264  7000            NOP
0265  1021            TAD      21              /GET WD FUN INDICATOR
0266  7710            SPA CLA                  /CHECK IF FROM PANEL 4000
0267  7614            7614                     /OD LAS AND SKIP GET FROM PANEL WITH LAS
0270  1020            TAD      20              /PSEUDO SWITCH
0271  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

                    /
                    /
0272  0000  XC8TTY, 0
0273  6031        KSF                     /LOOK FOR KEYBOARD FLAG
0274  5273        JMP     .-1
0275  6036        KRB                     /GET CHAR
0276  0370        AND     (177            /MASK FOR 7 BITS
0277  1367        TAD     (200            /ADD THE EIGTH BIT
0300  3766'       DCA     C8CHAR          /STORE IT
0301  1766'       TAD     C8CHAR
0302  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
                    /       MESS77                          /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


0303  0000  XC8PNT, 0
0304  7300        CLA CLL
0305  1703        TAD I   XC8PNT          /GET C8PRNT BUFFERS STARTING LOCATION
0306  3336        DCA     PT8TOR          /STORE IN PT8TOR
0307  2303        ISZ     XC8PNT          /BUMP RETURN
0310  1736  C8D01,  TAD I   PT8TOR        /GET DATA WORD
0311  0365        AND     (7700           /MASK FOR LEFT BYTE
0312  7450        SNA                     /CHECK IF 00 TERMINATE
0313  5703        JMP I   XC8PNT          /EXIT
0314  7500        SMA                     /IS AC MINUS
0315  7020        CML                     /MAKE CHAR A 300 AFTER ROTATE
0316  7001        IAC                     /MAKE CHAR A 200 AFTER ROTATE
0317  7012        RTR
0320  7012        RTR
0321  7012        RTR                     /PUT CHAR IN BITS 4-11 MAKE IT 8 BIT ASCII
0322  4764'       JMS     XC8TYPE         /C8PRNT IT ON CONSOLE
0323  1736        TAD I   PT8TOR          /GET DATA WORD
```



```
0324  0363        AND     (0077           /MASK FOR RIGHT BYTE
0325  7450        SNA                     /CHECK IF 00 TERMINATOR
0326  5703        JMP I   XC8PNT          //EXIT
0327  1362        TAD     (3740           /ADD FUDGE FACTOR TO DETERMINE IF 200
0330  7500        SMA                     /OR 300 IS TO BE ADD TO CHAR
0331  1361        TAD     (100            /ADD 100
0332  1360        TAD     (240            /ADD 200
0333  4764'       JMS     XC8TYPE         /C8TYPE ONLY BITS 4-11
0334  2336        ISZ     PT8TOR          /BUMP POINTER FOR NEXT WORD
0335  5310        JMP     C8D01           /DO AGAIN
0336  0000  PT8TOR, 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=


0337  0000  XC8PAU, 0
0340  7300        CLA CLL
0341  4777'       JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
0342  5350        JMP     C8D03           /GO DO CONSOL PART RETURN CALL+1
0343  7040        CMA                     /DEACTIVE CONSOLE PACKAGE PUT HLT IN CALL
0344  1337        TAD     XC8PAU          /GET CURRECT RETURN ADDRS
0345  3337        DCA     XC8PAU          /SET UP RETURN
0346  1357        TAD     (7402           /GET CODE FOR HLT
0347  3737        DCA I   XC8PAU          /PUT HALT IN CALL LOCATION
0350  5737  C8D03,  JMP I   XC8PAU        /GO TO HALT OR RETURN TO NEXT LOCATION


0357  7402
0360  0240
0361  0100
0362  3740
0363  0077
0364  1077
0365  7700
0366  1075
0367  0200
0370  0177
0371  1041
```

```
0372  0635
0373  1000
0374  1023
0375  0400
0376  0624
0377  1200
      0400    PAGE
              /**********************************************************************

              /C8CNTR
              /THIS ROUTINE WILL CHECK FOR THE PRESENCE OF CONTROL CHARACTERS
              /IT WILL CHECK FOR THE FOLLOWING CHAR C-R-U-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-UPARROW-XC8TYI-XC8PSW-
              /
              /
              /
0400  0000    XC8CNT, 0
0401  3777'           DCA     AC8AVE          /SAVE THE AC
0402  4776'           JMS     CHKCLA          /CHECK LOC,22 BIT3 FOR CONSOLE BIT
0403  5206            JMP     .+3             /ON ACTIVE CONSOLE
0404  1777'           TAD     AC8AVE          /DEACTIVE CONSOLEGET AC FOR RETURN
0405  5600            JMP I   XC8CNT          /EXIT NOT ON ACTIVE CONSOLE
0406  6804            GTF
0407  3775'           DCA     FL8AVE
0410  7501            MQA
0411  3774'           DCA     MQ8AVE          /SAVE THE MQ
0412  3255            DCA     INDEXA          /SET DISPLACEMENT INTO TABLE B
0413  1257            TAD     XTABLA          /GET ADDRS OF TABLE A
0414  3256            DCA     GETDAT          /CONTAINS POINTER TO CONTROL CHAR
0415  1656    REDOA,  TAD I   GETDAT          /GET CONTROL CHAR FROM TABLE
0416  7450            SNA                     /CHECK FOR A 0 END OF TABLE
0417  5226            JMP     DONEA           /END OF TABLE NO CONTROL CHAR
0420  1773'           TAD     C8CHAR          /COMPARE CHAR TO CONTROL CHAR
0421  7650            SNA CLA                 /0 IF MATCH
0422  5243            JMP     GOITA           /MATCH
0423  2255            ISZ     INDEXA          /NO MATCH NOT END OF TABLE REDO
0424  2256            ISZ     GETDAT          /BUMP INDEX FOR EXIT WHEN CONTROL FOUND
0425  5215            JMP     REDOA           /BUMP GETDAT FOR COMPARE OF NEXT CNTRL CHAR.
0426  1772'   DONEA,  TAD     INMODE          /CHECK IF PROGRAM EXPECTS CHAR
0427  7640            SZA CLA                 /1=CHAR EXPECTED  0= NO CHAR EXPECTED
0430  5240            JMP     EXITA           /CHAR EXPECTED
```



```
0431  1773'           TAD     C8CHAR          /GET CHAR= NOT CONTROL+ NOT EXPECTED
0432  4771'           JMS     XC8TYPE         /C8PRNT CHAR
0433  1370            TAD     (277            /GET CODE FOR "?"
0434  4771'           JMS     XC8TYPE
0435  4767'           JMS     XC8CRLF
0436  2200            ISZ     XC8CNT          /BUMP RETURN
0437  5600            JMP I   XC8CNT          /EXIT CALL+2
0440  2200    EXITA,  ISZ     XC8CNT          /BUMP RETURN FOR MAIN PROGRAM CHECK OF CHAR
0441  1773'           TAD     C8CHAR          /PUT CHAR IN AC.
0442  5600            JMP I   XC8CNT          /EXIT
0443  1773'   GOITA,  TAD     C8CHAR          /GET THE CONTENTS OF CHAR
0444  1366            TAD     (100            /ADD 100 TO FORM A GOOD ASCII CHARACTER
0445  3773'           DCA     C8CHAR          /RESTORE COFFECT CHAR
0446  1260            TAD     XTABLB          /GET START OF TABLE B
0447  1255            TAD     INDEXA          /GET NUM F \ INTO TABLE
0450  3254            DCA     GOTOA           /STORE IT
0451  1654            TAD I   GOTOA           /GET THE ROUTINE STARTTING ADDRESS
0452  3254            DCA     GOTOA           /STORE IT IN HERE
0453  5654            JMP I   GOTOA           /GOTO CONTROL CHAR ROUTINE
0454  0000    GOTOA,  0000                    /ADD OF CNTRL ROUTINE TO EXECUTE
0455  0000    INDEXA, 0000                    /DISPLACEMENT INTO CNTRL TABLE
0456  0000    GETDAT, 0000                    /LOCATION OF ADDRS OF CONTROL CHAR.
0457  0461    XTABLA, TABLA                   /ADDRS OF TABLEA
0460  0471    XTABLB, TABLB                   /ADDRS OF TABLEB
0461  7575    TABLA,  7575                    /CNTRL C BACK TO MONITOR 203
0462  7564            7564                    /CNTRL L SWITCH ERROR PRINTTING DEVICE 214
0463  7557            7557                    /CNTRL Q START DISPLAYING CHAR, AGAIN 221
0464  7556            7556                    /CNTRL R BACK TO BEGINNING OF PROGRAM 222
0465  7555            7555                    /CNTRL S STOP SENDING CHAR TO DISPLAY WAIT FOR CNTRL Q 223
0466  7573            7573                    /CNTRL E CONTINUE WITH PROGRAM 205
0467  7574            7574                    /CONTROL U CHANGE SWITCH REGISTER ON FLY
0470  0000            0000

0471  0551    TABLB,  CNTRLC
0472  0537            CNTRLL
0473  0500            CNTRLQ
0474  0511            CNTRLR
0475  0521            CNTRLS
0476  0545            CNTRLE
0477  0600            CNTRLU
              /
              /CONTROL Q
              /START SENDING CHAR, TO THE DISPLAY
              /THIS WILL RETURN CONTROL TO CALL THAT WAS SET BY
              /THE CALL FOR CONTROL S.
              /
0500  3772'   CNTRLQ, DCA     INMODE          /SET SUFT FLAG FOR UNEXPECTED CHAR
0501  1335            TAD     C8SETS          /CHECK IF CONTROL S TYPED IN
0502  7640            SZA CLA
0503  5306            JMP     BYRETR          /CONTROL S TYPED IN
0504  4765'           JMS     C8GET           /NO CONTROL S TYPED PREVIOUSLY
0505  5600            JMP I   XC8CNTR         /LEAVE VIA CNTR ENTRY ADDRESS
0506  3335    BYRETR, DCA     C8SETS          /CLEAR THE SUFT FLAG
0507  4765'           JMS     C8GET           /RESTORE REGISTERS
0510  5736            JMP I   C8RETR          /EXIT TO ADDRESS SET BY CONTROL S
```

```
                    /
                    /
                    /CONTROL R
                    /GO TO THE QUESTION C8SWIT
0511  3764'  CNTRLR, DCA     TTYLPT          /CLEAR THE TYPE FLAG SET TO TTY
0512  3335          DCA     C8SETS          /CLEAR SOFT FLAG FOR CNTRL S
0513  3772'         DCA     INMODE
0514  4763'         JMS     UPAROW          /PRINT THE ^ AND C8CHAR
0515  3762'  C8BY4,  DCA     C8SWST          /CLEAR FLAG FOR CNTRL D OR R
0516  6203          CIF CDF 0
0517  5720          JMP I   XDUSW           /GO TO ADDRS OF C8SWIT
0520  0200  XDUSW,  BGN                     /DOSW IS LABEL FOR C8SWIT QUESTION
                    /
                    /
                    /CONTROL S
                    /STOP SENDING CHAR, TO DISPLAY UNTIL A ^Q IS RECEIVED
                    /
                    /
0521  1335  CNTRLS, TAD     C8SETS          /IF1 DO NOT STORE IN C8RETR
0522  7640          SZA CLA
0523  5327          JMP     C8DO7           /DONT SET UP C8RETR
0524  7001          IAC                     /MAKE RETURN CALL PLUS 2
0525  1200          TAD     XC8CNT          /GET RETURN FOR THIS CALL
0526  3336          DCA     C8RETR          /STORE IT HERE FOR USE BE CNTROL Q
0527  2335  C8DO7,  ISZ     C8SETS          /SET FLAG TO SAVE CALL
0530  4761'         JMS     XC8TTYI                 /LOOK FOR THE INPUT
0531  4765'         JMS     C8GET           /GET REGISTERS
0532  4200          JMS     XC8CNTR                 /CHECK FOR THE CONTROL CHAR
0533  7200          CLA
0534  5321          JMP     CNTRLS          /IF NOT A CNTRL Q R C REASK
0535  0000  C8SETS, 0
0536  0000  C8RETR, 0
                    /
                    /SWITCH OUTPUT FROM ONE OUTPUT DEVICE TO ANOTHER- THE TWO OUTPUTS ARE THE
                    /CONSOLE AND THE PRINTER WITH DEVICE CODE 66.
                    /
                    /
0537  1764'  CNTRLL, TAD     TTYLPT          /GET PRESENT C8SWIT INDICATOR
0540  7040          CMA                     /COMPLEMENT IT
0541  3764'         DCA     TTYLPT          /STOR NEW C8SWIT
0542  4763'         JMS     UPAROW          /C8PRNT ^ AND CHAR ON NEW DEVICE
0543  4765'         JMS     C8GET           /RESTORE THE REGISTERS
0544  5600          JMP I   XC8CNT          /EXIT
                    /
                    /CONTROL E
                    /CONTINUE RUNNING FROM A INQUIRE OR ERROR
                    /
                    /
0545  4763'  CNTRLE, JMS     UPAROW          /PRINT THE CONTROL CHAR
0546  3762'         DCA     C8SWST          /CLEAR ENTRY FLAG.
0547  4765'         JMS     C8GET           /GET THE REGISTERS
0550  5600          JMP I   XC8CNT          /RETURN TO CALL PLUS ONE
                    /
                    /CONTROL C
```



```
                    /RETURN TO MONITOR CONTROL C
0551  3764'  CNTRLC, DCA     TTYLPT          /CLEAR THE LPT FLAG TO PRINT ON DISPLAY
0552  3762'         DCA     C8SWST          /CLEAR ENTRY FLAG.
0553  4763'         JMS     UPAROW          /C8PRNT ^C AND LETTER IN CHAR
0554  6203          CDF CIF                 /GO TO 0 FLD
0555  6007          CAF                     /CLEAR THE WORLD
0556  5760          JMP I   (7600           /GO TO DIAGNOSTIC MONITOR
                    /*****************************************************************
                    /
                    /
                    /
0560  7600
0561  0272
0562  0745
0563  0615
0564  1121
0565  0624
0566  0100
0567  1023
0570  0277
0571  1077
0572  1076
0573  1075
0574  1346
0575  1347
0576  1200
0577  1345
      0600    PAGE
                    /
                            /CONTROL D
                            /CHANGE THE SWITCH REGISTER ANYTIME CNTRL D AND RETURN TO
                            /THE PROGRAM RUNNING.

0600  4215  CNTRLD, JMS     UPAROW
0601  1213          TAD     C8SETD          /CHECK IF THE RETURN ADDRS IS SAFE
0602  7640          SZA CLA
0603  5207          JMP     C8DO11          /DO NOT CHANGE THE RETURN ADDRS
0604  1777'         TAD     XC8CNT          /GET THE RETURN ADDRS AND SAVE IT
0605  3214          DCA     C8RETD          /SAVE THE RETURN HERE
0606  2213          ISZ     C8SETD          /INDICATE RETURN SAVED DONT DISTROY
0607  4256  C8DO11, JMS     XC8PSW                  /GO CHANGE THE SWITCH REGISTER
0610  3213          DCA     C8SETD          /CLEAR THE FLAG
0611  4224          JMS     C8GET           /RESTORE THE AC MQ LINK ETC
0612  5614          JMP I   C8RETD          /RETURN TO THE PROGRAM
                    /
0613  0000  C8SETD, 0
0614  0000  C8RETD, 0


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

0615  0000  UPAROW, 0                       /C8PRNT THE "^" AND THE CHAR C8TYPED IN
```

```
0616  1376          TAD     (336            /CODE FOR "
0617  4775'         JMS     XC8TYPE
0620  1774'         TAD     C8CHAR          /C8TYPE THE CHAR
0621  4775'         JMS     XC8TYPE
0622  4773'         JMS     XC8CRLF
0623  5615          JMP I   UPAROW          /EXIT


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

0624  0000    C8GET,  0
0625  7200            CLA
0626  1772'           TAD     MQSAVE
0627  7421            MQL                     /RESTORE MQ
0630  1771'           TAD     FLSAVE
0631  7004            RAL                     /RESTORE THE LINK
0632  7200            CLA
0633  1770'           TAD     ACSAVE          /RESTORE THE AC
0634  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 CONTRUL CHAN 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=

0635  0000    XC8INQ, 0
0636  7308            CLA CLL
0637  4767'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
0640  7410            SKP                     /ACTIVE CONSULE PACKAGE
0641  5635            JMP I   XC8INQ          /NOT CONSOLE LEAVE
0642  4766'           JMS     XC8PNT
0643  0651            WATMES                  /INQUIR WAITTING
0644  4765'           JMS     XC8TTYI         /GET CHARACTER
0645  4224            JMS     C8GET
0646  4777'           JMS     XC8CNTR         /CHECK IF CONTROL CHARACTER
0647  5635            JMP I   XC8INQ          /EXIT AND CONTINUE
0650  5236            JMP     XC8INQ+1        /REASK
0651  2701    WATMES, TEXT    "WAITING =
0652  1124
0653  1116
```



```
0654  0740
0655  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=

0656  0000    XC8PSW, 0
0657  4767'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
0660  7410            SKP                     /ACTIVE CONSOLE
0661  5656            JMP I   XC8PSW          /DEACTIVE CONSOLE PACKAGE
                                              /RETURN WITHOUT ASKING PSEUDO SWITCH
0662  1345            TAD     C8SWST          /IS THE SOFT FLAG SET FOR SWITCH?
0663  7640            SZA CLA                 /SKIP IF ONE ENTRY AT ATIME OK
0664  5764'           JMP     C8SY4           /SECOND ENTRY WITH OUT A EXIT GO TO SW QUESTION
0665  2345            ISZ     C8SWST          /FIRST ENTRY SET FLAG
0666  4766'   C8WOPS, JMS     XC8PNT          /C8PRNT SR=
0667  0747            MESA
0670  1020            TAD     20              /GET CONTENTS OF SW
0671  4763'           JMS     XC8OCTA         /CONVENT IT TO ASCII
0672  1362            TAD     (40             /GET SPACE
0673  4775'           JMS     XC8TYPE
0674  2761'           ISZ     INMODE          /SET FLAG FOR CHAR EXECTED
0675  4760'           JMS     XC8ECHO         /LOOK FOR INPUT
0676  4315            JMS     TSTCHA          /NOT CONTROL TEST IT IS LEGAL
0677  1774'           TAD     C8CHAR          /STORE NEW CHAR IN SW REG
0700  3020            DCA     20

0701  1357            TAD     (-3             /GET A MINUS 3
0702  3346            DCA     TMPCNT          /STORE IN TEMP COUNT
0703  4760'   GETCH1, JMS     XC8ECHO         /GET NEXT CHAR
0704  4315            JMS     TSTCHA          /CHECK IF CR= GOOD CHAR
0705  1020            TAD     20              /GET C8SWIT REGISTER
0706  7106            RTL CLL                 /ROTATE IT LEFT 3 PLACES
0707  7004            RAL
0710  1774'           TAD     C8CHAR          /GET CHAR= AUD IT TO PREVIOUS CONTENTS
0711  3020            DCA     20              /SAVE NEW CONTENTS
0712  2346            ISZ     TMPCNT          /BUMP COUNT
0713  5303            JMP     GETCH1          /JMP BACK= GET NEXT CHAR
0714  5342            JMP     ENDIT           /END 4 CHAR C8TYPED IN
```

```
0715  0000    TSTCHA, 0
0716  7041            CIA                     /CMPL CHAR IN AC
0717  1356            TAD     (215            /TEST IF IT IS A CARRIAGE RETURN
0720  7650            SNA CLA                 /SKIP IN NOT CR,
0721  5342            JMP     ENDIT           /WAS CARRIAGE RETURN
0722  1774*           TAD     C8CHAR          /NOT CR, GET CHAR
0723  1355            TAD     (-260           /CHECK IF IT IS IN RANGE
0724  7710            SPA CLA                 /IF NOT POSITIVE C8ERR CHAR SMALLER THEN 260
0725  5336            JMP     ERR1            /C8ERR= CHAR TOO SMALL
0726  1774*           TAD     C8CHAR          /GET CHAR
0727  1354            TAD     (-270           /GET A-270+ CHECK IF IT IS LARGER THEN 7
0730  7700            SMA CLA                 /SKIP IF LESS THEN 7
0731  5336            JMP     ERR1            /C8ERR ON CHAR NOT IN RANGE
0732  1774*           TAD     C8CHAR          /GET CHAR
0733  0353            AND     (7              /MASK FOR RIGHT BYTE
0734  3774*           DCA     C8CHAR          /STORE IN CHAR
                                              /GET CHAR IN AC
0735  5715            JMP I   TSTCHA          /EXIT
0736  1352    ERR1,   TAD     (277            /C8PRNT
0737  4775*           JMS     XC8TYPE         /?
0740  4773*           JMS     XC8CRLF         /
0741  5266            JMP     C8RDP8          /EXIT+ ASK AGAIN
0742  4773*   ENDIT,  JMS     XC8CRLF         /DO A CR LF
0743  3345            DCA     C8SWST          /CLEAR THE PSW ENTRY FLAG
0744  5656            JMP I   XC8PSW          /EXIT ROUTINE
0745  0000    C8SWST, 0

0746  0000    TMPCNT, 0
0747  2322    MESA,   TEXT    "SR= "
0750  7540
0751  0000


0752  0277
0753  0007
0754  7510
0755  7520
0756  0215
0757  7775
0760  1063
0761  1076
0762  0040
0763  1000
0764  0515
0765  0272
0766  0303
0767  1200
0770  1345
0771  1347
0772  1346
0773  1023
0774  1075
0775  1077
0776  0336
0777  0400
```



```
1000    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-

1000  0000    XC8OCT, 0
1001  7106            CLL RTL
1002  7006            RTL                     /POSITION THE FIRST CHAR FOR PRINTING
1003  3221            DCA     C8TMP1          /SAVE CORRECT POSITIONED WORD HERE
1004  1377            TAD     (-4
1005  3222            DCA     C8CKP           /STORE COUNTER IN HERE
1006  1221    C8DO4,  TAD     C8TMP1          /GET FIRST NUMBER
1007  0376            AND     (0007           /MASK
1010  1375            TAD     (260            /ADD THE PRINT CONSTANT
1011  4277            JMS     XC8TYPE         /TYPE THE NUMBER
1012  1221            TAD     C8TMP1          /
1013  7006            RTL
1014  7004            RAL                     /PUT NEXT NUMBER IN POSITION
1015  3221            DCA     C8TMP1          /STORE IT
1016  2222            ISZ     C8CKP           /DONE YET WITH FOUR NUMBERS
1017  5206            JMP     C8DO4           /NOT YET DO MORE
1020  5600            JMP I   XC8OCT          /DONE WITH FOUR
1021  0000    C8TMP1, 0
1022  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-


1023  0000    XC8CRLF,0
1024  7300            CLA CLL
1025  1374            TAD     (215            /GET CODE FOR CR
1026  4277            JMS     XC8TYPE
1027  1237            TAD     FILLER
1030  7040            CMA
1031  3240            DCA     FILCNT          /STORE FILLER IN HERE
```

```
1032  1373            TAD     (212            /GET CODE FOR LF
1033  4277    C8DO2,  JMS     XC8TYPE
1034  2240            ISZ     FILCNT          /CHECK ON FILLER CHAR
1035  5233            JMP     C8DO2           /TYPE A NON PRINTING CHAR
1036  5623            JMP I   XC8CRL          /EXIT
1037  0004    FILLER, 0004                    /FILLER SET FOR 4 CHAR
1040  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 CONTROL CHAR THEN ITS CONTROL FUNCTION IS PERFORMED.
                /IF NOT A CONTROL CHARACTER OR A CONTROL E-D-L-O- IT WILL DO
                /THE CONTROL 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 CONSOL 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-

1041  0000    XC8CKP, 0
1042  3772'            DCA     AC8AVE          /SAVE THE AC
1043  6004            GTF                     /SAVE THE FLAGS
1044  3771'            DCA     FL8AVE          /SAVE THE FLAGS
1045  7501            MQA                     /PUT MQ IN AC
1046  3770'            DCA     MQ8AVE          /SACK THE MQ
1047  6031            KSF                     /CHECK THE KEYBOARD FLAG
1050  5261            JMP     C8BY3           /EXIT TO CALL PLUS 1
1051  4767'            JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
1052  7410            SKP                     /ACTIVE CONSOLE PACKAGE
1053  5261            JMP     C8BY3           /EXIT TO CALL PLUS 1
1054  4766'            JMS     XC8TTYI         /GET THE CHAR
1055  4765'            JMS     C8GET           /GET THE FLAGS
1056  4764'            JMS     XC8CNTR         /CHECK IF CONTROL  CHAR.
1057  7000            NOP                     /RETURN IF A CONTINUE CHAR.
1060  2241            ISZ     XC8CKP          /BUMP RETURN FOR CALL PLUS 2
1061  4765'   C8BY3,  JMS     C8GET           /GET REGISTERS
1062  5641            JMP I   XC8CKP          /SAY GOOD 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

                /
1063  0000    XC8ECH, 0
1064  4766'            JMS     XC8TTYI         /WAIT FOR CHAR FROM KEYBOARD
1065  4765'            JMS     C8GET           /RESTORE THE REGISTERS
1066  2276            ISZ     INMODE          /SET INMODE IDENTIFING THIS AS A EXPECTED CHAR
1067  4764'            JMS     XC8CNTR         /GO CHECK IF IT IS A CONTROL CHAR
1070  5663            JMP I   XC8ECH          /WAS A CONTROL CHAR- CONTINUE RUNNING
1071  4277            JMS     XC8TYPE         /NOT A CONTROL CHAR C8PRNT IT
1072  3276            DCA     INMODE          /CLEAR FLAG THAT CHAR EXPECTED
1073  1275            TAD     C8CHAR          /GET CHAR IN AC
1074  5663            JMP I   XC8ECH          /EXIT
1075  0000    C8CHAR, 0
1076  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-C8MANG-XC8CNTR-XC8PNT-XC8CHLP-XC8INQU-

1077  0000    XC8TYP, 0
1100  3320            DCA     PNTBUF          /STORE CHAR
1101  1321            TAD     TTYLPT          /CHECK 0=TTY 7777=LPT
1102  7640            SZA CLA
1103  5312            JMP     XDOLPT          /DO OUT PUT ON LPT
1104  1320            TAD     PNTBUF
1105  6046            TLS
1106  6041            TSF
1107  5306            JMP     .-1
1110  6042            TCF
1111  5316            JMP     C8BY5
1112  1320    XDOLPT, TAD     PNTBUF          /GET CHAR
1113  6666            PSTB    PCLF            /C8PRNT IT
1114  4322            JMS     C8MANG          /CHECK KEYBOARD IF HUNG
1115  6662            PCLF                    /CLEAR THE FLAG
1116  7600    C8BY5,  7600                    /CLEAR THE AC
```

```
1117  5677            JMP I   XC8TYP          /EXIT
1120  0000    PNTBUF, 0
1121  0000    TTYLPT, 0


1122  0000    C8HANG, 0
1123  7200            CLA             /
1124  1316            TAD     C8BY5           /GET CONSTANT 7600
1125  3320            DCA     PNTBUF          /PNTBUF IS NOW A COUNTER
1126  6661            PSKF                    /SKIP ON PRINTER DONE
1127  7410            SKP                     /NOT DONE YET
1130  5722            JMP I   C8HANG          /SAW FLAG DONE
1131  2345            ISZ     C8CONT          /FIRST COUNTER FAST ONE
1132  5326            JMP     .-4             /CHECK IF FLAG SET YET
1133  2320            ISZ     PNTBUF          /MADE 4096 COUNTS ON FAST COUNTER
1134  5331            JMP     .-5             /KEEP IT UP FOR 5 SEC
1135  1764*           TAD     XC8CNTR         /GET THE RETURN ADDRESS IN CONTROL
1136  3322            DCA     C8HANG          /SAVE IT IN HANG
1137  3321            DCA     TTYLPT          /ALLOW PRINTING ON TTY
1140  4763*           JMS     XC8PNT
1141  1146            MESHANG                 /LPT ERROR
1142  4223            JMS     XC8CRLF
1143  4762*           JMS     XC8INQU         /PRINT WAITING
1144  5722            JMP I   C8HANG          /CONTINUE TO SAVE ADDRESS
1145  0000    C8CONT, 0                       /COUNTER FOR TIMER
1146  1420    MESHANG,TEXT    "LPT ERROR"
1147  2440
1150  0522
1151  2217
1152  2200

1162  0635
1163  0303
1164  0400
1165  0624
1166  0272
1167  1200
1170  1346
1171  1347
1172  1345
1173  0212
1174  0215
1175  0260
1176  0007
1177  7774
      1200    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 CONSOLN PACKAGE AC=0
              /IF NOT SET THEN TO CALL PLUS ONE FOR A DEACTIVE CONSOLE PACKAGE.
```



```
1200  0000    CHKCLA, 0
1201  7200            CLA
1202  1022            TAD     22              /GET THE CONTENTS OF LOCATION 22
1203  0377            AND     (400            /MASK FOR BIT 3 (400
1204  7650            SNA CLA                 /
1205  2200            ISZ     CHKCLA          /ACTIVE CONSOLE PACKAGE RETURN
                                              /CALL PLUS ONE (1) FOR ACTIVE
1206  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-


1207  0000    XC8ERR, 0
1210  6002            IOF
1211  3345            DCA     ACSAVE          /SAVE AC
1212  6004            GTF
1213  3347            DCA     FLSAVE          /SAVE THE FLAGS
1214  7501            MQA
1215  3346            DCA     MQSAVE          /SAVE THE MQ
1216  7340            CLA CLL CMA             /SUBTRACT A 1 FOR TRUE LOCATION
1217  1207            TAD     XC8ERR          /GET RETTURN LOCATION
1220  3344            DCA     PCSAVE          /SAVE ADD OF C8ERR CALL
1221  6201            CDF
1222  7340            CLA CLL CMA
1223  1776            TAD I   (CLASIK)        /GET REAL PC.
1224  3316            DCA     REALPC          /SAVE IT.
1225  6211            CDF     10
1226  4200            JMS     CHKCLA          /CHECK LOC.22 BIT 3 CONSOL BIT
1227  7410            SKP                     /ACTIVE CONSOLE PACKAGE
1230  5270            JMP     NTCLAS          /NOT CLASSIC SYSTEM
1231  4775*           JMS     C8GET           /GET REGISTERS.
1232  4774*           JMS     XC8SW           /CHECK SWITCH REG FOR BIT THAT INDICATES
                                              /NO ERROR MESSAGE
1233  0373    SETUP1, AND     (0000           /MASK FOR BIT FOR NO ERROR PRINTING
                                              /IF THIS ERROR MESSAGE IS TO ALWAYS
                                              /BE PRINTED LEAVE AND VALUE AT 0000
1234  7640            SZA CLA                 /SKIP IF BIT IS 0 PRINT ERROR MESSAGE
1235  5262            JMP     C8D010          /DO NOT PRINT
1236  4772*           JMS     XC8CRLF
1237  4771*           JMS     XC8PNT
1240  1320            ERRMES                  /PRINT THE ERROR MESSAGE
1241  4771*           JMS     XC8PNT
1242  1330            MESPC                   /PRINT THE PC STSTEMENT
1243  1316            TAD     REALPC          /GET PC
1244  4770*           JMS     XC8OCTA         /CONVENT 4 DIGIT PC TO ASCII
1245  4771*           JMS     XC8PNT
1246  1333            MESAC                   /PRINT THE AC MESS
```

```
1247  1345            TAD     ACSAVE
1250  4770'           JMS     XC8OCTA
1251  4771'           JMS     XC8PNT
1252  1336            MESMQ                   /PRINT MQ
1253  1346            TAD     MQSAVE
1254  4770'           JMS     XC8OCTA
1255  4771'           JMS     XC8PNT
1256  1341            MESFL                   /PRINT FL
1257  1347            TAD     FLSAVE
1260  4770'           JMS     XC8OCTA
1261  4772'           JMS     XC8CRLF
1262  4775'  C8D010,  JMS     C8GET           /GET REGISTERS,
1263  4774'           JMS     XC8SW           /CHECK SWITCH REGISTER
1264  7610            SKP CLA                 /SKIP IF BIT 0 SET
1265  5300            JMP     C8BY2           /LEAVE
1266  4767'           JMS     XC8INQ          /GO TO THE INQUIRE ROUTINE
1267  5300            JMP     C8BY2           /LEAVE
1270  4775'  NTCLAS,  JMS     C8GET           /GET REGISTERS,
1271  4774'           JMS     XC8SW           /CHECK PSEUDO SWITCH REGISTER
                                              /CHECK THE C8SWIT REGISTER
1272  7610            SKP CLA                 /SKIP IF HALT
1273  5607            JMP I   XC8ERR          /NO HALT CONTINUE
1274  1366            TAD     (7402           /CODE FOR HLT
1275  3744            DCA I   PC8AVE          /PUT IT IN CALL LOC,
1276  4775'           JMS     C8GET
1277  5744            JMP I   PC8AVE          /EXIT  TO CALL AND HALT
1300  4775'  C8BY2,   JMS     C8GET           /GET THE REGISTERS
1301  5607            JMP I   XC8ERR
                      /
                      /
1302  7402    ROUINS, HLT                     /PUT INSTRUCTION TO EXECUTE HERE,
1303  7000            NOP
1304  3317            DCA     MYAC            /SAVE AC
1305  6201            CDF     0
1306  1020            TAD     SWR
1307  3765            DCA I   (SWR)
1310  1776            TAD I   (CLASIK)
1311  3315            DCA     CLRTRN
1312  1317            TAD     MYAC
1313  6202            CIF     0
1314  5715            JMP I   CLRTRN          /RETURN TO FIELD 0,
                      /
1315  0000    CLRTRN, 0
1316  0000    REALPC, 0
1317  0000    MYAC,   0
                      /
1320  0410    ERRMES, TEXT    "DHRKCH  FAILED "
1321  2213
1322  0310
1323  4040
1324  0601
1325  1114
1326  0504
1327  4000
1330  4040    MES8PC,  TEXT   "  PC:"
```



```
1331  2003
1332  7200
1333  4040    MESAC,  TEXT    "  AC:"
1334  0103
1335  7200
1336  4040    MESMQ,  TEXT    "  MQ:"
1337  1521
1340  7200
1341  4040    MESFL,  TEXT    "  FL:"
1342  0614
1343  7200
1344  7777    PC8AVE, 7777
1345  7777    AC8AVE, 7777
1346  7777    MQ8AVE, 7777
1347  7777    FL8AVE, 7777
                /
1365  0020
1366  7402
1367  0635
1370  1000
1371  0303
1372  1023
1373  0000
1374  0262
1375  0624
1376  1514
1377  0400
      0000          FIELD   0
```

```
0000  00000000  00000000  11101111  11111111  11000000  00000000  00000000  00000000
0100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  10000001  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111110  11111111  11111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11100000  00111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  00000000  00000111  11111111

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700
```



```
4000
4100

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
```

```
                    /
                    /NOTE:LOCATION 0 CONTAINS THE REVSION
                    /LEVEL (IN ASCII) ON PROGRAM LOAD.
                    /
                    /ALL KNOWN HALTS
                    /
1400  0556    ERHLT0                          /SKIP TRAP DLSC
1401  0563    ERHLT2                          /SKIP TRAP DCLR
1402  2561    ERHLT3                          /SKIP TRAP DLAG
1403  2544    ERHLT5                          /SKIP TRAP DRST
1404  0547    ERHLT6                          /SKIP TRAP DLDC
1405  3130    INTER1                          /NO DISK INTERRUPT
1406  2362    INTER2                          /UNDEFINED INTERUPT
1407  0206    FLDHLT                          /PROGRAM WILL ONLY RUN IN FIELD 0
1410  2702    NODSK8                          /NO DISK8 AVAILABLE TO RUN
1411  0603    STPHLT                          /PROGRAM STOP FROM SWR4=1
1412  2755    CHNHLT                          /IOT CHANGE HALT
1413  1707    BADHLT                          /COMPUTER MUST BE DOWN, CHECKSUM FAILED
                                              /BUT WORD-BY-WORD COMPARE WORKED.
1414  3136    BIGSTP                          /STOP FOR ALL ERROR HALTS.
                    /
      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
                    /
      4406    LAS=JMS I       XLAS
      4407    CLASIC=JMS I    XCLAS
      4427    RANDAT=JMS I    XRNWRD
      4430    DISCON=JMS I    XDUMP
      4431    SPACE=JMS I     XSPAC
      4432    ONEIN=JMS I     XOCT1
      4433    FORIN=JMS I     XOCT4
      4434    SETGEN=JMS I    XSTGEN




      4435    SETFLD=JMS I    XSTFLD
      4437    YESNO=JMS I     XCHKYN

      4436    SELCHK=JMS I    XCKPOT
      4440    RANGEN=JMS I    XRNDOM
      4442    RESRAN=JMS I    XRSRAN
      4441    DISKGO=JMS I    XDSKGO
      4443    RECAL=JMS I     XRESTR
      4444    RECEIV=JMS I    XWAIT
      4446    ERROR=JMS I     XERRO
      4447    RDSTAT=JMS I    XRDST
      4453    LOADD=JMS I     XLDAD
      4450    DSKSKP=JMS I    XSDKP
```



```
      4451    LDCMD=JMS I     XLDCM
      4452    LDCUR=JMS I     XLDCA
      4454    CLRALL=JMS I    XCLDR
      4455    PRNTER=JMS I    XPRN
      4456    OCTEL=JMS I     XFROCT
      4445    TYPE=JMS I      XPRINT
      4457    CRLF=JMS I      XCRLF
      4426    GENDAT=JMS I    XGNDAT
      4424    CHK22=JMS I     XCHK22
      4425    KTICK=JMS I     XKTCK
                    /
      0000    *0
                    /
0000  0310            310               /REVISION "H";INTERRUPT SERVICE RETURN
0001  5001            5001              /DCA SAVAC  SAVE AC AT INT.
0002  0002            0002              /RAL  SHIFT LINK AT TIME OF INT.
0003  0003            0003              /DCA SVLNK  SAVE LINK AT TIME OF INT.
0004  0004            0004              /JMP I 5   RETURN TO INT. SERVICE
0005  0005            0005              /RETURN POINTER
                    /
0006  1546    XLAS,   MYLAS
0007  1514    XCLAS,  CLASIK
                    /
      0010    *10
                    /
0010  0000    AUTO10, 0
                    /
0011  0000    AUTO11, 0
                    /
0012  0000    AUTO12, 0
                    /
                    /
0013  0004    K0004,  0004
0014  0070    K0070,  0070
0015  0100    K0100,  0100
0016  0200    K0200,  0200
0017  0400    K0400,  0400
                    /
      0020    *20
                    /
0020  0000    SWR,    0
0021  4000    OP1,    4000
0022  0000    OP2,    0
                    /
0023  2156    KAERRO, AERROR
0024  0523    XCHK22, CHEK22
0025  1154    XKTCK,  XKTICK
0026  1737    XGNDAT, GNDAT
0027  2600    XRNWRD, RNWRD
0030  2637    XDUMP,  DUMP
0031  1506    XSPAC,  SPAC
0032  2400    XOCT1,  OCT1
0033  2430    XOCT4,  OCT4
0034  1753    XSTGEN, STGEN
0035  2703    XSTFLD, STFLD
```

```
0036  2060    XCKPOT, CHKPOT
0037  2035    XCHKYN, CHKYN
0040  1715    XRNDOM, RANDOM
0041  2200    XDSKGO, DSKGO
0042  1761    XRSRAN, RSRAN
0043  3052    XRESTR, RESTOR
0044  2000    XWAIT,  WAIT
0045  2620    XPNINT, PRINT
0046  1200    XERRO,  ERRO
0047  2541    XRDST,  RDST
0050  0751    XSDKP,  SDKP
0051  0542    XLDCM,  LDCM
0052  2550    XLDCA,  LDCA
0053  2554    XLDAD,  LDAD
0054  0560    XCLDR,  CLDR
0055  1450    XPRN,   PRN
0056  1426    XFRDCT, FRDCT
0057  1414    XCRLF,  UPONE
0060  0000    AMOUNT, 0
0061  0001    K0001,  0001
0062  0003    K0003,  0003
0063  0006    K0006,  0006
0064  0007    K0007,  0007
0065  0010    K0010,  0010
0066  0017    K0017,  0017
0067  0260    K0260,  0260
0070  0277    K0277,  0277
0071  0770    A0770,  0770
0072  7007    A7007,  7007
0073  4000    K4000,  4000
0074  4100    K4100,  4100
0075  1000    K1000,  1000
0076  1777    K1777,  1777
0077  7700    K7700,  7700
0100  7760    K7760,  7760
0101  7777    K7777,  7777
0102  0077    K0077,  0077
0103  6201    KCDF,   CDF
0104  7400    K7400,  7400
              /
              DECIMAL
              /
0105  7764    M12,    -12
              /
              OCTAL
              /
0106  7774    M4,     -4
0107  7770    M10,    -10
0110  7775    K7775,  7775
              /
0111  0000    TRASH1, 0
0112  0000    TRASH2, 0
0113  0000    TRASH3, 0
0114  0000    UPDATE, 0
0115  0000    POLDSK, 0
```



```
0116  0000    OPNTAL, 0
0117  0000    BUFTAL, 0
0120  0000    PCNEG,  0
0121  0000    STNEG,  0
0122  0000    EXNEG,  0
0123  0000    CMNEG,  0
0124  0000    INTDA,  0
0125  0000    DANEG,  0
0126  0000    CANEG,  0
0127  0000    WCNEG,  0
0130  0000    FWNEG,  0
0131  0000    ASNEG,  0
0132  0000    WANEG,  0
0133  0000    ADNEG,  0
0134  0000    DGNEG,  0
0135  0000    DBNEG,  0
0136  0000    INTCM,  0
0137  0000    STATRY, 0
0140  0000    DATTRY, 0
0141  0000    CHKSAV, 0
0142  0000    ENDSUM, 0
0143  0000    MAXFLD, 0
0144  7607    MAXTIM, 7607
0145  3240    MAXTRK, 3240
0146  3600    BGNBUF, STRBUF
0147  0000    CONSEC, 0
0150  7777    CLKCNT, -1
              /
0151  0756    DATPOT, DAT1
0152  3522    TIMPOT, D8TM1
0153  3537    STAPOT, D8HRD-3
0154  3512    RUNPOT, D8K08
              /
0155  0000    CRCCNT, 0
0156  0000    CRCFLG, 0
0157  0000    DATFLG, 0
0160  0000    SPFLD,  0
0161  0000    SPTRK1, 0
0162  0000    SPTRK2, 0
0163  0000    SPSEC,  0
0164  0000    SPBLK,  0
0165  0000    ERFLG,  0
0166  0000    SAVAC,  0
0167  0000    SVLNK,  0
0170  0000    FINTIM, 0
0171  0000    TRYCNT, 0
0172  3213    XTEXT,  TEXPC
0173  3142    PRNDAT, TYPDAT
0174  0000    SAVCM,  0
0175  0000    CLKBAK, 0
              /
0176  3131    BGMLT,  BIGMLT
      0200    *200
              /
              /
```

```
                    /START OF PROGRAM BY OPERATOR:
                    /AT 0200, TTY INTERRIGATION:
                    /AT 0201, CHANGE IOT DEVICE CODES:
                    /AT 0202, RESTART AT SEEK ROUTINE:
                    /
 0200  4777'  BGN,    JMS     APT8                    /TO REGULAR TEST
 0201  5776'          JMP     CHANG                   /CHANGE IOT ROUTINE
 0202  5775'          JMP     RUN
 0203  3156          DCA     CRCFLG                  /CLEAR CRC FLAG
 0204  6224          RIF
 0205  7440          SZA                             /FIELD 07777
 0206  4576  FLDHLT, JMS I   BGHLT                   /WILL ONLY RUN IN FIELD 07777
 0207  1103          TAD     KCDF
 0210  3211          DCA     .+1
 0211  7402          HLT                             /MAKE DF=IF
                    /
                    /SETUP INTERRUPT SERVICE:
                    /
 0212  1362          TAD     ACDCA
 0213  3001          DCA     1                       /SETUP AC DCA
 0214  1250          TAD     KROT
 0215  3002          DCA     2                       /SETUP ROTATE LINK
 0216  1361          TAD     LNKDCA
 0217  3003          DCA     3                       /SETUP SAVE LINK
 0220  1360          TAD     K5405
 0221  3004          DCA     4                       /SETUP JMP RETURN
 0222  1363          TAD     BRKRET
 0223  3005          DCA     5                       /RETURN POINTER
                    /
                    /CLEAR DATA INFORMATION TABLE
                    /AT END OF PROGRAM:
                    /
 0224  1077  STRTEX, TAD     K7700
 0225  3111          DCA     TRASH1                  /CLEAR COUNTER
 0226  1774'         TAD     RANJMS
 0227  3773'         DCA     SWDAT           /SET INSTRUCTION SWITCH
 0230  7340          CLA CLL CMA
 0231  1152          TAD     TIMPOT
 0232  3010          DCA     AUTO10                  /LOCATION POINTER
 0233  3410          DCA I   AUTO10                  /CLEAR
 0234  2111          ISZ     TRASH1
 0235  5233          JMP     .-2                     /MORE TO CLEAR
 0236  3157          DCA     DATFLG
 0237  5775'  SKPNOP, JMP     RUN
                    /
                    /
                    /PRINT PROGRAM NAME AND
                    /ASK OPERATOR ABOUT AMOUNT
                    /OF MEMORY:
                    /
 0240  4457          CRLF
 0241  4455          PRNTER                          /PRINT "RK8E/RK8L DATA RELIABILITY"
 0242  3307          MES1
 0243  4455          PRNTER                          /PRINT "AMOUNT OF MEMORY"
 0244  3346          MES5
```



```
 0245  4432          ONEIN                           /RECEIVE ONE OCTAL
 0246  0070          0070                            /LIMITS
 0247  5243          JMP     .-4                     /INPUT ERROR
 0250  7004  KROT,    RAL
 0251  7006          RTL
 0252  7040          CMA                             /COMPLEMENT
 0253  3143          DCA     MAXFLD                  /MAXIMUM FIELD POINTER
 0254  4772'         JMS     CLAFLD                  /CHECK FOR CLASSIC.
 0255  3111  ALLAGN, DCA     TRASH1
 0256  1107          TAD     M10
 0257  3112          DCA     TRASH2
 0260  3060          DCA     AMOUNT                  /A FEW POINTERS
                    /
                    /ASK OPERATOR ABOUT DISK(S) TO TEST:
                    /
 0261  1111  NEXT,    TAD     TRASH1
 0262  1154          TAD     RUNPOT
 0263  3113          DCA     TRASH3                  /SAVE RUN POINTER
 0264  4455          PRNTER                          /PRINT "EXERCISE"
 0265  3325          MES2
 0266  7340          CLA CLL CMA
 0267  4455          PRNTER                          /PRINT " DISK"
 0270  3332          MES3
 0271  1067          TAD     K0260
 0272  1111          TAD     TRASH1                  /ADD IN DISK NUMBER
 0273  4445          TYPE                            /TYPE DISK NUMBER
 0274  1070          TAD     K0277
 0275  4445          TYPE                            /TYPE ?
 0276  4444          RECEIV                          /RECEIVE KEY INPUT
 0277  4437          YESNO                           /WAS IT YES OR NO
 0300  5255          JMP     ALLAGN                  /NEITHER
 0301  5304          JMP     .+3                     /WAS A NO
 0302  2060          ISZ     AMOUNT                  /AMOUNT OF DISK FOUND
 0303  7340          CLA CLL CMA                     /AC TO 7777 FOR EXISTING DISK
 0304  3513          DCA I   TRASH3                  /SETUP RUN POINTER
 0305  2111          ISZ     TRASH1
 0306  2112          ISZ     TRASH2
 0307  5261          JMP     NEXT                    /ASK ABOUT NEXT DISK
                    /
                    /
                    /ASK IF ACCEPT MODE:
                    /
 0310  1060          TAD     AMOUNT                  /GET AMOUNT FOUND
 0311  7650          SNA CLA                         /WERE ANY FOUND
 0312  5224          JMP     STRTEX                  /OPERATOR ERROR NO DISK INPUT
 0313  4455          PRNTER                          /PRINT "ACCEPT MODE?"
 0314  3363          MES6
 0315  4444          RECEIV                          /RECEIVE INPUT
 0316  4437          YESNO                           /YES OR NO????
 0317  5313          JMP     .-4                     /NEITHER ALL AGAIN
 0320  7610          SKP CLA                         /MANUAL TEST
 0321  5771'         JMP     ASKSUR                  /ASK "ARE YOU SURE"
                    /
                    /
                    /IF ACCEPT MODE, INTERAGATE
```

```
                        /ABOUT CONSTANT FIELD:
                        /
 0322  4455     MANUAL, PRNTER                          /PRINT "FIELD?"
 0323  3404             MES8
 0324  4444             RECEIV                          /RECEIVE Y OR N
 0325  4437             YESNO                           /CHECK FOR Y OR N
 0326  5322             JMP     MANUAL                  /NEITHER Y OR N
 0327  5345             JMP     ASKNX1                  /WAS A N, ASK ABOUT NEXT
 0330  4431             SPACE                           /SPACE OUT ONE
 0331  4432             ONEIN                           /GET 1 OCTAL
 0332  0070             0070                            /LIMITS
 0333  5322             JMP     MANUAL                  /INPUT ERROR ASK AGAIN
 0334  7104             CLL RAL
 0335  7006             RTL
 0336  3160             DCA     SPFLD                   /SAVE INPUT
 0337  1160             TAD     SPFLD
 0340  1143             TAD     MAXFLD                  /COMPARE TO MAXIMUM
 0341  7700             SMA CLA                         /O.K.?
 0342  5322             JMP     MANUAL                  /INPUT ERROR
 0343  7340             CLA CLL CMA
 0344  3770'            DCA     FLDFLG                  /SETUP FIELD FLAG
                        /
                        /
                        /INTERIGATE ABOUT CONSTANT TRACK:
                        /
 0345  4455     ASKNX1, PRNTER                          /PRINT "TRACK?"
 0346  3410             MES9
 0347  4444             RECEIV                          /RECEIVE Y OR N
 0350  4437             YESNO                           /CHECK FOR Y OR N
 0351  5345             JMP     ASKNX1                  /ERROR, ASK AGAIN
 0352  5767'            JMP     ASKNX2                  /N, ASK ABOUT NEXT
 0353  4431             SPACE
 0354  4432             ONEIN                           /RECEIVE 1 IN OCTAL
 0355  0010             0010                            /LIMITS
 0356  5345             JMP     ASKNX1                  /ERROR, ASK AGAIN
 0357  5766'            JMP     SAVE1                   /TO SAVE SOME ROOM.
                        /
 0360  5405     K5405,  5405
 0361  3167     LNKDCA, DCA     SVLNK
 0362  3166     ACDCA,  DCA     SAVAC
 0363  2304     BRKRET, RETURN
                        /
 0366  0400
 0367  0406
 0370  3572
 0371  0513
 0372  1404
 0373  2601
 0374  0522
 0375  0000
 0376  2730
 0377  2070
       0400     PAGE
                        /
                        /
```



```
                        /INTERIGATE ABOUT CONSTANT
                        /BLOCK LENGTH:
                        /
 0400  3161     SAVE1,  DCA     SPTRK1                  /SAVE EXTENDED TRACK BIT
 0401  4433             FORIN                   /GET FOUR IN OCTAL.
 0402  5777'            JMP     ASKNX1                  /ERROR, ASK AGAIN
 0403  3162             DCA     SPTRK2                  /SAVE CYL., SURFACE, AND SECTOR
 0404  7340             CLA CLL CMA
 0405  3776'            DCA     TRKFLG                  /SETUP TRACK FLAG
                        /
 0406  4455     ASKNX2, PRNTER                          /PRINT "BLOCK LENGTH?"
 0407  3424             MES11
 0410  4444             RECEIV                          /RECEIVE INPUT
 0411  4437             YESNO                           /CHECK FOR Y OR N
 0412  5206             JMP     ASKNX2                  /ERROR, ASK AGAIN
 0413  5225             JMP     ASKNX3                  /N, ASK ABOUT NEXT
 0414  4431             SPACE                           /Y, SPACE OUT 1
 0415  4432             ONEIN                           /RECEIVE 1 IN OCTAL
 0416  0010             0010                            /LIMITS
 0417  5206             JMP     ASKNX2                  /ERROR, ASK AGAIN
 0420  7640             SZA CLA                         /SET HALF BLOCK?
 0421  7340             CLA CLL CMA                     /YES
 0422  3164             DCA     SPBLK                   /SETUP BLOCK NUMBER
 0423  7340             CLA CLL CMA
 0424  3775'            DCA     HLFFLG                  /SETUP BLOCK FLAG
                        /
                        /
                        /INTERIGATE ABOUT CONSTANT
                        /SECTORS:
                        /
 0425  4455     ASKNX3, PRNTER                          /PRINT "EXTRA SECTORS?
 0426  3414             MES10
 0427  4444             RECEIV                          /RECEIVE INPUT
 0430  4437             YESNO                           /CHECK FOR Y OR N
 0431  5225             JMP     ASKNX3                  /INPUT ERROR
 0432  5264             JMP     ASKNX5                  /N, ASK ABOUT NEXT
 0433  4431             SPACE                           /SPACE OUT 1
 0434  4432             ONEIN                           /RECEIVE 1 IN OCTAL
 0435  0010             0010                            /LIMITS
 0436  5225             JMP     ASKNX3                  /ERROR, ASK AGAIN
 0437  7104             CLL RAL
 0440  7006             RTL
 0441  3163             DCA     SPSEC                   /SAVE IT
 0442  4432             ONEIN                           /RECEIVE 1 IN OCTAL
 0443  0070             0070                            /LIMITS
 0444  5225             JMP     ASKNX3                  /INPUT ERROR, ASK AGAIN
 0445  1163             TAD     SPSEC                   /ADD IN LAST
 0446  3163             DCA     SPSEC                   /SAVE ALL
 0447  1164             TAD     SPBLK
 0450  7640             SZA CLA                         /BLOCK LENGTH 07777
 0451  5254             JMP     .+3                     /NO LIMIT IS 17.
 0452  1160             TAD     SPFLD
 0453  7640             SZA CLA                         /FIELD 07777
 0454  1065             TAD     K0010                   /LIMIT IS 17.
 0455  1064             TAD     K0007
```

```
0456  7140          CLL CMA
0457  1163          TAD     SPSEC                   /COMPARE SECTOR INPUT;
0460  7638          SZL CLA                         /IN LIMITS???
0461  5225          JMP     ASKNX3                  /NO, INPUT ERROR
0462  7348          CLA CLL CMA
0463  3774'         DCA     SECFLG                  /SETUP SECTOR FLAG
                    /
                    /
                    /
                    /INTERIGATE ABOUT "OPERATOR
                    /SELECT DATA";
                    /
0464  4455    ASKNX5, PRNTER                        /PRINT "DATA?"
0465  3433          MES13
0466  1322          TAD     RANJMS
0467  3773'         DCA     SWDAT                   /SET INSTRUCTION SWITCH
0470  4444          RECEIV                          /RECEIVE INPUT
0471  4437          YESNO                           /Y OR N
0472  5264          JMP     ASKNX5                  /ERROR, ASK AGAIN
0473  5313          JMP     ASKSUR                  /ASK "ARE YOU SURE"
0474  1346          TAD     KSKP
0475  3773'         DCA     SWDAT                   /SET INSTRUCTION SWITCH
0476  1105          TAD     M12
0477  3111          DCA     TRASM1                  /SETUP WORD COUNTER
0500  7340          CLA CLL CMA
0501  1151          TAD     DATPOT                  /GET POT POINTER
0502  3010          DCA     AUTO10
0503  4457          CRLF
0504  4433          FORIN                           /RECEIVE 4 IN OCTAL
0505  5264          JMP     ASKNX5                  /INPUT ERROR, ASK AGAIN
0506  3410          DCA I   AUTO10                  /SAVE DATA
0507  2111          ISZ     TRASM1                  /UPDATE COUNTER
0510  5303          JMP     .-5                     /GET NEXT
0511  7340          CLA CLL CMA
0512  3157          DCA     DATFLG                  /SETUP DATA FLAG
                    /
                    /ASK IF HE'S SURE;
                    /
0513  4455    ASKSUR, PRNTER                        /PRINT "ARE YOU SURE"
0514  3436          MES14
0515  4444          RECEIV                          /GET INPUT
0516  4437          YESNO                           /Y OR N
0517  5313          JMP     ASKSUR                  /INPUT ERROR
0520  5772'         JMP     STRTEX                  /ALL AGAIN
0521  5771'         JMP     RUN                     /START DATA TESTING
0522  4426    RANJMS, GENDAT

                    /THIS ROUTINE TESTS FOR BEING ON APT,
                    /IF ON APT RETURN IS PLUS ONE, IF NOT RETURN IS PLUS TWO,
                    /
0523  0000    CHEK22, 0
0524  1822          TAD     22
0525  7700          SMA CLA                         /ON APT?
0526  2323          ISZ     CHEK22                  /NO, UPDATE RETURN,
0527  5723          JMP I   CHEK22                  /AND RETURN,
```



```
                    /
                    /ROUTINE TO NOTIFY APT,
                    /
0530  0000    KTIME,  0
0531  4424          CHK22
0532  7410          SKP                             /ON APT,
0533  5730          JMP I   KTIME                   /NOT ON APT,GO ABOUT NORMAL RUN,
0534  6002          IOF                             /TURN INTERUPT SYSTEM OFF
0535  6201          CDF     00                      /DATA FIELD SHOULD ALWAYS
                                                    /BE ZERO IN PROGRAM RUN,
                                                  /CHANGED TO CURRENT DATA FIELD,
0536  6272          CIF     70
0537  4741          JMS I   K6500
0540  5730          JMP I   KTIME                   /RETURN,
                    /
0541  6500    K6500,  6500
                    /
                    /
                    /SUBROUTINE TO LOAD COMMAND REGISTER
                    /
0542  0000    LDCM,   0
0543  3123          DCA     CMREG
0544  1123          TAD     CMREG
0545  6746    IOT6,   DLDC                            /LOAD COMMAND REGISTER
0546  7610    KSKP,   SKP CLA
0547  4576    ERMLT6, JMS I   BGMLT
0550  1122          TAD     EXREG
0551  7110          CLL RAR
0552  7630          SZL CLA
0553  1016          TAD     K0200
0554  6740    IOT0,   DLSC                            /LOAD EXT, DRIVE
0555  7610          SKP CLA
0556  4576    ERMLT0, JMS I   BGMLT                   /SKIP TRAP IOT0
0557  5742          JMP I   LDCM                    /EXIT
                    /

                    /SUBROUTINE TO ISSUE "DCLR" CLEAR IOT
0560  0000    CLDR,   0
0561  6742    IOT2,   DCLR                            /DCLR "CLEAR IOT"
0562  5760          JMP I   CLDR                    /EXIT
0563  4576    ERMLT2, JMS I   BGMLT                   /ERROR SKIP TRAP

0571  0600
0572  0224
0573  2601
0574  3574
0575  3575
0576  3573
0577  0345
      0600    PAGE
                    /
                    /
                    /SETUP ADDRESSING, COMMAND,
                    /AND DATA PARAMETERS;
```

```
                    /MAKE FIELD:
                    /
0600  4406  RUN,    LAS                     /GET THE SWITCHES.
0601  0016          AND     K0200           /MASK HALT SW.
0602  7640          SZA CLA                 /TIME TO HALT?
0603  7402  STPHLT, HLT                     /HALT FROM SWR4=1.
0604  1777'         TAD     FLDFLG          /GET FIELD FLAG
0605  7650          SNA CLA                 /WAS IT SET?
0606  5211          JMP     .+3             /NO, USE RANDOM FIELD
0607  1160          TAD     SPFLD           /YES, GET OPERATOR FIELD
0610  5230          JMP     RNFLD           /GO
0611  7301          CLA CLL IAC
0612  1143          TAD     MAXFLD          /GET MAXIMUM FIELD POINTER
0613  7650          SNA CLA                 /ANY FIELDS THERE
0614  5230          JMP     RNFLD           /NO EXTENDED FIELDS TO USE
0615  4440          RANGEN                  /YES, GET A RANDOM FIELD
0616  0014          AND     K0070           /MASK
0617  7450          SNA                     /COULD BE 0
0620  5230          JMP     RNFLD           /WAS DON'T HAVE TO CHECK LIMITS
0621  3136          DCA     INTCM           /SAVE FIELD FOUND
0622  1136          TAD     INTCM
0623  1143          TAD     MAXFLD          /ADD IN MAXIMUM FIELD POINTER
0624  7710          SPA CLA                 /IN LIMITS????
0625  5231          JMP     RNFLD+1         /YES, USE IT
0626  1143          TAD     MAXFLD          /NO, USE MAXIMUM IN THE MACHINE
0627  7040          CMA
0630  3136  RNFLD,  DCA     INTCM
                    /
                    /MAKE BLOCK LENGTH:
                    /
0631  1776'         TAD     HLFFLG          /GET BLOCK FLAG
0632  7650          SNA CLA                 /WAS IT SET????
0633  4440          RANGEN                  /NO, USE RANDOM
0634  1164          TAD     SPBLK
0635  0015          AND     K0100                   /MASK
0636  1136          TAD     INTCM
0637  3136          DCA     INTCM           /INITIAL HALF BLOCK BIT ****
0640  1136          TAD     INTCM
0641  0015          AND     K0100           /MASK
0642  7640          SZA CLA                 /HALF BLOCK SET????
0643  1016          TAD     K0200           /YES, SETUP WC POINTER
0644  1104          TAD     K7400
0645  3112          DCA     TRASH2          /WC BUILDER
0646  1112          TAD     TRASH2
0647  7041          CIA
0650  3114          DCA     UPDATE          /UPDATER FOR FWREG
0651  1136          TAD     INTCM
0652  0350          AND     A0170           /MASK FIELD BITS
0653  7640          SZA CLA                 /WERE THERE ANY
0654  1005          TAD     K0010           /YES
0655  1004          TAD     K0007           /MAKE MAXIMUM SECTOR POINTER
0656  3111          DCA     TRASH1          /SAVE IT
                    /
                    /MAKE AMOUNT OF SECTORS
                    /TO TRANSFER:
```



```
                    /
0657  1775'         TAD     SECFLG          /GET SECTOR FLAG
0660  7650          SNA CLA                 /WAS IT SET????
0661  4440          RANGEN                  /USE RANDOM
0662  1163          TAD     SPSEC           /GET OPERATOR INPUT
0663  0111          AND     TRASH1          /MASK OUT
0664  3147          DCA     CONSEC          /SAVE
0665  1147          TAD     CONSEC
0666  7040          CMA
0667  3111          DCA     TRASH1          /CONSECUTIVE TO DO
                    /
                    /MAKE WORD COUNT:
                    /
0670  1112          TAD     TRASH2          /COMPUTE INITIAL WC
0671  2111          ISZ     TRASH1
0672  5270          JMP     .+2             /UPDATE BY BUILDER
0673  3127          DCA     WCREG           /INITIAL WORD COUNT ****
                    /
                    /MAKE CURRENT ADDRESS:
                    /
0674  4440          RANGEN
0675  3126          DCA     CAREG           /GENERATE RANDOM CA
0676  1136          TAD     INTCM           /SAVE IT
0677  0014          AND     K0070           /MASK FIELD BITS
0700  7640          SZA CLA                 /EXTENDED FIELD????
0701  5317          JMP     FILLUP          /INITIAL CA O.K.****
0702  1146          TAD     BGNBUF
0703  7140          CMA CLL
0704  1126          TAD     CAREG
0705  7620          SNL CLA                 /GREATER THAN PROGRAM+1
0706  5315          JMP     CONCUR          /NO, USE CONSTANT VALUE
0707  1127          TAD     WCREG           /GET WORD COUNT
0710  7041          CIA
0711  1126          TAD     CAREG           /ADD IN CA
0712  1016          TAD     K0200
0713  7630          SZL CLA                 /WITHIN BOUNDS????
0714  5317          JMP     FILLUP          /YES, INITIAL CA O.K.****
0715  1146  CONCUR, TAD     BGNBUF          /NO, USE PROGRAM+1
0716  3126          DCA     CAREG           /SAVE IT
                    /
                    /ROUTINE TO FILL AND CHECK SUM BUFFER
                    /
0717  4425  FILLUP, KTICK                   /NOTIFY APT IF NEED BE.
0720  4434          SETGEN                  /SETUP AND SAVE GENERATER
0721  1106          TAD     M4
0722  3137          DCA     STATRY          /SETUP TRY COUNTER
0723  4435  REFILL, SETFLD                  /FIELD+ BUFTAL+ AUTO 11+ 12
0724  3325          DCA     .+1             /FIELD TO BUFFER IN AC
0725  7402          HLT                     /CUF TO BUFFER
0726  3141          DCA     CHKSAV          /START WITH 0
0727  4427  NEWRD,  RANDAT                  /GENERATE DATA
0730  3111          DCA     TRASH1          /SAVE OUTPUT WORD
0731  1111          TAD     TRASH1          /GET BACK WORD
0732  3411          DCA I   AUTO11          /STORE IN BUFFER
0733  7100          CLL
```

```
0734  1111          TAD     TRA8M1                  /GET BACK WORD
0735  1141          TAD     CHKSAV                  /ADD IN LAST
0736  7430          SZL                             /LINK SET??
0737  7001          IAC                             /ADD IT IN
0740  3141          DCA     CHKSAV                  /SAVE FOR NEXT
0741  2117          ISZ     BUFTAL                  /UPDATE BUFFER TALLY
0742  5327          JMP     NEWRD                   /MORE WORDS TO GO
0743  6201          CDF     0
0744  1165          TAD     ERFLG
0745  7650          SNA CLA                         /ERROR FLAG SET????
0746  5774*         JMP     POLNEX                  /POLE DRIVES
0747  5773*         JMP     REWRT                   /YES, MUST BE A WRITE ERROR
                    /
0750  0170    A0170,  0170
                    /
                    /SUBROUTINE TO ISSUE "DSKP" DISK SKIP IOT
                    /
0751  0000    SDKP,   0
0752  6741    IOT1,   DSKP                          /DISK SKIP IOT
0753  7410            SKP                           /DID NOT SKIP
0754  2351            ISZ     SDKP
0755  5751            JMP I   SDKP                  /EXIT
                    /
                    /PLACE FOR DATA IN MANUAL MODE
                    /
0756  0000    DAT1,   0000
0757  0000    DAT2,   0000
0760  0000    DAT3,   0000
0761  0000    DAT4,   0000
0762  0000    DAT5,   0000
0763  0000    DAT6,   0000
0764  0000    DAT7,   0000
0765  0000    DAT8,   0000
0766  0000    DAT9,   0000
0767  0000    DAT10,  0000
0770  0000    DAT11,  0000
0771  0000    DAT12,  0000
                    /
0773  1047
0774  1000
0775  3574
0776  3575
0777  3572
      1000    PAGE
                    /
                    /ROUTINE TO SELECT DRIVE NO,
                    /SEQUENCIAL SELECTION 0,1,2,3,4,5,6,7,ETC,
                    /
1000  2115    POLNEX, ISZ     POLDSK                  /UPDATE POLE POINTER
1001  1115            TAD     POLDSK                  /GET POINTER
1002  4436            SELCHK                          /CHECK IF DISK ON SYSTEM,
1003  5200            JMP     POLNEX                  /NO, TRY NEXT DRIVE
1004  1115            TAD     POLDSK
1005  7112            CLL RTR
1006  0061            AND     K0001
```



```
1007  3122            DCA     EXREG                   /SET EXT, DRIVE BIT
                    /
                    /DRIVE COMPLETED, START
                    /WRITE SEQUENCE;
                    /SELECT DISK ADDRESS,
                    /
1010  1115    GOTIT,  TAD     POLDSK                  /GET DRIVE NO,
1011  0062            AND     K0003                   /MASK
1012  7104            CLL RAL                         /MOVE TO 9-10,
1013  1136            TAD     INTCM                   /ADD IN OTHER,
1014  3136            DCA     INTCM                   /SAVE INITIAL COMMAND,
1015  1777*           TAD     TRKFLG                  /GET TRACK FLAG
1016  7650            SNA CLA                         /WAS IT SET????
1017  4440            RANGEN                          /GET RANDOM DA,
1020  1161            TAD     SPTRK1                  /GET OPERATOR CONSTANT INPUT,
1021  0061            AND     K0001                   /MASK EXT, BIT,
1022  1136            TAD     INTCM                   /ADD IN OTHER,
1023  3136            DCA     INTCM                   /SAVE COMPLETE INITIAL COMMAND,
1024  1777*           TAD     TRKFLG                  /GET TRACK FLAG
1025  7650            SNA CLA                         /WAS IT SET????
1026  4440            RANGEN                          /USE RANDOM
1027  1162            TAD     SPTRK2                  /GET INPUT
1030  3124            DCA     INTDA                   /SAVE INITIAL DA,
1031  1777*           TAD     TRKFLG
1032  7640            SZA CLA                         /INPUT BY OPERATOR?
1033  5247            JMP     REWRT                   /LET HIM FAIL??
1034  1136            TAD     INTCM
1035  7010            RAR
1036  7620            SNL CLA                         /EXT BIT SET?
1037  5247            JMP     REWRT                   /NO, DON'T LIMIT DA,
1040  1145            TAD     MAXTRK
1041  1124            TAD     INTDA
1042  7630            SZL CLA                         /BEOND MAXIMUM LIMIT?
1043  5247            JMP     REWRT                   /NO, DONT LIMIT,
1044  1124            TAD     INTDA
1045  7040            CMA
1046  3124            DCA     INTDA                   /YES, SET TO LEGAL LIMIT,
                    /
                    /WRITE INFORMATION;
                    /CLEAR BUFFER ON THE FLY;
                    /
1047  4441    REWRT,  DISKGO                          /GO WRITE
1050  4400            4400                            /WRITE DATA POINTER
1051  5263            JMP     REREAD                  /WRITE O,K,
1052  7340            CLA CLL CMA
1053  3165            DCA     ERFLG                   /SET WRITE ERROR FLAG
1054  4442            RESRAN                          /RESET GENERATOR
1055  2137            ISZ     STATRY                  /UPDATE WRITE RE-TRY
1056  5776*           JMP     REFILL                  /TRY AGAIN
                    /
                    /CHECK FOR LOOP ON WRITE;
                    /
1057  4406            LAS                             /GET SWITCH 0
1060  7710    TRYTIM, SPA CLA                         /LOOP ON WRITE????
1061  5775*           JMP     REFILL-2                /YES, TRY WRITE AGAIN
```

```
1062  5351            JMP     STNREL                  /RESTORE ALL DRIVES ON ERROR
1063  1260  REREAD,   TAD     TRYTIM
1064  3171            DCA     TRYCNT                  /SETUP FOR SOFT ERROR RETRY
1065  3165            DCA     ERFLG                   /CLEAR ERROR FLAG
1066  1106            TAD     M4
1067  3137            DCA     STATRY                  /SETUP TRY COUNTER
1070  1106            TAD     M4
1071  3140            DCA     DATTRY                  /SETUP TRY COUNTER
1072  3155            DCA     CHCCNT                  /CLEAR CRC COUNTER!!!!
                      /
                      /READ INFORMATION!
                      /CHECK BUFFER ON THE FLY!
                      /
1073  4441  RDTRY,   DISKGO                          /READ DATA
1074  0400            0400                          /READ DATA POINTER
1075  7610            SKP CLA                       /DATA READ O.K.
1076  5305            JMP     RDSTA                 /STATUS ERROR
1077  3155            DCA     CRCCNT                /CLEAR CRC COUNTER!
                      /
                      /CHECK DATA ON NO STATUS ERRORS!
                      /
1100  4774*           JMS     DTCHK                 /CHECK DATA
1101  5324            JMP     RERUN                 /DATA O.K.
1102  2140            ISZ     DATTRY                /UPDATE READ RE-TRY
1103  5273            JMP     RDTRY                 /TRY AGAIN
1104  5323            JMP     RERUN+1               /TRY TO SEEK IT
1105  1121  RDSTA,   TAD     STREG                 /GET STATUS READ
1106  0065            AND     K0010                 /MASK CRC
1107  7450            SNA                           /CRC ERROR????
1110  5320            JMP     UPTRY                 /NO, TRY READ AGAIN
1111  3156            DCA     CRCFLG                /YES, SET FLAG
1112  2155            ISZ     CRCCNT                /UPDATE CRC POINTER
                      /
                      /CHECK DATA AFTER CRC ERROR!
                      /
1113  4774*           JMS     DTCHK                 /CHECK DATA
1114  7610            SKP CLA                       /IS A HARD ERROR!
1115  7340            CLA CLL CMA                   /SET RETRY COUNTER!
1116  3165            DCA     ERFLG                 /SETUP FOR 64 RETRYS IF AC=7777
1117  7410            SKP                           /CHECK ON RETRY!!!!
1120  3155  UPTRY,   DCA     CRCCNT
1121  2137            ISZ     STATRY                /UPDATE TRY POINTER
1122  5273            JMP     RDTRY                 /TRY AGAIN
1123  3165            DCA     ERFLG                 /IS A HARD ERROR
1124  3155  RERUN,   DCA     CRCCNT                /CLEAR CRC COUNT
1125  3156            DCA     CRCFLG                /CLEAR CRC FLAG
1126  4773*           JMS     CKTIM                 /CHECK TIME POINTERS
1127  1165            TAD     ERFLG
1130  7650            SNA CLA                       /IS IT 64 RETRYS FOR SOFT ERROR?
1131  5334            JMP     .+3                   /NO DON'T BOTHER
1132  2171            ISZ     TRYCNT                /YES, UPDATE RETRY COUNTER
1133  5266            JMP     REREAD+3              /TRY AGAIN
                      /
                      /CHECK FOR LOOP ON READ!
                      /
```



```
1134  4406            LAS                           /GET SWITCH 1
1135  7104            CLL RAL
1136  7710            SPA CLA                       /LOOP????
1137  5263            JMP     REREAD                /YES, LOOP
1140  1137            TAD     STATRY                /TEST FOR HARD ERROR
1141  7650            SNA CLA
1142  5351            JMP     STNREL                /YES
1143  3165            DCA     ERFLG                 /CLEAR ERROR FLAG
                      /
                      /CHECK FOR TYPE STATUS
                      /REPORT!
                      /
1144  4406            LAS
1145  0017            AND     K0400                 /MASK
1146  7640            SZA CLA                       /TYPE STATUS REPORT????
1147  4772*           JMS     TPSTA                 /YES
1150  5771*           JMP     RUN                   /DO NEXT DRIVE
                      /
                      /RESTORE DRIVE AFTER ERROR
                      /
1151  1123  STNREL,   TAD     CMREG                 /GET DRIVE NO.
1152  4443            RECAL                         /RESTORE
1153  5771*           JMP     RUN                   /START NEXT DRIVE
                      /
                      /ROUTINE TO DETERMINE IF TIMING NEEDS TO BE FOR APT SYSTEM.
                      /
1154  0000  XKTICK,   0
1155  4424            CHK22                         /TEST FOR APT
1156  7410            SKP
1157  5754            JMP I   XKTICK                /NO, RETURN TO NORMAL RUN
1160  6201            CDF     0
1161  2150            ISZ     CLKCNT                /LONG COUNTER FOR APT
1162  5366            JMP     EXTICK                /NORMAL RETURN
1163  1100            TAD     K7760                 /INIT COUNTER
1164  3150            DCA     CLKCNT
1165  4770*           JMS     KTIME                 /NOTIFY APT
1166  6201  EXTICK,   CDF 0
1167  5754            JMP I   XKTICK
1170  0530
1171  0600
1172  3000
1173  2450
1174  1600
1175  0721
1176  0723
1177  3573
      1200    PAGE
                      /
                      /ERROR HANDLER!
                      /UPDATE "SOFT" OR "HARD" TALLYS!
                      /PRINT ERROR TEXT AND DATA!
                      /CHECK INHIBIT ERROR SW!
                      /
1200  0000  ERRO,     0
1201  7001            IAC                           /UPDATE AC FLAG
```

```
1202  3374            DCA     PCNTR2                  /SAVE NON-RECOVERABLE POINTER;
                      /
                      /COMPUTE WAY TO "HARD"/"SOFT" TALLYS;
                      /
1203  1377            TAD     K7773
1204  3375            DCA     PCNTR3                  /LINE COUNTER
1205  1123            TAD     CMREG                   /GET LAST COMMAND
1206  0063            AND     K0006                   /MASK DRIVE NUMBER
1207  7170            CLL CML CMA RAR
1210  3373            DCA     PCNTR1                  /SETUP COUNTER
1211  1062            TAD     K0003
1212  2373            ISZ     PCNTR1
1213  5211            JMP     .-2                     /COMPUTE WAY TO BUFFER
1214  1153            TAD     STAPOT
1215  3373            DCA     PCNTR1                  /POINTER TO BUFFER
                      /
                      /DETERMINE IF ERROR IS "HARD" OR "SOFT";
                      /
1216  1156            TAD     CRCFLG                  /GET CRC FLAG
1217  7650            SNA CLA                         /CRC ERROR????
1220  5251            JMP     NTSOFT                  /NO, WAS DEFINITLY A HARD ERROR;
1221  1600            TAD I   ERRO                    /GET ERROR POINTER;
1222  7650            SNA CLA                         /WAS IT FIRST TIME?
1223  5255            JMP     NTERR                   /NO ERROR, ADDITIONAL CRC DATA;
1224  1125            TAD     DAREG                   /COMPARE FAILING SECTOR TO
1225  0066            AND     K0017                   /SECTOR WHERE DATA ERROR
1226  7041            CIA                             /OCCURRED;
1227  1131            TAD     ASKEG
1230  7640            SZA CLA                         /SAME SECTOR?
1231  5251            JMP     NTSOFT                  /NO, "HARD" ERROR
1232  7340            CLA CLL CMA
1233  1155            TAD     CRCCNT                  /GET CRC COUNTER
1234  7450            SNA                             /WAS THIS FIRST POSSIBLE "SOFT"?
1235  5245            JMP     SOFT                    /YES, UPDATE "SOFT" TALLY;
1236  1110            TAD     K7775                   /CHECK IF NONRECOVERABLE "SOFT";
1237  7650            SNA CLA                         /WAS IT?
1240  2373            ISZ     PCNTR1                  /NO, DUMP "SOFT" TALLY;
1241  1773            TAD I   PCNTR1                  /OTHERWISE DUMP "HARD" TALLY;
1242  7440            SZA                             /DONT GO BACK WARDS!!!!!!!
1243  1101            TAD     K7777                   /DUMP APPROPRIATE TALLY!!
1244  5254            JMP     NTERR-1         /DUMP IT;
1245  1101  SOFT,     TAD     K7777
1246  1773            TAD I   PCNTR1                  /REDUCE HARD ERROR COUNT
1247  3773            DCA I   PCNTR1
1250  2373            ISZ     PCNTR1                  /YES, UPDATE POINTER
1251  1101  NTSOFT,   TAD     K7777
1252  2773            ISZ I   PCNTR1                  /UPDATE ERROR COUNT
1253  7610            SKP CLA
1254  3773            DCA I   PCNTR1                  /HOLD AT 7777
                      /
                      /CHECK INHIBIT SW;
                      /
1255  4423  NTERR,    JMS I   KAERRO                  /REPORT ERROR TO APT IF REQUIRED
1256  4406            LAS
1257  7106            CLL RTL
```



```
1260  7710            SPA CLA
1261  5356            JMP     ERROEX+1                /YES
                      /
                      /CHECK FOR NO HEADER ON SECOND DATA ERROR;
                      /
1262  1600  DOHEAD,   TAD I   ERRO                    /GET TEXT POINTER
1263  7650            SNA CLA                         /DATA ERROR?
1264  5355            JMP     ERROEX                  /EXIT
                      /
                      /TYPE ERROR MESSAGE;
                      /
1265  4457            CRLF
1266  4457            CRLF
1267  1374            TAD     PCNTR2
1270  7640            SZA CLA                         /GET NON-RECOV. FLAG
1271  5275            JMP     .+4                     /WAS IT SET
1272  7340            CLA CLL CMA                     /NO DON'T TYPE IT
1273  4455            PRNTER
1274  3335            MES4                            /PRINT "NON-RECOVERABLE "
1275  1600            TAD I   ERRO
1276  1376            TAD     HEDTAD                  /GET TEXT POINTER;
1277  3120            DCA     PCREG                   /MAKE ERROR HEADER POINTER;
1300  1520            TAD I   PCREG                   /SAVE POINTER;
1301  3304            DCA     .+3                     /GET CORRECT TEXT;
1302  7340            CLA CLL CMA
1303  4455            PRNTER
1304  7402            HLT                             /PRINT HEADER
1305  7340            CLA CLL CMA
1306  4455            PRNTER
1307  3303            MES0                            /PRINT "ERROR"
1310  4457            CRLF
1311  1200            TAD     ERRO
1312  3120            DCA     PCREG                   /SAVE PC
1313  2200            ISZ     ERRO
1314  1600            TAD I   ERRO
1315  3371            DCA     ESAVE
1316  2200            ISZ     ERRO                    /UPDATE FOR RETURN
1317  1172            TAD     XTEXT
1320  3374            DCA     PCNTR2
1321  1372            TAD     XREG
1322  3010            DCA     AUTO10
1323  1105            TAD     M12
1324  3373            DCA     PCNTR1                  /COUNTER FOR    # OF HEADS
1325  1371  STHAUT,   TAD     ESAVE                   /GET TEXT POINTER
1326  7500            SMA
1327  5363            JMP     NOTEX                   /NOT THIS ONE
1330  7104            CLL RAL
1331  3371            DCA     ESAVE
1332  2375            ISZ     PCNTR3                  /UPDATE LINE FILL COUNTER
1333  7610            SKP CLA                         /NO CRLF
1334  4457            CRLF
1335  1374            TAD     PCNTR2                  /GET TEXT MESSAGE POINTER
1336  2374            ISZ     PCNTR2
1337  2374            ISZ     PCNTR2
1340  3343            DCA     .+3                     /STORE FOR PRNTER
```

```
1341  7340           CLA CLL CMA
1342  4455           PRNTER                  /PRINT XX:
1343  7402           HLT                     /MODIFIED TEXT POINTER
1344  1410           TAD I   AUTO10
1345  4456           OCTEL                   /PRINT FOUR OCTAL
1346  2373  AGAIN,   ISZ     PCNTR1
1347  5325           JMP     STKAUT          /CHECK FOR NEXT XX:
1350  1520           TAD I   PCREG           /GET ERROR POINTER;
1351  1106           TAD     M4
1352  7650           SNA CLA                 /FIRST DATA ERROR?
1353  4573           JMS I   PRNDAT          /YES, PRINT DATA
1354  5360           JMP     .+4
1355  4573  ERROEX,  JMS I   PRNDAT          /PRINT ONLY DATA;
1356  2200           ISZ     ERRO
1357  2200           ISZ     ERRO            /UPDATE FOR RETURN
1360  7301           CLA CLL IAC             /ENABLE CLEAR CONTROL
1361  4454           CLRALL                  /CLEAR CONTROL
1362  5600           JMP I   ERRO            /EXIT
1363  7104  NOTEX,   CLL RAL
1364  3371           DCA     ESAVE
1365  2374           ISZ     PCNTR2
1366  2374           ISZ     PCNTR2
1367  2010           ISZ     AUTO10
1370  5346           JMP     AGAIN
                     /
1371  0000  ESAVE,   0
1372  0117  XREG,    PCREG-1
1373  0000  PCNTR1,  0
1374  0000  PCNTR2,  0
1375  0000  PCNTR3,  0
1376  1377  HEDTAD,  BUFPNT-1
1377  7773  K7773,   7773
                     /
      1400           PAGE
                     /
                     /POINTERS FOR TEXT INFORMATION;
                     /
1400  3247  BUFPNT,  ERTX1
1401  3255           ERTX2
1402  3264           ERTX3
1403  3276           ERTX4
                     /
                     /ROUTINE TO CHECK FOR CLASSIC AND LIMIT
                     /TRANSFERS TO FIELD 0 IF AVAILABLE.
                     /
1404  0000  CLAFLD,  0
1405  1022           TAD     22
1406  0017           AND     K0400
1407  7650           SNA CLA                 /ON CLASSIC?
1410  5604           JMP I   CLAFLD          /NO.
1411  7340           CLA CLL CMA
1412  3143           DCA     MAXFLD          /LIMIT TO FIELD 0.
1413  5604           JMP I   CLAFLD
                     /
                     /ROUTINE TO DO CRLF
```



```
                     /
1414  0000  UPONE,   0
1415  7300           CLA CLL
1416  1224           TAD     K0215
1417  4445           TYPE
1420  1225           TAD     K0212
1421  4445           TYPE
1422  4445           TYPE
1423  5614           JMP I   UPONE
                     /
1424  0215  K0215,   0215
1425  0212  K0212,   0212
                     /
                     /ROUTINE TO PRINT FOUR OCTAL
                     /
1426  0000  FROCT,   0
1427  7006           RTL
1430  7006           RTL
1431  3214           DCA     UPONE
1432  1106           TAD     M4
1433  3250           DCA     PRN
1434  1214           TAD     UPONE
1435  0064           AND     K0007
1436  1067           TAD     K0260
1437  4445           TYPE
1440  1214           TAD     UPONE
1441  7006           RTL
1442  7004           RAL
1443  3214           DCA     UPONE
1444  2250           ISZ     PRN
1445  5234           JMP     .-11
1446  4431           SPACE
1447  5626           JMP I   FROCT
                     /

                     /SUBROUTINE TO PRINT TEXT
                     /
1450  0000  PRN,     0
1451  7650           SNA CLA                 /TYPE CRLF
1452  4457           CRLF                    /YES!!!!
1453  1650           TAD I   PRN             /GET POINTER
1454  2250           ISZ     PRN
1455  3226           DCA     FROCT

1456  7300  MRPRN,   CLA CLL
1457  1626           TAD I   FROCT
1460  0077           AND     K7700
1461  7450           SNA
1462  5304           JMP     EXIT
1463  7500           SMA
1464  7020           CML
1465  7001           IAC
1466  7012           RTR
1467  7012           RTR
```

```
1470  7012          RTR
1471  4445          TYPE
1472  1626          TAD I   FRQCT
1473  0102          AND     K0077
1474  7450          SNA
1475  5304          JMP     EXIT
1476  1313          TAD     K3740
1477  7500          SMA
1500  1074          TAD     K4100
1501  4431          SPACE                       /SPACE OUT 1
1502  2226          ISZ     FRQCT
1503  5256          JMP     MRPRN               /MORE TO PRINT
1504  7300  EXIT,   CLA CLL
1505  5650          JMP I   PRN
                    /
                    /ROUTINE TO SPACE OUT 1
                    /
1506  0000  SPAC,   0
1507  1312          TAD     K0240
1510  4445          TYPE
1511  5706          JMP I   SPAC
                    /
1512  0240  K0240,  240
1513  3740  K3740,  3740
                    /
                    /THIS ROUTINE WILL BE A SKIP INSTRUCTION FOR SYSTEMS WITHOUT CLASSIC
                    /OTHERWISE IT WILL EXECUTE THE NEXT INSTRUCTION IN FIELD 0 AND THEN
                    /SKIP THE INSTRUCTION AFTER THAT ONE.
                    /
1514  0000  CLASIK, 0
1515  3345          DCA     SAVEAC              /SAVE CURRENT AC.
1516  1714          TAD I   CLASIK              /GET INSTRUCTION TO EXECUTE.
1517  3344          DCA     ROUTMP              /SAVE IT.
1520  2314          ISZ     CLASIK
1521  1022          TAD     OP2
1522  0017          AND     K0400
1523  7640          SZA CLA                     /ARE WE ON CLASSIC?
1524  5327          JMP     .+3                 /YES.
1525  1345          TAD     SAVEAC              /NO, THEN
1526  5714          JMP I   CLASIK              /EXIT.
1527  2314          ISZ     CLASIK
1530  6211          CDF     10
1531  1020          TAD     SWR
1532  3777          DCA I   (SWR)               /SAVE SWITCH REGISTER.
1533  1021          TAD     OP1
1534  3776          DCA I   (OP1)               /SAVE CONTROL 1.
1535  1022          TAD     OP2
1536  3775          DCA I   (OP2)
1537  1344          TAD     ROUTMP
1540  3774          DCA I   (ROUINS)            /SAVE ROUTINE IN FIELD 1.
1541  1345          TAD     SAVEAC              /GET BACK AC.
1542  6212          CIF     10
1543  5774          JMP I   (ROUINS)            /GO AND EXECUTE INSTRUCTION.
                    /
1544  0000  ROUTMP, 0
```



```
1545  0000  SAVEAC, 0
                    /
                    /ROUTINE TO GET THE SWITCHES.
                    /
1546  0000  MYLAS,  0
1547  4407          CLASIC                      /CHECK FOR CLASSIC.
1550  4425          CSCKSW                      /GET SWITCHES.
1551  7604          7604
1552  5746          JMP I   MYLAS               /EXIT.
                    /
                    /ROUTINE TO RESET REGISTERS FOR ERROR PRINTER
                    /
1553  0000  SETREG, 0
1554  1073          TAD     K4000               /GET STATUS
1555  3121          DCA     STREG               /SAVE FOR ERROR PRINTER
1556  7340          CLA CLL CMA                 /DECREASE BY 1
1557  1111          TAD     TRASH1              /GET SECTOR POINTER
1560  0066          AND     K0017
1561  1112          TAD     TRASH2              /ADD IN ADDRESS
1562  3125          DCA     DAREG               /SAVE FOR ERROR PRINTER
1563  1170          TAD     FIRTIM              /CHECK IF FIRST SECTOR?
1564  7640          SZA CLA                     /IF SO, DON'T UPDATE COMMAND!
1565  5753          JMP I   SETREG              /NO, DON'T!
1566  1174          TAD     SAVCM               /GET COMMAND REG.
1567  3123          DCA     CMREG               /SAVE FOR ERROR PRINTER
1570  5753          JMP I   SETREG              /RETURN
                    /
1574  1302
1575  0022
1576  0021
1577  0020
      1600    PAGE
                    /
                    /ROUTINE TO CHECK DATA READ
                    /
1600  0000  DTCHK,  0
1601  1156          TAD     CRCFLG              /GET CRC FLAG
1602  7640          SZA CLA                     /WAS IT SET?
1603  5212          JMP     WRDCHK              /YES, THEN WORD BYB WORD CHECK!!!
1604  1142          TAD     FNDSUM              /GET CHECK SUM FOUND
1605  7041          CIA
1606  1141          TAD     CHKSAV              /COMPARE TO GOOD VALUE SAVED
1607  7650          SNA CLA                     /WERE THEY THE SAME
1610  5600          JMP I   DTCHK               /YES, DATA O.K.
1611  7340          CLA CLL CMA
1612  3446  WRDCHK, DCA I   XEMRD               /SETUP CHECKSUM ERROR FLAG
1613  1123          TAD     CMREG

1614  0015          AND     K0100
1615  7640          SZA CLA                     /HALF BLOCK SET??
1616  1016          TAD     K0200               /YES!
1617  1104          TAD     K7400
1620  3112          DCA     TRASH2
1621  1112          TAD     TRASH2
1622  7040          CMA
```

```
1623  3314            DCA     MSKER
1624  7340            CLA CLL CMA
1625  3142            DCA     FNDSUM                  /SET FIRST TIME FLAG
1626  4442            RESRAN                          /NO, SETUP RANDOM GENERATOR
1627  1130            TAD     FWREG                   /GET FINAL WC
1630  4435            SETFLD                          /GET AUTO11+ BUFTAL+ FIELD
1631  3246            DCA     GOCDF                   /SAVE FIELD CDF
1632  1112            TAD     TRASM2
1633  3361            DCA     RSRAN
1634  1124            TAD     INTDA
1635  3353            DCA     STGEN
1636  1361    DTR1,   TAD     RSRAN
1637  0314            AND     MSKER
1640  3132            DCA     WAREG
1641  1353            TAD     STGEN
1642  0066            AND     K0017
1643  3131            DCA     ASREG
1644  4427            RANDAT                          /GENERATE DATA
1645  3134            DCA     DGREG                   /SAVE GOOD DATA POINTER
1646  7402    GOCDF,  HLT/CDF                         /CDF TO BUFFER FIELD
1647  1411            TAD I   AUTO11                  /GET BAD DATA WORD
1650  6201            CDF     0                       /HOME DF
1651  3135            DCA     DBREG                   /SAVE BAD WORD
1652  1011            TAD     AUTO11                  /GET ADDRESS
1653  3133            DCA     ADREG                   /SAVE FOR PRINTER
1654  1135            TAD     DBREG                   /GET DATA READ
1655  7041            CIA
1656  1134            TAD     DGREG                   /COMPARE TO GOOD VALUE
1657  7650            SNA CLA                         /WERE THEY THE SAME
1660  5272            JMP     NOERR                   /YES, NO ERROR
1661  2142            ISZ     FNDSUM                  /FIRST TIME PRINT????
1662  5310            JMP     NTWRKS                  /NO, JUST ADDRESS AND DATA
1663  1156            TAD     CRCFLG                  /GET CRC FLAG
1664  7650            SNA CLA                         /IF SET NO NON-RECOVERABLE,
1665  1140            TAD     DATTRY                  /NO, GET NON-RECOVERABLE FLAG,
1666  2280            ISZ     DTCHK                   /UPDATE FOR ERROR RETURN
1667  4446            ERROR                           /ERROR DATA
1670  0004            0004                            /POINTER
1671  7760            7760                            /POINTER
1672  2361    NOERR,  ISZ     RSRAN
1673  5300            JMP     .+5
1674  2353            ISZ     STGEN
1675  7000            NOP
1676  1112            TAD     TRASM2
1677  3361            DCA     RSRAN
1700  2117            ISZ     BUFTAL                  /UPDATE BUFFER TALLY
1701  5236            JMP     DTM1                    /MORE WORDS TO CHECK
1702  1446            TAD I   XERRD                   /GET ERROR INDICATOR!
1703  7650            SNA CLA                         /WAS THERE AN ERROR?
1704  3155            DCA     CRCCNT                  /NO, CLEAR CRC COUNTER
1705  2446            ISZ I   XERRD                   /CHECK FOR COMPUTER ERROR?
1706  5600            JMP I   DTCHK                   /ALL O.K.
1707  4576    BADMLT, JMS I   BGMLT                   /COMPUTER MUST BE DOWN, CHECKSUM
1710  4446    NTWRKS, ERROR                           /OTHER ERRORS IN BUFFER
1711  0000            0000
```



```
1712  0000            0000
1713  5272            JMP     NOERR                   /CHECK REST OF BUFFER
                /
1714  0000    MSKER,  0
                /
                /ROUTINE TO GENERATE RANDOM NUMBERS
                /
1715  0000    RANDOM, 0
1716  7301            CLA CLL IAC
1717  1373            TAD     RAD1
1720  1374            TAD     RAD2
1721  1375            TAD     RAD3
1722  3373            DCA     RAD1
1723  7004            RAL
1724  1373            TAD     RAD1
1725  1374            TAD     RAD2
1726  1375            TAD     RAD3
1727  3374            DCA     RAD2
1730  7004            RAL
1731  1373            TAD     RAD1
1732  1374            TAD     RAD2
1733  1375            TAD     RAD3
1734  3375            DCA     RAD3
1735  1375            TAD     RAD3
1736  5715            JMP I   RANDOM                  /EXIT, RANDOM NUMBER IN AC
                /
                /GENERATOR FOR RANDOM DATA
                /
1737  0000    GNDAT,  0
1740  7301            CLA CLL IAC
1741  1367            TAD     RAN1
1742  1370            TAD     RAN2
1743  7106            CLL RTL
1744  3367            DCA     RAN1
1745  1370            TAD     RAN2
1746  7012            RTR
1747  1367            TAD     RAN1
1750  3370            DCA     RAN2
1751  1370            TAD     RAN2
1752  5737            JMP I   GNDAT
                /
                /ROUTINE TO SAVE RANDOM GENERATION
                /
1753  0000    STGEN,  0
1754  1367            TAD     RAN1
1755  3371            DCA     SAV1
1756  1370            TAD     RAN2
1757  3372            DCA     SAV2
1760  5753            JMP I   STGEN
                /
                /ROUTINE TO RESET RANDOM GENERATOR
                /
1761  0000    RSRAN,  0
1762  1371            TAD     SAV1
1763  3367            DCA     RAN1
```

```
1764  1372          TAD     SAV2
1765  3370          DCA     RAN2
1766  5761          JMP I   RSRAN
                    /
1767  1234    RAN1, 1234
1770  5670    RAN2, 5670
                    /
1771  0000    SAV1, 0
1772  0000    SAV2, 0
1773  1234    RAD1, 1234
1774  5670    RAD2, 5670
1775  4321    RAD3, 4321
                    /
                    /
      2000    PAGE
                    /
                    /ROUTINE TO WAIT FOR KEY FROM OPERATOR.
                    /
2000  0000    WAIT, 0
2001  6032          KCC
2002  6031          KSF
2003  5202          JMP .-1
2004  6036          KRB
2005  0234          AND     K177
2006  1016          TAD     K0200
2007  3235          DCA     CHKYN                   /SAVE CHARACTER
2010  1022          TAD     22                      /CHECK FOR CLASSIC
2011  0017          AND     K0400                   /MASK CLASSIC BIT
2012  7650          SNA CLA                         /CLASSIC=NON ZERO
2013  5226          JMP     WAIT1
2014  1235          TAD     CHKYN                   /RESTORE CHAR. FOR CLASSIC
2015  6211          CDF     10
2016  3777*         DCA     C8CHAR                  /SAVE CHARACTER,
2017  2776*         ISZ     INMODE
2020  1777*         TAD     C8CHAR                  /GET BACK AC.
2021  6201          CDF     0
2022  4407          CLASIC                          /CHECK FOR CLASSIC,
2023  4427          C8CNTR                          /ROUTINE TO EXECUTE.
2024  7000          NOP
2025  7300          CLA CLL                         /CLEAR CLASSIC AC RETURN
2026  1235    WAIT1, TAD    CHKYN                   /RESTORE CHARACTER
2027  6046          TLS
2030  6041          TSF
2031  5230          JMP .-1
2032  6042          TCF
2033  5600          JMP I   WAIT                    /EXIT
                    /
2034  0177    K177, 0177
                    /
                    /ROUTINE TO CHECK FOR YES OR NO
                    /
2035  0000    CHKYN, 0
2036  3200          DCA     WAIT                    /SAVE POINTER
2037  1235          TAD     CHKYN                   /GET PC STORED
2040  3260          DCA     CHKPOT                  /SAVE IT
```



```
2041  1200          TAD     WAIT
2042  2235          ISZ     CHKYN
2043  7041          CIA
2044  1257          TAD     K0316
2045  7650          SNA CLA                         /WAS IT A NO
2046  5635          JMP I   CHKYN                   /YES
2047  1200          TAD     WAIT
2050  2235          ISZ     CHKYN
2051  7041          CIA
2052  1256          TAD     K0331
2053  7650          SNA CLA                         /WAS IT A YES
2054  5635          JMP I   CHKYN                   /YES
2055  5660          JMP I   CHKPOT                  /WAS NEITHER
                    /
                    /
                    /
2056  0331    K0331, 0331
2057  0316    K0316, 0316
                    /
                    /ROUTINE TO CHECK DISK RUN POINTERS
                    /
2060  0000    CHKPOT, 0
2061  0064          AND     K0007
2062  1154          TAD     RUNPOT
2063  3200          DCA     WAIT
2064  1600          TAD I   WAIT                    /GET RUN POINTER
2065  7640          SZA CLA                         /RUN THIS DRIVE
2066  2260          ISZ     CHKPOT                  /NO
2067  5660          JMP I   CHKPOT                  /EXIT
                    /
                    /ROUTINE TO TEST FOR APT AND SET UP APPROPRIATE
                    /REGISTERS IN ON THE SYSTEM.
                    /
2070  0000    APT8, 0
2071  4424          CHK22                           /TEST FOR APT
2072  5301          JMP     .+7                     /YES
2073  4407          CLASIC
2074  4431          C8SWIT
2075  7000          NOP
2076  1355          TAD     K7000
2077  3775*         DCA     SKPNOP
2100  5351          JMP     EXAPT8                  /EXIT
2101  1022          TAD     OP2
2102  0354          AND     K7377                   /NOP CONSOLE PACKAGE
2103  3022          DCA     OP2
2104  1355          TAD     K7000
2105  3774*         DCA     MYLAS+3                         /NOP SWITCH REGISTER
                                                    /NO OPERATOR INTERVENTION ALLOWED
2106  1022          TAD     OP2
2107  0064          AND     K0007                   /GET # OF DRIVES
2110  3111          DCA     TRASH1
2111  1022          TAD     OP2
2112  0015          AND     K0100
2113  7650          SNA CLA                         /SINGLE DRIVE = NON ZERO AC
2114  5325          JMP     MOUSKS                  /NO,
```

```
2115  7301            CLL CLA IAC
2116  3000            DCA     AMOUNT                  /ONLY ONE DRIVE
2117  1111            TAD     TRASH1                  /GET DRIVE NUMBER
2120  1154            TAD     NUNPOT
2121  3111            DCA     TRASH1
2122  7340            CLL CLA CMA
2123  3511            DCA I   TRASH1                  /DO THIS DRIVE
2124  5342            JMP     MEMSET
2125  1111    MODSKS, TAD     TRASH1
2126  7040            CMA
2127  3112            DCA     TRASH2                  /SAVE THE NUMBER OF DRIVES
2130  3111            DCA     TRASH1
2131  1111            TAD     TRASH1
2132  1154            TAD     NUNPOT                  /ESTABLISH DRIVE
2133  3113            DCA     TRASH3
2134  7340            CLL CLA CMA
2135  3513            DCA I   TRASH3                  /DO THIS DRIVE
2136  2111            ISZ     TRASH1
2137  2060            ISZ     AMOUNT
2140  2112            ISZ     TRASH2                  /DONE?
2141  5331            JMP     MODSKS+4                /MORE TO DO
2142  1021    MEMSET, TAD     21
2143  7012            RTR
2144  0064            AND     K0007
2145  7104            CLL RAL
2146  7006            RTL
2147  7040            CMA                             /NEGATIVE AMOUNT OF FIELDS.
2150  3143            DCA     MAXFLD
2151  2270    EXAPT8, ISZ APT8
2152  2270            ISZ     APT8
2153  5670            JMP I   APT8
                /
2154  7377    K7377,  7377
2155  7000    K7000,  7000
                /
                /THIS ROUTNE WILL NOTIFY APT OF AN ERROR.
                /ONLY THE DRIVE IN ERROR IS ESTABLISHED.
                /
2156  0000    AERROR, 0
2157  4424            CHK22                   /CHECK FOR APT=8.
2160  7410            SKP
2161  5756            JMP I   AERROR          /EXIT
2162  6002            IOF
2163  7200            CLA
2164  1115            TAD     POLDSK          /DRIVE NUMBER
2165  0064            AND     K0007
2166  6201            CDF 00
2167  6272            CIF 70
2170  5772            JMP I   K6520                   /NOTIFY APT
2171  7402            HLT                             /SOMETHING WENT WRONG IF IT GETS HERE
                /
2172  6520    K6520,  6520
2174  1551
2175  0237
2176  1076
```



```
2177  1075
      2200      PAGE
                /
                /ROUTINE TO WRITE OR READ SECTORS SELECTED
                /
2200  0000    DSKGO,  0
2201  7340            CLA CLL CMA
2202  3170            DCA     FIRTIM                  /SETUP FIRST TIME POINTER
2203  3156            DCA     CRCFLG                  /CLEAR CRC FLAG!
2204  1126            TAD     CAREG                   /GET INITIAL CURRENT ADDRESS
2205  4452            LDCUR                           /LOAD CURRENT ADDRESS
2206  1127            TAD     WCREG
2207  3130            DCA     FWREG                   /SETUP FINAL WC
2210  1124            TAD     INTDA                   /GET INITIAL STARTING SECTOR
2211  3111            DCA     TRASH1                  /SAVE
2212  1124            TAD     INTDA                   /GET DISK ADDRESS
2213  0100            AND     K7760                   /MASK
2214  3112            DCA     TRASH2                  /SAVE
2215  1136            TAD     INTCM                   /GET INITIAL COMMAND
2216  1600            TAD I   DSKGO                   /GET READ OR WRITE
2217  4451            LDCMD                           /LOAD COMMAND
2220  1123            TAD     CMREG
2221  1075            TAD     K1000                   /MAKE READ ALL OR WRITE ALL
2222  3174            DCA     SAVCM                   /SAVE FOR SWITCH TO CONSECUTIVE MODE
2223  1111            TAD     TRASH1                  /SECTOR TO DO
2224  0066            AND     K0017                   /MASK
2225  1112            TAD     TRASH2                  /ADD TO TRACK
2226  4453            LDADD                           /LOAD AND GO
2227  6001            ION                             /TURN INTERRUPT ON
                /
                /ROUTINE TO CLEAR OR CHECK SUM BUFFER ON THE FLY!
                /
2230  3777*   GOBAK,  DCA     TIMER2                  /CLEAR LONG TIMER
2231  3142            DCA     FNDSUM                  /CLEAR SUM CHECK
2232  4435            SETFLD                          /GET FIELD TO BUFFER
2233  3254            DCA     CMNCDF                  /SAVE CDF
2234  1170            TAD     FIRTIM
2235  7650            SNA CLA                         /TIME TO GO
2236  5241            JMP     STRWRK                  /YES!!!!
2237  4776*           JMS     TIME                    /WAIT FOR FIRST INTERRUPT
2240  5234            JMP     .-4                     /NOT HERE YET
2241  1117    STRWRK, TAD     BUFTAL
2242  7041            CIA
2243  1130            TAD     FWREG                   /COMPARE TO SOFTWARE FINAL
2244  7450            SNA                             /WAIT FOR DISK????
2245  5274            JMP     WRKDON                  /YES!!!!
2246  7041            CIA
2247  3175            DCA     CLKBAK                  /SAVE DIFFERENCE
2250  1175            TAD     CLKBAK
2251  7041            CIA
2252  1117            TAD     BUFTAL
2253  3117            DCA     BUFTAL                  /UPDATE BUFFER TALLY
2254  7402    CMNCDF, HLT                             /CDF TO BUFFER FIELD
2255  1123            TAD     CMREG
2256  7700            SMA CLA                         /READ OR WRITE
```

```
2257  5264            JMP     WASRD           /WAS A READ!!
2260  3411  GOCLR,    DCA I   AUTO11          /WAS A WRITE, CLEAR BUFFER
2261  2175            ISZ     CLRBAK          /UPDATE TALLY
2262  5260            JMP     GOCLR           /MORE TO CLEAR
2263  5274            JMP     WRKDON          /DONE WITH SOME
2264  1142  WASRD,    TAD     FNDSUM
2265  7100  GOCHK,    CLL
2266  1411            TAD I   AUTO11          /GET WORD
2267  7430            SZL
2270  7001            IAC
2271  2175            ISZ     CLRBAK          /UPDATE CLEAR POINTER
2272  5265            JMP     GOCHK           /MORE TO CHECKSUM
2273  3142            DCA     FNDSUM          /SAVE IT
2274  6201  WRKDON,   CDF     0
2275  1117            TAD     BUFTAL
2276  7650            SNA CLA
2277  5302            JMP     DSKEX           /LAST WORD DONE????
2300  4776'           JMS     TIME            /EXIT
2301  5241            JMP     STRWRK          /TIME AND WAIT
2302  2200  DSKEX,    ISZ     DSKGO           /WAIT FOR INT, OR DONE!!!!
2303  5600            JMP I   DSKGO           /EXIT
                      /
                      /INTERRUPT SERVICE
                      /
2304  6741  RETURN,   DSKP                    /DISK SKIP IOT
2305  5353            JMP     NODSKP          /NOT THE DISK
2306  2111            ISZ     TRASH1          /UPDATE SECTOR NUMBER
2307  7000            NOP                     /IT WON'T WORK WITHOUT IT!
2310  1114            TAD     UPDATE
2311  1130            TAD     FWREG           /UPDATE WORD COUNT
2312  3130            DCA     FWREG
2313  6745  STATUS,   DRST                    /READ STATUS
2314  1073            TAD     K4000
2315  7440            SZA                     /ONLY DONE FLAG?
2316  5337            JMP     STATER          /STATUS ERROR
2317  1130            TAD     FWREG
2320  7650            SNA CLA                 /LAST TRANSFER?
2321  5365            JMP     TRDONE          /TRANSFER IS DONE
2322  3170            DCA     FINTIM          /CLEAR FIRST TIME POINTER!
2323  1174            TAD SAVCM               /GET READ OR WRITE COMMAND
2324  6746  RDLWRL,   DLDC                    /LOAD COMMAND REGISTER
2325  1111            TAD     TRASH1          /GET SECTOR TO DO
2326  0066            AND     K0017           /MASK OFF
2327  1112            TAD     TRASH2          /ADD IN TRACK
2330  6743  LOADO,    DLAG                    /LOAD DISK AND GO
2331  1167  RETRN,    TAD     SVLNK           /GET LINK
2332  7110            CLL RAR
2333  1166            TAD     SAVAC           /GET AC
2334  6244            RMF                     /RESTORE FIELDS
2335  6001            ION                     /TURN INTERRUPT ON
2336  5400            JMP I   0               /EXIT
2337  4775'  STATER,   JMS     SETREG          /SETUP REGISTERS!
2340  1123            TAD     CMREG
2341  7710            SPA CLA                 /WRITE OR READ
2342  7001            IAC                     /WRITE
```



```
2343  7001            IAC
2344  3347            DCA     .+3             /MODIFY HEADER POINTER
2345  1137            TAD     STATRY          /GET TRY POINTER
2346  4446            ERROR                   /PRINT MESSAGE
2347  0000            0000                    /MODIFIED HEADER POINTER
2350  7770            7770                    /MESSAGE POINTER
2351  2200            ISZ     DSKGO           /UPDATE FOR ERROR
2352  5302            JMP     DSKEX           /EXIT
2353  3374  NODSKP,   DCA     TIMER3
2354  2374            ISZ     TIMER3
2355  5354            JMP     .-1             /WAIT FOR DISK TO STOP.
2356  4407            CLASIC                  /CHECK FOR CLASSIC.
2357  4440            C8CKPA                  /ROUTINE TO EXECUTE.
2360  7000            NOP
2361  6031            KSF                     /KEYBOARD FLAG??
2362  4576  INTER2,   JMS I   8GMLT           /ILLEGAL INTERUPT
2363  6032            KCC
2364  5331            JMP     RETRN           /EXIT BACK.
2365  4775'  TRDONE,   JMS     SETREG          /SETUP REGISTERS!
2366  3170            DCA     FINTIM          /CLEAR FIRST TIME POINTER!
2367  1167            TAD     SVLNK
2370  7110            CLL RAR                 /REPLACE LINK
2371  1166            TAD     SAVAC           /REPLACE AC
2372  6244            RMF                     /RESTORE MEMORY FIELDS+ FLAGS
2373  5400            JMP I   0               /RETURN TO BACK GROUND
                      /
2374  0000  TIMER3,   0
                      /
2375  1553
2376  3123
2377  3141
      2400  PAGE
                      /
                      /ROUTINE TO GET ONE IN OCTAL
                      /
2400  0000  OCT1,     0
2401  4444            RECEIV                  /RECEIVE
2402  3354            DCA     LOAD            /SAVE IT
2403  1600            TAD I   OCT1            /GET LIMITS
2404  0064            AND     K0007           /MASK
2405  1067            TAD     K0260
2406  7141            CLL CIA
2407  1354            TAD     LOAD            /GET INPUT
2410  7620            SNL CLA                 /IN LIMITS????
2411  5226            JMP     INERR           /NO, ERROR EXIT
2412  1600            TAD I   OCT1            /GET LIMITS
2413  0014            AND     K0070           /MASK
2414  7110            CLL RAR
2415  7012            RTR
2416  1067            TAD     K0260
2417  7040            CMA
2420  1354            TAD     LOAD            /GET INPUT
2421  7630            SZL CLA                 /IN LIMITS????
2422  5226            JMP     INERR           /NO, ERROR
2423  1354            TAD     LOAD            /GET INPUT
```

```
2424  0064          AND     K0007                   /MASK
2425  2200          ISZ     OCT1
2426  2200  INERR,  ISZ     OCT1
2427  5600          JMP I   OCT1                    /GOOD EXIT
                    /
                    /ROUTINE TO RELEIVE FOUR OCTAL
                    /
2430  0000  OCT4,   0
2431  1106          TAD     M4
2432  3341          DCA     RDST                    /SETUP COUNTER
2433  3350          DCA     LDCA                    /START WITH 0
2434  4432          ONEIN                           /RECEIVE ONE OCTAL
2435  0070          0070                            /LIMITS
2436  5630          JMP I   OCT4                    /ERROR EXIT
2437  1350          TAD     LDCA                    /GET LAST
2440  2341          ISZ     RDST                    /UPDATE COUNTER
2441  7410          SKP
2442  5246          JMP     .+4                     /EXIT
2443  7004          RAL
2444  7006          RTL
2445  5233          JMP     OCT4+3
2446  2230          ISZ     OCT4
2447  5630          JMP I   OCT4                    /EXIT OCTAL IN AC
                    /
                    /ROUTINE TO UPDATE AND CHECK FOR PASS COMPLETE
                    /
2450  0000  CKTIM,  0
2451  1115          TAD     PDLDSK
2452  0064          AND     K0007                   /SETUP CURRENT DRIVE #
2453  3341          DCA     RDST                    /POINTER
2454  1341          TAD     RDST
2455  1152          TAD     TIMPOT                  /GET TIME POINTER
2456  3354          DCA     LDAD                    /SAVE IT
2457  7301          CLA CLL IAC                     /ONE FOR 0
2460  1147          TAD     CONSEC                  /GET AMOUNT DONE
2461  1754          TAD I   LDAD                    /ADD IN AMOUNT COMPLETED SO FAR
2462  3754          DCA I   LDAD                    /SAVE IT
2463  7620          SNL CLA                         /LINK UP????
2464  5650          JMP I   CKTIM                   /NO, EXIT
2465  4440          RANGEN                          /GET RANDOM NUMBER
2466  3777'         DCA     RAN1                    /RE-PRIME GENERATOR
2467  4440          RANGEN                          /GET RANDOM NUMBER
2470  3776'         DCA     RAN2                    /RE-PRIME GENERATOR
2471  7100          CLL
2472  1354          TAD     LDAD
2473  1013          TAD     K0004
2474  3354          DCA     LDAD                    /SECOND TIME POINTER
2475  2754          ISZ I   LDAD                    /UPDATE IT
2476  1754          TAD I   LDAD                    /GET COUNT
2477  1144          TAD     MAXTIM                  /ADD IN FUDGE FACTOR
2500  7620          SNL CLA                         /PASS COMPLETE????
2501  5650          JMP I   CKTIM                   /NO, EXIT
2502  3754          DCA I   LDAD                    /ZERO SECOUND COUNTER
2503  1341          TAD     RDST
2504  7040          CMA
```



```
2505  3341          DCA     RDST                    /SETUP COUNTER
2506  1362          TAD     CMPPOT                  /ADD IN POINTER
2507  1062          TAD     K0003
2510  2341          ISZ     RDST                    /COMPUTE BUFFER
2511  5307          JMP     .-2
2512  3341          DCA     RDST                    /SAVE ADDRESS POINTER
2513  7340          CLA CLL CMA
2514  2741          ISZ I   RDST                    /UPDATE PASS COMPLETE POINTER
2515  7610          SKP CLA
2516  3741          DCA I   RDST                    /HOLD AT 7777
2517  4457          CRLF
2520  4455          PRNTER                          /PRINT "DISK"
2521  3077          MES17
2522  1115          TAD     PDLDSK                  /GET DISK POLE NUMBER
2523  0064          AND     K0007                   /MASK
2524  1067          TAD     K0260
2525  4445          TYPE                            /TYPE DISK NO,
2526  7340          CLA CLL CMA
2527  4455          PRNTER                          /PRINT "PASS COMPLETE"
2530  3502          MES18
2531  4406          LAS
2532  0015          AND     K0100                   /MASK
2533  7650          SNA CLA                         /PASS COMPLETE DISCONNECT????
2534  5337          JMP     .+3                     /NO WAY!!!!
2535  4430          DISCON                          /DUMP DRIVE
2536  5775'         JMP     RUN                     /MORE TO TEST!!!!
2537  4774'         JMS     TPSTA                   /STATUS=COMPLETE TYPEOUT
2540  5650          JMP I   CKTIM                   /EXIT
                    /
                    /SUBROUTINE TO READ STATUS REGISTER
                    /
2541  0000  RDST,   0
2542  6745  IOT5,   DRST                          /READ STATUS IOT
2543  7410          SKP
2544  4576  ERMLT5, JMS I   BGMLT                  /SKIP TRAP
2545  3121          DCA     STREG                   /SAVE RESULTS
2546  1121          TAD     STREG
2547  5741          JMP I   RDST                    /EXIT
                    /
                    /SUBROUTINE TO LOAD CURRENT ADDRESS REGISTER
                    /
2550  0000  LDCA,   0
2551  6744  IOT4,   DLCA                          /LOAD CURRENT ADDRESS IOT
2552  4425          KTICK                           /NOTIFY APT
2553  5750          JMP I   LDCA                    /EXIT

                    /
                    /SUBROUTINE TO LOAD TRACK ADDRESS REGISTER
                    /
2554  0000  LDAD,   0
2555  3125          DCA     DAREG
2556  1125          TAD     DAREG
2557  6743  IOT3,   DLAG                          /LOAD DISK ADDRESS REGISTER
2560  5754          JMP I   LDAD                    /EXIT
2561  4576  ERMLT3, JMS I   BGMLT                  /ERROR SKIP TRAP
```

```
                    /
 2562  3541         CMPPOT, D0CMP-3
 2574  3000
 2575  0600
 2576  1770
 2577  1767
       2600         PAGE
                    /
                    /ROUTINE TO GET RANDOM OR OPERATOR DATA
                    /
 2600  0000         RNWRD,  0
 2601  7402         SWDAT,  HLT                     /MODIFIED SWITCH
 2602  5600                 JMP I   RNWRD           /EXIT
 2603  6201                 CDF     0               /HOME CDF
 2604  1412                 TAD I   AUTO12          /GET DATA
 2605  7402         RECDF,  HLT                     /BUFFER CDF
 2606  2116                 ISZ     OPNTAL          /UPDATE TALLY
 2607  5600                 JMP I   RNWRD           /EXIT
 2610  3220                 DCA     PRINT           /SAVE WORD
 2611  1105                 TAD     M12
 2612  3116                 DCA     OPNTAL          /REPLACE TALLY
 2613  7340                 CLA CLL CMA
 2614  1151                 TAD     DATPOT
 2615  3012                 DCA     AUTO12          /REPLACE AUTO INDEX
 2616  1220                 TAD     PRINT           /GET SAVED WORD
 2617  5600                 JMP I   RNWRD           /EXIT
                    /
                    /ROUTINE TO TYPE
                    /
 2620  0000         PRINT,  0
 2621  3237                 DCA     DUMP            /STORE AC VALUE
 2622  4424                 CHK22                   /SEE IF ON APT
 2623  5235                 JMP     PREXIT          /NO, EXIT
 2624  1237                 TAD     DUMP            /RETURN AC.
 2625  4407                 CLASIC                  /CHECK FOR CLASSIC.
 2626  4435                 C8TYPE                  /ROUTINE TO EXECUTE.
 2627  7410                 SKP
 2630  5620                 JMP I   PRINT           /EXIT.
 2631  6046                 TLS
 2632  6041                 TSF
 2633  5232                 JMP     .-1
 2634  6042                 TCF
 2635  7200         PREXIT, CLA
 2636  5620                 JMP I   PRINT
                    /
                    /ROUTINE TO DUMP AND REPORT DISK STATUS
                    /
 2637  0000         DUMP,   0
 2640  4424                 CHK22                   /CHECK FOR APT
 2641  5637                 JMP I   DUMP
 2642  4455                 PRNTER                  /PRINT "DISK "
 2643  3477                 MES17
 2644  1115                 TAD     POLDSK
 2645  0064                 AND     K0007           /SETUP CURRENT DRIVE #
 2646  3200                 DCA     RNWRD           /SAVE
```



```
 2647  1200                 TAD     RNWRD           /GET DISK NUMBER
 2650  1067                 TAD     K0260
 2651  4445                 TYPE                    /TYPE DISK NUMBER
 2652  7340                 CLA CLL CMA
 2653  4455                 PRNTER                  /PRINT "DISCONNECTED1"
 2654  3445                 MES15
 2655  4777*                JMS     TPSTA           /TYPE STATUS REPORT
 2656  1200                 TAD     RNWRD
 2657  1154                 TAD     RUNPOT
 2660  3200                 DCA     RNWRD           /SAVE POINTER ADDRESS
 2661  3600                 DCA I   RNWRD           /CLEAR RUN POINTER
 2662  3200                 DCA     RNWRD
 2663  1106                 TAD     M6
 2664  3220                 DCA     PRINT           /CHECK FOR MORE POINTER
 2665  1200                 TAD     RNWRD
 2666  4436                 SELCHK                  /CHECK SELECT POINTERS
 2667  7610                 SKP CLA                 /DISK NOT HERE
 2670  5637                 JMP I   DUMP            /MORE AVAILABLE
 2671  2200                 ISZ     RNWRD
 2672  2220                 ISZ     PRINT           /UPDATE POINTERS
 2673  5265                 JMP     .-6
 2674  4457                 CRLF
 2675  4455                 PRNTER                  /PRINT "DISK"
 2676  3477                 MES17
 2677  7340                 CLA CLL CMA
 2700  4455                 PRNTER                  /PRINT "SYSTEM DOWN"
 2701  3455                 MES16
 2702  4576         NODSKS, JMS I   SGMLT           /ERROR, NO DISK AVAILABLE
                    /
                    /ROUTINE TO SETUP FIELD TO BUFFER+ AUTO11+ BUFFER TALLY
                    /
 2703  0000         STFLD,  0
 2704  7041                 CIA
 2705  1127                 TAD     WCNEG
 2706  3117                 DCA     BUFTAL
 2707  7340                 CLA CLL CMA
 2710  1126                 TAD     CANEG           /GET INITIAL CA
 2711  3011                 DCA     AUTO11          /SAVE
 2712  1157                 TAD     DATFLG          /GET DATA FLAG
 2713  7650                 SNA CLA                 /WAS IT SET????
 2714  5322                 JMP     .+6             /NO, USE REGULAR
 2715  1105                 TAD     M12
 2716  3116                 DCA     OPNTAL          /SETUP SPECIAL TALLY
 2717  7340                 CLA CLL CMA
 2720  1151                 TAD     DATPOT
 2721  3012                 DCA     AUTO12          /SETUP SPECIAL AUTO INDEX
 2722  1136                 TAD     INTCM           /GET LAST COMMAND
 2723  0014                 AND     K0070           /MASK FIELD BITS
 2724  1103                 TAD     KCDF            /MAKE BUFFER CDF
 2725  3205                 DCA     RECDF           /SETUP SPECIAL CDF
 2726  1205                 TAD     RECDF           /GET BACK CDF
 2727  5703                 JMP I   STFLD           /EXIT, FIELD IN AC
                    /
                    /ROUTINE TO CHANGE DEVICE IOT CODES
                    /
```

```
2730  4407    CHANG,  CLASIC                  /CHECK FOR CLASSIC,
2731  4431            C8SWIT                  /ROUTINE TO EXECUTE.
2732  7000            NOP
2733  4406            LAS                     /GET SWITCHES
2734  0071            AND     A0770           /MASK 3-8
2735  3776'           DCA     LDCM            /SAVE DESIRED CODE
2736  1360            TAD     CHNPOT          /POINTER
2737  3111            DCA     TRA8M1          /ADDRESS POINTER
2740  1357            TAD     CCNTR1          /AMOUNT TO DO
2741  3112            DCA     TRA8M2          /SETUP COUNTER
2742  1511    CHANGR, TAD I   TRA8M1          /GET ADDRESS POINTER
2743  3113            DCA     TRA8M3          /SAVE ADDRESS
2744  1513            TAD I   TRA8M3          /GET OLD CODE
2745  0072            AND     A7007           /MASK OFF OLD CODE
2746  1776'           TAD     LDCM            /ADD IN DESIRED CODE
2747  3513            DCA I   TRA8M3          /RESTORE
2750  2111            ISZ     TRA8M1          /UPDATE POINTER
2751  2112            ISZ     TRA8M2          /UPDATE CHANGE COUNTER
2752  5342            JMP     CHANGR          /MORE TO CHANGE
2753  4407            CLASIC                  /CHECK FOR CLASSIC,
2754  4436            C8ERR                   /ROUTINE TO EXECUTE,
2755  7402    CHNHLT, HLT                     /IOTS CHANGED, HIT CONTINUE OR
2756  5775'           JMP     BGN             /IF ON CONSOLE PACKAGE
                                              /CONTROL E TO START PROGRAM,
                /
2757  7765    CCNTR1, 7765
                /
2760  2761    CHNPOT, CHNPOT+1
2761  2304            RETURN
2762  2313            STATUS
2763  2324            RDLWRL
2764  2330            LODGO
2765  0554            IOT0
2766  0752            IOT1
2767  0561            IOT2
2770  2557            IOT3
2771  2551            IOT4
2772  2542            IOT5
2773  0545            IOT6
                /
2775  0200
2776  0542
2777  3000
      3000    PAGE
                /
                /ROUTINE TO TYPE STATUS REPORT
                /
3000  0000    TPSTA,  0
3001  4424            CHK22
3002  5600            JMP I   TPSTA
3003  4457            CRLF
3004  4455            PRNTER                  /PRINT "OSK HARD SOFT COMP"
3005  3372            MES7
3006  1107            TAD     M10
3007  3245            DCA     TSAVE1          /MAXIMUM TO DO
```



```
3010  3246            DCA     TSAVE2
3011  3247            DCA     TSAVE3
3012  1246    CHKRES, TAD     TSAVE2          /CLEAR SOME COUNTERS
3013  1062            TAD     K0003
3014  3246            DCA     TSAVE2
3015  1246            TAD     TSAVE2
3016  1153            TAD     STAPOT
3017  3251            DCA     TSAVE5          /LOCATION OF DISK STATUS
3020  1247            TAD     TSAVE3
3021  4436            SELCHK                  /CHECK RUN POINTER
3022  5241            JMP     NOTSTA          /DISK NOT RUNNING
3023  4457            CRLF
3024  4431            SPACE                   /SPACE OUT ONE
3025  1247            TAD     TSAVE3          /GET DISK NO,
3026  1067            TAD     K0260
3027  4445            TYPE
3030  4431            SPACE                   /SPACE OUT ONE
3031  4431            SPACE                   /SPACE OUT ONE
3032  7346            CLA CLL CMA RTL
3033  3250            DCA     TSAVE4          /COUNTER FOR FOUR WORDS
3034  1651            TAD I   TSAVE5          /GET STATUS
3035  4456            OCTEL                   /TYPE IT
3036  2251            ISZ     TSAVE5
3037  2250            ISZ     TSAVE4
3040  5234            JMP     .-4
3041  2247    NOTSTA, ISZ     TSAVE3          /UPDATE DRIVE NUMBER
3042  2245            ISZ     TSAVE1
3043  5212            JMP     CHKRES          /MORE TO REPORT
3044  5600            JMP I   TPSTA           /EXIT
                /
3045  0000    TSAVE1, 0
3046  0000    TSAVE2, 0
3047  0000    TSAVE3, 0
3050  0000    TSAVE4, 0
3051  0000    TSAVE5, 0
                /
                /ROUTINE TO RECALIBRATE SELECTED DRIVE
                /DISCONNECT DRIVE ON ERROR!
                /
3052  0000    RESTOR, 0
3053  0063            AND     K0006
3054  3200            DCA     TPSTA           /SAVE DRIVE NUMBER
3055  1077            TAD     K7700
3056  3341            DCA     TIMER2          /SETUP COUNTER
3057  2340            ISZ     TIMER1
3060  5257            JMP     .-1
3061  2341            ISZ     TIMER2          /WAIT FOR DISK TO COOL OFF!
3062  5257            JMP     .-3
3063  1200            TAD     TPSTA           /CURRENT DRIVE
3064  4451            LDCMD                   /LOAD COMMAND
3065  7326            CLA CLL CML RTL         /ENABLE RECALIBRATE BIT
3066  4454            CLRALL                  /"RECALIBRATE"
3067  4450            DSKSKP                  /DISK SKIP IOT
3070  5267            JMP     .-1             /WAIT FOR FIRST DONE FLAG
3071  4447            RDSTAT                  /READ STATUS
```

```
3072  7500            SMA                             /DONE FLAG SET????
3073  5311            JMP     RESERR                  /NO, ERROR
3074  0076            AND     K1777                   /MASK OTHER ERROR BITS
3075  7640            SZA CLA                         /ANY SET????
3076  5311            JMP     RESERR                  /YES, ERROR
3077  4454  RESTA,    CLRALL                          /CLEAR STATUS
3100  1016            TAD     K0200                   /ENABLE SET SECOND DONE FLAG
3101  1200            TAD     TPSTA                   /ORIGINAL COMMAND
3102  4451            LDCMD                           /LOAD COMMAND
3103  4450            DSKSKP                          /DISK SKIP IOT
3104  5303            JMP     .-1                     /WAIT FOR SECOND DONE
3105  4447            RDSTAT                          /READ STATUS
3106  1073            TAD     K4000
3107  7650            SNA CLA                         /WAS IT ONLY DONE FLAG
3110  5652            JMP I   RESTOR                  /YES, RETURN
3111  7300  RESERR,   CLA CLL
3112  4446            ERROR                           /ERROR
3113  0003            0003
3114  7500            7500
3115  4457            CRLF
3116  4457            CRLF
3117  4455            PRNTER                  /PRINT"RECALIBRATE ERROR DISCONNECT"
3120  3174            MES19
3121  4430            DISCON                          /DISCONNECT DISK
3122  5652            JMP I   RESTOR                  /MORE DISK AVAILABLE
                /
                /ROUTINE TO TIME AND WAIT
                /
3123  0000    TIME,   0
3124  2340            ISZ     TIMER1
3125  5723            JMP I   TIME                    /EXIT
3126  2341            ISZ     TIMER2
3127  5723            JMP I   TIME                    /EXIT
3130  4576    INTER1, JMS I   BGHLT                   /NO INTERRUPT OCCURRED, I GUESS!
                /
                /ROUTINE TO COMBINE ERROR HALTS,
                /WHEN THE COMPUTER HALTS THE AC
                /WILL EQUAL THE PC ON THE FAILING
                /HALT INSTRUCTION.
                /
3131  0000    BIGHLT, 0
3132  7300            CLA CLL
3133  1331            TAD     BIGHLT                  /LOAD AC WITH PC.
3134  4407            CLASIC                          /CHECK FOR CLASSIC.
3135  4436            CBERR                           /ROUTINE TO EXECUTE.
3136  7402    BIGBTP, HLT                             /AC=PC.
3137  5332            JMP     .-5                     /NON-RECOVERABLE.
                /
3140  0000    TIMER1, 0
3141  0000    TIMER2, 0
                /
                /ROUTINE TO TYPE OUT DATA INFORMATION
                /
3142  0000    TYPDAT, 0
3143  4455            PRNTER                          /PRINT "AS!"
```



```
3144  3235            TEXAS
3145  1131            TAD     ASREG
3146  4456            OCTEL
3147  7340            CLA CLL CMA
3150  4455            PRNTER                          /PRINT "WA:"
3151  3237            TEXWA
3152  1132            TAD     WAREG
3153  4456            OCTEL
3154  7340            CLA CLL CMA
3155  4455            PRNTER                          /PRINT "AD:"
3156  3241            TEXAD
3157  1133            TAD     ADREG
3160  4456            OCTEL
3161  7340            CLA CLL CMA
3162  4455            PRNTER                          /PRINT "DG:"
3163  3243            TEXDG
3164  1134            TAD     DGREG
3165  4456            OCTEL
3166  7340            CLA CLL CMA
3167  4455            PRNTER                          /PRINT "DB:"
3170  3245            TEXDB
3171  1135            TAD     DBREG
3172  4456            OCTEL
3173  5742            JMP I   TYPDAT
                /
3174  2205    MES19,  TEXT    "RECALIBRATE ERROR DISCONNECT!"
3175  0301
3176  1411
3177  0222
3200  0124
3201  0540
3202  0522
3203  2217
3204  2240
3205  0411
3206  2303
3207  1716
3210  1605
3211  0324
3212  4100
                /
3213  2003    TEXPC,  TEXT    "PC:"
3214  7200
3215  2324    TEXST,  TEXT    "ST:"
3216  7200
3217  0530    TEXEX,  TEXT    "EX:"
3220  7200
3221  0315    TEXCM,  TEXT    "CM:"
3222  7200
3223  1101    TEXIA,  TEXT    "IA:"
3224  7200
3225  0401    TEXDA,  TEXT    "DA:"
3226  7200
3227  0301    TEXCA,  TEXT    "CA:"
3230  7200
```

```
3231  2703    TEXWC,  TEXT    "WC:"
3232  7200
3233  0627    TEXFW,  TEXT    "FW:"
3234  7200
3235  0123    TEXAS,  TEXT    "AS:"
3236  7200
3237  2701    TEXWA,  TEXT    "WA:"
3240  7200
3241  0104    TEXAD,  TEXT    "AD:"
3242  7200
3243  0407    TEXDG,  TEXT    "DG:"
3244  7200
3245  0402    TEXDB,  TEXT    "DB:"
3246  7200
              /
3247  2205    ERTX1,  TEXT    "READ STATUS"
3250  0104
3251  4023
3252  2401
3253  2425
3254  2300
3255  2722    ERTX2,  TEXT    "WRITE STATUS"
3256  1124
3257  0540
3260  2324
3261  0124
3262  2523
3263  0000
3264  2205    ERTX3,  TEXT    "RECALIBRATE STATUS"
3265  0301
3266  1411
3267  0222
3270  0124
3271  0540
3272  2324
3273  0124
3274  2523
3275  0000
3276  0411    ERTX4,  TEXT    "DISK DATA"
3277  2313
3300  4004
3301  0124
3302  0100
              /
3303  4005    MES0,   TEXT    " ERROR"
3304  2222
3305  1722
3306  0000
3307  2213    MES1,   TEXT "RK8E/RK8L DATA RELIABILITY"
3310  7005
3311  5722
3312  1370
3313  1440
3314  0401
3315  2401
```



```
3316  4022
3317  0514
3320  1101
3321  0211
3322  1411
3323  2431
3324  0000
3325  0530    MES2,   TEXT "EXERCISE"
3326  0522
3327  0311
3330  2305
3331  0000
3332  4004    MES3,   TEXT " DISK"
3333  1123
3334  1300
3335  1617    MES4,   TEXT    "NON-RECOVERABLE "
3336  1655
3337  2205
3340  0317
3341  2605
3342  2201
3343  0214
3344  0540
3345  0000
3346  0530    MES5,   TEXT    "EXTENDED R/W MEMORY(0-7)?"
3347  2405
3350  1604
3351  0504
3352  4022
3353  5727
3354  4015
3355  0515
3356  1722
3357  3150
3360  6055
3361  6751
3362  7700

3363  0103    MES6,   TEXT    "ACCEPT MODE?"
3364  0305
3365  2024
3366  4015
3367  1704
3370  0577
3371  0000
3372  0423    MES7,   TEXT    "DSK HARD SOFT COMP"
3373  1340
3374  1001
3375  2204
3376  4023
3377  1706
3400  2440
3401  0317
3402  1520
```

```
3403  0000
3404  0611    ME88,   TEXT    "FIELD?"
3405  0514
3406  0477
3407  0000
3410  2422    ME89,   TEXT    "TRACK?"
3411  0103
3412  1377
3413  0000
3414  0530    ME810,  TEXT    "EXTRA SECTORS?"
3415  2422
3416  0140
3417  2305
3420  0324
3421  1722
3422  2377
3423  0000
3424  0214    ME811,  TEXT    "BLOCK LENGTH?"
3425  1703
3426  1340
3427  1405
3430  1607
3431  2410
3432  7700
3433  0401    ME813,  TEXT    "DATA?"
3434  2401
3435  7700
3436  0122    ME814,  TEXT    "ARE YOU SURE?"
3437  0540
3440  3117
3441  2540
3442  2325
3443  2205
3444  7700
3445  4004    ME815,  TEXT    " DISCONNECTED!"
3446  1123
3447  0317
3450  1616
3451  0503
3452  2405
3453  0441
3454  0000
3455  2331    ME816,  TEXT    "SYSTEM SHUT DOWN, NO DISKS TO RUN!"
3456  2324
3457  0515
3460  4023
3461  1825
3462  2440
3463  0417
3464  2716
3465  5440
3466  1617
3467  4004
3470  1123
3471  1323
```



```
3472  4024
3473  1700
3474  2225
3475  1641
3476  0000
3477  0411    ME817,  TEXT    "DISK "
3500  2313
3501  4000
3502  4020    ME818,  TEXT    " PASS COMPLETE!"
3503  0123
3504  2340
3505  0317
3506  1520
3507  1405
3510  2405
3511  4100
              /

3512  0000    D8K08,  0
3513  0000    D8K18,  0
3514  0000    D8K28,  0
3515  0000    D8K38,  0
3516  0000    D8K48,  0
3517  0000    D8K58,  0
3520  0000    D8K68,  0
3521  0000    D8K78,  0
              /

3522  0000    D0TM1,  0
3523  0000    D1TM1,  0
3524  0000    D2TM1,  0
3525  0000    D3TM1,  0
3526  0000    D4TM1,  0
3527  0000    D5TM1,  0
3530  0000    D6TM1,  0
3531  0000    D7TM1,  0
3532  0000    D0TM2,  0
3533  0000    D1TM2,  0
3534  0000    D2TM2,  0
3535  0000    D3TM2,  0
3536  0000    D4TM2,  0
3537  0000    D5TM2,  0
3540  0000    D6TM2,  0
3541  0000    D7TM2,  0
              /
3542  0000    D0HRD,  0
3543  0000    D0SOF,  0
3544  0000    D0CMP,  0
3545  0000    D1HRD,  0
3546  0000    D1SOF,  0
3547  0000    D1CMP,  0
3550  0000    D2HRD,  0
3551  0000    D2SOF,  0
3552  0000    D2CMP,  0
```

```
3553  0000    D3MRD,  0
3554  0000    D3BOF,  0
3555  0000    D3CMP,  0
3556  0000    D4MRD,  0
3557  0000    D4BOF,  0
3560  0000    D4CMP,  0
3561  0000    D5MRD,  0
3562  0000    D5BOF,  0
3563  0000    D5CMP,  0
3564  0000    D6MRD,  0
3565  0000    D6BOF,  0
3566  0000    D6CMP,  0
3567  0000    D7MRD,  0
3570  0000    D7BOF,  0
3571  0000    D7CMP,  0
              /
3572  0000    FLDFLG, 0
3573  0000    TRKFLG, 0
3574  0000    SECFLG, 0
3575  0000    HLFFLG, 0
              /
              /
              /
      3600    PAGE
              /
      3600    STRBUF=.
              /
              $$$$
```



```
0000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11110011  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111111  11110000  01111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11011111

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  11111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10001111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111100

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11101111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00001111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11110111

3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111100

3600
3700
```

```
4000
4100

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
```


A0170	0750	C8GET	0624	CONCUR	0715	DAT3	0760
A0778	0071	C8HANG	1122	CONSEC	0147	DAT4	0761
A7007	0072	C8INQU	4437	CONSOL	0000	DAT5	0762
ACOCA	0362	C8OCTA	4432	CRCCNT	0155	DAT6	0763
ACL	7701	C8PA8S	4424	CRCFLG	0156	DAT7	0764
ACSAVE	1345	C8PAUS	4441	CRLF	4457	DAT8	0765
ADREG	0133	C8PRNT	4430	D0CMP	3544	DAT9	0766
AERROR	2156	C8RDPS	0606	D0HRD	3542	DATFLG	0157
AGAIN	1346	C8RETD	0614	D0SOP	3543	DATPOT	0151
ALLAGN	0255	C8RETR	0536	D0TM1	3522	DATTRY	0140
AMOUNT	0060	C8SETD	0613	D0TM2	3532	DBREG	0135
APT8	2270	C8SETS	0535	D1CMP	3547	DCLR	6742
ASKNX1	0345	C8SWIT	4431	D1HRD	3545	DGREG	0134
ASKNX2	0406	C8SWST	0745	D1SOP	3546	DISCON	4430
ASKNX3	0425	C8TMP1	1021	D1TM1	3523	DISKGO	4441
ASKNX5	0464	C8TTYI	4426	D1TM2	3533	DLAG	6743
ASKSUR	0513	C8TYPE	4435	D2CMP	3552	DLCA	6744
ASREG	0131	CAF	6007	D2HRD	3550	DLDC	6746
AUTO10	0010	CAREG	0126	D2SOP	3551	DLSC	6740
AUTO11	0011	CCNTR1	2757	D2TM1	3524	DOCNT	0247
AUTO12	0012	CHANG	2730	D2TM2	3534	DOHEAD	1262
BADHLT	1707	CHANGR	2742	D3CMP	3555	DONEA	0426
BGHLT	0176	CHEK22	0523	D3HRD	3553	DOPACK	0212
BGN	0200	CHK22	4424	D3SOP	3554	DOSET	0251
BGNBUF	0146	CHKCLA	1200	D3TM1	3525	DRST	6745
BIGHLT	3131	CHKPOT	2000	D3TM2	3535	DSK0B	3512
BIGSTP	3136	CHKRES	5012	D4CMP	3560	DSK1B	3513
BRKRET	0363	CHKSAV	0141	D4HRD	3556	DSK2B	3514
BUFPNT	1400	CHKYN	2035	D4SOP	3557	DSK3B	3515
BUFTAL	0117	CHNCDF	2254	D4TM1	3526	DSK4B	3516
BYRETR	0506	CHNHLT	2755	D4TM2	3536	DSK5B	3517
C8BY1	0230	CHNPOT	2760	D5CMP	3563	DSK6B	3520
C8BY2	1300	CKCOUT	0232	D5HRD	3561	DSK7B	3521
C8BY3	1061	CKTIM	2450	D5SOP	3562	DSKEX	2302
C8BY4	0515	CLAFLD	1404	D5TM1	3527	DSKGO	2200
C8BY5	1116	CLASIC	4407	D5TM2	3537	DSKP	6741
C8CHAR	1075	CLASIK	1514	D6CMP	3566	DSKSKP	4450
C8CKP	1022	CLDR	0560	D6HRD	3564	DTCHK	1600
C8CKPA	4440	CLKCNT	0150	D6SOP	3565	DTR1	1636
C8CKSW	4425	CLRALL	4454	D6TM1	3530	DUMP	2637
C8CNTR	4427	CLRBAK	0175	D6TM2	3540	ENDIT	0742
C8CONT	1145	CLRTRN	1315	D7CMP	3571	ERFLG	0165
C8CRLF	4433	CMPPOT	2562	D7HRD	3567	ERHLT0	0556
C8DO1	0310	CMREG	0123	D7SOP	3570	ERHLT2	0563
C8DO10	1262	CNTRLC	0551	D7TM1	3531	ERHLT3	2561
C8DO11	0607	CNTRLD	0600	D7TM2	3541	ERHLT5	2544
C8DO2	1033	CNTRLE	0545	DAREG	0145	ERHLT6	0547
C8DO3	0350	CNTRLL	0537	DAT1	0756	ERR1	0736
C8DO4	1006	CNTRLQ	0500	DAT10	0767	ERRMES	1520
C8DO7	0527	CNTRLR	0511	DAT11	0770	ERRO	1200
C8ECHO	4434	CNTRLS	0521	DAT12	0771	ERROEX	1355
C8ERR	4436	CNTVAL	0252	DAT2	0757	ERROR	4446

ERTX1	3247	K0001	0001	M12	0105	NTWRKS	1710
ERTX2	3255	K0003	0002	M4	0106	OCT1	2400
ERTX3	3264	K0004	0013	MANUAL	0322	OCT4	2430
ERTX4	3276	K0006	0003	MAXFLD	0143	OCTEL	4456
ESAVE	1371	K0007	0004	MAXTIM	0144	ONEIN	4432
EXAPTB	2151	K0010	0005	MAXTRK	0145	OP1	0021
EXIT	1504	K0017	0006	MEMSET	2142	OP2	0022
EXITA	0440	K0070	0014	MES0	3303	OPRTAL	0116
EXREG	0122	K0077	0102	MES1	3307	PASCNT	0250
EXTICK	1166	K0100	0015	MES10	3414	PCLF	6662
F1OP1	0021	K0200	0016	MES11	3424	PCNTR1	1373
F1OP2	0022	K0212	1425	MES12	3433	PCNTR2	1374
F1SWR	0020	K0215	1424	MES13	3436	PCNTR3	1375
FILCNT	1040	K0240	1512	MES14	3445	PCREG	0120
FILLER	1037	K0260	0007	MES15	3455	PCSAVE	1344
FILLUP	0717	K0277	0070	MES16	3477	PNTBUF	1120
FIRTIM	0170	K0316	2057	MES17	3502	POLDSK	0115
FLDFLG	3572	K0331	2056	MES18	3174	POLNEX	1000
FLDHLT	0206	K0400	0017	MES19	3325	PREXIT	2635
FLSAVE	1347	K1000	0075	MES2	3332	PRINT	2620
FNDSUM	0142	K177	2034	MES3	3335	PRN	1450
FORIN	4433	K1777	0076	MES4	3346	PRNDAT	0173
FROCT	1426	K3740	1513	MES5	3363	PRNTER	4455
FWREG	0130	K4000	0073	MES6	3372	PSIE	6665
GENDAT	4426	K4100	0074	MES7	3404	PSKE	6663
GETCH1	0703	K5405	0360	MES8	3410	PSKF	6661
GETDAT	0456	K6500	0541	MES9	0747	PSTB	6664
GNDAT	1737	K6520	2172	MESAC	1333	PTSTOR	0336
GOBAK	2230	K7000	2155	MESFL	1341	RAD1	1773
GOCOF	1646	K7377	2154	MESMAN	1146	RAD2	1774
GOCMK	2265	K7400	0104	MESMQ	1336	RAD3	1775
GOCLR	2260	K7700	0077	MESPAS	0253	RAN1	1767
GOITA	0443	K7760	0100	MESPC	1330	RAN2	1770
GOTIT	1010	K7773	1377	MODSKS	2125	RANDAT	4427
GOTOA	0454	K7775	0110	MQA	7501	RANDOM	1715
GTF	6004	K7777	0101	MQL	7421	RANGEN	4440
HEDTAD	1376	KAERRD	0023	MQSAVE	1346	RANJMS	0522
HLFFLG	3575	KCDF	0103	MRPRN	1456	RDLWRL	2324
INDEXA	0455	KROT	0250	MSKEN	1714	RDST	2541
INERR	2426	KSKP	0546	MYAC	1317	RDSTA	1105
INMODE	1076	KTICK	4425	MYLAS	1546	RDSTAT	4447
INTCM	0136	KTIME	0530	NEWRD	0727	RDTRY	1073
INTDA	0124	LAS	4406	NEXT	0201	REALPC	1316
INTER1	3130	LDAD	2554	NODSKP	2353	RECAL	4443
INTER2	2362	LDADD	4453	NODSKS	2702	RECDF	2605
IOT0	0554	LDCA	2550	NOERR	1672	RECEIV	4444
IOT1	0752	LDCM	0542	NOSET	0242	REDOA	0415
IOT2	0561	LDCMD	4451	NOTEX	1363	REFILL	0723
IOT3	2557	LDCUR	4452	NOTSTA	3041	REREAD	1063
IOT4	2551	LNKDCA	0361	NTCLAS	1270	RERUN	1124
IOT5	2542	LODGO	2330	NTERR	1255	RESERR	3111
IOT6	0545	M10	0107	NTSOFT	1251	RESRAN	4442

RESTA	3077	TABLB	0471	XC8CNL	1023		
RESTOR	3052	TEXAD	3241	XC8ECM	1063		
RETRN	2331	TEXAS	3235	XC8ERR	1207		
RETURN	2304	TEXCA	3227	XC8INQ	0635		
REWRT	1047	TEXCM	3221	XC8OCT	1000		
RNFLD	0630	TEXDA	3225	XC8PAS	0200		
RNWRD	2600	TEXDB	3245	XC8PAU	0337		
ROUINS	1302	TEXDG	3243	XC8PNT	0303		
ROUTMP	1544	TEXEX	3217	XC8PSW	0656		
RSRAN	1761	TEXFW	3233	XC8SW	0262		
RUN	0600	TEXIA	3223	XC8TTY	0272		
RUNPOT	0154	TEXPC	3213	XC8TYP	1077		
SAV1	1771	TEXST	3215	XCHK22	0024		
SAV2	1772	TEXWA	3237	XCHKYN	0037		
SAVAC	0166	TEXWC	3231	XCKPUT	0036		
SAVCM	0174	TIME	3123	XCLAS	0007		
SAVE1	0400	TIMER1	3140	XCLOK	0054		
SAVEAC	1545	TIMER2	3141	XCRLF	0057		
SDKP	0751	TIMER3	2374	XDOLPT	1112		
SECFLG	3574	TIMPOT	0152	XDOSW	0520		
SELCHK	4436	TMPCNT	0746	XDSKWD	0041		
SETFLD	4435	TPSTA	3000	XDUMP	0030		
SETGEN	4434	TRASH1	0111	XERRD	0046		
SETREG	1553	TRASH2	0112	XFROCT	0056		
SETUP1	1233	TRASH3	0113	XGNDAT	0026		
SETUP2	0225	TRDONE	2365	XKTCK	0025		
SKPNOP	0237	TRKFLG	3573	XKTICK	1154		
SOFT	1245	TRYCNT	0171	XLAS	0006		
SPAC	1506	TRYTIM	1060	XLDAD	0053		
SPACE	4431	TSAVE1	3045	XLDCA	0052		
SPBLK	0164	TSAVE2	3046	XLDCM	0051		
SPFLD	0160	TSAVE3	3047	XOCT1	0032		
SPSEC	0163	TSAVE4	3050	XOCT4	0033		
SPTRK1	0161	TSAVE5	3051	XPRINT	0045		
SPTRK2	0162	TSTCHA	0715	XPRN	0055		
STAPOT	0153	TTYLPT	1121	XRDST	0047		
STATER	2337	TYPDAT	3142	XREG	1372		
STATRY	0137	TYPE	4445	XRESTR	0043		
STATUS	2313	UPAROW	0615	XRNDUM	0040		
STFLD	2703	UPDATE	0114	XRNWRD	0027		
STGEN	1753	UPONE	1414	XRSRAN	0042		
STPHLT	0603	UPTRY	1120	XSDKP	0050		
STRAUT	1325	WAIT	2000	XSPAC	0031		
STRBUF	3600	WAIT1	2026	XSTFLD	0035		
STREG	0121	WAREG	0132	XSTGEN	0034		
STRREL	1151	WASRD	2264	XTABLA	0457		
STRTEX	0224	WATMES	0651	XTABLB	0460		
STRWRK	2241	WCREG	0127	XTEXT	0172		
SVLNK	0167	WRDCHK	1612	XWAIT	0044		
SWDAT	2601	WRKDON	2274	YESNO	4437		
SWR	0020	XC8CKP	1041				
TABLA	0461	XC8CNT	0400				

ERRORS DETECTED: 0

LINKS GENERATED: 163

RUN-TIME: 6 SECONDS

3K CORE USED