IDENTIFICATION

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

PRODUCT NAME: RK8E/RK8L DATA RELIABILITY PROGRAM

DATE RELEASED: FEBRUARY, 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

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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 2200 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 SECTIUN 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" MENTIONED 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 LOCATION 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 DONE 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-R0- 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 XDOSW WHICH CONTAINS C8STRT SO PUT THE LABEL C8STRT
                    /WHERE YOU WANT TO RESTART THE PROGRAM.


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

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

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


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          /CONVERT TO ASCII AND PRINT
4433                        C8CRLF= JMS I   .
0033  1023                          XC8CRL          /DO A CARRIGE RETUR+ 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
                                                    /400=CONSOL PACKAGE SET ACTIVE
                                                    /0000=CONSOLE 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=

0280  0000    XC8PAS, 0
0281  7200            CLA
0282  4777'           JMS      CHKCLA          /IS WORD 22 BIT 3 ACTIVE CONSOLE?
0283  5212            JMP      DOPACK          /IS CLASSIC
0284  4776'           JMS      C8GET           /GET REGISTERS.
0285  4262            JMS      XC8SW           /DEACTIVE CONSOL CHECK SR SETTING
0286  0375            AND      (400            /FOR HALT ON END OF C8PASS
0287  7640            SZA CLA                  /1= HALT 0 CONTINUE
0288  5600            JMP I    XC8PAS          /GO TO HALT
0289  5230            JMP      C8BY1           /CONTINUE ON RUNNING PROGRAM
0290  4232    DOPACK, JMS      CKCOUT          /CLASS CHECK C8PASS COUNT
0291  5230            JMP      C8BY1           /C8PASS COUNT NOT DONE REDO PROGRAM
0292  2250            ISZ      PASCNT          /C8PASS COUNT DONE SET C8PASS COUNT
0293  4774'           JMS      XC8CRLF
0294  4303            JMS      XC8PNT          /C8PRNT BUFFER
0295  0253            MESPAS                   /
0296  1250            TAD      PASCNT          /GET NUMBER
0297  4773'           JMS      XC8OCTA         /CONVERT IT TO ASCII
0298  4774'           JMS      XC8CRLF         /DO A CARRIAGE RETURN
0299  4776'           JMS      C8GET           /GET REGISTERS.
0300  4262            JMS      XC8SW           /CHECK A HALT AT END OF C8PASS
0301  0375    SETUP2, AND      (400            /MASK BIT
0302  7640            SZA CLA                  /HALT =1 NO SKIP CONTINUE =0
0303  4772'           JMS      XC8INQ          /STOP PROGRAM EXECUTION=LOOK FOR INPUT
0304  2200    C8BY1,  ISZ      XC8PAS          /BUMP RETURN
0305  5600            JMP I    XC8PAS
0306  0000    CKCOUT, 0
0307  1251            TAD      DOSET           /CHECK IF SET UP NEEDED
0308  7640            SZA CLA                  /0=SET UP C8PASS COUNT VALUE
                                               /1=C8PASS COUNT VALUE OK
0309  5242            JMP      NOSET           /C8PASS COUNT VALUE ON
0310  1252            TAD      CNTVAL          /GET COUNT VALUE FOR THIS PROG
0311  7040            CMA                      /SET TO NEGATIVE
0312  3247            DCA      DOCNT           /STORE IN HERE
0313  2251            ISZ      DOSET           /INDICATE VALUE SET UP
0314  2247    NOSET,  ISZ      DOCNT           /COUNT THE NUMBER OF PASSES
0315  5230            JMP      C8BY1           /EXIT FOR ANOTHER PASS
```



```
0316  3251            DCA      DOSET           /SET TO C8PRNT C8PASS
0317  2232            ISZ      CKCOUT          /BUMP RETURN FOR
0318  5632            JMP I    CKCOUT          /C8PASS C8TYPE OUT
0319  0000    DOCNT,  0
0320  0000    PASCNT, 0                        /
0321  0000    DOSET,  0
0322  0000    CNTVAL, 0
0323  0410    MESPAS, TEXT     "DMRKCH  PASS "
0324  2213
0325  0310
0326  4040
0327  2001
0328  2323
0329  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=

0330  0000    XC8SW,  0
0331  4771'           JMS      XC8CKPA         /GO CHECK THE IF ANY CONTRL
0332  7000            NOP
0333  1021            TAD      21              /GET WD FOR INDICATOR
0334  7710            SPA CLA                  /CHECK IF FROM PANEL 4000
0335  7614            7614                     /DO LAS AND SKIP GET FROM PANEL WITH LAS
0336  1020            TAD      20              /PSEUDO SWITCH
0337  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  0378        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 200 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
               /*****************************************************************

               /C8CNTK
               /THIS ROUTINE WILL CHECK FOR THE PRESENCE OF CONTROL CHARACTERS
               /IT WILL CHECK FOR THE FOLLOWING CHAR C=R=Q=L=S
               /       C8CNTR= JMS XC8CNT

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

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

               /CALLS USED ARE=CHKCLA=XC8TYPE=XC8CRLF=C8GET=UPAROW=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 STANT 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 D 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           CNTRLD
               /
               /CONTRUL 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 SOFT FLAG FOR UNEXPECTED CHAR
 0501  1335          TAD     C8SETS          /CHECK IF CONTROL S TYPED IN
 0502  7640          SZA CLA
 0503  5306          JMP     BYRETR          /CONTRUL 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 SOFT 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 O 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     C8D07           /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    C8D07,  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 ^ 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     C8D011          /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    C8D011, 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     (356            /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 CHAR AGAIN.

                /       C8INQU =        JMS XC8INQ

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

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

0635  0000    XC8INQ, 0
0636  7300            CLA CLL
0637  4767'           JMS     CHKCLA          /CHECK LOC 22 BIT 3 CONSOLE BIT
0640  7410            SKP                     /ACTIVE CONSOLE PACKAGE
0641  5635            JMP I   XC8INQ          /NOT CONSOLE LEAVE
0642  4766'           JMS     XC8PNT
0643  0651            WATMES                  /INQUIN 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'   C8RDPS, 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+ ADD 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            /C8ENR= 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     C8RDPS          /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  C8D04,    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     C8D04           /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  2248            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 CONTENTA 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     C8UO10          /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*  C8DO10,  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  5308            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    MESPC,  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    PCSAVE, 7777
1345  7777    ACSAVE, 7777
1346  7777    MQSAVE, 7777
1347  7777    FLSAVE, 7777
                      /
1365  0020
1366  7402
1367  0635
1370  1000
1371  0303
1372  1023
1373  0000
1374  0262
1375  0624
1376  1514
1377  0400
      0008            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      ERMLT0                      /SKIP TRAP DLSC
    1401  0563      ERMLT2                      /SKIP TRAP DCLR
    1402  2561      ERMLT3                      /SKIP TRAP DLAG
    1403  2544      ERMLT5                      /SKIP TRAP DRST
    1404  0547      ERMLT6                      /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 DISKS 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      LDADD=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,  CLASIC
                    /
          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, CMKPOT
0037  2035    XCMKYN, CMKYN
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    XFROCT, FROCT
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    TRASM1, 0
0112  0000    TRASM2, 0
0113  0000    TRASM3, 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    CMKSAV, 0
0142  0000    FNDSUM, 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, D0TM1
0153  3537    STAPOT, D0HRD-3
0154  3512    RUNPOT, D8K0B
              /
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    CLNBAK, 0
              /
0176  3131    BGHLT,  BIGHLT
      0200    *200
              /
              /
```

```
                    /START OF PROGRAM BY OPERATOR:
                    /AT 0200, TTY INTERIGATION:
                    /AT 0201, CHANGE IOT DEVICE CODES:
                    /AT 0202, RESTART AT SEEK ROUTINE:
                    /
0200  4777'  BGN,    JMS     APTS                    /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  1183           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  1877  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     FLOFLG          /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  1484
0373  2601
0374  0522
0375  0600
0376  2730
0377  2870
      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                   /REVEIVE 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  7630          SZL CLA                         /IN LIMITS???
0461  5225          JMP     ASKNX3                  /NO, INPUT ERROR
0462  7340          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 SWR#=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  1065            TAD     K0010           /YES
0655  1064            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                  /GENERATE RANDOM CA
0675  3126            DCA     CAREG           /SAVE IT
0676  1136            TAD     INTCM
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                     /CDF 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     TRASH1                  /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 0,1,2,3,0,1,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
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     STRREL                  /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     CRCCNT                  /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     STRREL                  /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  STRREL, 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                             /DUNT 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                /INHIBIT ERRORS????
                                                    /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     STRAUT          /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  3258            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   FRUCT
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     FRUCT
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            C8CKSW                  /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     FWNEG           /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     DTR1            /MORE WORDS TO CHECK
1702  1446            TAD I   XERRO           /GET ERROR INDICATOR!
1703  7650            SNA CLA                 /WAS THERE AN ERROR?
1704  3155            DCA     CRCCNT          /NO, CLEAR CRC COUNTER
1705  2446            ISZ I   XERRO           /CHECK FOR COMPUTER ERROR?
1706  5600            JMP I   DTCHK           /ALL O.K.
1707  4576    BADHLT, JMS I   BGHLT           /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 GENERATOR
                /
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.
```

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2115  7301            CLL CLA IAC
2116  3060            DCA     AMOUNT                  /ONLY ONE DRIVE
2117  1111            TAD     TRASH1                  /GET DRIVE NUMBER
2120  1154            TAD     HUNPOT
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     HUNPOT                  /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     FINTIM
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     CLRBAK                  /SAVE DIFFERENCE
2250  1175            TAD     CLRBAK
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
```

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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                         /LAST WORD DONE????
2277  5302            JMP     DSKEX                   /EXIT
2300  4776'           JMS     TIME                    /TIME AND WAIT
2301  5241            JMP     STRWRK                  /WAIT FOR INT, OR DONE!!!!
2302  2200    DSKEX,  ISZ     DSKGO
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    LOOGO,  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
```



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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            CSCKPA                          /ROUTINE TO EXECUTE.
2360  7000            NOP
2361  6031            KSF                             /KEYBOARD FLAG??
2362  4576    INTER2, JMS I   SGMLT                   /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 RECEIVE 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     POLDSK
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
```



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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  3477          MES17
2522  1115          TAD     POLDSK                  /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
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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 "DISCONNECTED!"
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   BGMLT           /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            CSSWIT                  /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     TRASM1          /ADDRESS POINTER
2740  1357            TAD     CCNTR1          /AMOUNT TO DO
2741  3112            DCA     TRASM2          /SETUP COUNTER
2742  1511    CHANGR, TAD I   TRASM1          /GET ADDRESS POINTER
2743  3113            DCA     TRASM3          /SAVE ADDRESS
2744  1513            TAD I   TRASM3          /GET OLD CODE
2745  0072            AND     A7007           /MASK OFF OLD CODE
2746  1776'           TAD     LDCM            /ADD IN DESIRED CODE
2747  3513            DCA I   TRASM3          /RESTORE
2750  2111            ISZ     TRASM1          /UPDATE POINTER
2751  2112            ISZ     TRASM2          /UPDATE CHANGE COUNTER
2752  5342            JMP     CHANGR          /MORE TO CHANGE
2753  4407            CLASIC                  /CHECK FOR CLASSIC,
2754  4436            CSERR                   /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 "DSK HARD SOFT COMP"
3005  3372            MES7
3006  1107            TAD     M10
3007  3245            DCA     TSAVE1          /MAXIMUM TO DO
```



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3010  3246            DCA     TSAVE2
3011  3247            DCA     TSAVE3          /CLEAR SOME COUNTERS
3012  1246    CHKRES, TAD     TSAVE2
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            LOCMD                           /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   BGMLT                   /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    BIGSTP, 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    ME80,   TEXT    " ERROR"
3304  2222
3305  1722
3306  0000
3307  2213    ME81,   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    ME82,   TEXT "EXERCISE"
3326  0522
3327  0311
3330  2305
3331  0000
3332  4004    ME83,   TEXT " DISK"
3333  1123
3334  1300
3335  1617    ME84,   TEXT    "NON-RECOVERABLE "
3336  1655
3337  2205
3340  0317
3341  2605
3342  2201
3343  0214
3344  0540
3345  0000
3346  0530    ME85,   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    ME86,   TEXT    "ACCEPT MODE?"
3364  0305
3365  2024
3366  4015
3367  1704
3370  0577
3371  0000
3372  0423    ME87,   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    ME08,   TEXT    "FIELD?"
3405  0514
3406  0477
3407  0000
3410  2422    ME09,   TEXT    "TRACK?"
3411  0103
3412  1377
3413  0000
3414  0530    ME010,  TEXT    "EXTRA SECTORS?"
3415  2422
3416  0140
3417  2305
3420  0324
3421  1722
3422  2377
3423  0000
3424  0214    ME011,  TEXT    "BLOCK LENGTH?"
3425  1703
3426  1340
3427  1405
3430  1607
3431  2410
3432  7700
3433  0401    ME013,  TEXT    "DATA?"
3434  2401
3435  7700
3436  0122    ME014,  TEXT    "ARE YOU SURE?"
3437  0540
3440  3117
3441  2540
3442  2325
3443  2205
3444  7700
3445  4004    ME015,  TEXT    " DISCONNECTED!"
3446  1123
3447  0317
3450  1616
3451  0503
3452  2405
3453  0441
3454  0000
3455  2331    ME016,  TEXT    "SYSTEM SHUT DOWN, NO DISKS TO RUN!"
3456  2324
3457  0515
3460  4023
3461  1025
3462  2440
3463  0417
3464  2716
3465  5440
3466  1617
3467  4004
3470  1123
3471  1323
```



```
3472  4024
3473  1740
3474  2225
3475  1641
3476  0000
3477  0411    ME017,  TEXT    "DISK "
3500  2313
3501  4000
3502  4020    ME018,  TEXT    " PASS COMPLETE!"
3503  0123
3504  2340
3505  0317
3506  1520
3507  1405
3510  2405
3511  4100
              /

3512  0000    DSK00,  0
3513  0000    DSK10,  0
3514  0000    DSK20,  0
3515  0000    DSK30,  0
3516  0000    DSK40,  0
3517  0000    DSK50,  0
3520  0000    DSK60,  0
3521  0000    DSK70,  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
A0770   0071    C8HANG  1122    CONSEC  0147    DAT4    0761
A7007   0872    C8INQU  4437    CONSOL  0000    DAT5    0762
ACDCA   0362    C8OCTA  4432    CRCCNT  0155    DAT6    0763
ACL     7701    C8PAGS  4424    CRCFLG  0156    DAT7    0764
ACSAVE  1345    C8PAUS  4441    CRLF    4457    DAT8    0765
ADREG   0133    C8PRNT  4430    D0CMP   3544    DAT9    0766
AERROR  2156    C8RDPS  0666    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    DTCMK   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  2502    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   0125    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    ERRDEX  1355
C8ERR   4436    CNTVAL  0252    DAT2    0757    ERROR   4446
```

ERTX1	3247	K0001	0061	M12	0105	NTWRKS	1710
ERTX2	3255	K0003	0062	M4	0106	OCT1	2400
ERTX3	3264	K0004	0013	MANUAL	0322	OCT4	2430
ERTX4	3276	K0006	0063	MAXFLD	0143	OCTEL	4456
ESAVE	1371	K0007	0064	MAXTIM	0144	ONEIN	4432
EXAPT8	2151	K0010	0065	MAXTRK	0145	OP1	0021
EXIT	1504	K0017	0066	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	MES13	3433	PCNTR2	1374
F1SWR	0020	K0215	1424	MES14	3436	PCNTR3	1375
FILCNT	1040	K0240	1512	MES15	3445	PCREG	0120
FILLER	1037	K0260	0067	MES16	3455	PCSAVE	1344
FILLUP	0717	K0277	0070	MES17	3477	PNTBUF	1120
FIRTIM	0170	K0316	2057	MES18	3502	POLDSK	0115
FLDFLG	3572	K0331	2056	MES19	3174	POLNEX	1000
FLDHLT	0206	K0400	0017	MES2	3325	PREXIT	2635
FLSAVE	1347	K1000	0075	MES3	3332	PRINT	2620
FNDSUM	0142	K177	2034	MES4	3335	PRN	1450
FORIN	4433	K1777	0076	MES5	3346	PRNDAT	0173
FROCT	1426	K3740	1513	MES6	3363	PRNTER	4455
FWREG	0130	K4000	0073	MES7	3372	PSIE	6665
GENDAT	4426	K4100	0074	MES8	3404	PSKE	6663
GETCH1	0703	K5405	0360	MES9	3410	PSKF	6661
GETDAT	0456	K6500	0541	MESA	0747	PSTB	6664
GNDAT	1737	K6520	2172	MESAC	1553	PTSTOR	0536
GOBAK	2230	K7000	2155	MESFL	1541	RAD1	1773
GOCDF	1646	K7377	2154	MESMAN	1146	RAD2	1774
GOCHK	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	MYLAB	1546	RDSTAT	4447
INTCM	0136	KTIME	0530	NEWRD	0727	RDTRY	1073
INTDA	0124	LAB	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	XC8ENR	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	0034		
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	0045		
SKPNOP	0237	TRKFLG	3573	XKTICK	1154		
SOFT	1245	TRYCNT	0171	XLAS	0006		
SPAC	1506	TRYTIM	1060	XLOAD	0053		
SPACE	4431	TSAVE1	3045	XLOCA	0052		
SPBLK	0164	TSAVE2	3046	XLOCM	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	1572		
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	XTASLA	0437		
STRTEX	0224	WATMES	0651	XTABLB	0480		
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