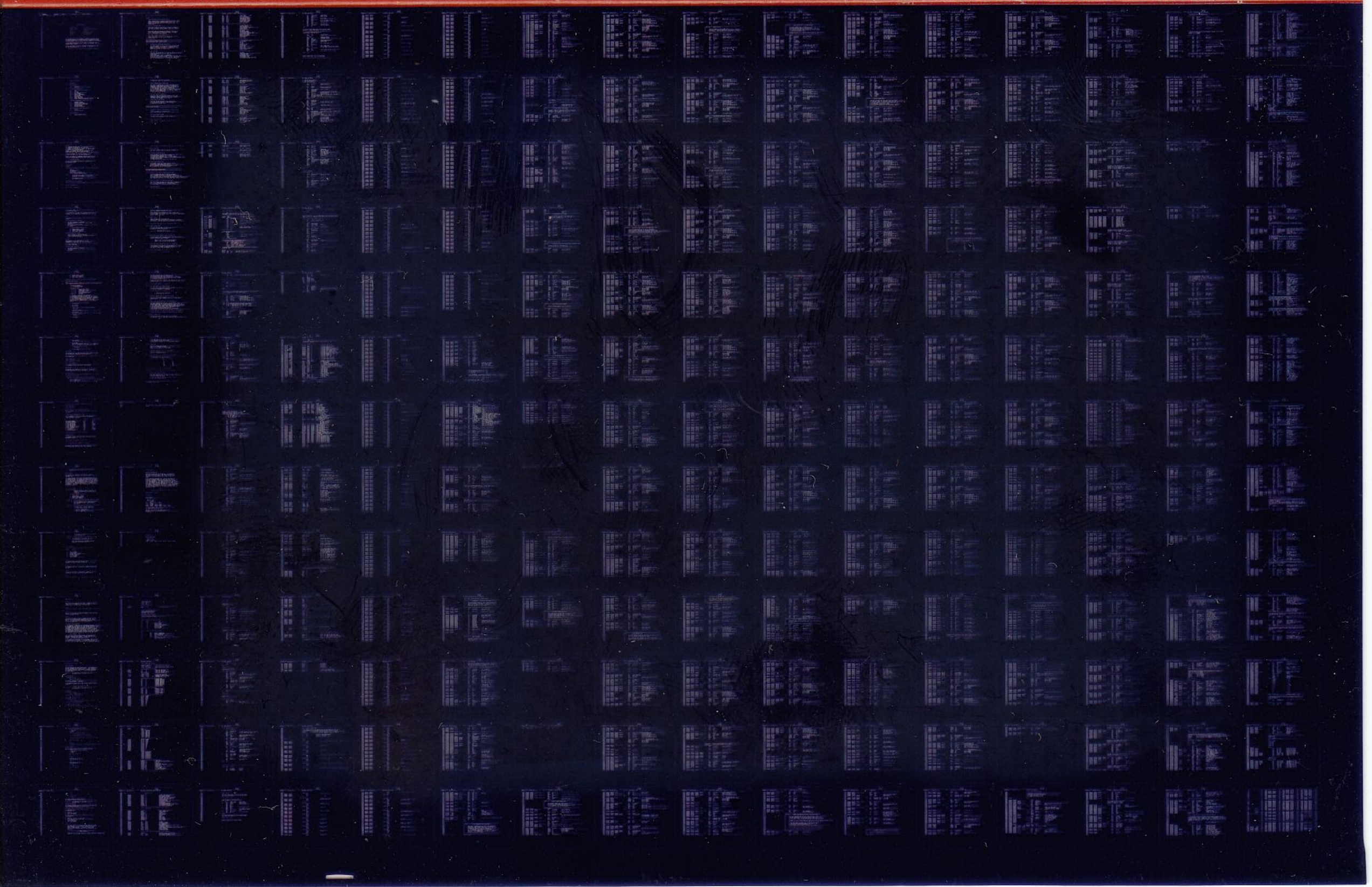
RK611

UNIBUS RK6 DRIVE PART 1
CZR6HE0

AH-9118E-MC

FICHE 1 OF 2

MAR 1978
digital
MADE IN USA



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IDENTIFICATION

PRODUCT CODE:	AC-9116E-MC
PRODUCT NAME:	CZR6HEO UNIBUS RK6 DR PRT 1
DATE:	FEB 1978
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	GARY PAPAZIAN

TABLE OF CONTENTS

1.0 ABSTRACT

2.0 REQUIREMENTS

- 2.1 HARDWARE
- 2.2 PRELIMINARY TESTING & PROGRAMS

3.0 PROGRAM CONSIDERATIONS

- 3.1 PDP-11 FAMILY COMPATIBILITY
- 3.2 XXDP
- 3.3 ACT/APT
- 3.3.1 APT ETABLE DEFINITIONS
- 3.4 DUAL ACCESS
- 3.5 MEMORY MANAGEMENT
- 3.6 PARITY CHECK ENABLED
- 3.7 BAD SECTORS
- 3.8 EXECUTION TIME
- 3.9 FAULT ISOLATION
- 3.10 ERROR CORRECTION & FAILURE RATE ANALYSIS
- 3.11 DEFAULT UNIBUS ADDRESSES & VECTORS

4.0 OPERATING PROCEDURE & CONTROL FUNCTIONS

- 4.1 PROGRAM LOADING
- 4.2 STARTING LOCATIONS
- 4.3 CONSOLE SWITCH REGISTERS
- 4.4 SOFTWARE SWITCH REGISTER
- 4.5 INPUT DIALOGUE
- 4.6 PROGRAM EXAMPLE
- 4.7 HALTING THE PROGRAM

5.0 DRIVE DIAGNOSTIC FUNCTIONAL DESCRIPTION

- 5.1 GENERAL
- 5.2 TEST DESCRIPTIONS

6.0 ERROR REPORTING

- 6.1 ERROR INTERPRETATION
- 6.2 ERROR PRINTOUT EXAMPLE

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                1.0     ABSTRACT

                THIS PROGRAM PERFORMS PART 1 OF THE DRIVE DIAGNOSTICS
                 TO INSURE THAT THE RK06 & RK07 DISK DRIVE
                IS CAPABLE OF PERFORMING ALL STATIC & CYCLE UP  TESTS.
                IT INSURES THAT THE DRIVE CAN WRITE AND READ HEADERS
                 IN BOTH 20 & 22 SECTOR FORMATS.
                FINALLY, IT INSURES THAT THE DISK CAN PERFORM SEEK
                OPERATIONS BY DOING SEVERAL SEEK PATTERNS.
                ERROR DETECTION  LOGIC IS CHECKED BY SOFTWARE ERROR FORCING.

                AFTER A SUCCESSFUL RUN (WITH NO ERRORS) OF PART 1, THE DRIVE
                IS READY FOR PART 2 OF THE DRIVE DIAGNOSTICS.

                TESTING IS BASED ON A HIERARCHY APPROACH STARTING WITH
                BASIC LOGIC TESTS AND PROCEEDING THRU DYNAMIC TESTING.  THE
                TESTS WILL BE KEPT SMALL TO FACILITATE SCOPING LOOPS.

                        *****CAUTION*****

                HALTING THIS PROGRAM ANYWHERE BUT AT THE END OF A PASS,
                MAY LEAVE THE HEADERS IN THE DISK CARTRIDGE IN AN
                UNDETERMINED STATE.


                2.0     REQUIREMENTS

                2.1     HARDWARE

                THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE DISK DIAGNOSTIC:

                        PDP-11
                        CONSOLE TELETYPE
                        16K MEMORY
                        KW11-L OR KW11-P CLOCK
                        RK06 UNIBUS CONTROLLER (RK611)
                        1 TO 8 (TOTAL) RK06/RK07 DRIVES

                NOTES:  1.  IF NEITHER KW11-L OR P CLOCK IS USED, ALL TIMING
                            TESTS WILL BE BYPASSED.  A MSG AT THE
                            BEGINNING OF THE TESTS WILL CONFIRM THIS.

                        2.  THE PROGRAM CAN WORK OFF EITHER FORMATTED OR
                            NON-FORMATTED PACKS.

        2.2     PRELIMINARY TESTING & PROGRAMS

                THE RK611 DISKLESS CONTROLLER DIAGNOSTICS (ALL PARTS) SHOULD FIRST RUN SUCCESSFU

        3.0     PROGRAM CONSIDERATIONS

        3.1     PDP-11 FAMILY COMPATIBILITY
```

THIS PROGRAM CAN BE USED BY THE PDP-11/04,05,10,20,
34,35,40,45,50, & 70.

IT IS COMPATABLE WITH THE LSI-11 INSTRUCTION SET AND CAN TEST
THE RK06 ONLY IF THE DRIVE CONTROLLER FOR THE LSI-11 IS
DESIGNED TO BE DIAGNOSTICALLY COMPATABLE WITH THE RK611.

3.2 XXDP

THIS PROGRAM CAN BE CHAINED BY XXDP & WILL NOT OVERLAY THE
LOADER.

CHAIN MODE OPERATION (MONITOR)

1. THE INPUT DIALOGUE IS BYPASSED.
2. THE BUSS ADDRESS & CONTROLLER INTERRUPT VECTOR IS DEFAULTED.
3. DRIVE 0 WILL NOT BE TESTED.
4. ALL OTHER DRIVES IN THE 'DRIVE PRESENT' CONDITION WILL BE TESTED.

NOTE: THE DRIVE PRESENT CONDITION IS:

- A. HEADS MANUALLY LOADED
- B. CORRECT PORT SELECTED
- C. WRITE LOCK DISABLED
- D. DRIVE READY INDICATOR ON

DUMP MODE OPERATION (MANUAL)

1. INPUT DIALOGUE IF STARTED FROM 220.
2. DRIVE 0 CAN BE TESTED, BUT THE OPERATOR IS FIRST GIVEN A MSG TO REPLACE THE PACK IN DR0 WITH A SCRATCH PACK & TYPE <CR> WHEN DONE.

3.3 ACT/APT

THIS PROGRAM IS ACT COMPATIBLE. IT IS APT
COMPATABLE TO THE EXTENT THAT APT HOOKS WILL BE IN THE
PROGRAM & WILL WORK THRU THE 'UPTON INTERFACE'.

FOR OTHER INTERFACES, APT MAY ONLY LOAD & START THE PROGRAM.
I.E. LOAD & DUMP MODE.

AUTOMATIC MODE (MONITOR)

1. THE INPUT DIALOGUE IS BYPASSED.
2. THE BUSS ADDRESS & CONTROLLER INTERRUPT VECTOR IS DEFAULTED.
3. ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION WILL BE TESTED.

NOTE: THE DRIVE PRESENT CONDITION IS:

A. HEADS MANUALLY LOADED
B. CORRECT PORT SELECTED
C. WRITE LOCK DISABLED
D. DRIVE READY INDICATOR ON

DUMP MODE (MANUAL): INPUT DIALOGUE IF STARTED FROM 220.

3.3.1 APT ETABLE DEFINITIONS

THE FOLLOWING DEFINITIONS ARE VALID FOR SPECIFYING APT ENVIRONMENTAL TABLE (ETABLE) ENTRIES, VIA RUNNING THE APT UTILITY PROGRAM "TSP":

1. SOFTWARE ENVIRONMENT:
   =1 IF APT SCRIPT MODE
   =0 IF STANDALONE MODE

2. ENVIRONMENT MODE:

BIT 7 =	1	ETABLE DOES SIZING
	0	PROGRAM DOES SIZING
BIT 6 =	1	SPOOL MSGS TO APT IF SCRIPT MODE
	0	DON'T SPOOL TO APT
BIT 5 =	1	SUPPRESS CONSOLE OUTPUT
	0	ALLOW CONSOLE OUTPUT
BITS 4-0		NOT USED

3. SWITCH 1 (SOFTWARE SWITCH REGISTER)
IF ENVIRONMENT MODE BIT 7 (SIZING BIT) IS SET TO 1, THE SOFTWARE SWITCH REGISTER WILL BE USED, INSTEAD OF THE HARDWARE CONSOLE SWITCH REGISTER. REGARDLESS OF WHICH ONE IS USED, ALL BITS DEFINED IN SECTIONS 4.3 & 4.4 (SWITCH REGISTER OPTIONS) MAY USED WHEN RUNNING IN STANDALONE MODE. IN APT SCRIPT MODE, HOWEVER, BIT 14 (LOOP ON TEST) MUST ALWAYS BE SET TO 0.

4. SWITCH 2 (USER SWITCH REGISTER)
   NOT USED

5. CPU OPTIONS:
   NOT USED

6. MEMORY TYPES 1-4 AND MAX MEMORY ADDRESSES
   NOT USED

7. INTERRUPT VECTOR 1:
   USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 210

8. BUS PRIORITY 1:
   USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 5

9. INTERRUPT VECTOR 2:
   NOT USED

10. BUS PRIORITY 2:
    NOT USED

11. BASE ADDRESS:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 177440

12. DEVICE MAP:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. EACH BIT SET TO 1 IN BITS 0-7 WILL SELECT THE CORRESPONDING DRIVE TO BE TESTED. BITS 8-15 ARE NOT USED.

13. CONTROLLER DESCRIPTOR WORDS:
    NOT USED

14. DEVICE DESCRIPTOR CODES (IN WORDS):
    NOT USED

3.4 DUAL ACCESS

THIS PROGRAM WILL NOT TEST OR SUPPORT DUAL-ACCESS. A DRIVE EQUIPED WITH DUAL ACCESS MUST BE SWITCHED TO THE PORT UNDER TEST TO PREVENT CONTENTION WITH THE OTHER PORT.

DUAL ACCESS TESTS WILL BE INCORPORATED IN A SEPARATE PROGRAM AT A LATER DATE.

3.5 MEMORY MANAGEMENT

MEMORY MANAGEMENT NOT USED

3.6 PARITY CHECK ENABLED

IF THE MEMORY PARITY CHECK OPTION IS AVAILABLE ON THE SYSTEM, THE PROGRAM WILL RUN WITH MEMORY CHECK ENABLED.

3.7 BAD SECTOR

THE PROGRAM WILL COMPARE DATA ERRORS WITH THE BAD SECTOR INFORMATION CONTAINED ON CYL 410, HEAD 2. PRINTOUTS OF DATA ERRORS DUE TO BAD SECTORS/TRACKS WILL BE MASKED OUT.

3.8 EXECUTION TIME

THE EXECUTION TIMES SHOWN BELOW ARE BASED ON THE PDP 11/50.

TOTAL TIME: 5 MIN, 30 SEC

A BREAKDOWN OF THE MORE LENGTHY TESTS ARE SHOWN BELOW:

```
TEST 16 STATIC CYL ADDRESS & DIFF REGS-PART 2: 2 MIN, 15 SEC
TEST 34 FORMAT PACK                          : 1 MIN
TEST 37 SEEK FROM CYL 0 TO ALL CYLS          : 40 SEC
TEST 40 SEEK FROM CYL 410 TO ALL CYLS        : 40 SEC
```

THE ABOVE TIMES ARE APPROX. DOUBLED FOR THE RK07.

3.9 FAULT ISOLATION

TO BE DETERMINED.

3.10 ERROR CORRECTION AND FAILURE RATE ANALYSIS

THIS PROGRAM WILL NOT DO ERROR CORRECTION OR FAILURE RATE ANALYSIS.

3.11 DEFAULT UNIBUS ADDRESSES & VECTORS

THE FOLLOWING IS A LIST OF ALL DEFAULT ADDRESSES & VECTORS OF ALL HARDWARE TO BE USED & THEIR MEMORY ADDRESSES WHERE THEY CAN BE CHANGED.

	LOCATION	DEFAULT CONTENTS
RK06 BUSS ADDRESS	1264	177440
CONTROLLER INTERRUPT VECTOR	1314	210
CONTROLLER PRIORITY	1316	240
P-CLOCK STATUS REG	1320	172540
P-CLOCK SET BUFFER	1322	172542
P-CLOCK READ BUFFER	1324	172544
L-CLOCK STATUS REG	1326	177546
L-CLOCK INTERRUPT VECTOR	1330	100
P-CLOCK INTERRUPT VECTOR	1332	104
TTY KB STATUS REG	1144	177560
TTY KB BUFFER	1146	177562
TTY PRINTER STATUS REG	1150	177564
TTY PRINTER BUFFER	1152	177566

4.0 OPERATING PROCEDURE & CONTROL FUNCTIONS

4.1 PROGRAM LOADING

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING STANDARD PROCEDURE FOR ABSOLUTE LOADER TAPES; OR FROM ANY MEDIA SUPPORTED BY XXDP.

4.1.1 LOAD THE STARTING ADDRESS (SEE SEC 4.2).

4.1.2 SET SWITCH REGISTERS AS DESIRED (SEE SEC 4.3).

4.1.3 SET DRIVES TO BE TESTED IN THE 'LOAD' CONDITION & WITH THE APPROPRIATE PORT SELECTED & WRITE LOCK DISABLED. DRIVES NOT TO BE TESTED MUST HAVE BOTH PORTS DESELECTED.

NOTE: THE DRIVE WILL NOT RESPOND TO THE 'START SPINDLE' CMD IF THE RUN/STOP SWITCH IS IN THE 'STOP' POSITION.

4.1.4 PRESS 'START'

THE PROGRAM WILL IDENTIFY ITSELF AND WILL BEGIN A DIALOGUE WITH THE OPERATOR TO DETERMINE DRIVES TO BE TESTED (SEE SEC 4.5).

THE PROGRAM BEGINS TESTING ONLY THOSE DRIVES SPECIFIED BY THE INPUT DIALOGUE. IF A SPECIFIED DRIVE CANNOT BE FOUND BY THE PROGRAM IT WILL BE FLAGGED AS AN ERROR THAT THE DRIVE WAS NOT AVAILABLE. THEN BEGINNING WITH THE LOWEST NUMERICAL DRIVE AND PROCEEDING IN SEQUENTIAL ORDER, ALL VALID DRIVES WILL BE TESTED. ONE PASS THROUGH THE TEST SEQUENCE WILL BE PERFORMED ON EACH DRIVE BEFORE MOVING TO THE NEXT DRIVE IN SEQUENCE. THE DRIVE TO BE TESTED WILL BE TYPED AT THE BEGINNING OF EACH PASS. "END OF PASS" WILL BE TYPED AFTER TESTING ALL DRIVES.

4.2 STARTING LOCATIONS

LOCATION 200 - STARTING ADDRESS TO DEFAULT THE BUSS ADDRESS & THE CONTROLLER INTERRUPT VECTOR & TEST ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION.

NOTE: THE DRIVE PRESENT CONDITION IS:

A. HEADS MANUALLY LOADED
B. CORRECT PORT SELECTED
C. WRITE LOCK DISABLED
D. DRIVE READY INDICATOR ON

LOCATION 204 - SAME AS 200 START BUT BYPASS TEST 16 (N SQUARE)

LOCATION 220 - STARTING ADDRESS TO INPUT TESTING PARAMETERS VIA THE INPUT DIALOGUE. BUSS ADDRESS & CONT. INTERRUPT VECTOR INPUTTED ONLY ON 1ST PASS.

LOCATION 230 - SAME AS 220 START BUT BYPASS TEST 16 (N SQUARE)

LOCATION 260 - RUN MODULE TEST ...DEFAULT MODE ONLY.
THIS SKIPS OVER THE FOLLOWING TESTS:

1. TEST 35 FORMAT PACK
2. TEST 36 DECREMENT FROM CYL 410 TO 0 & READ HEADERS
3. TEST 40 SEEK FROM CYL 0 TO ALL
4. TEST 41 SEEK FROM CYL 410 TO ALL

THE PURPOSE OF BYPASSING IS TO PROVIDE
A QUICK MODULE TEST

LOCATION 270 - SAME AS 260 START BUT BYPASS TEST 16 ALSO.

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

ALSO, THE PROGRAM WILL DETERMINE WHETHER THE DRIVE TO BE TESTED IS AN RK06 OR RK07. OPERATOR INPUTS ARE NOT REG'D.

4.3 SWITCH REGISTER

THE SWITCHES ARE USED TO PROVIDE CONTROL FUNCTIONS.

SWITCH	FUNCTION
15	HALT ON ERROR
14	LOOP ON TEST
13	INHIBIT ERROR TYPEOUT
12	BYPASS DRIVE AFTER 20 ERRORS
11	INHIBIT ITERATION
10	BELL ON ERROR
9	LOOP ON ERROR
8	LOOP ON TEST IN SW<07:00>

4.3.1 SW<15>

THE PROGRAM HALTS ON ENCOUNTERING AN ERROR, AFTER TYPING OUT THE ERROR MSG AND PERTINENT INFORMATION.
PRESSING "CONTINUE" CONTINUES OPERATION OF THE PROGRAM.

4.3.2 SW<14>

THE PROGRAM LOOPS ON THE TEST THAT IS BEING EXECUTED WHEN THE SWITCH IS PUT ON. THIS SWITCH IS NORMALLY USED ALONG WITH SW15.

4.3.3 SW<13>

THIS SWITCH INHIBITS ALL ERROR MSGS. NORMALLY USED WHEN LOOPING ON TEST (SW14) OR LOOPING ON ERROR (SW9).
WITH SWITCH <13> SET, SWITCH <15> SHOULD NOT BE SET.

4.3.4 SW<12>

THIS SWITCH BYPASSES A GIVEN DRIVE AFTER 20 ERRORS HAVE

BEEN DETECTED.

4.3.5 SW<11>

EACH TEST WILL BE EXECUTED ONLY ONCE. NORMALLY AFTER THE FIRST PASS, EACH SUBTEST IS ITERATED A NUMBER OF TIMES (USUALLY 50, 5 IN SOME CASES). SETTING THIS SWITCH INHIBITS ITERATIONS, SO THAT QUICK PASSES CAN BE MADE.

4.3.6 SW<10>

RINGS A BELL ON ERROR. USEFUL WHEN ERROR TYPEOUT IS INHIBITED.

4.3.7 SW<09>

THIS SWITCH PROVIDES THE TIGHTEST POSSIBLE SCOPE LOOP FOR ERRORS. IF THE PROGRAM DETECTS AN ERROR, IT WILL LOOP BACK TO THE BEGINNING OF TEST.

4.3.8 SW<08>

THIS SWITCH IS USED TO SELECT A PARTICULAR TEST (AS PER SW<00-7>) FOR EXECUTION AND SUBSEQUENT LOOPING. THUS IF TEST 15 IS TO BE SELECTED THE SWITCH SETTING WOULD BE 000415. IT SHOULD BE NOTED THAT BEFORE SELECTING & LOOPING TEST 15, ALL THE PREVIOUS TESTS (1-14) WILL BE EXECUTED.

4.4 'SOFTWARE' SWITCH REGISTER

IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E. AN 11/04 OR 11/34) THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE 'SOFTWARE' SWITCH REGISTER IS LOCATED AT LOCATION 176 (8). THE SETTINGS OF THE "SOFTWARE" SWITCHES ARE CONTROLLED THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'. THE PROGRAM WILL RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT WHEN THE PROGRAM IS AT A HIGHER PRIORITY PROCESSING AN RK06 INTERRUPT. THE 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER IN RESPONSE TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:

SWR = NNNNNN NEW =

EACH TIME SWITCH SETTING ARE ENTERED, THE ENTIRE SWITCH REGISTER IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT REQUIRED., 'RUBOUT' AND 'CONTROL U' FUNCTIONS MAY BE USED TO CORRECT TYPING ERRORS DURING SWITCH ENTRY.

ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE' SWITCH REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16 SWITCHES IN THE 'UP' POSITION, ALL SWITCH REGISTER REFERENCES WILL BE TO THE 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED

ABOVE MUST BE FOLLOWED.

4.5 INPUT DIALOGUE

THE DIALOGUE WILL BE DONE INTERACTIVELY. THE PROGRAM WILL REQUEST A PARAMETER BY CONSOLE TYPEOUT. THE PARAMETER MAY THEN BE ENTERED AS SPECIFIED BELOW OR ALLOWED TO DEFAULT BY A CARRIAGE RETURN. UNRECOGNIZED OR ILLEGAL RESPONSES WILL BE ECHOED BACK FOLLOWED BY "?". THE PROPER RESPONSE MAY THEN BE ENTERED.

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.5.1 DRIVE SELECTION

THE REQUEST WILL BE:

DRIVES TO BE TESTED:

THE DEFAULT RESPONSE IS CARRIAGE RETURN TO TEST ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION.

THE OPERATOR CAN ALSO TYPE IN THE SPECIFIC DRIVE NUMBERS TO BE TESTED, SEPARATED BY COMMAS & TERMINATED BY A CARRIAGE RETURN.

E.G. DRIVES TO BE TESTED: 1,2,4,6

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.5.2 BUS ADDRESS

THE REQUEST WILL BE:

TYPE IN BUSS ADDRESS IF NOT 177440

THE DEFAULT IS A CARRIAGE RETURN

4.5.3 CONTROLLER INTERRUPT VECTOR

THE REQUEST WILL BE:

TYPE IN CONTROLLER INTERRUPT VECTOR IF NOT 210

THE DEFAULT IS A CARRIAGE RETURN.

4.5.4 EXAMPLE OF PROGRAM DIALOGUE

THE EXAMPLE SHOWN IS FOR A PROGRAM STARTED AT ADDRESS 220.

```
                        ALL OPERATOR RESPONSES ARE UNDERLINED.

                                UNIBUS RK06-RK07 DRIVE DIAGNOSTIC
                                    PART 1
                                CZR6HE0

                                DRIVES TO BE TESTED: 1,3<CR>
                                                    -------

                                TYPE IN BUSS ADDRESS IF NOT 177440 <CR>
                                                           ----

                                TYPE IN CONTROLLER INTERRUPT VECTOR IF NOT 210 <CR>
                                                                       ----

                                WILL TEST DRIVES:
                                1
                                3

                                DRIVE 1

                                (THE REST IS IDENTICAL TO THE EXAMPLE SHOWN IN 4.6 BELOW)


                4.6     PROGRAM EXAMPLE

                        THE FOLLOWING IS AN EXAMPLE OF A PROGRAM STARTED AT THE
                        DEFAULT ADDRESS (200) & WITH 2 DRIVES ON THE LINE.

                                UNIBUS RK06-RK07 DRIVE DIAGNOSTIC
                                    PART 1
                                CZR6HE0

                                WILL TEST DRIVES:
                                0
                                1

                                DRIVE 0

                                DRIVE SERIAL NO. AAA
                                CARTRIDGE SERIAL NO. BBB

                                DRIVE 1

                                DRIVE SERIAL NO. CCC
                                CARTRIDGE SERIAL NO. DDD

                                END PASS #1


                                WILL TEST DRIVES:
                                0
                                1

                                DRIVE 0
```

DRIVE 1

END PASS # 2

(ETC)

THE ABOVE ASSUMES NO ERRORS DETECTED.
THE NUMBER OF PASSES IS DETERMINED BY ACT/APT/XXDP

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.7 HALTING THE PROGRAM

THE PROGRAM PROVIDES A METHOD OF HALTING ITSELF SUCH THAT THE CARTRIDGE AND/OR DRIVE IS NOT LEFT IN ON UNDETERMINED STATE; IE: HEADS UNLOADED OR INVALID FORMAT.

TO PROPERLY HALT, TYPE CONTROL-C (↑C) ON THE CONSOLE.

IF HEADS ARE LOADED & F RMATTING IS VALID,
THE PROGRAM WILL:

1. ECHO ↑C
2. TYPE "CPU HALTED"
3. HALT THE PROGRAM

IF HEADS ARE NOT LOADED AND/OR FORMATTING IS INVALID,
THE PROGRAM WILL:

1. ECHO ↑C
2. TYPE 'HALT PENDING, PLEASE WAIT'
3. DO THE TEST(S) THAT LOADS HEADS AND/OR FORMATS THE INVALID CYLS
4. TYPE 'CPU HALTED'
5. HALT THE PROGRAM

NOTES:

1. THE ABOVE EXAMPLE IS FOR THE PROGRAM RUNNING IN DUMP MODE (MANUAL). IF THE PROGRAM IS RUNNING IN CHAIN/AUTO MODE VIA XXDP,ACT,APT; IT WILL FIRST LOAD HEADS AND/OR FORMAT CORRECTLY, IF REQ'D, THEN IT WILL JUMP ON TO THE MONITOR WHERE THE NEXT PROGRAM CAN BE CALLED IN.

   THE TYPEOUTS WILL BE "ABORT PENDING - PLEASE WAIT"
   & "PROGRAM ABORTING"

2. OPERATING THE 'CONTINUE' SWITCH ON THE CPU CONSOLE WILL RETURN THE PROGRAM TO TEST 1 WHERE TESTING WILL BEGIN WITH THE 1'ST DRIVE AGAIN.

5.0 DRIVE DIAGNOSTIC FUNCTIONAL DESCRIPTION

5.1 GENERAL

A. BASIC CONTROLLER TESTS, SIZING & SETUP

THESE TESTS DO BASIC CONTROLLER REGISTER REFERENCE TESTS, CHECKS OPERATOR INPUTS AGAINST DRIVES SEEN ON THE LINE OR DEFAULTS TO TEST ALL THE DRIVES SEEN ON THE LINE. IT CHECKS THE EXISTENCE OF AN L OR P CLOCKS FOR USE IN THE TIMING TESTS.

B. STATIC & CYCLE UP TESTS

THESE TESTS CHECK OUT THE ABILITY TO SELECT & DESELECT THE DRIVE; TO DETECT PARITY, UNSAFE, AND FAULT CONDITIONS WITH THE DRIVE READY TO OPERATE BUT WITHOUT THE SPINDLE ON.

THE ENTIRE POWER UP SEQUENCE IS TESTED BY VERIFYING ALL STATUS BITS SET/RESET IN PROPER SEQUENCE: THE BRUSH CYCLE, INNER-OUTER LIMIT DETECTION, FORWARD, REVERSE, PIP...ETC STATUS BITS ARE CHECKED.

C. SEEK, WRITE HEADER, READ HEADER TESTS

THESE TESTS CHECK THE ABILITY OF THE DRIVE TO DO SEEKS, HEADER OPERATIONS & 20, 22 SECTOR FORMATTING.

5.2 TEST DESCRIPTIONS

****
BASIC CONTROLLER TESTS, SIZING & SETUP
****

TEST 1 REFERENCE ALL CONTROLLER REGISTERS

THIS TEST VERIFIES THAT ALL THE CONTROLLER REGISTERS CAN BE ACCESSED. THE INABILITY TO BE ACCESSED WILL RESULT IN A TIMEOUT TRAP WITH AN ERROR MSG. ANY ERROR IN THIS TEST WILL RESULT IN ABORTING ALL OTHER TESTS AND JUMPING TO 'END OF PASS'

TEST 2 SIZE THE BUSS

THIS TEST IS ENTERED ONLY IF 'DRIVE SELECTION' IS DEFAULTED EITHER BY RUNNING IN THE AUTO MODE OR A 200 START IN THE MANUAL MODE.
EVERY DRIVE FROM 0 THRU 7 IS ADDRESSED.
CONTROLLER ERROR (CERR) IS EXAMINED AND IF NOT SET, THE DRIVE WILL BE TESTED AS AN RK06. IF SET, THE PROGRAM WILL BYPASS TESTING THAT DRIVE ONLY IF THE ERROR WAS A RESULT OF MDS, UFE OR NED BEING SET; OR BOTH NED & DRA RESET IN-

```
                        DICATING THE OTHER PORT IS ACCESSED.
                        IF CERR DUE TO DTYE, THE DRIVE WILL BE TESTED AS AN RK07.


                TEST 3  VERIFY OPERATOR DRIVE SELECTIONS

                        THIS TEST IS ENTERED ONLY IF DRIVE SELECTION IS NOT
                        DEFAULTED.  EVERY DRIVE FROM 0 TO 7 IS ADDRESSED &
                        CONTROLLER ERROR (CERR) IS EXAMINED. IF NOT SET, THE
                        PROGRAM WILL ASSUME THE DRIVE IS PRESENT AS AN RK06
                        IF CERR WAS SET, THAT DRIVE WILL BE BYPASSED
                        ONLY IF THE ERROR WAS A RESULT OF MDS OR UFE SET OR BOTH
                        NED & DRA RESET (WRONG PORT).  IF CERR IS  A RESULT OF
                        NED ONLY, IT IS CHECKED AGAINT THE INPUTTED INFOR TO
                        VERIFY IT WAS NOT SPECIFIED.
                        IF CERR DUE TO DTYE, THE DRIVE WILL BE TESTED AS AN RK07.


                TEST 4  FIND NEXT DRIVE TO BE TESTED

                        THIS TEST FINDS THE NEXT DRIVE PRESENT & PUTS THAT
                        ADDRESS IN 'DRVAD' & $TMP4 IS SET TO CDT IF DRIVE IS RK07.
                        THROUGHOUT THE FOLLOWING TESTS, THE DRIVE TESTED IS
                        THE DRIVE WHOSE ADDRESS IS IN 'DRVAD'.

                TEST 5  UNLOAD DRIVE TO BE TESTED

                        THIS TEST UNLOADS THE DRIVE TO BE TESTED NEXT,
                        WAITS FOR ATTN & VERIFIES IT CAME FROM THE CORRECT DRIVE.
                        IT THEN WAITS FOR SPEED OK TO GO LOW BEFORE
                        PROCEEDING TO THE NEXT TEST.


                ;*******************************************************************
                STATIC & CYCLE UP TESTS
                ;*******************************************************************


                TEST 6  REFERENCE & CHECK ALL STATUS BYTES IN RKMR2 & RKMR3

                         CHECKS THE ABILITY TO REFERENCE ALL
                        DRIVE REGISTERS AND THAT THEY CONTAIN CORRECT STATUS.


                TEST 7  PRINT DRIVE SERIAL NUMBER

                        THIS TEST READS & PRINTS THE DRIVE SERIAL # FROM MSG A, WORD 11
                        IN DECIMAL & IS PERFORMED ON THE 1ST PASS ONLY


                TEST 10 SET VV WITH PACK CMD

                        IF VV IS RESET, THE PACK CMD IS USED TO SET IT.


                TEST 11 RELEASE DRIVE
```

```
819
820                                     TESTS THE ABILITY TO RECOGNIZE THE RLS BIT AND NOT RAISE SACK
821
822
823                             TEST 12 DRIVE TYPE TEST
824
825                                     THIS TEST COMPARES DRIVE TYPE IN MSG A AGAINST 'DDT' IN RKDS.
826                                     WRONG CDT IN RKCS1 IS SENT & ERRORS ARE VERIFIED.
827
828
829                             TEST 13 C-D PARITY ERROR DETECTION
830
831                                     TESTS THE ABILITY OF THE DRIVE TO DETECT EVEN PARITY SENT BY
832                                     THE CONTROLLER BY SETTING 'PAT' ON RKMR1.
833                                     THE DRIVE SHOULD RESPOND WITH 'C-D PARITY ERROR'
834                                     THE DRIVE STILL SENDS ODD PARITY TO THE CONTROLLER WHICH IS NOW
835                                     CHECKING FOR EVEN PARITY THEREFORE THE CONTROLLER SHOULD DETECT
836                                     AN ERROR AND SET SPAR.
837                                     THE ERROR CONDITION IS RESET WITH THE CLEAR CMD
838
839
840                             TEST 14 VERIFY START SPINDLE CMD
841
842                                     THE PROGRAM CHECKS THE ENTIRE STARTUP SEQUENCE, IE:
843                                     BRUSH CYCLE, HEADS HOME, FWD, REV ETC.
844                                     BY VERIFYING ALL APPROPRIATE STATUS BITS FOR PROPER SEQUENCING.
845                                     THE CYL ADDRESS & CYL DIFFERENCE REGS ARE CHECKED
846                                     TO BE ZERO AT THE END OF THE SEQUENCE.
847
848
849                             ;*******************************************************************
850                             ;SEEK/READ HEADER/WRITE HEADER TESTS
851                             ;*******************************************************************
852
853
854                             TEST 15 STATIC CYL DIFF AND CYL ADDR REG TEST; PART 1
855
856                                     THIS TEST CHECKS EACH BIT OF THE CYL DIFFERENCE
857                                     AND CYL ADDRESS REGISTERS BY PERFORMING SEEKS TO ALL
858                                     MAJOR CYLS (0,1,2,4,8,16,32,64,128,256) (512 FOR THE RK07)
859                                     WITH EVEN PARITY SET. THIS FREEZES THE INFORMATION IN THE ABOVE REGISTER
860                                     AND ALLOWS FOR CHECKING. THIS TEST VERIFIES C-D PARITY ERROR BIT SET,
861                                     THAT HEADS DID NOT MOVE & ALL OTHER APPLICABLE STATUS BITS & REGS.
862
863
864                             TEST 16 STATIC CYL DIFF & CYL ADDR REG TEST-PART 2
865
866                                     THIS TEST CHECKS THE ABILITY OF THE DRIVE TO PROPERLY SET THE CYL
867                                     DIFF. & CYL ADDR REGS FOR ALL COMBINATIONS BY SEEKING TO
868                                     ALL CYLS FROM EVERY OTHER CYL. (N SQUARE SEEKS).
869                                     IT IS PERFORMED IN THE SAME MANNER AS THE ABOVE TEST.
870
871
872                             TEST 17 HEAD REGISTER TEST
873
874                                     THIS TEST CHECKS THE ABILITY TO SELECT ALL HEADS (0,1,2)
```

```
                        VIA RKDA & READING BACK FROM MSG B3 BY THE SELECT DRIVE CMD.
                        HEAD 3 IS CHECKED TO PRODUCE INV. ADDR.

                        SINCE CHANGING HEAD ADDRESSES ARE TIED TO SEEK CMDS,
                        SELECTING HEAD 3 MUST RESULT IN A SEEK INCOMPLETE ALONG WITH
                        ILLEGAL ADDRESS. IF NOT,THIS MEANS THAT CHANGING HEAD ADDRESSES
                        ARE NOT TIED TO SEEK CMDS


TEST 20 SEEK TO CYL 0

                        TESTS THE ABILITY TO DO A SEEK CMD.
                        VERIFIES THERE WAS NO MOVEMENT BY CHECKING ALL APPROPRIATE
                        STATUS BITS.  VERIFIES CMD COMPLETION BETWEEN 10-15USEC.
                        READ HEADER IS NOT PERFORMED AS THE PACK MAY NOT BE FORMATTED.


TEST 21 TEST SECTOR COUNT REG. FOR 22 & 20 SECTOR FORMAT


TEST 22 DETECT OUTER LIMIT

                        THIS TEST VERIFIES THAT THE ABOVE TEST DID ACTUALLY POSITION ON CYL 0
                        BY DETECTING OUTER LIMIT AS THE ADJACENT CYL.
                        AN ERROR IN THIS TEST INDICATES:

                                A.  HEADS WERE NOT ON CYL 0
                        AND/OR  B.  COULD NOT SEEK IN REVERSE DIRECTION.


TEST 23 BASIC WRITE/READ HEADER & HEAD SWITCHING TEST

                        THIS TEST CHECKS HEAD SWITCHING BY WRITING UNIQUE HEADERS
                        ON EACH TRACK OF CYL 0, READING BACK & VERIFYING THEY REMAINED
                        UNIQUE. 22 SECTOR FORMAT IS USED

                        I.E.    TRACK 0: ALL 0'S FOR ALL SECTOR HEADERS
                                TRACK 1: 0101 FOR ALL SECTOR HEADERS
                                TRACK 2: ALL 1'S FOR ALL SECTOR HEADERS


TEST 24 BASIC WRITE/READ HEADER TEST; ALL 1'S, 20 SECTORS

                        USING HEAD 0, WRITE & READ 20 SECTOR HEADERS BY WRITING ALL
                        1'S AS HEADERS.  ATTEMPT TO FIND SECTORS 20 & 21.  VERIFY
                        THEY ARE NO LONGER THERE BY READING 22 SECTORS AND NOT
                        FINDING 0'S AS DATA FROM THE PREVIOUS TEST.


TEST 25 WRITE & READ HEADERS CYL 0, HEAD 0


TEST 26 SEEK FROM CYL 0 TO 1 & READ HEADERS
```

```
                        THIS TEST CHECKS MSG A & B WORDS 0,1,2 FOR CORRECT STATUS AFTER RDY
                        IS RECEIVED FROM A SEEK CMD TO DETERMINE
                        THAT THE HEADS ARE ACTUALLY MOVING & THE CYL DIFF IS 1.
                        AFTER ATTN IS RECEIVED, CERR IS EXAMINED FOR ANY ERRORS.
                        CYL DIFFERENCE IN MSG A2 IS VERIFIED TO BE 0 & CYL ADDR
                        IN MSG B2 IS VERIFIED TO BE 1.

                        HEADERS ARE READ FROM 1 SECTOR, HEAD 0 & VERIFIED THAT THEY ARE
                        DIFFERENT FROM CYL 0 TO SHOW THAT THE HEADS DID ACTUALLY MOVE.


                TEST 27 WRITE & READ HEADERS CYL 1, HEAD 0


                TEST 30 TEST RECALIBRATE CMD & READ HEADERS

                        THIS TEST DOES A RECALIBRATE & READS HEADERS.
                        IT VERIFIES THAT WRITING HEADERS ON CYL 1 FROM THE PREVIOUS
                        TEST DID NOT OVERWRITE CYL 0 HEADERS.

                        AN ERROR IN THIS TEST INDICATES THAT HEADS:


                                A. MOVED TO A CYL OTHER THAN 1
                        OR      B. DID NOT GET BACK TO CYL 0


                TEST 31 SINGLE INCREMENT SEEKS TO THE LAST CYLINDER

                        THIS TEST DOES SINGLE INCREMENT SEEKS OUT TO THE LAST CYL
                        WITHOUT ANY WRITING OR READING SO AS NOT TO INADVERTENTLY
                        DESTROY DATA.


                TEST 32 READ & SAVE BAD SECTOR INFO & TYPE PACK SERIAL #

                        THIS TEST VERIFIES THAT CYL 632 (1456 FOR RK07), TRACK 2 CAN BE READ.
                        THIS AREA CONTAINS BAD SECTOR INFO WHICH IS WRITTEN BY THE
                        FACTORY DURING MANF.  ALL BAD SECTOR INFO (BSE) WILL BE STORED
                        AT THIS TIME TO MASK FUTURE READ HEADER OR DATA ERROR PRINTOUTS.
                        IF BSE INFO CANNOT BE READ, OR IF AFTER READING THE BSE INFO
                        IT IS DETERMINED THAT AN ALIGNMENT CARTRIDGE IS USED,
                        A MSG WILL BE TYPED INDICATING THAT ALL
                        FUTURE FORMAT AND READ-WRITE TESTS WILL BE BYPASSED.
                        THIS IS DONE SO AS NOT TO DESTROY BSE INFO OR AN ALIGNMENT PACK BY WRITI

                        THE PACK SERIAL # IS TYPED IN OCTAL & FOR THE FIRST PASS ONLY.

                        THIS IS THE FIRST TEST WHERE THE READ DATA CMD IS PERFORMED


                TEST 33 DETECT INNER LIMIT

                        THIS TEST VERIFIES THAT THE LAST CYL IN THE ABOVE
                        TEST WAS 632 (1456) BY DETECTING INNER LIMIT AS THE ADJACENT CYL.
                        IF THIS TEST FAILS, IT INDICATES THAT HEADS WERE NOT ON THE LAST CYL
```

```
                        & THAT BSE INFO IS NOT VALID.  THE FORMAT PACK TEST
                        & ALL READ-WRITE TESTS ARE BYPASSED
                        TO AVOID DESTROYING BSE INFO OR AN ALIGNMENT CARTRIDGE
                        SINCE THERE IS A SEEKING OR LIMIT DETECTION PROBLEM.


TEST 34 FORMAT PACK

        THIS TEST FORMATS THE ENTIRE PACK IN 22 SECTOR FORMAT BY
        DOING 1 CYL INCREMENTAL SEEKS
        FROM 0 TO 632 (1456) WITH WRITE HEADER CMDS (ALL TRACKS).
        HEADERS WILL BE READ IN THE NEXT TEST


TEST 35 DECREMENT FROM LAST CYL TO 0 & READ HEADERS

        THIS TEST VERIFIES MOTION IN THE NEGATIVE DIRECTION BY
        SINGLE CYL INCREMENTAL SEEKS.


TEST 36 SEEK FROM CYL 0 TO ALL MAJOR CYLS & READ HEADERS

        THIS TEST SEEKS FROM CYL 0 TO ALL THE MAJOR CYLS & READS HEADERS.
        IT THEN SEEKS CYL 0 & READS HEADERS.

        MAJOR CYLS ARE: 1 (DECIMAL)  =  1 (OCTAL)
                        2               2
                        4               4
                        8               10
                        16              20
                        32              40
                        64              100
                        128             200
                        256             400
                        512             1000 (RK07)


TEST 37 SEEK TO ALL CYLS FROM 0 & READ HEADERS

TEST 40 SEEK TO ALL CYLS FROM LAST CYL & READ HEADERS


TEST 41 SEEK TO ALL INVALID CYLINDERS

        THIS TEST VERIFIES THAT 'INV ADDR' & 'SEEK INCOMPLETE' IS
        PRODUCED & THAT HEADS DO NOT MOVE OR UNLOAD IF AN ILLEGAL
        CYL IS SPECIFIED IN A SEEK.

        INVALID CYLS ARE 633 THRU 777 (8) FOR THE RK06
        & 1457 THRU 1777 FOR THE RK07


THE PROGRAM DOES NOT REQUIRE FORMATTED PACKS AS FORMATTING
IS PERFORMED IN ANY CASE.
```

```
1043
1044                    ANY TEST THAT MODIFIES STANDARD FORMATTING IS FOLLOWED BY A
1045                    'CLEAN UP' TEST TO PUT THOSE CYLS BACK TO STANDARD
1046                    FORMAT.
1047
```

6.0 ERROR REPORTING

6.1 ERROR INTERPRETATION

WHENEVER AN ERROR MSG IS PRINTED OUT, ALL REGISTERS AND OTHER DATA PERTAINING TO THE ERROR ARE ALSO GIVEN. MSG A(00), MSG B(01), RKER, RKBA...ETC, INDICATE THE CONTENTS OF THE CORRESPONDING REGISTERS AT THE TIME OF ERROR.

EVERY ERROR MSG CONTAINS A PC. THIS PC INDICATES THE POSITION IN PROGRAM WHERE THE ERROR CALL IS LOCATED. THE ERROR MSG, BECAUSE OF PRACTICAL CONSIDERATIONS IS MADE SHORT AND MEANINGFUL. THE USER IS ADVISED TO LOOK UP THE PC IN THE PROGRAM LISTING, WHERE HE WILL FIND MORE INFORMATION ABOUT THE ERROR. IN MANY INSTANCES, A SINGLE FAULT WILL GIVE RISE TO MORE THAN ONE ERROR REPORT. A LITTLE DELIBERATION AND CAREFUL EXAMINATION OF THE DATA GIVEN WILL BE CERTAINLY VERY HELPFUL IN PINPOINTING THE FAULT. A BRIEF EXPLANATION OF WHAT IS BEING CHECKED IN THE TEST IS GIVEN AT THE BEGINNING OF EVERY TEST. ALL THE NUMBERS GIVEN WITH ERROR MSGS ARE IN OCTAL.

NOTE

NO ERROR LOGGING OR OPERATION HISTORY IS PROVIDED.

6.2 ERROR PRINTOUT EXAMPLES:

EXAMPLE #1:

MSG A0 ERROR
AFTER START SPINDLE CMD & FWD SET

```
  TEST NO.   PC
  000014   016530
           EXPECT
A0         B0        A1        B1        A2        B2        B3
030144     100000    013704    000001
           ACTUAL
140144     100000    101744    000001
RKCS1      RKCS2     RKASOF    RKER      RKDS      RKDC
040200     000100    010000    000000    000000    000000
```

THE ABOVE EXAMPLE SHOWS EXPECTED & ACTUAL DATA FOR MSG REGISTERS A0, B0, A1 & B1.

MSGS A2, B2 & B3 WILL BE TYPED OUT ONLY AS REQUIRED IF THE CYL DIFFERENCE/OFFSET, CYL ADDRESS & HEAD & SECTOR INFORMATION IS A VARIABLE PARAMETER OF THE TEST.

```
1104
1105                                    EXAMPLE #2:
1106
1107                                    NO ATTN IN RKASOF
1108                                    AFTER UNLOAD CMD
1109
1110                                      TEST NO.  PC
1111                                      000003  014330
1112                                    RKMR2   RKMR3   RKER    RKDS    RKCS1   RKCS2   RKASOF
1113                                    000144  100000  000000  100101  000206  000104  000000
1114
1115
1116
1117                                            [ END OF DOCUMENT ]
1118
1119
1120                            %
```

```
1121
1122
1123
1124                            ; *** PGM REV 039 ***
1125                            .NLIST  CND,MC,MD
1126                            .LIST   ME
1127                            .ENABL  ABS,AMA
1128
1129                            ;DEFINE SYSMAC MACROS
1130
1131    167400                  $SWR=   167400                  ;DEFINE SWITCHES 15,14,13,11,10,9,8
1132    000001                  $TN=    1                       ;SET FIRST TEST NO. TO 1
1133
1134
1135
1136                            .TITLE  CZR6HE0 UNIBUS RK6 DR PRT1
1137                            ;*COPYRIGHT (C) 1976,1977
1138                            ;*DIGITAL EQUIPMENT CORP.
1139                            ;*MAYNARD, MASS. 01754
1140                            ;*
1141                            ;*PROGRAM BY GARY PAPAZIAN
1142                            ;*
1143                            ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
1144                            ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
1145                            ;*
1146
1147
1148                            .SBTTL  OPERATIONAL SWITCH SETTINGS
1149                            ;*
1150                            ;*      SWITCH                  USE
1151                            ;*      ------          --------------------
1152                            ;*        15            HALT ON ERROR
1153                            ;*        14            LOOP ON TEST
1154                            ;*        13            INHIBIT ERROR TYPEOUTS
1155                            ;*        12            ABORT DRIVE AFTER 20 ERRORS
1156                            ;*        11            INHIBIT ITERATIONS
1157                            ;*        10            BELL ON ERROR
1158                            ;*         9            LOOP ON ERROR
1159                            ;*         8            LOOP ON TEST IN SWR<7:0>
1160
1161
1162                            .SBTTL  SUMMARY OF STARTING LOCATIONS
1163                            ;*
1164                            ;*
1165                            ;*              200     DEFAULT PARAMETERS
1166                            ;*              204     DEFAULT PARAMETERS & BYPASS TEST 16
1167                            ;*              220     INPUT PARAMETERS
1168                            ;*              230     INPUT PARAMETERS & BYPASS TEST 16
1169                            ;*              240     ODT11
1170                            ;*              260     RUN MODULE TEST VERSION-DEFAULT MODE ONLY BYPASS
1171                            ;*                      TESTS 35,36,40 & 41
1172                            ;*              270     SAME AS 260 START BUT BYPASS TEST 16 ALSO
1173                            ;*
```

```
1174                                    .SBTTL  BASIC DEFINITIONS
1175
1176                                    ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
1177    001100                          STACK=  1100
1178                                    .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
1179                                    .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
1180
1181                                    ;*MISCELLANEOUS DEFINITIONS
1182    000011                          HT=     11              ;;CODE FOR HORIZONTAL TAB
1183    000012                          LF=     12              ;;CODE FOR LINE FEED
1184    000015                          CR=     15              ;;CODE FOR CARRIAGE RETURN
1185    000200                          CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
1186    177776                          PS=     177776          ;;PROCESSOR STATUS WORD
1187                                    .EQUIV  PS,PSW
1188    177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
1189    177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
1190    177570                          DSWR=   177570          ;;HARDWARE SWITCH REGISTER
1191    177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
1192
1193                                    ;*GENERAL PURPOSE REGISTER DEFINITIONS
1194    000000                          R0=     %0              ;;GENERAL REGISTER
1195    000001                          R1=     %1              ;;GENERAL REGISTER
1196    000002                          R2=     %2              ;;GENERAL REGISTER
1197    000003                          R3=     %3              ;;GENERAL REGISTER
1198    000004                          R4=     %4              ;;GENERAL REGISTER
1199    000005                          R5=     %5              ;;GENERAL REGISTER
1200    000006                          R6=     %6              ;;GENERAL REGISTER
1201    000007                          R7=     %7              ;;GENERAL REGISTER
1202    000006                          SP=     %6              ;;STACK POINTER
1203    000007                          PC=     %7              ;;PROGRAM COUNTER
1204
1205                                    ;*PRIORITY LEVEL DEFINITIONS
1206    000000                          PR0=    0               ;;PRIORITY LEVEL 0
1207    000040                          PR1=    40              ;;PRIORITY LEVEL 1
1208    000100                          PR2=    100             ;;PRIORITY LEVEL 2
1209    000140                          PR3=    140             ;;PRIORITY LEVEL 3
1210    000200                          PR4=    200             ;;PRIORITY LEVEL 4
1211    000240                          PR5=    240             ;;PRIORITY LEVEL 5
1212    000300                          PR6=    300             ;;PRIORITY LEVEL 6
1213    000340                          PR7=    340             ;;PRIORITY LEVEL 7
1214
1215                                    ;*"SWITCH REGISTER" SWITCH DEFINITIONS
1216    100000                          SW15=   100000
1217    040000                          SW14=   40000
1218    020000                          SW13=   20000
1219    010000                          SW12=   10000
1220    004000                          SW11=   4000
1221    002000                          SW10=   2000
1222    001000                          SW09=   1000
1223    000400                          SW08=   400
1224    000200                          SW07=   200
1225    000100                          SW06=   100
1226    000040                          SW05=   40
1227    000020                          SW04=   20
1228    000010                          SW03=   10
1229    000004                          SW02=   4
```

```
                        SW01=   2
                        SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
                        BIT15=  100000
                        BIT14=  40000
                        BIT13=  20000
                        BIT12=  10000
                        BIT11=  4000
                        BIT10=  2000
                        BIT09=  1000
                        BIT08=  400
                        BIT07=  200
                        BIT06=  100
                        BIT05=  40
                        BIT04=  20
                        BIT03=  10
                        BIT02=  4
                        BIT01=  2
                        BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                  TBITVEC=14              ;;"T" BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                  TRAPVEC=34              ;;"TRAP" TRAP
000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR

                        .SBTTL  RK06 CONTROLLER REGISTER DEFINITION
```

```
1286
1287                            ;       $BASE=177440
1288
1289    000000                  RKCS1=  0               ;CONTROL AND STATUS REGISTER 1
1290    000002                  RKWC=   2               ;WORD COUNT REGISTER
1291    000004                  RKBA=   4               ;BUS ADDRESS REGISTER
1292    000006                  RKDA=   6               ;DESIRED TRACK SECTOR REGISTER
1293    000010                  RKCS2=  10              ;CONTROL AND STATUS REGISTER 2
1294    000012                  RKDS=   12              ;DRIVE STATUS REGISTER
1295    000014                  RKER=   14              ;ERROR REGISTER
1296    000016                  RKASOF= 16              ;ATTENTION SUMMARY AND OFFSET REGISTER
1297    000020                  RKDC=   20              ;DESIRED CYL REGISTER
1298    000024                  RKDB=   24              ;DATA BUFFER
1299    000026                  RKMR1=  26              ;MAINTENANCE REGISTER 1
1300    000034                  RKMR2=  34              ;MAINTENANCE REGISTER 2 (MSG LINE A)
1301    000036                  RKMR3=  36              ;MAINTENANCE REGISTER 3 (MSG LINE B)
1302    000030                  RKECPS= 30              ;ECC POSITION INFORMATION
1303    000032                  RKECPT= 32              ;ECC PATTERN INFORMATION
1304
1305                            .SBTTL  CONTROL AND STATUS REGISTER 1 BITS (RKCS1:0)
1306
1307                            ;       DRIVE CMDS
1308
1309    000001                  SELDRV= 1               ;SELECT DRIVE (GET STATUS)
1310    000003                  PACK=   3               ;PACK ACKNOWLEDGE
1311    000005                  CLEAR=  5               ;DRIVE CLEAR
1312    000007                  UNLOAD= 7               ;UNLOAD
1313    000011                  SRTSPL= 11              ;START SPINDLE
1314    000013                  RECAL=  13              ;RECALIBRATE
1315    000015                  OFFSET= 15              ;OFFSET
1316    000017                  SEEK=   17              ;SEEK
1317    000021                  RDDATA= 21              ;READ DATA
1318    000023                  WRDATA= 23              ;WRITE DATA
1319    000025                  RDHEAD= 25              ;READ HEADER
1320    000027                  WRHEAD= 27              ;WRITE HEADER AND DATA
1321    000031                  WRTCHK= 31              ;WRITE CHECK
1322
1323    000001                  GO=     BIT0            ;GO BIT
1324    000100                  IE=     BIT6            ;INTERRUPT ENABLE
1325    000200                  RDY=    BIT7            ;CONTROLLER READY
1326    000400                  BA16=   BIT8            ;BUS ADDRESS BIT 16
1327    001000                  BA17=   BIT9            ;BUS ADDRESS BIT 17
1328    002000                  CDT=    BIT10           ;CONTROLLER DRIVE TYPE (0=RK06, 1=RK07
1329    004000                  CTO=    BIT11           ;CONTROLLER TIMEOUT
1330    010000                  CFMT=   BIT12           ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
1331    020000                  DCPAR=  BIT13           ;SERCON PARITY ERROR DETECTED BY CONTROLLER
1332    040000                  DI=     BIT14           ;DRIVE INTERRUPT
1333    100000                  CERR=   BIT15           ;CONTROLLER ERROR
1334    100000                  CCLR=   BIT15           ;CONTROLLER CLEAR
1335
1336                            .SBTTL  CONTROL AND STATUS REGISTER 2 BITS (RKCS2:10)
1337
1338    000007                  DRVMSK= 7               ;MASK FOR DRIVE SELECTION CODE
1339    000010                  RLS=    BIT3            ;DESELECT OR RELEASE DRIVE IN BITS 0-2
1340    000020                  BAI=    BIT4            ;BUS ADDRESS INCREMENT INHIBIT
1341    000040                  SCLR=   BIT5            ;SUBSYSTEM CLEAR CONTROLLER AND ALL DRIVES
```

```
                        CONTROL AND STATUS REGISTER 2 BITS (RKCS2:10)

000100          IR=     BIT6                    ;INPUT READY
000200          OR=     BIT7                    ;OUTPUT READY
000400          UFE=    BIT8                    ;UNIT FIELD ERROR
001000          MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
002000          PGE=    BIT10                   ;PROGRAMMING ERROR
004000          NEM=    BIT11                   ;NON-EXISTENT MEMORY
010000          NED=    BIT12                   ;NON-EXISTENT DRIVE
020000          UPE=    BIT13                   ;UNIBUS PARITY ERROR
040000          WCE=    BIT14                   ;WRITE CHECK ERROR
100000          DLT=    BIT15                   ;DATA LATE ERROR

                .SBTTL  ERROR REGISTER BIT DEFINITION (RKER:14)

000001          ILF=    BIT0                    ;ILLEGAL FUNCTION CODE
000002          SKI=    BIT1                    ;SEEK INCOMPLETE
000004          NXF=    BIT2                    ;NON-EXECUTABLE FUNCTION
000010          DRPAR=  BIT3                    ;DRIVE DETECTED SERCON PARITY ERROR
000020          FMTE=   BIT4                    ;FORMAT ERROR
000040          DTYE=   BIT5                    ;DRIVE TYPE ERROR
000100          ECH=    BIT6                    ;ECC HARD
000200          BSE=    BIT7                    ;BAD SECTOR ERROR
000400          HVRC=   BIT8                    ;HEADER VRC ERROR
001000          COE=    BIT9                    ;CYL ADDRESS OVERFLOW ERROR
002000          IDAE=   BIT10                   ;INVALID DISK ADDRESS ERROR: HEAD/CYL
004000          WLE=    BIT11                   ;WRITE LOCK ERROR
010000          DTE=    BIT12                   ;DRIVE TIMING ERROR
020000          OPI=    BIT13                   ;OPERATION (SEARCH) INCOMPLETE
040000          UNS=    BIT14                   ;DRIVE UNSAFE
100000          DCK=    BIT15                   ;DATA CHECK

                .SBTTL  STATUS REGISTER BIT DEFINITION (RKDS:12)

000001          DRA=    BIT0                    ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                ;   THIS BIT IS RESET)
000004          OFST=   BIT2                    ;DRIVE OFFSET
000010          ACLO=   BIT3                    ;AC LOW
000020          DCLO=   BIT4                    ;DC LOW
000040          DROT=   BIT5                    ;DRIVE OFF TRACK
000100          VV=     BIT6                    ;VOLUME VALID
000200          DRDY=   BIT7                    ;DRIVE READY
000400          ODT=    BIT8                    ;DRIVE TYPE (0=RK06, 1=RK07)
004000          WRL=    BIT11                   ;WRITE LOCK
020000          PIP=    BIT13                   ;POSITIONING IN PROGRESS
040000          DSC=    BIT14                   ;DRIVE STATUS CHANGE
100000          SVAL=   BIT15                   ;STATUS VALID

                .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION (RKMR1:22)

000017          MESMSK= 17                      ;MSG MASK
000020          PAT=    BIT4                    ;FORCE EVEN PARITY ON SERCON MSG LINES
000040          DMD=    BIT5                    ;DIAGNOSTIC MODE
000100          MSP=    BIT6                    ;MAINTENANCE SECTOR PULSE
000200          MIND=   BIT7                    ;MAINTENANCE INDEX
000400          MCLK=   BIT8                    ;MAINTENANCE CLOCK
001000          MERD=   BIT9                    ;MAINTENANCE ENCODED READ DATA
002000          MEWD=   BIT10                   ;MAINTENANCE ENCODED WRITE DATA
```

```
1398    004000          PCA=    BIT11                   ;PRECOMPENSATION ADVANCE
1399    010000          PCD=    BIT12                   ;PRECOMPENSATION DELAY
1400    020000          ECCW=   BIT13                   ;ECC WORD IS BEING READ OR WRITTEN
1401    040000          WRTGAT= BIT14                   ;WRITE GATE
1402    100000          RDGATE= BIT15                   ;READ GATE
1403
1404                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MSG A (RKMR2:34)
1405
1406    000040          D.DRA=  BIT5                    ;DRIVE AVAILABLE
1407    000100          D.VV=   BIT6                    ;VOLUME VALID
1408    000200          D.DRDY= BIT7                    ;DRIVE READY
1409    000400          D.DDT=  BIT8                    ;DRIVE TYPE (0=Rk06,1 = RK07)
1410    001000          D.FORM= BIT9                    ;DRIVE FORMAT
1411    002000          D.OFF=  BIT10                   ;OFFSET ON
1412    004000          D.WRL=  BIT11                   ;WRITE LOCK
1413    010000          D.SPIN= BIT12                   ;SPINDLE ON
1414    020000          D.PIP=  BIT13                   ;POSITIONING IN PROGRESS
1415    040000          D.DSC=  BIT14                   ;DRIVE STATUS CHANGE
1416
1417                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MSG A (RKMR2:34)
1418
1419    000020          D.SSP=  BIT4                    ;SERVO SIG PRESENT
1420    000040          D.HDHM= BIT5                    ;HEADS HOME
1421    000100          D.BRHM= BIT6                    ;BRUSHES HOME
1422    000200          D.DOOR= BIT7                    ;DOOR INTERLOCKED
1423    000400          D.CART= BIT8                    ;CARTRAGE INTERLOCK
1424    001000          D.SPOK= BIT9                    ;SPEED OK
1425    002000          D.FWD=  BIT10                   ;FORWARD
1426    004000          D.REV=  BIT11                   ;REVERSE
1427    010000          D.LOAD= BIT12                   ;HEADS LOADING
1428    020000          D.RTZ=  BIT13                   ;RETURN TO ZERO
1429    040000          D.UNLD= BIT14                   ;HEADS UNLOADING
1430
1431                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MSG B (RKMR3:36)
 32
1433    000040          D.IDAE= BIT5                    ;INVALID DISK ADDRESS ERROR:HEAD/CYL
1434    000100          D.ACLO= BIT6                    ;AC LOW
1435    000200          D.FLT=  BIT7                    ;DRIVE FAULT
1436    000400          D.ILF=  BIT8                    ;ILLEGAL FUNCTION CODE
1437    001000          D.PAR=  BIT9                    ;DRIVE DETECTED SERCON PARITY ERROR
1438    002000          D.SKI=  BIT10                   ;SEEK INCOMPLETE
1439    004000          D.WLE=  BIT11                   ;WRITE LOCK ERROR
1440    010000          D.SPLS= BIT12                   ;SPEED LOSS
1441    020000          D.DROT= BIT13                   ;DRIVE OFF TRACK
1442    040000          D.UNS=  BIT14                   ;R/W UNSAFE
1443
1444                    .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MSG B (RKMR3:36)
1445
1446    000020          D.SECT= BIT4                    ;SECTOR ERROR
1447    000040          D.WCUR= BIT5                    ;WRITE CURRENT AND NO WRITE GATE
1448    000100          D.WGAT= BIT6                    ;WRITE GATE AND NO TRANSISTIONS
1449    000200          D.HDFL= BIT7                    ;HEAD FAULT
1450    000400          D.MHD=  BIT8                    ;MULTIPLE HEAD SELECT
1451    001000          D.XERROR=       BIT9                    ;INDEX ERROR
1452    002000          D.TIB=  BIT10                   ;TRIBIT ERROR
1453    004000          D.PLO=  BIT11                   ;PLO ERROR
```

```
                        DEFINITION OF DRIVE STATUS BYTE 01 MSG B (RKMR3:36)

1454    010000          D.NMOV= BIT12                   ;SEEK AND NO MOTION
1455    020000          D.LIMD= BIT13                   ;LIMIT DETECT ON SEEK
1456    040000          D.SUNS= BIT14                   ;SERVO UNSAFE
1457
1458                    .SBTTL  COMMON MASKS AND OTHER BITS: MSG A (RKMR2:34)
1459
1460    000007          M.DRV=  7                       ;DRIVE CODE, ALL BYTES
1461    077770          M.SER=  77770                   ;DRIVE SERIAL #, BYTE 11
1462
1463                    .SBTTL  COMMON MASKS AND OTHER BITS: MSG B (RKMR3:36)
1464
1465    000003          M.ID=   3                       ;BYTE ID, ALL BYTES
1466    040000          M.ALGN= BIT14                   ;ALIGN SIGN, BYTE 10
1467    000760          M.SECT= 760                     ;SECTOR COUNT, BYTE 11
1468    007000          M.HEAD= 7000                    ;HEAD DECODE, BYTE 11
1469    100000          M.PAR=  BIT15                   ;PARITY, MESS A/B, ALL BYTES
```

```
1470
1471
1472
1473            000000                  .SBTTL  TRAP CATCHER
1474                                            .=0
1475                                    ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
1476                                    ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
1477            000174                  ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
1478  000174   000000                          .=174
1479  000176   000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
1480                                    SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
1481  000200   000137  007120                  .SBTTL  STARTING ADDRESS(ES)
1482            000204                          JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
1483  000204   000137  007014                  .=204
1484            000220                          JMP     BYT16           ;BYPASS N-SQUARE TEST IN DEFAULT MODE
1485  000220   000137  006774                  .=220
1486            000230                          JMP     PARSRT          ;INPUT ALL PARAMETERS & START TESTING
1487  000230   000137  007034                  .=230
1488            000240                          JMP     BYT16A  ;BYPASS N-SQUARE TEST IN PARAM MODE
1489  000240   000137  067744                  .=240
1490            000260                          JMP     0.ODT           ;ENTER ODT11
1491  000260   000137  007056                  .=260
1492            000270                          JMP     MDTST           ;MODULE TESTS DEFAULT MODE ONLY
1493  000270   000137  007076                                          ;BYPASS SEVERAL TESTS
1494                                            .=270
1495                                            JMP     MDTSTA          ;SAME AS 260 & BYPASS N-SQUARE TEST ALSO
1496
1497                                    .SBTTL  ACT11 HOOKS
1498
1499            000274                  ;;**************************************************************
1500            000046                  ;HOOKS REQUIRED BY ACT11
1501  000046   043010                          $SVPC=.                 ;SAVE PC
1502            000052                          .=46
1503  000052   100000                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
1504            000274                          .=52
1505            001000                          .WORD   100000          ;;2)SET LOC.52 TO 100000
1506                                            .=$SVPC                 ;; RESTORE PC
1507                                            .=1000
1508                                    .SBTTL  APT PARAMETER BLOCK
1509
1510                                    ;;**************************************************************
1511            001000                  ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
1512            000024                  ;;**************************************************************
1513  000024   000200                          .$X=.   ;;SAVE CURRENT LOCATION
1514            000044                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
1515  000044   001000                          200     ;;FOR APT START UP
1516            001000                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
1517                                            $APTHDR ;;POINT TO APT HEADER BLOCK
1518                                            .=.$X   ;;RESET LOCATION COUNTER
1519                                    ;;**************************************************************
1520                                    ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
1521  001000                            ;INTERFACE SPEC.
1522  001000   000000                  $APTHD:
1523  001002   001210                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
1524  001004   000430                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
1525  001006   001130                  $TSTM:  .WORD   280.    ;;RUN TIM OF LONGEST TEST
                                        $PASTM: .WORD   600.    ;;RUN. TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
```

```
1526   001010  001130                  $UNITM: .WORD   600.     ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
1527   001012  000042                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
1528
1529
1530                                           .LIST   MD
1531                                   ;
1532                                   ;USE LOOP X TO OMIT JSR PC, SUBCLR
1533                                   ;
1534
1535                                   .MACRO  LOOP    A
1536                                           SCOP1
1537                                           MOV     #STACK,SP       ;RESTORE STK PTR
1538
1539                                   .IF     B       A
1540                                           JSR     PC,SUBCLR
1541                                           ERROR   24              ;CERR AFTER SCLR
1542
1543                                   .ENDC
1544                                   .ENDM   LOOP
1545
1546                                   ;
1547                                   ; THIS MACRO FILLS EXPECTED MSG A0,B0,A1,B1,A2,B2 & B3 WITH STANDARD BITS SET
1548                                   ; A=D.DSC AFTER ATTN OR 0 AFTER DRIVE CLEAR OR ANY IMPLIED SEEKS
1549                                   ; NOTE: A CAN BE ANY BIT COMBINATION DESIRED
1550
1551                                   .MACRO  F.EAB   A
1552
1553                                           MOV     #<A!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
1554                                           CLR     E.B0            ;EXPECTED MSG B0
1555                                           MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
1556                                           MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
1557                                           CLR     E.A2            ;EXPECTED MSG A2
1558                                           MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
1559                                           MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
1560                                   .ENDM   F.EAB
1561                                   ;
1562                                   ; THIS MACRO ASSUMES DRIVE MSG A0,B0,A1,B1 WILL ALWAYS BE TESTED
1563                                   ; USE   A,C,D,E FOR MSG A0,B0,A1,B1 ERROR NUMBERS RESP.
1564                                   ; USE   G=T.A2  TO READ MSG A2 & PUT INFO INTO 'CYLDIF'
1565                                   ;       H=T.B2  TO READ MSG B2 & PUT INFOR INTO 'CYLADD'
1566                                   ;       I=T.B3  TO READ MSG B3 & PUT INFO INTO 'SECTOR' & 'HEADA'
1567                                   ;
1568                                   ;       F=      < ERROR DESCRIPTION>
1569                                   ;
1570                                   .MACRO  CHECK   A,C,D,E,F,G,H,I
1571
1572                                           JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
1573                                           .WORD   G!H!I           ;& MSGS SPECIFIED HERE
1574                                           ERROR   A               ;MSG A0 ERROR F
1575                                           ERROR   C               ;MSG B0 ERROR
1576                                           ERROR   D               ;MSG A1 ERROR
1577                                           ERROR   E               ;MSG B1 ERROR
1578                                   .ENDM   CHECK
1579                                   ;
1580                                   ; A=CYL DIFF/OFFSET ERROR #
1581                                   ; B=CYL ADDR ERROR #
```

```
1582                            ; C= <ERROR DESCRIPTION>
1583                            ;
1584                            .MACRO  CWD2    A,B,C,?D,?E
1585
1586                                    MOV     #2,RKMR1(R5)    ;SELECT WORD 2
1587                                    JSR     PC,GSTAT
1588                                    TST     CYLDIF          ;SEE IF MSG A2=0
1589                                    BEQ     D               ;BR IF YES
1590                                    ERROR   A               ;MSG A2 NOT CLEARED C
1591                            D:      TST     CYLADD          ;SEE IF MSG B2=0
1592                                    BEQ     E               ;BR IF YES
1593                                    ERROR   B               ;MSG B2 NOT CLEARED C
1594                            E:
1595                            .ENDM   CWD2
1596
1597
1598                            .MACRO  LPCHK   ?A
1599                                    CLR     $ESCAPE
1600                                    TST     LPFLG
1601                                    BEQ     A
1602                                    JMP     @$LPERR         ;SW 9 WAS SET.
1603                            A:      JMP     @$LPADR         ;SW 14 OR 8 WAS SET
1604                            .ENDM   LPCHK
1605
1606                            .MACRO  SW814
1607                                    JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
1608                                    SKIP R,<GO TO NEXT TEST>        ;RETURN HERE IF NEITHER IS SET
1609                                                            ;RETURN HERE IF SW 14 IS SET OR
1610                                                            ;SW 8 WITH SWR <7:0> APPLY
1611                            .ENDM   SW814
1612
1613
1614                            ;SWR9 (LOOP ON ERROR) TEST      A=BRANCH POINT TO RECONDITION DRIVE
1615                            ;                               B=JMP POINT TO RE-ENTER MAIN LINE
1616                            .MACRO  TSTSW9  A,B
1617                                    INC     LPFLG
1618                                    BIT     #SW9,@SWR       ;LOOP ON ERROR?
1619                                    BNE     A               ;YES, RECONDITION DRIVE
1620                                    JMP     B               ;RETURN TO MAINLINE
1621                            .ENDM   TSTSW9
1622
1623
1624
1625                            ; USE DRCLR     X    TO OMIT CHECKING MSG A0,B0,A1 & B1
1626                            ;
1627                            .MACRO  DRCLR   A,?C
1628
1629                                    MOV     #CCLR,RKCS1(R5)
1630                                    MOV     $UNIT,RKCS2(R5) ;DRIVE#
1631                                    MOV     #CLEAR,HCS1
1632                                    JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
1633                                    ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
1634                                    JSR     PC,TSTATN       ;TEST FOR ATTN
1635                                    BR      C
1636                                    ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
1637                            C:
```

```
1638                                    .IF B   A
1639                                            F.EAB   0
1640                                            CHECK   273,265,274,266,<AFTER DRIVE CLEAR CMD>,T.A2,T.B2,0
1641                                    .ENDC
1642
1643                                    .ENDM   DRCLR
1644
1645
1646                                    ;
1647                                    ;A=BLANK TO CHECK A0 THRU B2
1648                                    ;A=NON BLANK TO OMIT CHECKING A0 THRU B2
1649                                    ;D=BLANK TO CHECK A0 THRU B2 IN DRCLR
1650                                    ;D=NON-BLANK TO OMIT CHECKING A0 THRU B2 IN DRCLR
1651                                    ;THE FOLLOWING MACRO DEFINITION IS CHANDGED ON 24-OCT-77
1652                                    ;       1. ADD NEW LABEL ?F
1653                                    ;       2. DEL THE MACRO CALL CWD2
1654                                    ;       3. ADD 5 LINES LONG HAND CODING FOR SUBSTITUTING ITEM 2
1655                                    ;       4.  SELECT MESSAGE 2
1656                                    ;
1657                                    .MACRO  CALIB   A,D,?C,?F
1658
1659                                            MOV     #CCLR,RKCS1(R5)
1660                                            MOV     $UNIT,RKCS2(R5)
1661                                            MOV     #RECAL,HCS1
1662                                            JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
1663                                            ERROR   124             ;RDY NOT SET AFTER RECAL CMD
1664
1665                                            MOV     #1,RKMR1(R5)    ;SELECT WORD 1
1666                                            JSR     PC,GSTAT
1667                                            BI      #D.RTZ,HMR2
1668                                            BNE     C
1669                                            ERROR   244             ;RTZ NOT SET DURING RECAL CMD
1670                                    C:      MOV     T10,TEMP2       ;SETUP TIMEOUT
1671                                            JSR     PC,FATT1        ;FIND ATTN
1672                                            ERROR   55              ;NO ATTN AFTER RECAL CMD
1673                                    .IF B   A
1674                                            F.EAB   D.DSC
1675                                            CHECK   221,275,222,276,<AFTER RECAL CMD>,T.A2,T.B2,T.B3
1676                                    ;       CWD2    47,50,<AFTER RECAL CMD>
1677                                            MOV     #2,RKMR1(R5)    ;SELECT THE MESSAGE
1678                                            JSR     PC,GSTAT        ;GET THE STATUS
1679                                            TST     CYLADD          ;RECAL SUCCESSFUL ?
1680                                            BEQ     F               ;BRANCH IF SO
1681                                            ERROR   50              ;REPORT THE ERROR
1682                                    F:
1683                                    .ENDC
1684                                            DRCLR   D
1685
1686                                    .ENDM   CALIB
1687
1688                                    ;
1689                                    ;IDAE IS CLEARED ONLY BY RECAL & DRIVE CLEAR
1690                                    ;
1691                                    .MACRO  CIDAE   ?A
1692
1693                                            MOV     #CCLR,RkCS1(R5)
```

```
1694                                    MOV     $UNIT,RKCS2(R5)
1695                                    MOV     #RECAL,HCS1
1696                                    JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
1697                                    ERROR   124             ;RDY NOT FOUND AFTER RECAL CMD
1698                                    DRCLR   X
1699
1700                                    JSR     PC,GSTAT
1701                                    BIT     #D.IDAE,HMR3    ;SEE IF IDAE IS CLEARED
1702                                    BEQ     A               ;BR IF YES
1703                                    ERROR   155             ;IDAE NOT CLEARED AFTER RECAL CMD
1704
1705                            A:      MOV     #CCLR,RKCS1(R5)
1706                                    MOV     T1,TEMP2        ;LOOK FOR ATTN FROM RECAL
1707                                    JSR     PC,FATT1
1708                                    ERROR   55              ;NO ATTN AFTER RECAL CMD
1709
1710                            .ENDM   CIDAE
1711
1712                            ;
1713                            ; A=D.FWD/D.REV
1714                            ;
1715                            .MACRO  SKRDY A
1716
1717                                    MOV     #SEEK,HCS1
1718                                    JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
1719                                    ERROR   131             ;NO RDY AFTER SEEK CMD
1720                                    MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
1721                                    CLR     E.B0
1722                                    MOV     #<A!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
1723                                    MOV     #1,E.B1
1724                                    CHECK   203,204,205,206,<DURING SEEK CMD>,T.A2,T.B2,0
1725
1726                            .ENDM   SKRDY
1727
1728                            .MACRO  SKATN ?A,?B
1729
1730                                    JSR     PC,FATT2        ;FIND ATTN
1731                                    ERROR   132             ;NO ATTN AFTER SEEK CMD
1732                                    BIT     #CERR,HCS1
1733                                    BEQ     A
1734                                    ERROR   210             ;CERR AFTER SEEK CMD
1735                            A:      F.EAB   D.DSC
1736                                    CHECK   133,134,135,136,<AFTER SEEK CMD>,T.A2,T.B2,0
1737                                    TST     CYLDIF
1738                                    BEQ     B
1739                                    ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
1740
1741                            B:      DRCLR
1742                            .ENDM   SKATN
1743
1744                            ;
1745                            ;QUICK START SPINDLE.
1746                            ;
1747                            .MACRO  QKSRT   A
1748
1749                                    JSR     PC,SUBCLR
```

```
1750                                    ERROR   24              ;CERR AFTER SCLR
1751
1752                                    MOV     #SRTSPL,HCS1
1753                                    JSR     PC,DOCMD        ;DO START SPINDLE CMD & GET CONTR RDY
1754                                    ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.
1755
1756                                    MOV     T50G,TEMP2      ;SETUP  TIMEOUT
1757                                    JSR     PC,FATT1        ;FIND ATTN
1758                                    ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
1759
1760                                    CLR     UNLD
1761                            .IF B   A
1762                                    TSTSW9  10$,2$
1763                            .ENDC
1764                            .ENDM   QKSRT
1765
1766                            ;
1767                            ;QUICK SEEK.    ENTER WITH CYL # IN RKDC
1768                            ;
1769                            .MACRO  QKSEEK  ?A
1770
1771                                    MOV     #SEEK,HCS1
1772                                    JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
1773                                    ERROR   131             ;NO RDY AFTER SEEK CMD.
1774
1775                                    MOV     T50000,TEMP1
1776                                    JSR     PC,FATT2        ;FIND ATTN
1777                                    ERROR   132             ;NO ATTN AFTER SEEK CMD
1778                                    BIT     #CERR,HCS1
1779                                    BEQ     A
1780                                    ERROR   210             ;CERR AFTER SEEK CMD.
1781
1782                            A:      JSR     PC,SUBCLR
1783                                    ERROR   24              ;CERR AFTER SCLR
1784
1785                            .ENDM   QKSEEK
1786
1787                            ;
1788                            ;QUICK REPETITIVE SEEKS
1789                            ;       A=INC/DEC    CYL#
1790                            ;       B=FINAL VALUE OF CYL# BEFORE EXITING
1791
1792                            .MACRO  QKRPSK  A,B,?C,?D
1793
1794                                    JSR     PC,SUBCLR
1795                                    ERROR   24              ;CERR AFTER SCRL
1796
1797                            C:      MOV     TOCYL,RKDC(R5)  ;CYL#
1798                                    QKSEEK
1799                                    CMP     TOCYL,B ;LAST CYL DONE?
1800                                    BEQ     D               ;BR IF YES
1801                                    A       TOCYL           ;ELSE DO ANOTHER
1802                                    BR      C
1803
1804                            D:      JSR     PC,SUBCLR
1805                                    ERROR   24              ;CERR AFTER SCLR
```

```
1806
1807                                    LPCHK
1808
1809                            .ENDM   QKRPSK
1810
1811                            ;
1812                            ;QUICK UNLOAD
1813                            ;D=BLANK TO DO SUBCLR & LPCHK
1814                            ;D=NON-BLANK TO BYPASS
1815                            ;
1816                            .MACRO  QKUNLD  D
1817
1818                                    JSR     PC,SUBCLR
1819                                    ERROR   24              ;CERR AFTER SCLR
1820
1821                                    MOV     #UNLOAD,HCS1
1822                                    JSR     PC,DOCMD        ;DO UNLOAD CMD & GET CONTR READY
1823                                    ERROR   11              ;RDY NOT SET AFTER UNLOAD CMD.
1824                                    JSR     PC,TSTATN
1825                                    ERROR   12              ;NO ATTN AFTER UNLOAD CMD
1826
1827                                    JSR     PC,SUBCLR
1828                                    ERROR   24              ;CERR AFTER SCLR
1829
1830                                    MOV     T10,TEMP2
1831                                    JSR     PC,FSPOK
1832                                    ERROR   315             ;SPEED NOT DOWN BY TIMEOUT
1833                            .IF     B       D
1834
1835                                    JSR     PC,SUBCLR
1836                                    ERROR   24              ;CERR AFTER SCLR
1837
1838                                    LPCHK
1839                            .ENDC
1840
1841
1842
1843                            .ENDM   QKUNLD
1844
1845                            ;
1846                            ; A=WRHEAD/<CFMT!WRHEAD>
1847                            ; USE WRHDR     <A>,X   TO OMIT CHECKING A0,B0,A1,B1
1848                            ;
1849                            .MACRO  WRHDR   A,C,?D
1850
1851                                    MOV     #<A>,HCS1
1852                                    JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
1853                                    ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
1854                                    JSR     PC,GSTAT        ;GET FRESH STATUS
1855                                    BIT     #CERR,HCS1
1856                                    BEQ     D
1857                                    ERROR   201             ;CERR AFTER WRITE HEADER CMD
1858                                    TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
1859                                    JMP     $EOP            ;ABORT DRIVE
1860                            D:
1861                            .IF B   C
```

```
1862                                    F.EAB   0
1863                                    CHECK   277,267,300,270,<AFTER WRITE HEADER CMD>,T.A2,T.B2,0
1864                            .ENDC
1865
1866                            .ENDM   WRHDR
1867
1868                            ;
1869                            ; A=RDHEAD/<CFMT!RDHEAD>
1870                            ; USE RDHDR <A>,X TO OMIT CHECKING A0,B0,A1,B1
1871                            ;
1872                            .MACRO  RDHDR   A,C,?D,?E
1873
1874                                    MOV     #RHTAB,R0
1875                                    MOV     #<A>,HCS1
1876                                    JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
1877                                    ERROR   171             ;NO RDY AFTER READ HEADER CMD
1878                                    BIT     #CERR,HCS1
1879                                    BEQ     D
1880                                    ERROR   174             ;CERR AFTER READ HEADER CMD
1881                                    TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
1882                                    JMP     $EOP            ;ABORT DRIVE
1883
1884                            D:      MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
1885                                    MOV     RKDB(R5),(R0)+  ;2'ND WORD
1886                                    MOV     RKDB(R5),(R0)+  ;3'RD WORD
1887
1888
1889                                    BIT     #DLT,RKCS2(R5)
1890                                    BEQ     E
1891                                    JSR     PC,GSTAT
1892                                    ERROR   173             ;DLT AFTER READ HEADER CMD
1893                                    TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
1894                                    JMP     $EOP            ;ABORT DRIVE
1895                            E:
1896                            .IF     B       C
1897                                    F.EAB   0
1898                                    CHECK   301,271,302,272,<AFTER READ HEADER CMD>,T.A2,T.B2,0
1899                            .ENDC
1900
1901                            .ENDM   RDHDR
1902
1903                            ;
1904                            ;A=TOCYL/FRCYL
1905                            ;B=310 FOR TOCYL/311 FOR FRCYL
1906                            ;
1907
1908                            .MACRO  HDCHK3  A,B,?C
1909
1910                                    RDHDR   RDHEAD,X
1911                                    CMP     RHTAB,A ;CHECK WORD 0 (CYL#) ONLY
1912                                    BEQ     C               ;BR IF SAME
1913                                    ERROR   B               ;READ CYL WORD HEADER ERROR
1914                            C:
1915
1916                            .ENDM   HDCHK3
1917
```

```
1918                            .MACRO  RALLHD  ?A,?B,?C,?D,?E
1919
1920                                    MOV     #RHTAB,R0
1921
1922                            A:      MOV     #RDHEAD,HCS1
1923                                    JSR     PC,DATCMD       ;DO READ HEADER CMD & GET CONTR RDY
1924                                    ERROR   171             ;NO RDY AFTER READ HEADER CMD
1925                                    BIT     #CERR,HCS1
1926                                    BEQ     B
1927                                    ERROR   174             ;CERR AFTER READ HEADER  CMD
1928                                    TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
1929                                    JMP     $EOP            ;ABORT DRIVE
1930
1931                            B:      MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
1932                                    MOV     RKDB(R5),(R0)+  ;2'ND WORD
1933                                    MOV     RKDB(R5),(R0)+  ;3'RD WORD
1934
1935                                    BIT     #DLT,RKCS2(R5)  ;SEE IF DATA LATE
1936                                    BEQ     C
1937                                    JSR     PC,GSTAT
1938                                    ERROR   173             ;DATA LATE ON READ HEADER
1939                                    TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
1940                                    JMP     $EOP            ;ABORT DRIVE
1941
1942                            C:      CMP     R0,#RHTAB+132.  ;ALL 66 WORDS DONE?
1943                                    BNE     A               ;BR IF NO
1944
1945                                    JSR     PC,SORT         ;SORT RHTAB INTO SRTTAB SO THAT IT
1946                                                            ;BEGINS WITH SECTOR 0
1947                                    CLR     WDCNT           ;WORD COUNT
1948                                    MOV     #SRTTAB,R0      ;ACTUAL HEADER TABLE
1949                                    MOV     #HDTAB,R1       ;CALC HEADER TABLE
1950
1951                            D:      MOV     (R0)+,HDWD
1952                                    MOV     (R1)+,TEMP1
1953                                    CMP     HDWD,TEMP1      ;COMPARE ACTUAL WITH CALCULATED WORD
1954                                    BEQ     E               ;BR IF COMPARE
1955                                    ERROR   202             ;READ HEADER MISMATCH
1956
1957                            E:      INC     WDCNT
1958                                    CMP     WDCNT,#66.      ;ALL WORDS DONE?
1959                                    BNE     D               ;BR IF NO
1960
1961                            .ENDM   RALLHD
1962
1963
1964
1965                            ;
1966                            ; A=TOCYL/FRCYL , B=HEAD#, C = 0 FOR 22 SECTOR, 1 FOR 20 SECTOR
1967                            ;
1968                            .MACRO  HDTBL   A,B,C
1969
1970                                    MOV     A,CALADD        ;SETUP
1971                                    MOV     #B,HEAD         ;TO FILL
1972                                    MOV     #C,FORMAT       ;HEADER
1973                                    JSR     PC,FHDTAB       ;TABLE
```

```
1974
1975                            .ENDM   HDTBL
1976                            ;
1977                            ;USE FSECA FS022,RDSEC,22 FOR 22 SECTOR FORMAT
1978                            ;USE FSECA FS020,R20SEC,20 FOR 20 SECTOR FORMAT.
1979                            ;
1980                            .MACRO  FSECA   A,B,C
1981
1982                            ;
1983                            ;FIND SECTOR 0 IN C SECTOR FORMAT.
1984                            ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
1985                            ;
1986                            A:      MOV     TEMP1,-(SP)     ;SAVE TEMP1
1987                                    MOV     T5000,TEMP1     ;SETUP TIMEOUT
1988                            1$:     JSR     PC,B            ;READ SECTOR
1989                                    TST     SECTOR          ;LOOK FOR SECTOR 0
1990                                    BNE     2$
1991                                    JSR     PC,B
1992                                    TST     SECTOR
1993                                    BEQ     3$              ;BR IF SAME TWICE
1994                            2$:     DEC     TEMP1
1995                                    BNE     1$              ;TRY AGAIN IF TIMEOUT NOT UP
1996                                    MOV     (SP)+,TEMP1     ;ELSE RESTORE TEMP1
1997                                    RTS     PC              ;EXIT
1998                            3$:     MOV     (SP)+,TEMP1
1999                                    ADD     #2,(SP)         ;SKIP OVER ERROR
2000                                    RTS     PC
2001                            .ENDM
2002                            ;
2003                            ;USE FSECB FNS22,RDSEC,22 FOR 22 SECTOR FORMAT
2004                            ;USE FSECB FNS20,R20SEC,20 FOR 20 SECTOR FORMAT
2005                            ;
2006                            .MACRO  FSECB   A,B,C
2007
2008                            ;
2009                            ;FIND NEXT SECTOR IN C SECTOR FORMAT
2010                            ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
2011                            ;
```

```
2012                            A:      MOV     TEMP1,-(SP)     ;SAVE TEMP 1
2013                                    MOV     T500,TEMP1      ;SETUP TIMEOUT
2014                            1$:     JSR     PC,B            ;READ SECTOR
2015                                    CMP     PSEC,SECTOR
2016                                    BEQ     3$              ;BR IF SAME
2017                                    JSR     PC,B            ;ELSE TRY READ DIFFERENT TWICE
2018                                    CMP     PSEC,SECTOR
2019                                    BNE     2$              ;BR IF DIFFERENT TWICE
2020                            3$:     DEC     TEMP1           ;ELSE TRY AGAIN IF TIME LEFT
2021                                    BNE     1$
2022                                    MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
2023                                    RTS     PC
2024                            2$:     MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
2025                                    ADD     #2,(SP)         ;SKIP OVER ERROR
2026                                    RTS     PC
2027                            .ENDM
2028
2029                            ;
2030                            ;USE SECTST FS022,FNS22,RDSEC FOR 22 SECTOR FORMAT
2031                            ;USE SECTST FS020,FNS20,R20SEC FOR 20 SECTOR FORMAT
2032                            ;
2033                            ;THE FOLLOWING MACRO DEFINTION IS CHANGED ON 24-OCT-77
2034                            ; 1. DETET 8 LINES FROM THE CODING
2035                            .MACRO  SECTST  D,E,F?A,?B,?C
2036
2037                                    JSR     PC,D            ;FIND SECTOR 0
2038                                    ERROR   142             ;SECTOR 0 NOT FOUND BY TIMEOUT
2039
2040                                    CLR PSEC                ;PREVIOUS SECTOR
2041                            A:      JSR     PC,E            ;FIND NEXT SECTOR
2042                                    ERROR   143             ;DIFFERENT SECTOR  NOT FOUND BY TIMEOUT
2043                                    MOV     PSEC,ESEC
2044                                    ADD     #1,ESEC         ;SETUP EXPECTED SECTOR
2045                                    MOV     SECTOR,PSEC     ;UPDATE PREV SECTOR
2046                            ;       JSR     PC,F            ;READ SECTOR
2047                            ;       CMP     SECTOR,PSEC
2048                            ;       BEQ     B               ;BR IF READ SAME TWICE
2049                            ;       JSR     PC,F
2050                            ;       CMP     SECTOR,PSEC
2051                            ;       BEQ     B               ;TRY 1 MORE TIME
2052                            ;       ERROR   144             ;MSG B3 ERROR, SECTOR REG UNSTABLE
2053                            ;                               ;MAY BE DURING SECTOR PULSE TIME
2054                            B:      CMP     SECTOR,ESEC
2055                                    BEQ     C
2056                                    ERROR   145             ;MSG B3 ERROR BETWEEN SECTOR COUNTS
2057                            C:      DEC     SECNT
2058                                    BNE     A               ;BR IF SECTOR COUNT NOT DONE
2059
2060                            .ENDM   SECTST
2061
2062
2063                            ;
2064                            ;DETECT OUTER LIMIT: FCP1,FC,D.REV,OUTER
2065                            ;DETECT INNER LIMIT: LCM1,LC,D.FWD,INNER
2066                            ;
2067                            ;THE FOLLOWING MACRO DEFINIT.ON IS CHANGED ON 24-OCT-77
```

```
2068                            ;1. ADD NEW LOCAL LABEL ?F
2069                            ;2. DELET CHECK MACRO CALL ON LIMIT DETECT
2070                            ;3. DEL CDW2 MCARO CALL
2071                            .MACRO  LIMIT A,B,C,D,?F
2072
2073                                    JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
2074                                    ERROR   24              ;CERR AFTER SCLR
2075
2076                                    CLR     LPFLG
2077                                    INC     BYPCERR         ;BYPASS CHECKING FOR ANY CERR IN GSTAT1
2078                                    INC     UNLD            ;USED FOR VALID HALT
2079
2080                                    MOV     #PAT,RKMR1(R5)  ;PARITY & WORD 0
2081                                    MOV     A,RKDC(R5)
2082                                    MOV     #SEEK,HCS1
2083                                    JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
2084                                    ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
2085                                    JSR     PC,TSTATN       ;TEST FOR ATTN
2086                                    ERROR   125             ;NO ATTN FROM SEEK WITH BAD PARITY
2087                                    MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
2088                                    MOV     #<D.FLT!D.PAR>,E.B0
2089                                    MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
2090                                    MOV     #1,E.B1
2091                                    CHECK   110,111,146,147,<AFTER SEEK WITH BAD PARITY>,0,0,0
2092                                    DRCLR
2093
2094                                    MOV     B,RKDC(R5)
2095                                    MOV     #SEEK,HCS1
2096                                    JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
2097                                    ERROR   131             ;NO RDY AFTER SEEK CMD
2098                                    MOV     #CCLR,RKCS1(R5)
2099                                    JSR     PC,GSTAT
2100                                    JSR     PC,FLIM         ;FIND LIMIT DETECT
2101                                    ERROR   160             ;LIMIT DETECT NOT FOUND BEFORE TIMEOUT
2102
2103                                    BIT     #D.UNLD,HMR2
2104                                    BNE     1$
2105                                    ERROR   305             ;DRIVE NOT UNLOADING AFTER LIMIT DETECT
2106                                    JMP     30$             ;BYPASS REST OF TEST
2107
2108                            1$:     MOV     #20$,$ESCAPE    ;MUST ESCAPE TO CYCLE UP DRIVE & TEST SWR
2109                                    MOV     #<D.DSC!D.PIP!D.SPIN!D.VV!D.DRA>,E.A0   ;EXPECTED A0
2110                                    MOV     #<D.SKI!D.FLT>,E.B0
2111                                    MOV     #<D.UNLD!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
2112                                    MOV     #<D.LIMD!D.NMOV!1>,E.B1
2113                            ;       CHECK   161,162,163,164,<AFTER D LIMIT DETECT>,0,0,0
2114                                    JSR     PC,CHKMSG       ;CHECK MESSAGE A0,B0,A1,B1
2115                                    .WORD   0!0!0
2116                                    ERROR   161             ;MAY BE A0 ERROR
2117                                    ERROR   162             ;MAY BE B0 ERROR
2118                                    ERROR   163             ;MAY BE B1 ERROR
2119                                    NOP                     ;NEED FOR THE CALLIN SEQ
2120                                    BIT     #D.LIMD,H.B1    ;SEE IF LIMIT DETECT BIT SET IN B1
2121                                    BNE     3$              ;BRANCH IF SO
2122                                    TYPE    ,EM42           ;OTHERWISE REPORT ERROR
2123                                    ERROR   164
```

```
2124
2125                            3$:     JSR     PC,TSTATN
2126                                    ERROR   165             ;NO ATTN AFTER D LIMIT DETECT
2127                                    CLR     BYPCERR         ;ALLOW CHECKING CERR IN GSTAT1
2128
2129                                    JSR     PC,SUBCLR       ;SUBSYS CLR
2130                                    ERROR   24              ;CERR AFTER SCLR
2131                                    MOV     T10,TEMP2       ;SET UP TIMEOUT
2132                                    JSR     PC,FHDHM        ;FIND HEAD HOME
2133                                    ERROR   166             ;HEAD HOME NOT FOUND BEFORE TIMEOUT
2134                                    JSR     PC,FLOAD        ;FIND LOAD HEADS
2135                                    ERROR   167             ;LOAD HEADS NOT FOUND BEFORE TIMEOUT
2136                                    MOV     T100,TEMP2      ;SETUP TIMEOUT
2137                                    JSR     PC,FATT1        ;FIND ATTN
2138                                    ERROR   67              ;ATTN NOT FOUND BEFORE TIMEOUT
2139                            2$:     CLR     $ESCAPE
2140                                    CLR     UNLD            ;CLEAR FLAG
2141                                    F.EAB   D.DSC
2142                                    CHECK   63,64,65,66,<AT END OF HEAD LOADING>,T.A2,T.B2,0
2143                            ;       CWD2    175,176,<AT END OF HEAD LOADING>
2144                                    MOV     #2,RKMR1(R5)    ;SELECT MESSAGE
2145                                    JSR     PC,GSTAT        ;GET STATUS AND MR2,MR3
2146                                    TST     CYLADD          ;RECAL SUCCFUL ?
2147                                    BEQ     F               ;BRANCH IF SO
2148                                    ERROR   50              ;REPORT ERROR
2149                            F:      DRCLR
2150                                    SW814
2151
2152
2153                            .ENDM   LIMIT
2154
2155
2156                            ;
2157                            ; A=CYL#, B=HEAD#
2158                            ;
2159                            .MACRO  HEADER  A,B
2160
2161                                    NEWTST <<WRITE & READ HEADERS CYL A, HEAD B>>,1
2162                                    MOV     #STACK,SP       ;RESTORE STK PTR
2163
2164                                    JSR     PC,SUBCLR
2165                                    ERROR   24              ;CERR AFTER SCLR
2166
2167                                    INC     BYPFMT          ;SET BIT 14 & 15  IN HEADER
2168
2169                                    MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
2170                                    MOV     #-66.,RKWC(R5)  ;WORD COUNT.
2171                                    MOV     #A,TOCYL
2172                                    HDTBL   TOCYL,0,0
2173                                    MOV     #A,RKDC(R5)     ;CYL#
2174                                    WRHDR   WRHEAD
2175                                    CLR     SECNT           ;SECTOR COUNT
2176                                    LOOP
2177                                    MOV     #A,RKDC(R5)     ;CYL #
2178                                    RALLHD
2179
```

```
2180                            CLR BYPFMT              ;ALLOW CORRECT FORMATTING
2181
2182                            .ENDM HEADER
2183
2184
2185
2186                            ;
2187                            ;SEEK TO MAJOR CYL: FC,FCP1,TEMP3,TEMP4,D.FWD,D.REV,ASL,MC,DEC,FC
2188                            ;SEEK 0 TO ALL CYL: FC,FCP1,TEMP3,TEMP4,D.FWD,D.REV,INC,LC,DEC,FC
2189                            ;SEEK 410 TO ALL CYL: LC,LCM1,TEMP4,TEMP3,D.REV,D.FWD,DEC,FC,INC,LC
2190                            ;
2191                            .MACRO  SKOSC   A,B,C,D,E,F,G,H,I,J
2192
2193                                    MOV     A,FRCYL ;SETUP FROM CYL
2194                                    MOV     B,TOCYL ;SETUP TO CYL
2195
2196                            1$:     LOOP
2197                                    MOV     #10$,$ESCAPE
2198                                    MOV     FRCYL,TEMP3     ;SETUP
2199                                    MOV     TOCYL,TEMP4     ;CYL DIFF
2200                                    SUB     C,D     ;FOR
2201                                    MOV     D,CALDIF        ;ERROR PRINTOUT
2202
2203                                    MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
2204                                    SKRDY   E
2205                            2$:     MOV     #12$,$ESCAPE
2206                                    MOV     T50000,TEMP1    ;SETUP  TIMEOUT
2207                                    SKATN
2208                                    CMP     CYLADD,TOCYL
2209                                    BEQ     3$
2210                                    ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
2211
2212                            3$:     LOOP
2213                                    CLR     $ESCAPE
2214                                    MOV     TOCYL,RKDC(R5)  ;CYL #
2215                                    HDCHK3  TOCYL,310
2216
2217                                    LOOP
2218                                    MOV     #14$,$ESCAPE
2219                                    MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
2220                                    MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
2221                                    SKRDY   F
2222
2223                            4$:     MOV     #16$,$ESCAPE
2224                                    MOV     T50000,TEMP1    ;SETUP  TIMEOUT
2225                                    SKATN
2226                                    CMP     CYLADD,FRCYL
2227                                    BEQ     5$
2228                                    ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
2229
2230                            5$:     LOOP
2231                                    CLR     $ESCAPE
2232                                    MOV     FRCYL,RKDC(R5)  ;CYL #
2233                                    HDCHK3  FRCYL,311
2234
2235                                    CMP     TOCYL,H ;ALL CYL DONE?
```

```
2236                                    BEQ     6$              ;BR IF YES
2237                                    G       TOCYL           ;ELSE DO ANOTHER
2238                                    JMP     1$
2239                            6$:     SW814
2240                            8$:     QKRPSK  I,J
2241                            10$:    TSTSW9  8$,2$
2242                            12$:    TSTSW9  8$,3$
2243                            14$:    TSTSW9  8$,4$
2244                            16$:    TSTSW9  8$,5$
2245                            .ENDM   SKOSC
2246
2247                            .MACRO  EOPGM
2248
2249                                    SCOPE
2250                                    CLR     $ESCAPE
2251                                    MOV     #1,$TIMES
2252                                    MOV     #STACK,SP
2253                                    INC     $DEVCT          ;INCR COUNT FOR # OF DRIVES THAT ARE CHECKED
2254                                    CMP     DRIVS,$DEVCT    ;ARE ALL DRIVES PRESINT TESTED?
2255                                    BEQ     $EOP1+2         ;BR IF YES
2256                                    JMP     NUDRV           ;IF NOT , TEST NEXT DRIVE PRESENT
2257                            $EOP1:  SCOPE
2258                            .ENDM   EOPGM
2259
2260                                    .NLIST  MD
```

```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                    001100              .=1100
001100              001100      $CMTAG:                     ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000                     $TSTNM: .BYTE   0           ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0           ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0           ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0           ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0           ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0           ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0           ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1           ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0           ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0           ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0           ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0           ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0           ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0           ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0           ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0           ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR        ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP       ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560              ;;TTY KBD STATUS
001146  177562                  $TKB:   177562              ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564              ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566              ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0           ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2           ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12          ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0           ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $TMP0:  .WORD   0           ;;USER DEFINED
001162  000000                  $TMP1:  .WORD   0           ;;USER DEFINED
001164  000000                  $TMP2:  .WORD   0           ;;USER DEFINED
001166  000000                  $TMP3:  .WORD   0           ;;USER DEFINED
001170  000000                  $TMP4:  .WORD   0           ;;USER DEFINED
001172  000000                  $TMP5:  .WORD   0           ;;USER DEFINED
001174  000000                  $TIMES: 0                   ;;MAX. NUMBER OF ITERATIONS
001176  000000                  $ESCAPE:0                   ;;ESCAPE ON ERROR ADDRESS
001200  177607  000377            $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001204  077                     $QUES:  .ASCII  /?/         ;;QUESTION MARK
001205  015                     $CRLF:  .ASCII  <15>        ;;CARRIAGE RETURN
001206  000012                  $LF:    .ASCIZ  <12>        ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
001210                          $MAIL:                      ;;APT MAILBOX
001210  000000                  $MSGTY: .WORD   AMSGTY       ;;MESSAGE TYPE CODE
```

```
2317  001212  000000                $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
2318  001214  000000                $TESTN: .WORD   ATESTN  ;;TEST NUMBER
2319  001216  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
2320  001220  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
2321  001222  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
2322  001224  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
2323  001226  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
2324  001230                        $ETABLE:                ;;APT ENVIRONMENT TABLE
2325  001230     000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
2326  001231     000                $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
2327  001232  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
2328  001234  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
2329  001236  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
2330                                ;*                      BITS 15-11=CPU TYPE
2331                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
2332                                ;*                              11/70=06,PDQ=07,Q=10
2333                                ;*                      BIT 10=REAL TIME CLOCK
2334                                ;*                      BIT  9=FLOATING POINT PROCESSOR
2335                                ;*                      BIT  8=MEMORY MANAGEMENT
2336  001240     000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
2337  001241     000                $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
2338                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
2339                                ;*                              900 NSEC CORE=001
2340                                ;*                              300 NSEC BIPOLAR=002
2341                                ;*                              500 NSEC MOS=003
2342  001242  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
2343                                ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
2344  001244     000                $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
2345  001245     000                $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
2346  001246  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
2347  001250     000                $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
2348  001251     000                $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
2349  001252  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
2350  001254     000                $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
2351  001255     000                $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
2352  001256  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
2353  001260  000000                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
2354  001262  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
2355  001264  177440                $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
2356  001266  000000                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
2357  001270  000000                $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
2358  001272  000000                $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
2359  001274  000000                $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
2360  001276  000000                $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
2361  001300  000000                $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
2362  001302  000000                $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
2363  001304  000000                $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
2364  001306  000000                $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
2365  001310  000000                $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
2366  001312  000000                $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
2367  001314                        $ETEND:
2368                                .MEXIT
2369        177440                  ABASE=  177440          ;DEFAULT BUSS ADDRESS
2370  001314  000210                RKVEC:  210             ;DEFAULT CONTROLLER INTERRUPT VECTOR
2371  001316  000240                RKPRI:  P 5             ;PRIORITY
2372  001320  172540                PKS:    172540          ;P-CLOCK STATUS REG
```

```
2373  001322  172542          PKSB:   172542          ;P-CLOCK SET BUFFER
2374  001324  172544          PKRB:   172544          ;P-CLOCK READ BUFFER
2375  001326  177546          LKS:    177546          ;L-CLOCK STATUS REG.
2376
2377  001330  000100          LCVEC:  100             ;L-CLOCK INTERRUPT VECTOR
2378  001332  000104          PCVEC:  104             ;P-CLOCK INTERRUPT VECTOR.
2379
2380          000114          MEMVEC= 114             ;MEMORY PARITY VECTOR
2381          172100          MEMBAS= 172100          ;MEMORY PARITY OPTION CSR START ADDR
2382  001334  000000          TRAPPC: 0               ;PC FOR MEMORY CHECK ENABLE TRAP
2383
2384  001336  000000          PARAM:  0               ;1 FOR 220 OR 230 START, NO DEFAULT
2385  001340  000000          BYPT16: 0               ;1 FOR 210, 230, 270 START
2386  001342  000000          MODTST: 0               ;1 FOR 260 OR 270 START
2387  001344  000000          FTITLE: 0               ;FLAG FOR PRINTING OUT 1ST PROGRAM TITLE
2388
2389  001346  000000          DRVPTR: 0               ;CONTAINS THE POINTER TO THE DRIVE FLAG
2390                                                  ;(DRIV0-DRIV7) OF THE DRIVE TO BE CHECKED NEXT.
2391  001350  000000          FRCYL:  0               ;FROM CYL
2392  001352  000000          TOCYL:  0               ;TO CYL
2393  001354  000000          CCYL:   0               ;CURRENT CYL, USED IN N SQUARE TEST
2394  001356  000000          PCYL:   0               ;PREV CYL., USED IN N SQUARE TEST
2395  001360  000000          CALDIF: 0               ;CALC CYL DIFF USED IN N SQUARE TEST
2396  001362  000000          CYLDIF: 0               ;CYL DIFF, RIGHT JUSTIFIED FROM RKMR3
2397  001364  000000          CYLADD: 0               ;CYL ADDR, RIGHT JUSTIFIED FROM RKMR3
2398  001366  000000          CALADD: 0               ;CYL ADDR USED IN FHDTAB ROUTINE
2399
2400  001370  000074          HZ:     60.             ;60 FOR 60 CPS
2401                                                  ;50 FOR 50 CPS
2402  001372  000000          COUNT:  0               ;LOADED TO 50 OR 60 TO COUNT TO 1 SEC
2403                                                  ;OR ANY OTHER NUMBER TO COUNT OFF FRACTIONAL SECOND
2404  001374  000000          SEC:    0               ;SECOND COUNTER
2405  001376  000000          TIMUP:  0               ;FLAG TO INDICATE TIME IS UP
2406  001400  000000          SECNT:  0               ;SECTOR COUNT
2407  001402  000000          PSEC:   0               ;PREVIOUS SECTOR
2408  001404  000000          ESEC:   0               ;EXPECTED SECTOR
2409  001406  000000          SECTOR: 0               ;SECTOR COUNT, RIGHT JUSTIFIED FROM RKMR3
2410
2411  001410  000000          LPFLG:  0               ;SET TO 0 TO RETURN TO $LPADR
2412                                                  ;IF SW14 OR SW8 SET
2413                                                  ;SET TO 1 TO RETURN TO $LPERR
2414                                                  ;IF SW9 SET
2415  001412  000001          T1:     1               ;TIMEOUT CONSTANTS
2416  001414  000012          T10:    10.
2417  001416  000144          T100:   100.
2418  001420  000764          T500:   500.
2419  001422  004704          T2500:  2500.
2420  001424  011610          T5000:  5000.
2421  001426  141520          T50000: 50000.
2422
2423  001430  000000          HEAD:   0               ;HEAD NUMBER
2424  001432  000000          HEADA:  0               ;HEAD # FROM H.B3 RIGHT JUSTIFIED
2425  001434  000000          HD1:    0               ;SHIFTED HEAD# FOR FORMATTER ROUTINE
2426  001436  000000          FORMAT: 0               ;FORMAT TYPE
2427  001440  000000          FMT1:   0               ;SHIFTED FORMAT FOR FORMATTER ROUTINE
2428  001442  000000          WDCNT:  0               ;WORD COUNT
```

```
2429
2430  001444  000000                DATA0:  0                       ;ALL 0'S
2431  001446  052525                DATA01: 52525                   ;0101 PATT
2432  001450  177777                DATA1:  177777                  ;ALL 1'S
2433
2434  001452  000000                WORD:   0                       ;HEADER/DATA WORD
2435  001454  000000                HDWD:   0                       ;HEADER WORD FROM RKDB
2436
2437  001456  000000                BSERR:  0                       ;CANNOT READ BSE INFO WHEN SET
2438  001460  000000                LIMERR: 0                       ;LIMIT DETECT ERROR FLAG
2439
2440  001462  000000                BYPCERR:0                       ;SET TO 1 TO BYPASS CKCERR IN GSTAT1 ROUTINE
2441  001464  000000                BYPFMT: 0                       ;BYPASS FORMAL FORMATTING OF HEADERS
2442                                                                ;UNTIL BSE INFO HAS BEEN STORED.
2443                                                                ;IF SET, BIT 14,15 = 1
2444
2445  001466  000000                CHKFLG: 0                       ;WORDS TO BE CHECKED
2446
2447  001470  000102                HDTAB:  .BLKW 66.               ;CALCULATED HEADER WORD TABLE
2448  001674  000102                RHTAB:  .BLKW 66.               ;FILLED AFTER READ HEADER CMD
2449  002100  000102                SRTTAB: .BLKW 66.               ;ABOVE RHTAB SORTED STARTING FORM
2450                                                                ;SECTOR 0 BY SORT ROUTINE
2451  002304  000400                BSE22H: .BLKW 256.              ;22 SECTOR HARDWARE BSE INFO.
2452                                                                ;22 SECTOR SOFTWARE BSE INFO
2453                                                                ;OVERLAYS MSG1
2454  003304  000000                UNLD:   0                       ;SET TO 0 IF HEADS ARE LOADED
2455                                                                ;SET TO 1 IF HEADS UNLOADED
2456  003306  000000                BADHDR: 0                       ;SET TO 0 IF FORMATTING OK
2457                                                                ;SET TO 1 IF FORMATTING ALTERED
2458  003310  000000                HPEND:  0                       ;SET TO 0 IF HALT NOT PENDING
2459                                                                ;SET TO 1 IF HALT PENDING
2460
2461                                                                ;THE ABOVE 3 FLAGS ARE USED
2462                                                                ;BY 'STOP' ROUTINE TO BRING
2463                                                                ;THE CPU TO A VALID HALT.
2464
2465  003312    001     002     004  ATTN:   .BYTE 1,2,4,10,20,40,100,200   ;ATN 0-7 RESP.
2466  003315    010     020     040
2467  003320    100     200
2468                                        .EVEN
2469
2470
2471                                ;
2472                                ;THE FOLLOWING ARE HOLDING REGISTERS FOR THE RK611 REGISTERS
2473                                ;THEY ARE LOADED AFTER RDY IS REC'D FROM WRDY ROUTINE.
2474                                ;
2475
2476  003322  000000                HCS1:   0                       ;HOLD RKCS1
2477  003324  000000                HCS2:   0                       ;HOLD RKCS2
2478  003326  000000                HWC:    0                       ;HOLD RKWC
2479  003330  000000                HBA:    0                       ;ETC.
2480  003332  000000                HDA:    0
2481  003334  000000                HDS:    0
2482  003336  000000                HER:    0
2483  003340  000000                HASOF:  0
2484  003342  000000                HDC:    0
```

```
2485  003344  000000                HDB:    0
2486  003346  000000                HMR1:   0
2487  003350  000000                HMR2:   0
2488  003352  000000                HMR3:   0
2489  003354  000000                HPOS:   0
2490  003356  000000                HPAT:   0
2491
2492  003360  000000                TEMP1:  0                       ;TEMPORARY STORAGE.
2493  003362  000000                TEMP2:  0
2494  003364  000000                TEMP3:  0
2495  003366  000000                TEMP4:  0
2496  003370  000000                TEMP5:  0
2497                                ;
2498                                ; THE FOLLOWING ARE HOLDING REGISTERS FOR MSG A (0-3) & MSG B (0-3)
2499                                ;
2500  003372  000000                H.A0:   0
2501  003374  000000                H.B0:   0
2502  003376  000000                H.A1:   0
2503  003400  000000                H.B1:   0
2504  003402  000000                H.A2:   0
2505  003404  000000                H.B2:   0
2506  003406  000000                H.A3:   0
2507  003410  000000                H.B3:   0
2508                                ;
2509                                ; THE FOLLOWING ARE 'EXPECTED' REGISTER FOR THE ABOVE
2510                                ;
2511  003412  000000                E.A0:   0
2512  003414  000000                E.B0:   0
2513  003416  000000                E.A1:   0
2514  003420  000000                E.B1:   0
2515  003422  000000                E.A2:   0
2516  003424  000000                E.B2:   0
2517  003426  000000                E.A3:   0
2518  003430  000000                E.B3:   0
2519
2520                                ;
2521                                ; THE FO' LOWING ARE IDENTITIES FOR DRIVE MSG WORDS TO BE TESTED
2522                                ;
2523          000001                T.A2=BIT0                       ;TEST MSG A2 IF SET
2524          000002                T.B2=BIT1
2525          000004                T.B3=BIT2
2526
2527                                ;
2528                                ;ALL THE FLAGS BELOW ARE CLEARED INITIALLY BY THE CLRFLG ROUTINE.
2529                                ;
2530
2531  003432  000000                DDUMP:  0                       ;FLAG - SET WHEN IN DDP DUMP MODE
2532  003434  000000                DDPCH:  0                       ;FLAG - SET WHEN IN DDP CHAIN MODE
2533  003436  000000                ACT11:  0                       ;FLAG - SET WHEN IN ACT11 MODE OF OPERATION
2534  003440  000000                PPTP:   0                       ;FLAG - SET WHEN PROGRAM LOADED BY PAPER TAPE
2535  003442  000000                DRIVS:  0                       ;CONTAINS THE NUMBER OF DRIVES PRESENT
2536
2537                                ;THE FLAGS BELOW ARE SET TO 1 TO INDICATE THAT A PARTICULAR DRIVE
2538                                ;IS PRESENT AND IS TO BE TESTED.
2539
2540  003444  000000                DRIV0:  0                       ;FLAG SET TO 1 WHEN DRIVE 0 PRESENT
```

```
2541   003446  000000                  DRIV1:  0                       ;FOR DRIVE 1
2542   003450  000000                  DRIV2:  0                       ;FOR DRIVE 2
2543   003452  000000                  DRIV3:  0                       ;FOR DRIVE 3
2544   003454  000000                  DRIV4:  0                       ;FOR DRIVE 4
2545   003456  000000                  DRIV5:  0                       ;FOR DRIVE 5
2546   003460  000000                  DRIV6:  0                       ;FOR DRIVE 6
2547   003462  000000                  DRIV7:  0                       ;FOR DRIVE 7
2548
2549   003464  000000                  LCLKF:  0                       ;L-CLOCK FLAG PRESENT FLAG
2550   003466  000000                  PCLKF:  0                       ;P-CLOCK FLAG PRESENT FLAG
2551   003470  000000                  DOTIM:  0                       ;SET IF EITHER CLOCK PRESENT FOR TIMING TESTS.
2552   003472  000000                  SIZFLG: 0                       ;SET IF DEFAULT DO SIZING IN TEST 1
```

```
2553                                    .SBTTL  ERROR POINTER TABLE
2554
2555                                    ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
2556                                    ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
2557                                    ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
2558                                    ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
2559                                    ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
2560
2561                                    ;*      EM              ;;POINTS TO THE ERROR MESSAGE
2562                                    ;*      DH              ;;POINTS TO THE DATA HEADER
2563                                    ;*      DT              ;;POINTS TO THE DATA
2564                                    ;*      DF              ;;POINTS TO THE DATA FORMAT
2565
2566
2567  003474                            $ERRTB:
2568
2569                                    ;ERROR 1
2570  003474  057016                            EM2                     ;DR # IN RKCS2 CANNOT BE READ BACK CORRECTLY IN RKMR2
2571  003476  063767                            DH1
2572  003500  066076                            DT1
2573  003502  066744                            DF1
2574
2575                                    ;ERROR 2
2576  003504  057266                            EM5                     ;DETECTED MDS
2577  003506  063767                            DH1
2578  003510  066076                            DT1
2579  003512  066744                            DF1
2580
2581                                    ;ERROR 3
2582  003514  057307                            EM6                     ;DETECTED UFE
2583  003516  063767                            DH1
2584  003520  066076                            DT1
2585  003522  066744                            DF1
2586
2587                                    ;ERROR 4
2588  003524  057330                            EM7                     ;DETECTED DR3 & NED RESET (WRONG PORT SELECTED?)
2589  003526  063767                            DH1
2590  003530  066076                            DT1
2591  003532  066744                            DF1
2592                                    ;ERROR 5
2593  003534  057417                            EM8                     ;DDT NOT SET IN MR2
2594  003536  063767                            DH1
2595  003540  066076                            DT1
2596  003542  066744                            DF1
2597
2598                                    ;ERROR 6
2599  003544  057451                            EM9                     ;DR NOT PRESENT BUT SPECIFIED BY OPERATOR
2600  003546  063767                            DH1
2601  003550  066076                            DT1
2602  003552  066744                            DF1
2603
2604                                    ;ERROR 7
2605  003554  057521                            EM10                    ;ABORT TEST, COULD NOT REFERENCE CONTROLLER REGISTER
2606  003556  063767                            DH1
2607  003560  066076                            DT1
2608  003562  066744                            DF1
```

```
2609
2610                                    ;ERROR 10
2611   003564  057564                           EM11                    ;DRA & NED BOTH SET
2612   003566  063767                           DH1
2613   003570  066076                           DT1
2614   003572  066744                           DF1
2615
2616                                    ;ERROR 11
2617   003574  057630                           EM12                    ;CONTROLLER NOT READY
2618   003576  064560                           DH18                    ;AFTER UNLOAD CMD.
2619   003600  066076                           DT1
2620   003602  067070                           DF10
2621
2622                                    ;ERROR 12
2623   003604  057661                           EM13                    ;NO ATTN
2624   003606  064560                           DH18                    ;AFTER UNLOAD CMD
2625   003610  066076                           DT1
2626   003612  067070                           DF10
2627                                    ;ERROR 13
2628   003614  057703                           EM14                    ;WRONG ATTN
2629   003616  064560                           DH18
2630   003620  066076                           DT1
2631   003622  067070                           DF10
2632                                    ;ERROR 14
2633   003624  057730                           EM15                    ;DRDY NOT CLEARED
2634   003626  064560                           DH18
2635   003630  066076                           DT1
2636   003632  067070                           DF10
2637                                    ;ERROR 15
2638   003634  057762                           EM16                    ;DSC NOT SET
2639   003636  064560                           DH18
2640   003640  066076                           DT1
2641   003642  067070                           DF10
2642                                    ;ERROR 16
2643   003644  060007                           EM17                    ;MSG A0 ERROR
2644   003646  064160                           DH8                     ;IN UNLD
2645   003650  066500                           DT13
2646   003652  067240                           DF20
2647                                    ;ERROR 17
2648   003654  060024                           EM18                    ;MSG B0 ERROR
2649   003656  064160                           DH8                     ;IN UNLD
2650   003660  066500                           DT13
2651   003662  067240                           DF20
2652                                    ;ERROR 20
2653   003664  060041                           EM19                    ;MSG A1 ERROR
2654   003666  064160                           DH8                     ;IN UNLD
2655   003670  066500                           DT13
2656   003672  067240                           DF20
2657                                    ;ERROR 21
2658   003674  060056                           EM20                    ;MSG B1 ERROR
2659   003676  064160                           DH8                     ;IN UNLD
2660   003700  066500                           DT13
2661   003702  067240                           DF20
2662                                    ;ERROR 22
2663   003704  061471                           EM46                    ;MSG A2 ERROR
2664   003706  064160                           DH8                     ;IN UNLD
```

```
2665        710  066560                    DT14
2666        712  067314                    DF22
2667                                  ;ERROR 23
2668  003714  061504                    EM47          ;MSG B2 ERROR
2669  003716  064160                    DH8           ;IN UNLD
2670  003720  066560                    DT14
2671  003722  067314                    DF22
2672
2673                                  ;ERROR 24
2674  003724  060073                    EM21          ;CERR SET
2675  003726  064647                    DH21          ;AFTER SCLR
2676  003730  066076                    DT1
2677  003732  067070                    DF10
2678                                  ;ERROR 25
2679  003734  060115                    EM22          ;RLS DID NOT SET CERR
2680  003736  063767                    DH1
2681  003740  066076                    DT1
2682  003742  066744                    DF1
2683
2684                                  ;ERROR 26
2685  003744  060154                    EM23          ;SACK SET AFTER RLS SENT
2686  003746  063767                    DH1
2687  003750  066076                    DT1
2688  003752  066744                    DF1
2689
2690                                  ;ERROR 27
2691  003754  060234                    EM24          ;VOL VALID NOT SET
2692  003756  064601                    DH19          ;AFTER PACK CMD
2693  003760  066076                    DT1
2694  003762  067070                    DF10
2695                                  ;ERROR 30
2696  003764  060260                    EM25          ;DRIVE TYPE SET IN MR2
2697  003766  063767                    DH1
2698  003770  066076                    DT1
2699  003772  066744                    DF1
2700                                  ;ERROR 31
2701  003774  060306                    EM26          ;DDT SET IN RKDS
2702  003776  063767                    DH1
2703  004000  066076                    DT1
2704  004002  066744                    DF1
2705                                  ;ERROR  32
2706  004004  060326                    EM27          ;DTYE SET IN RKER
2707  004006  063767                    DH1
2708  004010  066076                    DT1
2709  004012  066744                    DF1
2710                                  ;ERROR 33
2711  004014  060347                    EM28          ;DTYE NOT SET IN RKER
2712  004016  063767                    DH1
2713  004020  066076                    DT1
2714  004022  066744                    DF1
2715                                  ;ERROR 34
2716  004024  060425                    EM29          ;DTYE DID NOT SET CERR
2717  004026  063767                    DH1
2718  004030  066076                    DT1
2719  004032  066744                    DF1
2720                                  ;ERROR 35
```

```
2721  004034  060474                  EM30            ;C-D PARITY ERROR SET IN MR3
2722  004036  063767                  DH1
2723  004040  066076                  DT1
2724  004042  066744                  DF1
2725                          ;ERROR 36
2726  004044  060525                  EM31            ;D-C PARITY  SET IN CS1
2727  004046  063767                  DH1
2728  004050  066076                  DT1
2729  004052  066744                  DF1
2730                          ;ERROR 37
2731  004054  060552                  EM32            ;FAULT NOT SET IN MR3
2732  004056  063767                  DH1
2733  004060  066076                  DT1
2734  004062  066744                  DF1
2735                          ;ERROR 40
2736  004064  060577                  EM33            ;C-D PARITY ERROR NOT SET IN MR3
2737  004066  063767                  DH1
2738  004070  066076                  DT1
2739  004072  066744                  DF1
2740                          ;ERROR 41
2741  004074  060634                  EM34            ;D-C PARITY  NOT SET IN CS1
2742  004076  063767                  DH1
2743  004100  066076                  DT1
2744  004102  066744                  DF1
2745                          ;ERROR 42
2746  004104  060665                  EM35            ;DCPAR DID NOT SET CERR
2747  004106  063767                  DH1
2748  004110  066076                  DT1
2749  004112  066744                  DF1
2750                          ;ERROR 43
2751  004114  060740                  EM36            ;CYL ADDR IN B2 NOT = RKDC
2752  004116  064446                  DH14            ;AFTER SEEK WITH BAD PARITY
2753  004120  066560                  DT14
2754  004122  067314                  DF22
2755                          ;ERROR 44
2756  004124  061000                  EM37            ;CYL DIFF IN A2 NOT=RKDC
2757  004126  064446                  DH14
2758  004130  066560                  DT14
2759  004132  067314                  DF22
2760                          ;ERROR 45
2761  004134  060740                  EM36            ;CYL ADDR IN RKMR3 NOT=RKDC
2762  004136  064446                  DH14
2763  004140  066136                  DT4
2764  004142  067044                  DF6
2765                          ;ERROR 46
2766  004144  061040                  EM38            ;CYL DIFF IN RKMR2 NOT=CALDIF
2767  004146  064446                  DH14
2768  004150  066136                  DT4
2769  004152  067044                  DF6
2770                          ;ERROR 47
2771  004154  061111                  EM39            ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
2772  004156  064540                  DH17            ;AFTER RECAL CMD
2773  004160  066560                  DT14
2774  004162  067314                  DF22
2775                          ;ERROR 50
2776  004164  061146                  EM40            ;CYL ADDR IN RKMR3 NOT CLEARED
```

```
2777  004166  064540                    DH17                    ;AFTER RECAL COMD
2778  004170  066560                    DT14
2779  004172  067314                    DF22
2780                          ;ERROR 51
2781  004174  060007                    EM17                    ;AO ERROR
2782  004176  064763                    DH26                    ;AFTER READ DATA CMD
2783  004200  066500                    DT13
2784  004202  067240                    DF20
2785                          ;ERROR 52
2786  004204  060024                    EM18                    ;BO ERROR
2787  004206  064763                    DH26
2788  004210  066500                    DT13
2789  004212  067240                    DF20
2790                          ;ERROR 53
2791  004214  061265                    EM43                    ;HEAD DECODE IN B3 NOT CLEARED
2792  004216  064540                    DH17                    ;AFTER RECAL CMD
2793  004220  066650                    DT15
2794  004222  067350                    DF23
2795                          ;ERROR 54
2796  004224  061314                    EM44                    ;B3 HEAD DECODE INCORRECT
2797  004226  064476                    DH16
2798  004230  066650                    DT15
2799  004232  067350                    DF23
2800                          ;ERROR 55
2801  004234  057661                    EM13                    ;NO ATTN
2802  004236  064540                    DH17                    ;AFTER RECAL CMD
2803  004240  066076                    DT1
2804  004242  067070                    DF10
2805                          ;ERROR 56
2806  004244  062436                    EM64                    ;MSG B3 HEAD REG NOT CLEARED
2807  004246  064160                    DH8                     ;IN UNLOAD
2808  004250  066650                    DT15
2809  004252  067350                    DF23
2810                          ;ERROR 57
2811  004254  060007                    EM17                    ;MSG AO ERROR
2812  004256  064204                    DH9                     ;AFTER START SPINDLE CMD REC'D BY DRIVE
2813  004260  066500                    DT13
2814  004262  067240                    DF20
2815                          ;ERROR 60
2816  004264  060024                    EM18                    ;MSG BO ERROR
2817  004266  064204                    DH9
2818  004270  066500                    DT13
2819  004272  067240                    DF20
2820                          ;ERROR 61
2821  004274  060041                    EM19                    ;MSG A1 ERROR
2822  004276  064204                    DH9
2823  004300  066500                    DT13
2824  004302  067240                    DF20
2825                          ;ERROR 62
2826  004304  060056                    EM20                    ;MSG B1 ERROR
2827  004306  064204                    DH9
2828  004310  066500                    DT13
2829  004312  067240                    DF20
2830                          ;ERROR 63
2831  004314  060007                    EM17
2832  004316  064250                    DH10                    ;AT END OF HEAD LOADING
```

```
2833  004320  066500                DT13
2834  004322  067240                DF20
2835                        ;ERROR 64
2836  004324  060024                EM18
2837  004326  064250                DH10
2838  004330  066500                DT13
2839  004332  067240                DF20
2840                        ;ERROR 65
2841  004334  060041                EM19
2842  004336  064250                DH10
2843  004340  066500                DT13
2844  004342  067240                DF20
2845                        ;ERROR 66
2846  004344  060056                EM20
2847  004346  064250                DH10
2848  004350  066500                DT13
2849  004352  067240                DF20
2850                        ;ERROR 67
2851  004354  057661                EM13          ;NO ATTN
2852  004356  064250                DH10          ;AT END OF HEAD LOADING.
2853  004360  066076                DT1
2854  004362  067070                DF10
2855                        ;ERROR 70
2856  004364  061620                EM50          ;FWD NOT SET WITHIN 60 SEC FROM
2857  004366  063767                DH1           ;START SPINDLE CMD.
2858  004370  066076                DT1
2859  004372  066744                DF1
2860                        ;ERROR 71
2861  004374  060007                EM17
2862  004376  064277                DH11          ;AFTER START SPINDLE CMD & FWD SET.
2863  004400  066500                DT13
2864  004402  067240                DF20
2865                        ;ERROR 72
2866  004404  060024                EM18
2867  004406  064277                DH11
2868  004410  066500                DT13
2869  004412  067240                DF20
2870                        ;ERROR 73
2871  004414  060041                EM19
2872  004416  064277                DH11
2873  004420  066500                DT13
2874  004422  067240                DF20
2875                        ;ERROR 74
2875  004424  060056                EM20
2877  004426  064277                DH11
2878  004430  066500                DT13
2879  004432  067240                DF20
2880                        ;ERROR 75
2881  004434  061671                EM51          ;FWD NOT CLEARED WITHIN 5 SEC OF MOTION
2882  004436  063767                DH1           ;FROM START SPINDLE CMD.
2883  004440  066076                DT1
2884  004442  066744                DF1
2885                        ;ERROR 76
2886  004444  060007                EM17
2887  004446  064336                DH12          ;AT INNER LIMIT FROM START SPINDLE CMD.
2888  004450  066500                DT13
```

```
2889  004452  067240                    DF20
2890                          ;ERROR 77
2891  004454  060024                    EM18
2892  004456  064336                    DH12
2893  004460  066500                    DT13
2894  004462  067240                    DF20
2895                          ;ERROR 100
2896  004464  060041                    EM19
2897  004466  064336                    DH12
2898  004470  066500                    DT13
2899  004472  067240                    DF20
2900                          ;ERROR 101
2901  004474  060056                    EM20
2902  004476  064336                    DH12
2903  004500  066500                    DT13
2904  004502  067240                    DF20
2905                          ;ERROR 102
2906  004504  061532                    EM49          ;FWD NOT SET WITHIN 4 SEC IN RTZ PORTION
2907  004506  063767                    DH1           ;OF START SPIN CMD.
2908  004510  066076                    DT1
2909  004512  066744                    DF1
2910                          ;ERROR 103
2911  004514  060007                    EM17
2912  004516  064377                    DH13          ;FROM OUTER LIMIT TO CYL 0 DURING LOADING
2913  004520  066500                    DT13
2914  004522  067240                    DF20
2915                          ;ERROR 104
2916  004524  060024                    EM18
2917  004526  064377                    DH13
2918  004530  066500                    DT13
2919  004532  067240                    DF20
2920                          ;ERROR 105
2921  004534  060041                    EM19
2922  004536  064377                    DH13
2923  004540  066500                    DT13
2924  004542  067240                    DF20
2925                          ;ERROR 106
2926  004544  060056                    EM20
2927  004546  064377                    DH13
2928  004550  066500                    DT13
2929  004552  067240                    DF20
2930                          ;ERROR 107
2931  004554  061350                    EM45          ;DRIVE READY NOT SET WITHIN 1 SEC
2932  004556  063767                    DH1           ;FROM FWD IN RTZ PORTION OF START SPIN CMD.
2933  004560  066076                    DT1
2934  004562  066744                    DF1
2935                          ;ERROR 110
2936  004564  060007                    EM17          ;MSG A0 ERROR
2937  004566  064446                    DH14          ;AFTER SEEK WITH BAD PARITY
2938  004570  066560                    DT14
2939  004572  067314                    DF22
2940                          ;ERROR 111
2941  004574  060024                    EM18          ;MSG B0 ERROR
2942  004576  064446                    DH14          ;AFTER SEEK WITH BAD PARITY
2943  004600  066560                    DT14
2944  004602  067314                    DF22
```

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2945
2946  004604  060041                ;ERROR 112
2947  004606  064763                        EM19                    ;A1 ERROR
2948  004610  066500                        DH26                    ;AFTER READ DATA CMD
2949  004612  067240                        DT13
2950                                        DF20
2951  004614  060056                ;ERROR 113
2952  004616  064763                        EM20                    ;B1 ERROR
2953  004620  066500                        DH26
2954  004622  067240                        DT13
2955                                        DF20
2956  004624  060007                ;ERROR 114
2957  004626  064476                        EM17
2958  004630  066500                        DH16                    ;AFTER LOADING HEAD REGISTER & SEEK CMD
2959  004632  067240                        DT13
2960                                        DF20
2961  004634  060024                ;ERROR 115
2962  004636  064476                        EM18
2963  004640  066500                        DH16
2964  004642  067240                        DT13
2965                                        DF20
2966  004644  057630                ;ERROR 116
2967  004646  064601                        EM12                    ;CONT NOT RDY
2968  004650  066076                        DH19                    ;AFTER PACK CMD
2969  004652  067070                        DT1
2970                                        DF10
2971  004654  057630                ;ERROR 117
2972  004656  064620                        EM12                    ;CONT NOT RDY
2973  004660  066076                        DH20                    ;AFTER SEL DR CMD
2974  004662  067070                        DT1
2975                                        DF10
2976  004664  057630                ;ERROR 120
2977  004666  064647                        EM12
2978  004670  066076                        DH21                    ;AFTER SUBSYS CLEAR
2979  004672  067070                        DT1
2980                                        DF10
2981  004674  057630                ;ERROR 121
2982  004676  064204                        EM12
2983  004700  066076                        DH9                     ;AFTER START SPINDLE CMD
2984  004702  067070                        DT1
2985                                        DF10
2986  004704  057630                ;ERROR 122
2987  004706  064446                        EM12
2988  004710  066076                        DH14                    ;AFTER SEEK WITH BAD PARITY
2989  004712  067070                        DT1
2990                                        DF10
2991  004714  063547                ;ERROR 123
2992  004716  063767                        EM88                    ;NO DRIVES FOUND
2993  004720  066076                        DH1
2994  004722  066744                        DT1
2995                                        DF1
2996  004724  057630                ;ERROR 124
2997  004726  064540                        EM12
2998  004730  066076                        DH17                    ;AFTER RECAL CMD
2999  004732  067070                        DT1
3000                                        DF10
                                    ;ERROR 125
```

```
3001  004734  057661                EM13            ;NO ATTN
3002  004736  064446                DH14            ;FROM SEEK WITH BAD PARITY
3003  004740  066076                DT1
3004  004742  067070                DF10
3005                          ;ERROR 126
3006  004744  063640                EM89            ;NO DRVS FOUND IN DEVICE MAP
3007  004746  063767                DH1
3008  004750  066076                DT1
3009  004752  066744                DF1
3010                          ;ERROR 127
3011  004754  061111                EM39            ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
3012  004756  064647                DH21            ;AFTER SCLR
3013  004760  066076                DT1
3014  004762  067070                DF10
3015                          ;ERROR 130
3016  004764  061146                EM40            ;CYL ADDR IN RKMR3 NOT CLEARED
3017  004766  064647                DH21
3018  004770  066076                DT1
3019  004772  067070                DF10
3020                          ;ERROR 131
3021  004774  057630                EM12            ;NO RDY
3022  004776  064744                DH25            ;AFTER SEEK CMD
3023  005000  066076                DT1
3024  005002  067070                DF10
3025                          ;ERROR 132
3026  005004  057661                EM13            ;NO ATTN
3027  005006  064744                DH25
3028  005010  066076                DT1
3029  005012  067070                DF10
3030                          ;ERROR 133
3031  005014  060007                EM17            ;MSG A0 ERROR
3032  005016  064744                DH25
3033  005020  066500                DT13
3034  005022  067240                DF20
3035                          ;ERROR 134
3036  005024  060024                EM18            ;MSG B0 ERROR
3037  005026  064744                DH25
3038  005030  066500                DT13
3039  005032  067240                DF20
3040                          ;ERROR 135
3041  005034  060041                EM19            ;MSG A1 ERROR
3042  005036  064744                DH25
3043  005040  066500                DT13
3044  005042  067240                DF20
3045                          ;ERROR 136
3046  005044  060056                EM20            ;MSG B1 ERROR.
3047  005046  064744                DH25
3048  005050  066500                DT13
3049  005052  067240                DF20
3050                          ;ERROR 137
3051  005054  061111                EM39            ;CYL DIFF/OFFSET IN A2 NOT CLEARED
3052  005056  064744                DH25
3053  005060  066560                DT14
3054  005062  067314                DF22
3055                          ;ERROR 140
3056  005064  061146                EM40            ;CYL ADDR IN B2 NOT CLEARED
```

```
3057  005066  064744                    DH25
3058  005070  066560                    DT14
3059  005072  067314                    DF22
3060                          ;ERROR 141
3061  005074  061771                    EM52          ;20 SECTOR FORMAT NOT SET IN RKMR2
3062  005076  063767                    DH1
3063  005100  066076                    DT1
3064  005102  066744                    DF1
3065                          ;ERROR 142
3066  005104  062030                    EM53          ;SECTOR 0 NOT FOUND WITHIN 50 MS
3067  005106  063767                    DH1
3068  005110  066076                    DT1
3069  005112  066744                    DF1
3070                          ;ERROR 143
3071  005114  062061                    EM54          ;DIFF SECTOR NOT FOUND WITHIN 3MS
3072  005116  063767                    DH1
3073  005120  066076                    DT1
3074  005122  066744                    DF1
3075                          ;ERROR 144
3076  005124  061517                    EM48          ;MSG B3 ERROR
3077  005126  065122                    DH34          ;SECTOR REG UNSTABLE
3078  005130  066076                    DT1
3079  005132  067070                    DF10
3080                          ;ERROR 145
3081  005134  061517                    EM48
3082  005136  065146                    DH35          ;BETWEEN SECTOR COUNTS
3083  005140  066204                    DT6
3084  005142  067110                    DF12
3085                          ;ERROR 146
3086  005144  060041                    EM19          ;MSG A1 ERROR
3087  005146  064446                    DH14          ;AFTER SEEK WITH BAD PARITY
3088  005150  066560                    DT14
3089  005152  067314                    DF22
3090                          ;ERROR 147
3091  005154  060056                    EM20          ;MSG B1 ERROR
3092  005156  064446                    DH14
3093  005160  066560                    DT14
3094  005162  067314                    DF22
3095                          ;ERROR 150
3096  005164  060041                    EM19          ;MSG A1 ERROR
3097  005166  065217                    DH37
3098  005170  066076                    DT1
3099  005172  067070                    DF10
3100                          ;ERROR 151
3101  005174  057630                    EM12          ;NO RDY
3102  005176  064675                    DH22          ;AFTER CLEAR CMD
3103  005200  066076                    DT1
3104  005202  067070                    DF10
3105                          ;ERROR 152
3106  005204  063743                    EM90          ;DDT NOT SET IN RKDS
3107  005206  063767                    DH1
3108  005210  066076                    DT1
3109  005212  066744                    DF1
3110                          ;ERROR 153
3111  005214  000000                    0
3112  005216  000000                    0
```

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3113  005220  000000                    0
3114  005222  000000                    0
3115                            ;ERROR 154
3116  005224  062114                    EM55            ;ATTN NOT CLEARED
3117  005226  064675                    DH22
3118  005230  066076                    DT1
3119  005232  067070                    DF10
3120                            ;ERROR 155
3121  005234  063404                    EM85            ;IDAE NOT CLEARED
3122  005236  064540                    DH17            ;AFTER RECAL CMD
3123  005240  066076                    DT1
3124  005242  067070                    DF10
3125                            ;ERROR 156
3126  005244  057630                    EM12            ;CONT NOT READY
3127  005246  065747                    DH51            ;AFTER SEEK TO SELF
3128  005250  066076                    DT1
3129  005252  067070                    DF10
3130                            ;ERROR 157
3131  005254  057661                    EM13            ;NO ATTN
3132  005256  065747                    DH51
3133  005260  066076                    DT1
3134  005262  067070                    DF10
3135                            ;ERROR 160
3136  005264  062274                    EM59            ;LIMIT DETECT NOT FOUND
3137  005266  063767                    DH1
3138  005270  066076                    DT1
3139  005272  066744                    DF1
3140                            ;ERROR 161
3141  005274  060007                    EM17            ;MSG A0 ERROR
3142  005276  065263                    DH38            ;AFTER LIMIT DETECT
3143  005300  066500                    DT13
3144  005302  067240                    DF20
3145                            ;ERROR 162
3146  005304  060024                    EM18            ;MSG B0 ERROR
3147  005306  065263                    DH38
3148  005310  066500                    DT13
3149  005312  067240                    DF20
3150                            ;ERROR 163
3151  005314  060041                    EM19            ;MSG A1 ERROR
3152  005316  065263                    DH38
3153  005320  066500                    DT13
3154  005322  067240                    DF20
3155                            ;ERROR 164
3156  005324  060056                    EM20            ;MSG B1 ERROR
3157  005326  065263                    DH38
3158  005330  066500                    DT13
3159  005332  067240                    DF20
3160                            ;ERROR 165
3161  005334  057661                    EM13            ;NO ATTN
3162  005336  065263                    DH38
3163  005340  066076                    DT1
3164  005342  067070                    DF10
3165                            ;ERROR 166
3166  005344  062325                    EM60            ;HEADS HOME NOT FOUND
3167  005346  065263                    DH38
3168  005350  066076                    DT1
```

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3169  005352  067070                    DF10
3170                          ;ERROR 167
3171  005354  062361                    EM61          ;LOAD HEADS NOT FOUND
3172  005356  065263                    DH38
3173  005360  066076                    DT1
3174  005362  067070                    DF10
3175                          ;ERROR 170
3176  005364  057153                    EM4           ;FATAL ERROR
3177  005366  065515                    DH45          ;LIMIT DETECT ERROR ON PREVIOUS TEST
3178  005370  066076                    DT1
3179  005372  067174                    DF16
3180                          ;ERROR 171
3181  005374  057630                    EM12          ;NO RDY
3182  005376  065027                    DH30          ;AFTER READ HEADER CMD
3183  005400  066076                    DT1
3184  005402  067070                    DF10
3185                          ;ERROR 172
3186  005404  061111                    EM39          ;CYL DIFF/OFFSET NOT CLEARED
3187  005406  065027                    DH30          ;AFTER READ HEADER CMD
3188  005410  066560                    DT14
3189  005412  067314                    DF22
3190                          ;ERROR 173
3191  005414  062415                    EM63          ;DLT SET
3192  005416  065027                    DH30
3193  005420  066076                    DT1
3194  005422  067154                    DF15
3195                          ;ERROR 174
3196  005424  060073                    EM21          ;CERR SET
3197  005426  065027                    DH30
3198  005430  066076                    DT1
3199  005432  067154                    DF15
3200                          ;ERROR 175
3201  005434  061111                    EM39          ;CYL DIFF NOT CLEARED
3202  005436  064250                    DH10          ;AT END OF HEAD LOADING
3203  005440  066560                    DT14
3204  005442  067314                    DF22
3205                          ;ERROR 176
3206  005444  061146                    EM40          ;CYL ADDR NOT CLEARED.
3207  005446  064250                    DH10
3208  005450  066560                    DT14
3209  005452  067314                    DF22
3210                          ;ERROR 177
3211  005454  062713                    EM72          ;FORMAT TEST BYPASSED
3212  005456  065574                    DH46          ;COULD NOT READ BSE INFO
3213  005460  066076                    DT1
3214  005462  067174                    DF16
3215                          ;ERROR 200
3216  005464  057630                    EM12          ;NO RDY
3217  005466  065301                    DH39          ;AFTER WRITE HEADER CMD
3218  005470  066076                    DT1
3219  005472  067154                    DF15
3220                          ;ERROR 201
3221  005474  060073                    EM21          ;CERR SET
3222  005476  065301                    DH39
3223  005500  066076                    DT1
3224  005502  067154                    DF15
```

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3225
3226  005504  062465                ;ERROR 202
3227  005506  063767                        EM65                    ;READ HEADER ERROR
3228  005510  066250                        DH1
3229  005512  067134                        DT7
3230                                        DF14
3231  005514  060007                ;ERROR 203
3232  005516  065102                        EM17                    ;MSG A0 ERROR
3233  005520  066500                        DH33                    ;DURING SEEK CMD
3234  005522  067240                        DT13
3235                                        DF20
3236  005524  060024                ;ERROR 204
3237  005526  065102                        EM18                    ;MSG B0 ERROR
3238  005530  066500                        DH33
3239  005532  067240                        DT13
3240                                        DF20
3241  005534  060041                ;ERROR 205
3242  005536  065102                        EM19                    ;MSG A1 ERROR
3243  005540  066500                        DH33
3244  005542  067240                        DT13
3245                                        DF20
3246  005544  060056                ;ERROR 206
3247  005546  065102                        EM20                    ;MSG B1 ERROR
3248  005550  066500                        DH33
3249  005552  067240                        DT13
3250                                        DF20
3251  005554  060740                ;ERROR 207
3252  005556  064744                        EM36                    ;CYL ADDR IN RKMR3 INCORRECT
3253  005560  066136                        DH25                    ;AFTER SEEK CMD
3254  005562  067044                        DT4
3255                                        DF6
3256  005564  060073                ;ERROR 210
3257  005566  064744                        EM21                    ;CERR SET
3258  005570  066076                        DH25
3259  005572  067070                        DT1
3260                                        DF10
3261  005574  062541                ;ERROR 211
3262  005576  064744                        EM67                    ;READ CYL 0 HEADERS ON CYL 1
3263  005600  066076                        DH25
3264  005602  067070                        DT1
3265                                        DF10
3266  005604  061040                ;ERROR 212
3267  005606  065102                        EM38                    ;CYL DIFF IN RKMR2 NOT = CALDIF
3268  005610  066136                        DH33                    ;DURING SEEK CMD
3269  005612  067044                        DT4
3270                                        DF6
3271  005614  060007                ;ERROR 213
3272  005616  065364                        EM17                    ;MSG A0 ERROR
3273  005620  066500                        DH41                    ;DURING RECAL CMD
3274  005622  067240                        DT13
3275                                        DF20
3276  005624  060024                ;ERROR 214
3277  005626  065364                        EM18                    ;MSG B0 ERROR
3278  005630  066500                        DH41
3279  005632  067240                        DT13
3280                                        DF20
                                   ;ERROR 215
```

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3281  005634  060041                  EM19            ;MSG A1 ERROR
3282  005636  065364                  DH41
3283  005640  066500                  DT13
3284  005642  067240                  DF20
3285                          ;ERROR 216
3286  005644  060056                  EM20            ;MSG B1 ERROR
3287  005646  065364                  DH41
3288  005650  066500                  DT13
3289  005652  067240                  DF20
3290                          ;ERROR 217
3291  005654  061040                  EM38            ;CYL DIFF IN RKMR2 NOT=CALDIF
3292  005656  065364                  DH41
3293  005660  066136                  DT4
3294  005662  067044                  DF6
3295                          ;ERROR 220
3296  005664  060073                  EM21            ;CERR SET
3297  005666  064540                  DH17            ;AFTER RECAL CMD
3298  005670  066076                  DT1
3299  005672  067070                  DF10
3300                          ;ERROR 221
3301  005674  060007                  EM17            ;MSG A0 ERROR
3302  005676  064540                  DH17
3303  005700  066500                  DT13
3304  005702  067240                  DF20
3305                          ;ERROR 222
3306  005704  060041                  EM19            ;MSG A1 ERROR
3307  005706  064540                  DH17
3308  005710  066500                  DT13
3309  005712  067240                  DF20
3310                          ;ERROR 223
3311  005714  061111                  EM39            ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
3312  005716  064540                  DH17
3313  005720  066076                  DT1
3314  005722  067070                  DF10
3315                          ;ERROR 224
3316  005724  062505                  EM66            ;CYL ADDR IN RKMR3 INCORRECT
3317  005726  064540                  DH17
3318  005730  066076                  DT1
3319  005732  067070                  DF10
3320                          ;ERROR 225
3321  005734  062600                  EM68            ;READING CYL 1 HEADERS ON CYL 0
3322  005736  064540                  DH17
3323  005740  066076                  DT1
3324  005742  067070                  DF10
3325                          ;ERROR 226
3326  005744  057630                  EM12            ;NO RDY
3327  005746  064763                  DH26            ;AFTER READ DATA CMD
3328  005750  066076                  DT1
3329  005752  067070                  DF10
3330                          ;ERROR 227
3331  005754  060073                  EM21            ;CERR SET
3332  005756  064763                  DH26
3333  005760  066076                  DT1
3334  005762  067154                  DF15
3335                          ;ERROR 230
3336  005764  063522                  EM87            ;CANT READ BSE INFO
```

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3337  005766  066026                    DH53                    ;ON SECT 10,12,14,16,18,20
3338  005770  066076                    DT1
3339  005772  067214                    DF17
3340                            ;ERROR 231
3341  005774  000000                    0
3342  005776  000000                    0
3343  006000  000000                    0
3344  006002  000000                    0
3345                            ;ERROR 232
3346  006004  060740                    EM36                    ;CYL ADDR IN RKMR3 NOT=RKDC
3347  006006  064744                    DH25                    ;AFTER SEEK CMD
3348  006010  066076                    DT1
3349  006012  067024                    DF5
3350                            ;ERROR 233
3351  006014  063522                    EM87                    ;CANNOT READ BSE INFO
3352  006016  065405                    DH42                    ;ON SECT 0,2,4,6,8
3353  006020  066076                    DT1
3354  006022  067214                    DF17
3355                            ;ERROR 234
3356  006024  000000                    0
3357  006026  000000                    0
3358  006030  000000                    0
3359  006032  000000                    0
3360                            ;ERROR 235
3361  006034  062637                    EM69                    ;ALIGN CARTRIDGE USED
3362  006036  065445                    DH44                    ;WILL BYPASS FORMAT & ALL R/W TESTS
3363  006040  066076                    DT1
3364  006042  067070                    DF10
3365                            ;ERROR 236
3366  006044  062147                    EM56                    ;UNEXP MEM PARITY TRAP
3367  006046  065   3                   DH23                    ;TEST #, TRAP PC
3368  006050  066474                    DT11
3369  006052  067004                    DF3
3370                            ;ERROR 237
3371  006054  062672                    EM71                    ;DSC SET
3372  006056  064675                    DH22                    ;AFTER DRIVE CLEAR CMD
3373  006060  066076                    DT1
3374  006062  067070                    DF10
3375                            ;ERROR 240
3376  006064  062600                    EM68                    ;READ CYL 1 HEADERS ON CYL 0
3377  006066  064540                    DH17                    ;AFTER RECAL CMD
3378  006070  066076                    DT1
3379  006072  067070                    DF10
3380                            ;ERROR 241
3381  006074  060740                    EM36                    ;RKMR3 NOT = RKDC
3382  006076  064446                    DH14                    ;AFTER SEEK WITH BAD PARITY
3383  006100  066316                    DT8
3384  006102  067044                    DF6
3385                            ;ERROR 242
3386  006104  061040                    EM38                    ;CYL DIFF IN RKMR2 INCORRECT
3387  006106  064446                    DH14
3388  006110  066316                    DT8
3389  006112  067044                    DF6
3390
3391                            ;ERROR 243
3392  006114  060740                    EM36                    ;CYL ADDR IN RKMR3 INCORRECT
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3393  006116  064744                DH25                    ;AFTER SEEK CMD
3394  006120  066316                DT8
3395  006122  067044                DF6
3396                          ;ERROR 244
3397  006124  062761                EM74                    ;RTZ NOT SET
3398  006126  065364                DH41                    ;DURING RECAL CMD
3399  006130  066076                DT1
3400  006132  067070                DF10
3401                          ;ERROR 245
3402  006134  057661                EM13                    ;NO ATTN
3403  006136  065641                DH48                    ;AFTER SEEK TO INVALID CYL
3404  006140  066076                DT1
3405  006142  067070                DF10
3406                          ;ERROR 246
3407  006144  063006                EM75                    ;IDAE NOT SET
3408  006146  065641                DH48
3409  006150  066136                DT4
3410  006152  067044                DF6
3411                          ;ERROR 247
3412  006154  060552                EM32                    ;FAULT NOT SET
3413  006156  065641                DH48
3414  006160  066136                DT4
3415  006162  067044                DF6
3416                          ;ERROR 250
3417  006164  063034                EM76                    ;PIP SET
3418  006166  065641                DH48
3419  006170  066136                DT4
3420  006172  067044                DF6
3421                          ;ERROR 251
3422  006174  057762                EM16                    ;DSC NOT SET
3423  006176  065641                DH48
3424  006200  066136                DT4
3425  006202  067044                DF6
3426                          ;ERROR 252
3427  006204  060007                EM17                    ;MSG A0 ERROR
3428  006206  065641                DH48
3429  006210  066500                DT13
3430  006212  067240                DF20
3431                          ;ERROR 253
3432  006214  060024                EM18                    ;MSG B0 ERROR
3433  006216  065641                DH48
3434  006220  066500                DT13
3435  006222  067240                DF20
3436                          ;ERROR 254
3437  006224  060041                EM19                    ;MSG A1 ERROR
3438  006226  065641                DH48
3439  006230  066500                DT13
3440  006232  067240                DF20
3441                          ;ERROR 255
3442  006234  060056                EM20                    ;MSG B1 ERROR
3443  006236  065641                DH48
3444  006240  066500                DT13
3445  006242  067240                DF20
3446                          ;ERROR 256
3447  006244  061040                EM38                    ;CYL DIFF IN RKMR2 NOT='CYL DIF'
3448  006246  065641                DH48
```

```
3449  006250  066136                  DT4
3450  006252  067044                  DF6
3451                          ;ERROR 257
3452  006254  060740                  EM36                ;CYL ADDR IN RKMR3 NOT=RKDC
3453  006256  065641                  DH48
3454  006260  066136                  DT4
3455  006262  067044                  DF6
3456                          ;ERROR 260
3457  006264  000000                  0
3458  006266  000000                  0
3459  006270  000000                  0
3460  006272  000000                  0
3461                          ;ERROR 261
3462  006274  000000                  0
3463  006276  000000                  0
3464  006300  000000                  0
3465  006302  000000                  0
3466                          ;ERROR 262
3467  006304  063055                  EM77                ;FAULT NOT CLEARED
3468  006306  064675                  DH22                ;AFTER DRIVE CLEAR CMD
3469  006310  066076                  DT1
3470  006312  067070                  DF10
3471                          ;ERROR 263
3472  006314  063103                  EM78                ;CYL DIFF IN RKMR2 NOT=1 IN SEEK TO SELF
3473  006316  064446                  DH14                ;AFTER SEEK WITH BAD PARITY
3474  006320  066316                  DT8
3475  006322  067044                  DF6
3476                          ;ERROR 264
3477  006324  061174                  EM41                ;CYL ADDR NOT CLEARED
3478  006326  065027                  DH30                ;AFTER READ HEADER CMD
3479  006330  066560                  DT14
3480  006332  067314                  DF22
3481                          ;ERROR 265
3482  006334  060024                  EM18                ;MSG BO ERROR
3483  006336  064675                  DH22                ;AFTER DRIVE CLEAR CMD
3484  006340  066500                  DT13
3485  006342  067240                  DF20
3486                          ;ERROR 266
3487  006344  060056                  EM20                ;MSG B1 ERROR
3488  006346  064675                  DH22
3489  006350  066500                  DT13
3490  006352  067240                  DF20
3491                          ;ERROR 267
3492  006354  060024                  EM18
3493  006356  065301                  DH39                ;AFTER WRITE HEADER CMD
3494  006360  066500                  DT13
3495  006362  067240                  DF20
3496                          ;ERROR 270
3497  006364  060056                  EM20
3498  006366  065301                  DH39
3499  006370  066500                  DT13
3500  006372  067240                  DF20
3501                          ;ERROR 271
3502  006374  060024                  EM18
3503  006376  065027                  DH30                ;AFTER READ HEADER CMD
3504  006400  066500                  DT13
```

```
3505  006402  067240                  DF20
3506                          ;ERROR 272
3507  006404  060056                  EM20
3508  006406  065027                  DH30
3509  006410  066500                  DT13
3510  006412  067240                  DF20
3511                          ;ERROR 273
3512  006414  060007                  EM17                    ;MSG A0 ERROR
3513  006416  064675                  DH22                    ;AFTER DRV CLR CMD
3514  006420  066500                  DT13
3515  006422  067240                  DF20
3516                          ;ERROR 274
3517  006424  060041                  EM19                    ;MSG A1 ERROR
3518  006426  064675                  DH22
3519  006430  066500                  DT13
3520  006432  067240                  DF20
3521                          ;ERROR 275
3522  006434  060024                  EM18                    ;MSG B0 ERROR
3523  006436  064540                  DH17                    ;AFTER RECAL CMD
3524  006440  066500                  DT13
3525  006442  067240                  DF20
3526                          ;ERROR 276
3527  006444  060056                  EM20                    ;MSG B1 ERROR
3528  006446  064540                  DH17
3529  006450  066500                  DT13
3530  006452  067240                  DF20
3531                          ;ERROR 277
3532  006454  060007                  EM17                    ;MSG A0 ERROR
3533  006456  065301                  DH39                    ;AFTER WRITE HEADER CMD
3534  006460  066500                  DT13
3535  006462  067240                  DF20
3536                          ;ERROR 300
3537  006464  060041                  EM19                    ;MSG A1 ERROR
3538  006466  065301                  DH39
3539  006470  066500                  DT13
3540  006472  067240                  DF20
3541                          ;ERROR 301
3542  006474  060007                  EM17
3543  006476  065027                  DH30                    ;AFTER READ HEADER CMD
3544  006500  066500                  DT13
3545  006502  067240                  DF20
3546                          ;ERROR 302
3547  006504  060041                  EM19
3548  006506  065027                  DH30
3549  006510  066500                  DT13
3550  006512  067240                  DF20
3551                          ;ERROR 303
3552  006514  061111                  EM39                    ;CYL DIFF/OFFSET NOT CLEARED
3553  006516  065301                  DH39                    ;AFTER WRITE HEADER CMD
3554  006520  066560                  DT14
3555  006522  067314                  DF22
3556                          ;ERROR 304
3557  006524  061174                  EM41                    ;CYL ADDR NOT CLEARED
3558  006526  065301                  DH39
3559  006530  066560                  DT14
3560  006532  067314                  DF22
```

```
3561
3562                                    ;ERROR 305
3563  006534  063211                        EM80            ;UNLD NOT SET
3564  006536  065263                        DH38            ;AFTER LIMIT DETECT
3565  006540  066076                        DT1
3566  006542  067070                        DF10
3567                                    ;ERROR 306
3568  006544  063241                        EM81            ;SPIN NOT SET
3569  006546  064204                        DH9             ;AFTER START SPIN CMD.
3570  006550  066076                        DT1
3571  006552  067070                        DF10
3572                                    ;ERROR 307
3573  006554  063267                        EM82            ;RTZ NOT SET
3574  006556  065364                        DH41            ;DURING RECAL CMD
3575  006560  066076                        DT1
3576  006562  067070                        DF10
3577                                    ;ERROR 310
3578  006564  063314                        EM83            ;READ HEADER ERROR
3579  006566  063767                        DH1
3580  006570  066364                        DT9
3581  006572  067274                        DF21
3582                                    ;ERROR 311
3583  006574  063314                        EM83
3584  006576  063767                        DH1
3585  006600  066430                        DT10
3586  006602  067274                        DF21
3587                                    ;ERROR 312
3588  006604  063354                        EM84            ;FORMAT NOT SET
3589  006606  065301                        DH39            ;AFTER WRITE HEADER CMD
3590  006610  066076                        DT1
3591  006612  067070                        DF10
3592                                    ;ERROR 313
3593  006614  063354                        EM84
3594  006616  065027                        DH30            ;AFTER READ HEADER CMD
3595  006620  066076                        DT1
3596  006622  067070                        DF10
3597                                    ;ERROR 314
3598  006624  062172                        EM57            ;WCE AT CYL 411,TRK 2,SEC 21
3599  006626  063767                        DH1
3600  006630  066076                        DT1
3601  006632  067010                        DF4
3602                                    ;ERROR 315
3603  006634  062226                        EM58            ;SPOK NOT CLEARED
3604  006636  064560                        DH18            ;AFTER UNLD CMD
3605  006640  066076                        DT1
3606  006642  067070                        DF10
3607                                    ;ERROR 316
3608  006644  062657                        EM70            ;UNEXP ATTN
3609  006646  064204                        DH9             ;AFTER START SPIN CMD
3610  006650  066076                        DT1
3611  006652  067070                        DF10
3612                                    ;ERROR 317
3613  006654  062657                        EM70
3614  006656  064277                        DH11            ;AFT SPIN CMD &  FWD SET
3615  006660  066076                        DT1
3616  006662  067070                        DF10
```

```
3617                                    ;ERROR 320
3618  006664  062657                            EM70
3619  006666  064336                            DH12            ;AT INNER LIMIT FROM ST SPIN CMD
3620  006670  066076                            DT1
3621  006672  067070                            DF10
3622                                    ;ERROR 321
3623  006674  062657                            EM70
3624  006676  064377                            DH13            ;FROM OUTER LIM TO CYL 0 DURING LOADING
3625  006700  066076                            DT1
3626  006702  067070                            DF10
3627                                    ;ERROR 322
3628  006704  060041                            EM19            ;MSG A1 ERROR
3629  006706  064476                            DH16            ;AFT LD HEAD REG & SEEK
3630  006710  066500                            DT13
3631  006712  067240                            DF20
3632                                    ;ERROR 323
3633  006714  060056                            EM20            ;MSG B1 ERROR.
3634  006716  064476                            DH16
3635  006720  066500                            DT13
3636  006722  067240                            DF20
3637                                    ;ERROR 324
3638  006724  061471                            EM46            ;MSG A2 ERROR
3639  006726  064476                            DH16
3640  006730  066560                            DT14
3641  006732  067314                            DF22
3642                                    ;ERROR 325
3643  006734  061504                            EM47            ;MSG B2 ERROR
3644  006736  064476                            DH16
3645  006740  066560                            DT14
3646  006742  067314                            DF22
3647                                    ;ERROR 326
3648  006744  062740                            EM73            ;CTO SET
3649  006746  063435                            EM86            ;WHILE WAITING FOR OR REC'D CONTR RDY. MSG A&B BAD
3650  006750  066076                            DT1
3651  006752  066760                            DF2
3652                                    ;ERROR 327
3653  006754  063170                            EM79            ;NED SET
3654  006756  063435                            EM86
3655  006760  066076                            DT1
3656  006762  066760                            DF2
3657
3658                                    ;ERROR 330
3659  006764  057266                            EM5             ;MDS SET
3660  006766  063435                            EM86
3661  006770  066076                            DT1
3662  006772  066760                            DF2
```

```
3663
3664                                        .SBTTL  PROGRAM SETUP
3665
3666  006774  012737  000001  001336  PARSRT: MOV     #1,PARAM        ;SET FLAG FOR 220 START
3667  007002  005037  001340                  CLR     BYPT16
3668  007006  005037  001342                  CLR     MODTST
3669  007012  000450                          BR      PRGSRT          ;START PROGRAM
3670
3671  007014  005037  001336          BYT16:  CLR     PARAM
3672  007020  012737  000001  001340          MOV     #1,BYPT16       ;SET FLAG TO BYPASS TEST 16
3673  007026  005037  001342                  CLR     MODTST
3674  007032  000440                          BR      PRGSRT
3675
3676  007034  012737  000001  001336  BYT16A: MOV     #1,PARAM
3677  007042  012737  000001  001340          MOV     #1,BYPT16
3678  007050  005037  001342                  CLR     MODTST
3679  007054  000427                          BR      PRGSRT
3680
3681  007056  005037  001336          MDTST:  CLR     PARAM
3682  007062  005037  001340                  CLR     BYPT16
3683  007066  012737  000001  001342          MOV     #1,MODTST
3684  007074  000417                          BR      PRGSRT
3685
3686  007076  005037  001336          MDTSTA: CLR     PARAM
3687  007102  012737  000001  001340          MOV     #1,BYPT16
3688  007110  012737  000001  001342          MOV     #1,MODTST
3689  007116  000406                          BR      PRGSRT
3690  007120  005037  001336          START:  CLR     PARAM           ;CLEAR FOR 200 START
3691  007124  005037  001340                  CLR     BYPT16
3692  007130  005037  001342                  CLR     MODTST
3693  007134  000005                  PRGSRT: RESET                   ;CLEAR ALL INT ENABLE & INIT
3694  007136  012706  001100                  MOV     #STACK,SP       ;SETUP STACK POINTER
3695  007142  012746  000000                  MOV     #PRO,-(SP)      ;PSW LOADED TO BE
3696  007146  012746  007154                  MOV     #1$,-(SP)       ;LSI-11 COMPATABLE
3697  007152  000002                          RTI                     ;ENABLE ALL INTERRUPTS
3698
3699  007154  004737  052156          1$:     JSR     PC,$TKINT       ;SETUP KB VECTOR ADDR, PRIORITY 4
3700                                                                  ;& TURN ON KB INTERRUPT
3701
3702
3703                                          ;*** CPU PRIORITY LEVEL NOW AT 0 ***
3704                                          ;*** ANY DEVICE WHICH SETS ITS   ***
3705                                          ;*** INTERRUPT ENABLE BIT WILL   ***
3706                                          ;*** SERVICED.                   ***
3707
3708                                          ;CLOCK INTERRUPTS WILL CHANGE CPU PRIORITY TO LEVEL 6 (IN 'ST5')
3709                                          ;RK06 CONTROLLER INTERRUPTS WILL CHANGE CPU PRIORITY TO LEVEL 5 IN 'SETINT')
3710                                          ;KEYBOARD INTERRUPTS WILL CHANGE CPU PRIORITY TO LEVEL 4 (SEE ABOVE)
3711
3712                                          ;ALL 'SYSMAC' TRAPS WILL CHANGE CPU PRIORITY TO LEVEL 7 (SEE BELOW)
3713
3714                                                                  ;SYSMAC 'SETUP'
3715                                  .SBTTL  INITIALIZE THE COMMON TAGS
3716                                  ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
3717  007160  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
3718  007164  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
```

```
3719  007166  022706  001140            CMP     #SWR,R6 ;;DONE?
3720  007172  001374                    BNE     .-6             ;;LOOP BACK IF NO
3721  007174  012706  001100            MOV     #STACK,SP       ;;SETUP THE STACK POINTER
3722                          ;;INITIALIZE A FEW VECTORS
3723  007200  012737  050264  000020    MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
3724  007206  012737  000340  000022    MOV     #340,@#IOTVEC+2 ;;LEVEL 7
3725  007214  012737  050544  000030    MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
3726  007222  012737  000340  000032    MOV     #340,@#EMTVEC+2 ;;LEVEL 7
3727  007230  012737  054262  000034    MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
3728  007236  012737  000340  000036    MOV     #340,@#TRAPVEC+2;LEVEL 7
3729  007244  012737  050176  000024    MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
3730  007252  012737  000340  000026    MOV     #340,@#PWRVEC+2 ;;LEVEL 7
3731  007260  013737  042756  042750    MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
3732  007266  005037  001174            CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
3733  007272  005037  001176            CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
3734  007276  112737  000001  001115    MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
3735  007304  012737  007304  001106    MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
3736  007312  012737  007312  001110    MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
3737                          ;;SIZE FOR A HARDWARE SWITCH REGISTER, IF NOT FOUND OR IT IS
3738                          ;;EQUAL TO A "-1"  SETUP FOR A SOFTWARE SWITCH REGISTER.
3739  007320  013746  000004            MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
3740  007324  012737  007360  000004    MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
3741  007332  012737  177570  001140    MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
3742  007340  012737  177570  001142    MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
3743  007346  022777  177777  171564    CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
3744  007354  001012                    BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
3745                                                            ;;AND  THE HARDWARE SWR IS NOT = -1
3746  007356  000403                    BR      65$             ;;BRANCH IF NO TIMEOUT
3747  007360  012716  007366    64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
3748  007364  000002                    RTI
3749  007366  012737  000176  001140    65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
3750  007374  012737  000174  001142            MOV     #DISPREG,DISPLAY
3751  007402  012637  000004            66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
3752
3753  007406  005037  001216            CLR     $PASS           ;;CLEAR PASS COUNT
3754  007412  132737  000200  001231    BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
3755  007420  001403                    BEQ     67$             ;;YES,USE NON-APT SWITCH
3756  007422  012737  001232  001140    MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
3757  007430                    67$:
3758  007430  012737  007474  000004    MEMPAR: MOV     #1$,ERRVEC      ;SET TIMEOUT VECTOR
3759  007436  012737  000340  000006            MOV     #PR7,ERRVEC+2
3760
3761  007444  012701  172100            MOV     #MEMBAS,R1      ;ADDR OF MEM CSR
3762  007450  005011            3$:     CLR     (R1)            ;SEE IF CAN REFERENCE
3763  007452  012711  000001            MOV     #1,(R1)         ;SET ENABLE BIT IF YES
3764  007456  012737  050114  000114    MOV     #MEMERR,MEMVEC  ;LOAD MEMORY CHECK VECTOR IF NO TIMEOUT
3765  007464  012737  000340  000116    MOV     #PR7,MEMVEC+2
3766  007472  000401                    BR      2$
3767
3768  007474  022626            1$:     CMP     (SP)+,(SP)+     ;ADJ STACK
3769  007476  062701  000002    2$:     ADD     #2,R1           ;TRY NEXT CSR
3770  007502  020127  172140            CMP     R1,#MEMBAS+40   ;SEE IF TRIED ALL
3771  007506  001360                    BNE     3$              ;BR IF NO
3772  007510  012737  000006  000004    MOV     #ERRVEC+2,ERRVEC        ;RESTORE TRAP CATCHER
3773  007516  005037  000006            CLR     ERRVEC+2
3774
```

```
3775  007522  004737  043076                  JSR     PC,CLRFLG       ;CLEAR DDUMP THRU SIZFLG
3776  007526  005037  001220                  CLR     $DEVCT
3777  007532  005037  001222                  CLR     $UNIT
3778
3779                                          ;
3780                                          ;FIND OUT IF XXDP, ACT, APT; CHAIN OR DUMP MODE
3781                                          ;
3782
3783  007536  005737  000042          START1: TST     42
3784  007542  001015                          BNE     1$              ;BR IF AUTO
3785  007544  004737  043116                  JSR     PC,TITLE        ;MANUAL, TYPE PROG ID
3786  007550  123727  000041  000013          CMPB    41,#13          ;13=LOADED BY XXDP
3787  007556  001011                          BNE     2$
3788  007560  005237  003432                  INC     DDUMP           ;SET RK06 DUMP MODE FLAG
3789  007564  104401  055405                  TYPE    ,MSG2           ;REPLACE DRO PACK W/SCRATCH & DO<CR>
3790  007570  000000                          HALT                    ;HALT HERE
3791  007572  000137  007606                  JMP     ST2
3792  007576  000137  007652          1$:     JMP     ST3
3793  007602  005237  003440          2$:     INC     PPTP            ;SET ACT/APT/PTP DUMP MODE FLAG
3794
3795                                          ;
3796                                          ;CHECK IF ALL PARAMETERS DEFAULTED.  IF NOT, BEGIN INPUT DIALOGUE
3797                                          ;WITH OPERATOR.  THE REPLY TO 'DRIVES TO BE TESTED' SHOULD BE
3798                                          ;DRIVE NOS.  SEPERATED BY COMMAS & TERMINATED BY <CR>
3799                                          ;       EX:     DRIVES TO BE TESTED:  1,2,4<CR>
3800                                          ;
3801
3802  007606  005737  001336          ST2:    TST     PARAM
3803  007612  001002                          BNE     1$              ;BR IF 220 START
3804  007614  000137  007704                  JMP     ST4             ;200 START, DEFAULT & SIZE THE BUSS
3805  007620  104401  055466          1$:     TYPE    ,MSG3           ;DRIVES TO BE TESTED
3806  007624  004737  043176                  JSR     PC,GDRVS        ;GET DR NOS.
3807  007630  104401  055520                  TYPE    ,MSG4           ;BUSS ADDR
3808  007634  004737  043336                  JSR     PC,GBA          ;GET BA
3809  007640  104401  055546                  TYPE    ,MSG5           ;CONT INT VECTOR
3810  007644  004737  043364                  JSR     PC,GINT         ;GET INT VECTOR
3811  007650  000427                          BR      ST5
3812
3813                                          ;
3814                                          ;AUTO MODE
3815                                          ;CHECK IF LOADED BY XXDP OR OTHER.  SET FLAGS & NO INPUT DIALOGUE.
3816                                          ;DEFAULT ALL PARAMETERS.  TEST ONLY THOSE DRIVES THAT ARE READY
3817                                          ;ON THE BUSS
3818                                          ;
3819
3820  007652  123727  000041  000013  ST3:    CMPB    41,#13          ;13=LOADED BY XXDP
3821  007660  001007                          BNE     1$
3822  007662  005237  003434                  INC     DDPCH           ;SET RK06 CHAIN MODE FLAG
3823  007666  004737  043116                  JSR     PC,TITLE
3824  007672  104401  055611                  TYPE    ,MSG7           ;DRO NOT TSTD
3825  007676  000402                          BR      ST4
3826  007700  005237  003436          1$:     INC     ACT11           ;SET ACT AUTO FLAG.
3827
3828  007704  012737  177440  001264  ST4:    MOV     #177440,$BASE   ;DEFAULT VALUE
3829  007712  012737  000210  001314          MOV     #210,RKVEC      ;DEFAULT VALUE
3830  007720  004737  043416                  JSR     PC,SETINT
```

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3831  007724  005237  003472                  INC     SIZFLG          ;DO "SIZE THE BUSS" TEST
3832
3833  007730  005037  003304          ST5:    CLR     UNLD            ;INITIALIZE FLAGS
3834  007734  005037  003306                  CLR     BADHDR                  ;USED IN 'STOP ROUTINE
3835  007740  005037  003310                  CLR     HPEND                   ;FOR VALID PROGRAM HALTS
3836  007744  005037  001176                  CLR     $ESCAPE
3837  007750  005037  001170                  CLR     $TMF4           ;CLR RK06 IND. FLAG
3838  007754  012737  003444  001346          MOV     #DRIV0,DRVPTR   ;SETUP
3839  007762  005037  001220                  CLR     $DEVCT          ;NO. OF DRVS DONE
3840  007766  005037  001222                  CLR     $UNIT           ;CURRENT DRV UNDER TEST
3841  007772  012737  010040  000004          MOV     #1$,ERRVEC      ;SETUP TIMEOUT ERROR VECTOR
3842  010000  005777  171322                  TST     @LKS            ;SEE IF L-CLOCK THERE
3843  010004  005237  003464                  INC     LCLKF           ;PRESENT, SET FLAG.
3844  010010  013700  001330                  MOV     LCVEC,R0        ;VECTOR ADDR
3845  010014  012737  010102  000004          MOV     #2$,ERRVEC
3846  010022  005777  171272                  TST     @PKS            ;SEE IF P-CLOCK THERE
3847  010026  005237  003466                  INC     PCLKF           ;PRESENT, SET FLAG
3848  010032  013700  001332                  MOV     PCVEC,R0        ;VECTOR ADDR
3849  010036  000412                          BR      3$
3850
3851  010040  022626                  1$:     CMP     (SP)+,(SP)+     ;L-CLOCK NOT THERE, CLEAR STACK
3852  010042  012737  010106  000004          MOV     #4$,ERRVEC
3853  010050  005777  171244                  TST     @PKS            ;SEE IF P-CLOCK THERE
3854  010054  005237  003466                  INC     PCLKF           ;PRESENT, SET FLAG
3855  010060  013700  001332                  MOV     PCVEC,R0        ;VECTOR ADDR
3856  010064  005237  003470          3$:     INC     DOTIM           ;INDICATES TIMING TESTS CAN BE DONE
3857  010070  012720  047246                  MOV     #CLOCK,(R0)+    ;SERVICE ROUTINE FOR CLOCKS
3858  010074  012710  000300                  MOV     #PR6,(R0)
3859  010100  000407                          BR      TST1            ;;GO TO NEXT TEST
3860
3861  010102  022626                  2$:     CMP     (SP)+,(SP)+     ;P-CLOCK NOT THERE, CLEAR STACK
3862  010104  000767                          BR      3$
3863
3864  010106  022626                  4$:     CMP     (SP)+,(SP)+     ;NEITHER CLOCK THERE, CLEAR STACK
3865  010110  005037  003470                  CLR     DOTIM           ;TIMING TESTS CANNOT BE DONE.
3866  010114  104401  056052                  TYPE    ,MSG13          ;ALL TIMING TESTS BYPASSED
3867
3868
```

```
                                .SBTTL BASIC CONTROLLER TESTS, SIZING & SETUP

                                ;;*****************************************************************
                                ;*TEST 1         REFERENCE ALL CONTROLLER REGISTERS
                                ;*
                                ;*       THIS TEST VERIFIES THAT ALL THE CONTROLLER REGISTERS
                                ;*       CAN BE ACCESSED.  THE INABILITY  TO BE ACCESSED WILL
                                ;*       RESULT IN A TIMEOUT TRAP WITH  AN ERROR MSG.  ANY
                                ;*       ERROR IN THIS TEST WILL RESULT IN ABORTING ALL OTHER
                                ;*       TESTS AND JUMPING TO  'END OF PASS'
                                ;*
                                ;;*****************************************************************
010120  000004                TST1:   SCOPE
010122  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
010130  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
010134  012746  000000                MOV     #PR0,-(SP)      ;RESET PSW TO PRIORITY 0
010140  012746  010146                MOV     #5$,-(SP)       ;& MAKE IT LSI COMPATABLE
010144  000002                        RTI
010146                          5$:
010146  012737  010272  000004        MOV     #1$,ERRVEC      ;SETUP TIMOUT ERROR VECTOR
010154  013705  001264                MOV     $BASE,R5        ;SETUP INDEX REG.
010160  005765  000000                TST     RKCS1(R5)       ;REFERENCE ALL THE
010164  005765  000010                TST     RKCS2(R5)       ;CONTROLLER REGISTERS
010170  005765  000002                TST     RKWC(R5)
010174  005765  000004                TST     RKBA(R5)
010200  005765  000006                TST     RKDA(R5)
010204  005765  000012                TST     RKDS(R5)        ;TIMEOUTS IN THIS SECTION
010210  005765  000014                TST     RKER(R5)        ;INDICATE THAT THE CONTROLLER
010214  005765  000016                TST     RKASOF(R5)      ;REGISTERS CANNOT BE READ.
010220  005765  000020                TST     RKDC(R5)        ;TESTING SHOULD NOT PROCEED
010224  005765  000024                TST     RKDB(R5)        ;UNTIL THIS IS REMEDIED.
010230  005765  000026                TST     RKMR1(R5)
010234  005765  000034                TST     RKMR2(R5)
010240  005765  000036                TST     RKMR3(R5)
010244  005765  000030                TST     RKECPS(R5)
010250  005765  000032                TST     RKECPT(R5)

010254  012737  050026  000004        MOV     #BADTMO,ERRVEC  ;SETUP TIMEOUT HANDLER
010262  012737  000340  000006        MOV     #PR7,ERRVEC+2
010270  000404                        BR      TST2            ;;GO TO NEXT TEST

010272  022626                  1$:   CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
010274  104007                        ERROR   7               ;ABORT-COULD NOT REFERENCE CONTROLLER REGISTER
010276  000137  042722                JMP     $EOP1


                                ;;*****************************************************************
                                ;*TEST 2         SIZE THE BUSS
                                ;*
                                ;*       THIS TEST IS ENTERED ONLY IF 'DRIVE SELECTION' IS DEFAULTED
                                ;*       EITHER BY RUNNING IN THE AUTO MODE OR A 200 START IN THE
                                ;*       MANUAL MODE.
                                ;*       EVERY DRIVE FROM 0 THRU 7 IS ADDRESSED.
                                ;*       CONTROLLER ERROR (CERR) IS EXAMINED AND IF NOT SET, THE
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                                        ;*      DRIVE WILL BE TESTED AS AN RK06.  IF SET, THE PROGRAM WILL BYPASS
                                        ;*      TESTING THAT DRIVE ONLY IF THE ERROR WAS A RESULT OF
                                        ;*      MDS, UFE OR NED BEING SET; OR BOTH NED & DRA RESET IN-
                                        ;*      DICATING THE OTHER PORT IS ACCESSED.
                                        ;*      IF CERR DUE TO DTYE, THE DRIVE WILL BE TESTED AS AN RK07.
                                        ;*
                                        ;*************************************************************************
010302  000004                TST2:   SCOPE
010304  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
010312  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
010316  005237  001462                INC     BYPCERR         ;DO NOT TEST CERR IN 'FRDY'

010322  132737  000200  001231        BITB    #BIT7,$ENVM     ;SEE IF USE APT SELECTED DRIVES
010330  001002                        BNE     14$             ;BR IF YES
010332  000137  010452                JMP     12$             ;ELSE DO NORM SIZING OR VERIFY

010336  104401  055732        14$:    TYPE    ,MSG10          ;WILL TEST DRIVES
010342  005037  003442                CLR     DRIVS           ;# OF DRIVES PRESENT
010346  005000                        CLR     R0              ;DRV ADDR
010350  012701  003444                MOV     #DRIV0,R1       ;DRV FLAG
010354  013702  001266                MOV     $DEVM,R2        ;APT DEVICE MAP

010360  032702  000001        15$:    BIT     #BIT0,R2        ;SEE IF DRV IN DEVICE MAP
010364  001410                        BEQ     16$             ;BR IF NO
010366  005237  003442                INC     DRIVS           ;ELSE INCR DRIVE COUNT
010372  005211                        INC     (R1)            ;& SET DRIVE PRESENT FLAG
010374  104401  001205                TYPE    ,$CRLF
010400  010046                        MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
                                                            ;;TYPE DRIVE #
010402  104403                        TYPOS                   ;;GO TYPE--OCTAL ASCII
010404     001                      .BYTE   1               ;;TYPE 1 DIGIT(S)
010405     000                      .BYTE   0               ;;SUPPRESS LEADING ZEROS

010406  005721        16$:    TST     (R1)+           ;ADV POINTER TO NEXT FLAG
010410  005200                INC     R0              ;INC DRIVE #
010412  022700  000010        CMP     #8.,R0          ;ALL 8 TESTED?
010416  001402                BEQ     17$             ;BR IF YES

010420  006002                ROR     R2              ;ELSE GET NEXT BIT OFF DEVICE MAP
010422  000756                BR      15$             ;& TRY AGAIN

010424  005737  003442        17$:    TST     DRIVS           ;SEE IF MORE DRIVES PRESENT
010430  001402                BEQ     18$             ;BR IF NO
010432  000137  011126                JMP     VERIFY          ;ELSE EXIT TEST & SETUP FOR RK07'S

010436  104126        18$:    ERROR   126             ;NO DRIVES FOUND IN $DEVM
010440  000000                HALT                    ;SETUP CORRECTLY & PRESS 'CONTINUE'
010442  000137  007730        JMP     ST5             ;TO TRY AGAIN
010446  000137  011126        20$:    JMP     VERIFY          ;DO NOT SIZE, GO TO NEXT TEST
010452  012765  000040  000010  12$:    MOV     #SCLR,RKCS2(R5) ;SUBSYSTEM CLEAR
010460  013737  001414  003360        MOV     T10,TEMP1
010466  004737  043530                JSR     PC,FRDY         ;FIND RDY
010472  104120                        ERROR   120             ;RDY NOT SET BY END OF SCLR
010474  005737  003472                TST     SIZFLG          ;SIZE BUS?
010500  001762                        BEQ     20$             ;BR IF NO
010502  104401  055732                TYPE    ,MSG10          ;WILL TEST DRIVES
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3981  010506  005037  003442            CLR     DRIVS           ;# OF DRIVES PRESENT
3982  010512  005000                    CLR     R0              ;DRV ADDR
3983  010514  012701  003444            MOV     #DRIV0,P1       ;DRV FLAG
3984  010520                    1$:
3985  010520  104415                    SCOP1
3986  010522  012706  001100            MOV     #STACK,SP       ;RESTORE STK PTR
3987
3988  010526  012765  000040  000010    MOV     #SCLR,RKCS2(R5) ;SUBSYS CLEAR
3989  010534  013737  001414  003360    MOV     T10,TEMP1
3990  010542  004737  043530            JSR     PC,FRDY         ;FIND RDY
3991  010546  104120                    ERROR   120             ;RDY NOT SET BY END OF SCLR
3992  010550  010065  000010            MOV     R0,RKCS2(R5)    ;SELECT THE DRIVE ADDR
3993  010554  012737  000001  003322    MOV     #SELDRV,HCS1
3994  010562  053737  001170  003322    BIS     $TMP4,HCS1      ;ADD CDT IF RK07
3995  010570  013765  003322  000000    MOV     HCS1,RKCS1(R5)  ;GET STATUS
3996  010576  013737  001426  003360    MOV     T50000,TEMP1
3997  010604  004737  044220            JSR     PC,DLY          ;DO DELAY TO CATCH MDS
3998  010610  013737  001414  003360    MOV     T10,TEMP1
3999  010616  004737  043530            JSR     PC,FRDY         ;FIND RDY
4000  010622  104117                    ERROR   117             ;NO RDY AFTER SELECT DR. CMD
4001  010624  032737  100000  003322    BIT     #CERR,HCS1
4002  010632  001052                    BNE     2$
4003  010634  013737  003350  003360    MOV     HMR2,TEMP1
4004  010642  042737  177770  003360    BIC     #^C<DRVMSK>,TEMP1
4005  010650  020037  003360            CMP     R0,TEMP1        ;S/B SAME
4006  010654  001020                    BNE     3$
4007  010656  005700                    TST     R0
4008  010660  001003                    BNE     4$
4009  010662  005737  003434            TST     DDPCH           ;SEE IF XXDP CHAIN MODE
4010  010666  001016                    BNE     5$
4011  010670  005237  003442    4$:     INC     DRIVS           ;INC DRIVE COUNT.
4012  010674  005211                    INC     (R1)            ;SET DRIVE PRESENT FLAG
4013  010676  053711  001170            BIS     $TMP4,(R1)      ;ADD CDT IF SET
4014  010702  104401  001205            TYPE    ,$CRLF
4015  010706  010046                    MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
4016                                                            ;;TYPE DR #
4017  010710  104403                    TYPOS                   ;;GO TYPE--OCTAL ASCII
4018  010712     001                    .BYTE   1               ;;TYPE 1 DIGIT(S)
4019  010713     000                    .BYTE   0               ;;SUPPRESS LEADING ZEROS
4020  010714  000403                    BR      5$
4021
4022  010716  004737  044236    3$:     JSR     PC,BYP          ;TYPE BYPASS DR #
4023  010722  104001                    ERROR   1               ;SELECTED DR # DOES NOT MATCH RKMR2 DR #
4024
4025  010724  005721            5$:     TST     (R1)+           ;ADVANCE PTR TO NEXT DR. FLAG
4026  010726  005200                    INC     R0              ;INC DR #
4027  010730  005037  001170            CLR     $TMP4           ;CLEAR RK07 FLAG FOR NEXT DRIVE
4028  010734  022700  000010            CMP     #8.,R0
4029  010740  001267                    BNE     1$              ;MORE LEFT.
4030  010742  005737  003442            TST     DRIVS
4031  010746  001065                    BNE     10$
4032  010750  104123                    ERROR   123             ;NO DRIVES FOUND
4033  010752  000000                    HALT                    ;SETUP CORRECTLY
4034  010754  000137  007730            JMP     ST5             ;& PRESS 'CONT'
4035
4036  010760  032737  000040  003336    2$:     BIT     #DTYE,HER
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4037  010766  001405                        BEQ     13$
4038  010770  012737  002000  001170        MOV     #CDT,$TMP4      ;ADD CDT
4039  010776  000137  010520                JMP     1$              ;TRY AGAIN
4040  011002  032737  001000  003324  13$:   BIT     #MDS,HCS2
4041  011010  001015                        BNE     6$
4042  011012  032737  000400  003324        BIT     #UFE,HCS2
4043  011020  001015                        BNE     7$
4044  011022  032737  000001  003334        BIT     #DRA,HDS
4045  011030  001015                        BNE     8$
4046  011032  032737  010000  003324        BIT     #NED,HCS2
4047  011040  001424                        BEQ     9$
4048  011042  000730                        BR      5$
4049
4050  011044  004737  044236          6$:   JSR     PC,BYP          ;TYPE BYP DR #
4051  011050  104002                        ERROR   2               ;MDS DETECTED
4052  011052  000724                        BR      5$
4053
4054  011054  004737  044236          7$:   JSR     PC,BYP
4055  011060  104003                        ERROR   3               ;UFE DETECTED
4056  011062  000720                        BR      5$
4057
4058  011064  032737  010000  003324  8$:   BIT     #NED,HCS2
4059  011072  001676                        BEQ     4$
4060  011074  104401  056153                TYPE    ,MSG15          ;DRV#
4061  011100  010046                        MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
4062                                                                ;;TYPE DR#
4063  011102  104403                        TYPOS                   ;;GO TYPE--OCTAL ASCII
4064  011104     001                        .BYTE   1               ;;TYPE 1 DIGIT(S)
4065  011105     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
4066  011106  104010                        ERROR   10              ;DRA & NED BOTH SET
4067  011110  000705                        BR      5$
4068
4069  011112  004737  044236          9$:   JSR     PC,BYP
4070  011116  104004                        ERROR   4               ;NO DRA & NO NED = OTHER PORT SELECTED
4071  011120  000701                        BR      5$
4072  011122  C00137  011520          10$:  JMP     NUDRV
4073
4074  011126                          VERIFY:
4075
4076
4077                                  ;;*****************************************************************
4078                                  ;*TEST 3        VERIFY OPERATOR DRIVE SELECTIONS
4079                                  ;*
4080                                  ;*      THIS TEST IS ENTERED ONLY IF DRIVE SELECTION IS NOT
4081                                  ;*      DEFAULTED.  EVERY DRIVE FROM 0 TO 7 IS ADDRESSED &
4082                                  ;*      CONTROLLER ERROR (CERR) IS EXAMINED. IF NOT SET, THE
4083                                  ;*      PROGRAM WILL ASSUME THE DRIVE IS PRESENT AS AN RK06
4084                                  ;*      IF CERR WAS SET, THAT DRIVE WILL BE BYPASSED
4085                                  ;*      ONLY IF THE ERROR WAS A RESULT OF MDS OR UFE SET OR BOTH
4086                                  ;*      NED & DRA RESET (WRONG PORT).  IF CERR IS  A RESULT OF
4087                                  ;*      NED ONLY, IT IS CHECKED AGAINT THE INPUTTED INFO TO
4088                                  ;*      VERIFY IT WAS NOT SPECIFIED.
4089                                  ;*      IF CERR DUE TO DTYE , THE DRIVE WILL BE TESTED AS AN RK07.
4090                                  ;*
4091                                  ;*****************************************************************
4092  011126  000004                  TST3:   SCOPE
```

```
4093  011130  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
4094  011136  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4095  011142  005000                          CLR     R0              ;DRIVE ADDR
4096  011144  012701  003444                  MOV     #DRIV0,R1       ;DRIVE FLAG
4097  011150                          1$:
4098  011150  104415                          SCOP1
4099  011152  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4100
4101  011156  012765  000040  000010          MOV     #SCLR,RKCS2(R5)
4102  011164  013737  001414  003360          MOV     T10,TEMP1
4103  011172  004737  043530                  JSR     PC,FRDY         ;FIND RDY
4104  011176  104120                          ERROR   120             ;NO RDY AFTER SCLR
4105  011200  010065  000010                  MOV     R0,RKCS2(R5)    ;DRV ADDR
4106  011204  012737  000001  003322          MOV     #SELDRV,HCS1
4107  011212  053737  001170  003322          BIS     $TMP4,HCS1      ;ADD CDT IF RK07
4108  011220  013765  003322  000000          MOV     HCS1,RKCS1(R5)  ;GET STATUS
4109  011226  013737  001426  003360          MOV     T50000,TEMP1
4110  011234  004737  044220                  JSR     PC,DLY          ;DO DELAY TO CATCH MDS
4111  011240  013737  001414  003360          MOV     T10,TEMP1
4112  011246  004737  043530                  JSR     PC,FRDY         ;FIND RDY
4113  011252  104117                          ERROR   117             ;NO RDY AFTER SELDRV CMD
4114  011254  032737  100000  003322          BIT     #CERR,HCS1
4115  011262  001036                          BNE     2$
4116  011264  013737  003350  003360          MOV     HMR2,TEMP1
4117  011272  042737  177770  003360          BIC     #^C<DRVMSK>,TEMP1
4118  011300  020037  003360                  CMP     R0,TEMP1        ;S/B SAME
4119  011304  001014                          BNE     3$
4120  011306  005711                  11$:    TST     (R1)
4121  011310  001402                          BEQ     4$
4122  011312  053711  001170                  BIS     $TMP4,(R1)      ;ADD CDT IF SET
4123  011316  005721                  4$:     TST     (R1)+           ;SHIFT PTR TO NEXT DR FLAG
4124  011320  005200                          INC     R0              ;INC DR#
4125  011322  005037  001170                  CLR     $TMP4           ;CLEAR CDT FLAG FOR NEXT DRIVE
4126  011326  022700  000010                  CMP     #8.,R0
4127  011332  001306                          BNE     1$              ;MORE LEFT
4128  011334  000475                          BR      TST4            ;;GO TO NEXT TEST
4129
4130  011336  004737  044236          3$:     JSR     PC,BYP          ;TRY BYPASS DRIVE#
4131  011342  104001                          ERROR   1               ;WRITTEN DR# DOES NOT MATCH RKMR2 DR#
4132  011344  005711                          TST     (R1)
4133  011346  001763                          BEQ     4$              ;BRANCH IF NOT SPEC BY INPUT
4134  011350  005337  003442          12$:    DEC     DRIVS           ;DECREMENT TOTAL DRIVS
4135  011354  005011                          CLR     (R1)            ;CLEAR DRIVE FLAG
4136  011356  000757                          BR      4$
4137
4138  011360  032737  000040  003336  2$:     BIT     #DTYE,HER
4139  011366  001405                          BEQ     13$
4140  011370  012737  002000  001170          MOV     #CDT,$TMP4      ;ADD CDT
4141  011376  000137  011150                  JMP     1$              ;TRY AGAIN
4142
4143  011402  032737  001000  003324  13$:    BIT     #MDS,HCS2
4144  011410  001027                          BNE     6$
4145  011412  032737  000400  003324          BIT     #UFE,HCS2
4146  011420  001027                          BNE     7$
4147  011424  032737  000001  003334          BIT     #DRA,HDS
4148  011430  001005                          BNE     8$
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4149  011432  032737  010000  003324          BIT     #NED,HCS2
4150  011440  001423                          BEQ     9$
4151  011442  000404                          BR      10$
4152  011444  032737  010000  003324  8$:     BIT     #NED,HCS2
4153  011452  001715                          BEQ     11$
4154  011454  005711                  10$:    TST     (P1)
4155  011456  001717                          BEQ     4$
4156
4157  011460  004737  044236                  JSR     PC,BYP          ;TYPE BYPASS DRIVE#
4158  011464  104006                          ERROR   6
4159  011466  000730                          BR      12$
4160
4161  011470  004737  044236          6$:     JSR     PC,BYP          ;TYPE BYPASS DRIVE#
4162  011474  104002                          ERROR   2               ;MDS DETECTED
4163  011476  000724                          BR      12$
4164
4165  011500  004737  044236          7$:     JSR     PC,BYP
4166  011504  104003                          ERROR   3               ;UFE DETECTED
4 67  011506  000720                          BR      12$
4168
4169  011510  004737  044236          9$:     JSR     PC,BYP
4170  011514  104004                          ERROR   4               ;DRA & NED RESET - OTHER PORT SELECTED
4171  011516  000714                          BR      12$
4172
4173
4174                                          ;
4175                                          ;THIS PART OF THE PROGRAM WILL BE REPEATED FOR EACH
4176                                          ;DRIVE PRESENT
4177                                          ;
4178                                          ;'$UNIT' CONTAINS THE ADDRESS OF THE DRIVE CURRENTLY
4179                                          ;UNDER TEST
4180
4181  011520  005037  001462          NUDRV:  CLR     BYPCERR         ;ENTER HERE FROM LAST TEST
4182                                                                  ;& TEST CERR IN 'FRDY'
4183  011524  005037  001170                  CLR     $TMP4           ;CLEAR RK07 IND FLAG
4184
4185                                  ;;**************************************************************
4186                                  ;*TEST 4         FIND NEXT DRIVE TO BE TESTED
4187                                  ;*
4188                                  ;*      THIS TEST FINDS THE NEXT DRIVE PRESENT & PUTS THAT
4189                                  ;*      ADDRESS IN '$UNIT' & $TMP4 IS SET TO CDT IF DRIVE IS RK07.
4190                                  ;*      THROUGHOUT THE FOLLOWING TESTS, THE DRIVE TESTED IS
4191                                  ;*      THE DRIVE WHOSE ADDRESS IS IN '$UNIT'.
4192                                  ;*
4193                                  ;;**************************************************************
4194  011530  000004                  TST4:   SCOPE
4195  011532  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
4196  011540  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4197  011544  012737  000004  001214          MOV     #$TN-1,$TESTN
4198  011552  012737  000004  001102          MOV     #$TN-1,$TSTNM
4199
4200  011560  005737  003442                  TST     DRIVS           ;ANY DRIVES PRESENT?
4201  011564  001004                          BNE     4$              ;YES BRANCH
4202  011566  104401  056271                  TYPE    ,MSG19          ;ALL DRIVES TESTED
4203  011572  000137  042722                  JMP     $EOP1           ;NO, GO TO END
4204
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4205  011576  013701  001346          4$:   MOV   DRVPTR,R1      ;ADDR OF NEXT DRIVE FLAG
4206  011602  005737  001220                TST   $DEVCT         ;IS FIRST DRIVE BEING CHECKED
4207  011606  001402                      BEQ   2$              ;YES, BRANCH
4208  011610  005237  001222          1$:   INC   $UNIT          ;INCR DRIVE ADDR TO NEXT DRIVE
4209  011614  005711                2$:   TST   (R1)            ;IS DRIVE PRESENT?
4210  011616  001002                      BNE   5$              ;BR IF YES
4211  011620  005721                      TST   (R1)+           ;ELSE FIND NEXT DRIVE
4212  011622  000772                      BR    1$
4213  011624  005737  003434          5$:   TST   DDPCH           ;DDP CHAIN MODE?
4214  011630  001405                      BEQ   3$              ;BR IF NO
4215  011632  005737  001222                TST   $UNIT           ;ELSE IS IT DRIVE 0?
4216  011636  001002                      BNE   3$              ;BR IF NO
4217  011640  005721                      TST   (R1)+           ;ELSE FIND NEXT DRIVE PRESENT
4218  011642  000762                      BR    1$
4219
4220  011644  032721  002000          3$:   BIT   #CDT,(R1)+      ;SEE IF DRIVE UNDER TEST IS RK07
4221  011650  001403                      BEQ   6$              ;BR IF NO
4222  011652  012737  002000  001170      MOV   #CDT,$TMP4      ;ELSE SET RK07 FLAG
4223  011660  010137  001346          6$:   MOV   R1,DRVPTR       ;STORE POINTER TO NEXT DR FLAG
4224  011664  104401  056153              TYPE  ,MSG15          ;"DRIVE"
4225  011670  013700  001222              MOV   $UNIT,R0
4226  011674  010046                      MOV   R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
4227                                                             ;;DRIVE #
4228  011676  104403                      TYPOS                 ;;GO TYPE--OCTAL ASCII
4229  011700     001                      .BYTE 1               ;;TYPE 1 DIGIT(S)
4230  011701     000                      .BYTE 0               ;;SUPPRESS LEADING ZEROS
4231
4232                                ;     TYPE  ,$CRLF
4233
4234  011702  005737  001170              TST   $TMP4           ;SEE IF RK07 UNDER TEST
4235  011706  001030                      BNE   7$              ;BR IF YES
4236  011710  012737  000631  012052      MOV   #631,LCM1       ;ELSE LOAD RK06 PARAMETERS
4237  011716  012737  000632  012054      MOV   #632,LC
4238  011724  012737  000633  012056      MOV   #633,LCP1
4239  011732  005037  012070              CLR   E.DDT
4240  011736  012737  000400  012060      MOV   #400,MC
4241  011744  012737  001000  012062      MOV   #1000,MC1
4242  011752  012737  000777  012064      MOV   #777,MASK
4243  011760  012737  160017  012066      MOV   #160017,MASK1
4244  011766  000443                      BR    TST5            ;;GOTO NEXT TEST
4245
4246  011770  012737  001455  012052  7$: MOV   #1455,LCM1       ;LOAD RK07 PARAMETERS
4247  011776  012737  001456  012054      MOV   #1456,LC
4248  012004  012737  001457  012056      MOV   #1457,LCP1
4249  012012  012737  000400  012070      MOV   #D.DDT,E.DDT
4250  012020  012737  001000  012060      MOV   #1000,MC
4251  012026  012737  002000  012062      MOV   #2000,MC1
4252  012034  012737  001777  012064      MOV   #1777,MASK
4253  012042  012737  140017  012066      MOV   #140017,MASK1
4254  012050  000412                      BR    TST5            ;;GOTO NEXT TEST
4255
4256  012052  000000          LCM1: 0                           ;LC-1
4257  012054  000000          LC:   0                           ;LAST CYL
4258  012056  000000          LCP1: 0                           ;LC+1
4259  012060  000000          MC:   0                           ;MAJ CYL
4260  012062  000000          MC1:  0                           ;MAJ CYL + 1 SHIFT
```

```
012064  000000                  MASK:   0
012066  000000                  MASK1:  0
012070  000000                  E.DDT:  0                       ;EXPECTED DRIVE TYPE TO E.AD
012072  000000                  FC:     0                       ;FIND CYL
012074  000001                  FCP1:   1                       ;FC+1
                                ;;*************************************************************
                                ;*TEST 5         UNLOAD DRIVE TO BE TESTED
                                ;*
                                ;*      THIS TEST UNLOADS THE DRIVE TO BE TESTED NEXT,
                                ;*      WAITS FOR ATTN & VERIFIES IT CAME FROM  THE CORRECT DRIVE.
                                ;*      IT THEN WAITS FOR SPEED OK TO GO LOW BEFORE
                                ;*      PROCEEDING TO THE NEXT TEST
                                ;*
                                ;;*************************************************************
012076  000004                  TST5:   SCOPE
012100  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
012106  012706  001100                  MOV     #STACK,SP
012112  005237  003304                  INC     UNLD            ;USED TO CHECK VALID HALT
012116  004737  045424                  JSR     PC,SUBCLR
012122  104024                          ERROR   24              ;CERR AFTER SCLR
012124  012737  000007  003322          MOV     #UNLOAD,HCS1
012132  004737  043434                  JSR     PC,DOCMD        ;DO UNLOAD CMD & GET CONTR READY
012136  104011                          ERROR   11              ;RDY NOT SET AFTER UNLOAD CMD.
012140  004737  044012                  JSR     PC,TSTATN
012144  104012                          ERROR   12              ;NO ATTN AFTER UNLOAD CMD
012146  004737  045424                  JSR     PC,SUBCLR
012152  104024                          ERROR   24              ;CERR AFTER SCLR
012154  013737  001414  003362          MOV     T10,TEMP2
012162  004737  046460                  JSR     PC,FSPOK
012166  104315                          ERROR   315             ;SPEED NOT DOWN BY TIMEOUT


012170                          PFSRT:                          ;ENTER HERE FOR POWER FAIL RESTART
                                .SBTTL STATIC & CYCLE UP TESTS

                                ;;*************************************************************
                                ;*TEST 6         REFERENCE & CHECK ALL STATUS BYTES IN RKMR2 & RKMR3
                                ;*
                                ;*       CHECKS THE ABILITY TO REFERENCE ALL
                                ;*      DRIVE REGISTERS AND THAT THEY CONTAIN CORRECT STATUS.
                                ;*
                                ;;*************************************************************
012170  000004                  TST6:   SCOPE
012172  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
012200  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
012204  004737  045424                  JSR     PC,SUBCLR
012210  104024                          ERROR   24              ;CERR AFTER SCLR
```

```
4317
4318  012212  004737  045074                JSR     PC,GSTAT
4319  012216  032737  000100  003350        BIT     #D.VV,HMR2
4320  012224  001004                        BNE     4$                      ;BR IF VV SET
4321  012226  012737  000040  003412        MOV     #D.DRA,E.A0             ;LOAD EXPECTED VALUE FOR A0
4322  012234  000403                        BR      5$
4323
4324  012236  012737  000140  003412  4$:   MOV     #<D.DRA!D.VV>,E.A0
4325  012244  005037  003414        5$:     CLR     E.B0                    ;EXPECTED MSG B0
4326  012250  012737  000740  003416        MOV     #<D.HDHM!D.BRHM!D.DOOR!D.CART>,E.A1      ;EXPECTED MSG A1
4327  012256  012737  000001  003420        MOV     #1,E.B1                 ;EXPECTED MSG B1
4328  012264  005037  003422                CLR     E.A2                    ;EXPECTED MSG A2
4329  012270  012737  000002  003424        MOV     #2,E.B2                 ;EXPECTED MSG B2
4330  012276  012737  000003  003430        MOV     #3,E.B3                 ;EXPECTED MSG B3
4331
4332  012304  004737  044252                JSR     PC,CHKMSG               ;CHECK MSGS A0,B0,A1,B1
4333  012310  000007                        .WORD   T.A2!T.B2!T.B3                  ;& MSGS SPECIFIED HERE
4334  012312  104016                        ERROR   16                      ;MSG A0 ERROR FOR DRIVE UNLOADED
4335  012314  104017                        ERROR   17                      ;MSG B0 ERROR
4336  012316  104020                        ERROR   20                      ;MSG A1 ERROR
4337  012320  104021                        ERROR   21                      ;MSG B1 ERROR
4338
4339  012322  012765  000002  000026        MOV     #2,RKMR1(R5)            ;SELECT WORD 2
4340  012330  004737  045074                JSR     PC,GSTAT
4341  012334  005737  001362                TST     CYLDIF                  ;SEE IF MSG A2=0
4342  012340  001401                        BEQ     64$                     ;BR IF YES
4343  012342  104022                        ERROR   22                      ;MSG A2 NOT CLEARED FOR DRIVE UNLOADED
4344  012344  005737  001364        64$:    TST     CYLADD                  ;SEE IF MSG B2=0
4345  012350  001401                        BEQ     65$                     ;BR IF YES
4346  012352  104023                        ERROR   23                      ;MSG B2 NOT CLEARED FOR DRIVE UNLOADED
4347  012354                        65$:
4348  012354  023727  001432  000001        CMP     HEADA,#1                ;FOR HEAD 0, B3=1
4349  012362  001401                        BEQ     TST7                    ;;GO TO NXT TST IF YES
4350  012364  104056                        ERROR   56                      ;HEAD REG IN B3 NOT 0 IN UNLOAD
4351
4352
4353
4354                                ;;*****************************************************************
4355                                ;*TEST 7         PRINT DRIVE SERIAL NUMBER
4356                                ;*
4357                                ;*      THIS TEST READS & PRINTS THE DRIVE SERIAL # FROM MSG A, WORD 11
4358                                ;*      IN BCD & IS PERFORMED ON THE 1ST PASS ONLY
4359                                ;*
4360                                ;*****************************************************************
4361  012366  000004                TST7:   SCOPE
4362  012370  012737  000001  001174        MOV     #1,$TIMES               ;;DO 1 ITERATION
4363  012376  012706  001100                MOV     #STACK,SP               ;RESTORE STK PTR
4364
4365  012402  005737  001216                TST     $PASS
4366  012406  001046                        BNE     TST10                   ;;GO TO NEXT IF NOT FIRST PASS
4367  012410  004737  045424                JSR     PC,SUBCLR               ;DO SUBSYS CLEAR
4368  012414  104024                        ERROR   24                      ;CERR AFTER SCLR
4369
4370  012416  104401  056165                TYPE    ,MSG16                  ;DRIVE SERIAL NO.
4371  012422  012765  000003  000026        MOV     #3,RKMR1(R5)            ;SELECT BYTE 3
4372  012430  004737  045074                JSR     PC,GSTAT                ;GET STATUS
```

```
4373  012434  013701  003350            MOV     HMR2,R1          ;GET SERIAL #
4374  012440  012704  053660            MOV     #$OCTVL,R4       ;GET ADDR CHAR BUFF
4375  012444  010446                    MOV     R4,-(SP)         ;STORE ON STACK FOR $SUPRS
4376  012446  012703  000003            MOV     #3,R3            ;SETUP CHAR COOUNT
4377  012452  006101                    ROL     R1               ;INITIALIZE BIT POSITIONS
4378  012454  006101                    ROL     R1
4379  012456  006101            1$:     ROL     R1               ;GET NEXT 4 BITS
4380  012460  006101                    ROL     R1
4381  012462  006101                    ROL     R1
4382  012464  006101                    ROL     R1
4383  012466  010100                    MOV     R1,R0            ;GET WORKING COPY
4384  012470  042700  177760            BIC     #177760,R0       ;CLEAR ALL BUT LOW 4 BITS
4385  012474  052700  000060            BIS     #60,R0           ;CONVERT TO ASCII DIGIT
4386  012500  110024                    MOVB    R0,(R4)+         ;PUT ASCII DIGIT INTO CHAR BUFF
4387  012502  005303                    DEC     R3
4388  012504  001364                    BNE     1$               ;BR IF ALL 3 CHARS NOT DONE
4389  012506  105014                    CLRB    (R4)             ;ELSE INSERT NULL TERMINATOR
4390  012510  004737  054126            JSR     PC,$SUPRS        ;TYPE
4391  012514  104401  001205            TYPE    ,$CRLF
4392  012520  104401  001205            TYPE    ,$CRLF
4393
4394                                ;;*****************************************************************
4395                                ;*TEST 10        SET VV WITH PACK CMD
4396                                ;*
4397                                ;*       IF VV IS RESET, THE PACK CMD IS USED TO SET IT.
4398                                ;*
4399                                ;;*****************************************************************
4400  012524  000004            TST10:  SCOPE
4401  012526  012737  000001  001174    MOV     #1,$TIMES        ;;DO 1 ITERATION
4402  012534  012706  001100            MOV     #STACK,SP        ;RESTORE STK PTR
4403
4404  012540  005065  000026            CLR     RKMR1(R5)        ;SELECT BYTE 0
4405  012544  004737  045074            JSR     PC,GSTAT         ;GET STATUS
4406  012550  032737  000100  003350    BIT     #D.VV,HMR2
4407  012556  001021                    BNE     TST11            ;;GO TO NEXT TEST IF VV SET
4408
4409  012560  104415                    SCOP1
4410  012562  012706  001100            MOV     #STACK,SP        ;RESTORE STK PTR
4411
4412  012566  004737  045424            JSR     PC,SUBCLR
4413  012572  104024                    ERROR   24               ;CERR AFTER SCLR
4414
4415  012574  012737  000003  003322    MOV     #PACK,HCS1
4416  012602  004737  043434            JSR     PC,DOCMD         ;DO PACK CMD & GET CONTR READY
4417  012606  104116                    ERROR   116              ;RDY NOT SET AFTER PACK CMD
4418
4419  012610  032737  000100  003350    BIT     #D.VV,HMR2
4420  012616  001001                    BNE     TST11            ;;GO TO NEXT TEST IF VV NOW SET
4421  012620  104027                    ERROR   27               ;PACK DID NOT SET V.V.
4422
4423                                ;;*****************************************************************
4424                                ;*TEST 11        RELEASE DRIVE
4425                                ;*
4426                                ;*       TESTS THE ABILITY TO RECOGNIZE THE RLS BIT AND NOT RAISE SACK
4427                                ;*
4428                                ;;*****************************************************************
```

```
4429  012622  000004                    TST11:  SCOPE
4430  012624  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
4431  012632  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
4432
4433  012636  004737  045424                    JSR     PC,SUBCLR       ;DO SUBSYS CLEAR & GET STATUS
4434  012642  104024                            ERROR   24              ;CONTR ERROR SET AFTER SCLR
4435  012644  032737  000400  003324            BIT     #UFE.HCS2
4436  012652  001401                            BEQ     1$
4437  012654  104003                            ERROR   3               ;UFE SET AFTER SCLR
4438
4439  012656                            1$:
4440  012656  104415                            SCOP1
4441  012660  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
4442
4443  012664  004737  045424                    JSR     PC,SUBCLR
4444  012670  104024                            ERROR   24              ;CERR AFTER SCLR
4445
4446  012672  062765  000010  000010            ADD     #RLS,RKCS2(R5)  ;ADD RELEASE BIT TO $UNIT
4447  012700  004737  045074                    JSR     PC,GSTAT        ;GET STATUS
4448
4449  012704  032737  100000  003322            BIT     #CERR,HCS1      ;CHECK FOR CONTR ERROR
4450  012712  001401                            BEQ     2$
4451  012714  104025                            ERROR   25              ;RLS SET CERR
4452  012716  032737  000400  003324    2$:     BIT     #UFE,HCS2
4453  012724  001401                            BEQ     TST12           ;;GO TO NEXT TEST IF SET
4454  012726  104026                            ERROR   26              ;SACK SET AFTER RLS SENT
```

```
4455
```

```
4456                                    ;;*****************************************************************
4457                                    ;*TEST 12       DRIVE TYPE TEST
4458                                    ;*
4459
4460                                    ;*      THIS TEST COMPARES DRIVE TYPE IN MSG A AGAINST 'DDT' IN RKDS.
4461                                    ;*      WRONG CDT IN RKCS1 IS SENT & ERRORS ARE VERIFIED.
4462                                    ;*
4463                                    ;*****************************************************************
4464  012730  000004                    TST12:  SCOPE
4465  012732  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
4466  012740  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
4467
4468  012744  004737  045424                    JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
4469  012750  104024                            ERROR   24              ;CONT ERROR SET AFT SUBSYS CLEAR
4470  012752  005737  001170                    TST     $TMP4
4471  012756  001013                            BNE     1$
4472  012760  032737  000400  003350            BIT     #D.DDT,HMR2
4473  012766  001401                            BEQ     2$
4474  012770  104030                            ERROR   30              ;DR TYPE SET IN MR2
4475  012772  032737  000400  003334  2$:       BIT     #DDT,HDS
4476  013000  001414                            BEQ     3$
4477  013002  104031                            ERROR   31              ;DDT SET IN RKDS
4478  013004  000412                            BR      3$
4479
4480  013006  032737  000400  003350  1$:       BIT     #D.DDT,HMR2
4481  013014  001001                            BNE     8$
4482  013016  104005                            ERROR   5               ;DR TYPE NOT SET IN MR2
4483  013020  032737  000400  003334  8$:       BIT     #DDT,HDS
4484  013026  001001                            BNE     3$
4485  013030  104152                            ERROR   152
4486  013032  032737  000040  003336  3$:       BIT     #DTYE,HER
4487  013040  001401                            BEQ     4$
4488  013042  104032                            ERROR   32              ;DTYE SET IN RKER
4489
4490  013044                            4$:
4491  013044  104415                            SCOP1
4492  013046  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
4493
4494  013052  004737  045424                    JSR     PC,SUBCLR
4495  013056  104024                            ERROR   24              ;CERR AFTER SCLR
4496
4497  013060  005737  001170                    TST     $TMP4           ;SEE IF RK07
4498  013064  001404                            BEQ     9$              ;BR IF NO
4499  013066  012765  000001  000000            MOV     #SELDRV,RKCS1(R5)
4500  013074  000403                            BR      10$
4501  013076  012765  002001  000000  9$:       MOV     #<CDT!SELDRV>,RKCS1(R5)  ;GET STATUS WITH CDT SET
4502  013104  013737  001414  003360  10$:      MOV     T10,TEMP1
4503  013112  004737  043530                    JSR     PC,FRDY         ;FIND RDY
4504  013116  104117                            ERROR   117             ;RDY NOT SET BY END OF SEL DRV CMD
4505  013120  005737  001170                    TST     $TMP4
4506  013124  001013                            BNE     11$
4507  013126  032737  000400  003350            BIT     #D.DDT,HMR2
4508  013134  001401                            BEQ     5$
4509  013136  104030                            ERROR   30              ;DR TYPE SET IN MR2
4510  013140  032737  000400  003334  5$:       BIT     #DDT,HDS
4511  013146  001414                            BEQ     6$
```

```
4512  013150  104031                          ERROR   31              ;DDT SET IN RKDS
4513  013152  000412                          BR      6$
4514
4515  013154  032737  000400  003350  11$:    BIT     #D.DDT,HMR2
4516  013162  001001                          BNE     12$
4517  013164  104005                          ERROR   5               ;DR TYPE NOT SET IN MR2
4518  013166  032737  000400  003334  12$:    BIT     #DDT,HDS
4519  013174  001001                          BNE     6$
4520  013176  104152                          ERROR   152             ;DDT NOT SET IN RKDS
4521  013200  032737  000040  003336  6$:     BIT     #DTYE,HER       ;DTYE=DDT(NOT)*CDT
4522  013206  001001                          BNE     7$
4523  013210  104033                          ERROR   33              ;DTYE NOT SET AFT WRITING WRONG CDT
4524  013212  032737  100000  003322  7$:     BIT     #CERR,HCS1
4525  013220  001001                          BNE     TST13           ;;GO TO NEXT TEST
4526  013222  104034                          ERROR   34              ;CERR NOT SET AFT WRITING WRONG CDT
4527
4528                                  ;;**********************************************************************
4529                                  ;*TEST 13       C-D PARITY ERROR DETECTION
4530                                  ;*
4531                                  ;*      TESTS THE ABILITY OF THE DRIVE TO DETECT EVEN PARITY SENT BY
4532                                  ;*      THE CONTROLLER BY SETTING 'PAT' ON RKMR1.
4533                                  ;*      THE DRIVE SHOULD RESPOND WITH 'C-D PARITY ERROR'
4534                                  ;*      THE DRIVE STILL SENDS ODD PARITY TO THE CONTROLLER WHICH IS NOW
4535                                  ;*      CHECKING FOR EVEN PARITY THEREFORE THE CONTROLLER SHOULD DETECT
4536                                  ;*      AN ERROR AND SET DCPAR.
4537                                  ;*      THE ERROR CONDITION IS RESET WITH THE CLEAR CMD
4538                                  ;*
4539                                  ;**********************************************************************
4540  013224  000004                  TST13:  SCOPE
4541  013226  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
4542  013234  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4543
4544  013240  004737  045424                  JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
4545  013244  104024                          ERROR   24              ;CONT ERROR AFTER SUBSYS CLR
4546  013246  032737  001000  003352          BIT     #D.PAR,HMR3
4547  013254  001401                          BEQ     2$
4548  013256  104035                          ERROR   35              ;C-D PARITY ERROR SET IN MR3
4549  013260  032737  020000  003322  2$:     BIT     #DCPAR,HCS1
```

```
4550  013266  001401                        BEQ     3$
4551  013270  104036                        ERROR   36              ;DCPAR SET IN CS1
4552
4553  013272                          3$:
4554  013272  104415                        SCOP1
4555  013274  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
4556
4557  013300  004737  045424                JSR     PC,SUBCLR
4558  013304  104024                        ERROR   24              ;CERR AFTER SCLR
4559
4560  013306  012765  000020  000026        MOV     #PAT,RKMR1(R5)  ;SELECT BYTE 0 & EVEN PARITY
4561  013314  004737  045074                JSR     PC,GSTAT        ;GET STATUS
```

```
 4562  013320  032737  000200  003352          BIT     #D.FLT,HMR3
 4563  013326  001001                          BNE     4$
```

```
4564  013330  104037                          ERROR   37                  ;FAULT NOT SET IN MR3
4565  013332  032737  001000  003352  4$:     BIT     #D.PAR,HMR3
4566  013340  001001                          BNE     5$
4567  013342  104040                          ERROR   40                  ;C-D PARITY ERROR NOT SET IN MR3
4568  013344  032737  020000  003322  5$:     BIT     #DCPAR,HCS1
4569  013352  001001                          BNE     6$
4570  013354  104041                          ERROR   41                  ;DCPAR NOT SET AFT WRITING PAT IN MR1
4571  013356  032737  100000  003322  6$:     BIT     #CERR,HCS1
4572  013364  001001                          BNE     TST14               ;;GO TO NEXT TEST
4573  013366  104042                          ERROR   42                  ;CERR NOT SET BY WRITING PAT IN MR1
4574
4575                                  ;;*****************************************************************
4576                                  ;*TEST 14        VERIFY START SPINDLE CMD
4577                                  ;*
4578                                  ;*      THE PROGRAM CHECKS THE ENTIRE STARTUP SEQUENCE, IE:
4579                                  ;*      BRUSH CYCLE, HEADS HOME, FWD, REV ETC.
4580                                  ;*      BY VERIFYING ALL APPROPRIATE STATUS BITS FOR PROPER SEQUENCING.
4581                                  ;*      THE CYL ADDRESS & CYL DIFFERENCE REGS ARE CHECKED
4582                                  ;*      TO BE ZERO AT THE END OF THE SEQUENCE.
4583                                  ;*
4584                                  ;*****************************************************************
4585  013370  000004                  TST14:  SCOPE
4586  013372  012737  000001  001174          MOV     #1,$TIMES           ;;DO 1 ITERATION
4587  013400  012706  001100                  MOV     #STACK,SP           ;RESTORE STK PTR
4588
4589  013404  004737  045424                  JSR     PC,SUBCLR           ;SUBSYS CLEAR & GET STATUS
4590  013410  104024                          ERROR   24                  ;CERR AFTER SCLR
4591
4592  013412  012737  000011  003322          MOV     #SRTSPL,HCS1
4593  013420  004737  043434                  JSR     PC,DOCMD            ;DO START SPINDLE CMD & GET CONTR RDY
4594  013424  104121                          ERROR   121                 ;RDY NOT SET AFTER START SPIN CMD
4595
4596  013426  004737  045074                  JSR     PC,GSTAT            ;WORD 0
4597  013432  032737  010000  003350          BIT     #D.SPIN,HMR2
4598  013440  001001                          BNE     13$
4599  013442  104306                          ERROR   306                 ;SPIN NOT SET AFTER START SPIN CMD
4600
4601  013444  012737  014642  001176  13$:     MOV     #25$,$ESCAPE
4602  013452  004737  044012                  JSR     PC,TSTATN           ;TEST FOR ATTN
4603  013456  000401                          BR      15$
4604  013460  104316                          ERROR   316
4605  013462  012737  010140  003412  15$:     MOV     #<D.SPIN!D.VV!D.DRA>,E.A0       ;LOAD IN EXPECTED VALUES
4606  013470  005037  003414                  CLR     E.B0
4607  013474  012737  000740  003416          MOV     #<D.CART!D.DOOR!D.HDHM!D.BRHM>,E.A1
4608  013502  012737  000001  003420          MOV     #1,E.B1
4609
4610  013510  004737  044252                  JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
4611  013514  000000                          .WORD   0!0!0               ;& MSGS SPECIFIED HERE
4612  013516  104057                          ERROR   57                  ;MSG A0 ERROR AFTER START SPIN CMD REC'D BY DRIVE
4613  013520  104060                          ERROR   60                  ;MSG B0 ERROR
4614  013522  104061                          ERROR   61                  ;MSG A1 ERROR
4615  013524  104062                          ERROR   62                  ;MSG B1 ERROR
4616  013526  005737  003470                  TST     DOTIM
4617  013532  001126                          BNE     3$                  ;BRANCH IF P OR L CLOCK PRESENT
4618  013534  012737  014666  001176  1$:     MOV     #30$,$ESCAPE
4619  013542  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
```

```
4620  013550  013737  001416  003362          MOV     T100,TEMP2      ;SETUP TIMEOUT
4621  013556  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
4622  013562  104067                          ERROR   67              ;NO ATTN AFTER HEAD LOADING
4623  013564                          2$:
4624
4625  013564  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
4626  013572  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
4627  013576  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
4628  013604  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4629  013612  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
4630  013616  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4631  013624  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
4632
4633  013632  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4634  013636  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
4635  013640  104063                          ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOAD
4636  013642  104064                          ERROR   64              ;MSG B0 ERROR
4637  013644  104065                          ERROR   65              ;MSG A1 ERROR
4638  013646  104066                          ERROR   66              ;MSG B1 ERROR
4639  013650  005737  001364                  TST     CYLADD          ;SEE IF MSG B2 = 0
4640  013654  001401                          BEQ     16$             ;BR IF YES
4641  013656  104176                          ERROR   176             ;CYL ADDR NOT 0 AT END OF HEAD LOAD
4642  013660                          16$:
4643
4644  013660  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4645  013666  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
4646  013674  012737  000005  003322          MOV     #CLEAR,HCS1
4647  013702  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
4648  013706  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
4649  013710  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
4650  013714  000401                          BR      64$
4651  013716  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
4652  013720                          64$:
4653
4654  013720  012737  000340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
4655  013726  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
4656  013732  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
4657  013740  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4658  013746  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
4659  013752  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4660  013760  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
4661
4662  013766  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4663  013772  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
4664  013774  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
4665  013776  104265                          ERROR   265             ;MSG B0 ERROR
4666  014000  104274                          ERROR   274             ;MSG A1 ERROR
4667  014002  104266                          ERROR   266             ;MSG B1 ERROR
4668
4669  014004  000137  014462                  JMP     12$
4670
4671  014010  012765  100000  000000  3$:     MOV     #CCLR,RKCS1(R5)
4672  014016  013737  001370  001372          MOV     HZ,COUNT
4673  014024  012737  000074  001374          MOV     #60.,SEC
4674  014032  004737  047206                  JSR     PC,CLKON        ;TURN CLK INTR ON FOR 60 SEC MAX
4675  014036  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
```

```
 4676  014044  004737  045074          4$:     JSR     PC,GSTAT
 4677  014050  032737  002000  003350          BIT     #D.FWD,HMR2
 4678  014056  001004                          BNE     5$
 4679  014060  005737  001376                  TST     TIMUP           ;IS 60 SEC DELAY UP?
 4680  014064  001767                          BEQ     4$              ;BRANCH IF NO & REPEAT
 4681  014066  104070                          ERROR   70              ;FWD NOT SET WITHIN 60 SEC FROM
 4682                                                                  ;START SPINDLE CMD.
 4683  014070  004737  047302          5$:     JSR     PC,CLKOF        ;TURN OFF CLOCK INTERRUPT
 4684  014074  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 4685
 4686  014102  013737  001370  001372          MOV     HZ,COUNT
 4687  014110  012737  000005  001374          MOV     #5,SEC
 4688  014116  004737  047206                  JSR     PC,CLKON        ;TURN CLK INTR ON FOR 5 SEC MAX
 4689  014122  012765  000001  000026  6$:     MOV     #1,RKMR1(R5)    ;WORD 1
 4690  014130  004737  045074                  JSR     PC,GSTAT
 4691  014134  032737  002000  003350          BIT     #D.FWD,HMR2
 4692  014142  001404                          BEQ     7$
 4693  014144  005737  001376                  TST     TIMUP
 4694  014150  001764                          BEQ     6$
 4695  014152  104075                          ERROR   75              ;FWD NOT CLEARED WITHIN 5 SEC OF MOTION
 4696                                                                  ;FROM START SPINDLE CMD.
 4697  014154  004737  047302          7$:     JSR     PC,CLKOF        ;TURN OFF CLK INTERRUPT
 4698  014160  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
 4699  014164  000401                          BR      17$
 4700  014166  104320                          ERROR   320             ;UNEXP ATTN AFTER INNER LIM DETECT
 4701  014170  012737  030140  003412  17$:     MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 4702  014176  005037  003414                  CLR     E.B0
 4703  014202  012737  025720  003416          MOV     #<D.RTZ!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 4704  014210  012737  000001  003420          MOV     #1,E.B1
 4705
 4706  014216  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4707  014222  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
 4708  014224  104076                          ERROR   76              ;MSG A0 ERROR AT INNER LIMIT DETECT
 4709  014226  104077                          ERROR   77              ;MSG B0 ERROR
 4710  014230  104100                          ERROR   100             ;MSG A1 ERROR
 4711  014232  104101                          ERROR   101             ;MSG B1 ERROR
 4712
 4713  014234  013737  001370  001372          MOV     HZ,COUNT
 4714  014242  012737  000004  001374          MOV     #4,SEC
 4715  014250  004737  047206                  JSR     PC,CLKON        ;TURN CLK INTR ON FOR 4 SEC MAX
 4716  014254  012765  000001  000026  8$:     MOV     #1,RKMR1(R5)    ;WORD 1
 4717  014262  004737  045074                  JSR     PC,GSTAT
 4718  014266  032737  002000  003350          BIT     #D.FWD,HMR2
 4719  014274  001004                          BNE     9$
 4720  014276  005737  001376                  TST     TIMUP
 4721  014302  001764                          BEQ     8$
 4722  014304  104102                          ERROR   102             ;FWD NOT DETECTED WITHIN 4 SEC IN RTZ PORTION OF
 4723                                                                  ;START SPINDLE CMD.
 4724  014306  004737  047302          9$:     JSR     PC,CLKOF        ;TURN CLOCK INTR OFF.
 4725  014312  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
 4726  014316  000401                          BR      18$
 4727  014320  104321                          ERROR   321             ;UNEXP ATTN AFTER OUTER LIM TO CYL 0
 4728  014322  012737  030140  003412  18$:     MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 4729  014330  005037  003414                  CLR     E.B0
 4730  014334  012737  023720  003416          MOV     #<D.RTZ!D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 4731  014342  012737  000001  003420          MOV     #1,E.B1
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4732
4733  014350  004737  044252          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4734  014354  000000                  .WORD   0!0!0           ;& MSGS SPECIFIED HERE
4735  014356  104103                  ERROR   103             ;MSG A0 ERROR FROM OUT LIM TO CYL 0 DURING LOAD
4736  014360  104104                  ERROR   104             ;MSG B0 ERROR
4737  014362  104105                  ERROR   105             ;MSG A1 ERROR
4738  014364  104106                  ERROR   106             ;MSG B1 ERROR
4739  014366  013737  001370  001372  MOV     HZ,COUNT
4740  014374  012737  000001  001374  MOV     #1,SEC
4741  014402  004737  047206          JSR     PC,CLKON        ;TURN CLK INTR ON FOR 1 SEC MAX
4742  014406  005065  000026      10$: CLR     RKMR1(R5)       ;WORD 0
4743  014412  004737  045074          JSR     PC,GSTAT
4744  014416  032737  000200  003350  BIT     #D.DRDY,HMR2    ;SEE IF DRIVE READY
4745  014424  001004                  BNE     11$
4746  014426  005737  001376          TST     TIMUP
4747  014432  001765                  BEQ     10$
4748  014434  104107                  ERROR   107             ;DRIVE READY NOT SET WITHIN 1 SEC FROM
4749                                                          ;FWO IN RTZ PORTION OF START SPIN CMD
4750  014436  004737  047302      11$: JSR     PC,CLKOF        ;TURN CLOCKS OFF
4751  014442  004737  044012          JSR     PC,TSTATN       ;TEST ATTN
4752  014446  104067                  ERROR   67              ;NO ATTN AFTER START SPIN CMD
4753  014450  012737  014666  001176  MOV     #30$,$ESCAPE
4754  014456  000137  013564          JMP     2$              ;CHECK RKMR 2 & 3 WORDS 0 & 1
4755
4756  014462  005037  001176      12$: CLR     $ESCAPE
4757  014466  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
4758  014474  005065  000026          CLR     RKMR1(R5)
4759  014500  004737  045074          JSR     PC,GSTAT
4760  014504  032737  010000  003350  BIT     #D.SPIN,HMR2
4761  014512  001003                  BNE     14$
4762  014514  104306                  ERROR   306             ;SPIN NOT SET AFTER ST. SPIN CMD
4763  014516  000137  042662          JMP     $EOP            ;ABORT DRIVE
4764  014522  005037  003304      14$: CLR     UNLD            ;USED FOR VALID HALT
4765  014526  004737  047430          JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
4766  014532  000467                  BR      TST15           ;GO TO NEXT TEST
4767                                                          ;RETURN HERE IF SW 14 IS SET OR
4768                                                          ;SW 8 WITH SWR <7:0> APPLY
4769  014534  005237  003304      20$: INC     UNLD
4770
4771  014540  004737  045424          JSR     PC,SUBCLR
4772  014544  104024                  ERROR   24              ;CERR AFTER SCLR
4773
4774  014546  012737  000007  003322  MOV     #UNLOAD,HCS1
4775  014554  004737  043434          JSR     PC,DOCMD        ;DO UNLOAD CMD & GET CONTR READY
4776  014560  104011                  ERROR   11              ;RDY NOT SET AFTER UNLOAD CMD.
4777  014562  004737  044012          JSR     PC,TSTATN
4778  014566  104012                  ERROR   12              ;NO ATTN AFTER UNLOAD CMD
4779
4780  014570  004737  045424          JSR     PC,SUBCLR
4781  014574  104024                  ERROR   24              ;CERR AFTER SCLR
4782
4783  014576  013737  001414  003362  MOV     T10,TEMP2
4784  014604  004737  046460          JSR     PC,FSPOK
4785  014610  104315                  ERROR   315             ;SPEED NOT DOWN BY TIMEOUT
4786
4787  014612  004737  045424          JSR     PC,SUBCLR
```

```
4788  014616  104024                          ERROR   24              ;CERR AFTER SCLR
4789
4790  014620  005037  001176                  CLR     $ESCAPE
4791  014624  005737  001410                  TST     LPFLG
4792  014630  001402                          BEQ     65$
4793  014632  000177  164252                  JMP     @$LPERR         ;SW 9 WAS SET.
4794  014636  000177  164244          65$:    JMP     @$LFADR         ;SW 14 OR 8 WAS SET
4795
4796
4797
4798  014642  004737  047302          25$:    JSR     PC,CLKOF
4799  014646  005237  001410                  INC     LPFLG
4800  014652  032777  001000  164260          BIT     #SW9,@SWR       ;LOOP ON ERROR?
4801  014660  001325                          BNE     20$             ;YES, RECONDITION DRIVE
4802  014662  000137  013534                  JMP     1$              ;RETURN TO MAINLINE
4803  014666  004737  047302          30$:    JSR     PC,CLKOF
4804  014672  005237  001410                  INC     LPFLG
4805  014676  032777  001000  164234          BIT     #SW9,@SWR       ;LOOP ON ERROR?
4806  014704  001313                          BNE     20$             ;YES, RECONDITION DRIVE
4807  014706  000137  014462                  JMP     12$             ;RETURN TO MAINLINE
4808                                  .SBTTL SEEK/READ HEADER/WRITE HEADER TESTS
4809
4810                                  ;;*****************************************************************
4811                                  ;*TEST 15       STATIC CYL DIFF AND CYL ADDR REG TEST; PART 1
4812                                  ;*
4813                                  ;*      THIS TEST CHECKS EACH BIT OF THE CYL DIFFERENCE
4814                                  ;*      AND CYL ADDRESS REGISTERS BY PERFORMING SEEKS TO ALL
4815                                  ;*      MAJOR CYLS (0,1,2,4,8,16,32,64,128,256) (512 FOR RK07) WITH EVEN PARITY SET.
4816                                  ;*      THIS FREEZES THE INFORMATION IN THE ABOVE REGISTERS & ALLOWS FOR CHECKING.
4817                                  ;*      THIS TEST VERIFIES C-D PARITY ERROR BIT SET, THAT HEADS DID
4818                                  ;*      NOT MOVE & ALL OTHER APPLICABLE STATUS BITS & REGS.
4819                                  ;*
4820                                  ;;*****************************************************************
4821  014712  000004                  TST15:  SCOPE
4822  014714  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
4823  014722  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4824
4825  014726  005000                          CLR     R0              ;CYL # REGISTER
4826  014730  012737  100000  003370          MOV     #BIT15,TEMP5
4827
4828  014736                          1$:
4829  014736  104415                          SCOP1
4830  014740  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4831
4832  014744  004737  045424                  JSR     PC,SUBCLR
4833  014750  104024                          ERROR   24              ;CERR AFTER SCLR
4834
4835
4836  014752  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4837  014760  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
4838  014766  012737  000013  003322          MOV     #RECAL,HCS1
4839  014774  004737  043434                  JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
4840  015000  104124                          ERROR   124             ;RDY NOT SET AFTER RECAL CMD
4841
4842  015002  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
4843  015010  004737  045074                  JSR     PC,GSTAT
```

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4844  015014  032737  020000  003350          BIT     #D.RTZ,HMR2
4845  015022  001001                          BNE     64$
4846  015024  104244                          ERROR   244             ;RTZ NOT SET DURING RECAL CMD
4847  015026  013737  001414  003362  64$:    MOV     T10,TEMP2       ;SETUP TIMEOUT
4848  015034  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
4849  015040  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
4850
4851  015042  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
4852  015050  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
4853  015054  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
4854  015062  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4855  015070  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
4856  015074  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4857  015102  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
4858
4859  015110  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4860  015114  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
4861  015116  104221                          EPROR   221             ;MSG A0 ERROR AFTER RECAL CMD
4862  015120  104275                          ERROR   275             ;MSG B0 ERROR
4863  015122  104222                          ERROR   222             ;MSG A1 ERROR
4864  015124  104276                          ERROR   276             ;MSG B1 ERROR
4865                                  ;       CWD2    47,50,<AFTER RECAL CMD>
4866  015126  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT THE MESSAGE
4867  015134  004737  045074                  JSR     PC,GSTAT        ;GET THE STATUS
4868  015140  005737  001364                  TST     CYLADD          ;RECAL SUCCESSFUL ?
4869  015144  001401                          BEQ     65$             ;BRANCH IF SO
4870  015146  104050                          ERROR   50              ;REPORT THE ERROR
4871  015150                          65$:
4872
4873  015150  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4874  015156  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
4875  015164  012737  000005  003322          MOV     #CLEAR,HCS1
4876  015172  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
4877  015176  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
4878  015200  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
4879  015204  000401                          BR      66$
4880  015206  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
4881  015210                          66$:
4882
4883  015210  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
4884  015216  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
4885  015222  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
4886  015230  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4887  015236  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
4888  015242  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4889  015250  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
4890
4891  015256  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4892  015262  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
4893  015264  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
4894  015266  104265                          ERROR   265             ;MSG B0 ERROR
4895  015270  104274                          ERROR   274             ;MSG A1 ERROR
4896  015272  104266                          ERROR   266             ;MSG B1 ERROR
4897
4898
4899  015274  104415                          SCOP1
```

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4900  015276  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4901
4902  015302  004737  045424                  JSR     PC,SUBCLR
4903  015306  104024                          ERROR   24              ;CERR AFTER SCLR
4904
4905  015310  005237  001462                  INC     BYPCERR         ;DO NOT TEST CERR IN GSTAT1
4906  015314  012765  000020  000026          MOV     #PAT,RKMR1(R5)  ;EVEN PARITY
4907  015322  010065  000020                  MOV     R0,RKDC(R5)     ;CYL ADDR
4908  015326  012737  000017  003322          MOV     #SEEK,HCS1
4909  015334  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
4910  015340  104122                          ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
4911  015342  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
4912  015346  104125                          ERROR   125             ;NO ATTN FROM SEEK & BAD PARITY
4913  015350  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
4914  015356  012737  001200  003414          MOV     #<D.FLT!D.PAR>,E.B0
4915  015364  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
4916  015372  012737  000001  003420          MOV     #1,E.B1
4917  015400  010037  003422                  MOV     R0,E.A2
4918  015404  006137  003422                  ROL     E.A2
4919  015410  006137  003422                  ROL     E.A2
4920  015414  006137  003422                  ROL     E.A2
4921  015420  006137  003422                  ROL     E.A2
4922  015424  013737  003422  003424          MOV     E.A2,E.B2
4923  015432  052737  000002  003424          BIS     #2,E.B2         ;ADD MSG ID
4924
4925  015440  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4926  015444  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
4927  015446  104110                          ERROR   110             ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
4928  015450  104111                          ERROR   111             ;MSG B0 ERROR
4929  015452  104146                          ERROR   146             ;MSG A1 ERROR
4930  015454  104147                          ERROR   147             ;MSG B1 ERROR
4931
4932  015456  020037  001364                  CMP     R0,CYLADD
4933  015462  001401                          BEQ     2$
4934  015464  104043                          ERROR   43              ;CYL ADDR IN B2 NOT=RKDC
4935
4936  015466  020037  001362          2$:     CMP     R0,CYLDIF
4937  015472  001401                          BEQ     3$
4938  015474  104044                          ERROR   44              ;CYL DIFF IN A2 NOT=RKDC
4939
4940  015476  005037  001462          3$:     CLR     BYPCERR         ;ALLOW CHECKING FOR ANY CERR IN GSTAT1
4941  015502  006137  003370                  ROL     TEMP5           ;SET CARRY ONLY ONCE
4942  015506  006100                          ROL     R0              ;SELECT NEXT MAJOR CYL
4943  015510  020037  012062                  CMP     R0,MC1          ;ALL MAJOR CYL DONE?
4944  015514  001001                          BNE     4$              ;BRANCH IF NO
4945  015516  000402                          BR      TST16           ;;GO TO  NEXT TST
4946  015520  000137  014736          4$:     JMP     1$
4947
4948                                  ;;*****************************************************************
4949                                  ;*TEST 16       STATIC CYL DIFF & CYL ADDR REG TEST-PART 2
4950                                  ;*
4951                                  ;*      THIS TEST CHECKS THE ABILITY OF THE DRIVE TO PROPERLY SET THE CYL
4952                                  ;*      DIFF. & CYL ADDR REGS FOR ALL COMBINATIONS BY SEEKING TO
4953                                  ;*      ALL CYLS FROM EVERY OTHER CYL. (N SQUARE SEEKS).
4954                                  ;*      IT IS PERFORMED IN THE SAME MANNER AS THE ABOVE TEST.
4955                                  ;*
```

```
                                ;;*****************************************************************
015524  000004                  ;TST16: SCOPE
015526  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
015534  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
                                
015540  005737  001340                  TST     BYPT16
015544  001404                          BEQ     13$
015546  104401  055704                  TYPE    ,MSG9           ;BYPASSING TEST 16
015552  000137  016766                  JMP     12$
                                
015556  005737  001170          13$:    TST     $TMP4           ;SEE IF RK07
015562  001403                          BEQ     15$             ;BR OF NO
015564  104401  056600                  TYPE    ,MSG23          ;10-12 MIN TEST
015570  000402                          BR      16$
015572  104401  055646          15$:    TYPE    ,MSG8           ;2-4 MIN TEST
                                
015576  005037  001350          16$:    CLR     FRCYL           ;FROM CYL
015602  005037  001352                  CLR     TOCYL           ;TO CYL
015606  005037  001354                  CLR     CCYL            ;CURRENT CYL
015612  005037  001356                  CLR     PCYL            ;PREV CYL
                                
015616  104415                          SCOP1
015620  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
                                
015624  004737  045424                  JSR     PC,SUBCLR
015630  104024                          ERROR   24              ;CERR AFTER SCLR
                                
                                
015632  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
015640  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
015646  012737  000013  003322          MOV     #RECAL,HCS1
015654  004737  043434                  JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
015660  104124                          ERROR   124             ;RDY NOT SET AFTER RECAL CMD
                                
015662  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
015670  004737  045074                  JSR     PC,GSTAT
015674  032737  020000  003350          BIT     #D.RTZ,HMR2
015702  001001                          BNE     64$
015704  104244                          ERROR   244             ;RTZ NOT SET DURING RECAL CMD
015706  013737  001414  003362  64$:    MOV     T10,TEMP2       ;SETUP TIMEOUT
015714  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
015720  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
                                
015722  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
015730  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
015734  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
015742  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
015750  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
015754  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
015762  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
                                
015770  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
015774  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
015776  104221                          ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
016000  104275                          ERROR   275             ;MSG B0 ERROR
016002  104222                          ERROR   222             ;MSG A1 ERROR
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5012  016004  104276                          ERROR   276             ;MSG B1 ERROR
5013                                  ;       CWD2    47,50,<AFTER RECAL CMD>
5014  016006  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT THE MESSAGE
5015  016014  004737  045074                  JSR     PC,GSTAT        ;GET THE STATUS
5016  016020  005737  001364                  TST     CYLADD          ;RECAL SUCCESSFUL ?
5017  016024  001401                          BEQ     65$             ;BRANCH IF SO
5018  016026  104050                          ERROR   50              ;REPORT THE ERROR
5019  016030                          65$:
5020
5021  016030  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5022  016036  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
5023  016044  012737  000005  003322          MOV     #CLEAR,HCS1
5024  016052  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5025  016056  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5026  016060  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
5027  016064  000401                          BR      66$
5028  016066  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5029  016070                          66$:
5030
5031  016070  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5032  016076  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5033  016102  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5034  016110  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5035  016116  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5036  016122  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5037  016130  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5038
5039  016136  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5040  016142  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5041  016144  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5042  016146  104265                          ERROR   265             ;MSG B0 ERROR
5043  016150  104274                          ERROR   274             ;MSG A1 ERROR
5044  016152  104266                          ERROR   266             ;MSG B1 ERROR
5045
5046
5047  016154  104415                  SCOP1
5048  016156  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5049
5050  016162  004737  045424                  JSR     PC,SUBCLR
5051  016166  104024                          ERROR   24              ;CERR AFTER SCLR
5052
5053
5054  016170  012765  000020  000026  1$:     MOV     #PAT,RKMR1(R5)  ;EVEN PARITY
5055  016176  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;SET TO CYL ADDR
5056  016204  013737  001352  001354          MOV     TOCYL,CCYL      ;CURRENT CYL
5057  016212  013737  001354  003364          MOV     CCYL,TEMP3
5058  016220  013737  001356  003366          MOV     PCYL,TEMP4      ;PREV CYL
5059  016226  163737  003364  003366          SUB     TEMP3,TEMP4
5060  016234  100002                          BPL     2$              ;BR IF TEMP4 IS POS
5061  016236  005437  003366                  NEG     TEMP4
5062  016242  013737  003366  001360  2$:     MOV     TEMP4,CALDIF
5063  016250  013737  001354  001356          MOV     CCYL,PCYL
5064  016256  012737  000017  003322          MOV     #SEEK,HCS1
5065  016264  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
5066  016270  104122                          ERROR   122             ;NO RDY AFTER SEEK WITH BAD PARITY
5067  016272  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
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5068  016276  104125                        ERROR   125             ;NO ATTN FROM SEEK & BAD PARITY
5069  016300  012765  100000  000000        MOV     #CCLR,RKCS1(R5) ;CLEAR ERROR
5070  016306  013765  001352  000020        MOV     TOCYL,RKDC(R5)  ;RESTOR RKDC AFT CCLR
5071  016314  004737  046014                JSR     PC,RDCYLA       ;READ CYL ADDR
5072  016320  023737  001352  001364        CMP     TOCYL,CYLADD    ;SEE IF TO CYL ECHOED OK
5073  016326  001401                        BEQ     3$
5074  016330  104045                        ERROR   45              ;MR3 NOT=RKDC
5075
5076  016332  004737  045730          3$:   JSR     PC,RDCYLD       ;READ CYL DIFF
5077  016336  023737  001360  001362        CMP     CALDIF,CYLDIF   ;SEE IF CYL DIFF CORRECT
5078  016344  001401                        BEQ     4$
5079  016346  104046                        ERROR   46              ;CYL DIFF IN RKMR2 INCORRECT
5080
5081  016350                          4$:
5082
5083  016350  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
5084  016356  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
5085  016364  012737  000005  003322        MOV     #CLEAR,HCS1
5086  016372  004737  043434                JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5087  016376  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5088  016400  004737  044012                JSR     PC,TSTATN       ;TEST FOR ATTN
5089  016404  000401                        BR      67$
5090  016406  104154                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5091  016410                          67$:
5092
5093
5094  016410  104415                        SCOP1
5095  016412  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
5096
5097  016416  004737  045424                JSR     PC,SUBCLR
5098  016422  104024                        ERROR   24              ;CERR AFTER SCLR
5099
5100  016424  012765  000020  000026        MOV     #PAT,RKMR1(R5)  ;EVEN PARITY
5101  016432  013765  001350  000020        MOV     FRCYL,RKDC(R5)  ;SET RETURN CYL ADDR
5102  016440  013737  001350  001354        MOV     FRCYL,CCYL
5103  016446  013737  001354  003364        MOV     CCYL,TEMP3
5104  016454  013737  001356  003366        MOV     PCYL,TEMP4
5105  016462  163737  003364  003366        SUB     TEMP3,TEMP4
5106  016470  100002                        BPL     5$              ;BR IF TEMP4 IS POS
5107  016472  005437  003366                NEG     TEMP4
5108  016476  013737  003366  001360  5$:   MOV     TEMP4,CALDIF
5109  016504  013737  001354  001356        MOV     CCYL,PCYL
5110  016512  012737  000017  003322        MOV     #SEEK,HCS1
5111  016520  004737  043434                JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
5112  016524  104122                        ERROR   122             ;NO RDY AFTER SEEK WITH BAD PARITY
5113  016526  004737  044012                JSR     PC,TSTATN       ;TEST FOR ATTN
5114  016532  104125                        ERROR   125             ;NO ATTN FROM SEEK & BAD PARITY
5115  016534  012765  100000  000000        MOV     #CCLR,RKCS1(R5) ;CLEAR ERROR
5116  016542  013765  001350  000020        MOV     FRCYL,RKDC(R5)  ;RESTOR RKDC AFT CCLR
5117  016550  004737  046014                JSR     PC,RDCYLA       ;READ CYL ADDR
5118  016554  023737  001350  001364        CMP     FRCYL,CYLADD    ;SEE IF RETURN CYL ECHOED OK
5119  016562  001401                        BEQ     6$
5120  016564  104241                        ERROR   241             ;MR3 NOT=RKDC
5121
5122  016566  023737  001352  001350  6$:   CMP     TOCYL,FRCYL     ;SEE IF TO=FROM
5123  016574  001022                        BNE     10$             ;DO NORMAL TEST IF NO
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5124  016576  005737  001352          TST     TOCYL           ;SEE IF=0
5125  016602  001007                  BNE     9$
5126  016604  004737  045730          JSR     PC,RDCYLD       ;CYL DIFF S/B 0 ON CYL 0
5127  016610  005737  001362          TST     CYLDIF
5128  016614  001421                  BEQ     7$
5129  016616  104242                  ERROR   242             ;CYL DIFF IN RKMR2 INCORRECT
5130  016620  000417                  BR      7$
5131
5132  016622  004737  045730  9$:     JSR     PC,RDCYLD       ;CYL DIFF/OFFSET SHOULD NOT
5133  016626  023727  001362  000001  CMP     CYLDIF,#1       ;CHANGE IN SEEK TO SELF
5134  016634  001411                  BEQ     7$              ;SHOULD = 1 IN THIS TEST
5135  016636  104263                  ERROR   263             ;CYL DIFF IN RKMR2 DID NOT REMAIN = 0
5136  016640  000407                  BR      7$
5137  016642  004737  045730  10$:    JSR     PC,RDCYLD       ;READ CYL DIFF
5138  016646  023737  001360  001362  CMP     CALDIF,CYLDIF   ;SEE IF CYL DIFF OK
5139  016654  001401                  BEQ     7$
5140  016656  104242                  ERROR   242             ;CYL DIFF IN RKMR2 INCORRECT
5141
5142  016660                  7$:
5143
5144  016660  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
5145  016666  013765  001222  000010  MOV     $UNIT,RKCS2(R5) ;DRIVE#
5146  016674  012737  000005  003322  MOV     #CLEAR,HCS1
5147  016702  004737  043434          JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5148  016706  104151                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5149  016710  004737  044012          JSR     PC,TSTATN       ;TEST FOR ATTN
5150  016714  000401                  BR      68$
5151  016716  104154                  ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5152  016720                  68$:
5153
5154
5155  016720  005237  001352          INC     TOCYL
5156  016724  023737  001352  012056  CMP     TOCYL,LCP1      ;SEE IF SCANNED ALL CYLS
5157  016732  001402                  BEQ     8$              ;BR IF YES
5158  016734  000137  016170          JMP     1$              ;ELSE REPEAT
5159
5160  016740  005237  001350  8$:     INC     FRCYL
5161  016744  023737  001350  012056  CMP     FRCYL,LCP1      ;SEE IF ALL DONE
5162  016752  001405                  BEQ     TST17           ;;GO TO NEXT TST
5163  016754  013737  001350  001352  MOV     FRCYL,TOCYL     ;FRCYL ALWAYS = OR > TOCYL
5164  016762  000137  016170          JMP     1$              ;ELSE REPEAT
5165  016766                  12$:
5166
5167
5168                          ;;*****************************************************************
5169                          ;*TEST 17       HEAD REGISTER TEST
5170                          ;*
5171                          ;*      THIS TEST CHECKS THE ABILITY TO SELECT ALL HEADS (0,1,2)
5172                          ;*      VIA RKDA & READING BACK FROM MSG 83 BY THE SELECT DRIVE CMD.
5173                          ;*      HEAD 3 IS CHECKED TO PRODUCE INV. ADDR.
5174                          ;*
5175                          ;*      SINCE CHANGING HEAD ADDRESSES ARE TIED TO SEEK CMDS,
5176                          ;*      SELECTING HEAD 3 MUST RESULT IN A SEEK INCOMPLETE ALONG WITH
5177                          ;*      ILLEGAL ADDRESS. IF NOT,THIS MEANS THAT CHANGING HEAD ADDRESSES
5178                          ;*      ARE NOT TIED TO SEEK CMDS
5179                          ;*
```

```
5180                                    ;;*****************************************************************
5181  016766  000004                    TST17:  SCOPE
5182  016770  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
5183  016776  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
5184
5185  017002  005000                            CLR     R0              ;HEAD #
5186  017004                            1$:
5187  017004  104415                            SCOP1
5188  017006  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
5189
5190  017012  004737  045424                    JSR     PC,SUBCLR
5191  017016  104024                            ERROR   24              ;CERR AFTER SCLR
5192
5193
5194
5195  017020  012765  100000  000000            MOV     #CCLR,RKCS1(R5)
5196  017026  013765  001222  000010            MOV     $UNIT,RKCS2(R5)
5197  017034  012737  000013  003322            MOV     #RECAL,HCS1
5198  017042  004737  043434                    JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
5199  017046  104124                            ERROR   124             ;RDY NOT SET AFTER RECAL CMD
5200
5201  017050  012765  000001  000026            MOV     #1,RKMR1(R5)    ;SELECT WORD 1
5202  017056  004737  045074                    JSR     PC,GSTAT
5203  017062  032737  020000  003350            BIT     #D.RTZ,HMR2
5204  017070  001001                            BNE     64$
5205  017072  104244                            ERROR   244             ;RTZ NOT SET DURING RECAL CMD
5206  017074  013737  001414  003362  64$:     MOV     T10,TEMP2       ;SETUP TIMEOUT
5207  017102  004737  044044                    JSR     PC,FATT1        ;FIND ATTN
5208  017106  104055                            ERROR   55              ;NO ATTN AFTER RECAL CMD
5209
5210  017110  012737  050340  003412            MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
5211  017116  005037  003414                    CLR     E.B0            ;EXPECTED MSG B0
5212  017122  012737  001720  003416            MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5213  017130  012737  000001  003420            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5214  017136  005037  003422                    CLR     E.A2            ;EXPECTED MSG A2
5215  017142  012737  000002  003424            MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5216  017150  012737  000003  003430            MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5217
5218  017156  004737  044252                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5219  017162  000007                            .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
5220  017164  104221                            ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
5221  017166  104275                            ERROR   275             ;MSG B0 ERROR
5222  017170  104222                            ERROR   222             ;MSG A1 ERROR
5223  017172  104276                            ERROR   276             ;MSG B1 ERROR
5224                                    ;       CWD2    47,50,<AFTER RECAL CMD>
5225  017174  012765  000002  000026            MOV     #2,RKMR1(R5)    ;SELECT THE MESSAGE
5226  017202  004737  045074                    JSR     PC,GSTAT        ;GET THE STATUS
5227  017206  005737  001364                    TST     CYLADD          ;RECAL SUCCESSFUL ?
5228  017212  001401                            BEQ     65$             ;BRANCH IF SO
5229  017214  104050                            ERROR   50              ;REPORT THE ERROR
5230  017216                            65$:
5231
5232  017216  012765  100000  000000            MOV     #CCLR,RKCS1(R5)
5233  017224  013765  001222  000010            MOV     $UNIT,RKCS2(R5) ;DRIVE#
5234  017232  012737  000005  003322            MOV     #CLEAR,HCS1
5235  017240  004737  043434                    JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
```

```
5236  017244  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5237  017246  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
5238  017252  000401                          BR      66$
5239  017254  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5240  017256                          66$:
5241
5242  017256  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5243  017264  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5244  017270  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5245  017276  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5246  017304  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5247  017310  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5248  017316  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5249
5250  017324  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5251  017330  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5252  017332  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5253  017334  104265                          ERROR   265             ;MSG B0 ERROR
5254  017336  104274                          ERROR   274             ;MSG A1 ERROR
5255  017340  104266                          ERROR   266             ;MSG B1 ERROR
5256
5257
5258  017342  023727  001432  000001          CMP     HEADA,#1        ;FOR HEAD 0, B3=1
5259  017350  001401                          BEQ     3$
5260  017352  104053                          ERROR   53              ;RECAL DID NOT RESET HEAD REG IN B3.
5261
5262  017354                          3$:
5263  017354  104415                          SCOP1
5264  017356  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5265
5266  017362  004737  045424                  JSR     PC,SUBCLR
5267  017366  104024                          ERROR   24              ;CERR AFTER SCLR
5268
5269  017370  000300                          SWAB    R0
5270  017372  010065  000006                  MOV     R0,RKDA(R5)     ;HEAD #
5271  017376  000300                          SWAB    R0
5272
5273  017400  012737  000017  003322          MOV     #SEEK,HCS1
5274  017406  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
5275  017412  104156                          ERROR   156             ;NO RDY AFTER SEEK TO SELF
5276  017414  004737  044012                  JSR     PC,TSTATN
5277  017420  104157                          ERROR   157             ;NO ATTN AFTER SEEK TO SELF
5278  017422  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
5279  017430  020027  000003                  CMP     R0,#3
5280  017434  001403                          BEQ     4$              ;BR FOR HEAD 3
5281  017436  005037  003414                  CLR     E.B0            ;FOR HEADS 0,1,2
5282  017442  000403                          BR      5$
5283  017444  012737  002240  003414  4$:     MOV     #<D.SKI!D.FLT!D.IDAE>,E.B0       ;FOR HEAD 3
5284  017452  012737  001720  003416  5$:     MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
5285  017460  012737  000001  003420          MOV     #1,E.B1
5286  017466  005037  003422                  CLR     E.A2
5287  017472  012737  000002  003424          MOV     #2,E.B2
5288  017500  005700                          TST     R0              ;SEE IF HEAD 0
5289  017502  001004                          BNE     6$              ;BR IF NO
5290  017504  012737  001003  003430          MOV     #<BIT9!3>,E.B3  ;LOAD EXPECTED B3 FOR HEAD 0 & MSG ID
5291  017512  000412                          BR      8$
```

```
5292  017514  020027  000001          6$:     CMP     R0,#1           ;SEE IF HEAD 1
5293  017520  001004                          BNE     7$              ;BR IF NO
5294  017522  012737  002003  003430          MOV     #<BIT10!3>,E.B3 ;B3 FOR HEAD 1
5295  017530  000403                          BR      8$
5296  017532  012737  004003  003430  7$:     MOV     #<BIT11!3>,E.B3 ;B3 FOR HEAD 2
5297  017540                          8$:
5298
5299  017540  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5300  017544  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
5301  017546  104114                          ERROR   114             ;MSG A0 ERROR AFTER LOAD HEAD REG & SEEK CMD
5302  017550  104115                          ERROR   115             ;MSG B0 ERROR
5303  017552  104322                          ERROR   322             ;MSG A1 ERROR
5304  017554  104323                          ERROR   323             ;MSG B1 ERROR
5305
5306  017556  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT WORD 2
5307  017564  004737  045074                  JSR     PC,GSTAT
5308  017570  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
5309  017574  001401                          BEQ     67$             ;BR IF YES
5310  017576  104324                          ERROR   324             ;MSG A2 NOT CLEARED AFTER LOAD HEAD REG & SEEK CMD
5311  017600  005737  001364          67$:    TST     CYLADD          ;SEE IF MSG B2=0
5312  017604  001401                          BEQ     68$             ;BR IF YES
5313  017606  104325                          ERROR   325             ;MSG B2 NOT CLEARED AFTER LOAD HEAD REG & SEEK CMD
5314  017610                          68$:
5315
5316  017610  020027  000003                  CMP     R0,#3
5317  017614  001412                          BEQ     9$              ;BR IF HEAD 3
5318
5319  017616  005037  003360                  CLR     TEMP1
5320  017622  116037  003312  003360          MOVB    ATTN(R0),TEMP1
5321  017630  023737  003360  001432          CMP     TEMP1,HEADA     ;FOR RKDA=HEAD 0, HEAD=1 IN B3
5322                                                                  ;FOR RKDA=HEAD 1, HEAD=2 IN B3
5323                                                                  ;FOR RKDA=HEAD 2, HEAD=4 IN B3
5324  017636  001401                          BEQ     9$
5325  017640  104054                          ERROR   54              ;HEAD DECODE IN B3 INCORRECT
5326
5327
5328  017642  005200                  9$:     INC     R0
5329  017644  020027  000004                  CMP     R0,#4           ;0 THRU 3 DONE?
5330  017650  001402                          BEQ     10$             ;BR IF YES
5331  017652  000137  017004                  JMP     1$              ;ELSE REPEAT
5332
5333  017656                          10$:
5334
5335  017656  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5336  017664  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
5337  017672  012737  000013  003322          MOV     #RECAL,HCS1
5338  017700  004737  043434                  JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
5339  017704  104124                          ERROR   124             ;RDY NOT FOUND AFTER RECAL CMD
5340
5341  017706  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5342  017714  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
5343  017722  012737  000005  003322          MOV     #CLEAR,HCS1
5344  017730  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5345  017734  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5346  017736  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
5347  017742  000401                          BR      70$
```

```
5348  017744  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5349  017746                          70$:
5350
5351
5352  017746  004737  045074                  JSR     PC,GSTAT
5353  017752  032737  000040  003352          BIT     #D.IDAE,HMR3    ;SEE IF IDAE IS CLEARED
5354  017760  001401                          BEQ     69$             ;BR IF YES
5355  017762  104155                          ERROR   155             ;IDAE NOT CLEARED AFTER RECAL CMD
5356
5357  017764  012765  100000  000000  69$:    MOV     #CCLR,RKCS1(R5)
5358  017772  013737  001412  003362          MOV     T1,TEMP2        ;LOOK FOR ATTN FROM RECAL
5359  020000  004737  044044                  JSR     PC,FATT1
5360  020004  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
5361
5362
5363                                  ;;*****************************************************************
5364                                  ;*TEST 20        SEEK TO CYL 0
5365                                  ;*
5366                                  ;*      TESTS THE ABILITY TO DO A SEEK CMD.
5367                                  ;*      VERIFIES THERE WAS NO MOVEMENT BY CHECKING ALL APPROPRIATE
5368                                  ;*      STATUS BITS.  VERIFIES CMD COMPLETION BETWEEN 10-15USEC.
5369                                  ;*      READ HEADER IS NOT PERFORMED AS THE PACK MAY NOT BE FORMATTED.
5370                                  ;*
5371                                  ;;*****************************************************************
5372  020006  000004                  TST20:  SCOPE
5373  020010  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
5374  020016  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5375
5376  020022  004737  045424                  JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
5377  020026  104024                          ERROR   24              ;CERR AFTER SCLR
5378  020030  004737  046014                  JSR     PC,RDCYLA       ;READ CYL ADDR IN RKMR3
5379  020034  005737  001364                  TST     CYLADD
5380  020040  001401                          BEQ     1$
5381  020042  104130                          ERROR   130             ;CYL ADDR NOT CLEARED AFTER SCLR
5382  020044                          1$:
5383  020044  104415                          SCOP1
5384  020046  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5385
5386  020052  004737  045424                  JSR     PC,SUBCLR
5387  020056  104024                          ERROR   24              ;CERR AFTER SCLR
5388
5389  020060  012737  000017  003322          MOV     #SEEK,HCS1
5390  020066  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
5391  020072  104131                          ERROR   131             ;RDY NOT SET AFTER SEEK CMD
5392  020074  012737  000005  003360          MOV     #5,TEMP1        ;SETUP 100US TIMEOUT
5393
5394  020102  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
5395  020106  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
5396  020110  032737  100000  003322          BIT     #CERR,HCS1
5397  020116  001401                          BEQ     64$
5398  020120  104210                          ERROR   210             ;CERR AFTER SEEK CMD
5399  020122                          64$:
5400
5401  020122  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
5402  020130  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5403  020134  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
```

```
5404  020142  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5405  020150  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5406  020154  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5407  020162  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5408
5409  020170  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5410  020174  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5411  020176  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
5412  020200  104134                          ERROR   134             ;MSG B0 ERROR
5413  020202  104135                          ERROR   135             ;MSG A1 ERROR
5414  020204  104136                          ERROR   136             ;MSG B1 ERROR
5415  020206  005737  001362                  TST     CYLDIF
5416  020212  001401                          BEQ     65$
5417  020214  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
5418
5419  020216                          65$:
5420
5421  020216  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5422  020224  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
5423  020232  012737  000005  003322          MOV     #CLEAR,HCS1
5424  020240  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5425  020244  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5426  020246  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
5427  020252  000401                          BR      66$
5428  020254  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5429  020256                          66$:
5430
5431  020256  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5432  020264  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5433  020270  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5434  020276  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5435  020304  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5436  020310  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5437  020316  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5438
5439  020324  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5440  020330  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5441  020332  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5442  020334  104265                          ERROR   265             ;MSG B0 ERROR
5443  020336  104274                          ERROR   274             ;MSG A1 ERROR
5444  020340  104266                          ERROR   266             ;MSG B1 ERROR
5445
5446  020342  005737  001364                  TST     CYLADD
5447  020346  001401                          BEQ     TST21           ;;GO TO NEXT TEST
5448  020350  104140                          ERROR   140             ;CYL ADDR IN B2 NOT CLEARED AFT SEEK CMD.
5449
5450                          ;;*****************************************************************
5451                          ;*TEST 21        TEST SECTOR COUNT REG. IN MSG B3
5452                          ;;*****************************************************************
5453  020352  000004          TST21:  SCOPE
5454  020354  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
5455  020362  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5456
5457  020366  004737  045424                  JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
5458  020372  104024                          ERROR   24              ;CERR AFTER SCLR
5459  020374  012737  020472  001176          MOV     #2$,$ESCAPE     ;GO TO NEXT TEST IF ANY ERROR DETECTED
```

```
5460
5461  020402  012737  000025  001400          MOV     #21.,SECNT      ;22 SECTOR FORMAT TEST
5462
5463  020410  004737  045554                  JSR     PC,FSO22                ;FIND SECTOR 0
5464  020414  104142                          ERROR   142             ;SECTOR 0 NOT FOUND BY TIMEOUT
5465
5466  020416  005037  001402                  CLR PSEC                ;PREVIOUS SECTOR
5467  020422  004737  045640          64$:    JSR     PC,FNS22                ;FIND NEXT SECTOR
5468  020426  104143                          ERROR   143             ;DIFFERENT SECTOR  NOT FOUND BY TIMEOUT
5469  020430  013737  001402  001404          MOV     PSEC,ESEC
5470  020436  062737  000001  001404          ADD     #1,ESEC         ;SETUP EXPECTED SECTOR
5471  020444  013737  001406  001402          MOV     SECTOR,PSEC     ;UPDATE PREV SECTOR
5472                                  ;       JSR     PC,RDSEC                ;READ SECTOR
5473                                  ;       CMP     SECTOR,PSEC
5474                                  ;       BEQ     65$             ;BR IF READ SAME TWICE
5475                                  ;       JSR     PC,RDSEC
5476                                  ;       CMP     SECTOR,PSEC
5477                                  ;       BEQ     65$             ;TRY 1 MORE TIME
5478                                  ;       ERROR   144             ;MSG B3 ERROR, SECTOR REG UNSTABLE
5479                                  ;                               ;MAY BE DURING SECTOR PULSE TIME
5480  020452  023737  001406  001404  65$:    CMP     SECTOR,ESEC
5481  020460  001401                          BEQ     66$
5482  020462  104145                          ERROR   145             ;MSG B3 ERROR BETWEEN SECTOR COUNTS
5483  020464  005337  001400          66$:    DEC     SECNT
5484  020470  001354                          BNE     64$             ;BR IF SECTOR COUNT NOT DONE
5485
5486
5487  020472  005037  001176          2$:     CLR     $ESCAPE
5488
5489                                  ;;*****************************************************************
5490                                  ;*TEST 22        DETECT OUTER LIMIT
5491                                  ;*
5492                                  ;*      THIS TEST VERIFIES THAT THE ABOVE TEST DID ACTUALLY POSITION ON CYL 0
5493                                  ;*      BY DETECTING OUTER LIMIT AS THE ADJACENT CYL.
5494                                  ;*      AN ERROR IN THIS TEST INDICATES:
5495                                  ;*
5496                                  ;*              A.  HEADS WERE NOT ON CYL 0
5497                                  ;*      AND/OR  B.  COULD NOT SEEK IN REVERSE DIRECTION.
5498                                  ;*
5499                                  ;*****************************************************************
5500  020476  000004                  TST22:  SCOPE
5501  020500  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
5502  020506  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5503
5504  020512  004737  045424                  JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
5505  020516  104024                          ERROR   24              ;CERR AFTER SCLR
5506
5507  020520  005037  001410                  CLR     LPFLG
5508  020524  005237  001462                  INC     BYPCERR         ;BYPASS CHECKING FOR ANY CERR IN GSTAT1
5509  020530  005237  003304                  INC     UNLD            ;USED FOR VALID HALT
5510
5511  020534  012765  000020  000026          MOV     #PAT,RKMR1(R5)  ;PARITY & WORD 0
5512  020542  013765  012074  000020          MOV     FCP1,RKDC(R5)
5513  020550  012737  000017  003322          MOV     #SEEK,HCS1
5514  020556  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
5515  020562  104122                          ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
```

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5516  020564  004737  044012                      JSR     PC,TSTATN       ;TEST FOR ATTN
5517  020570  104125                              ERROR   12$             ;NO ATTN FROM SEEK WITH BAD PARITY
5518  020572  012737  050340  003412              MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
5519  020600  012737  001200  003414              MOV     #<D.FLT!D.PAR>,E.B0
5520  020606  012737  001720  003416              MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
5521  020614  012737  000001  003420              MOV     #1,E.B1
5522
5523  020622  004737  044252                      JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5524  020626  000000                              .WORD   0!0!0           ;& MSGS SPECIFIED HERE
5525  020630  104110                              ERROR   110             ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
5526  020632  104111                              ERROR   111             ;MSG B0 ERROR
5527  020634  104146                              ERROR   146             ;MSG A1 ERROR
5528  020636  104147                              ERROR   147             ;MSG B1 ERROR
5529
5530  020640  012765  100000  000000              MOV     #CCLR,RKCS1(R5)
5531  020646  013765  001222  000010              MOV     $UNIT,RKCS2(R5) ;DRIVE#
5532  020654  012737  000005  003322              MOV     #CLEAR,HCS1
5533  020662  004737  043434                      JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5534  020666  104151                              ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5535  020670  004737  044012                      JSR     PC,TSTATN       ;TEST FOR ATTN
5536  020674  000401                              BR      65$
5537  020676  104154                              ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5538  020700                          65$:
5539
5540  020700  012737  010340  003412              MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5541  020706  005037  003414                      CLR     E.B0            ;EXPECTED MSG B0
5542  020712  012737  001720  003416              MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5543  020720  012737  000001  003420              MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5544  020726  005037  003422                      CLR     E.A2            ;EXPECTED MSG A2
5545  020732  012737  000002  003424              MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5546  020740  012737  000003  003430              MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5547
5548  020746  004737  044252                      JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5549  020752  000003                              .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5550  020754  104273                              ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5551  020756  104265                              ERROR   265             ;MSG B0 ERROR
5552  020760  104274                              ERROR   274             ;MSG A1 ERROR
5553  020762  104266                              ERROR   266             ;MSG B1 ERROR
5554
5555
5556  020764  013765  012072  000020              MOV     FC,RKDC(R5)
5557  020772  012737  000017  003322              MOV     #SEEK,HCS1
5558  021000  004737  043434                      JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
5559  021004  104131                              ERROR   131             ;NO RDY AFTER SEEK CMD
5560  021006  012765  100000  000000              MOV     #CCLR,RKCS1(R5)
5561  021014  004737  045074                      JSR     PC,GSTAT
5562  021020  004737  046260                      JSR     PC,FLIM         ;FIND LIMIT DETECT
5563  021024  104160                              ERROR   160             ;LIMIT DETECT NOT FOUND BEFORE TIMEOUT
5564
5565  021026  032737  040000  003350              BIT     #D.UNLD,HMR2
5566  021034  001003                              BNE     1$
5567  021036  104305                              ERROR   305             ;DRIVE NOT UNLOADING AFTER LIMIT DETECT
5568  021040  000137  021556                      JMP     30$             ;BYPASS REST OF TEST
5569
5570  021044  012737  021474  001176  1$:         MOV     #20$,$ESCAPE    ;MUST ESCAPE TO CYCLE UP DRIVE & TEST SWR
5571  021052  012737  070140  003412              MOV     #<D.DSC!D.PIP!D.SPIN!D.VV!D.DRA>,E.A0   ;EXPECTED A0
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```
5572  021060  012737  002200  003414          MOV     #<D.SKI!D.FLT>,E.B0
5573  021066  012737  045720  003416          MOV     #<D.UNLD!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
5574  021074  012737  030001  003420          MOV     #<D.LIMD!D.NMOV!1>,E.B1
5575                            ;               CHECK   161,162,163,164,<AFTER OUTER LIMIT DETECT>,0,0,0
5576  021102  004737  044252                  JSR     PC,CHKMSG       ;CHECK MESSAGE A0,B0,A1,B1
5577  021106  000000                          .WORD   0!0!0
5578  021110  104161                          ERROR   161             ;MAY BE A0 ERROR
5579  021112  104162                          ERROR   162             ;MAY BE B0 ERROR
5580  021114  104163                          ERROR   163             ;MAY BE B1 ERROR
5581  021116  000240                          NOP                     ;NEED FOR THE CALLIN SEQ
5582  021120  032737  020000  003400          BIT     #D.LIMD,H.B1    ;SEE IF LIMIT DETECT BIT SET IN B1
5583  021126  001003                          BNE     3$              ;BRANCH IF SO
5584  021130  104401  061235                  TYPE    ,EM42           ;OTHERWISE REPORT ERROR
5585  021134  104164                          ERROR   164
5586
5587  021136  004737  044012          3$:     JSR     PC,TSTATN
5588  021142  104165                          ERROR   165             ;NO ATTN AFTER OUTER LIMIT DETECT
5589  021144  005037  001462                  CLR     BYPCERR         ;ALLOW CHECKING CERR IN GSTAT1
5590
5591  021150  004737  045424                  JSR     PC,SUBCLR       ;SUBSYS CLR
5592  021154  104024                          ERROR   24              ;CERR AFTER SCLR
5593  021156  013737  001414  003362          MOV     T10,TEMP2       ;SET UP TIMEOUT
5594  021164  004737  046336                  JSR     PC,FHDHM        ;FIND HEAD HOME
5595  021170  104166                          ERROR   166             ;HEAD HOME NOT FOUND BEFORE TIMEOU
5596  021172  004737  046412                  JSR     PC,FLOAD        ;FIND LOAD HEADS
5597  021176  104167                          ERROR   167             ;LOAD HEADS NOT FOUND BEFORE TIMEOUT
5598  021200  013737  001416  003362          MOV     T100,TEMP2      ;SETUP TIMEOUT
5599  021206  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
5600  021212  104067                          ERROR   67              ;ATTN NOT FOUND BEFORE TIMEOUT
5601  021214  005037  001176          2$:     CLR     $ESCAPE
5602  021220  005037  003304                  CLR     UNLD            ;CLEAR FLAG
5603
5604  021224  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
5605  021232  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5606  021236  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5607  021244  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5608  021252  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5609  021256  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5610  021264  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5611
5612  021272  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5613  021276  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5614  021300  104063                          ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOADING
5615  021302  104064                          ERROR   64              ;MSG B0 ERROR
5616  021304  104065                          ERROR   65              ;MSG A1 ERROR
5617  021306  104066                          ERROR   66              ;MSG B1 ERROR
5618                            ;               CWD2    175,176,<AT END OF HEAD LOADING>
5619  021310  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT MESSAGE
5620  021316  004737  045074                  JSR     PC,GSTAT        ;GET STATUS AND MR2,MR3
5621  021322  005737  001364                  TST     CYLADD          ;RECAL SUCCFUL ?
5622  021326  001401                          BEQ     64$             ;BRANCH IF SO
5623  021330  104050                          ERROR   50              ;REPORT ERROR
5624  021332                          64$:
5625
5626  021332  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5627  021340  012765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
```

```
5628  021346  012737  000005  003322          MOV     #CLEAR,HCS1
5629  021354  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
5630  021360  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5631  021362  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
5632  021366  000401                          BR      66$
5633  021370  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5634  021372                          66$:
5635
5636  021372  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5637  021400  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5638  021404  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5639  021412  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5640  021420  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5641  021424  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5642  021432  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5643
5644  021440  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5645  021444  000003                          .WORD   T.A2!T.B2!0             & MSGS SPECIFIED HERE
5646  021446  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5647  021450  104265                          ERROR   265             ;MSG B0 ERROR
5648  021452  104274                          ERROR   274             ;MSG A1 ERROR
5649  021454  104266                          ERROR   266             ;MSG B1 ERROR
5650
5651  021456  004737  047430                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
5652  021462  000435                          BR      TST23           ;:GO TO NEXT TEST
5653                                                                  ;RETURN HERE IF SW 14 IS SET OR
5654                                                                  ;SW 8 WITH SWR <7:0> APPLY
5655
5656
5657  021464  005037  001176          10$:    CLR     $ESCAPE
5658  021470  000177  157412                  JMP     @$LPADR
5659  021474                          20$:
5660
5661  021474  004737  045424                  JSR     PC,SUBCLR
5662  021500  104024                          ERROR   24              ;CERR AFTER SCLR
5663
5664  021502  012737  000011  003322          MOV     #SRTSPL,HCS1
5665  021510  004737  043434                  JSR     PC,DOCMD        ;DO START SPINDLE CMD & GET CONTR RDY
5666  021514  104121                          ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.
5667
5668  021516  013737  001420  003362          MOV     T500,TEMP2      ;SETUP  TIMEOUT
5669  021524  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
5670  021530  104067                          ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
5671
5672  021532  005037  003304                  CLR     UNLD
5673  021536  005237  001410                  INC     LPFLG
5674  021542  032777  001000  157370          BIT     #SW9,@SWR       ;LOOP ON ERROR?
5675  021550  001345                          BNE     10$             ;YES, RECONDITION DRIVE
5676  021552  000137  021214                  JMP     2$              ;RETURN TO MAINLINE
5677  021556                          30$:
5678
5679
5680
5681
5682
5683                                ;;*****************************************************************
```

```
                                        ;*TEST 23       BASIC WRITE/READ HEADER & HEAD SWITCHING TEST
                                        ;*
                                        ;*      THIS TEST CHECKS HEAD SWITCHING BY WRITING UNIQUE HEADERS
                                        ;*      ON EACH TRACK OF CYL 0, READING BACK & VERIFYING THEY REMAINED
                                        ;*      UNIQUE. 22 SECTOR FORMAT IS USED
                                        ;*
                                        ;*      I.E.    TRACK 0: ALL 0'S FOR ALL SECTOR HEADERS
                                        ;*              TRACK 1: 0101 FOR ALL SECTOR HEADERS
                                        ;*              TRACK 2: ALL 1'S FOR ALL SECTOR HEADERS
                                        ;*
                                        ;*****************************************************************
021556  000004                  TST23:  SCOPE
021560  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
021566  012706  001100                  MOV     #$TACK,SP       ;RESTORE STK PTR
021572  005737  001460                  TST     LIMERR          ;CHK FOR LIMIT ERROR
021576  001403                          BEQ     5$              ;BR IF NO
021600  104170                          ERROR   170             ;FATAL ERROR
021602  000137  042662                  JMP     $EOP            ;ABORT BAL OF TESTS
021606                          5$:
021606  005237  003306                  INC     BADHDR          ;USED FOR VALID HALT
021612  005037  001430                  CLR     HEAD            ;HEAD CTR
021616  104415                          SCOP1
021620  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
021624  004737  045424                  JSR     PC,SUBCLR
021630  104024                          ERROR   24              ;CERR AFTER SCLR
021632  052765  000020  000010  1$:     BIS     #BAI,RKCS2(R5)  ;SET BUSS ADDR INCR INHIBIT
021640  012765  001470  000004          MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
021646  012765  177676  000002          MOV     #-66.,RKWC(R5)  ;WORD COUNT.
021654  000337  001430                  SWAB    HEAD
021660  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;SETUP HEAD ADDR
021666  000337  001430                  SWAB    HEAD
021672  013700  001430                  MOV     HEAD,R0
021676  006300                          ASL     R0              ;DOUBLE R0
021700  016037  001444  001470          MOV     DATA0(R0),HDTAB ;SETUP HEADER WORD FOR RKBA
021706  012737  000027  003322          MOV     #<WRHEAD>,HCS1
021714  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
021720  104200                          ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
021722  004737  045074                  JSR     PC,GSTAT        ;GET FRESH STATUS
021726  032737  100000  003322          BIT     #CERR,HCS1
021734  001405                          BEQ     64$
021736  104201                          ERROR   201             ;CERR AFTER WRITE HEADER CMD
021740  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
021744  000137  042662                  JMP     $EOP            ;ABORT DRIVE
021750                          64$:
021750  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
021756  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
021762  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
021770  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
021776  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
```

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5740  022002  012737  000002  003424          MOV     #2,E.B2          ;MSG ID FOR EXPECTED MSG B2
5741  022010  012737  000003  003430          MOV     #3,E.B3          ;MSG ID FOR EXPECTED MSG B3
5742
5743  022016  004737  044252                  JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
5744  022022  000003                          .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
5745  022024  104277                          ERROR   277              ;MSG A0 ERROR AFTER WRITE HEADER CMD
5746  022026  104267                          ERROR   267              ;MSG B0 ERROR
5747  022030  104300                          ERROR   300              ;MSG A1 ERROR
5748  022032  104270                          ERROR   270              ;MSG B1 ERROR
5749
5750
5751  022034  012765  000002  000026          MOV     #2,RKMR1(R5)     ;SELECT WORD 2
5752  022042  004737  045074                  JSR     PC,GSTAT
5753  022046  005737  001362                  TST     CYLDIF           ;SEE IF MSG A2=0
5754  022052  001401                          BEQ     65$              ;BR IF YES
5755  022054  104303                          ERROR   303              ;MSG A2 NOT CLEARED AFTER WRITE HEADER CMD
5756  022056  005737  001364          65$:    TST     CYLADD           ;SEE IF MSG B2=0
5757  022062  001401                          BEQ     66$              ;BR IF YES
5758  022064  104304                          ERROR   304              ;MSG B2 NOT CLEARED AFTER WRITE HEADER CMD
5759  022066                          66$:
5760
5761  022066  005237  001430                  INC     HEAD
5762  022072  023727  001430  000003          CMP     HEAD,#3
5763  022100  001254                          BNE     1$
5764
5765  022102  005037  001430                  CLR     HEAD             ;HEAD CTR
5766  022106  104415                          SCOP1
5767  022110  012706  001100                  MOV     #STACK,SP        ;RESTORE STK PTR
5768
5769  022114  004737  045424                  JSR     PC,SUBCLR
5770  022120  104024                          ERROR   24               ;CERR AFTER SCLR
5771
5772
5773
5774  022122  000337  001430          2$:     SWAB    HEAD
5775  022126  013765  001430  000006          MOV     HEAD,RKDA(R5)    ;SETUP HEAD ADDR
5776  022134  000337  001430                  SWAB    HEAD
5777
5778  022140  012700  001674                  MOV     #RHTAB,R0
5779  022144  012737  000025  003322          MOV     #<RDHEAD>,HCS1
5780  022152  004737  043472                  JSR     PC,DATCMD        ;DO DATA XFER CMD & GET CONTR RDY
5781  022156  104171                          ERROR   171              ;NO RDY AFTER READ HEADER CMD
5782  022160  032737  100000  003322          BIT     #CERR,HCS1
5783  022166  001405                          BEQ     67$
5784  022170  104174                          ERROR   174              ;CERR AFTER READ HEADER CMD
5785  022172  104401  056235                  TYPE    ,MSG18           ;ABORT BALANCE OF TESTS
5786  022176  000137  042662                  JMP     $EOP             ;ABORT DRIVE
5787
5788  022202  016520  000024          67$:    MOV     RKDB(R5),(R0)+   ;1'ST WORD FROM SILO TO RHTAB
5789  022206  016520  000024                  MOV     RKDB(R5),(R0)+   ;2'ND WORD
5790  022212  016520  000024                  MOV     RKDB(R5),(R0)+   ;3'RD WORD
5791
5792
5793  022216  032765  100000  000010          BIT     #DLT,RKCS2(R5)
5794  022224  001407                          BEQ     68$
5795  022226  004737  045074                  JSR     PC,GSTAT
```

```
5796  022232  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
5797  022234  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5798  022240  000137  042662                  JMP     $EOP            ;ABORT DRIVE
5799  022244                          68$:
5800
5801  022244  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5802  022252  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
5803  022256  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5804  022264  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5805  022272  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
5806  022276  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5807  022304  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5808
5809  022312  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5810  022316  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5811  022320  104301                          ERROR   301             ;MSG A0 ERROR AFTER READ HEADER CMD
5812  022322  104271                          ERROR   271             ;MSG B0 ERROR
5813  022324  104302                          ERROR   302             ;MSG A1 ERROR
5814  022326  104272                          ERROR   272             ;MSG B1 ERROR
5815
5816
5817  022330  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT WORD 2
5818  022336  004737  045074                  JSR     PC,GSTAT
5819  022342  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
5820  022346  001401                          BEQ     69$             ;BR IF YES
5821  022350  104172                          ERROR   172             ;MSG A2 NOT CLEARED AFTER READ HEADER CMD
5822  022352  005737  001364          69$:    TST     CYLADD          ;SEE IF MSG B2=0
5823  022356  001401                          BEQ     70$             ;BR IF YES
5824  022360  104264                          ERROR   264             ;MSG B2 NOT CLEARED AFTER READ HEADER CMD
5825  022362                          70$:
5826  022362  000337  001430                  SWAB    HEAD
5827  022366  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;RESTORE RKDA
5828  022374  000337  001430                  SWAB    HEAD
5829
5830  022400  012701  001674                  MOV     #RHTAB,R1
5831
5832  022404  005037  001442                  CLR     WDCNT           ;HEADER WORD COUNT
5833  022410  013700  001430                  MOV     HEAD,R0
5834  022414  006300                          ASL     R0              ;DOUBLE R0
5835  022416  016037  001444  003360          MOV     DATA0(R0),TEMP1 ;GET THE 'SHOULD BE' DATA
5836  022424  012137  001454          3$:     MOV     (R1)+,HDWD      ;READ HEADER WORD
5837  022430  023737  001454  003360          CMP     HDWD,TEMP1
5838  022436  001401                          BEQ     4$
5839  022440  104202                          ERROR   202             ;READ HEADER MISMATCH
5840  022442  005237  001442          4$:     INC     WDCNT
5841  022446  023727  001442  000003          CMP     WDCNT,#3        ;DO ONLY 1 SECTOR
5842  022454  001363                          BNE     3$
5843
5844  022456  005237  001430                  INC     HEAD
5845  022462  023727  001430  000003          CMP     HEAD,#3         ;ALL 3 HEADS DONE?
5846  022470  001402                          BEQ     TST24           ;;GO TO NXT TST IF YES
5847  022472  000137  022122                  JMP     2$              ;ELSE REPEAT
5848
5849                          ;;*****************************************************************
5850                          ;*TEST 24        BASIC WRITE/READ HEADER TEST; ALL 1'S, 20 SECTORS
5851                          ;*
```

```
5852                                    ;*      USING HEAD 0, WRITE & READ 20 SECTOR HEADERS BY WRITING ALL
5853                                    ;*      1'S AS HEADERS.  ATTEMPT TO FIND SECTORS 20 & 21.  VERIFY
5854                                    ;*      THEY ARE NO LONGER THERE BY READING 22 SECTORS AND NOT
5855                                    ;*      FINDING 0'S AS DATA FROM THE PREVIOUS TEST.
5856                                    ;*
5857                                    ;**********************************************************************
5858  022476  000004                    TST24:  SCOPE
5859  022500  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
5860  022506  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
5861
5862  022512  004737  045424                    JSR     PC,SUBCLR
5863  022516  104024                            ERROR   24              ;CERR AFTER SCLR
5864  022520  052765  000020  000010            BIS     #BAI,RKCS2(R5)  ;SET BUSS ADDR INCR INHIBIT
5865  022526  012765  001450  000004            MOV     #DATA1,RKBA(R5) ;XFER 1'S ONLY
5866  022534  012765  177704  000002            MOV     #-60.,RKWC(R5)  ;WORD COUNT
5867
5868
5869  022542  012737  010027  003322            MOV     #<CFMT!WRHEAD>,HCS1
5870  022550  004737  043472                    JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
5871  022554  104200                            ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
5872  022556  004737  045074                    JSR     PC,GSTAT        ;GET FRESH STATUS
5873  022562  032737  100000  003322            BIT     #CERR,HCS1
5874  022570  001405                            BEQ     64$
5875  022572  104201                            ERROR   201             ;CERR AFTER WRITE HEADER CMD
5876  022574  104401  056235                    TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5877  022600  000137  042662                    JMP     $EOP            ;ABORT DRIVE
5878  022604                            64$:
5879
5880  022604  012737  010001  003322            MOV     #<CFMT!SELDRV>,HCS1     ;GET 20 SECTOR STATUS
5881  022612  004737  043434                    JSR     PC,DOCMD        ;DO COMMAND
5882  022616  104117                            ERROR   117             ;NO RDY AFTER SELDRV CMD
5883  022620  032737  001000  003350            BIT     #D.FORM,HMR2
5884  022626  001001                            BNE     1$
5885  022630  104312                            ERROR   312             ;FORMAT NOT SET AFTER WRITE HDR CMD
5886
5887  022632                            1$:
5888
5889  022632  012737  010340  003412            MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5890  022640  005037  003414                    CLR     E.B0            ;EXPECTED MSG B0
5891  022644  012737  001720  003416            MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5892  022652  012737  000001  003420            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5893  022660  005037  003422                    CLR     E.A2            ;EXPECTED MSG A2
5894  022664  012737  000002  003424            MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5895  022672  012737  000003  003430            MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5896
5897  022700  004737  044252                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5898  022704  000000                            .WORD   0!0!0           ;& MSGS SPECIFIED HERE
5899  022706  104277                            ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
5900  022710  104267                            ERROR   267             ;MSG B0 ERROR
5901  022712  104300                            ERROR   300             ;MSG A1 ERROR
5902  022714  104270                            ERROR   270             ;MSG B1 ERROR
5903
5904  022716  005037  001400                    CLR     SECNT           ;SECTOR COUNT
5905  022722                            2$:
5906  022722  104415                            SCOP1
5907  022724  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
```

```
5908
5909  022730  004737  045424          JSR     PC,SUBCLR
5910  022734  104024                  ERROR   24                      ;CERR AFTER SCLR
5911
5912
5913  022736  012700  001674          MOV     #RHTAB,R0
5914  022742  012737  010025  003322  MOV     #<CFMT!RDHEAD>,HCS1
5915  022750  004737  043472          JSR     PC,DATCMD               ;DO DATA XFER CMD & GET CONTR RDY
5916  022754  104171                  ERROR   171                     ;NO RDY AFTER READ HEADER CMD
5917  022756  032737  100000  003322  BIT     #CERR,HCS1
5918  022764  001405                  BEQ     65$
5919  022766  104174                  ERROR   174                     ;CERR AFTER READ HEADER CMD
5920  022770  104401  056235          TYPE    ,MSG18                  ;ABORT BALANCE OF TESTS
5921  022774  000137  042662          JMP     $EOP                    ;ABORT DRIVE
5922
5923  023000  016520  000024  65$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
5924  023004  016520  000024          MOV     RKDB(R5),(R0)+  ;2'ND WORD
5925  023010  016520  000024          MOV     RKDB(R5),(R0)+  ;3'RD WORD
5926
5927
5928  023014  032765  100000  000010  BIT     #DLT,RKCS2(R5)
5929  023022  001407                  BEQ     66$
5930  023024  004737  045074          JSR     PC,GSTAT
5931  023030  104173                  ERROR   173                     ;DLT AFTER READ HEADER CMD
5932  023032  104401  056235          TYPE    ,MSG18                  ;ABORTING BALANCE OF TESTS
5933  023036  000137  042662          JMP     $EOP                    ;ABORT DRIVE
5934  023042                  66$:
5935
5936  023042  012737  010001  003322  MOV     #<CFMT!SELDRV>,HCS1
5937  023050  004737  043434          JSR     PC,DOCMD                ;DO CMD.
5938  023054  104117                  ERROR   117                     ;NO RDY AFTER SELDRV CMD
5939  023056  032737  001000  003350  BIT     #D.FORM,HMR2
5940  023064  001001                  BNE     6$
5941  023066  104313                  ERROR   313                     ;FORMAT NOT SET AFTER READ HDR CMD
5942
5943  023070                  6$:
5944
5945  023070  012737  010340  003412  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5946  023076  005037  003414          CLR     E.B0                    ;EXPECTED MSG B0
5947  023102  012737  001720  003416  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5948  023110  012737  000001  003420  MOV     #1,E.B1                 ;MSG ID FOR EXPECTED MSG B1
5949  023116  005037  003422          CLR     E.A2                    ;EXPECTED MSG A2
5950  023122  012737  000002  003424  MOV     #2,E.B2                 ;MSG ID FOR EXPECTED MSG B2
5951  023130  012737  000003  003430  MOV     #3,E.B3                 ;MSG ID FOR EXPECTED MSG B3
5952
5953  023136  004737  044252          JSR     PC,CHKMSG               ;CHECK MSGS A0,B0,A1,B1
5954  023142  000003                  .WORD   T.A2!T.B2!0                     ;& MSGS SPECIFIED HERE
5955  023144  104301                  ERROR   301                     ;MSG A0 ERROR AFTER READ HEADER CMD
5956  023146  104271                  ERROR   271                     ;MSG B0 ERROR
5957  023150  104302                  ERROR   302                     ;MSG A1 ERROR
5958  023152  104272                  ERROR   272                     ;MSG B1 ERROR
5959
5960  023154  012765  000002  000026  MOV     #2,RKMR1(R5)    ;SELECT WORD 2
5961  023162  004737  045074          JSR     PC,GSTAT
5962  023166  005737  001362          TST     CYLDIF                  ;SEE IF MSG A2=0
5963  023172  001401                  BEQ     67$                     ;BR IF YES
```

```
 5964  023174  104172                        ERROR   172             ;MSG A2 NOT CLEARED AFTER READ HEADER CMD
 5965  023176  005737  001364        67$:    TST     CYLADD          ;SEE IF MSG B2=0
 5966  023202  001401                        BEQ     68$             ;BR IF YES
 5967  023204  104264                        ERROR   264             ;MSG B2 NOT CLEARED AFTER READ HEADER CMD
 5968  023206                        68$:
 5969  023206  012701  001674                MOV     #PHTAB,R1
 5970
 5971  023212  005037  001442        3$:     CLR     WDCNT           ;HEADER WORD COUNT
 5972  023216  013737  001450  003360        MOV     DATA1,TEMP1     ;GET 'SHOULD BE' DATA
 5973  023224  012137  001454        4$:     MOV     (R1)+,HDWD      ;READ HEADER WORD
 5974  023230  023737  001454  003360        CMP     HDWD,TEMP1      ;MATCH OK?
 5975  023236  001401                        BEQ     5$              ;BR IF YES
 5976  023240  104202                        ERROR   202             ;READ HEADER MISMATCH
 5977  023242  005237  001442        5$:     INC     WDCNT
 5978  023246  023727  001442  000003        CMP     WDCNT,#3        ;JUST 1 SECTOR AND 1 HEAD
 5979  023254  001363                        BNE     4$
 5980
 5981
 5982
 5983
 5984                                  ;;*****************************************************************
 5985                                  ;*TEST 25        WRITE & READ HEADERS CYL 0, HEAD 0
 5986                                  ;;*****************************************************************
 5987  023256  000004                  TST25:  SCOPE
 5988  023260  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
 5989  023266  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 5990
 5991  023272  004737  045424                  JSR     PC,SUBCLR
 5992  023276  104024                          ERROR   24              ;CERR AFTER SCLR
 5993
 5994  023300  005237  001464                  INC     BYPFMT          ;SET BIT 14 & 15  IN HEADER
 5995
 5996  023304  012765  001470  000004          MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
 5997  023312  012765  177676  000002          MOV     #-66.,RKWC(R5)  ;WORD COUNT.
 5998  023320  012737  000000  001352          MOV     #0,TOCYL
 5999
 6000  023326  013737  001352  001366          MOV     TOCYL,CALADD    ;SETUP
 6001  023334  012737  000000  001430          MOV     #0,HEAD         ;TO FILL
 6002  023342  012737  000000  001436          MOV     #0,FORMAT       ;HEADER
 6003  023350  004737  046534                  JSR     PC,FHDTAB       ;TABLE
 6004
 6005  023354  012765  000000  000020          MOV     #0,RKDC(R5)     ;CYL#
 6006
 6007  023362  012737  000027  003322          MOV     #<WRHED>,HCS1
 6008  023370  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
 6009  023374  104200                          ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
 6010  023376  004737  045074                  JSR     PC,GSTAT        ;GET FRESH STATUS
 6011  023402  032737  100000  003322          BIT     #CERR,HCS1
 6012  023410  001405                          BEQ     64$
 6013  023412  104201                          ERROR   201             ;CERR AFTER WRITE HEADER CMD
 6014  023414  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 6015  023420  000137  042662                  JMP     $EOP            ;ABORT DRIVE
 6016  023424                        64$:
 6017
 6018  023424  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
 6019  023432  005037  003414                  CLR     F.B0            ;EXPECTED MSG B0
```

```
6020  023436  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6021  023444  012737  000001  003420          MOV     #1,E.B1             ;MSG ID FOR EXPECTED MSG B1
6022  023452  005037  003422                  CLR     E.A2                ;EXPECTED MSG A2
6023  023456  012737  000002  003424          MOV     #2,E.B2             ;MSG ID FOR EXPECTED MSG B2
6024  023464  012737  000003  003430          MOV     #3,E.B3             ;MSG ID FOR EXPECTED MSG B3
6025
6026  023472  004737  044252                  JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
6027  023476  000003                          .WORD   T.A2!T.B2!0                 ;& MSGS SPECIFIED HERE
6028  023500  104277                          ERROR   277                 ;MSG A0 ERROR AFTER WRITE HEADER CMD
6029  023502  104267                          ERROR   267                 ;MSG B0 ERROR
6030  023504  104300                          ERROR   300                 ;MSG A1 ERROR
6031  023506  104270                          ERROR   270                 ;MSG B1 ERROR
6032
6033  023510  005037  001400                  CLR     SECNT               ;SECTOR COUNT
6034  023514  104415                          SCOP1
6035  023516  012706  001100                  MOV     #STACK,SP           ;RESTORE STK PTR
6036
6037  023522  004737  045424                  JSR     PC,SUBCLR
6038  023526  104024                          ERROR   24                  ;CERR AFTER SCLR
6039
6040  023530  012765  000000  000020          MOV     #0,RKDC(R5)         ;CYL #
6041
6042  023536  012700  001674                  MOV     #RHTAB,R0
6043
6044  023542  012737  000025  003322  65$:     MOV     #RDHEAD,HCS1
6045  023550  004737  043472                  JSR     PC,DATCMD           ;DO READ HEADER CMD & GET CONTR RDY
6046  023554  104171                          ERROR   171                 ;NO RDY AFTER READ HEADER CMD
6047  023556  032737  100000  003322          BIT     #CERR,HCS1
6048  023564  001405                          BEQ     66$
6049  023566  104174                          ERROR   174                 ;CERR AFTER READ HEADER  CMD
6050  023570  104401  056235                  TYPE    ,MSG18              ;ABORTING BALANCE OF TESTS
6051  023574  000137  042662                  JMP     $EOP                ;ABORT DRIVE
6052
6053  023600  016520  000024          66$:    MOV     RKDB(R5),(R0)+      ;1'ST WORD FROM SILO TO RHTAB
6054  023604  016520  000024                  MOV     RKDB(R5),(R0)+      ;2'ND WORD
6055  023610  016520  000024                  MOV     RKDB(R5),(R0)+      ;3'RD WORD
6056
6057  023614  032765  100000  000010          BIT     #DLT,RKCS2(R5)      ;SEE IF DATA LATE
6058  023622  001407                          BEQ     67$
6059  023624  004737  045074                  JSR     PC,GSTAT
6060  023630  104173                          ERROR   173                 ;DATA LATE ON READ HEADER
6061  023632  104401  056235                  TYPE    ,MSG18              ;ABORT BALANCE OF TESTS
6062  023636  000137  042662                  JMP     $EOP                ;ABORT DRIVE
6063
6064  023642  020027  002100          67$:    CMP     R0,#RHTAB+132.      ;ALL 66 WORDS DONE?
6065  023646  001335                          BNE     65$                 ;BR IF NO
6066
6067  023650  004737  047056                  JSR     PC,SORT             ;SORT RHTAB INTO SRTTAB SO THAT IT
6068                                                                      ;BEGINS WITH SECTOR 0
6069  023654  005037  001442                  CLR     WDCNT               ;WORD COUNT
6070  023660  012700  002100                  MOV     #SRTTAB,R0          ;ACTUAL HEADER TABLE
6071  023664  012701  001470                  MOV     #HDTAB,R1           ;CALC HEADER TABLE
6072
6073  023670  012037  001454          68$:    MOV     (R0)+,HDWD
6074  023674  012137  003360                  MOV     (R1)+,TEMP1
6075  023700  023737  001454  003360          CMP     HDWD,TEMP1          ;COMPARE ACTUAL WITH CALCULATED WORD
```

```
6076  023706  001401                          BEQ     69$             ;BR IF COMPARE
6077  023710  104202                          ERROR   202             ;READ HEADER MISMATCH
6078
6079  023712  005237  001442          69$:    INC     WDCNT
6080  023716  023727  001442  000102          CMP     WDCNT,#66.      ;ALL WORDS DONE?
6081  023724  001361                          BNE     68$             ;BR IF NO
6082
6083
6084  023726  005037  001464                  CLR BYPFMT              ;ALLOW CORRECT FORMATTING
6085
6086
6087
6088
6089                                  ;;*****************************************************************
6090                                  ;*TEST 26        SEEK FROM CYL 0 TO 1 & READ HEADERS
6091                                  ;*
6092                                  ;*      THIS TEST CHECKS MSG A & B WORDS 0,1,2 FOR CORRECT STATUS AFTER RDY
6093                                  ;*      IS RECEIVED FROM A SEEK CMD TO DETERMINE
6094                                  ;*      THAT THE HEADS ARE ACTUALLY MOVING & THE CYL DIFF IS 1.
6095                                  ;*      AFTER ATTN IS RECEIVED, CERR IS EXAMINED FOR ANY ERRORS.
6096                                  ;*      CYL DIFFERENCE IN MSG A2 IS VERIFIED TO BE 0 & CYL ADDR
6097                                  ;*      IN MSG B2 IS VERIFIED TO BE 1.
6098                                  ;*
6099                                  ;*      HEADERS ARE READ FROM 1 SECTOR, HEAD 0 & VERIFIED THAT THEY ARE
6100                                  ;*      DIFFERENT FROM CYL 0 TO SHOW THAT THE HEADS DID ACTUALLY MOVE.
6101                                  ;*
6102                                  ;;*****************************************************************
6103  023732  000004                  TST26:  SCOPE
6104  023734  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
6105  023742  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
6106  023746  004737  045424                  JSR     PC,SUBCLR
6107  023752  104024                          ERROR   24              ;CERR AFTER SCLR
6108  023754  005037  001350                  CLR     FRCYL
6109  023760  012737  000001  001352          MOV     #1,TOCYL
6110  023766  012737  000001  001360          MOV     #1,CALDIF
6111  023774  012765  000001  000020          MOV     #1,RKDC(R5)     ;SET FOR CYL 1
6112  024002  012737  024766  001176          MOV     #10$,$ESCAPE
6113
6114  024010  012737  000017  003322          MOV     #SEEK,HCS1
6115  024016  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
6116  024022  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
6117  024024  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
6118  024032  005037  003414                  CLR     E.B0
6119  024036  012737  003720  003416          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6120  024044  012737  000001  003420          MOV     #1,E.B1
6121
6122  024052  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6123  024056  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6124  024060  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
6125  024062  104204                          ERROR   204             ;MSG B0 ERROR
6126  024064  104205                          ERROR   205             ;MSG A1 ERROR
6127  024066  104206                          ERROR   206             ;MSG B1 ERROR
6128
6129  024070  023727  001362  000001          CMP     CYLDIF,#1
6130  024076  001401                          BEQ     1$
6131  024100  104212                          ERROR   212             ;CYL DIFF INCORRECT DURING SEEK CMD.
```

```
6132
6133
6134  024102  012737  025006  001176  1$:     MOV     #12$,$ESCAPE
6135  024110  013737  001422  003360          MOV     T2500,TEMP1     ;SETUP TIMEOUT
6136
6137
6138  024116  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
6139  024122  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
6140  024124  032737  100000  003322          BIT     #CERR,HCS1
6141  024132  001401                          BEQ     64$
6142  024134  104210                          ERROR   210             ;CERR AFTER SEEK CMD
6143  024136                          64$:
6144
6145  024136  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
6146  024144  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
6147  024150  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6148  024156  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6149  024164  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
6150  024170  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6151  024176  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6152
6153  024204  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6154  024210  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6155  024212  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
6156  024214  104134                          ERROR   134             ;MSG B0 ERROR
6157  024216  104135                          ERROR   135             ;MSG A1 ERROR
6158  024220  104136                          ERROR   136             ;MSG B1 ERROR
6159  024222  005737  001362                  TST     CYLDIF
6160  024226  001401                          BEQ     65$
6161  024230  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
6162
6163  024232                          65$:
6164
6165  024232  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6166  024240  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
6167  024246  012737  000005  003322          MOV     #CLEAR,HCS1
6168  024254  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
6169  024260  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
6170  024262  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
6171  024266  000401                          BR      66$
6172  024270  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6173  024272                          66$:
6174
6175  024272  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
6176  024300  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
6177  024304  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6178  024312  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6179  024320  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
6180  024324  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6181  024332  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6182
6183  024340  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6184  024344  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6185  024346  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6186  024350  104265                          ERROR   265             ;MSG B0 ERROR
6187  024352  104274                          ERROR   274             ;MSG A1 ERROR
```

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6188  024354  104266                          ERROR   266             ;MSG B1 ERROR
6189
6190  024356  005737  001364                  TST     CYLADD
6191  024362  023727  001364  000001          CMP     CYLADD,#1
6192  024370  001401                          BEQ     2$
6193  024372  104207                          ERROR   207             ;CYL ADDR INCORRECT AFTER SEEK CMD
6194
6195
6196  024374                          2$:
6197  024374  104415                          SCOP1
6198  024376  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
6199
6200  024402  004737  045424                  JSR     PC,SUBCLR
6201  024406  104024                          ERROR   24              ;CERR AFTER SCLR
6202
6203  024410  005037  001176                  CLR     $ESCAPE
6204  024414  012765  000001  000020          MOV     #1,RKDC(R5)     ;CYL #
6205
6206  024422  012700  001674                  MOV     #RHTAB,R0
6207  024426  012737  000025  003322          MOV     #<RDHEAD>,HCS1
6208  024434  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
6209  024440  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
6210  024442  032737  100000  003322          BIT     #CERR,HCS1
6211  024450  001405                          BEQ     67$
6212  024452  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
6213  024454  104401  056235                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
6214  024460  000137  042662                  JMP     $EOP            ;ABORT DRIVE
6215
6216  024464  016520  000024          67$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
6217  024470  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
6218  024474  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
6219
6220
6221  024500  032765  100000  000010          BIT     #DLT,RKCS2(R5)
6222  024506  001407                          BEQ     68$
6223  024510  004737  045074                  JSR     PC,GSTAT
6224  024514  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
6225  024516  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
6226  024522  000137  042662                  JMP     $EOP            ;ABORT DRIVE
6227  024526                          68$:
6228
6229
6230  024526  005737  001674                  TST     RHTAB           ;CHECK 1'ST WORD ONLY:CYL#
6231  024532  001001                          BNE     3$
6232  024534  104211                          ERROR   211             ;CYL 0 HEADER ON CYL 1
6233
6234  024536  013737  001674  001454  3$:     MOV     RHTAB,HDWD
6235  024544  012737  000001  003360          MOV     #1,TEMP1
6236  024552  023737  001454  003360          CMP     HDWD,TEMP1
6237  024560  001401                          BEQ     4$
6238  024562  104202                          ERROR   202             ;READ CYL WORD HEADER ERROR
6239  024564                          4$:
6240  024564  004737  047430                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
6241  024570  000516                          BR      TST27           ;;GO TO NEXT TEST
6242                                                                  ;RETURN HERE IF SW 14 IS SET OR
6243                                                                  ;SW 8 WITH SWR <7:0> APPLY
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```
6244  024572  004737  045424          6$:     JSR     PC,SUBCLR
6245  024576  104024                          ERROR   24                  ;CERR AFTER SCLR
6246
6247  024600  012737  000017  003322          MOV     #SEEK,HCS1
6248  024606  004737  043434                  JSR     PC,DOCMD            ;DO SEEK CMD & GET CONTR READY
6249  024612  104131                          ERROR   131                 ;NO RDY AFTER SEEK CMD.
6250
6251  024614  013737  001426  003360          MOV     T50000,TEMP1
6252  024622  004737  044140                  JSR     PC,FATT2            ;FIND ATTN
6253  024626  104132                          ERROR   132                 ;NO ATTN AFTER SEEK CMD
6254  024630  032737  100000  003322          BIT     #CERR,HCS1
6255  024636  001401                          BEQ     69$
6256  024640  104210                          ERROR   210                 ;CERR AFTER SEEK CMD.
6257
6258  024642  004737  045424          69$:    JSR     PC,SUBCLR
6259  024646  104024                          ERROR   24                  ;CERR AFTER SCLR
6260
6261
6262  024650  012737  050340  003412          MOV     #<D.DSC!D.SPIN'D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
6263  024656  005037  003414                  CLR     E.B0                ;EXPECTED MSG B0
6264  024662  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6265  024670  012737  000001  003420          MOV     #1,E.B1             ;MSG ID FOR EXPECTED MSG B1
6266  024676  005037  003422                  CLR     E.A2                ;EXPECTED MSG A2
6267  024702  012737  000002  003424          MOV     #2,E.B2             ;MSG ID FOR EXPECTED MSG B2
6268  024710  012737  000003  003430          MOV     #3,E.B3             ;MSG ID FOR EXPECTED MSG B3
6269
6270  024716  004737  044252                  JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
6271  024722  000003                          .WORD   T.A2!T.B2!0                 ;& MSGS SPECIFIED HERE
6272  024724  104133                          ERROR   133                 ;MSG A0 ERROR AFTER SEEK CMD
6273  024726  104134                          ERROR   134                 ;MSG B0 ERROR
6274  024730  104135                          ERROR   135                 ;MSG A1 ERROR
6275  024732  104136                          ERROR   136                 ;MSG B1 ERROR
6276  024734  005737  001364                  TST     CYLADD
6277  024740  001401                          BEQ     7$
6278  024742  104043                          ERROR   43                  ;CYL ADDR IN RKMR3 NOT=RKDC
6279
6280  024744                          7$:
6281  024744  005037  001176                  CLR     $ESCAPE
6282  024750  005737  001410                  TST     LPFLG
6283  024754  001402                          BEQ     70$
6284  024756  000177  154126                  JMP     @$LPERR             ;SW 9 WAS SET.
6285  024762  000177  154120          70$:    JMP     @$LPADR             ;SW 14 OR 8 WAS SET
6286
6287  024766                          10$:
6288  024766  005237  001410                  INC     LPFLG
6289  024772  032777  001000  154140          BIT     #SW9,@SWR           ;LOOP ON ERROR?
6290  025000  001274                          BNE     6$                  ;YES, RECONDITION DRIVE
6291  025002  000137  024102                  JMP     1$                  ;RETURN TO MAINLINE
6292  025006                          12$:
6293  025006  005237  001410                  INC     LPFLG
6294  025012  032777  001000  154120          BIT     #SW9,@SWR           ;LOOP ON ERROR?
6295  025020  001264                          BNE     6$                  ;YES, RECONDITION DRIVE
6296  025022  000137  024374                  JMP     2$                  ;RETURN TO MAINLINE
6297
6298
6299
```

```
6300
6301                                    ;;*****************************************************************
6302                                    ;*TEST 27       WRITE & READ HEADERS CYL 1, HEAD 0
6303                                    ;;*****************************************************************
6304   025026  000004                   $ST27:  SCOPE
6305   025030  012737  000001  001174           MOV     #1,$TIMES       ;;DO 1 ITERATION
6306   025036  012706  001100                   MOV     #STACK,SP       ;RESTORE STK PTR
6307
6308   025042  004737  045424                   JSR     PC,SUBCLR
6309   025046  104024                           ERROR   24              ;CERR AFTER SCLR
6310
6311   025050  005237  001464                   INC     BYPFMT          ;SET BIT 14 & 15  IN HEADER
6312
6313   025054  012765  001470  000004           MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
6314   025062  012765  177676  000002           MOV     #-66.,RKWC(R5)  ;WORD COUNT.
6315   025070  012737  000001  001352           MOV     #1,TOCYL
6316
6317   025076  013737  001352  001366           MOV     TOCYL,CALADD    ;SETUP
6318   025104  012737  000000  001430           MOV     #0,HEAD         ;TO FILL
6319   025112  012737  000000  001436           MOV     #0,FORMAT       ;HEADER
6320   025120  004737  046534                   JSR     PC,FHDTAB       ;TABLE
6321
6322   025124  012765  000001  000020           MOV     #1,RKDC(R5)     ;CYL#
6323
6324   025132  012737  000027  003322           MOV     #<WRHEAD>,HCS1
6325   025140  004737  043472                   JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
6326   025144  104200                           ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
6327   025146  004737  045074                   JSR     PC,GSTAT        ;GET FRESH STATUS
6328   025152  032737  100000  003322           BIT     #CERR,HCS1
6329   025160  001405                           BEQ     64$
6330   025162  104201                           ERROR   201             ;CERR AFTER WRITE HEADER CMD
6331   025164  104401  056235                   TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
6332   025170  000137  042662                   JMP     $EOP            ;ABORT DRIVE
6333   025174                          64$:
6334
6335   025174  012737  010340  003412           MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
6336   025202  005037  003414                   CLR     E.B0            ;EXPECTED MSG B0
6337   025206  012737  001720  003416           MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6338   025214  012737  000001  003420           MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6339   025222  005037  003422                   CLR     E.A2            ;EXPECTED MSG A2
6340   025226  012737  000002  003424           MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6341   025234  012737  000003  003430           MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6342
6343   025242  004737  044252                   JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6344   025246  000003                           .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6345   025250  104277                           ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
6346   025252  104267                           ERROR   267             ;MSG B0 ERROR
6347   025254  104300                           ERROR   300             ;MSG A1 ERROR
6348   025256  104270                           ERROR   270             ;MSG B1 ERROR
6349
6350   025260  005037  001400                   CLR     SECNT           ;SECTOR COUNT
6351   025264  104415                           SCOP1
6352   025266  012706  001100                   MOV     #STACK,SP       ;RESTORE STK PTR
6353
6354   025272  004737  045424                   JSR     PC,SUBCLR
6355   025276  104024                           ERROR   24              ;CERR AFTER SCLR
```

```
6356
6357  025300  012765  000001  000020          MOV     #1,RKDC(R5)     ;CYL #
6358
6359  025306  012700  001674                  MOV     #RHTAB,R0
6360
6361  025312  012737  000025  003322  65$:    MOV     #RDHEAD,HCS1
6362  025320  004737  043472                  JSR     PC,DATCMD       ;DO READ HEADER CMD & GET CONTR RDY
6363  025324  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
6364  025326  032737  100000  003322          BIT     #CERR,HCS1
6365  025334  001405                          BEQ     66$
6366  025336  104174                          ERROR   174             ;CERR AFTER READ HEADER  CMD
6367  025340  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
6368  025344  000137  042662                  JMP     $EOP            ;ABORT DRIVE
6369
6370  025350  016520  000024          66$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
6371  025354  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
6372  025360  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
6373
6374  025364  032765  100000  000010          BIT     #DLT,RKCS2(R5)  ;SEE IF DATA LATE
6375  025372  001407                          BEQ     67$
6376  025374  004737  045074                  JSR     PC,GSTAT
6377  025400  104173                          ERROR   173             ;DATA LATE ON READ HEADER
6378  025402  104401  056235                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
6379  025406  000137  042662                  JMP     $EOP            ;ABORT DRIVE
6380
6381  025412  020027  002100          67$:    CMP     R0,#RHTAB+132.  ;ALL 66 WORDS DONE?
6382  025416  001335                          BNE     65$             ;BR IF NO
6383
6384  025420  004737  047056                  JSR     PC,SORT         ;SORT RHTAB INTO SRTTAB SO THAT IT
6385                                                                  ;BEGINS WITH SECTOR 0
6386  025424  005037  001442                  CLR     WDCNT           ;WORD COUNT
6387  025430  012700  002100                  MOV     #SRTTAB,R0      ;ACTUAL HEADER TABLE
6388  025434  012701  001470                  MOV     #HDTAB,R1       ;CALC HEADER TABLE
6389
6390  025440  012037  001454          68$:    MOV     (R0)+,HDWD
6391  025444  012137  003360                  MOV     (R1)+,TEMP1
6392  025450  023737  001454  003360          CMP     HDWD,TEMP1      ;COMPARE ACTUAL WITH CALCULATED WORD
6393  025456  001401                          BEQ     69$             ;BR IF COMPARE
6394  025460  104202                          ERROR   202             ;READ HEADER MISMATCH
6395
6396  025462  005237  001442          69$:    INC     WDCNT
6397  025466  023727  001442  000102          CMP     WDCNT,#66.      ;ALL WORDS DONE?
6398  025474  001361                          BNE     68$             ;BR IF NO
6399
6400
6401  025476  005037  001464                  CLR BYPFMT              ;ALLOW CORRECT FORMATTING
6402
6403
6404
6405                          ;;*****************************************************************
6406                          ;*TEST 30       TEST RECALIBRATE CMD & READ HEADERS
6407                          ;*
6408                          ;*      THIS TEST DOES A RECALIBRATE & READS HEADERS.
6409                          ;*      IT VERIFIES THAT WRITING HEADERS ON CYL 1 FROM THE PREVIOUS
6410                          ;*      TEST DID NOT OVERWRITE CYL 0 HEADERS.
6411                          ;*      AN ERROR IN THIS TEST INDICATES THAT HEADS:
```

```
6412                                        ;*
6413                                        ;*
6414                                        ;*              A. MOVED TO A CYL OTHER THAN 1
6415                                        ;*      OR      B. DID NOT GET BACK TO CYL 0
6416                                        ;*
6417                                        ;**************************************************************
6418  025502  000004                        TST30:  SCOPE
6419  025504  012737  000001  001174                MOV     #1,$TIMES       ;;DO 1 ITERATION
6420  025512  012706  001100                        MOV     #STACK,SP       ;RESTORE STK PTR
6421
6422  025516  004737  045424                        JSR     PC,SUBCLR
6423  025522  104024                                ERROR   24              ;CERR AFTER SCLR
6424  025524  012737  000001  001350                MOV     #1,FRCYL        ;PARAMETERS
6425  025532  005037  001352                        CLR     TOCYL           ;FOR
6426  025536  012737  000001  001360                MOV     #1,CALDIF       ;ERROR TYPEOUTS
6427  025544  012737  026542  001176                MOV     #10$,$ESCAPE
6428  025552  012737  000013  003322                MOV     #RECAL,HCS1
6429  025560  004737  043434                        JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
6430  025564  104124                                ERROR   124             ;NO RDY AFTER RECAL CMD
6431  025566  012765  100000  000000                MOV     #CCLR,RKCS1(R5)
6432  025574  012765  000001  000026                MOV     #1,RKMR1(R5)    ;SELECT WORD 1
6433  025602  004737  045074                        JSR     PC,GSTAT
6434  025606  032737  020000  003350                BIT     #D.RTZ,HMR2
6435  025614  001001                                BNE     1$
6436  025616  104307                                ERROR   307             ;RTZ NOT SET DURING RECAL CMD
6437
6438  025620  012737  030140  003412  1$:           MOV     #<D.PIP!D.SPIN!D.VV!D.DRA> E.A0 ;EXPECTED A0
6439  025626  005037  003414                        CLR     E.B0
6440  025632  012737  025720  003416                MOV     #<D.RTZ!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6441  025640  012737  000001  003420                MOV     #1,E.B1
6442
6443  025646  004737  044252                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6444  025652  000001                                .WORD   T.A2!0!0                ;& MSGS SPECIFIED HERE
6445  025654  104213                                ERROR   213             ;MSG A0 ERROR DURING RECAL CMD
6446  025656  104214                                ERROR   214             ;MSG B0 ERROR
6447  025660  104215                                ERROR   215             ;MSG A1 ERROR
6448  025662  104216                                ERROR   216             ;MSG B1 ERROR
6449                                        ;       TST     CYLDIF
6450                                        ;       BEQ     2$
6451                                        ;       ERROR   217             ;CYL DIFF INCORRECT DURING RECAL CMD.
6452
6453  025664  012737  026562  001176  2$:           MOV     #12$,$ESCAPE
6454  025672  012737  177777  003360                MOV     #-1,TEMP1       ;SETUP TIMEOUT
6455  025700  004737  044140                        JSR     PC,FATT2        ;FIND ATTN
6456  025704  104055                                ERROR   55              ;NO ATTN AFTER RECAL CMD
6457  025706  032737  100000  003322                BIT     #CERR,HCS1
6458  025714  001401                                BEQ     3$
6459  025716  104220                                ERROR   220             ;CERR AFTER RECAL CMD
6460  025720                                3$:
6461
6462  025720  012737  050340  003412                MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
6463  025726  005037  003414                        CLR     E.B0            ;EXPECTED MSG B0
6464  025732  012737  001720  003416                MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6465  025740  012737  000001  003420                MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6466  025746  005037  003422                        CLR     E.A2            ;EXPECTED MSG A2
6467  025752  012737  000002  003424                MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
```

```
6468  025760  012737  000003  003430          MOV     #3,E.B3          ;MSG ID FOR EXPECTED MSG B3
6469
6470  025766  004737  044252                  JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
6471  025772  000003                          .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
6472  025774  104221                          ERROR   221              ;MSG A0 ERROR AFTER RECAL CMD
6473  025776  104275                          ERROR   275              ;MSG B0 ERROR
6474  026000  104222                          ERROR   222              ;MSG A1 ERROR
6475  026002  104276                          ERROR   276              ;MSG B1 ERROR
6476
6477  026004  012765  000002  000026          MOV     #2,RKMR1(R5)     ;SELECT WORD 2
6478  026012  004737  045074                  JSR     PC,GSTAT
6479  026016  005737  001362                  TST     CYLDIF           ;SEE IF MSG A2=0
6480  026022  001401                           EQ      64$              ;BR IF YES
6481  026024  104047                          ERROR   47               ;MSG A2 NOT CLEARED AFTER RECAL CMD
6482  026026  005737  001364          64$:    TST     CYLADD           ;SEE IF MSG B2=0
6483  026032  001401                          BEQ     65$              ;BR IF YES
6484  026034  104050                          ERROR   50               ;MSG B2 NOT CLEARED AFTER RECAL CMD
6485  026036                          65$:
6486
6487  026036  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6488  026044  013765  001222  000010          MOV     $UNIT,RKCS2(R5)  ;DRIVE#
6489  026052  012737  000005  003322          MOV     #CLEAR,HCS1
6490  026060  004737  043434                  JSR     PC,DOCMD         ;DO DRIVE CLEAR CMD & GET CONTR RDY
6491  026064  104151                          ERROR   151              ;NO RDY AFTER DRIVE CLEAR CMD
6492  026066  004737  044012                  JSR     PC,TSTATN        ;TEST FOR ATTN
6493  026072  000401                          BR      66$
6494  026074  104154                          ERROR   154              ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6495  026076                          66$:
6496
6497  026076  012737  010340  003412          MOV     #<0!D.SPUN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
6498  026104  005037  003414                  CLR     E.B0             ;EXPECTED MSG B0
6499  026110  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6500  026116  012737  000001  003420          MOV     #1,E.B1          ;MSG ID FOR EXPECTED MSG B1
6501  026124  005037  003422                  CLR     E.A2             ;EXPECTED MSG A2
6502  026130  012737  000002  003424          MOV     #2,E.B2          ;MSG ID FOR EXPECTED MSG B2
6503  026136  012737  000003  003430          MOV     #3,E.B3          ;MSG ID FOR EXPECTED MSG B3
6504
6505  026144  004737  044252                  JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
6506  026150  000003                          .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
6507  026152  104273                          ERROR   273              ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6508  026154  104265                          ERROR   265              ;MSG B0 ERROR
6509  026156  104274                          ERROR   274              ;MSG A1 ERROR
6510  026160  104266                          ERROR   266              ;MSG B1 ERROR
6511
6512  026162  004737  045424          4$:     JSR     PC,SUBCLR
6513  026166  104024                          ERROR   24               ;CERR AFTER SCLR
6514
6515  026170  005037  001176                  CLR     $ESCAPE
6516
6517  026174  012700  001674                  MOV     #RHTAB,R0
6518  026200  012737  000025  003322          MOV     #<RDHEAD>,HCS1
6519  026206  004737  043472                  JSR     PC,DATCMD        ;DO DATA XFER CMD & GET CONTR RDY
6520  026212  104171                          ERROR   171              ;NO RDY AFTER READ HEADER CMD
6521  026214  032737  100000  003322          BIT     #CERR,HCS1
6522  026222  001405                          BEQ     67$
6523  026224  104174                          ERROR   174              ;CERR AFTER READ HEADER CMD
```

```
6524  026226  104401  056235          TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
6525  026232  000137  042662          JMP     $EOP            ;ABORT DRIVE
6526
6527  026236  016520  000024  67$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
6528  026242  016520  000024          MOV     RKDB(R5),(R0)+  ;2'ND WORD
6529  026246  016520  000024          MOV     RKDB(R5),(R0)+  ;3'RD WORD
6530
6531
6532  026252  032765  100000  000010  BIT     #DLT,RKCS2(R5)
6533  026260  001407                  BEQ     68$
6534  026262  004737  045074          JSR     PC,GSTAT
6535  026266  104173                  ERROR   173             ;DLT AFTER READ HEADER CMD
6536  026270  104401  056235          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
6537  026274  000137  042662          JMP     $EOP            ;ABORT DRIVE
6538  026300                  68$:
6539
6540  026300  023727  001674  000001  CMP     RHTAB,#1        ;CHECK WORD 0, CYL # ONLY
6541  026306  001001                  BNE     5$
6542  026310  104240                  ERROR   240             ;CYL 1 HEADERS ON CYL 0
6543
6544  026312  005737  001674          5$:     TST     RHTAB
6545  026316  001401                  BEQ     6$
6546  026320  104202                  ERROR   202             ;READ CYL WORD HEADER ERROR
6547  026322                  6$:
6548  026322  004737  047430          JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
6549  026326  000525                  BR      TST31           ;;GO TO NEXT TEST
6550                                                          ;RETURN HERE IF SW 14 IS SET OR
6551                                                          ;SW 8 WITH SWR <7:0> APPLY
6552  026330  004737  045424          8$:     JSR     PC,SUBCLR
6553  026334  104024                  ERROR   24              ;CERR AFTER SCLR
6554  026336  012765  000001  000020  MOV     #1,RKDC(R5)     ;RECONDITION BACK TO CYL 1
6555
6556  026344  012737  000017  003322  MOV     #SEEK,HCS1
6557  026352  004737  043434          JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
6558  026356  104131                  ERROR   131             ;NO RDY AFTER SEEK CMD.
6559
6560  026360  013737  001426  003360  MOV     T50000,TEMP1
6561  026366  004737  044140          JSR     PC,FAT12        ;FIND ATTN
6562  026372  104132                  ERROR   132             ;NO ATTN AFTER SEEK CMD
6563  026374  032737  100000  003322  BIT     #CERR,HCS1
6564  026402  001401                  BEQ     69$
6565  026404  104210                  ERROR   210             ;CERR AFTER SEEK CMD.
6566
6567  026406  004737  045424          69$:    JSR     PC,SUBCLR
6568  026412  104024                  ERROR   24              ;CERR AFTER SCLR
6569
6570
6571
6572  026414  012737  010340  003412  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
6573  026422  005037  003414          CLR     E.B0            ;EXPECTED MSG B0
6574  026426  012737  001720  003416  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1      ;EXPECTED A1
6575  026434  012737  000001  003420  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6576  026442  005037  003422          CLR     E.A2            ;EXPECTED MSG A2
6577  026446  012737  000002  003424  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6578  026454  012737  000003  003430  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6579  026462  012737  000022  003424  MOV     #<BIT4!2>,E.B2  ;EXPECTED MSG B2 & ID FOR CYL 1
```

```
6580
6581  026470  004737  044252          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6582  026474  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6583  026476  104133                  ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
6584  026500  104134                  ERROR   134             ;MSG B0 ERROR
6585  026502  104135                  ERROR   135             ;MSG A1 ERROR
6586  026504  104136                  ERROR   136             ;MSG B1 ERROR
6587  026506  023727  001364  000001  CMP     CYLADD,#1
6588  026514  001401                  BEQ     9$
6589  026516  104043                  ERROR   43              ;CYL ADDR IN RKMR3 NOT=RKDC
6590  026520                  9$:
6591  026520  005037  001176          CLR     $ESCAPE
6592  026524  005737  001410          TST     LPFLG
6593  026530  001402                  BEQ     70$
6594  026532  000177  152352          JMP     @$LPERR         ;SW 9 WAS SET.
6595  026536  000177  152344  70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
6596  026542                  10$:
6597  026542  005237  001410          INC     LPFLG
6598  026546  032777  001000  152364  BIT     #SW9,@SWR       ;LOOP ON ERROR?
6599  026554  001265                  BNE     8$              ;YES, RECONDITION DRIVE
6600  026556  000137  025664          JMP     2$              ;RETURN TO MAINLINE
6601  026562                  12$:
6602  026562  005237  001410          INC     LPFLG
6603  026566  032777  001000  152344  BIT     #SW9,@SWR       ;LOOP ON ERROR?
6604  026574  001255                  BNE     8$              ;YES, RECONDITION DRIVE
6605  026576  000137  026162          JMP     4$              ;RETURN TO MAINLINE
6606                          ;;*****************************************************************
6607                          ;*TEST 31       SINGLE INCREMENT SEEKS TO LAST CYL
6608                          ;*
6609                          ;*      THIS TEST DOES SINGLE INCREMENT SEEKS OUT TO THE LAST CYL
6610                          ;*      WITHOUT ANY WRITING OR READING SO AS NOT TO INADVERTENTLY
6611                          ;*      DESTROY DATA.
6612                          ;*
6613                          ;*****************************************************************
6614  026602  000004          T31:    SCOPE
6615  026604  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
6616  026612  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
6617
6618  026616  004737  045424          JSR     PC,SUBCLR
6619  026622  104024                  ERROR   24              ;CERR AFTER SCLR
6620  026624  005037  001350          CLR     FRCYL           ;FROM CYL
6621  026630  012737  000001  001352  MOV     #1,TOCYL        ;TO CYL
6622  026636  012737  000001  001360  MOV     #1,CALDIF       ;CALCULATED DIFF.
6623
6624  026644                  1$:
6625  026644  104415                  SCOP1
6626  026646  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
6627
6628  026652  004737  045424          JSR     PC,SUBCLR
6629  026656  104024                  ERROR   24              ;CERR AFTER SCLR
6630
6631  026660  012737  027442  001176  MOV     #10$,$ESCAPE
6632  026666  013765  001352  000020  MOV     TOCYL,RKDC(R5)  ;CYL TO SEEK TO
6633
6634  026674  012737  000017  003322  MOV     #SEEK,HCS1
6635  026702  004737  043434          JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
```

```
6636  026706  104131                        ERROR   131                 ;NO RDY AFTER SEEK CMD
6637  026710  012737  030140  003412        MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
6638  026716  005037  003414                CLR     E.B0
6639  026722  012737  003720  003416        MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6640  026730  012737  000001  003420        MOV     #1,E.B1
6641
6642  026736  004737  044252                JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
6643  026742  000003                        .WORD   T.A2!T.B2!0                 ;& MSGS SPECIFIED HERE
6644  026744  104203                        ERROR   203                 ;MSG A0 ERROR DURING SEEK CMD
6645  026746  104204                        ERROR   204                 ;MSG B0 ERROR
6646  026750  104205                        ERROR   205                 ;MSG A1 ERROR
6647  026752  104206                        ERROR   206                 ;MSG B1 ERROR
6648
6649  026754  023727  001362  000001        CMP     CYLDIF,#1
6650  026762  001401                        BEQ     2$
6651  026764  104212                        ERROR   212                 ;CYL DIFF INCORRECT DURING SEEK
6652
6653  026766  012737  027462  001176  2$:   MOV     #12$,$ESCAPE
6654  026774  013737  001422  003360        MOV     T2500,TEMP1         ;SETUP TIMEOUT
6655
6656  027002  004737  044140                JSR     PC,FATT2            ;FIND ATTN
6657  027006  104132                        ERROR   132                 ;NO ATTN AFTER SEEK CMD
6658  027010  032737  100000  003322        BIT     #CERR,HCS1
6659  027016  001401                        BEQ     64$
6660  027020  104210                        ERROR   210                 ;CERR AFTER SEEK CMD
6661  027022                          64$:
6662
6663  027022  012737  050340  003412        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
6664  027030  005037  003414                CLR     E.B0                ;EXPECTED MSG B0
6665  027034  012737  001720  003416        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6666  027042  012737  000001  003420        MOV     #1,E.B1             ;MSG ID FOR EXPECTED MSG B1
6667  027050  005037  003422                CLR     E.A2                ;EXPECTED MSG A2
6668  027054  012737  000002  003424        MOV     #2,E.B2             ;MSG ID FOR EXPECTED MSG B2
6669  027062  012737  000003  003430        MOV     #3,E.B3             ;MSG ID FOR EXPECTED MSG B3
6670
6671  027070  004737  044252                JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
6672  027074  000003                        .WORD   T.A2!T.B2!0                 ;& MSGS SPECIFIED HERE
6673  027076  104133                        ERROR   133                 ;MSG A0 ERROR AFTER SEEK CMD
6674  027100  104134                        ERROR   134                 ;MSG B0 ERROR
6675  027102  104135                        ERROR   135                 ;MSG A1 ERROR
6676  027104  104136                        ERROR   136                 ;MSG B1 ERROR
6677  027106  005737  001362                TST     CYLDIF
6678  027112  001401                        BEQ     65$
6679  027114  104137                        ERROR   137                 ;CYL DIFF NOT CLEARED AFTER SEEK CMD
6680
6681  027116                          65$:
6682
6683  027116  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
6684  027124  013765  001222  000010        MOV     $UNIT,RKCS2(R5)     ;DRIVE#
6685  027132  012737  000005  003322        MOV     #CLEAR,HCS1
6686  027140  004737  043434                JSR     PC,DOCMD            ;DO DRIVE CLEAR CMD & GET CONTR RDY
6687  027144  104151                        ERROR   151                 ;NO RDY AFTER DRIVE CLEAR CMD
6688  027146  004737  044012                JSR     PC,TSTATN           ;TEST FOR ATTN
6689  027152  000401                        BR      66$
6690  027154  104154                        ERROR   154                 ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6691  027156                          66$:
```

```
6692
6693  027156  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
6694  027164  005037  003414                  CLR     E.B0                    ;EXPECTED MSG B0
6695  027170  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6696  027176  012737  000001  003420          MOV     #1,E.B1                 ;MSG ID FOR EXPECTED MSG B1
6697  027204  005037  003422                  CLR     E.A2                    ;EXPECTED MSG A2
6698  027210  012737  000002  003424          MOV     #2,E.B2                 ;MSG ID FOR EXPECTED MSG B2
6699  027216  012737  000003  003430          MOV     #3,E.B3                 ;MSG ID FOR EXPECTED MSG B3
6700
6701  027224  004737  044252                  JSR     PC,CHKMSG               ;CHECK MSGS A0,B0,A1,B1
6702  027230  000003                          .WORD   T.A2!T.B2!0                     ;& MSGS SPECIFIED HERE
6703  027232  104273                          ERROR   273                     ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6704  027234  104265                          ERROR   265                     ;MSG B0 ERROR
6705  027236  104274                          ERROR   274                     ;MSG A1 ERROR
6706  027240  104266                          ERROR   266                     ;MSG B1 ERROR
6707
6708  027242  023737  001364  001352          CMP     CYLADD,TOCYL
6709  027250  001401                          BEQ     3$
6710  027252  104207                          ERROR   207                     ;CYL ADDR IN RKMR2 NOT=RKDC
6711
6712  027254  023737  001352  012054  3$:     CMP     TOCYL,LC                ;LAST CYL DONE?
6713  027262  001407                          BEQ     4$                      ;BR IF YES
6714  027264  005237  001350                  INC     FRCYL                   ;ELSE DO ANOTHER
6715  027270  005237  001352                  INC     TOCYL
6716  027274  001402                          BEQ     4$                      ;BR IF YES
6717  027276  000137  026644                  JMP     1$
6718
6719  027302                          4$:
6720  027302  004737  047430                  JSR     PC,SWTST                ;SEE IF SW 14 OR 8 IS SET
6721  027306  000475                          BR      TST32                   ;;GO TO NEXT TEST
6722                                                                          ;RETURN HERE IF SW 14 IS SET OR
6723                                                                          ;SW 8 WITH SWR <7:0> APPLY
6724
6725
6726
6727  027310                          6$:
6728
6729  027310  004737  045424                  JSR     PC,SUBCLR
6730  027314  104024                          ERROR   24                      ;CERR AFTER SCRL
6731
6732  027316  013765  001352  000020  67$:     MOV     TOCYL,RKDC(R5)          ;CYL#
6733
6734  027324  012737  000017  003322          MOV     #SEEK,HCS1
6735  027332  004737  043434                  JSR     PC,DOCMD                ;DO SEEK CMD & GET CONTR READY
6736  027336  104131                          ERROR   131                     ;NO RDY AFTER SEEK CMD.
6737
6738  027340  013737  001426  003360          MOV     T50000,TEMP1
6739  027346  004737  044140                  JSR     PC,FATT2                ;FIND ATTN
6740  027352  104132                          ERROR   132                     ;NO ATTN AFTER SEEK CMD
6741  027354  032737  100000  003322          BIT     #CERR,HCS1
6742  027362  001401                          BEQ     69$
6743  027364  104210                          ERROR   210                     ;CERR AFTER SEEK CMD.
6744
6745  027366  004737  045424          69$:    JSR     PC,SUBCLR
6746  027372  104024                          ERROR   24                      ;CERR AFTER SCLR
6747
```

```
6748  027374  023737  001352  000000          CMP     TOCYL,0 ;LAST CYL DONE?
6749  027402  001403                          BEQ     68$             ;BR IF YES
6750  027404  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
6751  027410  000742                          BR      67$
6752
6753  027412  004737  045424          68$:    JSR     PC,SUBCLR
6754  027416  104024                          ERROR   24              ;CERR AFTER SCLR
6755
6756  027420  005037  001176                  CLR     $ESCAPE
6757  027424  005737  001410                  TST     LPFLG
6758  027430  001402                          BEQ     70$
6759  027432  000177  151452                  JMP     @$LPERR         ;SW 9 WAS SET.
6760  027436  000177  151444          70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
6761
6762
6763
6764  027442                          10$:
6765  027442  005237  001410                  INC     LPFLG
6766  027446  032777  001000  151464          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6767  027454  001315                          BNE     6$              ;YES, RECONDITION DRIVE
6768  027456  000137  026766                  JMP     2$              ;RETURN TO MAINLINE
6769
6770  027462                          12$:
6771  027462  005237  001410                  INC     LPFLG
6772  027466  032777  001000  151444          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6773  027474  001305                          BNE     6$              ;YES, RECONDITION DRIVE
6774  027476  000137  027302                  JMP     4$              ;RETURN TO MAINLINE
6775
6776                          ;;*****************************************************************
6777                          ;*TEST 32       READ & SAVE BAD SECTOR INFO & TYPE PACK SERIAL #
6778                          ;*
6779                          ;*      THIS TEST VERIFIES THAT CYL 632 (1456 FOR RK07), TRACK 2 CAN BE READ.
6780                          ;*      THIS AREA CONTAINS BAD SECTOR INFO WHICH IS WRITTEN BY THE
6781                          ;*      FACTORY DURING MANF.  ALL BAD SECTOR INFO (BSE  ILL BE STORED
6782                          ;*      AT THIS TIME TO MASK FUTURE READ HEADER OR DATA ERROR PRINTOUTS.
6783                          ;*
6784                          ;*      SECTORS 0,2,4,6,8 CONTAIN IDENTICAL INFO FOR 22 SECTOR HARDWARE DETECTED FOR BAD
6785                          ;*      SECTORS 10,12,14,16,18,20 CONTAIN IDENTICAL INFO FOR 22 SECTOR SOFTWARE DETECTED
6786                          ;*
6787                          ;*      IF BSE INFO CANNOT BE READ, OR IF AFTER READING THE BSE INFO
6788                          ;*      IT IS DETERMINED THAT AN ALIGNMENT CARTRIDGE IS USED,
6789                          ;*      A MSG WILL BE TYPED INDICATING THA  ALL
6790                          ;*      FUTURE FORMAT AND READ-WRITE TESTS WILL BE BYPASSED.
6791                          ;*      THIS IS DONE SO AS NOT TO DESTROY BSE INFO OR AN ALIGNMENT PACK BY WRITING
6792                          ;*
6793                          ;*      THE PACK SERIAL # IS TYPED IN OCTAL 3 FOR THE FIRST PASS ONLY.
6794                          ;*
6795                          ;*       THIS IS THE FIRST TEST WHERE THE READ DATA CMD IS PERFORMED
6796                          ;*
6797                          ;*****************************************************************
6798  027502  000004          TST32:  SCOPE
6799  027504  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
6800  027512  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
6801
6802  027516  004737  045424                  JSR     PC,SUBCLR
6803  027522  104024                          ERROR   24              ;CERR AFTER SCLR
```

```
6804  027524  005037  003362                  CLR     TEMP2           ;SECTOR CTR
6805  027530  005037  003364                  CLR     TEMP3           ;0=22 SECTOR HARDWARE DETECTED TABLE
6806                                                                  ;1=22 SECTOR SOFTWARE DETECTED TABLE
6807                                                                  ;2=DONE
6808  027534  012737  002304  003366          MOV     #BSE22H,TEMP4   ;STORE 22 SECTOR HARDWARE BSE INFO
6809  027542  013765  003366  000004          MOV     TEMP4,RKBA(R5)
6810  027550  012737  001000  003370          MOV     #1000,TEMP5     ;TRACK 2, SECTOR 0
6811  027556  013765  003370  000006          MOV     TEMP5,RKDA(R5)
6812
6813  027564  013765  012054  000020  1$:     MOV     LC,RKDC(R5)     ;LAST CYL
6814  027572  012765  177400  000002          MOV     #-256.,RKWC(R5) ;LOAD WORD CT
6815  027600  012737  000021  003322          MOV     #RDDATA,HCS1
6816  027606  004737  043472                  JSR     PC,DATCMD       ;DO COMMAND
6817  027612  104226                          ERROR   226             ;NO RDY AFTER READ DATA CMD
6818  027614  004737  045074                  JSR     PC,GSTAT        ;GET FRESH STATUS
6819  027620  032737  100000  003322          BIT     #CERR,HCS1
6820  027626  001470                          BEQ     8$
6821  027630  104227                          ERROR   227             ;CERR AFTER READ DATA CMD
6822
6823  027632  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRH>,E.A0       ;EXPECTED MSG A0
6824  027640  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
6825  027644  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6826  027652  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6827  027660  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
6828  027664  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6829  027672  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6830
6831  027700  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6832  027704  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
6833  027706  104051                          ERROR   51              ;MSG A0 ERROR AFTER READ DATA CMD
6834  027710  104052                          ERROR   52              ;MSG B0 ERROR
6835  027712  104112                          ERROR   112             ;MSG A1 ERROR
6836  027714  104113                          ERROR   113             ;MSG B1 ERROR
6837
6838  027716  004737  045424                  JSR     PC,SUBCLR
6839  027722  104024                          ERROR   24              ;CERR AFTER SUBCLR
6840
6841  027724  005237  003362                  INC     TEMP2
6842  027730  023727  003362  000005          CMP     TEMP2,#5        ;READ ALL 5 SECTORS?
6843  027736  001007                          BNE     5$
6844  027740  005737  003364                  TST     TEMP3
6845  027744  001002                          BNE     2$
6846  027746  104233                          ERROR   233             ;CANT READ SECTORS 0,2,4,6,8
6847  027750  000414                          BR      3$
6848  027752  104230                  2$:     ERROR   230             ;CANT READ SECTORS 10,12,14,16,18,20
6849  027754  000412                          BR      3$
6850
6851  027756  013765  003366  000004  5$:     MOV     TEMP4,RKBA(R5)  ;RESTORE TABLE ADDR
6852  027764  062737  000002  003370          ADD     #2,TEMP5        ;SETUP TO READ 2 SECTORS FROM LAST
6853  027772  013765  003370  000006          MOV     TEMP5,RKDA(R5)
6854  030000  000671                          BR      1$
6855
6856  030002  005237  001456          3$:     INC     BSERR           ;SET BSE FLAG
6857  030006  000454                          BR      TST33           ;;GO TO NEXT TEST
6858
6859  030010  005737  002312          8$:     TST     BSE22H+6        ;TEST CARTRIDGE TYPE
```

```
6860  030014  001404                        BEQ     9$              ;BRANCH IF DATA CARTRIDGE
6861  030016  104235                        ERROR   235             ;ALIGNMENT CARTRIDGE USED
6862  030020  005237  001456                INC     BSERR           ;SET BSE ERROR FLAG
6863  030024  000426                        BR      10$
6864
6865  030026  005237  003364        9$:     INC     TEMP3
6866  030032  023727  003364  000001        CMP     TEMP3,#1
6867  030040  001020                        BNE     10$
6868  030042  005037  003362                CLR     TEMP2
6869  030046  012737  054352  003366        MOV     #BSE22S,TEMP4   ;STORE 22 SECTOR SOFTWARE BSE ADDR
6870  030054  013765  003366  000004        MOV     TEMP4,RKBA(R5)
6871  030062  012737  001012  003370        MOV     #1012,TEMP5     ;TRACK 2, SECTOR 12
6872  030070  013765  003370  000006        MOV     TEMP5,RKDA(R5)
6873  030076  000137  027564                JMP     1$              ;REPEAT
6874
6875  030102  005737  001216        10$:    TST     $PASS
6876  030106  001014                        BNE     TST33           ;;GO TO NEXT TST IF NOT 1'ST PASS
6877  030110  104401  056206                TYPE    ,MSG17          ;CART SERIAL #
6878  030114  012746  002304                MOV     #BSE22H,-(SP)
6879  030120  004737  053556                JSR     PC,$D820        ;CONVERT DBL BINARY WORD TO OCTAL
6880  030124  004737  054126                JSR     PC,$SUPRS       ;TYPE SERIAL #
6881  030130  104401  001205                TYPE    ,$CRLF
6882  030134  104401  001205                TYPE    ,$CRLF
6883
6884                                ;;*****************************************************************
6885                                ;*TEST 33       DETECT INNER LIMIT
6886                                ;*
6887                                ;*      THIS TEST VERIFIES THAT THE LAST CYL IN THE ABOVE
6888                                ;*      TEST WAS 632 (1456) BY DETECTING INNER LIMIT AS THE ADJACENT CYL.
6889                                ;*      IF THIS TEST FAILS, IT INDICATES THAT HEADS WERE NOT ON THE LAST CYL
6890                                ;*      & THAT BSE INFO IS NOT VALID.  THE FORMAT PACK TEST
6891                                ;*      & ALL READ-WRITE TESTS ARE BYPASSED
6892                                ;*      TO AVOID DESTROYING BSE INFO OR AN ALIGNMENT CARTRIDGE
6893                                ;*      SINCE THERE IS A SEEKING OR LIMIT DETECTION PROBLEM.
6894                                ;*
6895                                ;*****************************************************************
6896  030140  000004                TST33:  SCOPE
6897  030142  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
6898  030150  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
6899
6900  030154  004737  045424                JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
6901  030160  104024                        ERROR   24              ;CERR AFTER SCLR
6902
6903  030162  005037  001410                CLR     LPFLG
6904  030166  005237  001462                INC     BYPCERR         ;BYPASS CHECKING FOR ANY CERR IN GSTAT1
6905  030172  005237  003304                INC     UNLD            ;USED FOR VALID HALT
6906
6907  030176  012765  000020  000026        MOV     #PAT,RKMR1(R5)  ;PARITY & WORD 0
6908  030204  013765  012052  000020        MOV     LCM1,RKDC(R5)
6909  030212  012737  000017  003322        MOV     #SEEK,HCS1
6910  030220  004737  043434                JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
6911  030224  104122                        ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
6912  030226  004737  044012                JSR     PC,TSTATN       ;TEST FOR ATTN
6913  030232  104125                        ERROR   125             ;NO ATTN FROM SEEK WITH BAD PARITY
6914  030234  012737  050340  003412        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
6915  030242  012737  001200  003414        MOV     #<D.FLT!D.PAR>,E.B0
```

```
6916  030250  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6917  030256  012737  000001  003420          MOV     #1,E.B1
6918
6919  030264  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6920  030270  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
6921  030272  104110                          ERROR   110             ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
6922  030274  104111                          ERROR   111             ;MSG B0 ERROR
6923  030276  104146                          ERROR   146             ;MSG A1 ERROR
6924  030300  104147                          ERROR   147             ;MSG B1 ERROR
6925
6926  030302  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6927  030310  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
6928  030316  012737  000005  003322          MOV     #CLEAR,HCS1
6929  030324  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
6930  030330  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
6931  030332  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
6932  030336  000401                          BR      65$
6933  030340  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6934  030342                          65$:
6935
6936  030342  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
6937  030350  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
6938  030354  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6939  030362  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6940  030370  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
6941  030374  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6942  030402  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6943
6944  030410  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6945  030414  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6946  030416  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6947  030420  104265                          ERROR   265             ;MSG B0 ERROR
6948  030422  104274                          ERROR   274             ;MSG A1 ERROR
6949  030424  104266                          ERROR   266             ;MSG B1 ERROR
6950
6951
6952  030426  013765  012054  000020          MOV     LC,RKDC(R5)
6953  030434  012737  000017  003322          MOV     #SEEK,HCS1
6954  030442  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
6955  030446  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
6956  030450  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6957  030456  004737  045074                  JSR     PC,GSTAT
6958  030462  004737  046260                  JSR     PC,FLIM         ;FIND LIMIT DETECT
6959  030466  104160                          ERROR   160             ;LIMIT DETECT NOT FOUND BEFORE TIMEOUT
6960
6961  030470  032737  040000  003350          BIT     #D.UNLD,HMR2
6962  030476  001003                          BNE     1$
6963  030500  104305                          ERROR   305             ;DRIVE NOT UNLOADING AFTER LIMIT DETECT
6964  030502  000137  031342                  JMP     30$             ;BYPASS REST OF TEST
6965
6966  030506  012737  031260  001176  1$:     MOV     #20$,$ESCAPE    ;MUST ESCAPE TO CYCLE UP DRIVE & TEST SWR
6967  030514  012737  070140  003412          MOV     #<D.DSC!D.PIP!D.SPIN!D.VV!D.DRA>,E.A0    ;EXPECTED A0
6968  030522  012737  002200  003414          MOV     #<D.SKI!D.FLT>,E.B0
6969  030530  012737  045720  003416          MOV     #<D.UNLD!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6970  030536  012737  030001  003420          MOV     #<D.LIMD!D.NMOV!1>,E.B1
6971                          ;               CHECK   161,162,163,164,<AFTER INNER LIMIT DETEC> 0,0,0
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```
6972  030544  004737  044252          JSR     PC,CHKMSG       ;CHECK MESSAGE A0,B0,A1,B1
6973  030550  000000                  .WORD   0!0!0
6974  030552  104161                  ERROR   161             ;MAY BE A0 ERROR
6975  030554  104162                  ERROR   162             ;MAY BE B0 ERROR
6976  030556  104163                  ERROR   163             ;MAY BE B1 ERROR
6977  030560  000240                  NOP                     ;NEED FOR THE CALLIN SEQ
6978  030562  032737  020000  003400  BIT     #D.LIMD,H.B1    ;SEE IF LIMIT DETECT BIT SET IN B1
6979  030570  001003                  BNE     3$              ;BRANCH IF SO
6980  030572  104401  061235          TYPE    ,EM42           ;OTHERWISE REPORT ERROR
6981  030576  104164                  ERROR   164
6982
6983  030600  004737  044012    3$:   JSR     PC,TSTATN
6984  030604  104165                  ERROR   165             ;NO ATTN AFTER INNER LIMIT DETECT
6985  030606  005037  001462          CLR     BYPCERR         ;ALLOW CHECKING CERR IN GSTAT1
6986
6987  030612  004737  045424          JSR     PC,SUBCLR       ;SUBSYS CLR
6988  030616  104024                  ERROR   24              ;CERR AFTER SCLR
6989  030620  013737  001414  003362  MOV     T10,TEMP2       ;SET UP TIMEOUT
6990  030626  004737  046336          JSR     PC,FHDHM        ;FIND HEAD HOME
6991  030632  104166                  ERROR   166             ;HEAD HOME NOT FOUND BEFORE TIMEOUT
6992  030634  004737  046412          JSR     PC,FLOAD        ;FIND LOAD HEADS
6993  030640  104167                  ERROR   167             ;LOAD HEADS NOT FOUND BEFORE TIMEOUT
6994  030642  013737  001416  003362  MOV     T100,TEMP2      ;SETUP TIMEOUT
6995  030650  004737  044044          JSR     PC,FATT1        ;FIND ATTN
6996  030654  104067                  ERROR   67              ;ATTN NOT FOUND BEFORE TIMEOUT
6997  030656  005037  001176    2$:   CLR     $ESCAPE
6998  030662  005037  003304          CLR     UNLD            ;CLEAR FLAG
6999
7000  030666  012737  050340  003412  MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7001  030674  005037  003414          CLR     E.B0            ;EXPECTED MSG B0
7002  030700  012737  001720  003416  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7003  030706  012737  000001  003420  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7004  030714  005037  003422          CLR     E.A2            ;EXPECTED MSG A2
7005  030720  012737  000002  003424  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7006  030726  012737  000003  003430  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7007
7008  030734  004737  044252          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7009  030740  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7010  030742  104063                  ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOADING
7011  030744  104064                  ERROR   64              ;MSG B0 ERROR
7012  030746  104065                  ERROR   65              ;MSG A1 ERROR
7013  030750  104066                  ERROR   66              ;MSG B1 ERROR
7014                            ;     CWD2    175,176,<AT END OF HEAD LOADING>
7015  030752  012765  000002  000026  MOV     #2,RKMR1(R5)    ;SELECT MESSAGE
7016  030760  004737  045074          JSR     PC,GSTAT        ;GET STATUS AND MR2,MR3
7017  030764  005737  001364          TST     CYLADD          ;RECAL SUCCFUL ?
7018  030770  001401                  BEQ     64$             ;BRANCH IF SO
7019  030772  104050                  ERROR   50              ;REPORT ERROR
7020  030774                  64$:
7021
7022  030774  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
7023  031002  013765  001222  000010  MOV     $UNIT,RKCS2(R5) ;DRIVE#
7024  031010  012737  000005  003322  MOV     #CLEAR,HCS1
7025  031016  004737  043434          JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
7026  031022  104151                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7027  031024  004737  044012          JSR     PC,TSTATN       ;TEST FOR ATTN
```

```
7028  031030  000401                          BR      66$
7029  031032  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7030  031034                          66$:
7031
7032  031034  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7033  031042  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7034  031046  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7035  031054  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7036  031062  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7037  031066  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7038  031074  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7039
7040  031102  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7041  031106  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7042  031110  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7043  031112  104265                          ERROR   265             ;MSG B0 ERROR
7044  031114  104274                          ERROR   274             ;MSG A1 ERROR
7045  031116  104266                          ERROR   266             ;MSG B1 ERROR
7046
7047  031120  004737  047430                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
7048  031124  000506                          BR      TST34           ;;GO TO NEXT TEST
7049                                                                  ;RETURN HERE IF SW 14 IS SET OR
7050                                                                  ;SW 8 WITH SWR <7:0> APPLY
7051
7052
7053  031126                          10$:
7054
7055  031126  004737  045424                  JSR     PC,SUBCLR
7056  031132  104024                          ERROR   24              ;CERR AFTER SCRL
7057
7058  031134  013765  001352  000020  67$:    MOV     TOCYL,RKDC(R5)  ;CYL#
7059
7060  031142  012737  000017  003322          MOV     #SEEK,HCS1
7061  031150  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7062  031154  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
7063
7064  031156  013737  001426  003360          MOV     T50000,TEMP1
7065  031164  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7066  031170  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7067  031172  032737  100000  003322          BIT     #CERR,HCS1
7068  031200  001401                          BEQ     69$
7069  031202  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
7070
7071  031204  004737  045424          69$:    JSR     PC,SUBCLR
7072  031210  104024                          ERROR   24              ;CERR AFTER SCLR
7073
7074  031212  023737  001352  012054          CMP     TOCYL,LC        ;LAST CYL DONE?
7075  031220  001403                          BEQ     68$             ;BR IF YES
7076  031222  005237  001352                  INC     TOCYL           ;ELSE DO ANOTHER
7077  031226  000742                          BR      67$
7078
7079  031230  004737  045424          68$:    JSR     PC,SUBCLR
7080  031234  104024                          ERROR   24              ;CERR AFTER SCLR
7081
7082  031236  005037  001176                  CLR     $ESCAPE
7083  031242  005737  001410                  TST     LPFLG
```

```
                        T33     DETECT INNER LIMIT

7084   031246  001402                       BEQ     70$
7085   031250  000177  147634               JMP     @$LPERR         ;SW 9 WAS SET.
7086   031254  000177  147626       70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7087
7088   031260                       20$:
7089
7090   031260  004737  045424               JSR     PC,SUBCLR
7091   031264  104024                       ERROR   24              ;CERR AFTER SCLR
7092
7093   031266  012737  000011  003322       MOV     #SRTSPL,HCS1
7094   031274  004737  043434               JSR     PC,DOCMD        ;DO START SPINDLE CMD & GET CONTR RDY
7095   031300  104121                       ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.
7096
7097   031302  013737  001420  003362       MOV     T500,TEMP2      ;SETUP  TIMEOUT
7098   031310  004737  044044               JSR     PC,FATT1        ;FIND ATTN
7099   031314  104067                       ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
7100
7101   031316  005037  003304               CLR     UNLD
7102   031322  005237  001410               INC     LPFLG
7103   031326  032777  001000  147604       BIT     #SW9,@SWR       ;LOOP ON ERROR?
7104   031334  001274                       BNE     10$             ;YES, RECONDITION DRIVE
7105   031336  000137  030656               JMP     2$              ;RETURN TO MAINLINE
7106   031342                       30$:
7107
7108   031342                       FORM:
7109                                ;;*****************************************************************
7110                                ;*TEST 34        FORMAT PACK
7111                                ;*
7112                                ;*      THIS TEST FORMATS THE ENTIRE PACK IN 22 SECTOR FORMAT BY
7113                                ;*      DOING 1 CYL INCREMENTAL SEEKS
7114                                ;*      FROM 0 TO 632 (1456 FOR RK07) WITH WRITE HEADER CMDS (ALL TRACKS).
7115                                ;*      HEADERS WILL BE READ IN THE NEXT TEST
7116                                ;*
7117                                ;;*****************************************************************
7118   031342  000004               T$T34:  SCOPE
7119   031344  012737  000001  001174       MOV     #1,$TIMES       ;;DO 1 ITERATION
7120
7121
7122   031352  012706  001100               MOV     #STACK,SP       ;RESTORE STK PTR
7123   031356  005737  001342               TST     MODTST          ;SEE IF MODULE TESTING
7124   031362  001402                       BEQ     22$             ;BR IF NO
7125   031364  104401  056321               TYPE    ,MSG20          ;RUNNING MODIFIED VERSION OF TEST
7126
7127   031370  005737  001460       22$:    TST     LIMERR          ;CHECK IF FOUND LIMIT DETECT ERROR
7128   031374  001403                       BEQ     1$
7129   031376  104170                       ERROR   170             ;FATAL ERROR
7130   031400  000137  042662               JMP     $EOP            ;ABORT BAL OF TESTS
7131   031404  005737  001456       1$:     TST     BSERR           ;CHECK IF FOUND BSE INFO OK
7132   031410  001403                       BEQ     2$
7133   031412  104177                       ERROR   177             ;FORMAT TEST BYPASSED-BSE ERROR
7134   031414  000137  033016               JMP     7$
7135
7136   031420  004737  045424       2$:     JSR     PC,SUBCLR
7137   031424  104024                       ERROR   24              ;CERR AFTER SCLR
7138
7139   031426  104401  056021               TYPE    ,MSG12          ;FORMATTING PACK, PLEASE WAIT
```

```
7140
7141  031432  005037  001352                    CLR     TOCYL
7142
7143  031436  013737  001352  001366            MOV     TOCYL,CALADD    ;SETUP
7144  031444  012737  000000  001430            MOV     #0,HEAD         ;TO FILL
7145  031452  012737  000000  001436            MOV     #0,FORMAT       ;HEADER
7146  031460  004737  046534                    JSR     PC,FHDTAB       ;TABLE
7147
7148
7149  031464  012765  001470  000004  9$:       MOV     #HDTAB,RKBA(R5) ;THIS SECTION
7150  031472  012765  177676  000002            MOV     #-66.,RKWC(R5)  ;OF CODE
7151  031500  000337  001430                    SWAB    HEAD            ;IS TO RESTORE STANDARD FORMAT
7152  031504  013765  001430  000006            MOV     HEAD,RKDA(R5)   ;TO CYL 0
7153  031512  000337  001430                    SWAB    HEAD            ;HEAD 0,1 & 2
7154
7155  031516  012737  000027  003322            MOV     #<WRHEAD>,HCS1
7156  031524  004737  043472                    JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
7157  031530  104200                            ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
7158  031532  004737  045074                    JSR     PC,GSTAT        ;GET FRESH STATUS
7159  031536  032737  100000  003322            BIT     #CERR,HCS1
7160  031544  001405                            BEQ     64$
7161  031546  104201                            ERROR   201             ;CERR AFTER WRITE HEADER CMD
7162  031550  104401  056[illegible]            TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
      [illegible]  000137  042662               JMP     $EOP            ;ABORT DRIVE
7164  031560                          64$:
7165
7166  031560  005237  001430                    INC     HEAD
7167  031564  023727  001430  000003            CMP     HEAD,#3
7168  031572  001403                            BEQ     11$             ;BR IF ALL HEADS DONE
7169
7170  031574  004737  046534                    JSR     PC,FHDTAB
7171  031600  000731                            BR      9$
7172
7173  031602  012737  000001  001366  11$:       MOV     #1,CALADD       ;SETUP
7174  031610  005037  001430                    CLR     HEAD            ;FOR
7175  031614  005037  001436                    CLR     FORMAT          ;FHDTAB ROUTINE
7176
7177  031620  012737  000001  001360            MOV     #1,CALDIF       ;SETUP
7178  031626  005037  001350                    CLR     FRCYL           ;FOR
7179  031632  012737  000001  001352            MOV     #1,TOCYL        ;ERROR REPORT
7180                                                                    ;START FORMATTING CYL 1 TO 410 HERE
7181
7182
7183  031640                          3$:
7184  031640  104415                            SCOP1
7185  031642  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
7186
7187  031646  004737  045424                    JSR     PC,SUBCLR
7188  031652  104024                            ERROR   24              ;CERR AFTER SCLR
7189
7190  031654  005737  001342                    TST     MODTST          ;SEE IF MODULE TESTING
7191  031660  001404                            BEQ     18$             ;BR IF NO
7192  031662  012737  033352  001176            MOV     #16$,$ESCAPE
7193  031670  000403                            BR      19$
7194  031672  012737  033056  001176  18$:       MOV     #10$,$ESCAPE
7195  031700  013765  001366  000020  19$:       MOV     CALADD,RKDC(R5) ;CYL #
```

```
7196  031706  000337  001430                  SWAB    HEAD
7197  031712  013765  001430  000006          MOV     HEAD,RKDA(R5)    ;HEAD #
7198  031720  000337  001430                  SWAB    HEAD
7199
7200  031724  012737  000017  003322          MOV     #SEEK,HCS1
7201  031732  004737  043434                  JSR     PC,DOCMD         ;DO SEEK CMD & GET CONTR READY
7202  031736  104131                          ERROR   131              ;NO RDY AFTER SEEK CMD
7203  031740  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7204  031746  005037  003414                  CLR     E.B0
7205  031752  012737  003720  003416          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7206  031760  012737  000001  003420          MOV     #1,E.B1
7207
7208  031766  004737  044252                  JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
7209  031772  000003                          .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
7210  031774  104203                          ERROR   203              ;MSG A0 ERROR DURING SEEK CMD
7211  031776  104204                          ERROR   204              ;MSG B0 ERROR
7212  032000  104205                          ERROR   205              ;MSG A1 ERROR
7213  032002  104206                          ERROR   206              ;MSG B1 ERROR
7214
7215  032004  023727  001362  000001          CMP     CYLDIF,#1
7216  032012  001401                          BEQ     4$
7217  032014  104212                          ERROR   212              ;CYL DIFF INCORRECT DURING SEEK
7218
7219  032016  005737  001342          4$:     TST     MODTST           ;SEE IF MODULE TESTING
7220  032022  001404                          BEQ     20$              ;BR IF NO
7221  032024  012737  033372  001176          MOV     #17$,$ESCAPE
7222  032032  000403                          BR      21$
7223
7224  032034  012737  033076  001176  20$:    MOV     #12$,$ESCAPE
7225  032042  012737  004704  003360  21$:    MOV     #2500.,TEMP1     ;SETUP TIMEOUT
7226
7227  032050  004737  044140                  JSR     PC,FATT2         ;FIND ATTN
7228  032054  104132                          ERROR   132              ;NO ATTN AFTER SEEK CMD
7229  032056  032737  100000  003322          BIT     #CERR,HCS1
7230  032064  001401                          BEQ     65$
7231  032066  104210                          ERROR   210              ;CERR AFTER SEEK CMD
7232  032070                          65$:
7233
7234  032070  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7235  032076  005037  003414                  CLR     E.B0             ;EXPECTED MSG B0
7236  032102  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7237  032110  012737  000001  003420          MOV     #1,E.B1          ;MSG ID FOR EXPECTED MSG B1
7238  032116  005037  003422                  CLR     E.A2             ;EXPECTED MSG A2
7239  032122  012737  000002  003424          MOV     #2,E.B2          ;MSG ID FOR EXPECTED MSG B2
7240  032130  012737  000003  003430          MOV     #3,E.B3          ;MSG ID FOR EXPECTED MSG B3
7241
7242  032136  004737  044252                  JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
7243  032142  000003                          .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
7244  032144  104133                          ERROR   133              ;MSG A0 ERROR AFTER SEEK CMD
7245  032146  104134                          ERROR   134              ;MSG B0 ERROR
7246  032150  104135                          ERROR   135              ;MSG A1 ERROR
7247  032152  104136                          ERROR   136              ;MSG B1 ERROR
7248  032154  005737  001362                  TST     CYLDIF
7249  032160  001401                          BEQ     66$
7250  032162  104137                          ERROR   137              ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7251
```

```
7252  032164                                  66$:
7253
7254  032164  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
7255  032172  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
7256  032200  012737  000005  003322          MOV     #CLEAR,HCS1
7257  032206  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
7258  032212  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7259  032214  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
7260  032220  000401                          BR      67$
7261  032222  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7262  032224                                  67$:
7263
7264  032224  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7265  032232  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7266  032236  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7267  032244  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7268  032252  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7269  032256  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7270  032264  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7271
7272  032272  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7273  032276  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7274  032300  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7275  032302  104265                          ERROR   265             ;MSG B0 ERROR
7276  032304  104274                          ERROR   274             ;MSG A1 ERROR
7277  032306  104266                          ERROR   266             ;MSG B1 ERROR
7278
7279  032310  023737  001364  001366          CMP     CYLADD,CALADD
7280  032316  001401                          BEQ     5$
7281  032320  104232                          ERROR   232             ;CYL ADDR IN RKMR2 NOT=RKDC
7282
7283  032322                                  5$:
7284  032322  104415                          SCOP1
7285  032324  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7286
7287  032330  004737  045424                  JSR     PC,SUBCLR
7288  032334  104024                          ERROR   24              ;CERR AFTER SCLR
7289
7290  032336  005037  001176                  CLR     $ESCAPE
7291  032342  004737  046534                  JSR     PC,FHDTAB       ;FILL HEADER TABLE
7292  032346  000337  001430                  SWAB    HEAD
7293  032352  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;SET TRACK #
7294  032360  000337  001430                  SWAB    HEAD
7295  032364  012765  001470  000004          MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
7296  032372  012765  177676  000002          MOV     #-66.,RKWC(R5)  ;WORD CT
7297  032400  013765  001366  000020          MOV     CALADD,RKDC(R5) ;CYL #
7298
7299
7300  032406  012737  000027  003322          MOV     #<WRHEAD>,HCS1
7301  032414  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
7302  032420  104200                          ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
7303  032422  004737  045074                  JSR     PC,GSTAT        ;GET FRESH STATUS
7304  032426  032737  100000  003322          BIT     #CERR,HCS1
7305  032434  001405                          BEQ     68$
7306  032436  104201                          ERROR   201             ;CERR AFTER WRITE HEADER CMD
7307  032440  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
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```
 7308  032444  000137  042662                  JMP     $EOP            ;ABORT DRIVE
 7309  032450                          68$:
 7310
 7311  032450  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
 7312  032456  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
 7313  032462  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
 7314  032470  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 7315  032476  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
 7316  032502  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 7317  032510  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 7318
 7319  032516  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7320  032522  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7321  032524  104277                          ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
 7322  032526  104267                          ERROR   267             ;MSG B0 ERROR
 7323  032530  104300                          ERROR   300             ;MSG A1 ERROR
 7324  032532  104270                          ERROR   270             ;MSG B1 ERROR
 7325
 7326
 7327  032534  005737  001342                  TST     MODTST          ;SEE IF MODULE TESTING
 7328  032540  001402                          BEQ     23$             ;BR IF NO
 7329  032542  000137  033116                  JMP     14$             ;ELSE RESTORE HEADERS ONLY
```

```
7330
7331  032546  005237  001430          23$:    INC     HEAD
7332  032552  023727  001430  000002          CMP     HEAD,#2
7333  032560  001006                          BNE     6$
7334  032562  023737  001366  012054          CMP     CALADD,LC       ;HEAD 2, SEE IF ON LAST CYL
7335  032570  001002                          BNE     6$              ;DO NOT WRITE ON LAST CYL HEAD 2
7336  032572  000137  033016                  JMP     7$
7337
7338  032576  023727  001430  000003  6$:     CMP     HEAD,#3         ;ALL HEADS DONE?
7339  032604  001246                          BNE     5$              ;BR IF NO
7340  032606  005037  001430                  CLR     HEAD            ;ALL HEADS ON CYL DONE
7341  032612  005237  001366                  INC     CALADD          ;GO TO NEXT CYL
7342  032616  005237  001350                  INC     FRCYL           ;FOR ERROR REPORT
7343  032622  005237  001352                  INC     TOCYL           ;FOR ERROR REPORT
7344  032626  005737  003310                  TST     HPEND           ;SEE IF HALT PENDING
7345  032632  001002                          BNE     24$             ;BR IF YES
7346  032634  000137  031640                  JMP     3$              ;ELSE KEEP FORMATTING
7347
7348  032640  005037  003310          24$:    CLR     HPEND           ;CLEAR FOR FUTURE FORMATTING
7349  032644  005037  003306                  CLR     BADHDR          ;HEADERS NOW OK
7350  032650  000137  047500                  JMP     STOP            ;GO & HALT THE CPU
7351
7352  032654  005037  001366          8$:     CLR     CALADD
7353  032660  005037  001350                  CLR     FRCYL
7354
7355  032664  004737  045424                  JSR     PC,SUBCLR
7356  032670  104024                          ERROR   24              ;CERR AFTER SCRL
7357
7358  032672  013765  001352  000020  69$:    MOV     TOCYL,RKDC(RS)  ;CYL#
7359
7360  032700  012737  000017  003322          MOV     #SEEK,HCS1
7361  032706  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7362  032712  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
7363
7364  032714  013737  001426  003360          MOV     T50000,TEMP1
7365  032722  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7366  032726  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7367  032730  032737  100000  003322          BIT     #CERR,HCS1
7368  032736  001401                          BEQ     71$
7369  032740  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
7370
7371  032742  004737  045424          71$:    JSR     PC,SUBCLR
7372  032746  104024                          ERROR   24              ;CERR AFTER SCLR
7373
7374  032750  023737  001352  000000          CMP     TOCYL,0 ;LAST CYL DONE?
7375  032756  001403                          BEQ     70$             ;BR IF YES
7376  032760  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
7377  032764  000742                          BR      69$
7378
7379  032766  004737  045424          70$:    JSR     PC,SUBCLR
7380  032772  104024                          ERROR   24              ;CERR AFTER SCLR
7381
7382  032774  005037  001176                  CLR     $ESCAPE
7383  033000  005737  001410                  TST     LPFLG
7384  033004  001402                          BEQ     72$
7385  033006  000177  146076                  JMP     @$LPERR         ;SW 9 WAS SET.
```

```
7386  033012  000177  146070          72$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7387
7388
7389  033016  004737  050006          7$:     JSR     PC,HPEN         ;SEE IF HALT PENDING
7390  033022  000137  032640                  JMP     24$             ;RET HERE IF YES & EXIT
7391                                                                  ;ELSE RET HERE
7392  033026  004737  047430                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
7393  033032  000567                          BR      TST35           ;GO TO NEXT TEST
7394                                                                  ;RETURN HERE IF SW 14 IS SET OR
7395                                                                  ;SW 8 WITH SWR <7:0> APPLY
7396  033034  005037  001176                  CLR     $ESCAPE
7397  033040  005737  001410                  TST     LPFLG
7398  033044  001402                          BEQ     73$
7399  033046  000177  146036                  JMP     @$LPERR         ;SW 9 WAS SET.
7400  033052  000177  146030          73$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7401
7402  033056                          10$:
7403  033056  005237  001410                  INC     LPFLG
7404  033062  032777  001000  146050          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7405  033070  001271                          BNE     8$              ;YES, RECONDITION DRIVE
7406  033072  000137  032016                  JMP     4$              ;RETURN TO MAINLINE
7407
7408  033076                          12$:
7409  033076  005237  001410                  INC     LPFLG
7410  033102  032777  001000  146030          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7411  033110  001261                          BNE     8$              ;YES, RECONDITION DRIVE
7412  033112  000137  032322                  JMP     5$              ;RETURN TO MAINLINE
7413
7414
7415  033116  005237  001430          14$:    INC     HEAD
7416  033122  023727  001430  000003          CMP     HEAD,#3         ;SEE IF ALL HEADS DONE
7417  033130  001402                          BEQ     15$             ;BR IF YES TO GO BACK TO CYL 0
7418  033132  000137  032322                  JMP     5$              ;ELSE REPEAT FOR NEXT HEAD
7419
7420  033136  005065  000006          15$:    CLR     RKDA(R5)        ;SEEK TO CYL 0 & READ HEADERS
7421  033142  005037  001352                  CLR     TOCYL           ;TO RECONDITION DRIVE
7422
7423  033146  012737  000017  003322          MOV     #SEEK,HCS1
7424  033154  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7425  033160  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
7426
7427  033162  013737  001426  003360          MOV     T50000,TEMP1
7428  033170  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7429  033174  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7430  033176  032737  100000  003322          BIT     #CERR,HCS1
7431  033204  001401                          BEQ     74$
7432  033206  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
7433
7434  033210  004737  045424          74$:    JSR     PC,SUBCLR
7435  033214  104024                          ERROR   24              ;CERR AFTER SCLR
7436
7437
7438
7439  033216  012700  001674                  MOV     #RHTAB,R0
7440  033222  012737  000025  003322          MOV     #<RDHEAD>,HCS1
7441  033230  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
```

```
7442  033234  104171                        ERROR   171             ;NO RDY AFTER REFD HEADER CMD
7443  033236  032737  100000  003322        BIT     #CERR,HCS1
7444  033244  001405                        BEQ     76$
7445  033246  104174                        ERROR   174             ;CERR AFTER READ HEADER CMD
7446  033250  104401  056235                TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7447  033254  000137  042662                JMP     $EOP            ;ABORT DRIVE
7448
7449  033260  016520  000024        76$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
7450  033264  016520  000024                MOV     RKDB(R5),(R0)+  ;2'ND WORD
7451  033270  016520  000024                MOV     RKDB(R5),(R0)+  ;3'RD WORD
7452
7453
7454  033274  032765  100000  000010        BIT     #DLT,RKCS2(R5)
7455  033302  001407                        BEQ     77$
7456  033304  004737  045074                JSR     PC,GSTAT
7457  033310  104173                        ERROR   173             ;DLT AFTER READ HEADER CMD
7458  033312  104401  056235                TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
7459  033316  000137  042662                JMP     $EOP            ;ABORT DRIVE
7460  033322                        77$:
7461
7462  033322  023737  001674  001352        CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
7463  033330  001401                        BEQ     75$             ;BR IF SAME
7464  033332  104310                        ERROR   310             ;READ CYL WORD HEADER ERROR
7465  033334                        75$:
7466
7467  033334  004737  050006                JSR     PC,HPEN         ;SEE IF HALT PENDING
7468  033340  000137  032640                JMP     24$             ;RET HERE IF YES
7469                                                                ;ELSE RET HERE & EXIT
7470  033344  004737  047430                JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
7471  033350  000420                        BR      TST35           ;GO TO NEXT TEST
7472                                                                ;RETURN HERE IF SW 14 IS SET OR
7473                                                                ;SW 8 WITH SWR <7:0> APPLY
7474  033352                        16$:
7475  033352  005237  001410                INC     LPFLG
7476  033356  032777  001000  145554        BIT     #SW9,@SWR       ;LOOP ON ERROR?
7477  033364  001264                        BNE     15$             ;YES, RECONDITION DRIVE
7478  033366  000137  032016                JMP     4$              ;RETURN TO MAINLINE
7479  033372                        17$:
7480  033372  005237  001410                INC     LPFLG
7481  033376  032777  001000  145534        BIT     #SW9,@SWR       ;LOOP ON ERROR?
7482  033404  001254                        BNE     15$             ;YES, RECONDITION DRIVE
7483  033406  000137  032322                JMP     5$              ;RETURN TO MAINLINE
7484
7485
7486  033412                        13$:
7487
7488
7489
7490                                        ;;*****************************************************************
7491                                        ;*TEST 35       DECREMENT FROM LAST CYL TO 0 & READ HEADERS
7492                                        ;*
7493                                        ;*      THIS TEST VERIFIES MOTION IN THE NEGATIVE DIRECTION BY
7494                                        ;*      SINGLE CYL INCREMENTAL SEEKS.
7495                                        ;*
7496                                        ;;*****************************************************************
7497  033412  000004                TST35:  SCOPE
```

```
7498  033414  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
7499  033422  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7500
7501  033426  104401  056550                  TYPE    ,MSG22          ;FORMATTING FINISHED
7502  033432  005737  001342                  TST     MODTST          ;SEE IF MODULE TESTING
7503  033436  001404                          BEQ     5$              ;BR IF NO
7504  033440  104401  056470                  TYPE    ,MSG21          ;BYP TESTS 36,40,41
7505  033444  000137  034470                  JMP     13$
7506  033450  013737  012054  001350  5$:     MOV     LC,FRCYL        ;FROM CYL
7507  033456  013737  012052  001352          MOV     LCM1,TOCYL      ;TO CYL
7508
7509  033464                          1$:
7510  033464  104415                          SCOP1
7511  033466  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7512
7513  033472  004737  045424                  JSR     PC,SUBCLR
7514  033476  104024                          ERROR   24              ;CERR AFTER SCLR
7515
7516  033500  012737  034430  001176          MOV     #10$,$ESCAPE
7517  033506  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
7518
7519  033514  012737  000017  003322          MOV     #SEEK,HCS1
7520  033522  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7521  033526  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
7522  033530  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7523  033536  005037  003414                  CLR     E.B0
7524  033542  012737  005720  003416          MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7525  033550  012737  000001  003420          MOV     #1,E.B1
7526
7527  033556  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7528  033562  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7529  033564  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
7530  033566  104204                          ERROR   204             ;MSG B0 ERROR
7531  033570  104205                          ERROR   205             ;MSG A1 ERROR
7532  033572  104206                          ERROR   206             ;MSG B1 ERROR
7533
7534  033574  023727  001362  000001          CMP     CYLDIF,#1
7535  033602  001406                          BEQ     2$
7536  033604  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT WD 2
7537  033612  004737  045074                  JSR     PC,GSTAT
7538  033616  104212                          ERROR   212             ;CYL DIFF INCORRECT DURING SEEK
7539
7540  033620  012737  034450  001176  2$:     MOV     #12$,$ESCAPE
7541  033626  012737  004704  003360          MOV     #2500.,TEMP1    ;SETUP TIMEOUT
7542
7543  033634  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7544  033640  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7545  033642  032737  100000  003322          BIT     #CERR,HCS1
7546  033650  001401                          BEQ     64$
7547  033652  104210                          ERROR   210             ;CERR AFTER SEEK CMD
7548  033654                          64$:
7549
7550  033654  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7551  033662  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7552  033666  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7553  033674  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
```

```
7554  033702  005037  003422                  CLR     E.A2                    ;EXPECTED MSG A2
7555  033706  012737  000002  003424          MOV     #2,E.B2                 ;MSG ID FOR EXPECTED MSG B2
7556  033714  012737  000003  003430          MOV     #3,E.B3                 ;MSG ID FOR EXPECTED MSG B3
7557
7558  033722  004737  044252                  JSR     PC,CHKMSG               ;CHECK MSGS A0,B0,A1,B1
7559  033726  000003                          .WORD   T.A2!T.B2!0                     ;& MSGS SPECIFIED HERE
7560  033730  104133                          ERROR   133                     ;MSG A0 ERROR AFTER SEEK CMD
7561  033732  104134                          ERROR   134                     ;MSG B0 ERROR
7562  033734  104135                          ERROR   135                     ;MSG A1 ERROR
7563  033736  104136                          ERROR   136                     ;MSG B1 ERROR
7564  033740  005737  001362                  TST     CYLDIF
7565  033744  001401                          BEQ     65$
7566  033746  104137                          ERROR   137                     ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7567
7568  033750                          65$:
7569
7570  033750  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
7571  033756  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
7572  033764  012737  000005  003322          MOV     #CLEAR,HCS1
7573  033772  004737  043434                  JSR     PC,DOCMD                ;DO DRIVE CLEAR CMD & GET CONTR RDY
7574  033776  104151                          ERROR   151                     ;NO RDY AFTER DRIVE CLEAR CMD
7575  034000  004737  044012                  JSR     PC,TSTATN               ;TEST FOR ATTN
7576  034004  000401                          BR      66$
7577  034006  104154                          ERROR   154                     ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7578  034010                          66$:
7579
7580  034010  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7581  034016  005037  003414                  CLR     E.B0                    ;EXPECTED MSG B0
7582  034022  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7583  034030  012737  000001  003420          MOV     #1,E.B1                 ;MSG ID FOR EXPECTED MSG B1
7584  034036  005037  003422                  CLR     E.A2                    ;EXPECTED MSG A2
7585  034042  012737  000002  003424          MOV     #2,E.B2                 ;MSG ID FOR EXPECTED MSG B2
7586  034050  012737  000003  003430          MOV     #3,E.B3                 ;MSG ID FOR EXPECTED MSG B3
7587
7588  034056  004737  044252                  JSR     PC,CHKMSG               ;CHECK MSGS A0,B0,A1,B1
7589  034062  000003                          .WORD   T.A2!T.B2!0                     ;& MSGS SPECIFIED HERE
7590  034064  104273                          ERROR   273                     ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7591  034066  104265                          ERROR   265                     ;MSG B0 ERROR
7592  034070  104274                          ERROR   274                     ;MSG A1 ERROR
7593  034072  104266                          ERROR   266                     ;MSG B1 ERROR
7594
7595  034074  023737  001364  001352          CMP     CYLADD,TOCYL
7596  034102  001401                          BEQ     3$
7597  034104  104207                          ERROR   207                     ;CYL ADDR IN RKMR3 NOT = RKDC
7598
7599  034106                          3$:
7600  034106  104415                          SCOP1
7601  034110  012706  001100                  MOV     #STACK,SP               ;RESTORE STK PTR
7602
7603  034114  004737  045424                  JSR     PC,SUBCLR
7604  034120  104024                          ERROR   24                      ;CERR AFTER SCLR
7605
7606  034122  005037  001176                  CLR     $ESCAPE
7607
7608  034126  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
7609
```

```
7610
7611  034134  012700  001674            MOV     #RHTAB,R0
7612  034140  012737  000025  003322    MOV     #<RDHEAD>,HCS1
7613  034146  004737  043472            JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
7614  034152  104171                    ERROR   171             ;NO RDY AFTER READ HEADER CMD
7615  034154  032737  100000  003322    BIT     #CERR,HCS1
7616  034162  001405                    BEQ     68$
7617  034164  104174                    ERROR   174             ;CERR AFTER READ HEADER CMD
7618  034166  104401  056235            TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7619  034172  000137  042662            JMP     $EOP            ;ABORT DRIVE
7620
7621  034176  016520  000024    68$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
7622  034202  016520  000024            MOV     RKDB(R5),(R0)+  ;2'ND WORD
7623  034206  016520  000024            MOV     RKDB(R5),(R0)+  ;3'RD WORD
7624
7625
7626  034212  032765  100000  000010    BIT     #DLT,RKCS2(R5)
7627  034220  001407                    BEQ     69$
7628  034222  004737  045074            JSR     PC,GSTAT
7629  034226  104173                    ERROR   173             ;DLT AFTER READ HEADER CMD
7630  034230  104401  056235            TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
7631  034234  000137  042662            JMP     $EOP            ;ABORT DRIVE
7632  034240                    69$:
7633
7634  034240  023737  001674  001352    CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
7635  034246  001401                    BEQ     67$             ;BR IF SAME
7636  034250  104310                    ERROR   310             ;READ CYL WORD HEADER ERROR
7637  034252                    67$:
7638
7639  034252  005337  001350            DEC     FRCYL
7640  034256  001404                    BEQ     4$
7641  034260  005337  001352            DEC     TOCYL
7642  034264  000137  033464            JMP     1$
7643
7644  034270                    4$:
7645  034270  004737  047430            JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
7646  034274  000475                    BR      TST36           ;:GO TO NEXT TEST
7647                                                            ;RETURN HERE IF SW 14 IS SET OR
7648                                                            ;SW 8 WITH SWR <7:0> APPLY
7649
7650
7651  034276                    6$:
7652
7653  034276  004737  045424            JSR     PC,SUBCLR
7654  034302  104024                    ERROR   24              ;CERR AFTER SCRL
7655
7656  034304  013765  001352  000020  70$:    MOV     TOCYL,RKDC(R5)  ;CYL#
7657
7658  034312  012737  000017  003322    MOV     #SEEK,HCS1
7659  034320  004737  043434            JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7660  034324  104131                    ERROR   131             ;NO RDY AFTER SEEK CMD.
7661
7662  034326  013737  001426  003360    MOV     T50000,TEMP1
7663  034334  004737  044140            JSR     PC,FATT2        ;FIND ATTN
7664  034340  104132                    ERROR   132             ;NO ATTN AFTER SEEK CMD
7665  034342  032737  100000  003322    BIT     #CERR,HCS1
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7666  034350  001401                      BEQ     72$
7667  034352  104210                      ERROR   21D             ;CERR AFTER SEEK CMD.
7668
7669  034354  004737  045424        72$:  JSR     PC,SUBCLR
7670  034360  104024                      ERROR   24              ;CERR AFTER SCLR
7671
7672  034362  023737  001352  012054      CMP     TOCYL,LC        ;LAST CYL DONE?
7673  034370  001403                      BEQ     71$             ;BR IF YES
7674  034372  005237  001352              INC     TOCYL           ;ELSE DO ANOTHER
7675  034376  000742                      BR      70$
7676
7677  034400  004737  045424        71$:  JSR     PC,SUBCLR
7678  034404  104024                      ERROR   24              ;CERR AFTER SCLR
7679
7680  034406  005037  001176              CLR     $ESCAPE
7681  034412  005737  001410              TST     LPFLG
7682  034416  001402                      BEQ     73$
7683  034420  000177  144464              JMP     @$LPERR         ;SW 9 WAS SET.
7684  034424  000177  144456        73$:  JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7685
7686
7687
7688  034430                        10$:
7689  034430  005237  001410              INC     LPFLG
7690  034434  032777  001000  144476      BIT     #SW9,@SWR       ;LOOP ON ERROR?
7691  034442  001315                      BNE     6$              ;YES, RECONDITION DRIVE
7692  034444  000137  033620              JMP     2$              ;RETURN TO MAINLINE
7693
7694  034450                        12$:
7695  034450  005237  001410              INC     LPFLG
7696  034454  032777  001000  144456      BIT     #SW9,@SWR       ;LOOP ON ERROR?
7697  034462  001305                      BNE     6$              ;YES, RECONDITION DRIVE
7698  034464  000137  034106              JMP     3$              ;RETURN TO MAINLINE
7699
7700  034470                        13$:
7701
7702
7703                                ;*****************************************************************
7704                                ;*TEST 36       SEEK FROM CYL 0 TO ALL MAJOR CYLS & READ HEADERS
7705                                ;*
7706                                ;*      THIS TEST SEEKS FROM CYL 0 TO ALL THE MAJOR CYLS & READS HEADERS.
7707                                ;*      IT THEN SEEKS CYL 0 & READS HEADERS.
7708                                ;*
7709                                ;*      MAJOR CYLS ARE: 1  (DECIMAL)  =  1 (OCTAL)
7710                                ;*                      2                2
7711                                ;*                      4                4
7712                                ;*                      8                10
7713                                ;*                      16               20
7714                                ;*                      32               40
7715                                ;*                      64               100
7716                                ;*                      128              200
7717                                ;*                      256              400
7718                                ;*                      512              1000 (RK07)
7719                                ;*
7720                                ;*****************************************************************
7721  034470  000004                TST36:  SCOPE
```

```
7722  034472  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
7723  034500  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7724
7725  034504  013737  012072  001350          MOV     FC,FRCYL        ;SETUP FROM CYL
7726  034512  013737  012074  001352          MOV     FCP1,TOCYL      ;SETUP TO CYL
7727
7728  034520                          1$:
7729  034520  104415                          SCOP1
7730  034522  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7731
7732  034526  004737  045424                  JSR     PC,SUBCLR
7733  034532  104024                          ERROR   24              ;CERR AFTER SCLR
7734
7735  034534  012737  036242  001176          MOV     #10$,$ESCAPE
7736  034542  013737  001350  003364          MOV     FRCYL,TEMP3     ;SETUP
7737  034550  013737  001352  003366          MOV     TOCYL,TEMP4     ;CYL DIFF
7738  034556  163737  003364  003366          SUB     TEMP3,TEMP4     ;FOR
7739  034564  013737  003366  001360          MOV     TEMP4,CALDIF    ;ERROR PRINTOUT
7740
7741  034572  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
7742
7743  034600  012737  000017  003322          MOV     #SEEK,HCS1
7744  034606  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7745  034612  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
7746  034614  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7747  034622  005037  003414                  CLR     E.B0
7748  034626  012737  003720  003416          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7749  034634  012737  000001  003420          MOV     #1,E.B1
7750
7751  034642  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7752  034646  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7753  034650  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
7754  034652  104204                          ERROR   204             ;MSG B0 ERROR
7755  034654  104205                          ERROR   205             ;MSG A1 ERROR
7756  034656  104206                          ERROR   206             ;MSG B1 ERROR
7757
7758  034660  012737  036262  001176  2$:     MOV     #12$,$ESCAPE
7759  034666  013737  001426  003360          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
7760
7761  034674  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7762  034700  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7763  034702  032737  100000  003322          BIT     #CERR,HCS1
7764  034710  001401                          BEQ     64$
7765  034712  104210                          ERROR   210             ;CERR AFTER SEEK CMD
7766  034714                          64$:
7767
7768  034714  012737  050240  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7769  034722  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7770  034726  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7771  034734  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7772  034742  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7773  034746  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7774  034754  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7775
7776  034762  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7777  034766  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
```

```
7778  034770  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7779  034772  104134                          ERROR   134             ;MSG B0 ERROR
7780  034774  104135                          ERROR   135             ;MSG A1 ERROR
7781  034776  104136                          ERROR   136             ;MSG B1 ERROR
7782  035000  005737  001362                  TST     CYLDIF
7783  035004  001401                          BEQ     65$
7784  035006  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7785
7786  035010                          65$:
7787
7788  035010  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
7789  035016  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
7790  035024  012737  000005  003322          MOV     #CLEAR,HCS1
7791  035032  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
7792  035036  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7793  035040  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
7794  035044  000401                          BR      66$
7795  035046  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7796  035050                          66$:
7797
7798  035050  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7799  035056  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7800  035062  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7801  035070  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7802  035076  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7803  035102  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7804  035110  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7805
7806  035116  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7807  035122  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7808  035124  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7809  035126  104265                          ERROR   265             ;MSG B0 ERROR
7810  035130  104274                          ERROR   274             ;MSG A1 ERROR
7811  035132  104266                          ERROR   266             ;MSG B1 ERROR
7812
7813  035134  023737  001364  001352          CMP     CYLADD,TOCYL
7814  035142  001401                          BEQ     3$
7815  035144  104207                          ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
7816
7817  035146                          3$:
7818  035146  104415                          SCOP1
7819  035150  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7820
7821  035154  004737  045424                  JSR     PC,SUBCLR
7822  035160  104024                          ERROR   24              ;CERR AFTER SCLR
7823
7824  035162  005037  001176                  CLR     $ESCAPE
7825  035166  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
7826
7827
7828  035174  012700  001674                  MOV     #RHTAB,R0
7829  035200  012737  000025  003322          MOV     #<RDHEAD>,HCS1
7830  035206  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
7831  035212  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
7832  035214  032737  100000  003322          BIT     #CERR,HCS1
7833  035222  001405                          BEQ     68$
```

```
7834  035224  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
7835  035226  104401  056235                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7836  035232  000137  042662                  JMP     $EOP            ;ABORT DRIVE
7837
7838  035236  016520  000024          68$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
7839  035242  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
7840  035246  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
7841
7842
7843  035252  032765  100000  000010          BIT     #DLT,RKCS2(R5)
7844  035260  001407                          BEQ     69$
7845  035262  004737  045074                  JSR     PC,GSTAT
7846  035266  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
7847  035270  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
7848  035274  000137  042662                  JMP     $EOP            ;ABORT DRIVE
7849  035300                          69$:
7850
7851  035300  023737  001674  001352          CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
7852  035306  001401                          BEQ     67$             ;BR IF SAME
7853  035310  104310                          ERROR   310             ;READ CYL WORD HEADER ERROR
7854  035312                          67$:
7855
7856
7857  035312  104415                          SCOP1
7858  035314  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7859
7860  035320  004737  045424                  JSR     PC,SUBCLR
7861  035324  104024                          ERROR   24              ;CERR AFTER SCLR
7862
7863  035326  012737  036302  001176          MOV     #14$,$ESCAPE
7864  035334  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
7865  035342  013737  001350  001354          MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
7866
7867  035350  012737  000017  003322          MOV     #SEEK,HCS1
7868  035356  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
7869  035362  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
7870  035364  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7871  035372  005037  003414                  CLR     E.B0
7872  035376  012737  005720  003416          MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7873  035404  012737  000001  003420          MOV     #1,E.B1
7874
7875  035412  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7876  035416  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7877  035420  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
7878  035422  104204                          ERROR   204             ;MSG B0 ERROR
7879  035424  104205                          ERROR   205             ;MSG A1 ERROR
7880  035426  104206                          ERROR   206             ;MSG B1 ERROR
7881
7882
7883  035430  012737  036322  001176  4$:     MOV     #16$,$ESCAPE
7884  035436  013737  001426  003360          MOV     TS0000,TEMP1    ;SETUP  TIMEOUT
7885
7886  035444  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
7887  035450  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7888  035452  032737  100000  003322          BIT     #CERR,HCS1
7889  035460  001401                          BEQ     70$
```

```
7890  035462  104210                          ERROR   210             ;CERR AFTER SEEK CMD
7891  035464                          70$:
7892
7893  035464  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7894  035472  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7895  035476  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7896  035504  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7897  035512  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7898  035516  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7899  035524  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7900
7901  035532  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7902  035536  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7903  035540  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7904  035542  104134                          ERROR   134             ;MSG B0 ERROR
7905  035544  104135                          ERROR   135             ;MSG A1 ERROR
7906  035546  104136                          ERROR   136             ;MSG B1 ERROR
7907  035550  005737  001362                  TST     CYLDIF
7908  035554  001401                          BEQ     71$
7909  035556  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7910
7911  035560                          71$:
7912
7913  035560  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
7914  035566  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
7915  035574  012737  000005  003322          MOV     #CLEAR,HCS1
7916  035602  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
7917  035606  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7918  035610  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
7919  035614  000401                          BR      72$
7920  035616  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7921  035620                          72$:
7922
7923  035620  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7924  035626  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
7925  035632  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7926  035640  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7927  035646  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
7928  035652  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7929  035660  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7930
7931  035666  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7932  035672  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7933  035674  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7934  035676  104265                          ERROR   265             ;MSG B0 ERROR
7935  035700  104274                          ERROR   274             ;MSG A1 ERROR
7936  035702  104266                          ERROR   266             ;MSG B1 ERROR
7937
7938  035704  023737  001364  001350          CMP     CYLADD,FRCYL
7939  035712  001401                          BEQ     5$
7940  035714  104243                          ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
7941
7942  035716                          5$:
7943  035716  104415                          SCOP1
7944  035720  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7945
```

```
7946  035724  004737  045424            JSR     PC,SUBCLR
7947  035730  104024                    ERROR   24              ;CERR AFTER SCLR
7948
7949  035732  005037  001176            CLR     $ESCAPE
7950  035736  013765  001350  000020    MOV     FRCYL,RKDC(R5)  ;CYL #
7951
7952
7953  035744  012700  001674            MOV     #RHTAB,R0
7954  035750  012737  000025  003322    MOV     #<RDHEAD>,HCS1
7955  035756  004737  043472            JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
7956  035762  104171                    ERROR   171             ;NO RDY AFTER READ HEADER CMD
7957  035764  032737  100000  003322    BIT     #CERR,HCS1
7958  035772  001405                    BEQ     74$
7959  035774  104174                    ERROR   174             ;CERR AFTER READ HEADER CMD
7960  035776  104401  056235            TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7961  036002  000137  042662            JMP     $EOP            ;ABORT DRIVE
7962
7963  036006  016520  000024    74$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
7964  036012  016520  000024            MOV     RKDB(R5),(R0)+  ;2'ND WORD
7965  036016  016520  000024            MOV     RKDB(R5),(R0)+  ;3'RD WORD
7966
7967
7968  036022  032765  100000  000010    BIT     #DLT,RKCS2(R5)
7969  036030  001407                    BEQ     75$
7970  036032  004737  045074            JSR     PC,GSTAT
7971  036036  104173                    ERROR   173             ;DLT AFTER READ HEADER CMD
7972  036040  104401  056235            TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
7973  036044  000137  042662            JMP     $EOP            ;ABORT DRIVE
7974  036050                    75$:
7975
7976  036050  023737  001674  001350    CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
7977  036056  001401                    BEQ     73$             ;BR IF SAME
7978  036060  104311                    ERROR   311             ;READ CYL WORD HEADER ERROR
7979  036062                    73$:
7980
7981
7982  036062  023737  001352  012060    CMP     TOCYL,MC        ;ALL CYL DONE?
7983  036070  001404                    BEQ     6$              ;BR IF YES
7984  036072  006337  001352            ASL     TOCYL           ;ELSE DO ANOTHER
7985  036076  000137  034520            JMP     1$
7986  036102                    6$:
7987  036102  004737  047430            JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
7988  036106  000515                    BR      TST37           ;;GO TO NEXT TEST
7989                                                            ;RETURN HERE IF SW 14 IS SET OR
7990                                                            ;SW 8 WITH SWR <7:0> APPLY
7991  036110                    8$:
7992
7993  036110  004737  045424            JSR     PC,SUBCLR
7994  036114  104024                    ERROR   24              ;CERR AFTER SCRL
7995
7996  036116  013765  001352  000020    MOV     TOCYL,RKDC(R5)  ;CYL#
7997
7998  036124  012737  000017  003322    MOV     #SEEK,HCS1
7999  036132  004737  043434            JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8000  036136  104131                    ERROR   131             ;NO RDY AFTER SEEK CMD.
8001
```

```
8002  036140  013737  001426  003360          MOV     T50000,TEMP1
8003  036146  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
8004  036152  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8005  036154  032737  100000  003322          BIT     #CERR,HCS1
8006  036162  001401                          BEQ     78$
8007  036164  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
8008
8009  036166  004737  045424          78$:    JSR     PC,SUBCLR
8010  036172  104024                          ERROR   24              ;CERR AFTER SCLR
8011
8012  036174  023737  001352  012072          CMP     TOCYL,FC        ;LAST CYL DONE?
8013  036202  001403                          BEQ     77$             ;BR IF YES
8014  036204  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
8015  036210  000742                          BR      76$
8016
8017  036212  004737  045424          77$:    JSR     PC,SUBCLR
8018  036216  104024                          ERROR   24              ;CERR AFTER SCLR
8019
8020  036220  005037  001176                  CLR     $ESCAPE
8021  036224  005737  001410                  TST     LPFLG
8022  036230  001402                          BEQ     79$
8023  036232  000177  142652                  JMP     @$LPERR         ;SW 9 WAS SET.
8024  036236  000177  142644          79$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
8025
8026  036242                          10$:
8027  036242  005237  001410                  INC     LPFLG
8028  036246  032777  001000  142664          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8029  036254  001315                          BNE     8$              ;YES, RECONDITION DRIVE
8030  036256  000137  034660                  JMP     2$              ;RETURN TO MAINLINE
8031  036262                          12$:
8032  036262  005237  001410                  INC     LPFLG
8033  036266  032777  001000  142644          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8034  036274  001305                          BNE     8$              ;YES, RECONDITION DRIVE
8035  036276  000137  035146                  JMP     3$              ;RETURN TO MAINLINE
8036  036302                          14$:
8037  036302  005237  001410                  INC     LPFLG
8038  036306  032777  001000  142624          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8039  036314  001275                          BNE     8$              ;YES, RECONDITION DRIVE
8040  036316  000137  035430                  JMP     4$              ;RETURN TO MAINLINE
8041  036322                          16$:
8042  036322  005237  001410                  INC     LPFLG
8043  036326  032777  001000  142604          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8044  036334  001265                          BNE     8$              ;YES, RECONDITION DRIVE
8045  036336  000137  035716                  JMP     5$              ;RETURN TO MAINLINE
8046
8047
8048
8049                                  ;;*****************************************************************
8050                                  ;*TEST 37        SEEK TO ALL CYLS FROM 0 & READ HEADERS
8051                                  ;;*****************************************************************
8052  036342  000004                  TST37:  SCOPE
8053  036344  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
8054  036352  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8055
8056  036356  005737  001342                  TST     MODTST          ;SEE IF MODULE TESTING
8057  036362  001402                          BEQ     DOSEEK          ;BR IF NO
```

```
8058  036364  000137  042164                    JMP     CYLINV          ;ELSE BYPASS TESTS 40 & 41
8059  036370                            DOSEEK:
8060
8061  036370  013737  012072  001350            MOV     FC,FRCYL        ;SETUP FROM CYL
8062  036376  013737  012074  001352            MOV     FCP1,TOCYL      ;SETUP TO CYL
8063
8064  036404                            1$:
8065  036404  104415                            SCOP1
8066  036406  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
8067
8068  036412  004737  045424                    JSR     PC,SUBCLR
8069  036416  104024                            ERROR   24              ;CERR AFTER SCLR
8070
8071  036420  012737  040126  001176            MOV     #10$,$ESCAPE
8072  036426  013737  001350  003364            MOV     FRCYL,TEMP3     ;SETUP
8073  036434  013737  001352  003366            MOV     TOCYL,TEMP4     ;CYL DIFF
8074  036442  163737  003364  003366            SUB     TEMP3,TEMP4     ;FOR
8075  036450  013737  003366  001360            MOV     TEMP4,CALDIF    ;ERROR PRINTOUT
8076
8077  036456  013765  001352  000020            MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
8078
8079  036464  012737  000017  003322            MOV     #SEEK,HCS1
8080  036472  004737  043434                    JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8081  036476  104131                            ERROR   131             ;NO RDY AFTER SEEK CMD
8082  036500  012737  030140  003412            MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
8083  036506  005037  003414                    CLR     E.B0
8084  036512  012737  003720  003416            MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
8085  036520  012737  000001  003420            MOV     #1,E.B1
8086
8087  036526  004737  044252                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8088  036532  000003                            .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8089  036534  104203                            ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
8090  036536  104204                            ERROR   204             ;MSG B0 ERROR
8091  036540  104205                            ERROR   205             ;MSG A1 ERROR
8092  036542  104206                            ERROR   206             ;MSG B1 ERROR
8093
8094  036544  012737  040146  001176  2$:       MOV     #12$,$ESCAPE
8095  036552  013737  001426  003360            MOV     T50000,TEMP1    ;SETUP  TIMEOUT
8096
8097  036560  004737  044140                    JSR     PC,FATT2        ;FIND ATTN
8098  036564  104132                            ERROR   132             ;NO ATTN AFTER SEEK CMD
8099  036566  032737  100000  003322            BIT     #CERR,HCS1
8100  036574  001401                            BEQ     64$
8101  036576  104210                            ERROR   210             ;CERR AFTER SEEK CMD
8102  036600                            64$:
8103
8104  036600  012737  050340  003412            MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
8105  036606  005037  003414                    CLR     E.B0            ;EXPECTED MSG B0
8106  036612  012737  001720  003416            MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8107  036620  012737  000001  003420            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8108  036626  005037  003422                    CLR     E.A2            ;EXPECTED MSG A2
8109  036632  012737  000002  003424            MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8110  036640  012737  000003  003430            MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8111
8112  036646  004737  044252                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8113  036652  000003                            .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
```

```
8114  036654  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
8115  036656  104134                          ERROR   134             ;MSG B0 ERROR
8116  036660  104135                          ERROR   135             ;MSG A1 ERROR
8117  036662  104136                          ERROR   136             ;MSG B1 ERROR
8118  036664  005737  001362                  TST     CYLDIF
8119  036670  001401                          BEQ     65$
8120  036672  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
8121
8122  036674                          65$:
8123
8124  036674  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
8125  036702  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
8126  036710  012737  000005  003322          MOV     #CLEAR,HCS1
8127  036716  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
8128  036722  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
8129  036724  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
8130  036730  000401                          BR      66$
8131  036732  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
8132  036734                          66$:
8133
8134  036734  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
8135  036742  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8136  036746  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
8137  036754  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8138  036762  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8139  036766  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8140  036774  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8141
8142  037002  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8143  037006  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8144  037010  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
8145  037012  104265                          ERROR   265             ;MSG B0 ERROR
8146  037014  104274                          ERROR   274             ;MSG A1 ERROR
8147  037016  104266                          ERROR   266             ;MSG B1 ERROR
8148
8149  037020  023737  001364  001352          CMP     CYLADD,TOCYL
8150  037026  001401                          BEQ     3$
8151  037030  104207                          ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
8152
8153  037032                          3$:
8154  037032  104415                          SCOP1
8155  037034  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8156
8157  037040  004737  045424                  JSR     PC,SUBCLR
8158  037044  104024                          ERROR   24              ;CERR AFTER SCLR
8159
8160  037046  005037  001176                  CLR     $ESCAPE
8161  037052  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
8162
8163
8164  037060  012700  001674                  MOV     #RHTAB,R0
8165  037064  012737  000025  003322          MOV     #<RDHEAD>,HCS1
8166  037072  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
8167  037076  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
8168  037100  032737  100000  003322          BIT     #CERR,HCS1
8169  037106  001405                          BEQ     68$
```

```
8170  037110  104174                        ERROR   174             ;CERR AFTER READ HEADER CMD
8171  037112  104401  056235                TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
8172  037116  000137  042662                JMP     $EOP            ;ABORT DRIVE
8173
8174  037122  016520  000024        68$:    MOV     RKDB(R5),(R )+  ;1'ST WORD FROM SILO TO RHTAB
8175  037126  016520  000024                MOV     RKDB(R5),(R )+  ;2'ND WORD
8176  037132  016520  000024                MOV     RKDB(R5),(R0)+  ;3'RD WORD
8177
8178
8179  037136  032765  100000  000010        BIT     #DLT,RKCS2(R5)
8180  037144  001407                        BEQ     69$
8181  037146  004737  045074                JSR     PC,GSTAT
8182  037152  104173                        ERROR   173             ;DLT AFTER READ HEADER CMD
8183  037154  104401  056235                TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
8184  037160  000137  042662                JMP     $EOP            ;ABORT DRIVE
8185  037164                        69$:
8186
8187  037164  023737  001674  001352        CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
8188  037172  001401                        BEQ     67$             ;BR IF SAME
8189  037174  104310                        ERROR   310             ;READ CYL WORD HEADER ERROR
8190  037176                        67$:
8191
8192
8193  037176  104415                        SCOP1
8194  037200  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
8195
8196  037204  004737  045424                JSR     PC,SUBCLR
8197  037210  104024                        ERROR   24              ;CERR AFTER SCLR
8198
8199  037212  012737  040166  001176        MOV     #14$,$ESCAPE
8200  037220  013765  001350  000020        MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
8201  037226  013737  001350  001354        MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
8202
8203  037234  012737  000017  003322        MOV     #SEEK,HCS1
8204  037242  004737  043434                JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8205  037246  104131                        ERROR   131             ;NO RDY AFTER SEEK CMD
8206  037250  012737  030140  003412        MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
8207  037256  005037  003414                CLR     E.B0
8208  037262  012737  005720  003416        MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
8209  037270  012737  000001  003420        MOV     #1,E.B1
8210
8211  037276  004737  044252                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8212  037302  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8213  037304  104203                        ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
8214  037306  104204                        ERROR   204             ;MSG B0 ERROR
8215  037310  104205                        ERROR   205             ;MSG A1 ERROR
8216  037312  104206                        ERROR   206             ;MSG B1 ERROR
8217
8218
8219  037314  012737  040206  001176  4$:   MOV     #16$,$ESCAPE
8220  037322  013737  001426  003360        MOV     T50000,TEMP1    ;SETUP  TIMEOUT
8221
8222  037330  004737  044140                JSR     PC,FATT2        ;FIND ATTN
8223  037334  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
8224  037336  032737  100000  003322        BIT     #CERR,HCS1
8225  037344  001401                        BEQ     70$
```

```
8226  037346  104210                          ERROR   210             ;CERR AFTER SEEK CMD
8227  037350                          70$:
8228
8229  037350  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
8230  037356  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8231  037362  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8232  037370  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8233  037376  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8234  037402  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8235  037410  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8236
8237  037416  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8238  037422  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8239  037424  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
8240  037426  104134                          ERROR   134             ;MSG B0 ERROR
8241  037430  104135                          ERROR   135             ;MSG A1 ERROR
8242  037432  104136                          ERROR   136             ;MSG B1 ERROR
8243  037434  005737  001362                  TST     CYLDIF
8244  037440  001401                          BEQ     71$
8245  037442  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
8246
8247  037444                          71$:
8248
8249  037444  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
8250  037452  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
8251  037460  012737  000005  003322          MOV     #CLEAR,HCS1
8252  037466  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
8253  037472  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
8254  037474  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
8255  037500  000401                          BR      72$
8256  037502  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
8257  037504                          72$:
8258
8259  037504  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
8260  037512  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8261  037516  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8262  037524  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8263  037532  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8264  037536  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8265  037544  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8266
8267  037552  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8268  037556  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8269  037560  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
8270  037562  104265                          ERROR   265             ;MSG B0 ERROR
8271  037564  104274                          ERROR   274             ;MSG A1 ERROR
8272  037566  104266                          ERROR   266             ;MSG B1 ERROR
8273
8274  037570  023737  001364  001350          CMP     CYLADD,FRCYL
8275  037576  001401                          BEQ     5$
8276  037600  104243                          ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
8277
8278  037602                          5$:
8279  037602  104415                          SCOP1
8280  037604  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8281
```

```
8282  037610  004737  045424                      JSR     PC,SUBCLR
8283  037614  104024                              ERROR   24              ;CERR AFTER SCLR
8284
8285  037616  005037  001176                      CLR     $ESCAPE
8286  037622  013765  001350  000020              MOV     FRCYL,RKDC(R5)  ;CYL #
8287
8288
8289  037630  012700  001674                      MOV     #RHTAB,R0
8290  037634  012737  000025  003322              MOV     #<RDHEAD>,HCS1
8291  037642  004737  043472                      JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
8292  037646  104171                              ERROR   171             ;NO RDY AFTER READ HEADER CMD
8293  037650  032737  100000  003322              BIT     #CERR,HCS1
8294  037656  001405                              BEQ     74$
8295  037660  104174                              ERROR   174             ;CERR AFTER READ HEADER CMD
8296  037662  104401  056235                      TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
8297  037666  000137  042662                      JMP     $EOP            ;ABORT DRIVE
8298
8299  037672  016520  000024          74$:        MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
8300  037676  016520  000024                      MOV     RKDB(R5),(R0)+  ;2'ND WORD
8301  037702  016520  000024                      MOV     RKDB(R5),(R0)+  ;3'RD WORD
8302
8303
8304  037706  032765  100000  000010              BIT     #DLT,RKCS2(R5)
8305  037714  001407                              BEQ     75$
8306  037716  004737  045074                      JSR     PC,GSTAT
8307  037722  104173                              ERROR   173             ;DLT AFTER READ HEADER CMD
8308  037724  104401  056235                      TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
8309  037730  000137  042662                      JMP     $EOP            ;ABORT DRIVE
8310  037734                          75$:
8311
8312  037734  023737  001674  001350              CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
8313  037742  001401                              BEQ     73$             ;BR IF SAME
8314  037744  104311                              ERROR   311             ;READ CYL WORD HEADER ERROR
8315  037746                          73$:
8316
8317
8318  037746  023737  001352  012054              CMP     TOCYL,LC        ;ALL CYL DONE?
8319  037754  001404                              BEQ     6$              ;BR IF YES
8320  037756  005237  001352                      INC     TOCYL           ;ELSE DO ANOTHER
8321  037762  000137  036404                      JMP     1$
8322  037766                          6$:
8323  037766  004737  047430                      JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
8324  037772  000515                              BR      TST40           ;;GO TO NEXT TEST
8325                                                                      ;RETURN HERE IF SW 14 IS SET OR
8326                                                                      ;SW 8 WITH SWR <7:0> APPLY
8327  037774                          8$:
8328
8329  037774  004737  045424                      JSR     PC,SUBCLR
8330  040000  104024                              ERROR   24              ;CERR AFTER SCRL
8331
8332  040002  013765  001352  000020  76$:        MOV     TOCYL,RKDC(R5)  ;CYL#
8333
8334  040010  012737  000017  003322              MOV     #SEEK,HCS1
8335  040016  004737  043434                      JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8336  040022  104131                              ERROR   131             ;NO RDY AFTER SEEK CMD.
8337
```

```
8338  040024  013737  001426  003360          MOV     T50000,TEMP1
8339  040032  004737  044140                  JSR     PC,FAT12        ;FIND ATTN
8340  040036  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8341  040040  032737  100000  003322          BIT     #CERR,HCS1
8342  040046  001401                          BEQ     78$
8343  040050  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
8344
8345  040052  004737  045424          78$:    JSR     PC,SUBCLR
8346  040056  104024                          ERROR   24              ;CERR AFTER SCLR
8347
8348  040060  023737  001352  012072          CMP     TOCYL,FC        ;LAST CYL DONE?
8349  040066  001403                          BEQ     77$             ;BR IF YES
8350  040070  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
8351  040074  000742                          BR      76$
8352
8353  040076  004737  045424          77$:    JSR     PC,SUBCLR
8354  040102  104024                          ERROR   24              ;CERR AFTER SCLR
8355
8356  040104  005037  001176                  CLR     $ESCAPE
8357  040110  005737  001410                  TST     LPFLG
8358  040114  001402                          BEQ     79$
8359  040116  000177  140766                  JMP     @$LPERR         ;SW 9 WAS SET.
8360  040122  000177  140760          79$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
8361
8362  040126                          10$:
8363  040126  005237  001410                  INC     LPFLG
8364  040132  032777  001000  141000          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8365  040140  001315                          BNE     8$              ;YES, RECONDITION DRIVE
8366  040142  000137  036544                  JMP     2$              ;RETURN TO MAINLINE
8367  040146                          12$:
8368  040146  005237  001410                  INC     LPFLG
8369  040152  032777  001000  140760          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8370  040160  001305                          BNE     8$              ;YES, RECONDITION DRIVE
8371  040162  000137  037032                  JMP     3$              ;RETURN TO MAINLINE
8372  040166                          14$:
8373  040166  005237  001410                  INC     LPFLG
8374  040172  032777  001000  140740          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8375  040200  001275                          BNE     8$              ;YES, RECONDITION DRIVE
8376  040202  000137  037314                  JMP     4$              ;RETURN TO MAINLINE
8377  040206                          16$:
8378  040206  005237  001410                  INC     LPFLG
8379  040212  032777  001000  140720          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8380  040220  001265                          BNE     8$              ;YES, RECONDITION DRIVE
8381  040222  000137  037602                  JMP     5$              ;RETURN TO MAINLINE
8382
8383                                  ;;*****************************************************************
8384                                  ;*TEST 40        SEEK TO ALL CYLS FROM LAST CYL & READ HEADERS
8385                                  ;;*****************************************************************
8386  040226  000004                  T$T40:  SCOPE
8387  040230  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
8388  040236  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8389
8390
8391  040242  004737  045424                  JSR     PC,SUBCLR
8392  040246  104024                          ERROR   24              ;CERR AFTER SCLR
8393
```

```
8394  040250  013765  012054  000020          MOV     LC,RKDC(R5)     ;QUICK SEEK TO LAST CYL
8395
8396  040256  012737  000017  003322          MOV     #SEEK,HCS1
8397  040264  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8398  040270  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
8399
8400  040272  013737  001426  003360          MOV     T50000,TEMP1
8401  040300  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
8402  040304  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8403  040306  032737  100000  003322          BIT     #CERR,HCS1
8404  040314  001401                          BEQ     64$
8405  040316  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
8406
8407  040320  004737  045424          64$:    JSR     PC,SUBCLR
8408  040324  104024                          ERROR   24              ;CERR AFTER SCLR
8409
8410
8411  040330  013737  012054  001350          MOV     LC,FRCYL        ;SETUP FROM CYL
8412  040336  013737  012052  001352          MOV     LCM1,TOCYL      ;SETUP TO CYL
8413
8414  040342                          1$:
8415  040342  104415                          SCOP1
8416  040344  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8417
8418  040350  004737  045424                  JSR     PC,SUBCLR
8419  040354  104024                          ERROR   24              ;CERR AFTER SCLR
8420
8421  040356  012737  042064  001176          MOV     #10$,$ESCAPE
8422  040364  013737  001350  003364          MOV     FRCYL,TEMP3     ;SETUP
8423  040372  013737  001352  003366          MOV     TOCYL,TEMP4     ;CYL DIFF
8424  040400  163737  003366  003364          SUB     TEMP4,TEMP3     ;FOR
8425  040406  013737  003364  001360          MOV     TEMP3,CALDIF    ;ERROR PRINTOUT
8426
8427  040414  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
8428
8429  040422  012737  000017  003322          MOV     #SEEK,HCS1
8430  040430  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8431  040434  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
8432  040436  012737  030140  003412          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.AO ;EXPECTED AO
8433  040444  005037  003414                  CLR     E.BO
8434  040450  012737  005720  003416          MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
8435  040456  012737  000001  003420          MOV     #1,E.B1
8436
8437  040464  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS AO,BO,A1,B1
8438  040470  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8439  040472  104203                          ERROR   203             ;MSG AO ERROR DURING SEEK CMD
8440  040474  104204                          ERROR   204             ;MSG BO ERROR
8441  040476  104205                          ERROR   205             ;MSG A1 ERROR
8442  040500  104206                          ERROR   206             ;MSG B1 ERROR
8443
8444  040502  012737  042104  001176  2$:     MOV     #12$,$ESCAPE
8445  040510  013737  001426  003360          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
8446
8447  040516  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
8448  040522  104132                          ERROR   132             ;NO ATTN AFTER SEEk CMD
8449  040524  032737  100000  003322          BIT     #CERR,HCS1
```

```
8450  040532  001401                          BEQ     65$
8451  040534  104210                          ERROR   210             ;CERR AFTER SEEK CMD
8452  040536                          65$:
8453
8454  040536  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
8455  040544  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8456  040550  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8457  040556  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8458  040564  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8459  040570  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8460  040576  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8461
8462  040604  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8463  040610  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8464  040612  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
8465  040614  104134                          ERROR   134             ;MSG B0 ERROR
8466  040616  104135                          ERROR   135             ;MSG A1 ERROR
8467  040620  104136                          ERROR   136             ;MSG B1 ERROR
8468  040622  005737  001362                  TST     CYLDIF
8469  040626  001401                          BEQ     66$
8470  040630  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
8471
8472  040632                          66$:
8473
8474  040632  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
8475  040640  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
8476  040646  012737  000005  003322          MOV     #CLEAR,HCS1
8477  040654  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
8478  040660  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
8479  040662  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
8480  040666  000401                          BR      67$
8481  040670  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
8482  040672                          67$:
8483
8484  040672  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
8485  040700  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8486  040704  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8487  040712  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8488  040720  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8489  040724  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8490  040732  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8491
8492  040740  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8493  040744  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8494  040746  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
8495  040750  104265                          ERROR   265             ;MSG B0 ERROR
8496  040752  104274                          ERROR   274             ;MSG A1 ERROR
8497  040754  104266                          ERROR   266             ;MSG B1 ERROR
8498
8499  040756  023737  001364  001352          CMP     CYLADD,TOCYL
8500  040764  001401                          BEQ     3$
8501  040766  104207                          ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
8502
8503  040770                          3$:
8504  040770  104415                          SCOP1
8505  040772  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
```

```
8506
8507  040776  004737  045424          JSR     PC,SUBCLR
8508  041002  104024                  ERROR   24              ;CERR AFTER SCLR
8509
8510  041004  005037  001176          CLR     $ESCAPE
8511  041010  013765  001352  000020  MOV     TOCYL,RKDC(R5)  ;CYL #
8512
8513
8514  041016  012700  001674          MOV     #RHTAB,R0
8515  041022  012737  000025  003322  MOV     #<RDHEAD>,HCS1
8516  041030  004737  043472          JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
8517  041034  104171                  ERROR   171             ;NO RDY AFTER READ HEADER CMD
8518  041036  032737  100000  003322  BIT     #CERR,HCS1
8519  041044  001405                  BEQ     69$
8520  041046  104174                  ERROR   174             ;CERR AFTER READ HEADER CMD
8521  041050  104401  056235          TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
8522  041054  000137  042662          JMP     $EOP            ;ABORT DRIVE
8523
8524  041060  016520  000024  69$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
8525  041064  016520  000024          MOV     RKDB(R5),(R0)+  ;2'ND WORD
8526  041070  016520  000024          MOV     RKDB(R5),(R0)+  ;3'RD WORD
8527
8528
8529  041074  032765  100000  000010  BIT     #DLT,RKCS2(R5)
8530  041102  001407                  BEQ     70$
8531  041104  004737  045074          JSR     PC,GSTAT
8532  041110  104173                  ERROR   173             ;DLT AFTER READ HEADER CMD
8533  041112  104401  056235          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
8534  041116  000137  042662          JMP     $EOP            ;ABORT DRIVE
8535  041122                  70$:
8536
8537  041122  023737  001674  001352  CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
8538  041130  001401                  BEQ     68$             ;BR IF SAME
8539  041132  104310                  ERROR   310             ;READ CYL WORD HEADER ERROR
8540  041134                  68$:
8541
8542
8543  041134  104415                  SCOP1
8544  041136  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
8545
8546  041142  004737  045424          JSR     PC,SUBCLR
8547  041146  104024                  ERROR   24              ;CERR AFTER SCLR
8548
8549  041150  012737  042124  001176  MOV     #14$,$ESCAPE
8550  041156  013765  001350  000020  MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
8551  041164  013737  001350  001354  MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
8552
8553  041172  012737  000017  003322  MOV     #SEEK,HCS1
8554  041200  004737  043434          JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8555  041204  104131                  ERROR   131             ;NO RDY AFTER SEEK CMD
8556  041206  012737  030140  003412  MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
8557  041214  005037  003414          CLR     E.B0
8558  041220  012737  003720  003416  MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
8559  041226  012737  000001  003420  MOV     #1,E.B1
8560
8561  041234  004737  044252          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
```

```
8562  041240  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8563  041242  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
8564  041244  104204                          ERROR   204             ;MSG B0 ERROR
8565  041246  104205                          ERROR   205             ;MSG A1 ERROR
8566  041250  104206                          ERROR   206             ;MSG B1 ERROR
8567
8568
8569  041252  012737  042144  001176  4$:     MOV     #16$,$ESCAPE
8570  041260  013737  001426  003360          MOV     TS0000,TEMP1    ;SETUP  TIMEOUT
8571
8572  041266  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
8573  041272  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8574  041274  032737  100000  003322          BIT     #CERR,HCS1
8575  041302  001401                          BEQ     71$
8576  041304  104210                          ERROR   210             ;CERR AFTER SEEK CMD
8577  041306                          71$:
8578
8579  041306  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
8580  041314  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8581  041320  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8582  041326  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8583  041334  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8584  041340  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8585  041346  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8586
8587  041354  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8588  041360  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8589  041362  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
8590  041364  104134                          ERROR   134             ;MSG B0 ERROR
8591  041366  104135                          ERROR   135             ;MSG A1 ERROR
8592  041370  104136                          ERROR   136             ;MSG B1 ERROR
8593  041372  005737  001362                  TST     CYLDIF
8594  041376  001401                          BEQ     72$
8595  041400  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
8596
8597  041402                          72$:
8598
8599  041402  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
8600  041410  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
8601  041416  012737  000005  003322          MOV     #CLEAR,HCS1
8602  041424  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
8603  041430  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
8604  041432  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
8605  041436  000401                          BR      73$
8606  041440  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
8607  041442                          73$:
8608
8609  041442  012737  010340  003412          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
8610  041450  005037  003414                  CLR     E.B0            ;EXPECTED MSG B0
8611  041454  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
8612  041462  012737  000001  003420          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8613  041470  005037  003422                  CLR     E.A2            ;EXPECTED MSG A2
8614  041474  012737  000002  003424          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8615  041502  012737  000003  003430          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8616
8617  041510  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
```

```
8618  041514  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8619  041516  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
8620  041520  104265                          ERROR   265             ;MSG B0 ERROR
8621  041522  104274                          ERROR   274             ;MSG A1 ERROR
8622  041524  104266                          ERROR   266             ;MSG B1 ERROR
8623
8624  041526  023737  001364  001350          CMP     CYLADD,FRCYL
8625  041534  001401                          BEQ     5$
8626  041536  104243                          ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
8627
8628  041540                          5$:
8629  041540  104415                          SCOP1
8630  041542  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
8631
8632  041546  004737  045424                  JSR     PC,SUBCLR
8633  041552  104024                          ERROR   24              ;CERR AFTER SCLR
8634
8635  041554  005037  001176                  CLR     $ESCAPE
8636  041560  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;CYL #
8637
8638
8639  041566  012700  001674                  MOV     #RHTAB,R0
8640  041572  012737  000025  003322          MOV     #<RDHEAD>,HCS1
8641  041600  004737  043472                  JSR     PC,DATCMD       ;DO DATA XFER CMD & GET CONTR RDY
8642  041604  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
8643  041606  032737  100000  003522          BIT     #CERR,HCS1
8644  041614  001405                          BEQ     75$
8645  041616  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
8646  041620  104401  056235                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
8647  041624  000137  042662                  JMP     $EOP            ;ABORT DRIVE
8648
8649  041630  016520  000024          75$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
8650  041634  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
8651  041640  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
8652
8653
8654  041644  032765  100000  000010          BIT     #DLT,RKCS2(R5)
8655  041652  001407                          BEQ     76$
8656  041654  004737  045074                  JSR     PC,GSTAT
8657  041660  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
8658  041662  104401  056235                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
8659  041666  000137  042662                  JMP     $EOP            ;ABORT DRIVE
8660  041672                          76$:
8661
8662  041672  023737  001674  001350          CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
8663  041700  001401                          BEQ     74$             ;BR IF SAME
8664  041702  104311                          ERROR   311             ;READ CYL WORD HEADER ERROR
8665  041704                          74$:
8666
8667
8668  041704  023737  001352  012072          CMP     TOCYL,FC        ;ALL CYL DONE?
8669  041712  001404                          BEQ     6$              ;BR IF YES
8670  041714  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
8671  041720  000137  040342                  JMP     1$
8672  041724                          6$:
8673  041724  004737  047430                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
```

```
8674  041730  000515                          BR      TST41           ;;GO TO NEXT TEST
8675                                                                  ;RETURN HERE IF SW 14 IS SET OR
8676                                                                  ;SW 8 WITH SWR <7:0> APPLY
8677  041732                          8$:
8678
8679  041732  004737  045424                  JSR     PC,SUBCLR
8680  041736  104024                          ERROR   24              ;CERR AFTER SCRL
8681
8682  041740  013765  001352  000020  77$:    MOV     TOCYL,RKDC(R5)  ;CYL#
8683
8684  041746  012737  000017  003322          MOV     #SEEK,HCS1
8685  041754  004737  043434                  JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8686  041760  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
8687
8688  041762  013737  001426  003360          MOV     TS0000,TEMP1
8689  041770  004737  044140                  JSR     PC,FATT2        ;FIND ATTN
8690  041774  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8691  041776  032737  100000  003322          BIT     #CERR,HCS1
8692  042004  001401                          BEQ     79$
8693  042006  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
8694
8695  042010  004737  045424          79$:    JSR     PC,SUBCLR
8696  042014  104024                          ERROR   24              ;CERR AFTER SCLR
8697
8698  042016  023737  001352  012054          CMP     TOCYL,LC        ;LAST CYL DONE?
8699  042024  001403                          BEQ     78$             ;BR IF YES
8700  042026  005237  001352                  INC     TOCYL           ;ELSE DO ANOTHER
8701  042032  000742                          BR      77$
8702
8703  042034  004737  045424          78$:    JSR     PC,SUBCLR
8704  042040  104024                          ERROR   24              ;CERR AFTER SCLR
8705
8706  042042  005037  001176                  CLR     $ESCAPE
8707  042046  005737  001410                  TST     LPFLG
8708  042052  001402                          BEQ     80$
8709  042054  000177  137030                  JMP     @$LPERR         ;SW 9 WAS SET.
8710  042060  000177  137022          80$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
8711
8712  042064                          10$:
8713  042064  005237  001410                  INC     LPFLG
8714  042070  032777  001000  137042          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8715  042076  001315                          BNE     8$              ;YES, RECONDITION DRIVE
8716  042100  000137  040502                  JMP     2$              ;RETURN TO MAINLINE
8717  042104                          12$:
8718  042104  005237  001410                  INC     LPFLG
8719  042110  032777  001000  137022          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8720  042116  001305                          BNE     8$              ;YES, RECONDITION DRIVE
8721  042120  000137  040770                  JMP     3$              ;RETURN TO MAINLINE
8722  042124                          14$:
8723  042124  005237  001410                  INC     LPFLG
8724  042130  032777  001000  137002          BIT     #SW9,@SWR       ;LOOP ON ERROR?
8725  042136  001275                          BNE     8$              ;YES, RECONDITION DRIVE
8726  042140  000137  041252                  JMP     4$              ;RETURN TO MAINLINE
8727  042144                          16$:
8728  042144  005237  001410                  INC     LPFLG
8729  042150  032777  001000  136762          BIT     #SW9,@SWR       ;LOOP ON ERROR?
```

```
8730  042156  001265                      BNE     8$              ;YES, RECONDITION DRIVE
8731  042160  000137  041540              JMP     5$              ;RETURN TO MAINLINE
8732
8733  042164                      CYLINV:
8734
8735
8736                              ;;*****************************************************************
8737                              ;*TEST 41        SEEK TO ALL INVALID CYLINDERS
8738                              ;*
8739                              ;*      THIS TEST VERIFIES THAT 'INV ADDR' & 'SEEK INCOMPLETE' IS
8740                              ;*      PRODUCED & THAT HEADS DO NOT MOVE OR UNLOAD IF AN ILLEGAL
8741                              ;*      CYL IS SPECIFIED IN A SEEK.
8742                              ;*
8743                              ;*      INVALID CYLS ARE 633 THRU 777 (8) FOR THE RK06
8744                              ;*      & 1457 THRU 1777 FOR THE RK07.
8745                              ;*
8746                              ;;*****************************************************************
8747  042164  000004              T$T41:  SCOPE
8748  042166  012737  000001  001174      MOV     #1,$TIMES       ;;DO 1 ITERATION
8749  042174  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
8750
8751  042200  004737  045424              JSR     PC,SUBCLR
8752  042204  104024                      ERROR   24              ;CERR AFTER SCLR
8753
8754  042206  012737  000017  003322      MOV     #SEEK,HCS1
8755  042214  004737  043434              JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR READY
8756  042220  104131                      ERROR   131             ;NO RDY AFTER SEEK CMD.
8757
8758  042222  013737  001426  003360      MOV     T50000,TEMP1
8759  042230  004737  044140              JSR     PC,FATT2        ;FIND ATTN
8760  042234  104132                      ERROR   132             ;NO ATTN AFTER SEEK CMD
8761  042236  032737  100000  003322      BIT     #CERR,HCS1
8762  042244  001401                      BEQ     64$
8763  042246  104210                      ERROR   210             ;CERR AFTER SEEK CMD.
8764
8765  042250  004737  045424      64$:    JSR     PC,SUBCLR
8766  042254  104024                      ERROR   24              ;CERR AFTER SCLR
8767
8768  042256  005000                      CLR     R0
8769  042260  005037  001350              CLR     FRCYL           ;FROM CYL 0
8770  042264  013737  012056  001352      MOV     LCP1,TOCYL              ;1'ST INV CYL
8771
8772  042272                      1$:
8773  042272  104415                      SCOP1
8774  042274  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
8775
8776  042300  004737  045424              JSR     PC,SUBCLR
8777  042304  104024                      ERROR   24              ;CERR AFTER SCLR
8778
8779  042306  013737  001352  001360      MOV     TOCYL,CALDIF
8780  042314  013765  001352  000020      MOV     TOCYL,RKDC(R5)
8781  042322  012737  000017  003322      MOV     #SEEK,HCS1
8782  042330  004737  043434              JSR     PC,DOCMD        ;DO SEEK CMD & GET CONTR RDY
8783  042334  104131                      ERROR   131             ;NO RDY AFTER SEEK CMD
8784  042336  004737  044012              JSR     PC,TSTATN
8785  042342  104245                      ERROR   245             ;NO ATTN AFTER SEEK TO INV CYL
```

```
 8786
 8787  042344  032737  000040  003352          BIT     #D.IDAE,HMR3
 8788  042352  001001                          BNE     2$
 8789  042354  104246                          ERROR   246             ;IDAE NOT SET AFTER SEEK TO INVALID ADDR
 8790  042356  032737  000200  003352  2$:     BIT     #D.FLT,HMR3
 8791  042364  001001                          BNE     4$
 8792  042366  104247                          ERROR   247             ;FLT NOT SET AFTER SEEK TO INV ADDR
 8793  042370  032737  020000  003350  4$:     BIT     #D.PIP,HMR2
 8794  042376  001401                          BEQ     5$
 8795  042400  104250                          ERROR   250             ;PIP SET AFTER SEEK TO INV ADDR
 8796  042402  032737  040000  003350  5$:     BIT     #D.DSC,HMR2
 8797  042410  001001                          BNE     6$
 8798  042412  104251                          ERROR   251             ;DSC NOT SET AFTER SEEK TO INV ADDR
 8799
 8800  042414  005237  001462          6$:     INC     BYPCERR         ;BYPASS CHECKING FOR CERR IN GSTAT1
 8801  042420  012737  050340  003412          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
 8802  042426  012737  002240  003414          MOV     #<D.SKI!D.FLT!D.IDAE>,E.B0
 8803  042434  012737  001720  003416          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 8804  042442  012737  000001  003420          MOV     #1,E.B1
 8805
 8806  042450  004737  044252                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 8807  042454  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 8808  042456  104252                          ERROR   252             ;MSG A0 ERROR AFTER SEEK TO INV CYL
 8809  042460  104253                          ERROR   253             ;MSG B0 ERROR
 8810  042462  104254                          ERROR   254             ;MSG A1 ERROR
 8811  042464  104255                          ERROR   255             ;MSG B1 ERROR
 8812  042466  023737  001362  001352          CMP     CYLDIF,TOCYL
 8813  042474  001401                          BEQ     7$
 8814  042476  104256                          ERROR   256             ;CYL DIFF IN RKMR2 NOT=CYL DIF
 8815  042500  023737  001364  001352  7$:     CMP     CYLADD,TOCYL
 8816  042506  001401                          BEQ     8$
 8817  042510  104257                          ERROR   257             ;CYL ADDR IN RKMR3 NOT=RKDC
 8818
 8819  042512                          8$:
 8820
 8821  042512  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 8822  042520  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
 8823  042526  012737  000013  003322          MOV     #RECAL,HCS1
 8824  042534  004737  043434                  JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
 8825  042540  104124                          ERROR   124             ;RDY NOT FOUND AFTER RECAL CMD
 8826
 8827  042542  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 8828  042550  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 8829  042556  012737  000005  003322          MOV     #CLEAR,HCS1
 8830  042564  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
 8831  042570  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 8832  042572  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
 8833  042576  000401                          BR      66$
 8834  042600  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 8835  042602                          66$:
 8836
 8837
 8838  042602  004737  045074                  JSR     PC,GSTAT
 8839  042606  032737  000040  003352          BIT     #D.IDAE,HMR3    ;SEE IF IDAE IS CLEARED
 8840  042614  001401                          BEQ     65$             ;BR IF YES
 8841  042616  104155                          ERROR   155             ;IDAE NOT CLEARED AFTER RECAL CMD
```

```
 8842
 8843  042620  012765  100000  000000  65$:    MOV     #CCLR,RKCS1(R5)
 8844  042626  013737  001412  003362          MOV     T1,TEMP2        ;LOOK FOR ATTN FROM RECAL
 8845  042634  004737  044044                  JSR     PC,FATT1
 8846  042640  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
 8847
 8848
 8849  042642  005237  001352                  INC     TOCYL
 8850  042646  023737  001352  012064          CMP     TOCYL,MASK
 8851  042654  001402                          BEQ     $EOP
 8852  042656  000137  042272                  JMP     I$
 8853
 8854
```

```
                                .SBTTL  END OF PASS ROUTINE

                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO ST5XY

042662                          $EOP:

042662  000004                          SCOPE
042664  005037  001176                  CLR     $ESCAPE
042670  012737  000001  001174          MOV     #1,$TIMES
042676  012706  001100                  MOV     #STACK,SP
042702  005237  001220                  INC     $DEVCT          ;INCR COUNT FOR # OF DRIVES THAT ARE CHECKED
042706  023737  003442  001220          CMP     DRIVS,$DEVCT    ;ARE ALL DRIVES PRESINT TESTED?
042714  001403                          BEQ     $EOP1+2         ;BR IF YES
042716  000137  011520                  JMP     NUDRV           ;IF NOT , TEST NEXT DRIVE PRESENT
042722  000004          $EOP1:  SCOPE
042724  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
042730  005037  001174                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
042734  005237  001216                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
042740  042737  100000  001216          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
042746  005327                          DEC     (PC)+           ;;LOOP?
042750  000001          $EOPCT: .WORD   1
042752  003022                          BGT     $DOAGN          ;;YES
042754  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
042756  000001          $ENDCT: .WORD   1
042760  042750                          $EOPCT
042762  104401  043027                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
042766  013746  001216                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
042772  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
042774  104401  043024                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
043000  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
043004  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
043006  000005                          RESET                   ;;CLEAR THE WORLD
043010  004710          $ENDAD: JSR     PC,(R0)                 ;;GO TO MONITOR
043012  000240                          NOP                     ;;SAVE ROOM
043014  000240                          NOP                     ;;FOR
043016  000240                          NOP                     ;;ACT11
043020                  $DOAGN:
043020  000137                          JMP     @(PC)+          ;;RETURN
043022  043044          $RTNAD: .WORD   ST5XY
043024     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
043027     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
043034  050040  051501  020123
043042  000043
043044  122737  000001  001230  ST5XY:  CMPB    #APTENV,$ENV            ;RUN UNDER APT ?
043052  001007                          BNE     2$              ;BRANCH IF NOT
043054  022737  000002  001216          CMP     #2,$PASS                ;TWO PASSES DONE ?
043062  101003                          BHI     2$              ;BRANCH IF NOT
043064  005237  001102          1$:     INC     $TSTNM          ;CHANGE THE TEST NUMBER
043070  000775                          BR      1$              ;LOOP WAIT FOR LOADING THE NEXT PRG
043072  000137  007730          2$:     JMP     ST5             ;EXIT
```

```
8909                                    .SBTTL  SUBROUTINES
8910
8911                                    ;SUBROUTINE TO CLEAR ALL FLAGS FROM DDUMP THRU DOTIM
8912                                    ;
8913
8914  043076  012700  003432           CLRFLG: MOV     #DDUMP,R0
8915  043102  012701  177757                   MOV     #-17.,R1
8916  043106  005020                   1$:     CLR     (R0)+
8917  043110  005201                           INC     R1
8918  043112  001375                           BNE     1$
8919  043114  000207                           RTS     PC
8920
8921                                    ;
8922                                    ;TYPE PROGRAM ID IF FTITLE=0
8923                                    ;
8924
8925  043116  005737  001344           TITLE:  TST     FTITLE
8926  043122  001024                           BNE     1$
8927  043124  005237  001344                   INC     FTITLE
8928  043130  104401  054516                   TYPE    ,MSG1                   ;PROGRAM ID
8929                                    .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
8930  043134  005737  000042                   TST     @#42                    ;;ARE WE RUNNING UNDER XXDP/ACT?
8931  043140  001013                           BNE     64$                     ;;BRANCH IF YES
8932  043142  123727  001230  000001           CMPB    $ENV,#1                 ;;ARE WE RUNNING UNDER APT?
8933  043150  001403                           BEQ     64$                     ;;BRANCH IF YES
8934  043152  023727  001140  000176           CMP     SWR,#SWREG              ;;SOFTWARE SWITCH REG SELECTED?
8935  043160  001003                           BNE     65$                     ;;BRANCH IF NO
8936  043162  104406                           GTSWR                           ;;GET SOFT-SWR SETTINGS
8937  043164  000403                           BR      65$
8938  043166  112737  000001  001134   64$:    MOVB    #1,$AUTOB               ;;SET AUTO-MODE INDICATOR
8939  043174                           65$:
8940  043174  000207                   1$:     RTS     PC
8941
8942                                    ;
8943                                    ;ROUTINE TO INPUT DRIVE NOS. TYPED IN & SET
8944                                    ;DRIVS, DRIV0-DRIV7 REGISTERS APPROPRIATELY
8945                                    ;
8946
8947  043176  104411                   GDRVS:  RDLIN
8948  043200  012600                           MOV     (SP)+,R0                ;GET STARTING ADDR OF ASCII STRING
8949  043202  012701  177770                   MOV     #-8.,R1                 ;SET UP COUNT
8950  043206  112002                   1$:     MOVB    (R0)+,R2                ;GET ASCII CHAR
8951  043210  042702  177400                   BIC     #177400,R2              ;MASK HI BYTE
8952  043214  012703  003444                   MOV     #DRIV0,R3               ;DRIVE FLAG ADDR
8953  043220  012704  000060                   MOV     #60,R4
8954
8955  043224  020402                   2$:     CMP     R4,R2                   ;WAS TYPED CHAR 0 THRU 7?
8956  043226  001415                           BEQ     3$                      ;BRANCH IF YES
8957  043230  005723                           TST     (R3)+                   ;NO, INCREMENT DR FLAG ADDR
8958  043232  005204                           INC     R4
8959  043234  020427  00007C                   CMP     R4,#70
8960  043240  001371                           BNE     2$                      ;S/B 0-7 OR TERMINATOR
8961  043242  005702                           TST     R2
8962  043244  001022                           BNE     4$
8963  043246  020127  177770                   CMP     R1,#-8.
8964  043252  001426                           BEQ     6$                      ;DEFAULT ALL DRIVES
```

```
8965  043254  005037  003472          7$:     CLR     SIZFLG          ;BYPASS TEST 1 (SIZING)
8966  043260  000207                          RTS     PC              ;FOUND TERMINATOR, EXIT
8967
8968  043262  005213                  3$:     INC     @R3             ;SET UP FLAG FOR THE DRIVE
8969  043264  005237  003442                  INC     DRIVS           ;INCREMENT TOTAL # DRIVES TO BE TESTED
8970  043270  112002                          MOVB    (PO)+,R2        ;GET NEXT ASCII CHAR.
8971  043272  042702  177400                  BIC     #177400,R2      ;MASK
8972  043276  022702  000054                  CMP     #54,R2          ;IS IT A COMMA?
8973  043302  001407                          BEQ     5$              ;YES, GO TO NEXT WORD.
8974  043304  005702                          TST     R2              ;NO, IS IT A TERMINATOR?
8975  043306  001001                          BNE     4$              ;IF NOT, SOMETHING WRONG.
8976  043310  000761                          BR      7$              ;FOUND TERMINATOR, EXIT
8977
8978  043312  104401  056744          4$:     TYPE    ,EM1            ;ONLY 0-7 ALLOWED.
8979  043316  000137  007134                  JMP     PRGSRT          ;START ALL OVER
8980
8981  043322  005201                  5$:     INC     R1              ;S/B NO MORE THAN 8 DIFF
8982  043324  001330                          BNE     1$              ;DRIVES TYPED IN.
8983  043326  000771                          BR      4$              ;IF MORE, HAVE ERROR.
8984
8985  043330  005237  003472          6$:     INC     SIZFLG          ;DO TEST 1 (SIZING)
8986  043334  000207                          RTS     PC              ;EXIT.
8987
8988                                          ;
8989                                          ;ROUTINE TO INPUT RKBAS OR DEFAULT.
8990                                          ;
8991
8992  043336  104412                  GBA:    RDOCT
8993  043340  012600                          MOV     (SP)+,R0        ;GET LOW ORDER FROM STACK
8994  043342  005700                          TST     R0
8995  043344  001403                          BEQ     1$              ;BRANCH IF DEFAULT.
8996  043346  010037  001264                  MOV     R0,$BASE
8997  043352  000207                          RTS     PC
8998  043354  012737  177440  001264  1$:     MOV     #177440,$BASE   ;DEFAULT VALUE
8999  043362  000207                          RTS     PC
9000
9001                                          ;
9002                                          ;ROUTINE TO INPUT RKVEC OR DEFAULT
9003                                          ;
9004
9005  043364  104412                  GINT:   RDOCT
9006  043366  012600                          MOV     (SP)+,R0        ;GET LOW ORDER FROM STACK
9007  043370  005700                          TST     R0
9008  043372  001405                          BEQ     1$              ;BRANCH IF DEFAULT
9009  043374  010037  001314                  MOV     R0,RKVEC
9010  043400  004737  043416          2$:     JSR     PC,SETINT
9011  043404  000207                          RTS     PC
9012  043406  012737  000210  001314  1$:     MOV     #210,RKVEC      ;DEFAULT VALUE
9013  043414  000771                          BR      2$
9014
9015                                          ;
9016                                          ;ROUTINE TO SETUP INTERRUPT VECTOR & PRIORITY
9017                                          ;
9018
9019  043416  013700  001314          SETINT: MOV     RKVEC,R0
9020  043422  012720  050156                  MOV     #INTER,(R0)+    ;INTER ADDR TO RKVEC
```

```
9021  043426  013710  001316                  MOV     RKPRI,(R0)      ;PRS TO RKVEC+2
9022  043432  000207                          RTS     PC
9023
9024                                          ;
9025                                          ;THIS ROUTINE SETS CDT IN RKCS1 IF DRIVE UNDER TEST IS AN RK07.
9026                                          ;ENTER WITH COMMAND IN HCS1
9027                                          ;
9028  043434  053737  001170  003322  DOCMD:  BIS     $TMP4,HCS1      ;ADD CDT IF RK07
9029  043442  013765  003322  000000          MOV     HCS1,RKCS1(R5)  ;DO COMMAND
9030  043450  013737  001414  003360          MOV     T10,TEMP1
9031  043456  004737  043530                  JSR     PC,FRDY         ;FIND CONTR READY
9032  043462  000207                          RTS     PC              ;SET HERE IF NOT RDY
9033  043464  062716  000002                  ADD     #2,(SP)         ;ELSE SKIP OVER ERROR
9034  043470  000207                          RTS     PC
9035                                          ;
9036                                          ;THIS ROUTINE IS SIMILAR TO THE ABOVE BUT IS USED FOR DATA TRANSFERS
9037                                          ;& REQUIRES A LONGER TIMEOUT
9038                                          ;
9039  043472  053737  001170  003322  DATCMD: BIS     $TMP4,HCS1      ;ADD CDT IF RK07
9040  043500  013765  003322  000000          MOV     HCS1,RKCS1(R5)  ;DO CMD
9041  043506  013737  001426  003360          MOV     T50000,TEMP1
9042  043514  004737  043530                  JSR     PC,FRDY         ;FIND CONTR RDY
9043  043520  000207                          RTS     PC
9044  043522  062716  000002                  ADD     #2,(SP)
9045  043526  000207                          RTS     PC
9046
9047                                          ;
9048                                          ;ROUTINE TO FIND CONTROLLER READY (RDY) DURING A DELAY
9049                                          ;ENTER WITH A COUNT IN TEMP1
9050                                          ;RETURN IF RDY NOT PRESENT (ERROR CONDITION)
9051                                          ;RETURN +2 IF RDY PRESENT (SKIP OVER ERROR)
9052                                          ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
9053                                          ;
9054  043530  032765  000200  000000  FRDY:   BIT     #RDY,RKCS1(R5)
9055  043536  001010                          BNE     1$
9056  043540  005337  003360                  DEC     TEMP1
9057  043544  001371                          BNE     FRDY
9058  043546  004737  043664                  JSR     PC,HOLD         ;STORE ALL RK611 REGS IN HOLDING REGS.
9059  043552  004737  045012                  JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR
9060  043556  000207                          RTS     PC              ;NO RDY, EXIT
9061  043560  062716  000002          1$:     ADD     #2,(SP)         ;SKIP OVER ERROR
9062  043564  004737  043664                  JSR     PC,HOLD
9063  043570  004737  045012                  JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR
9064  043574  000207                          RTS     PC
9065
9066                                          ;
9067                                          ; ROUTINE TO FIND CONTROLLER READY & STORE DRIVE REGS ONLY
9068                                          ;
9069  043576  032765  000200  000000  FRDY1:  BIT     #RDY,RKCS1(R5)
9070  043604  001014                          BNE     1$
9071  043606  005337  003360                  DEC     TEMP1
9072  043612  001371                          BNE     FRDY1
9073  043614  016537  000034  003350          MOV     RKMR2(R5),HMR2
9074  043622  016537  000036  003352          MOV     RKMR3(R5),HMR3
9075  043630  004737  045012                  JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR CONDITIONS
9076  043634  000207                          RTS     PC              ;NO RDY, EXIT
```

```
9077  043636  062716  000002          1$:     ADD     #2,(SP)          ;SKIP OVER ERROR
9078  043642  016537  000034  003350          MOV     RKMR2(R5),HMR2
9079  043650  016537  000036  003352          MOV     RKMR3(R5),HMR3
9080  043656  004737  045012                  JSR     PC,CKCERR        ;CHECK FOR SPECIAL CERR CONDITIONS
9081  043662  000207                          RTS     PC
9082                                          ;
9083                                          ;STORE ALL RK611 REGISTERS IN HOLDING REGS
9084                                          ;
9085
9086  043664  016537  000000  003322  HOLD:   MOV     RKCS1(R5),HCS1
9087  043672  016537  000010  003324          MOV     RKCS2(R5),HCS2
9088  043700  016537  000002  003326          MOV     RKWC(R5),HWC
9089  043706  016537  000004  003330          MOV     RKBA(R5),HBA
9090  043714  016537  000006  003332          MOV     RKDA(R5),HDA
9091  043722  016537  000012  003334          MOV     RKDS(R5),HDS
9092  043730  016537  000014  003336          MOV     RKER(R5),HER
9093  043736  016537  000016  003340          MOV     RKASOF(R5),HASOF
9094  043744  016537  000020  003342          MOV     RKDC(R5),HDC
9095  043752  016537  000026  003346          MOV     RKMR1(R5),HMR1
9096  043760  016537  000034  003350          MOV     RKMR2(R5),HMR2
9097  043766  016537  000036  003352          MOV     RKMR3(R5),HMR3
9098  043774  016537  000030  003354          MOV     RKECPS(R5),HPOS
9099  044002  016537  000032  003356          MOV     RKECPT(R5),HPAT
9100  044010  000207                          RTS     PC
9101
9102                                          ;
9103                                          ;ROUTINE TO CHECK FOR CORRECT ATTN
9104                                          ;RETURN IF ATTN NOT PRESENT (ERROR CONDITION)
9105                                          ;RETURN +2 IF ATTN PRESENT (SKIP OVER ERROR)
9106                                          ;
9107  044012  010446                  ;STATN: MOV     R4,-(SP)         ;SAV R4
9108  044014  013704  001222                  MOV     $UNIT,R4
9109  044020  136437  003312  003341          BITB    ATTN(R4),HASOF+1
9110  044026  001404                          BEQ     1$               ;BRANCH IF ATTN NOT PRESENT
9111  044030  012604                          MOV     (SP)+,R4         ;RESTOR R4
9112  044032  062716  000002                  ADD     #2,(SP)          ;INCR RET ADDR TO JUMP OVER ERROR.
9113  044036  000207                          RTS     PC
9114  044040  012604                  1$:     MOV     (SP)+,R4         ;RESTOR R4
9115  044042  000207                          RTS     PC
9116
9117                                          ;
9118                                          ;ROUTINE TO FIND ATTN WITHIN TIMES GREATER THAN 1 SEC
9119                                          ;ENTER WITH TIME IN SECONDS IN TEMP2
9120                                          ;RETURN IF NO ATTN (ERROR CONDITION)
9121                                          ;RETURN +2 IF ATTN FOUND
9122                                          ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
9123                                          ;
9124
9125  044044  010446                  FATT1:  MOV     R4,-(SP)         ;SAV R4
9126  044046  012737  177777  003360  3$:     MOV     #-1,TEMP1
9127  044054  013704  001222                  MOV     $UNIT,R4
9128  044060  136465  003312  000017  1$:     BITB    ATTN(R4),RKASOF+1(R5) ;FIND CORRECT ATTN
9129  044066  001014                          BNE     2$
9130  044070  005337  003360                  DEC     TEMP1
9131  044074  001371                          BNE     1$
9132  044076  005337  003362                  DEC     TEMP2
```

```
9133  044102  001361                        BNE     3$
9134  044104  005065  000026                CLR     RKMR1(R5)       ;SELECT WORD 0
9135  044110  004737  045074                JSR     PC,GSTAT        ;GET LATEST STATUS
9136  044114  012604                        MOV     (SP)+,R4        ;RESTOR R4
9137  044116  000207                        RTS     PC
9138  044120  005065  000026        2$:     CLR     RKMR1(R5)
9139  044124  004737  045074                JSR     PC,GSTAT        ;GET STATUS AFTER ATTN SEEN
9140  044130  012604                        MOV     (SP)+,R4        ;RESTOR R4
9141  044132  062716  000002                ADD     #2,(SP)         ;SKIP OVER ERROR
9142  044136  000207                        RTS     PC
9143
9144                                        ;
9145                                        ;ROUTINE TO FIND ATTN WITHIN 1 SEC
9146                                        ;ENTER WITH COUNT IN TEMP1
9147                                        ;RETURN IF NO ATTN (ERROR)
9148                                        ;RETURN +2 IF ATTN FOUND
9149                                        ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
9150                                        ;
9151
9152  044140  010446                FATT2:  MOV     R4,-(SP)        ;SAV R4
9153  044142  013704  001222        2$:     MOV     $UNIT,R4
9154  044146  136465  003312  000017        BITB    ATTN(R4),RKASOF+1(R5)  ;FIND CORRECT ATTN
9155  044154  001011                        BNE     1$
9156  044156  005337  003360                DEC     TEMP1
9157  044162  001367                        BNE     2$
9158  044164  005065  000026                CLR     RKMR1(R5)       ;SELECT WORD 0
9159  044170  004737  045074                JSR     PC,GSTAT        ;GET LATEST STATUS.
9160  044174  012604                        MOV     (SP)+,R4        ;RESTOR R4
9161  044176  000207                        RTS     PC
9162  044200  005065  000026        1$:     CLR     RKMR1(R5)
9163  044204  004737  045074                JSR     PC,GSTAT
9164  044210  012604                        MOV     (SP)+,R4        ;RESTOR R4
9165  044212  062716  000002                ADD     #2,(SP)         ;SKIP OVER ERROR
9166  044216  000207                        RTS     PC
9167
9168                                        ;ENTER WITH A COUNT IN TEMP1
9169                                        ;THE DELAY IS APPROX 17 US/ITERATION + 12 US TO EXIT
9170                                        ;WHEN COUNT IS 0...BASED ON AN 11/05.
9171                                        ;
9172  044220  005737  003360        DLY:    TST     TEMP1           ;5.6 US
9173  044224  001403                        BEQ     1$              ;2.5 US
9174  044226  005337  003360                DEC     TEMP1           ;6.8 US
9175  044232  000772                        BR      DLY             ;2.5 US
9176  044234  000207                1$:     RTS     PC              ;3.8 US
9177
9178                                        ;THIS ROUTINE TYPES BYPASSED DRIVE#.  ENTER WITH DRIVE# IN R0
9179                                        ;
9180
9181  044236  104401  056130        BYP:    TYPE    ,MSG14          ;BYPASS DRIVE
9182  044242  010046                        MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
9183                                                                ;;TYPE DR#
9184  044244  104403                        TYPOS                   ;;GO TYPE--OCTAL ASCII
9185  044246     001                        .BYTE   1               ;;TYPE 1 DIGIT(S)
9186  044247     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
9187  044250  000207                        RTS     PC
9188                                ;
```

```
9189                                    ; THIS ROUTINE READS ALL MSG A&B WORDS & CHECKS THEM AS REQ'D
9190                                    ;
9191  044252  017637  000000  001466  CHKMSG: MOV     @(SP),CHKFLG    ;PASS MSGS TO BE TESTED
9192  044260  062716  000002                  ADD     #2,(SP)         ;BUMP RETURN ADDR TO 1ST ERROR
9193  044264  004737  045130                  JSR     PC,GSTAT1       ;GET ALL ACTUAL DRIVE & CONTR STATUS
9194
9195  044270  053737  001222  003412          BIS     $UNIT,E.A0      ;SET UNIT #
9196  044276  053737  001222  003416          BIS     $UNIT,E.A1
9197  044304  053737  001222  003422          BIS     $UNIT,E.A2
9198  044312  053737  001222  003426          BIS     $UNIT,E.A3
9199  044320  053737  012070  003412          BIS     E.DDT,E.A0      ;ADD EXP. DRV TYPE
9200
9201  044326  013746  003360                  MOV     TEMP1,-(SP)     ;SAVE TEMP 1
9202
9203  044332  013737  003412  003360          MOV     E.A0,TEMP1
9204  044340  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG A0
9205  044344  013737  003360  003412          MOV     TEMP1,E.A0
9206
9207  044352  013737  003416  003360          MOV     E.A1,TEMP1
9208  044360  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG A1
9209  044364  013737  003360  003416          MOV     TEMP1,E.A1
9210
9211  044372  013737  003422  003360          MOV     E.A2,TEMP1
9212  044400  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG A2
9213  044404  013737  003360  003422          MOV     TEMP1,E.A2
9214
9215  044412  013737  003414  003360          MOV     E.B0,TEMP1
9216  044420  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG B0
9217  044424  013737  003360  003414          MOV     TEMP1,E.B0
9218
9219  044432  013737  003420  003360          MOV     E.B1,TEMP1
9220  044440  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG B1
9221  044444  013737  003360  003420          MOV     TEMP1,E.B1
9222
9223  044452  013737  003424  003360          MOV     E.B2,TEMP1
9224  044460  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG B2
9225  044464  013737  003360  003424          MOV     TEMP1,E.B2
9226
9227  044472  013737  003430  00336           MOV     E.B3,TEMP1
9228  044500  004737  047324                  JSR     PC,SBPAR        ;GET PARITY FOR MSG B3
9229  044504  013737  003360  003430          MOV     TEMP1,E.B3
9230
9231  044512  012637  003360                  MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
9232  044516  013737  001176  001172          MOV     $ESCAPE,$TMP5   ;SAVE ESCAPE
9233
9234  044524  023737  003372  003412          CMP     H.A0,E.A0       ;TEST MSG A0
9235  044532  001411                          BEQ     2$              ;BR IF OK
9236  044534  012737  044546  001176          MOV     #1$,$ESCAPE     ;ELSE SETUP ESCAPE
9237  044542  011646                          MOV     (SP),-(SP)      ;COPY RET ADDR
9238  044544  000207                          RTS     PC              ;& RETURN TO MAINLINE ERROR
9239
9240  044546  032777  001000  134364  1$:     BIT     #SW9,@SWR       ;RET HERE FROM MAINLINE ERROR
9241  044554  001107                          BNE     20$             ;& BR IF LOOP ON ERROR
9242  044556  062716  000002          2$:     ADD     #2,(SP)         ;BUMP RET ADDR TO NEXT ERROR
9243
9244  044562  023737  003374  003414          CMP     H.B0,E.B0       ;TEST MSG B0
```

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9245  044570  001411                        BEQ     5$              ;BR IF OK
9246  044572  012737  044604  001176        MOV     #4$,$ESCAPE     ;ELSE SETUP ESCAPE
9247  044600  011646                        MOV     (SP),-(SP)      ;COPY RET ADDR
9248  044602  000207                        RTS     PC              ;& RETURN TO MAINLINE ERROR
9249
9250  044604  032777  001000  134326  4$:   BIT     #SW9,@SWR       ;RETURN HERE FROM MAINLINE ERROR
9251  044612  001070                        BNE     20$             ;& BR IF LOOP ON ERROR
9252  044614  062716  000002          5$:   ADD     #2,(SP)         ;BUMP RET ADDR TO NEXT ERROR
9253
9254  044620  023737  003376  003416        CMP     H.A1,E.A1       ;TEST MSG A1
9255  044626  001411                        BEQ     8$              ;BR IF OK
9256  044630  012737  044642  001176        MOV     #7$,$ESCAPE
9257  044636  011646                        MOV     (SP),-(SP)
9258  044640  000207                        RTS     PC
9259
9260  044642  032777  001000  134270  7$:   BIT     #SW9,@SWR
9261  044650  001051                        BNE     20$
9262  044652  062716  000002          8$:   ADD     #2,(SP)
9263
9264  044656  023737  003400  003420        CMP     H.B1,E.B1       ;TEST MSG B1
9265  044664  001411                        BEQ     11$             ;BR IF OK
9266  044666  012737  044700  001176        MOV     #10$,$ESCAPE
9267  044674  011646                        MOV     (SP),-(SP)
9268  044676  000207                        RTS     PC
9269
9270  044700  032777  001000  134232  10$:  BIT     #SW9,@SWR
9271  044706  001032                        BNE     20$
9272  044710  062716  000002          11$:  ADD     #2,(SP)
9273
9274  044714  032737  000001  001466  12$:  BIT     #T.A2,CHKFLG    ;TEST MSG A2?
9275  044722  001402                        BEQ     13$             ;BR IF NO
9276  044724  004737  046064                JSR     PC,RCYLD        ;PUT INFO IN CYLDIF, DO NOT CHECK
9277
9278  044730  032737  000002  001466  13$:  BIT     #T.B2,CHKFLG    ;TEST MSG B2?
9279  044736  001402                        BEQ     14$             ;BR IF NO
9280  044740  004737  046136                JSR     PC,RCYLA        ;PUT INFO IN CYLADD, DO NOT CHECK
9281
9282  044744  032737  000004  001466  14$:  BIT     #T.B3,CHKFLG    ;TEST MSG B3?
9283  044752  001404                        BEQ     15$
9284  044754  004737  046174                JSR     PC,RSEC         ;PUT INFO IN SECTOR, DO NOT CHECK
9285  044760  004737  046232                JSR     PC,RHEAD        ;PUT INFO IN HEADA, DO NOT CHECK
9286
9287  044764  013737  001172  001176  15$:  MOV     $TMP5,$ESCAPE   ;RESTORE ESCAPE
9288  044772  000207                        RTS     PC
9289
9290  044774  012706  001100          20$:  MOV     #STACK,SP       ;RESET STACK PTR
9291  045000  013737  001172  001176        MOV     $TMP5,$ESCAPE   ;RESTORE ESCAPE
9292  045006  000177  134076                JMP     @$LPERR
9293
9294                                ;
9295                                ; THIS ROUTINE CHECKS FOR CERTAIN ERROR CONDITIONS ONLY
9296                                ; IE: IF NED, CTO OR MDS SET, MSG A&B ARE INVALID
9297                                ;
9298  045012  005737  001462        CKCERR: TST     BYPCERR
9299  045016  001025                        BNE     4$
9300  045020  032737  100000  003322        BIT     #CERR,HCS1
```

```
9301  045026  001001                        BNE     1$              ;BR IF CERR
9302  045030  000207                        RTS     PC
9303
9304  045032  032737  004000  003322  1$:   BIT     #CTO,HCS1
9305  045040  001402                        BEQ     2$              ;BR IF NOT CTO
9306  045042  104326                        ERROR   326             ;CTO ERROR, MSG A&B INVALID
9307  045044  000207                        RTS     PC
9308
9309  045046  032737  010000  003324  2$:   BIT     #NED,HCS2
9310  045054  001401                        BEQ     3$              ;BR IF NOT NED
9311  045056  104327                        ERROR   327             ;NED ERROR, MSG A&B INVALID
9312
9313  045060  032737  001000  003324  3$:   BIT     #MDS,HCS2
9314  045066  001401                        BEQ     4$
9315  045070  104330                        ERROR   330             ;MDS ERROR, MSG A&B INVALID
9316
9317  045072  000207                  4$:   RTS     PC
9318
9319                                  ;
9320                                  ;THIS ROUTINE DOES THE SELFCT DRIVE CMD TO GET STATUS
9321                                  ;IT THEN WAITS FOR CONTROLLER  READY.
9322                                  ;IF RDY NOT RECEIVED BY A TIMEOUT, AN ERROR IS FLAGGED
9323                                  ;
9324  045074  013746  003360          GSTAT:  MOV     TEMP1,-(SP)     ;SAVE TEMP1
9325  045100  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
9326  045106  012737  000001  003322          MOV     #SELDRV,HCS1
9327  045114  004737  043434                JSR     PC,DOCMD        ;DR SELDRV (STATUS) CMD & GET CONTR RDY
9328  045120  104117                        ERROR   117             ;RDY NOT SET BY END OF SELECT DRIVE CMD
9329  045122  012637  003360                MOV     (SP)+,TEMP1     ;RESTOR TEMP1
9330  045126  000207                        RTS     PC
9331
9332
9333                                  ; THIS ROUTINE GETS STATUS OF ALL DRIVE REGISTERS (MSG A0-A3, B0-B3)
9334                                  ; & ALL CONTROLLER REGISTERS
9335                                  ;
9336  045130  013746  003360          GSTAT1: MOV     TEMP1,-(SP)     ;SAVE TEMP 1
9337  045134  004737  043664                  JSR     PC,HOLD         ;GET ALL CONTR REGS
9338  045140  012765  100000  000000          MOV     #CCLR,RKCS1(R5) ;CLEAR CONTR
9339  045146  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
9340  045154  012765  000003  000026          MOV     #3,RKMR1(R5)    ;SELECT WORD 3
9341  045162  004737  045360                  JSR     PC,GSTAT2
9342  045166  104117                          ERROR   117             ;RDY NOT SET BY END OF SELECT DRV CMD
9343  045170  013737  003350  003406          MOV     HMR2,H.A3       ;STORE MSG A3
9344  045176  013737  003352  003410          MOV     HMR3,H.B3       ;STORE MSG B3
9345
9346  045204  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
9347  045212  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
9348  045220  012765  000002  000026          MOV     #2,RKMR1(R5)    ;SELECT WORD 2
9349  045226  004737  045360                  JSR     PC,GSTAT2
9350  045232  104117                          ERROR   117             ;RDY NOT SET BY END OF SELECT DRV CMD
9351  045234  013737  003350  003402          MOV     HMR2,H.A2       ;STORE MSG A2
9352  045242  013737  003352  003404          MOV     HMR3,H.B2       ;STORE MSG B2
9353
9354  045250  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
9355  045256  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
9356  045264  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
```

```
9357  045272  004737  045360              JSR     PC,GSTAT2
9358  045276  104117                      ERROR   117             ;RDY NOT SET BY END OF SELECT DRV CMD
9359  045300  013737  003350  003376      MOV     HMR2,H.A1       ;STORE MSG A1
9360  045306  013737  003352  003400      MOV     HMR3,H.B1       ;STORE MSG B1
9361
9362  045314  012765  100000  000000      MOV     #CCLR,RKCS1(R5)
9363  045322  013765  001222  000010      MOV     $UNIT,RKCS2(R5)
9364  045330  004737  045360              JSR     PC,GSTAT2
9365  045334  104117                      ERROR   117             ;RDY NOT SET BY END OF SEL DRV CMD
9366  045336  013737  003350  003372      MOV     HMR2,H.A0       ;STORE MSG A0
9367  045344  013737  003352  003374      MOV     HMR3,H.B0       ;STORE MSG B0
9368
9369  045352  012637  003360              MOV     (SP)+,TEMP1     ;RESTORE TEMP1
9370  045356  000207                      RTS     PC
9371
9372
9373  045360  012737  000001  003322  GSTAT2: MOV     #SELDRV,HCS1
9374  045366  053737  001170  003322          BIS     $TMP4,HCS1      ;ADD CDT IF RK07
9375  045374  013765  003322  000000          MOV     HCS1,RKCS1(R5)  ;GET STATUS
9376  045402  013737  001414  003360          MOV     T10,TEMP1
9377  045410  004737  043576                  JSR     PC,FRDY1        ;FIND CONTR RDY & STORE DRIVE REGS ONLY
9378  045414  000207                          RTS     PC              ;RET HERE IF NOT RDY
9379  045416  062716  000002                  ADD     #2,(SP)         ;RET HERE IF OK
9380  045422  000207                          RTS     PC
9381                                  ;
9382                                  ;THIS ROUTINE DOES A SUBSYSTEM CLEAR & WAITS FOR CONTROLLER READY
9383                                  ;IF RDY IS NOT RECEIVED BY THE END OF THE TIMEOUT, AN ERROR IS FLAGGED.
9384                                  ;THE ROUTINE THEN GETS CURRENT STATUS & CHECKS FOR CONTROLLER ERROR (CERR)
9385                                  ;RETURN IF CERR SET
9386                                  ;RETURN +2 IF CERR CLEAR
9387                                  ;
9388  045424  012765  000040  000010  SUBCLR: MOV     #SCLR,RKCS2(R5) ;SUBSYS CLEAR
9389  045432  013737  001414  003360          MOV     T10,TEMP1
9390  045440  004737  043530                  JSR     PC,FRDY         ;FIND RDY
9391  045444  104120                          ERROR   120             ;RDY NOT SET BY END OF SCLR
9392  045446  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
9393  045454  005065  000026                  CLR     RKMR1(R5)       ;SELECT WORD 0
9394  045460  004737  045074                  JSR     PC,GSTAT        ;GET STATUS
9395  045464  032737  100000  003322          BIT     #CERR,HCS1      ;CHECK FOR CONT ERROR
9396  045472  001401                          BEQ     1$
9397  045474  000207                          RTS     PC
9398  045476  062716  000002          1$:     ADD     #2,(SP)         ;SKIP OVER ERROR
9399  045502  000207                          RTS     PC
9400
9401                                  ;
9402                                  ;READ THE SECTOR COUNT IN RKMR3, RIGHT JUSTIFY IT & STORE IT IN 'SECTOR'
9403                                  ;
9404  045504  012765  000003  000026  RDSEC:  MOV     #3,RKMR1(R5)    ;WORD 3
9405  045512  004737  045074                  JSR     PC,GSTAT
9406  045516  013737  003352  001406          MOV     HMR3,SECTOR
9407  045524  042737  177017  001406          BIC     #^C<M.SECT>,SECTOR
9408  045532  006237  001406                  ASR     SECTOR          ;RIGHT JUSTIFY
9409  045536  006237  001406                  ASR     SECTOR          ;SECTOR
9410  045542  006237  001406                  ASR     SECTOR          ;INFO
9411  045546  006237  001406                  ASR     SECTOR
9412  045552  000207                          RTS     PC
```

```
                                        ;
                                        ;FIND SECTOR 0 IN 22 SECTOR FORMAT.
                                        ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
                                        ;
045554  013746  003360          FS022:  MOV     TEMP1,-(SP)     ;SAVE TEMP1
045560  013737  001424  003360          MOV     T5000,TEMP1     ;SETUP TIMEOUT
045566  004737  045504          1$:     JSR     PC,RDSEC                ;READ SECTOR
045572  005737  001406                  TST     SECTOR          ;LOOK FOR SECTOR 0
045576  001005                          BNE     2$
045600  004737  045504                  JSR     PC,RDSEC
045604  005737  001406                  TST     SECTOR
045610  001406                          BEQ     3$              ;BR IF SAME TWICE
045612  005337  003360          2$:     DEC     TEMP1
045616  001363                          BNE     1$              ;TRY AGAIN IF TIMEOUT NOT UP
045620  012637  003360                  MOV     (SP)+,TEMP1     ;ELSE RESTORE TEMP1
045624  000207                          RTS     PC              ;EXIT
045626  012637  003360          3$:     MOV     (SP)+,TEMP1
045632  062716  000002                  ADD     #2,(SP)         ;SKIP OVER ERROR
045636  000207                          RTS     PC
                                        ;
                                        ;FIND NEXT SECTOR IN 22 SECTOR FORMAT
                                        ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
                                        ;
045640  013746  003360          FNS22:  MOV     TEMP1,-(SP)     ;SAVE TEMP 1
045644  013737  001420  003360          MOV     T500,TEMP1      ;SETUP TIMEOUT
045652  004737  045504          1$:     JSR     PC,RDSEC                ;READ SECTOR
045656  023737  001402  001406          CMP     PSEC,SECTOR
045664  001406                          BEQ     3$              ;BR IF SAME
045666  004737  045504                  JSR     PC,RDSEC                ;ELSE TRY READ DIFFERENT TWICE
045672  023737  001402  001406          CMP     PSEC,SECTOR
045700  001006                          BNE     2$              ;BR IF DIFFERENT TWICE
045702  005337  003360          3$:     DEC     TEMP1           ;ELSE TRY AGAIN IF TIME LEFT
045706  001361                          BNE     1$
045710  012637  003360                  MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
045714  000207                          RTS     PC
045716  012637  003360          2$:     MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
045722  062716  000002                  ADD     #2,(SP)         ;SKIP OVER ERROR
045726  000207                          RTS     PC
                                        ;
                                        ;READ THE CYL DIFF/OFFSET IN RKMR2, RIGHT JUSTIFY IT & STORE IT IN 'CYLDIF'
                                        ;
045730  012765  000002  000026  RDCYLD: MOV     #2,RKMR1(R5)    ;WORD 2
045736  004737  045074                  JSR     PC,GSTAT
045742  013737  003350  001362          MOV     HMR2,CYLDIF
045750  043737  012066  001362          BIC     MASK1,CYLDIF
045756  006237  001362                  ASR     CYLDIF          ;RIGHT JUSTIFY
045762  006237  001362                  ASR     CYLDIF          ;CYL DIFF/OFFSET
045766  006237  001362                  ASR     CYLDIF          ;INFO
045772  006237  001362                  ASR     CYLDIF
045776  023737  001362  012064          CMP     CYLDIF,MASK     ;CHK TO SEE IF RET IN COMPL. FORM
046004  001002                          BNE     1$              ;BR IF NOT
046006  005037  001362                  CLR     CYLDIF          ;CLR IF YES
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9469  046012  000207                  1$:     RTS     PC
9470
9471                                  ;READ THE CYL ADDR IN RKMR3, RIGHT JUSTIFY IT & STORE IT IN  'CYLADD'
9472
9473  046014  012765  000002  000026  RDCYLA: MOV     #2,RKMR1(R5)    ;WORD 2
9474  046022  004737  045074          JSR     PC,GSTAT
9475  046026  013737  003352  001364  MOV     HMR3,CYLADD
9476  046034  043737  012066  001364  BIC     MASK1,CYLADD
9477  046042  006237  001364          ASR     CYLADD          ;RIGHT JUSTIFY
9478  046046  006237  001364          ASR     CYLADD          ;CYL ADDR
9479  046052  006237  001364          ASR     CYLADD          ;INFO
9480  046056  006237  001364          ASR     CYLADD
9481  046062  000207                  RTS     PC
9482
9483                                  ; READ THE CYL DIFF/OFFSET IN H.A2, RIGHT JUSTIFY IT & STORE IT IN 'CYLDIF'
9484
9485  046064  013737  003402  001362  RCYLD:  MOV     H.A2,CYLDIF
9486  046072  043737  012066  001362  BIC     MASK1,CYLDIF
9487  046100  006237  001362          ASR     CYLDIF          ;RIGHT JUSTIFY
9488  046104  006237  001362          ASR     CYLDIF
9489  046110  006237  001362          ASR     CYLDIF
9490  046114  006237  001362          ASR     CYLDIF
9491  046120  023737  001362  012064  CMP     CYLDIF,MASK     ;CHK TO SEE IF RET IN COMPL. FORM
9492  046126  001002                  BNE     1$              ;BR IF NO
9493  046130  005037  001362          CLR     CYLDIF          ;ELSE CLEAR
9494  046134  000207                  1$:     RTS     PC
9495
9496                                  ; READ THE CYL ADDR IN H.B2, RIGHT JUSTIFY IT & STORE IT IN 'CYLADD'
9497
9498  046136  013737  003404  001364  RCYLA:  MOV     H.B2,CYLADD
9499  046144  043737  012066  001364  BIC     MASK1,CYLADD
9500  046152  006237  001364          ASR     CYLADD          ;RIGHT JUSTIFY
9501  046156  006237  001364          ASR     CYLADD
9502  046162  006237  001364          ASR     CYLADD
9503  046166  006237  001364          ASR     CYLADD
9504  046172  000207                  RTS     PC
9505
9506                                  ; READ THE SECTOR COUNT IN H.B3, RIGHT JUSTIFY IT & STORE IT IN 'SECTOR'
9507
9508  046174  013737  003410  001406  RSEC:   MOV     H.B3,SECTOR
9509  046202  042737  177017  001406  BIC     #^C<M.SECT>,SECTOR      ;CLEAR UNWANTED INFO
9510  046210  006237  001406          ASR     SECTOR          ;RIGHT JUSTIFY
9511  046214  006237  001406          ASR     SECTOR
9512  046220  006237  001406          ASR     SECTOR
9513  046224  006237  001406          ASR     SECTOR
9514  046230  000207                  RTS     PC
9515
9516                                  ; READ THE HEAD ADDR IN H.B3, RIGHT IT & STORE IT IN 'HEADA'
9517
9518  046232  013737  003410  001432  RHEAD:  MOV     H.B3,HEADA
9519  046240  042737  170777  001432  BIC     #^C<M.HEAD>,HEADA       ;CLEAR UNWANTED INFO
9520  046246  006237  001432          ASR     HEADA           ;RIGHT JUSTIFY IT
9521  046252  000337  001432          SWAB    HEADA
9522  046256  000207                  RTS     PC
9523
9524                                  ;FIND LIMIT DETECT ON SEEK IN RKMR3 BEFORE TIMEOUT
```

```
 9525                                   ;RETURN IF NOT FOUND: ERROR
 9526                                   ;RETURN+2 IF FOUND: SKIP OVER ERROR
 9527                                   ;
 9528  046260  005037  001460          FLIM:   CLR     LIMERR          ;LIMIT DETECT ERROR FLAG
 9529  046264  012737  177777  003360          MOV     #-1,TEMP1       ;SETUP TIMEOUT
 9530  046272  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
 9531  046300  004737  045074          1$:     JSR     PC,GSTAT
 9532  046304  032737  020000  003352          BIT     #D.LIMD,HMR3
 9533  046312  001006                          BNE     2$              ;EXIT IF SET
 9534  046314  005337  003360                  DEC     TEMP1
 9535  046320  001367                          BNE     1$
 9536  046322  005237  001460                  INC     LIMERR          ;SET LIMIT DETECT FLAG
 9537  046326  000207                          RTS     PC
 9538  046330  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
 9539  046334  000207                          RTS     PC
 9540                                   ;
 9541                                   ;ROUTINE TO FIND HEADS HOME IN RKMR2 WORD 1 BEFORE TIMEOUT
 9542                                   ;ENTER WITH TIME IN SECONDS IN TEMP2
 9543                                   ;RETURN IF NOT FOUND
 9544                                   ;RETURN+2 IF FOUND - SKIP OVER ERROR
 9545                                   ;
 9546  046336  012737  177777  003360  FHDHM:   MOV     #-1,TEMP1       ;ALL 1'S
 9547  046344  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
 9548  046352  004737  045074          1$:     JSR     PC,GSTAT
 9549  046356  032737  000040  003350          BIT     #D.HDHM,HMR2
 9550  046364  001007                          BNE     2$
 9551  046366  005337  003360                  DEC     TEMP1
 9552  046372  001367                          BNE     1$
 9553  046374  005337  003362                  DEC     TEMP2
 9554  046400  001356                          BNE     FHDHM
 9555  046402  000207                          RTS     PC
 9556  046404  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
 9557  046410  000207                          RTS     PC
 9558                                   ;
 9559                                   ;ROUTINE TO FIND LOAD HEADS IN RKMR2 WORD 1 BEFORE TIMEOUT
 9560                                   ;RETURN IF NOT FOUND
 9561                                   ;RETURN+2 IF FOUND: SKIP OVER ERROR
 9562                                   ;
 9563  046412  012737  177777  003360  FLOAD:  MOV     #-1,TEMP1       ;SETUP TIMEOUT
 9564  046420  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
 9565  046426  004737  045074          1$:     JSR     PC,GSTAT
 9566  046432  032737  010000  003350          BIT     #D.LOAD,HMR2
 9567  046440  001004                          BNE     2$
 9568  046442  005337  003360                  DEC     TEMP1
 9569  046446  001367                          BNE     1$
 9570  046450  000207                          RTS     PC
 9571  046452  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
 9572  046456  000207                          RTS     PC
 9573                                   ;
 9574                                   ;ROUTINE TO FIND SPOK BEFORE TIMEOUT
 9575                                   ;ENTER WITH APPROX TIME IN TEMP2
 9576                                   ;RETURN IF NOT CLEARED
 9577                                   ;RETURN +2 IF CLEARED TO SKIP OVER ERROR
 9578                                   ;
 9579  046460  012737  177777  003360  FSPOK:  MOV     #-1,TEMP1       ;ALL 1'S
 9580  046466  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
```

```
 9581  046474  004737  045074          1$:     JSR     PC,GSTAT
 9582  046500  032737  001000  003350          BIT     #D.SPOK,HMR2    ;SEE IF SPOK CLEARED
 9583  046506  001407                          BEQ     2$
 9584  046510  005337  003360                  DEC     TEMP1
 9585  046514  001367                          BNE     1$
 9586  046516  005337  003362                  DEC     TEMP2
 9587  046522  001356                          BNE     FSPOK
 9588  046524  000207                          RTS     PC
 9589  046526  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
 9590  046532  000207                          RTS     PC
 9591                                  ;
 9592                                  ;FILL HEADER TABLE WITH 66 WORDS OF VALID HEADERS
 9593                                  ;ENTER WITH CYL # IN 'CALADD'
 9594                                  ;ENTER WITH HEAD # IN 'HEAD'
 9595                                  ;ENTER WITH FORMAT IN 'FORMAT'
 9596                                  ;
 9597  046534  010046                  FHDTAB: MOV     R0,-(SP)        ;SAV R0
 9598  046536  010146                          MOV     R1,-(SP)        ;SAV R1
 9599  046540  012700  001470                  MOV     #HDTAB,R0       ;HEADER WORD TABLE ADDR
 9600  046544  005001                          CLR     R1              ;SECTOR COUNTER
 9601  046546  013737  001430  001434          MOV     HEAD,HD1
 9602  046554  006337  001434                  ASL     HD1
 9603  046560  006337  001434                  ASL     HD1
 9604  046564  006337  001434                  ASL     HD1
 9605  046570  006337  001434                  ASL     HD1
 9606  046574  006337  001434                  ASL     HD1             ;SETUP HEAD # FOR WORD 2 OF HEADER
 9607  046600  013737  001436  001440          MOV     FORMAT,FMT1
 9608  046606  000337  001440                  SWAB    FMT1
 9609  046612  006337  001440                  ASL     FMT1            ;SETUP FORMAT FOR WORD 2 OF HEADER
 9610
 9611  046616  013720  001366          1$:     MOV     CALADD,(R0)+    ;HEADER WORD 1-CYL ADDR
 9612  046622  010110                          MOV     R1,(R0)         ;HEADER WORD 2-SECTOR NO
 9613  046624  053710  001434                  BIS     HD1,(R0)        ;               -HEAD NO
 9614  046630  053710  001440                  BIS     FMT1,(R0)       ;               -FORMAT
 9615  046634  005737  001464                  TST     BYPFMT
 9616  046640  001403                          BEQ     2$              ;BR IF TRUE FORMAT
 9617  046642  052710  140000                  BIS     #<BIT14!BIT15>,(R0)     ;SET GOOD SECTOR FLAGS
 9618  046646  000402                          BR      3$
 9619  046650  004737  046730          2$:     JSR     PC,SECFLG       ;GET  SECTOR FLAGS
 9620
 9621  046654  013737  001366  003360  3$:     MOV     CALADD,TEMP1
 9622  046662  011037  003362                  MOV     (R0),TEMP2
 9623  046666  043737  001366  003362          BIC     CALADD,TEMP2
 9624  046674  042037  003360                  BIC     (R0)+,TEMP1
 9625  046700  053737  003360  003362          BIS     TEMP1,TEMP2
 9626  046706  013720  003362                  MOV     TEMP2,(R0)+     ;HEADER WORD 3-HEADER CHECK
 9627
 9628  046712  005201                          INC     R1              ;SECTOR CTR
 9629  046714  020127  000026                  CMP     R1,#22.         ;ALL 22 SECTORS DONE? (66 WORDS)
 9630  046720  001336                          BNE     1$              ;BR IF NO
 9631
 9632  046722  012601                          MOV     (SP)+,R1        ;RESTOR R1
 9633  046724  012600                          MOV     (SP)+,R0        ;RESTOR R0
 9634  046726  000207                          RTS     PC
 9635
 9636                                  ;
```

```
 9637                                   ; THIS ROUTINE GETS INFORMATION FROM THE BAD SECTOR TABLE FILLED BY A PREVIOUS TEST
 9638                                   ; & SETS BITS 14 & 15 APPROPRIATELY.
 9639                                   ;
 9640  046730  010246                  SECFLG: MOV     R2,-(SP)        ;SAVE R2
 9641  046732  005737  001436                  TST     FORMAT
 9642  046736  001016                          BNE     1$              ;BR IF 20 SECTOR FORMAT
 9643  046740  012702  002314                  MOV     #BSE22H+8.,R2
 9644  046744  004737  047000                  JSR     PC,FLGTST       ;GET HARDWARE DETECTED FLAG
 9645  046750  052710  100000                  BIS     #BIT15,(R0)     ;RETURN HERE IF GOOD SECTOR
 9646
 9647  046754  012702  054362                  MOV     #BSE22S+8.,R2   ;ELSE RETURN HERE
 9648  046760  004737  047000                  JSR     PC,FLGTST       ;GET SOFTWARE DETECTED FLAG
 9649  046764  052710  040000                  BIS     #BIT14,(R0)     ;RETURN HERE IF GOOD SECTOR
 9650
 9651  046770  012602                          MOV     (SP)+,R2        ;ELSE RETURN HERE
 9652  046772  000207                          RTS     PC
 9653
 9654
 9655  046774  012602                  1$:     MOV     (SP)+,R2        ;RESTORE R2
 9656  046776  000207                          RTS     PC
 9657
 9658                                   ;
 9659                                   ; THIS ROUTINE DOES THE ACTUAL SCANNING OF THE BAD SECTOR TABLES
 9660                                   ; ENTER WITH THE ADDRESS OF TABLE (BSE22H, BSE22S, ETC) IN TEMP1
 9661                                   ; RETURN IF NO COMPARE
 9662                                   ; RETURN +4 IF COMPARE
 9663                                   ;
 9664  047000  010346                  FLGTST: MOV     R3,-(SP)        ;SAVE R3
 9665
 9666  047002  021227  177777           1$:     CMP     (R2),#-1        ;SEE IF ALL 1'S
 9667  047006  001003                          BNE     2$              ;BR IF NO
 9668  047010  012603                          MOV     (SP)+,R3        ;RESTORE R3
 9669  047012  000207                          RTS     PC
 9670
 9671  047014  022237  001366           2$:     CMP     (R2)+,CALADD    ;SEE IF = CYL #, & ADV PTR TO TRACK/SECTOR WORD
 9672  047020  001403                          BEQ     3$
 9673  047022  062702  000002                  ADD     #2,R2           ;GO TO NEXT CYL WORD IN TABLE
 9674  047026  000765                          BR      1$
 9675
 9676  047030  013703  001430           3$:     MOV     HEAD,R3         ;GET HEAD # FROM FHDTAB ROUTINE
 9677  047034  000303                          SWAB    R3
 9678  047036  050103                          BIS     R1,R3           ;ADD SECTOR # FROM FHDTAB ROUTINE
 9679  047040  022203                          CMP     (R2)+,R3        ;SECTOR/HEAD COMPARE? & INCR TO NEXT CYL WORD
 9680  047042  001401                          BEQ     4$              ;BR IF YES
 9681  047044  000756                          BR      1$              ;TRY NEXT CYL
 9682
 9683  047046  012603                  4$:     MOV     (SP)+,R3        ;RESTORE R3
 9684  047050  062716  000004                  ADD     #4,(SP)         ;INCREMENT RET ADDR
 9685  047054  000207                          RTS     PC
 9686                                   ;
 9687                                   ;THIS ROUTINE SORTS THE RHTAB TABLE FROM WHATEVER SECTOR IT BEGINS
 9688                                   ;WITH AND RE-WRITES THE INFO IN SRTTAB TABLE TO BEGIN WITH SECTOR 0
 9689                                   ;
 9690  047056  010046                  SORT:   MOV     R0,-(SP)        ;SAVE R0
 9691  047060  010146                          MOV     R1,-(SP)        ;SAVE R1
 9692  047062  004737  045504                  JSR     PC,RDSEC
```

```
 9693  047066  062737  000001  001406          ADD     #1,SECTOR
 9694  047074  004737  047164                  JSR     PC,MULT6        ;MULT SECTOR BY 6
 9695
 9696  047100  012700  000204                  MOV     #132.,R0
 9697  047104  163700  001406                  SUB     SECTOR,R0       ;R0-SECTOR TO R0 = INDEX
 9698  047110  010037  001406                  MOV     R0,SECTOR
 9699  047114  062737  001674  001406          ADD     #RHTAB,SECTOR   ;SAVE INDEX
 9700
 9701  047122  062700  001674                  ADD     #RHTAB,R0       ;INDEX TO BOT HALF OF RHTAB
 9702  047126  012701  002100                  MOV     #SRTTAB,R1      ;INDEX TO TOP HALF OF SRTTAB
 9703
 9704  047132  012021                  1$:     MOV     (R0)+,(R1)+     ;PUT BOTTOM OF RHTAB TO TOP OF SRTTAB
 9705  047134  020027  002100                  CMP     R0,#RHTAB+132.
 9706  047140  001374                          BNE     1$
 9707
 9708  047142  012700  001674                  MOV     #RHTAB,R0       ;PUT TOP OF RHTAB TO BOT OF SRTTAB
 9709  047146  012021                  2$:     MOV     (R0)+,(R1)+
 9710  047150  020037  001406                  CMP     R0,SECTOR
 9711  047154  001374                          BNE     2$
 9712
 9713  047156  012601                          MOV     (SP)+,R1        ;RESTOR R1
 9714  047160  012600                          MOV     (SP)+,R0        ;RESTOR R0
 9715  047162  000207                          RTS     PC
 9716
 9717                                  ;
 9718                                  ;MULT BY 6. ENTER WITH DESIRED # IN 'SECTOR'
 9719                                  ;
 9720  047164  006337  001406          MULT6:  ASL     SECTOR          ;2 X SECTOR
 9721  047170  013746  001406                  MOV     SECTOR,-(SP)
 9722  047174  006337  001406                  ASL     SECTOR          ;4 X SECTOR
 9723  047200  062637  001406                  ADD     (SP)+,SECTOR    ;(4 X S)+(2 X S) = 6 X SECTOR
 9724  047204  000207                          RTS     PC
 9725
 9726                                  ;
 9727                                  ;ROUTINE TO TURN L OR P CLOCK INTERRUPT ON
 9728                                  ;
 9729  047206  005037  001376          CLKON:  CLR     TIMUP
 9730  047212  005737  003466                  TST     PCLKF
 9731  047216  001004                          BNE     1$              ;BRANCH IF P-CLOCK PRESENT
 9732  047220  012777  000100  132100          MOV     #100,@LKS       ;L-CLOCK, ENABLE INT
 9733  047226  000207                          RTS     PC
 9734  047230  012777  177777  132064  1$:     MOV     #-1,@PKSB       ;P-CLOCK, ALL 1'S
```

```
 9735  047236  012777  000135  132054          MOV     #135,@PKS       ;ENABLE INT, CT UP, REP INT
 9736  047244  000207                          RTS     PC              ;LINE FREQ & RUN
 9737
 9738                                  ;KW11-L & KW11-P INTERRUPT HANDLER
 9739                                  ;
 9740  047246  005037  001376          CLOCK:  CLR     TIMUP
 9741  047252  005337  001372                  DEC     COUNT
 9742  047256  001010                          BNE     1$
 9743  047260  013737  001370  001372          MOV     HZ,COUNT
```

```
 9744  047266  005337  001374                 DEC     SEC
 9745  047272  001002                         BNE     1$
 9746  047274  005237  001376                 INC     TIMUP           ;SORRY, TIME IS UP
 9747  047300  000002                 1$:     RTI
 9748                                 ;
 9749                                 ;ROUTINE TO TURN L OR P CLOCK INTERRUPT OFF
 9750                                 ;
 9751  047302  005737  003466         CLKOF:  TST     PCLKF
 9752  047306  001003                         BNE     1$              ;BRACH IF P-CLOCK PRESENT
 9753  047310  005077  132012                 CLR     @LKS            ;L-CLOCK, CLEAR INTERRUPT
 9754  047314  000207                         RTS     PC
 9755  047316  005077  131776         1$:     CLR     @PKS            ;P-CLOCK, CLEAR INTERRUPT
 9756  047322  000207                         RTS     PC
```

```
9757
9758                                    ;
9759                                    ;THIS ROUTINE GENERATES PARITY FOR THE EXPECTED MSGS
9760                                    ;ENTER WITH THE EXPECTED WORD IN TEMP1
9761                                    ; TEMP1 IS ROTATED LEFT 17 TIMES. EACH TIME THE CARRY BIT IS SET,
9762                                    ;R1 IS INCREMENTED. AT THE END OF 17 ROTATES ( TEMP1 BACK TO ORIG),
9763                                    ;R1 BIT 0 IS EXAMINED. IF IT IS SET, INDICATING AN ODD # OF 1'S,
9764                                    ; THE PARITY BIT IS NOT SET IN B .
9765                                    ;IF IT IS NOT SET, INDICATING AN EVEN # OF 1'S ,THE PARITY BIT IS
9766                                    ;SET IN TEMP1
9767                                    ;
9768  047324  010046                   $BPAR:  MOV     R0,-(SP)        ;SAVE R0
9769  047326  010146                           MOV     R1,-(SP)        ;SAVE R1
9770  047330  012700  000021                   MOV     #17.,R0         ;SHIFT COUNTER
9771  047334  005001                           CLR     R1              ;COUNT # OF 1'S IN TEMP1
9772  047336  000241                           CLC                     ;CLEAR CARRY
9773
9774  047340  006137  003360           1$:     ROL     TEMP1
9775  047344  103001                           BCC     2$              ;BR IF CARRY CLEAR
9776  047346  005201                           INC     R1              ;COUNT # OF 1'S
9777  047350  005300                   2$:     DEC     R0              ;SHIFT COUNTER
9778  047352  001372                           BNE     1$
9779
9780  047354  032701  000001                   BIT     #BIT0,R1
9781  047360  001003                           BNE     3$              ;BR IF ODD # IN R0
9782  047362  052737  100000  003360           BIS     #M.PAR,TEMP1    ;SET PARITY BIT
9783  047370  012601                   3$:     MOV     (SP)+,R1        ;RESTORE R1
9784  047372  012600                           MOV     (SP)+,R0        ;RESTORE R0
9785  047374  000207                           RTS     PC
9786
9787                                    ;
9788                                    ;ROUTINE TO ENABLE LOOPING ON INTERMITTANT ERRORS
9789                                    ;WHEN $LPERR SET BY OTHER THAN SCOPE ROUTINE
9790                                    ; IE: MY LOOP MACRO
9791                                    ;
9792  047376  032777  001000  131534   $COP1$: BIT     #SW9,@SWR       ;LOOP ON ERROR?
9793  047404  001406                           BEQ     1$              ;BR IF NO
9794  047406  105737  001103                   TSTB    $ERFLG          ;HAD ERROR?
9795  047412  001403                           BEQ     1$              ;BR IF NO
9796  047414  013716  001110                   MOV     $LPERR,(SP)
9797  047420  000002                           RTI
9798
9799  047422  011637  001110           1$:     MOV     (SP),$LPERR     ;SET LOOP ADDR FOR TIGHT SCOPE LOOP
9800  047426  000002                           RTI
9801
9802                                    ;
9803                                    ;CHECK FOR SW14 (LOOP ON TEST) OR SW8 (LOOP ON SPECIFIC TEST)
9804                                    ;
9805                                    ;RETURN IF NEITHER SET
9806                                    ;RETURN +2 IF EITHER SET
9807                                    ;
9808                                    ;THIS SUBROUTINE IS USED AT THE END OF ANY TEST THAT REQUIRES
9809                                    ;RECONDITIONING OF THE DRIVE BEFORE LOOPING ON AN ERROR OR TEST
9810                                    ;
9811  047430  005037  001176           $WTST:  CLR     $ESCAPE
9812  047434  005037  001410                   CLR     LPFLG
```

```
 9813  047440  032777  040000  131472          BIT     #SW14,@SWR      ;LOOP ON TEST?
 9814  047446  001403                          BEQ     3$              ;BR IF NO
 9815  047450  062716  000002            1$:   ADD     #2,(SP)
 9816  047454  000207                    2$:   RTS     PC
 9817
 9818  047456  032777  000400  131454  3$:   BIT     #SW8,@SWR       ;LOOP ON SPECIFIC TEST?
 9819  047464  001773                          BEQ     2$              ;BR IF NO
 9820  047466  127737  131446  001102          CMPB    @SWR,$TSTNM     ;RIGHT TEST? SWR <7:0>
 9821  047474  001765                          BEQ     1$              ;BR IF YES
 9822  047476  000207                          RTS     PC
 9823
 9824                                  ;
 9825                                  ;THIS ROUTINE IS ENTERED BY TYPING A CONTROL-C.
 9826                                  ;IT IS USED TO ALLOW THE OPERATOR TO HALT THE CPU WHILE INSURING
 9827                                  ;THAT HEADS ARE LOADED & FORMATTING IS VALID BEFORE ACTUALLY HALTING
 9828                                  ;THE CPU.
 9829                                  ;
 9830  047500  022626                  STOP:   CMP     (SP)+,(SP)+     ;RESTORE STACK FROM INTERRUPT
 9831
 9832  047502  004737  045424                  JSR     PC,SUBCLR
 9833  047506  104024                          ERROR   24              ;CERR AFTER
 9834
 9835  047510  005737  003304                  TST     UNLD            ;SEE IF HEADS UNLOADED
 9836  047514  001431                          BEQ     3$              ;BR IF NO
 9837  047516  005737  000042                  TST     42              ;SEE IF MANUAL OR AUTO MODE
 9838  047522  001403                          BEQ     1$              ;BR IF MANUAL MODE
 9839  047524  104401  056640                  TYPE    ,MSG74          ;PGM ABORT PENDING
 9840  047530  000402                          BR      2$
 9841  047532  104401  056667            1$:   TYPE    ,MSG75          ;HALT PENDING
 9842  047536                            2$:
 9843
 9844  047536  004737  045424                  JSR     PC,SUBCLR
 9845  047542  104024                          ERROR   24              ;CERR AFTER SCLR
 9846
 9847  047544  012737  000011  003322          MOV     #SRTSPL,HCS1
 9848  047552  004737  043434                  JSR     PC,DOCMD        ;DO START SPINDLE CMD & GET CONTR RDY
 9849  047556  104121                          ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.
 9850
 9851  047560  013737  001420  003362          MOV     T500,TEMP2      ;SETUP  TIMEOUT
 9852  047566  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
 9853  047572  104067                          ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
 9854
 9855  047574  005037  003304                  CLR     UNLD
 9856
 9857  047600  005737  003306          3$:   TST     BADHDR          ;SEE IF HEADERS VALID
 9858  047604  001460                          BEQ     4$              ;BR IF YES
 9859  047606  005237  003310                  INC     HPEND
 9860
 9861  047612  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 9862  047620  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
 9863  047626  012737  000013  003322          MOV     #RECAL,HCS1
 9864  047634  004737  043434                  JSR     PC,DOCMD        ;DO RECAL CMD & GET CONTR RDY
 9865  047640  104124                          ERROR   124             ;RDY NOT SET AFTER RECAL CMD
 9866
 9867  047642  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
 9868  047650  004737  045074                  JSR     PC,GSTAT
```

```
9869  047654  032737  020000  003350          BIT     #D.RTZ,HMR2
9870  047662  001001                          BNE     64$
9871  047664  104244                          ERROR   244             ;RTZ NOT SET DURING RECAL CMD
9872  047666  013737  001414  003362  64$:    MOV     T10,TEMP2       ;SETUP TIMEOUT
9873  047674  004737  044044                  JSR     PC,FATT1        ;FIND ATTN
9874  047700  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
9875
9876  047702  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
9877  047710  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
9878  047716  012737  000005  003322          MOV     #CLEAR,HCS1
9879  047724  004737  043434                  JSR     PC,DOCMD        ;DO DRIVE CLEAR CMD & GET CONTR RDY
9880  047730  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
9881  047732  004737  044012                  JSR     PC,TSTATN       ;TEST FOR ATTN
9882  047736  000401                          BR      66$
9883  047740  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
9884  047742                          66$:
9885
9886
9887  047742  000137  031342                  JMP     FORM            ;WRITE VALID FORMATS
9888
9889  047746  005737  000042          4$:     TST     42              ;SEE IF MANUAL OR AUTO MODE
9890  047752  001410                          BEQ     5$              ;BR IF MANUAL MODE
9891  047754  104401  056711                  TYPE    ,MSG76          ;PGM ABORTED
9892  047760  005037  042750                  CLR     $EOPCT          ;SET UP EOP TO EXIT TO MONITOR
9893  047764  005037  001176                  CLR     $ESCAPE
9894  047770  000137  042722                  JMP     $EOP1           ;ABORT PROGRAM
9895
9896  047774  104401  056727          5$:     TYPE    ,MSG77          ;CPU HALTED
9897  050000  000000                          HALT
9898  050002  000137  007730                  JMP     ST5             ;START OVER IF CONTINUE PRESSED
9899
9900                                  ;
9901                                  ;CHECK IF HALT PENDING
9902                                  ;RET IF YES
9903                                  ;RET+4 IF NO
9904                                  ;
9905  050006  005037  003306  HPEN:   CLR     BADHDR          ;CLR VALID HALT FLAG
9906  050012  005737  003310          TST     HPEND           ;SEE IF HALT PENDING
9907  050016  001002                  BNE     1$              ;BR IF YES
9908  050020  062716  000004          ADD     #4,(SP)         ;ELSE BUMP RET ADDR
9909  050024  000207          1$:     RTS     PC              ;& RET
9910
9911                                  .SBTTL  UNEXPECTED TIMEOUT HANDLER
9912
9913                                  ;
9914                                  ;THIS ROUTINE IS ENTERED IF THERE IS
9915                                  ;       A.  NON EXISTANT MEMORY (NO SSYN)
9916                                  ;       B.  BOUNDRY ERROR
9917                                  ;       C.  STACK OVERFLOW
9918                                  ;
9919
9920  050026  011600          BADTMO: MOV     (SP),R0         ;SAVE PC WHERE TIMEOUT OCCURRED.
9921  050030  005740                  TST     -(R0)           ;GET PC BEFORE UPDATE
9922  050032  032777  020000  131100  BIT     #SW13,@SWR      ;INHIBIT ERROR TYPOUT?
9923  050040  001005                  BNE     1$              ;YES, DON'T TYPE
9924  050042  104401  057105          TYPE    ,EM3            ;ABORT TESTS,UNEXP T.O. @ PC=
```

```
9925  050046  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
9926                                                                  ;;TYPE PC
9927  050050  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
9928  050052     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
9929  050053     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
9930  050054  032777  001000  131056  1$:     BIT     #SW9,@SWR       ;LOOP ON ERROR?
9931  050062  001403                          BEQ     2$              ;NO, BRANCH
9932  050064  022626                          CMP     (SP)+,(SP)+     ;YES, RESTORE STACK
9933  050066  000177  131014                  JMP     @$LPADR         ;GO TO STARTING ADDR OF TEST
9934                                                                  ;THAT GAVE BAD TIMEOUT
9935  050072  032777  040000  131040  2$:     BIT     #SW14,@SWR      ;LOOP ON TEST?
9936  050100  001401                          BEQ     3$              ;NO BRANCH
9937  050102  000002                          RTI                     ;YES
9938
9939  050104  000000                  3$:     HALT                    ;UNEXPECTED TIME OUT OCCURRED
9940                                                                  ;AS INDICATED. YOU CAN LOOP ON
9941                                                                  ;ERROR, LOOP ON TEST OR INHIBIT
9942                                                                  ;ERROR TYPEOUT BY SETTING THOSE
9943                                                                  ;SWITCHES.
9944                                                                  ;
9945  050106  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK
9946  050110  000137  042722                  JMP     $EOP1           ;ABORT TESTS
9947
9948                          .SBTTL  MEMORY CHECK ENABLE TRAP
9949
9950  050114  012737  050130  001176  MEMERR: MOV     #1$,$ESCAPE     ;LOAD ESCAPE
9951  050122  011637  001334                  MOV     (SP),TRAPPC     ;STORE PC
9952  050126  104236                          ERROR   236             ;UNEXP MEM PARITY TRAP
9953
9954  050130  005037  001176          1$:     CLR     $ESCAPE
9955  050134  032777  001000  130776          BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
9956  050142  001001                          BNE     2$              ;YES, FORCE STACK AND TRY AGAIN
9957  050144  000002                          RTI                     ;ELSE RETURN
9958
9959  050146  012706  001100          2$:     MOV     #STACK,SP       ;INIT STACK
9960  050152  000177  130732                  JMP     @$LPERR         ;LOOP ON ERROR
9961
9962                          .SBTTL  RK06 INTERRUPT HANDLER
9963
9964  050156  011600                  INTER:  MOV     (SP),R0         ;SAVE PC WHERE INT OCCURRED.
9965  050160  005740                          TST     -(R0)           ;GET PC BEFORE UPDATE.
9966  050162  104401  055573                  TYPE    ,MSG6           ;INT AT PC=
9967  050166  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
9968                                                                  ;;TYPE PC
9969  050170  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
9970  050172     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
9971  050173     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
9972  050174  000002                          RTI
9973
9974                          .SBTTL  POWER DOWN AND UP ROUTINES
9975
9976                          ;POWER DOWN ROUTINE
9977
9978  050176  012737  050210  000024  $PWRDN: MOV     #$PWRUP,PWRVEC  ;SET UP VECTOR
9979  050204  000000                          HALT
9980  050206  000776                          BR      .-2             ;HANG UP.
```

```
 9981
 9982                                   ;POWER UP ROUTINE
 9983
 9984  050210  005037  050262          $PWRUP: CLR     $PWRCT          ;WAIT LOOP FOR TTY
 9985  050214  005237  050262          1$:     INC     $PWRCT          ;WAIT FOR THE INCR
 9986  050220  001375                          BNE     1$              ;OF WORD
 9987  050222  012737  050176  000024          MOV     #$PWRDN,PWRVEC  ;SET POWER DOWN VECTOR
 9988  050230  012737  000340  000026          MOV     #PR7,PWRVEC+2   ;PRIORITY 7
 9989  050236  012737  000340  000036          MOV     #PR7,TRAPVEC+2  ;LOCKOUT ALL INTERRUPTS FOR TRAPS
 9990  050244  012706  001100                  MOV     #STACK,SP       ;INITIALIZE STACK
 9991  050250  104401  055761                  TYPE    ,MSG11          ;REPORT POWER FAIL
 9992  050254  000005                          RESET
 9993  050256  000137  012170                  JMP     PFSRT
 9994
 9995  050262  000000                  $PWRCT: 0                       ;WAIT COUNT FOR TTY
 9996
```

```
 9997                                   .SBTTL  SCOPE HANDLER ROUTINE
 9998
 9999                                   ;;*****************************************************************
10000                                   ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
10001                                   ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
10002                                   ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
10003                                   ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
10004                                   ;*SW14=1         LOOP ON TEST
10005                                   ;*SW11=1         INHIBIT ITERATIONS
10006                                   ;*SW09=1         LOOP ON ERROR
10007                                   ;*SW08=1         LOOP ON TEST IN SWR<7:0>
10008                                   ;*CALL
10009                                   ;*      SCOPE           ;;SCOPE=IOT
10010
10011  050264                           $SCOPE:
10012  050264  104407                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
10013  050266  032777  040000  130644   1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
10014  050274  001114                          BNE     $OVER           ;;YES IF SW14=1
10015                                   ;*****START OF CODE FOR THE XOR TESTER*****
10016  050276  000416                   $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
10017                                                                   ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
10018  050300  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
10019  050304  012737  050324  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
10020  050312  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
10021  050316  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
10022  050322  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
10023  050324  022626                   5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
10024  050326  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
10025  050332  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
10026  050334                           6$:;*****END OF CODE FOR THE XOR TESTER*****
10027  050334  032777  000400  130576          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
10028  050342  001404                          BEQ     2$              ;;BR IF NO
10029  050344  127737  130570  001102          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
10030  050352  001465                          BEQ     $OVER           ;;BR IF YES
10031  050354  105737  001103           2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
10032  050360  001421                          BEQ     3$              ;;BR IF NO
10033  050362  123737  001115  001103          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
10034  050370  101015                          BHI     3$              ;;BR IF NO
10035  050372  032777  001000  130540          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
10036  050400  001404                          BEQ     4$              ;;BR IF NO
10037  050402  013737  001110  001106   7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
10038  050410  000446                          BR      $OVER
10039  050412  105037  001103           4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
10040  050416  005037  001174                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
10041  050422  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
10042  050424  032777  004000  130506   3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
10043  050432  001011                          BNE     1$              ;;BR IF YES
10044  050434  005737  001216                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
10045  050440  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
10046  050442  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
10047  050446  023737  001174  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
10048  050454  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
10049  050456  012737  000001  001104   1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
10050  050464  013737  050542  001174          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
10051  050472  105237  001102           $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
10052  050476  113737  001102  001214          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
```

```
10053  050504  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
10054  050510  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
10055  050514  005037  001176                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
10056  050520  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
10057  050526  013777  001102  130406  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
10058  050534  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
10059  050540  000002                          RTI                     ;;FIXES PS
10060  050542  003720                  $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
10061                                   .SBTTL  ERROR HANDLER ROUTINE
10062
10063                                   ;;**************************************************************
10064                                   ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
10065                                   ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
10066                                   ;*AND GO TO TYPERR ON ERROR
10067                                   ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
10068                                   ;*SW15=1         HALT ON ERROR
10069                                   ;*SW13=1         INHIBIT ERROR TYPEOUTS
10070                                   ;*SW10=1         BELL ON ERROR
10071                                   ;*SW09=1         LOOP ON ERROR
10072                                   ;*CALL
10073                                   ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
10074
10075  050544                           $ERROR:
10076  050544  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
10077  050546  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
10078  050552  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
10079  050554  013777  001102  130360          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
10080  050562  032777  002000  130350          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
10081  050570  001402                          BEQ     1$              ;;NO - SKIP
10082  050572  104401  001200                  TYPE    ,$BELL          ;;RING BELL
10083  050576  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
10084  050602  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
10085  050606  162737  000002  001116          SUB     #2,$ERRPC
10086  050614  117737  130276  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
10087  050622  032777  020000  130310          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
10088  050630  001004                          BNE     20$             ;;SKIP TYPEOUTS
10089  050632  004737  067404                  JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
10090  050636  104401  001205                  TYPE    ,$CRLF
10091  050642                           20$:
10092  050642  122737  000001  001230          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
10093  050650  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
10094  050652  113737  001114  050664          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
10095  050660  004737  051470                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
10096  050664     000                  21$:    .BYTE   0
10097  050665     000                          .BYTE   0
10098  050666  000777                  22$:    BR      22$             ;;APT ERROR LOOP
10099  050670  005777  130244          2$:     TST     @SWR            ;;HALT ON ERROR
10100  050674  100002                          BPL     3$              ;;SKIP IF CONTINUE
10101  050676  000000                          HALT                    ;;HALT ON ERROR!
10102  050700  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
10103  050702  032777  001000  130230  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
10104  050710  001402                          BEQ     4$              ;;BR IF NO
10105  050712  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
10106  050716  005737  001176          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
10107  050722  001402                          BEQ     5$              ;;BR IF NONE
10108  050724  013716  001176                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
```

```
10109  050730
10110  050730  022737  043010  000042  5$:     CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
10111  050736  001001                          BNE     6$              ;;BRANCH IF NO
10112  050740  000000                          HALT                    ;;YES
10113  050742                                6$:
10114  050742  000002                          RTI                     ;;RETURN
10115                                  .SBTTL  TYPE ROUTINE
10116
10117                                  ;;*****************************************************************
10118                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
10119                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
10120                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
10121                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
10122                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
10123                                  ;*
10124                                  ;*CALL:
10125                                  ;*1) USING A TRAP INSTRUCTION
10126                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
10127                                  ;*OR
10128                                  ;*      TYPE
10129                                  ;*      MESADR
10130                                  ;*
10131
10132  050744  105737  001157          $TYPE:  TSTB    @#PFLG          ;;IS THERE A TERMINAL?
10133  050750  100002                          BPL     1$              ;;BR IF YES
10134  050752  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
10135  050754  000430                          BR      3$              ;;LEAVE
10136  050756  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
10137  050760  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
10138  050764  122737  000001  001230          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
10139  050772  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
10140  050774  132737  000100  001231          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
10141  051002  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
10142  051004  010037  051014                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
10143  051010  004737  051460                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
10144  051014  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
10145  051016  132737  000040  001231  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
10146  051024  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
10147  051026  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
10148  051030  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
10149  051032  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
10150  051034  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
10151  051036  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
10152  051042  000002                          RTI                     ;;RETURN
10153  051044  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
10154  051050  001430                          BEQ     8$
10155  051052  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
10156  051056  001006                          BNE     5$
10157  051060  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
10158  051062  104401                          TYPE                    ;;TYPE A CR AND LF
10159  051064  001205                          $CRLF
10160  051066  105037  051222                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
10161  051072  000755                          BR      2$              ;;GET NEXT CHARACTER
10162  051074  004737  051156          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
10163  051100  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
10164  051104  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
```

```
10165  051106  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
10166                                                                   ;;AND THE NULL CHAR.
10167  051112  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
10168  051116  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
10169  051120  004737  051156                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
10170  051124  105337  051222                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
10171  051130  000770                          BR      7$              ;;LOOP
10172
10173                                  ;HORIZONTAL TAB PROCESSOR
10174
10175  051132  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
10176  051136  004737  051156          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
10177  051142  132737  000007  051222          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
10178  051150  001372                          BNE     9$              ;;TAB STOP
10179  051152  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
10180  051154  000724                          BR      2$              ;;GET NEXT CHARACTER
10181  051156  105777  127766          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
10182  051162  100375                          BPL     $TYPEC
10183  051164  116677  000002  127760          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
10184  051172  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
10185  051200  001003                          BNE     1$              ;;BRANCH IF NO
10186  051202  105037  051222                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
10187  051206  000406                          BR      $TYPEX          ;;EXIT
10188  051210  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
10189  051216  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
10190  051220  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
10191  051222  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
10192  051224  000207          $TYPEX: RTS     PC
10193
10194                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
10195
10196                                  ;;**************************************************************
10197                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
10198                                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
10199                                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
10200                                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
10201                                  ;*REPLACED WITH SPACES.
10202                                  ;*CALL:
10203                                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
10204                                  ;*      TYPDS                   ;;GO TO THE ROUTINE
10205
10206  051226                          $TYPDS:
10207  051226  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10208  051230  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10209  051232  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
10210  051234  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
10211  051236  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
10212  051240  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
10213  051244  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
10214  051250  100004                          BPL     1$              ;;BR IF INPUT IS POS.
10215  051252  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
10216  051254  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
10217  051262  005000          1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
10218  051264  012703  051442                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
10219  051270  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
10220  051274  005002          2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
```

```
10221  051276  016001  051432          MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
10222  051302  160105          3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
10223  051304  002402                  BLT     4$              ;;BR IF DONE
10224  051306  005202                  INC     R2              ;;INCREASE THE BCD DIGIT BY 1
10225  051310  000774                  BR      3$
10226  051312  060105          4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
10227  051314  005702                  TST     R2              ;;CHECK IF BCD DIGIT=0
10228  051316  001002                  BNE     5$              ;;FALL THROUGH IF 0
10229  051320  105716                  TSTB    (SP)            ;;STILL DOING LEADING 0'S?
10230  051322  100407                  BMI     7$              ;;BR IF YES
10231  051324  106316          5$:     ASLB    (SP)            ;;MSD?
10232  051326  103003                  BCC     6$              ;;BR IF NO
10233  051330  116663  000001  177777  MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
10234  051336  052702  000060  6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
10235  051342  052702  000040  7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
10236  051346  110223                  MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
10237  051350  005720                  TST     (R0)+           ;;JUST INCREMENTING
10238  051352  020027  000010          CMP     R0,#10          ;;CHECK THE TABLE INDEX
10239  051356  002746                  BLT     2$              ;;GO DO THE NEXT DIGIT
10240  051360  003002                  BGT     8$              ;;GO TO EXIT
10241  051362  010502                  MOV     R5,R2           ;;GET THE LSD
10242  051364  000764                  BR      6$              ;;GO CHANGE TO ASCII
10243  051366  105726          8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
10244  051370  100003                  BPL     9$              ;;BR IF NO
10245  051372  116663  177777  177776  MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
10246  051400  105013          9$:     CLRB    (R3)            ;;SET THE TERMINATOR
10247  051402  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
10248  051404  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
10249  051406  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
10250  051410  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
10251  051412  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
10252  051414  104401  051442          TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
10253  051420  016666  000002  000004  MOV     2(SP),4(SP)     ;;ADJUST THE STACK
10254  051426  012616                  MOV     (SP)+,(SP)
10255  051430  000002                  RTI                     ;;RETURN TO USER
10256  051432  023420          $DTBL:  10000.
10257  051434  001750                  1000.
10258  051436  000144                  100.
10259  051440  000012                  10.
10260  051442  000004          $DBLK:  .BLKW   4
10261                           .SBTTL  APT COMMUNICATIONS ROUTINE
10262
10263                           ;;**************************************************************
10264  051452  112737  000001  051716  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
10265  051460  112737  000001  051714  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
10266  051466  000403                  BR      $ATYC
10267  051470  112737  000001  051716  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
10268  051476          $ATYC:
10269  051476  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10270  051500  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10271  051502  105737  051714          TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
10272  051506  001450                  BEQ     5$              ;;IF NOT:  BR
10273  051510  122737  000001  001230  CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
10274  051516  001031                  BNE     3$              ;;IF NOT:  BR
10275  051520  132737  000100  001231  BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
10276  051526  001425                  BEQ     3$              ;;IF NOT:  BR
```

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10277  051530  017600  000004          MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
10278  051534  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
10279  051542  005737  001210      1$: TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
10280  051546  001375              BNE     1$              ;;IF NOT:  WAIT
10281  051550  010037  001224      MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
10282  051554  105720              2$: TSTB    (R0)+           ;;FIND END OF MESSAGE
10283  051556  001376              BNE     2$
10284  051560  163700  001224      SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
10285  051564  006200              ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
10286  051566  010037  001226      MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
10287  051572  012737  000004  001210  MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
10288  051600  000413              BR      5$
10289  051602  017637  000004  051626  3$: MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
10290  051610  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
10291  051616  013746  177776      MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
10292  051622  004737  050744      JSR     PC,$TYPE        ;;CALL TYPE MACRO
10293  051626  000000              4$: .WORD   0
10294  051630                      5$:
10295  051630  105737  051716      10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
10296  051634  001416              BEQ     12$             ;;IF NOT:  BR
10297  051636  005737  001230      TST     $ENV            ;;RUNNING UNDER APT?
10298  051642  001413              BEQ     12$             ;;IF NOT:  BR
10299  051644  005737  001210      11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
10300  051650  001375              BNE     11$             ;;IF NOT:  WAIT
10301  051652  017637  000004  001212  MOV     @4(SP),$FATAL   ;;GET ERROR #
10302  051660  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
10303  051666  005237  001210      INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
10304  051672  105037  051716      12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
10305  051676  105037  051715      CLRB    $LFLG           ;;CLEAR LOG FLAG
10306  051702  105037  051714      CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
10307  051706  012601              MOV     (SP)+,R1        ;;POP STACK INTO R1
10308  051710  012600              MOV     (SP)+,R0        ;;POP STACK INTO R0
10309  051712  000207              RTS     PC              ;;RETURN
10310  051714     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
10311  051715     000          $LFLG:  .BYTE   0               ;;LOG FLAG
10312  051716     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
10313          051720                  .EVEN
10314          000200          APTSIZE=200
10315          000001          APTENV=001
10316          000100          APTSPOOL=100
10317          000040          APTCSUP=040
10318                          .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
10319
10320                          ;;**************************************************************
10321                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
10322                          ;*OCTAL (ASCII) NUMBER AND TYPE IT.
10323                          ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
10324                          ;*CALL:
10325                          ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
10326                          ;*      TYPOS                   ;;CALL FOR TYPEOUT
10327                          ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
10328                          ;*      .BYTE   M               ;;M=1 OR 0
10329                          ;*                                      ;;1=TYPE LEADING ZEROS
10330                          ;*                                      ;;0=SUPPRESS LEADING ZEROS
10331                          ;*
10332                          ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
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10333                                   ;*$TYPOS OR $TYPOC
10334                                   ;*CALL:
10335                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
10336                                   ;*      TYPON                   ;;CALL FOR TYPEOUT
10337                                   ;*
10338                                   ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
10339                                   ;*CALL:
10340                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
10341                                   ;*      TYPOC                   ;;CALL FOR TYPEOUT
10342
10343  051720  017646  000000          $TYPOS: MOV     @(SP)+,-(SP)    ;;PICKUP THE MODE
10344  051724  116637  000001  052143          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
10345  051732  112637  052145                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
10346  051736  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
10347  051742  000406                          BR      $TYPON
10348  051744  112737  000001  052143  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
10349  051752  112737  000006  052145          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
10350  051760  112737  000005  052142  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
10351  051766  010346                          MOV     R3,-(SP)        ;;SAVE R3
10352  051770  010446                          MOV     R4,-(SP)        ;;SAVE R4
10353  051772  010546                          MOV     R5,-(SP)        ;;SAVE R5
10354  051774  113704  052145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
10355  052000  005404                          NEG     R4
10356  052002  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
10357  052006  110437  052144                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
10358  052012  113704  052143                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
10359  052016  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
10360  052022  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
10361  052024  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
10362  052026  000404                          BR      3$              ;;GO DO MSB
10363  052030  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
10364  052032  006105                          ROL     R5
10365  052034  006105                          ROL     R5
10366  052036  010503                          MOV     R5,R3
10367  052040  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
10368  052042  105337  052144                  DECB    $OMODE          ;;TYPE THIS DIGIT?
10369  052046  100016                          BPL     7$              ;;BR IF NO
10370  052050  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
10371  052054  001002                          BNE     4$              ;;TEST FOR 0
10372  052056  005704                          TST     R4              ;;SUPPRESS THIS 0?
10373  052060  001403                          BEQ     5$              ;;BR IF YES
10374  052062  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
10375  052064  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
10376  052070  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
10377  052074  110337  052140                  MOVB    R3,8$           ;;SAVE FOR TYPING
10378  052100  104401  052140                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
10379  052104  105337  052142          7$:     DECB    $OCNT           ;;COUNT BY 1
10380  052110  003347                          BGT     2$              ;;BR IF MORE TO DO
10381  052112  002402                          BLT     6$              ;;BR IF DONE
10382  052114  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
10383  052116  000744                          BR      2$              ;;GO DO THE LAST DIGIT
10384  052120  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
10385  052122  012604                          MOV     (SP)+,R4        ;;RESTORE R4
10386  052124  012603                          MOV     (SP)+,R3        ;;RESTORE R3
10387  052126  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
10388  052134  012616                          MOV     (SP)+,(SP)
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10389  052136  000002                          RTI                     ;;RETURN
10390  052140     000  8$:        .BYTE   0       ;;STORAGE FOR ASCII DIGIT
10391  052141     000             .BYTE   0       ;;TERMINATOR FOR TYPE ROUTINE
10392  052142     000  $OCNT:     .BYTE   0       ;;OCTAL DIGIT COUNTER
10393  052143     000  $OFILL:    .BYTE   0       ;;ZERO FILL SWITCH
10394  052144  000000  $OMODE:    .WORD   0       ;;NUMBER OF DIGITS TO TYPE
10395                   .SBTTL  TTY INPUT ROUTINE
10396
10397                   ;;*****************************************************************
10398                   .ENABL  LSB
10399  052146  000000  $TKCNT:    .WORD   0       ;;NUMBER OF ITEMS IN QUEUE
10400  052150  000000  $TKQIN:    .WORD   0       ;;INPUT POINTER
10401  052152  000000  $TKQOUT:   .WORD   0       ;;OUTPUT POINTER
10402  052154  000001  $TKQSRT:   .BLKB   1       ;;TTY KEYBOARD QUEUE
10403           052155  $TKQEND=.
10404           052156          .EVEN
10405
10406                   ;*TK INITIALIZE ROUTINE
10407                   ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
10408                   ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
10409                   ;
10410                   ;*CALL:
10411                   ;*      JSR     PC,$TKINT
10412                   ;*      RETURN
10413                   ;
10414  052156  005037  052146  $TKINT:  CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
10415  052162  012737  052154  052150   MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
10416  052170  013737  052150  052152   MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
10417  052176  012737  052226  000060   MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
10418  052204  012737  000200  000062   MOV     #200,@#TKVEC+2  ;;"BR" LEVEL 4
10419  052212  005777  126730           TST     @$TKB           ;;CLEAR DONE FLAG
10420  052216  012777  000100  126720   MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
10421  052224  000207                   RTS     PC              ;;RETURN TO CALLER
10422
10423                   ;*TK SERVICE ROUTINE
10424                   ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
10425                   ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
10426                   ;*IT IN THE QUEUE.
10427                   ;*IF THE CHARACTER IS A "CONTROL-C" (↑C) $TKINT IS CALLED AND
10428                   ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (STOP)
10429                   ;
10430  052226  117746  126714  $TKSRV:  MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
10431  052232  042716  177600           BIC     #↑C177,(SP)     ;;STRIP THE JUNK
10432  052236  021627  000003           CMP     (SP),#3         ;;IS IT A CONTROL C?
10433  052242  001007                   BNE     1$              ;;BRANCH IF NO
10434  052244  104401  053354           TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (↑C)
10435  052250  004737  052156           JSR     PC,$TKINT       ;;INIT THE KEYBOARD
10436  052254  005726                   TST     (SP)+           ;;CLEAN UP STACK
10437  052256  000137  047500           JMP     STOP            ;;CONTROL C RESTART
10438  052262  021627  000007  1$:      CMP     (SP),#7         ;;IS IT A CONTROL G?
10439  052266  001004                   BNE     2$              ;;BRANCH IF NO
10440  052270  022737  000176  001140   CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
10441  052276  001500                   BEQ     6$              ;;GO TO SWR CHANGE
10442
10443  052300                   2$:
10444  052300  022737  000001  052146   CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
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10445  052306  001004                        BNE     3$              ;;BRANCH IF NO
10446  052310  104401  001200                TYPE    ,$BELL          ;;RING THE TTY BELL
10447  052314  005726                        TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
10448  052316  000451                        BR      5$              ;;EXIT
10449  052320  021627  000023          3$:   CMP     (SP),#23        ;;IS IT A CONTROL-S?
10450  052324  001021                        BNE     32$             ;;BRANCH IF NO
10451  052326  005077  126612                CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
10452  052332  005726                        TST     (SP)+           ;;CLEAN CHAR OFF STACK
10453  052334  105777  126604          31$:  TSTB    @$TKS           ;;WAIT FOR A CHAR
10454  052340  100375                        BPL     31$             ;;LOOP UNTIL IT'S THERE
10455  052342  117746  126600                MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
10456  052346  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
10457  052352  022627  000021                CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
10458  052356  001366                        BNE     31$             ;;BRANCH IF NO
10459  052360  012777  000100  126556        MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
10460  052366  000002                        RTI                     ;;RETURN
10461  052370  005237  052146          32$:  INC     $TKCNT          ;;COUNT THIS CHARACTER
10462  052374  021627  000140                CMP     (SP),#140       ;;IS IT UPPER CASE?
10463  052400  002405                        BLT     4$              ;;BRANCH IF YES
10464  052402  021627  000175                CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
10465  052406  003002                        BGT     4$              ;;BRANCH IF YES
10466  052410  042716  000040                BIC     #40,(SP)        ;;MAKE IT UPPER CASE
10467  052414  112677  177530          4$:   MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
10468  052420  005237  052150                INC     $TKQIN          ;;UPDATE THE POINTER
10469  052424  023727  052150  052155        CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
10470  052432  001003                        BNE     5$              ;;BRANCH IF NO
10471  052434  012737  052154  052150        MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
10472  052442  000002                  5$:   RTI                     ;;RETURN
10473
10474                                        ;;*****************************************************************
10475                                        ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
10476                                        ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
10477                                        ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
10478                                        ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
10479  052444  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
10480  052452  001124                        BNE     15$             ;;EXIT IF NOT
10481  052454  105777  126464                TSTB    @$TKS           ;;IS A CHAR WAITING?
10482  052460  100121                        BPL     15$             ;;IF NOT, EXIT
10483  052462  117746  126460                MOVB    @$TKB,-(SP)     ;;YES
10484  052466  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
10485  052472  021627  000007                CMP     (SP),#7         ;;IS IT A CONTROL-G?
10486  052476  001300                        BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
10487                                                                ;;AND EXIT
10488
10489                                        ;;*****************************************************************
10490                                        ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
10491                                        ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
10492                                        ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
10493  052500  123727  001134  000001    6$:   CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
10494  052506  001674                        BEQ     2$              ;;BRANCH IF YES
10495  052510  005726                        TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
10496  052512  004737  052156                JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
10497  052516  005077  126422                CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
10498  052522  112737  000001  001135        MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR
10499
10500  052530  104401  053366                TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
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10501  052534  104401  053373          $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
10502  052540  013746  000176                  MOV     $WREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
10503  052544  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
10504  052546  104401  053404                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
10505  052552  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
10506  052554  005046                          CLR     -(SP)           ;;THE NEW SWR
10507  052556  105777  126362          7$:     TSTB    @$TKS           ;;CHAR THERE?
10508  052562  100375                          BPL     7$              ;;IF NOT TRY AGAIN
10509
10510  052564  117746  126356                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
10511  052570  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
10512
10513  052574  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
10514  052600  001015                          BNE     9$              ;;BRANCH IF NOT
10515  052602  104401  053354                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
10516  052606  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
10517  052612  123727  001135  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
10518  052620  001003                          BNE     8$              ;;BRANCH IF NO
10519  052622  012777  000100  126314          MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
10520  052630  000137  047500          8$:     JMP     STOP            ;;CONTROL-C RESTART
10521
10522
10523  052634  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
10524  052640  001005                          BNE     10$             ;;BRANCH IF NOT
10525  052642  104401  053361                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
10526  052646  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
10527  052652  000737                          BR      19$             ;;LET'S TRY IT AGAIN
10528
10529
10530  052654  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
10531  052660  001022                          BNE     16$             ;;BRANCH IF NO
10532  052662  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
10533  052666  001403                          BEQ     11$             ;;BRANCH IF YES
10534  052670  016677  000002  126242          MOV     2(SP),@SWR      ;;SAVE NEW SWR
10535  052676  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
10536  052702  104401  001205          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
10537  052706  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
10538  052714  001003                          BNE     15$             ;;BRANCH IF NOT
10539  052716  012777  000100  126220          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
10540  052724  000002                  15$:    RTI                     ;;RETURN
10541  052726  004737  051156          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
10542  052732  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
10543  052736  002420                          BLT     18$             ;;BRANCH IF YES
10544  052740  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
10545  052744  003015                          BGT     18$             ;;BRANCH IF YES
10546  052746  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
10547  052752  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
10548  052756  001403                          BEQ     17$             ;;BRANCH IF YES
10549  052760  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
10550  052762  006316                          ASL     (SP)            ;;    CHAR OVER TO MAKE
10551  052764  006316                          ASL     (SP)            ;;    ROOM FOR NEW ONE.
10552  052766  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
10553  052772  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
10554  052776  000667                          BR      7$              ;;GET THE NEXT ONE
10555  053000  104401  001204          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
10556  053004  000720                          BR      20$             ;;SIMULATE CONTROL-U
```

```
10557                                   .DSABL  LSB
10558
10559
10560                                   ;;*****************************************************************
10561                                   ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
10562                                   ;*CALL:
10563                                   ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
10564                                   ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
10565                                   ;*                              ;;WITH PARITY BIT STRIPPED OFF
10566                                   ;
10567
10568  053006  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
10569  053010  016666  000004  000002          MOV     4(SP),2(SP)     ;;THE PS
10570  053016  005066  000004                  CLR     4(SP)           ;;GET READY FOR A CHARACTER
10571  053022  005046                          CLR     -(SP)           ;;PUT NEW PS ON STACK
10572  053024  012746  053032                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
10573  053030  000002                          RTI                     ;;POP NEW PC AND PS
10574  053032                          64$:
10575  053032  005737  052146          1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
10576  053036  001775                          BEQ     1$
10577  053040  005337  052146                  DEC     $TKCNT          ;;DECREMENT THE COUNTER
10578  053044  117766  177102  000004          MOVB    @$TKQOUT,4(SP)  ;;GET ONE CHARACTER
10579  053052  005237  052152                  INC     $TKQOUT         ;;UPDATE THE POINTER
10580  053056  023727  052152  052155          CMP     $TKQOUT,#$TKQEND ;;DID IT GO OFF OF THE END?
10581  053064  001003                          BNE     2$              ;;BRANCH IF NO
10582  053066  012737  052154  052152          MOV     #$TKQSRT,$TKQOUT ;;RESET THE POINTER
10583  053074  000002                  2$:     RTI                     ;;RETURN
10584                                  ;;*****************************************************************
10585                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
10586                                  ;*CALL:
10587                                  ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
10588                                  ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
10589                                  ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
10590
10591  053076  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
10592  053100  005046                          CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
10593  053102  012703  053332          1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
10594  053106  022703  053354          2$:     CMP     #$TTYIN+22,R3   ;;BUFFER FULL?
10595  053112  101456                          BLOS    4$              ;;BR IF YES
10596  053114  104410                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
10597  053116  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
10598  053120  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
10599  053124  001022                          BNE     5$              ;;BR IF NO
10600  053126  005716                          TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
10601  053130  001007                          BNE     6$              ;;BR IF NO
10602  053132  112737  000134  053330          MOVB    #'\,9$          ;;TYPE A BACK SLASH
10603  053140  104401  053330                  TYPE    ,9$
10604  053144  012716  177777                  MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
10605  053150  005303                  6$:     DEC     R3              ;;BACKUP BY ONE
10606  053152  020327  053332                  CMP     R3,#$TTYIN      ;;STACK EMPTY?
10607  053156  103434                          BLO     4$              ;;BR IF YES
10608  053160  111337  053330                  MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
10609  053164  104401  053330                  TYPE    ,9$             ;;GO TYPE
10610  053170  000746                          BR      2$              ;;GO READ ANOTHER CHAR.
10611  053172  005716                  5$:     TST     (SP)            ;;RUBOUT KEY SET?
10612  053174  001406                          BEQ     7$              ;;BR IF NO
```

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10613  053176  112737  000134  053330          MOVB    #'\,9$          ;;TYPE A BACK SLASH
10614  053204  104401  053330                  TYPE    ,9$
10615  053210  005016                          CLR     (SP)            ;;CLEAR THE RUBOUT KEY
10616  053212  122713  000025          7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
10617  053216  001003                          BNE     8$              ;;BR IF NO
10618  053220  104401  053361                  TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
10619  053224  000726                          BR      1$              ;;GO START OVER
10620  053226  122713  000022          8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "↑R"?
10621  053232  001011                          BNE     3$              ;;BRANCH IF NO
10622  053234  105013                          CLRB    (R3)            ;;CLEAR THE CHARACTER
10623  053236  104401  001205                  TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
10624  053242  104401  053332                  TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
10625  053246  000717                          BR      2$              ;;GO PICKUP ANOTHER CHACTER
10626  053250  104401  001204          4$:     TYPE    ,$QUES          ;;TYPE A '?'
10627  053254  000712                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
10628  053256  111337  053330          3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
10629  053262  104401  053330                  TYPE    ,9$
10630  053266  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
10631  053272  001305                          BNE     2$              ;;LOOP IF NOT RETURN
10632  053274  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
10633  053300  104401  001206                  TYPE    ,$LF            ;;TYPE A LINE FEED
10634  053304  005726                          TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
10635  053306  012603                          MOV     (SP)+,R3        ;;RESTORE R3
10636  053310  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
10637  053312  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
10638  053320  012766  053332  000004          MOV     #$TTYIN,4(SP)
10639  053326  000002                          RTI                     ;;RETURN
10640  053330     000          9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
10641  053331     000                  .BYTE   0                       ;;TERMINATOR
10642  053332  000022          $TTYIN: .BLKB   22                      ;;RESERVE 22 BYTES FOR TTY INPUT
10643  053354  041536  005015     000  $CNTLC: .ASCIZ  /↑C/<15><12>    ;;CONTROL "C"
10644  053361     136  006525  000012  $CNTLU: .ASCIZ  /↑U/<15><12>    ;;CONTROL "U"
10645  053366  043536  005015     000  $CNTLG: .ASCIZ  /↑G/<15><12>    ;;CONTROL "G"
10646  053373     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
10647  053400  036440  000040
10648  053404  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
10649  053412  020075     000
10650          053416                  .EVEN
10651                                  .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
10652
10653                                  ;;*****************************************************************
10654                                  ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
10655                                  ;*CHANGE IT TO BINARY.
10656                                  ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
10657                                  ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
10658                                  ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
10659                                  ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
10660                                  ;*CALL:
10661                                  ;*      RDOCT                   ;;READ AN OCTAL NUMBER
10662                                  ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
10663                                  ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
10664
10665  053416  011646          $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
10666  053420  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
10667  053426  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10668  053430  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
```

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                        READ AN OCTAL NUMBER FROM THE TTY

10669  053432  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
10670  053434  104411          1$:     RDLIN                   ;;READ AN ASCIZ LINE
10671  053436  012600                  MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
10672  053440  010037  053544          MOV     R0,5$           ;;AND SAVE IT
10673  053444  005001                  CLR     R1              ;;CLEAR DATA WORD
10674  053446  005002                  CLR     R2
10675  053450  112046          2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
10676  053452  001420                  BEQ     3$              ;;IF ZERO GET OUT
10677  053454  122716  000060          CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
10678  053460  003026                  BGT     4$              ;;IS AN OCTAL DIGIT
10679  053462  122716  000067          CMPB    #'7,(SP)
10680  053466  002423                  BLT     4$
10681  053470  006301                  ASL     R1              ;;*2
10682  053472  006102                  ROL     R2
10683  053474  006301                  ASL     R1              ;;*4
10684  053476  006102                  ROL     R2
10685  053500  006301                  ASL     R1              ;;*8
10686  053502  006102                  ROL     R2
10687  053504  042716  177770          BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
10688  053510  062601                  ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
10689  053512  000756                  BR      2$              ;;LOOP
10690  053514  005726          3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
10691  053516  010166  000012          MOV     R1,12(SP)       ;;SAVE THE RESULT
10692  053522  010237  053554          MOV     R2,$HIOCT
10693  053526  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
10694  053530  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
10695  053532  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
10696  053534  000002                  RTI                     ;;RETURN
10697  053536  005726          4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
10698  053540  105010                  CLRB    (R0)            ;;SET A TERMINATOR
10699  053542  104401                  TYPE                    ;;TYPE UP THRU THE BAD CHAR.
10700  053544  000000          5$:     .WORD   0
10701  053546  104401  001204          TYPE    $QUES           ;;"?" "CR" & "LF"
10702  053552  000730                  BR      1$              ;;TRY AGAIN
10703  053554  000000          $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
10704                          .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
10705
10706                          ;;*****************************************************************
10707                          ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
10708                          ;*UNSIGNED OCTAL ASCIZ NUMBER.
10709                          ;*CALL
10710                          ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
10711                          ;*      JSR     PC,@#$DB20      ;;CALL THE ROUTINE
10712                          ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
10713
10714
10715  053556  104413          $DB20:  SAVREG                  ;;SAVE ALL REGISTERS
10716  053560  016601  000002          MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
10717  053564  012705  053675          MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
10718  053570  012704  000014          MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
10719  053574  012703  177770          MOV     #^C7,R3         ;;MASK
10720  053600  012100                  MOV     (R1)+,R0        ;;LOWER WORD
10721  053602  012101                  MOV     (R1)+,R1        ;;HIGH WORD
10722  053604  005002                  CLR     R2              ;;TERMINATOR
10723  053606  110245          1$:     MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
10724  053610  010002                  MOV     R0,R2           ;;GET THIS DIGIT
```

```
10725  053612  005304                          DEC     R4              ;;COUNT THIS CHARACTER
10726  053614  003007                          BGT     3$              ;;BR IF NOT THE LAST DIGIT
10727  053616  001405                          BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
10728  053620  005205                          INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
10729  053622  010566  000002                  MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
10730  053626  104414                          RESREG                  ;;RESTORE ALL REGISTERS
10731  053630  000207                          RTS     PC              ;;RETURN TO USER
10732  053632  006203                  2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
10733  053634  006001                  3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
10734  053636  006000                          ROR     R0              ;;      THE NEXT OCTAL DIGIT
10735  053640  006001                          ROR     R1
10736  053642  006000                          ROR     R0
10737  053644  006001                          ROR     R1
10738  053646  006000                          ROR     R0
10739  053650  040302                          BIC     R3,R2           ;;MASK OUT ALL JUNK
10740  053652  062702  000060                  ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
10741  053656  000753                          BR      1$              ;;GO PUT IT IN THE DATA TABLE
10742  053660  000016                  $OCTVL: .BLKB   14.             ;;RESERVE DATA TABLE
10743                                  .SBTTL  SINGLE LENGTH BINARY TO DECIMAL ASCIZ ROUTINE
10744
10745                                  ;;*****************************************************************
10746                                  ;*THIS ROUTINE WILL CONVERT A 16-BIT UNSIGNED BINARY NUMBER TO AN
10747                                  ;*UNSIGNED DECIMAL ASCIZ NUMBER.
10748                                  ;*CALL
10749                                  ;*      MOV     NUMBER,-(SP)    ;;PUT BINARY NUMBER ON THE STACK
10750                                  ;*      JSR     PC,@#$$B2D      ;;CALL
10751                                  ;*      RETURN                  ;;ADDRESS OF THE 1ST ASCIZ CHAR.IS ON THE STACK
10752
10753
10754  053676  016637  000002  053726  $$B2D:  MOV     2(SP),1$        ;;SAVE BINARY NUMBER
10755  053704  012746  053726                  MOV     #1$,-(SP)       ;;SET POINTER
10756  053710  004737  053732                  JSR     PC,@#$DB2D      ;;CALL DOUBLE LENGTH CONVERT
10757  053714  062716  000005                  ADD     #5,(SP)         ;;ONLY ALLOW FIVE CHARACTERS
10758  053720  012666  000002                  MOV     (SP)+,2(SP)     ;;PICKUP POINTER
10759  053724  000207                          RTS     PC              ;;RETURN
10760  053726  000000  000000          1$:     .WORD   0,0
10761                                  .SBTTL  DOUBLE LENGTH BINARY TO DECIMAL ASCII CONVERT ROUTINE
10762
10763                                  ;;*****************************************************************
10764                                  ;*THIS ROUTINE WILL CONVERT A 32-BIT BINARY NUMBER TO AN UNSIGNED
10765                                  ;*DECIMAL (ASCII) NUMBER. THE SIGN OF THE BINARY NUMBER MUST BE
10766                                  ;*POSITIVE.
10767                                  ;*CALL
10768                                  ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
10769                                  ;*      JSR     PC,@#$DB2D
10770                                  ;*      RETURN                  ;;THE FIRST ADDRESS OF ASCIZ
10771                                                                  ;;IS ON THE STACK
10772
10773
10774  053732  104413                  $DB2D:  SAVREG                  ;;SAVE REGISTERS
10775  053734  016602  000002                  MOV     2(SP),R2        ;;PICKUP THE DATA POINTER
10776  053740  012700  054112                  MOV     #$DECVL,R0      ;;GET ADDRESS OF "$DECVL" STRING
10777  053744  010066  000002                  MOV     R0,2(SP)        ;;PUT ADDRESS OF ASCIZ STRING ON STACK
10778  053750  012201                          MOV     (R2)+,R1        ;;PICKUP THE BINARY NUMBER
10779  053752  012202                          MOV     (R2)+,R2
10780  053754  012737  000012  054030          MOV     #10.,4$         ;;SET UP TO DO 10 CONVERSIONS
```

```
10781  053762  012704  054042                MOV     #$TNPWR,R4      ;;ADDRESS OF TEN POWER
10782  053766  012705  054044                MOV     #$TNPWR+2,R5
10783  053772  005003                1$:     CLR     R3              ;;CLEAR PARTIAL
10784  053774  161401                2$:     SUB     (R4),R1         ;;SUBTRACT TEN POWER
10785  053776  005602                        SBC     R2
10786  054000  161502                        SUB     (R5),R2
10787  054002  002402                        BLT     3$              ;;BR IF TEN POWER TO LARGE
10788  054004  005203                        INC     R3              ;;ADD 1 TO PARTIAL
10789  054006  000772                        BR      2$              ;;LOOP
10790  054010  062401                3$:     ADD     (R4)+,R1        ;;RESTORE SUBTRACTED VALUE
10791  054012  005502                        ADC     R2
10792  054014  062402                        ADD     (R4)+,R2
10793  054016  022525                        CMP     (R5)+,(R5)+     ;;MOVE TO NEXT TEN POWER
10794  054020  052703  000060                BIS     #'0,R3          ;;CHANGE PARTIAL TO ASCII
10795  054024  110320                        MOVB    R3,(R0)+        ;;SAVE IT
10796  054026  005327                        DEC     (PC)+           ;;DONE?
10797  054030  000000                4$:     .WORD   0
10798  054032  001357                        BNE     1$              ;;BR IF NO
10799  054034  105020                        CLRB    (R0)+           ;;TERMINATOR
10800  054036  104414                        RESREG                  ;;RESTORE REGISTERS
10801  054040  000207                        RTS     PC              ;;RETURN
10802  054042  145000                $TNPWR: 145000                  ;;1.0E09
10803  054044  035632                        35632
10804  054046  160400                        160400                  ;;1.0E08
10805  054050  002765                        2765
10806  054052  113200                        113200                  ;;1.0E07
10807  054054  000230                        230
10808  054056  041100                        041100                  ;;1.0E06
10809  054060  000017                        17
10810  054062  103240                        1032[illegible]         ;;1.0E05
10811  054064  000001                        1
10812  054066  023420                        234[illegible]          ;;1.0E04
10813  054070  000000                        0
10814  054072  001750                        17 [illegible]          ;;1.0E03
10815  054074  000000                        0
10816  054076  000144                        144                     ;;1.0E02
10817  054100  000000                        0
10818  054102  000012                        12                      ;;1.0E01
10819  054104  000000                        0
10820  054106  000001                        1                       ;;1.0E00
10821  054110  000000                        0
10822  054112  000014                $DECVL: .BLKB   12.             ;;RESERVE STORAGE FOR ASCIZ STRING
10823                                .SBTTL  TYPE NUMERICAL ASCIZ STRING SUPPRESS LEADING ZEROS
10824
10825                                ;;**************************************************************
10826                                ;*THIS ROUTINE IS USED TO TYPE AN ASCIZ NUMBER SUPPRESSING THE
10827                                ;*LEADING NUMBERS.
10828                                ;*CALL
10829                                ;*      MOV     #NUMADR,-(SP)   ;;FIRST ADDRESS OF ASCIZ STRING
10830                                ;*      JSR     PC,@#$SUPRS
10831
10832
10833  054126  010046                $SUPRS: MOV     R0,-(SP)        ;;SAVE R0
10834  054130  016600  000004                MOV     4(SP),R0        ;;PICKUP THE POINTER
10835  054134  105710                1$:     TSTB    (R0)            ;;TERMINATEOR?
10836  054136  001403                        BEQ     2$              ;;BR IF YES
```

```
10837  054140  122720  000060          CMPB    #'0,(R0)+       ;;IS THIS AN ASCII "0" ?
10838  054144  001773                  BEQ     1$              ;;BR IF YES
10839  054146  005300                  DEC     R0              ;;BACKUP BY "1"
10840  054150  010037  054156          MOV     R0,3$           ;;SAVE FOR TYPING
10841  054154  104401                  TYPE                    ;;GO TYPE
10842  054156  000000          3$:     .WORD   0               ;;ASCIZ POINTER GOES HERE
10843  054160  012600                  MOV     (SP)+,R0        ;;RESTORE R0
10844  054162  012616                  MOV     (SP)+,(SP)      ;;RESTORE THE STACK
10845  054164  000207                  RTS     PC              ;;RETURN
10846                          .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
10847
10848                          ;;**************************************************************
10849                          ;*SAVE R0-R5
10850                          ;*CALL:
10851                          ;*      SAVREG
10852                          ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
10853                          ;*
10854                          ;*TOP---(+16)
10855                          ;* +2---(+18)
10856                          ;* +4---R5
10857                          ;* +6---R4
10858                          ;* +8---R3
10859                          ;*+10---R2
10860                          ;*+12---R1
10861                          ;*+14---R0
10862
10863  054166                  $SAVREG:
10864  054166  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10865  054170  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10866  054172  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
10867  054174  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
10868  054176  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
10869  054200  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
10870  054202  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
10871  054206  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
10872  054212  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
10873  054216  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
10874  054222  000002                  RTI
10875
10876                          ;*RESTORE R0-R5
10877                          ;*CALL:
10878                          ;*      RESREG
10879  054224                  $RESREG:
10880  054224  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
10881  054230  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
10882  054234  012666  000022          MOV     (SP)+,22(SP`    ;;RESTORE PC OF MAIN FLOW
10883  054240  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
10884  054244  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
10885  054246  012604                  MOV     (SP)+,R4        ;;POP STACK INTO R4
10886  054250  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
10887  054252  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
10888  054254  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
10889  054256  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
10890  054260  000002                  RTI
10891                          .SBTTL  TRAP DECODER
10892
```

```
10893                                   ;;*****************************************************************
10894                                   ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
10895                                   ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
10896                                   ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
10897                                   ;*GO TO THAT ROUTINE.
10898
10899  054262  010046                   $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
10900  054264  016600  000002                   MOV     2(SP),R0        ;;GET TRAP ADDRESS
10901  054270  005740                           TST     -(R0)           ;;BACKUP BY 2
10902  054272  111000                           MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
10903  054274  006300                           ASL     R0              ;;POSITION FOR INDEXING
10904  054276  016000  054316                   MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
10905  054302  000200                           RTS     R0              ;;GO TO ROUTINE
10906
10907
10908                                   ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
10909
10910  054304  011646                   $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
10911  054306  016666  000004  000002           MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
10912  054314  000002                           RTI                     ;;RESTORE THE PSW
10913
10914                                   .SBTTL  TRAP TABLE
10915
10916                                   ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
10917                                   ;*BY THE "TRAP" INSTRUCTION.
10918
10919                                   ;       ROUTINE
10920                                   ;       -------
10921  054316  054304                   $TRPAD: .WORD   $TRAP2
10922  054320  050744                           $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
10923  054322  051744                           $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
10924  054324  051720                           $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
10925  054326  051760                           $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
10926  054330  051226                           $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
10927
10928  054332  052534                           $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
10929
10930  054334  052444                           $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
10931  054336  053006                           $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
10932  054340  053076                           $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
10933  054342  053416                           $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
10934  054344  054166                           $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
10935  054346  054224                           $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
10936  054350  047376                           SCOP1$  ;;CALL=SCOP1    TRAP+15(104415) INTERNAL LOOP ON ERROR
10937
```

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10938
10939                                   .SBTTL  SERVICE MSGS
10940                                   .EVEN
10941  054352  000062                   BSE22S: .BLKW   50.              ;22 SECTOR SOFTWARE INFO
10942
10943
10944  054516  005015  047125  041111   MSG1:   .ASCII  <CR><LF>/UNIBUS RK06-RK07 DRIVE DIAGNOSTIC--PART 1/
10945  054524  051525  051040  030113
10946  054532  026466  045522  033460
10947  054540  042040  044522  042526
10948  054546  042040  040511  047107
10949  054554  051517  044524  026503
10950  054562  050055  051101  020124
10951  054570     061
10952  054571     015  041412  051132           .ASCII  <CR><LF>/CZR6HE0/<CR><LF>
10953  054576  044066  030105  005015
10954  054604  005015  025011  025052           .ASCII  <CR><LF>/       *** CAUTION ***/<CR><LF>
10955  054612  041440  052501  044524
10956  054620  047117  025040  025052
10957  054626  005015
10958  054630  005015  044124  051511           .ASCII  <CR><LF>/THIS PROGRAM SHOULD BE HALTED ONLY BY TYPING CONTROL-C/
10959  054636  050040  047522  051107
10960  054644  046501  051440  047510
10961  054652  046125  020104  042502
10962  054660  044040  046101  042524
10963  054666  020104  047117  054514
10964  054674  041040  020131  054524
10965  054702  044520  043516  041440
10966  054710  047117  051124  046117
10967  054716  041455
10968  054720  005015  052117  042510           .ASCII  <CR><LF>/OTHERWISE, CARTRIDGE FORMATTING AND,OR THE DRIVE/
10969  054726  053522  051511  026105
10970  054734  041440  051101  051124
10971  054742  042111  042507  043040
10972  054750  051117  040515  052124
10973  054756  047111  020107  047101
10974  054764  026104  051117  052040
10975  054772  042510  042040  044522
10976  055000  042526
10977  055002  005015  040515  020131           .ASCII  <CR><LF>/MAY BE LEFT IN AN UNDETERMINED STATE/<CR><LF>
10978  055010  042502  046040  043105
10979  055016  020124  047111  040440
10980  055024  020116  047125  042504
10981  055032  042524  046522  047111
10982  055040  042105  051440  040524
10983  055046  042524  005015
10984  055052  005015  047111  052111           .ASCII  <CR><LF>/INITIALLY, DRIVES TO BE TESTED SHOULD HAVE:/<CR><LF>
10985  055060  040511  046114  026131
10986  055066  042040  044522  042526
10987  055074  020123  047524  041040
10988  055102  020105  042524  052123
10989  055110  042105  051440  047510
10990  055116  046125  020104  040510
10991  055124  042526  006472     012
10992  055131     015  040412  020056           .ASCII  <CR><LF>/A.. HEADS MANUALLY LOADED/
10993  055136  044040  040505  051504
```

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 10994  055144  046440  047101  040525
 10995  055152  046114  020131  047514
 10996  055160  042101  042105
 10997  055164  005015  027102  020040          .ASCII  <CR><LF>/B.  CORRECT PORT SELECTED/
 10998  055172  047503  051122  041505
 10999  055200  020124  047520  052122
 11000  055206  051440  046105  041505
 11001  055214  042524     104
 11002  055217     015  041412  020056          .ASCII  <CR><LF>/C.  WRITE LOCK DISABLED/
 11003  055224  053440  044522  042524
 11004  055232  046040  041517  020113
 11005  055240  044504  040523  046102
 11006  055246  042105
 11007  055250  005015  027104  020040          .ASCII  <CR><LF>/D.  DRIVE READY INDICATOR ON/<CR><LF>
 11008  055256  051104  053111  020105
 11003  055264  042522  042101  020131
 11010  055272  047111  044504  040503
 11011  055300  047524  020122  047117
 11012  055306  005015
 11013  055310  005015  051104  053111          .ASCII  <CR><LF>/DRIVES NOT TO BE TESTED MUST HAVE BOTH/
 11014  055316  051505  047040  052117
 11015  055324  052040  020117  042502
 11016  055332  052040  051505  042524
 11017  055340  020104  052515  052123
 11018  055346  044040  053101  020105
 11019  055354  047502  044124
 11020  055360  005015  047520  052122          .ASCIZ  <CR><LF>/PORTS DESELECTED/<CR><LF>
 11021  055366  020123  042504  042523
 11022  055374  042514  052103  042105
 11023  055402  005015     000
 11024  055405     015  041412  040510  MSG2:   .ASCII  <CR><LF>/CHANGE XXDP PACK/
 11025  055412  043516  020105  054130
 11026  055420  050104  050040  041501
 11027  055426     113
 11028  055427     015  041412  042514          .ASCIZ  <CR><LF>/CLEAR LOC 40,RESTART PROGRAM/
 11029  055434  051101  046040  041517
 11030  055442  032040  026060  042522
 11031  055450  052123  051101  020124
 11032  055456  051120  043517  040522
 11033  055464  000115
 11034  055466  005015  051104  053111  MSG3:   .ASCIZ  <CR><LF>/DRIVE(S) TO BE TESTED: /
 11035  055474  024105  024523  052040
 11036  055502  020117  042502  052040
 11037  055510  051505  042524  035104
 11038  055516  000040
 11039  055520  005015  052502  020123  MSG4:   .ASCIZ  <CR><LF>/BUS ADDR (177440): /
 11040  055526  042101  051104  024040
 11041  055534  033461  032067  030064
 11042  055542  035051  000040
 11043  055546  005015  047503  052116  MSG5:   .ASCIZ  <CR><LF>/CONTR ADDR (210): /
 11044  055554  020122  042101  051104
 11045  055562  024040  030462  024460
 11046  055570  020072     000
 11047  055573     015  044412  052116  MSG6:   .ASCIZ  <CR><LF>/INTR AT PC=/
 11048  055600  020122  052101  050040
 11049  055606  036503     000
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11050  055611     015  042012  044522  MSG7:   .ASCIZ  <CR><LF>/DRIVE 0 WILL NOT BE TESTED/
11051  055616  042526  030040  053440
11052  055624  046111  020114  047516
11053  055632  020124  042502  052040
11054  055640  051505  042524  000104
11055  055646  005015  042524  052123  MSG8:   .ASCIZ  <CR><LF>/TEST 16 TAKES 2 TO 4 MIN./<CR><LF>
11056  055654  030440  020066  040524
11057  055662  042513  020123  020062
11058  055670  047524  032040  046440
11059  055676  047111  006456  000012
11060  055704  005015  054502  040520  MSG9:   .ASCIZ  <CR><LF>/BYPASSING TEST 16/<CR><LF>
11061  055712  051523  047111  020107
11062  055720  042524  052123  030440
11063  055726  006466  000012
11064  055732  005015  053412  046111  MSG10:  .ASCIZ  <CR><LF><LF>/WILL TEST DRIVE(S):/
11065  055740  020114  042524  052123
11066  055746  042040  044522  042526
11067  055754  051450  035051     000
11068  055761     015  005012  047520  MSG11:  .ASCIZ  <CR><LF><LF>/POWER UP RESTART TO TEST 1/<CR><LF>
11069  055766  042527  020122  050125
11070  055774  051040  051505  040524
11071  056002  052122  052040  020117
11072  056010  042524  052123  030440
11073  056016  005015     000
11074  056021     015  050012  041501  MSG12:  .ASCIZ  <CR><LF>/PACK BEING FORMATTED/<CR><LF>
11075  056026  020113  042502  047111
11076  056034  020107  047506  046522
11077  056042  052101  042524  006504
11078  056050  000012
11079  056052  005015  047516  046040  MSG13:  .ASCII  <CR><LF>/NO L OR P CLOCKS/
11080  056060  047440  020122  020120
11081  056066  046103  041517  051513
11082  056074  005015  046101  020114          .ASCIZ  <CR><LF>/ALL TIMING TESTS BYPASSED/
11083  056102  044524  044515  043516
11084  056110  052040  051505  051524
11085  056116  041040  050131  051501
11086  056124  042523  000104
11087  056130  005015  054502  040520  MSG14:  .ASCIZ  <CR><LF>/BYPASSING DRIVE /
11088  056136  051523  047111  020107
11089  056144  051104  053111  020105
11090  056152     000
11091  056153     015  005012  051104  MSG15:  .ASCIZ  <CR><LF><LF>/DRIVE /
11092  056160  053111  020105     000
11093  056165     015  042012  044522  MSG16:  .ASCIZ  <CR><LF>/DRIVE SERIAL #/
11094  056172  042526  051440  051105
11095  056200  040511  020114  000043
11096  056206  005015  040503  052122  MSG17:  .ASCIZ  <CR><LF>/CARTRIDGE SERIAL NO./
11097  056214  044522  043504  020105
11098  056222  042523  044522  046101
11099  056230  047040  027117     000
11100  056235     015  005012  041101  MSG18:  .ASCIZ  <CR><LF><LF>/ABORTING BAL OF TESTS/<CR><LF><LF>
11101  056242  051117  044524  043516
11102  056250  041040  046101  047440
11103  056256  020106  042524  052123
11104  056264  006523  005012     000
11105  056271     015  005012  046101  MSG19:  .ASCIZ  <CR><LF><LF>/ALL DRIVES TESTED/<CR><LF><LF>
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11106  056276  020114  05:104  053111
11107  056304  051505  052040  051505
11108  056312  042524  006504  005012
11109  056320     000
11110  056321     015  046412  042117  MSG20:   .ASCII  <CR><LF>/MODIFIED VERSION OF FORMAT PACK TEST FOR MODULE TESTING/
11111  056326  043111  042511  020104
11112  056334  042526  051522  047511
11113  056342  020116  043117  043040
11114  056350  051117  040515  020124
11115  056356  040520  045503  052040
11116  056364  051505  020124  047506
11117  056372  020122  047515  052504
11118  056400  042514  052040  051505
11119  056406  044524  043516
11120  056412  005015  047524  051040          .ASCIZ  <CR><LF>/TO RESTORE HEADERS ON CYL 0 & 1, ALL TRACKS/
11121  056420  051505  047524  042522
11122  056426  044040  040505  042504
11123  056434  051522  047440  020116
11124  056442  054503  020114  020060
11125  056450  020046  026061  040440
11126  056456  046117  052040  040522
11127  056464  045503  000123
11128  056470  005015  054502  040520  MSG21:   .ASCIZ  <CR><LF>/BYPASSING TESTS 36,40,41 FOR MODULE TESTING/<CR><LF>
11129  056476  051523  047111  020107
11130  056504  042524  052123  020123
11131  056512  033063  032054  026060
11132  056520  030464  043040  051117
11133  056526  046440  042117  046125
11134  056534  020105  042524  052123
11135  056542  047111  006507  000012
11136  056550  005015  047506  046522  MSG22:   .ASCIZ  <CR><LF>/FORMATTING FINISHED/<CR><LF>
11137  056556  052101  044524  043516
11138  056564  043040  047111  051511
11139  056572  042510  006504  000012
11140  056600  005015  042524  052123  MSG23:   .ASCIZ  <CR><LF>/TEST 16 TAKES 10 TO 12 MIN./<CR><LF>
11141  056606  030440  020066  040524
11142  056614  042513  020123  030061
11143  056622  052040  020117  031061
11144  056630  046440  047111  006456
11145  056636  000012
11146  056640  005015  043520  020115  MSG74:   .ASCIZ  <CR><LF>/PGM ABORT PENDING.../
11147  056646  041101  051117  020124
11148  056654  042520  042116  047111
11149  056662  027107  027056     000
11150  056667     015  044012  046101  MSG75:   .ASCIZ  <CR><LF>/HALT PENDING.../
11151  056674  020124  042520  042116
11152  056702  047111  027107  027056
11153  056710     000
11154  056711     015  050012  046507  MSG76:   .ASCIZ  <CR><LF>/PGM ABORTED/
11155  056716  040440  047502  052122
11156  056724  042105     000
11157  056727     015  041412  052520  MSG77:   .ASCIZ  <CR><LF>/CPU HALTED/
11158  056734  044040  046101  042524
11159  056742  000104
11160
11161
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11162                                                   .SBTTL  ERR MSGS
11163
11164  056744  005015  051105  026122  EM1:    .ASCIZ  <CR><LF>/ERR, ONLY 0 THRU 7 ALLOWED, TRY AGAIN/<CR><LF>
11165  056752  047440  046116  020131
11166  056760  020060  044124  052522
11167  056766  033440  040440  046114
11168  056774  053517  042105  020054
11169  057002  051124  020131  043501
11170  057010  044501  006516  000012
11171  057016  042523  042514  052103  EM2:    .ASCIZ  /SELECTED DRIVE # IN RKCS2 CANNOT BE READ BACK IN RKMR2/
11172  057024  042105  042040  044522
11173  057032  042526  021440  044440
11174  057040  020116  045522  051503
11175  057046  020062  040503  047116
11176  057054  052117  041040  020105
11177  057062  042522  042101  041040
11178  057070  041501  020113  047111
11179  057076  051040  046513  031122
11180  057104     000
11181  057105     015  040412  047502  EM3:    .ASCIZ  <CR><LF>/ABORT TESTS...UNEXP TIME OUT AT PC=/
11182  057112  052122  052040  051505
11183  057120  051524  027056  052456
11184  057126  042516  050130  052040
11185  057134  046511  020105  052517
11186  057142  020124  052101  050040
11187  057150  038 )3     000
11188  057153     106  052101  046101  EM4:    .ASCII  /FATAL ERROR/<CR><LF>
11189  057160  042440  051122  051117
11190  057166  005015
11191  057170  041101  051117  044524          .ASCII  /ABORTING BALANCE OF TESTS/<CR><LF>
11192  057176  043516  041040  046101
11193  057204  047101  042503  047440
11194  057212  020106  042524  052123
11195  057220  006523     012
11196  057223     110  040505  020104          .ASCIZ  /HEAD POSITION CANNOT BE DETERMINED/
11197  057230  047520  044523  044524
11198  057236  047117  041440  047101
11199  057244  047516  020124  042502
11200  057252  042040  052105  051105
11201  057260  044515  042516  000104
11202  057266  042115  020123  042523  EM5:    .ASCIZ  /MDS SET IN RKCS2/
11203  057274  020124  047111  051040
11204  057302  041513  031123     000
11205  057307     125  042506  051440  EM6:    .ASCIZ  /UFE SET IN RKCS2/
11206  057314  052105  044440  020116
11207  057322  045522  051503  000062
11208  057330  051104  020101  047111  EM7:    .ASCIZ  /DRA IN RKDS & NED IN RKCS2 RESET; WRONG PORT SELECTED?/
11209  057336  051040  042113  020123
11210  057344  020046  042516  020104
11211  057352  047111  051040  041513
11212  057360  031123  051040  051505
11213  057366  052105  020073  051127
11214  057374  047117  020107  047520
11215  057402  052122  051440  046105
11216  057410  041505  042524  037504
11217  057416     000
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11218  057417     104  053122  052040  EM8:    .ASCIZ  /DRV TYPE NOT SET IN RKMR2/
11219  057424  050131  020105  047516
11220  057432  020124  042523  020124
11221  057440  047111  051040  046513
11222  057446  031122     000
11223  057451     104  044522  042526  EM9:    .ASCIZ  /DRIVE NOT PRESENT BUT TYPED BY OPERATOR/
11224  057456  047040  052117  050040
11225  057464  042522  042523  052116
11226  057472  041040  052125  052040
11227  057500  050131  042105  041040
11228  057506  020131  050117  051105
11229  057514  052101  051117     000
11230  057521     101  047502  052122  EM10:   .ASCIZ  /ABORT TESTS...CANNOT REF CONTR REG/
11231  057526  052040  051505  051524
11232  057534  027056  041456  047101
11233  057542  047516  020124  042522
11234  057550  020106  047503  052116
11235  057556  020122  042522  000107
11236  057564  051104  020101  047111  EM11:   .ASCIZ  /DRA IN RKDS & NED IN RKCS2 BOTH SET/
11237  057572  051040  042113  020123
11238  057600  020046  042516  020104
11239  057606  047111  051040  041513
11240  057614  031123  041040  052117
11241  057622  020110  042523  000124
11242  057630  047503  052116  020122  EM12:   .ASCIZ  /CONTR NOT READY IN RKCS1/
11243  057636  047516  020124  042522
11244  057644  042101  020131  047111
11245  057652  051040  041513  030523
11246  0 7660     000
11247  057661     116  020117  052101  EM13:   .ASCIZ  /NO ATTN IN RKASOF/
11248  057666  047124  044440  020116
11249  057674  045522  051501  043117
11250  057702     000
11251  057703     127  047522  043516  EM14:   .ASCIZ  /WRONG ATTN IN RKASOF/
11252  057710  040440  052124  020116
11253  057716  047111  051040  040513
11254  057724  047523  000106
11255  057730  051104  054504  047040  EM15:   .ASCIZ  /DRDY NOT CLEARED IN RKMR2/
11256  057736  052117  041440  042514
11257  057744  051101  042105  044440
11258  057752  020116  045522  051115
11259  057760  000062
11260  057762  051504  020103  047516  EM16:   .ASCIZ  /DSC NOT SET IN RKMR2/
11261  057770  020124  042523  020124
11262  057776  047111  051040  046513
11263  060004  031122     000
11264  060007     115  043523  040440  EM17:   .ASCIZ  /MSG A0 ERROR/
11265  060014  020060  051105  047522
11266  060022  000122
11267  060024  051515  020107  030102  EM18:   .ASCIZ  /MSG B0 ERROR/
11268  060032  042440  051122  051117
11269  060040     000
11270  060041     115  043523  040440  EM19:   .ASCIZ  /MSG A1 ERROR/
11271  060046  020061  051105  047522
11272  060054  000122
11273  060056  051515  020107  030502  EM20:   .ASCIZ  /MSG B1 ERROR/
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11274  060064  042440  051122  051117
11275  060072     000
11276  060073     103  051105  020122  EM21:   .ASCIZ  /CERR SET IN RKCS1/
11277  060100  042523  020124  047111
11278  060106  051040  041513  030523
11279  060114     000
11280  060115     122  051514  044440  EM22.   .PSCIZ  /RLS IN RKCS2 SET CERR IN RKCS1/
11281  060122  020116  045522  051503
11282  060130  020062  042523  020124
11283  060136  042503  051122  044440
11284  060144  020116  045522  051503
11285  060152  000061
11286  060154  043125  020105  047111  EM23:   .ASCIZ  /UFE IN RKCS2 SET (SACK) AFTER RLS IN RKCS2 SENT/
11287  060162  051040  041513  031123
11288  060170  051440  052105  024040
11289  060176  040523  045503  020051
11290  060204  043101  042524  020122
11291  060212  046122  020123  047111
11292  060220  051040  041513  031123
11293  060226  051440  047105  000124
11294  060234  053126  047040  052117  EM24:   .ASCIZ  /VV NOT SET IN RKMR2/
11295  060242  051440  052105  044440
11296  060250  020116  045522  051115
11297  060256  000062
11298  060260  051104  020126  054524  EM25:   .ASCIZ  /DRV TYPE SET IN RKMR2/
11299  060266  042520  051440  052105
11300  060274  044440  020116  045522
11301  060302  051115  000062
11302  060306  042104  020124  042523  EM26:   .ASCIZ  /DDT SET IN RKDS/
11303  060314  020124  047111  051040
11304  060322  042113  000123
11305  060326  052104  042531  051440  EM27:   .ASCIZ  /DTYE SET IN RKER/
11306  060334  052105  044440  020116
11307  060342  045522  051105     000
11308  060347     104  054524  020105  EM28:   .ASCIZ  /DTYE NOT SET IN RKER AFTER WRONG CDT IN RKCS1/
11309  060354  047516  020124  042523
11310  060362  020124  047111  051040
11311  060370  042513  020122  043101
11312  060376  042524  020122  051127
11313  060404  047117  020107  042103
11314  060412  020124  047111  051040
11315  060420  041513  030523     000
11316  060425     104  054524  020105  EM29:   .ASCIZ  /DTYE IN RKER DID NOT SET CERR IN RKCS1/
11317  060432  047111  051040  042513
11318  060440  020122  044504  020104
11319  060446  047516  020124  042523
11320  060454  020124  042503  051122
11321  060462  044440  020116  045522
11322  060470  051503  000061
11323  060474  026503  020104  040520  EM30:   .ASCIZ  /C-D PAR ERR SET IN RKMR3/
11324  060502  020122  051105  020122
11325  060510  042523  020124  047111
11326  060516  051040  046513  031522
11327  060524     000
11328  060525     104  041455  050040  EM31:   .ASCIZ  /D-C PAR SET IN RKCS1/
11329  060532  051101  051440  052105
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11330  060540  044440  020116  045522
11331  060546  051503  000061
11332  060552  046106  020124  047516  EM32:   .ASCIZ  /FLT NOT SET IN RKMR3/
11333  060560  020124  042523  020124
11334  060566  047111  051040  046513
11335  060574  031522     000
11336  060577     103  042055  050040  EM33:   .ASCIZ  /C-D PAR ERR NOT SET IN RKMR3/
11337  060604  051101  042440  051122
11338  060612  047040  052117  051440
11339  060620  052105  044440  020116
11340  060626  045522  051115  000063
11341  060634  026504  020103  040520  EM34:   .ASCIZ  /D-C PAR NOT SET IN RKCS1/
11342  060642  020122  047516  020124
11343  060650  042523  020124  047111
11344  060656  051040  041513  030523
11345  060664     000
11346  060665     104  041455  050040  EM35:   .ASCIZ  /D-C PAR IN RKCS1 DID NOT SET CERR IN RKCS1/
11347  060672  051101  044440  020116
11348  060700  045522  051503  020061
11349  060706  044504  020104  047516
11350  060714  020124  042523  020124
11351  060722  042503  051122  044440
11352  060730  020116  045522  051503
11353  060736  000061
11354  060740  054503  020114  042101  EM36:   .ASCIZ  /CYL ADDR IN B2 NOT SAME AS RKDC/
11355  060746  051104  044440  020116
11356  060754  031102  047040  052117
11357  060762  051440  046501  020105
11358  060770  051501  051040  042113
11359  060776  000103
11360  061000  054503  020114  044504  EM37:   .ASCIZ  /CYL DIFF IN A2 NOT SAME AS RKDC/
11361  061006  043106  044440  020116
11362  061014  031101  047040  052117
11363  061022  051440  046501  020105
11364  061030  051501  051040  042113
11365  061036  000103
11366  061040  054503  020114  044504  EM38:   .ASCIZ  /CYL DIFF IN RKMR2 NOT SAME AS 'CYL DIFF'/
11367  061046  043106  044440  020116
11368  061054  045522  051115  020062
11369  061062  047516  020124  040523
11370  061070  042516  040440  020123
11371  061076  041447  046131  042040
11372  061104  043111  023506     000
11373  061111     103  046131  042040  EM39:   .ASCIZ  /CYL DIFF & OFST IN A2 NOT =0/
11374  061116  043111  020106  020046
11375  061124  043117  052123  044440
11376  061132  020116  031101  047040
11377  061140  052117  036440  000060
11378  061146  054503  020114  042101  EM40:   .ASCIZ  /CYL ADDR IN B2 NOT =0/
11379  061154  051104  044440  020116
11380  061162  031102  047040  052117
11381  061170  036440  000060
11382  061174  054503  020114  042101  EM41:   .ASCIZ  /CYL ADDR IN B2 DID NOT REMAIN =0/
11383  061202  051104  044440  020116
11384  061210  031102  042040  042111
11385  061216  047040  052117  051040
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11386  061224  046505  044501  020116
11387  061232  030075     000
11388  061235     114  046511  052111  EM42:   .ASCIZ  /LIMIT DET NOT SET IN B1/
11389  061242  042040  052105  047040
11390  061250  052117  051440  052105
11391  061256  044440  020116  030502
11392  061264     000
11393  061265     110  040505  020104  EM43:   .ASCIZ  /HEAD ADDR IN B3 NOT =0/
11394  061272  042101  051104  044440
11395  061300  020116  031502  047040
11396  061306  052117  036440  000060
11397  061314  042510  042101  042040  EM44:   .ASCIZ  /HEAD DECODE IN B3 INCORRECT/
11398  061322  041505  042117  020105
11399  061330  047111  041040  020063
11400  061336  047111  047503  051122
11401  061344  041505  000124
11402  061350  051104  053111  020105  EM45:   .ASCII  /DRIVE READY IN RKMR2 NOT SET BY 1 SEC FROM FWD/
11403  061356  042522  042101  020131
11404  061364  047111  051040  046513
11405  061372  031122  047040  052117
11406  061400  051440  052105  041040
11407  061406  020131  020061  042523
11408  061414  020103  051106  046517
11409  061422  043040  042127
11410  061426  005015  047111  051040          .ASCIZ  <CR><LF>/IN RTZ PORTION OF START SPIN CMD/
11411  061434  055124  050040  051117
11412  061442  044524  047117  047440
11413  061450  020106  052123  051101
11414  061456  020124  050123  047111
11415  061464  041440  042115     000
11416  061471     115  043523  040440  EM46:   .ASCIZ  /MSG A2 ERR/
11417  061476  020062  051105  000122
11418  061504  051515  020107  031102  EM47:   .ASCIZ  /MSG B2 ERR/
11419  061512  042440  051122     000
11420  061517     115  043523  041040  EM48:   .ASCIZ  /MSG B3 ERR/
11421  061524  020063  051105  000122
11422  061532  053506  020104  047516  EM49:   .ASCIZ  /FWD NOT SET IN RKMR2 IN RTZ PORTION OF START SPIN CMD/
11423  061540  020124  042523  020124
11424  061546  047111  051040  046513
11425  061554  031122  044440  020116
11426  061562  052122  020132  047520
11427  061570  052122  047511  020116
11428  061576  043117  051440  040524
11429  061604  052122  051440  044520
11430  061612  020116  046503  000104
11431  061620  053506  020104  047516  EM50:   .ASCIZ  /FWD NOT SET IN RKMR2 FROM START SPIN CMD/
11432  061626  020124  042523  020124
11433  061634  047111  051040  046513
11434  061642  031122  043040  047522
11435  061650  020115  052123  051101
11436  061656  020124  050123  047111
11437  061664  041440  042115     000
11438  061671     106  042127  047040  EM51:   .ASCIZ  /FWD NOT CLEARED IN RKMR2 BY 5 SEC OF MOTION FROM START SPIN CMD/
11439  061676  052117  041440  042514
11440  061704  051101  042105  044440
11441  061712  020116  045522  051115
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11442  061720  020062  054502  032440
11443  061726  051440  041505  047440
11444  061734  020106  047515  044524
11445  061742  047117  043040  047522
11446  061750  020115  052123  051101
11447  061756  020124  050123  047111
11448  061764  041440  042115     000
11449  061771     062  020060  042523  EM52:   .ASCIZ  /20 SEC FORMAT NOT SET IN RKMR2/
11450  061776  020103  047506  046522
11451  062004  052101  047040  052117
11452  062012  051440  052105  044440
11453  062020  020116  045522  051115
11454  062026  000062
11455  062030  042523  020103  020060  EM53:   .ASCIZ  /SEC 0 NOT FOUND BY 50 MS/
11456  062036  047516  020124  047506
11457  062044  047125  020104  054502
11458  062052  032440  020060  051515
11459  062060     000
11460  062061     104  043111  020106  EM54:   .ASCIZ  /DIFF SEC NOT FOUND BY 3 MS/
11461  062066  042523  020103  047516
11462  062074  020124  047506  047125
11463  062102  020104  054502  031440
11464  062110  046440  000123
11465  062114  052101  047124  047040  EM55:   .ASCIZ  /ATTN NOT CLEARED IN RKASOF/
11466  062122  052117  041440  042514
11467  062130  051101  042105  044440
11468  062136  020116  045522  051501
11469  062144  043117     000
11470  062147     125  042516  050130  EM56:   .ASCIZ  /UNEXP MEM PAR TRAP/
11471  062154  046440  046505  050040
11472  062162  051101  052040  040522
11473  062170  000120
11474  062172  041527  020105  020100  EM57:   .ASCIZ  /WCE @ CYL 411, TRK 2, SEC 2/
11475  062200  054503  020114  030464
11476  062206  026061  052040  045522
11477  062214  031040  020054  042523
11478  062222  020103  000062
11479  062226  005015  050123  042505  EM58:   .ASCIZ  <CR><LF>/SPEED OK IN RKMR2 NOT =0 BY TIMEOUT/
11480  062234  020104  045517  044440
11481  062242  020116  045522  051115
11482  062250  020062  047516  020124
11483  062256  030075  041040  020131
11484  062264  044524  042515  052517
11485  062272  000124
11486  062274  044514  020115  042504  EM59:   .ASCIZ  /LIM DET NOT SET IN RKMR3/
11487  062302  020124  047516  020124
11488  062310  042523  020124  047111
11489  062316  051040  046513  031522
11490  062324     000
11491  062325     110  040505  051504  EM60:   .ASCIZ  /HEADS HOME NOT SET IN RKMR2/
11492  062332  044040  046517  020105
11493  062340  047516  020124  042523
11494  062346  020124  047111  051040
11495  062354  046513  031122     000
11496  062361     114  040517  020104  EM61:   .ASCIZ  /LOAD HEADS NOT SET IN RKMR2/
11497  062366  042510  042101  020123
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11498  062374  047516  020124  042523
11499  062402  020124  047111  051040
11500  062410  046513  031122     000
11501  062415     104  052114  051440  EM63:   .ASCIZ  /DLT SET IN RKCS2/
11502  062422  052105  044440  020116
11503  062430  045522  051503  000062
11504  062436  051515  020107  031502  EM64:   .ASCIZ  /MSG B3 HEAD REG NOT =0/
11505  062444  044040  040505  020104
11506  062452  042522  020107  047516
11507  062460  020124  030075     000
11508  062465     122  040505  020104  EM65:   .ASCIZ  /READ HEADER ERR/
11509  062472  042510  042101  051105
11510  062500  042440  051122     000
11511  062505     103  046131  040440  EM66:   .ASCIZ  /CYL ADDR IN RKMR3 INCORRECT/
11512  062512  042104  020122  047111
11513  062520  051040  046513  031522
11514  062526  044440  041516  051117
11515  062534  042522  052103     000
11516  062541     122  040505  044504  EM67:   .ASCIZ  /READING CYL 0 HEADERS ON CYL 1/
11517  062546  043516  041440  046131
11518  062554  030040  044040  040505
11519  062562  042504  051522  047440
11520  062570  020116  054503  020114
11521  062576  000061
11522  062600  042522  042101  047111  EM68:   .ASCIZ  /READING CYL 1 HEADERS ON CYL 0/
11523  062606  020107  054503  020114
11524  062614  020061  042510  042101
11525  062622  051105  020123  047117
11526  062630  041440  046131  030040
11527  062636     000
11528  062637     101  044514  047107  EM69:   .ASCIZ  /ALIGN CART USED/
11529  062644  041440  051101  020124
11530  062652  051525  042105     000
11531  062657     125  042516  050130  EM70:   .ASCIZ  /UNEXP ATTN/
11532  062664  040440  052124  000116
11533  062672  051504  020103  042523  EM71:   .ASCIZ  /DSC SET IN RKMR2/
11534  062700  020124  047111  051040
11535  062706  046513  031122     000
11536  062713     106  051117  040515  EM72:   .ASCIZ  /FORMAT TEST BYPASSED/
11537  062720  020124  042524  052123
11538  062726  041040  050131  051501
11539  062734  042523  000104
11540  062740  052103  020117  042523  EM73:   .ASCIZ  /CTO SET IN RKCS1/
11541  062746  020124  047111  051040
11542  062754  041513  030523     000
11543  062761     122  055124  047040  EM74:   .ASCIZ  /RTZ NOT SET IN RKMR2/
11544  062766  052117  051440  052105
11545  062774  044440  020116  045522
11546  063002  051115  000062
11547  063006  042111  042501  047040  EM75:   .ASCIZ  /IDAE NOT SET IN RKMR3/
11548  063014  052117  051440  052105
11549  063022  044440  020116  045522
11550  063030  051115  000063
11551  063034  044520  020120  042523  EM76:   .ASCIZ  /PIP SET IN RKMR2/
11552  063042  020124  047111  051040
11553  063050  046513  031122     000
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11554  063055     106  052501  052114  EM77:   .ASCIZ  /FAULT NOT =0 IN RKMR3/
11555  063062  047040  052117  036440
11556  063070  020060  047111  051040
11557  063076  046513  031522     000
11558  063103     103  046131  042040  EM78:   .ASCIZ  /CYL DIFF IN RKMR2 DID NOT REMAIN = 1 IN SEEK TO SELF/
11559  063110  043111  020106  047111
11560  063116  051040  046513  031122
11561  063124  042040  042111  047040
11562  063132  052117  051040  046505
11563  063140  044501  020116  020075
11564  063146  020061  047111  051440
11565  063154  042505  020113  047524
11566  063162  051440  046105  000106
11567  063170  042516  020104  042523  EM79:   .ASCIZ  /NED SET IN RKCS2/
11568  063176  020124  047111  051040
11569  063204  041513  031123     000
11570  063211     125  046116  040517  EM80:   .ASCIZ  /UNLOAD NOT SET IN RKMR2/
11571  063216  020104  047516  020124
11572  063224  042523  020124  047111
11573  063232  051040  046513  031122
11574  063240     000
11575  063241     123  044520  020116  EM81:   .ASCIZ  /SPIN NOT SET IN RKMR2/
11576  063246  047516  020124  042523
11577  063254  020124  047111  051040
11578  063262  046513  031122     000
11579  063267     122  055124  047040  EM82:   .ASCIZ  /RTZ NOT SET IN RKMR2/
11580  063274  052117  051440  052105
11581  063302  044440  020116  045522
11582  063310  051115  000062
11583  063314  042522  042101  044040  EM83:   .ASCIZ  /READ HEADER ERR   WORD 0 (CYL#)/
11584  063322  040505  042504  020122
11585  063330  051105  020122  020040
11586  063336  047527  042122  030040
11587  063344  024000  054503  021514
11588  063352  000051
11589  063354  047506  046522  052101  EM84:   .ASCIZ  /FORMAT IN RKMR3 NOT SET/
11590  063362  044440  020116  045523
11591  063370  051115  020063  047517
11592  063376  020124  042523  000124
11593  063404  046111  020114  042101  EM85:   .ASCIZ  /ILL ADDR IN RKMR3 NOT =0/
11594  063412  051104  044440  020116
11595  063420  045522  051115  020063
11596  063426  047516  020124  030075
11597  063434     000
11598  063435     127  044510  042514  EM86:   .ASCIZ  /WHILE WAITING FOR CONTR RDY OR AFTER CONTR RDY REC'D/
11599  063442  053440  044501  044524
11600  063450  043516  043040  051117
11601  063456  041440  047117  051124
11602  063464  051040  054504  047440
11603  063472  020122  043101  042524
11604  063500  020122  047503  052116
11605  063506  020122  042122  020131
11606  063514  042522  023503  000104
11607  063522  040503  047116  052117  EM87:   .ASCIZ  /CANNOT READ BSE INFO/
11608  063530  051040  040505  020104
11609  063536  051502  020105  047111
```

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11610  063544  047506     000
11611  063547     116  020117  051104  EM88:   .ASCII  /NO DRIVES FOUND ON BUS/<CR><LF>
11612  063554  053111  051505  043040
11613  063562  052517  042116  047440
11614  063570  020116  052502  006523
11615  063576     012
11616  063577     123  052105  050125          .ASCIZ  /SETUP CORRECTLY & PRESS 'CONT'/<CR><LF>
11617  063604  041440  051117  042522
11618  063612  052103  054514  023040
11619  063620  050040  042522  051523
11620  063626  023440  047503  052116
11621  063634  006447  000012
11622  063640  047516  042040  044522  EM89:   .ASCII  /NO DRIVES FOUND IN DEVICE MAP ($DEVM)/<CR><LF>
11623  063646  042526  020123  047506
11624  063654  047125  020104  047111
11625  063662  042040  053105  041511
11626  063670  020105  040515  020120
11627  063676  022050  042504  046526
11628  063704  006451     012
11629  063707     123  052105  050125          .ASCIZ  /SETUP CORRECTLY & RESTART/<CR><LF>
11630  063714  041440  051117  042522
11631  063722  052103  054514  023040
11632  063730  051040  051505  040524
11633  063736  052122  005015     000
11634  063743     104  052104  047040  EM90:   .ASCIZ  /DDT NOT SET IN RKDS/
11635  063750  052117  051440  052105
11636  063756  044440  020116  045522
11637  063764  051504     000
11638
11639                                  .SBTTL  DATA HEADERS
11640
11641  063767     124  051505  020124  DH1:    .ASCIZ  /TEST NO.  PC/
11642  063774  047516  020056  050040
11643  064002  000103
11644  064004  045522  051115  004461  DH2:    .ASCIZ  /RKMR1  RKMR2  RKMR3  RKER  RKDS  RKCS1  RKCS2/
11645  064012  045522  051115  004462
11646  064020  045522  051115  004463
11647  064026  045522  051105  051011
11648  064034  042113  004523  045522
11649  064042  051503  004461  045522
11650  064050  051503  000062
11651  064054  045522  041527  051011  DH3:    .ASCIZ  /RKWC  RKBA  RKDA  RKASOF  RKDC  RKECPS  RKECPT/
11652  064062  041113  004501  045522
11653  064070  040504  051011  040513
11654  064076  047523  004506  045522
11655  064104  041504  051011  042513
11656  064112  050103  004523  045522
11657  064120  041505  052120     000
11658  064125     106  047522  020115  DH6:    .ASCIZ  /FROM CYL  TO CYL  CYL DIFF/
11659  064132  054503  020114  052040
11660  064140  020117  054503  020114
11661  064146  041440  046131  042040
11662  064154  043111  000106
11663  064160  044127  047105  042040  DH8:    .ASCIZ  /WHEN DRIVE UNLOADED/
11664  064166  044522  042526  052440
11665  064174  046116  040517  042504
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11666  064202  000104
11667  064204  043101  042524  020122  DH9:    .ASCIZ  /AFTER START SPIN CMD REC'D BY DRIVE/
11668  064212  052123  051101  020124
11669  064220  050123  047111  041440
11670  064226  042115  051040  041505
11671  064234  042047  041040  020131
11672  064242  051104  053111  000105
11673  064250  052101  042440  042116  DH10:   .ASCIZ  /AT END OF HEAD LOADING/
11674  064256  047440  020106  042510
11675  064264  042101  046040  040517
11676  064272  044504  043516     000
11677  064277     101  052106  051105  DH11:   .ASCIZ  /AFTER START SPIN CMD & FWD SET/
11678  064304  051440  040524  052122
11679  064312  051440  044520  020116
11680  064320  046503  020104  020046
11681  064326  053506  020104  042523
11682  064334  000124
11683  064336  052101  044440  047116  DH12:   .ASCIZ  /AT INNER LIM FROM START SPIN CMD/
11684  064344  051105  046040  046511
11685  064352  043040  047522  020115
11686  064360  052123  051101  020124
11687  064366  050123  047111  041440
11688  064374  042115     000
11689  064377     106  047522  020115  DH13:   .ASCIZ  /FROM OUTER LIM TO CYL 0 DURING LOADING/
11690  064404  052517  042524  020122
11691  064412  044514  020115  047524
11692  064420  041440  046131  030040
11693  064426  042040  051125  047111
11694  064434  020107  047514  042101
11695  064442  047111  000107
11696  064446  043101  042524  020122  DH14:   .ASCIZ  /AFTER SEEK WITH BAD PAR/
11697  064454  042523  043505  053440
11698  064462  052111  020110  040502
11699  064470  020104  040520  000122
11700  064476  043101  042524  020122  DH16:   .ASCIZ  /AFTER LOADING HEAD REG & SEEK CMD/
11701  064504  047514  042101  047111
11702  064512  020107  042510  042101
11703  064520  051040  043505  023040
11704  064526  051440  042505  020113
11705  064534  046503  000104
11706  064540  043101  042524  020122  DH17:   .ASCIZ  /AFTER RECAL CMD/
11707  064546  042522  040503  020114
11708  064554  046503  000104
11709  064560  043101  042524  020122  DH18:   .ASCIZ  /AFTER UNLOAD CMD/
11710  064566  047125  047514  042101
11711  064574  041440  042115     000
11712  064601     101  052106  051105  DH19:   .ASCIZ  /AFTER PACK CMD/
11713  064606  050040  041501  020113
11714  064614  046503  000104
11715  064620  043101  042524  020122  DH20:   .ASCIZ  /AFTER SELECT DRIVE CMD/
11716  064626  042523  042514  052103
11717  064634  042040  044522  042526
11718  064642  041440  042115     000
11719  064647     101  052106  051105  DH21:   .ASCIZ  /AFTER SUBSYSTEM CLEAR/
11720  064654  051440  041125  054523
11721  064662  052123  046505  041440
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11722  064670  042514  051101     000
11723  064675     101  052106  051105  DH22:   .ASCIZ  /AFTER DRIVE CLEAR CMD/
11724  064702  042040  044522  042526
11725  064710  041440  042514  051101
11726  064716  041440  042115     000
11727  064723     124  051505  020124  DH23:   .ASCIZ  /TEST NO.       TRAP PC/
11728  064730  047516  004456  051124
11729  064736  050101  050040  000103
11730  064744  043101  042524  020122  DH25:   .ASCIZ  /AFTER SEEK CMD/
11731  064752  042523  045505  041440
11732  064760  042115     000
11733  064763     101  052106  051105  DH26:   .ASCIZ  /AFTER READ DATA CMD/
11734  064770  051040  040505  020104
11735  064776  040504  040524  041440
11736  065004  042115     000
11737  065007     011  054105  042520  DH28:   .ASCIZ  /       EXPECT/
11738  065014  052103     000
11739  065017     011  041501  052524  DH29:   .ASCIZ  /       ACTUAL/
11740  065024  046101     000
11741  065027     101  052106  051105  DH30:   .ASCIZ  /AFTER READ HEADER CMD/
11742  065034  051040  040505  020104
11743  065042  042510  042101  051105
11744  065050  041440  042115     000
11745  065055     101  004460  030102  DH32:   .ASCIZ  /A0     B0      A1      B1      A2      B2      B3/
11746  065062  040411  004461  030502
11747  065070  040411  004462  031102
11748  065076  041011  000063
11749  065102  052504  044522  043516  DH33:   .ASCIZ  /DURING SEEK CMD/
11750  065110  051440  042505  020113
11751  065116  046503  000104
11752  065122  042523  052103  051117  DH34:   .ASCIZ  /SECTOR REG UNSTABLE/
11753  065130  051040  043505  052440
11754  065136  051516  040524  046102
11755  065144  000105
11756  065146  042502  053524  042505  DH35:   .ASCIZ  /BETWEEN SECTOR COUNTS/
11757  065154  020116  042523  052103
11758  065162  051117  041440  052517
11759  065170  052116  000123
11760  065174  051106  046517  051440  DH36:   .ASCIZ  /FROM SECT  TO SECT/
11761  065202  041505  020124  052040
11762  065210  020117  042523  052103
11763  065216     000
11764  065217     123  042520  042105  DH37:   .ASCIZ  /SPEED OK NOT =0 10 SEC AFTER UNLOAD/
11765  065224  047440  020113  047516
11766  065232  020124  030075  030440
11767  065240  020060  042523  020103
11768  065246  043101  042524  020122
11769  065254  047125  047514  042101
11770  065262     000
11771  065263     101  052106  051105  DH38:   .ASCIZ  /AFTER LIM DET/
11772  065270  046040  046511  042040
11773  065276  052105     000
11774  065301     101  052106  051105  DH39:   .ASCIZ  /AFTER WRITE HEADER CMD/
11775  065306  053440  044522  042524
11776  065314  044040  040505  042504
11777  065322  020122  046503  000104
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11778  065330  047527  042122  004443  DH40:   .ASCIZ  /WORD#  HEADER WAS  SHOULD BE/
11779  065336  042510  042101  051105
11780  065344  053440  051501  020040
11781  065352  044123  052517  042114
11782  065360  041040  000105
11783  065364  052504  044522  043516  DH41:   .ASCIZ  /DURING RECAL CMD/
11784  065372  051040  041505  046101
11785  065400  041440  042115     000
11786  065405     117  020116  042523  DH42:   .ASCIZ  /ON SEC 0,2,4,6,8  CYL 410 TRK 2/
11787  065412  020103  026060  026062
11788  065420  026064  026066  020070
11789  065426  041440  046131  032040
11790  065434  030061  052040  045522
11791  065442  031040     000
11792  065445     106  051117  040515  DH44:   .ASCIZ  /FORMAT & ALL R-W TESTS WILL BE BYPASSED/
11793  065452  020124  020046  046101
11794  065460  020114  026522  020127
11795  065466  042524  052123  020123
11796  065474  044527  046114  041040
11797  065502  020105  054502  040520
11798  065510  051523  042105     000
11799  065515     102  041505  052501  DH45:   .ASCIZ  /BECAUSE OF LIMIT DETECT ERROR ON PREVIOUS TEST/
11800  065522  042523  047440  020106
11801  065530  044514  044515  020124
11802  065536  042504  042524  052103
11803  065544  042440  051122  051117
11804  065552  047440  020116  051120
11805  065560  053105  047511  051525
11806  065566  052040  051505  000124
11807  065574  047503  046125  020104  DH46:   .ASCIZ  /COULD NOT READ BSE INFO ON PREV TEST/
11808  065602  047516  020124  042522
11809  065610  042101  041040  042523
11810  065616  044440  043116  020117
11811  065624  047117  050040  042522
11812  065632  020126  042524  052123
11813  065640     000
11814  065641     101  052106  051105  DH48:   .ASCIZ  /AFTER SEEK CMD TO INV CYL/
11815  065646  051440  042505  020113
11816  065654  046503  020104  047524
11817  065662  044440  053116  041440
11818  065670  046131     000
11819  065673     115  043523  040440  DH49:   .ASCIZ  /MSG A&B IN RKMR2 & RKMR3 RESP., ARE INVALID/
11820  065700  041046  044440  020116
11821  065706  045522  051115  020062
11822  065714  020046  045522  051115
11823  065722  020063  042522  050123
11824  065730  026056  040440  042522
11825  065736  044440  053116  046101
11826  065744  042111     000
11827  065747     101  052106  051105  DH51:   .ASCIZ  /AFTER SEEK TO SELF CMD/
11828  065754  051440  042505  020113
11829  065762  047524  051440  046105
11830  065770  020106  046503  000104
11831  065776  054105  020120  054503  DH52:   .ASCIZ  /EXP CYL#       CYL HEADER WAS/
11832  066004  021514  041411  046131
11833  066012  044040  040505  042504
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11834  066020  020122  040527  000123
11835  066026  047117  051440  041505  DH53:   .ASCIZ  /ON SEC 10,12,14,16,18,20 CYL 410 TRK 2/
11836  066034  030440  026060  031061
11837  066042  030454  026064  033061
11838  066050  030454  026070  030062
11839  066056  041440  046131  032040
11840  066064  030061  052040  045522
11841  066072  031040     000
11842                                  .SBTTL  ERR OUTPUT DATA
11843
11844          066076                  .EVEN
11845  066076  001214  001116          DT1:    $TESTN,$ERRPC
11846  066102  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11847  066110  003336  003334  003322
11848  066116  003324
11849  066120  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11850  066126  003340  003342  003354
11851  066134  003356
11852  066136  001214  001116  001350  DT4:    $TESTN,$ERRPC,FRCYL,TOCYL,CALDIF
11853  066144  001352  001360
11854  066150  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11855  066156  003336  003334  003322
11856  066164  003324
11857  066166  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11858  066174  003340  003342  003354
11859  066202  003356
11860  066204  001214  001116  001402  DT6:    $TESTN,$ERRPC,PSEC,ESEC
11861  066212  001404
11862  066214  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11863  066222  003336  003334  003322
11864  066230  003324
11865  066232  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11866  066240  003340  003342  003354
11867  066246  003356
11868  066250  001214  001116  001442  DT7:    $TESTN,$ERRPC,WDCNT,HDWD,TEMP1
11869  066256  001454  003360
11870  066262  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11871  066270  003336  003334  003322
11872  066276  003324
11873  066300  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11874  066306  003340  003342  003354
11875  066314  003356
11876  066316  001214  001116  001352  DT8:    $TESTN,$ERRPC,TOCYL,FRCYL,CALDIF
11877  066324  001350  001360
11878  066330  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11879  066336  003336  003334  003322
11880  066344  003324
11881  066346  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11882  066354  003340  003342  003354
11883  066362  003356
11884  066364  001214  001116  001352  DT9:    $TESTN,$ERRPC,TOCYL,RHTAB
11885  066372  001674
11886  066374  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11887  066402  003336  003334  003322
11888  066410  003324
11889  066412  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
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11890  066420  003340  003342  003354
11891  066426  003356
11892  066430  001214  001116  001350  DT10:   $TESTN,$ERRPC,FPCYL,RHTAB
11893  066436  001674
11894  066440  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11895  066446  003330  003334  003322
11896  066454  003324
11897  066456  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11898  066464  003340  003342  003354
11899  066472  003356
11900  066474  001214  001334          DT11:   $TESTN,TRAPPC
11901  066500  001214  001116  003412  DT13:   $TESTN,$ERRPC,E.A0,E.B0,E.A1,E.B1,H.A0,H.B0,H.A1,H.B1
11902  066506  003414  003416  003420
11903  066514  003372  003374  003376
11904  066522  003400
11905  066524  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11906  066532  003336  003334  003322
11907  066540  003324
11908  066542  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11909  066550  003340  003342  003354
11910  066556  003356
11911
11912  066560  001214  001116  003412  DT14:   $TESTN,$ERRPC,E.A0,E.B0,E.A1,E.B1,E.A2,E.B2
11913  066566  003414  003416  003420
11914  066574  003422  003424
11915  066600  003372  003374  003376          H.A0,H.B0,H.A1,H.B1,H.A2,H.B2
11916  066606  003400  003402  003404
11917  066614  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11918  066622  003336  003334  003322
11919  066630  003324
11920  066632  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11921  066640  003340  003342  003354
11922  066646  003356
11923
11924  066650  001214  001116  003412  DT15:   $TESTN,$ERRPC,E.A0,E.B0,E.A1,E.B1,E.A2,E.B2,E.B3
11925  066656  003414  003416  003420
11926  066664  003422  003424  003430
11927  066672  003372  003374  003376          H.A0,H.B0,H.A1,H.B1,H.A2,H.B2,H.B3
11928  066700  003400  003402  003404
11929  066706  003410
11930  066710  003346  003350  003352          HMR1,HMR2,HMR3,HER,HDS,HCS1,HCS2
11931  066716  003336  003334  003322
11932  066724  003324
11933  066726  003326  003330  003332          HWC,HBA,HDA,HASOF,HDC,HPOS,HPAT
11934  066734  003340  003342  003354
11935  066742  003356
11936
11937                                  .SBTTL  ERR DATA FORMATS ;
11938
11939  066744  000003                  DF1:    3
11940  066746     002      000                 .BYTE 2,0
11941  066750  064004                          DH2
11942  066752     007      000                 .BYTE 7,0
11943  066754  064054                          DH3
11944  066756     007      000                 .BYTE   7,0
11945
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11946  066760  000005                  DF2:    5
11947  066762     000      000                 .BYTE 0,0
11948  066764  065673                         DH49
11949  066766     000      000                 .BYTE 0,0
11950  066770  063767                         DH1
11951  066772     002      000                 .BYTE 2,0
11952  066774  064004                         DH2
11953  066776     007      000                 .BYTE 7,0
11954  067000  064054                         DH3
11955  067002     007      000                 .BYTE   7,0
11956
11957  067004  000001                  DF3:    1
11958  067006     002      000                 .BYTE   2,0
11959  067010  000003                  DF4:    3
11960  067012     002      000                 .BYTE   2,0
11961  067014  064004                         DH2
11962  067016     007      000                 .BYTE   7,0
11963  067020  064054                         DH3
11964  067022     007      000                 .BYTE   7,0
11965
11966  067024  000004                  DF5:    4
11967  067026     000      000                 .BYTE 0,0
11968  067030  063767                         DH1
11969  067032     002      000                 .BYTE 2,0
11970  067034  064004                         DH2
11971  067036     007      000                 .BYTE   7,0
11972  067040  064054                         DH3
11973  067042     007      000                 .BYTE   7,0
11974
11975  067044  000005                  DF6:    5
11976  067046     000      000                 .BYTE 0,0
11977  067050  063767                         DH.
11978  067052     002      000                 .BYTE 2,0
11979  067054  064125                         DH6
11980  067056     003      000                 .BYTE 3,0
11981  067060  064004                         DH2
11982  067062     007      000                 .BYTE   7,0
11983  067064  064054                         DH3
11984  067066     007      000                 .BYTE   7,0
11985
11986
11987
11988  067070  000004                  DF10:   4
11989  067072     000      000                 .BYTE 0,0
11990  067074  063767                         DH1
11991  067076     002      000                 .BYTE 2,0
11992  067100  064004                         DH2
11993  067102     007      000                 .BYTE 7,0
11994  067104  064054                         DH3
11995  067106     007      000                 .BYTE   7,0
11996
11997  067110  000005                  DF12:   5
11998  067112     000      000                 .BYTE 0,0
11999  067114  063767                         DH1
12000  067116     002      000                 .BYTE 2,0
12001  067120  065174                         DH36
```

```
12002  067122  002      000          .BYTE 2,0
12003  067124  064004                DH2
12004  067126  007      000          .BYTE  7,0
12005  067130  064054                DH3
12006  067132  007      000          .BYTE  7,0
12007
12008  067134  000004           DF14: 4
12009  067136  002      000          .BYTE  2,0
12010  067140  065330                DH40
12011  067142  003      000          .BYTE  3,0
12012  067144  064004                DH2
12013  067146  007      000          .BYTE  7,0
12014  067150  064054                DH3
12015  067152  007      000          .BYTE  7,0
12016
12017
12018  067154  000004           DF15: 4
12019  067156  000      000          .BYTE  0,0
12020  067160  063767                DH1
12021  067162  002      000          .BYTE  2,0
12022  067164  064004                DH2
12023  067166  007      000          .BYTE  7,0
12024  067170  064054                DH3
12025  067172  007      000          .BYTE  7,0
12026
12027  067174  000004           DF16: 4
12028  067176  000      000          .BYTE 0,0
12029  067200  063767                DH1
12030  067202  002      000          .BYTE 2,0
12031  067204  064004                DH2
12032  067206  007      000          .BYTE  7,0
12033  067210  064054                DH3
12034  067212  007      000          .BYTE  7,0
12035
12036  067214  000005           DF17: 5
12037  067216  000      000          .BYTE  0,0
12038  067220  065445                DH44
12039  067222  000      000          .BYTE  0,0
12040  067224  063767                DH1
12041  067226  002      000          .BYTE  2,0
12042  067230  064004                DH2
12043  067232  007      000          .BYTE  7,0
12044  067234  064054                DH3
12045  067236  007      000          .BYTE  7,0
12046  067240  000007           DF20: 7
12047  067242  000      000          .BYTE  0,0
12048  067244  063767                DH1
12049  067246  002      000          .BYTE  2,0
12050  067250  065007                DH28
12051  067252  000      000          .BYTE  0,0
12052  067254  065055                DH32
12053  067256  004      000          .BYTE  4,0
12054  067260  065017                DH29
12055  067262  004      000          .BYTE  4,0
12056  067264  064004                DH2
12057  067266  007      000          .BYTE  7,0
```

```
12058  067270  064054                      DH3
12059  067272     007      000             .BYTE   7,0
12060  067274  000004              DF21:   4
12061  067276     002      000             .BYTE   2,0
12062  067300  065776                      DH52
12063  067302     002      000             .BYTE   2,0
12064  067304  064004                      DH2
12065  067306     007      000             .BYTE   7,0
12066  067310  064054                      DH3
12067  067312     007      000             .BYTE   7,0
12068  067314  000007              DF22:   7
12069  067316     000      000             .BYTE   0,0
12070  067320  063767                      DH1
12071  067322     002      000             .BYTE   2,0
12072  067324  065007                      DH28
12073  067326     000      000             .BYTE   0,0
12074  067330  065055                      DH32
12075  067332     006      000             .BYTE   6,0
12076  067334  065017                      DH29
12077  067336     006      000             .BYTE   6,0
12078  067340  064004                      DH2
12079  067342     007      000             .BYTE   7,0
12080  067344  064054                      DH3
12081  067346     007      000             .BYTE   7,0
12082
12083  067350  000007              DF23:   7
12084  067352     000      000             .BYTE   0,0
12085  067354  063767                      DH1
12086  067356     002      000             .BYTE   2,0
12087  067360  065007                      DH28
12088  067362     000      000             .BYTE   0,0
12089  067364  065055                      DH32
12090  067366     007      000             .BYTE   7,0
12091  067370  065017                      DH29
12092  067372     007      000             .BYTE   7,0
12093  067374  064004                      DH2
12094  067376     007      000             .BYTE   7,0
12095  067400  064054                      DH3
12096  067402     007      000             .BYTE   7,0
```

```
12097                                   ;;*****************************************************************
12098                                   .SBTTL  TYPE ERR ROUTINE
12099                                   ;*ENTRY JSR PC,TYP ERR
12100                                   ;*RETURN RTS PC
12101                                   ;*
12102                                   ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
12103                                   ;*ERR IS TO BE REPORTED. IT THEN USES THE "ERR TABLE" ($ERRTB)
12104                                   ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
12105                                   ;*THE ERR.
12106                                   ;;*****************************************************************
12107  067404  104413                  TYPERR: SAVREG
12108  067406  113700  001114                  MOVB    $ITEMB,R0       ;ENTER ERR NUMBER
12109  067412  042700  177400                  BIC     #177400,R0      ;CLEAR SIGN EXTENSION
12110  067416  005300                          DEC     R0              ;FORM INDEX FOR ERR TABLE
12111  067420  006300                          ASL     R0
12112  067422  006300                          ASL     R0
12113  067424  006300                          ASL     R0
12114  067426  062700  003474          1$:     ADD     #$ERRTB,R0      ;FORM ADDRESS OF ERR ENTRY
12115  067432  012037  067446                  MOV     (R0)+,2$        ;GET EM POINTER
12116  067436  001404                          BEQ     3$              ;BRANCH IF THERE ISN'T ONE
12117  067440  104401  001205                  TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN LINE FEED
12118  067444  104401                          TYPE                    ;TYPE ERR MSG (EM)
12119  067446  000000          2$:     .WORD   0                       ;EM POINTER GOES HERE
12120  067450  012037  067464          3$:     MOV     (R0)+,4$        ;GET DH POINTER
12121  067454  001404                          BEQ     5$              ;BRANCH IF THERE ISN'T ONE
12122  067456  104401  001205                  TYPE    ,$CRLF          ;TYPE CR-LF
12123  067462  104401                          TYPE                    ;TYPE DATA HEADER
12124  067464  000000          4$:     .WORD   0                       ;DH POINTER GOES HERE
12125  067466  012001          5$:     MOV     (R0)+,R1                ;GET DT POINTER
12126  067470  001455                          BEQ     20$             ;BRANCH IF THERE ARE NONE
12127  067472  005004                          CLR     R4              ;SET INDENT SWITCH
12128  067474  012000                          MOV     (R0)+,R0        ;GET DF POINTER
12129  067476  012002                          MOV     (R0)+,R2        ;STORE NUMBER OF DH'S
12130  067500  001446                          BEQ     17$             ;DH NUM IS 0-BRANCH
12131  067502  005104                          COM     R4              ;NO INDENT
12132  067504  104401  001205                  TYPE    ,$CRLF
12133  067510  112003          10$:    MOVB    (R0)+,R3                ;GET & STORE NUMBER OF DATA WORDS
12134  067512  105720                          TSTB    (R0)+           ;BUMP PAST FORMAT WORD
12135  067514  005703                          TST     R3              ;TEST IF ANY DATA FOR THIS HEADER
12136  067516  001407                          BEQ     14$             ;NO - SKIP DATA PRINT
12137  067520  013146          11$:    MOV     2(R1)+,-(SP)            ;PUT FIRST DATA WORD ON STACK
12138  067522  104402                          TYPOC                   ;TYPE IT
12139  067524  005303                          DEC     R3              ;MORE DATA WORDS
12140  067526  001403                          BEQ     14$             ;NO-BRANCH
12141  067530  104401  067660                  TYPE    ,SPACE2         ;TYPE SEPARATORS
12142  067534  000771                          BR      11$             ;LOOP
12143  067536  005302          14$:    DEC     R2                      ;MORE DH'S?
12144  067540  003431                          BLE     20$             ;NO-BRANCH
12145  067542  104401  001205                  TYPE    ,$CRLF
12146  067546  005760  000002                  TST     2(R0)           ;ONLY A DH IN THIS REQUEST?
12147  067552  001404                          BEQ     15$             ;YES-BRANCH BYPASS INDENT
12148  067554  005104                          COM     R4              ;INDENT?
12149  067556  001002                          BNE     15$             ;NO-BRANCH
12150  067560  104401  067660                  TYPE    ,SPACE2         ;YES-TYPE SPACES
12151  067564  012037  067572          15$:    MOV     (R0)+,16$       ;GET NEXT DH POINTER
12152  067570  104401                          TYPE                    ;TYPE DH
```

```
12153  067572  000000                 16$:    .WORD   0               ;DH POINTER GOES HERE
12154  067574  105710                         TSTB    (R0)            ;TYPE A DT?
12155  067576  001003                         BNE     21$             ;YES-BRANCH
12156  067600  062700  000002                 ADD     #2,R0           ;INCREMENT DF POINTER
12157  067604  000754                         BR      14$             ;SEE IF END OF DF BLOCK
12158  067606  104401  001205         21$:    TYPE    ,$CRLF
12159  067612  005704                         TST     R4              ;INDENT?
12160  067614  001335                         BNE     10$             ;NO-BRANCH
12161  067616  104401  067660         17$:    TYPE    ,SPACE2         ;YES-TYPE SPACES
12162  067622  000732                         BR      10$             ;LOOP
12163  067624  104414                 20$:    RESREG
12164
12165  067626  032777  010000  111304         BIT     #SW12,@SWR      ;ABORT DRV AFTER 20 ERRS?
12166  067634  001410                         BEQ     25$             ;BR IF NO
12167  067636  023727  001103  000024         CMP     $ERFLG,#20.     ;ELSE SEE IF 20 ERRS
12168  067644  001004                         BNE     25$             ;BR IF NO
12169  067646  012706  001100                 MOV     #STACK,SP       ;ELSE RESTORE STK
12170  067652  000137  042662                 JMP     $EOP            ;AND DROP DRIVE
12171  067656  000207                 25$:    RTS     PC
12172  067660  020040     000         SPACE2: .ASCIZ/  /              ;2 SPACES
```

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12173                                   ;  ODT-11 -- V005A
12174                                   ;
12175                                   ; DEC-11-UODPA-A-LA
12176                                   ;
12177                                   ; COPYRIGHT 1969,1970,1972
12178                                   ; DIGITAL EQUIPMENT CORPORATION
12179                                   ; MAYNARD, MASSACHUSETTS 01754
12180                                           .ENABL  ABS,AMA
12181   067664                                  .EVEN
12182   067744                                  .=.+60
12183   000000                          R0      =       %0      ; REGISTER
12184   000001                          R1      =       %1      ;  NAMING
12185   000002                          R2      =       %2      ;   CONVENTIONS
12186   000003                          R3      =       %3
12187   000004                          R4      =       %4
12188   000005                          R5      =       %5
12189   000006                          SP      =       %6
12190   000007                          PC      =       %7
12191   177776                          ST      =       177776          ;STATUS REGISTER
12192                                   ;
12193   000014                          0.TVEC  =       14              ;TRT VECTOR LOCATION
12194   000340                          0.STM   =       340             ;PRIORITY MASK - STATUS REGISTER
12195   000020                          0.TBT   =       20              ;T-BIT MASK - STATUS REGISTER
12196   000003                          TRT     =       000003          ;TRT INSTRUCTION
12197   000006                          RTT     =       000006          ;RTT INSTRUCTION
12198                                   ;
12199                                   ; R5 IS USUALLY CONSIDERED SAFE, THE CURRENT ADDRESS WORD
12200                                   ; RESIDES IN IT.  AFTER A BREAKPOINT, IT IS SET TO ZERO, AND SEARCH
12201                                   ; OPERATIONS LEAVE IT RANDOMLY FILLED.  OTHERWISE, IT SHOULD NOT
12202                                   ; BE USED EXCEPT FOR JSR'S AND THE CURRENT ADDRESS POINTER (CAD).
12203                                   ;
12204   177562                          0.RDB   =       177562  ;R DATA BUFFER
12205   177560                          0.RCSR  =       177560  ;R C/SR
12206   177566                          0.TDB   =       177566  ;T DATA BUFFER
12207   177564                          0.TCSR  =       177564  ;T C/SR
12208                                   ;
12209                                   ;
12210                                   ; INITIALIZE ODT
12211                                   ;  USE 0.ODT FOR A NORMAL ENTRY
12212                                   ;  USE 0.ODT+2 TO RESTART ODT - WIPING OUT ALL BREAKPOINTS
12213                                   ;  USE 0.ODT+4 TO RE-ENTER (I.E. - FAKE A BREAKPOINT)
12214                                   ;
12215   067744  000413                  0.ODT:  BR      0.STRT          ;NORMAL ENTRY
12216   067746  000417                          BR      0.RST           ;RESTART
12217   067750  013737  177776  067724  0.ENTR: MOV     ST,0.UST        ;RE-ENTER  --  SAVE STATUS
12218   067756  013737  000016  177776          MOV     0.TVEC+2,ST     ;SET UP LOCAL STATUS
12219   067764  010737  067722                  MOV     PC,0.UPC        ;FAKE THE PC
12220   067770  000137  071122                  JMP     0.BK1
12221                                   ;
12222   067774  012706  067704          0.STRT: MOV     #0.URO,SP       ;SET UP STACK
12223   070000  010637  067720                  MOV     SP,0.USP        ;FAKE THE SAVED STACK
12224   070004  000414                          BR      0.RST1          ;CLEAR BREAKPOINT TABLES
12225   070006  004037  071330          0.RST:  JSR     0,0.SVR         ;SAVE REGISTERS
12226   070012  013777  067742  177716          MOV     0.UIN,@0.ADR1   ;REMOVE THE BREAKPOINT
12227   070020  113704  067726                  MOVB    0.PRI,R4        ;GET ODT PRIORITY
12228   070024  106004                          RORB    R4              ;SHIFT
```

```
12229  070026  106004                          RORB    R4              ; INTO
12230  070030  106004                          RORB    R4              ;  POSITION
12231  070032  110437  177776                 MOVB    R4,ST           ;STORE IN STATUS
12232  070036  000127                  O.RST1: JMP     (PC)+
12233  070040  000403                          BR      O.45
12234  070042  012737  000002  071032         MOV     #PTI,O.RTIT     ;SET TO RTI IF 11/20 OR /05
12235  070050  105037  071751          O.45:   CLRB    O.P             ;DISALLOW PROCEED
12236  070054  012737  000340  000016         MOV     #O.STM,O.TVEC+2 ;STATUS WORD TO TRT VECTOR + 2
12237  070062  012737  071112  000014         MOV     #O.BRK,O.TVEC   ;PC TO TRT VECTOR
12238  070070  000447                          BR      O.RALL          ;CLEAR BREAKPOINT TABLES
12239
12240                                  ;
12241                                  ; SPECIAL NAME HANDLER
12242                                  ;  DEPENDS UPON THE EXPLICIT ORDER OF THE TWO TABLES O.TL AND O.URO
12243                                  ;
12244  070076  004537  071552          O.REGT: JSR     5,O.GET         ;SPECIAL NAME, GET ONE MORE CHARACTER
12245  070102  012704  071775                  MOV     #O.TL,R4        ;TABLE START ADDRESS
12246  070106  120024                  O.RSP:  CMPB    R0,(R4)+        ;IS THIS THE CORRECT CHARACTER?
12247  070110  001413                          BEQ     O.SP            ;JUMP IF YES
12248  070112  022704  072003                  CMP     #O.TL+O.LG,R4   ;IS THE SEARCH DONE?
12249  070116  101373                          BHI     O.RSP           ;BRANCH IF NOT
12250  070120  042700  177770                 BIC     #177770,R0      ;MASK OFF OCTAL
12251  070124  010004                          MOV     R0,R4
12252  070126  006304                  O.SP1:  ASL     R4
12253  070130  062704  067704                  ADD     #O.URO,R4       ;GENERATE ADDRESS
12254  070134  005202                          INC     R2              ;SET FOUND FLAG
12255  070136  000444                          BR      O.SCAN          ;GO FIND NEXT CHARACTER
12256  070140  162704  071766          O.SP:   SUB     #O.TL-7,R4      ;CORRECT CONSTANT
12257  070144  000770                          BR      O.SP1
12258
12259                                  ;
12260                                  ; ← HANDLER - OPEN INDEXED ON THE PC
12261                                  ;
12262  070146  004737  071676          O.ORPC: JSR     PC,O.TCLS
12263  070152  010502                          MOV     R5,R2           ;CURRENT ADDRESS IN R2
12264  070154  061202                          ADD     @R2,R2          ;COMPUTE
12265  070156  006202                          ASR     R2              ;MOVE ONE BIT TO CARRY
12266  070160  103421                          BCS     O.ERR           ;ERR IF ODD NUMBER
12267  070162  006302                          ASL     R2              ;RESTORE WORD
12268  070164  005722                          TST     (R2)+           ;  AND INCREMENT BY TWO
12269  070166  010205                          MOV     R2,R5           ;UPDATE CAD
12270  070170  000137  070436                 JMP     O.OP2           ;GO FINISH UP
12271
12272                                  ;
12273                                  ; B HANDLER - SET AND REMOVE BREAKPOINTS
12274                                  ;
12275  070174  005702                  O.BKPT: TST     R2              ;IF NO NUMBER TYPED
12276  070176  001406                          BEQ     O.RALL          ;  REMOVE BREAKPOINT
12277  070200  006204                          ASR     R4              ;CHECK IF ODD
12278  070202  103410                          BCS     O.ERR           ;JUMP IF ODD
12279  070204  006304                          ASL     R4              ;RESTORE ONE BIT
12280  070206  010437  067736                 MOV     R4,O.ADR1       ;SET A BREAKPOINT
12281  070212  000412                          BR      O.DCD
12282  070214  012737  072012  067736  O.RALL: MOV     #O.TRTC,O.ADR1  ;CLEAR BREAKPOINT
12283  070222  000406                          BR      O.DCD
12284                                  ;
                                       ; CMD DECODER - ODT11
                                       ;
                                       ;   REGISTERS R0-R4 MAY BE USED,
```

```
12285                                   ;    REGISTER R5 WILL BE CONSIDERED SAFE
12286                                   ;
12287  070220  052705  000001          O.ERR:  BIS     #1,R5           ;CLOSE EVERYTHING
12288  070224  012700  000077                  MOV     #'?,R0          ;  ? TO BE TYPED
12289  070230  004537  071630                  JSR     5,O.FTYP        ; OUTPUT ?
12290  070234  004537  071730          O.DCD:  JSR     5,O.CRLS        ;TYPE  <CR><LF>*
12291  070240  005004          O.DCD1: CLR     R4              ; R4 CONTAINS THE CONVERTED OCTAL
12292  070242  005002                  CLR     R2              ; R2 IS THE NUMBER FOUND FLAG
12293  070244  004537  071552  O.SCAN: JSR     5,O.GET         ;GET A CHAR, RETURN IN R0
12294  070250  022700  000060          CMP     #'0,R0          ;COMPARE WITH ASCII 0
12295  070254  101013                  BHI     O.CLGL          ;CHECK LEGALITY IF NON-NUMERIC
12296  070256  022700  000067          CMP     #'7,R0          ;COMPARE WITH ASCII 7
12297  070262  103410                  BLO     O.CLGL          ;CHECK LEGALITY IF NOT OCTAL
12298  070264  042700  177770          BIC     #177770,R0      ;CONVERT TO BCD
12299  070270  006304                  ASL     R4              ; MAKE ROOM
12300  070272  006304                  ASL     R4              ;  IN
12301  070274  006304                  ASL     R4              ;    R4
12302  070276  060004                  ADD     R0,R4           ;PACK THREE BITS IN R4
12303  070300  005202                  INC     R2              ;R2 HAS NUMERIC FLAG
12304  070302  000760                  BR      O.SCAN          ;   AND TRY AGAIN
12305  070304  005001          O.CLGL: CLR     R1              ;CLEAR INDEX
12306  070306  120061  071761  O.LGL1: CMPB    R0,O.LGCH(R1)   ;DO THE CODES MATCH?
12307  070312  001405                  BEQ     O.LGL2          ;JUMP IF YES
12308  070314  005201                  INC     R1              ; SET INDEX FOR NEXT SEARCH
12309  070316  020127  000014          CMP     R1,#O.CLGT      ;IS THE SEARCH DONE?
12310  070322  103336                  BHIS    O.ERR           ;    OOPS!
12311  070324  000770                  BR      O.LGL1          ;RE-LOOP
12312  070326  006301          O.LGL2: ASL     R1              ;MULTIPLY BY TWO
12313  070330  000171  070334          JMP     @O.LGDR(R1)     ;GO TO PROPER ROUTINE
12314                                   ;
12315  070334  070364          O.LGDR: O.WRD   ;  /    OPEN WORD
12316  070336  070416                  O.CRET  ;  CARRIAGE RETURN    CLOSE
12317  070340  070072                  O.REGT  ;  $  REGISTER OPS
12318  070342  070726                  O.GO    ;  G  GO TO ADDRESS K
12319  070344  070430                  O.OP1   ;  <LF>  MODIFY, CLOSE, OPEN NEXT
12320  070346  070142                  O.ORPC  ;  ←  OPEN RELATED, INDEX - PC
12321  070350  070462                  O.BACK  ;  ↑  OPEN PREVIOUS
12322  070352  070472                  O.OFST  ;  O  OFFSET
12323  070354  070550                  O.WSCH  ;  W  SEARCH WORD
12324  070356  070544                  O.EFF   ;  E  SEARCH EFFECTIVE ADDRESS
12325  070360  070170                  O.BKPT  ;  B  BREAKPOINTS
12326  070362  071034                  O.PROC  ;  P  PROCEED
12327           000030          O.LGL   =       .-O.LGDR        ;LGL MUST EQUAL 2X CHLGT ALWAYS
12328                                   ;
12329                                   ; PROCESS / - OPEN WORD
12330                                   ;
12331  070364  005702          O.WRD:  TST     R2              ;GET VALUE IF R2 IS NON-ZERO
12332  070366  001410                  BEQ     O.WRDA          ;SKIP OTHERWISE
12333  070370  010405                  MOV     R4,R5           ;   PUT VALUE IN CAD
12334  070372  006205          O.WRD1: ASR     R5              ;MOVE ONE BIT TO CARRY
12335  070374  103711          O.ERR2: BCS     O.ERR           ;JUMP IF ODD ADDRESS
12336  070376  006305                  ASL     R5              ;RESTORE THE CARRY BIT
12337  070400  011500                  MOV     @R5,R0          ;GET CONTENTS OF WORD
12338  070402  004537  071466          JSR     5,O.CADV        ;GO GET AND TYPE OUT @CAD
12339  070406  000714                  BR      O.DCD1          ;GO BACK TO DECODER
12340  070410  042705  000001  O.WRDA: BIC     #1,R5           ;CLEAR CLOSED BIT
```

```
12341  070414  000766                          BR      0.WRD1          ;GO BACK TO MAIN-LINE
12342                                  ;
12343                                  ; PROCESS CARRIAGE RETURN
12344                                  ;
12345  070416  004737  071676          0.CRET: JSR     PC,0.TCLS       ;CLOSE LOCATION
12346  070422  052705  000001                  BIS     #1,R5           ;CLOSE EVERYTHING
12347  070426  000702                          BR      0.DCD           ;RETURN TO DECODER
12348                                  ;
12349                                  ; PROCESS <LF>, OPEN NEXT WORD
12350                                  ;
12351  070430  004737  071676          0.OP1:  JSR     PC,0.TCLS       ;CLOSE PRESENT CELL
12352  070434  005725                          TST     (R5)+           ;GENERATE NEW ADDRESS
12353  070436  004537  071722          0.OP2:  JSR     5,0.CRLF        ;<CR><LF>
12354  070442  010500                          MOV     R5,R0           ;NUMBER TO TYPE
12355  070444  004537  071466                  JSR     5,0.CADV        ; TYPE OUT ADDRESS
12356  070450  012700  000057                  MOV     #'/,R0          ;TYPE A /
12357  070454  004537  071630                  JSR     5,0.FTYP
12358  070460  000744                          BR      0.WRD1          ;GO PROCESS IT
12359                                  ;
12360                                  ; PROCESS ↑, OPEN PREVIOUS WORD
12361                                  ;
12362  070462  004737  071676          0.BACK: JSR     PC,0.TCLS
12363  070466  005745                          TST     -(R5)           ;GENERATE NEW ADDRESS
12364  070470  000762                          BR      0.OP2           ;GO DO THE REST
12365                                  ;
12366                                  ; PROCESS 0, COMPUTE OFFSET
12367                                  ;
12368  070472  006205                  0.OFST: ASR     R5              ;GET LOW ORDER BIT
12369  070474  103737                          BCS     0.ERR2          ;ERR IF CLOSED
12370  070476  006305                          ASL     R5              ;RESTORE WORD
12371  070500  012700  000040                  MOV     #' ,R0          ;TYPE ONE BLANK
12372  070504  004537  071630                  JSR     5,0.FTYP        ; AS A SEPARATOR
12373  070510  160504                          SUB     R5,R4           ;COMPUTE
12374  070512  005304                          DEC     R4
12375  070514  005304                          DEC     R4              ;    16 BIT OFFSET
12376  070516  010400                          MOV     R4,R0           ;TYPE A
12377  070520  010402                          MOV     R4,R2           ;SAVE R4
12378  070522  004537  071466                  JSR     5,0.CADV        ;NUMBER IN R0 - WORD MODE
12379  070526  010200                          MOV     R2,R0
12380  070530  006200                          ASR     R0              ;DIVIDE BY TWO
12381  070532  103402                          BCS     0.OF1           ;BRANCH IF ODD
12382  070534  004537  071466                  JSR     5,0.CADV        ;NUMBER IN R0 - BYTE MODE
12383  070540  000137  070240          0.OF1:  JMP     0.DCD1          ;ALL DONE
12384                                  ;
12385                                  ; SEARCHES - $MSK   HAS THE MASK
12386                                  ;            $MSK+2 HAS THE FWA
12387                                  ;            $MSK+4 HAS THE LWA
12388                                  ;
12389  070544  005201                  0.EFF:  INC     R1              ;SET EFFECTIVE SEARCH
12390  070546  000401                          BR      0.WDS
12391  070550  005001                  0.WSCH: CLR     R1              ;SET WORD SEARCH
12392  070552  005702                  0.WDS:  TST     R2              ;CHECK FOR OBJECT FOUND
12393  070554  001621                  0.ERR1: BEQ     0.ERR           ;ERR IF NO OBJECT
12394  070556  013702  067732                  MOV     0.MSK+2,R2      ;SET ORIGIN
12395  070562  013705  067730                  MOV     0.MSK,R5        ;SET MASK
12396  070566  005105                          COM     R5              ;AND COMPLEMENT IT
```

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12397  070570  020237  067734          0.WDS2: CMP     R2,0.MSK+4      ; IS THE SEARCH ALL DONE?
12398  070574  101217                          BHI     0.DCD           ;  YES
12399  070576  011200                          MOV     @R2,R0          ; GET OBJECT
12400  070600  005701                          TST     R1              ;NO
12401  070602  001027                          BNE     0.EFF1          ;BRANCH IF EFFECTIVE SEARCH
12402  070604  010046                          MOV     R0,-(SP)
12403  070606  010403                          MOV     R4,R3           ;EXCLUSIVE OR
12404  070610  040400                          BIC     R4,R0           ; IS DONE
12405  070612  042603                          BIC     (SP)+,R3        ;  IN A VERY
12406  070614  050003                          BIS     R0,R3           ;     FANCY MANNER HERE
12407  070616  040503                          BIC     R5,R3           ;AND RESULT WITH MASK
12408  070620  001016                  0.WDS3: BNE     0.WDS4          ;RE-LOOP IF NO MATCH
12409  070622  010446                          MOV     R4,-(SP)        ;REGISTERS R2,R4, AND R5 ARE SAFE
12410  070624  004537  071722                  JSR     5,0.CRLF        ;TYPE <CR,LF>
12411  070630  010200                          MOV     R2,R0           ;GET READY TO TYPE
12412  070632  004537  071466                  JSR     5,0.CADV        ;  TYPE ADDRESS
12413  070636  012700  000057                  MOV     #'/,R0          ;SLASH TO R0
12414  070642  004537  071630                  JSR     5,0.FTYP        ;TYPE IT
12415  070646  011200                          MOV     @R2,R0          ;GET CONTENTS
12416  070650  004537  071466                  JSR     5,0.CADV        ;TYPE CONTENTS
12417  070654  012604                          MOV     (SP)+,R4        ; RESTORE R4
12418  070656  005722                  0.WDS4: TST     (R2)+           ;INCREMENT TO NEXT CELL AND
12419  070660  000743                          BR      0.WDS2          ;     RETURN
12420  070662  020004                  0.EFF1: CMP     R0,R4           ; IS (X)=K?
12421  070664  001755                          BEQ     0.WDS3          ;TYPE IF EQUAL
12422  070666  010003                          MOV     R0,R3           ;(X) TO R3
12423  070670  060203                          ADD     R2,R3           ;(X)+X
12424  070672  005203                          INC     R3
12425  070674  005203                          INC     R3              ;(X)+X+2
12426  070676  020304                          CMP     R3,R4           ;IS (X)+X+2=K?
12427  070700  001747                          BEQ     0.WDS3          ;BRANCH IF EQUAL
12428  070702  042700  177400                  BIC     #177400,R0      ;WIPE OUT EXTRANEOUS BITS
12429  070706  110000                          MOVB    R0,R0           ;EXTEND SIGN
12430  070710  000257                          CCC
12431  070712  006300                          ASL     R0              ;MULTIPLY BY TWO
12432  070714  005200                          INC     R0              ;ADD TWO
12433  070716  005200                          INC     R0
12434  070720  060200                          ADD     R2,R0           ;ADD PC
12435  070722  020004                          CMP     R0,R4           ;IS THE RESULT A PROPER REL. BRANCH?
12436  070724  000735                          BR      0.WDS3
12437
12438                                  ;
                                       ; PROCESS G - GO
12439                                  ;
12440  070726  105037  071751          0.GO:   CLRB    0.P             ;DISALLOW PROCEED
12441  070732  006204                          ASR     R4              ;CHECK LOW ORDER BIT
12442  070734  103617                          BCS     0.ERR2          ;ERR IF ODD NUMBER
12443  070736  006304                          ASL     R4              ;RESTORE WORD
12444  070740  010437  067722                  MOV     R4,0.UPC        ;SET UP NEW PC
12445  070744  112737  000340  177776          MOVB    #0.STM,ST       ;SET HIGH PRIORITY
12446  070752  004537  071420                  JSR     5,0.RSTT        ;RESTORE TELETYPE
12447  070756  105037  071750          0.TBIT: CLRB    0.T             ;CLEAR BOTH
12448  070762  042737  000020  067724          BIC     #0.TBT,0.UST    ;  T-BIT FLAGS
12449  070770  017737  176742  067742          MOV     @0.ADR1,0.UIN   ;SAVE INSTRUCTION
12450  070776  013777  072012  176732          MOV     0.TRTC,@0.ADR1  ;REPLACE WITH TRAP
12451  071004  012600                  0.GO2:  MOV     (SP)+,R0        ;RESTORE
12452  071006  012601                          MOV     (SP)+,R1        ; R0
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12453  071010  012602                        MOV     (SP)+,R2        ;    THRU
12454  071012  012603                        MOV     (SP)+,R3
12455  071014  012604                        MOV     (SP)+,R4        ;
12456  071016  012605                        MOV     (SP)+,R5        ;     R5
12457  071020  012606                        MOV     (SP)+,SP        ; AND SP
12458  071022  013746  067724                MOV     0.UST,-(SP)     ;     AND STATUS
12459  071026  013746  067722                MOV     0.UFC,-(SP)     ;     AND PC
12460  071032  000006              0.RTIT:   RTT                     ;CHANGED TO RTI FOR 11/20 AND /05
12461                                        ;
12462                                        ; PROCESS P - PROCEED
12463                                        ;   ONLY ALLOWED AFTER A BREAKPOINT
12464                                        ;
12465  071034  105737  071751        0.PROC: TSTB    0.P             ;CHECK LEGALITY OF PROCEED
12466  071040  001645                        BEQ     0.ERR1          ;NOT LEGAL
12467  071042  105037  071751                CLRB    0.P             ;CLEAR PROCEED FLAG
12468  071046  005702                        TST     R2              ;WAS COUNT SPECIFIED?
12469  071050  001402                        BEQ     0.PR1           ;NO
12470  071052  010437  067740                MOV     R4,0.CT         ;YES, PUT AWAY COUNT
12471  071056  112737  000340  177776  0.PR1:  MOVB    #0.STM,ST       ;FORCE HIGH PRIORITY
12472  071064  004537  071420                JSR     5,0.RSTT        ;RESTORE TTY
12473  071070  112737  000340  177776  0.C1:   MOVB    #0.STM,ST       ;SET HIGH PRIORITY
12474  071076  105237  071750                INCB    0.T             ;SET T-BIT FLAG
12475  071102  052737  000020  067724        BIS     #0.TBT,0.UST    ;SET T-BIT
12476  071110  000735                        BR      0.GO2
12477                                        ;
12478                                        ; BREAKPOINT HANDLER
12479                                        ;  A TRT BREAKPOINT CAUSES 0.BRK TO BE ENTERED, WHICH SAVES
12480                                        ;  VARIOUS ODDS AND ENDS, FINDS OUT IF THE BREAKPOINT WAS LEGAL,
12481                                        ;  AND GIVES CONTROL TO THE CMD DECODER
12482                                        ;
12483  071112  012637  067722        0.BRK:  MOV     (SP)+,0.UPC     ;PRIORITY IS 7 UPON ENTRY
12484  071116  012637  067724                MOV     (SP)+,0.UST     ;SAVE STATUS AND PC
12485  071122  004037  071330        0.BK1:  JSR     0,0.SVR         ;SAVE VARIOUS REGISTERS
12486  071126  105737  071750                TSTB    0.T             ;CHECK FOR T-BIT SET
12487  071132  001311                        BNE     0.TBIT          ;JUMP IF SET
12488  071134  013777  067742  176574        MOV     0.UIN,@0.ADR1   ;REMOVE BREAKPOINTS
12489  071142  105737  067726                TSTB    0.PRI           ;CHECK IF PRIORITY
12490  071146  100003                        BPL     0.BK2           ;  IS AS SAME AS USER PGM
12491  071150  113705  067724                MOVB    0.UST,R5        ;PICK UP USER UST IF SO
12492  071154  000407                        BR      0.BK3           ;AND DON'T COMPUTE THE PRIORITY
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 12493  071156  113705  067726          C.BK2:  MOVB    O.PRI,R5        ;OTHERWISE PICK UP ACTUAL PRIORITY
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12494  071162  000257                          CCC                     ;CLEAR CARRY
12495  071164  106005                          RORB    R5              ;SHIFT LOW ORDER BITS
12496  071166  106005                          RORB    R5              ;  INTO
12497  071170  106005                          RORB    R5              ;    HIGH ORDER
12498  071172  106005                          RORB    R5              ;      POSITION
12499  071174  110537  177776        0.BK3:  MOVB    R5,ST           ;PUT THE STATUS AWAY WHERE IT BELONGS
12500  071200  013705  067722                  MOV     0.UFC,R5        ;GET PC, IT POINTS TO THE TRT
12501  071204  005745                          TST     -(R5)           ;SUBTRACT TWO
12502  071206  010537  067722                  MOV     R5,0.UPC        ;FROM THE USER'S PC
12503  071212  020537  067736                  CMP     R5,0.ADR1       ;COMPARE WITH LIST
12504  071216  001417                          BEQ     0.B2            ;JUMP IF FOUND
12505  071220  004537  071366                  JSR     5,0.SVTT        ;SAVE TELETYPE STATUS
12506  071224  004537  071722                  JSR     5,0.CRLF
12507  071230  012704  071754                  MOV     #0.BD,R4        ;ERR, NOTHING FOUND
12508  071234  012703  071755                  MOV     #0.BD+1,R3
12509  071240  004537  071614                  JSR     5,0.TYPE        ;OUTPUT "BE" FOR BAD ENTRY
12510  071244  010500                          MOV     R5,R0
12511  071246  042737  000020  067724        BIC     #0.TBT,0.UST    ;CLEAR OUT ANY POSSIBLE FAKE T-BIT
12512  071254  000420                          BR      0.B3            ;  AND CONTINUE
12513  071256  005337  067740        0.B2:   DEC     0.CT
12514  071262  003302                          BGT     0.C1            ;JUMP IF REPEAT
12515  071264  012737  000001  067740        MOV     #1,0.CT         ;RESET COUNT TO 1
12516  071272  105237  071751                  INCB    0.P             ;ALLOW PROCEED
12517  071276  004537  071366                  JSR     5,0.SVTT        ;SAVE TELETYPE STATUS, R4 IS SAFE
12518  071302  012700  000102                  MOV     #'B,R0
12519  071306  004537  071630                  JSR     5,0.FTYP        ;TYPE "B"
12520  071312  013700  067736                  MOV     0.ADR1,R0       ;GET ADDRESS OF BREAK
12521  071316  004537  071466        0.B3:   JSR     5,0.CADV        ;TYPE ADDRESS
12522  071322  005005                          CLR     R5              ;CLEAR CAD
12523  071324  000137  070234                  JMP     0.DCD           ;GO TO DECODER
12524
12525                                  ;SAVE REGISTERS R0-R6 IN INTERNAL STACK
12526
12527  071330  012637  071746        0.SVR:  MOV     (SP)+,0.XXX     ;PICK REGISTER FROM  TACK AND SAVE
12528  071334  010637  067720                  MOV     SP,0.USP        ;SAVE USER STACK ADDRESS
12529  071340  012706  067720                  MOV     #0.USP,SP       ;SET TO INTERNAL STACK
12530  071344  010546                          MOV     R5,-(SP)        ;SAVE
12531  071346  010446                          MOV     R4,-(SP)        ;  REGISTERS
12532  071350  010346                          MOV     R3,-(SP)        ;1
12533  071352  010246                          MOV     R2,-(SP)        ;  THRU
12534  071354  010146                          MOV     R1,-(SP)        ;       5
12535  071356  013746  071746                  MOV     0.XXX,-(SP)     ;PUT SAVED REGISTER ON STACK
12536  071362  005746                          TST     -(SP)
12537  071364  000200                          RTS     R0
12538
12539                                  ;SAVE TELETYPE STATUS
12540
12541  071366  113737  177560  071752  0.SVTT: MOVB    0.RCSR,0.CSR1   ;SAVE R C/SR
12542  071374  113737  177564  071753          MOVB    0.TCSR,0.CSR2   ;SAVE T C/SR
12543  071402  105037  177560                  CLRB    0.RCSR          ;CLEAR ENABLE AND MAINTENANCE
12544  071406  105037  177564                  CLRB    0.TCSR          ;  BITS IN BOTH C/SR
12545  071412  004537  071722                  JSR     5,0.CRLF        ;TYPE <CR,LF>
12546  071416  000205                          RTS     R5
12547
12548                                  ;RESTORE TELETYPE STATUS
12549
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12550  071420  004537  071722          0.RSTT: JSR     5,0.CRLF                ;<CR,LF> BEFORE RESTORING
12551  071424  105737  177564                  TSTB    0.TCSR          ;WAIT READY ON PRINTER
12552  071430  100375                          BPL     .-4
12553  071432  032737  004000  177560          BIT     #4000,0.RCSR    ;CHECK BUSY FLAG ON READER
12554  071440  001403                          BEQ     0.RSE1          ;SKIP READY LOOP IF NOT BUSY
12555  071442  105737  177560                  TSTB    0.RCSR          ;WAIT READY
12556  071446  100375                          BPL     .-4             ;    ON READER
12557  071450  113737  071752  177560  0.RSE1: MOVB    0.CSR1,0.RCSR   ;RESTORE
12558  071456  113737  071753  177564          MOVB    0.CSR2,0.TCSR   ;  THE STATUS REGISTERS
12559  071464  000205                          RTS     R5
12560
12561                                  ; TYPE OUT CONTENTS OF WORD OR BYTE WITH ONE TRAILING SPACE
12562                                  ; WORD IS IN R0
12563                                  ;
12564  071466  010246                  0.CADV: MOV     R2,-(SP)                ;SAVE R2
12565  071470  012704  072011                  MOV     #0.BUF+6,R4     ;BUFFER START ADDRESS
12566  071474  012746  000060                  MOV     #'0,-(SP)               ;CONSTANT ASCII 0
12567  071500  010002                  0.SPC:  MOV     R0,R2           ; GET
12568  071502  042702  177770                  BIC     #177770,R2      ;    OCTAL CHARACTER
12569  071506  061602                          ADD     (SP),R2         ;CONVERT TO ASCII
12570  071510  110244                          MOVB    R2,-(R4)        ;STORE IN BUFFER
12571  071512  006200                          ASR     R0              ;SHIFT THIS MESS
12572  071514  006200                          ASR     R0              ; RIGHT
12573  071516  006200                          ASR     R0              ;    THREE WHOLE PLACES
12574  071520  020427  072004                  CMP     R4,#0.BUF+1     ;DONE?
12575  071524  101365                          BHI     0.SPC           ;    NO
12576  071526  042700  177776                  BIC     #177776,R0      ;GET LAST BIT
12577  071532  062600                          ADD     (SP)+,R0                ;CONVERT TO ASCII
12578  071534  110044                          MOVB    R0,-(R4)        ;AND PUT IT AWAY
12579  071536  012703  072011                  MOV     #0.BUF+6,R3     ;LWA
12580  071542  004537  071614                  JSR     5,0.TYPE        ;TYPE WHOLE STRING OF CHARACTERS
12581  071546  012602                          MOV     (SP)+,R2        ;RESTORE R2
12582  071550  000205                          RTS     R5
12583
12584                                  ; GENERAL CHARACTER INPUT ROUTINE
12585                                  ; CHARACTER INPUT GOES TO R0
12586                                  ;
12587  071552  105737  177560          0.GET:  TSTB    0.RCSR          ;WAIT FOR
12588  071556  100375                          BPL     .-4             ;    INPUT FROM KEYBOARD
12589  071560  113700  177562                  MOVB    0.RDB,R0        ;GET A CHARACTER
12590  071564  004537  071630                  JSR     5,0.FTYP        ;ECHO CHARACTER
12591  071570  042700  177600                  BIC     #177600,R0      ;STRIP OFF PARITY FROM CHARACTER
12592  071574  001766                          BEQ     0.GET           ;IGNORE NULLS
12593  071576  122700  000040                  CMPB    #40,R0          ;CHECK FOR SPACES
12594  071602  001763                          BEQ     0.GET           ;IGNORE NULLS
12595  071604  122700  000073                  CMPB    #';,R0          ;CHECK FOR SEMI-COLON
12596  071610  001760                          BEQ     0.GET           ;IGNORE THEM IF FOUND
12597  071612  000205                          RTS     R5
12598
12599                                  ; GENERAL CHARACTER OUTPUT ROUTINE
12600                                  ;  ADDRESS OF FIRST BYTE IN R4,
12601                                  ;  ADDRESS OF LAST BYTE IN R3,'(R3)>(R4)
12602                                  ;
12603  071614  020304                  0.TYPE: CMP     R3,R4           ;CHECK FOR COMPLETION
12604  071616  103426                          BLO     0.TYP1          ; EXIT WHEN DONE
12605  071620  112400                          MOVB    (R4)+,R0        ;GET A CHARACTER
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12606  071622  004537  071630                JSR     5,0.FTYP        ;TYPE ONE CHARACTER
12607  071626  000772                        BR      0.TYPE          ;LOOP UNTIL DONE
12608                                ;
12609                                ; TYPE ONLY ONE CHARACTER (CONTAINED IN R0)
12610                                ;
12611  071630  105737  177564      0.FTYP: TSTB    0.TCSR          ;CHECK STATUS
12612  071634  100375                        BPL     .-4             ;WAIT UNTIL READY
12613  071636  110037  177566              MOVB    R0,0.TDB        ;TYPE ONE CHARACTER
12614  071642  120037  000045              CMPB    R0,@#45         ;IS CHAR TO BE FILLED?
12615  071646  001012                        BNE     0.TYP1          ;NO
12616  071650  113746  000044              MOVB    @#44,-(SP)      ;YES, INIT THE COUNT
12617  071654  105737  177564      0.TYP2: TSTB    0.TCSR
12618  071660  100375                        BPL     0.TYP2
12619  071662  105037  177566              CLRB    0.TDB           ;GENERATE NULL FILLER
12620  071666  105316                        DECB    @SP
12621  071670  003371                        BGT     0.TYP2
12622  071672  005726                        TST     (SP)+           ;POP STACK
12623  071674  000205      0.TYP1: RTS     R5
12624                                ;
12625                                ; CLOSE WORD OR BYTE AND EXIT,
12626                                ; UPON ENTERING, R2 HAS NUMERIC FLAG, R4 HAS CONTENTS
12627                                ;
12628  071676  006205      0.TCLS: ASR     R5              ;GET LOW ORDER BIT
12629  071700  103405              BCS     0.TC            ;JUMP IF ALREADY CLOSED
12630  071702  006305              ASL     R5
12631  071704  005702              TST     R2              ;IF NO NUMBER WAS TYPED THERE IS
12632  071706  001401              BEQ     0.CLS1          ;NO CHANGE TO THE OPEN CELL
12633  071710  010415              MOV     R4,@R5          ;STORE WORD
12634  071712  000207      0.CLS1: RTS     PC
12635  071714  005746      0.TC:   TST     -(SP)           ;POP EXTRA CELL FROM STACK
12636  071716  000137  070220              JMP     0.ERR           ;AND SCREAM BLOODY MURDER
12637                                ;
12638                                ; 0.CRLF - TYPE <CR,LF>
12639                                ; 0.CRLS - TYPE <CR,LF>*
12640                                ;
12641  071722  012703  071757      0.CRLF: MOV     #0.CR+1,R3      ;LWA <CR,LF>
12642  071726  000402                      BR      0.CRS
12643  071730  012703  071760      0.CRLS: MOV     #0.CR+2,R3      ;LWA <CR,LF>*
12644  071734  012704  071756      0.CRS:  MOV     #0.CR,R4        ;FWA
12645  071740  004537  071614              JSR     5,0.TYPE        ;TYPE SOMETHING
12646  071744  000205                      RTS     R5
12647                                ;
12648  071746  000000      0.XXX:  .WORD   0               ;TEMPORARY STORAGE
12649  071750     000      0.T:    .BYTE   0               ;  T-BIT FLAG
12650  071751     000      0.P:    .BYTE   0               ;PROCEED FLAG = 0 IF PROCEED NOT ALLOWED
12651                                                      ;               = 1 IF PROCEED ALLOWED
12652  071752     000      0.CSR1: .BYTE   0               ;SAVE CELL - R C/SR
12653  071753     000      0.CSR2: .BYTE   0               ;SAVE CELL - T C/SR
12654                                ;
12655                                .EVEN
12656  071754  042502      0.BD:   .WORD   "BE
12657                                ;
12658  071756     015      0.CR:   .BYTE   015     ;  <CR>
12659  071757     012              .BYTE   012     ;  <LF>
12660  071760     052              .BYTE   '*      ;  *
12661                                ;
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```
12662  071761  057                 O.LGCH: .BYTE   '/      ;  /
12663  071762  015                         .BYTE   015     ;  CARRIAGE RETURN
12664  071763  044                         .BYTE   '$      ;  $
12665  071764  107                         .BYTE   'G      ;  G
12666  071765  012                         .BYTE   012     ;  <LF>
12667  071766  137                         .BYTE   '←      ;  ←
12668  071767  136                         .BYTE   '↑      ;  ↑
12669  071770  117                         .BYTE   'O      ;  O
12670  071771  127                         .BYTE   'W      ;  W
12671  071772  105                         .BYTE   'E      ;  E
12672  071773  102                         .BYTE   'B      ;  B
12673  071774  120                         .BYTE   'P      ;  P
12674          000014              O.CLGT  =       .-O.LGCH                ;TABLE LENGTH
12675                                      ;
12676  071775  123                 O.TL:   .BYTE   'S      ;DO        1
12677  071776  120                         .BYTE   'P      ;NOT       2
12678  071777  115                         .BYTE   'M      ;CHANGE    3
12679  072000  000                         .BYTE   0       ;THE       4
12680  072001  000                         .BYTE   0       ;ORDER     5
12681  072002  102                         .BYTE   'B      ;HERE      6
12682          000006              O.LG    =       .-O.TL
12683                                      ;
12684  072003                      O.BUF:                          ;6 CHAR. BUFFER WITH
12685          072011              .       =       .+6
12686  072011  040                         .BYTE                   ;TRAILING BLANK
12687                                      .EVEN
12688                                      ;
12689  072012  000003              O.TRTC: TRT                     ;TRACE TRAP PROTOTYPE
12690                                      ;
12691                                      ;THE ORDER OF THE FOLLOWING ENTRIES IS CRITICAL
12692                                      ;
12693          067704                      =       O.ODT-40
12694  067704  000000              O.URO:  0       ;USER R0
12695  067706  000000                      0       ;      R1
12696  067710  000000                      0       ;      R2
12697  067712  000000                      0       ;      R3
12698  067714  000000                      0       ;      R4
12699  067716  000000                      0       ;      R5
12700  067720  000000              O.USP:  0       ;USER SP
12701  067722  000000              O.UPC:  0       ;USER PC
12702  067724  000000              O.UST:  0       ;USER ST
12703  067726  000007              O.PRI:  7       ;ODT PRIORITY
12704  067730  000000              O.MSK:  0       ;MASK
12705  067732  000000                      0       ;LOW LIMIT
12706  067734  000000                      0       ;HIGH LIMIT
12707                                      ;
12708                                      ; BREAK POINT LISTS, ADR1 = ADDRESS OF BREAKPOINT,CT = COUNT,
12709                                      ;   UIN = CONTENTS
12710                                      ;
12711  067736  000000              O.ADR1: 0
12712  067740  000000              O.CT:   0
12713  067742  000000              O.UIN:  0
12714          000001                      .END
```

```
ABASE = 177440            2314     2355    2369#
ACDW1 = 000000            2314     2357
ACDW2 = 000000            2314     2358
ACLO  = 000010            1377#
ACPUO?= 000000            2314     2329
ACT11   003436            2533#    3826*
ADDW0 = 000000            2314     2359
ADDW1 = 000000            2314     2360
ADDW10= 000000            2314
ADDW11= 000000            2314
ADDW12= 000000            2314
ADDW13= 000000            2314
ADDW14= 000000            2314
ADDW15= 000000            2314
ADDW2 = 000000            2314     2361
ADDW3 = 000000            2314     2362
ADDW4 = 000000            2314     2363
ADDW5 = 000000            2314     2364
ADDW6 = 000000            2314     2365
ADDW7 = 000000            2314     2366
ADDW8 = 000000            2314
ADDW9 = 000000            2314
ADEVCT= 000000            2314     2320
ADEVM = 000000            2314     2356
AENV  = 000000            2314     2325
AENVM = 000000            2314     2326
AFATAL= 000000            2314     2317
AMADR1= 000000            2314     2342
AMADR2= 000000            2314     2346
AMADR3= 000000            2314     2349
AMADR4= 000000            2314     2352
AMAMS1= 000000            2314     2336
AMAMS2= 000000            2314     2344
AMAMS3= 000000            2314     2347
AMAMS4= 000000            2314     2350
AMSGAD= 000000            2314     2322
AMSGLG= 000000            2314     2323
AMSGTY= 000000            2314     2316
AMTYP1= 000000            2314     2337
AMTYP2= 000000            2314     2345
AMTYP3= 000000            2314     2348
AMTYP4= 000000            2314     2351
APASS = 000000            2314     2319
APRIOR= 000000            2314
APTCSU= 000040           10145    10317#
APTENV= 000001            8902    10092   10138   10273   10315#
APTSIZ= 000200            3754    10314#
APTSPO= 000100           10140    10275   10316#
ASWREG= 000000            2314     2327
ATESTN= 000000            2314     2318
ATTN    003312            2465#    5320    9109    9128    9154
AUNIT = 000000            2314     2321
AUSWR = 000000            2314     2328
AVECT1= 000000            2314     2353
AVECT2= 000000            2314     2354
BADHDR  003306            2456#    3834*   5704*   7349*   9857    9905*
```

```
BADTMO  050026          3908    9920#
BAI     = 000020        1340#   5713    5864
BA16    = 000400        1326#
BA17    = 001000        1327#
BIT0    = 000001        1269#   1323    1355    1374    2523    3947    9780
BIT00   = 000001        1259#   1269
BIT01   = 000002        1258#   1268
BIT02   = 000004        1257#   1267
BIT03   = 000010        1256#   1266
BIT04   = 000020        1255#   1265
BIT05   = 000040        1254#   1264
BIT06   = 000100        1253#   1263
BIT07   = 000200        1252#   1262
BIT08   = 000400        1251#   1261    10027
BIT09   = 001000        1250#   1260    10035   10103
BIT1    = 000002        1268#   1356    2524
BIT10   = 002000        1249#   1328    1346    1365    1397    1411    1425    1438    1452    5294    10080
BIT11   = 004000        1248#   1329    1347    1366    1383    1398    1412    1426    1439    1453    5296    10042
BIT12   = 010000        1247#   1330    1348    1367    1399    1413    1427    1440    1454
BIT13   = 020000        1246#   1331    1349    1368    1384    1400    1414    1428    1441    1455    10087
BIT14   = 040000        1245#   1332    1350    1369    1385    1401    1415    1429    1442    1456    1466    9617    9649
                        10013
BIT15   = 100000        1244#   1333    1334    1351    1370    1386    1402    1469    4826    9617    9645
BIT2    = 000004        1267#   1357    1376    2525
BIT3    = 000010        1266#   1339    1358    1377
BIT4    = 000020        1265#   1340    1359    1378    1391    1419    1446    6579
BIT5    = 000040        1264#   1341    1360    1379    1392    1406    1420    1433    1447
BIT6    = 000100        1263#   1324    1342    1361    1380    1393    1407    1421    1434    1448
BIT7    = 000200        1262#   1325    1343    1362    1381    1394    1408    1422    1435    1449    3937
BIT8    = 000400        1261#   1326    1344    1363    1382    1395    1409    1423    1436    1450
BIT9    = 001000        1260#   1327    1345    1364    1396    1410    1424    1437    1451    5290
BPTVEC= 000014          1276#
BSE     = 000200        1362#
BSERR   001456          2437#   6856*   6862*   7131
BSE22H  002304          2451#   6808    6859    6878    9643
BSE22S  054352          6869    9647    10941#
BYP     044236          4022    4050    4054    4069    4130    4157    4161    4165    4169    9181#
BYPCER  001462          2440#   3935*   4181*   4905*   4940*   5508*   5589*   6904*   6985*   8800*   9298
BYPFMT  001464          2441#   5994*   6084*   6311*   6401*   9615
BYPT16  001340          2385#   3667*   3672*   3677*   3682*   3687*   3691*   4961
BYT16   007014          1483    3671#
BYT16A  007034          1487    3676#
CALADD  001366          2398#   6000*   6317*   7143*   7173*   7195    7279    7297    7334    7341*   7352*   9611    9621
                        9623    9671
CALDIF  001360          2395#   5062*   5077    5108*   5138    6110*   6426*   6622*   7177*   7739*   8075*   8425*   8779*
                        11852   11876
CCLR    = 100000        1334#   4619    4644    4671    4684    4757    4836    4873    4984    5021    5069    5083    5115
                        5144    5195    5232    5335    5341    5357    5421    5530    5560    5626    6165    6431    6487
                        6683    6926    6956    7022    7254    7570    7788    7913    8124    8249    8474    8599    8821
                        8827    8843    9338    9346    9354    9362    9861    9876
CCYL    001354          2393#   4974*   5056*   5057    5063    5102*   5103    5109    7865*   8201*   8551*
CDT     = 002000        1328#   4038    4140    4220    4222    4501
CERR    = 100000        1333#   4001    4114    4449    4524    4571    5396    5728    5782    5873    5917    6011    6047
                        6140    6210    6254    6328    6364    6457    6521    6563    6658    6741    6819    7067    7159
                        7229    7304    7367    7430    7443    7545    7615    7665    7763    7832    7888    7957    8005
                        8099    8168    8224    8293    8341    8403    8449    8518    8574    8643    8691    8761    9300
```

```
                9395
CFMT   = 010000 1330*  5869   5880   5914   5936
CHKFLG  001466 2445*  9191*  9274   9278   9282
CHKMSG  044252 4332   4610   4633   4662   4706   4733   4859   4891   4925   5007   5039   5218   5250
               5299   5409   5439   5523   5548   5576   5612   5644   5743   5809   5897   5953   6026
               6122   6153   6183   6270   6343   6443   6470   6505   6581   6642   6671   6701   6831
               6919   6944   6972   7008   7040   7208   7242   7272   7319   7527   7558   7588   7751
               7776   7806   7875   7901   7931   8087   8112   8142   8211   8237   8267   8437   8462
               8492   8561   8587   8617   8806   9191*
CKCERR  045012 9059   9063   9075   9080   9298*
CKSWR  = 104407 10012  10076  10102  10930*
CLEAR  = 000005 1311*  4646   4875   5023   5085   5146   5234   5343   5423   5532   5628   6167   6489
               6685   6928   7024   7256   7572   7790   7915   8126   8251   8476   8601   8829   9878
CLKOF   047302 4683   4697   4724   4750   4798   4803   9751*
CLKON   047206 4674   4688   4715   4741   9729*
CLOCK   047246 3857   9740*
CLRFLG  043076 3775   8914*
COE    = 001000 1364*
COUNT   001372 2402*  4672*  4686*  4713*  4739*  9741*  9743*
CR     = 000015 1184*  10184  10194  10944  10952  10954  10958  10968  10977  10984  10992  10997  11002
               11007  11013  11020  11024  11028  11034  11039  11043  11047  11050  11055  11060  11064
               11068  11074  11079  11082  11087  11091  11093  11096  11100  11105  11110  11120  11128
               11136  11140  11146  11150  11154  11157  11164  11181  11188  11191  11410  11479  11611
               11616  11622  11629
CRLF   = 000200 1185*  10155  10194
CTO    = 004000 1329*  9304
CYLADD  001364 2397*  4344   4639   4868   4932   5016   5072   5118   5227   5311   5379   5446   5621
               5756   5822   5965   6190   6191   6276   6482   6587   6708   7017   7279   7595   7813
               7938   8149   8274   8499   8624   8815   9475*  9476*  9477*  9478*  9479*  9480*  9498*
               9499*  9500*  9501*  9502*  9503*
CYLDIF  001362 2396*  4341   4936   5077   5127   5133   5138   5308   5415   5753   5819   5962   6129
               6159   6479   6649   6677   7215   7248   7534   7564   7782   7907   8118   8243   8468
               8593   8812   9460*  9461*  9462*  9463*  9464*  9465*  9466   9468*  9485*  9486*  9487*
               9488*  9489*  9490*  9491   9493*
CYLINV  042164 8058   8733*
DATAO   001444 2430*  5722   5835
DATAO1  001446 2431*
DATAI   001450 2432*  5865   5972
DATCMD  043472 5725   5780   5870   5915   6008   6045   6208   6325   6362   6519   6816   7156   7301
               7441   7613   7830   7955   8166   8291   8516   8641   9039*
DCK    = 100000 1370*
DCLO   = 000020 1378*
DCPAR  = 020000 1331*  4549   4568
DDISP  = 177570 1191*  2289   3742
DDPCH   003434 2532*  3822*  4009   4213
DDT    = 000400 1382*  4475   4483   4510   4518
DDUMP   003432 2531*  3788*  8914
DF1     066744 2573   2579   2585   2591   2596   2602   2608   2614   2682   2688   2699   2704   2709
               2714   2719   2724   2729   2734   2739   2744   2749   2859   2884   2909   2934   2994
               3009   3064   3069   3074   3109   3139   11939*
DF10    067070 2620   2626   2631   2636   2641   2677   2694   2804   2854   2969   2974   2979   2984
               2989   2999   3004   3014   3019   3024   3029   3079   3099   3104   3119   3124   3129
               3134   3164   3169   3174   3184   3259   3264   3299   3314   3319   3324   3329   3364
               3374   3379   3400   3405   3470   3566   3571   3576   3591   3596   3606   3611   3616
               3621   3626   11988*
DF12    067110 3084   11997*
```

```
DF14    067134  3229  12008#
DF15    067154  3194  3199  3219  3224  3334  12018#
DF16    067174  3179  3214  12027#
DF17    067214  3339  3354  12036#
DF2     066760  3651  3656  3662  11946#
DF20    067240  2646  2651  2656  2661  2784  2789  2814  2819  2824  2829  2834  2839  2844
                2849  2864  2869  2874  2879  2889  2894  2899  2904  2914  2919  2924  2929
                2949  2954  2959  2964  3034  3039  3044  3049  3144  3149  3154  3159  3234
                3239  3244  3249  3274  3279  3284  3289  3304  3309  3430  3435  3440  3445
                3485  3490  3495  3500  3505  3510  3515  3520  3525  3530  3535  3540  3545
                3550  3631  3636  12046#
DF21    067274  3581  3586  12060#
DF22    067314  2666  2671  2754  2759  2774  2779  2939  2944  3054  3059  3089  3094  3189
                3204  3209  3480  3555  3560  3641  3646  12068#
DF23    067350  2794  2799  2809  12083#
DF3     067004  3369  11957#
DF4     067010  3601  11959#
DF5     067024  3349  11966#
DF6     067044  2764  2769  3254  3269  3294  3384  3389  3395  3410  3415  3420  3425  3450
                3455  3475  11975#
DH1     063767  2571  2577  2583  2589  2594  2600  2606  2612  2680  2686  2697  2702  2707
                2712  2717  2722  2727  2732  2737  2742  2747  2857  2882  2907  2932  2992
                3007  3062  3067  3072  3107  3137  3227  3579  3584  3599  11641#  11950  11968
                11977  11990  11999  12020  12029  12040  12048  12070  12085
DH10    064250  2832  2837  2842  2847  2852  3202  3207  11673#
DH11    064277  2862  2867  2872  2877  3614  11677#
DH12    064336  2887  2892  2897  2902  3619  11683#
DH13    064377  2912  2917  2922  2927  3624  11689#
DH14    064446  2752  2757  2762  2767  2937  2942  2987  3002  3087  3092  3382  3387  3473
                11696#
DH16    064476  2797  2957  2962  3629  3634  3639  3644  11700#
DH17    064540  2772  2777  2792  2802  2997  3122  3297  3302  3307  3312  3317  3322  3377
                3523  3528  11706#
DH18    064560  2618  2624  2629  2634  2639  3604  11709#
DH19    064601  2692  2967  11712#
DH2     064004  11644#  11941  11952  11961  11970  11981  11992  12003  12012  12022  12031  12042  12056
                12064  12078  12093
DH20    064620  2972  11715#
DH21    064647  2675  2977  3012  3017  11719#
DH22    064675  3102  3117  3372  3468  3483  3488  3513  3518  11723#
DH23    064723  3367  11727#
DH25    064744  3022  3027  3032  3037  3042  3047  3052  3057  3252  3257  3262  3347  3393
                11730#
DH26    064763  2782  2787  2947  2952  3327  3332  11733#
DH28    065007  11737#  12050  12072  12087
DH29    065017  11739#  12054  12076  12091
DH3     064054  11651#  11943  11954  11963  11972  11983  11994  12005  12014  12024  12033  12044  12058
                12066  12080  12095
DH30    065027  3182  3187  3192  3197  3478  3503  3508  3543  3548  3594  11741#
DH32    065055  11745#  12052  12074  12089
DH33    065102  3232  3237  3242  3247  3267  11749#
DH34    065122  3077  11752#
DH35    065146  3082  11756#
DH36    065174  11760#  12001
DH37    065217  3097  11764#
DH38    065263  3142  3147  3152  3157  3162  3167  3172  3564  11771#
```

```
DH39    065301  3217  3222  3493  3498  3533  3538  3553  3558  3589  11774#
DH40    065330  11778#  12010
DH41    065364  3272  3277  3282  3287  3292  3398  3574  11783#
DH42    065405  3352  11786#
DH44    065445  3362  11792#  12038
DH45    065515  3177  11799#
DH46    065574  3212  11807#
DH48    065641  3403  3408  3413  3418  3423  3428  3433  3438  3443  3448  3453  11814#
DH49    065673  11819#  11948
DH51    065747  3127  3132  11827#
DH52    065776  1183:#  12062
DH53    066026  3337  11835#
DH6     064125  11658#  11979
DH8     064160  2644  2649  2654  2659  2664  2669  2807  11663#
DH9     064204  2812  2817  2822  2827  2982  3569  3609  11667#
DI    = 040000  1332#
DISPLA  001142  2289#  3742*  3750*  10057*  10079*
DISPRE  000174  1478#  3750
DLT   = 100000  1351#  5793  5928  6057  6221  6374  6532  7454  7626  7843  7968  8179  8304
                8529  8654
DLY     044220  3997  4110  9172#  9175
DMD   = 000040  1392#
DOCMD   043434  4285  4416  4593  4647  4775  4839  4876  4909  4987  5024  5065  5086  5111
                5147  5198  5235  5274  5338  5344  5390  5424  5514  5533  5558  5629  5665
                5881  5937  6115  6168  6248  6429  6490  6557  6635  6686  6735  6910  6929
                6954  7025  7061  7094  7201  7257  7361  7424  7520  7573  7659  7744  7791
                7868  7916  7999  8080  8127  8204  8252  8335  8397  8430  8477  8554  8602
                8685  8755  8782  8824  8830  9028#  9327  9848  9864  9879
DOSEEK  036370  8057  8059#
DOTIM   003470  255.#  3856*  3865*  4616
DRA   = 000001  1374#  4044  4147
DRDY  = 000200  1381#
DRIVS   003442  2535#  3942*  3949*  3966  3981*  4011*  4030  4134*  4200  8870  8969*
DRIV0   003444  2540#  3838  3944  3983  4096  8952
DRIV1   003446  2541#
DRIV2   003450  2542#
DRIV3   003452  2543#
DRIV4   003454  2544#
DRIV5   003456  2545#
DRIV6   003460  2546#
DRIV7   003462  2547#
DROT  = 000040  1379#
DRPAR = 000010  1358#
DRVMSK= 000007  1338#  4004  4117
DRVPTR  001346  2389#  3838*  4205  4223*
DSC   = 040000  1385#
DSWR  = 177570  1190#  2288  3741
DTE   = 010000  1367#
DTYE  = 000040  1360#  4036  4138  4486  4521
DT1     066076  2572  2578  2584  2590  2595  2601  2607  2613  2619  2625  2630  2635  2640
                2676  2681  2687  2693  2698  2703  2708  2713  2718  2723  2728  2733  2738
                2743  2748  2803  2853  2858  2883  2908  2933  2968  2973  2978  2983  2988
                2993  2998  3003  3008  3013  3018  3023  3028  3063  3068  3073  3078  3098
                3103  3108  3118  3123  3128  3133  3138  3163  3168  3173  3178  3183  3193
                3198  3213  3218  3223  3258  3263  3298  3313  3318  3323  3328  3333  3338
                3348  3353  3363  3373  3378  3399  3404  3469  3565  3570  3575  3590  3595
```

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                    3600    3605    3610    3615    3620    3625    3650    3655    3661    11845#
DT10    066430      3585    11892#
DT11    066474      3368    11900#
DT13    066500      2645    2650    2655    2660    2783    2788    2813    2818    2823    2828    2833    2838    2843
                    2848    2863    2868    2873    2878    2888    2893    2898    2903    2913    2918    2923    2928
                    2948    2953    2958    2963    3033    3038    3043    3048    3143    3148    3153    3158    3233
                    3238    3243    3248    3273    3278    3283    3288    3303    3308    3429    3434    3439    3444
                    3484    3489    3494    3499    3504    3509    3514    3519    3524    3529    3534    3539    3544
                    3549    3630    3635    11901#
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                    3203    3208    3479    3554    3559    3640    3645    11912#
DT15    066650      2793    2798    2808    11924#
DT4     066136      2763    2768    3253    3268    3293    3409    3414    3419    3424    3449    3454    11852#
DT6     066204      3083    11860#
DT7     066250      3228    11868#
DT8     066316      3383    3388    3394    3474    11876#
DT9     066364      3580    11884#
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D.BRHM= 000100      1421#   4326    4607    4627    4656    4703    4730    4853    4885    4915    5001    5033    5212
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                    6020    6119    6147    6177    6264    6337    6440    6464    6499    6574    6639    6665    6695
                    6825    6916    6938    6969    7002    7034    7205    7236    7266    7313    7524    7552    7582
                    7748    7770    7800    7872    7895    7925    8084    8106    8136    8208    8231    8261    8434
                    8456    8486    8558    8581    8611    8803
D.CART= 000400      1423#   4326    4607    4627    4656    4703    4730    4853    4885    4915    5001    5033    5212
                    5244    5284    5403    5433    5520    5542    5573    5606    5638    5737    5803    5891    5947
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                    6825    6916    6938    6969    7002    7034    7205    7236    7266    7313    7524    7552    7582
                    7748    7770    7800    7872    7895    7925    8084    8106    8136    8208    8231    8261    8434
                    8456    8486    8558    8581    8611    8803
D.DDT = 000400      1409#   4249    4472    4480    4507    4515
D.DOOR= 000200      1422#   4326    4607    4627    4656    4703    4730    4853    4885    4915    5001    5033    5212
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                    7748    7770    7800    7872    7895    7925    8084    8106    8136    8208    8231    8261    8434
                    8456    8486    8558    8581    8611    8803
D.DRA = 000040      1406#   4321    4324    4605    4625    4654    4701    4728    4851    4883    4913    4999    5031
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                    5945    6018    6117    6145    6175    6262    6335    6438    6462    6497    6572    6637    6663
                    6693    6823    6914    6936    6967    7000    7032    7203    7234    7264    7311    7522    7550
                    7580    7746    7768    7798    7870    7893    7923    8082    8104    8134    8206    8229    8259
                    8432    8454    8484    8556    8579    8609    8801
D.DRDY= 000200      1408#   4625    4654    4744    4851    4883    4913    4999    5031    5210    5242    5278    5401
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                    6335    6462    6497    6572    6663    6693    6823    6914    6936    7000    7032    7234    7264
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                    8579    8609    8801
D.DROT= 020000      1441#
D.DSC = 040000      1415#   4625    4851    4913    4999    5210    5278    5401    5518    5571    5604    6145    6262
                    6462    6663    6914    6967    7000    7234    7550    7768    7893    8104    8229    8454    8579
                    8796    8801
D.FLT = 000200      1435#   4562    4914    5283    5519    5572    6915    6968    8790    8802
D.FORM= 001000      1410#   5883    5939
D.FWD = 002000      1425#   4677    4691    4718    4730    6119    6639    7205    7748    8084    8558
D.HDFL= 000200      1449#
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D.IDAE= 000040  1433#  5283  5353  8787  8802  8839
D.ILF = 000400  1436#
D.LIMD= 020000  1455#  5574  5582  6970  6978  9532
D.LOAD= 010000  1427#  9566
D.MHD = 000400  1450#
D.NMOV= 010000  1454#  5574  6970
D.OFF = 002000  1411#
D.PAR = 001000  1437#  4546  4565  4914  5519  6915
D.PIP = 020000  1414#  4701  4728  5571  6117  6438  6637  6967  7203  7522  7746  7870  8082
                8206   8432  8556  8793
D.PLO = 004000  1453#
D.REV = 004000  1426#  4703  5573  6440  6969  7524  7872  8208  8434
D.RTZ = 020000  1428#  4703  4730  4844  4992  5203  6434  6440  9869
D.SECT= 000020  1446#
D.SKI = 002000  1438#  5283  5572  6968  8802
D.SPIN= 010000  1413#  4597  4605  4625  4654  4701  4728  4760  4851  4883  4913  4999  5031
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                5945   6018  6117  6145  6175  6262  6335  6438  6462  6497  6572  6637  6663
                6693   6823  6914  6936  6967  7000  7032  7203  7234  7264  7311  7522  7550
                7580   7746  7768  7798  7870  7893  7923  8082  8104  8134  8206  8229  8259
                8432   8454  8484  8556  8579  8609  8801
D.SPLS= 010000  1440#
D.SPOK= 001000  1424#  4627  4656  4703  4730  4853  4885  4915  5001  5033  5212  5244  5284
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                6147   6177  6264  6337  6440  6464  6499  6574  6639  6665  6695  6825  6916
                6938   6969  7002  7034  7205  7236  7266  7313  7524  7552  7582  7748  7770
                7800   7872  7895  7925  8084  8106  8136  8208  8231  8261  8434  8456  8486
                8558   8581  8611  8803  9582
D.SSP = 000020  1419#  4627  4656  4703  4730  4853  4885  4915  5001  5033  5212  5244  5284
                5403   5433  5520  5542  5573  5606  5638  5737  5803  5891  5947  6020  6119
                6147   6177  6264  6337  6440  6464  6499  6574  6639  6665  6695  6825  6916
                6938   6969  7002  7034  7205  7236  7266  7313  7524  7552  7582  7748  7770
                7800   7872  7895  7925  8084  8106  8136  8208  8231  8261  8434  8456  8486
                8558   8581  8611  8803
D.SUNS= 040000  1456#
D.TIB = 002000  1452#
D.UNLD= 040000  1429#  5565  5573  6961  6969
D.UNS = 040000  1442#
D.VV  = 000100  1407#  4319  4324  4406  4419  4605  4625  4654  4701  4728  4851  4883  4913
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                5801   5889  5945  6018  6117  6145  6175  6262  6335  6438  6462  6497  6572
                6637   6663  6693  6823  6914  6936  6967  7000  7032  7203  7234  7264  7311
                7522   7550  7580  7746  7768  7798  7870  7893  7923  8082  8104  8134  8206
                8229   8259  8432  8454  8484  8556  8579  8609  8801
D.WCUR= 000040  1447#
D.WGAT= 000100  1448#
D.WLE = 004000  1439#
D.WRL = 004000  1412#
D.XERR= 001000  1451#
ECCW  = 020000  1400#
ECH   = 000100  1361#
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EM10    057521  2605  11230#
EM11    057564  2611  11236#
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EM14	057703	2628	11251#											
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		3301	3427	3512	3532	3542	11264#							
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		3432	3482	3492	3502	3522	11267#							
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                6694# 6824# 6915# 6937# 6968# 7001# 7033# 7204# 7235# 7265# 7312# 7523# 7551#
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                8433# 8455# 8485# 8557# 8580# 8610# 8802# 9215  9217# 9244  11901 11912 11924
E.B1    003420  2514# 4327# 4608# 4628# 4657# 4704# 4731# 4854# 4886# 4916# 5002# 5034# 5213#
                5245# 5285# 5404# 5434# 5521# 5543# 5574# 5607# 5639# 5738# 5804# 5892# 5948#
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E.B2    003424  2516# 4329# 4630# 4659# 4856# 4888# 4922# 4923# 5004# 5036# 5215# 5247# 5287#
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                8584# 8614# 9223  9225# 11912 11924
E.B3    003430  2518# 4330# 4631# 4660# 4857# 4889# 5005# 5037# 5216# 5248# 5290# 5294# 5296#
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FATT2   044140  5394  6138  6252  6455  6561  6656  6739  7065  7227  7365  7428  7543  7663
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                8061# 8072  8200  8201  8274  8286  8312  8411# 8422  8550  8551  8624  8636
                8662  8769# 11852 11876 11892
FRDY    043530  3976  3990  3999  4103  4112  4503  9031  9042  9054# 9057  9390
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FSPOK   046460  4294  4784  9579# 9587
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GBA     043336  3808  8992#
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                10936
GO    = 000001  1323#
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                    9868
GSTAT1  045130      9193    9336*
GSTAT2  045360      9341    9349    9357    9364    9373*
GTSWR = 104406      8936   10928*
HASOF   003340      2483*   9093*   9109   11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HBA     003330      2479*   9089*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HCS1    003322      2476*   3993*   3994*   3995    4001    4106*   4107*   4108    4114    4284*   4415*   4449    4524
                    4549    4568    4571    4592*   4646*   4774*   4838*   4875*   4908*   4986*   5023*   5064*   5085*
                    5110*   5146*   5197*   5234*   5273*   5337*   5343*   5389*   5396    5423*   5513*   5532*   5557*
                    5628*   5664*   5724*   5728    5779*   5782    5869*   5873    5880*   5914*   5917    5936*   6007*
                    6011    6044*   6047    6114*   6140    6167*   6207*   6210    6247*   6254    6324*   6328    6361*
                    6364    6428*   6457    6489*   6518*   6521    6556*   6563    6634*   6678    6685*   6734*   6741
                    6815*   6819    6909*   6928*   6953*   7024*   7060*   7067    7093*   7155*   7159    7200*   7229
                    7256*   7300*   7304    7360*   7367    7423*   7430    7440*   7443    7519*   7545    7572*   7612*
                    7615    7658*   7665    7743*   7763    7790*   7829*   7832    7867*   7888    7915*   7954*   7957
                    7998*   8005    8079*   8099    8126*   8165*   8168    8203*   8224    8251*   8290*   8293    8334*
                    8341    8396*   8403    8429*   8449    8476*   8515*   8518    8553*   8574    8601*   8640*   8643
                    8684*   8691    8754*   8761    8781*   8823*   8829*   9028*   9029    9039*   9040    9086*   9300
                    9304    9326*   9373*   9374*   9375    9395    9847*   9863*   9878*  11846   11854   11862   11870
                   11878   11886   11894   11905   11917   11930
HCS2    003324      2477*   4040    4042    4046    4058    4143    4145    4149    4152    4435    4452    9087*   9309
                    9313   11846   11854   11862   11870   11878   11886   11894   11905   11917   11930
HDA     003332      2480*   9090*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HDB     003344      2485*
HDC     003342      2484*   9094*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HDS     003334      2481*   4044    4147    4475    4483    4510    4518    9091*  11846   11854   11862   11870   11878
                   11886   11894   11905   11917   11930
HDTAB   001470      2447*   5714    5722*   5996    6071    6313    6388    7149    7295    9599
HDWD    001454      2435*   5836*   5837    5973*   5974    6073*   6075    6234*   6236    6390*   6392   11868
HD1     001434      2425*   9601*   9602*   9603*   9604*   9605*   9606*   9613
HEAD    001430      2423*   5705*   5716*   5717    5718*   5720    5761*   5762    5765*   5774*   5775    5776*   5826*
                    5827    5828*   5833    5844*   5845    6001*   6318*   7144*   7151*   7152    7153*   7166*   7167
                    7174*   7196*   7197    7198*   7292*   7293    7294*   7331*   7332    7338    7340*   7415*   7416
                    9601    9676
HEADA   001432      2424*   4348    5258    5321    9518*   9519*   9520*   9521*
HER     003336      2482*   4036    4138    4486    4521    9092*  11846   11854   11862   11870   11878   11886   11894
                   11905   11917   11930
HMR1    003346      2486*   9095*  11846   11854   11862   11870   11878   11886   11894   11905   11917   11930
HMR2    003350      2487*   4003    4116    4319    4373    4406    4419    4472    4480    4507    4515    4597    4677
                    4691    4718    4744    4760    4844    4992    5203    5565    5883    5939    6434    6961    8793
                    8796    9073*   9078*   9096*   9343    9351    9359    9366    9460    9549    9566    9582    9869
                   11846   11854   11862   11870   11878   11886   11894   11905   11917   11930
HMR3    003352      2488*   4546    4562    4565    5353    8787    8790    8839    9074*   9079*   9097*   9344    9352
                    9360    9367    9406    9475    9532   11846   11854   11862   11870   11878   11886   11894   11905
                   11917   11930
HOLD    043664      9058    9062    9086*   9337
HPAT    003356      2490*   9099*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HPEN    050006      7389    7467    9905*
HPEND   003310      2458*   3835*   7344    7348*   9859*   9906
HPOS    003354      2489*   9098*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
HT    = 000011      1182*  10153   10194
HVRC  = 000400      1363*
HWC     003326      2478*   9088*  11849   11857   11865   11873   11881   11889   11897   11908   11920   11933
```

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HZ      001370          2400*  4672   4686   4713   4739   9743
H.A0    003372          2500*  9234   9366*  11901  11915  11927
H.A1    003376          2502*  9254   9359*  11901  11915  11927
H.A2    003402          2504*  9351*  9485   11915  11927
H.A3    003406          2506*  9343*
H.B0    003374          2501*  9244   9367*  11901  11915  11927
H.B1    003400          2503*  5582   6979   9264   9360*  11901  11915  11927
H.B2    003404          2505*  9352*  9498   11915  11927
H.B3    003410          2507*  9344*  9508   9518   11927
IDAE  = 002000          1365*
IE    = 000100          1324*
ILF   = 000001          1355*
INTER   050156          9020   9964*
IOTVEC= 000020          1277*  3723*  3724*
IR    = 000100          1342*
LC      012054          4237*  4247*  4257*  6712   6813   6952   7074   7334   7506   7672   8318   8394   8411
                        8698
LCLKF   003464          2549*  3843*
LCM1    012052          4236*  4246*  4256*  6908   7507   8412
LCP1    012056          4238*  4248*  4258*  5156   5161   8770
LCVEC   001330          2377*  3844
LF    = 000012          1183*  10188  10194  10944  10952  10954  10958  10968  10977  10984  10992  10997  11002
                        11007  11013  11020  11024  11028  11034  11039  11043  11047  11050  11055  11060  11064
                        11068  11074  11079  11082  11087  11091  11093  11096  11100  11105  11110  11120  11128
                        11136  11140  11146  11150  11154  11157  11164  11181  11188  11191  11410  11479  11611
                        11616  11622  11629
LIMERR  001460          2438*  5698   7127   9528*  9536*
LKS     001326          2375*  3842   9732*  9753*
LPFLG   001410          2411*  4791   4799*  4804*  5507*  5673*  6282   6288*  6293*  6592   6597*  6602*  6757
                        6765*  6771*  6903*  7083   7102*  7383   7397   7403*  7409*  7475*  7480*  7681   7689*
                        7695*  8021   8027*  8032*  8037*  8042*  8357   8363*  8368*  8373*  8378*  8707   8713*
                        8718*  8723*  8728*  9812*
MASK    012064          4242*  4252*  4261*  8850   9466   9491
MASK1   012066          4243*  4253*  4262*  9461   9476   9486   9499
MC      012060          4240*  4250*  4259*  7982
MCLK  = 000400          1395*
MC1     012062          4241*  4251*  4260*  4943
MDS   = 001000          1345*  4040   4143   9313
MDTST   007056          1491   3681*
MDTSTA  007076          1493   3686*
MEMBAS= 172100          2381*  3761   3770
MEMERR  050114          3764   9950*
MEMPAR  007430          3758*
MEMVEC= 000114          2380*  3764*  3765*
MERD  = 001000          1396*
MESMSK= 000017          1390*
MEWD  = 002000          1397*
MIND  = 000200          1394*
MODTST  001342          2386*  3668*  3673*  3678*  3683*  3688*  3692*  7123   7190   7219   7327   7502   8056
MSG1    054516          8928   10944*
MSG10   055732          3941   3980   11064*
MSG11   055761          9991   11068*
MSG12   056021          7139   11074*
MSG13   056052          3866   11079*
MSG14   056130          9181   11087*
MSG15   056153          4060   4224   11091*
```

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MSG16   056165            4370   11093#
MSG17   056206            6877   11096#
MSG18   056235            5731    5785    5797    5876    5920    5932    6014    6050    6061    6213    6225    6331    6367
                          6378    6524    6536    7162    7307    7446    7458    7618    7630    7835    7847    7960    7972
                          8171    8183    8296    8308    8521    8533    8646    8658   11100#
MSG19   056271            4202   11105#
MSG2    055405            3789   11024#
MSG20   056321            7125   11110#
MSG21   056470            7504   11128#
MSG22   056550            7501   11136#
MSG23   056600            4968   11140#
MSG3    055466            3805   11034#
MSG4    055520            3807   11039#
MSG5    055546            3809   11043#
MSG6    055573            9966   11047#
MSG7    055611            3824   11050#
MSG74   056640            9839   11146#
MSG75   056667            9841   11150#
MSG76   056711            9891   11154#
MSG77   056727            9896   11157#
MSG8    055646            4970   11055#
MSG9    055704            4963   11060#
MSP   = 000100            1393#
MULT6   047164            9694    9720#
M.ALGN= 040000            1466#
M.DRV = 000007            1460#
M.HEAD= 007000            1468#   9519
M.ID  = 000003            1465#
M.PAR = 100000            1469#   9782
M.SECT= 000760            1467#   9407    9509
M.SER = 077770            1461#
NED   = 010000            1348#   4046    4058    4149    4152    9309
NEM   = 004000            1347#
NUDRV   011520            4072    4181#   8872
NXF   = 000004            1357#
OFFSET= 000015            1315#
OFST  = 000004            1376#
OPI   = 020000            1368#
OR    = 000200            1343#
O.ADR1  067736           12226#  12277#  12279#  12449   12450#  12488#  12503   12520   12711#
O.BACK  070462           12321   12362#
O.BD    071754           12507   12508   12656#
O.BKPT  070170           12272#  12325
O.BK1   071122           12220   12485#
O.BK2   071156           12490   12493#
O.BK3   071174           12492   12499#
O.BRK   071112           12237   12483#
O.BUF   072003           12565   12574   12579   12684#
O.B2    071256           12504   12513#
O.B3    071316           12512   12521#
O.CADV  071466           12338   12355   12378   12382   12412   12416   12521   12564#
O.CLGL  070304           12295   12297   12305#
O.CLGT= 000014           12309   12674#
O.CLS1  071712           12632   12634#
O.CR    071756           12641   12643   12644   12658#
O.CRET  070416           12316   12345#
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0.CRLF  071722          12353   12410   12506   12545   12550   12641#
0.CRLS  071730          12290   12643#
0.CRS   071734          12642   12644#
0.CSR1  071752          12541#  12557   12652#
0.CSR2  071753          12542#  12558   12653#
0.CT    067740          12470#  12513#  12515#  12712#
0.C1    071070          12473#  12514
0.DCD   070234          12278   12280   12290#  12347   12398   12523
0.DCD1  070240          12291#  12339   12383
0.EFF   070544          12324   12389#
0.EFF1  070662          12401   12420#
0.ENTR  067750          12217#
0.ERR   070220          12264   12275   12287#  12310   12335   12393   12636
0.ERR1  070554          12393#  12466
0.ERR2  070374          12335#  12369   12442
0.FTYP  071630          12289   12357   12372   12414   12519   12590   12606   12611#
0.GET   071552          12243   12293   12587#  12592   12594   12596
0.GO    070726          12318   12440#
0.GO2   071004          12451#  12476
0.LG  = 000006          12247   12682#
0.LGCH  071761          12306   12662#  12674
0.LGDR  070334          12313   12315#  12327
0.LGL = 000030          12327#
0.LGL1  070306          12306#  12311
0.LGL2  070326          12307   12312#
0.MSK   067730          12394   12395   12397   12704#
0.ODT   067744           1489   12215#  12693
0.OFST  070472          12322   12368#
0.OF1   070540          12381   12383#
0.OP1   070430          12319   12351#
0.OP2   070436          12268   12353#  12364
0.ORPC  070142          12260#  12320
0.P     071751          12235#  12440#  12465   12467#  12516#  12650#
0.PRI   067726          12227   12489   12493   12703#
0.PROC  071034          12326   12465#
0.PR1   071056          12469   12471#
0.RALL  070210          12238   12273   12279#
0.RCSR= 177560          12205#  12541   12543#  12553   12555   12557#  12587
0.RDB = 177562          12204#  12589
0.REGT  070072          12243#  12317
0.RSE1  071450          12554   12557#
0.RSP   070102          12245#  12248
0.RST   070006          12216   12225#
0.RSTT  071420          12446   12472   12550#
0.RST1  070036          12224   12232#
0.RTIT  071032          12234#  12460#
0.SCAN  070244          12254   12293#  12304
0.SP    070134          12246   12255#
0.SPC   071500          12567#  12575
0.SP1   070122          12251#  12256
0.STM = 000340          12194#  12236   12445   12471   12473
0.STRT  067774          12215   12222#
0.SVR   071330          12225   12485   12527#
0 SVTT  071366          12505   12517   12541#
0.T     071750          12447#  12474#  12486   12649#
0.TBIT  070756          12447#  12487
```

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0.TBT = 000020          12195* 12448  12475  12511
0.TC    071714          12629  12635*
0.TCLS  071676          12260  12345  12351  12362  12628*
0.TCSR= 177564          12207* 12542  12544* 12551  12558* 12611  12617
0.TDB = 177566          12206* 12613* 12619*
0.TL    071775          12244  12247  12255  12676* 12682
0.TRTC  072012          12279  12450  12689*
0.TVEC= 000014          12193* 12218  12236* 12237*
0.TYPE  071614          12509  12580  12603* 12607  12645
0.TYP1  071674          12604  12615  12623*
0.TYP2  071654          12617* 12618  12621
0.UIN   067742          12226  12449* 12488  12713*
0.UPC   067722          12219* 12444* 12459  12483* 12500  12502* 12701*
0.URO   067704          12222  12252  12694*
0.USP   067720          12223* 12528* 12529  12700*
0.UST   067724          12217* 12448* 12458  12475* 12484* 12491  12511* 12702*
0.WDS   070552          12390  12392*
0.WDS2  070570          12397* 12419
0.WDS3  070620          12408* 12421  12427  12436
0.WDS4  070656          12408  12418*
0.WRD   070364          12315  12331*
0.WRDA  070410          12332  12340*
0.WRD1  070372          12334* 12341  12358
0.WSCH  070550          12323  12391*
0.XXX   071746          12527* 12535  12648*
0.45    070050          12233  12235*
PACK  = 000003           1310*  4415
PARAM   001336           2384*  3666*  3671*  3676*  3681*  3686*  3690*  3802
PARSRT  006774           1485   3666*
PAT   = 000020           1391*  4560   4906   5054   5100   5511   6907
PCA   = 004000           1398*
PCD   = 010000           1399*
PCLKF   003466           2550*  3847*  3854*  9730   9751
PCVEC   001332           2378*  3848   3855
PCYL    001356           2394*  4975*  5058   5063*  5104   5109*
PFSRT   012170           4301*  9993
PGE   = 002000           1346*
PIP   = 020000           1384*
PIRQ  = 177772           1189*
PIRQVE= 000240           1283*
PKRB    001324           2374*
PKS     001320           2372*  3846   3853   9735*  9755*
PKSB    001322           2373*  9734*
PPTP    003440           2534*  3793*
PRGSRT  007134           3669   3674   3679   3684   3689   3693*  8979
PR0   = 000000           1206*  3695   3885
PR1   = 000040           1207*
PR2   = 000100           1208*
PR3   = 000140           1209*
PR4   = 000200           1210*
PR5   = 000240           1211*  2371
PR6   = 000300           1212*  3858
PR7   = 000340           1213*  3759   3765   3909   9988   9989
PS    = 177776           1186*  1187
PSEC    001402           2407*  5466*  5469   5471*  9443   9446   11860
PSW   = 177776           1187*
```

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PWRVEC= 000024  1278#  3729*  3730*  9978*  9987*  9988*
RCYLA   046136  9280   9498#
RCYLD   046064  9276   9485#
RDCHR = 104410  10596  10931#
RDCYLA  046014  5071   5117   5378   9473#
RDCYLD  045730  5076   5126   5132   5137   9458#
RDDATA= 000021  1317#  6815
RDGATE= 100000  1402#
RDHEAD= 000025  1319#  5779   5914   6044   6207   6361   6518   7440   7612   7829   7954   8165   8290
                8515   8640
RDLIN = 104411  8947   10670  10932#
RDOCT = 104412  8992   9005   10933#
RDSEC   045504  9404#  9421   9424   9442   9445   9692
RDY   = 000200  1325#  9054   9069
RECAL = 000013  1314#  4838   4986   5197   5337   6428   8823   9863
RESREG= 104414  10730  10800  10935#  12163
RESVEC= 000010  1273#
RHEAD   046232  9285   9518#
RHTAB   001674  2448#  5778   5830   5913   5969   6042   6064   6206   6230   6234   6359   6381   6517
                6540   6544   7439   7462   7611   7634   7828   7851   7953   7976   8164   8187   8289
                8312   8514   8537   8639   8662   9699   9701   9705   9708   11884  11892
RKASOF= 000016  1296#  3899   9093   9128   9154
RKBA  = 000004  1291#  3895   5714*  5865*  5996*  6313*  6809*  6851*  6870*  7149*  7295*  9089
RKCS1 = 000000  1289#  3892   3995*  4108*  4499*  4501*  4619*  4644*  4671*  4684*  4757*  4836*  4873*
                4984*  5021*  5069*  5083*  5115*  5144*  5195*  5232*  5335*  5341*  5357*  5421*  5530*
                5560*  5626*  6165*  6431*  6487*  6683*  6926*  6956*  7022*  7254*  7570*  7788*  7913*
                8124*  8249*  8474*  8599*  8821*  8827*  8843*  9029*  9040*  9054   9069   9086   9338*
                9346*  9354*  9362*  9375*  9861*  9876*
RKCS2 = 000010  1293#  3893   3974*  3988*  3992*  4101*  4105*  4446*  4645*  4837*  4874*  4985*  5022*
                5084*  5145*  5196*  5233*  5336*  5342*  5422*  5531*  5627*  5713*  5793   5864*  5928
                6057   6166*  6221   6374   6488*  6532   6684*  6927*  7023*  7255*  7454   7571*  7626
                7789*  7843   7914*  7968   8125*  8179   8250*  8304   8475*  8529   8600*  8654   8822*
                8828*  9087   9325*  9330*  9347*  9355*  9363*  9388*  9392*  9862*  9877*
RKDA  = 000006  1292#  3896   5270*  5717*  5775*  5827*  6811*  6853*  6872*  7152*  7197*  7293*  7420*
                9090
RKDB  = 000024  1298#  3901   5788   5789   5790   5923   5924   5925   6053   6054   6055   6216   6217
                6218   6370   6371   6372   6527   6528   6529   7449   7450   7451   7621   7622   7623
                7838   7839   7840   7963   7964   7965   8174   8175   8176   8299   8300   8301   8524
                8525   8526   8649   8650   8651
RKDC  = 000020  1297#  3900   4907*  5055*  5070*  5101*  5116*  5512*  5556*  6005*  6040*  6111*  6204*
                6322*  6357*  6554*  6632*  6732*  6813*  6908*  6952*  7058*  7195*  7297*  7358*  7517*
                7608*  7656*  7741*  7825*  7864*  7950*  7996*  8077*  8161*  8200*  8286*  8332*  8394*
                8427*  8511*  8550*  8636*  8682*  8780*  9094
RKDS  = 000012  1294#  3897   9091
RKECPS= 000030  1302#  3905   9098
RKECPT= 000032  1303#  3906   9099
RKER  = 000014  1295#  3898   9092
RKMR1 = 000026  1299#  3902   4339*  4371*  4404*  4560*  4675*  4689*  4716*  4742*  4758*  4842*  4866*
                4906*  4990*  5014*  5054*  5100*  5201*  5225*  5306*  5511*  5619*  5751*  5817*  5960*
                6432*  6477*  6907*  7015*  7536*  9095   9134*  9138*  9158*  9162*  9340*  9348*  9356*
                9393*  9404*  9458*  9473*  9530*  9547*  9564*  9580*  9867*
RKMR2 = 000034  1300#  3903   9073   9078   9096
RKMR3 = 000036  1301#  3904   9074   9079   9097
RKPRI   001316  2371#  9021
RKVEC   001314  2370#  3829*  9009*  9012*  9019
RKWC  = 000002  1290#  3894   5715*  5866*  5997*  6314*  6814*  7150*  7296*  9088
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RLS    = 000010          1339*  4446
RSEC     046174          9284   9508*
RTT    = 000006         12197*
SAVREG= 104413          10715  10774  10934* 12107
SBPAR    047324          9204   9208   9212   9216   9220   9224   9228   9768*
SCLR   = 000040          1341*  3974   3988   4101   9388
SCOP1  = 104415          3985   4098   4409   4440   4491   4554   4829   4899   4977   5047   5094   5187   5263
                         5383   5707   5766   5906   6034   6197   6351   6625   7184   7284   7510   7600   7729
                         7818   7857   7943   8065   8154   8193   8279   8415   8504   8543   8629   8773  10936*
SCOP1$   047376          9792* 10936
SDC    = ****** U        1169   1488  12173
SEC      001374          2404*  4673*  4687*  4714*  4740*  9744*
SECFLG   046730          9619   9640*
SECNT    001400          2406*  5461*  5483*  5904*  6033*  6350*
SECTOR   001406          2409*  5471   5480   9406*  9407*  9408*  9409*  9410*  9411*  9422   9425   9443   9446
                         9508*  9509*  9510*  9511*  9512*  9513*  9693*  9697   9698*  9699*  9710   9720*  9721
                         9722*  9723*
SEEK   = 000017          1316*  4908   5064   5110   5273   5389   5513   5557   6114   6247   6556   6634   6734
                         6909   6953   7060   7200   7360   7423   7519   7658   7743   7867   7998   8079   8203
                         8334   8396   8429   8553   8684   8754   8781
SELDRV= 000001          1309*  3993   4106   4499   4501   5880   5936   9326   9373
SETINT   043416          3830   9010   9019*
SIZFLG   003472          2552*  3831*  3978   8965*  8985*
SKI    = 000002          1356*
SORT     047056          6067   6384   9690*
SPACE2   067660         12141  12150  12161  12172*
SRTSPL= 000011          1313*  4592   5664   7093   9847
SRTTAB   002100          2449*  6070   6387   9702
ST     = 177776         12191* 12217  12218* 12231* 12445* 12471* 12473* 12499*
STACK  = 001100          1177*  3694   3721   3883   3934   3986   4094   4099   4196   4277   4313   4363   4402
                         4410   4431   4441   4466   4492   4542   4555   4587   4823   4830   4900   4959   4978
                         5048   5095   5183   5188   5264   5374   5384   5455   5502   5697   5708   5767   5860
                         5907   5989   6035   6105   6198   6306   6352   6420   6616   6626   6630   6838   7122
                         7185   7285   7499   7511   7601   7723   7730   7819   7858   7944   8054   8066   8155
                         8194   8280   8388   8416   8505   8544   8630   8749   8774   8868   9290   9959   9990
                        12169
START    007120          1481   3690*
START1   007536          3783*
STKLMT= 177774          1188*
STOP     047500          7350   9830*  10437  10520
ST2      007606          3791   3802*
ST3      007652          3792   3820*
ST4      007704          3804   3825   3828*
ST5      007730          3811   3833*  3972   4034   8908   9898
ST5XY    043044          8897   8902*
SUBCLR   045424          4281   4290   4315   4367   4412   4433   4443   4468   4494   4544   4557   4589   4771
                         4780   4787   4832   4902   4980   5050   5097   5190   5266   5376   5386   5457   5504
                         5591   5661   5710   5769   5862   5909   5991   6037   6106   6200   6244   6258   6308
                         6354   6422   6512   6552   6567   6618   6628   6729   6745   6753   6802   6838   6900
                         6987   7055   7071   7079   7090   7136   7187   7287   7355   7371   7379   7434   7513
                         7603   7653   7669   7677   7732   7821   7860   7946   7993   8009   8017   8068   8157
                         8196   8282   8329   8345   8353   8391   8407   8418   8507   8546   8632   8679   8695
                         8703   8751   8765   8776   9388*  9832   9844
SVAL   = 100000          1386*
SWR      001140          2288*  3719   3741*  3743   3749*  3756*  4800   4805   5674   6289   6294   6598   6603
                         6766   6772   7103   7404   7410   7476   7481   7690   7696   8028   8033   8038   8043
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                        8364    8369    8374    8379    8714    8719    8724    8729    8934    9240    9250    9260    9270
                        9792    9813    9818    9820    9922    9930    9935    9955   10013   10027   10029   10035   10042
                       10080   10087   10099   10103   10440   10479   10534*  12165
SWREG   000176         1479#   3749    8934    10440   10479   10502
SWTST   047430         4765    5651    6240    6548    6720    7047    7392    7470    7645    7987    8323    8673    9811#
SW0    = 000001        1241#
SW00   = 000001        1231#   1241
SW01   = 000002        1230#   1240
SW02   = 000004        1229#   1239
SW03   = 000010        1228#   1238
SW04   = 000020        1227#   1237
SW05   = 000040        1226#   1236
SW06   = 000100        1225#   1235
SW07   = 000200        1224#   1234
SW08   = 000400        1223#   1233
SW09   = 001000        1222#   1232
SW1    = 000002        1240#
SW10   = 002000        1221#
SW11   = 004000        1220#
SW12   = 010000        1219#   12165
SW13   = 020000        1218#   9922
SW14   = 040000        1217#   9813    9935
SW15   = 100000        1216#
SW2    = 000004        1239#
SW3    = 000010        1238#
SW4    = 000020        1237#
SW5    = 000040        1236#
SW6    = 000100        1235#
SW7    = 000200        1234#
SW8    = 000400        1233#   9818
SW9    = 001000        1232#   4800    4805    5674    6289    6294    6598    6603    6766    6772    7103    7404    7410
                        7476    7481    7690    7696    8028    8033    8038    8043    8364    8369    8374    8379    8714
                        8719    8724    8729    9240    9250    9260    9270    9792    9930    9955
TBITVE= 000014          1274#
TEMP1   003360          2492#   3975*   3989*   3996*   3998*   4003*   4004*   4005    4102*   4109*   4111*   4116*   4117*
                        4118    4502*   5319*   5320*   5321    5392*   5835*   5837    5972*   5974    6074*   6075    6135*
                        6235*   6236    6251*   6391*   6392    6454*   6560*   6654*   6738*   7064*   7225*   7364*   7427*
                        7541*   7662*   7759*   7884*   8002*   8095*   8220*   8338*   8400*   8445*   8570*   8688*   8758*
                        9030*   9041*   9056*   9071*   9126*   9130*   9156*   9172    9174*   9201    9203*   9205    9207*
                        9209    9211*   9213    9215*   9217    9219*   9221    9223*   9225    9227*   9229    9231*   9324
                        9329*   9336    9369*   9376*   9389*   9419    9420*   9427*   9429*   9431*   9440    9441*   9448*
                        9450*   9452*   9529*   9534*   9546*   9551*   9563*   9568*   9579*   9584*   9621*   9624*   9625
                        9774*   9782*   11868
TEMP2   003362          2493#   4293*   4620*   4783*   4847*   4995*   5206*   5358*   5593*   5598*   5668*   6804*   6841*
                        6842    6868*   6989*   6994*   7097*   8844*   9132*   9553*   9586*   9622*   9623*   9625*   9626
                        9851*   9872*
TEMP3   003364          2494#   5057*   5059    5103*   5105    6805*   6844    6865*   6866    7736*   7738    8072*   8074
                        8422*   8424*   8425
TEMP4   003366          2495#   5058*   5059*   5061*   5062    5104*   5105*   5107*   5108    6808*   6809    6851    6869*
                        6870    7737*   7738*   7739    8073*   8074*   8075    8423*   8424
TEMP5   003370          2496#   4826*   4941*   6810*   6811    6852*   6853    6871*   6872
TIMUP   001376          2405#   4679    4693    4720    4746    9729*   9740*   9746*
TITLE   043116          3785    3823    8925#
TKVEC  = 000060         1281#   10417*  10418*
TOCYL   001352          2392#   4973*   5055    5056    5070    5072    5122    5124    5155*   5156    5163*   5998*   6000
                        6109*   6315*   6317    6425*   6621*   6632    6708    6712    6715*   6732    6748    6750*   7058
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                        7074    7076*   7141*   7143    7179*   7343*   7358    7374    7376*   7421*   7462    7507*   7517
                        7595    7608    7634    7641*   7656    7672    7674*   7726*   7737    7741    7813    7825    7851
                        7982    7984*   7996    8012    8014*   8062*   8073    8077    8149    8161    8187    8318    8320*
                        8332    8348    8350*   8412*   8423    8427    8499    8511    8537    8668    8670*   8682    8698
                        8700*   8770*   8779    8780    8812    8815    8849*   8850    11852   11876   11884
TPVEC = 000064           1282#
TRAPPC  001334           2382#   9951*   11900
TRAPVE= 000034           1280#   3727*   3728*   9989*
TRT    = 000003         12196#  12689
TRTVEC= 000014           1275#
TSTATN  044012           4287    4602    4649    4698    4725    4751    4777    4878    4911    5026    5067    5088    5113
                         5149    5237    5276    5346    5426    5516    5535    5587    5631    6170    6492    6688    6912
                         6931    6983    7027    7259    7575    7793    7918    8.29    8254    8479    8604    8784    8832
                         9107*   9881
TST1     010120          3859    3881#
TST10    012524          4366    4400#
TST11    012622          4407    4420    4429#
TST12    012730          4453    4464#
TST13    013224          4525    4540#
TST14    013370          4572    4585#
TST15    014712          4766    4821#
TST16    015524          4945    4957#
TST17    016766          5162    5181#
TST2     010302          3910    3932#
TST20    020006          5372#
TST21    020352          5447    5453#
TST22    020476          5500#
TST23    021556          5652    5695#
TST24    022476          5846    5858#
TST25    023256          5987#
TST26    023732          6103#
TST27    025026          6241    6304#
TST3     011126          4092#
TST30    025502          6418#
TST31    026602          6549    6614#
TST32    027502          6721    6798#
TST33    030140          6857    6876    6896#
TST34    031342          7048    7118#
TST35    033412          7393    7471    7497#
TST36    034470          7646    7721#
TST37    036342          7988    8052#
TST4     011530          4128    4134#
TST40    040226          8324    8386#
TST41    042164          8674    8747#
TST5     012076          4244    4254    4275#
TST6     012170          4311#
TST7     012366          4349    4361#
TYPDS = 104405           8886   10926#
TYPE   = 104401          3789    3805    3807    3809    3824    3866    3941    3951    3980    4014    4060    4202    4224
                         4370    4391    4392    4963    4968    4970    5584    5731    5785    5797    5876    5920    5932
                         6014    6050    6061    6213    6225    6331    6367    6378    6524    6536    6877    6881    6882
                         6980    7125    7139    7162    7307    7446    7458    7501    7504    7618    7630    7835    7847
                         7960    7972    8171    8183    8296    8308    8521    8533    8646    8658    8884    8887    8928
                         8978    9181    9839    9841    9891    9896    9924    9966    9991   10082   10090   10158   10252
                        10378   10434   10446   10500   10501   10504   10515   10525   10536   10555   10603   10609   10614
                        10618   10623   10624   10626   10629   10633   10699   10701   10841   10922#  12117   12118   12122
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                    12123   12132   12141   12145   12150   12152   12158   12161
TYPERR  067404      10089   12107#
TYPOC = 104402      10503   10923#  12138
TYPON = 104404      10925#
TYPOS = 104403       3954    4017    4063    4228    9184    9927    9969   10924#
T.A2  = 000001       2523#   4333    4634    4663    4860    4892    4926    5008    5040    5219    5251    5300    5410
                     5440    5549    5613    5645    5744    5810    5954    6027    6123    6154    6184    6271    6344
                     6444    6471    6506    6582    6643    6672    6702    6945    7009    7041    7209    7243    7273
                     7320    7528    7559    7589    7752    7777    7807    7876    7902    7932    8088    8113    8143
                     8212    8238    8268    8438    8463    8493    8562    8588    8618    8807    9274
T.B2  = 000002       2524#   4333    4634    4663    4860    4892    4926    5008    5040    5219    5251    5300    5410
                     5440    5549    5613    5645    5744    5810    5954    6027    6123    6154    6184    6271    6344
                     6471    6506    6582    6643    6672    6702    6945    7009    7041    7209    7243    7273    7320
                     7528    7559    7589    7752    7777    7807    7876    7902    7932    8088    8113    8143    8212
                     8238    8268    8438    8463    8493    8562    8588    8618    8807    9278
T.B3  = 000004       2525#   4333    4860    5008    5219    5300    9282
T1      001412       2415#   5358    8844
T10     001414       2416#   3975    3989    3998    4102    4111    4293    4502    4783    4847    4995    5206    5593
                     6989    9030    9376    9389    9872
T100    001416       2417#   4620    5598    6994
T2500   001422       2419#   6135    6654
T500    001420       2418#   5668    7097    9441    9851
T5000   001424       2420#   9420
T50000  001426       2421#   3996    4109    6251    6560    6738    7064    7364    7427    7662    7759    7884    8002
                     8095    8220    8338    8400    8445    8570    8688    8758    9041
UFE   = 000400       1344#   4042    4145    4435    4452
UNLD    003304       2454#   3833*   4279*   4764*   4769*   5509*   5602*   5672*   6905*   6998*   7101*   9835    9855*
UNLOAD= 000007       1312#   4284    4774
UNS   = 040000       1369#
UPE   = 020000       1349#
VERIFY  011126       3968    3973    4074#
VV    = 000100       1380#
WCE   = 040000       1350#
WDCNT   001442       2428#   5832*   5840*   5841    5971*   5977*   5978    6069*   6079*   6080    6386*   6396*   6397
                    11868
WLE   = 004000       1366#
WORD    001452       2434#
WRDATA= 000023       1318#
WRHEAD= 000027       1320#   5724    5869    6007    6324    7155    7300
WRL   = 004000       1383#
WRTCHK= 000031       1321#
WRTGAT= 040000       1401#
$APTHD  001000       1515    1521#
$ASTAT= ****** U    10295   10310
$ATYC   051476      10266   10268#
$ATY1   051452      10264#
$ATY3   051460      10143   10265#
$ATY4   051470      10095   10267#
$AUTOB  001134       2285#   8938#  10493   10650
$BASE   001264       2355#   3828#   3891    8996#   8998#
$BDADR  001122       2280#
$BDDAT  001126       2282#
$BELL   001200       2306#  10082   10115   10446   10643
$CDW1   001270       2357#
$CDW2   001272       2358#
$CHARC  051222      10160#  10170#  10177   10186#  10191#
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CROSS REFERENCE TABLE -- USER SYMBOLS

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$CM4   =000006           2298#  2299#  2300#  2301#  2302#  2303#  2304#
$CNTLC  053354          10434  10515  10643#
$CNTLG  053366          10500  10645#
$CNTLU  053361          10525  10618  10644#
$CPUOP  001236           2329#
$CRLF   001205           2308#  3951   4014   4391   4392   6881   6882  10090  10115  10159  10194  10536  10623
                        10643  10704  12117  12122  12132  12145  12158
$DBLK   051442          10218  10252  10260#
$DB2D   053732          10756  10774#
$DB2O   053556           6879  10715#
$DDW0   001274           2359#
$DDW1   001276           2360#
$DDW2   001300           2361#
$DDW3   001302           2362#
$DDW4   001304           2363#
$DDW5   001306           2364#
$DDW6   001310           2365#
$DDW7   001312           2366#
$DECVL  054112          10776  10822#
$DEVCT  001220           2320#  3776*  3839*  4206   8869*  8870
$DEVM   001266           2356#  3945
$DOAGN  043020           8880   8889   8895#
$DTBL   051432          10221  10256#
$ENDAD  043010           1501   8891#  10110
$ENOCT  042756           3731   8882#
$ENOMG  043027           8884   8899#
$ENULL  043024           8887   8898#
$ENV    001230           2325#  8902   8932   10092  10138  10273  10297
$ENVM   001231           2326#  3754   3937   10140  10145  10275
$EOP    042662           4763   5701   5732   5786   5798   5877   5921  5933  6015  6051  6062  6214  6226
                         6332   6368   6379   6525   6537   7130   7163  7308  7447  7459  7619  7631  7836
                         7848   7961   7973   8172   8184   8297   8309  8522  8534  8647  8659  8851  8863#
                        12170
$EOPCT  042750           3731*  8879#  8883   9892#
$EOPI   042722           3914   4203   8871   8873#  9894   9946
$ERFLG  001103           2271#  9794   10002  10031  10033  10039#  10061  10077#  10115  12167
$ERMAX  001115           2277#  3734#  10033  10056#  10061
$ERROR  050544           3725   10075#
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                        11912  11924
$ERRTB  003474           2567#  12114
$ERTTL  001112           2275#  10083#  10115
$ESCAP  001176              #   3733#  3836#  4601#  4618#  4753#  4756#  4790#  5459#  5487#  5570#  5601#  5657#
                            *   6134#  6203#  6281#  6427#  6453#  6515#  6591#  6631#  6653#  6756#  6966#  6997#
                         7082#  7192#  7194#  7221#  7224#  7290#  7382#  7396#  7516#  7540#  7606#  7680#  7735#
                         7758#  7824#  7863#  7883#  7949#  8020#  8071#  8094#  8160#  8199#  8219#  8285#  8356#
                         8421#  8444#  8510#  8549#  8569#  8635#  8706#  8866#  9232   9236#  9246#  9256#  9266#
                         9287#  9291#  9811#  9893#  9950#  9954#  10055#  10106  10108  10115
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$ETEND  001314           1527   2367#
$FATAL  001212           2317#  10301#
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$FILLC  001156           2296#  10163  10194
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$HIBTS  001000          1522#
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$ICNT   001104          2272#  10046#  10047   10049#  10060
$INTAG  001135          2286#  10498#  10517   10537   10650
$ITEMB  001114          2276#  10086#  10094   10115   12108
$LF     001206          2309#  10115   10194   10633   10643   10704
$LFLG   051715         10305#  10311#
$LPADR  001106          2273#   3735#   4794    5658    6285    6595    6760    7086    7386    7400    7684    8024    8360
                        8710    9933   10037#  10053#  10058   10060
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                        9292    9796    9799#   9960   10037   10054#  10060   10105
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$MADR2  001246          2346#
$MADR3  001252          2349#
$MADR4  001256          2352#
$MAIL   001210          1523    1527    2315#   3753    8932   10052   10092   10138
$MAMS1  001240          2336#
$MAMS2  001244          2344#
$MAMS3  001250          2347#
$MAMS4  001254          2350#
$MBADR  001002          1523#
$MFLG   051714         10265#  10271   10306#  10310#
$MNEW   053404         10504   10648#
$MSGAD  001224          2322#  10281#  10284
$MSGLG  001226          2323#  10286#
$MSGTY  001210          2316#  10279   10287#  10299   10303#
$MSWR   053373         10501   10646#
$MTYP1  001241          2337#
$MTYP2  001245          2345#
$MTYP3  001251          2348#
$MTYP4  001255          2351#
$MXCNT  050542         10050   10060#
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 DOCUMENT PAGES:  270
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