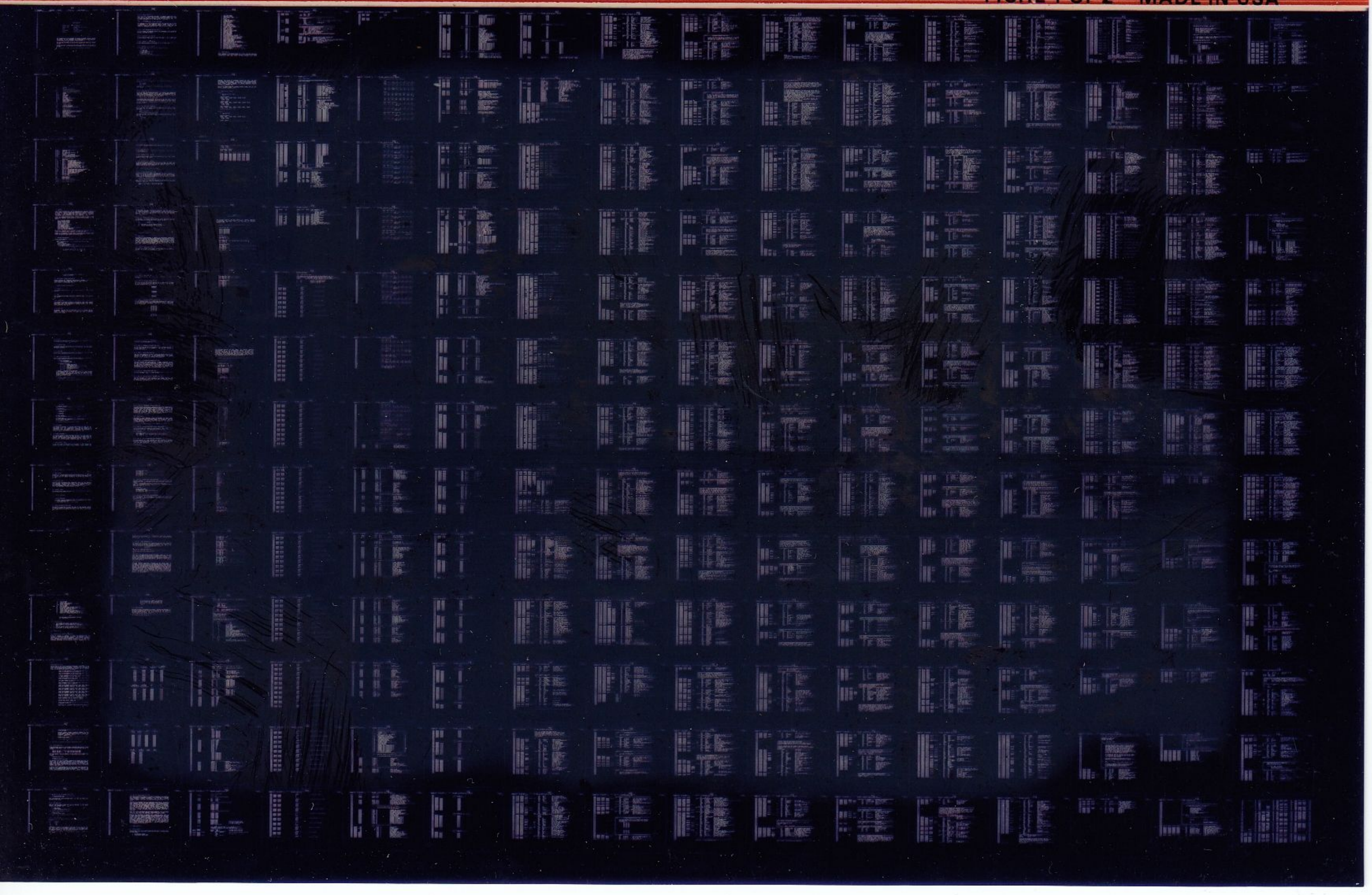
RK611/06

SUBSYSTEM VERIFICATION 1
CZR6MD0

AH-9138D-MC

FICHE 1 OF 2

MAR 1978
digital
MADE IN USA



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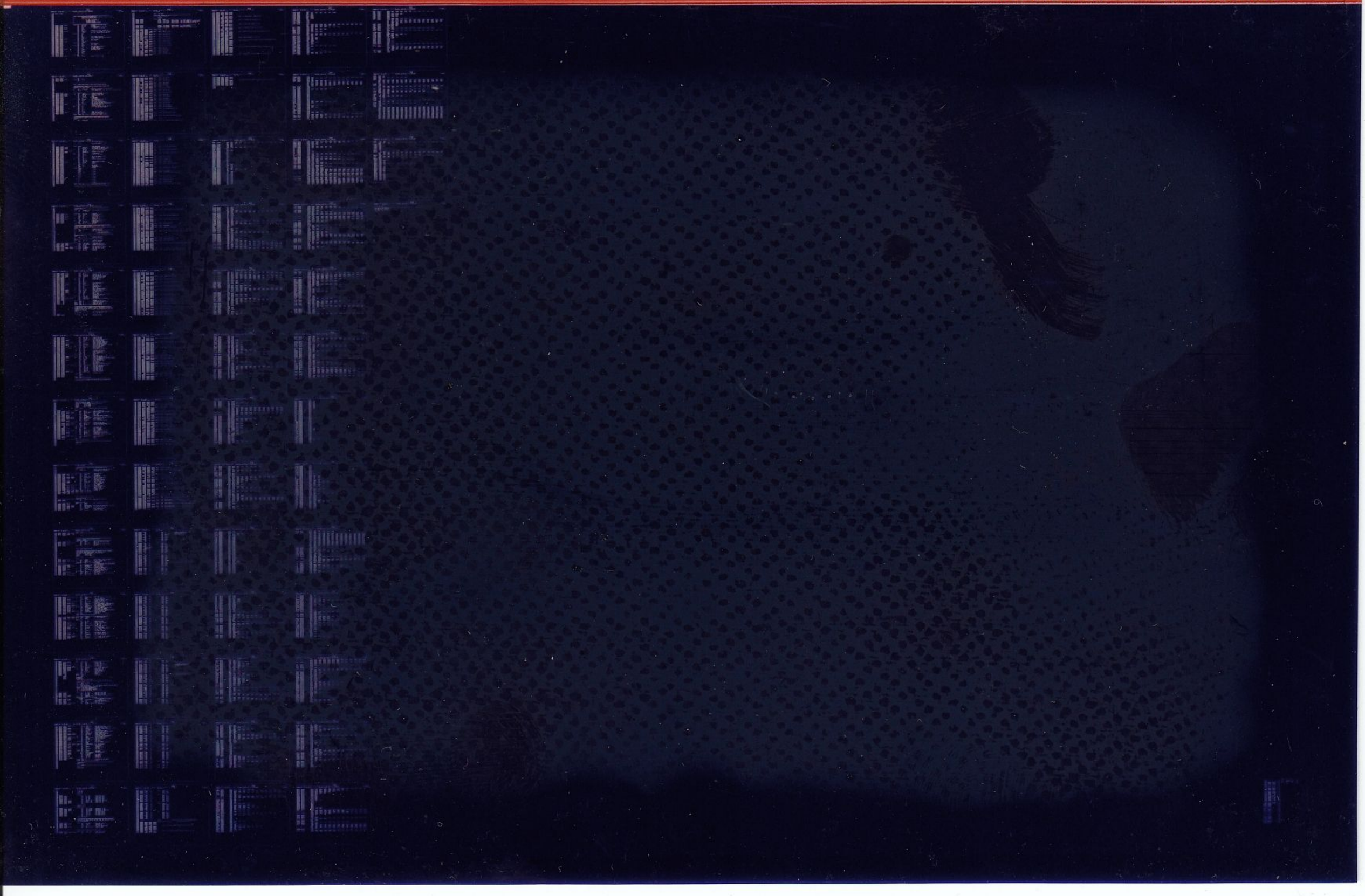

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IDENTIFICATION

PRODUCT CODE: AC-9136D-MC
PRODUCT NAME: CZR6MDO RK611/06 SS VERIF 1
DATE: FEB 1978
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: DAVE HOFFMAN

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1.0 ABSTRACT

THIS PROGRAM PERFORMS PART 1 OF THE RK06/RK06-RK07 SUBSYSTEM VERIFICATION TESTS, WHICH PROVIDE A FUNCTIONAL SHAKEDOWN OF THE ENTIRE SUBSYSTEM, INCLUDING THE UNIBUS INTERFACE AND ACCESS TO MAIN MEMORY. THE TESTING IN PART 1 EMPLOYS WORST-CASE SITUATIONS INVOLVING MECHANICAL POSITIONING, DISK ADDRESSING AND DATA TRANSFER. IN ADDITION, MEASUREMENTS ARE MADE PERTAINING TO DRIVE OPERATIONAL TIMING.

WITHIN THE VARIOUS SUBSYSTEM TESTS, EMPHASIS IS GIVEN TO USEFUL SCOPE LOOPS AND OPERATOR SPECIFICATION OF TEST PARAMETER VALUES. AT THE BEGINNNG OF TESTING, THE FOLLOWING OPTIONS MAY BE SPECIFIED BY THE USER:

- RK611 REGISTER ADDRESS
- RK06/07 VECTOR ADDRESS
- RK06/07 PRIORITY LEVEL
- DRIVE(S) TO BE TESTED
- TEST(S) TO BE RUN
- NUMBER OF TEST ITERATIONS
- DISK ADDRESS LIMITS
- DISK ADDRESS INCREMENTS
- DATA PATTERNS USED
- PHYSICAL MEMORY ADDRESS ON DATA TRANSFERS
- WORD COUNT ON DATA TRANSFERS
- STALL TIME BETWEEN OPERATIONS

IN ADDITION, STANDARD SWITCH REGISTER OPTIONS ARE PROVIDED, FOR A VARIETY OF PROGRAM LOOPING, RUNNING, AND REPORTING MODES.

ERRORS WILL BE REPORTED AS THEY OCCUR. THE REPORT WILL INCLUDE A TEST NUMBER AND DESCRIPTION, CURRENT AND PREVIOUS OPERATIONS, GOOD AND BAD TEST DATA, AND APPLICABLE DEVICE REGISTER CONTENTS.

2.0 HARDWARE REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN PART 1 OF THE SUBSYSTEM VERIFICATION TESTS:

- PDP-11/04,(05,10 MFG. ONLY),20,34,35,40,45,50,70 OR PDQ
- 16 K MEMORY
- CONSOLE TELETYPE
- KW11-L OR KW11-P CLOCK
- RK06/07 UNIBUS CONTROLLER (RK611)
- 1 TO 8 RK06/07 DRIVES
- 1 TO 8 RK06/07 DISK CARTRIDGES (FORMATTED IN 20 OR 22 SECTOR FORMAT)

NOTE

IF NEITHER KW11-L OR P CLOCK IS PROVIDED, THE TIMING TESTS IN SECTION

9.2 WILL BE BYPASSED, AND A MESSAGE WILL INFORM THE OPERATOR.

3.0 PRELIMINARY PROGRAM REQUIREMENTS

BEFORE RUNNING THE SUBSYSTEM VERIFICATION PROGRAM, THE RK611 CONTROLLER DIAGNOSTIC (CZR6A THRU DZR6E AND CZR6K) AND RK06 DRIVE DIAGNOSTIC (CZR6H THRU CZR6J) SHOULD FIRST BE RUN, TO RESOLVE BASIC, SOLID HARDWARE FAULTS.

4.0 GENERAL PROGRAM CONSIDERATIONS

4.1 SYSMAC

THIS PROGRAM USES PORTIONS OF THE SYSMAC DIAGNOSTIC SYSTEM MACRO PACKAGE.

4.2 XXDP

THIS PROGRAM MAY BE LOADED UNDER XXDP. SUBSYSTEM TESTS 1-21 MAY BE RUN IN CHAIN OR DUMP MODE, BUT DUAL-ACCESS TEST 22 MAY ONLY BE RUN IN DUMP MODE.

4.2.1 CHAIN MODE

THIS PROGRAM IS DESIGNED TO BE RUN IN THE DEFAULT MODE WHEN CHAINED UNDER XXDP. THUS, INPUT DIALOGUE IS BYPASSED, AND RK06 UNIBUS ADDRESS AND INTERRUPT VECTOR ARE DEFAULTED TO STANDARD VALUES. ALL DRIVES PRESENT AND READY WILL BE TESTED WITH THE EXCEPTION OF DRIVE 0, IF THE RK06 CONTAINS THE XXDP MEDIUM.

4.2.2 DUMP MODE

THE PROGRAM CAN BE RUN IN DUMP MODE, WITH OR WITHOUT DEFAULT PARAMETERS. DRIVE 0 MAY BE TESTED, BUT IF IT CONTAINS THE XXDP MEDIUM, THE OPERATOR MUST REPLACE THE XXDP PACK WITH A FORMATTED SCRATCH PACK PRIOR TO TESTING. A MESSAGE WILL INFORM THE OPERATOR WHEN THIS IS NECESSARY.

4.3 ACT/APT

THE PROGRAM IS COMPATIBLE WITH ACT/APT CONVENTIONS. SUBSYSTEM TESTS 1-21 MAY BE RUN IN AUTOMATIC OR DUMP MODE.

4.3.1 AUTOMATIC MODE

THE PROGRAM PROVIDES FOR AUTOMATIC APT/ACT OPERATION. IN THIS MODE, PARAMETERS REVERT TO DEFAULT VALUES, AND ALL DRIVES WHICH ARE PRESENT AND READY ARE TESTED.

4.3.2 DUMP MODE

IN DUMP MODE, PARAMETERS MAY BE INPUT, OR DEFAULTED, AND SUBSYSTEM TESTS 1-21 OR DUAL-ACCESS DATA TEST 26 MAY BE RUN.

4.3.3 APT ETABLE DEFINITIONS

THE FOLLOWING DEFINITIONS ARE VALID FOR SPECIFYING APT ENVIRONMENTAL TABLE (ETABLE) ENTRIES, VIA THE APT UTILITY PROGRAMS :

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

2. ENVIRONMENT MODE BYTE
   BIT 7 = 1 ETABLE DOES SIZING
   = 0 PROGRAM DOES SIZING
   BIT 6 = 1 SPOOL MESSAGES 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 SECTION 6.2 (SWITCH REGISTER OPTIONS) MAY BE 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. MEMORY TYPES 1-4 AND MAX MEMORY ADDRESSES

NOT USED

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

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

8. INTERRUPT VECTOR 2
NOT USED

9. BUS PRIORITY 2
NOT USED

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

11. 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.

12. REMAINING ETABLE ENTRIES ARE NOT USED.

4.4 DUAL-ACCESS

THIS PROGRAM IS DESIGNED TO UTILIZE DUAL-ACCESS IN TEST 22 ONLY (DUAL-ACCESS DATA TEST - SEE SECTION 9.6). FOR THE PURPOSES OF ALL OTHER TESTS (1-21). THE OPERATOR MUST GUARANTEE THAT THERE IS NO INTERFERENCE FROM THE UNUSED PORT. IF FAILURES ARE ENCOUNTERED IN TESTS 1-21 DUE TO INTERFERENCE FROM THE OTHER PORT, THE OPERATOR IS ADVISED TO SWITCH THAT PORT OFF-LINE AND RE-RUN THE TESTS.

4.5 MEMORY MANAGEMENT

THIS PROGRAM SUPPORTS MEMORY MANAGEMENT OPTIONS KT11C,D AND PDP11/70, FOR THE PURPOSES OF TESTS 21 AND 22 ONLY. IN THESE TESTS, NPR TRANSFERS BETWEEN THE RK06 AND ANY SPECIFIED PHYSICAL MEMORY ABOVE THE PROGRAM, ARE PERFORMED, DURING READ/WRITE TESTING. (NOTE - TESTS 21 AND 22 ALSO SUPPORT 22-BIT ADDRESSING AND THE UNIBUS MAP, IF INSTALLED). IN ALL OTHER TESTS, MEMORY MANAGEMENT IS DISABLED.

4.6 MEMORY PARITY CHECK

IF THE MEMORY PARITY CHECK OPTION IS AVAILABLE ON THE SYSTEM, ALL TESTING IS DONE WITH PARITY CHECK ENABLED. PARITY ERRORS ARE REPORTED, AND TESTING IS ABORTED, UNLESS THE BYTE LABELED MEMABT WAS

PREVIOUSLY LOADED WITH A NON-ZERO VALUE.

4.7 BAD SECTORS

ACCORDING TO A CONTROL SWITCH OPTION (SEE SECTION 8.2.4.2) THE BAD SECTOR FILE ON EACH DRIVE TO BE TESTED IS TYPED AT THE CONSOLE PRIOR TO TESTING. ALL DATA ERRORS OCCURRING IN THE PROGRAM ARE MASKED OUT IF THEY OCCUR ON SECTORS DESIGNATED AS BAD (BY EITHER FACTORY OR SOFTWARE).

4.8 EXECUTION TIME

EXECUTION TIME IS DEPENDENT UPON PARAMETERS INPUT BY THE OPERATOR (SUCH AS STALL TIME OR ITERATION COUNT), AND TO A LESSER DEGREE, UPON THE PROCESSOR. HOWEVER, THE "AVERAGE" TIME REQUIRED TO RUN A QUICK-VERIFICATION (FIRST PASS) IS 14 MINUTES PER DRIVE. A SUBSEQUENT PASS WITH PARAMETERS DEFAULTED REQUIRES 21 MINUTES PER DRIVE.
NOTE: TIMES ARE APPROX. DOUBLED FOR RK07 TESTING.

5.0 PROGRAM LOADING

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ANY MEDIA SUPPORTED BY XXDP.

6.0 STARTING PROCEDURE

6.1 STARTING ADDRESSES

200 NORMAL STARTING ADDRESS OF TESTS 1-21 (PARAMETERS DEFAULTED)
204 SELECT OPERATING PARAMETERS,RK06/07 UNIBUS ADDR. AND INTERRUPT VECTOR FOR TESTS 1-21
220 DUAL-ACCESS DATA TEST 22 START ADDRESS

6.2 SWITCH REGISTER OPTIONS USED

THIS PROGRAM IS DESIGNED TO ALLOW THE USE OF THE HARDWARE SWITCH REGISTER IF PRESENT, OR THE SYSMAC-SUPPORTED SOFTWARE SWITCH REGISTER (IF HARDWARE SWR IS NOT PRESENT OR IS SET TO ALL ONES). IN EITHER CASE, THE FOLLOWING OPTIONS ARE IMPLEMENTED WHEN THE APPROPRIATE BITS ARE SET TO 1:

```
   429                                  BIT   OPTION
```

```
                        ---   ------

                        15    HALT ON ERROR
                        14    LOOP ON TEST
                        13    INHIBIT ERROR REPORTS
                        12    REPORT DESCRIPTION ONLY, ON ERRORS
                        11    INHIBIT ITERATIONS
                        10    BELL ON ERROR
                        09    LOOP ON ERROR
                        08    APPLY RANDOM STALL BETWEEN OPERATIONS
                        07    DO EXPLICIT SEEKS IN TESTS 1-12
                        06    REPORT ONE ERROR PER TRANSFER IN TESTS 17,21
                        05    INHIBIT WRITES IN TEST 21
                        04    INHIBIT WRITE CHECKS IN TEST 21
                        03    INHIBIT READS AND SOFTWARE COMPARES IN TEST 21
                        02    INHIBIT SOFTWARE COMPARES IN TEST 21
                        01    READ AFTER A WRITE CHECK ERROR IN TEST 21
                        00    REPORT ALL SOFTWARE COMPARE ERRORS IN TESTS 17,21


                                          NOTE

                              FOR ADDITIONAL PROGRAM CONTROL  OPTIONS,
                              SEE  DESCRIPTION  OF CONTROL SWITCH WORD
                              (CS), SECTION 8.2.4.2.



7.0  OPERATOR ACTION

     1.  LOAD PROGRAM INTO MEMORY (SEE SECTION 5.0)
     2.  LOAD A FORMATTED PACK ON EACH DRIVE TO BE TESTED.
     3.  BRING DRIVE (S) TO ONLINE STATE, WRITE ENABLED, AND LOCKED ON
         PORT.
     4.  LOAD THE DESIRED STARTING ADDRESS (SEE SECTION 6.1)
     5.  SET SWITCHES IF DESIRED (SEE SECTION 6.2)
     6.  PRESS START OR GIVE APPROPRIATE MONITOR START COMMAND.


8.0  PROGRAM ACTION


8.1  DESCRIPTION OF OPERATING PARAMETERS

AFTER  THE  PROGRAM  IS  STARTED,  IT  TYPES  ITS  IDENTIFICATION,  AS
FOLLOWS:  "CZR6MD RK611/RK06-RK07  SUBSYSTEM  VERIFICATION:  PART  1,"
FOLLOWED BY:  "LAST PHYS MEM ADR=XXXXXXXX".  THEN,  EITHER  THE  TESTS
BEGIN  EXECUTION  WITH  DEFAULT PARAMETERS, OR AN OPERATOR INTERACTIVE
MODE IS ENTERED (SEE STARTING ADDRESSES, SECTION 6.1).  IN  THIS  MODE
OPERATING  PARAMETERS  MAY BE LISTED OR ALTERED BY VARIOUS MEANS.  ALL
PARAMETERS ARE TREATED AS OCTAL NUMBERS, AND  THE  PARAMETER  LIST  IS
```

SHARED AMONG THE TESTS.

THE FOLLOWING IS THE LIST OF OPERATING PARAMETERS, (WHICH APPLY TO THE CURRENT SELECTION OF DRIVES AND TESTS), AFTER EACH, IS INDICATED THE VALID RANGE OF VALUES FOR THAT PARAMETER (IN OCTAL), AND ITS DEFAULT VALUE. ALL PARAMETERS ARE ENTERED AS OCTAL NUMBERS, AND THE PARAMETER MNEMONICS SHOWN ARE THOSE USED BY THE PROGRAM.

FC	FIRST CYLINDER ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF CYLINDERS, FC=0-631, DEFAULT=0
LC	LAST CYLINDER ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF CYLINDERS, LC=0-632, DEFAULT=632
IC	CYLINDER INCREMENT VALUE IN TESTS WHICH STEP THROUGH CYLINDER ADDRESSES, IC=1-632, DEFAULT=1
FT	FIRST TRACK ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF TRACKS, FT=0-2, DEFAULT=0
LT	LAST TRACK ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF TRACKS, LT=0-2, DEFAULT=2
IT	TRACK INCREMENT VALUE IN TESTS WHICH ARE DONE OVER A RANGE OF TRACKS, IT=1-2, DEFAULT=1
SO	FIRST SECTOR ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF SECTORS, USED ON ANY DRIVE WHICH HAS A 20-SECTOR FORMATTED CARTRIDGE. SO=0-23, DEFAULT=0
S1	LAST SECTOR ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF SECTORS, USED ON ANY DRIVE WHICH HAS A 20-SECTOR FORMATTED CARTRIDGE. S1=0-23, DEFAULT=23
S2	FIRST SECTOR ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF SECTORS, USED ON ANY DRIVE WHICH HAS A 22-SECTOR FORMATTED CARTRIDGE. S2=0-25, DEFAULT=0
S3	LAST SECTOR ADDRESS IN TESTS WHICH ARE DONE OVER A RANGE OF SECTORS, USED ON ANY DRIVE WHICH HAS A 22-SECTOR FORMATTED CARTRIDGE. S3=0-25, DEFAULT=25
IS	SECTOR INCREMENT VALUE IN TESTS WHICH ARE DONE OVER A RANGE OF SECTORS, IS=1-25, DEFAULT=1
PT	DATA PATTERN SELECT WORD (SEE SECTION 8.2.4.1 FOR DETAILS) PT=0-177777, DEFAULT=0
CS	CONTROL SWITCH WORD (SEE SECTION 8.2.4.2 FOR DETAILS) CS=0-000070, DEFAULT=0
WC	WORD COUNT (NO. OF WORDS) USED IN DISK READ, WRITE, OR WRITE CHECK COMMANDS IN DATA TEST 20 , WC=0-177777,

DEFAULT=MAXIMUM BUFFER AVAILABLE, WC=0 IS INTERPRETED AS 65,536 WORDS

MA — PHYSICAL MEMORY ADDRESS (STARTING ADDRESS OF DATA BUFFER) USED ON ALL DATA TRANSFERS IN TESTS 21, 22. MA MAY BE GREATER THAN OR EQUAL TO ADDRESS OF RWBUF (NOT EXCEEDING AVAILABLE MEMORY ON THE SYSTEM). DEFAULT = ADDRESS OF RWBUF.

ST — NUMBER OF UNIT STALL TIMES WITH WHICH TO STALL (DELAY) BETWEEN RK06 COMMANDS

SM — MAXIMUM NUMBER OF UNIT STALL TIMES USED IN TEST 12 ONLY

8.2 SELECTION OF OPERATING PARAMETERS (ADDRESS 204 START)

8.2.1 DRIVE SELECTION

AFTER AN ADDRESS 204 START, THE PROGRAM INDICATES INPUT MODE BY TYPING "PARAMETER INPUT MODE". THEN, THE RK611 REGISTER ADDRESS, RK06 VECTOR ADDRESS, AND RK06 PRIORITY ARE OPENED FOR POSSIBLE MODIFICATION AS FOLLOWS:

```
RK06-07 BUS ADR  = 177440  NEW=(TYPE NEW VALUE HERE)
RK06-07 VEC ADR  =    210  NEW=(TYPE NEW VALUE HERE)
RK06-07 PRIORITY =      5  NEW=(TYPE NEW VALUE HERE)
```

NEXT THE PROGRAM TYPES THE NUMBER(S) OF THE CURRENT DRIVES UNDER TEST, FOLLOWED BY A (*) ON THE NEXT LINE TO REQUEST NEW DRIVE NUMBERS. FOR EXAMPLE:

```
PARAMETER INPUT MODE

DRIVE(S)=0,1,2,4,7
* (INPUT, IF ANY, GOES HERE)
```

THE OPERATOR TYPES THE NEW NUMBERS (SEPARATED BY COMMAS) PLUS <CR> OR SIMPLY <CR> TO LEAVE THEM UNCHANGED. IF HE ENTERS DRIVE NUMBERS, THESE DRIVES ARE THEN CHECKED FOR VALID STATUS BY THE PROGRAM, AND ALL THOSE TYPED WHICH ARE ACCEPTABLE WILL NOW BE LISTED AS BEFORE. THE OPERATOR MAY MANUALLY RECONFIGURE THE DRIVES AND TYPE IN NEW DRIVE NUMBERS, AND THESE WILL BE CHECKED AND TYPED, UNTIL THE OPERATOR FINALLY TYPES JUST <CR>.

ON INITIAL ENTRY FROM ADDRESS 204, THE DRIVES WHICH ARE LISTED ARE ALL THOSE ON THE SUBSYSTEM WHICH ARE ON-LINE, READY, WRITE-ENABLED, AND LOADED WITH A CARTRIDGE OTHER THAN AN ALIGNMENT PACK. (THIS IS THE DEFAULT DRIVE SELECTION FOR ADDRESS 200 START). ON ALL OTHER ENTRIES TO THE DRIVE SELECTION ROUTINE (VIA <↑C> AS DESCRIBED IN SECTIONS

8.2.2.5 AND 8.2.3.6) THE PROGRAM FIRST TYPES:

```
     TO TEST AL DRIVES TYPE "A"<CR>, ELSE <CR>
     * (CHARACTER GOES HERE)
```

NEXT, THE DRIVES ARE LISTED AS SHOWN ABOVE. IF (A) IS TYPED, ALL AVAILABLE DRIVES WILL BE LISTED, AND IF NOT, THE PREVIOUS SELECTION OF DRIVES WILL BE LISTED.

8.2.2 TEST SELECTION

WHEN THE OPERATOR FINALLY TYPES JUST <CR> IN RESPONSE TO THE DRIVE REQUEST, THE PROGRAM ENTERS THE TEST INPUT ROUTINE. THE FOLLOWING INSTRUCTIVE LINES ARE TYPED :

```
     L = LIST TESTS
     C = CHANGE TESTS
     I = INPUT PARAMETERS AND RUN TESTS
```

THEN, THE FOLLOWING REQUEST IS MADE :

```
     ENTER L,C, OR I
     * (CHARACTER GOES HERE)
```

THE OPERATOR TYPES THE DESIRED CHARACTER PLUS <CR>.

8.2.2.1 LIST TESTS, (L)

IF (L) IS TYPED, THE PROGRAM TYPES THE CURRENT DESIRED TEST LIST, AS FOLLOWS :

```
TEST      ITERATIONS
  1            0
  2       177777
  3          400
  4           25
  ETC.
```

THE ITERATION NUMBER IS THE NUMBER OF TIMES THE TEST WILL BE RUN ON THIS PASS, AND IT MUST BE BETWEEN 0 AND 177777. IF IT IS ZERO, THAT TEST WILL NOT BE RUN. ON THE FIRST TIME THROUGH, ALL TESTS ARE LISTED WITH DEFAULT ITERATIONS. THE LIST OF DEFAULT ITERATION NUMBERS BEGINS AT ADDRESS "DFLTST", AND CAN BE ALTERED IN CORE.

WHEN THE LIST IS COMPLETED, THE PROGRAM RETURNS TO TYPE : "ENTER L,C, OR I" AGAIN.

8.2.2.2 CHANGE TESTS, (C)

IF (C) IS TYPED, THE PROGRAM THEN ASKS: "TO DEFAULT TESTS TYPE D<CR>, ELSE <CR>". IF JUST <CR> IS TYPED, THE PROGRAM SEQUENTIALLY OPENS EACH TEST FOR POSSIBLE ALTERATION OF THE ITERATION NUMBER. EACH TEST IS OPENED AND A NEW LINE IS TYPED, GIVING THE TEST NO. AND ITER. NO. IN OCTAL, FOLLOWED BY (*) ON THE SAME LINE. FOR EXAMPLE :

```
TEST     ITERATIONS
  0           0 * (INPUT, IF ANY, GOES HERE)
```

THE OPERATOR THEN TYPES THE NEW VALUE PLUS <CR>, OR JUST <CR> TO LEAVE IT UNCHANGED. IF THE OPERATOR TYPES A NUMBER FOLLOWED BY <!> (EXCLAMATION POINT) THE NUMBER JUST ENTERED WILL BE LOADED INTO THE ITERATION TABLE FOR ALL REMAINING TESTS. AFTER ALL TESTS HAVE BEEN OPENED, THE PROGRAM RETURNS TO TYPE : "ENTER L,C, OR I" AGAIN.

8.2.2.3 INPUT PARAMETERS AND RUN TESTS, (I)

IF (I) IS TYPED, THE PROGRAM ENTERS THE PARAMETER LIST ALTERATION ROUTINE, DESCRIBED IN SECTION 8.2.3, IN WHICH OPERATING PARAMETERS MAY BE INPUT, AND TESTING BEGUN.

8.2.2.4 CONTROL Z (↑Z) FUNCTION

IF THE OPERATOR WISHES TO EXIT AT ANY TIME FROM L OR C MODE, AND RETURN TO SELECT A NEW MODE (L,C, OR I), CONTROL Z (↑Z) MAY BE TYPED.

8.2.2.5 CONTROL C (↑C) FUNCTION

IF THE OPERATOR WISHES TO TERMINATE L,C, OR I MODE, AND RETURN TO REQUEST NEW DRIVES AND TESTS, CONTROL C (↑C) MAY BE TYPED.

8.2.3 PARAMETER LIST ALTERATION

THE PROGRAM NEXT TYPES THE FOLLOWING INSTRUCTIVE LINES:

```
     T = TYPE LIST
     O = OPEN LIST
     S = SET INDIVIDUAL PARAM.
     R = RUN TESTS
     ENTER T,O,S, OR R
     * (CHARACTER GOES HERE)
```

THE OPERATOR TYPES THE DESIRED CHARACTER PLUS <CR>.

8.2.3.1 TYPE LIST, (T)

IF (T) IS TYPED, THE PROGRAM TYPES THE CURRENT PARAMETER LIST, AS FOLLOWS:

```
FC = XXXXXX
LC = XXXXXX
ETC.
```

WHEN THE LIST IS COMPLETED, THE PROGRAM RETURNS TO TYPE "ENTER T,O,S, OR R" AGAIN.

8.2.3.2 OPEN LIST, (O)

IF (O) IS TYPED THE PROGRAM THEN ASKS: "TO DEFAULT ALL PARAMETERS TYPE D<CR>, ELSE<CR>." IF JUST <CR> IS TYPED, THE PROGRAM SEQUENTIALLY OPENS EACH OPERATING PARAMETER IN THE LIST FOR ALTERATION (IN THE ORDER SHOWN IN SECTION 8.1). EACH PARAMETER IS OPENED AND A NEW LINE IS TYPED, GIVING THE PARAMETER AND ITS CURRENT VALUE (IN OCTAL), FOLLOWED BY (*) ON THE SAME LINE. FOR EXAMPLE:

```
IC=3 * (INPUT, IF ANY, GOES HERE)
```

THE OPERATOR THEN TYPES THE NEW VALUE PLUS A <CR> OR JUST <CR> TO LEAVE THAT PARAMETER UNCHANGED. AFTER ALL PARAMETERS HAVE BEEN OPENED FOR ALTERATION, THE PROGRAM RETURNS TO TYPE "ENTER T,O,S, OR R" AGAIN.

THE LIST OF DEFAULT PARAMETERS BEGINS AT ADDRESS "PRDFLT", AND CAN BE ALTERED IN CORE.

8.2.3.3 SET INDIVIDUAL PARAMETER, (S)

IF (S) IS TYPED, THE PROGRAM TYPES THE PROMPTER (>) ON THE NEXT LINE, AND WAITS FOR THE OPERATOR TO SET THE VALUE OF ANY INDIVIDUAL PARAMETER:

```
ENTER T,O,S, OR R
*S
> (ENTER PARAMETER AND VALUE HERE)
```

THE OPERATOR TYPES THE PARAMETER AND ITS NEW VALUE FOLLOWED BY <CR>, AND THE PROGRAM GIVES THE PROMPTER (>) AGAIN AS IN THE FOLLOWING EXAMPLE:

```
>  FC = 600
>  FS = 12
>  IT = 1
>  ETC.
```

TO TERMINATE INDIVIDUAL SETTING MODE, THE OPERATOR TYPES CONTROL Z (↑Z), AND THE PROGRAM RETURNS TO TYPE "ENTER T,O, S, OR R" AGAIN.

8.2.3.4 RUN TESTS, (R)

IF THE OPERATOR TYPES (R), EXECUTION OF TESTS BEGINS, USING ALL THE CURRENT PARAMETERS.

8.2.3.5 CONTROL Z (↑Z) FUNCTION

IF THE OPERATOR WISHES TO EXIT AT ANY TIME FROM T, O, S, OR R MODE (RUNNING TESTS), AND RETURN TO SELECT A NEW MODE (T,O,S, OR R), CONTROL Z (↑Z) MAY BE TYPED.

8.2.3.6 CONTROL C (↑C) FUNCTION

IF THE OPERATOR WISHES TO TERMINATE T, O, OR S MODE, OR STOP TEST EXECUTION (R MODE), CONTROL C (↑C) MAY BE TYPED, AND THE PROGRAM WILL RETURN TO REQUEST NEW DRIVE SELECTION (SEE SECTION 8.2.1). (ON AN ADDRESS 200 DEFAULT RUN, TYPING CONTROL C CAUSES THE PROGRAM TO HALT AFTER COMPLETING ANY DATA TRANSFER).

8.2.4 SPECIAL PARAMETER SPECIFICATIONS

8.2.4.1 PT-DATA PATTERN SELECT WORD

THE OPERATOR SPECIFIES A WORD OF SIXTEEN BITS (6 OCT. DIGITS), TO SELECT UP TO ALL SIXTEEN OF THE PATTERNS, LISTED IN SECTION 9.5.1. THE NO. OF ANY BIT SET IN PT CORRESPONDS TO THE NO. OF A PATTERN CHOSEN. IF THE HIGH BIT OF PT (BIT 15) IS SET, THE USER WILL BE ASKED TO TYPE UP TO SIXTEEN DATA WORDS WHICH WILL BE LOADED INTO THE BUFFER FOR PATTERN 15. THE PROGRAM TYPES:

    "SELECT USER DEFINED PATTERN 15"

NEXT, EACH OF UP TO 16 WORDS ARE REQUESTED BY THE PROGRAM IN THE SAME MANNER IN WHICH THE OPERATING PARAMETERS ARE OPENED FOR ALTERATION (SEE SECT. 8.2.3.2):

    WORD 0 = (OLD VALUE) * (NEW VALUE GOES HERE)
    WORD 1 = (OLD VALUE) * (NEW VALUE GOES HERE)
    ETC.

FOR EACH WORD, THE USER TYPES THE NEW VALUE PLUS <CR>, OR JUST <CR>, (TO LEAVE IT UNCHANGED). TO INPUT LESS THAN 16 WORDS FOR PATTERN 15, THE OPERATOR MAY TYPE (!) (EXCLAMATION POINT) AND THE PROGRAM WILL FILL UP THE REST OF THE PATTERN 15 BUFFER WITH THE LAST WORD SPECIFIED. NEXT, THE PROGRAM WILL CONTINUE, IN THE PROPER PARAMETER INPUT MODE (O OR S).

8.2.4.2 CS- CONTROL SWITCH WORD

IN ADDITION TO THE OPTIONS PROVIDED BY THE SWITCH REGISTER (HARDWARE OR SOFTWARE), A CONTROL SWITCH WORD (CS) MAY BE SPECIFIED AMONG THE OPERATING PARAMETERS TO PROVIDE THE FOLLOWING OPTIONS:

BIT	OPTION
05	DROP DRIVE IF 20(DEC) ERRORS EXCEEDED
04	TYPE BAD SECTOR FILES (BSF'S) ON FIRST PASS
03	INHIBIT TIMING REPORTS IN TESTS 13-16

NOTE

OTHER BITS UNUSED

9.0 DESCRIPTION OF TESTS

9.1 SEEK TESTS

THIS GROUP OF TESTS PERFORMS A VARIETY OF POSITIONING OPERATIONS. THROUGH THE EXECUTION OF READ HEADER COMMANDS, IMPLIED SEEKS ARE DONE TO SELECTED CYLINDERS, AND HEADER WORDS ARE READ AND CHECKED TO VERIFY THAT THE CORRECT CYLINDER WAS ADDRESSED. TESTING BEGINS WITH SIMPLE OPERATIONS WHICH VERIFY CYLINDER ADDRESSING CAPABILITY, AND PROCEEDS TO MORE INVOLVED SEEKING WHICH STRESSES THE SERVO MECHANISM. AT THE COMPLETION OF EACH SUBSYSTEM COMMAND, STATUS INDICATIONS AND ERROR BITS ARE CHECKED TO DETERMINE THE SUCCESS OF THE OPERATION. THROUGHOUT TESTING, SECTOR=FS, AND TRACK=FT.

9.1.1 TEST 1 - RECALIBRATE/SEEK TEST

THIS TEST WILL PERFORM A RECALIBRATE COMMAND (POSITION TO CYLINDER 0), FOLLOWED BY A SEEK TO CYLINDER LC. (AS IN ALL OF THE SEEK TESTS SEEKING IS IMPLIED, VIA THE READ HEADER COMMAND).

9.1.2 TEST 2 - SEEK/SEEK TEST

THIS TEST WILL PERFORM A SEEK TO CYLINDER FC, FOLLOWED BY A SEEK TO CYLINDER LC.

9.1.3 TEST 3 - CYLINDER ADDRESSING TEST

THIS TEST VERIFIES THE CYLINDER ADDRESS BITS, BY SEEKING TO CYLINDERS 0, 1, 2, 4, 10, 20, 40, 100, 200, AND 400 (OCTAL). THEN, THE SEEKS ARE DONE IN REVERSE BACK TO CYLINDER 0. IN BINARY, THE CYLINDER ADDRESSES SEQUENCE AS FOLLOWS:

```
000000000
000000001
000000010
    .
    .
    .
100000000
010000000
001000000
    .
    .
    .
000000001
000000000
```

9.1.4 TEST 4 - CYLINDER ADDRESS CROSSTALK TEST

THIS TEST PERFORMS SEEKS TO CYLINDERS WHOSE ADDRESSES ARE SUSCEPTIBLE TO BIT CROSSTALK WITHIN THE CYLINDER ADDRESSING LOGIC. FIRST A SEEK TO CYLINDER 0 IS DONE, FOLLOWED BY A SEEK TO 377 (OCTAL). THEN A SEEK TO 0 IS DONE AGAIN, AND A SEEK TO 376 , ETC. THE CYLINDER ADDRESSES SEQUENCE AS FOLLOWS:

```
000 000 000
011 111 111
000 000 000
011 111 110
000 000 000
011 111 101
000 000 000
011 111 011
    .
    .
    .
000 000 000
010 111 111
000 000 000
```

101 111 111

BY SEEKING TO 0 BETWEEN CROSSTALK SEEKS, THE CROSSTALK PATTERNS ALSO TEST THE CYLINDER DIFFERENCE LOGIC.

9.1.5 TEST 5 - INCREMENT/DECREMENT SEEK TEST

IN THIS TEST SEEKS ARE DONE IN INCREMENTS OF IC CYLINDERS STARTING AT CYL FC, AND ENDING AT OR BEYOND LC. THEN, THE SEEKS ARE DONE IN REVERSE, BACK TO FC. IF FC IS CHOSEN > LC, THE SEEKS WILL PROCEED IN THE OPPOSITE DIRECTION.

9.1.6 TEST 6 - OSCILLATING SEEK TEST

THIS TEST FIRST SEEKS TO CYLINDER FC, WHICH IS INITIALLY EQUAL TO NC. THEN NC IS INCREMENTED BY IC, AND A SEEK FROM FC TO NC IS MADE, FOLLOWED BY A SEEK BACK TO FC. NC IS INCREMENTED AGAIN, AND SEEKING FROM FC TO NC TO FC IS REPEATED UNTIL NC EXCEEDS LC. THEN, THE REVERSE IS DONE, DECREMENTING NC UNTIL NC EXCEEDS FC.

9.1.7 TEST 7 - CONVERGING/DIVERGING SEEK TEST

THIS TEST PERFORMS SEEKS WHICH EXERCISE CYLINDER DIFFERENCE VALUES. INITIALLY, NCYL1 = FC AND NCYL2 = LC. A SEEK IS DONE TO NCYL1 AND THEN TO NCYL2, THEN, NCYL1 IS INCREMENTED BY IC IN THE DIRECTION OF LC, AND NCYL2 IS INCREMENTED BY IC IN THE DIRECTION OF FC, AND SEEKS ARE DONE TO NCYL1 AND NCYL2 AGAIN. THIS SEEKING IS CONTINUED WITH INCREMENTED VALUES OF NCYL1 AND NCYL2, UNTIL NCYL1 EXCEEDS LC AND NCYL2 EXCEEDS FC. (NOTE: FC > LC IS PERMISSIBLE.) THIS TEST CAUSES SEEKING TO CONVERGING AND THEN DIVERGING CYLINDER VALUES.

9.1.8 TEST 10 - PSEUDO-RANDOM SEEK TEST

THIS TEST PERFORMS A SEEK TO A PSEUDO-RANDOMLY CHOSEN CYLINDER WHICH IS WITHIN THE RANGE (0-632), (0-1456 FOR RK07)

9.1.9 TEST 11 - MAXIMUM VELOCITY REVERSAL SEEK TEST

THIS TEST PERFORMS A SEEK FROM CYLINDER 0 TO CYLINDER 201(OCT), AND BACK TO CYLINDER 0. THIS PARTICULAR SEEK CAUSES THE HEADS TO ACCELERATE TO MAXIMUM VELOCITY, AND THEN IMMEDIATELY DECELERATE, WITH NO APPRECIABLE PLATEAU OF CONSTANT VELOCITY. THIS OPERATION INDUCES HEATING IN THE SERVO MECHANISM.

9.1.10 TEST 12 - MECHANICAL VIBRATION SEEK TEST

THIS TEST PERFORMS GEOMETRICALLY INCREASING SEEKS WITH GEOMETRICALLY DECREASING STALL TIME BETWEEN OPERATIONS WITH INTENT TO INDUCE VARYING VIBRATIONAL MODES UPON THE DRIVE. THE TEST BEGINS WITH LC = 1, AND ST = SM, THEN, THE FOLLOWING SEQUENCE IS PERFORMED: SEEKS ARE DONE BETWEEN 0 AND LC, 10(DEC) TIMES. THEN, ST IS DIVIDED BY 2 AND LC IS DOUBLED, AND SEEKS ARE DONE BETWEEN 0 AND LC AGAIN, 10(DEC) TIMES. THIS PROCESS IS CONTINUED FOR NEW VALUES OF ST AND LC, UNTIL LC EXCEEDS CYL 400 (OCT). THEN, THE WHOLE PROCESS IS REVERSED, WITH ST BEING DOUBLED AND LC DIVIDED BY 2, UNTIL LC BECOMES < 1.

9.2 TIMING TESTS

THIS GROUP OF TESTS PERFORMS TIMING MEASUREMENTS OF BASIC DRIVE OPERATIONS - SPINDLE ROTATION AND SEEKING. FOR EACH TEST THE FUNCTION BEING MEASURED IS TIMED FOR A GIVEN NUMBER OF OCCURENCES, AND THE MINIMUM, MAXIMUM, AND AVERAGE VALUES ARE TYPED ALONG WITH THE NUMBER OF OPERATIONS WHICH EXCEEDED THE LIMITS SPECIFIED IN THE RK06/07 DISK DRIVE SPECIFICATION.

NOTE- FOR 50 HZ OPERATION, PATCH 1 INTO LOCATION 166 (LABELED HZ:).

9.2.1 TEST 13 - MAXIMUM ROTATIONAL LATENCY MEASUREMENT

THIS TEST MEASURES THE INTERVAL OF TIME BETWEEN 2 INDEX MARKS IN A SINGLE DISK ROTATION. THE SPECIFIED MAXIMUM ROTATIONAL LATENCY = 25 MILLI-SEC + OR - 2.5%. THIS MEASUREMENT IS MADE 128 TIMES.

SAMPLE PRINTOUT --

```
     ROTATIONAL TIMES :
     MIN = 24086 US  103 OF 128 BELOW SPEC'D MIN OF 24375 US
     MAX = 25065 US    0 OF 128 ABOVE SPEC'D MAX OF 25625 US
     AVG = 24285 US
```

9.2.2 TEST 14 - ONE CYLINDER SEEK TIME MEASUREMENT

THIS TEST MEASURES THE TIME REQUIRED TO SEEK BETWEEN 2 ADJACENT CYLINDERS, BOTH IN THE FORWARD AND REVERSE DIRECTIONS. SEEKS ARE DONE TO 0,1,2,...,631,632 AND THEN TO 631,630,...,2,1,0 AND THE RESULTS ARE TYPED FOR EACH DIRECTION. THE SPECIFIED ONE CYL SEEK TIME IS < 8 MILLI-SEC. NOTE: SEEKS ARE TO CYL 1456 FOR THE RK07.

SAMPLE PRINTOUT --

```
     ONE CYL SEEK TIMES :
```

```
1040
1041
1042
1043                          **FORWARD DIRECTION**
1044                          MIN = 6332 US
1045                          MAX = 6749 US  0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1046                          AVG = 6536 US
1047                          **REVERSE DIRECTION**
1048                          MIN = 6314 US
1049                          MAX = 6749 US  0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1050                          AVG = 6532 US
1051
1052
1053
1054                    9.2.3  TEST 15 - AVERAGE SEEK TIME MEASUREMENT
1055
1056                    THIS TEST MEASURES THE TRUE AVERAGE SEEK TIME IN BOTH THE FORWARD  AND
1057                    REVERSE DIRECTIONS.  THE AVERAGE TIME IS CALCULATED FROM THE FOLLOWING
1058                    FORMULA :
1059                      T AVG = [T1(410)(2)+T2(409)(2)+...+T410(1)(2)]/(410)(410)
1060                    WHERE TX = THE MEASURED TIME TO SEEK X CYLINDERS.  FORWARD AND REVERSE
1061                    TIMES  ARE  MEASURED  AND TYPED, SEPARATELY.  THE AVERAGE SEEK TIME IS
1062                    SPECIFIED TO BE < 38 MILLI-SEC.
1063
1064                    SAMPLE PRINTOUT --
1065
1066                          AVERAGE SEEK TIMES :
1067                          **FORWARD DIRECTION**
1068                          AVG = 35673 US   SPEC'D MAX IS 38000 US
1069                          **REVERSE DIRECTION**
1070                          AVG = 35823 US   SPEC'D MAX IS 38000 US
1071
1072
1073
1074                    9.2.4  TEST 16 - MAXIMUM SEEK TIME MEASUREMENT
1075
1076                    THIS TEST MEASURES THE TIME REQUIRED TO SEEK FROM CYL  0  TO  CYL  632
1077                    OCT.  (410 DEC.).  THIS TIME REPRESENTS THE MAXIMUM SEEK TIME, AND IT
1078                    IS MEASURED 128 TIMES IN EACH DIRECTION.  THE SPECIFIED  MAXIMUM  SEEK
1079                    TIME IS < 75 MILLI-SEC.
1080
1081                    SAMPLE PRINTOUT --
1082
1083                          MAXIMUM SEEK TIMES :
1084                          **FORWARD DIRECTION**
1085                          MIN = 68950 US
1086                          MAX = 69286 US  0 OF 128 ABOVE SPEC'D MAX OF 75000 US
1087                          AVG = 69122 US
1088                          **REVERSE DIRECTION**
1089                          MIN = 70194 US
1090                          MAX = 70667 US  0 OF 128 ABOVE SPEC'D MAX OF 75000 US
1091                          AVG = 70407 US
1092
1093
1094
1095                    9.3  TEST 17 - SECTOR ADDRESSING TEST
```

IN THIS TEST, ALL SECTORS OF FC, FT ARE WRITTEN, EACH WITH 256(DEC) WORDS OF ITS OWN SECTOR NO. + 100(OCT). NEXT, FOR EACH SECTOR WRITTEN A WRITE CHECK IS DONE, FOLLOWED BY A READ AND SOFTWARE COMPARE OF THE DATA.

9.4 TEST 20 - TRACK ADDRESSING TEST

IN THIS TEST, SECTOR FS OF CYL FC IS WRITTEN WITH 256 (DEC) WORDS OF THE TRACK NO. + 100(OCT), FOR EACH OF TRACKS 0,1,2. THEN, A WRITE CHECK OF EACH SECTOR IS DONE TO VERIFY THE WRITES. THEN, EACH OF THE 3 SECTORS IS RE-WRITTEN, AND AFTER EACH WRITE ALL OF THE THREE SECTORS ARE WRITE-CHECKED TO DETECT TRACK ADDRESSING PROBLEMS.

9.5 TEST 21 - READ/WRITE DATA TEST

THE READ/WRITE DATA TEST HAS 2 DIFFERENT VERSIONS, DEPENDING ON THE VALUE OF THE DATA PATTERN PARAMETER (PT).

FOR PT = 0 :

THIS TEST IS THE QUICK VERIFY DEFAULT DATA TEST, WHICH IS RUN WHEN PT=0, DUE TO PARAMETER INPUT CHOICE, OR ADDRESS 200 START. IN THIS TEST, THE ENTIRE PACK IS TESTED WITH A SINGLE DATA PATTERN. THIS PATTERN IS COMPRISED OF THE DATA PATTERNS 00-15, WHICH REPEATS EVERY 256(DEC) WORDS. EACH TRACK IS WRITTEN IN 4 SEGMENTS, FOLLOWED BY A WRITE-CHECK, READ, AND SOFTWARE COMPARE. THE SEGMENTS ARE 6 SECTORS EACH, WHICH MEANS THAT TRACK SPIRALING OCCURS ON THE LAST SEGMENT WRITTEN ON EACH TRACK.

FOR PT NOT = 0 :

THIS TEST PERFORMS READ/WRITE FUNCTIONS ON THE ENTIRE RANGE OF CYLINDERS (FC-LC), TRACKS (FT-LT), AND SECTORS (FS-LS) SPECIFIED. AT EACH SPECIFIED SECTOR WC WORDS OF THE CURRENT REPEATING DATA PATTERN ARE WRITTEN, AND THEN WRITE-CHECKED, FOLLOWED BY A READ AND SOFTWARE COMPARE. THIS IS DONE FOR ALL THE SPECFIEID SECTORS ON ALL THE TRACKS USING THE SECTOR INCREMENT IS, AND TRACK INCREMENT IT. AND THEN IT IS REPEATED USING EACH OF THE OTHER DATA PATTERNS CHOSEN IN PARAMETER PT. THEN, EACH OF THE ABOVE OPERATIONS ARE REPEATED AT EACH OF THE REMAINING CYLINDERS, IN THE SPECIFIED RANGE, USING THE CYLINDER INCREMENT IC. NOTE THAT FS MUST BE CHOSEN < OR = LS, AND FT MUST BE < OR = LT. HOWEVER, FC MAY BE <, =, OR > LC, AND IF FC>LC, THE CYLINDER ADDRESS WILL BE DECREMENTED BY IC (INSTEAD OF INCREMENTED) TO OBTAIN EACH NEW CYLINDER ADDRESS.

NOTE:

THE PACK ADDRESS LIMITS

(FT,LT,FS,LS,FC,LC) REFER TO THE RANGE OF DATA SECTORS AT WHICH TRANSFERS MAY BEGIN, USING THE SPECIFIED WORD COUNT WC. IF WC IS LARGE ENOUGH, HOWEVER, THE TRANSFERS MAY EXTEND BEYOND THE ABOVE LIMITS.

9.5.1 DATA PATTERNS

EACH DATA PATTERN IS COMPRISED OF 16 WORDS. PATTERNS ARE REPEATED AS NECESSARY TO OBTAIN THE DESIRED WORD COUNT ON THE WRITE DATA COMMANDS. THE MAXIMUM ALLOWABLE WORD COUNT IS DETERMINED BY THE AMOUNT OF AVAILABLE BUFFER SPACE AT THE END OF THE PROGRAM, AND COULD BE AS LARGE AS 65,536 (DEC) WORDS. DATA SPIRALING AND TRACK SWITCHING IS THUS POSSIBLE DURING THE DATA TESTS.

THE FOLLOWING IS THE LIST OF 16 SELECTABLE DATA PATTERNS (IN OCTAL), WITH NOTABLE FEATURES DESCRIBED:

0 HIGH-LOW FREQUENCY MIX	1 HIGH FREQUENCY PHASE MIX	2 LOW FREQUENCY PHASE MIX	3 MAXIMUM PRECOMPENSATION PHASE MIX
177777	000000	052525	133333
177777	000000	052525	066666
177777	000000	052525	155555
052525	177777	125252	155555
052525	177777	125252	133333
052525	177777	125252	066666
177777	000000	052525	066666
177777	000000	052525	155555
052525	177777	125252	155555
052525	177777	125252	133333
177777	000000	052525	133333
052525	177777	125252	133333
177252	000000	052525	133333
177252	177777	125252	133333
172765	000000	052525	133333
172765	177777	125252	133333

4 ROTATING BOUNDARY PULSE PRECOMPENSATION	5 ROTATING CELL PULSE PRECOMPENSATION	6 ALL ZEROS	7 ALL ONES
121105	026455	000000	177777
150442	113226	000000	177777
064221	045513	000000	177777
132110	122645	000000	177777
055044	151322	000000	177777
026422	064551	000000	177777
013211	132264	000000	177777
105504	055132	000000	177777
042642	026455	000000	177777
021321	113226	000000	177777
110550	045513	000000	177777
044264	122645	000000	177777
022132	151322	000000	177777
011055	064551	000000	177777
104426	132264	000000	177777
042213	055132	000000	177777

8 SHIFTED 1 IN FIELD OF 0'S	9 SHIFTED 0 IN FIELD OF 1'S	10 ALTERNATING 0-1	11 ALTERNATING 1-0
000001	177776	052525	125252
000002	177775	052525	125252
000004	177773	052525	125252
000010	177767	052525	125252
000020	177757	052525	125252
000040	177737	052525	125252
000100	177677	052525	125252
000200	177577	052525	125252
000400	177377	052525	125252
001000	176777	052525	125252
002000	175777	052525	125252
004000	173777	052525	125252
010000	167777	052525	125252
020000	157777	052525	125252
040000	137777	052525	125252
100000	077777	052525	125252

12 SHIFTING 0'S AND 1'S	13 COMPOSITE ROTATING	14 PSEUDO-RANDOM	15 USER-DEFINED
000001	072307		
000003	135143		
000007	156461		
000017	167230		
000037	073514		
000077	035646		
000177	016723		
000377	107351		
000777	143564		
001777	061672		
003777	030735		
007777	114356		
017777	046167		
037777	123073		
077777	151453		
177777	164616		

9.6 TEST 22 - DUAL-ACCESS DATA TEST

THIS TEST IS DESIGNED TO RUN ON 2 DIFFERENT PROCESSORS, SIMULTANEOUSLY AND INDEPENDENTLY PERFORMING DYNAMIC DATA OPERATIONS ON THE SAME DRIVE, THROUGH 2 DIFFERENT CONTROLLERS. TEST 22 HAS A SEPARATE STARTING ADDRESS = 220 AND IT IS NEVER RUN WITH THE OTHER TESTS IN AN AUTOMATIC MANNER. ALSO, BOTH PORTS MUST BE SWITCHED ON-LINE, AT THE DRIVE.

THIS TEST IS A MODIFIED VERSION OF READ/WRITE DATA TEST 21, IN WHICH A DRIVE RELEASE COMMAND IS DONE IMMEDIATELY AFTER COMPLETION OF READ WRITE OPERATIONS AT A PARTICULAR PACK ADDRESS. IN ALL OTHER RESPECTS, TESTS 21 AND 22 ARE IDENTICAL, AS FAR AS EACH PROCESSOR IS CONCERNED. THIS MEANS THAT THE TEST PARAMETERS (ADDRESS LIMITS, DATA PATTERNS, ETC.) CAN BE DEFINED DIFFERENTLY FOR EACH PROCESSOR. IF DIFFERENT DATA PATTERNS ARE USED, FOR EXAMPLE, THE DATA WHICH APPEARS ON THE DISK AT TIME OF FAILURE CAN IDENTIFY THE CONTROLLER FROM WHICH IT ORIGINATED. LIKEWISE, THE WORD COUNT MAY BE CHOSEN APPROPRIATELY SMALL (WC=1) TO CAUSE THE GREATEST AMOUNT OF CONTENTION FOR THE USE OF THE DRIVE.

NOTE THAT IF BOTH PROCESSORS ARE PERFORMING TRANSFERS WITH DIFFERENT DATA, AT THE SAME PACK ADDRESS, INTERFERENCE MAY OCCUR, IF ONE CONTROLLER SHOULD LOSE THE DRIVE PREMATURELY TO REPORT AN ERROR.

WHEN THE TEST IS STARTED (AT ADDRESS 220) PARAMETER INPUT MODE IS ENTERED, AND OPERATIONAL PARAMETERS AND THE DRIVE NUMBER MAY BE TYPED IN (SEE SECTION 8.1) AS WELL AS RK06 UNIBUS ADDRESS AND INTERRUPT VECTOR. THE TEST NUMBER IS AUTOMATICALLY SET TO 22, AND THE PROGRAM TYPES "ENTER T,O,S, OR R" AS DESCRIBED IN SECTION 8.2.3. AT THIS POINT, THE OPERATION OF THE PROGRAM IS THE SAME AS PREVIOUSLY DESCRIBED IN CONJUNCTION WITH THE OTHER TESTS. HOWEVER, ONLY TEST 22 MAY BE RUN, AND ONLY ON THE SINGLE SELECTED DRIVE. ALSO, THE OPERATOR MUST INDEPENDENTLY LOAD AND START THE TEST IN EACH PROCESSOR AND SELECT INPUT PARAMETERS, INDEPENDENTLY. THE DRIVE NUMBER TYPED AT EACH PROCESSOR CONSOLE MUST BE THE SAME, IN ORDER TO PERFORM THE TESTS ON THE SAME DRIVE, SIMULTANEOUSLY.

10.0 ERROR REPORTING

10.1 COMMON ERRORS

THE FOLLOWING IS A LIST OF COMMON ERROR MESSAGES WHICH ACCOMPANY ERROR TYPEOUTS FROM THE SUBSYSTEM VERIFICATION PROGRAM. THE ERRORS ARE SELF-EXPLANATORY.

1. UNIBUS PARITY ERROR
2. NON-EXISTANT MEMORY ERROR
3. NON-EXISTANT DRIVE ERROR

```
1327
1328
1329
1330                    4.  UNIT FIELD ERROR
1331                    5.  SUBSYSTEM TIMEOUT
1332                    6.  SERCON PARITY ERROR
1333                    7.  DRIVE DETECTED PARITY ERROR
1334                    8.  AC LOW
1335                    9.  SPEED LOSS
1336                   10.  ILLEGAL FUNCTION ERROR
1337                   11.  PROGRAMMING ERROR
1338                   12.  NON-EXECUTABLE FUNCTION ERROR
1339                   13.  DRIVE TYPE ERROR
1340                   14.  FORMAT ERROR
1341                   15.  WRITE LOCK ERROR
1342                   16.  DRIVE UNSAFE ERROR
1343                   17.  SEEK INCOMPLETE ERROR
1344                   18.  CYLINDER OVERFLOW ERROR
1345                   19.  ILLEGAL CYLINDER ADDRESS ERROR
1346                   20.  DRIVE OFF TRACK
1347                   21.  DRIVE TIMING ERROR
1348                   22.  DATA LATE ERROR
1349                   23.  CONTROLLER TIMEOUT ERROR
1350                   24.  OPERATION INCOMPLETE ERROR
1351                   25.  HEADER VRC ERROR
1352                   26.  DATA CHECK ERROR
1353                   27.  WRITE CHECK ERROR
1354                   28.  DATA MISCOMPARE
1355                   29.  NO DRIVE RESPONSE - UFE AND NXD
1356                   30.  DRIVE ERROR WILL NOT CLEAR
1357                   31.  DRIVE STATUS CHANGE WILL NOT CLEAR
1358                   32.  ATTENTION BUT NO STATUS CHANGE OR FAULT
1359                   33.  ATTENTION BUT DRIVE NOT AVAILABLE
1360                   34.  ERROR WHILE GATHERING DRIVE STATUS
1361                   35.  MULTIPLE DRIVE SELECT
1362                   36.  HEADER COMPARE ERROR
1363                   37.  ERROR IN RECALIBRATE FOR RECOVERY
1364                   38.  CLEAR CONTROLLER DID NOT CLEAR ERROR
1365                   39.  NO ATTENTION IN ATTENTION SUMMARY REGISTER
1366                   40.  UNSOLICITED ATTENTION
1367                   41.  UNEXPECTED DATA TYPE ERROR
1368                   42.  ATTENTION DID NOT RESET WITH CLEAR
1369                   43.  SUBSYSTEM CLEAR DID NOT CLEAR DRIVE ATTENTION
1370                   44.  DATA LATE WHEN UNLOADING HEADER
1371                   45.  CONTROLLER ERROR WHEN DRIVER SERVICING
1372                   46.  RETRY UNSUCCESSFUL
1373                   47.  BAD SECTOR ERROR ON SECTOR NOT LISTED BAD
1374
1375
1376
1377        10.2  ERROR HANDLING
1378
1379        ERRORS REPORTED BY THE PROGRAM CONSIST OF  COMMON  FAILURES  RESULTING
1380        FROM  ATTEMPTED  SUBSYSTEM FUNCTIONS, AS WELL AS CERTAIN ERRORS UNIQUE
1381        TO PARTICULAR  TESTS.   EACH  ERROR  PRINTOUT  CONSISTS  OF  AN  ERROR
1382        DESCRIPTION AND TEST NUMBER, POSSIBLY FOLLOWED BY HEADER LINES, COLUMN
```

HEADINGS, AND COLUMNS OF REGISTER CONTENTS IN OCTAL. AS MUCH MEANINGFUL REGISTER DATA AS POSSIBLE (FOR EXAMPLE, RK611 REGISTERS) ARE REPORTED ON A GIVEN ERROR. IN THE CASE OF DATA MISCOMPARE ERRORS, FOR INSTANCE, THE WORD NUMBER, GOOD DATA WORD, BAD DATA WORD, PHYSICAL MEMORY ADDRESS, VIRTUAL ADDRESS, AND MEMORY MANAGEMENT REGISTER CONTENTS (IF PRESENT) ARE REPORTED. OTHER ERROR REPORTS MAY CONSIST OF A SINGLE DESCRIPTIVE LINE.

MANY OF THE COMMON ERRORS ARE RETRIED SEVERAL TIMES, AND IF THEY PERSIST, AN ABORT IS MADE. DATA ERRORS AND MISCOMPARES ARE REPORTED, AND THE PROGRAM CONTINUES TESTING.

10.3 ERROR PRINTOUT EXAMPLES

EXAMPLE 1:

```
** NON-EXISTANT DRIVE ERROR
   TEST 2

PREVIOUS COMMAND :
DRIVE   CMND    CYLNDR  TRACK   SECTOR  WD CNT
000000  000177  000000  000000  000000  000000
  HI BA   LO BA
  000000  000000

CURRENT COMMAND :
ERR PC  DRIVE   CMND    CYLNDR  TRACK   SECTOR  WD CNT
037576  000000  000125  000000  000000  000000  000000
  HI BA   LO BA
  000000  000000

RK611 REGISTERS:
RKCS1   RKCS2   RKDC    RKDA    RKWCR   RKBA    RKASOF
140324  010100  000000  000000  000000  000000  000400

REMAINING REGISTERS NOT VALID
```

EXAMPLE 2:

```
**  DATA MISCOMPARE
    TEST 21

PREVIOUS COMMAND :
DRIVE   CMND    CYLNDR  TRACK   SECTOR  WD CNT
000000  CJ0121  000000  000000  000000  036000
  HI BA   LO BA
  000000  074000

CURRENT COMMAND :
ERR PC  DRIVE   CMND    CYLNDR  TRACK   SECTOR  WD CNT
```

```
1439
1440
1441
1442                    034606  000000  000121  000000  000000  000000  036000
1443                      HI BA   LO BA
1444                      000000  074000
1445
1446                    PACK ADDRESS OF ERROR(S) :
1447                    CYLNDR  TRACK   SECTOR
1448                    000000  000000  000000
1449
1450                    WD #    GOOD    BAD     HI PHY  LO PHY  VRT AD  KIPAR6
1451
1452                    000000  000001  125252  000000  074000  154000  000600
1453                    000001  000002  125252  000000  074002  154002  000600
1454                    000002  000003  125252  000000  074004  154004  000600
1455                    000003  000004  125252  000000  074006  154006  000600
1456                    000004  000005  125252  000000  074010  154010  000600
1457                    000005  000006  125252  000000  074012  154012  000600
1458                    000006  000007  125252  000000  074014  154014  000600
1459                    000007  000010  125252  000000  074016  154016  000600
1460                    000010  000011  125252  000000  074020  154020  000600
1461                    000011  000012  125252  000000  074022  154022  000600
```

APPENDIX A

SAMPLE ADDRESS 200 DEFAULT RUN

THE FOLLOWING PRINTOUT WAS THE RESULT OF RUNNING SUBSYSTEM VERIFICATION, PART 1, ON A SINGLE DRIVE (DRIVE 0), FOR THE FIRST PASS OF THE PROGRAM (QUICK-VERIFY PASS). IN THIS MODE, ALL MESSAGES APPEARING HERE WERE OUTPUTS - NO OPERATOR INPUTS ARE PROVIDED ON AN ADDRESS 200 RUN.

```
     CZR6M-0 - RK611/RK06-RK07 SUBSYSTEM VERIFICATION : PART 1


     LAST PHYS MEM ADR = 377776

     DRIVE 1 NON-EXISTENT
     DRIVE 2 NON-EXISTENT
     DRIVE 3 NON-EXISTENT
     DRIVE 4 NON-EXISTENT
     DRIVE 5 NON-EXISTENT
     DRIVE 6 NON-EXISTENT
     DRIVE 7 NON-EXISTENT

     DRIVE(S) = 0

     TESTING DRIVE 0
     DRIVE SER. NO.  8
     CART. SER. NO.  334

     ROTATIONAL TIMES :
     MIN = 24153 US    99 OF 128 BELOW SPEC'S MIN OF 24375 US
     MAX = 25125 US     0 OF 128 ABOVE SPEC'D MAX OF 25625 US
     AVG = 24374 US

     ONE CYL SEEK TIMES :
     **FORWARD DIRECTION**
     MIN = 6323 US
     MAX = 6686 US     0 OF 410 (814 FOR RK07) ABOVE SPEC'D MAX OF 8000 US
     AVG = 6518 US
     **REVERSE DIRECTION**
     MIN = 6332 US
     MAX = 6713 US     0 OF 410 (814 FOR RK07) ABOVE SPEC'D MAX OF 8000 US
     AVG = 6513 US

     AVERAGE SEEK TIMES :
```

```
1518
1519
1520
1521                    **FORWARD DIRECTION**
1522                    AVG = 35673 US   SPEC'D MAX IS 38000 US
1523                    **REVERSE DIRECTION**
1524                    AVG = 35823 US   SPEC'D MAX IS 38000 US
1525
1526                    MAXIMUM SEEK TIMES :
1527                    **FORWARD DIRECTION**
1528                    MIN = 68950 US
1529                    MAX = 69150 US   0 OF 128 ABOVE SPEC'D MAX OF 75000 US
1530                    AVG = 69064 US
1531                    **REVERSE DIRECTION**
1532                    MIN = 70222 US
1533                    MAX = 70530 US   0 OF 128 ABOVE SPEC'D MAX OF 75000 US
1534                    AVG = 70379 US
1535
1536                    END PASS #    1
```

APPENDIX B

SAMPLE ADDRESS 204 RUN

THE FOLLOWING PRINTOUT WAS THE RESULT OF RUNNING SUBSYSTEM VERIFICATION, PART 1, ON A SINGLE DRIVE (DRIVE 0), WITH PARTICULAR TESTS SELECTED TO BE RUN FOR SPECIFIED NUMBERS OF TIMES, WITH SPECIFIED PARAMETERS, AND A SPECIFIED NO. OF PROGRAM PASSES. SPECIFICALLY, IT WAS DESIRED THAT TEST 2 BE RUN 25(OCTAL) TIMES, TEST 7 FOUR TIMES, TEST 14 RUN 2 TIMES, AND TEST 21 ONCE. THESE TESTS WERE SPECIFIED TO RUN FOR 2 PROGRAM PASSES, USING PARAMETER VALUES TYPED BY THE OPERATOR. IN THIS CASE PACK ADDRESS PARAMETERS AND DATA TRANSFER WORD COUNT WERE SPECIFIED, FOR TESTS WHICH UTILIZE THEM.

```
     CZR6M-D - RK611/RK06-RK07 SUBSYSTEM VERIFICATION : PART 1

     LAST PHYS MEM ADR = 377776


     PARAMETER INPUT MODE

     RK06 BUS ADR = 177440  NEW =
     RK06 VEC ADR =    210  NEW =
     RK06 PRIORITY =     5  NEW =

     DRIVE 1 NON-EXISTENT
     DRIVE 2 NON-EXISTENT
     DRIVE 3 NON-EXISTENT
     DRIVE 4 NON-EXISTENT
     DRIVE 5 NON-EXISTENT
     DRIVE 6 NON-EXISTENT
     DRIVE 7 NON-EXISTENT

     DRIVE(S) = 0
     *

     L = LIST TESTS
     C = CHANGE TESTS
     I = INPUT PARAMETERS AND RUN TESTS

     ENTER L, C, OR I
     * C
     TO DEFAULT TESTS TYPE D<CR>, ELSE <CR>
```

```
1593
1594
1595
1596                                    *
1597
1598                                    TEST    ITERATIONS
1599                                      1          10 * 0
1600                                      2         200 * 25
1601                                      3          10 * 0
1602                                      4          10 * 0
1603                                      5           2 * 0
1604                                      6           3 * 0
1605                                      7           2 * 4
1606                                     10         400 * 0
1607                                     11         500 * 0
1608                                     12           2 * 0
1609                                     13           1 * 0
1610                                     14           1 * 2
1611                                     15           1 * 0
1612                                     16           1 * 0
1613                                     17          10 * 0
1614                                     20          10 * 0
1615                                     21           1 *
1616
1617                                    ENTER L, C, OR I
1618                                    * L
1619
1620                                    TEST    ITERATIONS
1621                                      1           0
1622                                      2          25
1623                                      3           0
1624                                      4           0
1625                                      5           0
1626                                      6           0
1627                                      7           4
1628                                     10           0
1629                                     11           0
1630                                     12           0
1631                                     13           0
1632                                     14           2
1633                                     15           0
1634                                     16           0
1635                                     17           0
1636                                     20           0
1637                                     21           1
1638
1639                                    ENTER L, C, OR I
1640                                    * I
1641
1642                                    T = TYPE PARAMETER LIST
1643                                    O = OPEN PARAMETER LIST
1644                                    S = SET INDIVIDUAL PARAM
1645                                    R = RUN TESTS
1646
1647                                    ENTER T, O, S, OR R
1648                                    * O
```

```
1649
1650
1651
1652                    TO DEFAULT ALL PARAMETERS TYPE D<CR>, ELSE <CR>
1653                    *
1654                    FC=0 *
1655                    LC=632 * 2
1656                    IC=1 *
1657                    FT=0 * 1
1658                    LT=2 * )
1659                    IT+1 *
1660                    S0=0 *
1661                    S1=23 *
1662                    S2=0 * 10
1663                    S3=25 * 10
1664                    IS=1 *
1665                    PT=0 * 20
1666                    MA=61566 *
1667                    WC=403 * 1100
1668                    CS=0 *
1669                    ST=0 *
1670                    SM=1000 *
1671
1672                    ENTER T, O, S, OR R
1673                    * T
1674                    FC=0
1675                    LC=2
1676                    IC=1
1677                    FT=1
1678                    LT=1
1679                    IT=1
1680                    S0=0
1681                    S1=23
1682                    S2=10
1683                    S3=10
1684                    IS=1
1685                    PT=20
1686                    MA=61566
1687                    WC=1100
1688                    CS=0
1689                    ST=0
1690                    SM=1000
1691
1692                    ENTER T, O, S, OR R
1693                    * R
1694                    ENTER NO. OF PASSES (1-77777) :
1695                    * 2
1696
1697                    TESTING DRIVE 0
1698                    DRIVE SER. NO.  8
1699                    CART. SER. NO.  334
1700
1701                    ONE CYL SEEK TIMES :
1702                    **FORWARD DIRECTION**
1703                    MIN = 6319 US
1704                    MAX = 6691 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
```

```
1705
1706
1707
1708                                    AVG = 6502 US
1709                                    **REVERSE DIRECTION**
1710                                    MIN = 6301 US
1711                                    MAX = 6682 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1712                                    AVG = 6498 US
1713
1714                                    ONE CYL SEEK TIMES :
1715                                    **FORWARD DIRECTION**
1716                                    MIN = 6332 US
1717                                    MAX = 6695 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1718                                    AVG = 6506 US
1719                                    **REVERSE DIRECTION**
1720                                    MIN = 6314 US
1721                                    MAX = 6686 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1722                                    AVG = 6503 US
1723
1724                                    ONE CYL SEEK TIMES :
1725                                    **FORWARD DIRECTION**
1726                                    MIN = 6319 US
1727                                    MAX = 6691 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1728                                    AVG = 6504 US
1729                                    **REVERSE DIRECTION**
1730                                    MIN = 6301 US
1731                                    MAX = 6700 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1732                                    AVG = 6500 US
1733
1734                                    ONE CYL SEEK TIMES :
1735                                    **FORWARD DIRECTION**
1736                                    MIN = 6326 US
1737                                    MAX = 6698 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1738                                    AVG = 6511 US
1739                                    **REVERSE DIRECTION**
1740                                    MIN = 6317 US
1741                                    MAX = 6698 US    0 OF 410 ABOVE SPEC'D MAX OF 8000 US
1742                                    AVG = 6507 US
1743
1744                                    END PASS #    2
1745                                    TO TEST ALL DRIVES TYPE "A"<CR>, ELSE <CR>
1746                                    *
1747
1748
1749
1750                            a
```

```
                        PART=0
                        ;*** IF "PART" IS DEFINED = 0, PART 1 WILL BE ASSEMBLED. ***
                        ;*** IF "PART" IS DEFINED NOT = 0, PART 2 WILL BE ASSEMBLED. ***

                        ;*** REV 004 ***

                                .NLIST  MC,MD,CND
                                .LIST   ME
                                .ENABL  ABS,AMA
000000                          $SWR=   167000
                        ;;*****************************************************************
                        .SBTTL  STARTING ADDRESSES
                        ;*
                        ;*      200     DEFAULT PARAMETERS FOR TESTS 1-21
                        ;*      204     SELECT PARAMETERS FOR TESTS 1-21
                        ;*      220     DUAL-ACCESS DATA TEST
                        ;;*****************************************************************

000001                  $TN=1
                        .TITLE  CZR6MDO RK611/06 SS VERIF 1
                        ;*COPYRIGHT (C) 1976,1977
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY DAVE HOFFMAN
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            REPORT DESCRIPTION ONLY, ON ERRORS
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            APPLY RANDOM STALL BETWEEN OPERATIONS
                        ;*         7            DO EXPLICIT SEEKS IN TESTS 1-12
                        ;*         6            REPORT 1 ERROR PER TRANSFER IN TESTS 17,21
                        ;*         5            INHIBIT WRITES IN TEST 21
                        ;*         4            INHIBIT WRITE CHECKS IN TEST 21
                        ;*         3            INHIBIT READS AND SOFTWARE COMPARES IN TEST 21
                        ;*         2            INHIBIT SOFTWARE COMPARES IN TEST 21
                        ;*         1            READ AFTER A WRITE CHECK ERROR IN TEST 21
                        ;*         0            REPORT ALL SOFTWARE COMPARE ERRORS IN TESTS 17,21
                        .SBTTL  CONTROL SWITCH SETTINGS (PARAMETER CS)
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        05            DROP DRIVE IF 20(DEC) ERRORS EXCEEDED
                        ;*        04            TYPE BAD SECTOR FILES (BSF'S) ON FIRST PASS
                        ;*        03            INHIBIT TIMING REPORTS IN TESTS 13-16
```

```
                                .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
                                .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                                .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                                ;*MISCELLANEOUS DEFINITIONS
000011                          HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                          LF=     12              ;;CODE FOR LINE FEED
000015                          CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                          CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                          PS=     177776          ;;PROCESSOR STATUS WORD
                                .EQUIV  PS,PSW
177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                          DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                          R0=     %0              ;;GENERAL REGISTER
000001                          R1=     %1              ;;GENERAL REGISTER
000002                          R2=     %2              ;;GENERAL REGISTER
000003                          R3=     %3              ;;GENERAL REGISTER
000004                          R4=     %4              ;;GENERAL REGISTER
000005                          R5=     %5              ;;GENERAL REGISTER
000006                          R6=     %6              ;;GENERAL REGISTER
000007                          R7=     %7              ;;GENERAL REGISTER
000006                          SP=     %6              ;;STACK POINTER
000007                          PC=     %7              ;;PROGRAM COUNTER

                                ;*PRIORITY LEVEL DEFINITIONS
000000                          PR0=    0               ;;PRIORITY LEVEL 0
000040                          PR1=    40              ;;PRIORITY LEVEL 1
000100                          PR2=    100             ;;PRIORITY LEVEL 2
000140                          PR3=    140             ;;PRIORITY LEVEL 3
000200                          PR4=    200             ;;PRIORITY LEVEL 4
000240                          PR5=    240             ;;PRIORITY LEVEL 5
000300                          PR6=    300             ;;PRIORITY LEVEL 6
000340                          PR7=    340             ;;PRIORITY LEVEL 7

                                ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                          SW15=   100000
040000                          SW14=   40000
020000                          SW13=   20000
010000                          SW12=   10000
004000                          SW11=   4000
002000                          SW10=   2000
001000                          SW09=   1000
000400                          SW08=   400
000200                          SW07=   200
000100                          SW06=   100
000040                          SW05=   40
000020                          SW04=   20
000010                          SW03=   10
```

```
1863            000004                  SW02=   4
1864            000002                  SW01=   2
1865            000001                  SW00=   1
1866                                    .EQUIV  SW09,SW9
1867                                    .EQUIV  SW08,SW8
1868                                    .EQUIV  SW07,SW7
1869                                    .EQUIV  SW06,SW6
1870                                    .EQUIV  SW05,SW5
1871                                    .EQUIV  SW04,SW4
1872                                    .EQUIV  SW03,SW3
1873                                    .EQUIV  SW02,SW2
1874                                    .EQUIV  SW01,SW1
1875                                    .EQUIV  SW00,SW0
1876
1877                                    ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
1878            100000                  BIT15=  100000
1879            040000                  BIT14=  40000
1880            020000                  BIT13=  20000
1881            010000                  BIT12=  10000
1882            004000                  BIT11=  4000
1883            002000                  BIT10=  2000
1884            001000                  BIT09=  1000
1885            000400                  BIT08=  400
1886            000200                  BIT07=  200
1887            000100                  BIT06=  100
1888            000040                  BIT05=  40
1889            000020                  BIT04=  20
1890            000010                  BIT03=  10
1891            000004                  BIT02=  4
1892            000002                  BIT01=  2
1893            000001                  BIT00=  1
1894                                    .EQUIV  BIT09,BIT9
1895                                    .EQUIV  BIT08,BIT8
1896                                    .EQUIV  BIT07,BIT7
1897                                    .EQUIV  BIT06,BIT6
1898                                    .EQUIV  BIT05,BIT5
1899                                    .EQUIV  BIT04,BIT4
1900                                    .EQUIV  BIT03,BIT3
1901                                    .EQUIV  BIT02,BIT2
1902                                    .EQUIV  BIT01,BIT1
1903                                    .EQUIV  BIT00,BIT0
1904
1905                                    ;*BASIC "CPU" TRAP VECTOR ADDRESSES
1906            000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
1907            000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
1908            000014                  TBITVEC=14              ;;"T" BIT
1909            000014                  TRTVEC= 14              ;;TRACE TRAP
1910            000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
1911            000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
1912            000024                  PWRVEC= 24              ;;POWER FAIL
1913            000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
1914            000034                  TRAPVEC=34              ;;"TRAP" TRAP
1915            000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
1916            000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
1917            000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
1918                                    .SBTTL  MEMORY MANAGEMENT DEFINITIONS
```

```
1919
1920                                    ;*KT11 VECTOR ADDRESS
1921
1922            000250                  MMVEC=  250
1923
1924                                    ;*KT11 STATUS REGISTER ADDRESSES
1925
1926            177572                  SR0=    177572
1927            177574                  SR1=    177574
1928            177576                  SR2=    177576
1929            172516                  SR3=    172516
1930
1931                                    ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS
1932
1933            172300                  KIPDR0= 172300
1934            172302                  KIPDR1= 172302
1935            172304                  KIPDR2= 172304
1936            172306                  KIPDR3= 172306
1937            172310                  KIPDR4= 172310
1938            172312                  KIPDR5= 172312
1939            172314                  KIPDR6= 172314
1940            172316                  KIPDR7= 172316
1941
1942                                    ;*KERNEL "I" PAGE ADDRESS REGISTERS
1943
1944            172340                  KIPAR0= 172340
1945            172342                  KIPAR1= 172342
1946            172344                  KIPAR2= 172344
1947            172346                  KIPAR3= 172346
1948            172350                  KIPAR4= 172350
1949            172352                  KIPAR5= 172352
1950            172354                  KIPAR6= 172354
1951            172356                  KIPAR7= 172356
1952
1953            170200                  MAPL00=170200
1954            170202                  MAPH00=170202
1955            172100                  MEMCSR=172100                   ;MEMORY CSR REG START ADRS
1956            177740                  LOERAD=177740                   ;11/70 MEM LO ERROR ADRS REG
1957            177742                  HIERAD=177742                   ;11/70 MEM HI ERROR ADRS REG
1958            177744                  MEMSYS=177744                   ;11/70 MEM SYSTEM REG
1959                                    .SBTTL  TRAP CATCHER
1960
1961            000000                          .=0
1962                                    ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
1963                                    ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
1964                                    ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
1965            000174                          .=174
1966   000174   000000           DISPREG: .WORD  0                       ;;SOFTWARE DISPLAY REGISTER
1967   000176   000000           SWREG:   .WORD  0                       ;;SOFTWARE SWITCH REGISTER
1968                                    .SBTTL  STARTING ADDRESS(ES)
1969   000200   000137  012522           JMP     @#DFSTRT                ;;JUMP TO STARTING ADDRESS OF PROGRAM
1970            000166                  .=166
1971   000166   000000           HZ:      .WORD   0                       ;LINE FREQ. FLAG -  0 = 60 HZ
1972            000204                  .=204
1973   000204   000137  012574           JMP     @#PSTART
1974            000220                  .=220
```

```
1975  000220  000137  012556                  JMP     @#DASTRT
1976  000224  000700                  ..LOW:  .WORD   700
1977  000226  001100                  ..HIGH: .WORD   1100
1978                                  .SBTTL  ACT11 HOOKS
1979
1980                                  ;;*****************************************************************
1981                                  ;HOOKS REQUIRED BY ACT11
1982          000230                          $SVPC=.                 ;SAVE PC
1983          000046                          .=46
1984  000046  025534                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
1985          000052                          .=52
1986  000052  140000                          .WORD   140000          ;;2)SET LOC.52 TO 140000
1987          000230                          .=$SVPC                 ;; RESTORE PC
1988          001000                          .=1000
1989                                  .SBTTL  APT PARAMETER BLOCK
1990
1991                                  ;;*****************************************************************
1992                                  ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
1993                                  ;;*****************************************************************
1994          001000                          .$X=.   ;;SAVE CURRENT LOCATION
1995          000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
1996  000024  000200                          200     ;;FOR APT START UP
1997          000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
1998  000044  001000                          $APTHDR ;;POINT TO APT HEADER BLOCK
1999          001000                          .=.$X   ;;RESET LOCATION COUNTER
2000                                  ;;*****************************************************************
2001                                  ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
2002                                  ;INTERFACE SPEC.
2003
2004  001000                          $APTHD:
2005  001000  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
2006  001002  001320                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
2007  001004  001320                  $TSTM:  .WORD   1320    ;;RUN TIM OF LONGEST TEST
2008  001006  001546                  $PASTM: .WORD   1546    ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
2009  001010  001546                  $UNITM: .WORD   1546    ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
2010  001012  000030                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
2011          120210                  AVECT1=120210                  ;RKVEC=210, RKPRI=5
2012          177440                  ABASE=177440                   ;RKBAS ADRS
2013          000377                  ADEVM=000377                   ;SET DEVICES 0-7 IN MAP
```

```
                                .SBTTL  COMMON TAGS

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

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000             $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103  000             $ERF_G: .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          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000          $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001164  000000          $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001166  000000          $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
001170  000000          $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
001172  000000          $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
001174  000000          $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
001176  000000          $REG6:  .WORD   0               ;;CONTAINS (($REGAD)+14)
001200  000000          $REG7:  .WORD   0               ;;CONTAINS (($REGAD)+16)
001202  000000          $REG10: .WORD   0               ;;CONTAINS (($REGAD)+20)
001204  000000          $REG11: .WORD   0               ;;CONTAINS (($REGAD)+22)
001206  000000          $REG12: .WORD   0               ;;CONTAINS (($REGAD)+24)
001210  000000          $REG13: .WORD   0               ;;CONTAINS (($REGAD)+26)
001212  000000          $REG14: .WORD   0               ;;CONTAINS (($REGAD)+30)
001214  000000          $REG15: .WORD   0               ;;CONTAINS (($REGAD)+32)
001216  000000          $REG16: .WORD   0               ;;CONTAINS (($REGAD)+34)
001220  000000          $REG17: .WORD   0               ;;CONTAINS (($REGAD)+36)
001222  000000          $REG20: .WORD   0               ;;CONTAINS (($REGAD)+40)
```

```
2070  001224  000000                  $REG21: .WORD   0               ;;CONTAINS (($REGAD)+42)
2071  001226  000000                  $REG22: .WORD   0               ;;CONTAINS (($REGAD)+44)
2072  001230  000000                  $REG23: .WORD   0               ;;CONTAINS (($REGAD)+46)
2073  001232  000000                  $REG24: .WORD   0               ;;CONTAINS (($REGAD)+50)
2074  001234  000000                  $REG25: .WORD   0               ;;CONTAINS (($REGAD)+52)
2075  001236  000000                  $REG26: .WORD   0               ;;CONTAINS (($REGAD)+54)
2076  001240  000000                  $REG27: .WORD   0               ;;CONTAINS (($REGAD)+56)
2077  001242  000000                  $REG30: .WORD   0               ;;CONTAINS (($REGAD)+60)
2078  001244  000000                  $REG31: .WORD   0               ;;CONTAINS (($REGAD)+62)
2079  001246  000000                  $REG32: .WORD   0               ;;CONTAINS (($REGAD)+64)
2080  001250  000000                  $REG33: .WORD   0               ;;CONTAINS (($REGAD)+66)
2081  001252  000000                  $REG34: .WORD   0               ;;CONTAINS (($REGAD)+70)
2082  001254  000000                  $REG35: .WORD   0               ;;CONTAINS (($REGAD)+72)
2083  001256  000000                  $REG36: .WORD   0               ;;CONTAINS (($REGAD)+74)
2084  001260  000000                  $REG37: .WORD   0               ;;CONTAINS (($REGAD)+76)
2085  001262  000000                  $TMP0:  .WORD   0               ;;USER DEFINED
2086  001264  000000                  $TMP1:  .WORD   0               ;;USER DEFINED
2087  001266  000000                  $TMP2:  .WORD   0               ;;USER DEFINED
2088  001270  000000                  $TMP3:  .WORD   0               ;;USER DEFINED
2089  001272  000000                  $TMP4:  .WORD   0               ;;USER DEFINED
2090  001274  000000                  $TMP5:  .WORD   0               ;;USER DEFINED
2091  001276  000000                  $TMP6:  .WORD   0               ;;USER DEFINED
2092  001300  000000                  $TMP7:  .WORD   0               ;;USER DEFINED
2093  001302  000000                  $TMP10: .WORD   0               ;;USER DEFINED
2094  001304  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
2095  001306  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
2096  001310  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
2097  001314     077                  $QUES:  .ASCII  /?/             ;;QUESTION MARK
2098  001315     015                  $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
2099  001316  000012                  $LF:    .ASCIZ  <12>            ;;LINE FEED
2100                                  ;;**************************************************************
2101                                  .SBTTL  APT MAILBOX-ETABLE
2102
2103                                  ;;**************************************************************
2104                                  .EVEN
2105  001320                          $MAIL:                          ;;APT MAILBOX
2106  001320  000000                  $MSGTY: .WORD   AMSGTY           ;;MESSAGE TYPE CODE
2107  001322  000000                  $FATAL: .WORD   AFATAL           ;;FATAL ERROR NUMBER
2108  001324  000000                  $TESTN: .WORD   ATESTN           ;;TEST NUMBER
2109  001326  000000                  $PASS:  .WORD   APASS            ;;PASS COUNT
2110  001330  000000                  $DEVCT: .WORD   ADEVCT           ;;DEVICE COUNT
2111  001332  000000                  $UNIT:  .WORD   AUNIT            ;;I/O UNIT NUMBER
2112  001334  000000                  $MSGAD: .WORD   AMSGAD           ;;MESSAGE ADDRESS
2113  001336  000000                  $MSGLG: .WORD   AMSGLG           ;;MESSAGE LENGTH
2114  001340                          $ETABLE:                        ;;APT ENVIRONMENT TABLE
2115  001340     000                  $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
2116  001341     000                  $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
2117  001342  000000                  $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
2118  001344  000000                  $USWR:  .WORD   AUSWR           ;;USER SWITCHES
2119  001346  000000                  $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
2120                                  ;*                              BITS 15-11=CPU TYPE
2121                                  ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
2122                                  ;*                                      11/70=06,PDQ=07,Q=10
2123                                  ;*                              BIT 10=REAL TIME CLOCK
2124                                  ;*                              BIT  9=FLOATING POINT PROCESSOR
2125                                  ;*                              BIT  8=MEMORY MANAGEMENT
```

```
2126  001350  000                 $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
2127  001351  000                 $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
2128                                ;*                     MEM.TYPE BYTE   --  (HIGH BYTE)
2129                                ;*                             900 NSEC CORE=001
2130                                ;*                             300 NSEC BIPOLAR=002
2131                                ;*                             500 NSEC MOS=003
2132  001352  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
2133                                ;*                      MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
2134  001354  000                 $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
2135  001355  000                 $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
2136  001356  000000              $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
2137  001360  000                 $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
2138  001361  000                 $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
2139  001362  000000              $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
2140  001364  000                 $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
2141  001365  000                 $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
2142  001366  000000              $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
2143  001370  120210              $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
2144  001372  000000              $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
2145  001374  177440              $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
2146  001376  000377              $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
2147  001400                      $ETEND:
2148                              .MEXIT
```

```
                                .SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT


001400                          $ERRTB:

                                        ;ERROR 1                ;UNIBUS PARITY ERROR
001400  056361                          EM1
001402  061005                          DH100
001404  062504                          DT100
001406  062620                          DF01

                                        ;ERROR 2                ;NON-EXISTANT MEMORY
001410  056400                          EM2
001412  061005                          DH100
001414  062504                          DT100
001416  062620                          DF01

                                        ;ERROR 3                ;NON-EXISTANT DRIVE
001420  056416                          EM3
001422  061005                          DH100
001424  062504                          DT100
001426  062620                          DF01

                                        ;ERROR 4                ;UNIT FIELD ERROR
001430  056434                          EM4
001432  061005                          DH100
001434  062504                          DT100
001436  062620                          DF01

                                        ;ERROR 5                ;SUBSYSTEM TIMEOUT
001440  056453                          EM5
001442  061005                          DH100
001444  062504                          DT100
001446  062650                          DF02

                                        ;ERROR 6
001450  056472                          EM6                     ;D TO C PARITY ERROR
001452  061005                          DH100
001454  062504                          DT100
001456  062704                          DF03

                                        ;ERROR 7
001460  056511                          EM7                     ;DRIVE DETECTED PARITY ERROR
001462  061005                          DH100
001464  062504                          DT100
```

```
2205  001466  062704                    DF03
2206
2207                                    ;ERROR 10
2208  001470  056530                    EM10                ;AC LOW
2209  001472  061005                    DH100
2210  001474  062504                    DT100
2211  001476  062650                    DF02
2212
2213                                    ;ERROR 11
2214  001500  056537                    EM11                ;SPEED LOSS
2215  001502  061005                    DH100
2216  001504  062504                    DT100
2217  001506  062650                    DF02
2218
2219                                    ;ERROR 12
2220  001510  056552                    EM12                ;ILLEGAL FUNCTION
2221  001512  061005                    DH100
2222  001514  062504                    DT100
2223  001516  062650                    DF02
2224
2225                                    ;ERROR 13
2226  001520  056564                    EM13                ;PROGRAMMING ERROR
2227  001522  061005                    DH100
2228  001524  062504                    DT100
2229  001526  062620                    DF01
2230
2231                                    ;ERROR 14           ;NON-EXISTANT FUNCTION
2232  001530  056574                    EM14
2233  001532  061005                    DH100
2234  001534  062504                    DT100
2235  001536  062650                    DF02
2236
2237                                    ;ERROR 15
2238  001540  056614                    EM15                ;DRIVE TYPE ERROR
2239  001542  061005                    DH100
2240  001544  062504                    DT100
2241  001546  062650                    DF02
2242
2243                                    ;ERROR 16
2244  001550  056630                    EM16                ;FORMAT ERROR
2245  001552  061005                    DH100
2246  001554  062504                    DT100
2247  001556  062650                    DF02
2248
2249                                    ;ERROR 17
2250  001560  056640                    EM17                ;WRITE LOCK ERROR
2251  001562  061005                    DH100
2252  001564  062504                    DT100
2253  001566  062650                    DF02
2254
2255                                    ;ERROR 20
2256  001570  056655                    EM20                ;DRIVE UNSAFE
2257  001572  061005                    DH100
2258  001574  062504                    DT100
2259  001576  062650                    DF02
2260
```

```
2261                                    ;ERROR 21
2262  001600  056670                    EM21                ;SEEK INCOMPLETE
2263  001602  061005                    DH100
2264  001604  062504                    DT100
2265  001606  062650                    DF02
2266
2267                                    ;ERROR 22
2268  001610  056701                    EM22                ;CYLINDER OVERFLOW
2269  001612  061005                    DH100
2270  001614  062504                    DT100
2271  001616  062650                    DF02
2272
2273                                    ;ERROR 23
2274  001620  056714                    EM23                ;ILLEGAL CYLINDER
2275  001622  061005                    DH100
2276  001624  062504                    DT100
2277  001626  062650                    DF02
2278
2279                                    ;ERROR 24
2280  001630  056731                    EM24                ;DRIVE OFF TRACK
2281  001632  061005                    DH100
2282  001634  062504                    DT100
2283  001636  062650                    DF02
2284
2285                                    ;ERROR 25
2286  001640  056745                    EM25                ;DRIVE TIMING ERROR
2287  001642  061005                    DH100
2288  001644  062504                    DT100
2289  001646  062650                    DF02
2290
2291                                    ;ERROR 26
2292  001650  056764                    EM26                ;DATA LATE
2293  001652  061005                    DH100
2294  001654  062504                    DT100
2295  001656  062650                    DF02
2296
2297                                    ;ERROR 27
2298  001660  056776                    EM27                ;CONTROLLER TIMEOUT
2299  001662  061005                    DH100
2300  001664  062504                    DT100
2301  001666  062650                    DF02
2302
2303                                    ;ERROR 30           ;OPERATION INCOMPLETE
2304  001670  057013                    EM30
2305  001672  061005                    DH100
2306  001674  062504                    DT100
2307  001676  062760                    DF05
2308
2309                                    ;ERROR 31
2310  001700  057025                    EM31                ;HEADER VRC ERROR
2311  001702  061005                    DH100
2312  001704  062504                    DT100
2313  001706  062760                    DF05
2314
2315                                    ;ERROR 32
2316  001710  057041                    EM32                ;DATA CHECK ERROR
```

```
2317  001712  061005                  DH100
2318  001714  062504                  DT100
2319  001716  063014                  DF07
2320
2321                                  ;ERROR 33
2322  001720  057056                  EM33              ;WRITE CHECK ERROR
2323  001722  061005                  DH100
2324  001724  062504                  DT100
2325  001726  063050                  DF10
2326
2327                                  ;ERROR 34
2328  001730  057072                  EM34              ;DATA MISCOMPARE(S)
2329  001732  061005                  DH100
2330  001734  062504                  DT100
2331  001736  062744                  DF04
2332
2333                                  ;ERROR 35
2334  001740  057112                  EM35              ;NO DRIVE RESPONSE-UFE & NXD
2335  001742  061005                  DH100
2336  001744  062504                  DT100
2337  001746  062620                  DF01
2338
2339                                  ;ERROR 36
2340  001750  057144                  EM36              ;DRIVE ERROR WILL NOT CLEAR
2341  001752  000000                  0
2342  001754  000000                  0
2343  001756  000000                  0
2344
2345                                  ;ERROR 37         ;DRIVE STATUS CHANGE WILL NOT CLEAR
2346  001760  057173                  EM37
2347  001762  000000                  0
2348  001764  000000                  0
2349  001766  000000                  0
2350
2351                                  ;ERROR 40
2352  001770  057234                  EM40              ;ATTENTION BUT NO STATUS CHANGE OR FAULT
2353  001772  061005                  DH100
2354  001774  062504                  DT100
2355  001776  062650                  DF02
2356
2357                                  ;ERROR 41
2358  002000  057300                  EM41              ;ATTENTION BUT DRIVE NOT AVAILABLE
2359  002002  061005                  DH100
2360  002004  062504                  DT100
2361  002006  062650                  DF02
2362
2363                                  ;ERROR 42
2364  002010  057330                  EM42              ;ATTENTION WHEN NOT EXPECTED
2365  002012  061005                  DH100
2366  002014  062504                  DT100
2367  002016  062650                  DF02
2368
2369                                  ;ERROR 43         ;ERROR WHILE GATHERING DRIVE STATUS
2370  002020  057360                  EM43
2371  002022  061005                  DH100
2372  002024  062504                  DT100
```

```
2373  002026  063114                        DF12
2374
2375                                        ;ERROR 44
2376  002030  057560                        EM63            ;CLEAR CONTROLLER DID NOT CLEAR ERROR
2377  002032  061005                        DH100
2378  002034  062504                        DT100
2379  002036  063114                        DF12
2380
2381                                        ;ERROR 45
2382  002040  057616                        EM64            ;NO ATTENTION IN ATTENTION SUMMARY REG
2383  002042  061005                        DH100
2384  002044  062504                        DT100
2385  002046  063114                        DF12
2386
2387                                        ;ERROR 46
2388  002050  057644                        EM65            ;UNSOLICITED ATTENTION
2389  002052  061005                        DH100
2390  002054  062504                        DT100
2391  002056  063114                        DF12
2392
2393                                        ;ERROR 47
2394  002060  057666                        EM66            ;UNEXPECTED DATA TYPE ERROR
2395  002062  061005                        DH100
2396  002064  062504                        DT100
2397  002066  063114                        DF12
2398
2399                                        ;ERROR 50
2400  002070  057705                        EM67            ;ATTENTION DID NOT RESET WITH CLEAR
2401  002072  061005                        DH100
2402  002074  062504                        DT100
2403  002076  063114                        DF12
2404
2405                                        ;ERROR 51
2406  002100  057744                        EM70            ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE ATTENTION
2407  002102  061005                        DH100
2408  002104  062504                        DT100
2409  002106  063114                        DF12
2410
2411                                        ;ERROR 52
2412  002110  057411                        EM52            ;MULTIPLE DRIVE SELECT
2413  002112  061005                        DH100
2414  002114  062504                        DT100
2415  002116  063114                        DF12
2416
2417                                        ;ERROR 53
2418  002120  057426                        EM53            ;ABREVIATED HCE ERROR
2419  002122  061005                        DH100
2420  002124  062504                        DT100
2421  002126  063144                        DF13
2422
2423                                        ;ERROR 54
2424  002130  057013                        EM30            ;OPERATION INCOMPLETE ERROR
2425  002132  061005                        DH100
2426  002134  062504                        DT100
2427  002136  063174                        DF14
2428
```

```
2429                                    ;ERROR 55
2430  002140  057025                    EM31            ;ABREVIATED HVRC ERROR
2431  002142  061005                    DH100
2432  002144  062504                    DT100
2433  002146  063144                    DF13
2434
2435                                    ;ERROR 56
2436  002150  057443                    EM56            ;2 TIMEOUT ERROR
2437  002152  061005                    DH100
2438  002154  062504                    DT100
2439  002156  063224                    DF15
2440
2441                                    ;ERROR 57       ;2ND LEVEL IN SUBSYSTEM TIMEOUT
2442  002160  057443                    EM56
2443  002162  061005                    DH100
2444  002164  062504                    DT100
2445  002166  063270                    DF16
2446
2447                                    ;ERROR 60
2448  002170  057462                    EM60            ;ERROR IN RECAL FOR RECOVERY
2449  002172  000000                    0
2450  002174  000000                    0
2451  002176  000000                    0
2452
2453                                    ;ERROR 61
2454  002200  057514                    EM61            ;ABORT MESSAGE
2455  002202  000000                    0
2456  002204  000000                    0
2457  002206  000000                    0
2458
2459                                    ;ERROR 62
2460  002210  057544                    EM62            ;CYLINDER MISCOMPARE
2461  002212  061005                    DH100
2462  002214  062504                    DT100
2463  002216  063334                    DF17
2464
2465                                    ;ERROR 63       ;DATA ERROR WORDS
2466  002220  000000                    0
2467  002222  000000                    0
2468  002224  062576                    DT602
2469  002226  063444                    DF25
2470
2471                                    ;ERROR 64
2472  002230  057560                    EM63            ;CLEAR CONTROLLER DID NOT CLEAR ERROR
2473  002232  061005                    DH100
2474  002234  062504                    DT100
2475  002236  062650                    DF02
2476
2477                                    ;ERROR 65
2478  002240  057616                    EM64            ;NO ATTENTION IN ATTENTION SUMMARY REG
2479  002242  061005                    DH100
2480  002244  062504                    DT100
2481  002246  062650                    DF02
2482
2483                                    ;ERROR 66
2484  002250  057644                    EM65            ;UNSOLICITED ATTENTION
```

```
2485  002252  061005          DH100
2486  002254  062504          DT100
2487  002256  062650          DF02
2488
2489                          ;ERROR 67
2490  002260  057666          EM66          ;UNEXPECTED DATA TYPE ERROR
2491  002262  061005          DH100
2492  002264  062504          DT100
2493  002266  062650          DF02
2494
2495                          ;ERROR 70
2496  002270  057705          EM67          ;ATTENTION DID NOT RESET WITH CLEAR
2497  002272  061005          DH100
2498  002274  062504          DT100
2499  002276  062650          DF02
2500
2501                          ;ERROR 71
2502  002300  057744          EM70          ;SUBSYSTEM CLEAR DID NOT CLEAR ATT
2503  002302  061005          DH100
2504  002304  062504          DT100
2505  002306  062650          DF02
2506
2507                          ;ERROR 72
2508  002310  060011          EM71          ;DATA LATE WHEN UNLOADING HEADER
2509  002312  061005          DH100
2510  002314  062504          DT100
2511  002316  062650          DF02
2512
2513                          ;ERROR 73
2514  002320  060044          EM72          ;CONTROLLER ERROR DURING DRIVER SERVICE
2515  002322  061005          DH100
2516  002324  062504          DT100
2517  002326  062650          DF02
2518
2519                          ;ERROR 74
2520  002330  060077          EM73          ;DRIVE DETECTED PARITY ERROR
2521  002332  061005          DH100
2522  002334  062504          DT100
2523  002336  062650          DF02
2524
2525                          ;ERROR 75
2526  002340  060117          EM74          ;UNDEFINED ERROR
2527  002342  061005          DH100
2528  002344  062504          DT100
2529  002346  062650          DF02
2530
2531                          ;ERROR 76
2532  002350  060131          EM75          ;MARKING SECTOR BAD MESSAGE
2533  002352  000000          0
2534  002354  000000          0
2535  002356  000000          0
2536
2537                          ;ERROR 77
2538  002360  060161          EM76          ;BAD DATA VERIFICATION WITH READ
2539  002362  061717          DH605
2540  002364  062570          DT601
```

```
2541  002366  063370                    DF21
2542
2543                                    ;ERROR 100
2544  002370  060243                    EM77                ;RETRY SUCCESFUL MESSAGE
2545  002372  000000                    0
2546  002374  062570                    DT601
2547  002376  063430                    DF23
2548
2549                                    ;ERROR 101
2550  002400  060243                    EM77                ;ANOTHER RETRY SUCCESSFUL MESSAGE
2551  002402  000000                    0
2552  002404  062570                    DT601
2553  002406  063430                    DF23
2554
2555                                    ;ERROR 102
2556  002410  060264                    EM100               ;RETRY UNSUCCESSFUL MESSAGE
2557  002412  000000                    0
2558  002414  062570                    DT601
2559  002416  063430                    DF23
2560
2561                                    ;ERROR 103
2562  002420  060307                    EM101               ;NO VALID HEADERS IN TRACK JUST READ
2563  002422  061701                    DH6042
2564  002424  062570                    DT601
2565  002426  063440                    DF24
2566
2567                                    ;ERROR 104
2568  002430  060365                    EM102               ;BSE ERROR ON SECTOR NOT LISTED AS BAD
2569  002432  061005                    DH100
2570  002434  062504                    DT100
2571  002436  062650                    DF02
2572
2573                                    ;ERROR  105
2574  002440  060431                    EM103               ;TIMED-OUT ON READ HEADER
2575  002442  061005                    DH100
2576  002444  062504                    DT100
2577  002446  062704                    DF03
2578
2579                                    ;ERROR  106
2580  002450  060457                    EM104               ;TIMED-OUT ON SEEK
2581  002452  061005                    DH100
2582  002454  062504                    DT100
2583  002456  062704                    DF03
2584
2585                                    ;ERROR  107
2586  002460  060501                    EM105               ;DRIVE SIEZED BY OTHER PORT
2587  002462  061005                    DH100
2588  002464  062504                    DT100
2589  002466  062650                    DF02
2590
2591                                    ;ERROR  110
2592  002470  060532                    EM106               ;"DATA MISCMPR WHILE BAI SET"
2593  002472  061005                    DH100
2594  002474  062504                    DT100
2595  002476  063460                    DF27
2596
```

```
2597                                    ;ERROR  111
2598  002500  060565                    EM107                   ;"NO NEM WHEN EXPECTED"
2599  002502  000000                    0
2600  002504  000000                    0
2601  002506  000000                    0
2602
2603                                    ;ERROR  112
2604  002510  060630                    EM110                   ;"INTRPT WHEN CNTRLR NOT READY"
2605  002512  061005                    DH100
2606  002514  062504                    DT100
2607  002516  062620                    DF01
2608
2609                                    ;ERROR  113
2610  002520  060663                    EM111                   ;"NO ATT'N ON SEEK"
2611  002522  061005                    DH100
2612  002524  062504                    DT100
2613  002526  062650                    DF02
2614
2615                                    ;ERROR  114
2616  002530  060704                    EM112                   ;DRIVE'S CYLINDER INCORRECT
2617  002532  062126                    DH702
2618  002534  062544                    DT202
2619  002536  063450                    DF26
2620
2621                                    ;ERROR  115
2622  002540  000000                    0                       ;TYPE ADRS OF DATA MISCOMPARE(S)
2623  002542  000000                    0
2624  002544  062570                    DT601
2625  002546  063074                    DF11
2626
2627                                    ;ERROR  116
2628  002550  057072                    EM34                    ;DATA MISCOMPARE (11/70)
2629  002552  061263                    DH103
2630  002554  062614                    DT103
2631  002556  063360                    DF20
2632
2633                                    ;ERROR  117
2634  002560  000000                    0                       ;PART OF DATA MISCOMPARE
2635  002562  000000                    0
2636  002564  062504                    DT100
2637  002566  063400                    DF22
2638
2639                                    ;ERROR  120
2640  002570  060726                    EM113                   ;ABORT- CAN'T READ BSF
2641  002572  061005                    DH100
2642  002574  062504                    DT100
2643  002576  062620                    DF01
2644
2645                                    ;ERROR  121
2646  002600  060754                    EM114                   ;KT11 FAILURE
2647  002602  061005                    DH100
2648  002604  062504                    DT100
2649  002606  063504                    DF30
2650
2651                                    ;ERROR  122
2652  002610  060771                    EM115                   ;MEM PARITY ERROR
```

```
2653  002612  061005                    DH100
2654  002614  062504                    DT100
2655  002616  063530                    DF31
2656
2657                              ;ERROR  123
2658  002620  056416             EM3                    ;NED WHEN SIZING UNDER APT DRIVE TABLE
2659  002622  000000             0
2660  002624  000000             0
2661  002626  000000             0
2662
2663
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```
                        .SBTTL  BIT ASSIGNMENTS IN THE RK611 REGISTERS

                        ;RKCS1
                        ; 15      14      13      12      11      10      9       8
                        ;-----------------------------------------------------------------
                        ;CERR !   DI    ! DCPAR!  CFMT  ! CTO   ! CDT   ! BA17  ! BA16  !
                        ;CCLR !         !       !       !       !       !       !       !
                        ; R/W !   RO    !  RO   !  R/W  !  RO   !  R/W  !  R/W  !  R/W  !
                        ;-----------------------------------------------------------------

                        ;  7      6       5       4       3       2       1       0
                        ;-----------------------------------------------------------------
                        ; RDY !  IE   ! SPARE!  F4   !  F3   !  F2   !  F1   !  GO   !
                        ; R/W !  R/W  !  R/W  !  R/W  !  R/W  !  R/W  !  R/W  !  R/W  !
                        ;-----------------------------------------------------------------

                        ;RKCS2
                        ; 15     14      13      12      11      10      9       8
                        ;-----------------------------------------------------------------
                        ; DLT  ! WCE  ! UPE  ! NED  ! NEM  ! PGE  ! MDS  ! UFE  !
                        ; RO   ! RO   ! RO   ! RO   ! RO   ! RO   ! RO   ! RO   !
                        ;-----------------------------------------------------------------

                        ;  7      6       5       4       3       2       1       0
                        ;-----------------------------------------------------------------
                        ; OR   !  IR   ! CLR  ! BAI  ! DESL ! DS2  ! DS1  ! DS0  !
                        ; RO   !  RO   ! WO   ! R/W  ! R/W  ! R/W  ! R/W  ! R/W  !
                        ;--------- ----------------------------------------------------

                        ;RKDC (DESIRED CYLINDER)
                        ; 15     14      13      12      11      10      9       8
                        ;-----------------------------------------------------------------
                        ; NU   !  NU   !  NU  !  NU  !  NU  !  NU  ! DC9  ! DC8  !
                        ;                          READ ONLY                            !
                        ;-----------------------------------------------------------------

                        ;  7      6       5       4       3       2       1       0
                        ;-----------------------------------------------------------------
                        ; DC7  ! DC6  !  DC5  !  DC4  !  DC3  !  DC2  !  DC1  !  DC0  !
                        ;                          READ ONLY                            !
                        ;-----------------------------------------------------------------

                        ;RKDA (DESIRED TRACK AND SECTOR)
                        ; 15     14      13      12      11      10      9       8
                        ;-----------------------------------------------------------------
                        ; NU   !  UN   !  UN  !  UN  !  UN  !  TA2  !  TA1  !  TA0  !
                        ;                          READ ONLY                            !
                        ;-----------------------------------------------------------------

                        ;  7      6       5       4       3       2       1       0
                        ;-----------------------------------------------------------------
                        ; UN   !  UN   !  UN  !  SA4  !  SA3  !  SA2  !  SA1  !  SA0  !
                        ;                          READ ONLY                            !
                        ;-----------------------------------------------------------------
```

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```

```
;RKDB (DATA BUFFER)
; 15     14     13     12     11     10     9      8
;-----------------------------------------------------
;DB15 ! DB14 ! DB13 ! DB12 ! DB11 ! DB10 ! DB9  ! DB8  !
;                  READ/WRITE                         !
;-----------------------------------------------------

;  7      6      5      4      3      2      1      0
;-----------------------------------------------------
; DB7 ! DB6  ! DB5  ! DB4  ! DB3  ! DB2  ! DB1  ! DB0  !
;                  READ/WRITE                         !
;-----------------------------------------------------

;RKASOF (ATTENTION SUMMARY AND OFFSET)
; 15     14     13     12     11     10     9      8
;-----------------------------------------------------
;ATN7 ! ATN6 ! ATN5 ! ATN4 ! ATN3 ! ATN2 ! ATN1 ! ATN0 !
;                  READ ONLY                          !
;-----------------------------------------------------

;  7      6      5      4      3      2      1      0
;-----------------------------------------------------
; UN  ! OF6  ! OF5  ! OF4  ! OF3  ! OF2  ! OF1  ! OF0  !
;  ?  !              READ/WRITE                       !
;-----------------------------------------------------

;RKWC (WORD COUNT)
; 15     14     13     12     11     10     9      8
;-----------------------------------------------------
;WC15 ! WC14 ! WC13 ! WC12 ! WC11 ! WC10 ! WC9  ! WC8  !
;                  READ/WRITE                         !
;-----------------------------------------------------

;  7      6      5      4      3      2      1      0
;-----------------------------------------------------
; WC7 ! WC6  ! WC5  ! WC4  ! WC3  ! WC2  ! WC1  ! WC0  !
;                  READ/WRITE                         !
;-----------------------------------------------------

;RKBA (BUS ADDRESS)
; 15     14     13     12     11     10     9      8
;-----------------------------------------------------
;BA15 ! BA14 ! BA13 ! BA12 ! BA11 ! BA10 ! BA9  ! BA8  !
;                  READ/WRITE                         !
;-----------------------------------------------------

;  7      6      5      4      3      2      1      0
;-----------------------------------------------------
; BA7 ! BA6  ! BA5  ! BA4  ! BA3  ! BA2  ! BA1  ! BA0  !
;                  READ/WRITE                 !ALWYS0!
;-----------------------------------------------------
```

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2773
2774                    ;RKER (ERROR REGISTER)
2775                    ; 15     14     13     12     11     10     9      8
2776                    ;-----------------------------------------------------
2777                    ; DCK ! UNS  ! OPI  ! DTE  ! WLE  ! IDAE ! COE  ! HVRC !
2778                    ;                   READ ONLY                         !
2779                    ;-----------------------------------------------------
2780
2781                    ;  7      6      5      4      3      2      1      0
2782                    ;-----------------------------------------------------
2783                    ; BSE ! ECH  ! DTYPE! FMTE ! DRPAR! ILF  ! SKI  ! ILC  !
2784                    ;                   READ ONLY                         !
2785                    ;-----------------------------------------------------
2786
2787                    ;RKDS (DRIVE STATUS)
2788                    ; 15     14     13     12     11     10     9      8
2789                    ;-----------------------------------------------------
2790                    ;SVAL ! DSC  ! PIP  ! SPON ! WRL  !  UN  !  UN  ! DTP  !
2791                    ;                   READ ONLY                         !
2792                    ;-----------------------------------------------------
2793
2794                    ;  7      6      5      4      3      2      1      0
2795                    ;-----------------------------------------------------
2796                    ;DRDY !  VV  ! DROT ! SPLS ! ACLO ! OFSET!  UN  ! DRA  !
2797                    ;                   READ ONLY                         !
2798                    ;-----------------------------------------------------
2799
2800                    ;RKMR1 (MAINTENANCE REG 1)
2801                    ; 15     14     13     12     11     10     9      8
2802                    ;-----------------------------------------------------
2803                    ;RD   ! WRT  ! ECCW ! PCD  ! PCA  ! MEWD ! MERD ! MCLK !
2804                    ;GATE ! GATE !      !      !      !      !      !      !
2805                    ;             READ ONLY                 ! READ/WRITE  !
2806                    ;-----------------------------------------------------
2807
2808                    ;  7      6      5      4      3      2      1      0
2809                    ;-----------------------------------------------------
2810                    ;MIND ! MSP  ! DMD  ! PAT  ! MS3  ! MS2  ! MS1  ! MS0  !
2811                    ;                   READ/WRITE                        !
                        ;-----------------------------------------------------
```

```
;RKECC/PAT
;  15     14     13     12     11     10     9      8
;-------------------------------------------------------
; UN  !  UN  !  UN  !  UN  !  UN  ! EPA10! EPA9 ! EPA8 !
;                    READ ONLY                          !
;-------------------------------------------------------

;  7      6      5      4      3      2      1      0
;-------------------------------------------------------
;EPA7 ! EPA6 ! EPA5 ! EPA4 ! EPA3 ! EPA2 ! EPA1 ! EPA0 !
;                    READ ONLY                          !
;-------------------------------------------------------

;RKECC/POS
;  15     14     13     12     11     10     9      8
;-------------------------------------------------------
; UN  !  UN  !  UN  ! EP012! EP011! EP010! EP09 ! EP08 !
;                    READ ONLY                          !
;-------------------------------------------------------

;  7      6      5      4      3      2      1      0
;-------------------------------------------------------
;EP07 ! EP06 ! EP05 ! EP04 ! EP03 ! EP02 ! EP01 ! EP00 !
;                    READ ONLY                          !
;-------------------------------------------------------

;DRIVE STATUS INFORMATION

;LINE A MESSAGE 00
;  15     14     13     12     11     10     9      8
;-------------------------------------------------------
; PAR ! DSC  ! PIP  ! SPON ! WRLK ! OFFON! FMT  ! DRTP !
;-------------------------------------------------------

;  7      6      5      4      3      2      1      0
;-------------------------------------------------------
;DRDY !  VV  ! DRA  !  NU  !  NU  ! DRIVE SELECT CODE  !
;-------------------------------------------------------
```

```
2850                ;LINE B MESSAGE 00
2851                ; 15     14     13     12     11     10     9      8
2852                ;-----------------------------------------------------
2853                ; PAR ! UNS  ! DROT ! DCLO ! WLE  ! SKI  ! PERR ! ILF  !
2854                ;-----------------------------------------------------
2855
2856                ;  7     6      5      4      3      2      1      0
2857                ;-----------------------------------------------------
2858                ; FLT ! ACLO ! IVDA !  UN  !  UN  !  UN  !  0   !  0   !
2859                ;-----------------------------------------------------
2860
2861                ;LINE A MESSAGE 01
2862                ; 15     14     13     12     11     10     9      8
2863                ;-----------------------------------------------------
2864                ; PAR ! UNLDG! RTZ  ! LDG  ! REV  ! FWD  ! SPEED! CART !
2865                ;     ! HDS  !      ! HDS  !      !      !  OK  ! PRES !
2866                ;-----------------------------------------------------
2867
2868                ;  7     6      5      4      3      2      1      0
2869                ;-----------------------------------------------------
2870                ;DOOR ! BRUSH! HEADS! TRK  !  UN  !  DRIVE SELECT CODE !
2871                ;LTCH ! HOME ! HOME ! FOLOW!      !                     !
2872                ;     !      !      !  OK  !      !                     !
2873                ;-----------------------------------------------------
2874
2875                ;LINE B MESSAGE 01
2876                ; 15     14     13     12     11     10     9      8
2877                ;-----------------------------------------------------
2878                ; PAR ! SERVO! LIMIT! SEEK ! PLO  ! DIBIT! INDEX! MULTI!
2879                ;     ! BRAKE! ON SK!NO MO ! ERR  !  ERR !  ERR !HD SEL!
2880                ;-----------------------------------------------------
2881
2882                ;  7     6      5      4      3      2      1      0
2883                ;-----------------------------------------------------
2884                ;HEAD !WR GTE!WR CUR! SEC  !  NU  !  NU  !  0   !  1   !
2885                ;FAULT!AND NO!AND NO! ERR  !      !      !      !      !
2886                ;     !XISTON!WR GTE!      !      !      !      !      !
2887                ;-----------------------------------------------------
```

```
                        ;LINE A MESSAGE 10
                        ; 15     14     13     12     11     10     9      8
                        ;-------------------------------------------------------
                        ; PAR !  NU  !  NU  ! CYLINDER DIFF/OFFSET VALUE       !
                        ;-------------------------------------------------------
                        ;
                        ;  7      6      5      4      3      2      1      0
                        ;-------------------------------------------------------
                        ;CYLINDER DIFF/OFFSET VALUE!  NU  !  DRIVE SELECT CODE !
                        ;-------------------------------------------------------
                        ;
                        ;LINE B MESSAGE 10
                        ; 15     14     13     12     11     10     9      8
                        ;-------------------------------------------------------
                        ; PAR ! ALIGN!  NU  !    CYLINDER ADDRESS               !
                        ;     ! SIGN !                                         !
                        ;-------------------------------------------------------
                        ;
                        ;  7      6      5      4      3      2      1      0
                        ;-------------------------------------------------------
                        ;    CYLINDER ADDRESS      ! UN  ! UN  !  1  !  0  !
                        ;-------------------------------------------------------
                        ;
                        ;LINE A MESSAGE 11
                        ; 15     14     13     12     11     10     9      8
                        ;-------------------------------------------------------
                        ; PAR !     DRIVE SERIAL NUMBER                        !
                        ;-------------------------------------------------------
                        ;
                        ;  7      6      5      4      3      2      1      0
                        ;-------------------------------------------------------
                        ; DRIVE SERIAL NUMBER            !  DRIVE SELECT CODE !
                        ;-------------------------------------------------------
                        ;
                        ;LINE B MESSAGE 11
                        ; 15     14     13     12     11     10     9      8
                        ;-------------------------------------------------------
                        ; PAR !  NU  !     NU       !   DECODED HEAD     ! SECTOR!
                        ;     !     !              !     ADDRESS          ! COUNT !
                        ;-------------------------------------------------------
                        ;
                        ;  7      6      5      4      3      2      1      0
                        ;-------------------------------------------------------
                        ;   SECTOR COUNT            ! UN  ! UN  !  1  !  1  !
                        ;-------------------------------------------------------
                        ;
                        ;
                        ;
                        ;
                        .SBTTL  RK06 CONTROLLER REGISTER DEFINITION
                        ;
000000                  RKCS1=  0               ;CONTROL AND STATUS REGISTER 1
000002                  RKWC=   2               ;WORD COUNT REGISTER
000004                  RKBA=   4               ;BUS ADDRESS REGISTER
000006                  RKDA=   6               ;DESIRED TRACK SECTOR REGISTER
000010                  RKCS2=  10              ;CONTROL AND STATUS REGISTER 2
```

```
                        RKDS=   12                      ;DRIVE STATUS REGISTER
                        RKER=   14                      ;ERROR REGISTER
                        RKASOF= 16                      ;ATTENTION SUMMARY AND OFFSET REGISTER
                        RKDC=   20                      ;DESIRED CYLINDER REGISTER
                        RKDCYL= 20                      ;DESIRED CYLINDER REGISTER
                        RKDB=   24                      ;DATA BUFFER
                        RKMR1=  26                      ;MAINTENANCE REGISTER 1
                        RKMR2=  34                      ;MAINTENANCE REGISTER 2
                        RKMR3=  36                      ;MAINTENANCE REGISTER 3
                        RKPOS=  30                      ;ECC POSITION INFORMATION
                        RKECPS= 30                      ;ECC POSITION INFORMATION
                        RKPAT=  32                      ;ECC PATTERN INFORMATION
                        RKECPT= 32                      ;ECC PATTERN INFORMATION

                        .SBTTL  DRIVE COMMANDS

                        SELDRV= 101                     ;SELECT DRIVE
                        PACK=   103                     ;PACK ACKNOWLEDGE
                        CLEAR=  105                     ;DRIVE CLEAR
                        UNLOAD= 107                     ;UNLOAD
                        SRTSPL= 111                     ;START SPINDLE
                        RECAL=  113                     ;RECALIBRATE
                        OFFSET= 115                     ;OFFSET
                        SEEK=   117                     ;SEEK
                        RDDATA= 121                     ;READ DATA
                        WRDATA= 123                     ;WRITE DATA
                        RDHEAD= 125                     ;READ HEADER
                        WRHEAD= 127                     ;WRITE HEADER AND DATA
                        WRTCHK= 131                     ;WRITE CHECK

                        ;       THE FOLLOWING ARE NOT DRIVE COMMANDS BUT ARE USED BY THE DRIVER
                        ;       TO SIMULATE A SPECIFIC DESIRED OPERATION

                        RELEAS= 140                     ;RELEASE DRIVE
                        RDSTAT= 141                     ;GET ALL STATUS FROM DRIVE
                        RDALHD= 164                     ;READ ALL HEADERS
                        CONCLR= 176                     ;CONTROLLER CLEAR (BIT 15 OF CS1)
                        SUBCLR= 177                     ;SUBSYSTEM CLEAR (BIT 5 OF CS2)
                        INTR=   300                     ;GENERATE INTERRUPT TO CPU

                        ;       DRIVER ISSUED SERVICE COMMANDS

                        DR.SEL= 001                     ;DRIVE SELECT
                        DR.CLR= 005                     ;DRIVE CLEAR

                        .SBTTL  CONTROL AND STATUS REGISTER 1 BITS

                        GO=     BIT0                    ;GO BIT
                        IE=     BIT6                    ;INTERRUPT ENABLE
                        RDY=    BIT7                    ;CONTROLLER READY
                        BA16=   BIT8                    ;BUS ADDRESS BIT 16
                        BA17=   BIT9                    ;BUS ADDRESS BIT 17
                        CDT=    BIT10                   ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
                        CTO=    BIT11                   ;CONTROLLER TIMED OUT WAITING FOR
                                                        ;  DRIVE RESPONSE
                        CFMT=   BIT12                   ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
```

```
3000            020000          SPAR=   BIT13                   ;DRIVE BUS PARITY ERROR DETECTED BY CONTROLLER
3001            040000          DI=     BIT14                   ;DRIVE INTERRUPT
3002            100000          CERR=   BIT15                   ;CONTROLLER ERROR
3003            100000          CCLR=   BIT15                   ;CONTROLLER CLEAR
3004
3005                            ;       THESE BIT DEFINITIONS ARE USED FOR ADDRESS
3006                            ;       THE HIGH BYTE OF RKCS1
3007
3008            000001          B.BA16= BIT0                    ;BUS ADDRESS BIT 16
3009            000002          B.BA17= BIT1                    ;BUS ADDRESS BIT 17
3010            000004          B.CDT=  BIT2                    ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
3011            000020          B.CFMT= BIT4                    ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
3012
3013                            .SBTTL  CONTROL AND STATUS REGISTER 2 BITS
3014
3015            000007          DRVMSK= 7                       ;MASK FOR DRIVE SELECTION CODE
3016            000010          DESL=   BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
3017            000010          RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
3018            000020          BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
3019            000040          CLR=    BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
3020            000040          SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
3021            000100          IR=     BIT6                    ;INPUT READY
3022            000200          OR=     BIT7                    ;OUTPUT READY
3023            000400          UFE=    BIT8                    ;UNIT FIELD ERROR
3024            001000          MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
3025            002000          PGE=    BIT10                   ;PROGRAMMING ERROR
3026            004000          NEM=    BIT11                   ;NON-EXISTENT MEMORY
3027            010000          NED=    BIT12                   ;NON-EXISTENT DRIVE
3028            020000          UPE=    BIT13                   ;UNIBUS PARITY ERROR
3029            040000          WCE=    BIT14                   ;WRITE CHECK ERROR
3030            100000          DLT=    BIT15                   ;DATA LATE ERROR
3031
3032                            .SBTTL  ERROR REGISTER BIT DEFINITION
3033
3034            000001          ILC=    BIT0                    ;ILLEGAL FUNCTION CODE
3035                            ;*ILF=  BIT0                    ;ILLEGAL FUNCTION CODE
3036            000002          SKI=    BIT1                    ;SEEK INCOMPLETE
3037            000004          ILF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
3038            000004          NXF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
3039            000010          DRPAR=  BIT3                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
3040            000020          FMTE=   BIT4                    ;FORMAT ERROR
3041            000040          DTYE=   BIT5                    ;DRIVE TYPE ERROR
3042            000100          ECH=    BIT6                    ;ECC HARD
3043            000200          BSE=    BIT7                    ;BAD SECTOR ERROR
3044            000400          HCRC=   BIT8                    ;HEADER CRC ERROR
3045            000400          HVRC=   BIT8                    ;HEADER VRC ERROR
3046            001000          COE=    BIT9                    ;CYLINDER ADDRESS OVERFLOW ERROR
3047            002000          IDAE=   BIT10                   ;INVALID DISK ADDRESS ERROR
3048            004000          WLE=    BIT11                   ;WRITE LOCK ERROR
3049            010000          DTE=    BIT12                   ;DRIVE TIMING ERROR
3050            020000          OPI=    BIT13                   ;OPERATION (SEARCH) INCOMPLETE
3051            040000          UNS=    BIT14                   ;DRIVE UNSAFE
3052            100000          DCK=    BIT15                   ;DATA CHECK
3053
3054                            .SBTTL  STATUS REGISTER BIT DEFINITION
3055
```

```
3056            000001          DRA=    BIT0                    ;DRIVE AVAILABLE (CONTROLLER IS SET IF
3057                                                            ;  THIS BIT IS RESET)
3058            000004          OFST=   BIT2                    ;DRIVE OFFSET
3059            000010          ACLO=   BIT3                    ;AC LOW
3060            000020          SPDLSS= BIT4                    ;SPEED LOSS
3061            000020          DCLO=   BIT4                    ;DC LOW
3062            000040          DROT=   BIT5                    ;DRIVE OFF TRACK
3063            000100          VV=     BIT6                    ;VOLUME VALID
3064            000200          DRY=    BIT7                    ;DRIVE READY
3065            000200          DRDY=   BIT7                    ;DRIVE READY
3066            000400          DDT=    BIT8                    ;DRIVE TYPE (0=RK06,1=RK07)
3067            004000          WRL=    BIT11                   ;WRITE LOCK
3068            020000          PIP=    BIT13                   ;POSITIONING IN PROGRESS
3069            040000          DSC=    BIT14                   ;DRIVE STATUS CHANGE
3070            100000          SVAL=   BIT15                   ;STATUS VALID
3071
3072                            .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION
3073
3074            000017          MESMSK= 17                      ;MESSAGE MASK
3075
3076            000020          PAT=    BIT4                    ;FORCE EVEN PARITY ON DRIVE BUS MESSAGE LINES
3077            000040          DMD=    BIT5                    ;DIAGNOSTIC MODE
3078            000100          MSP=    BIT6                    ;MAINTENANCE SECTOR PULSE
3079            000200          MIND=   BIT7                    ;MAINTENANCE INDEX
3080            000400          MCLK=   BIT8                    ;MAINTENANCE CLOCK
3081            001000          MERD=   BIT9                    ;MAINTENANCE ENCODED READ DATA
3082            002000          MEWD=   BIT10                   ;MAINTENACNE ENCODED WRITE DATA
3083            004000          PCA=    BIT11                   ;PRECOMPENSATION ADVANCE
3084            010000          PCD=    BIT12                   ;PRECOMPENSATION DELAY
3085            020000          ECCW=   BIT13                   ;ECC WORD IS BEING READ OR WRITTEN
3086            040000          WRTGAT= BIT14                   ;WRITE GATE
3087            100000          RDGATE= BIT15                   ;READ GATE
3088
3089                            .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE A
3090
3091            000040          S.DRA=  BIT5                    ;DRIVE AVAILIABLE
3092            000100          S.VV=   BIT6                    ;VOLUME VALID
3093            000200          S.DRY=  BIT7                    ;DRIVE READY
3094            000400          S.TYPE= BIT8                    ;DRIVE TYPE
3095            001000          S.FORM= BIT9                    ;DRIVE FORMAT
3096            002000          S.OFF=  BIT10                   ;OFFSET
3097            004000          S.WRL=  BIT11                   ;WRITE LOCK
3098            010000          S.SPIN= BIT12                   ;SPINDLE ON
3099            020000          S.PIP=  BIT13                   ;POSITIONING IN PROGRESS
3100            040000          S.DSC=  BIT14                   ;DRIVE STATUS CHANGE
3101
3102                            .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE B
3103
3104            000040          S.ICYL= BIT5                    ;ILLEGAL CYLINDER ADDRESS
3105            000100          S.ACLO= BIT6                    ;AC LOW
3106            000200          S.FLT=  BIT7                    ;DRIVE FAULT
3107            000400          S.ILF=  BIT8                    ;ILLEGAL FUNCTION
3108            001000          S.PAR=  BIT9                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
3109            002000          S.SKI=  BIT10                   ;SEEK INCOMPLETE
3110            004000          S.WLE=  BIT11                   ;WRITE LOCK ERROR
3111            010000          S.SPLS= BIT12                   ;SPEED LOSS
```

```
                        S.DCLO= BIT12                   ;DC LOW
                        S.DROT= BIT13                   ;DRIVE OFF TRACK
                        S.UNS=  BIT14                   ;DRIVE UNSAFE

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE A

                        S.XDOK= BIT4                    ;TRANSDUCER OK
                        S.HDHM= BIT5                    ;HEADS HOME
                        S.BRHM= BIT6                    ;BRUSHES HOME
                        S.DOOR= BIT7                    ;DOOR INTERLOCKED
                        S.CART= BIT8                    ;CARTRAGE INTERLOCK
                        S.SPOK= BIT9                    ;SPEED OK
                        S.FWD=  BIT10                   ;FORWARD
                        S.REV=  BIT11                   ;REVERSE
                        S.LOAD= BIT12                   ;HEADS LOADING
                        S.RTZ=  BIT13                   ;RETURN TO ZERO
                        S.UNLD= BIT14                   ;HEADS UNLOADING

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE B

                        S.SECT= BIT4                    ;SECTOR ERROR
                        S.WCLK= BIT5                    ;WRITE CLOCK AND NO WRITE GATE
                        S.WGAT= BIT6                    ;WRITE GATE AND NO TRANSISTIONS
                        S.HDFL= BIT7                    ;HEAD FAULT
                        S.MHD=  BIT8                    ;MULTIPLE HEAD SELECT
                        S.XERR= BIT9                    ;INDEX ERROR
                        S.DIB=  BIT10                   ;DIBIT ERROR
                        S.PLO=  BIT11                   ;PLO ERROR
                        S.NMOV= BIT12                   ;SEEK AND NO MOTION
                        S.LIMD= BIT13                   ;LIMIT DETECT ON SEEK
                        S.BRKE= BIT14                   ;SERVO-BRAKE

                        .SBTTL  COMMON MASKS

                        M.DRV=  7                       ;DRIVE CODE
                        M.PAR=  BIT15                   ;PARITY
                        M.ID=   3                       ;BYTE ID
                        M.CDIF= 17760                   ;CYLINDER DIFFERENCE/OFFSET
                        M.CADD= 17760                   ;CYLINDER ADDRESS
                        M.SER=  77770                   ;DRIVE SERIAL NUMBER
                        M.SECT= 760                     ;SECTOR COUNT
                        M.HEAD= 7000                    ;HEAD DECODE
```

```
                        .SBTTL  PARAMETER BLOCK ALLOCATION

                        ;*      ************************************************
                        ;*  1   ! COMMAND                 ! DRIVE NO.          !  0
                        ;*  3   ! CYLINDER ADDRESS                             !  2
                        ;*  5   ! TRACK                   ! SECTOR             !  4
                        ;*  7   !BA16-17,FORMAT,DRV TYPE! OFFSET               !  6
                        ;* 11   ! BUS ADDRESS (LOW 16 BITS)                    ! 10
                        ;* 13   ! WORD COUNT (2'S COMPLEMENT)                  ! 12
                        ;* 15   ! PROGRAM DRIVE STATUS INFORMATION             ! 14
                        ;* 17   ! COMMAND AND STATUS REGISTER 1                ! 16
                        ;* 21   ! COMMAND AND STATUS REGISTER 2                ! 20
                        ;* 23   ! WORD COUNT REGISTER                          ! 22
                        ;* 25   ! BUS ADDRESS REGISTER                         ! 24
                        ;* 27   ! DESIRED TRACK AND SECTOR                     ! 26
                        ;* 31   ! DESIRED CYLINDER                             ! 30
                        ;* 33   ! ATTENTION SUMMARY AND DRIVE OFFSET           ! 32
                        ;* 35   ! ERROR REGISTER                               ! 34
                        ;* 37   ! STATUS REGISTER                              ! 36
                        ;* 41   ! MESSAGE LINE A STATUS BYTE 00                ! 40
                        ;* 43   ! MESSAGE LINE B STATUS BYTE 00                ! 42
                        ;* 45   ! MESSAGE LINE A STATUS BYTE 01                ! 44
                        ;* 47   ! MESSAGE LINE B STATUS BYTE 01                ! 46
                        ;* 51   ! MESSAGE LINE A STATUS BYTE 10                ! 50
                        ;* 53   ! MESSAGE LINE B STATUS BYTE 10                ! 52
                        ;* 55   ! MESSAGE LINE A STATUS BYTE 11                ! 54
                        ;* 57   ! MESSAGE LINE B STATUS BYTE 11                ! 56
                        ;* 61   ! ECC POSITION INFORMATION                     ! 60
                        ;* 63   ! ECC PATTERN INFORMATION                      ! 62
                        ;*      ************************************************

                        .SBTTL  PARAMETERS PASSED TO THE DRIVER

                        ;       THE FOLLOWING DEFINITIONS ARE USED TO PASS PARAMETERS
                        ;         TO THE RK06/RK07 DRIVER

000000                  P.DRVN= 0                       ;DRIVE NUMBER
000001                  P.CMND= 1                       ;COMMAND
000002                  P.CYLN= 2                       ;CYLINDER ADDRESS
000004                  P.SECT= 4                       ;SECTOR
000005                  P.TRCK= 5                       ;TRACK
000006                  P.OFST= 6                       ;OFFSET
000007                  P.CS1H= 7                       ;RKCS1 BITS 8-15
000007                  P.BAHI= 7                       ;BUS ADDRESS (BITS 16 AND 17)
000010                  P.BALO= 10                      ;BUS ADDRESS (BITS 0-15)
000012                  P.WC=   12                      ;WORD COUNT (2'S COMPLEMENT)
000014                  P.PRST= 14                      ;PROGRAM DRIVE STATUS INFORMATION

                        .SBTTL  PROGRAM DEVICE STATUS REGISTER DEFINITION

000001                  DRVUSE= BIT0                    ;DRIVE IN USE
000002                  DRVPOS= BIT1                    ;DRIVE POSITIONING
000004                  DRVPDT= BIT2                    ;DRIVE POSITIONED FOR DATA TRANSFER
000010                  UEXATT= BIT3                    ;UNEXPECTED ATTENTION
000020                  DRVHRD= BIT4                    ;DRIVE HAS HARD ERROR
000040                  DRVDSC= BIT5                    ;DRIVE STATUS CHANGE DID NOT CLEAR
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```
3210            000100                  CMDTO=  BIT6                    ;NO TERMINATION TO COMMAND FOR AT
3211                                                                    ;  LEAST 1 SECOND
3212            000200                  W.WCK=  BIT7                    ;WRITE FOR WRITE WRITE CHECK
3213            000400                  NOCHK=  BIT8                    ;NO CHECK, DO NOT SET INTERRUPT ENABLE
3214            001000                  PBSVAL= BIT9                    ;PARAMETER STATUS WORDS VALID
3215                                                                    ;  (SET WHEN ERROR TERMINATION OR
3216                                                                    ;  READ STATUS COMMAND)
3217            002000                  DRPDRV= BIT10                   ;DROP DRIVE FROM TEST SEQUENCE
3218            004000                  NODSC=  BIT11                   ;ATTENTION SET BUT DCS AND FAULT RESET
3219            010000                  DRVSZD= BIT12                   ;DRIVE SEIZED BY OTHER PORT
3220            020000                  E.UNLD= BIT13                   ;DRIVE UNLOADED DUE TO ERROR
3221            040000                  Q.INIT= BIT14                   ;PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
3222            100000                  DTBAII= BIT15                   ;INHIBIT BUS ADDRESS INCREMENT
3223
3224                                    .SBTTL  PARAMETERS PASSED FROM DRIVER TO PROGRAM
3225
3226                                    ;       THE FOLLOWING DEFINITIONS ARE USED FOR REGISTER RETURNS
3227                                    ;         FROM THE DRIVER TO THE CALLING PROGRAM
3228
3229            000016                  P.CS1=  16                      ;COMMAND AND STATUS REGISTER 1
3230            000020                  P.CS2=  20                      ;COMMAND AND STATUS REGISTER 2
3231            000022                  P.WCR=  22                      ;WORD COUNT REGISTER
3232            000024                  P.BAR=  24                      ;BUS ADDRESS REGISTER
3233            000026                  P.DTS=  26                      ;DESIRED TRACK SECTOR REGISTER
3234            000030                  P.DCYL= 30                      ;DESIRED CYLINDER REGISTER
3235            000032                  P.ASOF= 32                      ;ATTENTION SUMMARY/OFFSET REGISTER
3236            000034                  P.ER=   34                      ;ERROR REGISTER
3237            000036                  P.DS=   36                      ;STATUS REGISTER
3238            000040                  P.A00=  40                      ;MESSAGE A STATUS BYTE 00
3239            000042                  P.B00=  42                      ;MESSAGE B STATUS BYTE 00
3240            000044                  P.A01=  44                      ;MESSAGE A STATUS BYTE 01
3241            000046                  P.B01=  46                      ;MESSAGE B STATUS BYTE 01
3242            000050                  P.A10=  50                      ;MESSGGE A STATUS BYTE 10
3243            000052                  P.B10=  52                      ;MESSAGE B STATUS BYTE 10
3244            000054                  P.A11=  54                      ;MESSAGE A STATUS BYTE 11
3245            000056                  P.B11=  56                      ;MESSAGE B STATUS BYTE 11
3246            000060                  P.EPOS= 60                      ;ECC POSITION INFORMATION
3247            000062                  P.EPAT= 62                      ;ECC PATTERN INFORMATION
3248
3249                                    .SBTTL  PARAMETER BLOCK 0 FOR DRIVE
3250
3251  002630      000                   PARM0:  .BYTE   0               ;DRIVE NUMBER
3252  002631      000                           .BYTE   0               ;COMMAND
3253  002632  000000                        .WORD   0               ;CYLINDER ADDRESS
3254  002634      000                           .BYTE   0               ;SECTOR ADDRESS
3255  002635      000                           .BYTE   0               ;TRACK ADDRESS
3256  002636      000                           .BYTE   0               ;OFFSET VALUE
3257  002637      000                           .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
3258  002640  000000                        .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
3259  002642  000000                        .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
3260  002644  000000                        .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
3261  002646  000000                        .WORD   0               ;COMMAND AND STATUS REGISTER 1
3262  002650  000000                        .WORD   0               ;COMMAND AND STATUS REGISTER 2
3263  002652  000000                        .WORD   0               ;WORD COUNT REGISTER
3264  002654  000000                        .WORD   0               ;BUS ADDRESS REGISTER
3265  002656  000000                        .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
```

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3266  002660  000000                    .WORD   0               ;DESIRED CYLINDER REGISTER
3267  002662  000000                    .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
3268  002664  000000                    .WORD   0               ;ERROR REGISTER
3269  002666  000000                    .WORD   0               ;STATUS REGISTER
3270  002670  000000                    .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
3271  002672  000000                    .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
3272  002674  000000                    .WORD   0               ;MESSAGE LINE 9 STATUS BYTE 01
3273  002676  000000                    .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
3274  002700  000000                    .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
3275  002702  000000                    .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
3276  002704  000000                    .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
3277  002706  000000                    .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
3278  002710  000000                    .WORD   0               ;ECC POSITION INFORMATION
3279  002712  000000                    .WORD   0               ;ECC PATTERN INFORMATION
3280
3281                          .SBTTL  PARAMETER BLOCK 1 FOR DRIVE
3282
3283  002714     000          PARM1:  .BYTE   0               ;DRIVE NUMBER
3284  002715     000                  .BYTE   0               ;COMMAND
3285  002716  000000                  .WORD   0               ;CYLINDER ADDRESS
3286  002720     000                  .BYTE   0               ;SECTOR ADDRESS
3287  002721     000                  .BYTE   0               ;TRACK ADDRESS
3288  002722     000                  .BYTE   0               ;OFFSET VALUE
3289  002723     000                  .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
3290  002724  000000                  .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
3291  002726  000000                  .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
3292  002730  000000                  .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
3293  002732  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 1
3294  002734  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 2
3295  002736  000000                  .WORD   0               ;WORD COUNT REGISTER
3296  002740  000000                  .WORD   0               ;BUS ADDRESS REGISTER
3297  002742  000000                  .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
3298  002744  000000                  .WORD   0               ;DESIRED CYLINDER REGISTER
3299  002746  000000                  .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
3300  002750  000000                  .WORD   0               ;ERROR REGISTER
3301  002752  000000                  .WORD   0               ;STATUS REGISTER
3302  002754  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
3303  002756  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
3304  002760  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
3305  002762  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
3306  002764  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
3307  002766  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
3308  002770  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
3309  002772  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
3310  002774  000000                  .WORD   0               ;ECC POSITION INFORMATION
3311  002776  000000                  .WORD   0               ;ECC PATTERN INFORMATION
3312
3313                          .SBTTL  TEMPORARY CONTROLLER REGISTER STORAGE
3314
3315  003000  000000          T.CS1:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
3316                                                          ;  REGISTER 1
3317  003002  000000          T.CS2:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
3318                                                          ;  REGISTER 2
3319  003004  000000          T.WCR:  .WORD   0               ;TEMPORARY STORAGE FOR WORD COUNT REGISTER
3320  003006  000000          T.BA:   .WORD   0               ;TEMPORARY STORAGE FOR BUS ADDRESS REGISTER
3321  003010  000000          T.DA:   .WORD   0               ;TEMPORARY STORAGE FOR DISK TRACK AND SECTOR
```

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3322  003012  000000                  T.DC:    .WORD   0              ;TEMPORARY STORAGE FOR DRIVE CYLINDER
3323  003014  000000                  T.ASOF:  .WORD   0              ;TEMPORARY STORAGE FOR ATTENTION SUMMARY
3324                                                                  ;  AND OFFSET
3325  003016  000000                  T.ER:    .WORD   0              ;TEMPORARY STORAGE FOR ERROR REGISTER
3326  003020  000000                  T.DS:    .WORD   0              ;TEMPORARY STORAGE FOR DRIVE STATUS REGISTER
3327  003022  000000                  T.MR1:   .WORD   0              ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 1
3328  003024  000000                  T.MR2:   .WORD   0              ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 2
3329  003026  000000                  T.MR3:   .WORD   0              ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 3
3330  003030  000000                  T.POS:   .WORD   0              ;TEMPORARY STORAGE FOR ECC POSITION
3331  003032  000000                  T.PAT:   .WORD   0              ;TEMPORARY STORAGE FOR ECC PATTERN
3332  003034  000000                  T.DB:    .WORD   0              ;TEMPORARY STORAGE FOR DATA BUFFER REGISTER
3333
3334                                  .SBTTL  DRIVER PARAMERTERS
3335
3336  003036  177440                  RKBAS:   .WORD   177440         ;ADDRESS OF RK611 UNIBUS ADDRESS BLOCK
3337  003040  000210                  RKVEC:   .WORD   210            ;ADDRESS OF R611 VECTOR
3338  003042  000240                  RKPRI:   .WORD   PR5            ;RK611 INTERRUPT PRIORITY
3339  003044  040716                  A.NORM:  ERRFRE                 ;ADDRESS OF NORMAL RETURN FROM DRIVER
3340  003046  042164                  A.ABNL:  ERRHDL                 ;ADDRESS OF ABNORMAL RETURN FROM DRIVER
3341  003050  041460                  A.CONT:  CONERR                 ;ADDRESS OF CONTROLLER ERROR RETURN
3342  003052  000000                  E.CONT:  .WORD   0              ;CONTROLLER ERROR STATUS
3343                                                                  ;  THIS LOCATION IS CLEARED WHEN EVERY COMMAND
3344                                                                  ;  IS INITIATED.  IF A CONTROLLER ERROR
3345                                                                  ;  OCCURS THE FOLLOWING BIT ASSIGNMENT IS
3346                                                                  ;  USED:
3347                                                                  ;
3348          000001                  E.CCLR=  BIT0                   ;CLEAR CONTROLLER DID NOT CLEAR ERROR
3349          000002                  E.NOAT=  BIT1                   ;NO ATTENTION IN ATTENTION SUMMARY REG
3350          000004                  E.UATT=  BIT2                   ;UNSOLICATED ATTENTION (SEQUENTIAL ONLY)
3351          000010                  E.UDAT=  BIT3                   ;UNEXPECTED DATA TYPE ERROR
3352          000020                  E.CLAT=  BIT4                   ;ATTENTION DID NOT RESET WITH CLEAR
3353          000040                  E.SCLR=  BIT5                   ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE
3354                                                                  ;  ATTENTION
3355          000100                  E.ILLD=  BIT6                   ;ILLEGAL DRIVER COMMAND
3356          000400                  E.DLT=   BIT8                   ;DATA LATE WHEN UNLOADING HEADER
3357          001000                  E.CERR=  BIT9                   ;CONTROLLER ERROR DURING DRIVER SERVICING
3358          002000                  E.DPAR=  BIT10                  ;DRIVE DETECTED PARITY ERROR
3359          040000                  E.CMTO=  BIT14                  ;CONTROLLER COMMAND TIME OUT (QUEUED ONLY)
3360          100000                  E.MDS=   BIT15                  ;MULTIPLE DRIVE SELECT
3361
3362  003054  000000                  O.WAIT:  .WORD   0              ;PARAMETER BLOCK OF THE DRIVE
3363                                                                  ;WAITING FOR COMMAND COMPLETION
3364  003056  000400                  W.MTIM:  .WORD   400            ;LOOP COUNTER FOR MILISECOND SCAN OF DRIVE
3365  003060  000400                  W.MILI:  .WORD   400            ;16 MILISECOND TIME FOR PROGRAM
3366                                                                  ;
3367                                                                  ;        CPU      VALUE
3368                                                                  ;        ---      -----
3369                                                                  ;
3370                                                                  ;        11/05    100
3371                                                                  ;        11/10
3372                                                                  ;        11/20
3373                                                                  ;        11/34
3374                                                                  ;        11/40
3375                                                                  ;        11/45    400
3376                                                                  ;        11/50
3377                                                                  ;        11/70
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3378  003062  000300                  W.SEC:   .WORD   300              ;SECOND COUNT COUNT FOR ALL COMMANDS
3379                                                                    ;   EXCEPT START SPINDLE
3380  003064  003000                  W.8SEC:  .WORD   3000             ;8 SECOND FOR DRIVE CYCLE DOWN
3381  003066  030000                  W.MIN:   .WORD   30000            ;MINUTE TIME FOR START SPINDLE
3382  003070  000000                  HDR.AD:  .WORD   0                ;ADDRESS USED FOR READ ALL HEADERS
3383  003072  000000                  HDR.CT:  .WORD   0                ;NUMBER OF HEADERS LEFT TO READ FOR READ
3384                                                                    ;   ALL HEADERS
3385  003074      000                 I.ISRL:  .BYTE   0                ;INTERRUPT OR RELEASED COMMAND ISSUED
3386  003075      002      004   010  H.HEAD:  .BYTE   2,4,10           ;HEAD DECODES
3387  003100      000                 W.TIME:  .BYTE   0                ;DRIVES BEING WATCH-DOG TIMED
3388
3389                                  .SBTTL   INTERRUPT MASKS
3390
3391  003101      000                 INTMSK:  .BYTE   0                ;INTERRUPT MASKS FOR DRIVE IN PARAMETER BLOCK
3392
3393                                  ;        INTERRUPT MASK TABLE
3394
3395  003102      001                 I.DRV:   .BYTE   1                ;INTERRUPT MASK FOR DRIVE 0
3396  003103      002                          .BYTE   2                ;INTERRUPT MASK FOR DRIVE 1
3397  003104      004                          .BYTE   4                ;INTERRUPT MASK FOR DRIVE 2
3398  003105      010                          .BYTE   10               ;INTERRUPT MASK FOR DRIVE 3
3399  003106      020                          .BYTE   20               ;INTERRUPT MASK FOR DRIVE 4
3400  003107      040                          .BYTE   40               ;INTERRUPT MASK FOR DRIVE 5
3401  003110      100                          .BYTE   100              ;INTERRUPT MASK FOR DRIVE 6
3402  003111      200                          .BYTE   200              ;INTERRUPT MASK FOR DRIVE 7
3403
3404                                  .SBTTL   PARAMETER BLOCK TABLE
3405
3406  003112  002630                  PBLKT:   PARM0                    ;ADDRESS OF PARAMETER BLOCK GIVEN WITH
3407                                                                    ;DRIVE CALL.  MUST BE LOADED INTO PBLKT
3408
3409
3410                                  .SBTTL   TIME FOR WATCH-DOG TIMER
3411
3412  003114  000000                  W.DRV:   .WORD   0                ;TIME FOR INSTRUCTION IN PARAMETER BLOCK
3413                                  .SBTTL   PROGRAM SPECIFIC RESERVED LOCATIONS
3414  003116      000                 MDFLAG:  .BYTE   0                ;FLAG TO INDIC. DEFLT OR PARAM MODE
3415  003117      000                 XXDPCH:  .BYTE   0                ;XXDP CHAIN MODE FLAG
3416  003120      000                 TSTING:  .BYTE   0                ;CURRENTLY RUNNING TESTS IF = 1
3417  003121      000                 DERCNT:  .BYTE   0                ;DATA ERROR COUNT
3418  003122      000                 OPCOMP:  .BYTE   0                ;OPERATION COMPLETE FLAG
3419  003123      000                 DONE:    .BYTE   0                ;DONE SWITCH
3420  003124      000                 TYPFMT:  .BYTE   0                ;DRIVE TYPE & FORMAT CONTROL
3421  003125      000                 FORMAT:  .BYTE   0                ;DRIVE FORMAT IN BIT 4 OF BYTE
3422  003126      000                 ERRCNT:  .BYTE   0                ;ERROR COUNT
3423  003127      004                 ERRLMT:  .BYTE   4                ;ERROR LIMIT
3424  003130      000                 DRVERS:  .BYTE   0                ;ERROR COUNT FOR CURRENT DRIVE
3425  003131      000                 OPCONT:  .BYTE   0                ;OPERATION CONTROL SWITCHES
3426  003132      000                 PCLKF:   .BYTE   0                ;IF BYTE=1, KW11-P CLOCK IS PRESENT
3427  003133      000                 DOTIM:   .BYTE   0                ;IF BYTE=1, DO TIMING TESTS
3428  003134      000                 XOVLAD:  .BYTE   0                ;FLAG = 1 IF XXDP IS POSSIBLY OVERLAID
3429  003135      000                 XDPSVD:  .BYTE   0                ;FLAG = 1 IF XXDP IS SAVED
3430  003136      000                 DULACS:  .BYTE   0                ;FLAG=1 IF DUAL ACCESS TEST
3431  003137      000                 DRNAFG:  .BYTE   0                ;=1 INDICATES DRIVE SIEZED BY OTHER PORT
3432  003140      000                 REISSU:  .BYTE   0                ;DUAL-ACC FLAG TO RE-ISSUE COMMAND
3433  003141      000                 WCEFLG:  .BYTE   0                ;WRITE CHECK ERROR FLAG
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3434  003142  000                 DLTFLG: .BYTE   0               ;DATA LATE ERROR FLAG
3435  003143  000                 NORTRY: .BYTE   0               ;"NO-RETRY" FLAG
3436  003144  000                 UBMPRS: .BYTE   0               ;UNIBUS MAP PRESENT IF = 1
3437  003145  000                 MEMABT: .BYTE   0               ;SET BYTE = 1 FOR NO ABORT
3438                                                              ;    ON MEMORY PARITY ERRORS
3439  003146  000                 HLPOVL: .BYTE   0               ;HELP FILE OVERLAID INDICATOR
3440  003147  000                 NOTYPE: .BYTE   0               ;INDICATES PROGRAM JUST LOADED IF 0
3441          000001              WHDSW=BIT0                      ;WRITE HEADER & DATA SWITCH
3442          000002              VFHDSW=BIT1                     ;VERIFY HEADERS SWITCH
3443          000004              WCDASW=BIT2                     ;WRITE CHECK DATA SWITCH
3444          000010              RCDASW=BIT3                     ;READ CHECK DATA SWITCH
3445          000020              OREQSW=BIT4                     ;OFFSET REQUIRED SWITCH
3446                                      .EVEN
3447
3448  003150  177546              LKS:    .WORD   177546          ;KW11-L CLOCK STATUS REGISTER
3449  003152  172540              PKS:    .WORD   172540          ;KW11-P CONTROL AND STATUS REGISTER
3450  003154  172542              PKSB:   .WORD   172542          ;KW11-P COUNT SET BUFFER REGISTER
3451  003156  172544              PKRB:   .WORD   172544          ;KW11-P COUNTER REGISTER
3452  003160  000100              LCVEC:  .WORD   100             ;KW11-L VECTOR STORAGE
3453  003162  000104              PCVEC:  .WORD   104             ;KW11-P VECTOR STORAGE
3454          000114              MEMVEC=114                      ;MEMORY PARITY TRAP VECTOR
3455  003164  000000              TCONLO: .WORD   0               ;LO BITS OF CALIBRATION TIME CONSTANT
3456  003166  000000              TCONHI: .WORD   0               ;HI BITS OF CALIB TIME CONST
3457  003170  000000              BLWMIN: .WORD   0               ;COUNT OF TIMES BELOW MIN
3458  003172  000000              ABVMX1: .WORD   0               ;COUNT OF FORWARD TIMES ABOVE MAX
3459  003174  000000              ABVMX2: .WORD   0               ;COUNT OF REVERSE TIMES ABOVE MAX
3460  003176  000000              SUMLO1: .WORD   0               ;LO BITS OF FORWARD TIME SUM
3461  003200  000000              SUMHI1: .WORD   0               ;HI BITS OF FORWARD TIME SUM
3462  003202  000000              SUMLO2: .WORD   0               ;LO BITS OF REVERSE TIME SUM
3463  003204  000000              SUMHI2: .WORD   0               ;HI BITS OF REVERSE TIME SUM
3464  003206  000000              SAVPAR: .WORD   0               ;SAVE WORD FOR PAR CONSTANT
3465  003210  000000              SAVWRD: .WORD   0               ;SCRATCH WORD
3466  003212  000000              MINIL1: .WORD   0               ;LO BITS OF MIN MEAS'D TIME (FORWARD)
3467  003214  000000              MINIH1: .WORD   0               ;HI BITS OF MIN MEAS'D TIME (FORWARD)
3468  003216  000000              MAXIL1: .WORD   0               ;LO BITS OF MAX MEAS'D TIME (FORWARD)
3469  003220  000000              MAXIH1: .WORD   0               ;HI BITS OF MAX MEAS'D TIME (FORWARD)
3470  003222  000000              MINIL2: .WORD   0               ;LO BITS OF MIN MEAS'D TIME (REVERSE)
3471  003224  000000              MINIH2: .WORD   0               ;HI BITS OF MIN MEAS'D TIME (REVERSE)
3472  003226  000000              MAXIL2: .WORD   0               ;LO BITS OF MAX MEAS'D TIME (REVERSE)
3473  003230  000000              MAXIH2: .WORD   0               ;HI BITS OF MAX MEAS'D TIME (REVERSE)
3474  003232  000400              BSSOFT: .BLKW   ^D256           ;RECORD OF BAD SECTORS FROM SOFTWARE
3475  004232  000400              BSFACT: .BLKW   ^D256           ;RECORD OF BAD SECTORS FROM FACTORY
3476  005232  000000  000000  000000  PRVCMD: .WORD   0,0,0,0,0,0     ;PREVIOUS COMMAND STORAGE
3477  005240  000000  000000  000000
3478  005246  000000  000000  000000  COMSTR: .WORD   0,0,0,0,0,0     ;CURRENT COMMAND STORAGE
3479  005254  000000  000000  000000
3480  005262  000000              PRMPLO: .WORD   0               ;PREV. U.B. MAP REG 0
3481  005264  000000              PRMPHO: .WORD   0
3482  005266  000000              CRMPLO: .WORD   0               ;CURRENT U.B. MAP REG 0
3483  005270  000000              CRMPHO: .WORD   0
3484  005272  000102              BUFFO:  .BLKW   ^D66            ;OUTPUT BUFFER 1
3485  005476  000000              LOWOCT: .WORD   0               ;LOW 16 BITS OF CONVERTED BINARY NUMBER
3486  005500  000000              HIGOCT: .WORD   0               ;HIGH BITS OF CONVERTED BINARY NO.
3487  005502  000000              BUFPRT: .WORD   0               ;BUFFER POINTER
3488  005504  000000              RECODE: .WORD   0               ;RECOVERY CODE WORD
3489  005506  000000              ERRCOM: .WORD   0               ;ERROR COMMAND
```

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3490  005510  000000          DRIVE:   .WORD   0          ;NO.  OF  DRIVE IN USE
3491  005512  000000          STALLS:  .WORD   0          ;CURRENT NO. OF UNIT STALLS TO APPLY
3492  005514  000000          CYLNDR:  .WORD   0          ;CURRENT CYLINDER NUMBER
3493  005516  000000          FS:      .WORD   0          ;FIRST SECTOR LIMIT
3494  005520  000000          LS:      .WORD   0          ;LAST SECTOR LIMIT
3495  005522  000000          NCYL1:   .WORD   0          ;NEXT CYL SCRATCH WORD
3496  005524  000000          NCYL2:   .WORD   0          ;NEXT CYL SCRATCH WORD
3497  005526  000000          OFINUS:  .WORD   0          ;OFFSET IN USE
3498  005530  000000          TRACK:   .WORD   0          ;TRACK IN USE
3499  005532  000000          INTCHR:  .WORD   0          ;TTY INTERRUPT INPUT WORD
3500  005534  000000          SELECT:  .WORD   0          ;ANY BIT SET IN LOW BYTE GIVES AUTO-SELECTED DRIVE NO.
3501  005536  000000          ONLINE:  .WORD   0          ;ANY BIT SET IN LOW BYTE INDICATES A DRIVE WAS ON-LINE
3502  005540  000000          NEWON:   .WORD   0          ;NEW LOOK AT ONLINE DRIVES
3503  005542  000000          SCRACH:  .WORD   0          ;ALL-PURPOSE SCRATCH WORD
3504  005544  000000          PATRN:   .WORD   0          ;DATA PATTERN LIST WORD
3505  005546  000000          XXDPAD:  .WORD   0          ;STARTING ADDRESS OF XXDP LOADER
3506  005550  000002          XDPSAV:  .BLKW   2          ;XXDP PHYSICAL SAVE ADDRESS
3507  005554  000000          PLOFST:  .WORD   0          ;(+) OFFSET VALUE
3508  005556  000000          NGOFST:  .WORD   0          ;(-) OFFSET VALUE
3509  005560  000005          SAVPRS:  .BLKW   5          ;SAVE INITIAL PARAMS FOR XFER
3510  005572  000000          WDSXFR:  .WORD   0          ;NO. OF WORDS ACTUALLY XFERRED
3511  005574  000000          FINCYL:  .WORD   0          ;FINAL CYLINDER ADRS
3512  005576     000          FINTRK:  .BYTE   0          ;FINAL TRACK ADRS
3513  005577     000          FINSEC:  .BYTE   0          ;FINAL SECTOR ADRS
3514  005600  000000          LASTWC:  .WORD   0          ;ACTUAL FINAL WC
3515  005602  000002          PMA:     .BLKW   2          ;PARTIAL TRANSFER MEMORY START ADRS
3516
3517
3518
3519                          ;LIST OF DESIRED DRIVES TO TEST (IF BYTE=0, DON'T TEST DRIVE)
3520  005606                  DRVLST:
3521  005606     001                  .BYTE   1          ;DRIVE 0
3522  005607     001                  .BYTE   1          ;DRIVE 1
3523  005610     001                  .BYTE   1          ;DRIVE 2
3524  005611     001                  .BYTE   1          ;DRIVE 3
3525  005612     001                  .BYTE   1          ;DRIVE 4
3526  005613     001                  .BYTE   1          ;DRIVE 5
3527  005614     001                  .BYTE   1          ;DRIVE 6
3528  005615     001                  .BYTE   1          ;DRIVE 7
3529
3530                          ;LIST OF DRIVE TYPES  0=RK06, NON 0=RK07
3531  005616                  DTYLST:
3532  005616     000                  .BYTE   0          ;DRV 0
3533  005617     000                  .BYTE   0          ;DRV 1
3534  005620     000                  .BYTE   0          ;DRV 2
3535  005621     000                  .BYTE   0          ;DRV 3
3536  005622     000                  .BYTE   0          ;DRV 4
3537  005623     000                  .BYTE   0          ;DRV 5
3538  005624     000                  .BYTE   0          ;DRV 6
3539  005625     000                  .BYTE   0          ;DRV 7
3540
3541
3542
3543                          ;LIST OF ITERATION COUNTS FOR DESIRED TESTS (IF=0, TEST NOT RUN)
3544                          ;MAXIMUM ALLOWABLE NUMBER OF ITERATIONS = 77776 (OCT)
3545  005626                  TSTLST:
```

```
3546  005626  000010                  .WORD   10              ;TEST 01
3547  005630  000200                  .WORD   200             ;TEST 02
3548  005632  000010                  .WORD   10              ;TEST 03
3549  005634  000010                  .WORD   10              ;TEST 04
3550  005636  000002                  .WORD   2               ;TEST 05
3551  005640  000002                  .WORD   2               ;TEST 06
3552  005642  000002                  .WORD   2               ;TEST 07
3553  005644  000400                  .WORD   400             ;TEST 10
3554  005646  000500                  .WORD   500             ;TEST 11
3555  005650  000002                  .WORD   2               ;TEST 12
3556  005652  000001                  .WORD   1               ;TEST 13
3557  005654  000001                  .WORD   1               ;TEST 14
3558  005656  000001                  .WORD   1               ;TEST 15
3559  005660  000001                  .WORD   1               ;TEST 16
3560  005662  000010                  .WORD   10              ;TEST 17
3561  005664  000010                  .WORD   10              ;TEST 20
3562  005666  000001                  .WORD   1               ;TEST 21
3563
3564
3565
3566                          ;LIST OF DEFAULT ITERATION COUNTS FOR ALL TESTS
3567  005670                  DFLTST:
3568  005670  000010                  .WORD   10              ;TEST 01
3569  005672  000200                  .WORD   200             ;TEST 02
3570  005674  000010                  .WORD   10              ;TEST 03
3571  005676  000010                  .WORD   10              ;TEST 04
3572  005700  000002                  .WORD   2               ;TEST 05
3573  005702  000002                  .WORD   2               ;TEST 06
3574  005704  000002                  .WORD   2               ;TEST 07
3575  005706  000400                  .WORD   400             ;TEST 10
3576  005710  000500                  .WORD   500             ;TEST 11
3577  005712  000002                  .WORD   2               ;TEST 12
3578  005714  000001                  .WORD   1               ;TEST 13
3579  005716  000001                  .WORD   1               ;TEST 14
3580  005720  000001                  .WORD   1               ;TEST 15
3581  005722  000001                  .WORD   1               ;TEST 16
3582  005724  000010                  .WORD   10              ;TEST 17
3583  005726  000010                  .WORD   10              ;TEST 20
3584  005730  000001                  .WORD   1               ;TEST 21
3585
3586
3587          000021          NMTSTS=<DFLTST-TSTLST>/2        ;TOTAL NO. OF AUTOMATIC TESTS
3588
3589
3590                          ;OPERATING PARAMETER LIST
3591  005732                  PRMLST:
3592  005732  000000          FC:     .WORD   0               ;FIRST CYLINDER
3593  005734  000000          LC:     .WORD   0               ;LAST CYLINDER. 632 FOR RK06, 1456 FOR RK07
3594  005736  000001          IC:     .WORD   1               ;CYLINDER INCREMENT
3595  005740  000000          FT:     .WORD   0               ;FIRST TRACK
3596  005742  000002          LT:     .WORD   2               ;LAST TRACK
3597  005744  000001          IT:     .WORD   1               ;TRACK INCREMENT
3598  005746  000000          S0:     .WORD   0               ;FIRST SECTOR IF 20(DEC) SECTOR FMT
3599  005750  000023          S1:     .WORD   23              ;LAST SECTOR IF 20(DEC) SECTOR FMT
3600  005752  000000          S2:     .WORD   0               ;FIRST SECTOR IF 22(DEC) SECTOR FMT
3601  005754  000025          S3:     .WORD   25              ;LAST SECTOR IF 22(DEC) SECTOR FMT
```

```
3602  005756  000001          IS:     .WORD   1               ;SECTOR INCREMENT
3603  005760  000000          PT:     .WORD   0               ;DATA PATTERN SELECT WORD
3604  005762  063554          MA:     .WORD   RWBUF           ;LO BITS OF PHYS. MEM. ADDR. (BITS 0-15)
3605  005764  000000                  .WORD   0               ;HI BITS OF PHYS. MEM. ADDR. (BITS 16-21)
3606  005766  000403          WC:     .WORD   403             ;WORD COUNT (IF WC=0, WRD CNT IS 65,536 DEC)
3607  005770  000000          CS:     .WORD   0               ;CONTROL SWITCH WORD
3608  005772  000000          ST:     .WORD   0               ;NUMBER OF UNIT STALLS
3609  005774  001000          SM:     .WORD   1000            ;MAX. STALLS, TEST 11
3610
3611
3612                          ;DEFAULT OPERATING PARAMETER VALUES
3613  005776                  PRDFLT:
3614  005776  000000                  .WORD   0               ;FC DEFAULT
3615  006000  000000                  .WORD   0               ;LC DEFAULT
3616  006002  000001                  .WORD   1               ;IC DEFAULT
3617  006004  000000                  .WORD   0               ;FT DEFAULT
3618  006006  000002                  .WORD   2               ;LT DEFAULT
3619  006010  000001                  .WORD   1               ;IT DEFAULT
3620  006012  000000                  .WORD   0               ;S0 DEFAULT
3621  006014  000023                  .WORD   23              ;S1 DEFAULT
3622  006016  000000                  .WORD   0               ;S2 DEFAULT
3623  006020  000025                  .WORD   25              ;S3 DEFAULT
3624  006022  000001                  .WORD   1               ;IS DEFAULT
3625  006024  000000                  .WORD   0               ;PT DEFAULT
3626  006026  063554                  .WORD   RWBUF           ;LOW MA (0-15) DEFAULT
3627  006030  000000                  .WORD   0               ;HIGH MA (16-21) DEFAULT
3628  006032  000403                  .WORD   403             ;WC DEFAULT
3629  006034  000000                  .WORD   0               ;CS DEFAULT
3630  006036  000000                  .WORD   0               ;ST DEFAULT
3631  006040  001000                  .WORD   1000            ;SM DEFAULT
3632
3633
3634
3635                          ;OPERATING PARAMETER VALUE LOW AND HIGH LIMITS
3636  006042                  PRMLIM:
3637  006042  000000                  .WORD   0               ;FC LIMITS
3638  006044  000000                  .WORD   0
3639  006046  000000                  .WORD   0               :LC LIMITS
3640  006050  000000                  .WORD   0
3641  006052  000001                  .WORD   1               ;IC LIMITS
3642  006054  000000                  .WORD   0
3643  006056  000000                  .WORD   0               ;FT LIMITS
3644  006060  000002                  .WORD   2
3645  006062  000000                  .WORD   0               ,LT LIMITS
3646  006064  000002                  .WORD   2
3647  006066  000001                  .WORD   1               ;IT LIMITS
3648  006070  000002                  .WORD   2
3649  006072  000000                  .WORD   0               ;S0 LIMITS
3650  006074  000023                  .WORD   23
3651  006076  000000                  .WORD   0               ;S1 LIMITS
3652  006100  000023                  .WORD   23
3653  006102  000000                  .WORD   0               ;S2 LIMITS
3654  006104  000025                  .WORD   25
3655  006106  000000                  .WORD   0               ;S3 LIMITS
3656  006110  000025                  .WORD   25
3657  006112  000001                  .WORD   1               :IS LIMITS
```

```
006114  000025                  .WORD   25
006116  000000                  .WORD   0               ;PT LIMITS
006120  177777                  .WORD   177777
006122  063554                  .WORD   RWBUF           ;MA LOWER LIMIT
006124  000000                  .WORD   0
006126  157776          MAHILM: .WORD   157776          ;MA UPPER LIMIT
006130  000077                  .WORD   77
006132  000000                  .WORD   0               ;WC LIMITS
006134  177777                  .WORD   177777
006136  000000                  .WORD   0               ;CS LIMITS
006140  000070                  .WORD   000070
006142  000000                  .WORD   0               ;ST LIMITS
006144  177777                  .WORD   177777
006146  000000                  .WORD   0               ;SM LIMITS
006150  177777                  .WORD   177777


                        ;ASCII PARAMETER MNEMONICS
006152                  PRMNEM:
006152  041506                  .ASCII  /FC/
006154  041514                  .ASCII  /LC/
006156  041511                  .ASCII  /IC/
006160  052106                  .ASCII  /FT/
006162  052114                  .ASCII  /LT/
006164  052111                  .ASCII  /IT/
006166  030123                  .ASCII  /S0/
006170  030523                  .ASCII  /S1/
006172  031123                  .ASCII  /S2/
006174  031523                  .ASCII  /S3/
006176  051511                  .ASCII  /IS/
006200  052120                  .ASCII  /PT/
006202  040515                  .ASCII  /MA/
006204  000000                  .WORD   0               ;TABLE FILLER FOR MA
006206  041527                  .ASCII  /WC/
006210  051503                  .ASCII  /CS/
006212  052123                  .ASCII  /ST/
006214  046523                  .ASCII  /SM/


                        ;DATA PATTERN 00
                        ;       HI-LO FREQ. MIX
006216                  PAT00:
006216  177777                  177777
006220  177777                  177777
006222  177777                  177777
006224  052525                  052525
006226  052525                  052525
006230  052525                  052525
006232  177777                  177777
006234  177777                  177777
006236  052525                  052525
006240  052525                  052525
006242  177777                  177777
006244  052525                  052525
```

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3714  006246  177252                  177252
3715  006250  177252                  177252
3716  006252  172765                  172765
3717  006254  172765                  172765
3718
3719
3720
3721                          ;DATA PATTERN 01
3722                          ;       HI FREQ. PHASE MIX
3723  006256                  PAT01:
3724  006256  000000                  000000
3725  006260  000000                  000000
3726  006262  000000                  000000
3727  006264  177777                  177777
3728  006266  177777                  177777
3729  006270  177777                  177777
3730  006272  000000                  000000
3731  006274  000000                  000000
3732  006276  177777                  177777
3733  006300  177777                  177777
3734  006302  000000                  000000
3735  006304  177777                  177777
3736  006306  000000                  000000
3737  006310  177777                  177777
3738  006312  000000                  000000
3739  006314  177777                  177777
3740
3741
3742
3743                          ;DATA PATTERN 02
3744                          ;       LO FREQ. PHASE MIX
3745  006316                  PAT02:
3746  006316  052525                  052525
3747  006320  052525                  052525
3748  006322  052525                  052525
3749  006324  125252                  125252
3750  006326  125252                  125252
3751  006330  125252                  125252
3752  006332  052525                  052525
3753  006334  052525                  052525
3754  006336  125252                  125252
3755  006340  125252                  125252
3756  006342  052525                  052525
3757  006344  125252                  125252
3758  006346  052525                  052525
3759  006350  125252                  125252
3760  006352  052525                  052525
3761  006354  125252                  125252
3762
3763
3764
3765                          ;DATA PATTERN 03
3766                          ;       MAX. PRECOMP. PHASE MIX
3767  006356                  PAT03:
3768  006356  133333                  133333
3769  006360  066666                  066666
```

```
3770  006362  155555                    155555
3771  006364  155555                    155555
3772  006366  133333                    133333
3773  006370  066666                    066666
3774  006372  066666                    066666
3775  006374  155555                    155555
3776  006376  155555                    155555
3777  006400  133333                    133333
3778  006402  133333                    133333
3779  006404  133333                    133333
3780  006406  133333                    133333
3781  006410  133333                    133333
3782  006412  133333                    133333
3783  006414  133333                    133333
3784
3785
3786
3787                          ;DATA PATTERN 04
3788                          ;       ROTATING BOUNDARY PULSE PRECOMP.
3789  006416                  PAT04:
3790  006416  121105                    121105
3791  006420  150442                    150442
3792  006422  064221                    064221
3793  006424  132110                    132110
3794  006426  055044                    055044
3795  006430  026422                    026422
3796  006432  013211                    013211
3797  006434  105504                    105504
3798  006436  042642                    042642
3799  006440  021321                    021321
3800  006442  110550                    110550
3801  006444  044264                    044264
3802  006446  022132                    022132
3803  006450  011055                    011055
3804  006452  104426                    104426
3805  006454  042213                    042213
3806
3807
3808
3809                          ;DATA PATTERN 05
3810                          ;       ROTATING CELL PULSE PRECOMP.
3811  006456                  PAT05:
3812  006456  026455                    026455
3813  006460  113226                    113226
3814  006462  045513                    045513
3815  006464  122645                    122645
3816  006466  151322                    151322
3817  006470  064551                    064551
3818  006472  132264                    132264
3819  006474  055132                    055132
3820  006476  026455                    026455
3821  006500  113226                    113226
3822  006502  045513                    045513
3823  006504  122645                    122645
3824  006506  151322                    151322
3825  006510  064551                    064551
```

```
3826  006512  132264                  132264
3827  006514  055132                  055132
3828
3829
3830                                  ;DATA PATTERN 06
3831                                  ;       ALL ZEROS
3832  006516                          PAT06:
3833  006516  000000                          000000
3834  006520  000000                          000000
3835  006522  000000                          000000
3836  006524  000000                          000000
3837  006526  000000                          000000
3838  006530  000000                          000000
3839  006532  000000                          000000
3840  006534  000000                          000000
3841  006536  000000                          000000
3842  006540  000000                          000000
3843  006542  000000                          000000
3844  006544  000000                          000000
3845  006546  000000                          000000
3846  006550  000000                          000000
3847  006552  000000                          000000
3848  006554  000000                          000000
3849
3850
3851
3852                                  ;DATA PATTERN 07
3853                                  ;       ALL ONES
3854  006556                          PAT07:
3855  006556  177777                          177777
3856  006560  177777                          177777
3857  006562  177777                          177777
3858  006564  177777                          177777
3859  006566  177777                          177777
3860  006570  177777                          177777
3861  006572  177777                          177777
3862  006574  177777                          177777
3863  006576  177777                          177777
3864  006600  177777                          177777
3865  006602  177777                          177777
3866  006604  177777                          177777
3867  006606  177777                          177777
3868  006610  177777                          177777
3869  006612  177777                          177777
3870  006614  177777                          177777
3871
3872
3873                                  ;DATA PATTERN 08
3874                                  ;       SHIFTED 1 IN FIELD OF ZEROS
3875  006616                          PAT08:
3876  006616  000001                          000001
3877  006620  000002                          000002
3878  006622  000004                          000004
3879  006624  000010                          000010
3880  006626  000020                          000020
3881  006630  000040                          000040
```

```
3882  006632  000100                    000100
3883  006634  000200                    000200
3884  006636  000400                    000400
3885  006640  001000                    001000
3886  006642  002000                    002000
3887  006644  004000                    004000
3888  006646  010000                    010000
3889  006650  020000                    020000
3890  006652  040000                    040000
3891  006654  100000                    100000
3892
3893
3894
3895                                ;DATA PATTERN 09
3896                                ;       SHIFTED 0 IN FIELD OF ONES
3897  006656                        PAT09:
3898  006656  177776                    177776
3899  006660  177775                    177775
3900  006662  177773                    177773
3901  006664  177767                    177767
3902  006666  177757                    177757
3903  006670  177737                    177737
3904  006672  177677                    177677
3905  006674  177577                    177577
3906  006676  177377                    177377
3907  006700  176777                    176777
3908  006702  175777                    175777
3909  006704  173777                    173777
3910  006706  167777                    167777
3911  006710  157777                    157777
3912  006712  137777                    137777
3913  006714  077777                    077777
3914
3915
3916
3917
3918                                ;DATA PATTERN 10
3919  006716                        ;       ALTERNATING 0-1
3920  006716  052525                PAT10:
3921  006720  052525                    052525
3922  006722  052525                    052525
3923  006724  052525                    052525
3924  006726  052525                    052525
3925  006730  052525                    052525
3926  006732  052525                    052525
3927  006734  052525                    052525
3928  006736  052525                    052525
3929  006740  052525                    052525
3930  006742  052525                    052525
3931  006744  052525                    052525
3932  006746  052525                    052525
3933  006750  052525                    052525
3934  006752  052525                    052525
3935  006754  052525                    052525
3936
3937
```

```
3938
3939                                    ;DATA PATTERN 11
3940                                    ;       ALTERNATING 1-0
3941   006756                           PAT11:
3942   006756   125252                          125252
3943   006760   125252                          125252
3944   006762   125252                          125252
3945   006764   125252                          125252
3946   006766   125252                          125252
3947   006770   125252                          125252
3948   006772   125252                          125252
3949   006774   125252                          125252
3950   006776   125252                          125252
3951   007000   125252                          125252
3952   007002   125252                          125252
3953   007004   125252                          125252
3954   007006   125252                          125252
3955   007010   125252                          125252
3956   007012   125252                          125252
3957   007014   125252                          125252
3958
3959
3960
3961                                    ;DATA PATTERN 12
3962                                    ;       SHIFTING ZEROS AND ONES
3963   007016                           PAT12:
3964   007016   000001                          000001
3965   007020   000003                          000003
3966   007022   000007                          000007
3967   007024   000017                          000017
3968   007026   000037                          000037
3969   007030   000077                          000077
3970   007032   000177                          000177
3971   007034   000377                          000377
3972   007036   000777                          000777
3973   007040   001777                          001777
3974   007042   003777                          003777
3975   007044   007777                          007777
3976   007046   017777                          017777
3977   007050   037777                          037777
3978   007052   077777                          077777
3979   007054   177777                          177777
3980
3981
3982
3983                                    ;DATA PATTERN 13
3984                                    ;       COMPOSITE ROTATING
3985   007056                           PAT13:
3986   007056   072307                          072307
3987   007060   135143                          135143
3988   007062   156461                          156461
3989   007064   167230                          167230
3990   007066   073514                          073514
3991   007070   035646                          035646
3992   007072   016723                          016723
3993   007074   107351                          107351
```

```
3994  007076  143564                          143564
3995  007100  061672                          061672
3996  007102  030735                          030735
3997  007104  114356                          114356
3998  007106  046167                          046167
3999  007110  123073                          123073
4000  007112  151453                          151453
4001  007114  164616                          164616
4002
4003
4004
4005                                  ;DATA PATTERN 14
4006                                  ;       PSEUDO-RANDOM (COMPUTED BY PROGRAM)
4007  007116                          PAT14:
4008  007116  000000                          .WORD
4009  007120  000000                          .WORD
4010  007122  000000                          .WORD
4011  007124  000000                          .WORD
4012  007126  000000                          .WORD
4013  007130  000000                          .WORD
4014  007132  000000                          .WORD
4015  007134  000000                          .WORD
4016  007136  000000                          .WORD
4017  007140  000000                          .WORD
4018  007142  000000                          .WORD
4019  007144  000000                          .WORD
4020  007146  000000                          .WORD
4021  007150  000000                          .WORD
4022  007152  000000                          .WORD
4023  007154  000000                          .WORD
4024
4025
4026                                  ;USER-DEFINED DATA PATTERN 15
4027  007156                          PAT15:
4028  007156  072307                          072307          ;WORD 00
4029  007160  135143                          135143          ;WORD 01
4030  007162  156461                          156461          ;WORD 02
4031  007164  167230                          167230          ;WORD 03
4032  007166  073514                          073514          ;WORD 04
4033  007170  035646                          035646          ;WORD 05
4034  007172  016723                          016723          ;WORD 06
4035  007174  107351                          107351          ;WORD 07
4036  007176  143564                          143564          ;WORD 10
4037  007200  061672                          061672          ;WORD 11
4038  007202  030735                          030735          ;WORD 12
4039  007204  114356                          114356          ;WORD 13
4040  007206  046167                          046167          ;WORD 14
4041  007210  123073                          123073          ;WORD 15
4042  007212  151453                          151453          ;WORD 16
4043  007214  164616                          164616          ;WORD 17
4044
4045
4046
4047          057467  MINLO1=↑D24375                 ;LO BITS OF SPEC'D MIN ROT. LATENCY
4048          000000  MINHI1=0                        ;HI BITS OF SPEC'D MIN ROT. LATENCY
4049          062031  MAXLO1=↑D25625                  ;LO BITS OF SPEC'D MAX ROT. LATENCY
```

```
4050            000000                  MAXHI1=0                        ;HI BITS OF SPEC'D MAX ROT. LATENCY
4051                                    ;MAXLO2=↑D8000                  ;LO BITS OF SPEC'D MAX 1 CYL SEEK TIME
4052                                    ;MAXHI2=0                       ;HI BITS OF SPEC'D MAX 1 CYL SEEK TIME
4053  007216    000000                  MAXLO2: .WORD   0       ;LOAD FROM NEW DRIVE ROUTINE
4054  007220    000000                  MAXHI2: .WORD   0               ;LOAD FROM NEWDRIVE ROUTINE
4055            112160                  MAXLO3=↑D38000                  ;LO BITS OF SPEC'D MAX AVG SEEK TIME
4056            000000                  MAXHI3=0                        ;HI BITS OF SPEC'D MAX AVG SEEK TIME
4057                                    ;MAXLO4=↑D9464                  ;LO BITS OF SPEC'D MAX 410 CYL SEEK TIME
4058                                    ;MAXHI4=1                       ;HI BITS OF SPEC'D MAX 410 CYL SEEK TIME
4059  007222    000000                  MAXLO4: .WORD   0       ;LOAD FROM THE DEWDRIVE ROUTINE
4060  007224    000000                  MAXHI4: .WORD   0       ;LOAD FROM THE NEWDRIVE ROUTINE
4061            002734                  RNDSHT=↑D1500                   ;SHORT RANDOM SEEKS = 1500(10)
4062            016514                  RNDLNG=↑D7500                   ;LONG RANDOM SEEKS = 7500(10)
4063            000002                  LSTTRK=2                        ;LAST TRACK  = 2
4064            000365                  ALNCYL=365                      ;ALIGNMENT CYLINDER =245(10)
4065            000002                  BSERR=BIT1                      ;BSE ERROR
4066            000004                  HVRCER=BIT2                     ;HVRC ERROR
4067            000010                  OPIERR=BIT3                     ;OPI ERROR
4068            000020                  DCKERR=BIT4                     ;DATA CHECK ERROR
4069            000040                  ECCNC=BIT5                      ;ECC NON-CORRECTABLE
4070            000100                  WCERR=BIT6                      ;WRITE CHECK ERROR
4071            000200                  ABORT=BIT7                      ;ABORT
4072            000400                  LEV2ER=BIT8                     ;LEVEL TWO ERROR
4073            001000                  BADSEC=BIT9                     ;BAD SECTOR FLAG
4074            002000                  TWOTOS=BIT10                    ;TWO TIME OUTS
4075            004000                  RCLREQ=BIT11                    ;RECALIBRATE REQUIRED
4076            010000                  DRNAVL=BIT12                    ;DRIVE NOT RELSD BY OTHER PORT
4077            100000                  ANYDER=BIT15                    ;ANY ERROR DETECTED FLAG
4078
4079  007226    005015  055103  033122  DZR6M:  .ASCIZ  <15><12>/CZR6MD0/
4080  007234    042115  000060
4081  007240    005015  044103  047101  XXDPMG: .ASCII  <CR><LF>/CHANGE XXDP PACK/
4082  007246    042507  054040  042130
4083  007254    020120  040520  045503
4084  007262    005015  046103  040505          .ASCIZ  <CR><LF>/CLEAR LOC 40,RESTART PROGRAM/
4085  007270    020122  047514  020103
4086  007276    030064  051054  051505
4087  007304    040524  052122  050040
4088  007312    047522  051107  046501
4089  007320       000
4090  007321       040  020055  045522  SUBVER: .ASCIZ  & - RK611/RK06-RK07 SUBSYSTEM VERIFICATION : PART &
4091  007326    030466  027461  045522
4092  007334    033060  051055  030113
4093  007342    020067  052523  051502
4094  007350    051531  042524  020115
4095  007356    042526  044522  044506
4096  007364    040503  044524  047117
4097  007372    035040  050040  051101
4098  007400    020124     000
4099  007403       061  005015     000  PART1:  .ASCIZ  /1/<15><12>
4100  007407       062  005015     000  PART2:  .ASCIZ  /2/<15><12>
4101  007413       015  005012  040514  LSTMEM: .ASCIZ  <15><12><12>/LAST PHYS MEM ADR = /
4102  007420    052123  050040  054510
4103  007426    020123  042515  020115
4104  007434    042101  020122  020075
4105  007442       000
```

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4106  007443     117  042526  046122  OVLODR: .ASCIZ  /OVERLAY LOADER ? (Y OR N) * /
4107  007450  054501  046040  040517
4108  007456  042504  020122  020077
4109  007464  054450  047440  020122
4110  007472  024516  025040  000040
4111  007500  005015  040520  040522  PRMINP: .ASCIZ  <15><12>/PARAM INPUT MODE/<15><12><12>
4112  007506  020115  047111  052520
4113  007514  020124  047515  042504
4114  007522  005015  000012
4115  007526  045522  033060  030055  RKBADR: .ASCIZ  /RK06-07 BUS ADR = /
4116  007534  020067  052502  020123
4117  007542  042101  020122  020075
4118  007550     000
4119  007551     122  030113  026466  RKVADR: .ASCIZ  /RK06-07 VEC ADR = /
4120  007556  033460  053040  041505
4121  007564  040440  051104  036440
4122  007572  000040
4123  007574  045522  033060  030055  RKPRTY: .ASCIZ  /RK06-07 PRIOR =/
4124  007602  020067  051120  047511
4125  007610  020122  000075
4126  007614  053523  020122  020075  SWRMSG: .ASCIZ  /SWR = /
4127  007622     000
4128  007623     040  047040  053505  NEWMSG: .ASCIZ  /  NEW = /
4129  007630  036440  000040
4130  007634  005015  051104  024126  DRVSEQ: .ASCIZ  <15><12>/DRV(S) = /
4131  007642  024523  036440  000040
4132  007650  051104  053111  020105  BADDRV: .ASCIZ  /DRIVE   /
4133  007656  020040     000
4134  007661     116  047117  042455  NXDRIV: .ASCIZ  /NON-EXIST/<15><12>
4135  007666  044530  052123  005015
4136  007674     000
4137  007675     116  052117  051040  NTREDY: .ASCIZ  /NOT RDY/<15><12>
4138  007702  054504  005015     000
4139  007707     127  052122  046055  WRTLOK: .ASCIZ  /WRT-LOCK/<15><12>
4140  007714  041517  006513  000012
4141  007722  047514  042101  042105  ALNPAK: .ASCIZ  /LOADED WITH ALIGN PACK/<15><12>
4142  007730  053440  052111  020110
4143  007736  046101  043511  020116
4144  007744  040520  045503  005015
4145  007752     000
4146  007753     111  020106  054130  REPLPK: .ASCIZ  /IF XXDP PACK ON DRV 0, TYPE "Y <CR>", &  REPLACE IT : /
4147  007760  050104  050040  041501
4148  007766  020113  047117  042040
4149  007774  053122  030040  020054
4150  010002  054524  042520  021040
4151  010010  020131  041474  037122
4152  010016  026042  023040  020040
4153  010024  042522  046120  041501
4154  010032  020105  052111  035040
4155  010040  000040
4156  010042  005015  025012  020052  NODRTS: .ASCII  <15><12><12>/** NO DRVS TO TEST/<15><12>
4157  010050  047516  042040  053122
4158  010056  020123  047524  052040
4159  010064  051505  006524     012
4160  010071     120  042522  051523  CNTRDY: .ASCIZ  /PRESS "CONT" WHEN RDY/<15><12>
4161  010076  021040  047503  052116
```

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4162  010104  020042  044127  047105
4163  010112  051040  054504  005015
4164  010120     000
4165  010121     110  046101  020124  HLTRQD: .ASCIZ  /HALT REQ/<15><12>
4166  010126  042522  006521  000012
4167  010134  051104  020126  020060  DROXDP: .ASCIZ  /DRV 0 IS LOAD MEDIUM/<15><12>
4168  010142  051511  046040  040517
4169  010150  020104  042515  044504
4170  010156  046525  005015     000
4171  010163     015  005012  047524  ALDRVS: .ASCIZ  <15><12><12>/TO TEST ALL DRVS TYPE "A" <CR>, ELSE <CR>/<15><12>/* /
4172  010170  052040  051505  020124
4173  010176  046101  020114  051104
4174  010204  051526  052040  050131
4175  010212  020105  040442  020042
4176  010220  041474  037122  020054
4177  010226  046105  042523  036040
4178  010234  051103  006476  025012
4179  010242  000040
4180  010244  005015  020114  020075  TSTMDS: .ASCII  <15><12>/L = LIST TESTS/<15><12>
4181  010252  044514  052123  052040
4182  010260  051505  051524  005015
4183  010266  020103  020075  044103          .ASCII  /C = CHANGE TESTS/<15><12>
4184  010274  047101  042507  052040
4185  010302  051505  051524  005015
4186  010310  020111  020075  047111          .ASCIZ  /I = INPUT PARAMS, RUN TESTS/<15><12>
4187  010316  052520  020124  040520
4188  010324  040522  051515  020054
4189  010332  052522  020116  042524
4190  010340  052123  006523  000012
4191  010346  005015  047105  042524  ENTLCI: .ASCIZ  <15><12>/ENTER L,C, OR I/<15><12>/* /
4192  010354  020122  026114  026103
4193  010362  047440  020122  006511
4194  010370  025012  000040
4195  010374  047524  042040  043105  DFTEST: .ASCIZ  /TO DEFAULT TESTS TYPE D <CR>, ELSE <CR>/<15><12>/* /
4196  010402  052501  052114  052040
4197  010410  051505  051524  052040
4198  010416  050131  020105  020104
4199  010424  041474  037122  020054
4200  010432  046105  042523  036040
4201  010440  051103  006476  025012
4202  010446  000040
4203  010450  005015  042524  052123  TLSTHD: .ASCIZ  <15><12>/TEST      ITERATIONS/<15><12>
4204  010456  020040  020040  044440
4205  010464  042524  040522  044524
4206  010472  047117  006523  000012
4207  010500  005015  020124  020075  EXPLAN: .ASCII  <15><12>/T = TYPE PARAM LIST/<15><12>
4208  010506  054524  042520  050040
4209  010514  051101  046501  046040
4210  010522  051511  006524     012
4211  010527     117  036440  047440          .ASCII  /O = OPEN PARAM LIST/<15><12>
4212  010534  042520  020116  040520
4213  010542  040522  020115  044514
4214  010550  052123  005015
4215  010554  020123  020075  042523          .ASCII  /S = SET INDIVIDUAL PARAM/<15><12>
4216  010562  020124  047111  044504
4217  010570  044526  052504  046101
```

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4218  010576  050040  051101  046501
4219  010604  005015
4220  010606  020122  020075  052522          .ASCIZ  /R = RUN TESTS/<15><12>
4221  010614  020116  042524  052123
4222  010622  006523  000012
4223  010626  005015  047105  042524  PARMDE: .ASCIZ  <15><12>/ENTER T,0,S, OR R/<15><12>
4224  010634  020122  026124  026117
4225  010642  026123  047440  020122
4226  010650  006522  000012
4227  010654  005015  020052  052504  DUACES: .ASCIZ  <15><12>/* DUAL-PORT DATA TEST */<15><12>
4228  010662  046101  050055  051117
4229  010670  020124  040504  040524
4230  010676  052040  051505  020124
4231  010704  006452  000012
4232  010710  040515  020130  047527  MAWRDC: .ASCIZ  /MAX WORD CT = /
4233  010716  042122  041440  020124
4234  010724  020075     000
4235  010727     052  020052  051440  SECNL1: .ASCII  /**  S0>S1/
4236  010734  037060  030523
4237  010740  047040  052117  040440  NOTALD: .ASCIZ  / NOT ALLOWED/<15><12>
4238  010746  046114  053517  042105
4239  010754  005015     000
4240  010757     052  020052  051440  SECNL2: .ASCIZ  /**  S2>S3/
4241  010764  037062  031523     000
4242  010771     052  020052  043040  TRKNLW: .ASCIZ  /**  FT>LT/
4243  010776  037124  052114     000
4244  011003     052  020052  053440  WC2BIG: .ASCIZ  /**  WC OR MA TOO LARGE/<15><12>
4245  011010  020103  051117  046440
4246  011016  020101  047524  020117
4247  011024  040514  043522  006505
4248  011032  000012
4249  011034  047524  042040  043105  DFQUES: .ASCIZ  /TO DEFAULT ALL PARAMS, TYPE D <CR>, ELSE <CR>/<15><12>/* /
4250  011042  052501  052114  040440
4251  011050  046114  050040  051101
4252  011056  046501  026123  052040
4253  011064  050131  020105  020104
4254  011072  041474  037122  020054
4255  011100  046105  042523  036040
4256  011106  051103  006476  025012
4257  011114  000040
4258  011116  005015  051525  051105  PFIFTN: .ASCIZ  <15><12>/USER-DEF PATT 15 :/<15><12>
4259  011124  042055  043105  050040
4260  011132  052101  020124  032461
4261  011140  035040  005015     000
4262  011145     015  046412  042117  SELP15: .ASCIZ  <15><12>/MOD PATT 15 :/<15><12>
4263  011152  050040  052101  020124
4264  011160  032461  035040  005015
4265  011166     000
4266  011167     124  020117  047515  MDFY15: .ASCIZ  /TO MOD PATT 15, TYPE M <CR>, ELSE <CR>/<15><12>/* /
4267  011174  020104  040520  052124
4268  011202  030440  026065  052040
4269  011210  050131  020105  020115
4270  011216  041474  037122  020054
4271  011224  046105  042523  036040
4272  011232  051103  006476  025012
4273  011240  000040
```

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4274  011242  005015  047105  042524  ENTPAS: .ASCIZ  <15><12>/ENTER NO. OF PASSES (1-77777) :/<15><12>/* /
4275  011250  020122  047516  020056
4276  011256  043117  050040  051501
4277  011264  042523  020123  030450
4278  011272  033455  033467  033467
4279  011300  020051  006472  025012
4280  011306  000040
4281  011310  005015  025052  020040  DROPDR: .ASCIZ  <15><12>/**  DROPPING DRV - 20 ERRORS/<15><12>
4282  011316  051104  050117  044520
4283  011324  043116  042040  053122
4284  011332  026440  031040  020060
4285  011340  051105  047522  051522
4286  011346  005015     000
4287  011351     015  005012  042524  TSTDRN: .ASCII  <15><12><12>/TESTING DRV /
4288  011356  052123  047111  020107
4289  011364  051104  020126
4290  011370  006440  000012          DRVNO:  .ASCIZ  / /<15><12>
4291  011374  051104  020126     000  DRIV:   .ASCIZ  /DRV /
4292  011401     103  051101  027124  CART:   .ASCIZ  /CART. /
4293  011406  000040
4294  011410  042523  027122  047040  SERNM:  .ASCIZ  /SER. NO.  /
4295  011416  027117  020040     000
4296  011423     015  043012  041501  FACTBS: .ASCIZ  <15><12>/FACTORY /
4297  011430  047524  054522  000040
4298  011436  051412  043117  053524  SOFTBS: .ASCII  <12>/SOFTWARE /
4299  011444  051101  020105
4300  011450  040502  020104  042523  BDSECT: .ASCIZ  /BAD SECTORS :/<15><12>
4301  011456  052103  051117  020123
4302  011464  006472  000012
4303  011470  020040  047516  042516  NOFALS: .ASCIZ  /  NONE/
4304  011476     000
4305
4306                                  ;MESSAGES USED IN TIMING TESTS
4307  011477     052  020052  047040  NOCLKS: .ASCII  /**  NO CLOCK/
4308  011504  020117  046103  041517
4309  011512     113
4310  011513     040  020055  052040  TIMSKP: .ASCIZ  / -  TIMING TESTS WILL BE SKIPPED/<15><12>
4311  011520  046511  047111  020107
4312  011526  042524  052123  020123
4313  011534  044527  046114  041040
4314  011542  020105  045523  050111
4315  011550  042520  006504  000012
4316  011556  025052  020040  053513  CLKFAL: .ASCIZ  /**  KW11 FAILURE/
4317  011564  030461  043040  044501
4318  011572  052514  042522     000
4319  011577     015  051012  052117  ROTIMS: .ASCIZ  <15><12>/ROT TIMES :/<15><12>
4320  011604  052040  046511  051505
4321  011612  035040  005015     000
4322  011617     015  040412  043526  AVGSEK: .ASCIZ  <15><12>/AVG SEEK TIMES :/<15><12>
4323  011624  051440  042505  020113
4324  011632  044524  042515  020123
4325  011640  006472  000012
4326  011644  005015  047117  020105  ONECYL: .ASCIZ  <15><12>/ONE CYL SEEK TIMES :/<15><12>
4327  011652  054503  020114  042523
4328  011660  045505  052040  046511
4329  011666  051505  035040  005015
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4330  011674     000
4331  011675     015  046412  054101  MAXSEK: .ASCIZ  <15><12>/MAX SEEK TIMES :/<15><12>
4332  011702  051440  042505  020113
4333  011710  044524  042515  020123
4334  011716  006472  000012
4335  011722  025052  053506  020104  FORWRD: .ASCIZ  /**FWD DIR**/<15><12>
4336  011730  044504  025122  006452
4337  011736  000012
4338  011740  025052  042523  020126  REVRSE: .ASCIZ  /**REV DIR**/<15><12>
4339  011746  044504  025122  006452
4340  011754  000012
4341  011756  044515  020116  020075  MINEQ:  .ASCIZ  /MIN = /
4342  011764     000
4343  011765     115  054101  036440  MAXEQ:  .ASCIZ  /MAX = /
4344  011772  000040
4345  011774  053101  020107  020075  AVGEQ:  .ASCIZ  /AVG = /
4346  012002     000
4347  012003     040  051525     000  MICROS: .ASCIZ  / US/
4348  012007     040  043117  030440  BELOW:  .ASCIZ  / OF 128 BELOW SPEC'D MIN OF /
4349  012014  034062  041040  046105
4350  012022  053517  051440  042520
4351  012030  023503  020104  044515
4352  012036  020116  043117  000040
4353  012044  047440  020106  031061  ABOVE:  .ASCIZ  / OF 128 ABOVE SPEC'D MAX OF /
4354  012052  020070  041101  053117
4355  012060  020105  050123  041505
4356  012066  042047  046440  054101
4357  012074  047440  020106     000
4358  012101     040  043117  032040  ABOVE1: .ASCII  / OF 410 (814 FOR RK07) ABOVE SPEC'D MAX OF 8000 US/
4359  012106  030061  024040  030470
4360  012114  020064  047506  020122
4361  012122  045522  033460  020051
4362  012130  041101  053117  020105
4363  012136  050123  041505  042047
4364  012144  046440  054101  047440
4365  012152  020106  030070  030060
4366  012160  052440     123
4367  012163     050  032466  030060          .ASCIZ  /(6500-RK07)/<CR><LF>
4368  012170  051055  030113  024467
4369  012176  005015     000
4370  012201     040  043117  030440  ABOVE3: .ASCII  / OF 128 ABOVE SPEC'D MAX OF 75000 US/
4371  012206  034062  040440  047502
4372  012214  042526  051440  042520
4373  012222  023503  020104  040515
4374  012230  020130  043117  033440
4375  012236  030065  030060  052440
4376  012244     123
4377  012245     050  030467  030060          .ASCIZ  /(71000-RK07)/<CR><LF>
4378  012252  026460  045522  033460
4379  012260  006451  000012
4380  012264  020040  051440  042520  SPCDMX: .ASCIZ  /   SPEC'D MAX IS 38000(36500-RK07) US/<15><12>
4381  012272  023503  020104  040515
4382  012300  020130  051511  031440
4383  012306  030070  030060  031450
4384  012314  032466  030060  051055
4385  012322  030113  024467  052440
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4386  012330  006523  000012
4387  012334  032062  033463  020065  LIM1:   .ASCIZ  /24375 US/<15><12>
4388  012342  051525  005015     000
4389  012347     062  033065  032462  LIM2:   .ASCIZ  /25625 US/<15><12>
4390  012354  052440  006523  000012
4391
4392  012362  025052  020040  040503  BAD632: .ASCIZ  /**  CANNOT READ BAD SECTOR TRACK!/<15><12>
4393  012370  047116  052117  051040
4394  012376  040505  020104  040502
4395  012404  020104  042523  052103
4396  012412  051117  052040  040522
4397  012420  045503  006441  000012
4398  012426  041536  005015     000  CNTRLC: .ASCIZ  /↑C/<15><12>
4399  012433     136  006532  000012  CNTRLZ: .ASCIZ  /↑Z/<15><12>
4400  012440  051136  005015     000  CNTRLR: .ASCIZ  /↑R/<15><12>
4401  012445     136  006525  000012  CNTRLU: .ASCIZ  /↑U/<15><12>
4402  012452  043536  005015     000  CNTRLG: .ASCIZ  /↑G/<15><12>
4403  012457     015  005012     000  CR2LF:  .ASCIZ  <15><12><12>
4404  012463     134     000          BKSLSH: .ASCIZ  /\/
4405  012465     054     000          COMMA:  .ASCIZ  /,/
4406  012467     040     040          SPACE6: .ASCII  /  /
4407  012471     040                  SPACE4: .ASCII  / /
4408  012472     040                  SPACE3: .ASCII  / /
4409  012473     040                  SPACE2: .ASCII  / /
4410  012474  000040                  SPACE1: .ASCIZ  / /
4411                                       .EVEN
4412  012476  020040  000075          PRMBUF: .ASCIZ  /  =/
4413  012502  047527  042122  000040  WORDSP: .ASCIZ  /WORD /
4414  012510  036440  000040          EQUALS: .ASCIZ  / = /
4415  012514  020052     000          PROMPT: .ASCIZ  /* /
4416  012517     076  000040          PRMPSP: .ASCIZ  /> /
4417
4418                                       .EVEN
4419
4420
4421
4422
4423  012522  105037  003116  DFSTRT: CLRB    MDFLAG          ;SET FLAG FOR DEFAULT MODE
4424  012526  105037  003136          CLRB    DULACS          ;CLEAR DUAL-ACCESS FLAG
4425  012532  105037  003126          CLRB    ERRCNT          ;CLEAR ERROR COUNT FOR RESTARTS
4426  012536  022737  013732  000042  CMP     #DRVTST,@#42    ;SEE IF EOP RETURN ADRS = DRVTST
4427  012544  001003                  BNE     4$              ;BR IF NOT DRVTST
4428  012546  012737  017014  000042  MOV     #NEWPAS,@#42    ;SET RETURN ADRS = NEWPAS
4429  012554  000414          4$:     BR      CMSTRT          ;PROCEED
4430
4431  012556  112737  000001  003136  DASTRT: MOVB    #1,DULACS       ;SET FLAG FOR DUAL-ACCESS DATA TEST
4432  012564  112737  000001  003116          MOVB    #1,MDFLAG       ;SET FLAG FOR PARAMETER MODE
4433  012572  000405                  BR      CMSTRT          ;PROCEED
4434
4435  012574  112737  000001  003116  PSTART: MOVB    #1,MDFLAG       ;SET FLAG FOR PARAMETER MODE
4436  012602  105037  003136          CLRB    DULACS          ;CLEAR DUAL-ACCESS TEST FLAG
4437
4438  012606  012737  000340  177776  CMSTRT: MOV     #PR7,@#PS       ;BLOCK ALL INTERRUPTS
4439                          .SBTTL  INITIALIZE THE COMMON TAGS
4440                          ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
4441  012614  012706  001100          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
```

```
4447  012620  005026                        CLR     (R6)+           ;;CLEAR MEMORY LOCATION
4448  012622  022706  001140                CMP     #SWR,R6 ;;DONE?
4449  012626  001374                        BNE     .-6             ;;LOOP BACK IF NO
4450  012630  012706  001100                MOV     #STACK,SP       ;;SETUP THE STACK POINTER
4451                          ;;INITIALIZE A FEW VECTORS
4452  012634  012737  055154  000020        MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
4453  012642  012737  000340  000022        MOV     #340,@#IOTVEC+2 ;;LEVEL 7
4454  012650  012737  054450  000030        MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
4455  012656  012737  000340  000032        MOV     #340,@#EMTVEC+2 ;;LEVEL 7
4456  012664  012737  056262  000034        MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
4457  012672  012737  000340  000036        MOV     #340,@#TRAPVEC+2;LEVEL 7
4458  012700  012737  055020  000024        MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
4459  012706  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;LEVEL 7
4460  012714  013737  025502  025474        MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
4461  012722  005037  001304                CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
4462  012726  005037  001306                CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
4463  012732  112737  000001  001115        MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
4464  012740  012737  012740  001106        MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
4465  012746  012737  012746  001110        MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
4466                          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
4467                          ;;EQUAL TO A "-1"  SETUP FOR A SOFTWARE SWITCH REGISTER.
4468  012754  013746  000004                MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
4469  012760  012737  013014  000004        MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
4470  012766  012737  177570  001140        MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
4471  012774  012737  177570  001142        MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
4472  013002  022777  177777  166130        CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
4473  013010  001012                        BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
4474                                                                ;;AND  THE HARDWARE SWR IS NOT = -1
4475  013012  000403                        BR      65$             ;;BRANCH IF NO TIMEOUT
4476  013014  012716  013022        64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
4477  013020  000002                        RTI
4478  013022  012737  000176  001140  65$:  MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
4479  013030  012737  000174  001142        MOV     #DISPREG,DISPLAY
4480  013036  012637  000004        66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
4481
4482  013042  005037  001326                CLR     $PASS           ;;CLEAR PASS COUNT
4483  013046  132737  000200  001341        BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
4484  013054  001403                        BEQ     67$             ;;YES,USE NON-APT SWITCH
4485  013056  012737  001342  001140        MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
4486  013064                        67$:
4487  013064  000005                        RESET                   ;CLEAR THE UNIBUS
4488  013066  012737  000006  000004        MOV     #6,@#ERRVEC     ;SET TIME-OUT VECTOR
4489  013074  005037  000006                CLR     @#ERRVEC+2
4490  013100  112737  000144  001115        MOVB    #100.,$ERMAX    ;SET MAX ERROR CNT TO 100 FOR $SCOPE
4491  013106  105037  003130                CLRB    DRVERS          ;CLEAR ERROR COUNT FOR CURRENT DRIVE
4492  013112  112737  000001  003146        MOVB    #1,HLPOVL       ;SET HLP FILE OVLD INDICTR
4493  013120  104401  007226                TYPE    ,DZR6M          ;TYPE PROGRAM I.D. FOR PART 1
4494  013124  104401  007321                TYPE    ,SUBVER
4495  013130  104401  007403                TYPE    ,PART1
4496  013134  105737  003147                TSTB    NOTYPE          ;SEE IF OPERATOR NOTE SHOULD BE TYPED
4497  013140  001004                        BNE     39$             ;BR IF NOT
4498  013142  104401  063554                TYPE    ,NOTMSG         ;TYPE OPERATOR NOTE
4499  013146  105237  003147                INCB    NOTYPE          ;SET FLAG FOR NEXT TIME
4500  013152  105737  003136        39$:    TSTB    DULACS          ;SEE IF DUAL-ACCESS DATA TEST
4501  013156  001402                        BEQ     40$             ;BR IF NOT
4502  013160  104401  010654                TYPE    ,DUACES         ;TYPE "* DUAL-ACCESS DATA TEST *"
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4498  013164  012737  025700  000060  40$:    MOV     #KBDHDL,@#TKVEC ;LOAD VECTOR FOR TTY KBD
4499  013172  012737  000200  000062          MOV     #PR4,@#TKVEC+2  ;SET KBD PRIORITY = 4
4500  013200  013701  003040                  MOV     RKVEC,R1        ;ADDR. OF RK06 VECTOR STORAGE
4501  013204  012721  045270                  MOV     #I.INTR,(R1)+   ;SET IT TO RK06 HANDLER
4502  013210  013711  003042                  MOV     RKPRI,(R1)      ;SET RK06 PRIORITY
4503  013214  012737  026510  000250          MOV     #KTERHD,@#MMVEC ;VECT FOR KT11 FAILURE
4504  013222  012737  000340  000252          MOV     #PR7,@#MMVEC+2  ;SET PRIOR. = 7 FOR HNDLER
4505  013230  105037  003120                  CLRB    TSTING          ;CLEAR "RUNNING TESTS" FLAG
4506  013234  012737  000000  177776          MOV     #PR0,@#PS       ;ALLOW ALL INTERRUPTS AGAIN
4507  013242  012701  005232                  MOV     #PRVCMD,R1      ;ZERO OUT PREVIOUS COMMAND
4508  013246  012700  000006                  MOV     #6,R0           ;SET COUNTER
4509  013252  005021                  42$:    CLR     (R1)+           ;ZERO A WORD
4510  013254  005300                          DEC     R0
4511  013256  001375                          BNE     42$             ;BR IF NOT DONE YET
4512  013260  005037  005512                  CLR     STALLS          ;DON'T ALLOW STALLS YET
4513  013264  023727  000042  017014          CMP     @#42,#NEWPAS    ;SEE IF CHAIN MODE
4514  013272  101002                          BHI     44$             ;BR IF YES
4515  013274  004737  026370                  JSR     PC,GTSWRG       ;OPEN SOFTWARE SWR FOR MODIFICATION
4516  013300  012737  176543  052716  44$:    MOV     #176543,$HINUM  ;INIT. PSEUDO-RANDOM NOS.
4517  013306  012737  123456  052720          MOV     #123456,$LONUM
4518                          ;CHECK FOR PRESENCE OF KW11-L OR P CLOCK, AND SET FLAGS
4519  013314  105037  003132                  CLRB    PCLKF           ;INIT. P CLOCK FLAG
4520  013320  105037  003133                  CLRB    DOTIM           ;INIT. TIMING TESTS FLAG
4521  013324  012737  013364  000004          MOV     #6$,@#4         ;SET TIME-OUT ERROR VECTOR
4522  013332  005777  167614                  TST     @PKS            ;SEE IF P-CLOCK IS PRESENT
4523  013336  105237  003132                  INCB    PCLKF           ;PRESENT, SET FLAG
4524  013342  013700  003162                  MOV     PCVEC,R0        ;LOAD KW11-P VECTOR ADDRESS
4525  013346  012720  032664          4$:     MOV     #CLOCK,(R0)+    ;ADDR OF CLOCK SERVICE ROUTINE
4526  013352  012710  000340                  MOV     #PR7,(R0)       ;SET CLOCK HANDLER PRIORITY = 7
4527  013356  105237  003133                  INCB    DOTIM           ;SET FLAG TO ALLOW TIMING TESTS
4528  013362  000414                          BR      8$              ;BR TO CONTINUE
4529  013364  022626                  6$:     CMP     (SP)+,(SP)+     ;P-CLK NOT THERE, RESET THE STACK
4530  013366  012737  013406  000004          MOV     #7$,@#4         ;SET TIME-OUT ERROR VECTOR
4531  013374  005777  167550                  TST     @LKS            ;SEE IF L-CLK PRESENT
4532  013400  013700  003160                  MOV     LCVEC,R0        ;LOAD KW11-L VECTOR ADDRESS
4533  013404  000760                          BR      4$              ;BR TO SET UP L-CLK VECTOR
4534  013406  022626                  7$:     CMP     (SP)+,(SP)+     ;L-CLK NOT THERE, RESET THE STACK
4535  013410  104401  011477                  TYPE    ,NOCLKS         ;SAY TIMING TESTS WON'T BE RUN
4536  013414  012737  000006  000004  8$:     MOV     #6,@#4          ;SET TIME-OUT VECTOR TO LOCATION 6
4537  013422  004737  026072                  JSR     PC,SIZMEM       ;SIZE MEMORY, FIX MA LIMIT IN PRMLIM
4538  013426  105737  003135                  TSTB    XDPSVD          ;SEE IF XXDP PREVIOUSLY SAVED
4539  013432  001404                          BEQ     9$              ;BR IF NOT
4540  013434  004737  027262                  JSR     PC,GETXDP       ;RESTORE SAVED XXDP
4541  013440  105037  003135                  CLRB    XDPSVD          ;CLEAR THE FLAG
4542  013444                          9$:
4543  013444  122737  000013  000041          CMPB    #13,@#41        ;LOAD FROM XXDP ?
4544  013452  001003                          BNE     99$             ;BRANCH IF NOT
4545  013454  104401  007240                  TYPE    ,XXDPMG
4546  013460  000000                          HALT
4547  013462                          99$:
4548  013462  105737  003116                  TSTB    MDFLAG          ;SEE IF DEFAULT MODE
4549  013466  001031                          BNE     10$             ;BR IF NOT DEFAULT MODE
4550  013470  013700  001370                  MOV     $VECT1,R0       ;GET APT RK06 VECTOR AND PRTY
4551  013474  013737  001374  003036          MOV     $BASE,RKBAS     ;GET APT RK06 BASE ADDRESS
4552  013502  132737  000200  001341          BITB    #BIT7,$ENVM     ;SEE IF NO SIZING
4553  013510  001005                          BNE     18$             ;BR IF NO SIZING
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4554  013512  012700  120210            MOV     #AVECT1,R0          ;GET DEFAULT VECTOR AND PRIORITY
4555  013516  012737  177440  003036    MOV     #ABASE,RKBAS        ;GET DEFAULT BASE ADDRESS
4556  013524  110037  003040      18$:  MOVB    R0,RKVEC            ;STORE VECTOR
4557  013530  105037  003041            CLRB    RKVEC+1             ;CLEAR HI BYTE
4558  013534  000300                    SWAB    R0                  ;GET PRTY INTO BITS 5-7
4559  013536  042700  177437            BIC     #177437,R0          ;CLEAR OTHER BITS
4560  013542  010037  003042            MOV     R0,RKPRI            ;STORE RK06 PRIORITY
4561  013546  000137  014444            JMP     ALLDRV              ;GO CHECK ALL DRIVES
4562
4563
4564
4565                              ;BEGIN PARAMETER INPUT MODE
4566  013552  104401  007500      10$:  TYPE    ,PRMINP             ;TYPE "PARAMETER INPUT MODE"
4567
4568                              ;OPEN RK06 UNIBUS ADDRESS FOR MODIFICATION
4569  013556  013746  003036            MOV     RKBAS,-(SP)         ;PUT OLD VALUE ON STACK
4570  013562  104401  007526            TYPE    ,RKBADR             ;TYPE "RK06 BUS ADR = "
4571  013566  004737  026260            JSR     PC,GETPRM           ;TYPE OLD, GET NEW RKBAS VALUE
4572  013572  012637  003036            MOV     (SP)+,RKBAS         ;STORE NEW VALUE
4573                              ;OPEN RK06 VECTOR ADDRESS FOR MODIFICATION
4574  013576  013746  003040            MOV     RKVEC,-(SP)         ;PUT OLD VALUE ON STACK
4575  013602  104401  007551            TYPE    ,RKVADR             ;TYPE "RK06 VEC ADR = "
4576  013606  004737  026260            JSR     PC,GETPRM           ;TYPE OLD, GET NEW RKVEC VALUE
4577  013612  012637  003040            MOV     (SP)+,RKVEC         ;STORE NEW VALUE
4578                              ;OPEN RK06 INTERRUPT HANDLER PRIORITY LEVEL FOR MODIFICATION
4579  013616  013746  003042      11$:  MOV     RKPRI,-(SP)         ;GET OLD VALUE OF PRIORITY
4580  013622  006316                    ASL     (SP)                ;GET IT INTO BITS 0-2
4581  013624  006316                    ASL     (SP)
4582  013626  006316                    ASL     (SP)
4583  013630  000316                    SWAB    (SP)
4584  013632  104401  007574            TYPE    ,RKPRTY             ;TYPE   "RK06 PRIORITY = "
4585  013636  004737  026260            JSR     PC,GETPRM           ;TYPE OLD, GET NEW RKPRI VALUE
4586  013642  012600                    MOV     (SP)+,R0
4587  013644  020027  000004            CMP     R0,#4               ;SEE IF AT LEAST LEVEL 4
4588  013650  002414                    BLT     12$                 ;BR IF NEW VALUE TOO SMALL
4589  013652  020027  000007            CMP     R0,#7               ;SEE IF LEVEL 7 OR LESS
4590  013656  003011                    BGT     12$                 ;BR IF NEW VALUE TOO LARGE
4591  013660  000300                    SWAB    R0                  ;GET PRIORITY INTO BITS 5-7
4592  013662  006200                    ASR     R0
4593  013664  006200                    ASR     R0
4594  013666  006200                    ASR     R0
4595  013670  010037  003042            MOV     R0,RKPRI            ;STORE NEW VALUE
4596  013674  104401  001315            TYPE    ,$CRLF
4597  013700  000405                    BR      16$
4598  013702  104401  005272      12$:  TYPE    ,BUFFO              ;ECHO BAD INPUT
4599  013706  104401  001314            TYPE    ,$QUES
4600  013712  000741                    BR      11$                 ;GO ASK AGAIN
4601
4602  013714  105037  003126      16$:  CLRB    ERRCNT              ;CLEAR ERROR CNT FOR RESTARTS
4603  013720  012737  013732  000042    MOV     #DRVTST,@#42        ;SET UP DUMP MODE RETURN FROM $EOP
4604                                                                ;     UPON COMPLETION OF REQUESTED PASSES
4605  013726  000137  014522            JMP     CHKLST              ;GO CHECK STATUS OF MARKED DRIVES
4606
4607
4608
4609                              ;;*****************************************************************
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                                        .SBTTL  TO - DESIRED DRIVE INPUT ROUTINE
                                        ;*THIS ROUTINE TYPES THE CURRENT LIST OF DRIVES TO TEST,
                                        ;*WITH DRIVE NUMBERS SEPARATED BY COMMAS. THEN, A NEW
                                        ;*CHOICE OF DRIVES IS REQUESTED BY TTY INPUT, AND THESE
                                        ;*DRIVES ARE CHECKED FOR VALIDITY AND PROPER STATUS,
                                        ;*AND IF THEY ARE VALID, THEY ARE LOADED INTO THE DRIVE
                                        ;*LIST (DRVLST).
                                        ;;*****************************************************************
013732                                  DRVTST:
013732  012706  001100                          MOV     #STACK,SP       ;RESET THE STACK
013736  005037  005512                          CLR     STALLS          ;INHIBIT STALL BETWEEN OPERATIONS
013742  104401  010163                          TYPE    ,ALDRVS         ;ASK IF ALL DRIVES DESIRED
013746  004737  030624                          JSR     PC,RDCHRS       ;READ RESPONSE
013752  013732                                  DRVTST                  ;(↑C) RETURN ADDRESS
013754  013732                                  DRVTST                  ;(↑Z) RETURN ADDRESS
013756  013732                                  DRVTST                  ;(↑U) OR ERROR RETURN ADDRESS
013760  005700                          TST     R0                      ;SEE IF NULL INPUT
013762  001413                          BEQ     TELDRV                  ;BR IF NULL INPUT
013764  022737  000101  005272          CMP     #'A,BUFFO               ;SEE IF ALL DRIVES REQUESTED
013772  001002                          BNE     4$                      ;BR IF NOT ALL DRIVES
013774  000137  014444                  JMP     ALLDRV                  ;CHECK ALL DRIVES
014000  104401  005272          4$:     TYPE    ,BUFFO                  ;ECHO BAD INPUT
014004  104401  001314                  TYPE    ,$QUES                  ;TYPE <?> AND <CR>,<LF>
014010  000750                          BR      DRVTST                  ;GO ASK AGAIN
                                        ;TYPE CURRENT DRIVE LIST
014012  104401  007634          TELDRV: TYPE    ,DRVSEQ                 ;TYPE "DRIVE(S) = "
014016  005001                          CLR     R1                      ;INITIALIZE DRIVE NUMBER
014020  005000                          CLR     R0                      ;INIT. COUNT OF LISTED DRIVES
014022  012703  000001                  MOV     #BIT0,R3                ;INIT BIT POINTER
014026  105761  005606          4$:     TSTB    DRVLST(R1)              ;SEE IF THIS DRIVE IS LISTED
014032  001414                          BEQ     8$                      ;BR IF DRIVE NOT LISTED
014034  005700                          TST     R0                      ;SEE IF FIRST TIME HERE
014036  001402                          BEQ     6$                      ;BR IF FIRST TIME HERE
014040  104401  012465                  TYPE    ,COMMA                  ;TYPE A COMMA
014044  010137  005542          6$:     MOV     R1,SCRACH               ;USE SCRACH FOR BUFFER
014050  052737  000060  005542          BIS     #'0,SCRACH              ;CONVERT DRIVE NO. TO ASCII
014056  104401  005542                  TYPE    ,SCRACH                 ;TYPE DRIVE NO.
014062  005200                          INC     R0                      ;INCREMENT NO. OF LISTED DRIVES
014064  005201                  8$:     INC     R1                      ;INCREMENT DRIVE NO.
014066  006303                          ASL     R3                      ;SHIFT BIT POINTER
014070  022701  000010                  CMP     #10,R1                  ;SEE IF DONE YET
014074  001354                          BNE     4$                      ;BR IF NOT DONE
014076  005700                          TST     R0                      ;SEE IF ANY DRIVES WERE LISTED
014100  001016                          BNE     26$                     ;BR IF YES
014102  104401  011470                  TYPE    ,NOFALS                 ;TYPE "  NONE"
014106  104401  010042                  TYPE    ,NODRTS                 ;TYPE "** NO DRIVES TO TEST"
                                        ;                               "PRESS 'CONT' WHEN RDY"
014112  012703  000401                  MOV     #401,R3                 ;PATTERN TO MARK DRIVES
014116  012701  005606                  MOV     #DRVLST,R1              ;DRIVE LIST ADDRESS
014122  010321                          MOV     R3,(R1)+                ;MARK ALL DRIVES IN LIST
014124  010321                          MOV     R3,(R1)+
014126  010321                          MOV     R3,(R1)+
014130  010311                          MOV     R3,(R1)
014132  000137  044134                  JMP     HLTPRG                  ;HALT PROGRAM
014136  104401  001315          26$:    TYPE    ,$CRLF                  ;TYPE <CR>,<LF>
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4666  014142  105737  003116              TSTB    MDFLAG          ;SEE IF DEFAULT MODE
4667  014146  001002                      BNE     20$             ;BR IF NOT DEFAULT MODE
4668  014150  000137  015062              JMP     LODFLS          ;GO LOAD DEFLT ITER. COUNTS
4669  014154  122737  000013  000041  20$:  CMPB  #13,@#41        ;SEE IF RK06 IS XXDP MEDIUM
4670  014162  001032                      BNE     19$             ;BR IF NOT
4671  014164  105737  005606              TSTB    DPVLST          ;SEE IF DRIVE 0 LISTED TO TEST
4672  014170  001427                      BEQ     19$             ;BR IF NOT
4673  014172  104401  007753          24$:  TYPE    ,REPLPK         ;TYPE "IF XXDP PACK ON DRV 0, TYPE Y <CR>
4674                                                              ;     AND REPLACE IT"
4675  014176  004737  030624              JSR     PC,RDCHRS       ;READ RESPONSE
4676  014202  014172                      24$                     ;(↑C) RETURN
4677  014204  014172                      24$                     ;(↑Z) RETURN
4678  014206  014172                      24$                     ;(↑U) RETURN
4679  014210  005700                      TST     R0              ;SEE IF NULL INPUT
4680  014212  001416                      BEQ     19$             ;BR IF JUST <CR> TYPED
4681  014214  022737  000131  005272      CMP     #'Y,BUFF0       ;SEE IF "Y <CR>" TYPED
4682  014222  001363                      BNE     24$             ;BR IF NOT, TO ASK AGAIN
4683  014224  104401  010071              TYPE    ,CNTRDY         ;TYPE "PRESS CONT WHEN DRV RDY"
4684  014230  042762  000100  000000      BIC     #IE,RKCS1(R2)   ;DISABLE RK06 INTERRUPT
4685  014236  000000                      HALT                    ;HALT FOR PACK CHANGE
4686  014240  004737  027522              JSR     PC,INITSS       ;INIT THE SUB-SYS
4687  014244  000137  014522              JMP     CHKLST          ;GO CHECK STATUS OF LISTED DRIVES
4688  014250  104401  012514          19$:  TYPE    ,PROMPT         ;TYPE ASTERISK AND SPACE
4689                                  ;READ AND CHECK NEW DRIVE NUMBERS
4690  014254  004737  030624              JSR     PC,RDCHRS       ;READ IN INPUT STRING
4691  014260  013732                      DRVTST                  ;(↑C) RETURN ADDRESS
4692  014262  013732                      DRVTST                  ;(↑Z) RETURN ADDRESS
4693  014264  014012                      TELDRV                  ;(↑U) OR ERROR RETURN ADDRESS
4694  014266  005700                      TST     R0              ;SEE IF NULL INPUT
4695  014270  001007                      BNE     9$              ;BR IF NEW DRIVES WILL BE SELECTED
4696  014272  105737  003136              TSTB    DULACS          ;SEE IF DUAL-ACCESS FLAG SET
4697  014276  001002                      BNE     22$             ;BR IF YES
4698  014300  000137  014574              JMP     ASKTST          ;JUMP TO THE TEST INPUT ROUTINE
4699  014304  000137  015340          22$:  JMP     INPUTP          ;GO ASK FOR INPUT PARAMETERS
4700  014310  022700  000017          9$:   CMP     #15.,R0         ;SEE IF TOO MANY CHARACTERS TYPED
4701  014314  002005                      BGE     12$             ;BR IF NOT TOO MANY
4702  014316  104401  005272          10$:  TYPE    ,BUFF0          ;ECHO BAD INPUT
4703  014322  104401  001314              TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
4704  014326  000631                      BR      TELDRV          ;GO TYPE DRIVES AND ASK AGAIN
4705  014330  005001                  12$:  CLR     R1              ;CLEAR CHAR. POINTER
4706  014332  126127  005272  000060  14$:  CMPB    BUFF0(R1),#'0   ;SEE IF DRIVE NO. < 0
4707  014340  002766                      BLT     10$             ;BR TO ECHO BAD INPUT
4708  014342  126127  005272  000067      CMPB    BUFF0(R1),#'7   ;SEE IF > 7
4709  014350  003362                      BGT     10$             ;BR TO ECHO BAD INPUT
4710  014352  005201                      INC     R1              ;INCREMENT CHAR POINTER
4711  014354  020100                      CMP     R1,R0           ;SEE IF MORE CHARS TO CHECK
4712  014356  001406                      BEQ     16$             ;BR IF ALL CHARS CHECKED
4713  014360  126127  005272  000054      CMPB    BUFF0(R1),#',   ;SEE IF THIS IS COMMA
4714  014366  001353                      BNE     10$             ;BR IF NOT COMMA
4715  014370  005201                      INC     R1              ;INCREMENT CHAR POINTER
4716  014372  000757                      BR      14$             ;BR TO CONTINUE CHECKING CHARS
4717                                  ;GET NEW DRIVE NUMBERS INTO LIST
4718  014374  012701  005606          16$:  MOV     #DRVLST,R1      ;GET DRIVE LIST ADDRESS
4719  014400  005021                      CLR     (R1)+           ;CLEAR OUT THE DRIVE LIST
4720  014402  005021                      CLR     (R1)+
4721  014404  005021                      CLR     (R1)+
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4722  014406  005011                          CLR     (R1)
4723  014410  005000                          CLR     R0                      ;CLEAR BUFFER POINTER
4724  014412  116001  005272          18$:    MOVB    BUFFO(R0),R1            ;GET A DRIVE NUMBER
4725  014416  042701  000060                  BIC     #'0,R1                  ;STRIP ASCII BITS
4726  014422  112761  000001  005606          MOVB    #1,DRVLST(R1)           ;MARK THIS DRIVE IN DRIVE LIST
4727  014430  062700  000002                  ADD     #2,R0                   ;POINT TO NEXT DRIVE NUMBER
4728  014434  105760  005271                  TSTB    BUFFO-1(R0)             ;SEE IF NULL CHAR YET
4729  014440  001364                          BNE     18$                     ;BR IF NOT DONE YET
4730  014442  000427                          BR      CHKLST                  ;GO CHECK NEW DRIVES FOR VALID STATUS
4731                                  ;COME HERE IF ALL DRIVES REQUESTED
4732  014444  005000                  ALLDRV: CLR     R0                      ;CLEAR DRIVE NUMBER
4733  014446  013703  001376                  MOV     $DEVM,R3                ;GET APT DEVICE MAP
4734  014452  132737  000200  001341          BITB    #BIT7,$ENVM             ;SEE IF NO SIZING
4735  014460  001002                          BNE     1$                      ;BR IF NO SIZING
4736  014462  012703  000377                  MOV     #377,R3                 ;SET UP FOR SIZING
4737  014466  012701  000001          1$:     MOV     #BIT0,R1                ;SET BIT POINTER
4738  014472  105060  005606          2$:     CLRB    DRVLST(R0)              ;INITIALIZE DRIVE ENTRY
4739  014476  030103                          BIT     R1,R3                   ;SEE IF THIS DRIVE IS REQUESTED
4740  014500  001403                          BEQ     4$                      ;BR IF NOT
4741  014502  112760  000001  005606          MOVB    #1,DRVLST(R0)           ;MARK THIS DRIVE IN DRIVE LIST
4742  014510  006301                  4$:     ASL     R1                      ;SHIFT BIT POINTER
4743  014512  005200                          INC     R0                      ;INCREMENT DRIVE NUMBER
4744  014514  022700  000010                  CMP     #10,R0                  ;SEE IF DONE MARKING ALL DRIVES
4745  014520  001364                          BNE     2$                      ;BR IF NOT DONE YET
4746                                  ;CHECK ALL DRIVES MARKED IN DRIVE LIST FOR PROPER STATUS
4747  014522  005000                  CHKLST: CLR     R0                      ;CLEAR DRIVE NUMBER
4748  014524  105760  005606          2$:     TSTB    DRVLST(R0)              ;SEE IF THIS DRIVE IS MARKED IN LIST
4749  014530  001410                          BEQ     4$                      ;BR IF NOT MARKED
4750  014532  010037  005510                  MOV     R0,DRIVE                ;SET DRIVE NUMBER FOR SCNDRV
4751  014536  004737  027650                  JSR     PC,SCNDRV               ;CHECK STATUS OF THIS DRIVE
4752                                                                          ;IF NOT VALID, TYPE MESSAGE
4753                                                                          ;   AND REMOVE IT FROM DRIVE LIST
4754  014542  014566                  6$                                      ;ERROR RETURN ADDRESS FOR SCNDRV
4755  014544  113760  003124  005616          MOVB    TYPFMT,DTYLST(R0)       ;SET DRV TYPE. 0=RK06, 4=RK07
4756  014552  005200                  4$:     INC     R0                      ;RETURN HERE IF DRIVE IS USEABLE
4757  014554  022700  000010                  CMP     #10,R0                  ;SEE IF DONE CHECKING LIST
4758  014560  001361                          BNE     2$                      ;BR IF NOT DONE YET
4759  014562  000137  014012                  JMP     TELDRV                  ;GO BACK TO LIST SELECTED DRIVES
4760  014566  105060  005606          6$:     CLRB    DRVLST(R0)              ;REMOVE INVALID DRIVE FROM LIST
4761  014572  000767                          BR      4$                      ;CONTINUE CHECKING THE LIST
4762
4763
4764                                  ;*****************************************************************
4765                                  .SBTTL  TO - DESIRED TEST INPUT ROUTINE
4766                                  ;*THIS ROUTINE ALLOWS INPUT OF DESIRED TESTS AND ITERATION
4767                                  ;*COUNT FOR EACH TEST. THE INPUT IS CHECKED FOR VALIDITY,
4768                                  ;*AND IF VALID, THE ITERATION COUNTS ARE LOADED INTO THE
4769                                  ;*TEST LIST (TSTLST). AN ITERATION VALUE OF 0 INDICATES
4770                                  ;*THAT THE TEST IS NOT TO BE RUN.
4771                                  ;*THIS ROUTINE REQUESTS "ENTER L,C, OR I". TYPING (L)
4772                                  ;*CAUSES THE CURRENT LIST OF TESTS AND ITERATIONS TO BE
4773                                  ;*TYPED, (C) ALLOWS TESTS AND ITERATIONS TO BE CHANGED,
4774                                  ;*AND (I) ALLOWS THE OPERATOR TO PROCEED WITH SELECTION
4775                                  ;*OF OPERATING PARAMETERS, AND RUN TESTS.
4776                                  ;*TYPING (↑C) CAUSES IMMEDIATE RETURN TO DRVTST. TYPING
4777                                  ;* (↑Z) CAUSES RETURN TO ASKTMD.
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                                        ;;*****************************************************************
                                        ;DETERMINE L,C, OR I MODE
014574  104401  010244       ASKTST:  TYPE    ,TSTMDS          ;ASK FOR TEST INPUT MODE
014600  104401  010346       ASKTMD:  TYPE    ,ENTLCI          ;TYPE "ENTER L,C, OR I"
014604  004737  030624                JSR     PC,RDCHRS        ;READ RESPONSE
014610  013732                        DRVTST                   ;(↑C) RETURN ADDRESS
014612  014600                        ASKTMD                   ;(↑Z) RETURN ADDRESS
014614  014600                        ASKTMD                   ;(↑U) OR ERROR RETURN ADDRESS
014616  005700                        TST     R0               ;SEE IF ANY INPUT
014620  001005                        BNE     4$               ;BR IF ANY INPUT
014622  104401  005272       2$:      TYPE    ,BUFFO           ;ECHO BAD INPUT
014626  104401  001314                TYPE    ,$QUES           ;TYPE <?> AND <CR>,<LF>
014632  000762                        BR      ASKTMD           ;GO ASK AGAIN
014634  022737  000114  005272  4$:   CMP     #'L,BUFFO        ;SEE IF (L) TYPED
014642  001002                        BNE     6$               ;BR IF NOT (L)
014644  000137  014700                JMP     LSTTST           ;JUMP TO LIST TESTS
014650  022737  000103  005272  6$:   CMP     #'C,BUFFO        ;SEE IF (C) TYPED
014656  001002                        BNE     8$               ;BR IF NOT (C)
014660  000137  015016                JMP     CHGTST           ;JUMP TO CHANGE TESTS
014664  022737  000111  005272  8$:   CMP     #'I,BUFFO        ;SEE IF (I) TYPED
014672  001353                        BNE     2$               ;BR IF NOT (I), TO ECHO BAD INPUT
014674  000137  015340                JMP     INPUTP           ;GO INPUT PARAMS AND RUN TESTS

                                        ;LIST CURRENT TESTS AND ITERATION COUNTS
014700  104401  010450       LSTTST:  TYPE    ,TLSTHD          ;TYPE HEADING "TEST     ITERATIONS"
014704  005001                        CLR     R1               ;INITIALIZE TEST INDEX
014706  004737  026040       2$:      JSR     PC,PREPKB        ;PREPARE FOR POSSIBLE KBD INPUT
014712  004737  031136                JSR     PC,TYPTST        ;TYPE CURRENT TEST AND ITERATION NUMBER
014716  104401  001315                TYPE    ,$CRLF           ;TYPE <CR>,<LF>
014722  005737  005532                TST     INTCHR           ;SEE IF ANY INPUT
014726  001416                        BEQ     8$               ;BR IF NO INPUT
014730  122737  000003  005532        CMPB    #003,INTCHR      ;SEE IF (↑C) TYPED
014736  001002                        BNE     4$               ;BR IF NOT (↑C)
014740  000137  013732                JMP     DRVTST           ;JUMP TO ASK FOR DRIVES AGAIN
014744  122737  000032  005532  4$:   CMPB    #032,INTCHR      ;SEE IF (↑Z) TYPED
014752  001002                        BNE     6$               ;BR IF NOT (↑Z)
014754  000137  014600                JMP     ASKTMD           ;JUMP TO ASK FOR NEW TEST INPUT MODE
014760  004737  026060       6$:      JSR     PC,ECOBAD        ;ECHO BAD INPUT
014764  062701  000002       8$:      ADD     #2,R1            ;INCREMENT TEST INDEX
014770  010102                        MOV     R1,R2            ;GET COPY OF INDEX
014772  062702  005626                ADD     #TSTLST,R2       ;GET POSITION IN LIST
015000  022702  005670                CMP     #DFLTST,R2       ;SEE IF DONE WITH LIST
015002  001341                        BNE     2$               ;BR IF NOT DONE YET
015004  042777  000100  164132        BIC     #BIT6,@$TKS      ;DISABLE KBD INTERRUPT
015012  000137  014600                JMP     ASKTMD           ;GO ASK FOR NEW TEST INPUT MODE

                                        ;CHANGE CURRENT TESTS AND ITERATION COUNTS
015016  104401  010374       CHGTST:  TYPE    ,DFTEST          ;ASK IF TESTS SHOULD BE DEFAULTED
015022  004737  030624                JSR     PC,RDCHRS        ;READ RESPONSE
015026  013732                        DRVTST                   ;(↑C) RETURN ADDRESS
015030  014600                        ASKTMD                   ;(↑Z) RETURN ADDRESS
015032  015016                        CHGTST                   ;(↑U) OR ERROR RETURN ADDRESS
015034  005700                        TST     R0               ;SEE IF NULL INPUT
015036  001426                        BEQ     NULINP           ;BR IF NULL INPUT
015040  022737  000104  005272        CMP     #'D,BUFFO        ;SEE IF (D) TYPED
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4834  015046  001405                        BEQ     LODFLS          ;BR IF DEFAULTS REQUESTED
4835  015050  104401  005272                TYPE    ,BUFFO          ;ECHO BAD INPUT
4836  015054  104401  001314                TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
4837  015060  000756                        BR      CHGTST          ;GO ASK AGAIN
4838                                ;LOAD DEFAULT ITERATION COUNTS INTO TEST LIST
4839  015062  012700  005670        LODFLS: MOV     #DFLTST,R0      ;LOAD DEFAULT LIST ADDRESS
4840  015066  012702  005626                MOV     #TSTLST,R2      ;LOAD TEST LIST ADDRESS
4841  015072  012022                4$:     MOV     (R0)+,(R2)+     ;LOAD A DEFAULT VALUE
4842  015074  022702  005670                CMP     #DFLTST,R2      ;SEE IF DONE YET
4843  015100  001374                        BNE     4$              ;BR IF NOT DONE YET
4844  015102  105737  003116                TSTB    MDFLAG          ;SEE IF DEFAULT MODE
4845  015106  001234                        BNE     ASKTMD          ;BR IF NOT DEFAULT MODE
4846  015110  000137  016244                JMP     LODFPT          ;GO LOAD DEFAULT PARAMETERS
4847  015114  005001                NULINP: CLR     R1              ;INITIALIZE TEST INDEX
4848  015116  104401  010450                TYPE    ,TLSTHD         ;TYPE HEADING "TEST     ITERATIONS"
4849                                ;TYPE CURRENT TEST AND ITERATION NUMBER
4850  015122  004737  031136        8$:     JSR     PC,TYPTST       ;TYPE A TEST NO. AND ITERATION NO.
4851  015126  104401  012474                TYPE    ,SPACE1         ;TYPE A SPACE
4852  015132  104401  012514                TYPE    ,PROMPT         ;TYPE ASTERISK AND SPACE
4853                                ;READ AND CHECK INPUT, IF ANY
4854  015136  004737  030624                JSR     PC,RDCHRS       ;READ OCTAL DIGITS TYPED
4855  015142  013732                        DRVTST                  ;(↑C) RETURN ADDRESS
4856  015144  014600                        ASKTMD                  ;(↑Z) RETURN ADDRESS
4857  015146  015122                        8$                      ;(↑U) OR ERROR RETURN ADDRESS
4858  015150  005700                        TST     R0              ;SEE IF ANY INPUT
4859  015152  001012                        BNE     12$             ;BR IF ANY INPUT
4860  015154  062701  000002        10$:    ADD     #2,R1           ;INCREMENT INDEX
4861  015160  010102                        MOV     R1,R2           ;COPY INDEX
4862  015162  062702  005626                ADD     #TSTLST,R2      ;GET POSITION IN LIST
4863  015166  022702  005670                CMP     #DFLTST,R2      ;SEE IF DONE WITH LIST
4864  015172  001353                        BNE     8$              ;BR IF NOT DONE YET
4865  015174  000137  014600                JMP     ASKTMD          ;GO ASK FOR NEW TEST INPUT MODE
4866  015200  022737  000041  005272  12$:  CMP     #'!,BUFFO       ;SEE IF (!) TYPED
4867  015206  001431                        BEQ     16$             ;BR TO PROPAGATE CURRENT ITER. NO.
4868  015210  005002                        CLR     R2              ;INITIALIZE (!) INDICATOR
4869  015212  122760  000041  005271        CMPB    #'!,BUFFO-1(R0) ;SEE IF LAST CHAR IN BUF IS (!)
4870  015220  001004                        BNE     14$             ;BR IF NOT (!)
4871  015222  105060  005271                CLRB    BUFFO-1(R0)     ;INSERT TERMINATOR BYTE
4872  015226  005300                        DEC     R0              ;DECREMENT CHAR COUNT
4873  015230  005202                        INC     R2              ;SET (!) INDICATOR
4874  015232  022700  000005        14$:    CMP     #5,R0           ;SEE HOW MANY CHARS NOW
4875  015236  002433                        BLT     20$             ;BR IF TOO MANY (MAX ITER. NO. = 77776)
4876  015240  012746  005272                MOV     #BUFFO,-(SP)    ;GET BUF ADDR. ON STACK FOR OCTBIN
4877  015244  004737  052464                JSR     PC,OCTBIN       ;CHECK DIGITS AND CONVERT TO BINARY
4878  015250  015326                        20$                     ;ERROR RETURN ADDRESS FOR OCTBIN
4879  015252  012600                        MOV     (SP)+,R0        ;GET ITERATION NUMBER
4880  015254  020027  077776                CMP     R0,#77776       ;SEE IF > 77776
4881  015260  101022                        BHI     20$             ;BR IF TOO BIG
4882  015262  010061  005626                MOV     R0,TSTLST(R1)   ;PUT ITERATION NUMBER INTO TEST LIST
4883  015266  005702                        TST     R2              ;SEE IF (!) WAS TYPED
4884  015270  001731                        BEQ     10$             ;BR IF NOT (!)
4885                                ;PROPAGATE CURRENT ITERATION NO. TO THE END OF TSTLST
4886  015272  010102                16$:    MOV     R1,R2           ;COPY INDEX
4887  015274  062702  005626                ADD     #TSTLST,R2      ;GET POSITION IN LIST
4888  015300  022702  005666                CMP     #DFLTST-2,R2    ;SEE IF AT END OF LIST
4889  015304  001002                        BNE     17$             ;BR IF NOT DONE
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4890  015306  000137  014600                    JMP     ASKTMD          ;GO ASK FOR NEW TEST INPUT MODE
4891  015312  016161  005626  005630  17$:      MOV     TSTLST(R1),TSTLST+2(R1) ;PROPAGATE TO NEXT WORD
4892  015320  062701  000002                    ADD     #2,R1           ;INCREMENT INDEX
4893  015324  00?,62                            BR      16$             ;BR TO CONTINUE
4894  015326  1044J1  005272          20$:      TYPE    ,BUFFO          ;ECHO BAD INPUT
4895  015332  104401  001314                    TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
4896  015336  000671                            BR      8$              ;GO ASK AGAIN
4897
4898                                    ;ASK FOR DESIRED OPERATIONAL PARAMETER INPUT MODE
4899  015340  104401  010500          INPUTP:   TYPE    ,EXPLAN         ;EXPLAIN INPUT MODES
4900  015344  005037  005512          ASKMDE:   CLR     $TALLS          ;INHIBIT STALL BETWEEN OPERATIONS
4901  015350  104401  010626                    TYPE    ,PARMDE         ;ASK FOR DESIRED INPUT MODE
4902  015354  104401  012514                    TYPE    ,PROMPT         ;TYPE "* "
4903  015360  004737  030624                    JSR     PC,RDCHRS       ;READ RESPONSE TO MODE QUESTION
4904  015364  013732                            DRVTST                  ;(↑C) RETURN ADDRESS
4905  015366  015344                            ASKMDE                  ;(↑Z) RETURN ADDRESS
4906  015370  015344                            ASKMDE                  ;(↑U) OR ERROR RETURN ADDRESS
4907  015372  005700                            TST     R0              ;SEE IF NULL INPUT
4908  015374  001005                            BNE     4$              ;BR IF ANY INPUT
4909  015376  104401  005272          2$:       TYPE    ,BUFFO          ;ECHO BAD INPUT
4910  015402  104401  001314                    TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
4911  015406  000756                            BR      ASKMDE          ;GO ASK AGAIN
4912  015410  022737  000124  005272  4$:       CMP     #'T,BUFFO       ;SEE IF (T) TYPED
4913  015416  001002                            BNE     6$              ;BR IF NOT (T)
4914  015420  000137  015726                    JMP     TYPLST          ;JUMP TO THE TYPE LIST ROUTINE
4915  015424  022737  000117  005272  6$:       CMP     #'O,BUFFO       ;SEE IF (O) TYPED
4916  015432  001002                            BNE     8$              ;BR IF NOT (O)
4917  015434  000137  016200                    JMP     OPNLST          ;JUMP TO THE OPEN LIST ROUTINE
4918  015440  022737  000123  005272  8$:       CMP     #'S,BUFFO       ;SEE IF (S) TYPED
4919  015446  001002                            BNE     10$             ;BR IF NOT (S)
4920  015450  000137  016464                    JMP     SETPRM          ;JUMP TO THE SET INDIV. PARAM. ROUTINE
4921  015454  022737  000122  005272  10$:      CMP     #'R,BUFFO       ;SEE IF (R) TYPED
4922  015462  001345                            BNE     2$              ;BR IF NOT (R), TO ECHO BAD INPUT
4923  015464  023737  005746  005750            CMP     S0,S1           ;COMPARE 20(DEC) SECTOR LIMITS
4924  015472  003403                            BLE     12$             ;BR IF S0 NOT > S1
4925  015474  104401  010727                    TYPE    ,SECNL1         ;TYPE "S0>S1 NOT ALLOWED"
4926  015500  000721                            BR      ASKMDE          ;GO ASK AGAIN FOR PARAMETERS
4927  015502  023737  005752  005754  12$:      CMP     S2,S3           ;COMPARE 22(DEC) SECTOR LIMITS
4928  015510  003405                            BLE     14$             ;BR IF S2 NOT > S3
4929  015512  104401  010757                    TYPE    ,SECNL2         ;TYPE "S2>S3"
4930  015516  104401  010740                    TYPE    ,NOTALD         ;TYPE "NOT ALLOWED"
4931  015522  000710                            BR      ASKMDE          ;GO ASK AGAIN FOR PARAMETERS
4932  015524  023737  005740  005742  14$:      CMP     FT,LT           ;COMPARE CHOSEN TRACK LIMITS
4933  015532  003405                            BLE     20$             ;BR IF FT NOT > LT
4934  015534  104401  010771                    TYPE    ,TRKNLW         ;TYPE "FT>LT"
4935  015540  104401  010740                    TYPE    ,NOTALD         ;TYPE "NOT ALLOWED"
4936  015544  000677                            BR      ASKMDE          ;GO ASK AGAIN FOR PARAMETERS
4937                                    ;CHECK WORD COUNT AGAINST PHYSICAL MEMORY AVAILABLE
4938  015546  013700  005766          20$:      MOV     WC,R0           ;WORD COUNT LO BITS
4939  015552  005300                            DEC     R0              ;DECREMENT BY 1
4940  015554  005001                            CLR     R1              ;WORD COUNT HI BITS
4941  015556  000241                            CLC                     ;CONVERT WORD COUNT TO BYTES
4942  015560  006100                            ROL     R0
4943  015562  006101                            ROL     R1
4944  015564  063700  005762                    ADD     MA,R0           ;ADD WORD COUNT (WC) TO MEM. ADR. (MA)
4945  015570  005501                            ADC     R1
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4946  015572  063701  005764                ADD     MA+2,R1
4947  015576  020137  006130                CMP     R1,MAHILM+2     ;COMPARE HI BITS
4948  015602  101004                        BHI     26$             ;BR IF WC TOO BIG
4949  015604  001006                        BNE     28$             ;BR IF WC IS OK
4950  015606  020037  006126                CMP     R0,MAHILM       ;COMPARE LO BITS
4951  015612  101403                        BLOS    28$             ;BR IF WC IS OK
4952  015614  104401  011003        26$:    TYPE    ,WC2BIG         ;TYPE "**  WC OR MA TOO LARGE"
4953  015620  000651                        BR      ASKMDE          ;GO BACK TO ASK AGAIN FOR PARAMS
4954                                ;SAVE XXDP LOADER, IF NECESSARY
4955  015622  004737  027000        28$:    JSR     PC,CHKXDP       ;GO SAVE XXDP LOADER IF NECESSARY
4956  015626  015634                        36$                     ;"NO SAVE" RETURN ADDRESS
4957  015630  000137  016720        30$:    JMP     RUNTST          ;JUMP TO THE RUN TESTS ROUTINE
4958  015634  105737  000041        36$:    TSTB    @#41            ;SEE IF LOADED BY XXDP
4959  015640  001773                        BEQ     30$             ;BR IF NOT
4960  015642  104401  007443                TYPE    ,OVLODR         ;TYPE "OVERLAY LOADER ? (Y OR N) *"
4961  015646  004737  030624                JSR     PC,RDCHRS       ;READ RESPONSE
4962  015652  015634                        36$                     ;(↑C) RETURN ADDRESS
4963  015654  015634                        36$                     ;(↑Z) RETURN ADDRESS
4964  015656  015634                        36$                     ;(↑U) OR ERROR RETURN ADDRESS
4965  015660  022700  000001                CMP     #1,R0           ;SEE IF 1 CHAR TYPED
4966  015664  001405                        BEQ     38$             ;BR IF 1 CHAR TYPED
4967  015666  104401  005272        37$:    TYPE    ,BUFFO          ;ECHO BAD INPUT
4968  015672  104401  001314                TYPE    ,$QUES
4969  015676  000756                        BR      36$             ;GO ASK AGAIN
4970  015700  122737  000131  005272  38$:    CMPB    #'Y,BUFFO       ;SEE IF (Y) TYPED
4971  015706  001001                        BNE     40$             ;BR IF NOT (Y)
4972  015710  000747                        BR      30$             ;GO RUN TESTS
4973  015712  122737  000116  005272  40$:    CMPB    #'N,BUFFO       ;SEE IF (N) TYPED
4974  015720  001362                        BNE     37$             ;BR IF NOT (N)
4975  015722  000137  015344                JMP     ASKMDE          ;GO ASK FOR PARAMETERS AGAIN
4976
4977
4978
4979                                .SBTTL  TO - TYPE (T) LIST ROUTINE
4980                                ;*THIS ROUTINE TYPES THE ENTIRE PARAMETER LIST ON THE
4981                                ;*CONSOLE, LINE BY LINE. EACH LINE HAS THE FOLLOWING
4982                                ;*FORMAT:  XX=YYYYYY   WHERE XX IS A PARAMETER MNEMONIC
4983                                ;*AND YYYYYY IS THE VALUE OF THE PARAMETER IN OCTAL.
4984                                ;*TYPING (↑C) CAUSES IMMEDIATE RETURN TO DRVTST,
4985                                ;*AND (↑Z) CAUSES RETURN TO ASKMDE.
4986
4987  015726                        TYPLST:
4988  015726  005001                        CLR     R1              ;INITIALIZE INDEX
4989  015730  004737  026040                JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
4990  015734  004737  031172        1$:     JSR     PC,TYPPRM       ;TYPE CURRENT PARAMETER AND VALUE
4991  015740  104401  001315                TYPE    ,$CRLF          ;TYPE <CR>,<LF>
4992  015744  005737  005532                TST     INTCHR          ;SEE IF ANY INPUT AT KBD
4993  015750  001420                        BEQ     8$              ;BR IF NO INPUT
4994  015752  122737  000003  005532        CMPB    #003,INTCHR     ;SEE IF (↑C) TYPED
4995  015760  001002                        BNE     4$              ;BR IF NOT (↑C)
4996  015762  000137  013732                JMP     DRVTST          ;JUMP TO ASK FOR DRIVE(S) AGAIN
4997  015766  122737  000032  005532  4$:     CMPB    #032,INTCHR     ;SEE IF (↑Z) TYPED
4998  015774  001002                        BNE     6$              ;BR IF NOT (↑Z)
4999  015776  000137  015344                JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
5000  016002  004737  026060        6$:     JSR     PC,ECOBAD       ;ECHO BAD INPUT
5001  016006  004737  026040                JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
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 5002  016012  022761  040515  006152  8$:     CMP     #"MA,PRMNEM(R1) ;SEE IF PARAM. IS (MA)
 5003  016020  001002                          BNE     10$             ;BR IF NOT (MA)
 5004  016022  062701  000002                  ADD     #2,R1           ;INCREMENT PARAMETER INDEX
 5005  016026  062701  000002          10$:    ADD     #2,R1           ;INCREMENT PARAMETER INDEX
 5006  016032  010102                          MOV     R1,R2           ;GET COPY OF INDEX
 5007  016034  062702  005732                  ADD     #PRMLST,R2      ;COMPUTE POSITION IN LIST
 5008  016040  022702  005776                  CMP     #PRDFLT,R2      ;SEE IF DONE WITH LIST
 5009  016044  001333                          BNE     1$              ;BR IF NOT DONE YET
 5010  016046  032737  100000  005760          BIT     #BIT15,PT       ;SEE IF PATTERN 15 SPECIFIED
 5011  016054  001005                          BNE     12$             ;BR IF PATTERN SPECIFIED
 5012  016056  042777  000100  163060          BIC     #BIT6,@$TKS     ;DISABLE KBD INTERRUPT
 5013  016064  000137  015344                  JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
 5014                                  ;TYPE OUT USER-DEFINED PATTERN 15
 5015  016070  104401  011116          12$:    TYPE    ,PFIFTN         ;TYPE "USER-DEFINED PATTERN 15 :"
 5016  016074  005001                          CLR     R1              ;INITIALIZE WORD INDEX
 5017  016076  005737  005532          14$:    TST     INTCHR          ;SEE IF ANY INPUT
 5018  016102  001420                          BEQ     20$             ;BR IF NO INPUT
 5019  016104  122737  000003  005532          CMPB    #003,INTCHR     ;SEE IF (↑C) TYPED
 5020  016112  001002                          BNE     16$             ;BR IF NOT (↑C)
 5021  016114  000137  013732                  JMP     DRVTST          ;JUMP TO ASK FOR DRIVE(S) AGAIN
 5022  016120  122737  000032  005532  16$:    CMPB    #032,INTCHR     ;SEE IF (↑Z) TYPED
 5023  016126  001002                          BNE     18$             ;BR IF NOT (↑Z)
 5024  016130  000137  015344                  JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
 5025  016134  004737  026060          18$:    JSR     PC,ECOBAD       ;ECHO BAD INPUT
 5026  016140  004737  026040                  JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
 5027  016144  004737  031252          20$:    JSR     PC,TYPPAT       ;TYPE WORD XX = YYYYYY
 5028  016150  104401  001315                  TYPE    ,$CRLF          ;TYPE <CR>,<LF>
 5029  016154  062701  000002                  ADD     #2,R1           ;INCREMENT INDEX
 5030  016160  022701  000040                  CMP     #32.,R1         ;SEE IF 16 WORDS TYPED
 5031  016164  001344                          BNE     14$             ;BR IF NOT DONE YET
 5032  016166  042777  000100  162750          BIC     #BIT6,@$TKS     ;DISABLE KBD INTERRUPT
 5033  016174  000137  015344                  JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
 5034
 5035
 5036
 5037                                  .SBTTL  TO - OPEN (O) LIST ROUTINE
 5038                                  ;*THIS ROUTINE IS USED TO EITHER REQUEST LOADING OF ALL
 5039                                  ;*DEFAULT PARAMETERS INTO THE PARAMETER LIST, OR TO
 5040                                  ;*SEQUENTIALLY OPEN EACH PARAMETER FOR ALTERATION BY
 5041                                  ;*TTY INPUT. TYPING (↑C) CAUSES IMMEDIATE RETURN TO
 5042                                  ;*DRVTST, AND (↑Z) CAUSES RETURN TO ASKMDE.
 5043
 5044
 5045  016200                          OPNLST:
 5046  016200  104401  011034                  TYPE    ,DFQUES         ;ASK IF ALL DEFAULT VALUES DESIRED
 5047  016204  004737  030624                  JSR     PC,RDCHRS       ;READ RESPONSE TO DEFAULT QUESTION
 5048  016210  013732                          DRVTST                  ;(↑C) RETURN ADDRESS
 5049  016212  015344                          ASKMDE                  ;(↑Z) RETURN ADDRESS
 5050  016214  016200                          OPNLST                  ;(↑U) OR ERROR RETURN ADDRESS
 5051  016216  005700                          TST     R0              ;SEE IF NULL INPUT
 5052  016220  001433                          BEQ     NOTDFT          ;BR IF DEFAULTS NOT REQUESTED
 5053  016222  022737  000104  005272          CMP     #'D,BUFFO       ;SEE IF (D) TYPED
 5054  016230  001405                          BEQ     LODFPT          ;BR IF DEFAULTS DESIRED
 5055  016232  104401  005272                  TYPE    ,BUFFO          ;ECHO BAD INPUT
 5056  016236  104401  001314                  TYPE    ,$QUES
 5057  016242  000756                          BR      OPNLST          ;GO ASK AGAIN
```

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5058                                    ;LOAD ALL DEFAULT VALUES INTO PARAMETER LIST
5059  016244  012700  005776            LODFPT: MOV     #PRDFLT,R0      ;LOAD DEFAULT LIST ADDRESS
5060  016250  012702  005732                    MOV     #PRMLST,R2      ;LOAD PARAMETER LIST ADDRESS
5061  016254  012022                    4$:     MOV     (R0)+,(R2)+     ;LOAD A DEFAULT VALUE
5062  016256  022702  005776                    CMP     #PRDFLT,R2      ;SEE IF DONE YET
5063  016262  001374                            BNE     4$              ;BR IF MORE VALUES TO LOAD YET
5064  016264  105737  003116                    TSTB    MDFLAG          ;SEE IF DEFAULT MODE
5065  016270  001005                            BNE     6$              ;BR IF NOT DEFAULT MODE
5066  016272  012737  000001  025474            MOV     #1,$EOPCT       ;SET PASS COUNT = 1
5067  016300  000137  017002                    JMP     STPASS          ;GO RUN DFLT TESTS
5068  016304  000137  015344            6$:     JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
5069  016310  005001                    NOTDFT: CLR     R1              ;INITIALIZE INDEX
5070                                    ;TYPE CURRENT PARAMETER AND VALUE
5071  016312  004737  031172            8$:     JSR     PC,TYPPRM       ;TYPE PARAMETER AND VALUE
5072  016316  104401  012474                    TYPE    ,SPACE1         ;TYPE A SPACE
5073  016322  104401  012514                    TYPE    ,PROMPT         ;TYPE ASTERISK AND SPACE
5074                                    ;READ AND CHECK INPUT, IF ANY
5075  016326  004737  030624                    JSR     PC,RDCHRS       ;READ OCTAL DIGITS TYPED
5076  016332  013732                            DRVTST                  ;(↑C) RETURN ADDRESS FOR RDCHRS
5077  016334  015344                            ASKMDE                  ;(↑Z) RETURN ADDRESS FOR RDCHRS
5078  016336  016312                            8$                      ;(↑U) OR ERROR RETURN ADDR. FOR RDCHRS
5079  016340  005700                            TST     R0              ;SEE IF ANY INPUT
5080  016342  001007                            BNE     10$             ;BR IF ANY INPUT
5081  016344  022761  040515  006152            CMP     #"MA,PRMNEM(R1) ;SEE IF (MA) JUST DEFAULTED
5082  016352  001023                            BNE     12$             ;BR IF NOT (MA)
5083  016354  062701  000002                    ADD     #2,R1           ;INCREMENT INDEX
5084  016360  000420                            BR      12$             ;BR TO MOVE ON TO NEXT PARAMETER
5085  016362  022700  000010            10$:    CMP     #10,R0          ;SEE IF 8 CHARACTERS TYPED
5086  016366  002431                            BLT     14$             ;BR IF MORE THAN 8 TYPED
5087  016370  012746  005272                    MOV     #BUFFO,-(SP)    ;PUT BUFFER ADDR. ON STACK FOR OCTBIN
5088  016374  004737  052464                    JSR     PC,OCTBIN       ;CHECK DIGITS AND CONVERT TO BINARY
5089  016400  016452                            14$                     ;ERROR RETURN ADDRESS FOR OCTBIN
5090  016402  012637  005476                    MOV     (SP)+,LOWOCT    ;GET LOW BINARY BITS
5091  016406  013737  052616  005500            MOV     $HIOCT,HIGOCT   ;GET HIGH BINARY BITS
5092                                    ;CHECK PARAMETER VALUE AND PUT INTO LIST
5093  016414  004737  031630                    JSR     PC,CHKPRM       ;CHECK VALIDITY OF PARAM VALUE
5094  016420  016452                            14$                     ;ERROR RETURN ADDR. FOR CHKPRM
5095                                    ;OPEN USER-DEFINED PATTERN 15 FOR MODIFICATION, IF NECESSARY
5096  016422  004737  031304            12$:    JSR     PC,MODP15
5097                                    ;MOVE ON TO NEXT PARAMETER
5098  016426  062701  000002                    ADD     #2,R1           ;INCREMENT THE PARAMETER INDEX
5099  016432  010102                            MOV     R1,R2           ;GET COPY OF INDEX
5100  016434  062702  005732                    ADD     #PRMLST,R2      ;COMPUTE POSITION IN LIST
5101  016440  022702  005776                    CMP     #PRDFLT,R2      ;SEE IF DONE WITH LIST
5102  016444  001322                            BNE     8$              ;BR IF NOT DONE YET
5103  016446  000137  015344                    JMP     ASKMDE          ;JUMP TO ASK FOR NEW MODE
5104  016452  104401  005272            14$:    TYPE    ,BUFFO          ;ECHO BAD INPUT
5105  016456  104401  001314                    TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
5106  016462  000713                            BR      8$              ;BR TO ASK AGAIN
5107
5108
5109
5110                                    .SBTTL  TO - SET (S) INDIVIDUAL PARAM ROUTINE
5111                                    ;*THIS ROUTINE IS USED TO ALLOW SETTING OF ANY INDIVIDUAL
5112                                    ;*PARAMETER VALUE BY TTY INPUT. A PROMPTER (:) IS
5113                                    ;*TYPED AND THE ROUTINE WAITS FOR INPUT OF THE FORM
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5114                                    ;* XX=YYYYYY, WHERE XX IS THE MNEMONIC FOR ANY VALID
5115                                    ;*PARAMETER IN THE LIST, AND YYYYYY IS THE DESIRED PARAMETER
5116                                    ;*VALUE IN OCTAL DIGITS. THE PROGRAM THEN ASKS FOR ANOTHER
5117                                    ;*PARAMETER BY TYPING "> " AGAIN. TYPING (↑C) CAUSES
5118                                    ;*IMMEDIATE RETURN TO DRVTST, AND (↑Z) CAUSES RETURN TO
5119                                    ;*ASKMDE.
5120
5121  016464                            SETPRM:
5122  016464  104401  012517                   TYPE    ,PRMPSP         ;TYPE "> " PROMPTER
5123                                    ;READ AND CHECK INPUT, IF ANY
5124  016470  004737  030624                    JSR     PC,RDCHRS       ;READ INPUT LINE
5125  016474  013732                            DRVTST                  ;(↑C) RETURN ADDRESS FOR RDCHRS
5126  016476  015344                            ASKMDE                  ;(↑Z) RETURN ADDRESS FOR RDCHRS
5127  016500  016464                            SETPRM                  ;(↑U) OR ERROR RETURN ADDR. FOR RDCHRS
5128  016502  020027  000004                    CMP     R0,#4           ;SEE IF AT LEAST 4 CHARACTERS TYPED
5129  016506  002005                            BGE     6$              ;BR IF AT LEAST 4 TYPED
5130  016510  104401  005272          4$:       TYPE    ,BUFFO          ;ECHO BAD INPUT
5131  016514  104401  001314                    TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
5132  016520  000761                            BR      SETPRM          ;BR TO ASK FOR INPUT AGAIN
5133  016522  020027  000013          6$:       CMP     R0,#11.         ;SEE IF ELEVEN OR LESS CHARS TYPED
5134  016526  003370                            BGT     4$              ;BR IF MORE THAN ELEVEN TYPED
5135                                    ;SEE IF THIS MNEMONIC RESIDES IN PARAM MNEMONIC TABLE
5136  016530  005001                            CLR     R1              ;INITIALIZE PARAMETER INDEX
5137  016532  023761  005272  006152    8$:       CMP     BUFFO,PRMNEM(R1) ;TRY TO MATCH 2-CHAR MNEMONIC
5138  016540  001411                            BEQ     10$             ;BR IF PARAMETER FOUND IN TABLE
5139  016542  062701  000002                    ADD     #2,R1           ;INCREMENT INDEX
5140  016546  010102                            MOV     R1,R2           ;GET COPY OF INDEX
5141  016550  062702  005732                    ADD     #PRMLST,R2      ;SEE IF ALL ENTRIES HAVE BEEN CHECKED
5142  016554  022702  005776                    CMP     #PRDFLT,R2
5143  016560  001364                            BNE     8$              ;BR IF MORE TO CHECK YET
5144  016562  000752                            BR      4$              ;BR TO ECHO BAD INPUT
5145                                    ;CHECK FOR VALID LINE FORMAT
5146  016564  012702  000002          10$:      MOV     #2,R2           ;INITIALIZE BUFFER POINTER
5147  016570  122762  000075  005272            CMPB    #'=,BUFFO(R2)   ;SEE IF NEXT CHAR IS "="
5148  016576  001411                            BEQ     12$             ;BR IF IT IS "="
5149  016600  122762  000040  005272            CMPB    #040,BUFFO(R2)  ;SEE IF NEXT CHAR IS A SPACE
5150  016606  001340                            BNE     4$              ;BR TO ECHO BAD INPUT
5151  016610  005202                            INC     R2              ;INCREMENT BUFFER POINTER
5152  016612  122762  000075  005272            CMPB    #'=,BUFFO(R2)   ;SEE IF NEXT CHAR IS "="
5153  016620  001333                            BNE     4$              ;BR TO ECHO INVALID INPUT
5154  016622  005202                  12$:      INC     R2              ;INCREMENT BUFFER POINTER
5155  016624  020200                            CMP     R2,R0           ;SEE IF MORE CHARS LEFT IN BUFFER
5156  016626  002330                            BGE     4$              ;BR TO ECHO INVALID INPUT
5157  016630  122762  000040  005272            CMPB    #040,BUFFO(R2)  ;SEE IF NEXT CHARACTER IS SPACE
5158  016636  001003                            BNE     14$             ;BR IF NOT A SPACE
5159  016640  005202                            INC     R2              ;INCREMENT BUFFER POINTER
5160  016642  020200                            CMP     R2,R0           ;SEE IF MORE CHARS LEFT IN BUFFER
5161  016644  002321                            BGE     4$              ;BR IF NONE LEFT
5162  016646  160200                  14$:      SUB     R2,R0           ;SUBTRACT POINTER FROM CHAR COUNT
5163  016650  020027  000010                    CMP     R0,#10          ;SEE HOW MANY CHARS LEFT
5164  016654  003315                            BGT     4$              ;BR IF TOO MANY LEFT
5165                                    ;CHECK FOR LEGAL PARAMETER VALUE
5166  016656  062702  005272                    ADD     #BUFFO,R2       ;GET ADDRESS OF DIGITS
5167  016662  010246                            MOV     R2,-(SP)        ;PUT IT ON STACK FOR OCTBIN
5168  016664  004737  052464                    JSR     PC,OCTBIN       ;CHECK DIGITS AND CONVERT TO BINARY
5169  016670  016510                            4$                      ;ERROR RETURN ADDR. FOR OCTBIN
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5170  016672  012637  005476                MOV     (SP)+,LOWOCT    ;GET LOW BINARY BITS
5171  016676  013737  052616  005500        MOV     $HIOCT,HIGOCT   ;GET HIGH BINARY BITS
5172  016704  004737  031630                JSR     PC,CHKPRM       ;CHECK VALIDITY OF PARAMETER VALUE
5173  016710  016510                        4$                      ;ERROR RETURN ADDR. FOR CHKPRM
5174                                ;OPEN USER-DEFINED PATTERN 15 FOR MODIFICATION, IF NECESSARY
5175  016712  004737  031304                JSR     PC,MODP15
5176  016716  000662                        BR      SETFRM          ;RETURN TO ASK FOR ANOTHER PARAMETER
5177
5178
5179
5180                                .SBTTL  TO - RUN (R) TESTS ROUTINE
5181                                ;*THIS ROUTINE IS ENTERED TO SET UP THE RUNNING OF TESTS,
5182                                ;*WHOSE PARAMETERS HAVE BEEN DETERMINED. IT FIRST ASKS
5183                                ;*FOR THE DESIRED NUMBER OF PROGRAM PASSES, AND STORES
5184                                ;*THIS IN $EOPCT FOR THE END OF PASS ROUTINE. THEN, THE
5185                                ;*DRIVE LIST IS SCANNED FOR THE FIRST DESIRED DRIVE, AND
5186                                ;*THE HEADER ON SECTOR 0 IS READ TO GET THE FORMAT FOR THIS
5187                                ;*DRIVE. THIS IS STORED IN THE FORMAT BYTE, AND A JUMP IS
5188                                ;*MADE TO THE FIRST TEST.
5189                                ;*THE END OF PASS ROUTINE RETURNS TO "NEWDRV" TO SELECT
5190                                ;*EACH SUCCESSIVE DRIVE FOR TESTING, UNTIL THE ENTIRE PASS
5191                                ;* (ALL DRIVES) IS COMPLETED.
5192
5193  016720                        RUNTST:
5194                                ;INPUT THE DESIRED NUMBER OF PROGRAM PASSES
5195  016720  104401  011242        4$:     TYPE    ,ENTPAS         ;ASK FOR NUMBER OF PASSES
5196  016724  004737  030624                JSR     PC,RDCHRS       ;READ RESPONSE
5197  016730  013732                        DRVTST                  ;(↑C) RETURN ADDRESS
5198  016732  015344                        ASKMDE                  ;(↑Z) RETURN ADDRESS
5199  016734  016720                        4$                      ;(↑U) OR ERROR RETURN ADDRESS
5200  016736  005700                        TST     R0              ;SEE IF NULL INPUT
5201  016740  001403                        BEQ     6$              ;GO ASK AGAIN
5202  016742  022700  000005                CMP     #5,R0           ;SEE HOW MANY CHARS TYPED
5203  016746  002005                        BGE     8$              ;BR IF 5 OR LESS
5204  016750  104401  005272        6$:     TYPE    ,BUFFO          ;ECHO BAD INPUT
5205  016754  104401  001314                TYPE    ,$QUES
5206  016760  000757                        BR      4$              ;GO ASK AGAIN
5207  016762  012746  005272        8$:     MOV     #BUFFO,-(SP)    ;GET BUF ADDR ON STACK FOR OCTBIN
5208  016766  004737  052464                JSR     PC,OCTBIN       ;CHECK DIGITS AND CONVERT TO BINARY
5209  016772  016750                        6$                      ;ERROR RETURN ADDRESS FOR OCTBIN
5210  016774  012637  025474                MOV     (SP)+,$EOPCT    ;SET DESIRED NO. OF PASSES (1-77777)
5211  017000  001763                        BEQ     6$              ;BR IF 0, TO ASK AGAIN
5212                                ;THIS IS THE ACTUAL START OF A RUN WITH X PASSES
5213  017002  005037  001326        STPASS: CLR     $PASS           ;INIT. THE PASS NUMBER
5214  017006  112737  000001  003120        MOVB    #1,TSTING       ;SET "RUNNING TESTS" FLAG
5215  017014  012737  177777  005510  NEWPAS: MOV    #177777,DRIVE   ;INITIALIZE DRIVE NO. TO -1
5216  017022  005037  001330                CLR     $DEVCT          ;INIT APT DEVICE COUNT TO 0
5217                                ;CHECK DRIVE LIST FOR MORE DRIVES TO TEST ON THIS PASS
5218  017026  012737  000000  177776  NEWDRV: MOV    #PRO,@#PS       ;RE-ESTABLISH PRIORITY 0
5219  017034  012706  001100                MOV     #STACK,SP       ;RESTORE THE STACK
5220  017040  105037  003130                CLRB    DRVERS          ;CLEAR ERROR COUNT FOR CURRENT DRIVE
5221  017044  005037  005532                CLR     INTCHR          ;CLEAR TTY INPUT BUFFER WORD
5222  017050  005237  005510                INC     DRIVE           ;INCREMENT DRIVE NUMBER
5223  017054  022737  000010  005510        CMP     #10,DRIVE       ;SEE IF DONE WITH THIS PASS
5224  017062  001002                        BNE     2$              ;BR IF NOT DONE CHECKING LIST
5225  017064  000137  025442                JMP     DUNPAS          ;JUMP IF DONE WITH THIS PASS
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5226  017070  013700  005510          2$:   MOV   DRIVE,R0          ;GET NEW DRIVE NUMBER
5227  017074  105760  005606                TSTB  DRVLST(R0)        ;SEE IF THIS DRIVE IS MARKED IN LIST
5228  017100  001752                      BEQ   NEWDRV            ;BR IF NOT MARKED, TO CHECK ANOTHER
5229  017102  105037  001102                CLRB  $TSTNM            ;INIT TEST NUMBER TO 0
5230  017106  005037  001304                CLR   $TIMES            ;INIT ITERATION COUNT
5231  017112  105760  005616                TSTB  DTYLST(R0)        ;SEE IF RK07
5232  017116  001077                      BNE   1$                ;BR IF YES
5233  017120  105037  003124                CLRB  TYPFMT            ;ELSE LOAD ALL RK06 PARAMETERS
5234  017124  012737  000625  017754          MOV   #625,LCM5
5235  017132  012737  000631  017756          MOV   #631,LCM1
5236  017140  012737  000631  006044          MOV   #631,PRMLIM+2
5237  017146  012737  000632  005734          MOV   #632,LC
5238  017154  012737  000632  017760          MOV   #632,LSTCYL
5239  017162  012737  000632  006000          MOV   #632,PRDFLT+2
5240  017170  012737  000632  006050          MOV   #632,PRMLIM+6
5241  017176  012737  000632  006054          MOV   #632,PRMLIM+12
5242  017204  012737  000633  017762          MOV   #633,LCP1
5243  017212  012737  000400  017764          MOV   #400,HOLD1
5244  017220  012737  001000  017766          MOV   #1000,HOLD2
5245  017226  012737  000025  017770          MOV   #25,HOLD3
5246  017234  012737  010025  017772          MOV   #10025,HOLD4
5247  017242  012737  010125  017774          MOV   #10125,HOLD5
5248  017250  012737  000002  017776          MOV   #2,HOLD6
5249  017256  012737  110244  020000          MOV   #110244,HOLD7
5250  017264  012737  017500  007216          MOV   #8000.,MAXLO2     ;8000 US FOR RK06
5251  017272  012737  000000  007220          MOV   #0,MAXHI2         ;
5252  017300  012737  022370  007222          MOV   #9464.,MAXLO4     ;75000 US FOR RK06
5253  017306  012737  000001  007224          MOV   #1,MAXHI4         ;
5254  017314  000477                      BR    3$
5255
5256  017316  152737  000004  003124  1$:   BISB  #8.CDT,TYPFMT     ;LOAD ALL RK07 PARAMETERS
5257  017324  012737  001451  017754          MOV   #1451,LCM5
5258  017332  012737  001455  017756          MOV   #1455,LCM1
5259  017340  012737  001455  006044          MOV   #1455,PRMLIM+2
5260  017346  012737  001456  005734          MOV   #1456,LC
5261  017354  012737  001456  017760          MOV   #1456,LSTCYL
5262  017362  012737  001456  006000          MOV   #1456,PRDFLT+2
5263  017370  012737  001456  006050          MOV   #1456,PRMLIM+6
5264  017376  012737  001456  006054          MOV   #1456,PRMLIM+12
5265  017404  012737  001457  017762          MOV   #1457,LCP1
5266  017412  012737  001000  017764          MOV   #1000,HOLD1
5267  017420  012737  002000  017766          MOV   #2000,HOLD2
5268  017426  012737  002025  017770          MOV   #2025,HOLD3
5269  017434  012737  012025  017772          MOV   #12025,HOLD4
5270  017442  012737  012125  017774          MOV   #12125,HOLD5
5271  017450  012737  000012  017776          MOV   #12,HOLD6
5272  017456  012737  016104  020000          MOV   #16104,HOLD7
5273
5274  017464  012737  014544  007216          MOV   #6500.,MAXLO2     ;6500 US FOR RK07
5275  017472  012737  000000  007220          MOV   #0,MAXHI2         ;
5276  017500  012737  012530  007222          MOV   #5464.,MAXLO4     ;71000 US FOR RK07
5277  017506  012737  000001  007224          MOV   #1,MAXHI4         ;
5278  017514  010037  001332          3$:   MOV   R0,$UNIT          ;SET DRIVE NO FOR APT
5279                                ;READ THE HEADER ON SECTOR 0,TRACK 0,CYL 0, AND GET THE DRIVE FORMAT
5280  017520  004737  027522                JSR   PC,INITSS         ;INIT. DRIVER PARAMS AND S.S.
5281  017524  112765  000125  000001          MOVB  #RDHEAD,P.CMND(R5) ;SET READ HEADER COMMAND
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5282  017532  004737  040316            JSR     PC,DRVCAL       ;DO READ HEADER
5283  017536  013712  017770            MOV     HOLD3,(R2)      ;ISSUE RD HDR WITH FMT BIT = 0
5284  017542  032712  000200      4$:   BIT     #BIT7,(R2)      ;CHECK FOR C. READY IN CS1
5285  017546  001775                    BEQ     4$              ;BR IF NOT RDY YET
5286  017550  013712  017772            MOV     HOLD4,(R2)      ;ISSUE RD HDR WITH FMT BIT = 1
5287  017554  032712  000200      6$:   BIT     #BIT7,(R2)      ;CHECK FOR C. READY IN CS1
5288  017560  001775                    BEQ     6$              ;BR IF NOT RDY YET
5289  017562  105037  003125            CLRB    FORMAT          ;INITIALIZE FORMAT BYTE TO 0
5290  017566  013737  005752  005516    MOV     S2,FS           ;INIT SECTOR LIMITS FOR 22(DEC) SECTOR FMT
5291  017574  013737  005754  005520    MOV     S3,LS
5292  017602  005762  000024            TST     RKDB(R2)        ;POP SILO ONE TIME
5293  017606  032762  001000  000024    BIT     #BIT9,RKDB(R2)  ;TEST FORMAT BIT IN HEADER WORD 2
5294  017614  001411                    BEQ     8$              ;BR IF 22 SECTOR FORMAT
5295  017616  152737  000020  003125    BISB    #B.CFMT,FORMAT  ;SET 20 SECTOR FORMAT FOR THIS DRIVE
5296  017624  013737  005746  005516    MOV     S0,FS           ;INIT SECTOR LIMITS FOR 20(DEC) SECTOR FMT
5297  017632  013737  005750  005520    MOV     S1,LS
5298  017640  013737  005772  005512  8$:MOV     ST,STALLS       ;SET NUMBER OF UNIT STALLS DESIRED
5299  017646  004737  027522            JSR     PC,INITSS       ;INIT THE S.S.
5300  017652  004737  036674            JSR     PC,REDBSF       ;READ BAD SECTOR FILE FOR THIS DRIVE
5301  017656  113737  005510  011370    MOVB    DRIVE,DRVNO     ;GET DRIVE NO.
5302  017664  152737  000060  011370    BISB    #'0,DRVNO       ;CONVERT TO ASCII
5303  017672  104401  011351            TYPE    ,TSTDRN         ;TYPE "TESTING DRIVE X"
5304  017676  005737  001326            TST     $PASS           ;SEE IF THIS IS FIRST PASS
5305  017702  001012                    BNE     10$             ;BR IF NOT FIRST PASS
5306  017704  004737  032134            JSR     PC,DRVSER       ;TYPE "DRIVE SER. NO.  XXX"
5307  017710  004737  032254            JSR     PC,CRTSER       ;TYPE "CART. SER. NO.  XXXXXXXXXXX"
5308  017714  032737  000020  005770    BIT     #BIT4,CS        ;SEE IF BAD SECTORS SHOULD BE TYPED
5309  017722  001402                    BEQ     10$             ;BR IF NOT
5310  017724  004737  037164            JSR     PC,TYPBSF       ;TYPE BAD SECTOR FILES
5311  017730  005037  005532      10$:  CLR     INTCHR          ;INIT. TTY INPUT CHAR BUFFER
5312  017734  105737  003136            TSTB    DULACS          ;SEE IF DUAL-ACCESS FLAG SET
5313  017740  001420                    BEQ     TST1            ;BR IF NOT
5314  017742  112737  000021  001102    MOVB    #21,$TSTNM      ;SET TEST NO.
5315  017750  000137  024516            JMP     RWDTST          ;JUMP TO R/W DATA TEST
5316
5317  017754  000000            LCM5:   0                       ;LAST CYL-5
5318  017756  000000            LCM1:   0                       ;LAST CYL-1
5319  017760  000000            LSTCYL: 0                       ;LAST CYL 632 FOR RK06, 1456 FOR RK07
5320  017762  000000            LCP1:   0                       ;LAST CYL+1
5321  017764  000000            HOLD1:  0
5322  017766  000000            HOLD2:  0
5323  017770  000000            HOLD3:  0
5324  017772  000000            HOLD4:  0
5325  017774  000000            HOLD5:  0
5326  017776  000000            HOLD6:  0
5327  020000  000000            HOLD7:  0
5328
5329
5330
5331
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                                        ;;*****************************************************************
                                        ;*TEST 1         RECALIBRATE/SEEK TEST
                                        ;*
                                        ;*      THIS TEST PERFORMS A RECALIBRATE, FOLLOWED BY A
                                        ;*      SEEK TO CYLINDER LC.
                                        ;*
                                        ;;*****************************************************************
020002  000004                          TST1:   SCOPE
020004  012737  000001  001324                  MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
020012  004737  030462                          JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
020016  004737  030530                          JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
020022  000137  020062                          JMP     TST2            ;JUMP TO NEXT TEST
                                        ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
020026  004737  027522                          JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
020032  004737  026040                          JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
                                        ;RECALIBRATE THE DRIVE
020036  112765  000113  000001                  MOVB    #RECAL,P.CMND(R5) ;SET RECAL COMMAND
020044  004737  040316                          JSR     PC,DRVCAL       ;RECALIBRATE DRIVE
                                        ;DO SEEK TO CYLINDER LC
020050  013765  005734  000002                  MOV     LC,P.CYLN(R5)   ;SET CYLINDER = LC
020056  004737  032374                          JSR     PC,SEEKER       ;DO A READ HEADER OR EXPLICIT SEEK
                                        ;;*****************************************************************
                                        ;*TEST 2         SEEK/SEEK TEST
                                        ;*
                                        ;*      THIS TEST PERFORMS A SEEK TO CYLINDER FC, FOLLOWED
                                        ;*      BY A SEEK TO CYLINDER LC.
                                        ;*
                                        ;;*****************************************************************
020062  000004                          TST2:   SCOPE
020064  012737  000002  001324                  MOV     #2,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
020072  004737  030462                          JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
020076  004737  030530                          JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
020102  000137  020142                          JMP     TST3            ;JUMP TO NEXT TEST
                                        ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
020106  004737  027522                          JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
020112  004737  026040                          JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
                                        ;DO SEEK TO CYLINDER FC
020116  013765  005732  000002                  MOV     FC,P.CYLN(R5)   ;SET CYL = FC
020124  004737  032374                          JSR     PC,SEEKER       ;SEEK TO FC
                                        ;DO SEEK TO CYLINDER LC
020130  013765  005734  000002                  MOV     LC,P.CYLN(R5)   ;SET CYL = LC
020136  004737  032374                          JSR     PC,SEEKER       ;SEEK TO LC
                                        ;;*****************************************************************
                                        ;*TEST 3         CYLINDER ADDRESSING TEST
                                        ;*
                                        ;*      THIS TEST VERIFIES THE CYLINDER ADDRESS BITS, BY
                                        ;*      SEEKING TO CYLINDERS 0,1,2,4,10,20,40,100,200,400(OCT).
                                        ;*      THEN, THE SEEKS ARE DONE IN REVERSE, TO 400,200,100,
                                        ;*      40,20,10,4,2,1,0.
                                        ;*
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5388                                    ;;*****************************************************************
5389  020142  000004                    TST3:   SCOPE
5390  020144  012737  000003  001324            MOV     #3,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
5391  020152  004737  030462                    JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5392  020156  004737  030530                    JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5393  020162  000137  020250                    JMP     TST4            ;JUMP TO NEXT TEST
5394                                    ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5395  020166  004737  027522                    JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5396  020172  004737  026040                    JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5397                                    ;SEEK TO CYLINDER 0
5398  020176  005065  000002                    CLR     P.CYLN(R5)      ;SET CYL = 0
5399  020202  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CYL 0
5400                                    ;SEEK TO CYLINDERS 1,2,4,10,20,40,100,200,400 (FORWARD DIRECTION)
5401  020206  005265  000002                    INC     P.CYLN(R5)      ;INITIALIZE CYL TO 1
5402  020212  004737  032374            2$:     JSR     PC,SEEKER       ;SEEK TO CURRENT CYL
5403  020216  006365  000002                    ASL     P.CYLN(R5)      ;GET NEXT CYL NO.
5404  020222  033765  017766  000002            BIT     HOLD2,P.CYLN(R5) ;SEE IF DONE WITH FORWARD SEEKS
5405  020230  001770                            BEQ     2$              ;BR IF NOT DONE YET
5406                                    ;SEEK TO CYLINDERS 400,200,100,40,20,10,4,2,1,0 (REVERSE DIRECTION)
5407  020232  006265  000002            4$:     ASR     P.CYLN(R5)      ;GET NEXT CYL NO.
5408  020236  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CURRENT CYLINDER
5409  020242  005765  000002                    TST     P.CYLN(R5)      ;SEE IF DONE IN REVERSE DIRECTION
5410  020246  001371                            BNE     4$              ;BR IF NOT DONE YET
5411
5412
5413
5414                                    ;;*****************************************************************
5415                                    ;*TEST 4         CYLINDER ADDRESS CROSSTALK TEST
5416                                    ;*
5417                                    ;*      THIS TEST PERFORMS SEEKS TO CYLINDERS WHOSE ADDRESSES
5418                                    ;*      ARE SUSCEPTIBLE TO BIT CROSSTALK WITHIN THE CYLINDER
5419                                    ;*      ADDRESSING LOGIC. THE CYLINDER ADDRESS BITS SEQUENCE
5420                                    ;*      AS FOLLOWS :
5421                                    ;*              000 000 000
5422                                    ;*              011 111 111
5423                                    ;*              000 000 000
5424                                    ;*              011 111 110
5425                                    ;*              000 000 000
5426                                    ;*              011 111 101
5427                                    ;*              000 000 000
5428                                    ;*                  .
5429                                    ;*                  .
5430                                    ;*                  .
5431                                    ;*              000 000 000
5432                                    ;*              010 111 111
5433                                    ;*              000 000 000
5434                                    ;*              101 111 111
5435                                    ;*
5436                                    ;;*****************************************************************
5437  020250  000004                    TST4:   SCOPE
5438  020252  012737  000004  001324            MOV     #4,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
5439  020260  004737  030462                    JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5440  020264  004737  030530                    JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5441  020270  000137  020414                    JMP     TST5            ;JUMP TO NEXT TEST
5442                                    ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5443  020274  004737  027522                    JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
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5444  020300  004737  026040                    JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5445                                    ;SEEK TO CYL 0
5446  020304  005065  000002                    CLR     P.CYLN(R5)      ;SET CYL = 0
5447  020310  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CYLINDER 0
5448                                    ;SEEK TO CYL 377 (OCT)
5449  020314  012765  000377  000002            MOV     #377,P.CYLN(R5) ;SET CYL = 377
5450  020322  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CYL 377
5451                                    ;SEEK TO REMAINING CROSSTALK CYLINDERS
5452  020326  012737  000001  005514            MOV     #1,CYLNDR       ;INITIALIZE BIT MASK
5453  020334  005065  000002            2$:     CLR     P.CYLN(R5)      ;SET CYL = 0
5454  020340  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CYL 0
5455  020344  032737  000200  005514            BIT     #BIT07,CYLNDR   ;SEE IF ABOUT TO DO LAST SEEK
5456  020352  001013                            BNE     4$              ;BR IF THIS WILL BE LAST SEEK
5457  020354  012765  000377  000002            MOV     #377,P.CYLN(R5) ;SET CYL = 377
5458  020362  043765  005514  000002            BIC     CYLNDR,P.CYLN(R5) ;ZERO A BIT TO PROMOTE CROSSTALK
5459  020370  004737  032374                    JSR     PC,SEEKER       ;SEEK TO THIS CYLINDER
5460  020374  006337  005514                    ASL     CYLNDR          ;SHIFT BIT MASK
5461  020400  000755                            BR      2$              ;GO SEEK TO CYL 0 AGAIN
5462  020402  012765  000577  000002    4$:     MOV     #577,P.CYLN(R5) ;SET CYL = 577
5463  020410  004737  032374                    JSR     PC,SEEKER       ;SEEK TO CYL 577
5464
5465
5466
5467                                    ;;*****************************************************************
5468                                    ;*TEST 5        INCREMENT/DECREMENT SEEK TEST
5469                                    ;*
5470                                    ;*      IN THIS TEST SEEKS ARE DONE IN INCREMENTS OF IC CYLINDERS
5471                                    ;*      STARTING AT CYL FC, AND ENDING AT OR BEYOND LC. THEN, THE
5472                                    ;*      SEEKS ARE DONE IN REVERSE, BACK TO FC. IF FC IS CHOSEN > LC,
5473                                    ;*      THE SEEKS WILL PROCEED IN THE OPPOSITE DIRECTION.
5474                                    ;*
5475                                    ;;*****************************************************************
5476  020414  000004                    TST5:   SCOPE
5477  020416  012737  000005  001324            MOV     #5,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
5478  020424  004737  030462                    JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5479  020430  004737  030530                    JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5480  020434  000137  020620                    JMP     TST6            ;JUMP TO NEXT TEST
5481                                    ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5482  020440  004737  027522                    JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5483  020444  004737  026040                    JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5484                                    ;SEEK IN INCREMENTS, FROM FC TO LC
5485  020450  013737  005732  005522            MOV     FC,NCYL1        ;INITIALIZE NCYL1 TO FC
5486  020456  013765  005522  000002    2$:     MOV     NCYL1,P.CYLN(R5) ;SET CYL = NCYL1
5487  020464  004737  032374                    JSR     PC,SEEKER       ;SEEK TO NCYL1
5488  020470  023737  005732  005734            CMP     FC,LC           ;SEE IF FC > LC
5489  020476  003010                            BGT     4$              ;BR IF FC > LC
5490  020500  063737  005736  005522            ADD     IC,NCYL1        ;INCREMENT NCYL1
5491  020506  023737  005734  005522            CMP     LC,NCYL1        ;SEE IF LC EXCEEDED
5492  020514  002360                            BGE     2$              ;BR IF NOT YET
5493  020516  000407                            BR      6$              ;LC REACHED - DO REVERSE SEEKS
5494  020520  163737  005736  005522    4$:     SUB     IC,NCYL1        ;DECREMENT NCYL1
5495  020526  023737  005734  005522            CMP     LC,NCYL1        ;SEE IF LC EXCEEDED
5496  020534  003750                            BLE     2$              ;BR IF NOT YET
5497                                    ;SEEK IN INCREMENTS, BACK TO FC
5498  020536  023737  005732  005734    6$:     CMP     FC,LC           ;SEE IF FC >LC
5499  020544  003010                            BGT     8$              ;BR IF FC > LC
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5500  020546  163737  005736  005522          SUB     IC,NCYL1          ;DECREMENT NCYL1
5501  020554  023737  005732  005522          CMP     FC,NCYL1          ;SEE IF FC EXCEEDED
5502  020562  003410                          BLE     10$               ;BR IF NOT YET
5503  020564  000415                          BR      12$               ;FC REACHED - ALL DONE
5504  020566  063737  005736  005522  8$:     ADD     IC,NCYL1          ;INCREMENT NCYL1
5505  020574  023737  005732  005522          CMP     FC,NCYL1          ;SEE IF FC EXCEEDED
5506  020602  002406                          BLT     12$               ;FC REACHED - ALL DONE
5507  020604  013765  005522  000002  10$:     MOV     NCYL1,P.CYLN(R5)  ;SET CYL = NCYL1
5508  020612  004737  032374                  JSR     PC,SEEKER         ;SEEK TO NCYL1
5509  020616  000747                          BR      6$                ;CONTINUE
5510  020620                          12$:
5511
5512
5513                                    ;;*****************************************************************
5514                                    ;*TEST 6        OSCILLATING SEEK TEST
5515                                    ;*
5516                                    ;*      IN THIS TEST, SEEKS OF INCREASING LENGTH ARE DONE FROM FC
5517                                    ;*      TO NCYL1, AND BACK TO FC. NCYL1 IS INCREMENTED BY IC AFTER
5518                                    ;*      EACH SEEK, AND THE SEEKS TO NCYL1 ALWAYS PROCEED FROM FC
5519                                    ;*      TOWARD LC (FC > LC IS PERMISSIBLE). WHEN LC IS REACHED OR
5520                                    ;*      EXCEEDED, THE SAME SEEKS ARE DONE IN REVERSE ORDER, UNTIL
5521                                    ;*      NCYL1 EXCEEDS FC.
5522                                    ;*
5523                                    ;;*****************************************************************
5524  020620  000004                  TST6:   SCOPE
5525  020622  012737  000006  001324          MOV     #6,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
5526  020630  004737  030462                  JSR     PC,SETTUP         ;SET UP FOR LOOP ON ERROR
5527  020634  004737  030530                  JSR     PC,CHKITR         ;SEE IF ITER. NO. = 0 FOR THIS TEST
5528  020640  000137  021050                  JMP     TST7              ;JUMP TO NEXT TEST
5529                                  ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5530  020644  004737  027522                  JSR     PC,INITSS         ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5531  020650  004737  026040                  JSR     PC,PREPKB         ;PREPARE FOR POSSIBLE KBD INPUT
5532                                  ;DO OSCILLATING SEEKS TOWARD LC
5533  020654  013737  005732  005522          MOV     FC,NCYL1          ;INITIALIZE NCYL1 TO FC
5534  020662  013765  005522  000002  2$:      MOV     NCYL1,P.CYLN(R5)  ;SET CYL = NCYL1
5535  020670  004737  032374                  JSR     PC,SEEKER         ;SEEK TO NCYL1
5536  020674  013765  005732  000002          MOV     FC,P.CYLN(R5)     ;SET CYL = FC
5537  020702  004737  032374                  JSR     PC,SEEKER         ;SEEK TO FC
5538  020706  023737  005732  005734          CMP     FC,LC             ;SEE IF FC > LC
5539  020714  003010                          BGT     4$                ;BR IF FC > LC
5540  020716  063737  005736  005522          ADD     IC,NCYL1          ;INCREMENT NCYL1
5541  020724  023737  005734  005522          CMP     LC,NCYL1          ;SEE IF LC EXCEEDED
5542  020732  002353                          BGE     2$                ;BR IF NOT YET
5543  020734  000407                          BR      6$                ;LC REACHED - DO REVERSE SEEKS
5544  020736  163737  005736  005522  4$:     SUB     IC,NCYL1          ;DECREMENT NCYL1
5545  020744  023737  005734  005522          CMP     LC,NCYL1          ;SEE IF LC EXCEEDED
5546  020752  003743                          BLE     2$                ;BR IF NOT YET
5547                                  ;DO OSCILLATING SEEKS TOWARD FC
5548  020754  023737  005732  005734  6$:     CMP     FC,LC             ;SEE IF FC >LC
5549  020762  003010                          BGT     8$                ;BR IF FC > LC
5550  020764  163737  005736  005522          SUB     IC,NCYL1          ;DECREMENT NCYL1
5551  020772  023737  005732  005522          CMP     FC,NCYL1          ;SEE IF FC EXCEEDED
5552  021000  003410                          BLE     10$               ;BR IF NOT YET
5553  021002  000422                          BR      12$               ;FC REACHED - ALL DONE
5554  021004  063737  005736  005522  8$:     ADD     IC,NCYL1          ;INCREMENT NCYL1
5555  021012  023737  005732  005522          CMP     FC,NCYL1          ;SEE IF FC EXCEEDED
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5556  021020  002413                          BLT     12$             ;FC REACHED - ALL DONE
5557  021022  013765  005522  000002  10$:    MOV     NCYL1,P.CYLN(R5) ;SET CYL = NCYL1
5558  021030  004737  032374                  JSR     PC,SEEKER       ;SEEK TO NCYL1
5559  021034  013765  005732  000002          MOV     FC,P.CYLN(R5)   ;SET CYL = FC
5560  021042  004737  032374                  JSR     PC,SEEKER       ;SEEK TO FC
5561  021046  000742                          BR      6$              ;CONTINUE
5562  021050                          12$:
5563
5564
5565                                  ;;*****************************************************************
5566                                  ;*TEST 7         CONVERGING/DIVERGING SEEK TEST
5567                                  ;*
5568                                  ;*      THIS TEST PERFORMS SEEKS WHICH EXERCISE CYLINDER DIFFERENCE
5569                                  ;*      VALUES. INITIALLY, NCYL1 = FC AND NCYL2 = LC. A SEEK IS
5570                                  ;*      DONE TO NCYL1 AND THEN TO NCYL2. THEN, NCYL1 IS INCREMENTED
5571                                  ;*      BY IC IN THE DIRECTION OF LC, AND NCYL2 IS INCREMENTED BY
5572                                  ;*      IC IN THE DIRECTION OF FC, AND SEEKS ARE DONE TO NCYL1
5573                                  ;*      AND NCYL2 AGAIN. THIS SEEKING IS CONTINUED WITH INCREMENTED
5574                                  ;*      VALUES OF NCYL1 AND NCYL2, UNTIL NCYL1 EXCEEDS LC AND NCYL2
5575                                  ;*      EXCEEDS FC. (NOTE : FC > LC IS PERMISSIBLE.)
5576                                  ;*      THIS TEST CAUSES SEEKING TO CONVERGING AND THEN DIVERGING
5577                                  ;*      CYLINDER VALUES.
5578                                  ;*
5579                                  ;*****************************************************************
5580  021050  000004                  TST7:   SCOPE
5581  021052  012737  000007  001324          MOV     #7,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
5582  021060  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5583  021064  004737  030530                  JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5584  021070  000137  021226                  JMP     TST10           ;JUMP TO NEXT TEST
5585                          ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5586  021074  004737  027522                  JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5587  021100  004737  026040                  JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5588  021104  013737  005732  005522          MOV     FC,NCYL1        ;SET NCYL1 = FC
5589  021112  013737  005734  005524          MOV     LC,NCYL2        ;SET NCYL2 = LC
5590  021120  013765  005522  000002  2$:     MOV     NCYL1,P.CYLN(R5) ;SET CYL = NCYL1
5591  021126  004737  032374                  JSR     PC,SEEKER       ;SEEK TO NCYL1
5592  021132  013765  005524  000002          MOV     NCYL2,P.CYLN(R5) ;SET CYL = NCYL2
5593  021140  004737  032374                  JSR     PC,SEEKER       ;SEEK TO NCYL2
5594  021144  023737  005732  005734          CMP     FC,LC           ;SEE IF FC > LC
5595  021152  003013                          BGT     4$              ;BR IF FC > LC
5596  021154  063737  005736  005522          ADD     IC,NCYL1        ;INCREMENT NCYL1
5597  021162  163737  005736  005524          SUB     IC,NCYL2        ;DECREMENT NCYL2
5598  021170  023737  005734  005522          CMP     LC,NCYL1        ;SEE IF LIMITS EXCEEDED
5599  021176  002350                          BGE     2$              ;BR IF NOT YET
5600  021200  000412                          BR      6$              ;LIMITS REACHED - ALL DONE
5601  021202  163737  005736  005522  4$:     SUB     IC,NCYL1        ;DECREMENT NCYL1
5602  021210  063737  005736  005524          ADD     IC,NCYL2        ;INCREMENT NCYL2
5603  021216  023737  005734  005522          CMP     LC,NCYL1        ;SEE IF LIMITS EXCEEDED
5604  021224  003735                          BLE     2$              ;BR IF NOT YET
5605  021226                          6$:
5606
5607
5608
5609                                  ;;*****************************************************************
5610                                  ;*TEST 10        PSEUDO-RANDOM SEEK TEST
5611                                  ;*
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```
                                        ;*      THIS TEST PERFORMS A SEEK TO A PSEUDO-RANDOMLY CHOSEN
                                        ;*      CYLINDER, WHICH IS WITHIN THE RANGE (0-632).
                                        ;*
                                        ;;*****************************************************************
021226  000004                          TST10:  SCOPE
021230  012737  000010  001324                MOV     #10,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
021236  004737  030462                        JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
021242  004737  030530                        JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
021246  000137  021300                        JMP     TST11           ;JUMP TO NEXT TEST
                                        ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
021252  004737  027522                        JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
021256  004737  026040                        JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
021262  004737  032554                        JSR     PC,RNDADR       ;SELECT A PSEUDO-RANDOM CYLINDER
021266  013765  005514  000002                MOV     CYLNDR,P.CYLN(R5) ;SET CYL VALUE
021274  004737  032374                        JSR     PC,SEEKER       ;SEEK TO THIS CYLINDER
                                        ;;*****************************************************************
                                        ;*TEST 11       MAXIMUM VELOCITY REVERSAL SEEK TEST
                                        ;*
                                        ;*      THIS TEST PERFORMS A SEEK TO CYLINDER 0, FOLLOWED BY A
                                        ;*      SEEK TO CYL 201 (OCT), AND THEN A RETURN SEEK TO 0. THIS
                                        ;*      OPERATION REQUIRES THE HEADS TO DECELERATE UPON REACHING
                                        ;*      THE POINT OF MAXIMUM VELOCITY, AND INDUCES HEATING IN
                                        ;*      THE SERVO MECHANISM.
                                        ;*
                                        ;;*****************************************************************
021300  000004                          TST11:  SCOPE
021302  012737  000011  001324                MOV     #11,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
021310  004737  030462                        JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
021314  004737  030530                        JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
021320  000137  021366                        JMP     TST12           ;JUMP TO NEXT TEST
                                        ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
021324  004737  027522                        JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
021330  004737  026040                        JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
021334  005065  000002                        CLR     P.CYLN(R5)      ;SET CYL = 0
021340  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CYL 0
021344  012765  000201  000002                MOV     #201,P.CYLN(R5) ;SET CYL = 201 (OCT)
021352  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CYL 201
021356  005065  000002                        CLR     P.CYLN(R5)      ;SET CYL = 0
021362  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CYL 0
                                        ;;*****************************************************************
                                        ;*TEST 12       MECHANICAL VIBRATION SEEK TEST
                                        ;*
                                        ;*      THIS TEST PERFORMS GEOMETRICALLY INCREASING SEEKS WITH
                                        ;*      GEOMETRICALLY DECREASING STALL TIME BETWEEN OPERATIONS
                                        ;*      WITH INTENT TO INDUCE VARYING VIBRATIONAL MODES UPON
                                        ;*      THE DRIVE. THE TEST BEGINS WITH LC = 1, AND ST = SM. THEN,
                                        ;*      THE FOLLOWING SEQUENCE IS PERFORMED :
                                        ;*      SEEKS ARE DONE BETWEEN 0 AND LC, TEN TIMES. THEN, ST IS
                                        ;*      DIVIDED BY 2 AND LC IS DOUBLED, AND SEEKS ARE DONE BETWEEN
                                        ;*      0 AND LC AGAIN, TEN TIMES.THIS PROCESS IS CONTINUED FOR NEW
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```
                                        ;*      VALUES OF ST AND LC, UNTIL LC EXCEEDS CYL 400 (OCT). THEN,
                                        ;*      THE WHOLE PROCESS IS REVERSED, WITH ST BEING DOUBLED AND
                                        ;*      LC DIVIDED BY 2, UNTIL LC BECOMES < 1.
                                        ;*
                                        ;;*****************************************************************
021366  000004                        TST12:  SCOPE
021370  012737  000012  001324                MOV     #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
021376  004737  030462                        JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
021402  004737  030530                        JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
021406  000137  021626                        JMP     TST13           ;JUMP TO NEXT TEST
                                        ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
021412  004737  027522                        JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
021416  004737  026040                        JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
021422  012737  000001  005514                MOV     #1,CYLNDR       ;INIT. CURRENT CYL TO 1
021430  013737  005774  001276                MOV     SM,$TMP6        ;INIT. STALLS TO SM
                                        ;DO INCREASING SEEKS
021436  012737  000012  005542        2$:     MOV     #10.,SCRACH     ;INIT. LOOP COUNTER TO 10(DEC)
021444  013737  001276  005512                MOV     $TMP6,STALLS    ;SET CURRENT STALL IN STALL WORD
021452  005065  000002                4$:     CLR     P.CYLN(R5)      ;SET CYL = 0
021456  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CYL 0
021462  013765  005514  000002                MOV     CYLNDR,P.CYLN(R5) ;SET CURRENT CYLINDER
021470  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CURRENT CYLINDER
021474  005337  005542                        DEC     SCRACH          ;DECREMENT LOOP COUNTER
021500  001364                              BNE     4$              ;BR IF NOT 5 TIMES YET
021502  000241                              CLC                     ;CLEAR GARBAGE BIT
021504  006037  001276                      ROR     $TMP6           ;DIVIDE STALLS BY 2
021510  006037  001300                      ROR     $TMP7           ;SAVE THE DROPPED STALL BIT
021514  006337  005514                      ASL     CYLNDR          ;DOUBLE THE CURRENT CYLINDER NUMBER
021520  032737  001000  005514              BIT     #BIT09,CYLNDR   ;SEE IF DONE WITH INCREASING SEEKS YET
021526  001743                              BEQ     2$              ;BR IF NOT DONE YET
                                        ;DO DECREASING SEEKS
021530  006237  005514                6$:     ASR     CYLNDR          ;DIVIDE CURRENT CYLINDER BY 2
021534  006137  001300                      ROL     $TMP7           ;GET A SAVED STALL BIT INTO CARRY
021540  006137  001276                      ROL     $TMP6           ;DOUBLE THE STALL
021544  012737  000012  005542              MOV     #10.,SCRACH     ;INIT. LOOP COUNTER TO 10(DEC)
021552  013737  001276  005512              MOV     $TMP6,STALLS    ;SET CURRENT STALL IN STALL WORD
021560  005065  000002                8$:     CLR     P.CYLN(R5)      ;SET CYL = 0
021564  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CYL 0
021570  013765  005514  000002                MOV     CYLNDR,P.CYLN(R5) ;SET CURRENT CYL NUMBER
021576  004737  032374                        JSR     PC,SEEKER       ;SEEK TO CURRENT CYLINDER
021602  005337  005542                        DEC     SCRACH          ;DECREMENT LOOP COUNTER
021606  001364                              BNE     8$              ;BR IF NOT 5 TIMES YET
021610  032737  000002  005514              BIT     #BIT01,CYLNDR   ;SEE IF DONE YET
021616  001744                              BEQ     6$              ;BR IF NOT DONE YET
021620  013737  005772  005512              MOV     ST,STALLS       ;RESTORE DESIRED NO. OF UNIT STALLS
```

```
                                        ;;*****************************************************************
                                        ;*TEST 13       MAX ROTATIONAL LATENCY MEASUREMENT
                                        ;*THIS TEST MEASURES THE INTERVAL OF TIME BETWEEN 2 INDEX MARKS
                                        ;*IN A SINGLE DISK ROTATION. THE SPECIFIED MAXIMUM ROTATIONAL
                                        ;*LATENCY = 25 MILLI-SEC + OR - 2.5%. THIS MEASUREMENT IS MADE
                                        ;* 128 TIMES.
                                        ;;*****************************************************************
021626  000004                        TST13:  SCOPE
```

```
5724  021630  012737  000013  001324          MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
5725  021636  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5726  021642  004737  030530                  JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5727  021646  000137  022440                  JMP     TST14           ;JUMP TO NEXT TEST
5728                                  ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5729  021652  004737  027522                  JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5730  021656  004737  026040                  JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5731  021662  105737  003133                  TSTB    DOTIM           ;SEE IF TIMING TESTS ARE ALLOWED
5732  021666  001002                          BNE     26$             ;BR IF TEST ALLOWED
5733  021670  000177  000004                  JMP     @1$             ;SKIP TO NEXT TEST
5734  021674  004737  032712          26$:    JSR     PC,CALBRT       ;CALIBRATE SOFTWARE TIMER
5735  021700                          1$:
5736  021700  022440                          TST14                   ;ERROR RETURN ADDR FOR CALBRT
5737  021702  004737  033204                  JSR     PC,INIVRB       ;INIT VARIABLES TO BE USED
5738  021706  105037  003120                  CLRB    TSTING          ;INHIBIT ^C, ^Z ESCAPE
5739  021712  005003                          CLR     R3              ;INIT MEASUREMENT COUNTER
5740                                  ;READ HEADER TO INITIALIZE FORMAT BIT IN CONTROLLER
5741  021714  142765  000020  000007          BICB    #B.CFMT,P.CS1H(R5) ;SET FORMAT BIT = 0
5742  021722  112765  000125  000001          MOVB    #RDHEAD,P.CMND(R5) ;SET READ HDR COMMAND
5743  021730  004737  040316                  JSR     PC,DRVCAL       ;DO READ HDR TO SET FORMAT TO 0
5744  021734  112737  000001  003120          MOVB    #1,TSTING       ;ALLOW ^C, ^Z ESCAPE
5745                                  ;CHANGE FORMAT AND READ HDR TO FIND INDEX
5746  021742  005000                  2$:     CLR     R0              ;INIT RK06 INTR INDICATOR
5747  021744  012777  022422  161066          MOV     #RHEDHD,@RKVEC  ;SET SPECIAL RK06 HANDLER ADDRESS
5748  021752  005001                          CLR     R1              ;INIT TIME-OUT INDICATOR
5749  021754  152765  000020  000007          BISB    #B.CFMT,P.CS1H(R5) ;COMPLEMENT FORMAT BIT TO 1
5750  021762  052765  010000  000016          BIS     #CFMT,P.CS1(R5) ;COMPLEMENT FORMAT BIT TO 1
5751  021770  004737  040606                  JSR     PC,STRCMD       ;STORE PREV AND CURRENT COMMANDS
5752  021774  013712  017774                  MOV     HOLDS,(R2)      ;ISSUE RD HDR WITH FMT BIT = 1
5753  022000  005700                  6$:     TST     R0              ;SEE IF RK06 INTR REC'D YET
5754  022002  001012                          BNE     8$              ;BR IF RK06 INTR REC'D
5755  022004  005201                          INC     R1              ;INCREMENT TIME-OUT INDICATOR
5756  022006  001374                          BNE     6$              ;BR IF NO TIME-OUT
5757  022010  004737  041704          7$:     JSR     PC,REPSUP       ;GET COMMAND FOR REPORT
5758  022014  004737  044352                  JSR     PC,TOPROC       ;GATHER STATUS
5759  022020  104105                          ERROR   105             ;TIMED-OUT ON READ HEADER
5760  022022  000572                          BR      36$             ;GO TO EXIT
5761  022024  104410                  28$:    RESREG                  ;RESTORE R0-R5
5762  022026  000770                          BR      7$              ;TAKE ERROR EXIT
5763                                  ;CHANGE FORMAT AND READ HDR TO MEASURE TIME TO NEXT INDEX
5764  022030  005000                  8$:     CLR     R0              ;INIT RK06 INTERRUPT INDICATOR
5765  022032  005004                          CLR     R4              ;INIT HI CYCLE COUNT
5766  022034  010501                          MOV     R5,R1           ;SAVE PARAM BLK ADDRESS
5767  022036  010537  005542                  MOV     R5,SCRACH
5768  022042  005005                          CLR     R5
5769  022044  142761  000020  000007          BICB    #B.CFMT,P.CS1H(R1) ;COMPLEMENT FORMAT BIT TO 0
5770  022052  042761  010000  000016          BIC     #CFMT,P.CS1(R1) ;COMPLEMENT FORMAT BIT TO 0
5771  022060  016162  000016  000000          MOV     P.CS1(R1),RKCS1(R2) ;ISSUE READ HDR TO FIND NEXT INDEX
5772  022066  004737  033150                  JSR     PC,TIMER        ;MEASURE THE TIME TO NEXT INDEX
5773  022072  022010                          7$                      ;ERROR RETURN ADDRESS
5774                                  ;CONVERT MEAS'D CYCLES TO TIME AND CHECK AGAINST LIMITS
5775  022074  104407                          SAVREG                  ;SAVE R0-R5
5776  022076  004737  034136                  JSR     PC,CNVTIM       ;CONVERT MEAS'D CYCLES TO TIME
5777  022102  022024                          28$                     ;ERROR RETURN ADDRESS
5778  022104  060337  003176                  ADD     R3,SUML01       ;ADD CONVERTED TIME TO SUM
5779  022110  005537  003200                  ADC     SUMHI1
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5780  022114  060237  003200              ADD     R2,SUMHI1
5781  022120  004737  036332              JSR     PC,CTLOUT       ;CHECK FOR (↑C) OR (↑Z) KBD INPUT
5782                      ;COMPARE R2-R3 AGAINST CURRENT MIN AND MAX MEASUREMENTS
5783  022124  020237  003214              CMP     R2,MINIH1       ;COMP HI BITS TO HI MIN
5784  022130  101010                      BHI     32$             ;BR IF > MIN
5785  022132  103403                      BLO     30$             ;BR IF < MIN
5786  022134  020337  003212              CMP     R3,MINIL1       ;COMP LO BITS TO LO MIN
5787  022140  103004                      BHIS    32$             ;BR IF > OR = MIN
5788  022142  010237  003214      30$:    MOV     R2,MINIH1       ;SET NEW MIN
5789  022146  010337  003212              MOV     R3,MINIL1
5790  022152  020237  003220      32$:    CMP     R2,MAXIH1       ;COMP HI BITS TO HI MAX
5791  022156  103410                      BLO     14$             ;BR IF < MAX
5792  022160  101003                      BHI     34$             ;BR IF > MAX
5793  022162  020337  003216              CMP     R3,MAXIL1       ;COMP LO BITS TO LO MAX
5794  022166  101404                      BLOS    14$             ;BR IF < OR = MAX
5795  022170  010237  003220      34$:    MOV     R2,MAXIH1       ;SET NEW MAX
5796  022174  010337  003216              MOV     R3,MAXIL1
5797                      ;COMPARE MEAS'D TIME TO SPECIFIED LIMITS
5798  022200  020227  000000      14$:    CMP     R2,#MINHI1      ;COMPARE HI BITS TO HI MINIMUM
5799  022204  101006                      BHI     18$             ;BR IF > MIN
5800  022206  103403                      BLO     16$             ;BR IF < MIN
5801  022210  020327  057467              CMP     R3,#MINLO1      ;COMPARE LO BITS TO LO MIN
5802  022214  103002                      BHIS    18$             ;BR IF > OR = MIN
5803  022216  005237  003170      16$:    INC     BLWMIN          ;INCREMENT COUNT OF TIMES BELOW MIN
5804  022222  020227  000000      18$:    CMP     R2,#MAXHI1      ;COMPARE HI BITS TO HI MAX
5805  022226  103406                      BLO     22$             ;BR IF < MAX
5806  022230  101003                      BHI     20$             ;BR IF > MAX
5807  022232  020327  062031              CMP     R3,#MAXLO1      ;COMPARE LO BITS TO LO MAX
5808  022236  101402                      BLOS    22$             ;BR IF < OR = MAX
5809  022240  005237  003172      20$:    INC     ABVMX1          ;INCREMENT COUNT OF TIMES ABOVE MAX
5810  022244  104410      22$:    RESREG                          ;RESTORE R0-R5
5811  022246  005203                      INC     R3              ;INCREMENT MEASUREMENT COUNTER
5812  022250  013705  005542              MOV     SCRACH,R5       ;RESTORE PARAM BLK ADDRESS
5813  022254  022703  000200              CMP     #128.,R3        ;SEE IF 128 MEASUREMENTS YET
5814  022260  001230                      BNE     2$              ;BR IF NOT DONE WITH MEASUREMENTS YET
5815                      ;DVIDE SUM BY 128. TO GET AVERAGE TIME OF ROTATION
5816  022262  012704  000007              MOV     #7,R4           ;SET LOOP COUNTER = 7
5817  022266  000241      24$:    CLC                             ;DIVIDE DOUBLE-WORD SUM BY 2
5818  022270  006037  003200              ROR     SUMHI1
5819  022274  006037  003176              ROR     SUMLO1
5820  022300  005304                      DEC     R4              ;SEE IF DONE WITH DIVISION
5821  022302  001371                      BNE     24$             ;BR IF NOT DONE YET
5822                      ;TYPE TIMING MEASUREMENT RESULTS (IN DECIMAL)
5823  022304  032737  000010  005770      BIT     #BIT03,CS       ;SEE IF TIMING TEST REPORTS SHOULD BE INHIBITED
5824  022312  001036                      BNE     36$             ;BR IF REPORTS SHOULD BE INHIBITED
5825  022314  104401  011577              TYPE    ,ROTIMS         ;TYPE "ROTATIONAL TIMES :"
5826  022320  012701  003212              MOV     #MINIL1,R1      ;POINTER TO LO MIN
5827  022324  004737  034210              JSR     PC,TYPMIN       ;TYPE MIN MEAS'D TIME
5828  022330  013746  003170              MOV     BLWMIN,-(SP)    ;GET COUNT OF TIMES BELOW MIN
5829  022334  104405                      TYPDS                   ;CONVERT AND TYPE IT
5830  022336  104401  012007              TYPE    ,BELOW          ;TYPE " OF 128 BELOW MIN OF "
5831  022342  104401  012334              TYPE    ,LIM1           ;TYPE SPEC'D MIN LIMIT
5832  022346  012701  003216              MOV     #MAXIL1,R1      ;POINTER TO LO MAX
5833  022352  004737  034234              JSR     PC,TYPMAX       ;TYPE MAX MEAS'D TIME
5834  022356  013746  003172              MOV     ABVMX1,-(SP)    ;GET COUNT OF TIMES ABOVE MAX
5835  022362  104405                      TYPDS                   ;CONVERT AND TYPE IT
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5836  022364  104401  012044                    TYPE    ,ABOVE          ;TYPE " OF 128 ABOVE MAX OF "
5837  022370  104401  012347                    TYPE    ,LIM2           ;TYPE SPEC'D MAX LIMIT
5838  022374  012701  003176                    MOV     #SUML01,R1      ;POINTER TO AVG TIME
5839  022400  004737  034260                    JSR     PC,TYPAVG       ;TYPE AVERAGE TIME
5840  022404  104401  001315                    TYPE    ,$CRLF          ;TYPE <CR>,<LF>
5841  022410  012777  045270  160422  36$:      MOV     #I.INTR,@RKVEC  ;RESTORE RK06 HANDLER ADDRESS
5842  022416  000177  177256                    JMP     @1$             ;PROCEED TO NEXT TEST
5843
5844                                    ;;*****************************************************************
5845                                    ;*SPECIAL INTERRUPT HANDLER FOR READ HEADERS IN ROT. LAT. MEAS. TEST
5846                                    ;;*****************************************************************
5847  022422  005200                    RHEDHD: INC     R0              ;SET RK06 INTR HANDLER
5848  022424  005762  000000                    TST     RKCS1(R2)       ;SEE IF CONTROLLER ERROR SET
5849  022430  100002                            BPL     2$              ;BR IF NO ERROR
5850  022432  000137  045270                    JMP     I.INTR          ;LET DRIVER PROCESS THE ERROR
5851  022436  000002                    2$:     RTI                     ;RETURN FROM INTR
5852
5853
5854
5855                                    ;;*****************************************************************
5856                                    ;*TEST 14       ONE CYLINDER SEEK TIME MEASUREMENT
5857                                    ;*THIS TEST MEASURES THE TIME REQUIRED TO SEEK BETWEEN 2 ADJACENT
5858                                    ;*CYLINDERS, BOTH IN THE FORWARD AND REVERSE DIRECTIONS. SEEKS
5859                                    ;*ARE DONE TO 0,1,2,...,631,632  AND THEN TO 631,630,...,2,1,0
5860                                    ;* AND THE RESULTS ARE TYPED FOR EACH DIRECTION.
5861                                    ;*THE SPECIFIED ONE CYL SEEK TIME IS < 8 MILLI-SEC.
5862                                    ;* SEEKS ARE TO & FROM CYL 1456 FOR THE RK07
5863                                    ;*****************************************************************
5864  022440  000004                    TST14:  SCOPE
5865  022442  012737  000014  001324            MOV     #14,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
5866  022450  004737  030462                    JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
5867  022454  004737  030530                    JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
5868  022460  000137  022760                    JMP     TST15           ;JUMP TO NEXT TEST
5869                                    ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
5870  022464  004737  027522                    JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
5871  022470  004737  026040                    JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
5872  022474  105737  003133                    TSTB    DO?IM           ;SEE IF TIMING TESTS ARE ALLOWED
5873  022500  001002                            BNE     2$              ;BR IF ALLOWED
5874  022502  000177  000004            1$:     JMP     @4$             ;SKIP TO NEXT TEST
5875  022506  004737  032712            2$:     JSR     PC,CALBRT       ;CALIBRATE THE SOFTWARE TIMER
5876  022512                            4$:
5877  022512  022760                            TST15                   ;ERROR RETURN ADDR FOR CALBRT
5878  022514  004737  033204                    JSR     PC,INIVRB       ;INIT VARIABLES USED
5879  022520  112765  000117  000001            MOVB    #SEEK,P.CMND(R5) ;SET SEEK COMMAND
5880  022526  005065  000002                    CLR     P.CYLN(R5)      ;INIT CYL TO 0
5881  022532  004737  040316                    JSR     PC,DRVCAL       ;DO INITIAL SEEK TO CYL 0
5882                                    ;MEASURE FORWARD SEEK TIME
5883  022536  005265  000002            6$:     INC     P.CYLN(R5)      ;INCREMENT CYLINDER BY 1
5884  022542  004737  033312                    JSR     PC,TIMSEK       ;MEASURE A SEEK TIME
5885  022546  022760                            TST15                   ;ERROR RETURN ADDR FOR CALBRT
5886  022550  060137  003176                    ADD     R1,SUML01       ;ADD MEAS'D TIME TO FORWARD SUM
5887  022554  005537  003200                    ADC     SUMHI1
5888  022560  060037  003200                    ADD     R0,SUMHI1
5889  022564  004737  036332                    JSR     PC,CTLOUT       ;CHECK FOR (^C) OR (^Z) KBD INPUT
5890                                    ;COMPARE FORWARD TIME TO CURRENT FORWARD MIN AND MAX
5891  022570  012703  003212                    MOV     #MINIL1,R3      ;SET POINTER TO CURRENT MIN AND MAX
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5892  022574  004737  033624            JSR     PC,CMPTIM       ;COMPARE TO MEAS'D MIN AND MAX
5893                              ;COMPARE FORWARD TIME TO SPEC'D MAX LIMIT
5894  022600  020037  007220            CMP     R0,MAXHI2       ;COMPARE HI BITS TO HI MAX
5895  022604  103406                   BLO     12$             ;BR IF < MAX
5896  022606  101003                   BHI     10$             ;BR IF > MAX
5897  022610  020137  007216            CMP     R1,MAXLO2       ;COMPARE LO BITS TO LO MAX
5898  022614  101402                   BLOS    12$             ;BR IF < OR = MAX
5899  022616  005237  003172      10$:  INC     ABVMX1          ;INCREMENT COUNT OF TIMES ABOVE SPEC'D MAX
5900  022622  023765  017760  000002  12$:  CMP     LSTCYL,P.CYLN(R5)       ;SEE IF LAST FORWARD SEEK DONE
5901  022630  001342                   BNE     6$              ;BR IF NOT DONE
5902                              ;MEASURE A REVERSE SEEK TIME
5903  022632  005365  000002      14$:  DEC     P.CYLN(R5)      ;DECREMENT CYL BY 1
5904  022636  004737  033312            JSR     PC,TIMSEK       ;MEASURE A SEEK TIME
5905  022642  022760                   TST15                   ;ERROR RETURN ADDR FOR CALBRT
5906  022644  060137  003202            ADD     R1,SUMLO2       ;ADD MEASURED TIME TO REVERSE SUM
5907  022650  005537  003204            ADC     SUMHI2
5908  022654  060037  003204            ADD     R0,SUMHI2
5909  022660  004737  036332            JSR     PC,CTLOUT       ;CHECK FOR (↑C) OR (↑Z) KBD INPUT
5910                              ;COMPARE REVERSE TIME TO CURRENT REVERSE MIN AND MAX
5911  022664  012703  003222            MOV     #MINIL2,R3      ;SET POINTER TO CURRENT MIN AND MAX
5912  022670  004737  033624            JSR     PC,CMPTIM       ;COMPARE TO MEAS'D MIN AND MAX
5913                              ;COMPARE REVERSE TIME TO SPEC'D MAX LIMIT
5914  022674  020037  007220            CMP     R0,MAXHI2        COMPARE HI BITS TO HI MAX
5915  022700  103406                   BLO     18$             ;BR IF < MAX
5916  022702  101003                   BHI     16$             ;BR IF > MAX
5917  022704  020137  007216            CMP     R1,MAXLO2       ;COMPARE LO BITS TO LO MAX
5918  022710  101402                   BLOS    18$             ;BR IF < OR = MAX
5919  022712  005237  003174      16$:  INC     ABVMX2          ;INCR COUNT OF TIMES ABOVE SPEC'D MAX
5920  022716  005765  000002      18$:  TST     P.CYLN(R5)      ;SEE IF LAST REVERSE SEEK DONE
5921  022722  001343                   BNE     14$             ;BR IF NOT DONE YET
5922                              ;COMPUTE FORWARD AND REVERSE SEEK TIME AVERAGES
5923  022724  013703  017760            MOV     LSTCYL,R3               ;GET NO. OF MEASUREMENTS
5924  022730  004737  033676            JSR     PC,GETAVG       ;COMPUTE AVERAGES
5925                              ;TYPE TIMING MEASUREMENT RESULTS (IN DECIMAL)
5926  022734  032737  000010  005770        BIT     #BIT03,CS       ;SEE IF TIMING TEST REPORTS SHOULD BE INHIBITED
5927  022742  001257                   BNE     1$              ;BR IF REPORTS SHOULD BE INHIBITED
5928  022744  104401  011644            TYPE    ,ONECYL         ;TYPE "ONE CYL SEEK TIMES"
5929  022750  012703  012101            MOV     #ABOVE1,R3      ;GET POINTER TO MAX SPEC'D LIMIT MSG
5930  022754  004737  033770            JSR     PC,TYPTMS       ;TYPE TIMING TEST RESULTS
5931
5932
5933
5934                              ;;**********************************************************************
5935                              ;*TEST 15       AVERAGE SEEK TIME MEASUREMENT
5936                              ;*THIS TEST MEASURES THE TRUE AVERAGE SEEK TIME IN BOTH THE FORWARD
5937                              ;*AND REVERSE DIRECTIONS. THE AVERAGE TIME IS CALCULATED FROM THE
5938                              ;*FOLLOWING FORMULA :
5939                              ;*  T AVG = [T1(410)(2)+T2(409)(2)+...+T410(1)(2)]/(410)(410)
5940                              ;*  WHERE TX = THE MEASURED TIME TO SEEK X CYLINDERS.
5941                              ;*FORWARD AND REVERSE TIMES ARE MEASURED AND TYPED,
5942                              ;*SEPARATELY.
5943                              ;*THE SPECIFIED AVERAGE SEEK TIME IS < 38 MILLI-SEC.
5944                              ;* CYL 814 USED FOR THE RK07
5945                              ;;**********************************************************************
5946  022760  000004              TST15:  SCOPE
5947  022762  012737  000015  001324        MOV     #15,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
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 5948  022770  004737  030462                 JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
 5949  022774  004737  030530                 JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
 5950  023000  000137  023316                 JMP     TST16           ;JUMP TO NEXT TEST
 5951                          ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
 5952  023004  004737  027522                 JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
 5953  023010  004737  026040                 JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
 5954  023014  105737  003133                 TSTB    DOTIM           ;SEE IF TIMING TESTS ARE ALLOWED
 5955  023020  001002                         BNE     2$              ;BR IF ALLOWED
 5956  023022  000177  000004          1$:    JMP     @4$             ;SKIP TO NEXT TEST
 5957  023026  004737  032712          2$:    JSR     PC,CALBRT       ;CALIBRATE THE SOFTWARE TIMER
 5958  023032                          4$:
 5959  023032  023316                         TST16                   ;ERROR RETURN ADDR FOR CALBRT
 5960  023034  004737  033204                 JSR     PC,INIVRB       ;INIT VARIABLES
 5961  023040  112765  000117  000001         MOVB    #SEEK,P.CMND(R5) ;SET SEEK COMMAND
 5962  023046  005065  000002                 CLR     P.CYLN(R5)      ;SET CYL = 0
 5963  023052  004737  040316                 JSR     PC,DRVCAL       ;SEEK INITIALLY TO 0
 5964  023056  005037  005522                 CLR     NCYL1           ;SET DESTINATION CYLINDER
 5965  023062  013737  017762  005542         MOV     LCPI,SCRACH     ;INIT COEFFICIENT TO 411(DEC)/814(DEC) FOR RK07
 5966  023070  005237  005522          8$:    INC     NCYL1           ;INCR DESTINATION CYL
 5967  023074  005337  005542                 DEC     SCRACH          ;DECREMENT COEFFICIENT
 5968  023100  013765  005522  000002         MOV     NCYL1,P.CYLN(R5)
 5969  023106  004737  033312                 JSR     PC,TIMSEK       ;MEASURE A FORWARD SEEK TIME
 5970  023112  023316                         TST16                   ;ERROR RETURN ADDR FOR CALBRT
 5971  023114  004737  033514                 JSR     PC,FDTERM       ;COMPUTE AND ADD A FORWARD TERM
 5972  023120  005065  000002                 CLR     P.CYLN(R5)      ;SET CYL TO 0
 5973  023124  004737  033312                 JSR     PC,TIMSEK       ;MEASURE A REVERSE SEEK TIME
 5974  023130  023316                         TST16                   ;ERROR RETURN ADDR FOR CALBRT
 5975  023132  004737  033560                 JSR     PC,RVTERM       ;COMPUTE AND ADD A REVERSE TERM
 5976  023136  023737  005522  017760         CMP     NCYL1,LSTCYL    ;SEE IF DONE MEASURING YET
 5977  023144  002751                         BLT     8$              ;BR IF NOT DONE YET
 5978  023146  104401  011617                 TYPE    ,AVGSEK         ;TYPE "AVERAGE SEEK TIMES"
 5979                          ;DIVIDE FORWARD SUM BY (410)(410)/(814)(814) FOR RK07
 5980  023152  013700  003176                 MOV     SUML01,R0       ;GET DIVIDEND
 5981  023156  013701  003200                 MOV     SUMHI1,R1
 5982  023162  013702  003202                 MOV     SUML02,R2
 5983  023166  013703  003204                 MOV     SUMHI2,R3
 5984  023172  013704  017776                 MOV     HOLD6,R4                ;GET DIVISOR
 5985  023176  013705  020000                 MOV     HOLD7,R5
 5986  023202  004737  053244                 JSR     PC,M.DPID       ;PERFORM DIVISION
 5987  023206  010237  003200                 MOV     R2,SUMHI1       ;GET FORWARD AVG
 5988  023212  010337  003176                 MOV     R3,SUML01
 5989                          ;DIVIDE REVERSE SUM BY (410)(410)
 5990  023216  013700  003216                 MOV     MAXIL1,R0       ;GET DIVIDEND
 5991  023222  013701  003220                 MOV     MAXIH1,R1
 5992  023226  013702  003226                 MOV     MAXIL2,R2
 5993  023232  013703  003230                 MOV     MAXIH2,R3
 5994  023236  004737  053244                 JSR     PC,M.DPID       ;PERFORM DIVISION
 5995  023242  010237  003204                 MOV     R2,SUMHI2       ;GET REVERSE AVG
 5996  023246  010337  003202                 MOV     R3,SUML02
 5997                          ;TYPE FORWARD AVERAGE
 5998  023252  104401  011722                 TYPE    ,FORWRD         ;TYPE "***FORWARD DIRECTION***"
 5999  023256  012701  003176                 MOV     #SUML01,R1      ;POINTER TO FORWARD AVG
 6000  023262  004737  034260                 JSR     PC,TYPAVG       ;TYPE FORWARD AVERAGE
 6001  023266  104401  012264                 TYPE    ,SPCDMX         ;TYPE "SPEC'D MAX IS 40000 US"
 6002                          ;TYPE REVERSE AVERAGE
 6003  023272  104401  011740                 TYPE    ,REVRSE         ;TYPE "***REVERSE DIRECTION***"
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                        MOV     #SUML02,R1      ;POINTER TO REVERSE AVG
                        JSR     PC,TYPAVG       ;TYPE REVERSE AVERAGE
                        TYPE    ,SPCDMX         ;TYPE "SPEC'D MAX IS 40000 US"
                        JSR     PC,INITSS       ;INIT THE SUB-SYS


                ;:*****************************************************************
                ;*TEST 16        MAXIMUM SEEK TIME MEASUREMENT
                ;*THIS TEST MEASURES THE TIME  REQUIRED TO SEEK FORM CYL 0 TO
                ;*CYL 632 OCT. (410 DEC.). THIS TIME REPRESENTS THE MAXIMUM SEEK
                ;*TIME, AND IT IS MEASURED 128 TIMES IN EACH DIRECTION.  THE
                ;*THE SPECIFIED MAXIMUM SEEK TIME IS < 75 MILLI-SEC.
                ;* CYL 814 IS THE LAST CYL FOR THE RK07
                ;:*****************************************************************
000004          TST16:  SCOPE
001324                  MOV     #16,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                        JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
                        JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
                        JMP     TST17           ;JUMP TO NEXT TEST
                ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
                        JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
                        JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
                        TSTB    DOTIM           ;SEE IF TIMING TESTS ARE ALLOWED
                        BNE     2$              ;BR IF ALLOWED
000004          1$:     JMP     @4$             ;SKIP TO NEXT TEST
                2$:     JSR     PC,CALBRT       ;CALIBRATE THE SOFTWARE TIMER
                4$:
                        TST17                   ;ERROR RETURN ADDR FOR CALBRT
                        JSR     PC,INIVRB       ;INIT VARIABLES USED
000001                  MOVB    #SEEK,P.CMND(R5) ;SET SEEK COMMAND
                        CLR     P.CYLN(R5)      ;INIT CYL TO 0
                        JSR     PC,DRVCAL       ;DO INITIAL SEEK TO CYL 0
                        CLR     SCRACH          ;INIT MEASUREMENT COUNT
                ;MEASURE FORWARD SEEK TIME
017760  000002  6$:     MOV     LSTCYL,P.CYLN(R5)       ;SET CYL = 632 OCT, 1456 FOR RK07
                        JSR     PC,TIMSEK       ;MEASURE A SEEK TIME
                        TST17                   ;ERROR RETURN ADDR FOR CALBRT
                        ADD     R1,SUML01       ;ADD MEAS'D TIME TO FORWARD SUM
                        ADC     SUMHI1
                        ADD     R0,SUMHI1
                        JSR     PC,CTLOUT       ;CHECK FOR (↑C) OR (↑Z) KBD INPUT
                ;COMPARE FORWARD TIME TO CURRENT FORWARD MIN AND MAX
                        MOV     #MINIL1,R3      ;SET POINTER TO CURRENT MIN AND MAX
                        JSR     PC,CMPTIM       ;COMPARE TO MEAS'D MIN AND MAX
                ;COMPARE FORWARD TIME TO SPEC'D MAX LIMIT
                        CMP     R0,MAXHI4       ;COMPARE HI BITS TO HI MAX
                        BLO     12$             ;BR IF < MAX
                        BHI     10$             ;BR IF > MAX
                        CMP     R1,MAXLO4       ;COMPARE LO BITS TO LO MAX
                        BLOS    12$             ;BR IF < OR = MAX
                10$:    INC     ABVMX1          ;INCREMENT COUNT OF TIMES ABOVE SPEC'D MAX
                ;MEASURE A REVERSE SEEK TIME
                12$:    CLR     P.CYLN(R5)      ;SET CYL = 0
                        JSR     PC,TIMSEK       ;MEASURE A SEEK TIME
                        TST17                   ;ERROR RETURN ADDR FOR CALBRT
                        ADD     R1,SUML02       ;ADD MEASURED TIME TO REVERSE SUM
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6060  023524  005537  003204                ADC     SUMHI2
6061  023530  060037  003204                ADD     R0,SUMHI2
6062  023534  004737  036332                JSR     PC,CTLOUT       ;CHECK FOR (↑C) OR (↑Z) KBD INPUT
6063                                ;COMPARE REVERSE TIME TO CURRENT REVERSE MIN AND MAX
6064  023540  012703  003222                MOV     #MINIL2,R3      ;SET POINTER TO CURRENT MIN AND MAX
6065  023544  004737  033624                JSR     PC,CMPTIM       ;COMPARE TO MEAS'D MIN AND MAX
6066                                ;COMPARE REVERSE TIME TO SPEC'D MAX LIMIT
6067  023550  020037  007224                CMP     R0,MAXHI4       ;COMPARE HI BITS TO HI MAX
6068  023554  103406                        BLO     18$             ;BR IF < MAX
6069  023556  101003                        BHI     16$             ;BR IF > MAX
6070  023560  020137  007222                CMP     R1,MAXLO4       ;COMPARE LO BITS TO LO MAX
6071  023564  101402                        BLOS    18$             ;BR IF < OR = MAX
6072  023566  005237  003174        16$:    INC     ABVMX2          ;INCR COUNT OF TIMES ABOVE SPEC'D MAX
6073  023572  005237  005542        18$:    INC     SCRACH          ;INCREMENT MEASUREMENT COUNT
6074  023576  022737  000200  005542        CMP     #128.,SCRACH    ;SEE IF DONE WITH 128 MEASUREMENTS
6075  023604  001305                        BNE     6$              ;BR IF NOT DONE YET
6076                                ;COMPUTE FORWARD AND REVERSE SEEK TIME AVERAGES
6077  023606  012703  000200                MOV     #128.,R3        ;GET NO. OF MEASUREMENTS
6078  023612  004737  033676                JSR     PC,GETAVG       ;COMPUTE AVERAGES
6079                                ;TYPE TIMING MEASUREMENT RESULTS (IN DECIMAL)
6080  023616  032737  000010  005770        BIT     #BIT03,CS       ;SEE IF TIMING TEST REPORTS SHOULD BE INHIBITED
6081  023624  001255                        BNE     1$              ;BR IF REPORTS SHOULD BE INHIBITED
6082  023626  1044C1  011675                TYPE    ,MAXSEK         ;TYPE "MAXIMUM SEEK TIMES"
6083  023632  012703  012201                MOV     #ABOVE3,R3      ;GET POINTER TO MAX SPEC'D LIMIT MSG
6084  023636  004737  033770                JSR     PC,TYPTMS       ;TYPE TIMING TEST RESULTS
6085
6086
6087
6088                                ;;*****************************************************************
6089                                ;*TEST 17       SECTOR ADDRESSING TEST
6090                                ;*IN THIS TEST, ALL SECTORS OF FC, FT ARE WRITTEN, EACH WITH
6091                                ;*256(DEC) WORDS OF ITS OWN SECTOR NO. + 100(OCT). NEXT, FOR
6092                                ;*EACH SECTOR WRITTEN A WRITE CHECK IS DONE, FOLLOWED BY A
6093                                ;*READ AND SOFTWARE COMPARE OF THE DATA.
6094                                ;;*****************************************************************
6095  023642  000004                TST17:  SCOPE
6096  023644  012737  000017  001324        MOV     #17,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
6097  023652  004737  030462                JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
6098  023656  004737  030530                JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
6099  023662  000137  024262                JMP     TST20           ;JUMP TO NEXT TEST
6100                                ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
6101  023666  004737  027522                JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
6102  023672  004737  026040                JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
6103  023676  112765  000123  000001        MOVB    #WRDATA,P.CMND(R5)      ;SET WRITE DATA COMMAND
6104  023704  013765  005732  000002        MOV     FC,P.CYLN(R5)           ;SET CYL = FC
6105  023712  113765  005740  000005        MOVB    FT,P.TRCK(R5)           ;SET TRACK = FT
6106  023720  013737  005732  001174        MOV     FC,$REG5                ;SET PACK ADR FOR ERROR PRINTOUT
6107  023726  013737  005740  001176        MOV     FT,$REG6
6108  023734  005037  001200                CLR     $REG7
6109  023740  105065  000004                CLRB    P.SECT(R5)              ;SET SECTOR = 0
6110  023744  012765  063554  000010        MOV     #RWBUF,P.BALO(R5)       ;SET DATA BUFFER ADDRESS
6111  023752  012765  177400  000012        MOV     #-256.,P.WC(R5)         ;SET WORD CNT FOR 256(DEC) WORDS
6112                                ;SET NUMBER OF SECTORS IN R3
6113  023760  012703  000024                MOV     #20.,R3         ;SET R3 INITIALLY = 20(DEC)
6114  023764  105737  003125                TSTB    FORMAT          ;DETERMINE THE FORMAT
6115  023770  001002                        BNE     4$              ;BR IF 20 SECTOR FORMAT
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6116  023772  012703  000026            MOV     #22.,R3          ;SET R3 = 22(DEC)
6117                                ;WRITE THE CURRENT SECTOR WITH THE SECTOR NUMBER + 100(OCT)
6118  023776  116500  000004      4$:   MOVB    P.SECT(R5),R0    ;PUT SECTOR NO. INTO R0
6119  024002  062700  000100            ADD     #100,R0          ;ADD 100(OCT) TO SECTOR NO.
6120  024006  004737  034304            JSR     PC,LODSEC        ;LOAD THE ENTIRE BUFFER WITH SECTOR NO. + 100(OCT)
6121  024012  004737  040316            JSR     PC,DRVCAL        ;WRITE THE SECTOR
6122  024016  105265  000004            INCB    P.SECT(R5)       ;INCREMENT THE SECTOR NO.
6123  024022  120365  000004            CMPB    R3,P.SECT(R5)    ;SEE IF LAST SECTOR WRITTEN YET
6124  024026  001363                    BNE     4$               ;BR IF NOT DONE YET
6125  024030  012737  024030  001110    MOV     #.,$LPERR        ;SET NEW LOOP ON ERROR ADRS
6126  024036  004737  030462            JSR     PC,SETTUP        ;SET UP FOR LOOP ON ERROR
6127  024042  105065  000004            CLRB    P.SECT(R5)       ;INITIALIZE SECTOR TO 0
6128                                ;DO WRITE CHECK OF A SECTOR
6129  024046  116500  000004      8$:   MOVB    P.SECT(R5),R0    ;GET SECTOR INTO R0
6130  024052  062700  000100            ADD     #100,R0          ;ADD 100(OCT) TO SECTOR NO.
6131  024056  004737  034304            JSR     PC,LODSEC        ;LOAD BUFFER WITH SECTOR + 100(OCT)
6132  024062  112765  000131  000001    MOVB    #WRTCHK,P.CMND(R5) ;SET WRITE CHECK COMMAND
6133  024070  004737  040316            JSR     PC,DRVCAL        ;DO A WRITE CHECK
6134                                ;READ THE SECTOR AND COMPARE THE DATA TO SECTOR NUMBER + 100(OCT)
6135  024074  112765  000121  000001    MOVB    #RDDATA,P.CMND(R5) ;SET READ COMMAND
6136  024102  004737  040316            JSR     PC,DRVCAL        ;READ THIS SECTOR INTO MEMORY
6137  024106  012701  063554            MOV     #RWBUF,R1        ;GET ADDR. OF DATA BUF INTO R1
6138  024112  005004                    CLR     R4               ;CLEAR WORD NUMBER
6139  024114  005037  005542            CLR     SCRACH           ;INIT. COMPARE ERROR COUNT
6140  024120  116537  000004  001200    MOVB    P.SECT(R5),$REG7
6141  024126  032737  000002  005504    BIT     #BSERR,RECODE    ;SEE IF BAD SECTOR ERROR OCCURRED
6142  024134  001045                    BNE     22$              ;BR IF YES
6143  024136  020021            10$:    CMP     R0,(R1)+         ;COMPARE BUF WORD TO SECTOR + 100(OCT)
6144  024140  001437                    BEQ     20$              ;BR IF NO COMPARE ERROR
6145  024142  005737  005542            TST     SCRACH           ;CHECK ERROR COUNT
6146  024146  001006                    BNE     12$              ;BR IF NOT FIRST ERROR IN SECTOR
6147  024150  105037  062105            CLRB    DH701+38.        ;ADJUST DATA HEADER FOR MSG
6148  024154  012737  000005  063446    MOV     #5,DF25+2        ;ADJ. ERROR DATA WORD COUNT
6149  024162  104034                    ERROR   34               ;TYPE HEADING FOR ERROR MSG
6150  024164  005237  005542      12$:  INC     SCRACH           ;INCREMENT ERROR COUNT
6151  024170  032777  000001  154742    BIT     #BIT0,@SWR       ;SEE IF ALL ERRORS SHOULD BE REPORTED
6152  024176  001004                    BNE     14$              ;BR TO REPORT ALL ERRORS
6153  024200  022737  000012  005542    CMP     #10.,SCRACH      ;SEE IF 10(DEC) ERRORS YET
6154  024206  002420                    BLT     22$              ;BR IF > 10.
6155  024210  010437  001202      14$:  MOV     R4,$REG10        ;WORD NUMBER
6156  024214  010037  001204            MOV     R0,$REG11        ;GOOD DATA
6157  024220  016137  177776  001206    MOV     -2(R1),$REG12    ;BAD DATA
6158  024226  104063                    ERROR   63               ;TYPE GOOD AND BAD DATA
6159  024230  032777  000100  154702    BIT     #BIT6,@SWR       ;SEE IF JUST 1 ERROR SHOULD BE REPORTED
6160  024236  001004                    BNE     22$              ;BR IF JUST 1 ERROR SHOULD BE REPORTED
6161  024240  005204            20$:    INC     R4               ;INCREMENT WORD NUMBER
6162  024242  022704  000400            CMP     #256.,R4         ;SEE IF DONE YET
6163  024246  001333                    BNE     10$              ;BR IF NOT DONE COMPARING YET
6164  024250  105265  000004      22$:  INCB    P.SECT(R5)       ;INCREMENT SECTOR NO.
6165  024254  120365  000004            CMPB    R3,P.SECT(R5)    ;SEE IF ALL SECTORS CHECKED YET
6166  024260  001272                    BNE     8$               ;BR IF NOT DONE YET
6167
6168
6169
6170                                ;;*****************************************************************
6171                                ;*TEST 20        TRACK ADDRESSING TEST
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                                ;*IN THIS TEST, SECTOR FS OF CYL FC IS WRITTEN WITH 256 (DEC) WORDS
                                ;*OF THE TRACK NO. + 100(OCT), FOR EACH OF TRACKS 0,1,2. THEN, A
                                ;*WRITE CHECK OF EACH SECTOR IS DONE TO VERIFY THE WRITES. THEN, EACH
                                ;*OF THE 3 SECTORS IS RE-WRITTEN, AND AFTER EACH WRITE ALL OF THE
                                ;*THREE SECTORS ARE WRITE-CHECKED TO DETECT TRACK ADDRESSING PROBLEMS.
                                ;;*****************************************************************
024262  000004                  T$T20:  SCOPE
024264  012737  000020  001324          MOV     #20,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
024272  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
024276  004737  030530                  JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
024302  000137  024516                  JMP     T$T21           ;JUMP TO NEXT TEST
                                ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
024306  004737  027522                  JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
024312  004737  026040                  JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
024316  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;SET WRITE COMMAND
024324  013765  005732  000002          MOV     FC,P.CYLN(R5)   ;SET CYL = FC
024332  105065  000005                  CLRB    P.TRCK(R5)      ;INITIALIZE TRACK NO. TO 0
024336  113765  005516  000004          MOVB    FS,P.SECT(R5)   ;SET SECTOR =FS
024344  012765  06[54  000010          MOV     #RWBUF,P.BALO(R5) ;SET DATA BUFFER ADDRESS
024352  012765  177400  000012          MOV     #-256.,P.WC(R5) ;SET WORD COUNT FOR 256(DEC) WORDS
                                ;WRITE THE TRACK NO. + 100(OCT) AT SECTOR FS OF TRACKS 0,1,2
024360  116500  000005          4$:     MOVB    P.TRCK(R5),R0   ;SET TRACK NO. IN R0
024364  062700  000100                  ADD     #100,R0         ;ADD 100(OCT) TO TRACK NO.
024370  004737  034304                  JSR     PC,LODSEC       ;LOAD BUFFER WITH TRACK NO. + 100(OCT)
024374  004737  040316                  JSR     PC,DRVCAL       ;WRITE THE SECTOR
024400  105265  000005                  INCB    P.TRCK(R5)      ;INCREMENT THE TRACK NO.
024404  122765  000003  000005          CMPB    #3,P.TRCK(R5)   ;SEE IF ALL 3 TRACKS WRITTEN YET
024412  001362                          BNE     4$              ;BR IF NOT DONE YET
                                ;DO A WRITE-CHECK OF THE 3 SECTORS WRITTEN, TO VERIFY THE DATA
024414  012737  024414  001110          MOV     #.,$LPERR       ;SET NEW LOOP ON ERROR ADRS
024422  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
024426  004737  034326                  JSR     PC,TRKCHK
                                ;WRITE A SECTOR AND WRITE-CHECK ALL 3 SECTORS
024432  012737  024432  001110          MOV     #.,$LPERR       ;SET NEW LOOP ON ERROR ADRS
024440  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
024444  105065  000005                  CLRB    P.TRCK(R5)      ;INIT TRACK TO 0
024450  116500  000005          6$:     MOVB    P.TRCK(R5),R0   ;GET TRACK NO. IN R0
024454  062700  000100                  ADD     #100,R0         ;ADD 100(OCT) TO TRACK NO.
024460  004737  034304                  JSR     PC,LODSEC       ;LOAD BUF WITH TRACK + 100(OCT)
024464  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;SET WRITE DATA COMMAND
024472  004737  040316                  JSR     PC,DRVCAL       ;RE-WRITE A SECTOR
024476  004737  034326                  JSR     PC,TRKCHK       ;WRITE-CHECK ALL 3 SECTORS
024502  105265  000005                  INCB    P.TRCK(R5)      ;INCR THE TRACK NO.
024506  122765  000003  000005          CMPB    #3,P.TRCK(R5)   ;SEE IF ALL 3 TRACKS RE-WRITTEN YET
024514  001355                          BNE     6$              ;BR IF NOT DONE YET


024516                          RWDTST:
        000040                  RWTINX=<$TN-1>*2                ;R/W TEST INDEX
                                ;;*****************************************************************
                                ;*TEST 21        READ/WRITE DATA TEST
                                ;*THE READ/WRITE DATA TEST HAS 2 DIFFERENT VERSIONS, DEPENDING
                                ;*ON THE VALUE OF THE DATA PATTERN PARAMETER (PT).
                                ;*
                                ;*  FOR PT = 0 :
```

```
                                ;*THIS TEST IS THE QUICK VERIFY DEFAULT DATA TEST, WHICH IS RUN
                                ;*WHEN PT=0, DUE TO PARAMETER INPUT CHOICE, OR ADDRESS 200 START.
                                ;*IN THIS TEST, THE ENTIRE PACK IS TESTED WITH A SINGLE DATA PATTERN.
                                ;*THIS PATTERN IS COMPRISED OF THE DATA PATTERNS 00-15, WHICH REPEATS
                                ;*EVERY 256(DEC) WORDS. EACH TRACK IS WRITTEN IN 4 SEGMENTS, FOLLOWED
                                ;*BY A WRITE-CHECK, READ, AND SOFTWARE COMPARE. THE SEGMENTS ARE 6
                                ;*SECTORS EACH, WHICH MEANS THAT SPIRALING OCCURRS ON THE LAST
                                ;*SEGMENT WRITTEN ON EACH TRACK.
                                ;*
                                ;*  FOR PT NOT = 0 :
                                ;*THIS TEST PERFORMS READ/WRITE FUNCTIONS ON THE ENTIRE RANGE OF
                                ;*CYLINDERS (FC-LC), TRACKS (FT-LT), AND SECTORS (FS-LS) SPECIFIED.
                                ;*AT EACH SPECIFIED SECTOR WC WORDS OF THE CURRENT REPEATING DATA
                                ;*PATTERN ARE WRITTEN, AND THEN WRITE-CHECKED, FOLLOWED BY A READ
                                ;*AND SOFTWARE COMPARE. THIS IS DONE FOR ALL THE SPEC'D SECTORS ON ALL
                                ;*THE TRACKS, USING SECTOR INCR IS, AND TRACK INCR IT.
                                ;*     THEN IT IS REPEATED USING EACH OF THE OTHER DATA
                                ;*PATTERNS CHOSEN IN PARAMETER PT. THEN, EACH OF THE ABOVE OPERATIONS
                                ;*ARE REPEATED AT EACH OF THE REMAINING CYLINDERS, IN THE SPECIFIED
                                ;*RANGE, USING THE CYLINDER INCREMENT IC.
                                ;* NOTE THAT FS MUST BE CHOSEN < OR = LS, AND FT MUST BE < OR = LT.
                                ;*HOWEVER, FC MAY BE <, =, OR > LC, AND IF FC>LC, THE CYLINDER
                                ;*ADDRESS WILL BE DECREMENTED BY IC (INSTEAD OF INCREMENTED) TO
                                ;*OBTAIN EACH NEW CYLINDER ADDRESS.
                                ;*****************************************************************
024516  000004                  T21:    SCOPE
024520  012737  000021  001324          MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
024526  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
024532  004737  030530                  JSR     PC,CHKITR       ;SEE IF ITER. NO. = 0 FOR THIS TEST
024536  000137  025430                  JMP     $EOP            ;JUMP TO END-OF-PASS ROUTINE
                                ;RETURN HERE FROM CHKITR IF TEST SHOULD BE RUN
024542  004737  027522                  JSR     PC,INITSS       ;INITIALIZE DRIVER PARAMS AND SUB-SYS
024546  004737  026040                  JSR     PC,PREPKB       ;PREPARE FOR POSSIBLE KBD INPUT
024552  105037  003134                  CLRB    XOVLAD          ;INIT XXDP OVERLAID INDICATOR
024556  032777  000040  154354          BIT     #BIT5,@SWR      ;SEE IF WRITES INHIBITED
024564  001002                          BNE     2$              ;IF YES,DON'T CHANGE RAND DATA PAT
024566  004737  034412                  JSR     PC,LODP14       ;GENERATE PSEUDO-RAND PAT 14
024572  013737  005760  005544  2$:     MOV     PT,PATRN        ;GET A COPY OF PT
024600  005737  005760                  TST     PT              ;SEE IF QUICK VERIFY DATA TEST DESIRED
024604  001020                          BNE     7$              ;BR IF NOT QUICK VERIFY
                                ;SET PARAMETERS FOR QUICK VERIFY DEFAULT DATA TEST
024606  012765  063554  000010          MOV     #RWBUF,P.BALO(R5) ;SET R/W BUFFER ADDRESS
024614  005065  000002                  CLR     P.CYLN(R5)      ;INIT CYL TO 0
024620  105065  000005          4$:     CLRB    P.TRCK(R5)      ;INIT TRACK TO 0
024624  012765  175000  000012  5$:     MOV     #-1536.,P.WC(R5) ;SET WORD COUNT FOR 6 SECTORS
024632  105065  000004                  CLRB    P.SECT(R5)      ;INIT SECTOR TO 0
024636  004737  035762          6$:     JSR     PC,CHKLIM       ;CHK WRD COUNT AND PACK ADR TO AVOID OVERFLOW
024642  025404                          30$                     ;RETURN ADDR FOR TRANSFER NOT ALLOWED
024644  000457                          BR      18$             ;PROCEED
                                ;SET PARAMETERS FOR NON-DEFAULT DATA TEST
024646  013765  005762  000010  7$:     MOV     MA,P.BALO(R5)   ;SET BA BITS 0-15
024654  013700  005764                  MOV     MA+2,R0         ;GET MA BITS 16-21
024660  042700  177774                  BIC     #177774,R0      ;MASK FOR LO 2 BITS
024664  150065  000007                  BISB    R0,P.BAHJ(R5)   ;SET BA BITS 16,17
024670  013737  005762  005602          MOV     MA,PMA          ;SET BUFFER ADDRESS
024676  013737  005764  005604          MOV     MA+2,PMA+2
```

```
6284  024704  105237  003134                  INCB    XOVLAD          ;SET XXDP OVERLAID INDICATOR
6285  024710  005737  055716                  TST     $KT11           ;SEE IF MEMORY MANAGEMENT PRESENT
6286  024714  100002                          BPL     9$              ;BR IF NO MEM. MGT.
6287                          ;PREPARE PAGE ADDRESS REGISTERS FOR RELOCATION
6288  024716  004737  026604                  JSR     PC,PREPAR       ;PREPARE MEM MGT FOR RELOCATION
6289                          ;INITIALIZE TEST PARAMETERS
6290  024722  013765  005732  000002  9$:     MOV     FC,P.CYLN(R5)   ;INIT CYL TO FC
6291  024730  012701  000001  44$:    MOV     #1,R1           ;INIT PATTERN BIT POINTER
6292  024734  030137  005760  10$:    BIT     R1,PT           ;SEE IF THIS PATTERN SELECTED
6293  024740  001003                          BNE     14$             ;BR IF THIS PATTERN IS SELECTED
6294  024742  006301                  11$:    ASL     R1              ;SHIFT PATTERN BIT POINTER
6295  024744  001571                          BEQ     25$             ;BR IF ALL PATTERNS CHECKED ON THIS CYLINDER
6296  024746  000772                          BR      10$             ;GO CHECK ANOTHER PATTERN
6297  024750  113765  005740  000005  14$:    MOVB    FT,P.TRCK(R5)   ;INIT TRACK TO FT
6298  024756  113765  005516  000004  16$:    MOVB    FS,P.SECT(R5)   ;INITIALIZE SECTOR TO FS
6299  024764  013765  005766  000012  17$:    MOV     WC,P.WC(R5)     ;SET WORD COUNT FOR WC WORDS
6300  024772  005465  000012                  NEG     P.WC(R5)
6301  024776  004737  035762                  JSR     PC,CHKLIM       ;CHECK WRD CNT AND PACK ADR TO AVOID OVERFLOW
6302  025002  025330                          25$                     ;RETURN ADDRESS FOR TRANSFER NOT ALLOWED
6303                          ;PERFORM TESTS AT CURRENT ADDRESS
6304  025004  012737  025004  001110  18$:    MOV     #.,$LPERR       ;SET NEW LOOP ON ERROR ADRS
6305  025012  004737  030462                  JSR     PC,SETTUP       ;SET UP FOR LOOP ON ERROR
6306  025016  004737  037626                  JSR     PC,SVPRMS       ;STORE PARAMS FOR THIS XFER
6307  025022  004737  034626                  JSR     PC,LODBUF       ;LOAD DATA INTO R/W BUFFER
6308  025026  105037  003140                  CLRB    REISSU          ;DUAL-ACC COMMAND RE-ISSUE FLAG
6309  025032  032777  000040  154100          BIT     #BIT5,@SWR      ;SEE IF DATA WRITES INHIBITED
6310  025040  001005                          BNE     20$             ;BR IF INHIBITED
6311  025042  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;SET WRITE COMMAND
6312  025050  004737  037740                  JSR     PC,TRNSFR       ;WRITE THE DATA
6313  025054  032777  000020  154056  20$:    BIT     #BIT4,@SWR      ;SEE IF WRITE CHECKS INHIBITED
6314  025062  001014                          BNE     22$             ;BR IF INHIBITED
6315  025064  112765  000131  000001          MOVB    #WRTCHK,P.CMND(R5) ;SET WRITE CHECK COMMAND
6316  025072  004737  037740                  JSR     PC,TRNSFR       ;DO WRITE-CHECK OF DATA WRITTEN
6317  025076  105737  003141                  TSTB    WCEFLG          ;SEE IF A WCE ERROR OCCURRED
6318  025102  001404                          BEQ     22$             ;BR IF NOT
6319  025104  032777  000002  154026          BIT     #BIT1,@SWR      ;SEE IF READ AND COMPARE SHOULD BE DONE
6320  025112  001417                          BEQ     24$             ;BR IF NOT
6321  025114  032777  000010  154016  22$:    BIT     #BIT3,@SWR      ;SEE IF READ AND COMPARE INHIBITED
6322  025122  001013                          BNE     24$             ;BR IF INHIBITED
6323  025124  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5) ;SET READ COMMAND
6324  025132  004737  037740                  JSR     PC,TRNSFR       ;READ THE DATA
6325  025136  032777  000004  153774          BIT     #BIT2,@SWR      ;SEE IF SOFTWARE COMPARES INHIBITED
6326  025144  001002                          BNE     24$             ;BR IF INHIBITED
6327  025146  004737  035054                  JSR     PC,CMPBUF       ;PERFORM SOFTWARE COMPARE OF DATA
6328  025152  105737  003136  24$:    TSTB    DULACS          ;SEE IF DUAL-ACCESS DATA TEST
6329  025156  001405                          BEQ     27$             ;BR IF NOT DUAL-ACCESS
6330  025160  112765  000140  000001          MOVB    #RELEAS,P.CMND(R5) ;SET DRIVE RELEASE COMMAND
6331  025166  004737  040316                  JSR     PC,DRVCAL       ;RELEASE THE DRIVE
6332  025172  104411                  27$:    SCOPER                  ;CHECK FOR INTERNAL LOOP ON ERROR
6333  025174  005737  005760                  TST     PT              ;SEE IF QUICK VERIFY DATA TEST DESIRED
6334  025200  001031                          BNE     40$             ;BR IF NOT QUICK VERIFY
6335                          ;INCREMENT PACK ADDRESS FOR QUICK VERIFY DEFAULT DATA TEST
6336  025202  062765  000006  000004          ADD     #6,P.SECT(R5)   ;INCREMENT SECTOR BY 6
6337  025210  126527  000004  000030          CMPB    P.SECT(R5),#24. ;SEE IF SECTOR LIMIT REACHED YET
6338  025216  002002                          BGE     34$             ;BR IF LIMIT EXCEEDED
6339  025220  000137  024636                  JMP     6$              ;GO BACK AND TEST
```

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6340  025224  105265  000005          34$:    INCB    P.TRCK(R5)          ;INCREMENT TRACK
6341  025230  122765  000003  000005          CMPB    #3,P.TRCK(R5)       ;SEE IF TRACK LIMIT EXCEEDED
6342  025236  001402                          BEQ     36$                 ;BR IF YES
6343  025240  000137  024624                  JMP     5$
6344  025244  005265  000002          36$:    INC     P.CYLN(R5)          ;INCREMENT CYL
6345  025250  023765  017762  000002          CMP     LCP1,P.CYLN(R5)     ;SEE IF CYL LIMIT EXCEEDED
6346  025256  001452                          BEQ     30$                 ;BR IF YES
6347  025260  000137  024620                  JMP     4$
6348                          ;INCREMENT PACK ADDRESS FOR NON-DEFAULT DATA TEST
6349  025264  063765  005756  000004  40$:    ADD     IS,P.SECT(R5)       ;INCREMENT SECTOR BY IS
6350  025272  126537  000004  005520          CMPB    P.SECT(R5),LS       ;SEE IF LS EXCEEDED
6351  025300  003631                          BLE     17$                 ;BR IF NOT YET
6352  025302  116503  000005                  MOVB    P.TRCK(R5),R3       ;GET TRACK NO.
6353  025306  063703  005744                  ADD     IT,R3               ;INCREMENT TRACK
6354  025312  110365  000005                  MOVB    R3,P.TRCK(R5)       ;PUT IT BACK
6355  025316  020337  005742                  CMP     R3,LT               ;SEE IF LT EXCEEDED
6356  025322  003615                          BLE     16$                 ;BR IF NOT YET
6357  025324  000137  024742                  JMP     11$                 ;JMP TO CHECK FOR NEXT PATTERN
6358  025330  023737  005732  005734  25$:    CMP     FC,LC               ;SEE IF FC>LC
6359  025336  003011                          BGT     26$                 ;BR IF FC>LC
6360  025340  063765  005736  000002          ADD     IC,P.CYLN(R5)       ;INCREMENT THE CYLINDER
6361  025346  026537  000002  005734          CMP     P.CYLN(R5),LC       ;SEE IF LC EXCEEDED
6362  025354  003013                          BGT     30$                 ;BR IF LC EXCEEDED
6363  025356  000137  024730                  JMP     44$
6364  025362  163765  005736  000002  26$:    SUB     IC,P.CYLN(R5)       ;DECREMENT THE CYLINDER
6365  025370  026537  000002  005734          CMP     P.CYLN(R5),LC       ;SEE IF LC EXCEEDED
6366  025376  002402                          BLT     30$                 ;BR IF LC EXCEEDED
6367  025400  000137  024730                  JMP     44$
6368  025404  105737  003134          30$:    TSTB    XOVLAD              ;SEE IF XXDP MIGHT BE OVERLAID NOW
6369  025410  001402                          BEQ     31$                 ;BR IF NOT
6370  025412  004737  027262                  JSR     PC,GETXDP           ;RESTORE XXDP LOADER, IF SAVED
6371  025416  105737  003144          31$:    TSTB    UBMPRS              ;SEE IF UNIBUS MAP PRESENT
6372  025422  001402                          BEQ     32$                 ;BR IF NOT
6373  025424  005037  172516                  CLR     @#SR3               ;DISABLE 22-BIT MODE AND UNIBUS MAP
6374  025430                          32$:
6375
6376
6377
6378                                  .SBTTL  END OF PASS ROUTINE
6379
6380                                  ;;*****************************************************************
6381                                  ;*INCREMENT THE PASS NUMBER ($PASS)
6382                                  ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
6383                                  ;*IF THERES A MONITOR GO TO IT
6384                                  ;*IF THERE ISN'T JUMP TO APTPAS
6385
6386  025430                          $EOP:
6387  025430  000004                          SCOPE
6388  025432  005237  001330                  INC     $DEVCT              ;INCREMENT DEVICE COUNT FOR APT
6389  025436  000137  017026                  JMP     NEWDRV              ;GO SEE IF MORE DRIVES TO TEST ON THIS PASS
6390  025442                          DUNPAS: ;THIS IS TRULY THE END OF A PASS
6391  025442  042777  000100  153474          BIC     #BIT6,@$TKS         ;DISABLE TTY KBD INTERRUPT
6392  025450  005037  001102                  CLR     $TSTNM              ;;ZERO THE TEST NUMBER
6393  025454  005037  001304                  CLR     $TIMES              ;;ZERO THE NUMBER OF ITERATIONS
6394  025460  005237  001326                  INC     $PASS               ;;INCREMENT THE PASS NUMBER
6395  025464  042737  100000  001326          BIC     #100000,$PASS       ;;DON'T ALLOW A NEG. NUMBER
```

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6396  025472  005327                          DEC     (PC)+           ;;LOOP?
6397  025474  000001                  $EOPCT: .WORD   1
6398  025476  003022                          BGT     $DOAGN          ;;YES
6399  025500  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
6400  025502  000001                  $ENDCT: .WORD   1
6401  025504  025474                          $EOPCT
6402  025506  104401  025553                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
6403  025512  013746  001326                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
6404  025516  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
6405  025520  104401  025550                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
6406  025524  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
6407  025530  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
6408  025532  000005                          RESET                   ;;CLEAR THE WORLD
6409  025534  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
6410  025536  000240                          NOP                     ;;SAVE ROOM
6411  025540  000240                          NOP                     ;;FOR
6412  025542  000240                          NOP                     ;;ACT11
6413  025544                          $DOAGN:
6414  025544  000137                          JMP     @(PC)+          ;;RETURN
6415  025546  025570                  $RTNAD: .WORD   APTPAS
6416  025550     377        377      000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
6417  025553     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
6418  025560  050040  051501  020123
6419  025566  000043
6420  025570  122737  000001  001340  APTPAS: CMPB    #APTENV,$ENV    ;RUN UNDER THE APT ?
6421  025576  001007                          BNE     2$              ;BRANCH IF NOT
6422  025600  023727  001326  000002          CMP     $PASS,#2        ;TWO PASSES ?
6423  025606  103403                          BLO     2$              ;BRANCH IF NOT
6424  025610  005237  001102          1$:     INC     $TSTNM          ;INCREMENT THE TEST NUMBER
6425  025614  000775                          BR      1$              ;LOOPING FOR APT TO DUMP NEXT PROG
6426  025616  000137  017014          2$:     JMP     NEWPAS          ;JMP TO MAIN LOOP
6427
6428
6429
6430                                  ;THIS IS THE ABNORMAL RETURN FROM THE DRIVER,
6431                                  ;  WHICH IS USED WHEN NED INDICATION IS EXPECTED (AND VALID).
6432                                  ;    (NED = NON-EXISTENT DRIVE)
6433  025622  032765  010000  000020  NEDHDL: BIT     #NED,P.CS2(R5)  ;SEE IF NED ON DRIVE SELECT
6434  025630  001002                          BNE     1$              ;BR IF NED SET
6435  025632  000137  042164                  JMP     ERRHDL          ;GO HANDLE  OTHER ERROR
6436  025636  010046          1$:     MOV     R0,-(SP)        ;SAVE R0,R1
6437  025640  010146                  MOV     R1,-(SP)
6438  025642  012700  000001          MOV     #1,R0           ;SET BIT POINTER
6439  025646  005001                  CLR     R1              ;CLEAR COUNTER
6440  025650  120137  005510  2$:     CMPB    R1,DRIVE        ;SEE IF R1 = CURRENT DRIVE NUMBER
6441  025654  001403                  BEQ     3$              ;BR IF  =
6442  025656  005201                  INC     R1              ;INCREMENT COUNTER
6443  025660  006300                  ASL     R0              ;SHIFT BIT POINTER
6444  025662  000772                  BR      2$              ;TRY AGAIN
6445  025664  040037  005540  3$:     BIC     R0,NEWON        ;CLEAR ONLINE BIT FOR  THIS DRIVE
6446  025670  012601                  MOV     (SP)+,R1        ;RESTORE R0,R1
6447  025672  012600                  MOV     (SP)+,R0
6448  025674  000137  044342                  JMP     RETNML          ;TAKE  NORMAL  RETURN
6449
6450
6451                                  ;;*****************************************************************
```

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                                .SBTTL  KBDHDL - TTY KEYBOARD INTERRUPT HANDLER
                                ;;******************************************************************
025700  010146          KBDHDL: MOV     R1,-(SP)        ;SAVE R1 ON STACK
025702  017701  153240          MOV     @$TKB,R1        ;READ A CHAR FROM KBD BUFFER
025706  042701  177600          BIC     #177600,R1      ;MASK OUT UNUSED BITS
025712  120127  000172          CMPB    R1,#172         ;SEE IF LOWER CASE TYPED
025716  003005                  BGT     20$             ;BR IF NOT
025720  120127  000141          CMPB    R1,#141
025724  002402                  BLT     20$             ;BR IF NOT
025726  042701  000040          BIC     #BIT5,R1        ;MAKE IT UPPER CASE
025732  010137  005532  20$:    MOV     R1,INTCHR       ;SAVE INPUT CHARACTER
025736  122701  000003          CMPB    #003,R1         ;SEE IF (↑C) TYPED
025742  001007                  BNE     2$              ;BR IF NOT (↑C)
025744  104401  012426          TYPE    ,CNTRLC         ;ECHO (↑C)
025750  042777  000100  153166  1$:     BIC     #BIT6,@$TKS     ;CLEAR KBD INTERRUPT ENABLE BIT
025756  012601                  MOV     (SP)+,R1        ;RESTORE R1
025760  000002                  RTI                     ;RETURN
025762  122701  000032          CMPB    #032,R1         ;SEE IF (↑Z) TYPED
025766  001003                  BNE     3$              ;BR IF NOT (↑Z)
025770  104401  012433          TYPE    ,CNTRLZ         ;ECHO (↑Z)
025774  000765                  BR      1$              ;RETURN
025776  122701  000022          CMPB    #022,R1         ;SEE IF (↑R) TYPED
026002  001003                  BNE     4$              ;BR IF NOT (↑R)
026004  104401  012440          TYPE    ,CNTRLR         ;ECHO (↑R)
026010  000757                  BR      1$              ;RETURN
026012  122701  000007          CMPB    #007,R1         ;SEE IF (↑G) TYPED
026016  001003                  BNE     5$              ;BR IF NOT (↑G)
026020  104401  012452          TYPE    ,CNTRLG         ;ECHO (↑G)
026024  000751                  BR      1$              ;RETURN
026026  104401  005532  5$:     TYPE    ,INTCHR         ;ECHO INPUT
026032  104401  001315          TYPE    ,$CRLF          ;DO <CR> AND <LF>
026036  000744                  BR      1$              ;RETURN


                                ;;******************************************************************
                                .SBTTL  PREPKB - PREPARE FOR KEYBOARD INPUT
                                ;*THIS SUBROUTINE CLEARS THE KEYBOARD BUFFER AND THE
                                ;*DONE BIT, AND CLEARS THE TTY INTERRUPT INPUT WORD
                                ;*INTCHR, IN PREPARATION FOR NEW TTY INPUT. IT ALSO
                                ;*ENABLES KBD INTERRUPT.
                                ;* CALL:
                                ;*      JSR     PC,PREPKB
                                ;;******************************************************************

026040  005077  153102  PREPKB: CLR     @$TKB           ;CLEAR KBD BUFFER AND DONE BIT
026044  005037  005532          CLR     INTCHR          ;CLEAR TTY INPUT WORD
026050  052777  000100  153066  BIS     #BIT6,@$TKS     ;ENABLE KBD INTERRUPT
026056  000207                  RTS     PC              ;RETURN


                                ;;******************************************************************
                                .SBTTL  ECOBAD - ECHO BAD TTY INPUT
                                ;*THIS SUBROUTINE ECHOS A CHARACTER WHICH HAD BEEN
```

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                        ;*TYPED IN AND WAS DETERMINED TO BE INVALID FOR SOME
                        ;*REASON, FOLLOWED BY A QUESTION MARK (?). THEN, A <CR>
                        ;*AND <LF> ARE DONE.
                        ;* CALL -     JSR     PC,ECOBAD
                        ;;*****************************************************************

026060  104401  005532  ECOBAD: TYPE    ,INTCHR         ;ECHO BAD CHARACTER
026064  104401  001314          TYPE    ,$QUES          ;TYPE <?> AND <CR>, <LF>
026070  000207                  RTS     PC              ;RETURN


                        ;;*****************************************************************
                        ;*SIZMEM - SIZE MEMORY, SET LIMITS
                        ;*THIS SUBROUTINE SIZES MEMORY BY CALLING SUBROUTINE $SIZE, AND
                        ;*IT USES THE VALUES RETURNED, TO SET THE LIMITS ON PARAMETER MA.
                        ;*IT ALSO TYPES "LAST PHYS MEM ADR = XXXXXXXX" (LEAD ZEROS SUPRS'D).
                        ;*AND SETS THE FLAG UBMPRS = 1 IF 22-BIT ADDRESSES ARE USED (11/70).
                        ;;*****************************************************************
026072  104407          SIZMEM: SAVREG                  ;SAVE R0-R5
026074  012737  000200  055716          MOV     #200,$KT11      ;SET MEM MGT KEY FOR $SIZE
026102  004737  055660          JSR     PC,$SIZE        ;SIZE MEMORY
026106  005737  055716          TST     $KT11           ;SEE IF MEM MGT PRESENT
026112  100406                  BMI     8$              ;BR IF MEM MGT PRESENT
026114  013737  056162  006126          MOV     $LSTAD,MAHILM   ;SET MEM LIMIT LO BITS
026122  005037  006130          CLR     MAHILM+2        ;CLEAR MEM LIMIT HI BITS
026126  000436                  BR      16$             ;GO TYPE LAST ADDRESS
                        ;SHIFT SAF LEFT 6, AND PUT IN R1-R0
026130  013700  056164  8$:     MOV     $LSTBK,R0       ;LO BITS
026134  005001                  CLR     R1              ;HI BITS
026136  012702  000006          MOV     #6,R2           ;SET LOOP COUNT = 6
026142  000241          12$:    CLC                     ;ROTATE LOOP
026144  006100                  ROL     R0
026146  006101                  ROL     R1
026150  005302                  DEC     R2
026152  001373                  BNE     12$
                        ;ADD VIRTUAL ADDRESS TO SHIFTED SAF TO GET PHYSICAL ADDRESS
026154  063700  056162          ADD     $LSTAD,R0       ;ADD LO BITS
026160  005501                  ADC     R1              ;HI BITS
026162  010037  006126          MOV     R0,MAHILM       ;SET LO BITS OF MEM LIMIT
026166  010137  006130          MOV     R1,MAHILM+2     ;SET HI BITS OF MEM LIMIT
026172  000241                  CLC
026174  006100                  ROL     R0
026176  006101                  ROL     R1
026200  006100                  ROL     R0
026202  006101                  ROL     R1
026204  006100                  ROL     R0
026206  006101                  ROL     R1
026210  020127  000037          CMP     R1,#37          ;SEE IF 22 BIT ADDR
026214  103403                  BLO     16$             ;BR IF NO
026216  112737  000001  003144          MOVB    #1,UBMPRS       ;SET "UNIBUS MAP PRESENT" FLAG
                        ;TYPE "LAST PHYS MEM ADR = XXXXXXXX"
026224  104401  007413  16$:     TYPE    ,LSTMEM         ;TYPE "LAST PHYS MEM ADR ="
026230  012746  006126          MOV     #MAHILM,-(SP)   ;PUT POINTER ON STACK
026234  004737  053422          JSR     PC,@#$D820      ;CONVERT BINARY TO OCTAL ASCII
026240  004737  053736          JSR     PC,@#$SUPRS     ;TYPE "XXXXXXXX"
```

```
                        TYPE    ,$CRLF          ;TYPE <CR>,<LF>
                        TYPE    ,$CRLF
                        RESREG                  ;RESTORE R0-R5
                        RTS     PC              ;RETURN


                ;;*****************************************************************
                ;* GETPRM - INPUT A SIX-DIGIT OCTAL NO. ON TTY KBD
                ;*ENTER SUBROUTINE WITH OLD PARAMETER VALUE ON STACK. SUBROUTINE
                ;*TYPES OLD VALUE, AND INPUTS NEW VALUE, RETURNING NEW VALUE ON
                ;*TOP OF STACK.
                ;;*****************************************************************
GETPRM: MOV     2(SP),-(SP)     ;GET OLD VALUE
        TYPOS                   ;TYPE IT
        .BYTE   6               ;SIX DIGITS
        .BYTE   0               ;SUPPRESS LEADING ZEROS
        TYPE    ,NEWMSG         ;TYPE "  NEW = "
        JSR     PC,RDCHRS       ;READ NEW VALUE FROM KBD
        7$                      ;(↑C) RETURN ADDRESS
        7$                      ;(↑Z) RETURN ADDRESS
        7$                      ;(↑U) OR ERROR RETURN ADDRESS
        TST     R0              ;SEE IF ANY CHARS TYPED
        BNE     4$              ;BR IF YES
        RTS     PC              ;RETURN - OLD VALUE UNCHANGED
4$:     CMP     R0,#6           ;SEE IF > 6 CHARS TYPED
        BLE     8$              ;BR IF NOT BAD
6$:     TYPE    ,BUFFO          ;ECHO BAD INPUT
        TYPE    ,$QUES
7$:     SUB     #10,(SP)        ;FIX ERROR RETURN PC
        RTS     PC              ;ERROR RETURN
8$:     MOV     #BUFFO,-(SP)    ;PUT POINTER TO CHARS ON STACK
        JSR     PC,OCTBIN       ;CONVERT DIGITS TO BINARY
        6$                      ;ERROR RETURN ADDRESS
        MOV     (SP)+,R0        ;GET NEW BINARY VALUE
        TST     $HIOCT          ;SEE IF HI BITS ARE 0
        BNE     6$              ;BR IF NOT
        MOV     R0,2(SP)        ;PUT NEW VALUE ON STACK
        RTS     PC              ;RETURN


                ;;*****************************************************************
                ;SBTTL  GTSWRG - OPEN SOFTWARE SWITCH REGISTER FOR MODIFICATION
                ;*THIS SUBROUTINE ALLOWS THE CONTENTS OF THE SOFTWARE SWITCH
                ;*REGISTER TO BE MODIFIED BY TTY INPUT. THE SUBROUTINE TYPES
                ;* "SWR = XXXXXX  NEW = ", AND WAITS FOR A NEW OCTAL VALUE
                ;*OF UP TO SIX DIGITS TO BE TYPED.
                ;;*****************************************************************
GTSWRG: CMP     #SWREG,SWR      ;SEE IF SOFTWARE SWR SELECTED
        BNE     6$              ;BR IF NOT
        MOV     SWREG,-(SP)     ;PUT OLD VALUE ON STACK
        TYPE    ,SWRMSG         ;TYPE "SWR = "
        JSR     PC,GETPRM       ;TYPE OLD, GET NEW SWREG VALUE
        MOV     (SP)+,SWREG     ;STORE NEW VALUE
6$:     RTS     PC              ;RETURN
```

```
                                ;;*****************************************************************
                                ;*INITMM - INITIALIZE MEMORY MANAGEMENT REGISTERS
                                ;*THIS SUBROUTINE INITIALIZES KIPAR'S AND KIPDR'S, FOR
                                ;*CONTIGUOUS 4K PAGES, STARTING AT PHYSICAL ADDRESS 0.
                                ;*KIPAR7 IS LOADED WITH 177600, TO PRESERVE THE I/O PAGE.
                                ;*22-BIT MODE AND THE UNIBUS MAP ARE ENABLED, IF PRESENT.
                                ;*BUT MEM MGT IS NOT TURNED ON IN THIS SUBROUTINE. HOWEVER,
                                ;*MEM MGT TRAPS ARE ENABLED.
                                ;;*****************************************************************
026422  104407                  INITMM: SAVREG                  ;SAVE R0-R5
026424  005001                          CLR     R1              ;INIT FOR PAR LOADING
026426  012702  172340                  MOV     #KIPAR0,R2      ;ADDR OF FIRST PAR
026432  012703  000010                  MOV     #8.,R3          ;LOAD 8 PAR'S AND 8 PDR'S
026436  012762  077406  177740  4$:     MOV     #77406,-40(R2)  ;PDR = 4K,UP,READ/WRITE
026444  010122                          MOV     R1,(R2)+        ;LOAD A PAR
026446  062701  000200                  ADD     #200,R1         ;UPDATE FOR NEXT PAR
026452  005303                          DEC     R3              ;DECREMENT LOOP COUNTER
026454  001370                          BNE     4$              ;LOOP UNTIL ALL 8 ARE LOADED
026456  012742  177600                  MOV     #177600,-(R2)   ;SET UP KIPAR7 FOR I/O PAGE
026462  105737  003144                  TSTB    UBMPRS          ;SEE IF 22-BIT ADDRESSES
026466  001403                          BEQ     10$             ;BR IF NOT
026470  012737  000060  172516          MOV     #60,@#SR3       ;ENABLE 22-BIT MODE,AND UNIBUS MAP
026476  012737  001000  177572  10$:    MOV     #BIT9,@#SR0     ;ENABLE KT11 TRAPS
026504  104410                          RESREG                  ;RESTORE R0-R5
026506  000207                          RTS     PC              ;RETURN

                                ;;*****************************************************************
                                ;*SERVICE ROUTINE FOR MEM MGT TRAPS
                                ;*****************************************************************
026510  004737  041704          KTERHD: JSR     PC,REPSUP       ;GATHER STATUS FOR PRINTOUT
026514  013737  177572  001174          MOV     @#SR0,$REG5     ;GET SR0
026522  013737  177574  001176          MOV     @#SR1,$REG6     ;GET SR1
026530  013737  177576  001200          MOV     @#SR2,$REG7     ;GET SR2
026536  012737  026562  000004          MOV     #8$,@#ERRVEC    ;SET TIME-OUT VECTOR
026544  012737  000340  000006          MOV     #PR7,@#ERRVEC+2
026552  013737  172516  001202          MOV     @#SR3,$REG10    ;GET SR3
026560  000406                          BR      10$
026562  022626                  8$:     CMP     (SP)+,(SP)+     ;CLEAN UP STACK
026564  112737  000003  063526          MOVB    #3,DF30+18.     ;FIX PRINTOUT FOR NO SR3
026572  105037  062201                  CLRB    DH704+11.
026576  104121                  10$:    ERROR   121             ;KT11 FAILURE
026600  000137  044134                  JMP     HLTPRG          ;ABORT !!!

                                ;;*****************************************************************
                                ;*PREPAR - PREPARE MEM MGT FOR RELOCATION
                                ;*THIS SUBROUTINE CALLS INITMM, AND THEN SETS UP CONSTANT
                                ;*FOR KIPAR6 IN SAVPAR, AND LOADS THE UNIBUS MAP REGISTERS,
                                ;*IF PRESENT.
```

```
                                ;;*****************************************************************
026604  104407                  PREPAR: SAVREG                  ;SAVE R0-R5
026606  004737  026422                  JSR     PC,INITMM       ;INIT MEM MGT REGISTERS
026612  013700  005602                  MOV     PMA,R0          ;LO BITS OF MA
026616  042700  017777                  BIC     #17777,R0       ;MASK FOR BITS 13-15
026622  013701  005604                  MOV     PMA+2,R1        ;HI BITS OF MA
026626  010003                          MOV     R0,R3           ;SAVE THESE BITS
026630  010104                          MOV     R1,R4
026632  006100                          ROL     R0              ;GET MA BITS 13-21 INTO R1 BITS 7-15
026634  006101                          ROL     R1
026636  006100                          ROL     R0
026640  006101                          ROL     R1
026642  000301                          SWAB    R1
026644  006100                          ROL     R0
026646  106001                          RORB    R1
026650  010137  003206                  MOV     R1,SAVPAR       ;CONSTANT FOR LOADING PAR6 LATER
026654  105737  003144                  TSTB    UBMPRS          ;SEE IF UNIBUS MAP ENABLED
026660  001420                          BEQ     9$              ;BR IF NOT (NO UNIBUS MAPPING)
                                ;PREPARE FOR 22-BIT ADDRESSING -  LOAD UNIBUS MAP REGISTERS
026662  012700  170200                  MOV     #MAPLOD,R0      ;STARTING ADDR OF MAP REGISTERS
026666  012701  000037                  MOV     #31.,R1         ;SET REGISTER COUNTER
026672  010320                  4$:     MOV     R3,(R0)+        ;LOAD A MAP REGISTER
026674  010420                          MOV     R4,(R0)+
026676  062703  020000                  ADD     #20000,R3       ;ADD 4K WORDS
026702  005504                          ADC     R4
026704  077106                          SOB     R1,4$           ;LOOP UNTIL 31(DEC) ARE LOADED
026706  042765  160000  000010          BIC     #160000,P.BALO(R5) ;CLEAR BA BITS 13-17
026714  142765  000003  000007          BICB    #3,P.BAHI(R5)
026722  104410                  9$:     RESREG                  ;RESTORE R0-R5
026724  000207                          RTS     PC              ;RETURN


                                ;;*****************************************************************
                                ;* FNDXDP - FIND STARTING ADR OF XXDP LOADER , AND STORE IT
                                ;*IN XXDPAD.
                                ;;*****************************************************************
026726  005737  006130          FNDXDP: TST     MAHILM+2        ;TEST HI BITS OF UPPER MEMORY LIMIT
026732  001404                          BEQ     6$              ;BR IF HI BITS ARE 0
026734  012737  160000  005546  4$:     MOV     #160000,XXDPAD  ;START OF 28K IS END OF XXDP
026742  000412                          BR      8$
026744  023727  006126  157776  6$:     CMP     MAHILM,#157776  ;SEE IF MEM LIMIT > OR = 157776
026752  103370                          BHIS    4$              ;BR IF YES
026754  013737  006126  005546          MOV     MAHILM,XXDPAD   ;HI MEM LIMIT IS END OF XXDP
026762  062737  000002  005546          ADD     #2,XXDPAD       ;ADD 2 BYTES
026770  162737  006000  005546  8$:     SUB     #6000,XXDPAD    ;COMPUTE START OF XXDP
026776  000207                          RTS     PC              ;RETURN


                                ;;*****************************************************************
                                ;*CHKXDP - CHECK FOR IMMINENT OVERLAY OF XXDP LOADER
                                ;*THIS SUBROUTINE DETERMINES IF THE CURRENT MA AND WC COMBINATION
                                ;*WOULD CAUSE OVERLAY OF THE XXDP LOADER ON A WRITE TRANSFER.
                                ;*IF SO, AN ATTEMPT IS MADE TO MOVE THE LOADER INTO UNUSED MEMORY.
                                ;*IF THIS IS NOT POSSIBLE, A RETURN IS MADE TO THE ADDRESS
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                                ;*FOLLOWING THE CALL. THE SAVE ADDRESS IS STORED IN XXDPSAV AND XXDPSAV+2.
                                ;*IF IT IS NOT NECESSARY TO MOVE THE LOADER, A NORMAL RETURN IS MADE.
                                ;* CALL   -      JSR     PC,CHKXDP
                                ;*              <RETURN ADR FOR NO SAVE>
                                ;;*****************************************************************
027000  104407                  CHKXDP: SAVREG                          ,SAVE R0-R5
                                ;SEE IF LOADER MUST BE PROTECTED
027002  105737  003136                  TSTB    DULACS                  ;SEE IF DUAL-ACCESS DATA TEST
027006  001005                          BNE     2$                      ;BR IF YES
027010  012700  005626                  MOV     #TSTLST,R0              ;GET ADRS OF TEST LIST
027014  005760  000040                  TST     RWTINX(R0)              ;SEE IF R/W DATA TEST TO BE RUN
027020  001406                          BEQ     4$                      ;EXIT IF NOT TO BE RUN
027022  005737  005760          2$:     TST     PT                      ;SEE IF DEFAULT DATA TEST
027026  001403                          BEQ     4$                      ;BR IF DEFAULT DATA TEST
027030  005737  005764                  TST     MA+2                    ;SEE IF HI MEM ADR = 0
027034  001404                          BEQ     6$                      ;BR IF 0
027036  062716  000002          4$:     ADD     #2,(SP)                 ;FIX UP NORMAL RETURN PC
027042  104410                  5$:     RESREG                          ;RESTORE R0-R5
027044  000207                          RTS     PC                      ;RETURN
027046  013700  005766          6$:     MOV     WC,R0                   ;GET WORD COUNT LO BITS
027052  005300                          DEC     R0                      ;DECREMENT IT
027054  005001                          CLR     R1                      ;SET HI BITS = 0
027056  000241                          CLC                             ;DOUBLE IT FOR BYTES
027060  006100                          ROL     R0
027062  006101                          ROL     R1
027064  063700  005762                  ADD     MA,R0                   ;COMPUTE LAST ADR OF XFER IN R1-R0
027070  005501                          ADC     R1
027072  063701  005764                  ADD     MA+2,R1
027076  105037  003135                  CLRB    XDPSVD                  ;INIT LOADER SAVE INDICATOR
027102  004737  026726                  JSR     PC,FNDXDP               ;COMPUTE START ADR OF XXDP
027106  013703  005546                  MOV     XXDPAD,R3               ;GET START OF XXDP LOADER
027112  062703  005776                  ADD     #5776,R3                ;COMPUTE LAST ADDRESS OF XXDP
027116  023703  005762                  CMP     MA,R3                   ;SEE IF MA > LAST ADR OF XXDP
027122  101345                          BHI     4$                      ;BR IF YES - DON'T MOVE XXDP
027124  005701                          TST     R1                      ;CHECK HI BITS OF LAST XFER ADDRESS
027126  001003                          BNE     8$                      ;BR IF NOT 0
027130  020037  005546                  CMP     R0,XXDPAD               ;CHECK LO BITS OF LAST XFER ADR
027134  103740                          BLO     4$                      ;BR IF < XXDP ADR - DON'T MOVE XXDP
027136  105237  003135          8$:     INCB    XDPSVD                  ;SET SAVE INDICATOR
                                ;ATTEMPT TO FIND A SAVE AREA FOR LOADER
027142  023727  005762  100000          CMP     MA,#100000              ;SEE IF MA > OR = 16K
027150  103410                          BLO     12$                     ;BR IF NOT
027152  012737  072000  005550          MOV     #72000,XDPSAV           ;SAVE ADR = 72000
027160  005037  005552                  CLR     XDPSAV+2
027164  004737  027254          10$:    JSR     PC,SAVXDP               ;SAVE THE LOADER
027170  000722                          BR      4$                      ;BR TO RETURN
027172  062700  000002          12$:    ADD     #2,R0                   ;ADD 2 BYTES TO LAST ADR OF XFER
027176  005501                          ADC     R1
027200  010002                          MOV     R0,R2                   ;GET A COPY
027202  010103                          MOV     R1,R3
027204  062702  005776                  ADD     #5776,R2                ;COMPUTE END OF SAVE AREA
027210  005503                          ADC     R3
027212  020337  006130                  CMP     R3,MAHILM+2             ;SEE IF THIS EXCEEDS MEMORY LIMIT
027216  101011                          BHI     16$                     ;BR IF YES - CAN'T SAVE LOADER
027220  001003                          BNE     14$                     ;BR IF < MEM LIMIT
027222  020237  006126                  CMP     R2,MAHILM               ;SEE IF LO BITS EXCEED MEM LIMIT
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```
                        BHI     16$             ;BR IF YES - CAN'T SAVE LOADER
                14$:    MOV     R0,XDPSAV       ;SET SAVE ADR IN HI MEMORY
                        MOV     R1,XDPSAV+2
                        BR      10$             ;GO SAVE LOADER
                16$:    MOV     @(SP),(SP)      ;FIX UP NO-SAVE RETURN PC
                        CLRB    XDPSVD          ;CLEAR THE SAVE INDICATOR
                        BR      5$              ;BR TO RETURN


                ;;*****************************************************************
                ;* SAVXDP - SAVE THE XXDP LOADER IN HI MEMORY
                ;*THIS SUBROUTINE MOVES THE XXDP LOADER, WHICH RESIDES AT THE
                ;*PHYSICAL ADDRESS STORED IN XXDPAD, TO THE PHYSICAL ADDRESS
                ;*STORED IN XDPSAV AND XDPSAV+2. A TOTAL OF 1536(DEC) WORDS ARE MOVED.
                ;*
                ;* GETXDP - RESTORE THE XXDP LOADER TO ORIGINAL LOCATION
                ;*THIS SUBROUTINE MOVES THE RELOCATED XXDP LOADER FROM THE ADDRESS
                ;*STORED IN XDPSAV,XDPSAV+2, BACK TO LOCATION XXDPAD (ITS ORIGINAL
                ;*ADDRESS).
                ;;*****************************************************************
                SAVXDP: SAVREG                  ;SAVE R0-R5
                        CLR     R4              ;SET INDICATOR TO SAVE XXDP
                        BR      XDP1
                GETXDP: SAVREG                  ;SAVE R0-R5
                        CLRB    XOVLAD          ;CLEAR XXDP OVERLAID INDICATOR
                        TSTB    XDPSVD          ;SEE IF XXDP WAS SAVED
                        BEQ     XDP2            ;BR IF NOT SAVED
                        MOV     #1,R4           ;SET INDICATOR TO GET XXDP
                XDP1:   TSTB    @#41            ;SEE IF LOADED BY XXDP
                        BEQ     XDP2            ;BR IF NOT
                        MOV     #1536.,R2       ;GET SET TO MOVE 1536(DEC) WORDS
                        MOV     XXDPAD,R3       ;GET ORIG ADR OF START OF XXDP
                        MOV     XDPSAV,R0       ;GET SAVE ADR LO BITS
                        MOV     XDPSAV+2,R1     ;HI BITS
                        TST     $KT11           ;SEE IF MEM MGT PRESENT
                        BMI     XDP3            ;BR IF PRESENT
                        TST     R4              ;SEE IF WANT TO SAVE OR GET XXDP
                        BNE     XDP4            ;BR IF WANT TO GET XXDP
                6$:     MOV     (R3)+,(R0)+     ;SAVE A WORD
                        DEC     R2              ;SEE IF 1536(DEC) WORDS YET
                        BNE     6$              ;BR IF NOT YET
                XDP2:   RESREG                  ;RESTORE R0-R5
                        RTS     PC              ;RETURN
                XDP4:   ADD     #6000,R0        ;POINT TO END OF SAVE AREA
                        ADD     #6000,R3        ;POINT TO END OF XXDP LOADER AREA
                8$:     MOV     -(R0),-(R3)     ;GET A WORD
                        DEC     R2              ;SEE IF 1536(DEC) WORDS YET
                        BNE     8$              ;BR IF NOT YET
                        BR      XDP2            ;GO EXIT
                ;COME HERE IF MEM MGT
                XDP3:   JSR     PC,INITMM       ;INIT MEM MGT REGISTERS
                        ROL     R0              ;GET ADR BITS 13-21 INTO R1 BITS 7-15
                        ROL     R1
                        ROL     R0
                        ROL     R1
```

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6844  027410  000301                        SWAB    R1
6845  027412  006100                        ROL     R0
6846  027414  106001                        RORB    R1
6847  027416  010137  172354                MOV     R1,@#KIPAR6     ;SET UP PAR6
6848  027422  013701  005550                MOV     XDPSAV,R1       ;GET LO ADRS BITS
6849  027426  042701  160000                BIC     #160000,R1      ;FIX UP R1 TO REFERENCE PAR6
6850  027432  052701  140000                BIS     #140000,R1
6851  027436  005704              16$:      TST     R4              ;SEE IF WANT TO SAVE OR GET XXDP
6852  027440  001007                        BNE     18$             ;BR IF WANT TO GET XXDP
6853  027442  012305                        MOV     (R3)+,R5        ;SAVE A WORD
6854  027444  005237  177572                INC     @#SR0           ;TURN ON MEMORY MANAGEMENT
6855  027450  010521                        MOV     R5,(R1)+
6856  027452  005337  177572                DEC     @#SR0           ;TURN OFF MEMORY MANAGEMENT
6857  027456  000406                        BR      20$
6858  027460  005237  177572        18$:    INC     @#SR0           ;TURN ON MEMORY MANAGEMENT
6859  027464  012105                        MOV     (R1)+,R5        ;GET A WORD
6860  027466  005337  177572                DEC     @#SR0           ;TURN OFF MEMORY MANAGEMENT
6861  027472  010523                        MOV     R5,(R3)+
6862  027474  032701  020000        20$:    BIT     #BIT13,R1       ;SEE IF OVERFLOW TO PAGE 7
6863  027500  001405                        BEQ     22$             ;BR IF NOT
6864  027502  042701  020000                BIC     #BIT13,R1       ;SET PAGE = 6 AGAIN
6865  027506  062737  000200  172354        ADD     #200,@#KIPAR6   ;UPDATE PAR BY 4K
6866  027514  005302              22$:      DEC     R2              ;SEE IF 1536 WORDS YET
6867  027516  001347                        BNE     16$             ;BR IF NOT YET
6868  027520  000713                        BR      XDP2            ;BR TO RETURN
6869
6870
6871
6872                                  ;;*****************************************************************
6873                                  .SBTTL  INITSS - INITIALIZE SUBSYSTEM
6874                                  ;*
6875                                  ;*THIS SUBROUTINE INITIALIZES THE DRIVER AND ITS PARAMETERS
6876                                  ;*AND DOES A SUBSYSTEM CLEAR.
6877                                  ;* USES -   R2,R5
6878                                  ;* CALL:
6879                                  ;*              JSR     PC,INITSS
6880                                  ;;*****************************************************************
6881
6882  027522  012737  042164  003046  INITSS: MOV     #ERRHDL,A.ABNL  ;SET UP ABNORMAL ERROR RETURN ADDRESS
6883  027530  012737  040716  003044          MOV     #ERRFRE,A.NORM  ;SET UP NORMAL RETURN ADDRESS
6884  027536  013702  003036                MOV     RKBAS,R2        ;GET ADDRESS OF RK611 REGISTERS
6885  027542  012705  002630                MOV     #PARM0,R5       ;GET ADDRESS OF PARAMETER BLOCK
6886  027546  105037  003143                CLRB    NORTRY          ;CLEAR "NO-RETRY" FLAG
6887  027552  004737  027622                JSR     PC,CLRPRM       ;CLEAR DRIVER INPUT PARAMETERS
6888  027556  112765  000177  000001        MOVB    #SUBCLR,P.CMND(R5) ;SET SUBSYSTEM CLEAR COMMAND
6889  027564  004737  040316                JSR     PC,DRVCAL       ;DO SUBSYSTEM CLEAR
6890  027570  113765  005510  000000        MOVB    DRIVE,P.DRVN(R5) ;SET CURRENT DRIVE NO.
6891  027576  113737  005510  002714        MOVB    DRIVE,PARM1     ;SET DRIVE NO. IN ALTERNATE P.B.
6892  027604  113765  003125  000007        MOVB    FORMAT,P.CS1H(R5) ;SET CURRENT DRIVE FORMAT
6893  027612  153765  003124  000007        BISB    TYPFMT,P.CS1H(R5)       ;SET DRV TYPE BIT
6894  027620  000207                        RTS     PC              ;SUBROUTINE EXIT
6895
6896
6897
6898                                  ;;*****************************************************************
6899                                  .SBTTL  CLRPRM - CLEAR DRIVER INPUT PARAMETERS
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                                ;*THIS SUBROUTINE ZEROS THE FIRST 14 BYTES IN THE DRIVER
                                ;*PARAMETER BLOCK (WHOSE ADDRESS IS IN R5).
                                ;* CALL -       JSR     PC,CLRPRM
                                ;;*****************************************************************

027622  010046                CLRPRM: MOV     R0,-(SP)        ;SAVE R0
027624  010546                        MOV     R5,-(SP)        ;SAVE R5
027626  010500                        MOV     R5,R0           ;GET PARAMETER BLOCK ADDRESS
027630  062705  000016                ADD     #P.CS1,R5       ;COMPUTE LIMIT ADDRESS
027634  005020                1$:     CLR     (R0)+           ;CLEAR A WORD IN PARAMETER BLOCK
027636  020005                        CMP     R0,R5           ;SEE IF DONE YET
027640  001375                        BNE     1$              ;BR IF  NOT DONE  YET
027642  012605                        MOV     (SP)+,R5        ;RESTORE R5
027644  012600                        MOV     (SP)+,R0        ;RESTORE R0
027646  000207                        RTS     PC              ;RETURN


                                ;;*****************************************************************
                                ;SBTTL  SCNDRV - SCAN DRIVE FOR STATUS
                                ;*THIS SUBROUTINE SCANS THE SELECTED DRIVE TO INSURE
                                ;*THAT THE DRIVE IS ON-LINE, READY, NOT WRITE-LOCKED,
                                ;*AND NOT LOADED WITH AN ALIGNMENT CARTRIDGE. IF ANY
                                ;*OF THESE CONDITIONS ARE NOT MET, AN APPROPRIATE
                                ;*MESSAGE IS TYPED, RK06 INTERRUPT IS DISABLED, AND
                                ;*A RETURN IS MADE TO THE ADDRESS LISTED IMMEDIATELY
                                ;*AFTER THE CALL TO SCNDRV. THE REQUESTED DRIVE NO.
                                ;*MUST BE PASSED TO THE SUBROUTINE IN WORD "DRIVE".
                                ;*ALSO, IF RUNNING FROM ADRS 200 AND RK06 IS LOAD MEDIUM,
                                ;*DRIVE 0 WILL BE REJECTED FOR USE.
                                ;* CALL -    JSR     PC,SCNDRV
                                ;*          <ERROR RETURN ADDRESS>
                                ;*
                                ;;*****************************************************************
027650  105037  003124        SCNDRV: CLRB    TYPFMT          ;ASSUME RK06 FOR FIRST TRY
027654  004737  027522                JSR     PC,INITSS       ;INITIALIZE DRIVER AND CLEAR SUBSYSTEM
027660  113765  005510  000000        MOVB    DRIVE,P.DRVN(R5) ;GET DRIVE NUMBER
                                ;SEE IF DRIVE 0 IS XXDP LOAD MEDIUM
027666  001012                        BNE     3$              ;BR IF NOT DRIVE 0
027670  122737  000013  000041        CMPB    #13,@#41        ;SEE IF RK06 IS XXDP MEDIUM
027676  001006                        BNE     3$              ;BR IF NOT
027700  105737  003116                TSTB    MDFLAG          ;SEE IF 200 START
027704  001003                        BNE     3$              ;BR IF NOT
027706  104401  010134                TYPE    ,DR0XDP         ;TYPE "DRIVE 0 IS LOAD MEDIUM"
027712  000517                        BR      2$              ;TAKE ERROR EXIT
027714  042712  000100        3$:     BIC     #IE,(R2)        ;DISABLE RK06 INTERRUPT
027720  113762  005510  000010        MOVB    DRIVE,RKCS2(R2) ;SET DRIVE NO. IN RKCS2
027726  105737  003124                TSTB    TYPFMT          ;SEE IF RK07
027732  001003                        BNE     5$              ;BR IF YES
027734  012712  000001                MOV     #GO,(R2)        ;ELSE SET GO FOR RK06 IN CS1
027740  000402                        BR      7$
027742  012712  002001        5$:     MOV     #<CDT!GO>,(R2)  ;SET GO FOR RK07 IN CS1
027746  005037  005542        7$:     CLR     SCRACH          ;CLEAR STALL CTR
027752  005237  005542        14$:    INC     SCRACH          ;INCREMENT STALL COUNTER
027756  001375                        BNE     14$             ;STALL FOR SEVERAL MILLI-SEC
027760  032762  001000  000010        BIT     #MDS,RKCS2(R2)  ;SEE IF MDS ERROR
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6956  027766  001417                          BEQ     18$                 ;BR IF NOT
6957  027770  112765  000101  000001          MOVB    #SELDRV,P.CMND(R5)  ;SET CMND FOR REPORT
6958  027776  011265  000016                  MOV     (R2),P.CS1(R5)      ;GET RKCS1
6959  030002  004737  050212                  JSR     PC,I.CSTI           ;GET OTHER RK611 REGISTERS
6960  030006  004737  041704                  JSR     PC,REPSUP           ;SET UP ERROR REPORT
6961  030012  104052                          ERROR   52                  ;REPORT MDS ERROR
6962  030014  052737  000200  005504          BIS     #ABORT,RECODE       ;SET ABORT FLAG
6963  030022  000137  043760                  JMP     ALLTRM              ;GO ABORT TESTING
6964  030026  032762  000040  000014  18$:     BIT     #DTYE,RKER(R2)      ;SEE IF DRV TYPE ERROR
6965  030034  001403                          BEQ     20$                 ;BR IF NO, =RK06
6966  030036  152737  000004  003124          BISB    #B.CDT,TYPFMT       ;ELSE SET RK07 FLAG
6967  030044  004737  027522          20$:    JSR     PC,INITSS           ;INIT THE SUBSYSTEM
6968  030050  112765  000141  000001          MOVB    #RDSTAT,P.CMND(R5)  ;SET READ DRIVE STATUS COMMAND
6969  030056  012737  025622  003046          MOV     #NEDHDL,@.ABNL      ;SET NED ABNORMAL RETURN ADDRESS
6970  030064  012737  000377  005540          MOV     #377,NEWON          ;INIT. ON-LINE INDICATOR
6971  030072  004737  040316                  JSR     PC,DRVCAL           ;READ ALL DRIVE STATUS
6972                                  ;SEE IF THIS DRIVE EXISTS AND IS ON-LINE
6973  030076  012737  042164  003046          MOV     #ERRHDL,@.ABNL      ;RESTORE ABNL RETURN ADDRESS
6974  030104  022737  000377  005540          CMP     #377,NEWON          ;SEE IF NED INDICATION ON THIS DRIVE
6975  030112  001425                          BEQ     4$                  ;BR IF NED NOT SET
6976  030114  113737  005510  007656          MOVB    DRIVE,BADDRV+6      ;GET DRIVE NO. INTO BUF
6977  030122  152737  000060  007656          BISB    #'0,BADDRV+6        ;CONVERT TO ASCII
6978  030130  104401  007650                  TYPE    ,BADDRV             ;TYPE "DRIVE X"
6979  030134  104401  007661                  TYPE    ,NXDRIV             ;TYPE "NON-EXISTENT"
6980  030140  132737  000200  001341          BITB    #BIT7,$ENVM         ;SEE IF UNDER APT
6981  030146  001401                          BEQ     2$                  ;BR IF NO
6982  030150  104123                          ERROR   123                 ;NED UNDER APT SIZING
6983                                  ;SERVICE ERRORS HERE
6984  030152  042762  000100  000000  2$:     BIC     #IE,RKCS1(R2)       ;DISABLE RK06 INTERRUPT
6985  030160  017616  000000                  MOV     @(SP),(SP)          ;SET UP ERROR RETURN ADDRESS
6986  030164  000207                          RTS     PC                  ;ERROR RETURN
6987                                  ;SEE IF DRIVE IS READY
6988  030166  032765  000200  000040  4$:     BIT     #S.DRY,P.ADD(R5)    ;TEST FOR DRIVE READY
6989  030174  001013                          BNE     6$                  ;BR IF DRIVE IS READY
6990  030176  113737  005510  007656          MOVB    DRIVE,BADDRV+6      ;GET DRIVE NO. INTO BUF
6991  030204  152737  000060  007656          BISB    #'0,BADDRV+6        ;CONVERT TO ASCII
6992  030212  104401  007650                  TYPE    ,BADDRV             ;TYPE "DRIVE X"
6993  030216  104401  007675                  TYPE    ,NTREDY             ;TYPE "NOT READY"
6994  030222  000753                          BR      2$                  ;TAKE ERROR EXIT
6995                                  ;SEE IF DRIVE IS WRITE ENABLED
6996  030224  032765  004000  000040  6$:     BIT     #S.WRL,P.ADD(R5)    ;SEE IF WRITE LOCK SET
6997  030232  001413                          BEQ     8$                  ;BR IF WRITE LOCK NOT SET
6998  030234  113737  005510  007656          MOVB    DRIVE,BADDRV+6      ;GET DRIVE NO.
6999  030242  152737  000060  007656          BISB    #'0,BADDRV+6        ;CONVERT TO ASCII
7000  030250  104401  007650                  TYPE    ,BADDRV             ;TYPE "DRIVE X"
7001  030254  104401  007707                  TYPE    ,WRTLOK             ;TYPE "WRITE-LOCKED"
7002  030260  000734                          BR      2$                  ;TAKE ERROR EXIT
7003                                  ;SEE IF DRIVE NOT LOADED WITH ALIGNMENT CARTRIDGE
7004  030262  112765  000103  000001  8$:     MOVB    #PACK,P.CMND(R5)    ;SET PACK ACKNOWLEDGE COMMAND
7005  030270  004737  040316                  JSR     PC,DRVCAL           ;SET VOLUME VALID
7006  030274  112765  000013  000001          MOVB    #RECAL,P.CMND(R5)           ;SET RECAL COMMAND
7007  030302  004737  040316                  JSR     PC,DRVCAL           ;RECALIBRATE DRIVE
7008  030306  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5)  ;SET READ COMMAND
7009  030314  105737  003124                  TSTB    TYPFMT              ;SEE IF RK07
7010  030320  001004                          BNE     25$                 ;BR IF YES
7011  030322  012765  000632  000002          MOV     #632,P.CYLN(R5)
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7012  030330  000403                          BR      27$
7013  030332  012765  001456  000002  25$:    MOV     #1456,P.CYLN(R5)
7014  030340  112765  000002  000005  27$:    MOVB    #LSTTRK,P.TRCK(R5)      ;SET TRACK=2
7015  030346  012765  063554  000010          MOV     #RWBUF,P.BALO(R5) ;BUS ADDRESS
7016  030354  012765  177774  000012          MOV     #-4,P.WC(R5)      ;READ 4 WORDS
7017  030362  142765  000020  000007          BICB    #B.CFMT,P.CS1H(R5)      ;SET 22 SECTOR FORMAT
7018  030370  153765  003124  000007          BISB    TYPFMT,P.CS1H(R5)       ;SET CORRECT DRV TYPE
7019  030376  004737  040316                  JSR     PC,DRVCAL       ;READ 4 WORDS OF BAD SECTOR FILE
7020  030402  032737  100000  005504          BIT     #ANYDER,RECODE  ;SEE IF DATA ERROR
7021  030410  001402                          BEQ     10$             ;BR IF OK
7022  030412  104401  012362                  TYPE    ,BAD632         ;TYPE READ ERROR MESSAGE
7023  030416  022737  177777  063562  10$:    CMP     #177777,RWBUF+6 ;SEE IF ALL 1'S IN I.D. WORD 3
7024  030424  001013                          BNE     12$             ;BR IF NOT ALL 1'S
7025  030426  113737  005510  007656          MOVB    DRIVE,BADDRV+6  ;GET DRIVE NO.
7026  030434  152737  000060  007656          BISB    #'0,BADDRV+6    ;CONVERT TO ASCII
7027  030442  104401  007650                  TYPE    ,BADDRV         ;TYPE "DRIVE X"
7028  030446  104401  007722                  TYPE    ,ALNPAK         ;TYPE "LOADED WITH ALIGN PACK"
7029  030452  000637                          BR      2$              ;TAKE ERROR EXIT
7030                                  ;ERROR FREE RETURN
7031  030454  062716  000002          12$:    ADD     #2,(SP)         ;FIX UP RETURN PC
7032  030460  000207                          RTS     PC              ;RETURN
7033
7034
7035
7036                                  ;;*****************************************************************
7037                                  ;*SETTUP - SET UP FOR LOOP ON ERROR
7038                                  ;*THIS SUBROUTINE CANNOT BE CALLED BY ANY OTHER
7039                                  ;*SUBROUTINE --- ONLY MAIN-LINE CODE !!!!
7040                                  ;;*****************************************************************
7041  030462  011637  001076          SETTUP: MOV     (SP),@#STACK-2  ;MOVE RETURN PC ON STACK
7042  030466  012706  001076                  MOV     #STACK-2,SP     ;RE-INIT THE STACK POINTER
7043  030472  005037  005504                  CLR     RECODE          ;CLEAR ERROR RECOVERY FLAGS
7044  030476  105037  003126                  CLRB    ERRCNT          ;CLEAR RETRY ERROR COUNT
7045  030502  012705  002630                  MOV     #PARMO,R5       ;SET PARAM BLK ADRS
7046  030506  112765  000177  000001          MOVB    #SUBCLR,P.CMND(R5) ;SET SUBSYSTEM CLEAR CMND
7047  030514  004737  040316                  JSR     PC,DRVCAL       ;CLEAR THE SUBSYSTEM
7048  030520  012737  000000  177776          MOV     #PRO,@#PS       ;RE-ESTABLISH PRIORITY 0
7049  030526  000207                          RTS     PC              ;RETURN
7050
7051
7052
7053                                  ;;*****************************************************************
7054                                  ;$BTTL  CHKITR - CHECK CURRENT TEST ITERATION NUMBER
7055                                  ;*THIS SUBROUTINE LOADS THE ITERATION NUMBER FOR THE CURRENT
7056                                  ;*TEST INTO $TIMES, AND CHECKS IT TO DETERMINE IF THIS TEST
7057                                  ;*SHOULD BE RUN. IF ITERATION NO. = 0, THE SUBROUTINE RETURNS
7058                                  ;*TO THE STORED PC (AND THE TEST WILL BE SKIPPED). IF IT IS
7059                                  ;*NOT 0, THE RETURN IS MADE TO PC+2, AND THE TEST WILL
7060                                  ;*BE RUN. HOWEVER, ON THE FIRST PASS (QUICK VERIFY) OF A RUN
7061                                  ;*WHICH STARTED AT ADRS 200, ALL TESTS WILL BE RUN ONCE.
7062
7063  030530  010146          CHKITR: MOV     R1,-(SP)        ;SAVE R1
7064  030532  112737  000144  001115  MOVB    #100.,$ERMAX    ;SET MAX ERROR CNT TO 100 FOR $SCOPE
7065  030540  105737  003136          TSTB    DULACS          ;SEE IF DUAL-ACCESS FLAG SET
7066  030544  001006                  BNE     3$              ;BR IF YES
7067  030546  105737  003116          TSTB    MDFLAG          ;SEE IF 200 START
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7068  030552  001007                        BNE     4$                      ;BR IF NOT
7069  030554  005737  001326                TST     $PASS                   ;SEE IF FIRST PASS
7070  030560  001004                        BNE     4$                      ;BR IF NOT
7071  030562  012737  000001  001304  3$:   MOV     #1,$TIMES               ;SET UP FOR 1 ITERATION
7072  030570  000410                        BR      1$                      ;GO RUN DUAL-ACCESS TEST
7073  030572  113701  001102          4$:   MOVB    $TSTNM,R1               ;GET CURRENT TEST NUMBER
7074  030576  005301                        DEC     R1                      ;DECREMENT BY 1
7075  030600  006301                        ASL     R1                      ;DOUBLE IT, TO GET TEST LIST INDEX
7076  030602  016137  005626  001304        MOV     TSTLST(R1),$TIMES       ;LOAD ITERATION NUMBER
7077  030610  001403                        BEQ     2$                      ;BR IF TEST SHOULD BE SKIPPED
7078  030612  062766  000004  000002  1$:   ADD     #4,2(SP)                ;ADJUST RETURN PC TO RUN THIS TEST
7079  030620  012601                  2$:   MOV     (SP)+,R1                ;RESTORE R1
7080  030622  000207                        RTS     PC                      ;RETURN
7081
7082
7083
7084                                  ;;*****************************************************************
7085                                  ;SBTTL  RDCHRS - READ A STRING OF KBD INPUT CHARS
7086                                  ;*THIS SUBROUTINE READS A STRING OF UP TO EIGHTY INPUT
7087                                  ;*CHARACTERS AT THE KBD, TERMINATED BY <CR>, AND PLACES
7088                                  ;*THEM IN BUFFO, TERMINATED BY A NULL (0) BYTE.
7089                                  ;*RUB-OUT AND (↑U) FEATURES ARE PROVIDED.
7090                                  ;*IMMEDIATELY FOLLOWING THE SUBROUTINE CALL, THREE SPECIAL
7091                                  ;*RETURN ADDRESSES MUST BE LISTED: THE FIRST RETURN IS
7092                                  ;*TAKEN IF (↑C) IS TYPED, THE SECOND IS TAKEN IF (↑Z) IS
7093                                  ;*TYPED, AND THE THIRD IS TAKEN IF (↑U) OR INVALID INPUT IS TYPED.
7094                                  ;*IF (↑G) IS TYPED, THE SOFTWARE SWITCH REGISTER IS OPENED
7095                                  ;*FOR MODIFICATION, IF SELECTED, AND THEN THE (↑G) RETURN
7096                                  ;*IS TAKEN.
7097                                  ;*THE NUMBER OF INPUT CHARACTERS IN THE BUFFER IS RETURNED
7098                                  ;*IN R0.
7099                                  ;*
7100                                  ;*  CALL -      JSR     PC,RDCHRS
7101                                  ;*              <CONTROL-C RETURN ADDRESS>
7102                                  ;*              <CONTROL-Z RETURN ADDRESS>
7103                                  ;*              <CONTROL-U OR ERROR RETURN ADDRESS>
7104                                  ;*              RETURN
7105                                  ;;*****************************************************************
7106
7107  030624                          RDCHRS:
7108  030624  010146                          MOV     R1,-(SP)                ;SAVE R1
7109  030626  010246                          MOV     R2,-(SP)                ;SAVE R2
7110  030630  0050                            CLR     R0                      ;INITIALIZE CHARACTER COUNT
7111  030632  0050                            CLR     R1                      ;INITIALIZE RUB-OUT INDICATOR
7112                                  ;READ A CHARACTER
7113  030634  104406                  2$:     RDCHR                           ;READ A CHARACTER
7114  030636  112602                          MOVB    (SP)+,R2                ;GET CHARACTER INTO R2
7115                                  ;CHECK FOR (↑C)
7116  030640  122702  000003                  CMPB    #003,R2                 ;SEE IF (↑C) TYPED
7117  030644  001006                          BNE     4$                      ;BR IF NOT (↑C)
7118  030646  104401  012426                  TYPE    ,CNTRLC                 ;ECHO (↑C)
7119  030652  017666  000004  000004  3$:     MOV     @4(SP),4(SP)            ;PUT RETURN ADDRESS ON STACK
7120  030660  000523                          BR      24$                     ;BR TO TAKE EXIT
7121                                  ;CHECK FOR (↑Z)
7122  030662  122702  000032          4$:     CMPB    #032,R2                 ;SEE IF (↑Z) TYPED
7123  030666  001006                          BNE     6$                      ;BR IF NOT (↑Z)
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7124  030670  104401  012433            TYPE    ,CNTRLZ          ;ECHO (↑Z)
7125  030674  062766  000002  000004    ADD     #2,4(SP)         ;MAKE OLD PC POINT TO NEXT RETURN ADR.
7126  030702  000753                    BR      3$               ;BR TO TAKE (↑Z) EXIT
7127                        ;CHECK FOR (↑U)
7128  030704  122702  000025        6$: CMPB    #025,R2          ;SEE IF (↑U) TYPED
7129  030710  001006                    BNE     8$               ;BR IF NOT (↑U)
7130  030712  104401  012445            TYPE    ,CNTRLU          ;ECHO (↑U)
7131  030716  062766  000004  000004  7$: ADD     #4,4(SP)         ;MAKE OLD PC POINT TO NEXT RETURN ADDR.
7132  030724  000752                    BR      3$               ;BR TO TAKE (↑U) EXIT
7133                        ;CHECK FOR (↑G)
7134  030726  122702  000007        8$: CMPB    #007,R2          ;SEE IF (↑G) TYPED
7135  030732  001005                    BNE     9$               ;BR IF NOT (↑G)
7136  030734  104401  012452            TYPE    ,CNTRLG          ;ECHO (↑G)
7137  030740  004737  026370            JSR     PC,GTSWRG        ;OPEN SOFTWARE SWITCH REG. FOR CHANGE
7138  030744  000764                    BR      7$               ;TAKE (↑U) RETURN
7139                        ;CHECK FOR RUB-OUT (DELETE)
7140  030746  122702  000177        9$: CMPB    #177,R2          ;SEE IF RUB-OUT (DEL) TYPED
7141  030752  001020                    BNE     14$              ;BR IF NOT RUB-OUT
7142  030754  005700                    TST     R0               ;CHECK THE CHARACTER COUNT
7143  030756  001726                    BEQ     2$               ;BR IF COUNT = 0
7144  030760  005701                    TST     R1               ;CHECK THE RUB-OUT INDICATOR
7145  030762  001003                    BNE     11$              ;BR IF WE HAD A PREVIOUS RUB-OUT
7146  030764  005201                    INC     R1               ;SET RUB-OUT INDICATOR
7147  030766  104401  012463            TYPE    ,BKSLSH          ;TYPE A BACK-SLASH (\)
7148  030772  005037  005542        11$: CLR    $CRACH           ;USE SCRATCH WORD FOR TEMP. BUFFER
7149  030776  005300                    DEC     R0               ;DECREMENT COUNT
7150  031000  116037  005272  005542    MOVB    BUFFO(R0),SCRACH ;GET LAST CHAR. INTO BUFFER
7151  031006  104401  005542            TYPE    ,SCRACH          ;ECHO CHARACTER TO BE DELETED
7152  031012  000710                    BR      2$               ;GO READ ANOTHER CHARACTER
7153  031014  005701                14$: TST     R1               ;CHECK THE RUB-OUT INDICATOR
7154  031016  001403                    BEQ     16$              ;BR IF INDICATOR IS NOT SET
7155  031020  104401  012463            TYPE    ,BKSLSH          ;TYPE A BACK-SLASH
7156  031024  005001                    CLR     R1               ;CLEAR THE RUB-OUT INDICATOR
7157                        ;CHECK FOR CARRIAGE RETURN
7158  031026  122702  000015        16$: CMPB   #015,R2          ;SEE IF <CR> TYPED
7159  031032  001426                    BEQ     19$              ;BR IF <CR>
7160                        ;HANDLE POSSIBLE DIGIT
7161  031034  005037  005542            CLR     $CRACH           ;USE SCRATCH WORD FOR TEMP. BUFFER
7162  031040  110237  005542            MOVB    R2,$CRACH        ;GET THIS CHARACTER INTO BUFFER
7163  031044  104401  005542            TYPE    ,$CRACH          ;ECHO THE CHARACTER TYPED
7164  031050  110260  005272            MOVB    R2,BUFFO(R0)     ;PUT CHARACTER INTO BUFFER
7165  031054  005200                    INC     R0               ;INCREMENT CHARACTER COUNTER
7166  031056  022700  000120            CMP     #80.,R0          ;SEE IF TOO MANY CHARACTERS TYPED
7167  031062  001264                    BNE     2$               ;BR IF NOT TOO MANY
7168  031064  104401  001315            TYPE    ,$CRLF           ;TYPE <CR> AND <LF>
7169  031070  112760  000000  005272    MOVB    #0,BUFFO(R0)   ;PUT TERMINATING NULL INTO BUFFER
7170  031076  104401  005272            TYPE    ,BUFFO           ;ECHO INPUT STRING
7171  031102  104401  001314            TYPE    ,$QUES           ;TYPE <?>,<CR>,<LF>
7172  031106  000703                    BR      7$               ;TAKE ERROR EXIT FROM RDCHRS
7173  031110  104401  001315        19$: TYPE    ,$CRLF           ;TYPE <CR>,<LF>
7174  031114  112760  000000  005272    MOVB    #0,BUFFO(R0)     ;PUT TERMINATING NULL INTO BUFFER
7175  031122  062766  000006  000004    ADD     #6,4(SP)         ;FIX UP RETURN ADDRESS
7176  031130  012602                24$: MOV     (SP)+,R2         ;RESTORE R2
7177  031132  012601                    MOV     (SP)+,R1         ;RESTORE R1
7178  031134  000207                    RTS     PC               ;SUBROUTINE EXIT
7179
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                                ;;*****************************************************************
                                .SBTTL  TYPTST - TYPE CURRENT TEST AND ITERATION NUMBER
                                ;*THIS SUBROUTINE TYPES : "XX     YYYYYY", WITH NO <CR>
                                ;*OR <LF>. XX IS THE NUMBER OF THE CURRENT TEST AND
                                ;*YYYYYY IS THE NUMBER OF ITERATIONS FOR THAT TEST.
                                ;*R1 MUST CONTAIN THE INDEX INTO THE TEST LIST FOR
                                ;*THE CURRENT TEST.
                                ;* CALL -   JSR    PC,TYPTST
                                ;;*****************************************************************

031136  104401  012474  TYPTST:  TYPE    ,SPACE1          ;TYPE A SPACE
031142  010146                   MOV     R1,-(SP)         ;PUT INDEX ONTO STACK
031144  006216                   ASR     (SP)             ;DIVIDE BY 2
031146  005216                   INC     (SP)             ;INCREMENT TO GET TEST NO.
031150  104403                   TYPOS                    ;TYPE TEST NO. IN OCTAL
031152     002                   .BYTE   2                ;TYPE 2 DIGITS
031153     000                   .BYTE   0                ;SUPPRESS LEADING ZEROS
031154  104401  012467           TYPE    ,SPACE6          ;TYPE 6 SPACES
031160  016146  005626           MOV     TSTLST(R1),-(SP) ;PUT CURRENT ITERATION NO. ONTO STACK
031164  104403                   TYPOS                    ;TYPE ITERATION NO. IN OCTAL
031166     006                   .BYTE   6                ;TYPE 6 DIGITS
031167     000                   .BYTE   0                ;SUPPRESS LEADING ZEROS
031170  000207                   RTS     PC               ;RETURN

                                ;;*****************************************************************
                                .SBTTL  TYPPRM - TYPE CURRENT PARAMETER
                                ;*THIS SUBROUTINE TYPES THE LINE : XX=YYYYYYYY,
                                ;*WHERE XX IS THE CURRENT PARAMETER MNEMONIC, AND
                                ;*YYYYYYYY IS ITS VALUE IN OCTAL DIGITS, WITH LEADING
                                ;*ZEROS SUPPRESSED. NOTE: <CR> AND <LF> ARE NOT DONE.
                                ;*ON ENTRY, R1 MUST CONTAIN THE INDEX INTO THE
                                ;*PARAMETER TABLES, FOR THE CURRENT PARAMETER.
                                ;* CALL -      JSR     PC,TYPPRM
                                ;;*****************************************************************

031172  016137  006152  012476  TYPPRM: MOV     PRMNEM(R1),PRMBUF ;PUT MNEMONIC INTO OUTPUT BUFFER
031200  104401  012476           TYPE    ,PRMBUF          ;TYPE "XX="
031204  016137  005732  005476           MOV     PRMLST(R1),LOWOCT ;PUT LOW BITS OF PARAM. INTO LOWOCT
031212  005037  005500                   CLR     HIGOCT           ;CLEAR HIGH BINARY BITS
031216  022761  040515  006152           CMP     #"MA,PRMNEM(R1)  ;SEE IF PARAMETER IS (MA)
031224  001003                           BNE     1$               ;BR IF NOT (MA)
031226  016137  005734  005500           MOV     PRMLST+2(R1),HIGOCT ;PUT HI BITS OF PARAM. INTO HIGOCT
031234  012746  005476           1$:     MOV     #LOWOCT,-(SP)    ;PUT ADDRESS OF BINARY VALUE ON STACK
031240  004737  053422                   JSR     PC,@#$DB2O       ;CONVERT BINARY TO OCTAL ASCII
031244  004737  053736                   JSR     PC,@#$SUPRS      ;TYPE YYYYYYYY, SUPPRESSING LEADING O'S
031250  000207                           RTS     PC               ;RETURN


                                ;;*****************************************************************
                                .SBTTL  TYPPAT - TYPE CURRENT WORD OF DATA PATTERN IS
                                ;*THIS SUBROUTINE TYPES THE LINE : WORD XX = YYYYYY,
                                ;*WHERE XX IS THE NUMBER OF THE CURRENT WORD OF
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                                        ;*USER-DEFINED PATTERN 15, AND YYYYYY IS ITS 16-BIT
                                        ;*VALUE, IN OCTAL DIGITS. <CR> AND <LF> ARE NOT TYPED.
                                        ;*ON ENTRY, R1 MUST CONTAIN THE INDEX OF THE CURRENT
                                        ;*WORD IN THE PATTERN 15 TABLE.
                                        ;*  CALL -      JSR       PC,TYPPAT
                                        ;;*****************************************************************

031252                                  TYPPAT:
031252  104401  012502                          TYPE    ,WORDSP           ;TYPE "WORD "
031256  010146                                  MOV     R1,-(SP)          ;PUT INDEX ONTO STACK
031260  006216                                  ASR     (SP)              ;DIVIDE BY TWO FOR WORD NO.
031262  104403                                  TYPOS                     ;GO TYPE WORD NUMBER
031264     002                                  .BYTE   2                 ;DIGIT COUNT = 2 FOR TYPOC
031265     001                                  .BYTE   1                 ;TELL TYPOS TO TYPE LEADING ZEROS
031266  104401  012510                          TYPE    ,EQUALS           ;TYPE " = "
031272  016146  007156                          MOV     PAT15(R1),-(SP)   ;GET BINARY VALUE OF THIS WORD
031276  104403                                  TYPOS                     ;TYPE VALUE IN OCTAL
031300     006                                  .BYTE   6                 ;TYPE 6 DIGITS
031301     001                                  .BYTE   1                 ;TYPE LEADING ZEROS
031302  000207                                  RTS     PC                ;RETURN


                                        ;;*****************************************************************
                                        .SBTTL  MODP15 - MODIFY USER-DEFINED PATTERN 15
                                        ;*THIS SUBROUTINE DETERMINES WHETHER OR NOT USER-DEFINED
                                        ;*DATA PATTERN 15 SHOULD BE OPENED FOR MODIFICATION, AND
                                        ;*IF SO, IT REQUESTS THE NEW VALUES AND CONTROLS THEIR
                                        ;*INPUT ON THE TTY. IT CHECKS VALUES FOR VALIDITY, AND
                                        ;*LOADS THE 16 WORDS INTO THE PATTERN 15 TABLE (PAT15).
                                        ;*IF THE OPERATOR ANSWERS THE REQUEST FOR A PATTERN WORD
                                        ;*WITH EXCLAMATION POINT (!) (CR), THE SUBROUTINE
                                        ;*PROPAGATES THE LAST WORD TYPED INTO ALL REMAINING
                                        ;*WORDS OF THE PATTERN 15 TABLE.
                                        ;*  CALL -      JSR       PC,MODP15
                                        ;;*****************************************************************

031304                                  MODP15:
031304  010046                                  MOV     R0,-(SP)          ;SAVE R0
031306  010146                                  MOV     R1,-(SP)          ;SAVE R1
031310  010246                                  MOV     R2,-(SP)          ;SAVE R2
                                        ;SEE IF PARAMETER IS PT
031312  022761  052120  006152                  CMP     #"PT,PRMNEM(R1)   ;SEE IF CURRENT PARAMETER IS (PT)
031320  001127                                  BNE     22$               ;BR IF NOT (PT)
                                        ;SEE IF PATTERN 15 IS SPECIFIED
031322  032737  100000  005760                  BIT     #BIT15,PT         ;SEE IF PATTERN 15 SPECIFIED
031330  001523                                  BEQ     22$               ;BR IF NOT SPECIFIED
                                        ;SEE IF PATTERN 15 SHOULD BE MODIFIED
031332  104401  011167                  4$:     TYPE    ,MDFY15           ;ASK WHETHER PATTERN 15 SHOULD BE MODIFIED
031336  004737  030624                          JSR     PC,RDCHRS         ;READ RESPONSE
031342  031610                                  24$                       ;(↑C) RETURN ADDRESS
031344  031620                                  26$                       ;(↑Z) RETURN ADDRESS
031346  031404                                  8$                        ;(↑U) OR ERROR RETURN ADDRESS
031350  005700                                  TST     R0                ;SEE IF NULL INPUT
031352  001512                                  BEQ     22$               ;BR IF MODIFICATION NOT REQUESTED
031354  022737  000115  005272                  CMP     #'M,BUFF0         ;SEE IF (M) TYPED
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7292  031362  001405                        BEQ     6$              ;BR IF MODIFICATION REQUESTED
7293  031364  104401  005272                TYPE    .BUFFO          ;ECHO BAD INPUT
7294  031370  104401  001314                TYPE    .$QUES
7295  031374  000756                        BR      4$              ;GO ASK AGAIN
7296                          ;MODIFY PATTERN 15
7297  031376  104401  011145        6$:     TYPE    .SELP15         ;TYPE "MODIFY PATTERN 15"
7298  031402  005001                        CLR     R1              ;INITIALIZE WORD INDEX
7299  031404  004737  031252        8$:     JSR     PC,TYPPAT       ;TYPE CURRENT WORD AND VALUE
7300  031410  104401  012474                TYPE    ,SPACE1         ;TYPE A SPACE
7301  031414  104401  012514                TYPE    ,PROMPT         ;TYPE ASTERISK AND SPACE
7302                          ;READ AND CHECK INPUT, IF ANY
7303  031420  004737  030624                JSR     PC,RDCHRS       ;READ NEW DATA PATTERN WORD
7304  031424  031610                        24$                     ;(↑C) RETURN ADDRESS FOR RDCHRS
7305  031426  031620                        26$                     ;(↑Z) RETURN ADDRESS FOR RDCHRS
7306  031430  031404                        8$                      ;(↑U) OR ERROR RETURN ADDR. FOR RDCHRS
7307  031432  005700                        TST     R0              ;SEE IF ANY INPUT
7308  031434  001006                        BNE     12$             ;BR IF ANY INPUT
7309  031436  062701  000002        10$:    ADD     #2,R1           ;INCREMENT WORD INDEX
7310  031442  022701  000040                CMP     #32.,R1         ;SEE IF ALL DONE
7311  031446  001454                        BEQ     22$             ;BR IF DONE, TO RETURN
7312  031450  000755                        BR      8$              ;CONTINUE WITH NEXT WORD
7313  031452  022737  000041  005272  12$:  CMP     #'!,BUFFO       ;SEE IF (!) TYPED
7314  031460  001431                        BEQ     16$             ;BR TO PROPAGATE CURRENT VALUE
7315  031462  005002                        CLR     R2              ;INIT. (!) INDICATOR
7316  031464  122760  000041  005271        CMPB    #'!,BUFFO-1(R0) ;SEE IF LAST CHAR IN BUF IS (!)
7317  031472  001004                        BNE     14$             ;BR IF NOT (!)
7318  031474  105060  005271                CLRB    BUFFO-1(R0)     ;INSERT TERMINATOR BYTE
7319  031500  005300                        DEC     R0              ;DECREMENT CHAR COUNT
7320  031502  005202                        INC     R2              ;SET (!) INDICATOR
7321  031504  022700  000006        14$:    CMP     #6,R0           ;SEE HOW MANY CHARS NOW
7322  031510  002426                        BLT     20$             ;BR IF TOO MANY
7323  031512  012746  005272                MOV     #BUFFO,-(SP)    ;GET BUF. ADDR. ON STACK FOR OCTBIN
7324  031516  004737  052464                JSR     PC,OCTBIN       ;CHECK DIGITS AND CONVERT TO BINARY
7325  031522  031566                        20$                     ;ERROR RETURN ADDRESS FOR OCTBIN
7326  031524  012600                        MOV     (SP)+,R0        ;GET BINARY VALUE
7327  031526  005737  052616                TST     $HIOCT          ;SEE IF VALUE EXCEEDS 16 BITS
7328  031532  001015                        BNE     20$             ;BR TO ECHO BAD INPUT
7329  031534  010061  007156                MOV     R0,PAT15(R1)    ;PUT NEW WORD VALUE INTO TABLE
7330  031540  005702                        TST     R2              ;SEE IF (!) WAS TYPED
7331  031542  001735                        BEQ     10$             ;BR IF (!) WAS NOT TYPED
7332                          ;PROPAGATE CURRENT WORD TO END OF PATTERN 15 TABLE
7333  031544  022701  000036        16$:    CMP     #30.,R1         ;SEE IF ALL DONE YET
7334  031550  001413                        BEQ     22$             ;BR IF DONE
7335  031552  016161  007156  007160        MOV     PAT15(R1),PAT15+2(R1) ;PROPAGATE TO NEXT WORD
7336  031560  062701  000002                ADD     #2,R1           ;INCREMENT WORD INDEX
7337  031564  000767                        BR      16$             ;LOOP UNTIL DONE
7338                          ;ECHO BAD INPUT
7339  031566  104401  005272        20$:    TYPE    ,BUFFO          ;ECHO BAD INPUT
7340  031572  104401  001314                TYPE    ,$QUES          ;TYPE <?> AND <CR>,<LF>
7341  031576  000702                        BR      8$              ;BR TO ASK AGAIN
7342                          ;NORMAL RETURN
7343  031600  012602        22$:    MOV     (SP)+,R2        ;RESTORE R2
7344  031602  012601                MOV     (SP)+,R1        ;RESTORE R1
7345  031604  012600                MOV     (SP)+,R0        ;RESTORE R0
7346  031606  000207                RTS     PC              ;RETURN
7347                          ;(↑C) RETURN
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7348  031610  012766  013732  000006  24$:    MOV     #DRVTST,6(SP)   ;PC FOR (↑C) RETURN
7349  031616  000770                          BR      22$             ;BR TO RETURN
7350                                  ;(↑Z) RETURN
7351  031620  012766  015344  000006  26$:    MOV     #ASKMDE,6(SP)   ;PC FOR (↑Z) RETURN
7352  031626  000764                          BR      22$             ;BR TO RETURN
7353
7354
7355
7356                                  ;;*****************************************************************
7357                                  .SBTTL  CHKPRM - CHECK VALUE OF INPUT PARAMETER
7358                                  ;*THIS SUBROUTINE CHECKS THE CONTENTS OF LOWOCT AND
7359                                  ;*HIGOCT (IF 32-BIT VALUE) AGAINST LOWER AND UPPER
7360                                  ;*LIMITS FOR THE CURRENT PARAMETER. THE PARAMETER TABLE
7361                                  ;*INDEX FOR THE CURRENT PARAMETER MUST BE PASSED
7362                                  ;*TO CHKPRM IN R1 ON ENTRY. IF THE PARAMETER VALUE
7363                                  ;*IS LEGAL, IT IS ENTERED INTO THE PARAMETER TABLE
7364                                  ;*(PRMLST). IF NOT, A RETURN IS MADE TO THE ADDR. FOLLOWING
7365                                  ;*THE CALL TO CHKPRM. IF THE PARAMETER HAS A 2-WORD
7366                                  ;*VALUE (32 BITS) R1 IS INCREMENTED BY 2 BEFORE RETURN.
7367                                  ;* CALL -      JSR     PC,CHKPRM
7368                                  ;*            <ERROR RETURN ADDRESS>
7369                                  ;*            RETURN
7370                                  ;;*****************************************************************
7371
7372  031630  104407                  CHKPRM: SAVREG                          ;SAVE R0-R5
7373  031632  010102                          MOV     R1,R2                   ;GET COPY OF INDEX
7374  031634  006302                          ASL     R2                      ;DOUBLE IT
7375  031636  022761  040515  006152          CMP     #"MA,PRMNEM(R1)         ;SEE IF PARAMETER IS (MA)
7376  031644  001422                          BEQ     20$                     ;BR IF (MA)
7377  031646  005737  005500                  TST     HIGOCT                  ;SEE IF HIGH BITS = 0
7378  031652  001403                          BEQ     18$                     ;BR IF ZERO
7379  031654  017616  000000          16$:    MOV     @(SP),(SP)              ;GET ERROR RETURN PC
7380  031660  000475                          BR      30$                     ;GO TO RETURN
7381                                  ;CHECK VALIDITY OF 16-BIT PARAMETER VALUE
7382  031662  023762  005476  006042  18$:    CMP     LOWOCT,PRMLIM(R2)       ;SEE IF INPUT VALUE IS TOO SMALL
7383  031670  103771                          BLO     16$                     ;BR IF INPUT VALUE TOO SMALL
7384  031672  023762  005476  006044          CMP     LOWOCT,PRMLIM+2(R2)     ;SEE IF INPUT VALUE IS TOO LARGE
7385  031700  101365                          BHI     16$                     ;BR IF INPUT VALUE IS TOO LARGE
7386                                  ;UPDATE 16-BIT PARAMETER VALUE IN LIST
7387  031702  013761  005476  005732          MOV     LOWOCT,PRMLST(R1)       ;PUT NEW PARAMETER VALUE INTO LIST
7388  031710  000457                          BR      28$                     ;BR TO RETURN
7389                                  ;CHECK VALIDITY OF 32-BIT PARAMETER VALUE
7390  031712  032737  000001  005476  20$:    BIT     #BIT0,LOWOCT            ;SEE IF MA IS ODD
7391  031720  001355                          BNE     16$                     ;BR IF MA IS ODD
7392  031722  023762  005500  006044          CMP     HIGOCT,PRMLIM+2(R2)     ;SEE IF HIGH WORD TOO SMALL
7393  031730  103751                          BLO     16$                     ;BR IF HIGH WORD IS TOO SMALL
7394  031732  001004                          BNE     24$                     ;BR IF HIGH WORD NOT EQUAL TO LOW LIMIT
7395  031734  023762  005476  006042          CMP     LOWOCT,PRMLIM(R2)       ;SEE IF LOW WORD IS TOO SMALL
7396  031742  103744                          BLO     16$                     ;BR IF LOW WORD IS TOO SMALL
7397  031744  023762  005500  006050  24$:    CMP     HIGOCT,PRMLIM+6(R2)     ;SEE IF HIGH WORD IS TOO BIG
7398  031752  101340                          BHI     16$                     ;BR IF HIGH WORD TOO BIG
7399  031754  001004                          BNE     26$                     ;BR IF HI WORD NOT EQUAL TO UPPER LIMIT
7400  031756  023762  005476  006046          CMP     LOWOCT,PRMLIM+4(R2)     ;SEE IF LOW WORD IS TOO LARGE
7401  031764  101333                          BHI     16$                     ;BR IF LOW WORD IS TOO LARGE
7402                                  ;UPDATE 32-BIT PARAMETER VALUE IN LIST
7403  031766  013761  005476  005732  26$:    MOV     LOWOCT,PRMLST(R1)       ;PUT LOW WORD INTO LIST
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7404  031774  013761  005500  005734          MOV     HIGOCT,PRMLST+2(R1) ;PUT HIGH WORD INTO LIST
7405                        ;COMPUTE AND TYPE MAX ALLOWABLE WORD COUNT FOR THIS MA
7406  032002  004737  032060                  JSR     PC,MXWRDC           ;GET WORD COUNT IN R1-R0
7407  032006  104401  010710                  TYPE    ,MAWRDC             ;TYPE "MAX WORD COUNT = "
7408  032012  010037  003176                  MOV     R0,SUML01
7409  032016  010137  003200                  MOV     R1,SUMHI1
7410  032022  012746  003176                  MOV     #SUML01,-(SP)       ;PUT POINTER ON STACK
7411  032026  004737  053422                  JSR     PC,$DB2O            ;CONVERT TO OCTAL
7412  032032  004737  053736                  JSR     PC,$SUPRS           ;TYPE IT
7413  032036  104401  001315                  TYPE    ,$CRLF              ;TYPE <CR>,<LF>
7414  032042  062766  000002  000014          ADD     #2,14(SP)           ;INCREMENT R1 INDEX
7415  032050  062716  000002          28$:    ADD     #2,(SP) ;GET NORMAL RETURN PC
7416  032054  104410                  30$:    RESREG                      ;RESTORE R0-R5
7417  032056  000207                          RTS     PC                  ;RETURN
7418
7419
7420
7421                        ;;*****************************************************************
7422                        ;*MXWRDC - GET MAX WORD COUNT FOR CURRENT MEM LIMITS AND CURRENT MA,
7423                        ;*AND LEAVE THE WORD COUNT IN R1-R0. NO REGISTERS ARE SAVED.
7424                        ;;*****************************************************************
7425  032060  013700  006126          MXWRDC: MOV     MAHILM,R0           ;GET LO BITS OF MEM LIM
7426  032064  013701  006130                  MOV     MAHILM+2,R1         ;HI BITS OF MEM LIM
7427  032070  163700  005762                  SUB     MA,R0               ;SUBTRACT MA FROM MAHILM
7428  032074  005601                          SBC     R1
7429  032076  163701  005764                  SUB     MA+2,R1
7430  032102  100413                          BMI     27$                 ;IF NEGATIVE, RETURN
7431  032104  000241                          CLC                         ;DIVIDE BY 2 TO GET WORDS
7432  032106  006001                          ROR     R1
7433  032110  006000                          ROR     R0
7434  032112  062700  000001                  ADD     #1,R0               ;INCREMENT BY 1 WORD
7435  032116  005501                          ADC     R1
7436  032120  005701                          TST     R1
7437  032122  001403                          BEQ     27$                 ;BR IF WORD COUNT < 65,536 DEC
7438  032124  005000                          CLR     R0                  ;MAKE WORD COUNT = 65,536
7439  032126  012701  000001                  MOV     #1,R1
7440  032132  000207                  27$:    RTS     PC                  ;RETURN
7441
7442
7443
7444                        ;;*****************************************************************
7445                        ;$BTTL  DRVSER - TYPE DRIVE SERIAL NUMBER (LOW 3 DIGITS)
7446                        ;*THIS SUBROUTINE TYPES "DRIVE SER. NO.  XXX" (IN DECIMAL), WITH LEADING
7447                        ;*ZEROS SUPPRESSED.
7448                        ;;*****************************************************************
7449  032134  104407          DRVSER: SAVREG                              ;SAVE R0-R5
7450  032136  004737  027522                  JSR     PC,INITSS           ;CLEAR S.S. AND PARAMETERS
7451  032142  112765  000141  000001          MOVB    #RDSTAT,P.CMND(R5) ;SET READ STATUS COMMAND
7452  032150  004737  040316                  JSR     PC,DRVCAL           ;READ STATUS OF THIS DRIVE
7453  032154  104401  011374                  TYPE    ,DRIV               ;TYPE "DRIVE"
7454  032160  104401  011410                  TYPE    ,SERNM              ;TYPE " SER. NO.  "
7455  032164  016501  000054                  MOV     P.A11(R5),R1        ;GET "A" STATUS BYTE 11
7456  032170  012704  053524                  MOV     #$OCTVL,R4          ;GET ADDR OF CHAR BUFFER
7457  032174  010446                          MOV     R4,-(SP)            ;STORE IT ON STACK FOR $SUPRS
7458  032176  012703  000003                  MOV     #3,R3               ;INIT CHAR COUNT
7459  032202  006101                          ROL     R1                  ;INITIALIZE BIT POSITIONS
```

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7460  032204  006101                        ROL     R1
7461  032206  006101                4$:     ROL     R1              ;GET NEXT 4 BITS
7462  032210  006101                        ROL     R1
7463  032212  006101                        ROL     R1
7464  032214  006101                        ROL     R1
7465  032216  010100                        MOV     R1,R0           ;GET A WORKING COPY
7466  032220  042700  177760              BIC     #177760,R0      ;CLEAR ALL BUT LOW 4 BITS
7467  032224  052700  000060              BIS     #'0,R0          ;CONVERT A DIGIT TO ASCII
7468  032230  110024                      MOVB    R0,(R4)+        ;PUT ASCII DIGIT INTO CHAR BUFFER
7469  032232  005303                      DEC     R3              ;DECREMENT CHAR COUNT
7470  032234  001364                      BNE     4$              ;BR IF NOT 3 CHARS YET
7471  032236  105014                      CLRB    (R4)            ;INSERT NULL TERMINATOR
7472  032240  004737  053736              JSR     PC,@#$SUPRS     ;TYPE DRIVE SER. NUMBER
7473  032244  104401  001315              TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7474  032250  104410                      RESREG                  ;RESTORE R0-R5
7475  032252  000207                      RTS     PC              ;RETURN
7476
7477
7478
7479                                ;;*****************************************************************
7480                                .SBTTL  CRTSER - TYPE CARTRIDGE SERIAL NUMBER
7481                                ;*THIS SUBROUTINE TYPES "CART. SER. NO.  XXXXXXXXXXX" (IN OCTAL),
7482                                ;*WITH LEADING ZEROS SUPPRESSED.
7483                                ;;*****************************************************************
7484  032254  004737  027522       CRTSER: JSR     PC,INITSS       ;CLEAR S.S. AND PARAMETERS
7485  032260  142765  000020  000007        BICB    #8.CFMT,P.CS1H(R5)      ;SET 22 SECTOR FORMAT
7486  032266  105737  003125              TSTB    FORMAT          ;CHECK THE ACTUAL FORMAT
7487  032272  001402                      BEQ     4$              ;BR IF 22 SECTORS
7488  032274  105265  000004              INCB    P.SECT(R5)      ;IF 20 SECTORS, READ SECTOR 1
7489  032300  112765  000121  000001  4$: MOVB    #RDDATA,P.CMND(R5) ;SET READ COMMAND
7490  032306  013765  017760  000002      MOV     LSTCYL,P.CYLN(R5) ;SET CYL = 632(OCT)/1456(OCT) FOR RK07
7491  032314  112765  000002  000005      MOVB    #LSTTRK,P.TRCK(R5) ;SET TRACK = 2
7492  032322  012765  063554  000010      MOV     #RWBUF,P.BAL0(R5) ;SET READ BUFFER ADDRESS
7493  032330  012765  177776  000012      MOV     #-2,P.WC(R5)    ;SET WORD COUNT TO READ 2 WORDS
7494  032336  004737  040316              JSR     PC,DRVCAL       ;READ SERIAL NO. IN BSF
7495  032342  104401  011401              TYPE    ,CART           ;TYPE   "CART."
7496  032346  104401  011410              TYPE    ,SERNM          ;TYPE "SER. NO.  "
7497  032352  012746  063554              MOV     #RWBUF,-(SP)    ;GET POINTER FOR $DB2O
7498  032356  004737  053422              JSR     PC,@#$DB2O      ;CONVERT BINARY TO OCTAL
7499  032362  004737  053736              JSR     PC,@#$SUPRS     ;TYPE CART. SERIAL NO. IN OCTAL
7500  032366  104401  001315              TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7501  032372  000207                      RTS     PC              ;RETURN
7502
7503
7504
7505                                ;;*****************************************************************
7506                                .SBTTL  SEEKER - PERFORM IMPLICIT OR EXPLICIT SEEK
7507                                ;*THIS SUBROUTINE CHECKS SWR BIT 7, AND IF IT IS 0, AN IMPLICIT
7508                                ;*SEEK VIA THE READ HEADER COMMAND IS PERFORMED. IF THE HEADER
7509                                ;*DOES NOT CONTAIN THE CORRECT CYLINDER NO. AN ERROR IS REPORTED.
7510                                ;*IF SWR BIT 7 = 1, AN EXPLICIT SEEK COMMAND IS PERFORMED.
7511                                ;*ON ENTRY TO THE SUBROUTINE, THE DRIVE AND CYLINDER NUMBERS
7512                                ;*MUST BE PRE-LOADED INTO THE PARAMETER BLOCK.
7513                                ;* CALL --     JSR     PC,SEEKER
7514                                ;;*****************************************************************
7515
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7516  032374  010046                  SEEKER: MOV     R0,-(SP)          ;SAVE R0
7517  032376  112765  000117  000001          MOVB    #SEEK,P.CMND(R5)  ;SET SEEK COMMAND
7518  032404  032777  000200  146526          BIT     #BIT07,@SWR       ;SEE IF EXPLICIT SEEKS REQUESTED
7519  032412  001023                          BNE     2$                ;BR IF EXPLICIT SEEKS
7520  032414  112765  000125  000001          MOVB    #RDHEAD,P.CMND(R5) ;SET READ HEADER COMMAND
7521  032422  004737  040316                  JSR     PC,DRVCAL         ;READ A HEADER
7522  032426  016200  000024                  MOV     RKDB(R2),R0       ;GET WORD 1 OF ACTUAL HEADER
7523  032432  020065  000002                  CMP     R0,P.CYLN(R5)     ;COMPARE TO EXPECTED CYLINDER
7524  032436  001413                          BEQ     4$                ;BR IF EQUAL
7525  032440  004737  041704                  JSR     PC,REPSUP         ;STORE PREV AND CURRENT CMNDS
7526  032444  016537  000002  001174          MOV     P.CYLN(R5),$REG5  ;GET GOOD CYL NO.
7527  032452  010037  001176                  MOV     R0,$REG6          ;GET BAD CYL NO.
7528  032456  104062                          ERROR   62                ;CYLINDER MISCOMPARE
7529  032460  000402                          BR      4$
7530  032462  004737  040316          2$:     JSR     PC,DRVCAL         ;PERFORM COMMAND
7531  032466  012600                  4$:     MOV     (SP)+,R0          ;RESTORE R0
7532  032470  000207                          RTS     PC                ;RETURN
7533
7534
7535
7536                                  ;;*****************************************************************
7537                                  .SBTTL  STALL - STALL FOR ST UNIT STALL TIMES
7538                                  ;*IF SWR BIT 8 = 0, THIS SUBROUTINE STALLS FOR ST STALL TIMES,
7539                                  ;*WHERE A STALL TIME = 40 US, FOR AN "AVERAGE" CPU. IF BIT 8
7540                                  ;*IS EQUAL TO 1, A RANDOM STALL IS APPLIED.
7541                                  ;* CALL -   JSR     PC,STALL
7542                                  ;;*****************************************************************
7543
7544  032472  010046                  STALL:  MOV     R0,-(SP)          ;SAVE R0
7545  032474  010146                          MOV     R1,-(SP)          ;SAVE R1
7546  032476  032777  000400  146434          BIT     #BIT08,@SWR       ;APPLY RANDOM STALL ?
7547  032504  001407                          BEQ     1$                ;BR IF NOT RANDOM
7548  032506  004737  052620                  JSR     PC,$RAND          ;GENERATE PSEUDO-RANDOM NUMBER
7549  032512  013700  052720                  MOV     $LONUM,R0         ;GET IT INTO R0
7550  032516  006200                          ASR     R0                ;SCALE IT DOWN
7551  032520  006200                          ASR     R0
7552  032522  000403                          BR      2$                ;GO STALL WITH RANDOM NO.
7553  032524  013700  005512          1$:     MOV     STALLS,R0         ;GET REQUESTED NO. OF STALLS
7554  032530  001406                          BEQ     6$                ;RETURN IF NO STALL REQUIRED
7555  032532  012701  000016          2$:     MOV     #14.,R1           ;SET CONSTANT FOR 40 US
7556  032536  005301                  4$:     DEC     R1                ;INNER LOOP COUNTER
7557  032540  001376                          BNE     4$                ;INNER LOOP BR
7558  032542  005300                          DEC     R0                ;OUTER LOOP COUNTER
7559  032544  001372                          BNE     2$                ;OUTER LOOP BR
7560  032546  012601                  6$:     MOV     (SP)+,R1          ;RESTORE R1
7561  032550  012600                          MOV     (SP)+,R0          ;RESTORE R0
7562  032552  000207                          RTS     PC                ;RETURN
7563
7564
7565
7566                                  ;;*****************************************************************
7567                                  .SBTTL  RNDADR - RANDOM CYLINDER ADDRESS GENERATOR
7568                                  ;*THIS SUBROUTINE GENERATES A PSEUDO-RANDOM 9-BIT CYLINDER
7569                                  ;*ADDRESS, AND LEAVES IT IN "CYLNDR". IT REQUIRES THE SYSMAC
7570                                  ;*SUBROUTINE $RAND.
7571                                  ;* CALL -   JSR     PC,RNDADR
```

```
7572                                    ;;*****************************************************************
7573  032554  004737  052620            RNDADR. JSR     PC,$RAND        ;GENERATE 2 16-BIT RANDOM NUMBERS
7574  032560  013737  052720  005514            MOV     $LONUM,CYLNDR   ;GET A RANDOM NUMBER
7575  032566  042737  177000  005514            BIC     #177000,CYLNDR  ;SCALE IT TO 9 BITS
7576  032574  023737  017760  005514            CMP     LSTCYL,CYLNDR   ;SEE IF CYL IS TOO BIG
7577  032602  002003                            BGE     2$              ;BR IF CYL IS OK
7578  032604  043737  017764  005514            BIC     HOLD1,CYLNDR    ;SCALE DOWN TO A VALID CYLINDER
7579  032612  000207            2$:             RTS     PC              ;RETURN
7580
7581
7582
7583                                    .SBTTL  ROUTINES TO HANDLE KW11-L OR P CLOCK
7584
7585                                    ;;*****************************************************************
7586                                    ;*CLKON - ENABLE KW11-L OR P CLOCK INTERRUPT
7587                                    ;;*****************************************************************
7588  032614  105737  003132            CLKON:  TSTB    PCLKF           ;SEE WHICH CLOCK WILL BE USED
7589  032620  001004                            BNE     1$              ;BR IF P-CLOCK TO BE USED
7590  032622  012777  000100  150320            MOV     #100,@LKS       ;L-CLOCK, ENABLE INTERRUPT
7591  032630  000207                            RTS     PC              ;RETURN
7592  032632  012777  174575  150314  1$:       MOV     #-1667.,@PKSB   ;SET 60 HZ. COUNT
7593  032640  005737  000166                    TST     HZ              ;DETERMINE LINE FREQUENCY
7594  032644  001403                            BEQ     3$              ;BR IF 60 HZ.
7595  032646  012777  174060  150300            MOV     #-2000.,@PKSB   ;SET 50 HZ. COUNT
7596  032654  012777  000131  150270  3$:       MOV     #131,@PKS       ;ENABLE INTERRUPT,CNT UP,REP. INT.
7597                                                                    ;  100 KHZ.,AND RUN
7598  032662  000207                            RTS     PC              ;RETURN
7599
7600                                    ;;*****************************************************************
7601                                    ;*CLOCK - HANDLE KW11-L OR P CLOCK INTERRUPT
7602                                    ;;*****************************************************************
7603  032664  005200            CLOCK:  INC     R0              ;SIGNIFY A CLOCK TICK
7604  032666  000002                    RTI                     ;RETURN FROM INTR
7605
7606                                    ;;*****************************************************************
7607                                    ;*CLKOF - DISABLE KW11-L OR P CLOCK INTERRUPT
7608                                    ;;*****************************************************************
7609  032670  105737  003132            CLKOF:  TSTB    PCLKF           ;SEE WHICH CLOCK USED
7610  032674  001003                            BNE     1$              ;BR IF P-CLOCK USED
7611  032676  005077  150246                    CLR     @LKS            ;DISABLE KW11-L INTR
7612  032702  000207                            RTS     PC              ;RETURN
7613  032704  005077  150242  1$:       CLR     @PKS            ;DISABLE KW11-P INTR
7614  032710  000207                            RTS     PC              ;RETURN
7615
7616
7617
7618                                    ;;*****************************************************************
7619                                    .SBTTL  CALBRT - CALIBRATE THE SOFTWARE TIMER
7620                                    ;*THIS SUBROUTINE CALIBRATES THE SOFTWARE TIMER USED IN THE TIMING
7621                                    ;*TESTS. IT CALLS SUBROUTINE "TIMER" TO MEASURE THE TIME BETWEEN
7622                                    ;* 2 TICKS OF THE KW11-L OR P CLOCK. THIS INTERVAL EQUALS THE LINE
7623                                    ;*PERIOD. IN ALL, 128 MEASUREMENTS ARE MADE AND AVERAGED, AND THE
7624                                    ;*RESULTANT CALIBRATION CONSTANT IS LEFT IN TCONHI-TCONLO (IN
7625                                    ;* NANO-SEC). IF THE SUBROUTINE HAPPENS TO TIME OUT WAITING FOR
7626                                    ;*A TICK OF THE CLOCK, A RETURN IS MADE TO THE ADDRESS LISTED
7627                                    ;*IMMED. AFTER THE CALL TO CALBRT.
```

```
                        ;* CALL -     JSR     PC,CALBRT
                        ;*           <ERROR RETURN ADDRESS>
                        ;;*****************************************************

032712  104407          CALBRT: SAVREG                  ;SAVE R0-R5
032714  005002                  CLR     R2              ;INIT CALIBRATION LOOP CONSTANT
032716  005037  003176          CLR     SUML01          ;INIT SUM TO 0
032722  005037  003200          CLR     SUMHI1
032726  005001          2$:     CLR     R1              ;INIT TIME-OUT INDICATOR
032730  005000                  CLR     R0              ;INIT CLOCK INTR INDIC.
                        ;GET IN SYNCH WITH CLOCK
032732  004737  032614          JSR     PC,CLKON        ;ENABLE KW11-L OR P CLOCK INTR
032736  005700          4$:     TST     R0              ;SEE IF CLOCK INTR REC'D YET
032740  001013                  BNE     8$              ;BR IF INTR REC'D
032742  005201                  INC     R1              ;INCREMENT CLOCK TIME-OUT INDICATOR
032744  001374                  BNE     4$              ;BR IF NO TIME-OUT
032746  104401  011556  6$:     TYPE    ,CLKFAL         ;TIMED-OUT ON KW11-L OR P INTERRUPT
032752  104401  011513          TYPE    ,TIMSKP         ;SAY ALL TIMING TESTS WILL BE SKIPPED
032756  105037  003133          CLRB    DOTIM           ;DON'T ALLOW TIMING TESTS
032762  017616  000000          MOV     @(SP).(SP)      ;FIX UP ERROR RETURN PC
032766  000464                  BR      18$             ;GO TO RETURN
                        ;RUN TIMER TO NEXT CLOCK TICK
032770  005000          8$:     CLR     R0              ;INIT CLOCK INTR INDIC
032772  005004                  CLR     R4              ;INIT HI BITS OF CYCLE COUNT
032774  005005                  CLR     R5              ;LO BITS
032776  004737  033150          JSR     PC,TIMER        ;COUNT CYCLES TIL NEXT CLOCK INTR
033002  032746                  6$                      ;ERROR RETURN ADDRESS
                        ;ADD MEASURED CYCLES TO SUM
033004  060537  003176          ADD     R5,SUML01       ;ADD MEASUREMENT TO SUM
033010  005537  003200          ADC     SUMHI1
033014  060437  003200          ADD     R4,SUMHI1
033020  103752                  BCS     6$              ;BR IF SUM OVERFLOW
033022  005202                  INC     R2              ;INCR CALIBRATION LOOP COUNT
033024  022702  000200          CMP     #128.,R2        ;SEE IF 128 MEASUREMENTS MADE YET
033030  001336                  BNE     2$              ;BR IF NOT YET
                        ;TAKE AVERAGE OF 128 MEASUREMENTS
033032  012702  000007          MOV     #7,R2           ;SET DIVIDE LOOP COUNT
033036  000241          12$:    CLC
033040  006037  003200          ROR     SUMHI1          ;DIVIDE SUM BY 2
033044  006037  003176          ROR     SUML01
033050  005302                  DEC     R2              ;DECREMENTT LOOP COUNT
033052  001371                  BNE     12$             ;BR IF DIVISION NOT DONE YET
                        ;DIVIDE LINE PERIOD IN N-SEC BY TIMER CYCLE COUNT TO GET CALIB. CONST.
033054  005000                  CLR     R0              ;SET DIVIDEND = 16666667 NS
033056  005001                  CLR     R1
033060  012702  000376          MOV     #376,R2
033064  012703  050053          MOV     #^D20523,R3
033070  005737  000166          TST     HZ              ;DETERMINE THE LINE FREQUENCY
033074  001404                  BEQ     16$             ;BR IF 60 HZ.
033076  012702  000461          MOV     #461,R2         ;SET DIVIDEND = 20000000 NS
033102  012703  026400          MOV     #^D11520,R3
033106  013704  003200  16$:    MOV     SUMHI1,R4       ;SET DIVISOR
033112  013705  003176          MOV     SUML01,R5
033116  004737  053244          JSR     PC,M.DPID       ;PERFORM THE DIVISION
033122  010237  003166          MOV     R2,TCONHI       ;GET FINAL TIMING CONSTANT
033126  001307                  BNE     6$              ;BR IF HI BITS NOT 0
```

```
 7684  033130  010337  003164            MOV     R3,TCONLO       ;GET LO BITS
 7685  033134  062716  000002            ADD     #2,(SP)         ;FIX UP ERROR-FREE RETURN PC
 7686  033140  004737  032670    18$:    JSR     PC,CLKOF        ;DISABLE KW11-L OR P CLOCK INTERRUPT
 7687  033144  104410                    RESREG                  ;RESTORE R0-R5
 7688  033146  000207                    RTS     PC              ;RETURN
 7689
 7690
 7691
 7692                                    ;;*****************************************************************
 7693                                    .SBTTL  TIMER - SOFTWARE TIMER SUBROUTINE
 7694                                    ;*THIS SUBROUTINE LOOPS THROUGH THE SOFTWARE TIMING LOOP,
 7695                                    ;*INCREMENTING THE CYCLE COUNT IN R4-R5 EACH LOOP, AND CHECKS
 7696                                    ;*THE INTERRUPT INDICATION IN R0, FOR COMPLETION. IF A COUNT
 7697                                    ;*OF 4,194,304 IS REACHED IN R4-R5, A TIME-OUT ERROR RETURN
 7698                                    ;*IS MADE TO THE ADDRESS LISTED AFTER THE CALL .
 7699                                    ;* CALL -    JSR    PC,TIMER
 7700                                    ;*          <ERROR RETURN ADDRESS>
 7701                                    ;;*****************************************************************
 7702                                    ;*** SPECIAL TIMING LOOP ***
 7703  033150  062705  000001    TIMER:  ADD     #1,R5           ;INCREMENT LO CYCLE COUNT
 7704  033154  005504                    ADC     R4              ;ADD CARRY TO HI CYCLE COUNT
 7705  033156  032704  000200            BIT     #BIT07,R4       ;SEE IF TIMED-OUT WAITING FOR INTR
 7706  033162  001005                    BNE     4$              ;BR IF TIME-OUT
 7707  033164  005700                    TST     R0              ;SEE IF INTERRUPT RECEIVED
 7708  033166  001770                    BEQ     TIMER           ;BR IF INTERRUPT NOT REC'D YET
 7709                                    ;***************************
 7710  033170  062716  000002            ADD     #2,(SP)         ;FIX UP ERROR-FREE RETURN PC
 7711  033174  000207                    RTS     PC              ;ERROR-FREE RETURN
 7712  033176  017616  000000    4$:     MOV     @(SP),(SP)      ;FIX UP ERROR RETURN PC
 7713  033202  000207                    RTS     PC              ;ERROR RETURN
 7714
 7715
 7716
 7717
 7718                                    ;;*****************************************************************
 7719                                    ;* INIVRB - INITIALIZE VARIABLES USED IN TIMING TESTS
 7720  033204  005037  003170            ;;*****************************************************************
 7721  033210  005037  003172    INIVRB: CLR     BLWMIN          ;COUNT OF TIMES BELOW SPEC'D MIN
 7722  033214  005037  003174            CLR     ABVMX1          ;COUNT OF FORWARD TIMES ABOVE SPEC'D MAX
 7723  033220  005037  003176            CLR     ABVMX2          ;COUNT OF REVERSE TIMES ABOVE SPEC'D MAX
 7724  033224  005037  003200            CLR     SUMLO1          ;FORWARD TIME SUM AND AVERAGE
 7725  033230  005037  003202            CLR     SUMHI1
 7726  033234  005037  003204            CLR     SUMLO2          ;REVERSE TIME SUM AND AVERAGE
 7727  033240  012737  177777  003212    CLR     SUMHI2
 7728  033246  012737  177777  003214    MOV     #-1,MINIL1      ;MIN MEAS'D FORWARD TIME
 7729  033254  005037  003216            MOV     #-1,MINIH1
 7730  033260  005037  003220            CLR     MAXIL1          ;MAX MEAS'D FORWARD TIME
 7731  033264  012737  177777  003222    CLR     MAXIH1
 7732  033272  012737  177777  003224    MOV     #-1,MINIL2      ;MIN MEAS'D REVERSE TIME
 7733  033300  005037  003226            MOV     #-1,MINIH2
 7734  033304  005037  003230            CLR     MAXIL2          ;MAX MEAS'D REVERSE TIME
 7735  033310  000207                    CLR     MAXIH2
 7736                                    RTS     PC              ;RETURN
 7737
 7738
 7739                                    ;;*****************************************************************
```

```
                                .SBTTL  TIMSEK - MEASURE AN EXPLICIT SEEK TIME
                                ;*THIS SUBROUTINE MEASURES THE AMOUNT OF TIME REQUIRED TO PERFORM
                                ;*A SEEK TO THE CYLINDER ADDRESS IN P.CYLN IN THE PARAM BLK. THIS
                                ;*TIME IS RETURNED IN R0-R1, IN US. IF THE SEEK TIMES-OUT, OR IF
                                ;*THE TIME CALCULATION OVERFLOWS, A MESSAGE IS TYPED, AND AN ERROR
                                ;*RETURN IS MADE TO THE ADDRESS LISTED AFTER THE CALL.
                                ;* CALL -   JSR    PC,TIMSEK
                                ;*        <ERROR RETURN ADDRESS>
                                ;;*****************************************************************
033312  010246                  TIMSEK: MOV     R2,-(SP)        ;SAVE R2
033314  010546                          MOV     R5,-(SP)        ;SAVE R5
033316  005000                          CLR     R0              ;INIT DRIVE INTR INDICATOR
033320  005004                          CLR     R4              ;INIT HI CYCLE COUNT
033322  012777  033472  147510          MOV     #SEEKHD,@RKVEC  ;SET SPECIAL RK06 SEEK TIMER HANDLER VECTOR
033330  112765  000117  000001          MOVB    #SEEK,P.CMND(R5) ;SET SEEK COMMAND
033336  010537  033360                  MOV     R5,2$           ;SET PARAM BLK ADDRESS FOR DRIVER
033342  005005                          CLR     R5              ;INIT LO CYCLE COUNT
033344  062702  000000                  ADD     #RKCS1,R2       ;GET ADR OF RKCS1 IN R2 FOR SEEKHD
033350  004737  040606                  JSR     PC,STRCMD       ;STORE PREV AND CURRENT COMMANDS
033354  004737  050570                  JSR     PC,C.INIT       ;START THE SEEK
033360  000000          2$:     .WORD   0               ;PARAM BLK ADR GOES HERE
033362  004737  033150                  JSR     PC,TIMER        ;MEASURE TIME TIL DRIVE ATT'N
033366  033436                          6$              ;ERROR RETURN ADDRESS FOR TIMER
033370  004737  034136                  JSR     PC,CNVTIM       ;CONVERT MEAS'D CYCLES TO TIME
033374  033436                          6$              ;ERROR RETURN ADR FOR CNVTIM
033376  010200                          MOV     R2,R0           ;PUT HI TIME BITS IN R0
033400  010301                          MOV     R3,R1           ;PUT LO TIME BITS IN R1
033402  062766  000002  000004          ADD     #2,4(SP)        ;FIX UP ERROR-FREE RETURN PC
033410  012777  045270  147422  4$:     MOV     #I.INTR,@RKVEC  ;RESTORE RK06 INTR HANDLER
033416  012605                          MOV     (SP)+,R5        ;RESTORE R5
033420  012602                          MOV     (SP)+,R2        ;RESTORE R2
033422  112765  000177  000001          MOVB    #SUBCLR,P.CMND(R5) ;SET SUBSYSTEM CLEAR COMMAND
033430  004737  040316                  JSR     PC,DRVCAL       ;CLEAR THE SUBSYSTEM
033434  000207                          RTS     PC              ;RETURN
033436  013702  003036          6$:     MOV     RKBAS,R2        ;GET RK06 REG ADDR
033442  042762  000100  000000          BIC     #IE,RKCS1(R2)   ;DISABLE RK06 INTERRUPT
033450  004737  041704                  JSR     PC,REPSUP       ;GET PREV AND CURRENT CMNDS
033454  004737  044352                  JSR     PC,TOPROC       ;GATHER STATUS
033460  104106                          ERROR   106             ;TIMED-OUT ON SEEK
033462  017666  000004  000004          MOV     @4(SP),4(SP)    ;FIX ERROR RETURN PC
033470  000747                          BR      4$              ;BR TO EXIT

                                ;;*****************************************************************
                                ;*SPECIAL INTERRUPT HANDLER FOR SEEKS IN SEEK TIMING TESTS
                                ;;*****************************************************************
033472  011203                  SEEKHD: MOV     (R2),R3         ;GET BITS OF RKCS1
033474  100002                          BPL     2$              ;BR IF CERR NOT SET
033476  000137  045270                  JMP     I.INTR          ;LET DRIVER PROCESS THE ERROR
033502  032703  040000          2$:     BIT     #DI,R3          ;SEE IF DRIVE INTR SET YET
033506  001401                          BEQ     4$              ;BR IF NOT YET
033510  005200                          INC     R0              ;SET RK06 INTR INDICATOR
033512  000002          4$:     RTI                             ;RETURN FROM INTERRUPT


                                ;;*****************************************************************
                                ;*FDTERM - COMPUTE A TERM OF THE FORWARD SEEK AVERAGE FORMULA.
```

```
                                        ;*AND ADD IT TO THE FORWARD SUM IN SUML01-SUMHI1-SUML02-SUMHI2.
                                        ;;*****************************************************************
033514  104407                  FDTERM: SAVREG                          ;SAVE R0-R5
033516  010002                          MOV     R0,R2                   ;GET MEASUREMENT INTO  R2-R3
033520  010103                          MOV     R1,R3
033522  005004                          CLR     R4
033524  013705  005542                  MOV     SCRACH,R5               ;GET COEFFICIENT
033530  006305                          ASL     R5                      ;MULTIPLY BY 2
033532  004737  053204                  JSR     PC,M.DPIM               ;MULTIPLY COEFFICIENT
033536  060337  003204                  ADD     R3,SUMHI2               ;ADD TO FORWARD SUM
033542  005502                          ADC     R2
033544  060237  003202                  ADD     R2,SUML02
033550  005537  003200                  ADC     SUMHI1
033554  104410                          RESREG                          ;RESTORE R0-R5
033556  000207                          RTS     PC


                                        ;;*****************************************************************
                                        ;*RVTERM - COMPUTE  A TERM  OF THE REVERSE AVERAGE FORMULA,
                                        ;*AND ADD IT TO THE REVERSE SUM IN MAXIL1-MAXIH1-MAXIL2-MAXIH2.
                                        ;;*****************************************************************
033560  104407                  RVTERM: SAVREG          ;SAVE R0-R5
033562  010002                          MOV     R0,R2           ;GET MEASUREMENT INTO R2-R3
033564  010103                          MOV     R1,R3
033566  005004                          CLR     R4
033570  013705  005542                  MOV     SCRACH,R5       ;GET COEFFICIENT
033574  006305                          ASL     R5              ;MULTIPLY BY 2
033576  004737  053204                  JSR     PC,M.DPIM       ;MULTIPLY COEFFICIENT
033602  060337  003230                  ADD     R3,MAXIH2       ;ADD TO REVERSE SUM
033606  005502                          ADC     R2
033610  060237  003226                  ADD     R2,MAXIL2
033614  005537  003220                  ADC     MAXIH1
033620  104410                          RESREG                  ;RESTORE R0-R5
033622  000207                          RTS     PC


                                        ;;*****************************************************************
                                        ;* CMPTIM - COMPARE MEAS'D TIME TO MEAS'D MIN AND MAX
                                        ;*AND REPLACE, IF NECESSARY. TIME IS IN R0-R1, POINTER
                                        ;*TO LO MIN IS IN R3.
                                        ;;*****************************************************************
033624  020063  000002          CMPTIM: CMP     R0,2(R3)        ;COMPARE HI BITS TO HI MIN
033630  101006                          BHI     6$              ;BR IF > MIN
033632  103402                          BLO     4$              ;BR IF < MIN
033634  020113                          CMP     R1,(R3)         ;COMPARE LO BITS TO LO MIN
033636  103003                          BHIS    6$              ;BR IF > OR = MIN
033640  010063  000002          4$:     MOV     R0,2(R3)        ;SET NEW MIN HI BITS
033644  010113                          MOV     R1,(R3)         ;SET NEW MIN LO BITS
033646  020063  000006          6$:     CMP     R0,6(R3)        ;COMPARE HI BITS TO HI MAX
033652  103410                          BLO     10$             ;BR IF < MAX
033654  101003                          BHI     8$              ;BR IF > MAX
033656  020163  000004                  CMP     R1,4(R3)        ;COMPARE LO BITS TO LO MAX
033662  101404                          BLOS    10$             ;BR IF < OR = MAX
```

```
7852  033664  010063  000006          8$:     MOV     R0,6(R3)        ;SET NEW MAX HI BITS
7853  033670  010163  000004                  MOV     R1,4(R3)        ;SET NEW MAX LO BITS
7854  033674  000207                  10$:    RTS     PC              ;RETURN
7855
7856
7857
7858                                   ;;*****************************************************************
7859                                   ;*GETAVG - COMPUTE FORWARD AND REVERSE SEEK TIME AVERAGES BY
7860                                   ;*DIVIDING TIME SUMS BY NO. OF MEASUREMENTS (PASSED IN R3 ON ENTRY).
7861                                   ;;*****************************************************************
7862  033676  104407                  GETAVG: SAVREG                  ;SAVE R0-R5
7863  033700  010305                          MOV     R3,R5           ;LO DIVISOR = MEASUREMENT COUNT
7864  033702  005000                          CLR     R0              ;SET DIVIDEND = FORWARD TIME SUM
7865  033704  005001                          CLR     R1
7866  033706  013702  003200                  MOV     SUMHI1,R2
7867  033712  013703  003176                  MOV     SUML01,R3
7868  033716  005004                          CLR     R4              ;HI DIVISOR = 0
7869  033720  004737  053244                  JSR     PC,M.DPID       ;PERFORM DIVISION
7870  033724  010237  003200                  MOV     R2,SUMHI1       ;STORE FORWARD TIME AVG
7871  033730  010337  003176                  MOV     R3,SUML01
7872  033734  005000                          CLR     R0              ;SET DIVIDEND = REVERSE TIME SUM
7873  033736  005001                          CLR     R1
7874  033740  013702  003204                  MOV     SUMHI2,R2
7875  033744  013703  003202                  MOV     SUML02,R3
7876  033750  004737  053244                  JSR     PC,M.DPID       ;PERFORM DIVISION
7877  033754  010237  003204                  MOV     R2,SUMHI2       ;STORE REVERSE TIME AVG
7878  033760  010337  003202                  MOV     R3,SUML02
7879  033764  104410                          RESREG                  ;RESTORE R0-R5
7880  033766  000207                          RTS     PC              ;RETURN
7881
7882
7883
7884                                   ;;*****************************************************************
7885                                   ;SBTTL  TYPTMS - TYPE RESULTS OF SEEK TIMING MEASUREMENTS
7886                                   ;*THIS SUBROUTINE TYPES THE MIN,MAX, AND AVG SEEK TIMES
7887                                   ;*(IN DECIMAL) MEASURED IN ONE OF THE SEEK TIMING TESTS,
7888                                   ;*IN BOTH THE FORWARD AND REVERSE DIRECTIONS. ALSO TYPED ARE
7889                                   ;*THE MAX SPEC'D TIME AND THE NO. OF SEEKS EXCEEDING IT,
7890                                   ;* AND THE TOTAL NO. OF MEASUREMENTS. POINTER TO SPECIFIED
7891                                   ;*MAX MESSAGE MUST BE IN R3 ON ENTRY.
7892                                   ;;*****************************************************************
7893
7894  033770                          TYPTMS:
7895                                  ;TYPE FORWARD MEASUREMENTS
7896  033770  104401  011722                  TYPE    ,FORWRD         ;TYPE "***FORWARD DIRECTION***"
7897  033774  012701  003212                  MOV     #MINIL1,R1      ;POINTER TO LO MIN
7898  034000  004737  034210                  JSR     PC,TYPMIN       ;TYPE MIN MEAS'D TIME
7899  034004  104401  001315                  TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7900  034010  012701  003216                  MOV     #MAXIL1,R1      ;POINTER TO LO MAX
7901  034014  004737  034234                  JSR     PC,TYPMAX       ;TYPE MAX MEAS'D TIME
7902  034020  013746  003172                  MOV     ABVMX1,-(SP)    ;GET COUNT OF TIMES ABOVE MAX
7903  034024  104405                          TYPDS                   ;CONVERT AND TYPE IT
7904  034026  010337  034034                  MOV     R3,4$           ;SET POINTER TO SPEC'D MAX MESSAGE
7905  034032  104401                          TYPE                    ;TYPE " OF XXX ABOVE MAX OF XXXXX US "
7906  034034  000000          4$:     .WORD   0                       ;SPEC'D MAX MSG POINTER GOES HERE
7907  034036  012701  003176                  MOV     #SUML01,R1      ;SET POINTER TO LO AVG
```

```
7908  034042  004737  034260          JSR     PC,TYPAVG       ;TYPE AVG TIME
7909  034046  104401  001315          TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7910                                  ;TYPE REVERSE MEASUREMENTS
7911  034052  104401  011740          TYPE    ,REVRSE         ;TYPE "***REVERSE DIRECTION***"
7912  034056  012701  003222          MOV     #MINIL2,R1      ;POINTER TO LO MIN
7913  034062  004737  034210          JSR     PC,TYPMIN       ;TYPE MIN MEAS'D TIME
7914  034066  104401  001315          TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7915  034072  012701  003226          MOV     #MAXIL2,R1      ;POINTER TO LO MAX
7916  034076  004737  034234          JSR     PC,TYPMAX       ;TYPE MAX MEAS'D TIME
7917  034102  013746  003174          MOV     ABVMX2,-(SP)    ;GET COUNT OF TIMES ABOVE MAX
7918  034106  104405                  TYPDS                   ;CONVERT AND TYPE IT
7919  034110  010337  034116          MOV     R3,6$           ;GET POINTER TO SPEC'D MAX MESSAGE
7920  034114  104401                  TYPE                    ;TYPE " OF XXX ABOVE MAX OF XXXXX US "
7921  034116  000000          6$:     .WORD   0               ;SPEC'D MAX MSG POINTER GOES HERE
7922  034120  012701  003202          MOV     #SUML02,R1      ;SET POINTER TO LO AVG
7923  034124  004737  034260          JSR     PC,TYPAVG       ;TYPE AVG TIME
7924  034130  104401  001315          TYPE    ,$CRLF          ;TYPE <CR> AND <LF>
7925  034134  000207                  RTS     PC              ;RETURN
7926
7927
7928
7929                                  ;;*****************************************************************
7930                                  ;* CNVTIM - CONVERT SOFTWARE TIMER CYCLES TO TIME
7931                                  ;*THIS SUBROUTINE MULTIPLIES THE CYCLE COUNT IN R4-R5 BY THE
7932                                  ;*TIME CONSTANT IN TCONHI-TCONLO, TO OBTAIN TIME IN N-SEC. THIS
7933                                  ;*IS THEN DIVIDED BY 1000 (DEC) TO OBTAIN TIME IN MICRO-SEC.
7934                                  ;*THIS TIME IS RETURNED IN R2-R3. IF THE MULTIPLICATION OVERFLOWS
7935                                  ;*32 BITS, AN ERROR RETURN IS MADE TO THE ADDRESS LISTED AFTER THE
7936                                  ;*CALL TO CNVTIM.
7937                                  ;*CALL -    JSR    PC,CNVTIM
7938                                  ;*          <ERROR RETURN ADDRESS>
7939                                  ;;*****************************************************************
7940  034136  013702  003166  CNVTIM: MOV     TCONHI,R2       ;SET MULTIPLIER = TIME CONST
7941  034142  013703  003164          MOV     TCONLO,R3
7942  034146  004737  053204          JSR     PC,M.DPIM       ;MULTIPLY
7943  034152  005700                  TST     R0              ;MAKE SURE HI 2 WORDS ARE 0
7944  034154  001002                  BNE     4$              ;BR IF NOT 0
7945  034156  005701                  TST     R1
7946  034160  001403                  BEQ     6$
7947  034162  017616  000000  4$:     MOV     @(SP),(SP)      ;SET ERROR RETURN PC
7948  034166  000207                  RTS     PC              ;ERROR RETURN
7949  034170  005004          6$:     CLR     R4              ;SET HI BITS = 0
7950  034172  012705  001750          MOV     #1000.,R5       ;SET LO DIVISOR = 1000 (DEC)
7951  034176  004737  053244          JSR     PC,M.DPID       ;CONVERT TIME TO US
7952  034202  062716  000002          ADD     #2,(SP)         ;FIX ERROR-FREE RETURN PC
7953  034206  000207                  RTS     PC              ;ERROR-FREE RETURN
7954
7955
7956
7957                                  ;;*****************************************************************
7958                                  ;*TYPMIN - TYPE MIN MEAS'D TIME IN US. POINTER TO LO TIME IS IN R1
7959                                  ;*ON ENTRY.
7960                                  ;;*****************************************************************
7961  034210  104401  011756  TYPMIN: TYPE    ,MINEQ          ;TYPE "MIN = "
7962  034214  010146                  MOV     R1,-(SP)        ;GET POINTER TO LO TIME
7963  034216  004737  053542          JSR     PC,@#$DB2D      ;CONVERT TO DEC
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7964  034222  004737  053736                  JSR     PC,@#$SUPRS     ;TYPE IT
7965  034226  104401  012003                  TYPE    ,MICROS         ;TYPE "US "
7966  034232  000207                          RTS     PC
7967
7968
7969
7970                                  ;;*****************************************************************
7971                                  ;*TYPMAX - TYPE MAX MEAS'D TIME IN US. POINTER TO LO TIME IS IN R1
7972                                  ;*ON ENTRY.
7973                                  ;;*****************************************************************
7974  034234  104401  011765          TYPMAX: TYPE    ,MAXEQ          ;TYPE "MAX = "
7975  034240  010146                          MOV     R1,-(SP)        ;GET POINTER TO LO TIME
7976  034242  004737  053542                  JSR     PC,@#$DB2D      ;CONVERT TO DEC
7977  034246  004737  053736                  JSR     PC,@#$SUPRS     ;TYPE IT
7978  034252  104401  012003                  TYPE    ,MICROS         ;TYPE "US "
7979  034256  000207                          RTS     PC
7980
7981
7982
7983                                  ;;*****************************************************************
7984                                  ;*TYPAVG - TYPE AVERAGE MEAS'D TIME IN US. POINTER TO LO TIME IS IN R1
7985                                  ;*ON ENTRY.
7986                                  ;;*****************************************************************
7987  034260  104401  011774          TYPAVG: TYPE    ,AVGEQ          ;TYPE "AVG = "
7988  034264  010146                          MOV     R1,-(SP)        ;GET POINTER TO LO TIME
7989  034266  004737  053542                  JSR     PC,@#$DB2D      ;CONVERT TO DEC
7990  034272  004737  053736                  JSR     PC,@#$SUPRS     ;TYPE IT
7991  034276  104401  012003                  TYPE    ,MICROS         ;TYPE "US "
7992  034302  000207                          RTS     PC
7993
7994
7995
7996
7997
7998
7999
8000
8001  034304  104407                  LODSEC: SAVREG                  ;SAVE R0-R5
8002  034306  012701  063554                  MOV     #RWBUF,R1       ;GET ADDRESS OF DATA BUF INTO R1
8003  034312  010021          2$:     MOV     R0,(R1)+        ;PUT WORD INTO BUFFER
8004  034314  020127  064554                  CMP     R1,#RWBUF+512.  ;SEE IF 256 WORDS WRITTEN YET
8005  034320  001374                          BNE     2$              ;BR IF NOT DONE YET
8006  034322  104410                          RESREG                  ;RESTORE R0-R5
8007  034324  000207                          RTS     PC              ;RETURN
8008
8009
8010
8011                                  ;;*****************************************************************
8012                                  ;* TRKCHK - THIS SUBROUTINE DOES A WRITE-CHECK OF SECTOR FS ON CYL
8013                                  ;*FC, FOR EACH OF TRACKS 0, 1, AND 2. THE DATA IS COMPARED TO THE
8014                                  ;*TRACK NUMBER + 100(OCT) FOR THAT PARTICULAR BLOCK OF DATA WRITTEN.
8015                                  ;*THE PARAMETER BLOCK MUST BE PRE-LOADED WITH THE PROPER PARAMETERS.
8016                                  ;;*****************************************************************
8017  034326  104407                  TRKCHK: SAVREG                  ;SAVE R0-R5
8018  034330  016546  000004                  MOV     P.SECT(R5),-(SP) ;SAVE TRACK AND SECTOR PARAMETERS
8019  034334  105065  000005                  CLRB    P.TRCK(R5)      ;CLEAR THE TRACK NO.
```

```
8020                                        ;LOAD THE DATA BUFFER WITH THE CURRENT TRACK NO.
8021  034340  116500  000005        2$:     MOVB    P.TRCK(R5),R0   ;GET TRACK NO. INTO R0
8022  034344  062700  000100              ADD     #100,R0         ;ADD 100(OCT) TO TRACK NO.
8023  034350  004737  034304              JSR     PC,LODSEC       ;LOAD DATA BUF WITH TRACK NO. + 100.OCT)
8024  034354  112765  000131  000001      MOVB    #WRTCHK,P.CMND(R5) ;SET WRITE CHECK COMMAND
8025  034362  004737  040316              JSR     PC,DRVCAL       ;PERFORM THE WRITE CHECK
8026  034366  105265  000005              INCB    P.TRCK(R5)      ;INCREMENT THE TRACK NO.
8027  034372  122765  000003  000005      CMPB    #3,P.TRCK(R5)   ;SEE IF DONE WITH ALL TRACKS
8028  034400  001357                      BNE     2$              ;BR IF NOT DONE YET
8029  034402  012665  000004              MOV     (SP)+,P.SECT(R5) ;RESTORE TRACK AND SECTOR PARAMETERS
8030  034406  104410                      RESREG                  ;RESTORE R0-R5
8031  034410  000207                      RTS     PC              ;RETURN
8032
8033
8034
8035                                        ;;*****************************************************************
8036                                        ;*LODP14 - GENERATE SIXTEEN PSEUDO-RANDOM NUMBERS AND LOAD THEM
8037                                        ;*INTO THE PATTERN 14 TABLE.
8038                                        ;;*****************************************************************
8039  034412  104407                  LODP14: SAVREG                  ;SAVE R0-R5
8040  034414  012701  000010              MOV     #8.,R1          ;INIT LOOP COUNTER TO 8.
8041  034420  012700  007116              MOV     #PAT14,R0       ;GET ADDRESS OF PATTERN 14 BUFFER
8042  034424  004737  052620        4$:   JSR     PC,$RAND        ;GENERATE 2 16-BIT RANDOM NUMBERS
8043  034430  013720  052720              MOV     $LONUM,(R0)+    ;PUT ONE NUMBER INTO PATTERN
8044  034434  013720  052716              MOV     $HINUM,(R0)+    ;PUT OTHER NO. INTO PATTERN
8045  034440  005301                      DEC     R1              ;SEE IF 16 WORDS LOADED YET
8046  034442  001370                      BNE     4$              ;BR IF NOT YET
8047  034444  104410                      RESREG                  ;RESTORE R0-R5
8048  034446  000207                      RTS     PC              ;RETURN
8049
8050
8051
8052                                        ;;*****************************************************************
8053                                        ;SBTTL  FINADR - COMPUTE FINAL PACK ADDRESS
8054                                        ;*THIS SUBROUTINE IS USED AFTER A DATA TRANSFER HAS COMPLETED, TO
8055                                        ;*COMPUTE THE FINAL PACK ADDRESS AT TERMINATION. THE 2'S COMP. OF THE
8056                                        ;*WORD NO. AT THE POINT OF INTEREST IS PASSED IN LASTWC. THIS IS USED WITH
8057                                        ;*P.CYLN(R5), P.TRCK(R5), AND P.SECT(R5) TO COMPUTE THE CORRESPONDING
8058                                        ;*PACK ADDRESS, WHICH IS RETURNED IN FINCYL, FINTRK, AND FINSEC.
8059                                        ;*THE SUBROUTINE IS USED TO DETERMINE THE PACK ADDRESS OF A SOFTWARE
8060                                        ;*DATA MISCOMPARE.
8061                                        ;;*****************************************************************
8062  034450  104407                  FINADR: SAVREG                  ;SAVE R0-R5
8063  034452  013746  005600              MOV     LASTWC,-(SP)    ;STORE WORD COUNT
8064  034456  005416                      NEG     (SP)            ;MAKE IT POSITIVE
8065  034460  005046                      CLR     -(SP)           ;MAKE ROOM ON STACK
8066  034462  116616  000003        18$:  MOVB    3(SP),(SP)      ;STORE NO. OF SECTORS TRANSFERRED
8067  034466  005066  000002              CLR     2(SP)           ;CLEAR LOCATION ON STACK
8068  034472  116566  000004  000002      MOVB    P.SECT(R5),2(SP) ;STORE STARTING SECTOR
8069  034500  066616  000002              ADD     2(SP),(SP)      ;DETERMINE FINAL SECTOR ADDRESS
8070  034504  005066  000002              CLR     2(SP)           ;CLEAR NO. OF TRACKS TRANSFERRED
8071  034510  012700  000026              MOV     #22.,R0         ;SET FOR 22 SECTORS
8072  034514  105737  003125              TSTB    FORMAT          ;DETERMINE THE FORMAT
8073  034520  001402                      BEQ     19$             ;BR IF 22 SECTORS
8074  034522  012700  000024              MOV     #20.,R0         ;SET FOR 20 SECTORS
8075  034526  020016                  19$:  CMP     R0,(SP)         ;CHECK FOR SECTOR OVERFLOW
```

```
8076  034530  101004                        BHI     20$             ;NO, CHECK IF SECTOR CORRECT
8077  034532  160016                        SUB     R0,(SP)         ;DECREMENT SECTOR COUNT BY 20 OR 22
8078  034534  005266  000002                INC     2(SP)           ;INCREMENT TRACKS TRANSFERRED
8079  034540  000772                        BR      19$             ;CHECK FOR SECTOR OVERFLOW
8080  034542  112637  005577        20$:    MOVB    (SP)+,FINSEC    ;STORE FINAL SECTOR
8081  034546  005046                        CLR     -(SP)           ;MAKE ROOM FOR TRACKS TRANSFERRED
8082  034550  116516  000005                MOVB    P.TRCK(R5),(SP) ;STORE STARTING TRACK
8083  034554  066616  000002                ADD     2(SP),(SP)      ;DETERMINE FINAL TRACK ADDRESS
8084  034560  005066  000002                CLR     2(SP)           ;CLEAR FINAL CYLINDER
8085  034564  122716  000003        21$:    CMPB    #3,(SP)         ;CHECK FOR TRACK OVERFLOW
8086  034570  101005                        BHI     22$             ;NO, CHECK FINAL TRACK
8087  034572  162716  000003                SUB     #3,(SP)         ;DECREMENT TRACK COUNT BY 3
8088  034576  005266  000002                INC     2(SP)           ;INCR CYL COUNT
8089  034602  000770                        BR      21$             ;CHECK FOR TRACK OVERFLOW
8090  034604  112637  005576        22$:    MOVB    (SP)+,FINTRK    ;STORE FINAL TRACK
8091  034610  066516  000002                ADD     P.CYLN(R5),(SP) ;CALCULATE FINAL CYLINDER
8092  034614  011637  005574                MOV     (SP),FINCYL     ;STORE FINAL  CYLINDER
8093  034620  005726                        TST     (SP)+           ;CLEAN OFF STACK
8094  034622  104410                        RESREG                  ;RESTORE R0-R5
8095  034624  000207                        RTS     PC              ;RETURN
8096
8097
8098
8099                                  ;;*****************************************************************
8100                                  ;SBTTL  LODBUF - LOAD THE READ/WRITE DATA BUFFER
8101                                  ;*THIS SUBROUTINE LOADS THE READ/WRITE DATA BUFFER (POINTED TO BY
8102                                  ;* PMA AND PMA+2) WITH THE APPROPRIATE REPEATING DATA PATTERN. IF
8103                                  ;*PARAMETER PATRN = 0 ON ENTRY, THE DATA WHICH IS LOADED IS COMPRISED
8104                                  ;*OF ALL THE PATTERNS 00-15 (QUICK VERIFY DEFAULT DATA TEST).
8105                                  ;*IF PATRN IS NOT 0, THE NO. OF WORDS IN THE WORD WDSXFR
8106                                  ;*OF THE PATTERN IDENTIFIED BY THE NO. OF THE BIT SET IN R1 ON
8107                                  ;*ENTRY, ARE LOADED INTO THE BUFFER.
8108                                  ;;*****************************************************************
8109
8110  034626  104407        LODBUF:  SAVREG                          ;SAVE R0-R5
8111  034630  013702  005572                MOV     WDSXFR,R2       ;GET NO. OF WORDS
8112  034634  005737  005544                TST     PATRN           ;SEE IF QUICK VERIFY DATA TEST DESIRED
8113  034640  001007                        BNE     3$              ;BR IF NOT QUICK VERIFY
8114  034642  012700  006216                MOV     #PAT00,R0       ;SET DATA PATTERN STARTING ADDRESS
8115  034646  012746  000400                MOV     #256.,-(SP)     ;SET PATTERN WORD COUNT
8116  034652  012701  063554                MOV     #RWBUF,R1       ;SET BUFFER ADDRESS
8117  034656  000463                        BR      30$             ;PROCEED
8118  034660  005000        3$:     CLR     R0                      ;INIT PATTERN NUMBER
8119  034662  032701  000001        4$:     BIT     #BIT0,R1        ;SEE IF THIS BIT IS SET
8120  034666  001003                        BNE     6$              ;BR IF THIS BIT IS SET
8121  034670  005200                        INC     R0              ;INCREMENT PATTERN NO.
8122  034672  006201                        ASR     R1              ;SHIFT TO EXAMINE NEXT BIT
8123  034674  000772                        BR      4$              ;BR TO CHECK NEXT BIT
8124  034676  006300        6$:     ASL     R0                      ;MULTIPLY PATTERN NO. BY 32(DEC)
8125  034700  006300                        ASL     R0
8126  034702  006300                        ASL     R0
8127  034704  006300                        ASL     R0
8128  034706  006300                        ASL     R0
8129  034710  062700  006216                ADD     #PAT00,R0       ;GET ADDRESS OF DESIRED PATTERN
8130  034714  012746  000020                MOV     #16.,-(SP)      ;SET PATTERN WORD COUNT
8131  034720  013701  005602                MOV     PMA,R1          ;SET BUFFER ADDRESS
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 8132  034724  005737  055716                 TST     $KT11           ;SEE IF MEM MGT PRESENT
 8133  034730  100036                         BPL     30$             ;BR IF NOT PRESENT
 8134                                 ;BUFFER LOAD LOOP FOR MEM MGT STARTS HERE
 8135  034732  013737  003206  172354         MOV     SAVPAR,@#KIPAR6 ;SET UP WORKING PAR
 8136  034740  052737  000001  177572         BIS     #BIT0,@#SR0     ;TURN ON MEMORY MANAGEMENT
 8137  034746  042701  160000                 BIC     #160000,R1      ;FORCE RELOCATION THRU KIPAR6
 8138  034752  052701  140000                 BIS     #140000,R1
 8139  034756  010003                 22$:    MOV     R0,R3           ;GET A COPY OF PATTERN ADDRESS
 8140  034760  011604                         MOV     (SP),R4         ;INIT PATTERN WORD COUNT
 8141  034762  012321                 24$:    MOV     (R3)+,(R1)+     ;LOAD A DATA WORD INTO BUFFER
 8142  034764  032701  020000                 BIT     #BIT13,R1       ;SEE IF OVERFLOW TO NEXT PAGE
 8143  034770  001405                         BEQ     26$             ;BR IF NO OVERFLOW
 8144  034772  062737  000200  172354         ADD     #200,@#KIPAR6   ;INCREMENT PAR BY 4K FOR NEW PAGE
 8145  035000  042701  020000                 BIC     #BIT13,R1       ;SET PAGE = 6 AGAIN
 8146  035004  005302                 26$:    DEC     R2              ;DECREMENT WORD COUNTER
 8147  035006  001403                         BEQ     28$             ;BR IF ALL DONE
 8148  035010  005304                         DEC     R4              ;DECREMENT PATTERN WORD COUNT
 8149  035012  001363                         BNE     24$             ;BR IF NOT DONE WITH PATTERN YET
 8150  035014  000760                         BR      22$             ;BR TO REPEAT THE PATTERN
 8151  035016  042737  000001  177572 28$:    BIC     #BIT0,@#SR0     ;DISABLE MEMORY MANAGEMENT
 8152  035024  000410                         BR      44$             ;GO TO RETURN
 8153                                 ;BUFFER LOAD LOOP FOR NO MEM MGT STARTS HERE
 8154  035026  010003                 30$:    MOV     R0,R3           ;GET A COPY OF PATTERN ADDRESS
 8155  035030  011604                         MOV     (SP),R4         ;INIT PATTERN WORD COUNT
 8156  035032  012321                 34$:    MOV     (R3)+,(R1)+     ;LOAD A DATA WORD INTO BUFFER
 8157  035034  005302                         DEC     R2              ;DECREMENT WORD COUNTER
 8158  035036  001403                         BEQ     44$             ;BR IF ALL DONE
 8159  035040  005304                         DEC     R4              ;DECREMENT PATTERN WORD COUNT
 8160  035042  001373                         BNE     34$             ;BR IF NOT DONE WITH PATTERN YET
 8161  035044  000770                         BR      30$             ;BR TO REPEAT THE PATTERN
 8162  035046  005726                 44$:    TST     (SP)+           ;POP THE STACK
 8163  035050  104410                         RESREG                  ;RESTORE R0-R5
 8164  035052  000207                         RTS     PC              ;RETURN
 8165
 8166
 8167
 8168                                 ;;*****************************************************************
 8169                                 ;SBTTL  CMPBUF - SOFTWARE COMPARE DATA
 8170                                 ;*THIS SUBROUTINE PERFORMS A SOFTWARE COMPARE OF THE R/W DATA BUFFER (POINTED
 8171                                 ;*TO BY PMA AND PMA+2) TO THE APPROPRIATE REPEATING DATA PATTERN.  IF
 8172                                 ;*PARAMETER PATRN = 0 ON ENTRY, THE DATA IS COMPRISED OF ALL THE PATTERNS
 8173                                 ;*00-15 (QUICK VERIFY DEFAULT DATA TEST).
 8174                                 ;*IF PATRN IS NOT 0, THE NO. OF THE BIT SET IN R1 ON ENTRY IDENTIFIES THE
 8175                                 ;*REPEATING DATA PATTERN TO COMPARE AGAINST.
 8176                                 ;;*****************************************************************
 8177  035054  104407                 CMPBUF: SAVREG                  ;SAVE R0-R5
 8178  035056  112737  000040  062105         MOVB    #40,DH701+38.   ;RESTORE ERROR MSG PARAMS
 8179  035064  012737  000007  063446         MOV     #7,DF25+2
 8180  035072  013702  005572                 MOV     WD$XFR,R2       ;SET NO. OF WORDS
 8181  035076  005037  005542                 CLR     SCRACH          ;CLEAR COMPARE ERROR COUNT
 8182  035102  004737  041704                 JSR     PC,REPSUP       ;STORE PREV CMND FOR POSS. PRINT
 8183  035106  005737  005544                 TST     PATRN           ;SEE IF THIS IS QUICK VERIFY DEFAULT DATA TEST
 8184  035112  001007                         BNE     3$              ;BR IF NOT
 8185  035114  012700  006216                 MOV     #PAT00,R0       ;GET DATA PATTERN STARTING ADDR
 8186  035120  012746  000400                 MOV     #256.,-(SP)     ;SET PATTERN WORD COUNT
 8187  035124  012701  063554                 MOV     #RWBUF,R1       ;SET BUFFER ADDRESS
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8188  035130  000466                        BR      30$             ;PROCEED
8189  035132  005000                3$:     CLR     R0              ;INIT PATTERN NO.
8190  035134  032701  000001        4$:     BIT     #BIT0,R1        ;SEE IF THIS BIT IS SET
8191  035140  001003                        BNE     6$              ;BR IF THIS BIT IS SET
8192  035142  005200                        INC     R0              ;INCREMENT PATTERN NUMBER
8193  035144  006201                        ASR     R1              ;SHIFT TO EXAMINE NEXT BIT
8194  035146  000772                        BR      4$              ;BR TO CHECK NEXT BIT
8195  035150  006300                6$:     ASL     R0              ;MULTIPLY PATTERN NO. BY 32(DEC)
8196  035152  006300                        ASL     R0
8197  035154  006300                        ASL     R0
8198  035156  006300                        ASL     R0
8199  035160  006300                        ASL     R0
8200  035162  062700  006216              ADD     #PAT00,R0       ;GET ADDRESS OF DESIRED PATTERN
8201  035166  012746  000020              MOV     #16.,-(SP)      ;PATTERN WORD COUNT
8202  035172  013701  005602              MOV     PMA,R1          ;SET BUFFER ADDRESS
8203  035176  005737  055716              TST     $KT11           ;SEE IF MEM MGT PRESENT
8204  035202  100041                      BPL     30$             ;BR IF NOT PRESENT
8205                          ;COMPARE LOOP FOR MEM MGT STARTS HERE
8206  035204  013737  003206  172354      MOV     SAVPAR,@#KIPAR6 ;SET UP WORKING PAR
8207  035212  052737  000001  177572      BIS     #BIT0,@#SR0     ;TURN ON MEM MGT
8208  035220  042701  160000              BIC     #160000,R1      ;FORCE RELOCATION THRU KIPAR6
8209  035224  052701  140000              BIS     #140000,R1
8210  035230  010003                22$:    MOV     R0,R3           ;GET A COPY OF PATTERN ADDRESS
8211  035232  011604                        MOV     (SP),R4         ;INIT PATTERN WORD COUNT
8212  035234  022321                24$:    CMP     (R3)+,(R1)+     ;COMPARE DATA WORD TO PATTERN WORD
8213  035236  001404                        BEQ     25$             ;BR IF NO ERROR
8214  035240  013737  172354  001216      MOV     @#KIPAR6,$REG16 ;SET PAR FOR PRINTOUT
8215  035246  000432                        BR      35$             ;GO HANDLE ERROR
8216  035250  032701  020000        25$:    BIT     #BIT13,R1       ;SEE IF OVERFLOW TO NEXT PAGE
8217  035254  001405                        BEQ     26$             ;BR IF NO OVERFLOW
8218  035256  062737  000200  172354      ADD     #200,@#KIPAR6   ;INCR PAR BY 4K FOR NEW PAGE
8219  035264  042701  020000              BIC     #BIT13,R1       ;SET PAGE = 6 AGAIN
8220  035270  005302                26$:    DEC     R2              ;DECREMENT WORD COUNTER
8221  035272  001002                        BNE     27$             ;BR IF NOT ALL DONE YET
8222  035274  000137  035740              JMP     54$             ;ALL DONE - GET OUT
8223  035300  005304                27$:    DEC     R4              ;DECREMENT PATTERN WORD COUNT
8224  035302  001354                        BNE     24$             ;BR IF NOT DONE WITH PATTERN YET
8225  035304  000751                        BR      22$             ;BR TO REPEAT THE PATTERN
8226                          ;COMPARE LOOP FOR NO MEM MGT STARTS HERE
8227  035306  010003                30$:    MOV     R0,R3           ;GET COPY OF PATTERN ADDRESS
8228  035310  011604                        MOV     (SP),R4         ;INIT PATTERN WORD COUNT
8229  035312  022321                34$:    CMP     (R3)+,(R1)+     ;COMPARE DATA WORD TO PATTERN WORD
8230  035314  001002                        BNE     31$             ;BR IF COMPARE ERROR
8231  035316  000137  035720              JMP     40$             ;JUMP IF DATA COMPARES OK
8232  035322  105037  062105        31$:    CLRB    DH701+38.       ;ADJUST DATA HEADER FOR MSG
8233  035326  012737  000005  063446      MOV     #5,DF25+2       ;ADJUST ERROR DATA WORD COUNT
8234                          ;COMMON COMPARE ERROR HANDLER
8235  035334  010237  001202        35$:    MOV     R2,$REG10       ;GET WORD NO.
8236  035340  163737  005572  001202      SUB     WDSXFR,$REG10
8237  035346  013737  001202  005600      MOV     $REG10,LASTWC   ;GET 2'S COMP OF WORD NO.
8238  035354  004737  034450              JSR     PC,FINADR       ;COMPUTE ACTUAL PACK ADRS
8239  035360  104407                      SAVREG                  ;SAVE R0-R5
8240  035362  013700  005574              MOV     FINCYL,R0       ;GET CYL
8241  035366  113701  005576              MOVB    FINTRK,R1       ;GET TRACK
8242  035372  113702  005577              MOVB    FINSEC,R2       ;GET SECTOR
8243  035376  004737  040212              JSR     PC,BDSRCK       ;SEE IF THIS SECTOR LISTED BAD
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8244  035402  104410                        RESREG                  ;RESTORE R0-R5
8245  035404  032737  001000  005504        BIT     #BADSEC,RECODE
8246  035412  001132                        BNE     50$             ;BR IF LISTED- DON'T REPORT ERROR
8247  035414  005737  005542                TST     SCRACH          ;CHECK THE ERROR COUNT
8248  035420  001024                        BNE     36$             ;BR IF THIS IS NOT FIRST ERROR
8249  035422  105737  003144                TSTB    UBMPRS          ;SEE IF UNIBUS MAP PRESENT
8250  035426  001411                        BEQ     46$             ;BR IF NOT
8251  035430  013737  005270  001174        MOV     CRMPH0,$REG5    ;GET CURRENT MAP REG 0
8252  035436  013737  005266  001176        MOV     CRMPL0,$REG6
8253  035444  104116                        ERROR   116             ;DATA MISCOMPARE (11/70)
8254  035446  104117                        ERROR   117
8255  035450  000401                        BR      48$
8256  035452  104034              46$:      ERROR   34              ;TYPE HEADING FOR ERROR MSG
8257  035454  012737  177777  001174  48$:  MOV     #-1,$REG5       ;INIT CYL NO.
8258  035462  005037  001176                CLR     $REG6
8259  035466  005037  001200                CLR     $REG7
8260  035472  005237  005542        36$:    INC     SCRACH          ;INCREMENT THE ERROR COUNT
8261  035476  032777  000001  143434        BIT     #BIT0,@SWR      ;SEE IF ALL ERRORS SHOULD BE REPORTED
8262  035504  001004                        BNE     38$             ;BR TO REPORT ALL ERRORS
8263  035506  022737  000012  005542        CMP     #10.,SCRACH     ;SEE IF 10(DEC) ERRORS YET
8264  035514  002511                        BLT     54$             ;BR IF ERROR LIMIT EXCEEDED
8265  035516  023737  001174  005574  38$:  CMP     $REG5,FINCYL    ;SEE IF DIFFERENT CYL
8266  035524  001010                        BNE     42$             ;BR IF YES
8267  035526  123737  001176  005576        CMPB    $REG6,FINTRK    ;SEE IF DIFFERENT TRACK
8268  035534  001004                        BNE     42$             ;BR IF YES
8269  035536  123737  001200  005577        CMPB    $REG7,FINSEC    ;SEE IF DIFFERENT SECTOR
8270  035544  001412                        BEQ     44$             ;BR IF SAME PACK ADDRESS
8271  035546  013737  005574  001174  42$:  MOV     FINCYL,$REG5    ;SET NEW PACK ADRS FOR PRINTOUT
8272  035554  113737  005576  001176        MOVB    FINTRK,$REG6
8273  035562  113737  005577  001200        MOVB    FINSEC,$REG7
8274  035570  104115                        ERROR   115             ;TYPE NEW PACK ADDRESS
8275  035572  005437  001202        44$:    NEG     $REG10          ;GET WORD NO.
8276  035576  016337  177776  001204        MOV     -2(R3),$REG11   ;GET GOOD DATA
8277  035604  016137  177776  001206        MOV     -2(R1),$REG12   ;GET BAD DATA
8278  035612  013737  001202  001212        MOV     $REG10,$REG14   ;COMPUTE PHYSICAL ADDRESS
8279  035620  005037  001210                CLR     $REG13
8280  035624  006137  001212                ROL     $REG14
8281  035630  006137  001210                ROL     $REG13
8282  035634  063737  005602  001212        ADD     PMA,$REG14
8283  035642  005537  001210                ADC     $REG13
8284  035646  063737  005604  001210        ADD     PMA+2,$REG13
8285  035654  010137  001214                MOV     R1,$REG15       ;GET VIRT. ADRS FOR PRINTOUT
8286  035660  162737  000002  001214        SUB     #2,$REG15
8287  035666  104063                        ERROR   63              ;TYPE GOOD AND BAD DATA, MEM. ADRS.
8288  035670  032777  000100  143242        BIT     #BIT6,@SWR      ;SEE IF JUST 1 ERROR SHOULD BE REPORTED
8289  035676  001020                        BNE     54$             ;BR IF JUST 1 ERROR SHOULD BE REPORTED
8290  035700  005737  005544        50$:    TST     PATRN           ;SEE IF DEFAULT DATA TEST
8291  035704  001405                        BEQ     40$             ;BR IF YES
8292  035706  005737  055716                TST     $KT11           ;SEE IF MEM MGT PRESENT
8293  035712  100002                        BPL     40$             ;BR IF NOT PRESENT
8294  035714  000137  035250                JMP     25$             ;GO HANDLE MEM MGT
8295  035720  005302              40$:      DEC     R2              ;DECREMENT WORD COUNTER
8296  035722  001406                        BEQ     54$             ;BR IF ALL DONE
8297  035724  005304                        DEC     R4              ;DECREMENT PATTERN WORD COUNT
8298  035726  001002                        BNE     53$             ;BR IF NOT DONE WITH PATTERN YET
8299  035730  000137  035306                JMP     30$             ;JUMP TO REPEAT THE PATTERN
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 8300  035734  000137  035312          53$:    JMP     34$
 8301  035740  005737  055716          54$:    TST     $KT11           ;SEE IF MEM MGT PRESENT
 8302  035744  100003                          BPL     56$             ;BR IF NOT PRESENT
 8303  035746  042737  000001  177572          BIC     #BIT0,@#SR0     ;DISABLE MEM MGT
 8304  035754  005726                  56$:    TST     (SP)+           ;POP THE STACK
 8305  035756  104410                          RESREG                  ;RESTORE R0-R5
 8306  035760  000207                          RTS     PC              ;RETURN
 8307
 8308
 8309
 8310                                  ;;*****************************************************************
 8311                                  ;* CHKLIM - CHECK CURRENT DATA TRANSFER LIMITS
 8312                                  ;*THIS SUBROUTINE DETERMINES IF THE NEXT DATA TRANSFER SHOULD BE
 8313                                  ;*ALLOWED WITH THE CURRENT PACK ADDRESS AND WORD COUNT. IF THE
 8314                                  ;*TRANSFER WOULD CAUSE OVERFLOW BEYOND CYL 632, TRACK 1, THE
 8315                                  ;*WORD COUNT IN P.WC(R5) MUST BE SCALED DOWN TO A VALID NUMBER.
 8316                                  ;*IF NO POSSIBLE TRANSFER CAN BE ALLOWED, RETURN IS MADE TO
 8317                                  ;*ADDRESS FOLLOWING THE CALL TO CHKLIM.
 8318                                  ;* CYL 1456 USED FOR RK07
 8319                                  ;*  CALL -      JSR     PC,CHKLIM
 8320                                  ;*              <"NO TRANSFER" RETURN ADDRESS>
 8321                                  ;;*****************************************************************
 8322  035762                  CHKLIM:                         ;SAVE R0-R5
 8323  035762  026537  000002  017754          CMP     P.CYLN(R5),LCM5 ;SEE IF SHOULD CHECK ADDR. LIMITS YET
 8324  035770  002551                          BLT     34$             ;BR TO RETURN IF NOT
 8325  035772  104407                          SAVREG                  ;SAVE R0-R5
 8326  035774  005037  003176                  CLR     SUML01
 8327  036000  005037  003200                  CLR     SUMHI1
 8328  036004  023765  017760  000002          CMP     LSTCYL,P.CYLN(R5)       ;SEE IF ON LAST CYL
 8329  036012  001004                          BNE     8$              ;BR IF NOT
 8330  036014  122765  000002  000005          CMPB    #2,P.TRCK(R5)   ;SEE IF ON TRACK 2, CYL 632/1456
 8331  036022  001537                          BEQ     36$             ;BR IF CAN'T DO TRANSFER
 8332  036024  105737  003125          8$:     TSTB    FORMAT          ;DETERMINE THE FORMAT
 8333  036030  001411                          BEQ     10$             ;BR IF 22(DEC) SECTORS
 8334                                  ;STORE CONSTANTS FOR 20(DEC) SECTORS
 8335  036032  012746  024000                  MOV     #10240.,-(SP)   ;NO. OF WORDS ON 2 TRACKS
 8336  036036  012746  036000                  MOV     #15360.,-(SP)   ;NO. OF WORDS PER CYL
 8337  036042  012746  012000                  MOV     #5120.,-(SP)    ;NO. OF WORDS PER TRACK
 8338  036046  012746  000024                  MOV     #20.,-(SP)      ;NO. OF SECTORS
 8339  036052  000410                          BR      12$
 8340                                  ;STORE CONSTANTS FOR 22(DEC) SECTORS
 8341  036054  012746  026000          10$:    MOV     #11264.,-(SP)   ;NO. OF WORDS ON 2 TRACKS
 8342  036060  012746  041000                  MOV     #16896.,-(SP)   ;NO. OF WORDS PER CYL
 8343  036064  012746  013000                  MOV     #5632.,-(SP)    ;NO. OF WORDS PER TRACK
 8344  036070  012746  000026                  MOV     #22.,-(SP)      ;NO. OF SECTORS
 8345                                  ;COMPUTE NO. OF WORDS LEFT ON THIS TRACK
 8346  036074  012603                  12$:    MOV     (SP)+,R3        ;GET NO. OF SECTORS
 8347  036076  116502  000004                  MOVB    P.SECT(R5),R2   ;GET CURRENT SECTOR NO.
 8348  036102  160203                          SUB     R2,R3           ;NO. OF SECTORS LEFT
 8349  036104  005002                          CLR     R2              ;GET NO. OF WDS IN THESE SECTORS
 8350  036106  012705  000400                  MOV     #256.,R5
 8351  036112  005004                          CLR     R4
 8352  036114  004737  053204                  JSR     PC,M.DPIM
 8353  036120  010337  003176                  MOV     R3,SUML01       ;STORE THIS NO.
 8354  036124  016605  000012                  MOV     12(SP),R5       ;RESTORE PARAM BLK ADDR
 8355                                  ;COMPUTE NO. OF WORDS LEFT ON THIS CYLINDER
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8356  036130  012703  000002                MOV     #2,R3                   ;TRACK LIMIT = 2
8357  036134  023765  017760  000002        CMP     LSTCYL,P.CYLN(R5) ;SEE IF ON CYL 632/1456
8358  036142  001001                        BNE     14$                     ;BR IF NOT
8359  036144  005303                        DEC     R3                      ;DECREMENT TRACK LIMIT TO 1 FOR CYL 632/1456
8360  036146  116502  000005        14$:    MOVB    P.TRCK(R5),R2           ;GET CURRENT TRACK NO.
8361  036152  160203                        SUB     R2,R3                   ;GET NO. OF TRACKS LEFT
8362  036154  005002                        CLR     R2                      ;GET NO. OF WORDS IN THESE TRACKS
8363  036156  012605                        MOV     (SP)+,R5                ;NO. OF 'DS PER TRACK
8364  036160  004737  053204                JSR     PC,M.DPIM
8365  036164  060337  003176                ADD     R3,SUML01               ;ADD WORDS TO TOTAL
8366  036170  016605  000010                MOV     10(SP),R5               ;RESTORE PARAM BLK ADR
8367                                ;COMPUTE NO. OF WORDS ON WHOLE CYLINDERS REMAINING
8368  036174  013703  017756                MOV     LCM1,R3                 ;CYL LIMIT =631/1455
8369  036200  166503  000002                SUB     P.CYLN(R5),R3           ;GET NO. OF WHOLE CYLS LEFT
8370  036204  100001                        BPL     16$
8371  036206  005003                        CLR     R3
8372  036210  005002                16$:    CLR     R2
8373  036212  012605                        MOV     (SP)+,R5                ;GET NO. OF WDS PER CYL
8374  036214  004737  053204                JSR     PC,M.DPIM               ;COMPUTE NO. OF WDS IN THESE WHOLE CYLS
8375  036220  063703  003176                ADD     SUML01,R3               ;ADD THESE WDS TO TOTAL
8376  036224  005502                        ADC     R2
8377  036226  063702  003200                ADD     SUMHI1,R2
8378  036232  016605  000006                MOV     6(SP),R5                ;RESTORE PARAM BLK ADDR
8379                                ;ADD THE NO. OF WDS ON TRACKS 0,1, CYL 632/1456
8380  036236  023765  017760  000002        CMP     LSTCYL,P.CYLN(R5)       ;SEE IF CYL = 632/1456
8381  036244  001002                        BNE     18$                     ;BR IF NOT 632/1456
8382  036246  005726                        TST     (SP)+                   ;POP STACK
8383  036250  000402                        BR      20$
8384  036252  062603                18$:    ADD     (SP)+,R3                ;ADD WDS ON TRKS 0,1, CYL 632/1456
8385  036254  005502                        ADC     R2
8386                                ;GET DESIRED WORD COUNT
8387  036256  005000                20$:    CLR     R0                      ;WORD COUNT HI BITS
8388  036260  016501  000012                MOV     P.WC(R5),R1             ;GET THE DESIRED WORD COUNT
8389  036264  005401                        NEG     R1
8390  036266  001001                        BNE     22$                     ;BR IF WORD COUNT NOT 65,536(DEC)
8391  036270  005200                        INC     R0                      ;SET HI WORD COUNT = 1
8392                                ;SUBTRACT WORD COUNT FROM NO. OF WORDS LEFT TO DETERMINE IF OVERFLOW.
8393                                ;   NUMBER OF WORDS LEFT IS IN R2-R3, WORD COUNT IS IN R0-R1.
8394  036272  160103                22$:    SUB     R1,R3                   ;LO PARTS
8395  036274  005602                        SBC     R2
8396  036276  160002                        SUB     R0,R2                   ;HI PARTS
8397  036300  100004                        BPL     30$                     ;BR IF WORD COUNT NOT > NO. OF WDS LEFT
8398                                ;SCALE DOWN WORD COUNT TO AVOID OVERFLOW (SUBTRACT THE EXCESS)
8399  036302  060301                        ADD     R3,R1                   ;GET NEW WORD COUNT IN R1
8400  036304  005401                        NEG     R1
8401  036306  010165  000012                MOV     R1,P.WC(R5)             ;SET NEW WORD COUNT IN PARAM BLOCK
8402                                ;RETURN
8403  036312  104410                30$:    RESREG                          ;RESTORE R0-R5
8404  036314  062716  000002        34$:    ADD     #2,(SP)                 ;FIX NORMAL RETURN PC
8405  036320  000207                        RTS     PC                      ;EXIT
8406  036322  017616  000000        36$:    MOV     @(SP),(SP)              ;FIX "NO TRANSFER" RETURN PC
8407  036326  104410                        RESREG                          ;RESTORE R0-R5
8408  036330  000207                        RTS     PC                      ;RETURN
8409
8410
8411
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                                ;;*****************************************************************
                                ;* CTLOUT - THIS SUBROUTINE CHECKS FOR (↑C) OR (↑Z) TTY INPUT.
                                ;*IF (↑C) WAS TYPED, THE SUBROUTINE RETURNS TO DRVTST. IF (↑Z)
                                ;*WAS TYPED, THE SUBROUTINE RETURNS TO INPUTP. IN EITHER CASE,
                                ;*A RESET INSTRUCTION IS EXECUTED, AND THE STACK IS RE-INIT-
                                ;*IALIZED. IF THERE IS NO INPUT, OR INPUT OTHER THAN (↑C) OR (↑Z),
                                ;*NO ACTION IS TAKEN.
                                ;*  CALL -   JSR     PC,CTLOUT
                                ;*    OR -   CKEXIT
                                ;;*****************************************************************
036332  122737  000001  003120  CTLOUT: CMPB    #1,TSTING       ;SEE IF CURRENTLY RUNNING TESTS
036340  001077                        BNE     10$             ;BR IF NOT RUNNING TESTS
036342  005737  005532                TST     INTCHR          ;SEE IF ANY TTY INPUT
036346  001474                        BEQ     10$             ;BR IF NO INPUT
036350  105737  003116                TSTB    MDFLAG          ;SEE IF DEFAULT MODE RUN
036354  001446                        BEQ     12$             ;BR IF YES
036356  122737  000003  005532        CMPB    #003,INTCHR     ;SEE IF (↑C) TYPED
036364  001033                        BNE     4$              ;BR IF NOT (↑C)
036366  012700  013732                MOV     #DRVTST,R0      ;SET RETURN ADDR = DRVTST
036372  105737  003134        2$:     TSTB    XOVLAD          ;SEE IF XXDP CURRENTLY OVERLAID
036376  001402                        BEQ     6$              ;BR IF NOT
036400  004737  027262                JSR     PC,GETXDP       ;RESTORE SAVED XXDP, IF NECESSARY
036404  000005                6$:     RESET                   ;RESET ALL DEVICES
036406  005037  005532                CLR     INTCHR          ;CLEAR TTY CHAR BUFFER WORD
036412  005037  001304                CLR     $TIMES          ;CLEAR THE ITER. COUNT
036416  105037  003135                CLRB    XDPSVD          ;CLEAR THE XXDP SAVED FLAG
036422  012737  042164  003046        MOV     #ERRHDL,@.ABNL  ;RESTORE ERROR HANDLER ADDRESS
036430  012706  001100                MOV     #STACK,SP       ;RESET THE STACK
036434  112765  000113  000001        MOVB    #RECAL,P.CMND(R5) ;SET RECAL COMMAND
036442  004737  040316                JSR     PC,DRVCAL       ;DO CLEANUP RECALIBRATE
036446  005037  001102                CLR     $TSTNM          ;CLEAR THE TEST NO.
036452  000110                        JMP     @R0             ;EXIT FROM TESTS
036454  122737  000032  005532  4$:     CMPB    #032,INTCHR     ;SEE IF (↑Z) TYPED
036462  001016                        BNE     7$              ;BR IF NOT (↑Z)
036464  012700  015340                MOV     #INPUTP,R0      ;SET RETURN ADDR = INPUTP
036470  000740                        BR      2$              ;TAKE EXIT
036472  122737  000003  005532  12$:    CMPB    #003,INTCHR     ;SEE IF (↑C) TYPED
036500  001007                        BNE     7$              ;BR IF NOT
036502  104401  010121                TYPE    ,HLTRQD         ;TYPE "HALT REQUESTED"
036506  104401  010071                TYPE    ,CNTRDY         ;TYPE "PRESS CONT WHEN RDY"
036512  012700  044134                MOV     #HLTPRG,R0      ;SET HALT ADDRESS
036516  000725                        BR      2$              ;TAKE EXIT
036520  122737  000007  005532  7$:     CMPB    #007,INTCHR     ;SEE IF (↑G) TYPED
036526  001002                        BNE     8$              ;BR IF NOT (↑G)
036530  004737  026370                JSR     PC,GTSWRG       ;OPEN SOFTWARE SWR FOR MODIFICATION
036534  004737  026040        8$:     JSR     PC,PREPKB       ;ENABLE KBD INPUT AGAIN
036540  000207                10$:    RTS     PC              ;RETURN


                                ;;*****************************************************************
                                ;*WRTSEC - WRITE A BLOCK OF 400(OCT) WORDS ONTO DISK AND PERFORM
                                ;*A WRITE CHECK. PARAMETER BLOCK MUST BE PRE-LOADED WITH PACK
                                ;*ADDRESS. DATA WORD IS PASSED IN R3 ON ENTRY. RWBUF IS THE BUFFER
                                ;*USED.
                                ;;*****************************************************************
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8468  036542  104407                  WRTSEC: SAVREG                  ;SAVE R0-R5
8469                                  ;LOAD THE R/W BUFFER WITH DATA
8470  036544  012700  063554                  MOV     #RWBUF,R0       ;BUFFER ADDRESS
8471  036550  012701  000400                  MOV     #400,R1         ;400(OCT) WORDS
8472  036554  010320              4$:         MOV     R3,(R0)+        ;LOAD A BUFFER WORD
8473  036556  005301                          DEC     R1              ;DECR COUNTER
8474  036560  001375                          BNE     4$              ;BR IF NOT DONE YET
8475                                  ;SET UP PARAMETERS
8476  036562  012765  063554  000010          MOV     #RWBUF,P.BALO(R5) ;SET BUS ADDRESS
8477  036570  012765  177400  000012          MOV     #-400,P.WC(R5)  ;SET WORD COUNT
8478                                  ;WRITE THE DATA
8479  036576  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;SET WRITE COMMAND
8480  036604  004737  040316                  JSR     PC,DRVCAL       ;WRITE THE DATA
8481                                  ;PERFORM WRITE CHECK
8482  036610  112765  000131  000001  6$:     MOVB    #WRTCHK,P.CMND(R5) ;SET WRITE CHECK COMMAND
8483  036616  004737  040316                  JSR     PC,DRVCAL       ;PERFORM WRITE CHECK
8484  036622  104410                          RESREG                  ;RESTORE R0-R5
8485  036624  000207                          RTS     PC              ;RETURN
8486
8487
8488
8489                                  ;;*****************************************************************
8490                                  ;*INCRMA - INCREMENT MA BY WORD COUNT IN P.WC(R5).
8491                                  ;;*****************************************************************
8492  036626  104407              INCRMA: SAVREG                  ;SAVE R0-R5
8493  036630  005001                          CLR     R1
8494  036632  016500  000012                  MOV     P.WC(R5),R0     ;GET WORD COUNT
8495  036636  001002                          BNE     4$              ;BR IF NOT 65,536(DEC)
8496  036640  005201                          INC     R1              ;SET HI BIT
8497  036642  000401                          BR      6$              ;CONTINUE
8498  036644  005400              4$:         NEG     R0              ;GET TRUE WORD COUNT
8499  036646  000241              6$:         CLC                     ;DOUBLE THE WORD COUNT TO GET BYTES
8500  036650  006100                          ROL     R0
8501  036652  006101                          ROL     R1
8502  036654  060037  005762                  ADD     R0,MA           ;ADD IT TO COMPUTE NEW MA
8503  036660  005537  005764                  ADC     MA+2
8504  036664  060137  005764                  ADD     R1,MA+2
8505  036670  104410                          RESREG                  ;RESTORE R0-R5
8506  036672  000207                          RTS     PC              ;RETURN
8507
8508
8509
8510                                  ;;*****************************************************************
8511                                  ;*REDBSF - READ FACTORY BSF INTO BSFACT, AND READ SOFTWARE BSF
8512                                  ;*INTO BSSOFT.
8513                                  ;;*****************************************************************
8514  036674                          REDBSF:
8515  036674  004737  027522                  JSR     PC,INITSS       ;INIT THE S.S.
8516  036700  142765  000020  000007          BICB    #8.CFMT,P.CS1H(R5)      ;SET FOR 22 SECTOR FORMAT
8517  036706  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5) ;SET READ DATA COMMAND
8518  036714  013765  017760  000002          MOV     LSTCYL,P.CYLN(R5)       ;SET CYL = 632./1456
8519  036722  112765  000002  000005          MOVB    #2,P.TRCK(R5)   ;SET TRACK = 2
8520  036730  012703  000012                  MOV     #10.,R3         ;SET FACTORY BSF SECTOR LIMIT
8521  036734  105737  003125                  TSTB    FORMAT
8522  036740  001403                          BEQ     6$              ;BR IF 22 SECTORS
8523  036742  105265  000004                  INCB    P.SECT(R5)      ;SET STARTING FACTORY BSF SECTOR NO.
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8524  036746  005203                          INC     R3
8525  036750  012765  177400  000012  6$:     MOV     #-400,P.WC(R5)  ;SET WORD COUNT FOR 1 SECTOR
8526  036756  012765  004232  000010          MOV     #BSFACT,P.BALO(R5) ;SET BA FOR FACTORY BSF
8527  036764  012737  037140  003046  8$:     MOV     #BDSCHD,A.ABNL ;SET ERROR HANDLER FOR BSF READ
8528  036772  105037  003141                  CLRB    WCEFLG          ;INIT THE ERROR FLAG
8529  036776  004737  040316                  JSR     PC,DRVCAL       ;READ THE FACTORY BSF
8530  037002  105737  003141                  TSTB    WCEFLG          ;SEE IF ANY ERRORS
8531  037006  001413                          BEQ     12$             ;BR IF NOT
8532  037010  062765  000002  000004          ADD     #2,P.SECT(R5)   ;CHECK NEXT SECTOR
8533  037016  126503  000004                  CMPB    P.SECT(R5),R3   ;SEE IF LIMIT EXCEEDED YET
8534  037022  001360                          BNE     8$              ;BR IF NOT YET
8535  037024  004737  041704          10$:    JSR     PC,REPSUP       ;GATHER STATUS FOR PRINTOUT
8536  037030  104120                          ERROR   120             ;ABORTING- BAD BSF READ
8537  037032  000137  044134                  JMP     HLTPRG          ;HALT- CAN'T PROCEED
8538  037036  012765  003232  000010  12$:    MOV     #BSSOFT,P.BALO(R5) ;SET BA FOR SOFTWARE RECORD
8539  037044  110365  000004                  MOVB    R3,P.SECT(R5)   ;SET STARTING SECTOR NO.
8540  037050  012703  000026                  MOV     #22.,R3         ;SET 22 SECTOR LIMIT
8541  037054  105737  003125                  TSTB    FORMAT          ;SEE IF 22 SECTOR FORMAT
8542  037060  001402                          BEQ     14$             ;BR IF YES
8543  037062  012703  000023                  MOV     #19.,R3         ;SET 20 SECTOR LIMIT
8544  037066  012737  037140  003046  14$:    MOV     #BDSCHD,A.ABNL ;SET ERROR HANDLER FOR BSF READ
8545  037074  105037  003141                  CLRB    WCEFLG          ;INIT THE ERROR FLAG
8546  037100  004737  040316                  JSR     PC,DRVCAL       ;READ THE SOFTWARE BSF
8547  037104  105737  003141                  TSTB    WCEFLG          ;SEE IF ANY ERRORS
8548  037110  001407                          BEQ     16$             ;BR IF NOT
8549  037112  062765  000002  000004          ADD     #2,P.SECT(R5)   ;CHECK NEXT SECTOR
8550  037120  126503  000004                  CMPB    P.SECT(R5),R3   ;SEE IF LIMIT EXCEEDED YET
8551  037124  003760                          BLE     14$             ;BR IF NOT YET
8552  037126  000736                          BR      10$             ;REPORT ERROR AND ABORT
8553  037130  012737  042164  003046  16$:    MOV     #ERRHDL,A.ABNL  ;RESTORE ERROR HANDLER ADRS
8554  037136  000207                          RTS     PC              ;RETURN
8555
8556                                  ;*THIS IS THE ABNORMAL DRIVER RETURN WHICH IS USED TO HANDLE
8557                                  ;*POSSIBLE ERRORS IN READING BAD SECTORS.
8558  037140  032765  130600  000034  BDSCHD: BIT     #BSE!HVRC!DTE!OPI!DCK,P.ER(R5) ;SEE IF ANY READ ERRORS
8559  037146  001002                          BNE     4$              ;BR IF A READ ERROR OCCURRED
8560  037150  000137  042164                  JMP     ERRHDL          ;GO HANDLE OTHER ERROR
8561  037154  105237  003141          4$:     INCB    WCEFLG          ;SET ERROR FLAG
8562  037160  000137  044342                  JMP     RETNML          ;TAKE NORMAL DRIVER RETURN
8563
8564
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8566                                  ;;*****************************************************************
8567                                  ;*TYPBSF - TYPE FACTORY AND SOFTWARE BAD SECTOR FILES (BSF'S)
8568                                  ;*WITH THE CYLINDER, TRACK, AND SECTOR NO. OF EACH BAD SECTOR
8569                                  ;*LISTED SEPARATELY, IN A TABLE OF OCTAL VALUES, FOR EACH OF THE
8570                                  ;*2 BSF'S.
8571                                  ;;*****************************************************************
8572  037164  104407                  TYPBSF: SAVREG                  ;SAVE R0-R5
8573  037166  005004                          CLR     R4              ;INIT BSF FILE INDICATOR
8574  037170  012700  004242                  MOV     #BSFACT+10,R0   ;ADRS OF DATA IN FACTORY BSF
8575  037174  104401  011423                  TYPE    ,FACTBS         ;TYPE "FACTORY"
8576  037200  104401  011450                  TYPE    ,BDSECT         ;TYPE "BAD SECTORS"
8577  037204  104401  061652          3$:     TYPE    ,DH6041         ;TYPE   "CYLNDR  TRACK   SECTOR"
8578  037210  104401  001315                  TYPE    ,$CRLF
8579  037214  005001                          CLR     R1              ;INIT LIMIT COUNTER
```

```
8580  037216  005710                  4$:     TST     (R0)            ;SEE IF A SECTOR LISTED HERE
8581  037220  100007                          BPL     8$              ;BR IF YES
8582  037222  005701                          TST     R1              ;SEE IF FILE IS EMPTY
8583  037224  001032                          BNE     14$             ;BR IF NOT EMPTY
8584  037226  104401  011470                  TYPE    ,NOFALS         ;TYPE "NONE"
8585  037232  104401  001315                  TYPE    ,$CRLF          ;TYPE <CR>,<LF>
8586  037236  000425                          BR      14$
8587  037240  012046                  8$:     MOV     (R0)+,-(SP)     ;GET A CYL NO.
8588  037242  104402                          TYPOC                   ;TYPE IT
8589  037244  104401  012473                  TYPE    ,SPACE2         ;TYPE SEPARATORS
8590  037250  011003                          MOV     @(R0),R3        ;GET TRACK AND SECTOR
8591  037252  105003                          CLRB    R3
8592  037254  000303                          SWAB    R3              ;GET THE TRACK NO.
8593  037256  010346                          MOV     R3,-(SP)
8594  037260  104402                          TYPOC                   ;TYPE IT
8595  037262  104401  012473                  TYPE    ,SPACE2         ;TYPE SEPARATORS
8596  037266  111003                          MOVB    @(R0),R3        ;GET SECTOR NO.
8597  037270  010346                          MOV     R3,-(SP)
8598  037272  104402                          TYPOC                   ;TYPE IT
8599  037274  104401  001315                  TYPE    ,$CRLF
8600  037300  005720                          TST     (R0)+           ;INCR THE POINTER
8601  037302  005201                          INC     R1              ;INCR THE COUNTER
8602  037304  020127  000176                  CMP     R1,#126.        ;SEE IF LIMIT REACHED IN THIS FILE
8603  037310  002742                          BLT     4$              ;BR IF NOT YET
8604  037312  005704                  14$:    TST     R4              ;SEE IF BOTH FILES TYPED YET
8605  037314  001006                          BNE     18$             ;BR IF YES
8606  037316  005204                          INC     R4              ;SET INDICATOR FOR SOFT. FILE
8607  037320  012700  003242                  MOV     #BSSOFT+10,R0   ;ADRS OF DATA IN SOFTWARE BSF
8608  037324  104401  011436                  TYPE    ,SOFTBS         ;TYPE "SOFTWARE BAD SECTORS :"
8609  037330  000725                          BR      3$              ;GO TYPE SOFT. BSF
8610  037332  104410                  18$:    RESREG                  ;RESTORE R0-R5
8611  037334  000207                          RTS     PC              ;RETURN
8612
8613
8614
8615                                    ;:*****************************************************************
8616                                    ;*FINMEM - COMPUTE NO. OF WORDS XFERRED ON PARTIAL XFER
8617                                    ;*(TERMINATED BY BSE ERROR), AND STORE IT IN WDSXFR.
8618                                    ;:*****************************************************************
8619  037336  104407                  FINMEM: SAVREG                  ;SAVE R0-R5
8620  037340  016500  000002                  MOV     P.CYLN(R5),R0   ;GET ORIG. CYL NO.
8621  037344  116501  000005                  MOVB    P.TRCK(R5),R1   ;GET TRACK NO.
8622  037350  116502  000004                  MOVB    P.SECT(R5),R2   ;SECTOR NO.
8623  037354  005003                          CLR     R3              ;INIT SECTOR COUNT TO 0
8624  037356  026500  000030          6$:     CMP     P.DCYL(R5),R0   ;COMPARE ORIG. AND CURRENT CYLS
8625  037362  001006                          BNE     8$              ;BR IF NOT EQUAL
8626  037364  126501  000027                  CMPB    P.DTS+1(R5),R1  ;COMPARE TRACKS
8627  037370  001003                          BNE     8$              ;BR IF NOT EQUAL
8628  037372  126502  000026                  CMPB    P.DTS(R5),R2    ;COMPARE SECTORS
8629  037376  001404                          BEQ     12$             ;BR IF ADRS ARE EQUAL
8630  037400  005203                  8$:     INC     R3              ;INCR SECTOR COUNT
8631  037402  004737  037422                  JSR     PC,INCRSC       ;INCR PACK ADRS BY 1 SECTOR
8632  037406  000763                          BR      6$              ;GO COMPARE ADDRESSES
8633  037410  000303                  12$:    SWAB    R3              ;COMPUTE NO. OF WORDS XFERRED
8634  037412  010337  005572                  MOV     R3,WDSXFR       ;STORE IT
8635  037416  104410                          RESREG                  ;RESTORE R0-R5
```

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8636  037420  000207                  RTS     PC              ;RETURN
8637
8638
8639
8640                                  ;;*****************************************************************
8641                                  ;*INCRSC - INCREMENT PACK ADDRESS TO NEXT SECTOR
8642                                  ;*THE CYLINDER IS PASSED AND RETURNED IN R0, TRACK IN R1, AND SECTOR
8643                                  ;*IN R2.
8644                                  ;;*****************************************************************
8645  037422  012704  000025          INCRSC: MOV     #21.,R4         ;SET SECTOR LIMIT
8646  037426  105737  003125                  TSTB    FORMAT          ;SEE IF 22 SECTOR FORMAT
8647  037432  001402                          BEQ     4$              ;BR IF YES
8648  037434  012704  000023                  MOV     #19.,R4         ;SET SECTOR LIMIT
8649  037440  005202                  4$:     INC     R2              ;INCR. SECTOR NO.
8650  037442  020204                          CMP     R2,R4           ;SEE IF SECTOR LIMIT EXCEEDED
8651  037444  003407                          BLE     6$              ;BR IF NOT
8652  037446  005002                          CLR     R2              ;SET SECTOR = 0
8653  037450  005201                          INC     R1              ;INCR. TRACK NO.
8654  037452  020127  000002                  CMP     R1,#2           ;SEE IF TRACK LIMIT EXCEEDED
8655  037456  003402                          BLE     6$              ;BR IF NOT
8656  037460  005001                          CLR     R1              ;SET TRACK = 0
8657  037462  005200                          INC     R0              ;INCR. CYLINDER NO.
8658  037464  000207                  6$:     RTS     PC              ;RETURN
8659
8660
8661
8662                                  ;;*****************************************************************
8663                                  ;*MIDXFR - MID-TRANSFER PARAMETER UPDATE SUBROUTINE
8664                                  ;*THIS SUBROUTINE UPDATES PMA,PMA+2,MEM MGT REGS,UNIBUS MAP,P.BALO(R5),
8665                                  ;*P.BAHI(R5), AND P.WC(R5), IN PREPARATION TO RESUME A TRANSFER
8666                                  ;*TERMINATED BY A BAD SECTOR ERROR (BSE).
8667                                  ;;*****************************************************************
8668  037466  104407                  MIDXFR: SAVREG                  ;SAVE R0-R5
8669  037470  004737  037336                  JSR     PC,FINMEM       ;COMPUTE NO. OF WORDS XFERRED
8670  037474  016500  000030                  MOV     P.DCYL(R5),R0   ;GET CYL NO.
8671  037500  116501  000027                  MOVB    P.DTS+1(R5),R1  ;GET TRACK NO.
8672  037504  116502  000026                  MOVB    P.DTS(R5),R2    ;GET SECTOR NO.
8673  037510  004737  037422                  JSR     PC,INCRSC       ;INCREMENT PACK ADRS TO NEXT SECTOR
8674  037514  010065  000002                  MOV     R0,P.CYLN(R5)   ;UPDATE CYLINDER
8675  037520  110165  000005                  MOVB    R1,P.TRCK(R5)   ;UPDATE TRACK
8676  037524  110265  000004                  MOVB    R2,P.SECT(R5)   ;UPDATE SECTOR
8677  037530  013703  005572                  MOV     WDSXFR,R3       ;GET NO. OF WORDS XFERRED
8678  037534  062703  000400                  ADD     #400,R3         ;SKIP BAD SECTOR
8679  037540  060365  000012                  ADD     R3,P.WC(R5)     ;UPDATE P.WC(R5)
8680  037544  005004                          CLR     R4              ;GET BYTES XFERRED
8681  037546  006103                          ROL     R3
8682  037550  006104                          ROL     R4
8683  037552  060337  005602                  ADD     R3,PMA          ;UPDATE PMA,PMA+2
8684  037556  005537  005604                  ADC     PMA+2
8685  037562  060437  005604                  ADD     R4,PMA+2
8686  037566  013765  005602  000010          MOV     PMA,P.BALO(R5)  ;UPDATE P.BALO(R5)
8687  037574  013700  005604                  MOV     PMA+2,R0
8688  037600  042700  177774                  BIC     #177774,R0
8689  037604  150065  000007                  BISB    R0,P.BAHI(R5)   ;UPDATE P.BAHI(R5)
8690  037610  005737  055716                  TST     $KT11           ;SEE IF MEM MGT
8691  037614  100002                          BPL     16$
```

```
8692  037616  004737  026604            16$:    JSR     PC,PREPAR       ;UPDATE MEM MGT AND UNIBUS MAP
8693  037622  104410                            RESREG                  ;RESTORE R0-R5
8694  037624  000207                            RTS     PC              ;RETURN
8695
8696
8697
8698                                      ;;*****************************************************************
8699                                      ;*SVPRMS - SAVE INITIAL PARAMETERS FOR TRANSFER
8700                                      ;*GTPRMS - RESTORE SAVED TRANSFER PARAMETERS
8701                                      ;;*****************************************************************
8702  037626  104407                      SVPRMS: SAVREG                  ;SAVE R0-R5
8703  037630  012700  002632                      MOV     #PARM0+2,R0     ;ADRS OF PARAMS
8704  037634  012701  005560                      MOV     #SAVPRS,R1      ;ADRS OF SAVE AREA
8705  037640  016537  000012  005572              MOV     P.WC(R5),WDSXFR ;GET WORD COUNT
8706  037646  005437  005572                      NEG     WDSXFR          ;MAKE IT POSITIVE
8707  037652  012737  063554  005602              MOV     #RWBUF,PMA      ;INIT PMA TO RWBUF
8708  037660  005037  005604                      CLR     PMA+2           ;INIT PMA+2 TO 0
8709  037664  005737  005544                      TST     PATRN           ;SEE IF DEFAULT DATA TEST
8710  037670  001414                            BEQ     GTO             ;BR IF YES
8711  037672  013737  005762  005602              MOV     MA,PMA          ;SET PMA=MA
8712  037700  013737  005764  005604              MOV     MA+2,PMA+2      ;SET PMA+2=MA+2
8713  037706  000405                            BR      GTO
8714  037710  104407                      GTPRMS: SAVREG                  ;SAVE R0-R5
8715  037712  012700  005560                      MOV     #SAVPRS,R0      ;ADRS OF SAVE AREA
8716  037716  012701  002632                      MOV     #PARM0+2,R1     ;ADRS OF PARAMS
8717  037722  012702  000005              GTO:    MOV     #5,R2           ;SET FOR 5 WORDS
8718  037726  012021                      6$:     MOV     (R0)+,(R1)+     ;MOVE A WORD
8719  037730  005302                            DEC     R2              ;SEE IF DONE YET
8720  037732  001375                            BNE     6$              ;BR IF NOT YET
8721  037734  104410                            RESREG                  ;RESTORE R0-R5
8722  037736  000207                            RTS     PC              ;RETURN
8723
8724
8725
8726                                      ;;*****************************************************************
8727                                      ;*TRNSFR - PERFORM A DATA TRANSFER, AND HANDLE BAD SECTORS, IF
8728                                      ;*ENCOUNTERED. THE COMMAND MUST BE SET IN THE PARAM BLK. THIS SUB-
8729                                      ;*ROUTINE IS SUBSTITUTED FOR DRVCAL WHEN BAD SECTORS MUST BE HANDLED.
8730                                      ;;*****************************************************************
8731  037740  010446                      TRNSFR: MOV     R4,-(SP)        ;SAVE R4 ON STACK
8732  037742  005004                            CLR     R4              ;CLEAR BSE ERROR INDICATOR
8733  037744  105037  003141                    CLRB    WCEFLG          ;INIT WCE ERROR FLAG TO 0
8734  037750  004737  040316              4$:     JSR     PC,DRVCAL       ;PERFORM THE S.S. FUNCTION
8735  037754  032737  000100  005504            BIT     #WCERR,RECODE   ;SEE IF WCE ERROR OCCURRED
8736  037762  001403                            BEQ     5$              ;BR IF NOT
8737  037764  112737  000001  003141            MOVB    #1,WCEFLG       ;SET WCE ERROR FLAG
8738  037772  032737  000002  005504  5$:       BIT     #BSERR,RECODE   ;SEE IF BSE ERROR OCCURRED
8739  040000  001406                            BEQ     6$              ;BR IF NOT
8740  040002  005204                            INC     R4              ;INCR BSE ERROR INDICATOR
8741  040004  004737  037466                    JSR     PC,MIDXFR       ;UPDATE PARAMS TO RESUME XFER
8742  040010  005765  000012                    TST     P.WC(R5)        ;SEE IF ENTIRE XFER IS COMPLETED
8743  040014  001355                            BNE     4$              ;BR IF NOT
8744  040016  005704                      6$:     TST     R4              ;SEE IF ANY BSE ERRORS OCCURRED
8745  040020  001411                            BEQ     8$              ;BR IF NOT
8746  040022  004737  037710                    JSR     PC,GTPRMS       ;RESTORE ORIGINAL PARAMS OF XFER
8747  040026  004737  037626                    JSR     PC,SVPRMS       ;RESTORE WDSXFR,PMA,PMA+2
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8748  040032  005737  055716            TST     $KT11           ;SEE IF MEM MGT PRESENT
8749  040036  100002                    BPL     8$              ;BR IF NOT
8750  040040  004737  026604            JSR     PC,PREPAR       ;PREPARE MEM MGT AND U.M.
8751  040044  012604            8$:     MOV     (SP)+,R4        ;RESTORE R4
8752  040046  000207                    RTS     PC              ;RETURN
8753
8754
8755
8756                                ;;*****************************************************************
8757                                ;SBTTL  SEARCH BAD SECTOR TABLES ROUTINE
8758                                ;*THIS ROUTINE RETURNS A LIST OF BAD SECTORS FOUND IN
8759                                ;*THE SPECIFIC TABLE (BAD SECTOR SOFTWARE OR BAD SECTOR FACTORY)
8760                                ;*FOR THE SPECIFIC CYLINDER AND TRACK DESIRED. R0 AND R1 MUST
8761                                ;*CONTAIN THE CYLINDER AND TRACK, RESPECTIVELY.
8762                                ;*
8763                                ;*THE LIST OF BAD SECTORS IS FOUND ON THE STACK WHEN THE ROUTINE
8764                                ;*RETURNS TO THE CALLER. THE FIRST ENTRY ON THE STACK WILL BE THE
8765                                ;*NUMBER OF BAD SECTORS FOUND FOR THIS CYLINDER AND TRACK.
8766                                ;;*****************************************************************
8767  040050  010237  001266        SRHTBS: MOV     R2,$TMP2
8768  040054  010337  001270                MOV     R3,$TMP3
8769  040060  012637  001272                MOV     (SP)+,$TMP4     ;STORE RETURN CONTENTS OF R4
8770  040064  011402                        MOV     (R4),R2 ;GET ADDRESS OF BAD SECTOR TABLE TO SEARCH
8771  040066  012437  001264                MOV     (R4)+,$TMP1     ;SETUP FOR LENGTH OF BAD SECTOR TABLE
8772  040072  062737  001000  001264        ADD     #1000,$TMP1
8773  040100  005003                        CLR     R3              ;CLEAR R3 FOR COUNT
8774  040102  062702  000010                ADD     #10,R2          ;SET R2 FOR POINTER TO CYLINDER ENTRY
8775  040106  005712            1$:     TST     (R2)            ;TEST IF ALL ONES
8776  040110  100430                    BMI     5$              ;YES-DONE
8777  040112  020012                    CMP     R0,(R2)         ;TEST IF BAD SECTOR IN PRESENT CYL
8778  040114  001406                    BEQ     3$              ;YES-GO CHECK TRACK
8779  040116  062702  000004            ADD     #4,R2           ;ELSE BUMP POINTER
8780  040122  020237  001264            CMP     R2,$TMP1        ;TEST IF OUT OF TABLE
8781  040126  002021                    BGE     5$              ;YES-EXIT
8782  040130  000766                    BR      1$              ;LOOP
8783  040132  005722            3$:     TST     (R2)+           ;TRACK CHECK - PUT POINTER AT TRK/SEC BYTE
8784  040134  011237  001302            MOV     (R2),$TMP10     ;GET TRK/SEC WORD
8785  040140  042737  174377  001302    BIC     #174377,$TMP10  ;CLEAR ALL BUT TRACK
8786  040146  123701  001303            CMPB    $TMP10+1,R1     ;CHECK IF BAD SECTOR IN THIS TRACK
8787  040152  001402                    BEQ     4$              ;YES - GO PUT SECTOR NUMBER ON STACK
8788  040154  005722                    TST     (R2)+           ;ELSE BUMP POINTER TO NEXT CYL WORD
8789  040156  000753                    BR      1$              ;GO TEST NEXT CYL
8790  040160  005203            4$:     INC     R3              ;BUMP BAD SECTOR COUNT
8791  040162  012246                    MOV     (R2)+,-(SP)     ;PUT TRK/SEC WORD ON STACK
8792  040164  042716  177700            BIC     #177700,(SP)    ;CLEAR ALL BUT SECTOR NUMBER
8793  040170  000746                    BR      1$              ;GO CHECK REST OF FILE
8794  040172  010346            5$:     MOV     R3,-(SP)        ;EXIT - PUT NUMBER OF BAD
8795  040174  013702  001266            MOV     $TMP2,R2        ;SECTORS ON STACK-RESTORE
8796  040200  013703  001270            MOV     $TMP3,R3        ;REGISTERS
8797  040204  013746  001272            MOV     $TMP4,-(SP)     ;PUT RETURN ON STACK
8798  040210  000204                    RTS     R4              ;RETURN
8799                                ;;*****************************************************************
8800                                ;SBTTL  BAD SECTOR CHECK ROUTINE
8801                                ;*THIS ROUTINE WILL SEARCH BOTH TABLES TO DETERMINE IF A
8802                                ;*SPECIFIC SECTOR IS LISTED AS BAD. IF THE SECTOR IS LISTED IN THE
8803                                ;*TABLES THE ROUTINE SETS THE "BADSEC" FLAG AND RETURNS. IF THE SECTOR
```

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                                        ;*IS NOT LISTED THE FLAG IS RESET.
                                        ;;*****************************************************************
040212  104407                          BDSRCK: SAVREG
040214  012737  004232  040226                  MOV     #BSFACT,1$      ;SET TABLE TO SEARCH
040222  004437  040050                  2$:     JSR     R4,SRHTBS       ;GO SEARCH IT
040226  000000                          1$:     .WORD                   ;TABLE ADDRESS GOES HERE
040230  012603                                  MOV     (SP)+,R3        ;GET NUMBER OF BAD SECTORS, IF ANY
040232  001015                                  BNE     6$              ;IF ANY, GO TEST WHICH ONES
040234  023727  040226  003232          7$:     CMP     1$,#BSSOFT      ;ELSE TEST IF OTHER TABLE ALREADY SEARCHED
040242  001404                                  BEQ     3$              ;IF YES-EXIT
040244  012737  003232  040226                  MOV     #BSSOFT,1$      ;SET OTHER TABLE FOR SEARCH
040252  000763                                  BR      2$              ;GO SEARCH IT
040254  042737  001000  005504          3$:     BIC     #BADSEC,RECODE  ;CLEAR BAD SECTOR BIT
040262  104410                          4$:     RESREG
040264  000207                                  RTS     PC              ;RETURN
040266  022602                          6$:     CMP     (SP)+,R2        ;THIS SECTOR IN TABLE?
040270  001403                                  BEQ     8$              ;YES-GO SET BIT & EXIT
040272  005303                                  DEC     R3              ;DECREMENT BAD SECTOR COUNT
040274  001374                                  BNE     6$              ;IF NOT ZERO-CHECK NEXT ENTRY
040276  000756                                  BR      7$              ;ELSE GO SEARCH OTHER TABLE
040300  052737  001000  005504          8$:     BIS     #BADSEC,RECODE  ;SET BAD SECTOR BIT
040306  005303                          9$:     DEC     R3              ;CLEAR STACK OF OTHER BAD SECTOR
040310  001764                                  BEQ     4$              ;NUMBER
040312  005726                                  TST     (SP)+
040314  000774                                  BR      9$              ;EXIT


                                        ;;*****************************************************************
                                        .SBTTL  CALL DRIVER ROUTINE
                                        ;*ENTRY JSR PC,DRVCAL
                                        ;*              WITH R5 POINTING TO PARAMETER BLOCK
                                        ;*RETURN RTS PC
                                        ;*
                                        ;*THIS ROUTINE IS USED TO INITIATE A SUBSYSTEM OPERATION BY
                                        ;*CALLING THE DRIVER. THE PARAMETER BLOCK MUST BE SET UP
                                        ;*BY THE CALLER AND R5 MUST POINT TO THE PARAMETER
                                        ;*BLOCK WHEN THE ROUTINE IS CALLED.
                                        ;*
                                        ;*THIS ROUTINE WAITS FOR THE OPERATION TO BE COMPLETED.
                                        ;*WHILE WAITING THE WATCHDOG TIMER IS CALLED TO PREVENT
                                        ;*SILENT DEATH IN CASE THE SUBSYSTEM DOES NOT PROVIDE AN
                                        ;*INTERRUPT. THE TERMINATION HANDLER ROUTINES WILL SET THE DONE
                                        ;*FLAG WHICH KEYS THE ROUTINE TO RETURN TO THE CALLER.
                                        ;;*****************************************************************
040316                                  DRVCAL:
040316  104407                                  SAVREG                          ;SAVE R0-R5
040320  004737  032472                          JSR     PC,STALL                ;PERFORM A STALL IF REQUIRED
040324  004737  036332                          JSR     PC,CTLOUT               ;CHECK FOR (↑C) OR (↑Z) KBD INPUT
040330  105037  003123                          CLRB    DONE                    ;CLEAR DONE FLAG
040334  105037  003137                          CLRB    DRVAFG                  ;CLEAR DRIVE SIEZED BY OTHER PORT FLAG
040340  004737  040606                          JSR     PC,STRCMD               ;STORE PREV AND CURRENT COMMANDS
040344  105737  003136                          TSTB    DULACS                  ;SEE IF DUAL-ACCESS TEST
040350  001502                                  BEQ     26$                     ;BR IF NOT
040352  005077  140566                          CLR     @$TKS                   ;DISABLE KBD INPUT
040356  113762  005510  000010                  MOVB    DRIVE,RKCS2(R2)         ;SET DRIVE NO. IN RKCS2
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 8860  040364  012712  000001              MOV     #BIT0,(R2)          ;SELECT THE DRIVE
 8861  040370  032712  000200      20$:    BIT     #BIT7,(R2)          ;WAIT FOR C. READY
 8862  040374  001775                      BEQ     20$
 8863  040376  032762  010000  000010      BIT     #BIT12,RKCS2(R2)            ;SEE IF NED ERROR SET
 8864  040404  001060                      BNE     28$                 ;BR IF YES
 8865  040406  032762  000001  000012      BIT     #BIT0,RKDS(R2)      ;SEE IF DRIVE IS AVAILABLE
 8866  040414  001044                      BNE     30$                 ;BR IF YES
 8867  040416  012712  100000              MOV     #100000,(R2)        ;ISSUE CONTROLLER CLEAR
 8868  040422  113700  005510              MOVB    DRIVE,R0            ;GET DRIVE NO.
 8869  040426  012703  000100              MOV     #100,R3             ;SET OUTER COUNTER
 8870  040432  005001              32$:    CLR     R1                  ;INIT INNER COUNTER
 8871  040434  005201              33$:    INC     R1                  ;INCR INNER COUNTER
 8872  040436  001027                      BNE     22$
 8873  040440  005303                      DEC     R3                  ;DECR OUTER COUNTER
 8874  040442  001373                      BNE     32$                 ;BR IF NO TIME-OUT YET
 8875  040444  052737  000200  005504      BIS     #ABORT,RECODE       ;SET ABORT FLAG
 8876  040452  112737  000101  005233      MOVB    #SELDRV,PRVCMD+1    ;SET PREV CMND = SELECT DRIVE
 8877  040460  112765  000176  000001      MOVB    #CONCLR,P.CMND(R5)  ;SET CURRENT CMND = CONTR CLEAR
 8878  040466  113737  005510  005232      MOVB    DRIVE,PRVCMD        ;SET DRIVE NO. FOR PREV. CMND
 8879  040474  011265  000016              MOV     (R2),P.CS1(R5)      ;GET CURRENT CONTENTS OF RKCS1
 8880  040500  004737  050212              JSR     PC,I.CST1           ;GO READ CONTROLLER REGS
 8881  040504  004737  041704              JSR     PC,REPSUP           ;SET UP REGS FOR PRINTOUT
 8882  040510  104107                      ERROR   107                 ;TYPE "DRIVE SIEZED BY OTHER PORT"
 8883  040512  000137  043760              JMP     ALLTRM              ;REPORT DRIVE SIEZED AND HALT
 8884  040516  136062  003102  000017  22$:  BITB  I.DRV(R0),RKASOF+1(R2) ;WAIT FOR DRIVE ATTENTION
 8885  040524  001743                      BEQ     33$                 ;BR IF NO ATT'N YET
 8886  040526  113762  005510  000010  30$:  MOVB  DRIVE,RKCS2(R2)      ;SET DRIVE NO. IN RKCS2
 8887  040534  012712  000005              MOV     #5,(R2)             ;ISSUE DRIVE CLEAR
 8888  040540  032712  000200      24$:    BIT     #BIT7,(R2)          ;WAIT FOR CONTROLLER READY
 8889  040544  001775                      BEQ     24$
 8890  040546  012712  100000      28$:    MOV     #100000,(R2)        ;ISSUE CONTROLLER CLEAR
 8891  040552  004737  026040              JSR     PC,PREPKB           ;ENABLE KBD INPUT
 8892  040556  010537  040566      26$:    MOV     R5,4$               ;GET PARAM BLOCK ADDRESS
 8893  040562  004737  050570              JSR     PC,C.INIT           ;CALL DRIVER
 8894  040566  000000              4$:     .WORD                       ;P.B. ADDRESS GOES HERE
 8895  040570  004737  045140      6$:     JSR     PC,W.WTCH           ;CALL WATCH DOG
 8896  040574  105737  003123              TSTB    DONE                ;DONE SET?
 8897  040600  001773                      BEQ     6$                  ;NO-LOOP
 8898  040602  104410              12$:    RESREG                      ;RESTORE R0-R5
 8899  040604  000207                      RTS     PC                  ;YES-RETURN
 8900
 8901
 8902
 8903                                      ;;*****************************************************************
 8904                                      ;;*STRCMD - STORE PREVIOUS AND CURRENT SUBSYSTEM COMMANDS
 8905                                      ;;*****************************************************************
 8906  040606  104407              STRCMD: SAVREG                      ;SAVE R0-R5
 8907  040610  012701  005232              MOV     #PRVCMD,R1          ;ADDR OF PREV COMMAND STORAGE
 8908  040614  012700  005246              MOV     #COMSTR,R0          ;ADDR OF CURRENT COMMAND STORAGE
 8909                                      ;STORE PREVIOUS COMMAND
 8910  040620  012021                      MOV     (R0)+,(R1)+
 8911  040622  012021                      MOV     (R0)+,(R1)+
 8912  040624  012021                      MOV     (R0)+,(R1)+
 8913  040626  012021                      MOV     (R0)+,(R1)+
 8914  040630  012021                      MOV     (R0)+,(R1)+
 8915  040632  012021                      MOV     (R0)+,(R1)+
```

```
8916  040634  105737  003144            TSTB    UBMPRS          ;SEE IF UNIBUS MAP PRESENT
8917  040640  001414                    BEQ     4$              ;BR IF NOT
8918  040642  013737  005270  005264    MOV     CRMPHO,PRMPHO   ;STORE PREV U.B. MAP REG 0
8919  040650  013737  005266  005262    MOV     CRMPLO,PRMPLO
8920  040656  013737  170202  005270    MOV     @#MAPHOO,CRMPHO ;STORE CURRENT U.B. MAP REG 0
8921  040664  013737  170200  005266    MOV     @#MAPLOO,CRMPLO
8922                          ;STORE CURRENT COMMAND
8923  040672  012701  005246        4$: MOV     #COMSTR,R1
8924  040676  012521                    MOV     (R5)+,(R1)+     ;R5 POINTS TO DRIVER PARAM BLK
8925  040700  012521                    MOV     (R5)+,(R1)+
8926  040702  012521                    MOV     (R5)+,(R1)+
8927  040704  012521                    MOV     (R5)+,(R1)+
8928  040706  012521                    MOV     (R5)+,(R1)+
8929  040710  012521                    MOV     (R5)+,(R1)+
8930  040712  104410                    RESREG                  ;RESTORE R0-R5
8931  040714  000207                    RTS     PC              ;RETURN
8932
8933
8934
8935                          ;;*****************************************************************
8936                          .SBTTL  DRIVE ERROR FREE RETURN ROUTINE
8937                          ;*THIS ROUTINE IS CALLED BY THE DRIVER WHEN NO ERROR
8938                          ;*HAS BEEN DETECTED IN THE OPERATION. THE ROUTINE SETS THE
8939                          ;*DONE FLAG THAT IS TESTED IN THE DRIVER CALLING
8940                          ;*ROUTINE.
8941                          ;;*****************************************************************
8942  040716  152737  000377  003123  ERRFRE: BISB    #377,DONE       ;SET THE DONE FLAG
8943  040724  032737  100000  005504        BIT     #ANYDER,RECODE  ;TEST IF ANY DATA ERROR
8944  040732  001403                    BEQ     2$              ;IF NO - DO ERROR RECOVERY PRINT TEST
8945  040734  105037  003126            CLRB    ERRCNT          ;CLEAR ERROR COUNT
8946  040740  000413                    BR      1$              ;EXIT
8947  040742  105737  003126        2$: TSTB    ERRCNT          ;CHECK IF ANY ERRORS HAVE OCCURRED
8948  040746  001410                    BEQ     1$              ;NO - SKIP TO EXIT
8949  040750  005037  001174            CLR     $REGS
8950  040754  113737  003126  001174    MOVB    ERRCNT,$REGS    ;GET RETRY COUNT
8951  040762  104101                    ERROR   101             ;PRINT RETRY SUCCESSFUL MESSAGE
8952  040764  105037  003126            CLRB    ERRCNT          ;CLEAR ERROR COUNT
8953  040770  005037  005504        1$: CLR     RECODE          ;CLEAR RECOVERY FLAGS
8954  040774  000207                    RTS     PC              ;RETURN
8955                          ;;*****************************************************************
8956                          .SBTTL  TYPE ERROR ROUTINE
8957                          ;*ENTRY -       JSR     PC,TYPERR
8958                          ;*RETURN -      RTS     PC
8959                          ;*
8960                          ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
8961                          ;*ERROR IS TO BE REPORTED. IT THEN USES THE "ERROR TABLE" ($ERRTB)
8962                          ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
8963                          ;*THE ERROR.
8964                          ;;*****************************************************************
8965  040776  104407          TYPERR: SAVREG
8966  041000  105237  003130            INCB    DRVERS          ;INCR ERROR COUNT FOR THIS DRIVE
8967  041004  032737  000040  005770    BIT     #BIT5,CS        ;SEE IF DRIVE SHOULD BE DROPPED
8968                                                            ;   IF ERROR LIMIT EXCEEDED
8969  041012  001412                    BEQ     9$              ;BR IF NOT
8970  041014  123727  003130  000024    CMPB    DRVERS,#20.     ;SEE IF 20(DEC) ERRORS EXCEEDED
8971  041022  002406                    BLT     9$              ;BR IF NOT
```

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 8972  041024  105037  003130                CLRB    DRVERS          ;CLEAR DRIVE ERROR COUNT
 8973  041030  104401  011310                TYPE    ,DROPDR         ;TYPE "DROPPING DRIVE"
 8974  041034  000137  017026                JMP     NEWDRV          ;PROCEED TO TEST NEXT DRIVE
 8975  041040  032777  020000  140072  9$:   BIT     #SW13,@SWR      ;INHIBIT ERROR TYPEOUTS?
 8976  041046  001402                        BEQ     6$              ;BR IF NO
 8977  041050  000137  041454                JMP     20$
 8978  041054  005000                6$:     CLR     R0              ;CLR R0 FOR ERROR NUMBER
 8979  041056  005005                        CLR     R5              ;INIT INDENT INDICATOR
 8980  041060  005105                        COM     R5
 8981  041062  113700  001114                MOVB    $ITEMB,R0       ;ENTER ERROR NUMBER
 8982  041066  005300                        DEC     R0              ;FORM INDEX FOR ERROR TABLE
 8983  041070  006300                        ASL     R0
 8984  041072  006300                        ASL     R0
 8985  041074  006300                        ASL     R0
 8986  041076  062700  001400          1$:   ADD     #$ERRTB,R0      ;FORM ADDRESS OF ERROR ENTRY
 8987  041102  012037  041122                MOV     (R0)+,2$        ;GET EM POINTER
 8988  041106  001406                        BEQ     3$              ;BRANCH IF THERE ISN'T ONE
 8989  041110  104401  012457                TYPE    ,CR2LF
 8990  041114  104401  056354                TYPE    ,AS2SP2         ;TYPE "**  "
 8991  041120  104401                        TYPE                    ;TYPE ERROR MESSAGE (EM)
 8992  041122  000000                2$:     .WORD   0               ;EM POINTER GOES HERE
 8993  041124  012037  041300          3$:   MOV     (R0)+,4$        ;GET DH POINTER
 8994  041130  001467                        BEQ     5$              ;BR IF THERE ISN'T ONE
 8995  041132  104401  001315                TYPE    ,$CRLF
 8996  041136  104401  056342                TYPE    ,TSTMSG         ;TYPE "    TEST "
 8997  041142  013746  001102                MOV     $TSTNM,-(SP)    ;GET TEST NO. ON STACK
 8998  041146  104403                        TYPOS                   ;TYPE IT
 8999  041150     002                        .BYTE   2               ;2 DIGITS
 9000  041151     000                        .BYTE   0               ;SUPPRESS LEADING ZEROS
 9001  041152  104401  012457                TYPE    ,CR2LF
 9002  041156  032777  010000  137754        BIT     #BIT12,@SWR     ;REPORT DESCRIPTION ONLY ?
 9003  041164  001133                        BNE     20$             ;BR IF YES
 9004  041166  104401  061023                TYPE    ,DH105          ;TYPE "PREVIOUS COMMAND :"
 9005  041172  104401  001315                TYPE    ,$CRLF
 9006  041176  104401  061166                TYPE    ,DH101+10       ;TYPE PREV COMMAND HEADER
 9007  041202  104401  001315                TYPE    ,$CRLF
 9008  041206  012701  000006                MOV     #6,R1           ;SIX COMMAND VALUES
 9009  041212  012702  001236                MOV     #$REG26,R2      ;STARTING ADDR OF PREV CMND VALUES
 9010  041216  012246                30$:    MOV     (R2)+,-(SP)     ;PUT A WORD ON STACK
 9011  041220  104402                        TYPOC                   ;TYPE IT
 9012  041222  104401  012473                TYPE    ,SPACE2         ;TYPE SEPARATORS
 9013  041226  005301                        DEC     R1              ;SEE IF 7 VALUES TYPED YET
 9014  041230  001372                        BNE     30$             ;BR IF NOT
 9015  041232  104401  001315                TYPE    ,$CRLF
 9016  041236  104401  012473                TYPE    ,SPACE2         ;INDENT
 9017  041242  104401  061245                TYPE    ,DH102          ;TYPE HDR FOR BA DATA
 9018  041246  104401  001315                TYPE    ,$CRLF
 9019  041252  104401  012473                TYPE    ,SPACE2         ;INDENT
 9020  041256  012246                        MOV     (R2)+,-(SP)
 9021  041260  104402                        TYPOC                   ;TYPE PREV. HI BA BITS
 9022  041262  104401  012473                TYPE    ,SPACE2
 9023  041266  011246                        MOV     (R2),-(SP)
 9024  041270  104402                        TYPOC                   ;TYPE PREV. LO BA BITS
 9025  041272  104401  012457                TYPE    ,CR2LF
 9026  041276  104401                        TYPE                    ;TYPE DATA HEADER
 9027  041300  000000                4$:     .WORD   0               ;DH POINTER GOES HERE
```

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 9028  041302  104401  001315                TYPE    ,$CRLF
 9029  041306  005005                        CLR     R5                      ;INIT INDENT INDICATOR
 9030  041310  032777  010000  137622  5$:   BIT     #BIT12,@SWR             ;REPORT DESCRIPTION ONLY ?
 9031  041316  001056                        BNE     20$                     ;BR IF YES
 9032  041320  012001                        MOV     (R0)+,R1                ;GET DT POINTER
 9033  041322  001454                        BEQ     20$                     ;BRANCH IF THERE ARE NONE
 9034  041324  012000                        MOV     (R0)+,R0                ;GET DF POINTER
 9035  041326  012002                        MOV     (R0)+,R2                ;STORE NUMBER OF DH'S
 9036  041330  112003                10$:    MOVB    (R0)+,R3                ;GET & STORE NUMBER OF DATA WORDS
 9037  041332  105720                        TSTB    (R0)+                   ;BUMP PAST FORMAT WORD
 9038  041334  005703                        TST     R3                      ;TEST IF ANY DATA FOR THIS HEADER
 9039  041336  001417                        BEQ     14$                     ;NO - SKIP DATA PRINT
 9040  041340  005705                        TST     R5                      ;SEE IF SHOULD INDENT
 9041  041342  001002                        BNE     11$                     ;BR IF NOT
 9042  041344  104401  012473                TYPE    ,SPACE2                 ;INDENT
 9043  041350  013146                11$:    MOV     @(R1)+,-(SP)            ;PUT FIRST DATA WORD ON STACK
 9044  041352  104402                        TYPOC                           ;TYPE IT
 9045  041354  005303                        DEC     R3                      ;MORE DATA WORDS
 9046  041356  001403                        BEQ     12$                     ;NO-BRANCH
 9047  041360  104401  012473                TYPE    ,SPACE2                 ;TYPE SEPARATORS
 9048  041364  000771                        BR      11$                     ;LOOP
 9049  041366  005702                12$:    TST     R2                      ;SEE IF <CR>,<LF> NEEDED
 9050  041370  001402                        BEQ     14$                     ;BR IF NOT
 9051  041372  104401  001315                TYPE    ,$CRLF                  ;TYPE IT
 9052  041376  005302                14$:    DEC     R2                      ;MORE DH'S?
 9053  041400  003425                        BLE     20$                     ;NO-BRANCH
 9054  041402  012037  041434        15$:    MOV     (R0)+,16$               ;GET NEXT DH POINTER
 9055  041406  105710                        TSTB    (R0)                    ;SEE IF ANY DATA FOR HDR
 9056  041410  001004                        BNE     34$                     ;BR IF YES
 9057  041412  104401  001315                TYPE    ,$CRLF                  ;SKIP EXTRA LINE
 9058  041416  005005                        CLR     R5                      ;RE-INIT INDENT INDICATOR
 9059  041420  000404                        BR      36$
 9060  041422  005105                34$:    COM     R5                      ;COMPLEMENT INDENT INDICATOR
 9061  041424  001002                        BNE     36$                     ;BR IF NO INDENT REQUIRED
 9062  041426  104401  012473                TYPE    ,SPACE2                 ;INDENT
 9063  041432  104401                36$:    TYPE                            ;TYPE DH
 9064  041434  000000                16$:    .WORD   0                       ;DH POINTER GOES HERE
 9065  041436  104401  001315                TYPE    ,$CRLF
 9066  041442  105710                        TSTB    (R0)                    ;TYPE A DT?
 9067  041444  001331                        BNE     10$                     ;YES-BRANCH
 9068  041446  062700  000002                ADD     #2,R0                   ;INCREMENT DF POINTER
 9069  041452  000751                        BR      14$                     ;SEE IF END OF DF BLOCK
 9070  041454  104410                20$:    RESREG
 9071  041456  000207                        RTS     PC
 9072                                  ;;*****************************************************************
 9073                                  .SBTTL  CONTROLLER ERROR REPORTER ROUTINE
 9074                                  ;*ENTRY:        JSR PC, CONERR
 9075                                  ;*RETURN:       RTS PC
 9076                                  ;*
 9077                                  ;*THIS ROUTINE DECODES THE CONTROLLER ERROR WORD AND
 9078                                  ;*REPORTS THE APPROPRIATE MESSAGE. THE RK611 REGISTERS ARE
 9079                                  ;*RETRIEVED FROM THE RK611 AND PLACED IN THE PARAMETER
 9080                                  ;*BLOCK. THIS IS DONE BECAUSE PARM 0 MAY NOT BE VALID
 9081                                  ;*AT THIS TIME.
 9082                                  ;;*****************************************************************
 9083  041460  104407                CONERR: SAVREG                          ;SAVE R0-P5
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9084  041462  152737  000377  003123          BISB    #377,DONE       ;SET DONE FLAG
9085  041470  105237  003126                  INCB    ERRCNT          ;INCREMENT ERROR COUNT
9086  041474  004737  044352                  JSR     PC,TOPRCC       ;LOAD RK REGS INTO $REGS
9087  041500  032737  000001  003052          BIT     #BIT0,E.CONT    ;ERROR 0?
9088  041506  001402                          BEQ     1$              ;NO-BRANCH
9089  041510  104064                          ERROR   64              ;CLEAR CONT DID NOT CLEAR ERROR
9090  041512  000470                          BR      7$
9091  041514  032737  000002  003052  1$:     BIT     #BIT1,E.CONT    ;ERROR 1?
9092  041522  001402                          BEQ     2$              ;NO-BRANCH
9093  041524  104065                          ERROR   65              ;NO ATTENTION IN ATTENTION SUM REG
9094  041526  000462                          BR      7$
9095  041530  032737  000004  003052  2$:     BIT     #BIT2,E.CONT    ;ERROR 2?
9096  041536  001407                          BEQ     3$              ;NO-BPANCH
9097  041540  105737  003137                  TSTB    DRNAFG          ;SEE IF DRIVE WAS SIEZED BY OTHER PORT
9098  041544  001402                          BEQ     15$             ;BR IF NOT
9099  041546  105237  003140                  INCB    REISSU          ;SET FLAG TO RE-ISSUE COMMAND
9100  041552  104066                  15$:    ERROR   66              ;UNSOLICITED ATTENTION
9101  041554  000447                          BR      7$
9102  041556  032737  000010  003052  3$:     BIT     #BIT3,E.CONT    ;ERROR 3?
9103  041564  001402                          BEQ     4$              ;NO-BRANCH
9104  041566  104067                          ERROR   67              ;UNEXPECTED DATA TYPE ERROR
9105  041570  000441                          BR      7$
9106  041572  032737  000020  003052  4$:     BIT     #BIT4,E.CONT    ;ERROR 4?
9107  041600  001402                          BEQ     5$              ;NO-BRANCH
9108  041602  104070                          ERROR   70              ;ATTENTION DID NOT RESET WITH CLEAR
9109  041604  000433                          BR      7$
9110  041606  032737  000040  003052  5$:     BIT     #BIT5,E.CONT    ;ERROR 5?
9111  041614  001402                          BEQ     6$              ;NO-BRANCH
9112  041616  104071                          ERROR   71              ;SUBSYS CLEAR DIDN'T CLEAR DRIVE ATTENTION
9113  041620  000425                          BR      7$
9114  041622  032737  000400  003052  6$:     BIT     #BIT8,E.CONT
9115  041630  001401                          BEQ     8$
9116  041632  104072                          ERROR   72              ;DATA LATE WHEN UNLOADING HEADER
9117  041634  032737  001000  003052  8$:     BIT     #BIT9,E.CONT
9118  041642  001401                          BEQ     9$
9119  041644  104073                          ERROR   73              ;CONTROLLER ERROR DURING DRIVER SERVICE
9120  041646  032737  002000  003052  9$:     BIT     #BIT10,E.CONT
9121  041654  001401                          BEQ     10$
9122  041656  104074                          ERROR   74              ;DRIVE DETECTED PARITY ERROR
9123  041660  032737  100000  003052  10$:    BIT     #BIT15,E.CONT
9124  041666  001401                          BEQ     11$
9125  041670  104052                          ERROR   52              ;MULTIPLE DRIVE SELECT
9126  041672  104075                  11$:    ERROR   75              ;UNDEFINED ERROR
9127  041674  005037  003052          7$:     CLR     E.CONT          ;CLEAR CONTROLLER ERROR WORD
9128  041700  000137  044152                  JMP     BGNRTY          ;GO DO RETRY
9129                                  ;;*************************************************************
9130                                  .SBTTL  REPORT SUPPORT ROUTINE
9131                                  ;*THIS ROUTINE LOADS ALL THE PARAMETER BLOCK DATA TO BE REPORTED
9132                                  ;*INTO THE PROPER TEMPORARY REGISTERS FOR REPORTING.  ALL THESE MAY
9133                                  ;*NOT BE INCLUDED IN THE REPORT, BUT THEY ARE LOADED ANYWAY.
9134  041704                          REPSUP:
9135  041704  104407                          SAVREG
9136  041706  005037  005506                  CLR     ERRCOM          ;CLEAR ERROR COMMAND STORE
9137  041712  116537  000001  005506          MOVB    P.CMND(R5),ERRCOM ;STORE COMMAND START VALUES
9138  041720  012700  001162                  MOV     #$REGO,R0       ;FOR REPORTING
9139  041724  016520  000002                  MOV     P.CYLN(R5),(R0)+
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9140  041730  116520  000005                MOVB    P.TRCK(R5),(R0)+
9141  041734  105020                        CLRB    (R0)+
9142  041736  116520  000004                MOVB    P.SECT(R5),(R0)+
9143  041742  105020                        CLRB    (R0)+
9144  041744  016520  000012                MOV     P.WC(R5),(R0)+
9145  041750  012700  001174                MOV     #$REG5,R0
9146  041754  116503  000007                MOVB    P.BAHI(R5),R3
9147  041760  042703  177774                BIC     #177774,R3
9148  041764  010337  001256                MOV     R3,$REG36       ;HI BA BITS
9149  041770  016537  000010  001260        MOV     P.BALO(R5),$REG37 ;LO BA BITS
9150  041776  016520  000016                MOV     P.CS1(R5),(R0)+ ;GET ALL THE VALUES FROM THE
9151  042002  016520  000020                MOV     P.CS2(R5),(R0)+ ;PARAMETER BLOCK AND LOAD
9152  042006  016520  000030                MOV     P.DCYL(R5),(R0)+ ;THE TEMPORARY REGISTERS
9153  042012  016520  000026                MOV     P.DTS(R5),(R0)+ ;FOR REPORTING. ALL THIS
9154  042016  016520  000022                MOV     P.WCR(R5),(R0)+ ;DATA MAY NOT BE VALID
9155                                                                ;FOR ALL REPORTS (TO BE
9156  042022  016520  000024                MOV     P.BAR(R5),(R0)+ ;DETERMINED _ATER) BUT IT IS
9157  042026  016520  000032                MOV     P.ASOF(R5),(R0)+ ;STORED ANY WAY.
9158  042032  016520  000036                MOV     P.DS(R5),(R0)+
9159  042036  016520  000034                MOV     P.ER(R5),(R0)+
9160  042042  016520  000040                MOV     P.A00(R5),(R0)+
9161  042046  016520  000042                MOV     P.B00(R5),(R0)+
9162  042052  016520  000044                MOV     P.A01(R5),(R0)+
9163  042056  016520  000046                MOV     P.B01(R5),(R0)+
9164  042062  016520  000050                MOV     P.A10(R5),(R0)+
9165  042066  016520  000052                MOV     P.B10(R5),(R0)+
9166  042072  016520  000054                MOV     P.A11(R5),(R0)+
9167  042076  016520  000056                MOV     P.B11(R5),(R0)+
9168                          ;STORE PREVIOUS COMMAND FOR PRINTOUT
9169  042102  012701  001236                MOV     #$REG26,R1      ;ADRS OF PRINT BUF AREA
9170  042106  012700  005232                MOV     #PRVCMD,R0      ;ADRS OF PREV CMND STORAGE
9171  042112  112021                        MOVB    (R0)+,(R1)+     ;DRIVE NO.
9172  042114  105021                        CLRB    (R1)+
9173  042116  112021                        MOVB    (R0)+,(R1)+     ;COMMAND
9174  042120  105021                        CLRB    (R1)+
9175  042122  012021                        MOV     (R0)+,(R1)+     ;CYL ADDRESS
9176  042124  116021  000001                MOVB    1(R0),(R1)+     ;TRACK
9177  042130  105021                        CLRB    (R1)+
9178  042132  111021                        MOVB    (R0),(R1)+      ;SECTOR
9179  042134  105021                        CLRB    (R1)+
9180  042136  016021  000006                MOV     6(R0),(R1)+     ;WORD COUNT
9181  042142  116003  000003                MOVB    3(R0),R3        ;HI BA BITS
9182  042146  042703  177774                BIC     #177774,R3
9183  042152  010321                        MOV     R3,(R1)+
9184  042154  016011  000004                MOV     4(R0),(R1)      ;LO BA BITS
9185  042160  104410                        RESREG
9186  042162  000207                        RTS     PC
9187                          ;;*****************************************************************
9188                          ;SBTTL  REPORT ERROR ROUTINE
9189                          ;* ENTRY         JSR     PC, ERRHDL
9190                          ;*RETURN        RTS     PC
9191                          ;*
9192                          ;*THIS ROUTINE IS CALLED BY THE DRIVER WHEN AN ERROR IS DETECTED
9193                          ;*IN THE OPERATION.  THE ROUTINE DETERMINES WHICH COMMAND WAS
9194                          ;*BEING EXECUTED AND GENERATES THE PROPER ERROR MESSAGE.
9195                          ;;*****************************************************************
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 9196
 9197  042164  104407                    ERRHDL: SAVREG
 9198  042166  152737  000377  003123            BISB    #377,DONE       ;SET DONE FLAG
 9199  042174  105237  003126                    INCB    ERRCNT          ;INCREMENT ERROR COUNT
 9200  042200  005037  005504                    CLR     RECODE          ;CLEAR RECOVERY CODE WORD
 9201  042204  032737  000400  005504  ER2ENT:   BIT     #LEV2ER,RECODE  ;TEST IF 2ND LEVEL ERROR
 9202  042212  001402                            BEQ     52$             ;NO - SKIP PARAM BLOCK CHANGE
 9203  042214  012705  002714                    MOV     #PARM1,R5       ;ELSE SET R5 TO PARAMETER BLOCK 1
 9204  042220  012737  044324  003046  52$:     MOV     #RETANL,A.ABNL  ;SET NOW ABNORMAL AND NORMAL RETURN FOR
 9205  042226  012737  044342  003044            MOV     #RETNML,A.NORM  ;DRIVER OPERATIONS IN ERROR PROCESSING
 9206  042234  004737  041704                    JSR     PC,REPSUP       ;GO SET UP REGISTERS FOR REPORT
 9207                                                                    ;NOW BEGIN TESTING THE ERROR
 9208                                                                    ;BITS. THE SEQUENCE IN
 9209                                                                    ;WHICH THEY ARE TESTED IS
 9210                                                                    ;CONSIDERED SIGNIFICANT IN
 9211                                                                    ;THAT ERRORS OF A MORE
 9212                                                                    ;CATASTROPHIC NATURE ARE FIRST
 9213                                                                    ;TESTED.
 9214                                                                    ;
 9215                                                                    ;IF AN ERROR IS FOUND SET,
 9216                                                                    ;THAT ERROR IS REPORTED AND
 9217                                                                    ;THE REPORTING IS TERMINATED.
 9218                                                                    ;IF ADDITIONAL ERRORS ARE SET,
 9219                                                                    ;THE RK611 REGISTER PRINTOUTS
 9220                                                                    ;WILL SHOW THIS BUT THE
 9221                                                                    ;REGISTER CONTENTS MUST BE
 9222                                                                    ;MANUALLY DECODED TO LOCATE THE
 9223                                                                    ;SECOND ERROR
 9224  042240  016504  000034                    MOV     P.ER(R5),R4     ;SET R4 TO ERROR REGISTER
 9225  042244  032765  020000  000020            BIT     #UPE,P.CS2(R5)  ;TEST UPE. IF UES-SET
 9226  042252  001406                            BEQ     1$              ;REPORT ERROR
 9227  042254  104001                            ERROR   1
 9228  042256  052737  000200  005504            BIS     #ABORT,RECODE
 9229  042264  000137  043660                    JMP     37$
 9230  042270  032765  004000  000020  1$:      BIT     #NEM,P.CS2(R5)  ;TEST NON-EXISTANT MEMORY
 9231  042276  001406                            BEQ     2$
 9232  042300  104002                            ERROR   2
 9233  042302  052737  000200  005504            BIS     #ABORT,RECODE
 9234  042310  000137  043660                    JMP     37$
 9235  042314  032765  010000  000020  2$:      BIT     #NED,P.CS2(R5)  ;TEST NON-EXISTANT DRIVE
 9236  042322  001412                            BEQ     3$
 9237  042324  032765  000400  000020            BIT     #UFE,P.CS2(R5)  ;TEST IF NED & UFE BOTH SET
 9238  042332  001403                            BEQ     38$
 9239  042334  104035                            ERROR   35              ;NED & UFE BOTH SET ERROR
 9240  042336  000137  043660                    JMP     37$
 9241  042342  104003                    38$:    ERROR   3               ;NED ONLY
 9242  042344  000137  043660                    JMP     37$
 9243  042350  032765  000400  000020  3$:      BIT     #UFE,P.CS2(R5)  ;TEST UNIT FIELD ERROR
 9244  042356  001412                            BEQ     4$
 9245  042360  032765  010000  000020            BIT     #NED,P.CS2(R5)  ;TEST IF UFE & NED BOTH SET
 9246  042366  001403                            BEQ     39$             ;NO-SKIP
 9247  042370  104035                            ERROR   35              ;REPORT NED & UFE BOTH SET
 9248  042372  000137  043660                    JMP     37$
 9249  042376  104004                    39$:    ERROR   4               ;REPORT UFE ONLY
 9250  042400  000137  043660                    JMP     37$
 9251  042404  032765  000100  000014  4$:      BIT     #CMDTO,P.PRST(R5) ;
```

```
 9252  042412  001423                          BEQ     5$
 9253  042414  004737  044352                  JSR     PC,TOPROC       ;GO PROCESS TIMEOUT
 9254  042420  032737  002000  005504          BIT     #TWOTOS,RECODE  ;2ND TIMEOUT IN TIMEOUT PROC?
 9255  042426  001007                          BNE     40$             ;YES - SKIP TO ERROR 56
 9256  042430  032737  000400  005504          BIT     #LEV2ER,RECODE  ;TEST IF LEVEL 2 ERROR
 9257  042436  001006                          BNE     41$             ;YES - SKIP TO ERROR 57
 9258  042440  104005                          ERROR   5               ;ELSE MAKE FULL TIMEOUT REPORT
 9259  042442  000137  043660                  JMP     37$
 9260  042446  104056                  40$:    ERROR   56              ;TWO TIMEOUTS ERROR REPORT
 9261  042450  000137  043660                  JMP     37$
 9262  042454  104057                  41$:    ERROR   57              ;2ND LEVEL ERROR REPORT
 9263  042456  000137  042204                  JMP     ER2ENT          ;GO BUILD AND MAKE 2ND REPORT
 9264  042462  032765  010000  000014  5$:     BIT     #DRVSZD,P.PRST(R5) ;SEE IF DRIVE SIEZED BY OTHER PORT
 9265  042470  001403                          BEQ     65$             ;BR IF DRIVE IS AVAILABLE
 9266  042472  104107                          ERROR   107             ;DRIVE SIEZED BY OTHER PORT
 9267  042474  000137  043660                  JMP     37$
 9268  042500  032765  020000  000016  65$:    BIT     #SPAR,P.CS1(R5) ;TEST D TO C PARITY ERROR
 9269  042506  001406                          BEQ     6$
 9270  042510  104006                          ERROR   6
 9271  042512  052737  004000  005504          BIS     #RCLREQ,RECODE
 9272  042520  000137  043660                  JMP     37$
 9273  042524  032704  000010          6$:     BIT     #DRPAR,R4       ;TEST DRIVE DETECTED PARITY ERROR
 9274  042530  001406                          BEQ     7$
 9275  042532  104007                          ERROR   7
 9276  042534  052737  004000  005504          BIS     #RCLREQ,RECODE
 9277  042542  000137  043660                  JMP     37$
 9278  042546  032765  000010  000036  7$:     BIT     #ACLO,P.DS(R5)  ;TEST AC LOW
 9279  042554  001403                          BEQ     8$
 9280  042556  104010                          ERROR   10
 9281  042560  000137  043660                  JMP     37$
 9282  042564  032765  000020  000036  8$:     BIT     #SPDLSS,P.DS(R5) ;TEST SPEED LOSS
 9283  042572  001403                          BEQ     24$
 9284  042574  104011                          ERROR   11
 9285  042576  000137  043660                  JMP     37$
 9286  042602  032765  004000  000016  24$:    BIT     #CTO,P.CS1(R5)  ;TEST FOR CONTROLLER TIMEOUT
 9287  042610  001401                          BEQ     25$
 9288  042612  104027                          ERROR   27
 9289  042614  032704  000001          25$:    BIT     #ILC,R4         ;TEST ILLEGAL FUNCTION CODE
 9290  042620  001403                          BEQ     10$
 9291  042622  104012                          ERROR   12
 9292  042624  000137  043660                  JMP     37$
 9293  042630  032765  002000  000020  10$:    BIT     #PGE,P.CS2(R5)  ;TEST PROGRAMMING ERROR
 9294  042636  001403                          BEQ     11$
 9295  042640  104013                          ERROR   13
 9296  042642  000137  043660                  JMP     37$
 9297  042646  032704  000004          11$:    BIT     #ILF,R4         ;TEST ILLEGAL DRIVE FUNCTION
 9298  042652  001403                          BEQ     12$
 9299  042654  104014                          ERROR   14
 9300  042656  000137  043660                  JMP     37$
 9301  042662  032704  000040          12$:    BIT     #DTYE,R4        ;TEST DRIVE TYPE ERROR
 9302  042666  001403                          BEQ     13$
 9303  042670  104015                          ERROR   15
 9304  042672  000137  043660                  JMP     37$
 9305  042676  032704  000020          13$:    BIT     #FMTE,R4        ;TEST FORMAT ERROR
 9306  042702  001403                          BEQ     14$
 9307  042704  104016                          ERROR   16
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9308  042706  000137  043660            JMP     37$
9309  042712  032704  004000      14$:  BIT     #WLE,R4         ;TEST WRITE LOCK ERROR
9310  042716  001403                    BEQ     15$
9311  042720  104017                    ERROR   17
9312  042722  000137  043660            JMP     37$
9313  042726  032704  040000      15$:  BIT     #UNS,R4         ;TEST DRIVE UNSAFE
9314  042732  001406                    BEQ     16$
9315  042734  104020                    ERROR   20
9316  042736  052737  000200  005504    BIS     #ABORT,RECODE
9317  042744  000137  043760            JMP     ALLTRM
9318  042750  032704  000002      16$:  BIT     #SKI,R4         ;TEST SEEK INCOMPLETE
9319  042754  001406                    BEQ     17$
9320  042756  104021                    ERROR   21
9321  042760  052737  004000  005504    BIS     #RCLREQ,RECODE
9322  042766  000137  043660            JMP     37$
9323  042772  032704  001000      17$:  BIT     #COE,R4         ;TEST CYLINDER OVERFLOW
9324  042776  001406                    BEQ     18$
9325  043000  104022                    ERROR   22
9326  043002  052737  004000  005504    BIS     #RCLREQ,RECODE
9327  043010  000137  043660            JMP     37$
9328  043014  032704  002000      18$:  BIT     #IDAE,R4        ;TEST ILLEGAL CYLINDER
9329  043020  001406                    BEQ     19$
9330  043022  104023                    ERROR   23
9331  043024  052737  004000  005504    BIS     #RCLREQ,RECODE
9332  043032  000137  043660            JMP     37$
9333  043036  032765  000040  000036  19$:  BIT     #DROT,P.DS(R5)  ;TEST DRIVE OFF TRACK
9334  043044  001406                    BEQ     20$
9335  043046  104024                    ERROR   24
9336  043050  052737  004000  005504    BIS     #RCLREQ,RECODE
9337  043056  000137  043660            JMP     37$
9338  043062  032704  010000      20$:  BIT     #DTE,R4         ;TEST DRIVE TIMING ERROR
9339  043066  001406                    BEQ     21$
9340  043070  104025                    ERROR   25
9341  043072  052737  000200  005504    BIS     #ABORT,RECODE
9342  043100  000137  043660            JMP     37$
9343  043104  032765  100000  000020  21$:  BIT     #DLT,P.CS2(R5)  ;TEST DATA LATE
9344  043112  001403                    BEQ     22$
9345  043114  104026                    ERROR   26
9346  043116  000137  043660            JMP     37$
9347  043122  032704  020000      22$:  BIT     #OPI,R4         ;TEST IF OPI ERROR
9348  043126  001457                    BEQ     29$
9349  043130  052737  000010  005504    BIS     #OPIERR,RECODE
9350  043136  105737  003121            TSTB    DERCNT          ;TEST IF FIRST ERROR
9351  043142  001402                    BEQ     50$
9352  043144  000137  043660            JMP     37$             ;NO - SKIP REPORT
9353  043150  032737  000400  005504  50$:  BIT     #LEV2ER,RECODE  ;TEST IF A SECOND LEVEL 2 ERROR
9354  043156  001403                    BEQ     26$             ;HAS ALREADY OCCURRED
9355  043160  104054                27$:  ERROR   54
9356  043162  000137  043660            JMP     37$             ;GET OUT OF ERROR REPORT
9357  043166  004737  045012      26$:  JSR     PC,BLDEXH       ;GO BUILD EXPECTED HEADER
9358  043172  004737  044522            JSR     PC,RDHD0        ;GET HEADER OF SECTOR 0
9359  043176  032737  000400  005504    BIT     #LEV2ER,RECODE  ;TEST IF ERROR GETTING HDR
9360  043204  001025                    BNE     28$             ;IF YES-GO MAKE ABREVIATED REPORT
9361  043206  013702  003036            MOV     RKBAS,R2        ;STORE HEADER 0 INTO REGISTERS
9362  043212  042762  000100  000000    BIC     #IE,RKCS1(R2)   ;RESET INTERRUPT ENABLE
9363  043220  016237  000024  001202    MOV     RKDB(R2),$REG10 ;FOR REPORTING
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 9364  043226  016237  000024  001204          MOV     RKDB(R2),$REG11
 9365  043234  016237  000024  001206          MOV     RKDB(R2),$REG12
 9366  043242  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;TEST IF ERROR DURING STORAGE
 9367  043250  001343                          BNE     27$
 9368  043252  104030                          ERROR   30              ;MAKE OPI REPORT
 9369  043254  000137  043660                  JMP     37$
 9370  043260  104054                  28$:    ERROR   54
 9371  043262  000137  042204                  JMP     ER2ENT          ;GO MAKE 2ND LEVEL REPORT
 9372  043266  032704  000400          29$:    BIT     #HVRC,R4        ;TEST IF HVRC ERROR
 9373  043272  001457                          BEQ     23$
 9374  043274  052737  000004  005504          BIS     #HVRCER,RECODE
 9375  043302  105737  003121                  TSTB    DERCNT          ;TEST IF FIRST ERROR
 9376  043306  001402                          BEQ     30$             ;YES - REPORT
 9377  043310  000137  043660                  JMP     37$             ;JUMP TO RETURN
 9378  043314  032737  000400  005504  30$:    BIT     #LEV2ER,RECODE  ;TEST IF A 2ND LEVEL ERROR HAS ALREADY
 9379  043322  001403                          BEQ     31$             ;OCCURRED. NO-SKIP EXIT
 9380  043324  104055                  51$:    ERROR   55
 9381  043326  000137  043660                  JMP     37$             ;GET OUT OF ERROR REPORT
 9382  043332  004737  045012          31$:    JSR     PC,BLDEXH       ;GO BUILD EXPECTED HEADER
 9383  043336  004737  044522                  JSR     PC,RDHDO        ;GO GET HDR O
 9384  043342  032737  000400  005504          BIT     #LEV2ER,RECODE  ;TEST IF ERROR IN GETTING HDR
 9385  043350  001025                          BNE     32$             ;IF YES-GO MAKE ABREVIATED REPORT
 9386  043352  013702  003036                  MOV     RKBAS,R2        ;GET RK611 BASE ADDRESS
 9387  043356  042762  000100  000000          BIC     #IE,RKCS1(R2)   ;CLEAR INTERRUPT ENABLE
 9388  043364  016237  000024  001202          MOV     RKDB(R2),$REG10 ;STORE OFF HEADER
 9389  043372  016237  000024  001204          MOV     RKDB(R2),$REG11
 9390  043400  016237  000024  001206          MOV     RKDB(R2),$REG12
 9391  043406  032762  100000  000000          BIT     #CERR,RKCS1(R2) ;TEST IN ANY ERROR IN UNLOAD
 9392  043414  001343                          BNE     51$             ;IY YES - GO MAKE SHORT REPORT
 9393  043416  104031                          ERROR   31              ;MAKE FULL REPORT
 9394  043420  000137  043660                  JMP     37$
 9395  043424  104055                  32$:    ERROR   55              ;ABREVIATED HVRC ERROR RPORT
 9396  043426  000137  042204                  JMP     ER2ENT          ;GO REPORT 2ND LEVEL ERROR
 9397  043432  032704  000200          23$:    BIT     #BSE,R4         ;TEST FOR BAD SECTOR ERROR
 9398  043436  001430                          BEQ     33$             ;NO - SKIP
 9399  043440  052737  000002  005504          BIS     #BSERR,RECODE   ;SET ERROR FLAG
 9400  043446  016500  000030                  MOV     P.DCYL(R5),R0   ;GET CYL NO.
 9401  043452  116501  000027                  MOVB    P.DTS+1(R5),R1  ;GET TRACK NO.
 9402  043456  042701  177774                  BIC     #177774,R1      ;CLEAR ALL BITS EXCEPT TRACK
 9403  043462  016502  000026                  MOV     P.DTS(R5),R2    ;GET SECTOR IN ERROR
 9404  043466  042702  177740                  BIC     #177740,R2      ;CLEAR ALL BITS EXCEPT SECTOR
 9405  043472  004737  040212                  JSR     PC,BDSRCK       ;GO SEE IF THIS SECTOR LISTED
 9406  043476  032737  001000  005504          BIT     #BADSEC,RECODE  ;TEST RESULT
 9407  043504  001065                          BNE     37$             ;YES - EXIT, NO ERROR OR REPORT
 9408  043506  104104                          ERROR   104             ;ELSE REPORT BAD BSE
 9409  043510  042737  000002  005504          BIC     #BSERR,RECODE   ;RESET BSE ERROR FLAG
 9410  043516  000460                          BR      37$             ;GO EXIT
 9411  043520  032704  100000          33$:    BIT     #DCK,R4         ;TEST IF DATA CHECK
 9412  043524  001435                          BEQ     36$
 9413  043526  052737  000020  005504          BIS     #DCKERR,RECODE  ;SET DATA CHECK ERROR IN RECOVERY CODE
 9414  043534  032704  000100                  BIT     #ECH,R4         ;TEST IF ECC IS HARD. IF
 9415  043540  001406                          BEQ     34$             ;YES SET UNCORRECTABLE IN
 9416  043542  052737  000040  005504          BIS     #ECCNC,RECODE   ;RECOVERY FLAG AND A 0 IN
 9417  043550  005037  001206                  CLR     $REG12          ;REG12 TO INDICATE UNCORRECTABLE,
 9418  043554  000403                          BR      35$             ;A 1 IN REG 12 FOR CORRECTABLE
 9419  043556  012737  000001  001206  34$:    MOV     #1,$REG12
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 9420  043564  105737  003121          35$:    TSTB    DERCNT          ;TEST IF FIRST ERROR
 9421  043570  001033                          BNE     37$             ;NO SKIP REPORT
 9422  043572  004737  044666                  JSR     PC,GTPKAD       ;GO GET PACK ADDRESS OF ERROR
 9423  043576  016537  000060  001202          MOV     P.EPOS(R5),$REG10 ;STORE ECC POSITION &
 9424  043604  016537  000062  001204          MOV     P.EPAT(R5),$REG11 ;PATTERN
 9425  043612  104032                          ERROR   32              ;REPORT DCK ERROR
 9426  043614  000137  043660                  JMP     37$
 9427  043620  032765  040000  000020  36$:    BIT     #WCE,P.CS2(R5)  ;TEST WRITE CHECK ERROR
 9428  043626  001414                          BEQ     37$
 9429  043630  042737  000200  005504          BIC     #ABORT,RECODE   ;CLEAR ABORT & SET WRITE
 9430  043636  052737  000100  005504          BIS     #WCERR,RECODE   ;CHECK ERROR IN RECODE
 9431  043644  105737  003121                  TSTB    DERCNT          ;TEST IF FIRST ERROR
 9432  043650  001003                          BNE     37$             ;NO - SKIP
 9433  043652  004737  044666                  JSR     PC,GTPKAD       ;GO GET ADDRESS OF ERROR
 9434  043656  104033                          ERROR   33              ;REPORT WCE
 9435
 9436  043660  032765  000020  000014  37$:    BIT     #DRVHRD,P.PRST(R5) ;TEST HARD ERROR
 9437  043666  001404                          BEQ     43$
 9438  043670  104036                          ERROR   36
 9439  043672  052737  000200  005504          BIS     #ABORT,RECODE
 9440
 9441  043700  032765  000040  000014  43$:    BIT     #DRVDSC,P.PRST(R5) ;TEST STATUS CHANGE NOT CLEARED
 9442  043706  001404                          BEQ     44$
 9443  043710  104037                          ERROR   37
 9444  043712  052737  000200  005504          BIS     #ABORT,RECODE
 9445
 9446  043720  032765  004000  000014  44$:    BIT     #NODSC,P.PRST(R5) ;IFST ATTENTION BUT NO FAULT OR DSC
 9447  043726  001404                          BEQ     46$
 9448  043730  104040                          ERROR   40
 9449  043732  052737  000200  005504          BIS     #ABORT,RECODE
 9450
 9451  043740  032765  000010  000014  46$:    BIT     #UEXATT,P.PRST(R5) ;TEST UNEXPECTED ATTENTION
 9452  043746  001404                          BEQ     ALLTRM
 9453  043750  104042                          ERROR   42
 9454  043752  052737  000200  005504          BIS     #ABORT,RECODE
 9455
 9456
 9457                                  ;ALL ERRORS MUST EXIT THROUGH THIS POINT
 9458
 9459  043760  012705  002630          ALLTRM: MOV     #PARMO,R5       ;RESTORE PARAMETER BLOCK SELECTION
 9460  043764  012737  042164  003046          MOV     #ERRHDL,A.ABNL  ;RESTORE INTERRUPT VECTORS FOR RETRY
 9461  043772  012737  040716  003044          MOV     #ERRFRE,A.NORM  ;DRIVER OPERATIONS, IF ANY
 9462  044000  032737  000200  005504          BIT     #ABORT,RECODE   ;IF ABORT IS NOT SET AND
 9463  044006  001043                          BNE     48$             ;THE DRIVE IS READY (HAS NOT
 9464                                                                  ;CYCLED DOWN)
 9465  044010  013702  003036                  MOV     RKBAS,R2        ;GET BASE ADDRESS
 9466  044014  032762  000200  000012          BIT     #RDY,RKDS(R2)   ;TEST IF DRIVE READY SET
 9467  044022  001004                          BNE     47$             ;RECALIBRATE REQUIRED BIT IS SET
 9468  044024  052737  000200  005504          BIS     #ABORT,RECODE   ;ELSE ABORT WITH ABORT MESSAGE
 9469  044032  000431                          BR      48$
 9470  044034  032737  004000  005504  47$:    BIT     #RCLREQ,RECODE  ;IF RECALIBRATE IS REQUIRED
 9471  044042  001443                          BEQ     BGNRTY          ;FOR RETRY SET UP PARAM
 9472  044044  112737  000113  000001          MOVB    #RECAL,P.CMND   ;BLOCK TO DO IT.
 9473  044052  012737  044324  003046          MOV     #RETANL,A.ABNL
 9474  044060  004737  040316                  JSR     PC,DRVCAL
 9475  044064  012737  042164  003046          MOV     #ERRHDL,A.ABNL  ;RESTORE ERROR RETURN
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 9476  044072  032737  000400  005504          BIT     #LEV2ER,RECODE  ;IF AN ERROR OCCURRED IN THE
 9477  044100  001424                          BEQ     BGNRTY          ;RECAL ATTEMP SET ABORT,
 9478  044102  052737  000200  005504          BIS     #ABORT,PECODE   ;PRINT THE RECAL ERROR MESSAGE, AND
 9479  044110  104060                          ERROR   60              ;GO REPORT DETAILS
 9480  044112  000137  042204                  JMP     ER2ENT
 9481  044116  104061                  48$:    ERROR   61              ;REPORT ABORT-RETRY FAILED
 9482  044120  105037  003130                  CLRB    DRVERS          ;DROP DRIVE & GO TO NEW DRIVE
 9483  044124  105037  003126                  CLRB    ERRCNT
 9484  044130  000137  017026                  JMP     NEWDRV
 9485
 9486                                  ;THE PROGRAM WILL HALT HERE IF THE ABORT FLAG HAS BEEN SET OR
 9487                                  ;IF THE DRIVE READY BIT IS RESET.
 9488
 9489  044134  000005                  HLTPRG: RESET                   ;DISABLE ALL DEVICES
 9490  044136  000000                          HALT                    ;HALT THE CPU
 9491  044140  105037  003126                  CLRB    ERRCNT          ;CLEAR ERROR COUNT
 9492  044144  000005                          RESET                   ;RESET ALL DEVICES
 9493  044146  000137  012606                  JMP     CMSTRT
 9494
 9495
 9496                                  ;THE FOLLOWING CODE WILL DETERMINE IF AND DATA TYPE ERROR
 9497                                  ;HAS OCCURRED. IF YES, THE RETRY IS NOT DONE HERE BUT RETURNS TO
 9498                                  ;  THE INITIATING ROUTINE FOR RETRY.  ANY OTHER ERROR IS TO BE
 9499                                  ;RETRIED HERE. IF RETRY IS UNSUCCESSFUL AFTER 4 ATTEMPTS, THE ABORT
 9500                                  ;FLAG IS SET AND PROGRAM HALTS.
 9501
 9502  044152  032737  000136  005504  BGNRTY: BIT     #BSERR!HVRCER!OPIERR!DCKERR!WCERR,RECODE ;TEST IF ANY DATA ERROR
 9503  044160  001404                          BEQ     3$
 9504  044162  052737  100000  005504  9$:     BIS     #ANYDER,RECODE
 9505  044170  000453                          BR      2$
 9506  044172                          3$:
 9507  044172  105737  003143                  TSTB    NORTRY          ;SEE IF "NO-RETRY" FLAG SET
 9508  044176  001371                          BNE     9$              ;BR IF YES
 9509  044200  032737  001000  005504          BIT     #BADSEC,RECODE  ;TEST IF BAD SECTOR FLAG SET
 9510  044206  001044                          BNE     2$              ;IF YES-EXIT TO CALLER
 9511  044210  123737  003126  003127          CMPB    ERRCNT,ERRLMT   ;BEGIN RETRY IF ERROR COUNT HAS
 9512  044216  001012                          BNE     1$              ;NOT BEEN EXCEEDED
 9513  044220  005037  001174                  CLR     $REGS
 9514  044224  113737  003126  001174          MOVB    ERRCNT,$REGS    ;GET ERROR RETRY COUNT
 9515  044232  104102                          ERROR   102             ;REPORT RETRY UNSUCCESSFUL
 9516  044234  052737  000200  005504          BIS     #ABORT,RECODE   ;SET ABORT & QUIT
 9517  044242  000734                          BR      HLTPRG
 9518  044244  013702  003036          1$:     MOV     RKBAS,R2        ;GET RK BASE ADDRESS
 9519  044250  112765  000177  000001          MOVB    #SUBCLR,P.CMND(R5)  ;SET UP TO CLEAR SUBSYSTEM
 9520  044256  004737  040316                  JSR     PC,DRVCAL       ;GO DO IT
 9521  044262  012700  005246                  MOV     #COMSTR,R0      ;GO AND REESTABLISH THE COMMAND
 9522  044266  012025                          MOV     (R0)+,(R5)+     ;AS IT WAS ENTERED INTO THE
 9523  044270  012025                          MOV     (R0)+,(R5)+     ;PARAMETER BLOCK
 9524  044272  012025                          MOV     (R0)+,(R5)+
 9525  044274  012025                          MOV     (R0)+,(R5)+
 9526  044276  012025                          MOV     (R0)+,(R5)+
 9527  044300  012025                          MOV     (R0)+,(R5)+
 9528  044302  012705  002630                  MOV     #PARM0,R5
 9529  044306  012737  000000  177776          MOV     #PR0,@#PSW      ;LOWER PRIORITY TO ALLOW INTERRUPT
 9530  044314  004737  040316                  JSR     PC,DRVCAL       ;CALL DRIVER
 9531  044320  104410                  2$:     RESREG                  ;IF RETURN GETS HERE, NO ERROR
```

```
 9532  044322  000207                          RTS     PC              ;OCCURRED, RECOVERY WAS SUCCESSFUL
 9533
 9534
 9535  044324  152737  000377  003123  RETANL: BISB    #377,DONE       ;SET DONE
 9536  044332  052737  000400  005504          BIS     #LEV2ER,RECODE  ;SET LEVEL TWO ERROR
 9537  044340  000207                          RTS     PC
 9538  044342  152737  000377  003123  RETNML: BISB    #377,DONE       ;SET DONE
 9539  044350  000207                          RTS     PC
 9540
 9541
 9542                                  ;;*****************************************************************
 9543                                  .SBTTL  TIME OUT PROCESSOR ROUTINE
 9544                                  ;*THIS ROUTINE SUPPORTS THE ERROR HANDLER BY PROCESSING TIME OUT STATUS
 9545                                  ;*GATHERING DUTIES.
 9546                                  ;;*****************************************************************
 9547  044352                          TOPROC:
 9548  044352  104407                          SAVREG
 9549  044354  013702  003036                  MOV     RKBAS,R2
 9550  044360  012701  001174                  MOV     #$REGS,R1       ;SET UP R1 FOR RK REGISTER STORAGE
 9551  044364  016221  000000                  MOV     RKCS1(R2),(R1)+ ;STORE ALL VALID RK611
 9552  044370  016221  000010                  MOV     RKCS2(R2),(R1)+ ;REGISTERS
 9553  044374  016221  000020                  MOV     RKDC(R2),(R1)+
 9554  044400  016221  000006                  MOV     RKDA(R2),(R1)+
 9555  044404  016221  000002                  MOV     RKWC(R2),(R1)+
 9556  044410  016221  000004                  MOV     RKBA(R2),(R1)+
 9557  044414  016221  000016                  MOV     RKASOF(R2),(R1)+
 9558  044420  016221  000012                  MOV     RKDS(R2),(R1)+
 9559  044424  016221  000014                  MOV     RKER(R2),(R1)+
 9560  044430  005000                          CLR     R0                      ;THIS CODE WILL ATTEMPT TO
 9561                                                                          ;RETRIEVE THE STATUS FROM THE
 9562                                                                          ;DRIVE.
 9563  044432  012705  002714                  MOV     #PARM1,R5               ;SET UP TO USE PARM1
 9564  044436  112765  000141  000001          MOVB    #RDSTAT,P.CMND(R5)      ;DO READ DRIVE STATUS COMMAND
 9565  044444  004737  040316                  JSR     PC,DRVCAL               ;CALL DRIVER
 9566  044450  032765  000100  000014          BIT     #CMDTO,P.PRST(R5)       ;TEST FOR TIMEOUT
 9567  044456  001403                          BEQ     1$                      ;NO - SKIP
 9568  044460  052737  002000  005504          BIS     #TWOTOS,RECODE          ;SET TWO TIMEOUTS FLAG
 9569  044466  062705  000040          1$:     ADD     #P.ADD,R5               ;BUMP R5 TO POINT TO DRIVE STATUS
 9570  044472  012521                          MOV     (R5)+,(R1)+             ;MOVE ALL THE DRIVE STATUS INTO THE
 9571  044474  012521                          MOV     (R5)+,(R1)+             ;TEMP REGS FOR REPORTING.
 9572  044476  012521                          MOV     (R5)+,(R1)+
 9573  044500  012521                          MOV     (R5)+,(R1)+
 9574  044502  012521                          MOV     (R5)+,(R1)+
 9575  044504  012521                          MOV     (R5)+,(R1)+
 9576  044506  012521                          MOV     (R5)+,(R1)+
 9577  044510  012521                          MOV     (R5)+,(R1)+
 9578
 9579  044512  012705  002630                  MOV     #PARM0,R5               ;RESTORE PARM 0
 9580  044516  104410                          RESREG
 9581  044520  000207                          RTS     PC
 9582
 9583
 9584
 9585                                  ;;*****************************************************************
 9586                                  .SBTTL  READ HEADER 0 ROUTINE
 9587                                  ;;*****************************************************************
```

```
 9588  044522                          RDHDO:
 9589  044522  104407                          SAVREG
 9590  044524  016501  000026                  MOV     P.DTS(R5),R1    ;STORE TRACK AND SECTOR
 9591  044530  016500  000052                  MOV     P.B10(R5),R0    ;GET THE CYLINDER ADRS
 9592  044534  042700  160017                  BIC     #160017,R0      ;FROM THE DRIVE STATUS. CLEAR
 9593  044540  006200                          ASR     R0              ;OFF UNUSED BITS AND POSITION
 9594  044542  006200                          ASR     R0              ;FOR USE AS THE DESIRED
 9595  044544  006200                          ASR     R0              ;CYLINDER IN THE READ
 9596  044546  006200                          ASR     R0              ;HEADER COMMAND.
 9597  044550  012705  002714                  MOV     #PARM1,R5       ;SET UP TO USE P.B. 1
 9598  044554  010165  000004                  MOV     R1,P.SECT(R5)   ;INSERT TRK,SECT FOR READ HDR
 9599  044560  010065  000002                  MOV     R0,P.CYLN(R5)   ;SET CYL NO.
 9600  044564  112765  000177  000001          MOVB    #SUBCLR,P.CMND(R5) ;SET S.S. CLEAR CMND
 9601  044572  012737  000000  177776          MOV     #PR0,@#PSW      ;ALLOW INTERRUPTS
 9602  044600  004737  040316                  JSR     PC,DRVCAL       ;CLEAR THE S.S.
 9603  044604  112765  000125  000001          MOVB    #RDHEAD,P.CMND(R5) ;SET READ HEADER COMMAND
 9604  044612  004737  040316                  JSR     PC,DRVCAL       ;DO READ HEADER
 9605  044616  013712  017770                  MOV     HOLD3,(R2)      ;ISSUE RD HDR WITH FMT BIT = 0
 9606  044622  032712  000200          4$:     BIT     #BIT7,(R2)      ;CHECK FOR C. READY IN CS1
 9607  044626  001775                          BEQ     4$              ;BR IF NOT RDY YET
 9608  044630  013712  017772                  MOV     HOLD4,(R2)      ;ISSUE RD HDR WITH FMT BIT = 1
 9609  044634  032712  000200          6$:     BIT     #BIT7,(R2)      ;CHECK FOR C. READY IN CS1
 9610  044640  001775                          BEQ     6$              ;BR IF NOT RDY YET
 9611  044642  142765  000020  000007          BICB    #B.CFMT,P.CS1H(R5) ;CLEAR THE FORMAT BIT
 9612  044650  153765  003125  000007          BISB    FORMAT,P.CS1H(R5) ;RESTORE TYPE AND FMT IN USE
 9613  044656  012705  002630                  MOV     #PARM0,R5       ;RESTORE P.B. 0 ADDRESS
 9614  044662  104410                          RESREG                  ;RESTORE R0-R5
 9615  044664  000207                          RTS     PC              ;RETURN
 9616
 9617
 9618
 9619                                  ;;*****************************************************************
 9620                                  .SBTTL  GET PACK ADDRESS ROUTINE
 9621                                  ;;*****************************************************************
 9622  044666  016537  000030  001174  GTPKAD: MOV     P.DCYL(R5),$REGS ;GET CYLINDER NUMBER
 9623  044674  005037  001176                  CLR     $REG6           ;CLEAR REGISTERS FOR
 9624  044700  005037  001200                  CLR     $REG7           ;TRACK & SECTOR STORAGE
 9625  044704  116537  000026  001200          MOVB    P.DTS(R5),$REG7 ;STORE THE TRACK AND SECTOR
 9626  044712  116537  000027  001176          MOVB    P.DTS+1(R5),$REG6
 9627  044720  005737  001200                  TST     $REG7           ;ADJUST THE ADDRESS CONTAINED IN
 9628                                                                  ;THE RK REGISTERS FOR THE AUTOMATIC
 9629  044724  001403                          BEQ     1$              ;INCREMENT
 9630  044726  005337  001200                  DEC     $REG7
 9631  044732  000426                          BR      5$
 9632  044734  032765  010000  000016  1$:     BIT     #CFMT,P.CS1(R5)
 9633  044742  001404                          BEQ     2$
 9634  044744  012737  000023  001200          MOV     #19.,$REG7
 9635  044752  000403                          BR      3$
 9636  044754  012737  000025  001200  2$:     MOV     #21.,$REG7
 9637  044762  005737  001176          3$:     TST     $REG6
 9638  044766  001403                          BEQ     4$
 9639  044770  005337  001176                  DEC     $REG6
 9640  044774  000405                          BR      5$
 9641  044776  012737  000002  001176  4$:     MOV     #2,$REG6
 9642  045004  005337  001174                  DEC     $REG5
 9643  045010  000207                  5$:     RTS     PC
```

```
 9644
 9645
 9646
 9647                                   ;;*****************************************************************
 9648                                   ;SBTTL  BUILD EXPECTED HEADER
 9649                                   ;*USES DESIRED CYLINDER, TRACK AND SECTOR REGISTERS TO DETERMINE
 9650                                   ;*WHICH HEADER WAS EXPECTED. LOADS EXPECTED VALUES IN $REG5, 6, AND
 9651                                   ;*7 FOR REPORTING.
 9652                                   ;;*****************************************************************
 9653  045012  104407                   BLDEXH: SAVREG
 9654  045014  016537  000030  001174           MOV     P.DCYL(R5),$REG5 ;CONSTRUCT EXPECTED HDR
 9655  045022  016501  000026                  MOV     P.DTS(R5),R1 ;DESIRED CYLINDER & DESIRED TRACK
 9656  045026  042701  174377                  BIC     #174377,R1      ;CLEAR ALL BUT TRACK BITS
 9657  045032  006201                           ASR     R1              ;AND SECTOR. SHIFT THE TRACK
 9658  045034  006201                           ASR     R1              ;OVER TO CONFORM TO HEADER FORMAT
 9659  045036  006201                           ASR     R1              ;CHECK THE FORMAT BIT AND
 9660                                                                   ;IF SET, SET THE HEADER FORMAT
 9661  045040  016537  000026  001176           MOV     P.DTS(R5),$REG6 ;BIT.
 9662  045046  042737  177740  001176           BIC     #177740,$REG6   ;CLEAR ALL BUT SECTOR
 9663  045054  060137  001176                  ADD     R1,$REG6        ;ADD TRACK AND SECTOR TOGETHER
 9664  045060  052737  140000  001176           BIS     #140000,$REG6   ;INSERT BSE BITS
 9665  045066  032765  010000  000016           BIT     #CFMT,P.CS1(R5)
 9666  045074  001403                           BEQ     23$
 9667  045076  052737  001000  001176           BIS     #1000,$REG6
 9668  045104  013737  001174  001200  23$:     MOV     $REG5,$REG7     ;COMPUTE THE HEADER VRC
 9669  045112  013701  001176                  MOV     $REG6,R1
 9670  045116  043737  001176  001200          BIC     $REG6,$REG7
 9671  045124  043701  001174                  BIC     $REG5,R1
 9672  045130  050137  001200                  BIS     R1,$REG7
 9673  045134  104410                           RESREG
 9674  045136  000207                           RTS     PC
 9675
```

```
                        .SBTTL  RK611/RK06-RK07 UNIBUS DRIVER FOR SEQUENTIAL OPERATIONS (REV. 0.10)

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                        ;*MAYNARD, MA. 01754
                        ;*AUTHOR: ROY SPITZER

                        .SBTTL   *WATCH-DOG TIMER

                        ;;*****************************************************************
                        ;*
                        ;*      THE WATCH-DOG TIMER DOES A PSEUDO-TIMING OF RK06-RK07 UNIBUS
                        ;*      SUBSYSTEM COMMAND, SINCE ONE CAN NOT GUARANTEE THAT A
                        ;*      REAL-TIME CLOCK (KW11-P OR KW11-L) IS ON THE SYSTEM
                        ;*      THE RK06-RK07 DRIVER WILL USE THE LOCATION W.MTIM FOR
                        ;*      MILLI-SECOND TIMING. WHEN W.MTIM REACHES ZERO THE
                        ;*      WATCH-DOG TIMER WILL SCAN THE DRIVES IN USE AS
                        ;*      DETERMINED BY THE LOCATION W.TIME. THE TIMER COUNTS
                        ;*      (ONE FOR EACH DRIVE) ARE KEPT IN THE TABLE W.DRV.
                        ;*      IF ANY COUNT IN THE TABLE W.DRV REACHES ZERO A COMMAND
                        ;*      TIME-OUT WILL BE DESIGNATED IN THE PROGRAM DEVICE STATUS
                        ;*      REGISTER OF THAT DRIVE'S PARAMETER BLOCK.
                        ;*
                        ;*      THE DRIVER WILL USE THE LOCATION W.MIN AS THE NUMBER
                        ;*      OF MILLISECONDS FOR AN UNLOAD OR START SPINDLE COMMAND.
                        ;*      THE DRIVER WILL USE THE LOCATION W.SEC AS THE TIME
                        ;*      LIMIT FOR ALL OTHER COMMANDS.
                        ;*
                        ;*      FOR QUEUED OPERATIONS THE WATCH-DOG TIMER WILL
                        ;*      WATCH UP TO 8 OPERATIONS SIMULATEOUSLY. FOR SEQUENTIAL
                        ;*      OPERATIONS ONLY ONE OPERATION WILL BE WATCHED.
                        ;*
                        ;*CALL   JSR     PC,W.WTCH
                        ;*      RETURN          IF NO DRIVE ORDER EXCEEDED ITS TIME LIMIT
                        ;*
                        ;*      OTHERWISE AN ABNORMAL RETURN TO THE ROUTINE ADDRESS
                        ;*      BY LOCATION A.ABNL WILL OCCUR AND THE CMDTO FLAG
                        ;*      IN THE PROGRAM DEVICE STATUS REGISTER OF THE
                        ;*      APPROPRIATE PARAMETER BLOCK WILL BE SET.
                        ;*
                        ;;*****************************************************************

045140  010546          W.WTCH: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
045142  010446                  MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
045144  010346                  MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
045146  010246                  MOV     R2,-(SP)        ;SAVE R2 ON STACK
045150  013746  177776          MOV     PS,-(SP)        ;SAVE PROGRAM STATUS WORD ON STACK
045154  005337  003056          DEC     W.MTIM          ;DECREMENT MILLISECOND TIMER
045160  001034                  BNE     20$             ;IF NOT ZERO RETURN
045162  013737  003060  003056  MOV     W.MILI,W.MTIM   ;REINITIALIZE MILLISECOND TIMER
045170  105737  003100          TSTB    W.TIME          ;CHECK IF DRIVE IS BEING TIMED
045174  001426                  BEQ     20$             ;NO, RETURN
045176  013737  003042  177776  MOV     RKPRI,PS        ;LOCK OUT RK06-RK07 INTERRUPTS
045204  013702  003036          MOV     RKBAS,R2        ;LOAD BASE OF RK06-RK07 REGISTERS
045210  005337  003114          DEC     W.DRV           ;DECREMENT COMMAND TIMER
045214  001016                  BNE     20$             ;RETURN IF NO TIME OUT
```

```
 9732  045216  105037  003100                  CLRB    W.TIME          ;RESET TIMING INDICATOR
 9733  045222  013705  003112                  MOV     PBLKT,R5        ;LOAD ADDRESS OF PARAMETER BLOCK
 9734                                                                  ;   TABLE FOR INDEXING
 9735  045226  052765  000100  000014          BIS     #CMDTO.P.PRST(R5) ;SET COMMAND TIME OUT
 9736  045234  020537  003054                  CMP     R5,0.WAIT       ;CHECK IF DRIVER IS WAITING FOR
 9737                                                                  ;   COMMAND COMPLETION
 9738  045240  001002                          BNE     5$              ;NO, DO NOT ALTER WAITING FOR
 9739                                                                  ;   COMMAND COMPLETION
 9740  045242  005037  003054                  CLR     0.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
 9741  045246  004737  050522          5$:     JSR     PC,R.ABNL       ;BRANCH TO ERROR ROUTINE
 9742  045252  012637  177776          20$:    MOV     (SP)+,PS        ;RESTORE PSW
 9743  045256  012602                          MOV     (SP)+,R2        ;RESTORE R2
 9744  045260  012603                          MOV     (SP)+,R3        ;RESTORE R3
 9745  045262  012604                          MOV     (SP)+,R4        ;RESTORE R4
 9746  045264  012605                          MOV     (SP)+,R5        ;RESTORE R5
 9747  045266  000207                          RTS     PC              ;RETURN
```

```
                        .SBTTL   *RK06 INTERRUPT SERVICE ROUTINE

                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL SERVICE ALL RK06 INTERRUPTS.
                        ;*
                        ;*      UPON RECEIVING AN INTERRUPT, THIS ROUTINE WILL
                        ;*      PERFORM ONE OF THE FOLLOWING SERVICES:
                        ;*
                        ;*      1.) SERVICE PORT WAS SEIZED BY OTHER PORT
                        ;*      2.) SERVICE DRIVER IS WAIT FOR COMMAND COMPLETION
                        ;*      3.) SERVICE POSITIONING COMPLETION
                        ;*      4.) REQUEUE COMMAND IF DRIVE WAS RELEASED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*      5.) IF NO SERVICE IS REQUIRED, THE COMMAND WILL BE ISSUED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*
                        ;*      THREE LINKS ARE PROVIDED TO THE DRIVING PROGRAM.
                        ;*      THEY ARE:
                        ;*
                        ;*      1.) A.NORM ADDRESS OF NORMAL RETURN (SUCESSFUL COMPLETION OF COMMAND)
                        ;*      2.) A.ABNL ADDRESS OF ABNORMAL RETURN (UNSUCESSFUL COMPLETION OF COMMAND)
                        ;*      3.) A.CONT ADDRESS OF CONTROL ERROR RETURN
                        ;*
                        ;*      FOR NORMAL AND ABNORMAL RETURNS, THE ADDRESS OF THE APPROPRIATE
                        ;*      PARAMETER BLOCK WILL BE IN R5.
                        ;*
                        ;*      FOR THE CONTROLLER ERROR RETURN, THE LOCATION E.CONT CONTAINS
                        ;*      THE REASON FOR THE CONTROLLER ERROR.
                        ;*
                        ;*      ROUTINES USED:
                        ;*              C.OPT   (QUEUED ONLY)
                        ;*              Q.PUSH  (QUEUED ONLY)
                        ;*              Q.RMOV  (QUEUED ONLY)
                        ;*              R.CONT  (SEQUENTIAL ONLY)
                        ;*              R.NORM  (SEQUENTIAL ONLY)
                        ;*              R.ABNL  (SEQUENTIAL ONLY)
                        ;*              I.CSTS
                        ;*              I.STAT
                        ;*              I.ISSU
                        ;*              I.CCLR
                        ;*
                        ;;*****************************************************************

045270  010546          I.INTR: MOV     R5,-(SP)        ;STORE R5 ON THE STACK
045272  010446                  MOV     R4,-(SP)        ;STORE R4 ON THE STACK
045274  010346                  MOV     R3,-(SP)        ;STORE R3 ON THE STACK
045276  010246                  MOV     R2,-(SP)        ;STORE R2 ON THE STACK
045300  010146                  MOV     R1,-(SP)        ;STORE R1 ON THE STACK
045302  010046                  MOV     R0,-(SP)        ;STORE R0 ON THE STACK
045304  013702  003036          MOV     RKBAS,R2        ;LOAD R2 TO ADDRESS RK06 REGISTER
045310  016237  000010  003002  MOV     RKCS2(R2),T.CS2 ;STORE CS2
045316  032737  001000  003002  BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
045324  001407                  BEQ     1$              ;NO, CONTINUE PROCESSING
045326  052737  100000  003052  BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
045334  004737  050546          JSR     PC,R.CONT       ;REPORT ERROR
```

```
9804  045340  000137  047520                 JMP     I.RTRN          ;RETURN
9805
9806  045344  105737  003074          1$:    TSTB    I.ISRL          ;CHECK IF INTERRUPT OR RELEASE
9807  045350  001410                         BEQ     6$              ;NO, CHECK IF DRIVE AVAILABLE
9808  045352  100403                         BMI     5$              ;CHECK IF RELEASE COMMAND
9809  045354  105037  003074                 CLRB    I.ISRL          ;YES,CLEAR FLAG
9810  045360  000473                         BR      I.IGO           ;CONTINUE PROCESSING INTERRUPT
9811
9812  045362  105037  003074          5$:    CLRB    I.ISRL          ;CLEAR FLAG
9813  045366  000137  046502                 JMP     I.ATTN          ;GO PROCESS DRIVE ATTENTIONS
9814
9815  045372  032737  010400  003002  6$:    BIT     #NED!UFE,T.CS2  ;CHECK FOR NON-EXISTENT DRIVE OR
9816                                                                 ;  UNIT FIELD ERROR
9817  045400  001413                         BEQ     7$              ;NO, WAIT FOR DUAL ACCESS INTERRUPT
9818  045402  013704  003002                 MOV     T.CS2,R4        ;LOAD R4 FOR DRIVE NUMBER
9819  045406  042704  177770                 BIC     #^C<DRVMSK>,R4  ;KEEP DRIVE BITS
9820  045412  013705  003112                 MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS
9821  045416  016237  000000  003000         MOV     RKCS1(R2),T.CS1 ;LOAD TEMPORARY CS1 FOR STATUS REPORT
9822  045424  000137  045712                 JMP     I.ERRC          ;REPORT ERROR
9823
9824  045430  016237  000012  003020  7$:    MOV     RKDS(R2),T.DS   ;STORE STATUS REGISTER FOR COMPARISON
9825  045436  032737  000001  003020         BIT     #DRA,T.DS       ;CHECK IF DRIVE SEIZED BY OTHER
9826                                                                 ;  PORT
9827  045444  001041                         BNE     I.IOO           ;NO, CONTINUE PROCESSING INTERRUPT
9828
9829                                         ;CHECK IF ANY DATA TRANSFER ERROR EXISTS
9830  045446  032737  164000  003002         BIT     #DLT!WCE!UPE!NEM,T.CS2
9831
9832  045454  001007                         BNE     10$             ;INDICATE ERROR
9833  045456  016237  000014  003016         MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
9834
9835                                  ;      CHECK FOR DATA TRANSFER ERROR TYPE ERROR
9836  045464  032737  125700  003016         BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
9837
9838  045472  001407                         BEQ     11$             ;NO, WAIT FOR RELEASE OF RK06 DRIVE
9839
9840  045474  052737  000010  003052  10$:   BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
9841  045502  004737  050546                 JSR     PC,R.CONT       ;REPORT ERROR
9842  045506  000137  047520                 JMP     I.RTRN          ;RESTORE REGISTERS
9843
9844  045512  105037  003100          11$:   CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
9845  045516  005037  003114                 CLR     W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
9846  045522  013705  003112                 MOV     PBLKT,R5        ;LOAD R5 WITH PARAMETER BLOCK
9847                                                                 ;  ADDRESS
9848  045526  052765  010000  000014         BIS     #DRVSZD,P.PRST(R5) ;SET DRIVE SEIZED IN THE
9849                                                                 ;  PROGRAM DRIVE STATUS REGISTER
9850  045534  005037  003054                 CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
9851  045540  004737  050522                 JSR     PC,R.ABNL       ;INDICATE ABNORMAL TERMINATION
9852  045544  000137  047520                 JMP     I.RTRN          ;GO RESTORE REGISTERS
9853
9854  045550  013705  003054          I.IOO: MOV     O.WAIT,R5       ;LOAD PARAMETER BLOCK ADDRESS INTO R5
9855  045554  001002                         BNE     2$              ;IS COMMAND WAITING PROCESSING
9856                                                                 ;  YES, DO PROCESSING
9857  045556  000137  046502                 JMP     I.ATTN          ;NO, PROCESS ATTENTION
9858
9859  045562  013704  003002          2$:    MOV     T.CS2,R4        ;STORE RKCS2 FOR DRIVE NUMBER
```

```
9860  045566  042704  177770                    BIC     #^C<DRVMSK>,R4  ;MASK OUT UNNECESSARY BITS
9861
9862
9863  045572  126504  000000                    CMPB    P.DRVN(R5),R4   ;CHECK IF DRIVE NUMBER IS EXPECTED
9864  045576  001401                            BEQ     3$              ;YES, CONTINUE
9865  045600  000000                            HALT                    ;NO, DRIVER ERROR
9866  045602  122765  000164  000001  3$:       CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
9867  045610  001002                            BNE     10$             ;NO, EXECUTE NORMAL DATA TRANSFER
9868  045612  000137  046130                    JMP     I.HDAL          ;GO EXECUTE SPECIAL HEADER SEQUENCE
9869
9870  045616  005037  003054          10$:      CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
9871  045622  005037  003114                    CLR     W.DRV           ;CLEAR WATCH-DOG TIME
9872  045626  105037  003100                    CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
9873  045632  016237  000000  003000            MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
9874  045640  032737  100000  003000            BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
9875  045646  001021                            BNE     I.ERRC          ;YES, PROCESS ERROR
9876  045650  016237  000016  003014            MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
9877  045656  133737  003101  003015            BITB    INTMSK,T.ASOF+1 ;CHECK IF DRIVE ATTENTION SET
9878  045664  001004                            BNE     15$             ;YES, REPORT ERROR
9879  045666  004737  050534                    JSR     PC,R.NORM       ;INDICATE NORMAL RETURN
9880  045672  000137  047520                    JMP     I.RTRN          ;RESTORE REGISTERS
9881
9882  045676  052765  000010  000014  15$:      BIS     #UEXATT,P.PRST(R5) ;SET UNEXPECTED ATTENTION
9883
9884  045704  004737  050170          I.ERRA:   JSR     PC,I.CSTS       ;STORE CONTROLLER STATUS
9885  045710  000405                            BR      I.ERR           ;STORE PATTERN AND POSITION INFORMATION
9886
9887  045712  013765  003000  000016  I.ERRC:   MOV     T.CS1,P.CS1(R5) ;GET ERROR RKCS1
9888  045720  004737  050212                    JSR     PC,I.CST1       ;GET REST OF CONTROLLER STATUS
9889  045724  016265  000032  000062  I.ERR:    MOV     RKECPT(R2),P.EPAT(R5) ;STORE ECC PATTERN
9890  045732  016265  000030  000060            MOV     RKECPS(R2),P.EPOS(R5) ;STORE ECC POSITION
9891  045740  004037  047536                    JSR     R0,I.CCLR       ;CLEAR CONTROLLER
9892  045744  047520                            I.RTRN                  ;ERROR RETURN
9893  045746  032765  010400  000020            BIT     #NED!UFE,P.CS2(R5) ;CHECK IF IT WAS NON-EXISTENT DRIVE OR
9894                                                                    ;  UNIT FIELD ERROR
9895  045754  001046                            BNE     5$              ;YES, REPORT ERROR
9896  045756  004037  050274                    JSR     R0,I.STAT       ;GATHER DRIVE STATUS
9897  045762  047520                            I.RTRN                  ;ERROR RETURN
9898  045764  112737  000005  003000            MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
9899  045772  004037  047620                    JSR     R0,I.ISSU       ;ISSUE DRIVE CLEAR
9900  045776  047520                            I.RTRN                  ;ERROR RETURN
9901  046000  133737  003101  003015            BITB    INTMSK,T.ASOF+1 ;CHECK IF ATTENTION RESET
9902  046006  001407                            BEQ     2$              ;NO, INDICATE DRIVE ERROR
9903  046010  052737  000020  003052            BIS     #E.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
9904                                                                    ;  WITH CLEAR
9905  046016  004737  050546                    JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
9906  046022  000137  047520                    JMP     I.RTRN          ;GO RESTORE REGISTERS
9907
9908  046026  032737  040000  003024  2$:       BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE CLEARED
9909  046034  001403                            BEQ     3$              ;YES, CHECK FAULT
9910  046036  052765  000040  000014            BIS     #DRVDSC,P.PRST(R5) ;SET DSC DID NOT CLEAR
9911  046044  032737  001000  003026  3$:       BIT     #S.PAR,T.MR3    ;CHECK IF DRIVE PARITY ERROR
9912  046052  001407                            BEQ     5$              ;NO, INDICATE ABNORMAL TERMINATION
9913  046054  052737  002000  003052            BIS     #E.DPAR,E.CONT  ;SET DRIVE PARITY ERROR
9914  046062  004737  050546                    JSR     PC,R.CONT       ;INDICATE CONTROLLER ERROR
9915  046066  000137  047520                    JMP     I.RTRN          ;RETURN
```

```
9916
9917  046072  032765  000020  000014  5$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
9918  046100  001017                          BNE     10$                ;YES, GO REPORT ERROR
9919  046102  032737  020000  003024          BIT     #S.PIP,T.MR2       ;CHECK IF DRIVE IS CYCLING DOWN
9920  046110  001413                          BEQ     10$                ;NO, REPORT ERROR
9921  046112  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING
9922  046120  113737  003101  003100          MOVB    INTMSK,W.TIME      ;SET UP 8 SECONDS FOR DRIVE TO CYCLE UP
9923  046126  013737  003064  003114          MOV     W.8SEC,W.DRV
9924  046134  000137  047520                  JMP     I.RTRN             ;GO RESTORE REGISTERS
9925
9926  046140  004737  050522          10$:    JSR     PC,R.ABNL          ;GO REPORT ERROR
9927  046144  000137  047520                  JMP     I.RTRN             ;GO RESTORE REGISTERS
9928
9929                                  .SBTTL   *READ ALL HEADERS INTERRUPT SEQUENCE
9930
9931  046150  016237  000000  003000  I.HDAL: MOV     RKCS1(R2),T.CS1    ;STORE CS1 TO CHECK CONTROLLER
9932                                                                     ;  ERROR
9933  046156  032737  100000  003000          BIT     #CERR,T.CS1        ;CHECK IF CONTROLLER ERROR
9934  046164  001422                          BEQ     5$                 ;NO, CHECK FOR ATTENTION
9935
9936  046166  005037  003054                  CLR     O.WAIT             ;CLEAR WAITING FOR COMMAND COMPLETE
9937  046172  105037  003100                  CLRB    W.TIME             ;RESET TIMING ON DRIVE
9938  046176  005037  003114                  CLR     W.DRV              ;CLEAR TIME OUT COUNT
9939  046202  013765  003000  000016          MOV     T.CS1,P.CS1(R5)    ;STORE ERROR RKCS1
9940  046210  004737  050212                  JSR     PC,I.CST1          ;STORE CONTROLLER REGISTERS
9941  046214  004037  047536                  JSR     R0,I.CCLR          ;CLEAR CONTROLLER
9942  046220  047520                          I.RTRN                     ;ERROR RETURN
9943  046222  004737  050522                  JSR     PC,R.ABNL          ;INDICATE ERROR RETURN
9944  046226  000137  047520                  JMP     I.RTRN             ;RESTORE REGISTERS
9945
9946  046232  016237  000016  003014  5$:     MOV     RKASOF(R2),T.ASOF  ;STORE ATTENTION SUMMARY
9947  046240  133737  003101  003015          BITB    INTMSK,T.ASOF+1    ;CHECK IF DRIVE ATTENTION IS SET
9948  046246  001410                          BEQ     7$                 ;NO, CHECK IF READ ALL HEADERS
9949  046250  005037  003054                  CLR     O.WAIT             ;CLEAR WAITING FOR COMMAND COMPLETION
9950  046254  105037  003100                  CLRB    W.TIME             ;RESET TIMING ON DRIVE
9951  046260  005037  003114                  CLR     W.DRV              ;CLEAR TIME OUT COUNT
9952  046264  000137  045704                  JMP     I.ERRA             ;GO REPORT ERROR
9953
9954  046270  013701  003070          7$:     MOV     HDR.AD,R1          ;GET MAIN MEMORY ADDRESS
9955  046274  016221  000024                  MOV     RKDB(R2),(R1)+     ;GET FIRST WORD OF HEADER
9956  046300  016221  000024                  MOV     RKDB(R2),(R1)+     ;GET SECOND WORD OF HEADER
9957  046304  016221  000024                  MOV     RKDB(R2),(R1)+     ;GET THIRD WORD OF HEADER
9958  046310  010137  003070                  MOV     R1,HDR.AD          ;STORE ADDRESS FOR NEXT HEADER
9959  046314  016237  000010  003002          MOV     RKCS2(R2),T.CS2    ;STORE CS2 TO CHECK FOR DATA LATE
9960  046322  032737  100000  003002          BIT     #DLT,T.CS2         ;CHECK FOR DATA LATE
9961  046330  001055                          BNE     35$                ;YES, REPORT ERROR
9962  046332  005337  003072                  DEC     HDR.CT             ;DECREMENT NUMBER OF HEADER YET TO READ
9963  046336  001026                          BNE     25$                ;IF NON-ZERO, GO ISSUE NEXT READ HEADER
9964  046340  005037  003054                  CLR     O.WAIT             ;CLEAR DRIVER WAITING FOR COMMAND COMPLETION
9965  046344  005037  003114                  CLR     W.DRV              ;CLEAR TIME OUT COUNT FOR THIS DRIVE
9966  046350  105037  003100                  CLRB    W.TIME             ;CLEAR WATCH DOG TIME ON THIS DRIVE
9967  046354  012762  000003  000026          MOV     #3,RKMR1(R2)       ;LOAD MAINTENANCE REGISTER FOR SECTOR COUNT
9968  046362  112737  000001  003000          MOVB    #DR.SEL,T.CS1      ;LOAD SELECT COMMAND
9969  046370  004037  047620                  JSR     R0,I.ISSU          ;GET SECTOR COUNT
9970  046374  047520                          I.RTRN                     ;ERROR RETURN
9971  046376  013765  003026  000056          MOV     T.MR3,P.B11(R5)    ;LOAD SECTOR COUNT
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 9972  046404  004737  050534                JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
 9973  046410  000137  047520                JMP     I.RTRN          ;RESTORE REGISTERS
 9974
 9975  046414  016562  000002  000020  25$:  MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
 9976  046422  016562  000004  000006        MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
 9977  046430  116565  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
 9978  046436  042765  165777  000016        BIC     #^C<CDT!CFMT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT AND
 9979                                                                ;  DRIVE TYPE
 9980  046444  112765  000125  000016        MOVB    #RDHEAD,P.CS1(R5)  ;STORE COMMAND ISSUED
 9981  046452  016562  000016  000000        MOV     P.CS1(R5),RKCS1(R2)  ;ISSUE READ HEADER
 9982  046460  000137  047520                JMP     I.RTRN          ;RESTORE REGISTERS
 9983
 9984  046464  052737  000400  003052  35$:  BIS     #E.DLT,E.CONT   ;SET DATA LATE WHILE UNLOADING HEADER
 9985  046472  004737  050546                JSR     PC,R.CONT       ;REPORT ERROR
 9986  046476  000137  047520                JMP     I.RTRN          ;RESTORE REGISTERS
 9987
 9988                                  .SBTTL  *DRIVE ATTENTION SCANNER
 9989
 9990  046502  016237  000000  003000  I ATTN: MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS
 9991                                                                ;  REGISTER 1 FOR COMPARISON
 9992  046510  032737  100000  003000        BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCURRED
 9993  046516  001441                        BEQ     5$              ;NO, CHECK IF ATTENTION
 9994
 9995                                  ;CHECK IF ANY DATA TRANSFER TYPE ERROR EXISTS
 9996  046520  032737  164000  003002        BIT     #DLT!WCE!UPE!NEM,T.CS2
 9997
 9998  046526  001007                        BNE     1$              ;INDICATE ERROR
 9999  046530  016237  000014  003016        MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
10000
10001                                  ;       CHECK FOR DATA TRANSFER ERROR TYPE
10002  046536  032737  125700  003016        BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
10003
10004  046544  001407                        BEQ     2$              ;NO DATA TRANSFER ERROR
10005
10006  046546  052737  000010  003052  1$:   BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
10007  046554  004737  050546                JSR     PC,R.CONT       ;REPORT ERROR
10008  046560  000137  047520                JMP     I.RTRN          ;RESTORE REGISTERS
10009
10010  046564  013704  003002          2$:   MOV     T.CS2,R4        ;SAVE CS2 FOR REGISTER NUMBER
10011  046570  042704  177770                BIC     #^C<DRVMSK>,R4  ;STRIP OFF JUNK
10012  046574  105037  003100                CLRB    W.TIME          ;CLEAR WATCH DOG TIMER
10013  046600  005037  003114                CLR     W.DRV           ;RESET TIMER VALUE
10014  046604  013705  003112                MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS IN R5
10015
10016                                  ;       CLEAR DRIVE POSITIONING AND DRIVE POSITIONED FOR DATA TRANSFER
10017                                  ;         IN PROGRAM DEVICE STATUS REGISTER
10018  046610  042765  000006  000014        BIC     #DRVPOS!DRVPDT,P.PRST(R5)
10019
10020  046616  000137  045712                JMP     I.ERRC          ;GO REPORT ERROR
10021
10022  046622  032737  040000  003000  5$:   BIT     #DI,T.CS1       ;CHECK IF ANY DRIVE ATTENTION
10023  046630  001002                        BNE     6$              ;YES, PROCESS INTERRUPT
10024  046632  000137  047520                JMP     I.RTRN          ;RESTORE REGISTERS
10025
10026  046636  016237  000016  003014  6$:   MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
10027  046644  105737  003015                TSTB    T.ASOF+1        ;CHECK IF ANY ATTENTIONS SET
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10028  046650  001007                          BNE     7$                ;YES GO PROCESS INTERRUPT
10029  046652  052737  000002  003052          BIS     #E.NOAT,E.CONT    ;SET NO ATTENTION IN ATTENTION SUMMARY
10030  046660  004737  050546                  JSR     PC,R.CONT         ;GO REPORT ERROR
10031  046664  000137  047520                  JMP     I.RTRN            ;GO RESTORE REGISTERS
10032
10033  046670  133737  003101  003015  7$:     BITB    INTMSK,T.ASOF+1   ;CHECK IF DESIRED INTERRUPT
10034  046676  001007                          BNE     8$                ;YES, GO PROCESS IT
10035  046700  052737  000004  003052          BIS     #E.UATT,E.CONT    ;SET UNSOLICATED ATTENTION
10036  046706  004737  050546                  JSR     PC,R.CONT         ;GO REPORT ERROR
10037  046712  000137  047520                  JMP     I.RTRN            ;GO RESTORE REGISTERS
10038
10039  046716  013705  003112          8$:     MOV     PBLKT,R5          ;STORE PARAMETER BLOCK TABLE
10040  046722  116504  000000                  MOVB    P.DRVN(R5),R4     ;STORE DRIVE NUMBER
10041  046726  032765  020000  000014          BIT     #E.UNLD,P.PRST(R5)  ;CHECK IF DRIVE UNLOADING
10042  046734  001402                          BEQ     11$               ;NO, CONTINUE
10043  046736  000137  047420                  JMP     I.UNLD            ;SERVICE DRIVE IN POSITION AFTER ERROR
10044
10045  046742  042765  000002  000014  11$:     BIC     #DRVPOS,P.PRST(R5)  ;RESET DRIVE POSITIONING
10046  046750  005062  000026                  CLR     RKMR1(R2)         ;CLEAR MAINTENANCE REGISTER 1
10047  046754  112737  000001  003000          MOVB    #DR.SEL,T.CS1     ;LOAD COMMAND
10048  046762  004037  047620                  JSR     R0,I.ISSU         ;SELECT DRIVE WITH ATTENTION HIGH
10049  046766  047520                          I.RTRN                    ;ERROR RETURN
10050  046770  013765  003026  000042          MOV     T.MR3,P.B00(R5)   ;STORE STATUS BYTE 00 MESS B
10051  046776  032765  000200  000042          BIT     #S.FLT,P.B00(R5)  ;CHECK IF DRIVE FAULT
10052  047004  001401                          BEQ     12$               ;NO, CHECK FOR DRIVE STATUS CHANGE
10053  047006  000461                          BR      I.AERR            ;PROCESS ERROR
10054
10055  047010  013765  003024  000040  12$:     MOV     T.MR2,P.A00(R5)   ;STORE MAINTENANCE REGISTER 2
10056  047016  032765  040000  000040          BIT     #S.DSC,P.A00(R5)  ;CHECK FOR DRIVE STATUS CHANGE
10057  047024  001004                          BNE     13$               ;YES, PROCESS DRIVE STATUS CHANGE
10058  047026  052765  004000  000014          BIS     #NODSC,P.PRST(R5)  ;SET NO DRIVE STATUS CHANGE
10059  047034  000446                          BR      I.AERR            ;PROCESS ERROR
10060
10061  047036  112737  000005  003000  13$:     MOVB    #DR.CLR,T.CS1     ;LOAD COMMAND
10062  047044  004037  047620                  JSR     R0,I.ISSU         ;CLEAR DRIVE STATUS CHANGE
10063  047050  047520                          I.RTRN                    ;ERROR RETUN
10064  047052  013765  003014  000032          MOV     T.ASOF,P.ASOF(R5)  ;STORE ATTENTION SUMMARY
10065  047060  133765  003101  000033          BITB    INTMSK,P.ASOF+1(R5)  ;CHECK IF ATTENTION RESET
10066  047066  001407                          BEQ     15$               ;YES, CONTINUE INTERRUPT PROCESSING
10067  047070  052737  000020  003052          BIS     #E.CLAT,E.CONT    ;SET ATTENTION DID NOT RESET
10068                                                                    ;   WITH DRIVE CLEAR
10069  047076  004737  050546                  JSR     PC,R.CONT         ;FLAG ERROR
10070  047102  000137  047520                  JMP     I.RTRN            ;RESTORE REGISTERS
10071
10072  047106  013765  003024  000040  15$:     MOV     T.MR2,P.A00(R5)   ;STORE MAINTENANCE REGISTER 2
10073  047114  032765  040000  000040          BIT     #S.DSC,P.A00(R5)  ;CHECK IF DRIVE STATUS CHANGE
10074                                                                    ;   RESET
10075  047122  001404                          BEQ     16$               ;YES, CONTINUE INTERRUPT PROCESSING
10076  047124  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5)  ;SET DRIVE STATUS CHANGE DID NOT CLEAR
10077  047132  000407                          BR      I.AERR            ;GO PROCESS ERROR
10078
10079  047134  105037  003100          16$:     CLRB    W.TIME            ;RESET TIMING ON THIS DRIVE
10080  047140  005037  003114                  CLR     W.DRV             ;CLEAR DRIVE TIMING COUNT
10081  047144  004737  050534                  JSR     PC,R.NORM         ;REPORT SUCCESSFUL COMMAND COMPLETETION
10082  047150  000563                          BR      I.RTRN            ;RESTORE REGISTERS
10083
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10084                                   .SBTTL   *ATTENTION ERROR HANDLER
10085
10086  047152  042765  000004  000014  I.AERR: BIC     #DRVPDT,F.PRST(R5) ;RESET POSITIONING IN PROGRESS BECAUSE
10087                                                                     ;  OF DATA TRANSFER
10088  047160  105037  003100                  CLRB    W.TIME             ;CLEAR TIMING FOR THIS DRIVE
10089  047164  005037  003114                  CLR     W.DRV              ;RESET WATCH-DOG TIME
10090  047170  042765  177741  000016          BIC     #177741,P.CS1(R5) ;KEEP COMMAND ISSUED
10091  047176  042737  000036  003000          BIC     #36,T.CS1          ;KEEP CURRENT CONTROLLER STATUS
10092  047204  053765  003000  000016          BIS     T.CS1,P.CS1(R5)    ;MAKE GOOD MESSAGE
10093  047212  013765  003002  000020          MOV     T.CS2,P.CS2(R5)    ;STORE CONTROLLER REGISTERS
10094  047220  013765  003004  000022          MOV     T.WCR,P.WCR(R5)
10095  047226  013765  003006  000024          MOV     T.BA,P.BAR(R5)
10096  047234  013765  003010  000026          MOV     T.DA,P.DTS(R5)
10097  047242  013765  003012  000030          MOV     T.DC,P.DCYL(R5)
10098  047250  013765  003014  000032          MOV     T.ASOF,P.AS   R5)
10099  047256  013765  003016  000034          MOV     T.ER,P.ER(R5,
10100  047264  013765  003020  000036          MOV     T.DS,P.DS(R5)
10101  047272  004037  050274                  JSR     R0,I.STAT          ;GATHER DRIVE STATUS
10102  047276  047520                          I.RTRN                     ;ERROR RETURN
10103  047300  112737  000005  003000          MOVB    #DR.CLR,T.CS1      ;LOAD COMMAND
10104  047306  004037  047620                  JSR     R0,I.ISSU          ;CLEAR DRIVE ERRORS
10105  047312  047520                          I.RTRN                     ;ERROR RETURN
10106  047314  133737  003101  003015          BITB    INTMSK,T.ASOF+1    ;CHECK IF ATTENTION RESET
10107  047322  001407                          BEQ     2$                 ;YES, FLAG DRIVE ERROR
10108  047324  052737  000020  003052          BIS     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
10109  047332  004737  050546                  JSR     PC,R.CONT          ;REPORT ERROR
10110  047336  000137  047520                  JMP     I.RTRN             ;RESTORE REGISTERS
10111
10112  047342  032765  000020  000014  2$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF AHARD DRIVE ERROR
10113  047350  001017                          BNE     10$                ;YES, REPORT ERROR
10114  047352  032737  020000  003024          BIT     #S.PIP,T.MR2       ;CHECK IF DRIVE IS UNLOADING
10115  047360  001413                          BEQ     10$                ;NO, REPORT ERROR
10116  047362  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING DUE TO ERROR
10117  047370  113737  003101  003100          MOVB    INTMSK,W.TIME      ;SET TIMING ON THIS DRIVE
10118  047376  013737  003064  003114          MOV     W.8SEC,W.DRV       ;LOAD 8 SECONDS FOR CYCLE UP TIME
10119  047404  000137  047520                  JMP     I.RTRN             ;RESTORE REGISTERS
10120
10121  047410  004737  050522          10$:    JSR     PC,R.ABNL          ;REPORT ERROR
10122  047414  000137  047520                  JMP     I.RTRN             ;RESTORE REGISTERS
10123
10124                                   .SBTTL   *ERROR CAUSING DRIVE TO UNLOAD
10125
10126  047420  052765  020000  000014  I.UNLD: BIS     #E.UNLD,P.PRST(R5) ;CLEAR DRIVE UNLOADING BECAUSE OF ERROR
10127  047426  112737  000005  003000          MOVB    #DR.CLR,T.CS1      ;LOAD IN DRIVE CLEAR
10128  047434  004037  047620                  JSR     R0,I.ISSU          ;GO ISSUE DRIVE CLEAR
10129  047440  047520                          I.RTRN                     ;ERROR RETURN
10130  047442  136437  003101  003015          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION CLEARED
10131  047450  001406                          BEQ     15$                ;YES, CONTINUE
10132  047452  012737  000020  003052          MOV     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
10133  047460  004737  050546                  JSR     PC,R.CONT          ;REPORT ERROR
10134  047464  000415                          BR      I.RTRN             ;RESTORE REGISTERS
10135
10136  047466  032737  040000  003024  15$:    BIT     #S.DSC,T.MR2       ;CHECK IF DRIVE STAUS CHANGE RESET
10137  047474  001403                          BEQ     20$                ;YES, CONTINUE
10138  047476  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STAUS CHANGE DID NOT CLEAR
10139  047504  105037  003100          20$:    CLRB    W.TIME             ;RESET TIMING ON THIS DRIVE
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10140  047510  005037  003114                  CLR     W.DRV           ;CLEAR TIME COUNT
10141  047514  004737  050522                  JSR     PC,R.ABNL       ;REPORT ERROR
10142
10143  047520  012600              I.RTRN:     MOV     (SP)+,R0        ;RESTORE R0
10144  047522  012601                          MOV     (SP)+,R1        ;RESTORE R1
10145  047524  012602                          MOV     (SP)+,R2        ;RESTORE R2
10146  047526  012603                          MOV     (SP)+,R3        ;RESTORE R3
10147  047530  012604                          MOV     (SP)+,R4        ;RESTORE R4
10148  047532  012605                          MOV     (SP)+,R5        ;RESTORE R5
10149  047534  000002                          RTI                     ;RETURN
10150
```

```
10151                                   .SBTTL   *CONTROLLER CLEAR ROUTINE
10152
10153                                   ;;*****************************************************************
10154                                   ;*
10155                                   ;*      THIS ROUTINE WILL BE USED BY THE DRIVER TO CLEAR THE CONTROLLER
10156                                   ;*      AND CHECK IF THE CONTROLLER ERRORS ARE RESET.  IF THE ERROR IS NOT
10157                                   ;*      CLEARED, THE ROUTINE AS SPECIFIED IN A.CONT WILL BE CALLED WITH
10158                                   ;*      E.CCLR SET IN E.CONT.
10159                                   ;*
10160                                   ;*      REGISTER        USE
10161                                   ;*      --------        ---
10162                                   ;*
10163                                   ;*      R2              ADDRESS OF RK06 REGISTERS
10164                                   ;*      R5              ADDRESS OF PARAMETER BLOCK
10165                                   ;*
10166                                   ;*CALL  JSR     R0,I.CCLR
10167                                   ;*      <ADDRESS OF ERROR RETURN>
10168                                   ;*      RETURN
10169                                   ;*
10170                                   ;;*****************************************************************
10171
10172  047536  012762  100000  000000  I.CCLR: MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
10173  047544  016237  000000  003000          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
10174  047552  032737  100000  003000          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER CLEAR DID
10175                                                                  ;  CLEAR ERROR
10176  047560  001407                          BEQ     5$              ;YES, RETURN TO DRIVER PROCESSING
10177  047562  052737  000001  003052          BIS     #E.CCLR,E.CONT  ;SET CLEAR CONTROLLER DID NOT CLEAR ERROR
10178  047570  004737  050546                  JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
10179  047574  011000                          MOV     (R0),R0         ;SET UP ERROR RETURN
10180  047576  000200                          RTS     R0              ;RETURN
10181
10182  047600  012762  000100  000000  5$:     MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
10183  047606  112737  177777  003074          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE ISSUED
10184  047614  005720                          TST     (R0)+           ;ADJUST FOR NORMAL RETURN
10185  047616  000200                          RTS     R0              ;RETURN
```

```
10186                                   .SBTTL   *COMMAND ISSUED BY DRIVER SERVICE ROUTINE
10187
10188                                   ;;*****************************************************************
10189                                   ;*
10190                                   ;*      THIS ROUTINE WILL ISSUE THE COMMAND AS SPECIFIED IN T.CS1
10191                                   ;*      AND CHECK IF A CONTROLLER ERROR OCCURRED.  IF A CONTROLLER
10192                                   ;*      ERROR OCCURRED, E.CERR WILL BE SET IN E.CONT AND
10193                                   ;*      CONTROL WILL BE TURN OVER TO THE ROUTINE SPECIFIED BY THE
10194                                   ;*      ADDRESS IN A.CONT.
10195                                   ;*
10196                                   ;*      REGISTER        USE
10197                                   ;*      --------        ---
10198                                   ;*
10199                                   ;*      R2              ADDDRESS OF RK06 REGISTERS
10200                                   ;*      R5              ADDRESS OF PARAMETER BLOCK
10201                                   ;*
10202                                   ;*CALL  JSR     R0,I.ISSU
10203                                   ;*      <ADDRESS OF ERROR RETURN>
10204                                   ;*      RETURN
10205                                   ;*
10206                                   ;*      ROUTINES USED:
10207                                   ;*      --------------
10208                                   ;*
10209                                   ;*              I.CCLR
10210                                   ;*              I.STOR
10211                                   ;*
10212                                   ;;*****************************************************************
10213
10214  047620  013746  003000           I.ISSU: MOV     T.CS1,-(SP)     ;STORE COMMAND ISSUED
10215  047624  005037  003002                   CLR     T.CS2           ;CLEAR TEMPORARY CS2
10216  047630  116537  000000  003002         MOVB    P.DRVN(R5),T.CS2 ;LOAD IN DRIVE NUMBER
10217  047636  013762  003002  000010         MOV     T.CS2,RKCS2(R2) ;LOAD DRIVE NUMBER FOR COMMAND
10218  047644  116537  000007  003001         MOVB    P.CS1H(R5),T.CS1+1 ;STORE BITS 8-15 OF CS1
10219  047652  142737  177753  003001         BICB    #^C<B.CDT!B.CFMT>,T.CS1+1 ;CLEAR ALL BITS EXCEPT
10220                                                                  ;  FORMAT AND DRIVE TYPE
10221  047660  013762  003000  000000         MOV     T.CS1,RKCS1(R2) ;ISSUE COMMAND
10222  047666  105762  000000           1$:   TSTB    RKCS1(R2)       ;WAIT FOR READY
10223  047672  100375                         BPL     1$
10224  047674  004737  050042                 JSR     PC,I.STOR       ;GO STORE REGISTERS
10225  047700  032737  100000  003000         BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCUERED
10226  047706  001437                         BEQ     5$              ;NO, RETURN
10227  047710  032737  001000  003002         BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
10228  047716  001406                         BEQ     2$              ;NO, CHECK FOR OTHER CONTROLLER ERRORS
10229  047720  052737  100000  003052         BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT FLAG
10230  047726  004737  050546                 JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
10231  047732  000440                         BR      10$             ;RETURN
10232
10233                                         ;CHECK IF ANY CONTROLLER ERROR IS SET
10234  047734  032737  024000  003000   2$:   BIT     #CTO!SPAR,T.CS1
10235  047742  001027                         BNE     7$
10236  047744  032737  176400  003002         BIT     #UFE!PGE!NEM!NED!UPE!WCE!DLT,T.CS2
10237  047752  001023                         BNE     7$
10238  047754  032737  131761  003016         BIT     #ILC!DTYE!FMTE!ECH!BSE!HVRC!COE!DTE!OPI!DCK,T.ER
10239  047762  001017                         BNE     7$
10240
10241  047764  122716  000005                 CMPB    #DR.CLR,(SP)    ;CHECK IF CLEAR DRIVE
```

```
10242  047770  001003                        BNE     3$                ;NO, DO NOT SET DRIVE HARD ERROR
10243  047772  052765  000020  000014        BIS     #DRVHRD,P.PRST(R5) ;SET HARD DRIVE ERROR
10244  050000  004037  047536          3$:   JSR     R0,I.CCLR         ;GO ISSUE A CONTROLLER CLEAR
10245  050004  050034                        10$                       ;ERROR RETURN
10246  050006  012762  000100  000000  5$:   MOV     #IE,RKCS1(R2)     ;SET INTERRUPT ENABLE
10247  050014  005726                        TST     (SP)+             ;ADJUST STACK
10248  050016  005720                        TST     (R0)+             ;ADJUST R0 FOR NORMAL RETURN
10249  050020  000200                        RTS     R0                ;RETURN
10250
10251  050022  052737  001000  003052  7$:   BIS     #E.CERR,E.CONT    ;SET CONTROLLER ERROR DURING
10252                                                                  ;  DRIVER SERVICING
10253  050030  004737  050546                JSR     PC,R.CONT         ;REPORT ERROR
10254  050034  005726                  10$:  TST     (SP)+             ;ADJUST STACK
10255  050036  011000                        MOV     (R0),R0           ;ADJUST R0 FOR ERROR RETURN
10256  050040  000200                        RTS     R0                ;RETURN
```

```
                        .SBTTL   *STORE RK611 UNIBUS REGISTERS

                        ;;*****************************************************************
                        ;*
                        ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER TO STORE ALL
                        ;*      RK611 REGISTER IN TEMPORARY LOCATIONS.
                        ;*
                        ;*CALL  JSR     PC,I.STOR
                        ;*      RETURN
                        ;*
                        ;*      REGISTER        USE
                        ;*      --------        ---
                        ;*
                        ;*      R2              ADDRESS OF RK611 REGISTERS
                        ;*
                        ;;*****************************************************************

050042  016237  000000  003000  I.STOR: MOV     RKCS1(R2),T.CS1 ;STORE ALL CONTROLLER REGISTERS
050050  016237  000010  003002          MOV     RKCS2(R2),T.CS2 ;  EXCEPT DATA BUFFER
050056  016237  000002  003004          MOV     RKWC(R2),T.WCR
050064  016237  000004  003006          MOV     RKBA(R2),T.BA
050072  016237  000006  003010          MOV     RKDA(R2),T.DA
050100  016237  000012  003020          MOV     RKDS(R2),T.DS
050106  016237  000014  003016          MOV     RKER(R2),T.ER
050114  016237  000016  003014          MOV     RKASOF(R2),T.ASOF
050122  016237  000020  003012          MOV     RKDCYL(R2),T.DC
050130  016237  000026  003022          MOV     RKMR1(R2),T.MR1
050136  016237  000034  003024          MOV     RKMR2(R2),T.MR2
050144  016237  000036  003026          MOV     RKMR3(R2),T.MR3
050152  016237  000030  003030          MOV     RKECPS(R2),T.POS
050160  016237  000032  003032          MOV     RKECPT(R2),T.PAT
050166  000207                          RTS     PC              ;RETURN
```

```
10289                                   .SBTTL   *STORE CONTROLLER STATUS
10290
10291                                   ;;*****************************************************************
10292                                   ;*
10293                                   ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER AT PRIORITY 7.
10294                                   ;*      THE FOLLOWING REGISTERS WILL BE STORED:
10295                                   ;*
10296                                   ;*              COMMAND AND STATUS REGISTER 2
10297                                   ;*              WORD COUNT REGISTER
10298                                   ;*              BUS ADDRESS REGISTER
10299                                   ;*              DESIRED TRACK AND SECTOR
10300                                   ;*              STATUS REGISTER
10301                                   ;*              ERROR REGISTER
10302                                   ;*              ATTENTION SUMMARY/OFFSET REGISTER
10303                                   ;*              CYLINDER ADDRESS REGISTER
10304                                   ;*
10305                                   ;*CALL  JSR     PC,I.CSTS
10306                                   ;*      RETURN
10307                                   ;*
10308                                   ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
10309                                   ;*
10310                                   ;*
10311                                   ;*              REGISTER                CONTENTS
10312                                   ;*              --------                --------
10313                                   ;*
10314                                   ;*              R2                      RK06 BASE ADDRESS
10315                                   ;*              R5                      ADDRESS OF PARAMETER BLOCK
10316                                   ;*
10317                                   ;;*****************************************************************
10318
10319  050170  042765  177741  000016  I.CSTS: BIC     #177741,P.CS1(R5)       ;CLEAR ALL BITS EXCEPT FUNCTION
10320                                                                          ;OF LAST COMMAND ISSUED
10321  050176  042737  000036  003000          BIC     #36,T.CS1               ;CLEAR FUNCTION OF CS1 STATUS
10322  050204  053765  003000  000016          BIS     T.CS1,P.CS1(R5)         ;GENERATE CS1 STATUS INFORMATION
10323  050212  016265  000010  000020  I.CST1: MOV     RKCS2(R2),P.CS2(R5)     ;STORE COMMAND AND STATUS REGISTER 2
10324  050220  016265  000002  000022          MOV     RKWC(R2),P.WCR(R5)      ;STORE WORD COUNT REGISTER
10325  050226  016265  000004  000024          MOV     RKBA(R2),P.BAR(R5)      ;STORE BUS ADDRESS REGISTER
10326  050234  016265  000006  000026          MOV     RKDA(R2),P.DTS(R5)      ;STORE DESIRED TRACK AND SECTOR
10327  050242  016265  000012  000036          MOV     RKDS(R2),P.DS(R5)       ;STORE DRIVE STATUS REGISTER
10328  050250  016265  000014  000034          MOV     RKER(R2),P.ER(R5)       ;STORE ERROR REGISTER
10329  050256  016265  000016  000032          MOV     RKASOF(R2),P.ASOF(R5)   ;STORE ATTENTION SUMMARY AND
10330                                                                          ;   OFFSET
10331  050264  016265  000020  000030          MOV     RKDCYL(R2),P.DCYL(R5)   ;STORE CYLINDER ADDRESS
10332  050272  000207                          RTS     PC                      ;RETURN
10333
```

```
10334                                   .SBTTL   *GATHER DRIVE STATUS
10335
10336                                   ;;*****************************************************************
10337                                   ;*
10338                                   ;*      THIS SUBROUTINE WILL BE USED TO GATHER DRIVE STATUS
10339                                   ;*      BYTE 01, 10, AND 11. IT IS ASSUMED THAT THE DRIVE
10340                                   ;*      HAS PREVIOUSLY BEEN SEIZED.  IT RUNS AT PRIORITY 7.
10341                                   ;*
10342                                   ;*CALL  JSR     R0,I.STAT
10343                                   ;*      <ADDRESS OF ERROR RETURN>
10344                                   ;*      RETURN
10345                                   ;*
10346                                   ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
10347                                   ;*
10348                                   ;*
10349                                   ;*              REGISTER                CONTENTS
10350                                   ;*              --------                --------
10351                                   ;*
10352                                   ;*              R2                      RK06 BASE ADDRESS
10353                                   ;*              R5                      ADDRESS OF PARAMETER BLOCK
10354                                   ;*
10355                                   ;*      ROUTINES USED:
10356                                   ;*              I.ISSU
10357                                   ;*
10358                                   ;*****************************************************************
10359
10360  050274  012762  000001  000026  I.STAT: MOV     #1,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
10361                                                                          ;  FOR STATUS BYTE 01
10362  050302  112737  000001  003000          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
10363  050310  004037  047620                  JSR     R0,I.ISSU               ;GET STATUS BYTES 01
10364  050314  050504                          3$                              ;ERROR RETURN
10365  050316  013765  003024  000044          MOV     T.MR2,P.A01(R5)         ;STORE STATUS BYTE 01 MESS A
10366  050324  013765  003026  000046          MOV     T.MR3,P.B01(R5)         ;STORE STATUS BYTE 01 MESS B
10367  050332  012762  000002  000026          MOV     #2,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
10368                                                                          ;  FOR STATUS BYTE 10
10369  050340  112737  000001  003000          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
10370  050346  004037  047620                  JSR     R0,I.ISSU               ;GET STATUS BYTES 10
10371  050352  050504                          3$                              ;ERROR RETURN
10372  050354  013765  003024  000050          MOV     T.MR2,P.A10(R5)         ;STORE STATUS BYTE 10 MESS A
10373  050362  013765  003026  000052          MOV     T.MR3,P.B10(R5)         ;STORE STATUS BYTE 10 MESS B
10374  050370  012762  000003  000026          MOV     #3,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER
10375                                                                          ;  FOR STATUS BYTE 11
10376  050376  112737  000001  003000          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
10377  050404  004037  047620                  JSR     R0,I.ISSU               ;GET STATUS BYTES 11
10378  050410  050504                          3$                              ;ERROR RETURN
10379  050412  013765  003024  000054          MOV     T.MR2,P.A11(R5)         ;STORE STATUS BYTE 11 MESS A
10380  050420  013765  003026  000056          MOV     T.MR3,P.B11(R5)         ;STORE STATUS BYTE 11 MESS B
10381  050426  005062  000026                  CLR     RKMR1(R2)               ;LOAD MAINTENANCE REGISTER 1
10382                                                                          ;  FOR STATUS BYTE 00
10383  050432  112737  000001  003000          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
10384  050440  004037  047620                  JSR     R0,I.ISSU               ;GET STATUS BYTES 00
10385  050444  050504                          3$                              ;ERROR RETURN
10386  050446  013765  003024  000040          MOV     T.MR2,P.A00(R5)         ;STORE STATUS BYTE 00 MESS A
10387  050454  013765  003026  000042          MOV     T.MR3,P.B00(R5)         ;STORE STATUS BYTE 00 MESS B
10388  050462  032737  001000  003026          BIT     #S.PAR,T.MR3            ;CHECK IF BAD PARITY DETECTED BY DRIVE
10389  050470  001407                          BEQ     5$                      ;NO. RETURN NORMALLY
```

```
10390  050472  052737  002000  003052          BIS     #E.DPAR,E.CONT          ;INDICATE BAD PARITY DETECTED BY DRIVE
10391  050500  004737  050546                  JSR     PC,R.CONT               ;REPORT ERROR
10392  050504  011000                  3$:     MOV     (R0),R0                 ;LOAD R0 FOR ERROR RETURN
10393  050506  000200                          RTS     R0                      ;RETURN
10394
10395  050510  052765  001000  000014  5$:     BIS     #PBSVAL,P.PRST(R5)      ;SET PARAMETER BLOCK STATUS VALID
10396  050516  005720                          TST     (R0)+                   ;ADJUST R0 FOR NORMAL RETURN
10397  050520  000200                          RTS     R0                      ;RETURN
10398
```

```
10399                                   .SBTTL   *COMMON DRIVER RETURNS
10400
10401  050522  105037  003101  R.ABNL: CLRB     INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
10402  050526  004777  132314          JSR      PC,@A.ABNL      ;INDICATE ABNORMAL RETURN
10403  050532  000207                  RTS      PC              ;RETURN
10404
10405  050534  105037  003101  R.NORM: CLRB     INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
10406  050540  004777  132300          JSR      PC,@A.NORM      ;INDICATE NORMAL RETURN
10407  050544  000207                  RTS      PC              ;RETURN
10408
10409  050546  105037  003101  R.CONT: CLRB     INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
10410  050552  105037  003100          CLRB     W.TIME          ;RESET WATCH DOG TIMING ON THIS DRIVE
10411  050556  005037  003114          CLR      W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
10412  050562  004777  132262          JSR      PC,@A.CONT      ;INDICATE CONTROLLER ERROR RETURN
10413  050566  000207                  RTS      PC              ;RETURN
```

```
                                .SBTTL   *COMMAND INITATOR

                                ;;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE WILL INITIATE ALL COMMANDS AS SPECIFIED
                                ;*      BY THE COMMAND FIELD OF THE PARAMETER BLOCK. THE FOLLOWING
                                ;*      SPECIAL COMMAND ARE ALSO EXECUTED:
                                ;*
                                ;*              RELEASE
                                ;*              CONROLLER CLEAR
                                ;*              SUBSYSTEM CLEAR
                                ;*              READ ALL DRIVE STATUS
                                ;*              READ SPECIFIED HEADER
                                ;*
                                ;*      THE ABOVE COMMANDS ARE TRANSLATED INTO A SEQUENCE OF COMMANDS
                                ;*
                                ;*CALL  JSR     PC,C.INIT
                                ;*      <ADDRESS OF PARAMETER BLOCK>
                                ;*      RETURN
                                ;*
                                ;*      FOR THE SEQUENTIAL OPERATIONS, THE DRIVER WILL LOAD THE
                                ;*      LOCATIONS, PBLKT AND INTMSK.
                                ;*
                                ;*      ROUTINES USED:
                                ;*              W.WTCH
                                ;*              I.CSTS
                                ;*              I.STAT
                                ;*              I.CCLR
                                ;*
                                ;;*****************************************************************

050570  010546          C.INIT: MOV     R5,-(SP)        ;STORE R5 ON STACK
050572  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
050574  010346                  MOV     R3,-(SP)        ;STORE R3 CN STACK
050576  010246                  MOV     R2,-(SP)        ;STORE R2 ON STACK
050600  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
050602  010046                  MOV     R0,-(SP)        ;STORE R0 ON STACK
050604  013746  177776          MOV     PS,-(SP)        ;STORE PSW ON STACK
050610  013737  003042  177776  MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
050616  017605  000016          MOV     @16(SP),R5      ;STORE PARAMETER BLOCK ADDRESS
050622  062766  000002  000016  ADD     #2,16(SP)       ;ADJUST RETURN
050630  016504  000000          MOV     P.DRVN(R5),R4   ;STORE DRIVE NUMBER
050634  042704  177770          BIC     #^C<DRVMSK>,R4  ;MASK OUT JUNK
050640  010537  003112          MOV     R5,PBLKT        ;LOAD PARAMETER BLOCK TABLE
050644  116437  003102  003101  MOVB    I.DRV(R4),INTMSK ;LOAD INTERRUPT MASK
050652  116437  003102  003100  MOVB    I.DRV(R4),W.TIME ;SET WATCH-DOG TIMER FLAG
050660  013737  003062  003114  MOV     W.SEC,W.DRV     ;LOAD WATCH-DOG TIME

050666  013702  003036          MOV     RKBAS,R2        ;LOAD R2 WITH RK06 ADDRESS BASE

                                RESET ALL BITS IN PROGRAM DEVICE STATUS REGISTER EXCEPT
                                        DRIVE IN USE
                                        WRITE FOR WRITE CHECK
                                        NO CHECK
                                        DROP DRIVE FROM TEST SEQUENCE
                                        INHIBIT BUS ADDRESS INCREMENT
```

```
10470  050672  042765  075176  000014          BIC     #↑C<DRVUSE!W.WCK!NOCHK!DRPDRV!DTBAII>,P.PRST(R5)
10471
10472  050700  010500                          MOV     R5,R0           ;STORE PARAMETER BLOCK ADDRESS
10473  050702  062700  000016                  ADD     #P.CS1,R0       ;CALCULATE FIRST LOCATION TO BE CLEARED
10474  050706  010501                          MOV     R5,R1           ;STORE PARAMETER BLOCK ADDRESS
10475  050710  062701  000062                  ADD     #P.EPAT,R1      ;CALCULATE LAST LOCATION TO BE CLEARED
10476
10477  050714  005020                  1$:     CLR     (R0)+           ;CLEAR RETURN PARAMETER
10478  050716  020001                          CMP     R0,R1           ;CHECK IF FINISHED
10479  050720  101775                          BLOS    1$              ;NO, CLEAR NEXT RETURN PARAMETER
10480  050722  105037  003074                  CLRB    I.ISRL          ;CLEAR RELEASE OR INTERRUPT ISSUED
10481  050726  010465  000020                  MOV     R4,P.CS2(R5)    ;STORE DRIVE NUMBER
10482  050732  005062  000026                  CLR     RKMR1(R2)       ;CLEAR RK06 MAINTENANCE REGISTER 1
10483  050736  132765  000040  000001          BITB    #BIT5,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
10484  050744  001402                          BEQ     3$              ;NO, PROCESS
10485  050746  000137  051462                  JMP     C.SPEC          ;JUMP TO SPECIAL COMMAND PROCESSOR
10486
10487  050752  122765  000107  000001  3$:     CMPB    #UNLOAD,P.CMND(R5) ;CHECK IF POSITIONING COMMAND
10488                                                                  ;  START SPINDLE
10489                                                                  ;  RECALIBRATE
10490                                                                  ;  OFFSET
10491                                                                  ;  SEEK
10492                                                                  ;  UNLOAD
10493
10494  050760  101174                          BHI     25$             ;NO, DRIVE COMMAND
10495                                                                  ;  SELECT DRIVE
10496                                                                  ;  PACK ACKNOWLEDGE
10497                                                                  ;  CLEAR
10498
10499  050762  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF DATA TRANSFER
10500  050770  103540                          BLO     20$             ;YES, DATA TRANSFER COMMAND
10501                                                                  ;  READ DATA
10502                                                                  ;  WRITE DATA
10503                                                                  ;  READ HEADER
10504                                                                  ;  WRITE HEADER
10505                                                                  ;  WRITE CHECK
10506  050772  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
10507  051000  052765  000002  000014          BIS     #DRVPOS,P.PRST(R5) ;SET DRIVE POSITIONING
10508  051006  005037  003054                  CLR     @.WAIT          ;CLEAR WAIT FOR COMMAND
10509  051012  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK
10510  051020  001007                          BNE     5$              ;NO, CHECK FOR OFFSET
10511  051022  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
10512  051030  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
10513  051036  000431                          BR      8$              ;GO ISSUE COMMAND
10514
10515  051040  122765  000115  000001  5$:     CMPB    #OFFSET,P.CMND(R5) ;CHECK IF OFFSET
10516  051046  001007                          BNE     6$              ;NO, CHECK FOR UNLOAD
10517  051050  116565  000006  000032          MOVB    P.OFST(R5),P.ASOF(R5) ;STORE OFFSET
10518  051056  016562  000032  000016          MOV     P.ASOF(R5),RKASOF(R2) ;LOAD OFFSET REGISTER
10519  051064  000416                          BR      8$              ;GO ISSUE COMMAND
10520
10521  051066  122765  000111  000001  6$:     CMPB    #SRTSPL,P.CMND(R5) ;CHECK IF START SPINDLE
10522  051074  001003                          BNE     7$              ;NO, CHECK IF RECAL
10523  051076  013737  003066  003114          MOV     @.MIN,@.DRV     ;LOAD WATCH DOG TIME FOR 1 MINUTE
10524  051104  122765  000113  000001  7$:     CMPB    #RECAL,P.CMND(R5) ;CHECK IF RECAL
10525  051112  001003                          BNE     8$              ;NO, CONTINUE
```

```
10526  051114  013737  003064  003114          MOV     W.BSEC,W.DRV     ;LOAD RECAL TIME FOR 8 SECONDS
10527  051122  116565  000007  000017  8$:     MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
10528  051130  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
10529                                                                  ;  AND DRIVE TYPE
10530  051136  116565  000001  000016          MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
10531  051144  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
10532  051152  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
10533  051160  001533                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
10534  051162  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
10535  051170  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
10536  051176  004737  045140          10$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
10537  051202  016237  000000  003000          MOV     RKCS1(R2),T.CS1  ;STORE COMMAND AND STATUS REGISTER 1
10538  051210  032737  000200  003000          BIT     #RDY,T.CS1       ;WAIT FOR READY
10539  051216  001767                          BEQ     10$
10540  051220  032737  100000  003000          BIT     #CERR,T.CS1      ;CHECK FOR ERROR
10541  051226  001011                          BNE     15$              ;YES, GIVE NORMAL RETURN
10542  051230  004737  045140          11$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
10543  051234  016237  000016  003014          MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
10544  051242  133737  003101  003015          BITB    INTMSK,T.ASOF+1  ;CHECK IF INTERRUPT HAS OCCURRED
10545  051250  001767                          BEQ     11$              ;WAIT FOR DRIVE INTERRUPT
10546  051252  105037  003100          15$:    CLRB    W.TIME           ;RESET TIMING ON THIS DRIVE
10547  051256  005037  003114                  CLR     W.DRV            ;CLEAR DRIVE TIMING COUNT
10548  051262  004737  050534                  JSR     PC,R.NORM        ;INDICATE COMMAND IS FINISHED
10549  051266  000137  052442                  JMP     C.RTRN           ;RESTORE REGISTERS
10550
10551  051272  016562  000010  000004  20$:    MOV     P.BALO(R5),RKBA(R2) ;LOAD BUS ADDRESS REGISTER
10552  051300  016562  000012  000002          MOV     P.WC(R5),RKWC(R2) ;LOAD WORD COUNT REGISTER
10553  051306  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
10554  051314  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK NUMBER
10555  051322  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK COMMAND
10556  051330  001010                          BNE     25$              ;NO, GO ISSUE THE COMMAND
10557  051332  032765  000200  000014          BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE COMMAND SHOULD BE ISSUED
10558  051340  001404                          BEQ     25$              ;NO, GO ISSUE THE COMMAND
10559  051342  012765  000123  000016          MOV     #WRDATA,P.CS1(R5) ;ISSUE WRITE COMMAND
10560  051350  000406                          BR      26$              ;GO ISSUE COMMAND
10561
10562  051352  116565  000001  000016  25$:    MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
10563  051360  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
10564  051366  116565  000007  000017  26$:    MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
10565  051374  142765  177750  000017          BICB    #^C<B.CFMT!B.CDT!B.BA16!B.BA17>,P.CS1+1(R5) ;CLEAR ALL BITS EXCEPT
10566                                                                  ;  FORMAT, DRIVE TYPE, AND BUS ADDRESS
10567                                                                  ;  BITS 16-17
10568  051402  010537  003054                  MOV     R5,O.WAIT        ;LOAD WAITING FOR COMMAND
10569  051406  032765  100000  000014          BIT     #DTBAII,P.PRST(R5) ;CHECK IF INHIBIT BUS ADDRESS INCREMENT
10570  051414  001403                          BEQ     27$              ;NO, LOAD CS2
10571  051416  052765  000020  000020          BIS     #BAI,P.CS2(R5)   ;SET INHIBIT BUS ADDRESS INCREMENT
10572  051424  016562  000020  000010  27$:    MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2
10573  051432  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
10574  051440  001403                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
10575  051442  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
10576  051450  016562  000016  000000  30$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
10577  051456  000137  052442                  JMP     C.RTRN           ;RESTORE REGISTERS
10578
10579                                  .SBTTL   *SPECIAL COMMAND PROCESSING
10580
10581  051462  122765  000141  000001  C.SPEC: CMPB    #RDSTAT,P.CMND(R5) ;CHECK IF READ DRIVE STATUS
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10582  051470  001132                          BNE     10$                 ;NO, PROCESS OTHER COMMANDS
10583  051472  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR COMMAND
10584  051500  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
10585  051506  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
10586                                                                      ;  AND DRIVE TYPE
10587  051514  112765  000001  000016          MOVB    #DR.SEL,P.CS1(R5) ;STORE COMMAND
10588  051522  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
10589  051530  004737  045140          2$:     JSR     PC,W.WTCH           ;CALL WATCH-DOG TIMER
10590  051534  016265  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REG. 1
10591  051542  032765  000200  000016          BIT     #RDY,P.CS1(R5)  ;WAIT FOR READY
10592  051550  001767                          BEQ     2$
10593  051552  004737  050212                  JSR     PC,I.CST1           ;STORE CONTROLLER REGISTERS
10594  051556  016265  000034  000040          MOV     RKMR2(R2),P.A00(R5) ;STORE STATUS BYTE 00 MESSAGE A
10595  051564  016265  000036  000042          MOV     RKMR3(R2),P.B00(R5) ;STORE STATUS BYTE 00 MESSAGE B
10596  051572  032765  100000  000016          BIT     #CERR,P.CS1(R5) ;CHECK IF CONTROLLER ERROR
10597  051600  001436                          BEQ     6$                  ;NO, GATHER DRIVE STATUS
10598  051602  105037  003100                  CLRB    W.TIME              ;RESET WATCH DOG TIMING ON THIS DRIVE
10599  051606  005037  003114                  CLR     W.DRV               ;CLEAR WATCH DOG COUNT
10600  051612  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10601  051620  001043                          BNE     8$                  ;YES, INDICATE NORMAL RETURN
10602  051622  032765  001000  000020          BIT     #MDS,P.CS2(R5)  ;CHECK IF MULTIPLE DRIVE SELECT
10603  051630  001043                          BNE     9$                  ;YES, INDICATE CONTROLLER ERROR
10604  051632  004037  047536                  JSR     R0,I.CCLR           ;CLEAR ERROR
10605  051636  052442                          C.RTRN                      ;ERROR RETURN
10606  051640  032765  010400  000020          BIT     #NED!UFE,P.CS2(R5) ;CHECK IF NON-EXISTENT DRIVE OR UNIT FIELD ERROR
10607  051646  001007                          BNE     5$                  ;REPORT ERROR
10608  051650  032765  000001  000036          BIT     #DRA,P.DS(R5)   ;CHECK IF DRIVE AVAILIABLE
10609  051656  001003                          BNE     5$                  ;YES, REPORT ERROR
10610  051660  052765  010000  000014          BIS     #DRVSZD,P.PRST(R5) ;INDICATE DRIVE IS SEIZED BY OTHER PORT
10611  051666  004737  050522          5$:     JSR     PC,R.ABNL           ;INDICATE ABNORMAL RETURN
10612  051672  000137  052442                  JMP     C.RTRN              ;RESTORE REGISTERS
10613
10614  051676  004037  050274          6$:     JSR     R0,I.STAT           ;GATHER DRIVE STATUS
10615  051702  052442                          C.RTRN                      ;ERROR RETURN
10616  051704  105037  003100                  CLRB    W.TIME              ;STOP WATCH-DOG TIMING ON DRIVE
10617  051710  005037  003114                  CLR     W.DRV               ;RESET WATCH-DOG TIME
10618  051714  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10619  051722  001402                          BEQ     8$                  ;NO, REPORT ERROR
10620  051724  005062  000000                  CLR     RKCS1(R2)           ;CLEAR INTERRUPT ENABLE
10621  051730  004737  050534          8$:     JSR     PC,R.NORM           ;REPORT COMMAND COMPLETE
10622  051734  000137  052442                  JMP     C.RTRN              ;RESTORE REGISTERS
10623
10624  051740  052737  100000  003052  9$:     BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
10625  051746  004737  050546                  JSR     PC,R.CONT           ;INDICATE CONTROLLER ERROR
10626  051752  000137  052442                  JMP     C.RTRN
10627
10628  051756  122765  000140  000001  10$:     CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE COMMAND
10629  051764  001040                          BNE     13$                 ;NO, CHECK IF READ ALL HEADERS
10630  051766  010537  003054                  MOV     R5,O.WAIT           ;STORE PARAMETER BLOCK ADDRESS IN
10631                                                                      ;  WAIT FOR COMMAND
10632  051772  052765  000010  000020          BIS     #RLS,P.CS2(R5)  ;SET RELEASE BIT
10633  052000  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR DESELECT
10634  052006  112737  000001  003074          MOVB    #1,I.ISRL           ;SET FLAG FOR RELEASE COMMAND
10635  052014  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5);STORE BITS 8-15 OF CS1
10636  052022  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
10637                                                                      ;  AND DRIVE TYPE
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10638  052030  112765  000101  000016          MOVB    #SELDRV,P.CS1(R5) ;STORE COMMAND
10639  052036  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10640  052044  001403                          BEQ     11$               ;NO, DO NOT RESET INTERRUPT ENABLE
10641  052046  042765  000100  000016          BIC     #IE,P.CS1(R5)     ;RESET INTERRUPT ENABLE
10642  052054  016562  000016  000000  11$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
10643  052062  000137  052442                  JMP     C.RTRN            ;RESTORE REGISTERS
10644
10645  052066  122765  000164  000001  13$:    CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
10646  052074  001053                          BNE     30$               ;NO, CHECK IF CONTROLLER CLEAR
10647  052076  010537  003054                  MOV     R5,O.WAIT         ;SET WAITING FOR COMMAND COMMPLETION
10648  052102  016537  000010  003070          MOV     P.BALO(R5),HDR.AD ;LOAD HEADER ADDRESS
10649  052110  132765  000020  000007          BITB    #B.CFMT,P.CS1H(R5) ;CHECK IF 22 SECTOR FORMANT
10650  052116  001404                          BEQ     14$               ;YES, LOAD 22 IN HEADER COUNT
10651  052120  012737  000024  003072          MOV     #20.,HDR.CT       ;LOAD 20 IN SECTOR COUNT
10652  052126  000403                          BR      22$               ;GO ISSUE READ HEADER COMMAND
10653
10654  052130  012737  000026  003072  14$:    MOV     #22.,HDR.CT       ;LOAD 22 IN SECTOR COUNT
10655  052136  016562  000002  000020  22$:    MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
10656  052144  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD TRACK NUMBER
10657  052152  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
10658  052160  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
10659  052166  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT DRIVE TYPE
10660                                                                  ;  AND FORMAT
10661  052174  112765  000125  000016          MOVB    #RDHEAD,P.CS1(R5) ;STORE READ HEADER COMMAND
10662  052202  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10663  052210  001027                          BNE     34$               ;YES, INDICATE ILLEGAL DRIVER COMMAND
10664  052212  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE READ HEADER
10665  052220  000137  052442                  JMP     C.RTRN            ;RESTORE REGISTERS
10666
10667  052224  122765  000176  000001  30$:    CMPB    #CONCLR,P.CMND(R5) ;CHECK IF CONTROLLER CLEAR
10668  052232  001012                          BNE     32$               ;NO, CHECK IF SUBSYSTEM CLEAR
10669  052234  004037  047536                  JSR     R0,I.CCLR         ;CLEAR CONTROLLER
10670  052240  052442                          C.RTRN                    ;ERROR RETURN
10671  052242  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10672  052250  001472                          BEQ     40$               ;NO, INDICATE NORMAL RETURN
10673  052252  005062  000000                  CLR     RKCS1(R2)         ;RESET INTERRUPT ENABLE
10674  052256  000467                          BR      40$               ;INDICATE NORMAL RETURN
10675
10676  052260  122765  000177  000001  32$:    CMPB    #SUBCLR,P.CMND(R5) ;CHECK IF SUBSYSTEM CLEAR
10677  052266  001406                          BEQ     36$               ;YES, CLEAR SUBSYSTEM
10678  052270  052737  000100  003052  34$:    BIS     #E.ILLD,E.CONT    ;SET ILLEGAL DRIVER COMMAND
10679  052276  004737  050546                  JSR     PC,R.CONT         ;REPORT ERROR
10680  052302  000457                          BR      C.RTRN            ;RESTORE REGISTERS
10681
10682  052304  012762  000040  000010  36$:    MOV     #SCLR,RKCS2(R2)   ;ISSUE SUBSYSTEM CLEAR
10683  052312  016265  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REGISTER 1
10684  052320  032765  100000  000016          BIT     #CERR,P.CS1(R5)   ;CLEAR IF CONTROLLER ERROR RESET
10685  052326  001406                          BEQ     37$               ;NO, FINISH COMMAND
10686  052330  052737  000001  003052          BIS     #BIT0,E.CONT      ;SET CLEAR SUBSYSTEM DID NOT CLEAR
10687                                                                  ;  CONTROLLER ERROR
10688  052336  004737  050546                  JSR     PC,R.CONT         ;REPORT ERROR
10689  052342  000437                          BR      C.RTRN            ;RESTORE REGISTERS
10690
10691  052344  013746  003060          37$:    MOV     W.MILI,-(SP)      ;LOAD 16 MILI-SECOND COUNT FOR ATTENTION
10692                                                                  ;  TO DISAPPEAR
10693  052350  016265  000000  000016  38$:    MOV     RKCS1(R2),P.CS1(R5) ;STORE CS1
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10694  052356  032765  040000  000016          BIT     #DI,P.CS1(R5)   ;CHECK IF ATTENTIONS CLEARED
10695  052364  001411                          BEQ     39$             ;YES, FINISH COMMAND
10696  052366  005316                          DEC     (SP)            ;DECREMENT 16 MILISECOND COUNT
10697  052370  001367                          BNE     38$             ;CHECK DRIVE INTERRUPT AGAIN
10698  052372  005726                          TST     (SP)+           ;ADJUST STACK
10699  052374  052737  000040  003052          BIS     #E.SCLR,E.CONT  ;SET SUBSYSTEM CLEAR DID NOT CLEAR
10700                                                                  ;  DRIVE ATTENTIONS
10701  052402  004737  050546                  JSR     PC,R.CONT       ;REPORT ERROR
10702  052406  000415                          BR      C.RTRN          ;RESTORE REGISTER
10703
10704  052410  005726                  39$:    TST     (SP)+           ;ADJUST STACK
10705  052412  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
10706  052420  001010                          BNE     C.RTRN          ;YES, RESTORE REGISTERS
10707  052422  112737  177777  003074          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE SET
10708  052430  012762  000100  000000          MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
10709  052436  004737  050534                  JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
10710
10711  052442  012637  177776          C.RTRN: MOV     (SP)+,PS        ;RESTORE PSW
10712  052446  012600                          MOV     (SP)+,R0        ;RESTORE R0
10713  052450  012601                          MOV     (SP)+,R1        ;RESTORE R1
10714  052452  012602                          MOV     (SP)+,R2        ;RESTORE R2
10715  052454  012603                          MOV     (SP)+,R3        ;RESTORE R3
10716  052456  012604                          MOV     (SP)+,R4        ;RESTORE R4
10717  052460  012605                          MOV     (SP)+,R5        ;RESTORE R5
10718  052462  000207                          RTS     PC              ;RETURN
10719                                  .SBTTL  OCTAL TO BINARY CONVERSION ROUTINE
10720
10721                                  ;;*****************************************************************
10722                                  ;*
10723                                  ;*      THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
10724                                  ;*      WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL
10725                                  ;*      IT  WILL GENERATE TWO BINARY WORDS PLACING THE LOW 16 BITS
10726                                  ;*      ON THE STACK AND THE HIGH 16 BITS IN LOCATION $HIOCT.
10727                                  ;*
10728                                  ;*CALL
10729                                  ;*      MOV     <ADDRESS OF ASCII STRING>,-(SP)
10730                                  ;*      JSR     PC,OCTBIN
10731                                  ;*      <ADDRESS OF ERROR RETURN>
10732                                  ;*      RETURN
10733                                  ;*
10734                                  ;;*****************************************************************
10735
10736  052464  010046          OCTBIN: MOV     R0,-(SP)        ;SAVE R0
10737  052466  010146                  MOV     R1,-(SP)        ;SAVE R1
10738  052470  010246                  MOV     R2,-(SP)        ;SAVE R2
10739  052472  016600  000010          MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
10740  052476  005001                  CLR     R1              ;CLEAR DATA WORDS
10741  052500  005002                  CLR     R2
10742  052502  112046          2$:     MOVB    (R0)+,-(SP)     ;PICK THIS CHARACTER
10743  052504  001423                  BEQ     3$              ;IF ZERO GET OUT
10744  052506  121627  000054          CMPB    (SP),#',        ;CHECK IF COMMA
10745  052512  001420                  BEQ     3$              ;IF COMMA GET OUT
10746  052514  122716  000060          CMPB    #'0,(SP)        ;MAKE SURE THIS CHARACTER IS
10747  052520  003030                  BGT     4$              ;  AN OCTAL DIGIT
10748  052522  122716  000067          CMPB    #'7,(SP)
10749  052526  002425                  BLT     4$
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10750  052530  006301                  ASL     R1              ; *2
10751  052532  006102                  ROL     R2
10752  052534  006301                  ASL     R1              ; *4
10753  052536  006102                  ROL     R2
10754  052540  006301                  ASL     R1              ; *8
10755  052542  006102                  ROL     R2
10756  052544  042716  177770          BIC     #^C7,(SP)       ;STRIP THE ASCII JUNK
10757  052550  062601                  ADD     (SP)+,R1        ;ADD THIS DIGIT
10758  052552  000753                  BR      2$              ;LOOP
10759  052554  005726          3$:     TST     (SP)+           ;CLEAN PARTIAL FROM STACK
10760  052556  010166  000010          MOV     R1,10(SP)       ;SAVE RESULT
10761  052562  010237  052616          MOV     R2,$HIOCT
10762  052566  012602                  MOV     (SP)+,R2        ;RESTORE R2
10763  052570  012601                  MOV     (SP)+,R1        ;RESTORE R1
10764  052572  012600                  MOV     (SP)+,R0        ;RESTORE R0
10765  052574  062716  000002          ADD     #2,(SP)         ;ADJUST RETURN
10766  052600  000207                  RTS     PC              ;RETURN
10767
10768  052602  005726          4$:     TST     (SP)+           ;CLEAN UP PARTIAL FROM STACK
10769  052604  012602                  MOV     (SP)+,R2        ;RESTORE R2
10770  052606  012601                  MOV     (SP)+,R1        ;RESTORE R1
10771  052610  012600                  MOV     (SP)+,R0        ;RESTORE R0
10772  052612  013616                  MOV     @(SP)+,(SP)     ;PUT ADDRESS OF ERROR ROUTINE ON STACK
10773  052614  000207                  RTS     PC              ;GO PROCESS ERROR
10774  052616  000000  $HIOCT:  .WORD   0                       ;HIGH ORDER BITS GO HERE
10775                   .SBTTL  RANDOM NUMBER GENERATOR ROUTINE
10776
10777                   ;;*****************************************************************
10778                   ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
10779                   ;*WITH A RANGE OF 0 TO 2(+33)-1.
10780                   ;*CALL:
10781                   ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
10782                   ;*      RETURN                  ;;RETURN HERE THE RANDOM
10783                   ;*                              ;;NUMBER WILL BE IN
10784                   ;*                              ;;$HINUM,$LONUM
10785
10786  052620  $RAND:
10787  052620  010046          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10788  052622  010146          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10789  052624  010246          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
10790  052626  013700  052720  MOV     $LONUM,R0       ;;SET R0 WITH LOW
10791  052632  013701  052716  MOV     $HINUM,R1       ;;SET R1 WITH HIGH
10792  052636  012702  177771  MOV     #-7,R2          ;;SET SHIFT COUNT
10793  052642  006300          1$:     ASL     R0              ;;SHIFT R0 LEFT AND
10794  052644  006101                  ROL     R1              ;;ROTATE CARRY INTO R1 AND
10795  052646  005202                  INC     R2              ;;CHECK FOR DONE
10796  052650  001374                  BNE     1$              ;;CONTINUE SHIFT LOOP
10797  052652  063700  052720          ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
10798  052656  005501                  ADC     R1              ;;PROPOGATE CARRY
10799  052660  063701  052716          ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
10800  052664  062700  001057          ADD     #1057,R0        ;;ADD LOW CONSTANT
10801  052670  005501                  ADC     R1              ;;PROPOGATE CARRY
10802  052672  062701  047401          ADD     #47401,R1       ;;ADD HIGH CONSTANT
10803  052676  010037  052720          MOV     R0,$LONUM       ;;SAVE R0
10804  052702  010137  052716          MOV     R1,$HINUM       ;;SAVE R1
10805  052706  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
10806  052710  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
10807  052712  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
10808  052714  000207                          RTS     PC              ;;RETURN
10809  052716  176543                  $HINUM: .WORD   176543
10810  052720  123456                  $LONUM: .WORD   123456
10811                                   .SBTTL  TYPE ROUTINE
10812
10813                                   ;;*****************************************************************
10814                                   ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
10815                                   ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
10816                                   ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
10817                                   ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
10818                                   ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
10819                                   ;*
10820                                   ;*CALL:
10821                                   ;*1) USING A TRAP INSTRUCTION
10822                                   ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
10823                                   ;*OR
10824                                   ;*      TYPE
10825                                   ;*      MESADR
10826                                   ;*
10827
10828  052722  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
10829  052726  100002                          BPL     1$              ;;BR IF YES
10830  052730  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
10831  052732  000430                          BR      3$              ;;LEAVE
10832  052734  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
10833  052736  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
10834  052742  122737  000001  001340          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
10835  052750  001011                          BNE     6$              ;;NO,GO CHECK FOR APT CONSOLE
10836  052752  132737  000100  001341          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
10837  052760  001405                          BEQ     6$              ;;NO,GO CHECK FOR CONSOLE
10838  052762  010037  052772                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
10839  052766  004737  055420                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
10840  052772  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
10841  052774  132737  000040  001341  6_$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
10842  053002  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
10843  053004  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
10844  053006  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
10845  053010  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
10846  053012  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
10847  053014  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
10848  053020  000002                          RTI                     ;;RETURN
10849  053022  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
10850  053026  001430                          BEQ     8$
10851  053030  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
10852  053034  001006                          BNE     5$
10853  053036  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
10854  053040  104401                          TYPE                    ;;TYPE A CR AND LF
10855  053042  001315                          $CRLF
10856  053044  105037  053200                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
10857  053050  000755                          BR      2$              ;;GET NEXT CHARACTER
10858  053052  004737  053134          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
10859  053056  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
10860  053062  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
10861  053064  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
```

```
10862
10863  053070  105366  000001          7$:     DECB    1(SP)           ;;AND THE NULL CHAR.
10864  053074  002770                          BLT     6$              ;;DOES A NULL NEED TO BE TYPED?
10865  053076  004737  053134                  JSR     PC,$TYPEC       ;;BR IF NO--GO POP THE NULL OFF OF STACK
10866  053102  105337  053200                  DECB    $CHARCNT        ;;GO TYPE A NULL
10867  053106  000770                          BR      7$              ;;DO NOT COUNT AS A COUNT
10868                                                                  ;;LOOP
10869                                  ;HORIZONTAL TAB PROCESSOR
10870
10871  053110  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
10872  053114  004737  053134          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
10873  053120  132737  000007  053200          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
10874  053126  001372                          BNE     9$              ;;TAB STOP
10875  053130  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
10876  053132  000724                          BR      2$              ;; GET NEXT CHARACTER
10877  053134  105777  126010          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
10878  053140  100375                          BPL     $TYPEC
10879  053142  116677  000002  126002          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
10880  053150  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
10881  053156  001003                          BNE     1$              ;;BRANCH IF NO
10882  053160  105037  053200                  CLRB    $CHARCNT        ;,YES--CLEAR CHARACTER COUNT
10883  053164  000406                          BR      $TYPEX          ;;EXIT
10884  053166  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
10885  053174  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
10886  053176  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
10887  053200  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
10888  053202  000207          $TYPEX: RTS     PC
10889
10890
10891
10892
10893                                  ;;*****************************************************************
10894                                  .SBTTL  DOUBLE-PRECISION MULTIPLY SUBROUTINE
10895                                  ;*      SUBROUTINE TO MULTIPLY TWO DOUBLE PRECISION INTEGERS
10896                                  ;*      USES ALL REGISTERS (R0-R5)
10897                                  ;*
10898                                  ;*      ENTER WITH   JSR   PC,M.DPIM
10899                                  ;*                   MULTIPLIER IN R2-R3
10900                                  ;*                   MULTIPLICAND IN R4-R5
10901                                  ;*                   PRODUCT RETURNED IN R0-R1-R2-R3
10902                                  ;*
10903                                  ;;*****************************************************************
10904  053204  005000          M.DPIM: CLR     R0                      ;CLEAR HI ORDER WORDS
10905  053206  005001                  CLR     R1
10906  053210  012746  000041          MOV     #41.,-(SP)              ;MOVE 33 (DEC) TO COUNTER
10907  053214  006000          M.DP01: ROR     R0
10908  053216  006001                  ROR     R1
10909  053220  006002                  ROR     R2                      ;SHIFT TO ADD
10910  053222  006003                  ROR     R3
10911  053224  103003                  BCC     M.DP02                  ;NO CARRY NO ADD
10912  053226  060501                  ADD     R5,R1
10913  053230  005500                  ADC     R0                      ;ADD DOUBLE PRECISION TO OBTAIN NEW PARTIAL
10914  053232  060400                  ADD     R4,R0                   ;   PRODUCT
10915  053234  005316          M.DP02: DEC     @SP                     ;DECREMENT COUNTER
10916  053236  001366                  BNE     M.DP01
10917  053240  005726                  TST     (SP)+                   ;REMOVE THE COUNTER
```

```
10918  053242  000207                  RTS     PC
10919
10920
10921                          ;;*****************************************************************
10922                          .SBTTL  DOUBLE-PRECISION DIVIDE SUBROUTINE
10923                          ;*              SUBROUTINE TO PERFORM DOUBLE-PRECISION INTEGER DIVISION
10924                          ;*              USES ALL REGISTERS (R0-R5)
10925                          ;*
10926                          ;*              ENTER WITH  JSR   PC,M.DPID
10927                          ;*                      DIVIDEND IN R0-R1-R2-R3
10928                          ;*                      DIVISOR IN R4-R5
10929                          ;*                      REMAINDER RETURNED IN R0-R1
10930                          ;*                      QUOTIENT RETURNED IN R2-R3
10931                          ;*
10932                          ;*****************************************************************
10933  053244  012746  000040  M.DPID: MOV     #40,-(SP)       ;COUNTER FOR DIVISION CYCLES
10934  053250  010446          M.DP10: MOV     R4,-(SP)        ;HI ORDER
10935  053252  010546                  MOV     R5,-(SP)        ;LO ORDER DIVISOR TO THE STACK
10936  053254  005466  000002          NEG     2(SP)           ;FORM NEGATIVE
10937  053260  005416                  NEG     @SP             ;   VERSION OF THE DIVISOR
10938  053262  005666  000002          SBC     2(SP)
10939  053266  061601                  ADD     @SP,R1
10940  053270  005500                  ADC     R0              ;PERFORM THE INITIAL SUBTRACTION
10941  053272  066600  000002          ADD     2(SP),R0
10942  053276  103445                  BCS     M.DP50          ;IF CARRY THEN OVERFLOW HAS OCCURRED
10943  053300  005046                  CLR     -(SP)           ;THIS IS A LONGER LASTING CARRY BIT
10944  053302  006103          M.DP40: ROL     R3
10945  053304  006102                  ROL     R2
10946  053306  006101                  ROL     R1
10947  053310  006100                  ROL     R0
10948  053312  005716                  TST     @SP             ;TEST "CARRY INDICATOR"
10949  053314  001410                  BEQ     M.DP41          ;IF NO "CARRY" THEN ADD ELSE SUBTRACT
10950  053316  005016                  CLR     @SP             ;CLEAR UP FOR NEXT TIME
10951  053320  066601  000002          ADD     2(SP),R1
10952  053324  005500                  ADC     R0              ;ADD -(DIVISOR)
10953  053326  005516                  ADC     @SP     ; I     ;SET "CARRY"
10954  053330  066600  000004          ADD     4(SP),R0 ;<
10955  053334  000404                  BR      M.DP42
10956  053336  060501          M.DP41: ADD     R5,R1
10957  053340  005500                  ADC     R0              ;ADD +(DIVISOR)
10958  053342  005516                  ADC     @SP     ; I     ;SET "CARRY"
10959  053344  060400                  ADD     R4,R0   ;<
10960  053346  005516          M.DP42: ADC     @SP             ;SET "CARRY"
10961  053350  005716                  TST     @SP             ;TEST THE UPDATE INDICATOR
10962  053352  001401                  BEQ     .+4     ;>      ;IF ZERO FORGET IT
10963  053354  005203                  INC     R3      ; I     ;NO CARRY POSSIBLE HERE
10964  053356  005366  000006          DEC     6(SP)   ;<      ;DECREMENT COUNTER
10965  053362  003347                  BGT     M.DP40          ;BR IF MORE TO DO
10966  053364  006003                  ROR     R3
10967  053366  103404                  BCS     M.DP44
10968  053370  060501                  ADD     R5,R1
10969  053372  005500                  ADC     R0
10970  053374  060400                  ADD     R4,R0
10971  053376  000241                  CLC
10972  053400  006103          M.DP44: ROL     R3
10973  053402  062706  000010          ADD     #10,SP          ;ADJUST STACK BY 4 WORDS
```

```
10974  053406  000242                          CLV
10975  053410  000207                          RTS     PC
10976  053412  062706  000006      M.DPSO:     ADD     #6,SP
10977  053416  000262                          SEV
10978  053420  000207                          RTS     PC
10979
10980
10981
10982                                  .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
10983
10984                                  ;;**********************************************************************
10985                                  ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
10986                                  ;*UNSIGNED OCTAL ASCIZ NUMBER.
10987                                  ;*CALL
10988                                  ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
10989                                  ;*      JSR     PC,@#$DB2O      ;;CALL THE ROUTINE
10990                                  ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
10991
10992
10993  053422  104407      $DB2O:      SAVREG                          ;;SAVE ALL REGISTERS
10994  053424  016601  000002          MOV     2(SP),R1                ;;PICKUP THE POINTER TO LOW WORD
10995  053430  012705  053541          MOV     #$OCTVL+13.,R5          ;;POINTER TO DATA TABLE
10996  053434  012704  000014          MOV     #12.,R4                 ;;DO ELEVEN CHARACTERS
10997  053440  012703  177770          MOV     #^C7,R3                 ;;MASK
10998  053444  012100                  MOV     (R1)+,R0                ;;LOWER WORD
10999  053446  012101                  MOV     (R1)+,R1                ;;HIGH WORD
11000  053450  005002                  CLR     R2                      ;;TERMINATOR
11001  053452  110245      1$:         MOVB    R2,-(R5)                ;;PUT CHARACTER IN DATA TABLE
11002  053454  010002                  MOV     R0,R2                   ;;GET THIS DIGIT
11003  053456  005304                  DEC     R4                      ;;COUNT THIS CHARACTER
11004  053460  003007                  BGT     3$                      ;;BR IF NOT THE LAST DIGIT
11005  053462  001405                  BEQ     2$                      ;;BR IF IT IS THE LAST DIGIT
11006  053464  005205                  INC     R5                      ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
11007  053466  010566  000002          MOV     R5,2(SP)                ;;ASCIZ CHAR. & PUT IT ON THE STACK
11008  053472  104410                  RESREG                          ;;RESTORE ALL REGISTERS
11009  053474  000207                  RTS     PC                      ;;RETURN TO USER
11010  053476  006203      2$:         ASR     R3                      ;;POSITION THE MASK FOR THE LAST DIGIT
11011  053500  006001      3$:         ROR     R1                      ;;POSITION THE BINARY NUMBER FOR
11012  053502  006000                  ROR     R0                      ;;      THE NEXT OCTAL DIGIT
11013  053504  006001                  ROR     R1
11014  053506  006000                  ROR     R0
11015  053510  006001                  ROR     R1
11016  053512  006000                  ROR     R0
11017  053514  040302                  BIC     R3,R2                   ;;MASK OUT ALL JUNK
11018  053516  062702  000060          ADD     #'0,R2                  ;;MAKE THIS CHAR. ASCII
11019  053522  000753                  BR      1$                      ;;GO PUT IT IN THE DATA TABLE
11020  053524  000016      $OCTVL:     .BLKB   14.                     ;;RESERVE DATA TABLE
11021                                  .SBTTL  DOUBLE LENGTH BINARY TO DECIMAL ASCII CONVERT ROUTINE
11022
11023                                  ;;**********************************************************************
11024                                  ;*THIS ROUTINE WILL CONVERT A 32-BIT BINARY NUMBER TO AN UNSIGNED
11025                                  ;*DECIMAL (ASCII) NUMBER. THE SIGN OF THE BINARY NUMBER MUST BE
11026                                  ;*POSITIVE.
11027                                  ;*CALL
11028                                  ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
11029                                  ;*      JSR     PC,@#$DB2D
```

```
11030                                   ;*      RETURN                  ;;THE FIRST ADDRESS OF ASCIZ
11031                                                                   ;;IS ON THE STACK
11032
11033
11034  053542  104407                   $DB2D:  SAVREG                  ;;SAVE REGISTERS
11035  053544  016602  000002                   MOV     2(SP),R2        ;;PICKUP THE DATA POINTER
11036  053550  012700  053722                   MOV     #$DECVL,R0      ;;GET ADDRESS OF "$DECVL" STRING
11037  053554  010066  000002                   MOV     R0,2(SP)        ;;PUT ADDRESS OF ASCIZ STRING ON STACK
11038  053560  012201                           MOV     (R2)+,R1        ;;PICKUP THE BINARY NUMBER
11039  053562  012202                           MOV     (R2)+,R2
11040  053564  012737  000012  053640           MOV     #10.,4$         ;;SET UP TO DO 10 CONVERSIONS
11041  053572  012704  053652                   MOV     #$TNPWR,R4      ;;ADDRESS OF TEN POWER
11042  053576  012705  053654                   MOV     #$TNPWR+2,R5
11043  053602  005003                   1$:     CLR     R3              ;;CLEAR PARTIAL
11044  053604  161401                   2$:     SUB     (R4),R1         ;;SUBTRACT TEN POWER
11045  053606  005602                           SBC     R2
11046  053610  161502                           SUB     (R5),R2
11047  053612  002402                           BLT     3$              ;;BR IF TEN POWER TO LARGE
11048  053614  005203                           INC     R3              ;;ADD 1 TO PARTIAL
11049  053616  000772                           BR      2$              ;;LOOP
11050  053620  062401                   3$:     ADD     (R4)+,R1        ;;RESTORE SUBTRACTED VALUE
11051  053622  005502                           ADC     R2
11052  053624  062402                           ADD     (R4)+,R2
11053  053626  022525                           CMP     (R5)+,(R5)+     ;;MOVE TO NEXT TEN POWER
11054  053630  052703  000060                   BIS     #'0,R3          ;;CHANGE PARTIAL TO ASCII
11055  053634  110320                           MOVB    R3,(R0)+        ;;SAVE IT
11056  053636  005327                           DEC     (PC)+           ;;DONE?
11057  053640  000000                   4$:     .WORD   0
11058  053642  001357                           BNE     1$              ;;BR IF NO
11059  053644  105020                           CLRB    (R0)+           ;;TERMINATOR
11060  053646  104410                           RESREG                  ;;RESTORE REGISTERS
11061  053650  000207                           RTS     PC              ;;RETURN
11062  053652  145000                   $TNPWR: 145000                  ;;1.0E09
11063  053654  035632                           35632
11064  053656  160400                           160400                  ;;1.0E08
11065  053660  002765                           2765
11066  053662  113200                           113200                  ;;1.0E07
11067  053664  000230                           230
11068  053666  041100                           041100                  ;;1.0E06
11069  053670  000017                           17
11070  053672  103240                           103240                  ;;1.0E05
11071  053674  000001                           1
11072  053676  023420                           23420                   ;;1.0E04
11073  053700  000000                           0
11074  053702  001750                           1750                    ;;1.0E03
11075  053704  000000                           0
11076  053706  000144                           144                     ;;1.0E02
11077  053710  000000                           0
11078  053712  000012                           12                      ;;1.0E01
11079  053714  000000                           0
11080  053716  000001                           1                       ;;1.0E00
11081  053720  000000                           0
11082  053722  000014                   $DECVL: .BLKB   12.             ;;RESERVE STORAGE FOR ASCIZ STRING
11083                                   .SBTTL  TYPE NUMERICAL ASCIZ STRING SUPPRESS LEADING ZEROS
11084
11085                                   ;;**************************************************************
```

```
                                        ;*THIS ROUTINE IS USED TO TYPE AN ASCIZ NUMBER SUPPRESSING THE
                                        ;*LEADING NUMBERS.
                                        ;*CALL
                                        ;*      MOV     #NUMADR,-(SP)   ;;FIRST ADDRESS OF ASCIZ STRING
                                        ;*      JSR     PC,@#$SUPRS

053736  010046                 $SUPRS: MOV     R0,-(SP)        ;;SAVE R0
053740  016600  000004                  MOV     4(SP),R0        ;;PICKUP THE POINTER
053744  105710          1$:     TSTB    (R0)            ;;TERMINATEOR?
053746  001403                  BEQ     2$              ;;BR IF YES
053750  122720  000060          CMPB    #'0,(R0)+       ;;IS THIS AN ASCII "0" ?
053754  001773                  BEQ     1$              ;;BR IF YES
053756  005300          2$:     DEC     R0              ;;BACKUP BY "1"
053760  010037  053766          MOV     R0,3$           ;;SAVE FOR TYPING
053764  104401                  TYPE                    ;;GO TYPE
053766  000000          3$:     .WORD   0               ;;ASCIZ POINTER GOES HERE
053770  012600                  MOV     (SP)+,R0        ;;RESTORE R0
053772  012616                  MOV     (SP)+,(SP)      ;;RESTORE THE STACK
053774  000207                  RTS     PC              ;;RETURN
                        .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                        ;;**************************************************************
                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                        ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                        ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                        ;*CALL:
                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                        ;*      TYPOS                   ;;CALL FOR TYPEOUT
                        ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                        ;*      .BYTE   M               ;;M=1 OR 0
                        ;*                                      ;;1=TYPE LEADING ZEROS
                        ;*                                      ;;0=SUPPRESS LEADING ZEROS
                        ;*
                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                        ;*$TYPOS OR $TYPOC
                        ;*CALL:
                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                        ;*
                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                        ;*CALL:
                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

053776  017646  000000  $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
054002  116637  000001  054221  MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
054010  112637  054223          MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
054014  062716  000002          ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
054020  000406                  BR      $TYPON
054022  112737  000001  054221  $TYPOC: MOVB   #1,$OFILL       ;;SET THE ZERO FILL SWITCH
054030  112737  000006  054223          MOVB   #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
054036  112737  000005  054220  $TYPON: MOVB   #5,$OCNT        ;;SET THE ITERATION COUNT
054044  010346                  MOV     R3,-(SP)        ;;SAVE R3
054046  010446                  MOV     R4,-(SP)        ;;SAVE R4
054050  010546                  MOV     R5,-(SP)        ;;SAVE R5
```

```
11142  054052  113704  054223            MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
11143  054056  005404                    NEG     R4
11144  054060  062704  000006            ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
11145  054064  110437  054222            MOVB    R4,$OMODE       ;;SAVE IT FOR USE
11146  054070  113704  054221            MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
11147  054074  016605  000012            MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
11148  054100  005003                    CLR     R3              ;;CLEAR THE OUTPUT WORD
11149  054102  006105            1$:     ROL     R5              ;;ROTATE MSB INTO "C"
11150  054104  000404                    BR      3$              ;;GO DO MSB
11151  054106  006105            2$:     ROL     R5              ;;FORM THIS DIGIT
11152  054110  006105                    ROL     R5
11153  054112  006105                    ROL     R5
11154  054114  010503                    MOV     R5,R3
11155  054116  006103            3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
11156  054120  105337  054222            DECB    $OMODE          ;;TYPE THIS DIGIT?
11157  054124  100016                    BPL     7$              ;;BR IF NO
11158  054126  042703  177770            BIC     #177770,R3      ;;GET RID OF JUNK
11159  054132  001002                    BNE     4$              ;;TEST FOR 0
11160  054134  005704                    TST     R4              ;;SUPPRESS THIS 0?
11161  054136  001403                    BEQ     5$              ;;BR IF YES
11162  054140  005204            4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
11163  054142  052703  000060            BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
11164  054146  052703  000040    5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
11165  054152  110337  054216            MOVB    R3,8$           ;;SAVE FOR TYPING
11166  054156  104401  054216            TYPE    ,8$             ;;GO TYPE THIS DIGIT
11167  054162  105337  054220    7$:     DECB    $OCNT           ;;COUNT BY 1
11168  054166  003347                    BGT     2$              ;;BR IF MORE TO DO
11169  054170  002402                    BLT     6$              ;;BR IF DONE
11170  054172  005204                    INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
11171  054174  000744                    BR      2$              ;;GO DO THE LAST DIGIT
11172  054176  012605            6$:     MOV     (SP)+,R5        ;;RESTORE R5
11173  054200  012604                    MOV     (SP)+,R4        ;;RESTORE R4
11174  054202  012603                    MOV     (SP)+,R3        ;;RESTORE R3
11175  054204  016666  000002  000004    MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
11176  054212  012616                    MOV     (SP)+,(SP)
11177  054214  000002                    RTI                     ;;RETURN
11178  054216     000    8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
11179  054217     000            .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
11180  054220     000    $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
11181  054221     000    $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
11182  054222  000000    $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
11183                     .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
11184
11185                     ;;**************************************************************
11186                     ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
11187                     ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
11188                     ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
11189                     ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
11190                     ;*REPLACED WITH SPACES.
11191                     ;*CALL:
11192                     ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
11193                     ;*      TYPDS                   ;;GO TO THE ROUTINE
11194
11195  054224            $TYPDS:
11196  054224  010046            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11197  054226  010146            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
```

```
11198  054230  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11199  054232  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11200  054234  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11201  054236  012746  020200                MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
11202  054242  016605  000020                MOV     20(SP),R5       ;;GET THE INPUT NUMBER
11203  054246  100004                        BPL     1$              ;;BR IF INPUT IS POS.
11204  054250  005405                        NEG     R5              ;;MAKE THE BINARY NUMBER POS.
11205  054252  112766  000055  000001        MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
11206  054260  005000                1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
11207  054262  012703  054440                MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
11208  054266  112723  000040                MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
11209  054272  005002                2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
11210  054274  016001  054430                MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
11211  054300  160105                3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
11212  054302  002402                        BLT     4$              ;;BR IF DONE
11213  054304  005202                        INC     R2              ;;INCREASE THE BCD DIGIT BY 1
11214  054306  000774                        BR      3$
11215  054310  060105                4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
11216  054312  005702                        TST     R2              ;;CHECK IF BCD DIGIT=0
11217  054314  001002                        BNE     5$              ;;FALL THROUGH IF 0
11218  054316  105716                        TSTB    (SP)            ;;STILL DOING LEADING 0'S?
11219  054320  100407                        BMI     7$              ;;BR IF YES
11220  054322  106316                5$:     ASLB    (SP)            ;;MSD?
11221  054324  103003                        BCC     6$              ;;BR IF NO
11222  054326  116663  000001  177777        MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
11223  054334  052702  000060          6$:   BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
11224  054340  052702  000040          7$:   BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
11225  054344  110223                        MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
11226  054346  005720                        TST     (R0)+           ;;JUST INCREMENTING
11227  054350  020027  000010                CMP     R0,#10          ;;CHECK THE TABLE INDEX
11228  054354  002746                        BLT     2$              ;;GO DO THE NEXT DIGIT
11229  054356  003002                        BGT     8$              ;;GO TO EXIT
11230  054360  010502                        MOV     R5,R2           ;;GET THE LSD
11231  054362  000764                        BR      6$              ;;GO CHANGE TO ASCII
11232  054364  105726                8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
11233  054366  100003                        BPL     9$              ;;BR IF NO
11234  054370  116663  177777  177776        MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
11235  054376  105013                9$:     CLRB    (R3)            ;;SET THE TERMINATOR
11236  054400  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
11237  054402  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
11238  054404  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
11239  054406  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
11240  054410  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
11241  054412  104401  054440                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
11242  054416  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
11243  054424  012616                        MOV     (SP)+,(SP)
11244  054426  000002                        RTI                     ;;RETURN TO USER
11245  054430  023420                $DTBL:  10000.
11246  054432  001750                        1000.
11247  054434  000144                        100.
11248  054436  000012                        10.
11249  054440  000004                $DBLK:  .BLKW   4
11250                                 .SBTTL  ERROR HANDLER ROUTINE
11251
11252                                 ;;**************************************************************
11253                                 ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT.
```

```
11254                                   ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
11255                                   ;*AND GO TO TYPERR ON ERROR
11256                                   ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
11257                                   ;*SW15=1        HALT ON ERROR
11258                                   ;*SW13=1        INHIBIT ERROR TYPEOUTS
11259                                   ;*SW10=1        BELL ON ERROR
11260                                   ;*SW09=1        LOOP ON ERROR
11261                                   ;*CALL
11262                                   ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
11263
11264  054450                           $ERROR:
11265  054450  105237  001103           7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
11266  054454  001775                           BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
11267  054456  013777  001102  124456           MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
11268  054464  032777  002000  124446           BIT     #BIT10,@SWR     ;;BELL ON ERROR?
11269  054472  001402                           BEQ     1$              ;;NO - SKIP
11270  054474  104401  001310                   TYPE    ,$BELL          ;;RING BELL
11271  054500  005237  001112           1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
11272  054504  011637  001116                   MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
11273  054510  162737  000002  001116           SUB     #2,$ERRPC
11274  054516  117737  124374  001114           MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
11275  054524  032777  020000  124406           BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
11276  054532  001004                           BNE     20$             ;;SKIP TYPEOUTS
11277  054534  004737  040776                   JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
11278  054540  104401  001315                   TYPE    ,$CRLF
11279  054544                           20$:
11280  054544  122737  000001  001340           CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
11281  054552  001007                           BNE     2$              ;;NO,SKIP APT ERROR REPORT
11282  054554  113737  001114  054566           MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
11283  054562  004737  055430                   JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
11284  054566     000           21$:    .BYTE   0
11285  054567     000                   .BYTE   0
11286  054570  000777           22$:    BR      22$             ;;APT ERROR LOOP
11287  054572  005777  124342   2$:     TST     @SWR            ;;HALT ON ERROR
11288  054576  100001                   BPL     3$              ;;SKIP IF CONTINUE
11289  054600  000000                   HALT                    ;;HALT ON ERROR!
11290  054602  032777  001000  124330   3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
11291  054610  001402                           BEQ     4$              ;;BR IF NO
11292  054612  013716  001110                   MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
11293  054616  005737  001306           4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
11294  054622  001402                           BEQ     5$              ;;BR IF NONE
11295  054624  013716  001306                   MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
11296  054630                           5$:
11297  054630  022737  025534  000042           CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
11298  054636  001001                           BNE     6$              ;;BRANCH IF NO
11299  054640  000000                           HALT                    ;;YES
11300  054642                           6$:
11301  054642  000002                   RTI                     ;;RETURN
11302                                   .SBTTL  TTY INPUT ROUTINE
11303
11304                                   ;;**************************************************************
11305                                   .ENABL  LSB
11306
11307                                   .DSABL  LSB
11309
11309
```

```
11310                                   ;;*****************************************************************
11311                                   ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
11312                                   ;*CALL:
11313                                   ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
11314                                   ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
11315                                   ;*                              ;;WITH PARITY BIT STRIPPED OFF
11316                                   ;
11317
11318  054644  011646                   $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
11319  054646  016666  000004  000002           MOV     4(SP),2(SP)     ;;SAVE THE PS
11320  054654  105777  124264           1$:     TSTB    @$TKS           ;;WAIT FOR
11321  054660  100375                           BPL     1$              ;;A CHARACTER
11322  054662  117766  124260  000004           MOVB    @$TKB,4(SP)     ;;READ THE TTY
11323  054670  042766  177600  000004           BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
11324  054676  026627  000004  000023           CMP     4(SP),#23       ;;IS IT A CONTROL-S?
11325  054704  001013                           BNE     3$              ;;BRANCH IF NO
11326  054706  105777  124232           2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
11327  054712  100375                           BPL     2$              ;;LOOP UNTIL ITS THERE
11328  054714  117746  124226                   MOVB    @$TKB,-(SP)     ;;GET CHARACTER
11329  054720  042716  177600                   BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
11330  054724  022627  000021                   CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
11331  054730  001366                           BNE     2$              ;;IF NOT DISCARD IT
11332  054732  000750                           BR      1$              ;;YES, RESUME
11333  054734  026627  000004  000140   3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
11334  054742  002407                           BLT     4$              ;;BRANCH IF YES
11335  054744  026627  000004  000175           CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
11336  054752  003003                           BGT     4$              ;;BRANCH IF YES
11337  054754  042766  000040  000004           BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
11338  054762  000002                   4$:     RTI                     ;;GO BACK TO USER
11339  054764  052536  005015     000   $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
11340  054771     136  006507  000012   $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
11341  054776  005015  053523  020122   $MSWR:  .ASCIZ  <15><12>/SWR = /
11342  055004  020075     000
11343  055007     040  047040  053505   $MNEW:  .ASCIZ  /  NEW = /
11344  055014  036440  000040
11345
11346
11347
11348                                   .SBTTL  POWER DOWN AND UP ROUTINES
11349
11350                                   ;POWER DOWN ROUTINE
11351  055020  012737  055032  000024   $PWRDN: MOV     #$PWRUP,PWRVEC  ;SET VECTOR FOR POWER UP
11352  055026  000000                           HALT                    ;HANG UP
11353  055030  000776                           BR      .-2
11354
11355                                   ;POWER UP ROUTINE
11356  055032  005037  055104           $PWRUP: CLR     $PWRCT          ;WAIT LOOP FOR TTY TO COME UP
11357  055036  005237  055104           4$:     INC     $PWRCT
11358  055042  001375                           BNE     4$
11359  055044  012737  055020  000024           MOV     #$PWRDN,PWRVEC  ;SET VECTOR FOR POWER DOWN
11360  055052  012737  000340  000026           MOV     #PR7,PWRVEC+2   ;RE-ESTABLISH POWER AND TRAP PRIORITIES
11361  055060  012737  000340  000036           MOV     #PR7,TRAPVEC+2
11362  055066  012706  001100                   MOV     #STACK,SP       ;RE-INITIALIZE THE STACK
11363  055072  104401  055106                   TYPE    ,PWRMSG         ;TYPE "POWER FAILED"
11364  055076  000005                           RESET                   ;CLEAR THE UNIBUS
11365  055100  000177  124002                   JMP     @$LPADR         ;RESTART THE CURRENT TEST
```

```
11366  055100  000000                  $PWRCT: .WORD   0
11367  055106  005015  047520  042527  PWRMSG: .ASCIZ  <15><12>/POWER FAILED/<15><12>
11368  055114  020122  040506  046111
11369  055122  042105  005015     000
11370          055130                  .EVEN
11371
11372
11373
11374                                  ;;*****************************************************************
11375                                  ;* SCOPE1 - INTERNAL SCOPE ON ERROR ROUTINE
11376                                  ;*CALLED BY "SCOPER"
11377                                  ;;*****************************************************************
11378  055130  105737  001103         SCOPE1: TSTB    $ERFLG          ;SEE IF AN ERROR HAS OCCURRED
11379  055134  001406                         BEQ     6$              ;BR IF NOT
11380  055136  032777  001000  123774         BIT     #BIT9,@SWR      ;SEE IF LOOP ON ERROR DESIRED
11381  055144  001402                         BEQ     6$              ;BR IF NOT
11382  055146  013716  001110                 MOV     $LPERR,(SP)     ;SET ERROR LOOP ADDRESS ON STACK
11383  055152  000002                 6$:     RTI                     ;RETURN
11384
11385
11386
11387                                  .SBTTL  SCOPE HANDLER ROUTINE
11388
11389                                  ;;*****************************************************************
11390                                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
11391                                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
11392                                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
11393                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
11394                                  ;*SW14=1         LOOP ON TEST
11395                                  ;*SW11=1         INHIBIT ITERATIONS
11396                                  ;*SW09=1         LOOP ON ERROR
11397                                  ;*CALL
11398                                  ;*      SCOPE           ;;SCOPE=IOT
11399
11400  055154                         $SCOPE:
11401  055154  005737  001304                 TST     $TIMES          ;CHECK CURRENT ITERATION NUMBER
11402  055160  001404                         BEQ     $XTSTR          ;BR IF 0, TO SKIP CHECK OF SWR BIT 14
11403  055162  032777  040000  123750  1$:    BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
11404  055170  001101                         BNE     $OVER           ;;YES IF SW14=1
11405                                  ;#####START OF CODE FOR THE XOR TESTER#####
11406  055172  000416                 $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
11407                                                                  ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
11408  055174  013746  000004                 MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
11409  055200  012737  055220  000004         MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
11410  055206  005737  177060                 TST     @#177060        ;;TIME OUT ON XOR?
11411  055212  012637  000004                 MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
11412  055216  000450                         BR      $SVLAD          ;;GO TO THE NEXT TEST
11413  055220  022626                 5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
11414  055222  012637  000004                 MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
11415  055226  000413                         BR      7$              ;;LOOP ON THE PRESENT TEST
11416  055230                         6$:;#####END OF CODE FOR THE XOR TESTER#####
11417  055230  105737  001103         2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
11418  055234  001421                         BEQ     3$              ;;BR IF NO
11419  055236  123737  001115  001103         CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
11420  055244  101015                         BHI     3$              ;;BR IF NO
11421  055246  032777  001000  123664         BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
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11422  055254  001404                          BEQ     4$              ;;BR IF NO
11423  055256  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
11424  055264  000443                          BR      $OVER
11425  055266  105037  001103          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
11426  055272  005037  001304                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
11427  055276  000412                          BR      1$              ;;ESCAPE TO THE NEXT TEST
11428  055300  032777  004000  123632  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
11429  055306  001006                          BNE     1$              ;;BR IF YES
11430  055310  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
11431  055314  023737  001304  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
11432  055322  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
11433  055324  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
11434  055332  013737  055410  001304          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
11435  055340  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
11436  055344  113737  001102  001324          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
11437  055352  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
11438  055356  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
11439  055362  005037  001306                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
11440  055366  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
11441  055374  013777  001102  123540  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
11442  055402  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
11443  055406  000002                          RTI                     ;;FIXES PS
11444  055410  003720                  $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
11445                                   .SBTTL  APT COMMUNICATIONS ROUTINE
11446
11447                                   ;;**************************************************************
11448  055412  112737  000001  055656  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
11449  055420  112737  000001  055654  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
11450  055426  000403                          BR      $ATYC
11451  055430  112737  000001  055656  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
11452  055436                          $ATYC:
11453  055436  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11454  055440  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11455  055442  105737  055654                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
11456  055446  001450                          BEQ     5$              ;;IF NOT:  BR
11457  055450  122737  000001  001340          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
11458  055456  001031                          BNE     3$              ;;IF NOT:  BR
11459  055460  132737  000100  001341          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
11460  055466  001425                          BEQ     3$              ;;IF NOT:  BR
11461  055470  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
11462  055474  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
11463  055502  005737  001320          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
11464  055506  001375                          BNE     1$              ;;IF NOT:  WAIT
11465  055510  010037  001334                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
11466  055514  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
11467  055516  001376                          BNE     2$
11468  055520  163700  001334                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
11469  055524  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
11470  055526  010037  001336                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
11471  055532  012737  000004  001320          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
11472  055540  000413                          BR      5$
11473  055542  017637  000004  055566  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
11474  055550  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
11475  055556  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
11476  055562  004737  052722                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
11477  055566  000000                  4$:     .WORD   0
```

```
11478  055570                          5$:
11479  055570  105737  055656          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
11480  055574  001416                          BEQ     12$             ;;IF NOT:  BR
11481  055576  005737  001340                  TST     $ENV            ;;RUNNING UNDER APT?
11482  055602  001413                          BEQ     12$             ;;IF NOT:  BR
11483  055604  005737  001320          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
11484  055610  001375                          BNE     11$             ;;IF NOT:  WAIT
11485  055612  017637  000004  001322          MOV     @4(SP),$FATAL   ;;GET ERROR #
11486  055620  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
11487  055626  005237  001320                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
11488  055632  105037  055656          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
11489  055636  105037  055655                  CLRB    $LFLG           ;;CLEAR LOG FLAG
11490  055642  105037  055654                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
11491  055646  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11492  055650  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11493  055652  000207                          RTS     PC              ;;RETURN
11494  055654     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
11495  055655     000          $LFLG:  .BYTE   0               ;;LOG FLAG
11496  055656     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
11497          055660                  .EVEN
11498          000200          APTSIZE=200
11499          000001          APTENV=001
11500          000100          APTSPOOL=100
11501          000040          APTCSUP=040
11502                          .SBTTL  ROUTINE TO SIZE MEMORY
11503
11504                          ;;*****************************************************************
11505                          ;*CALL:
11506                          ;*      JSR     PC,$SIZE
11507                          ;*      RETURN
11508                          ;*$LSTAD WILL CONTAIN:
11509                          ;*      WITH KT11 OPTION        -- LAST VIRTUAL ADDRESS OF THE LAST BANK
11510                          ;*      WITHOUT KT11 OPTION     -- LAST ABSOLUTE ADDRESS OF AVAILABLE MEMORY
11511                          ;*$LSTBK WILL CONTAIN THE LAST BANK AS A SAF
11512                          ;*$KT11 IS THE MEMORY MANAGEMENT KEY
11513                          ;*BIT07 = 0 DON'T USE MEMORY MANAGEMENT
11514                          ;*      MUST BE SETUP BEFORE THE CALL
11515                          ;*BIT15 = 0 DON'T HAVE MEMORY MANAGEMENT OPTION
11516                          ;*      DETERMINED BY ROUTINE
11517
11518  055660  010046          $SIZE:  MOV     R0,-(SP)        ;;SAVE R0 ON THE STACK
11519  055662  010146                  MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
11520  055664  010246                  MOV     R2,-(SP)        ;;SAVE R2 ON THE STACK
11521  055666  010346                  MOV     R3,-(SP)        ;;SAVE R3 ON THE STACK
11522  055670  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE PRESENT ERROR VECTOR PS & PC
11523  055674  013746  000006          MOV     @#ERRVEC+2,-(SP)
11524  055700  010600                  MOV     SP,R0           ;;SAVE THE STACK POINTER
11525                          ;;SET THE ERRVEC PS TO THE PRESENT PS
11526  055702  104400                  TRAP                    ;;PUSH OLD PSW AND PC ON STACK
11527  055704  012637  000006          MOV     (SP)+,@#ERRVEC+2        ;;SAVE THE PSW IN @#ERRVEC+2
11528  055710  012701  003776          MOV     #3776,R1        ;;SETUP ADDRESS
11529  055714  105727                  TSTB    (PC)+           ;;USE MEMORY MANAGEMENT?
11530  055716  000200          $KT11:  .WORD   200             ;;SET TO USE MEMORY MANAGEMENT
11531  055720  100062                  BPL     $CORE           ;;BR IF NO
11532  055722  012737  056060  000004  MOV     #$KTNEX,@#ERRVEC        ;;SET FOR TIMEOUT
11533  055730  005737  177572          TST     @#SR0           ;;KT11 ARE YOU THERE?
```

```
11534  055734  052737  100000  055716          BIS     #100000,$KT11   ;;YES--SET KT11 KEY
11535  055742  005046                          CLR     -(SP)           ;;INITIALIZE FOR "PAR" LOADING
11536  055744  012702  172340                  MOV     #KIPAR0,R2      ;;ADDRESS OF FIRST "PAR"
11537  055750  012703  000010                  MOV     #^D8,R3         ;;LOAD EIGHT "PAR.'S" AND EIGHT 'PDR.'S"
11538  055754  012762  077406  177740  1$:     MOV     #77406,-40(R2)  ;;PDR = 4K, UP, READ/WRITE
11539  055762  011622                          MOV     (SP),(R2)+      ;;LOAD "PAR"
11540  055764  062716  000200                  ADD     #200,(SP)       ;;UPDATE FOR NEXT "PAR"
11541  055770  077307                          SOB     R3,1$           ;;LOOP UNTIL ALL EIGHT ARE LOADED
11542  055772  012742  177600                  MOV     #177600,-(R2)   ;;SETUP KIPAR7 FOR I/O
11543  055776  005042                          CLR     -(R2)           ;;SETUP KIPAR6 FOR TESTING
11544  056000  012737  056016  000004          MOV     #2$,@#ERRVEC    ;;CATCH TIMEOUT IF NO SR3
11545  056006  012737  000020  172516          MOV     #20,@#SR3       ;;ENABLE 22 BIT MODE
11546  056014  000401                          BR      3$              ;;THIS PDP-11 HAS A SR3 REGISTER
11547  056016  022626                  2$:     CMP     (SP)+,(SP)+     ;;CLEAN OFF THE STACK--NO SR3
11548  056020  005237  177572          3$:     INC     @#SR0           ;;TURN ON MEMORY MANAGEMENT
11549  056024  012737  056050  000004          MOV     #$KTOUT,@#ERRVEC ;;SET FOR TIME OUT
11550  056032  005737  143776          4$:     TST     @#143776        ;;TRAP ON NON-EX-MEM
11551  056036  062712  000040                  ADD     #40,(R2)        ;;MAKE A 1K STEP
11552  056042  023712  172356                  CMP     @#KIPAR7,(R2)   ;;LAST ONE?
11553  056046  101371                          BHI     4$              ;;NO--TRY IT
11554  056050  011202                  $KTOUT: MOV     (R2),R2         ;;GET LAST BANK+1
11555  056052  005037  177572                  CLR     @#SR0           ;;TURN OFF MEMORY MANAGEMENT
11556  056056  000421                          BR      $SIZEX
11557  056060  042737  100000  055716  $KTNEX: BIC     #100000,$KT11   ;;KT11 NON-EXISTENT
11558  056066  012737  056116  000004  $CORE:  MOV     #$CROUT,@#ERRVEC ;;SET FOR TIMEOUT
11559  056074  005002                          CLR     R2              ;;SET UP BANK
11560  056076  062701  004000          1$:     ADD     #4000,R1        ;;INCREMENT BY 1K
11561  056102  062702  000040                  ADD     #40,R2          ;;1K STEP
11562  056106  005711                          TST     (R1)            ;;TRAP ON TIME OUT
11563  056110  022701  177776                  CMP     #177776,R1      ;;LAST ONE
11564  056114  001370                          BNE     1$              ;;NO--TRY AGAIN
11565  056116  162701  004000          $CROUT: SUB     #4000,R1
11566  056122  162702  000040          $SIZEX: SUB     #40,R2          ;;DROP BACK
11567  056126  010006                          MOV     R0,SP           ;;RESTORE THE STACK
11568  056130  012637  000006                  MOV     (SP)+,@#ERRVEC+2 ;;RESTORE ERROR VECTOR
11569  056134  012637  000004                  MOV     (SP)+,@#ERRVEC
11570  056140  010137  056162                  MOV     R1,$LSTAD       ;;LAST ADDRESS
11571  056144  010237  056164                  MOV     R2,$LSTBK       ;;LAST BANK
11572  056150  012603                          MOV     (SP)+,R3        ;;RESTORE R3
11573  056152  012602                          MOV     (SP)+,R2        ;;RESTORE R2
11574  056154  012601                          MOV     (SP)+,R1        ;;RESTORE R1
11575  056156  012600                          MOV     (SP)+,R0        ;;RESTORE R0
11576  056160  000207                          RTS     PC
11577  056162  000000          $LSTAD: .WORD   0               ;;CONTAINS THE LAST ADDRESS
11578  056164  000000          $LSTBK: .WORD   0               ;;CONTAINS THE LAST BANK
11579                          .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
11580
11581                          ;;******************************************************************
11582                          ;*SAVE R0-R5
11583                          ;*CALL:
11584                          ;*      SAVREG
11585                          ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
11586                          ;*
11587                          ;*TOP---(+16)
11588                          ;* +2---(+18)
11589                          ;* +4---R5
```

```
11590                                   ;* +6---R4
11591                                   ;* +8---R3
11592                                   ;*+10---R2
11593                                   ;*+12---R1
11594                                   ;*+14---R0
11595
11596  056166                           $SAVREG:
11597  056166  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
11598  056170  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
11599  056172  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
11600  056174  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
11601  056176  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
11602  056200  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
11603  056202  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
11604  056206  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
11605  056212  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
11606  056216  016646  000022                  MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
11607  056222  000002                          RTI
11608
11609                                   ;*RESTORE R0-R5
11610                                   ;*CALL:
11611                                   ;*      RESREG
11612  056224                           $RESREG:
11613  056224  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
11614  056230  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
11615  056234  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
11616  056240  012666  000022                  MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
11617  056244  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
11618  056246  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
11619  056250  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
11620  056252  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
11621  056254  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
11622  056256  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
11623  056260  000002                          RTI
11624                                   .SBTTL  TRAP DECODER
11625
11626                                   ;;*****************************************************************
11627                                   ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
11628                                   ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
11629                                   ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
11630                                   ;*GO TO THAT ROUTINE.
11631
11632  056262  010046                   $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
11633  056264  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
11634  056270  005740                          TST     -(R0)           ;;BACKUP BY 2
11635  056272  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
11636  056274  006300                          ASL     R0              ;;POSITION FOR INDEXING
11637  056276  016000  056316                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
11638  056302  000200                          RTS     R0              ;;GO TO ROUTINE
11639
11640
11641                                   ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
11642
11643  056304  011646                   $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
11644  056306  016666  000004  000002           MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
11645  056314  000002                          RTI                     ;;RESTORE THE PSW
```

```
                                        .SBTTL  TRAP TABLE

                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE "TRAP" INSTRUCTION.

                                        ;       ROUTINE
                                        ;       -------
056316  056304                  $TRPAD: .WORD   $TRAP2
056320  052722                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
056322  054022                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
056324  053776                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
056326  054036                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
056330  054224                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

056332  054644                          $RDCHR  ;;CALL=RDCHR    TRAP+6(104406)  TTY TYPEIN CHARACTER ROUTINE
056334  056166                          $SAVREG ;;CALL=SAVREG   TRAP+7(104407)  SAVE R0-R5 ROUTINE
056336  056224                          $RESREG ;;CALL=RESREG   TRAP+10(104410) RESTORE R0-R5 ROUTINE
056340  055130                          SCOPE1  ;;CALL=SCOPER   TRAP+11(104411) INTERNAL LOOP ON ERROR ROUTINE

056342  020040  020040  042524  TSTMSG: .ASCIZ  /    TEST /
056350  052123  000040
056354  025052  020040     000  AS2SP2: .ASCIZ  /**  /
056361     125  044516  052502  EM1:    .ASCIZ  /UNIBUS PAR ERR/
056366  020123  040520  020122
056374  051105  000122
056400  047516  026516  054105  EM2:    .ASCIZ  /NON-EXIST MEM/
056406  051511  020124  042515
056414  000115
056416  047516  026516  054105  EM3:    .ASCIZ  /NON-EXIST DRV/
056424  051511  020124  051104
056432  000126
056434  047125  052111  043040  EM4:    .ASCIZ  /UNIT FIELD ERR/
056442  042511  042114  042440
056450  051122     000
056453     123  041125  054523  EM5:    .ASCIZ  /SUBSYS TIMEOUT/
056460  020123  044524  042515
056466  052517  000124
056472  020104  047524  041440  EM6:    .ASCIZ  /D TO C PAR ERR/
056500  050040  051101  042440
056506  051122     000
056511     103  052040  020117  EM7:    .ASCIZ  /C TO D PAR ERR/
056516  020104  040520  020122
056524  051105  000122
056530  041501  046040  053517  EM10:   .ASCIZ  /AC LOW/
056536     000
056537     123  042520  042105  EM11:   .ASCIZ  /SPEED LOSS/
056544  046040  051517  000123
056552  046111  020114  052506  EM12:   .ASCIZ  /ILL FUNCT/
056560  041516  000124
056564  043520  020115  051105  EM13:   .ASCIZ  /PGM ERR/
056572  000122
056574  047516  026516  054105  EM14:   .ASCIZ  /NON-EXIST FUNCT/
056602  051511  020124  052506
056610  041516  000124
```

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11702  056614  051104  020126  054524  EM15:   .ASCIZ  /DRV TYP ERR/
11703  056622  020120  051105  000122
11704  056630  046506  020124  051105  EM16:   .ASCIZ  /FMT ERR/
11705  056636  000122
11706  056640  051127  020124  047514  EM17:   .ASCIZ  /WRT LOCK ERR/
11707  056646  045503  042440  051122
11708  056654     000
11709  056655     104  053122  052440  EM20:   .ASCIZ  /DRV UNSAFE/
11710  056662  051516  043101  000105
11711  056670  042523  045505  044440  EM21:   .ASCIZ  /SEEK INC/
11712  056676  041516     000
11713  056701     103  046131  047440  EM22:   .ASCIZ  /CYL OVRFLO/
11714  056706  051126  046106  000117
11715  056714  046111  020114  054503  EM23:   .ASCIZ  /ILL CYL ADDR/
11716  056722  020114  042101  051104
11717  056730     000
11718  056731     104  053122  047440  EM24:   .ASCIZ  /DRV OFF TRK/
11719  056736  043106  052040  045522
11720  056744     000
11721  056745     104  053122  052040  EM25:   .ASCIZ  /DRV TIMING ERR/
11722  056752  046511  047111  020107
11723  056760  051105  000122
11724  056764  040504  040524  046040  EM26:   .ASCIZ  /DATA LATE/
11725  056772  052101  000105
11726  056776  047503  052116  052040  EM27:   .ASCIZ  /CONT TIMEOUT/
11727  057004  046511  047505  052125
11728  057012     000
11729  057013     117  020120  047111  EM30:   .ASCIZ  /OP INCOMP/
11730  057020  047503  050115     000
11731  057025     110  051104  053040  EM31:   .ASCIZ  /HDR VRC ERR/
11732  057032  041522  042440  051122
11733  057040     000
11734  057041     104  052101  020101  EM32:   .ASCIZ  /DATA CHK ERR/
11735  057046  044103  020113  051105
11736  057054  000122
11737  057056  051127  020124  044103  EM33:   .ASCIZ  /WRT CHK ERR/
11738  057064  020113  051105  000122
11739  057072  040504  040524  046440  EM34:   .ASCIZ  /DATA MISCOMPARE/
11740  057100  051511  047503  050115
11741  057106  051101  000105
11742  057112  047516  042040  053122  EM35:   .ASCIZ  /NO DRV RESPONSE-UFE & NXD/
11743  057120  051040  051505  047520
11744  057126  051516  026505  043125
11745  057134  020105  020046  054116
11746  057142  000104
11747  057144  051104  020126  051105  EM36:   .ASCIZ  /DRV ERR WILL NOT CLEAR/
11748  057152  020122  044527  046114
11749  057160  047040  052117  041440
11750  057166  042514  051101     000
11751  057173     104  053122  051440  EM37:   .ASCIZ  /DRV STATUS CHANGE WILL NOT CLEAR/
11752  057200  040524  052524  020123
11753  057206  044103  047101  042507
11754  057214  053440  046111  020114
11755  057222  047516  020124  046103
11756  057230  040505  053122
11757  057234  052101  023524  020116  EM40:   .ASCIZ  /ATT'N BUT NO STATUS CHANGE OR FAULT/
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11758  057242  052502  020124  047516
11759  057250  051440  040524  052524
11760  057256  020123  044103  047101
11761  057264  042507  047440  020122
11762  057272  040506  046125  000124
11763  057300  052101  023524  020116  EM41:   .ASCIZ  /ATT'N BUT DRV NOT AVAIL/
11764  057306  052502  020124  051104
11765  057314  020126  047516  020124
11766  057322  053101  044501  000114
11767  057330  052101  023524  020116  EM42:   .ASCIZ  /ATT'N WHEN NOT EXPECTED/
11768  057336  044127  047105  047040
11769  057344  052117  042440  050130
11770  057352  041505  042524  000104
11771  057360  051105  020122  040507  EM43:   .ASCIZ  /ERR GATHERING DRV STATUS/
11772  057366  044124  051105  047111
11773  057374  020107  051104  020126
11774  057402  052123  052101  051525
11775  057410     000
11776  057411     115  046125  020124  EM52:   .ASCIZ  /MULT DRV SEL/
11777  057416  051104  020126  042523
11778  057424  000114
11779  057426  042110  020122  047503  EM53:   .ASCIZ  /HDR COMP ERR/
11780  057434  050115  042440  051122
11781  057442     000
11782  057443     123  041125  054523  EM56:   .ASCIZ  /SUBSYS TIMEOUT/
11783  057450  020123  044524  042515
11784  057456  052517  000124
11785  057462  051105  020122  047111  EM60:   .ASCIZ  /ERR IN RECAL FOR RECOVERY/
11786  057470  051040  041505  046101
11787  057476  043040  051117  051040
11788  057504  041505  053117  051105
11789  057512  000131
11790  057514  051104  050117  044520  EM61:   .ASCIZ  /DROPPING DRV, FATAL ERR/
11791  057522  043516  042040  053122
11792  057530  020054  040506  040524
11793  057536  020114  051105  000122
11794  057544  054503  020114  044515  EM62:   .ASCIZ  /CYL MISCOMP/
11795  057552  041523  046517  000120
11796  057560  046103  040505  020122  EM63:   .ASCIZ  /CLEAR CONTR DID NOT CLEAR ERR/
11797  057566  047503  052116  020122
11798  057574  044504  020104  047516
11799  057602  020124  046103  040505
11800  057610  020122  051105  000122
11801  057616  047516  040440  052124  EM64:   .ASCIZ  /NO ATT'N IN ATT'N REG/
11802  057624  047047  044440  020116
11803  057632  052101  023524  020116
11804  057640  042522  000107
11805  057644  047125  047523  044514  EM65:   .ASCIZ  /UNSOLICITED ATT'N/
11806  057652  044503  042524  020104
11807  057660  052101  023524  000116
11808  057666  047125  054105  020120  EM66:   .ASCIZ  /UNEXP DATA ERR/
11809  057674  040504  040524  042440
11810  057702  051122     000
11811  057705     101  052124  047047  EM67:   .ASCIZ  /ATT'N DID NOT RESET WITH CLEAR/
11812  057712  042040  042111  047040
11813  057720  052117  051040  051505
```

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11814  057726  052105  053440  052111
11815  057734  020110  046103  040505
11816  057742  000122
11817  057744  052523  051502  051531  EM70:   .ASCIZ  /SUBSYS CLEAR DID NOT CLEAR DRV ATT'N/
11818  057752  041440  042514  051101
11819  057760  042040  042111  047040
11820  057766  052117  041440  042514
11821  057774  051101  042040  053122
11822  060002  040440  052124  047047
11823  060010     000
11824  060011     104  052101  020101  EM71:   .ASCIZ  /DATA LATE WHEN READING HDR/
11825  060016  040514  042524  053440
11826  060024  042510  020116  042522
11827  060032  042101  047111  020107
11828  060040  042110  000122
11829  060044  047503  052116  020122  EM72:   .ASCIZ  /CONTR ERR WHEN DRIVER SERV/
11830  060052  051105  020122  044127
11831  060060  047105  042040  044522
11832  060066  042526  020122  042523
11833  060074  053122     000
11834  060077     104  053122  042040  EM73:   .ASCIZ  /DRV DET PAR ERR/
11835  060104  052105  050040  051101
11836  060112  042440  051122     000
11837  060117     125  042116  043105  EM74:   .ASCIZ  /UNDEF ERR/
11838  060124  042440  051122     000
11839  060131     115  051101  044513  EM75:   .ASCIZ  /MARKING THIS SECTOR BAD/
11840  060136  043516  052040  044510
11841  060144  020123  042523  052103
11842  060152  051117  041040  042101
11843  060160     000
11844  060161     102  042101  042040  EM76:   .ASCIZ  /BAD DATA VERIF'N WITH READ. ECC OF LAST RETRY IS:/
11845  060166  052101  020101  042526
11846  060174  044522  023506  020116
11847  060202  044527  044124  051040
11848  060210  040505  027104  042440
11849  060216  041503  047440  020106
11850  060224  040514  052123  051040
11851  060232  052105  054522  044440
11852  060240  035123     000
11853  060243     122  052105  054522  EM77:   .ASCIZ  /RETRY SUCCESSFUL/
11854  060250  051440  041525  042503
11855  060256  051523  052506  000114
11856  060264  042522  051124  020131  EM100:  .ASCIZ  /RETRY UNSUCCESSFUL/
11857  060272  047125  052523  041503
11858  060300  051505  043123  046125
11859  060306     000
11860  060307     103  047101  047516  EM101:  .ASCIZ  /CANNOT FIND A VALID HEADER IN TRACK JUST READ/
11861  060314  020124  044506  042116
11862  060322  040440  053040  046101
11863  060330  042111  044040  040505
11864  060336  042504  020122  047111
11865  060344  052040  040522  045503
11866  060352  045040  051525  020124
11867  060360  042522  042101     000
11868  060365     102  042101  051440  EM102:  .ASCIZ  /BAD SECT ERR ON SECT NOT LISTED BAD/
11869  060372  041505  020124  051105
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11870  060400  020122  047117  051440
11871  060406  041505  020124  047516
11872  060414  020124  044514  052123
11873  060422  042105  041040  042101
11874  060430     000
11875  060431     124  046511  042105  EM103:  .ASCIZ  /TIMED-OUT ON READ HDR/
11876  060436  047455  052125  047440
11877  060444  020116  042522  042101
11878  060452  044040  051104     000
11879  060457     124  046511  042105  EM104:  .ASCIZ  /TIMED-OUT ON SEEK/
11880  060464  047455  052125  047440
11881  060472  020116  042523  045505
11882  060500     000
11883  060501     104  053122  051440  EM105:  .ASCIZ  /DRV SIEZED BY OTHER PORT/
11884  060506  042511  042532  020104
11885  060514  054502  047440  044124
11886  060522  051105  050040  051117
11887  060530  000124
11888  060532  040504  040524  046440  EM106:  .ASCIZ  /DATA MISCMPR WHILE BAI SET/
11889  060540  051511  046503  051120
11890  060546  053440  044510  042514
11891  060554  041040  044501  051440
11892  060562  052105     000
11893  060565     116  020117  042516  EM107:  .ASCIZ  /NO NEM ERR WHEN REF'ING LOC 760000/
11894  060572  020115  051105  020122
11895  060600  044127  047105  051040
11896  060606  043105  044447  043516
11897  060614  046040  041517  033440
11898  060622  030066  030060  000060
11899  060630  047111  051124  052120  EM110:  .ASCIZ  /INTRPT WHEN CNTRLR NOT RDY/
11900  060636  053440  042510  020116
11901  060644  047103  051124  051114
11902  060652  047040  052117  051040
11903  060660  054504     000
11904  060663     116  020117  052101  EM111:  .ASCIZ  /NO ATT'N ON SEEK/
11905  060670  023524  020116  047117
11906  060676  051440  042505  000113
11907  060704  051104  020126  054503  EM112:  .ASCIZ  /DRV CYL INCORRECT/
11908  060712  020114  047111  047503
11909  060720  051122  041505  000124
11910  060726  041101  051117  026524  EM113:  .ASCIZ  /ABORT- CAN'T READ BSF/
11911  060734  041440  047101  052047
11912  060742  051040  040505  020104
11913  060750  051502  000106
11914  060754  052113  030461  043040  EM114:  .ASCIZ  /KT11 FAILURE/
11915  060762  044501  052514  042522
11916  060770     000
11917  060771     115  046505  050040  EM115:  .ASCIZ  /MEM PAR ERR/
11918  060776  051101  042440  051122
11919  061004     000
11920  061005     103  051125  042522  DH100:  .ASCIZ  /CURRENT CMD :/
11921  061012  052116  041440  042115
11922  061020  035040     000
11923  061023     120  042522  020126  DH105:  .ASCIZ  /PREV CMD :/
11924  061030  046503  020104  000072
11925  061036  045522  030466  020061  DH200:  .ASCIZ  /RK611 REGS :/
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11926  061044  042522  051507  035040
11927  061052     000
11928  061053     122  046505  044501  DH500:  .ASCIZ  /REMAINING REGS NOT VALID/
11929  061060  044516  043516  051040
11930  061066  043505  020123  047516
11931  061074  020124  040526  044514
11932  061102  000104
11933  061104  044124  020105  047506  DH501:  .ASCIZ  /THE FOLLOWING REG DATA MAY BE INCORRECT :/
11934  061112  046114  053517  047111
11935  061120  020107  042522  020107
11936  061126  040504  040524  046440
11937  061134  054501  041040  020105
11938  061142  047111  047503  051122
11939  061150  041505  020124  000072
11940  061156  051105  020122  041520  DH101:  .ASCIZ  /ERR PC  DRIVE   CMND    CYLNDR  TRACK   SECTOR  WD CNT/
11941  061164  020040  051104  053111
11942  061172  020105  020040  046503
11943  061200  042116  020040  020040
11944  061206  054503  047114  051104
11945  061214  020040  051124  041501
11946  061222  020113  020040  042523
11947  061230  052103  051117  020040
11948  061236  042127  041440  052116
11949  061244     000
11950  061245     110  020111  040502  DH102:  .ASCIZ  /HI BA   LO BA/
11951  061252  020040  046040  020117
11952  061260  040502     000
11953  061263     120  042522  027126  DH103:  .ASCIZ  /PREV. UNIBUS MAP :/
11954  061270  052440  044516  052502
11955  061276  020123  040515  020120
11956  061304  000072
11957  061306  044510  051040  043505  DH104:  .ASCIZ  /HI REGO LO REGO/
11958  061314  020060  047514  051040
11959  061322  043505  000060
11960  061326  052503  027122  052440  DH106:  .ASCIZ  /CUR. UNIBUS MAP :/
11961  061334  044516  052502  020123
11962  061342  040515  020120  000072
11963  061350  045522  051503  020061  DH201:  .ASCIZ  /RKCS1   RKCS2   RKDC    RKDA    RKWCR   RKBA    RKASOF/
11964  061356  020040  045522  051503
11965  061364  020062  020040  045522
11966  061372  041504  020040  020040
11967  061400  045522  040504  020040
11968  061406  020040  045522  041527
11969  061414  020122  020040  045522
11970  061422  040502  020040  020040
11971  061430  045522  051501  043117
11972  061436     000
11973  061437     122  042113  020123  DH202:  .ASCIZ  /RKDS    RKER/
11974  061444  020040  051040  042513
11975  061452  000122
11976  061454  030101  020060  020040  DH203:  .ASCIZ  /A00     B00     A01     B01     A02     B02     A03     B03/
11977  061462  020040  030102  020060
11978  061470  020040  020040  030101
11979  061476  020061  020040  020040
11980  061504  030102  020061  020040
11981  061512  020040  030101  020062
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11982  061520  020040  020040  030102
11983  061526  020062  020040  020040
11984  061534  C 0101  020063  020040
11985  061542  020040  030102  000063
11986  061550  042110  020122  044123  DH601:   .ASCIZ  /HDR SHOULD BE:/
11987  061556  052517  042114  041040
11988  061564  035105     000
11989  061567     110  051104  047440  DH602:   .ASCIZ  /HDR OF SECTOR 0 THIS CYL IS:/
11990  061574  020106  042523  052103
11991  061602  051117  030040  052040
11992  061610  044510  020123  054503
11993  061616  020114  051511  000072
11994  061624  040520  045503  040440  DH604:   .ASCIZ  /PACK ADDR OF ERR(S) :/
11995  061632  042104  020122  043117
11996  061640  042440  051122  051450
11997  061646  020051  000072
11998  061652  054503  047114  051104  DH6041:  .ASCIZ  /CYLNDR  TRACK   SECTOR/
11999  061660  020040  051124  041501
12000  061666  020113  020040  042523
12001  061674  052103  051117     000
12002  061701     103  046131  042116  DH6042:  .ASCIZ  /CYLNDR  TRACK/
12003  061706  020122  052040  040522
12004  061714  045503     000
12005  061717     105  041503  042040  DH605:   .ASCIZ  /ECC DATA IS:/
12006  061724  052101  020101  051511
12007  061732  000072
12008  061734  047520  020123  020040  DH6051:  .ASCIZ  /POS     PAT     CORRECTABLE?/
12009  061742  020040  040520  020124
12010  061750  020040  020040  047503
12011  061756  051122  041505  040524
12012  061764  046102  037505     000
12013  061771     127  051117  030504  DH606:   .ASCIZ  /WORD1   WORD2   WORD3/
12014  061776  020040  053440  051117
12015  062004  031104  020040  053440
12016  062012  051117  031504     000
12017  062017     102  042101  044040  DH607:   .ASCIZ  /BAD HEADER IS :/
12018  062024  040505  042504  020122
12019  062032  051511  03[ 40     000
12020  062037     127  02[ 04  020043  DH701:   .ASCIZ  /WD #    GOOD    BAD     HI PHY  LO PHY  VRT AD  KIPAR6/
12021  062044  020040  043440  047517
12022  062052  020104  020040  041040
12023  062060  042101  020040  020040
12024  062066  044040  020111  044120
12025  062074  020131  046040  020117
12026  062102  044120  020131  053040
12027  062110  052122  040440  020104
12028  062116  045440  050111  051101
12029  062124  000066
12030  062126  047507  042117  020040  DH702:   .ASCIZ  /GOOD    BAD/
12031  062134  020040  040502  000104
12032  062142  040506  046111  047111  DH703:   .ASCIZ  /FAILING DATA WORD :/
12033  062150  020107  040504  040524
12034  062156  053440  051117  020104
12035  062164  000072
12036  062166  051123  004460  051123  DH704:   .ASCIZ  /SR0    SR1     SR2     SR3/
12037  062174  004461  051123  004462
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12038  062202  051123  000063
12039  062206  052113  030461  051040  DH705:  .ASCIZ  /KT11 REGS :/
12040  062214  043505  020123  000072
12041  062222  042515  020115  042522  DH706:  .ASCIZ  /MEM REGS :/
12042  062230  051507  035040     000
12043  062235     120  004503  047514  DH707:  .ASCIZ  /PC     LOERAD  HIERAD  MEMSYS/
12044  062242  051105  042101  044011
12045  062250  042511  040522  004504
12046  062256  042515  051515  051531
12047  062264     000
12048  062265     120  004503  051503  DH710:  .ASCIZ  /PC     CSR AD  CSR/
12049  062272  020122  042101  041411
12050  062300  051123     000
12051  062303     103  046131  047111  DH711:  .ASCIZ  /CYLINDERS :/
12052  062310  042504  051522  035040
12053  062316     000
12054  062317     122  042113  020123  DH204:  .ASCIZ  /RKDS    RKER    RKMR2   RKMR3/
12055  062324  020040  051040  042513
12056  062332  020122  020040  051040
12057  062340  046513  031122  020040
12058  062346  051040  046513  031522
12059  062354     000
12060  062355     105  051122  052040  DH502:  .ASCIZ  /ERR TRYING TO GET FAILURE INFO/
12061  062362  054522  047111  020107
12062  062370  047524  043440  052105
12063  062376  043040  044501  052514
12064  062404  042522  044440  043116
12065  062412  000117
12066  062414  023462  042116  052040  DH503:  .ASCIZ  /2'ND TIMEOUT OCCURRED GETTING DRV STATUS/
12067  062422  046511  047505  052125
12068  062430  047440  041503  051125
12069  062436  042522  020104  042507
12070  062444  052124  047111  020107
12071  062452  051104  020126  052123
12072  062460  052101  051525     000
12073  062465     043  047440  020106  DH800:  .ASCIZ  /# OF RETRIES:/
12074  062472  042522  051124  042511
12075  062500  035123     000
12076          062504                  .EVEN
12077  062504  001116  005510  005506  DT100:  .WORD   $ERRPC,DRIVE,ERRCOM,$REG0,$REG1,$REG2,$REG3
12078  062512  001162  001164  001166
12079  062520  001170
12080  062522  001256  001260          DT102:  .WORD   $REG36,$REG37
12081  062526  001174  001176  001200  DT201:  .WORD   $REG5,$REG6,$REG7,$REG10,$REG11,$REG12,$REG13
12082  062534  001202  001204  001206
12083  062542  001210
12084  062544  001212  001214          DT202:  .WORD   $REG14,$REG15
12085  062550  001216  001220  001222  DT203:  .WORD   $REG16,$REG17,$REG20,$REG21,$REG22,$REG23,$REG24,$REG25
12086  062556  001224  001226  001230
12087  062564  001232  001234
12088  062570  001174  001176  001200  DT601:  .WORD   $REG5,$REG6,$REG7
12089  062576  001202  001204  001206  DT602:  .WORD   $REG10,$REG11,$REG12,$REG13,$REG14,$REG15,$REG16
12090  062604  001210  001212  001214
12091  062612  001216
12092  062614  005264  005262          DT103:  .WORD   PRMPHO,PRMPLO
12093
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12094  062620  000006                DF01:   .WORD   6               ;NUMBER OF HEADER LINES
12095  062622     000                        .BYTE   0               ;NUMBER OF COL FOR FIRST HDR
12096  062623     000                        .BYTE   0               ;ALL CHARACTERS OCTAL
12097  062624  061156                        .WORD   DH101           ;SECOND HDR LINE
12098  062626     007     000                .BYTE   7,0             ;NUM OF COL-ALL OCTAL
12099  062630  061245                        .WORD   DH102
12100  062632     002     000                .BYTE   2,0
12101  062634  061036                        .WORD   DH200
12102  062636     000     000                .BYTE   0,0
12103  062640  061350                        .WORD   DH201
12104  062642     007     000                .BYTE   7,0
12105  062644  061053                        .WORD   DH500
12106  062646     000     000                .BYTE   0,0
12107
12108  062650  000007                DF02:   .WORD   7
12109  062652     000     000                .BYTE   0,0
12110  062654  061156                        .WORD   DH101
12111  062656     007     000                .BYTE   7,0
12112  062660  061245                        .WORD   DH102
12113  062662     002     000                .BYTE   2,0
12114  062664  061036                        .WORD   DH200
12115  062666     000     000                .BYTE   0,0
12116  062670  061350                        .WORD   DH201
12117  062672     007     000                .BYTE   7,0
12118  062674  061437                        .WORD   DH202
12119  062676     002     000                .BYTE   2,0
12120  062700  061454                        .WORD   DH203
12121  062702     010     000                .BYTE   10,0
12122
12123  062704  000010                DF03:   .WORD   10
12124  062706     000     000                .BYTE   0,0
12125  062710  061156                        .WORD   DH101
12126  062712     007     000                .BYTE   7,0
12127  062714  061245                        .WORD   DH102
12128  062716     002     000                .BYTE   2,0
12129  062720  061036                        .WORD   DH200
12130  062722     000     000                .BYTE   0,0
12131  062724  061350                        .WORD   DH201
12132  062726     007     000                .BYTE   7,0
12133  062730  061104                        .WORD   DH501           ;"THE FOLLOWING REG DATA MB INCORRECT"
12134  062732     000     000                .BYTE   0,0
12135  062734  061437                        .WORD   DH202
12136  062736     002     000                .BYTE   2,0
12137  062740  061454                        .WORD   DH203
12138  062742     010     000                .BYTE   10,0
12139
12140  062744  000003                DF04:   .WORD   3
12141  062746     000     000                .BYTE   0,0
12142  062750  061156                        .WORD   DH101
12143  062752     007     000                .BYTE   7,0
12144  062754  061245                        .WORD   DH102
12145  062756     002     000                .BYTE   2,0
12146
12147  062760  000007                DF05:   .WORD   7               ;OPI, HVRC
12148  062762     000     000                .BYTE   0,0
12149  062764  061156                        .WORD   DH101
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12150  062766  007  000                .BYTE   7,0
12151  062770  061245                  .WORD   DH102
12152  062772  002  000                .BYTE   2,0
12153  062774  061550                  .WORD   DH601
12154  062776  000  000                .BYTE   0,0
12155  063000  061771                  .WORD   DH606
12156  063002  003  000                .BYTE   3,0
12157  063004  061567                  .WORD   DH602
12158  063006  000  000                .BYTE   0,0
12159  063010  061771                  .WORD   DH606
12160  063012  003  000                .BYTE   3,0
12161
12162  063014  000007           DF07:  .WORD   7
12163  063016  000  000                .BYTE   0,0
12164  063020  061156                  .WORD   DH101
12165  063022  007  000                .BYTE   7,0
12166  063024  061245                  .WORD   DH102
12167  063026  002  000                .BYTE   2,0
12168  063030  061624                  .WORD   DH604
12169  063032  000  000                .BYTE   0,0
12170  063034  061652                  .WORD   DH6041
12171  063036  003  000                .BYTE   3,0
12172  063040  061717                  .WORD   DH605
12173  063042  000  000                .BYTE   0,0
12174  063044  061734                  .WORD   DH6051
12175  063046  003  000                .BYTE   3,0
12176
12177  063050  000005           DF10:  .WORD   5
12178  063052  000  000                .BYTE   0,0
12179  063054  061156                  .WORD   DH101
12180  063056  007  000                .BYTE   7,0
12181  063060  061245                  .WORD   DH102
12182  063062  002  000                .BYTE   2,0
12183  063064  061624                  .WORD   DH604
12184  063066  000  000                .BYTE   0,0
12185  063070  061652                  .WORD   DH6041
12186  063072  003  000                .BYTE   3,0
12187
12188  063074  000004           DF11:  .WORD   4
12189  063076  000  000                .BYTE   0,0
12190  063100  061624                  .WORD   DH604
12191  063102  000  000                .BYTE   0,0
12192  063104  061652                  .WORD   DH6041
12193  063106  003  000                .BYTE   3,0
12194  063110  062037                  .WORD   DH701
12195  063112  000  000                .BYTE   0,0
12196
12197  063114  000006           DF12:  .WORD   6
12198  063116  000  000                .BYTE   0,0
12199  063120  061156                  .WORD   DH101
12200  063122  007  000                .BYTE   7,0
12201  063124  061245                  .WORD   DH102
12202  063126  002  000                .BYTE   2,0
12203  063130  061036                  .WORD   DH200
12204  063132  000  000                .BYTE   0,0
12205  063134  061350                  .WORD   DH201
```

```
12206  063136  007  000                .BYTE   7,0
12207  063140  062317                  .WORD   DH204
12208  063142  004  000                .BYTE   4,0
12209
12210  063144  000006            DF13: .WORD   6              ;FORMAT FOR 2ND LEVEL ERROR
12211  063146  000  000                .BYTE   0,0            ;IN HEADER COMPARE ERROR
12212  063150  061156                  .WORD   DH101          ;AND 2ND LEVEL HEADER
12213  063152  007  000                .BYTE   7,0            ;VRC ERROR
12214  063154  061245                  .WORD   DH102
12215  063156  002  000                .BYTE   2,0
12216  063160  061550                  .WORD   DH601
12217  063162  000  000                .BYTE   0,0
12218  063164  061771                  .WORD   DH606
12219  063166  003  000                .BYTE   3,0
12220  063170  062355                  .WORD   DH502
12221  063172  000  000                .BYTE   0,0
12222
12223  063174  000006            DF14: .WORD   6              ;FORMAT FOR 2ND LEVEL ERROR
12224  063176  000  000                .BYTE   0,0            ;IN OPERATION INCOMPLETE ERROR
12225  063200  061156                  .WORD   DH101
12226  063202  007  000                .BYTE   7,0
12227  063204  061245                  .WORD   DH102
12228  063206  002  000                .BYTE   2,0
12229  063210  061550                  .WORD   DH601
12230  063212  000  000                .BYTE   0,0
12231  063214  061771                  .WORD   DH606
12232  063216  003  000                .BYTE   3,0
12233  063220  062355                  .WORD   DH502
12234  063222  000  000                .BYTE   0,0
12235
12236  063224  000011            DF15: .WORD   11
12237  063226  000  000                .BYTE   0,0
12238  063230  061156                  .WORD   DH101
12239  063232  007  000                .BYTE   7,0
12240  063234  061245                  .WORD   DH102
12241  063236  002  000                .BYTE   2,0
12242  063240  061036                  .WORD   DH200
12243  063242  000  000                .BYTE   0,0
12244  063244  061350                  .WORD   DH201
12245  063246  007  000                .BYTE   7,0
12246  063250  061437                  .WORD   DH202
12247  063252  002  000                .BYTE   2,0
12248  063254  062414                  .WORD   DH503
12249  063256  000  000                .BYTE   0,0
12250  063260  061104                  .WORD   DH501
12251  063262  000  000                .BYTE   0,0
12252  063264  061454                  .WORD   DH203
12253  063266  010  000                .BYTE   10,0
12254
12255  063270  000011            DF16: .WORD   11
12256  063272  000  000                .BYTE   0,0
12257  063274  061156                  .WORD   DH101
12258  063276  007  000                .BYTE   7,0
12259  063300  061245                  .WORD   DH102
12260  063302  002  000                .BYTE   2,0
12261  063304  061036                  .WORD   DH200
```

```
12262  063306  000  000          .BYTE  0,0
12263  063310  061350             .WORD  DH201
12264  063312  007  000          .BYTE  7,0
12265  063314  061437             .WORD  DH202
12266  063316  002  000          .BYTE  2,0
12267  063320  062355             .WORD  DH502
12268  063322  000  000          .BYTE  0,0
12269  063324  061104             .WORD  DH501
12270  063326  000  000          .BYTE  0,0
12271  063330  061454             .WORD  DH203
12272  063332  010  000          .BYTE  10,0
12273
12274  063334  000005        DF17: .WORD  5
12275  063336  000  000          .BYTE  0,0
12276  063340  061156             .WORD  DH101
12277  063342  007  000          .BYTE  7,0
12278  063344  061245             .WORD  DH102
12279  063346  002  000          .BYTE  2,0
12280  063350  062303             .WORD  DH711
12281  063352  000  000          .BYTE  0,0
12282  063354  062126             .WORD  DH702
12283  063356  002  000          .BYTE  2,0
12284
12285  063360  000002        DF20: .WORD  2
12286  063362  000  000          .BYTE  0,0
12287  063364  061306             .WORD  DH104
12288  063366  002  000          .BYTE  2,0
12289
12290  063370  000002        DF21: .WORD  2
12291  063372  000  000          .BYTE  0,0
12292  063374  061734             .WORD  DH6051
12293  063376  003  000          .BYTE  3,0
12294
12295  063400  000006        DF22: .WORD  6
12296  063402  000  000          .BYTE  0,0
12297  063404  061005             .WORD  DH100
12298  063406  000  000          .BYTE  0,0
12299  063410  061156             .WORD  DH101
12300  063412  007  000          .BYTE  7,0
12301  063414  061245             .WORD  DH102
12302  063416  002  000          .BYTE  2,0
12303  063420  061326             .WORD  DH106
12304  063422  000  000          .BYTE  0,0
12305  063424  061306             .WORD  DH104
12306  063426  002  000          .BYTE  2,0
12307
12308  063430  000002        DF23: .WORD  2
12309  063432  000  000          .BYTE  0,0
12310  063434  062465             .WORD  DH800
12311  063436  001  000          .BYTE  1,0
12312
12313  063440  000001        DF24: .WORD  1
12314  063442  002  000          .BYTE  2,0
12315
12316  063444  000000        DF25: .WORD  0
12317  063446  007  000          .BYTE  7,0
```

```
12318
12319  063450  000002                  DF26:   .WORD   2
12320  063452     002      000                .BYTE   2,0
12321  063454  061454                        .WORD   DH203
12322  063456     010      000                .BYTE   10,0
12323
12324  063460  000005                  DF27:   .WORD   5
12325  063462     000      000                .BYTE   0,0
12326  063464  061156                        .WORD   DH101
12327  063466     007      000                .BYTE   7,0
12328  063470  061245                        .WORD   DH102
12329  063472     002      000                .BYTE   2,0
12330  063474  062142                        .WORD   DH703
12331  063476     000      000                .BYTE   0,0
12332  063500  062126                        .WORD   DH702
12333  063502     002      000                .BYTE   2,0
12334
12335  063504  000005                  DF30:   .WORD   5
12336  063506     000      000                .BYTE   0,0
12337  063510  061156                        .WORD   DH101
12338  063512     007      000                .BYTE   7,0
12339  063514  061245                        .WORD   DH102
12340  063516     002      000                .BYTE   2,0
12341  063520  062206                        .WORD   DH705
12342  063522     000      000                .BYTE   0,0
12343  063524  062166                        .WORD   DH704
12344  063526     004      000                .BYTE   4,0
12345
12346  063530  000005                  DF31:   .WORD   5
12347  063532     000      000                .BYTE   0,0
12348  063534  061156                        .WORD   DH101
12349  063536     007      000                .BYTE   7,0
12350  063540  061245                        .WORD   DH102
12351  063542     002      000                .BYTE   2,0
12352  063544  062222                        .WORD   DH706
12353  063546     000      000                .BYTE   0,0
12354  063550  062265                        .WORD   DH710
12355  063552     003      000                .BYTE   3,0
12356
12357  063554                          RWBUF:                  ;READ/WRITE DATA BUF <AT LEAST 1536(DEC) WORDS>
12358
12359  063554  005015  020040  020040  NOTMSG: .ASCII  <15><12>/          *** NOTE ***/<15><12><12>
12360  063562  020040  020040  020040
12361  063570  025052  020052  047516
12362  063576  042524  025040  025052
12363  063604  005015     012
12364  063607     101  046114  042040          .ASCII  /ALL DRIVES TO BE TESTED MUST HAVE :/<15><12><12>
12365  063614  044522  042526  020123
12366  063622  047524  041040  020105
12367  063630  042524  052123  042105
12368  063636  046440  051525  020124
12369  063644  040510  042526  035040
12370  063652  005015     012
12371  063655     061  020056  020101          .ASCII  /1. A 20 OR 22 SECTOR FORMATTED CARTRIDGE/<15><12>
12372  063662  030062  047440  020122
12373  063670  031062  051440  041505
```

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12374  063676  047524  020122  047506
12375  063704  046522  052101  042524
12376  063712  020104  040503  052122
12377  063720  044522  043504  006505
12378  063736     012
12379  063727     062  020056  042510          .ASCII  /2. HEADS MANUALLY LOADED/<15><12>
12380  063734  042101  020123  040515
12381  063742  052516  046101  054514
12382  063750  046040  040517  042504
12383  063756  006504     012
12384  063761     063  020056  042504          .ASCII  /3. DESIRED PORT SELECTED/<15><12>
12385  063766  044523  042522  020104
12386  063774  047520  052122  051440
12387  064002  046105  041505  042524
12388  064010  006504     012
12389  064013     064  020056  051127          .ASCII  /4. WRITE LOCK DISABLED/<15><12>
12390  064020  052111  020105  047514
12391  064026  045503  042040  051511
12392  064034  041101  042514  006504
12393  064042     012
12394  064043     065  020056  051104          .ASCII  /5. DRIVE READY LIGHT ON/<15><12><12>
12395  064050  053111  020105  042522
12396  064056  042101  020131  044514
12397  064064  044107  020124  047117
12398  064072  005015     012
12399  064075     104  044522  042526          .ASCII  /DRIVES NOT TO BE TESTED MUST HAVE BOTH/<15><12>
12400  064102  020123  047516  020124
12401  064110  047524  041040  020105
12402  064116  042524  052123  042105
12403  064124  046440  051525  020124
12404  064132  040510  042526  041040
12405  064140  052117  006510     012
12406  064145     120  051117  051524          .ASCII  /PORTS DE-SELECTED./<15><12><12>
12407  064152  042040  026505  042523
12408  064160  042514  052103  042105
12409  064166  006456  005012
12410  064172  046120  040505  042523          .ASCII  &PLEASE NOTE THAT THE DEFAULT VERSION OF READ/WRITE&<15><12>
12411  064200  047040  052117  020105
12412  064206  044124  052101  052040
12413  064214  042510  042040  043105
12414  064222  052501  052114  053040
12415  064230  051105  044523  047117
12416  064236  047440  020106  042522
12417  064244  042101  053457  044522
12418  064252  042524  005015
12419  064256  040504  040524  052040          .ASCII  /DATA TEST 21 TAKES ABOUT 10 MIN, (20 FOR RK07),/<15><12>
12420  064264  051505  020124  030462
12421  064272  052040  045501  051505
12422  064300  040440  047502  052125
12423  064306  030440  020060  044515
12424  064314  026116  024040  030062
12425  064322  043040  051117  051040
12426  064330  030113  024467  006454
12427  064336     012
12428  064337     122  043505  051101          .ASCII  /REGARDLESS OF THE PASS NUMBER./<15><12><12>
12429  064344  046104  051505  020123
```

```
12430   064352  043117  052040  042510
12431   064360  050040  051501  020123
12432   064366  052516  041115  051105
12433   064374  006456  005012
12434   064400  047506  020122  030065          .ASCIZ  /FOR 50 HZ CPU OPERATION, PATCH LOC. 166 = 1./<15><12><12>
12435   064406  044040  020132  050103
12436   064414  020125  050117  051105
12437   064422  052101  047511  026116
12438   064430  050040  052101  044103
12439   064436  046040  041517  020056
12440   064444  033061  020066  020075
12441   064452  027061  005015  000012
12442
12443
12444
12445           000001                  .END
```

```
ABASE = 177440          2012#   2104    2145    4555
ABORT = 000200          4071#   6962    8875    9228    9233    9316    9341    9429    9439    9444    9449    9454    9462
                        9468    9478    9516
ABOVE   012044          4353#   5836
ABOVE1  012101          4358#   5929
ABOVE3  012201          4370#   6083
ABVMX1  003172          3458#   5809*   5834    5899*   6054*   7721*   7902
ABVMX2  003174          3459#   5919*   6072*   7722*   7917
ACDW1 = 000000          2104
ACDW2 = 000000          2104
ACLO  = 000010          3059#   9278
ACPUOP= 000000          2104    2119
ADDW0 = 000000          2104
ADDW1 = 000000          2104
ADDW10= 000000          2104
ADDW11= 000000          2104
ADDW12= 000000          2104
ADDW13= 000000          2104
ADDW14= 000000          2104
ADDW15= 000000          2104
ADDW2 = 000000          2104
ADDW3 = 000000          2104
ADDW4 = 000000          2104
ADDW5 = 000000          2104
ADDW6 = 000000          2104
ADDW7 = 000000          2104
ADDW8 = 000000          2104
ADDW9 = 000000          2104
ADEVCT= 000000          2104    2110
ADEVM = 000377          2013#   2104    2146
AENV  = 000000          2104    2115
AENVM = 000000          2104    2116
AFATAL= 000000          2104    2107
ALDRVS  010163          4171#   4622
ALLDRV  014444          4561    4631    4732#
ALLTRM  043760          6963    8883    9317    9452    9459#
ALNCYL= 000365          4064#
ALNPAK  007722          4141#   7028
AMADR1= 000000          2104    2132
AMADR2= 000000          2104    2136
AMADR3= 000000          2104    2139
AMADR4= 000000          2104    2142
AMAMS1= 000000          2104    2126
AMAMS2= 000000          2104    2134
AMAMS3= 000000          2104    2137
AMAMS4= 000000          2104    2140
AMSGAD= 000000          2104    2112
AMSGLG= 000000          2104    2113
AMSGTY= 000000          2104    2106
AMTYP1= 000000          2104    2127
AMTYP2= 000000          2104    2135
AMTYP3= 000000          2104    2138
AMTYP4= 000000          2104    2141
ANYDER= 100000          4077#   7020    8943    9504
APASS = 000000          2104    2109
APRIOR= 000000          2104
```

```
APTCSU= 000040  10841  11501#
APTENV= 000001   6420  10834  11280  11457  11499#
APTPAS  025570   6415   6420#
APTSIZ= 000200   4478  11498#
APTSPO= 000100  10836  11459  11500#
ASKMDE  015344   4900#  4905   4906   4911   4926   4931   4936   4953   4975   4999   5013   5024   5033
                 5049   5068   5077   5103   5126   5198   7351
ASKTMD  014600   4782#  4785   4786   4791   4815   4823   4829   4845   4856   4865   4890
ASKTST  014574   4698   4781#
ASWREG= 000000   2104   2117
AS2SP2  056354   8990  11669#
ATESTN= 000000   2104   2108
AUNIT = 000000   2104   2111
AUSWR = 000000   2104   2118
AVECT1= 120210   2011#  2104   2143   4554
AVECT2= 000000   2104   2144
AVGEQ   011774   4345#  7987
AVGSEK  0116     4322#  5978
A.ABNL  0030     3340#  6882#  6969#  6973#  8438#  8527#  8544#  8553#  9204#  9460#  9473#  9475#  10402
A.CONT  00305    3341#  10412
A.NORM  003044   3339#  6883#  9205#  9461#  10406
BADDRV  007650   4132#  6976#  6977#  6978   6990#  6991#  6992   6998#  6999#  7000   7025#  7026#  7027
BADSEC= 001000   4073#  8245   8816   8824   9406   9509
BAD632  012362   4392#  7022
BAI   = 000020   3018#  10571
BA16  = 000400   2994#
BA17  = 001000   2995#
BDSCHD  037140   8527   8544   8558#
BDSECT  011450   4300#  8576
BDSRCK  040212   8243   8806#  9405
BELOW   012007   4348#  5830
BGNRTY  044152   9128   9471   9477   9502#
BITO  = 000001   1903#  2991   3008   3034   3056   3204   3348   3441   4639   4737   6151   7390   8119
                 8136   8151   8190   8207   8261   8303   8860   8865   9087  10686
BITOO = 000001   1893#  1903
BITO1 = 000002   1892#  1902   5710
BITO2 = 000004   1891#  1901
BITO3 = 000010   1890#  1900   5823   5926   6080
BITO4 = 000020   1889#  1899
BITO5 = 000040   1888#  1898
BITO6 = 000100   1887#  1897
BITO7 = 000200   1886#  1896   5455   7518   7705
BITO8 = 000400   1885#  1895   7546
BITO9 = 001000   1884#  1894   5696  11290  11421
BIT1  = 000002   1902#  3009   3036   3205   3349   3442   4065   6319   9091
BIT10 = 002000   1883#  2996   3025   3047   3082   3096   3109   3124   3138   3217   3358   4074   9120
                11268
BIT11 = 004000   1882#  2997   3026   3048   3067   3083   3097   3110   3125   3139   3218   4075  11428
BIT12 = 010000   1881#  2999   3027   3049   3084   3098   3111   3112   3126   3140   3219   4076   8863
                 9002   9030
BIT13 = 020000   1880#  3000   3028   3050   3068   3085   3099   3113   3127   3141   3220   6862   6864
                 8142   8145   8216   8219  11275
BIT14 = 040000   1879#  3001   3029   3051   3069   3086   3100   3114   3128   3142   3221   3359  11403
BIT15 = 100000   1878#  3002   3003   3030   3052   3070   3087   3147   3222   3360   4077   5010   7281
                 9123
BIT2  = 000004   1901#  3010   3037   3038   3058   3206   3350   3443   4066   6325   9095
```

```
BIT3   = 000010  1900#  3016  3017  3039  3059  3207  3351  3444  4067  6321  9102
BIT4   = 000020  1899#  3011  3018  3040  3060  3061  3076  3118  3132  3208  3352  3445  4068
                 5308   6313  9106
BIT5   = 000040  1898#  3019  3020  3041  3062  3077  3091  3104  3119  3133  3209  3353  4069
                 6262   6309  6462  8967  9110  10483
BIT6   = 000100  1897#  2992  3021  3042  3063  3078  3092  3105  3120  3134  3210  3355  4070
                 4822   5012  5032  6159  6391  6467  6500  8288
BIT7   = 000200  1896#  2993  3022  3043  3064  3065  3079  3093  3106  3121  3135  3212  4071
                 4552   4734  5284  5287  6980  8861  8888  9606  9609
BIT8   = 000400  1895#  2994  3023  3044  3045  3066  3080  3094  3107  3122  3136  3213  3356
                 4072   9114
BIT9   = 001000  1894#  2995  3024  3046  3081  3095  3108  3123  3137  3214  3357  4073  5293
                 6646   9117  11380
BKSLSH  012463   4404#  7147  7155
BLDEXH  045012   9357   9382  9653#
BLWMIN  003170   3457#  5803*  5828  7720*
BPTVEC= 000014   1910#
BSE    = 000200  3043#  8558  9397  9836  10002  10238
BSERR  = 000002  4065#  6141  8738  9399  9409  9502
BSFACT  004232   3475#  8526  8574  8807
BSSOFT  003232   3474#  8538  8607  8812  8814
BUFFO   005272   3484#  4598  4629  4632  4681  4702  4706  4708  4713  4724  4728  4789  4792
                 4795   4798  4833  4835  4866  4869  4871*  4876  4894  4909  4912  4915  4918
                 4921   4967  4970  4973  5053  5055  5087  5104  5130  5137  5147  5149  5152
                 5157   5166  5204  5207  6591  6595  7150  7164*  7169*  7170  7174*  7291  7293
                 7313   7316  7318*  7323  7339
BUFPRT  005502   3487#
B.BA16= 000001   3008#  10565
B.BA17= 000002   3009#  10565
B.CDT  = 000004  3010#  5256  6966  10219  10565
B.CFMT= 000020   3011#  5295  5741  5749  5769  7017  7485  8516  9611  10219  10565  10649
CALBRT  032712   5734   5875  5957  6029  7632#
CART    011401   4292#  7495
CCLR   = 100000  3003#  10172
CDT    = 002000  2996#  6951  9978  10528  10585  10636  10659
CERR   = 100000  3007#  9366  9391  9874  9933  9992  10174  10225  10540  10596  10684
CFMT   = 010000  2994#  5750  5770  9632  9665  9978  10528  10585  10636  10659
CHGTST  015016   4797   4826#  4830  4837
CHKITR  030530   5342   5366  5392  5440  5479  5527  5583  5619  5643  5676  5726  5867  5949
                 6021   6098  6181  6256  7063#
CHKLIM  035762   6274   6301  8322#
CHKLST  014522   4605   4687  4730  4747#
CHKPRM  031630   5093   5172  7372#
CHKXDP  027000   4955   6737#
CLEAR  = 000105  2962#
CLKFAL  011556   4316#  7644
CLKOF   032670   7609#  7686
CLKON   032614   7588#  7639
CLOCK   032664   4525   7603#
CLR    = 000040  3019#
CLRPRM  027622   6887   6905#
CMDTO  = 000100  3210#  9251  9566  9735
CMPBUF  035054   6327   8177#
CMPTIM  033624   5892   5912  6047  6065  7840#
CMSTRT  012606   4429   4433  4438#  9493
CNTRDY  010071   4160#  4683  8451
```

```
CNTRLC  012426          4398*   6466    7118
CNTRLG  012452          4402*   6480    7136
CNTRLR  012440          4400*   6476
CNTRLU  012445          4401*   7130
CNTRLZ  012433          4399*   6472    7124
CNVTIM  034136          5776    7763    7940*
COE    = 001000         3046*   9323    9836   10002   10238
COMMA   012465          4405*   4644
COMSTR  005246          3478*   8908    8923    9521
CONCLR= 000176          2980*   8877   10667
CONERR  041460          3341    9083*
CR     = 000015         1818*   4081    4084    4367    4377   10880   10890
CRLF   = 000200         1819*  10851   10890
CRMPHO  005270          3483*   8251    8918    8920*
CRMPLO  005266          3482*   8252    8919    8921*
CRTSER  032254          5307    7484*
CR2LF   012457          4403*   8989    9001    9025
CS      005770          3607*   5308    5823    5926    6080    8967
CTLOUT  036332          5781    5889    5909    6044    6062    8422*   8852
CTO    = 004000         2997*   9286   10234
CYLNDR  005514          3492*   5452*   5455    5458    5460*   5625    5681*   5688    5695*   5696    5699*   5706    5710
                        7574*   7575*   7576    7578*
C.INIT  050570          7759    8893   10445*
C.RTRN  052442         10549   10577   10605   10612   10615   10622   10626   10643   10665   10670   10680   10689   10702
                       10706   10711*
C.SPEC  051462         10485   10581*
DASTRT  012556          1975    4431*
DCK    = 100000         3052*   8558    9411    9836   10002   10238
DCKERR= 000020          4068*   9413    9502
DCLO   = 000020         3061*
DDISP  = 177570         1825*   2042    4466
DDT    = 000400         3066*
DERCNT  003121          3417*   9350    9375    9420    9431
DESL   = 000010         3016*
DFLTST  005670          3567*   3587    4820    4839    4842    4863    4888
DFQUES  011034          4249*   5046
DFSTRT  012522          1969    4423*
DFTEST  010374          4195*   4826
DF01    062620          2169    2175    2181    2187    2229    2337    2607    2643   12094*
DF02    062650          2193    2211    2217    2223    2235    2241    2247    2253    2259    2265    2271    2277    2283
                        2289    2295    2301    2355    2361    2367    2475    2481    2487    2493    2499    2505    2511
                        2517    2523    2529    2571    2589    2613   12108*
DF03    062704          2199    2205    2577    2583   12123*
DF04    062744          2331   12140*
DF05    062760          2307    2313   12147*
DF07    063014          2319   12162*
DF10    063050          2325   12177*
DF11    063074          2625   12188*
DF12    063114          2373    2379    2385    2391    2397    2403    2409    2415   12197*
DF13    063144          2421    2433   12210*
DF14    063174          2427   12223*
DF15    063224          2439   12236*
DF16    063270          2445   12255*
DF17    063334          2463   12274*
DF20    063360          2631   12285*
DF21    063370          2541   12290*
```

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DF22    063400          2637   12295#
DF23    063430          2547    2553    2559   12308#
DF24    063440          2565   12313#
DF25    063444          2469    6148#   8179#   8233#  12316#
DF26    063450          2619   12319#
DF27    063460          2595   12324#
DF30    063504          2649    6664#  12335#
DF31    063530          2655   12346#
DH100   061005          2167    2173    2179    2185    2191    2197    2203    2209    2215    2221    2227    2233    2239
                        2245    2251    2257    2263    2269    2275    2281    2287    2293    2299    2305    2311    2317
                        2323    2329    2335    2353    2359    2365    2371    2377    2383    2389    2395    2401    2407
                        2413    2419    2425    2431    2437    2443    2461    2473    2479    2485    2491    2497    2503
                        2509    2515    2521    2527    2569    2575    2581    2587    2593    2605    2611    2641    2647
                        2653   11920#  12297
DH101   061156          9006   11940#  12097   12110   12125   12142   12149   12164   12179   12199   12212   12225   12238
                       12257   12276   12299   12326   12337   12348
DH102   061245          9017   11950#  12099   12112   12127   12144   12151   12166   12181   12201   12214   12227   12240
                       12259   12278   12301   12328   12339   12350
DH103   061263          2629   11953#
DH104   061306         11957#  12287   12305
DH105   061023          9004   11923#
DH106   061326         11960#  12303
DH200   061036         11925#  12101   12114   12129   12203   12242   12261
DH201   061350         11963#  12103   12116   12131   12205   12244   12263
DH202   061437         11973#  12118   12135   12246   12265
DH203   061454         11976#  12120   12137   12252   12271   12321
DH204   062317         12054#  12207
DH500   061053         11928#  12105
DH501   061104         11933#  12133   12250   12269
DH502   062355         12060#  12220   12233   12267
DH503   062414         12066#  12248
DH601   061550         11986#  12153   12216   12229
DH602   061567         11989#  12157
DH604   061624         11994#  12168   12183   12190
DH6041  061652          8577   11998#  12170   12185   12192
DH6042  061701          2563   12002#
DH605   061717          2539   12005#  12172
DH6051  061734         12008#  12174   12292
DH606   061771         12013#  12155   12159   12218   12231
DH607   062017         12017#
DH701   062037          6147#   8178#   8232#  12020#  12194
DH702   062126          2617   12030#  12282   12332
DH703   062142         12032#  12330
DH704   062166          6665#  12036#  12343
DH705   062206         12039#  12341
DH706   062222         12041#  12352
DH707   062235         12043#
DH710   062265         12048#  12354
DH711   062303         12051#  12280
DH800   062465         12073#  12310
DI     = 040000          3001#   7788   10022   10694
DISPLA  001142          2042#   4466#   4474#  11267#  11441#
DISPRE  000174          1966#   4474
DLT    = 100000          3030#   9343    9830    9960    9996   10236
DL~FLG  003142          3434#
DMD    = 000040          3077#
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DONE    003123  3419* 8853* 8896  8942* 9084* 9198* 9535* 9538*
DOTIM   003133  3427* 4520* 4527* 5731  5872  5954  6026  7646*
DRA   = 000001  3056* 9825  10608
DRDY  = 000200  3065*
DRIV    011374  4291* 7453
DRIVE   005510  3490* 4750* 5215* 5222* 5223  5226  5301  6440  6890  6891  6936  6946  6976
                6990  6998  7025  8859  8868  8878  8886  12077
DRNAFG  003137  3431* 8854* 9097
DRNAVL= 010000  4076*
DROPDR  011310  4281* 8973
DRO   = 000040  3062* 9333
DRPAR = 000010  3039* 9273
DRPDRV= 002000  3217* 10470
DRVCAL  040316  5282  5349  5743  5881  5963  6035  6121  6133  6136  6196  6212  6331  6889
                6971  7005  7007  7019  7047  7452  7494  7521  7530  7772  8025  8441  8480
                8483  8529  8546  8734  8849* 9474  9520  9530  9565  9602  9604
DRVDSC= 000040  3209* 9441  9910  10076 10138
DRVERS  003130  3424* 4486* 5220* 8966* 8970  8972* 9482*
DRVHRD= 000020  3208* 9436  9917  10112 10243
DRVLST  005606  3520* 4640  4659  4671  4718  4726* 4738* 4741* 4748  4760* 5227
DRVMSK= 000007  3015* 9819  9860  10011 10456
DRVNO   011370  4290* 5301* 5302*
DRVPDT= 000004  3206* 10018 10086
DRVPOS= 000002  3205* 10018 10045 10507
DRVSEQ  007634  4130* 4636
DRVSER  032134  5306  7449*
DRVSZD= 010000  3219* 9264  9848  10610
DRVTST  013732  4426  4603  4619* 4624  4625  4626  4634  4691  4692  4784  4812  4828  4855
                4904  4996  5021  5048  5076  5125  5197  7348  8430
DRVUSE= 000001  3204* 10470
DRY   = 000200  3064*
DR.CLR= 000005  2987* 9898  10061 10103 10127 10241
DR.SEL= 000001  2986* 9968  10047 10362 10369 10376 10383 10587
DROXDP  010134  4167* 6943
DSC   = 040000  3069*
DSWR  = 177570  1824* 2041  4465
DTBAII= 100000  3222* 10470 10569
DTE   = 010000  3049* 8558  9338  10238
DTYE  = 000040  3041* 6964  9301  10238
DTYLST  005616  3531* 4755* 5231
DT100   062504  2168  2174  2180  2186  2192  2198  2204  2210  2216  2222  2228  2234  2240
                2246  2252  2258  2264  2270  2276  2292  2288  2294  2300  2306  2312  2318
                2324  2330  2336  2354  2360  2366  2372  2378  2384  2390  2396  2402  2408
                2414  2420  2426  2432  2438  2444  2462  2474  2480  2486  2492  2498  2504
                2510  2516  2522  2528  2570  2576  2582  2588  2594  2606  2612  2636  2642
                2648  2654  12077*
DT102   062522  12080*
DT103   062614  2630  12092*
DT201   062526  12081*
DT202   062544  2618  12084*
DT203   062550  12085*
DT601   062570  2540  2546  2552  2558  2564  2624  12088*
DT602   062576  2468  12089*
DUACES  010654  4227* 4497
DULACS  003136  3430* 4424* 4431* 4436* 4495  4696  5312  6328  6739  7065  8856
DUNPAS  025442  5225  6390*
```

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DZR6M   007226          4079#   4488
ECCNC = 000040          4069#   9416
ECCW  = 020000          3085#
ECH   = 000100          3042#   9414    9836   10002   10238
ECOBAD  026060          4816    5000    5025    6514#
EMTVEC= 000030          1913#   4449*   4450*
EM1     056361          2166   11670#
EM10    056530          2208   11691#
EM100   060264          2556   11856#
EM101   060307          2562   11860#
EM102   060365          2568   11868#
EM103   060431          2574   11875#
EM104   060457          2580   11879#
EM105   060501          2586   11883#
EM106   060532          2592   11888#
EM107   060565          2598   11893#
EM11    056537          2214   11693#
EM110   060630          2604   11899#
EM111   060663          2610   11904#
EM112   060704          2616   11907#
EM113   060726          2640   11910#
EM114   060754          2646   11914#
EM115   060771          2652   11917#
EM12    056552          2220   11695#
EM13    056564          2226   11697#
EM14    056574          2232   11699#
EM15    056614          2238   11702#
EM16    056630          2244   11704#
EM17    056640          2250   11706#
EM2     056400          2172   11673#
EM20    056655          2256   11709#
EM21    056670          2262   11711#
EM22    056701          2268   11713#
EM23    056714          2274   11715#
EM24    056731          2280   11718#
EM25    056745          2286   11721#
EM26    056764          2292   11724#
EM27    056776          2298   11726#
EM3     056416          2178    2658   11676#
EM30    057013          2304    2424   11729#
EM31    057025          2310    2430   11731#
EM32    057041          2316   11734#
EM33    057056          2322   11737#
EM34    057072          2328    2628   11739#
EM35    057112          2334   11742#
EM36    057144          2340   11747#
EM37    057173          2346   11751#
EM4     056434          2184   11679#
EM40    057234          2352   11757#
EM41    057300          2358   11763#
EM42    057330          2364   11767#
EM43    057360          2370   11771#
EM5     056453          2190   11682#
EM52    057411          2412   11776#
EM53    057426          2418   11779#
EM56    057443          2436    2442   11782#
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EM6      056472            2196   11685#
EM60     057462            2448   11785#
EM61     057514            2454   11790#
EM62     057544            2460   11794#
EM63     057560            2376    2472   11796#
EM64     057616            2382    2478   11801#
EM65     057644            2388    2484   11805#
EM66     057666            2394    2490   11808#
EM67     057705            2400    2496   11811#
EM7      056511            2202   11688#
EM70     057744            2406    2502   11817#
EM71     060011            2508   11824#
EM72     060044            2514   11829#
EM73     060077            2520   11834#
EM74     060117            2526   11837#
EM75     060131            2532   11839#
EM76     060161            2538   11844#
EM77     060243            2544    2550   11853#
ENTLCI   010346            4191#   4782
ENTPAS   011242            4274#   5195
EQUALS   012510            4414#   7250
ERRCNT   003126            3422#   4425*   4602*   7044*   8945*   8947    8950    8952*   9085*   9199*   9483*   9491*   9511
                           9514
ERRCOM   005506            3489#   9136*   9137*  12077
ERRFRE   040716            3339    6883    8942#   9461
ERRHDL   042164            3340    6435    6882    6973    8438    8553    8560    9197#   9460    9475
ERRLMT   003127            3423#   9511
ERRVEC=  000004            1906#   4463    4464*   4475*   4483*   4484*   6659*   6660*  11408   11409*  11411*  11414*  11522
                          11523   11527*  11532*  11544*  11549*  11558*  11568*  11569*
ER2ENT   042204            9201#   9263    9371    9396    9480
EXPLAN   010500            4207#   4899
E.CCLR=  000001            3348#  10177
E.CERR=  001000            3357#  10251
E.CLAT=  000020            3352#   9903   10067   10108   10132
E.CMTO=  040000            3359#
E.CONT   003052            3342#   9087    9091    9095    9102    9106    9110    9114    9117    9120    9123    9127*   9802*
                           9840*   9903*   9913*   9984*  10006*  10029*  10035*  10067*  10108*  10132*  10177*  10229*  10251*
                          10390*  10624*  10678*  10686*  10699*
E.DLT =  000400            3356#   9984
E.DPAR=  002000            3358#   9913   10390
E.ILLD=  000100            3355#  10678
E.MDS =  100000            3360#   9802   10229   10624
E.NOAT=  000002            3349#  10029
E.SCLR=  000040            3353#  10699
E.UATT=  000004            3350#  10035
E.UDAT=  000010            3351#   9840   10006
E.UNLD=  020000            3220#   9921   10041   10116   10126
FACTBS   011423            4296#   8575
FC       005732            3592#   5372    5485    5488    5498    5501    5505    5533    5536    5538    5548    5551    5555
                           5559    5588    5594    6104    6106    6187    6290    6358
FDTERM   033514            5971    7798#
FINADR   034450            8062#   8238
FINCYL   005574            3511#   8092*   8240    8265    8271
FINMEM   037336            8619#   8669
FINSEC   005577            3513#   8080*   8242    8269    8273
FINTRK   005576            3512#   8090*   8241    8267    8272
```

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FMTE   = 000020            3040#   9305   10238
FNDXDP   026726            6713#   6761
FORMAT   003125            3421#   5289*   5295*   6114    6892    7486    8072    8332    8521    8541    8646    9612
FORWRD   011722            4335#   5998    7896
FS       005516            3493#   5290*   5296*   6189    6298
FT       005740            3595#   4932    6105    6107    6297
GETAVG   033676            5924    6078    7862#
GETPRM   026260            4571    4576    4585    6577#   6617
GETXDP   027262            4540    6370    6812#   8433
GNS    = ****** U          1965   11655   11656   11657   11658   11659   11662   11663   11664   11665
GO     = 000001            2991#   6949    6951
GTPKAD   044666            9422    9433    9622#
GTPRMS   037710            8714#   8746
GTSWRG   026370            4515    6613#   7137    8456
GTO      037722            8710    8713    8717#
HCRC   = 000400            3044#
HDR.AD   003070            3382#   9954    9958*  10648*
HDR.CT   003072            3383#   9962*  10651*  10654*
HIERAD=  177742            1957#
HIGOCT   005500            3486#   5091*   5171*   7221*   7224*   7377    7392    7397    7404
HLPOVL   003146            3439#   4487*
HLTPRG   044134            4664    6667    8452    8537    9489#   9517
HLTRQD   010121            4165#   8450
HOLD1    017764            5243#   5266*   5321#   7578
HOLD2    017766            5244#   5267*   5322#   5404
HOLD3    017770            5245#   5268*   5283    5323#   9605
HOLD4    017772            5246#   5269*   5286    5324#   9608
HOLD5    017774            5247#   5270*   5325#   5752
HOLD6    017776            5248#   5271*   5326#   5984
HOLD7    020000            5249#   5272*   5327#   5985
HT     = 000011            1816#  10849   10890
HVRC   = 000400            3045#   8558    9372    9836   10002   10238
HVRCER=  000004            4066#   9374    9502
HZ       000166            1971#   7593    7675
H.HEAD   003075            3386#
IC       005736            3594#   5490    5494    5500    5504    5540    5544    5550    5554    5596    5597    5601    5602
                           6360    6364
IDAE   = 002000            3047#   9328
IE     = 000100            2992#   4684    6945    6984    7775    9362    9387   10182   10246   10534   10575   10641   10708
ILC    = 000001            3034#   9289   10238
ILF    = 000004            3037#   9297
INCRMA   036626            8492#
INCRSC   037422            8631    8645#   8673
INITMM   026422            6633#   6678    6839
INITSS   027522            4686    5280    5299    5345    5369    5395    5443    5482    5530    5586    5622    5646    5679
                           5729    5870    5952    6007    6024    6101    6184    6259    6882#   6935    6967    7450    7484
                           8515
INIVRB   033204            5737    5878    5960    6032    7720#
INPUTP   015340            4699    4800    4899#   8446
INTCHR   005532            3499#   4808    4810    4813    4992    4994    4997    5017    5019    5022    5221*   5311*   6463#
                           6482    6499*   6514    8424    8428    8435*   8444    8448    8454
INTMSK   003101            3391#   9877    9901    9922    9947   10033   10065   10106   10117   10130   10401*  10405*  10409*
                          10458*  10544
INTR   = 000300            2982#
IOTVEC=  000020            1911#   4447*   4448*
IR     = 000100            3021#
```

```
IS      005756          3602*   6349
IT      005744          3597*   6353
I.AERR  047152         10053   10059   10077   10086*
I.ATTN  046502          9813    9857    9990*
I.CCLR  047536          9891    9941   10172*  10244   10604   10669
I.CSTS  050170          9884   10319*
I.CSTI  050212          6959    8880    9888    9940   10323*  10593
I.DRV   003102          3395*   8884   10458   10459
I.ERR   045724          9885    9889*
I.ERRA  045704          9884*   9952
I.ERRC  045712          9822    9875    9887*  10020
I.HDAL  046150          9868    9931*
I.INTR  045270          4501    5841    5850    7768    7787    9792*
I.ISRL  003074          3385*   9806    9809*   9812*  10183*  10480*  10634*  10707*
I.ISSU  047620          9899    9969   10048   10062   10104   10128   10214*  10363   10370   10377   10384
I.IOO   045550          9810    9827    9854*
I.RTRN  047520          9804    9842    9852    9880    9892    9897    9900    9906    9915    9924    9927    9942    9944
                        9970    9973    9982    9986   10008   10024   10031   10037   10049   10063   10070   10082   10102
                       10105   10110   10119   10122   10129   10134   10143*
I.STAT  050274          9896\  10101   10360*  10614
I.STOR  050042         10224   10274*
I.UNLD  047420         10043   10126*
KBDHDL  025700          4498    6455*
KIPAR0= 172340          1944*   6635   11508   11536
KIPAR1= 172342          1945*
KIPAR2= 172344          1946*
KIPAR3= 172346          1947*
KIPAR4= 172350          1948*
KIPAR5= 172352          1949*
KIPAR6= 172354          1950*   6847*   6865*   8135*   8144*   8206*   8214    8218*
KIPAR7= 172356          1951*  11552
KIPDR0= 172300          1933*
KIPDR1= 172302          1934*
KIPDR2= 172304          1935*
KIPDR3= 172306          1936*
KIPDR4= 172310          1937*
KIPDR5= 172312          1938*
KIPDR6= 172314          1939*
KIPDR7= 172316          1940*
KTERHD  026510          4503    6655*
LASTWC  005600          3514*   8063    8237*
LC      005734          3593*   5237*   5260*   5351    5375    5488    5491    5495    5498    5538    5541    5545    5548
                        5589    5594    5598    5603    6358    6361    6365
LCM1    017756          5235*   5258*   5318*   8368
LCM5    017754          5234*   5257*   5317*   8323
LCP1    017762          5242*   5265*   5320*   5965    6345
LCVEC   003160          3452*   4532
LEV2ER= 000400          4072*   9201    9256    9353    9359    9378    9384    9476    9536
LF    = 000012          1817*   4081    4084    4367    4377   10884   10890
LIM1    012334          4387*   5831
LIM2    012347          4389*   5837
LKS     003150          3448*   4531   7590*   7611*
LODBUF  034626          6307    8110*
LODFLS  015062          4668    4834    4839*
LODFPT  016244          4846    5054    5059*
LODP14  034412          6264    8039*
```

```
LODSEC  034304  6120  6131  6195  6210  8001*  8023
LOERAD= 177740  1956*
LOWOCT  005476  3485*  5090*  5170*  7220*  7225  7382  7384  7387  7390  7395  7400  7403
LS      005520  3494*  5291*  5297*  6350
LSTCYL  017760  5238*  5261*  5319*  5900  5923  5976  6038  7490  7576  8328  8357  8380  8518
LSTMEM  007413  4101*  6560
LSTTRK= 000002  4063*  7014  7491
LSTTST  014700  4794  4803*
LT      005742  3596*  4932  6355
MA      005762  3604*  4944  4946  6278  6279  6282  6283  6746  6757  6759  6764  6772  7427
                7429  8502*  8503*  8504*  8711  8712
MAHILM  006126  3663*  4947  4950  6532*  6533*  6547*  6548*  6561  6713  6717  6719  6784  6787
                7425  7426
MAPH00= 170202  1954*  8920
MAPL00= 170200  1953*  6695  8921
MAWRDC  010710  4232*  7407
MAXEQ   011765  4343*  7974
MAXHI1= 000000  4050*  5804
MAXHI2  007220  4054*  5251*  5275*  5894  5914
MAXHI3= 000000  4056*
MAXHI4  007224  4060*  5253*  5277*  6049  6067
MAXIH1  003220  3469*  5790  5795*  5991  7730*  7828*
MAXIH2  003230  3473*  5993  7734*  7825*
MAXIL1  003216  3468*  5793  5796*  5832  5990  7729*  7900
MAXIL2  003226  3472*  5992  7733*  7827*  7915
MAXL01= 062031  4049*  5807
MAXL02  007216  4053*  5250*  5274*  5897  5917
MAXL03= 112160  4055*
MAXL04  007222  4059*  5252*  5276*  6052  6070
MAXSEK  011675  4331*  6082
MCLK  = 000400  3080*
MDFLAG  003116  3414*  4423*  4432*  4435*  4548  4666  4844  5064  6941  7067  8426
MDFY15  011167  4266*  7284
MDS   = 001000  3024*  6955  9800  10227  10602
MEMABT  003145  3437*
MEMCSR= 172100  1955*
MEMSYS= 177744  1958*
MEMVEC= 000114  3434*
MERD  = 001000  3081*
MESMSK= 000017  3074*
MEWD  = 002000  3082*
MICROS  012003  4347*  7965  7978  7991
MIDXFR  037466  8668*  8741
MIND  = 000200  3079*
MINEQ   011756  4341*  7961
MINHI1= 000000  4048*  5798
MINIH1  003214  3467*  5783  5788*  7728*
MINIH2  003224  3471*  7732*
MINIL1  003212  3466*  5786  5789*  5826  5891  6046  7727*  7897
MINIL2  003222  3470*  5911  6064  7731*  7912
MINL01= 057467  4047*  5801
MMVEC = 000250  1922*  4503*  4504*
MODP15  031304  5096  5175  7273*
MSP   = 000100  3078*
MXWRDC  032060  7406  7425*
M.CADD= 017760  3150*
```

```
M.CDIF= 017760  3149#
M.DPID  053244  5986    5994    7681    7869    7876    7951   10933#
M.DPIM  053204  7804    7824    7942    8352    8364    8374   10904#
M.DPO1  053214 10907#  10916
M.DPO2  053234 10911   10915#
M.DP40  053302 10944#  10965
M.DP41  053336 10949   10956#
M.DP42  053346 10955   10960#
M.DP44  053400 10967   10972#
M.DPSO  053412 10942   10976#
M.DRV = 000007  3146#
M.HEAD= 007000  3153#
M.ID  = 000003  3148#
M.PAR = 100000  3147#
M.SECT= 000760  3152#
M.SER = 077770  3151#
NCYL1   005522  3495#  5485#  5486    5490#  5491    5494#  5495   5500#  5501   5504#  5505   5507   5533#
                5534   5540#  5541    5544#  5545    5550#  5551   5554#  5555   5557   5588#  5590   5596#
                5598   5601#  5603    5964#  5966#   5968   5976
NCYL2   005524  3496#  5589#  5592    5597#  5602#
NED   = 010000  3027#  6433   9235    9245   9815    9893  10236  10606
NEDHDL  025622  6433#  6969
NEM   = 004000  3026#  9230   9830    9996  10236
NEWDRV  017026  5218#  5228   6389    8974   9484
NEWMSG  007623  4128#  6581
NEWON   005540  3502#  6445#  6970#   6974
NEWPAS  017014  4428   4513   5215#   6426
NGOFST  005556  3508#
NMTSTS= 000021  3587#  5343   5367    5393   5441    5480   5528   5584   5620   5644   5677   5727   5868
                5950   6022   6099    6182   6257
NOCHK = 000400  3213#  10470  10532   10573  10600   10618  10639  10662  10671  10705
NOCLKS  011477  4307#  4535
NODRTS  010042  4156#  4656
NODSC = 004000  3218#  9446  10058
NOFALS  011470  4303#  4655   8584
NORTRY  003143  3435#  6886#  9507
NOTALD  010740  4237#  4930   4935
NOTDFT  016310  5052   5069#
NOTMSG  063554  4493  12359#
NOTYPE  003147  3440#  4491   4494#
NTREDY  007675  4137#  6993
NULINP  015114  4832   4847#
NXDRIV  007661  4134#  6979
NXF   = 000004  3038#
OCTBIN  052464  4877   5088   5168   5208   6596   7324  10736#
OFFSET= 000115  2966#  10515
OFINUS  005526  3497#
OFST  = 000004  3058#
ONECYL  011644  4326#  5928
ONLINE  005536  3501#
OPCOMP  003122  3418#
OPCONT  003131  3425#
OPI   = 020000  3050#  8558   9347   9836  10002  10238
OPIERR= 000010  4067#  9349   9502
OPNLST  016200  4917   5045#  5050   5057
OR    = 000200  3022#
```

```
OREQSW= 000020  3445#
OVLODR  007443  4106#  4960
O.WAIT  003054  3362#  9736  9740*  9850*  9854  9870*  9936*  9949*  9964*  10508*  10568*  10630*  10647*
PACK  = 000103  2961#  7004
PARMDE  010626  4223#  4901
PARM0   002630  3251#  3406  6885  7045  8703  8716  9459  9528  9579  9613
PARM1   002714  3283#  6891*  9203  9563  9557
PART  = 000000  1751#  1764  1767  1770  1780  1792  1800  1806  1807  1970  1972  1974  1976
                1989  2011  3466  3474  3515  3546  3563  3568  3585  3594  3597  3602  3604
                3609  3616  3619  3624  3626  3631  3641  3647  3657  3661  3669  3671  3680
                3683  3688  3690  3695  4079  4081  4306  4392  4431  4488  4491  4518  4937
                4976  5312  5332  6378  6428  6726  6817  6819  7036  7505  7583  8310  8480
                8489  8830  12357  12358  12406  12442  12443
PART1   007403  4099#  4490
PART2   007407  4100#
PAT   = 000020  3076#
PATRN   005544  3504#  6265*  8112  8183  8290  8709
PAT00   006216  3701#  8114  8129  8185  8200
PAT01   006256  3723#
PAT02   006316  3745#
PAT03   006356  3767#
PAT04   006416  3789#
PAT05   006456  3811#
PAT06   006516  3832#
PAT07   006556  3854#
PAT08   006616  3875#
PAT09   006656  3897#
PAT10   006716  3919#
PAT11   006756  3941#
PAT12   007016  3963#
PAT13   007056  3985#
PAT14   007116  4007#  8041
PAT15   007156  4027#  7251  7329*  7335*
PBLKT   003112  3406#  9733  9820  9846  10014  10039  10457*
PBSVAL= 001000  3214#  10395
PCA   = 004000  3083#
PCD   = 010000  3084#
PCLKF   003132  3426#  4519*  4523*  7588  7609
PCVEC   003162  3453#  4524
PFIFTN  011116  4258#  5015
PGE   = 002000  3025#  9293  10236
PIP   = 020000  3068#
PIRQ  = 177772  1823#
PIRQVE= 000240  1917#
PKRB    003156  3451#
PKS     003152  3449#  4522  7596*  7613*
PKSB    003154  3450#  7592*  7595*
PLOFST  005554  3507#
PMA     005602  3515#  6282*  6283*  6679  6681  8131  8202  8282  8284  8683*  8684*  8685*  8686
                8687  8707*  8708*  8711*  8712*
PROFLT  005776  3613#  5008  5059  5062  5101  5142  5239*  5262*
PREPAR  026604  6298  6677#  8692  8750
PREPKB  026040  4805  4989  5001  5026  5346  5370  5396  5444  5483  5531  5587  5623  5647
                5680  5730  5871  5953  6025  6102  6185  6260  6498#  8457  8891
PRMBUF  012476  4412#  7218*  7219
PRMINP  007500  4111#  4566
```

```
PRMLIM  006042          3636*  5236*  5240*  5241*  5259*  5263*  5264*  7382   7384   7392   7395   7397   7400
PRMLST  005732          3591*  5007   5060   5100   5141   7220   7224   7387*  7403*  7404*
PRMNEM  006152          3677*  5002   5081   5137   7218   7222   7278   7375
PRMPHO  005264          3481*  8918*  12092
PRMPLO  005262          3480*  8919*  12092
PRMPSP  012517          4416*  5122
PROMPT  012514          4415*  4688   4852   4902   5073   7301
PRVCMD  005232          3476*  4507   8876*  8878*  8907   9170
PR0    = 000000          1840*  4506   5218   7048   9529   9601
PR1    = 000040          1841*
PR2    = 000100          1842*
PR3    = 000140          1843*
PR4    = 000200          1844*  4499
PR5    = 000240          1845*  3338
PR6    = 000300          1846*
PR7    = 000340          1847*  4438   4504   4526   6660   11360  11361
PS     = 177776          1820*  1821   4438*  4506*  5218*  7048*  9722   9728*  9742*  10451  10452*  10711*
PSTART  012574          1973   4435*
PSW    = 177776          1821*  9529*  9601*
PT      005760          3603*  5010   6265   6266   6292   6333   6744   7281
PWRMSG  055106         11363  11367*
PWRVEC= 000024          1912*  4453*  4454*  11351*  11359*  11360*
P.ASOF= 000032          3235*  9157   10064*  10065   10098*  10329*  10517*  10518
P.A00  = 000040          3238*  6988   6996   9160   9569   10055*  10056  10072*  10073  10386*  10594*
P.A01  = 000044          3240*  9162   10365*
P.A10  = 000050          3242*  9164   10372*
P.A11  = 000054          3244*  7455   9166   10379*
P.BAHI= 000007          3197*  6281*  6703*  8689*  9146
P.BALO= 000010          3198*  6110*  6190*  6269*  6278*  6702*  7015*  7492*  8476*  8526*  8538*  8686*  9149
                       10551  10648
P.BAR  = 000024          3232*  9156   10095*  10325*
P.B00  = 000042          3239*  9161   10050*  10051   10387*  10595*
P.B01  = 000046          3241*  9163   10366*
P.B10  = 000052          3243*  9165   9591   10373*
P.B11  = 000056          3245*  9167   9971*  10380*
P.CMND= 000001          3191*  5281*  5348*  5742*  5879*  5961*  6033*  6103*  6132*  6135*  6186*  6211*  6311*
                       6315*  6323*  6330*  6888*  6957*  6968*  7004*  7006*  7008*  7046*  7451*  7489*  7517*
                       7520*  7754*  7771*  8024*  8440*  8479*  8482*  8517*  8877*  9137   9472*  9519*  9564*
                       9600*  9603*  9866   10483  10487  10499  10509  10515  10521  10524  10530  10555  10562
                      10581  10628  10645  10667  10676
P.CS1  = 000016          3229*  5750*  5770*  5771   6908   6958*  8879*  9150   9268   9286   9632   9665   9887*
                       9939*  9977*  9978*  9980*  9981  10090*  10092*  10319*  10322*  10473  10527*  10528*  10530*
                      10534*  10535  10559*  10562*  10564*  10565*  10575*  10576  10584*  10585*  10587*  10588  10590*
                      10591  10596  10635*  10636*  10638*  10641*  10642  10658*  10659*  10661*  10664  10683*  10684
                      10693*  10694
P.CS1H= 000007          3196*  5741*  5749*  5769*  6892*  6893*  7017*  7018*  7485*  8516*  9611*  9612*  9977
                      10218  10527  10564  10584  10635  10649  10658
P.CS2  = 000020          3230*  6433   9151   9225   9230   9235   9237   9243   9245   9293   9343   9427   9893
                      10093*  10323*  10481*  10506  10571*  10572  10583  10602  10606  10632*  10633  10657
P.CYLN= 000002          3192*  5351*  5372*  5375*  5398*  5401*  5403*  5404   5407*  5409   5446*  5449*  5453*
                       5457*  5458*  5462*  5486*  5507*  5534*  5536*  5557*  5559*  5590*  5592*  5625*  5648*
                       5650*  5652*  5686*  5688*  5704*  5706*  5880*  5883*  5900   5903*  5920   5962*  5968*
                       5972*  6034*  6038*  6056*  6104*  6187*  6270*  6290*  6344*  6345   6360*  6361   6364*
                       6365   7011*  7013*  7490*  7523   7526   8091   8323   8328   8357   8369   8380   8518*
                       8620   8674*  9139   9599*  9975  10511  10553  10655
P.DCYL= 000030          3234*  8624   8670   9152   9400   9622   9654  10097*  10331*
```

```
P.DRVN= 000000  3190*  6890*  6936*  9863  10040  10216  10455
P.DS  = 000036  3237*  9158   9278   9282  9333   10100* 10327* 10608
P.DTS = 000026  3233*  8626   8628   8671  8672   9153   9401   9403   9590   9625   9626   9655   9661
                10096* 10326*
P.EPAT= 000062  3247*  9424   9889*  10475
P.EPOS= 000060  3246*  9423   9890*
P.ER  = 000034  3236*  8558   9159   9224  10059* 10328*
P.OFST= 000006  3195*  10517
P.PRST= 000014  3200*  9251   9264   9436  9441   9446   9451   9566   9735*  9848*  9882*  9910*  9917
                9921*  10018* 10041  10045* 10058* 10076* 10086* 10112  10116* 10126* 10138* 10243* 10395*
                10470* 10507* 10531* 10532  10557  10563* 10569  10573  10600  10610* 10618  10639  10662
                10671  10705
P.SECT= 000004  3193*  6109*  6118   6122*  6123   6127*  6129   6140   6164*  6165   6189*  6273*  6298*
                6336*  6337   6349*  6350   7488*  8018   8029*  8068   8347   8523*  8532*  8533   8539*
                8549*  8550   8622   8676*  9142   9598*  9976   10512  10554  10656
P.TRCK= 000005  3194*  6105*  6188*  6193   6197*  6198   6207*  6208   6214*  6215   6271*  6297*  6340*
                6341   6352   6354*  7014*  7491*  8019*  8021   8026*  8027   8082   8330   8360   8519*
                8621   8675*  9140
P.WC  = 000012  3199*  6111*  6191*  6272*  6299*  6300*  7016*  7493*  8388   8401*  8477*  8494   8525*
                8679*  8705   8742   9144   10552
P.WCR = 000022  3231*  9154   10094* 10324*
QNEWSW= 000000  2950
Q.INIT= 040000  3221*
RCDASW= 000010  3444*
RCLREQ= 004000  4075*  9271   9276   9321   9326   9331   9336   9470
RDALHD= 000164  2979*  9866   10645
RDCHR = 104406  7113   11662*
RDCHRS  030624  4623   4675   4690   4783   4827   4854   4903   4961   5047   5075   5124   5196   6582
                7107*  7285   7303
RDDATA= 000121  2968*  6135   6323   7008   7489   8517
RDGATE= 100000  3087*
RDHDO   044522  9358   9383   9588*
RDHEAD= 000125  2970*  5281   5742   7520   9603   9980   10661
RDSTAT= 000141  2978*  6968   7451   9564   10581
RDY   = 000200  2993*  9466   10538  10591
RECAL = 000113  2965*  5348   7006   8440   9472   10524
RECODE  005504  3488*  6141   6962*  7020   7043*  8245   8735   8738   8816*  8824*  8875*  8943   8953*
                9200*  9201   9228*  9233*  9254   9256   9271*  9276*  9316*  9321*  9326*  9331*  9336*
                9341*  9349*  9353   9359   9374*  9378   9384   9399*  9406   9409*  9413*  9416*  9429*
                9430*  9439*  9444*  9449*  9454*  9462   94 9*  9470   9476   9478*  9502   9504*  9509
                9516*  9536*  9568*
REDBSF  036674  5300   8514*
REISSU  003140  3432*  6308*  9099*
RELEAS= 000140  2977*  6330   10628
REPLPK  007753  4146*  4673
REPSUP  041704  5757   6655   6960   7525   7776   8182   8535   8881   9134*  9206
RESREG= 104410  5761   5810   6566   6647   6704   6749   6830   7416   7474   7687   7809   7829   7879
                8006   8030   8047   8094   8163   8244   8305   8403   8407   8484   8505   8610   8635
                8693   8721   8817   8898   8930   9070   9185   9531   9580   9614   9673   11008  11060
                11664*
RESVEC= 000010  1907*
RETANL  044324  9204   9473   9535*
RETNML  044342  6448   8562   9205   9538*
REVRSE  011740  4338*  6003   7911
RHEDHD  022422  5747   5847*
RKASOF= 000016  2946*  8884   9557   9876   9946   10026  10281  10329  10518* 10543
```

```
RKBA   = 000004   2941#  9556  10277  10325  10551*
RKBADR  007526    4115#  4570
RKBAS   003036    3336#  4551*  4555*  4569  4572*  6884  7774  9361  9386  9465  9518  9549  9729
                  9798  10462
RKCS1  = 000000   2939#  4684*  5771*  5848  6984*  7757  7775*  9362*  9366  9387*  9391  9551  9821
                  9873  9931  9981*  9990  10172*  10173  10182*  10221*  10222  10246*  10274  10535*  10537
                 10576*  10588*  10590  10620*  10642*  10664*  10673*  10683  10693  10708*
RKCS2  = 000010   2943#  6946*  6955  8859*  8863  8886*  9552  9799  9959  10217*  10275  10323  10506*
                 10572*  10583*  10633*  10657*  10682*
RKDA   = 000006   2942#  9554  9976*  10278  10326  10512*  10554*  10656*
RKDB   = 000024   2943#  5292  5293  7522  9363  9364  9365  9388  9389  9390  9955  9956  9957
RKDC   = 000020   2947#  9553
RKDCYL= 000020   2948#  9975*  10282  10331  10511*  10553*  10655*
RKDS   = 000012   2944#  8865  9466  9558  9824  10279  10327
RKECPS= 000030   2954#  9890  10286
RKECPT= 000032   2956#  9889  10287
RKER   = 000014   2945#  6964  9559  9833  9999  10280  10328
RKMR1  = 000026   2950#  9967*  10046*  10283  10360*  10367*  10374*  10381*  10482*
RKMR2  = 000034   2951#  10284  10594
RKMR3  = 000036   2952#  10285  10595
RKPAT  = 000032   2955#
RKPOS  = 000030   2953#
RKPRI   003042    3338#  4502  4560*  4579  4595*  9728  10452
RKPRTY  007574    4123#  4584
RKVADR  007551    4119#  4575
RKVEC   003040    3337#  4500  4556*  4557*  4574  4577*  5747*  5841*  7753*  7768*
RKWC   = 000002   2940#  9555  10276  10324  10552*
RLS    = 000010   3017#  10632
RNDADR  032554    5624  7573#
RNDLNG= 016514    4062#
RNDSHT= 002734    4061#
ROTIMS  011577    4319#  5825
RUNTST  016720    4957  5193#
RVTERM  033560    5975  7818#
RWBUF   063554    3604  3626  3661  6110  6137  6190  6269  7015  7023  7492  7497  8002  8004
                  8116  8187  8470  8476  8707  12357#
RWDTST  024516    5315  6220#
RWTINX= 000040    6221#  6742
R.ABNL  050522    9741  9851  9926  9943  10121  10141  10401#  10611
R.CONT  050546    9803  9841  9905  9914  9985  10007  10030  10036  10069  10109  10133  10178  10230
                 10253  10391  10409#  10625  10679  10688  10701
R.NORM  050534    9879  9972  10081  10405#  10548  10621  10709
SAVPAR  003206    3464#  6691*  8135  8206
SAVPRS  005560    3509#  8704  8715
SAVREG= 104407    5775  6527  6633  6677  6737  6809  6812  7372  7449  7632  7798  7818  7862
                  8001  8017  8039  8062  8110  8177  8239  8325  8468  8492  8572  8619  8668
                  8702  8714  8806  8850  8906  8965  9083  9135  9197  9548  9589  9653  10993
                 11034  11663#
SAVWRD  003210    3465#
SAVXDP  027254    6776  6809#
SCLR   = 000040   3020#  10682
SCNDRV  027650    4751  6934#
SCOPER= 104411    6332  11665#
SCOPE1  055130   11378#  11665
SCRACH  005542    3503#  4645*  4646*  4647  5684*  5690*  5702*  5708*  5767*  5812  5965*  5967*  6036*
                  6073*  6074  6139*  6145  6150*  6153  6952*  6953*  7148*  7150*  7151  7161*  7162*
```

```
SECNL1  010727  7163  7802  7822  8181*  8247  8260*  8263
SECNL2  010757  4235*  4925
SEEK   = 000117  4240*  4929
SEEKER  032374  2967*  5879  5961  6033  7517  7754  10499  10509
                5352  5373  5376  5399  5402  5408  5447  5450  5454  5459  5463  5487  5508
                5535  5537  5558  5560  5591  5593  5626  5649  5651  5653  5687  5689  5705
                5707  7516*
SEEKHD  033472  7753  7785*
SELDRV= 000101  2960*  6957  8876  10638
SELECT  005534  3500*
SELP15  011145  4262*  7297
SERNM   011410  4294*  7454  7496
SETPRM  016464  4920  5121*  5127  5132  5176
SETTUP  030462  5341  5365  5391  5439  5478  5526  5582  5618  5642  5675  5725  5866  5948
                6020  6097  6126  6180  6202  6206  6255  6305  7041*
SIZMEM  026072  4537  6527*
SKI    = 000002  3036*  9318
SM      005774  3609*  5682
SOFTBS  011436  4298*  8608
SPACE1  012474  4410*  4851  5072  7192  7300
SPACE2  012473  4409*  8589  8595  9012  9016  9019  9022  9042  9047  9062
SPACE3  012472  4408*
SPACE4  012471  4407*
SPACE6  012467  4406*  7199
SPAR   = 020000  3000*  9268  10234
SPCDMX  012264  4380*  6001  6006
SPDLSS= 000020  3060*  9282
SRHTBS  040050  8767*  8808
SRTSPL= 000111  2964*  10521
SRO    = 177572  1926*  6646*  6656  6854*  6856*  6858*  6860*  8136*  8151*  8207*  8303*  11533  11548*
                11555*
SR1    = 177574  1927*  6657
SR2    = 177576  1928*  6658
SR3    = 172516  1929*  6373*  6645*  6661  11545*
ST      005772  3608*  5298  5712
STACK  = 001100  1811*  4445  4620  5219  7041*  7042  8439  11362
STALL   032472  7544*  8851
STALLS  005512  3491*  4512*  4621*  4900*  5298*  5685*  5703*  5712*  7553
STKLMT= 177774  1822*
STPASS  017002  5067  5213*
STRCMD  040606  5751  7758  8855  8906*
SUBCLR= 000177  2981*  6888  7046  7771  9519  9600  10676
SUBVER  007321  4090*  4489
SUMHI1  003200  3461*  5779*  5780*  5818*  5887*  5888*  5981  5987*  6042*  6043*  7409*  7635*  7657*
                7658*  7666*  7679  7724*  7808*  7866  7870*  8327*  8377
SUMHI2  003204  3463*  5907*  5908*  5983  5995*  6060*  6061*  7726*  7805*  7874  7877*
SUML01  003176  3460*  5778*  5819*  5838  5886*  5980  5988*  5999  6041*  7408*  7410  7634*  7656*
                7667*  7680  7723*  7867  7871*  7907  8326*  8353*  8365*  8375
SUML02  003202  3462*  5906*  5982  5996*  6004  6059*  7725*  7807*  7875  7878*  7922
SVAL   = 100000  3070*
SVPRMS  037626  6306  8702*  8747
SWR     001140  2041*  4443  4465*  4467  4473*  4480*  6151  6159  6262  6309  6313  6319  6321
                6325  6613  7518  7546  8261  8288  8975  9002  9030  11268  11275  11287  11290
                11380  11403  11421  11428
SWREG   000176  1967*  4473  6613  6615  6618*
SWRMSG  007614  4126*  6616
```

```
SW0    = 000001            1875#
SW00   = 000001            1865#   1875
SW01   = 000002            1864#   1874
SW02   = 000004            1863#   1873
SW03   = 000010            1862#   1872
SW04   = 000020            1861#   1871
SW05   = 000040            1860#   1870
SW06   = 000100            1859#   1869
SW07   = 000200            1858#   1868
SW08   = 000400            1857#   1867
SW09   = 001000            1856#   1866
SW1    = 000002            1874#
SW10   = 002000            1855#
SW11   = 004000            1854#
SW12   = 010000            1853#
SW13   = 020000            1852#   8975
SW14   = 040000            1851#
SW15   = 100000            1850#
SW2    = 000004            1873#
SW3    = 000010            1872#
SW4    = 000020            1871#
SW5    = 000040            1870#
SW6    = 000100            1869#
SW7    = 000200            1868#
SW8    = 000400            1867#
SW9    = 001000            1866#
S.ACLO= 000100             3105#
S.BRHM= 000100             3120#
S.BRKE= 040000             3142#
S.CART= 000400             3122#
S.DCLO= 010000             3112#
S.DIB  = 002000            3138#
S.DOOR= 000200             3121#
S.DRA  = 000040            3091#
S.DROT= 020000             3113#
S.DRY  = 000200            3093#   6988
S.DSC  = 040000            3100#   9908   10056   10073   10136
S.FLT  = 000200            3106#  10051
S.FORM= 001000             3095#
S.FWD  = 002000            3124#
S.HDFL= 000200             3135#
S.HDHM= 000040             3119#
S.ICYL= 000040             3104#
S.ILF  = 000400            3107#
S.LIMD= 020000             3141#
S.LOAD= 010000             3126#
S.MHD  = 000400            3136#
S.NMOV= 010000             3140#
S.OFF  = 002000            3096#
S.PAR  = 001000            3108#   9911   10388
S.PIP  = 020000            3099#   9919   10114
S.PLO  = 004000            3139#
S.REV  = 004000            3125#
S.RTZ  = 020000            3127#
S.SECT= 000020             3132#
S.SKI  = 002000            3109#
```

```
S.SPIN= 010000           3098#
S.SPLS= 010000           3111#
S.SPOK= 001000           3123#
S.TYPE= 000400           3094#
S.UNLD= 040000           3128#
S.UNS = 040000           3114#
S.VV  = 000100           3092#
S.WCLK= 000040           3133#
S.WGAT= 000100           3134#
S.WLE = 004000           3110#
S.WRL = 004000           3097#   6996
S.XDOK= 000020           3118#
S.XERR= 001000           3137#
S0      005746           3598#   4923    5296
S1      005750           3599#   4923    5297
S2      005752           3600#   4927    5290
S3      005754           3601#   4927    5291
TBITVE= 000014           1908#
TCONHI  003166           3456#   7682*   7940
TCONLO  003164           3455#   7684*   7941
TELDRV  014012           4628    4636#   4693    4704    4759
TIMER   033150           5772    7653    7703#   7708    7761
TIMSEK  033312           5884    5904    5969    5973    6039    6057    7749#
TIMSKP  011513           4310#   7645
TKVEC = 000060           1915#   4498*   4499*
TLSTHD  010450           4203#   4803    4848
TOPROC  044352           5758    7777    9086    9253    9547#
TPVEC = 000064           1916#
TRACK   005530           3498#
TRAPVE= 000034           1914#   4451*   4452*  11361*
TRKCHK  034326           6203    6213    8017#
TRKNLW  010771           4242#   4934
TRNSFR  037740           6312    6316    6324    8731#
TRTVEC= 000014           1909#
TSTDRN  011351           4287#   5303
TSTING  003120           3416#   4505*   5214*   5738*   5744*   8422
TSTLST  005626           3545#   3587    4819    4840    4862    4882*   4887    4891*   6741    7076    7200
TSTMOS  010244           4180#   4781
TSTMSG  056342           8996   11667#
TST1    020002           5313    5339#
TST10   021226           5584    5616#
TST11   021300           5620    5640#
TST12   021366           5644    5673#
TST13   021626           5677    5723#
TST14   022440           5727    5736    5864#
TST15   022760           5868    5877    5885    5905    5946#
TST16   023316           5950    5959    5970    5974    6018#
TST17   023642           6022    6031    6040    6058    6095#
TST2    020062           5343    5363#
TST20   024262           6099    6178#
TST21   024516           6182    6253#
TST3    020142           5367    5389#
TST4    020250           5393    5437#
TST5    020414           5441    5476#
TST6    020620           5480    5524#
TST7    021050           5528    5580#
```

```
TWOTOS= 002000  4074*  9254   9568
TYPAVG  034260  5839   6000   6005   7908   7923   7987*
TYPBSF  037164  5310   8572*
TYPDS = 104405  5829   5835   6404   7903   7918   11659*
TYPE  = 104401  4488   4489   4490   4493   4497   4535   4545   4566   4570   4575   4584   4596   4598
                4599   4622   4632   4633   4636   4644   4647   4655   4656   4665   4673   4683   4688
                4702   4703   4781   4782   4769   4790   4803   4807   4826   4835   4836   4848   4851
                4852   4894   4895   4899   4901   4902   4909   4910   4925   4929   4930   4934   4935
                4952   4960   4967   4968   4991   5015   5028   5046   5055   5056   5072   5073   5104
                5105   5122   5130   5131   5195   5204   5205   5303   5825   5830   5831   5836   5837
                5840   5928   5978   5998   6001   6003   6006   6082   6402   6405   6466   6472   6476
                6480   6482   6483   6514   6515   6561   6564   6565   6581   6591   6592   6616   6943
                6978   6979   6992   6993   7000   7001   7022   7027   7028   7118   7124   7130   7136
                7147   7151   7155   7163   7168   7170   7171   7173   7192   7199   7219   7244   7250
                7284   7293   7294   7297   7300   7301   7339   7340   7407   7413   7453   7454   7473
                7495   7496   7500   7644   7645   7896   7899   7905   7909   7911   7914   7920   7924
                7961   7965   7974   7978   7987   7991   8450   8451   8575   8576   8577   8578   8584
                8585   8589   8595   8599   8608   8973   8989   8990   8991   8995   8996   9001   9004
                9005   9006   9007   9012   9015   9016   9017   9018   9019   9022   9025   9026   9028
                9042   9047   9051   9057   9062   9063   9065   10854  11101  11166  11241  11270  11278
                11363  11655*
TYPERR  040776  8965*  11277
TYPFMT  003124  3420*  4755   5233*  5256*  6893   6934*  6947   6966*  7009   7018
TYPLST  015726  4914   4987*
TYPMAX  034234  5833   7901   7916   7974*
TYPMIN  034210  5827   7898   7913   7961*
TYPOC = 104402  8588   8594   8598   9011   9021   9024   9044   11656*
TYPON = 104404  11658*
TYPOS = 104403  6578   7196   7201   7247   7252   8998   11657*
TYPPAT  031252  5027   7243*  7299
TYPPRM  031172  4990   5071   7218*
TYPTMS  033770  5930   6084   7894*
TYPTST  031136  4806   4850   7192*
T.ASOF  003014  3323*  9876*  9877   9901   9946*  9947   10026*  10027  10033  10064  10098  10106  10130
                10281*  10543*  10544
T.BA    003006  3320*  10095  10277*
T.CS1   003000  3315*  9821*  9873*  9874   9887   9898*  9931*  9933   9939   9968*  9990*  9992   10022
                10047*  10061*  10091*  10092  10103*  10127*  10173*  10174  10214  10219*  10219*  10221  10225
                10234   10274*  10321*  10322  10362*  10369*  10376*  10383*  10537*  10538  10540
T.CS2   003002  3317*  9799*  9800   9815   9818   9830   9859   9959*  9960   9996   10010  10093  10215*
                10216*  10217  10227  10236  10275*
T.DA    003010  3321*  10096  10278*
T.DB    003034  3332*
T.DC    003012  3322*  10097  10282*
T.DS    003020  3326*  9824*  9825   10100  10279*
T.ER    003016  3325*  9833*  9836   9999*  10002  10099  10238  10280*
T.MR1   003022  3327*  10283*
T.MR2   003024  3328*  9908   9919   10055  10072  10114  10136  10284*  10365  10372  10379  10386
T.MR3   003026  3329*  9911   9971   10050  10285*  10366  10373  10380  10387  10388
T.PAT   003032  3331*  10287*
T.POS   003030  3330*  10286*
T.WCR   003004  3319*  10094  10276*
UBMPRS  003144  3436*  6371   6558*  6643   6692   8249   8916
UEXATT= 000010  3207*  9451   9882
UFE   = 000400  3023*  9237   9243   9815   9893   10236  10606
UNLOAD= 000107  2963*  10487
```

```
UNS    = 040000          3051#   9313
UPE    = 020000          3028#   9225    9830    9996   10236
VFHDSW= 000002           3442#
VV     = 000100          3063#
WC       005766          3606#   4938    6299    6751
WCDASW= 000004           3443#
WCE    = 040000          3029#   9427    9830    9996   10236
WCEFLG   003141          3433#   6317    8528*   8530    8545*   8547    8561*   8733*   8737*
WCERR  = 000100          4070#   8735    9430    9502
WC28IG   011003          4244#   4952
WDSXFR   005572          3510#   8111    8180    8236    8634*   8677    8705*   8706*
WHDSW  = 000001          3441#
WLE    = 004000          3048#   9309    9836   10002
WORDSP   012502          4413#   7244
WRDATA= 000123           2969#   6103    6186    6211    6311    8479   10559
WRHEAD= 000127           2971#
WRL    = 004000          3067#
WRTCHK= 000131           2972#   6132    6315    8024    8482   10555
WRTGAT= 040000           3086#
WRTLOK   007707          4139#   7001
WRTSEC   036542          8468#
W.DRV    003114          3412#   9730*   9845*   9871*   9923*   9938*   9951*   9965*  10013*  10080*  10089*  10118*  10140*
                        10411*  10460*  10523*  10526*  10547*  10599*  10617*
W.MILI   003060          3365#   9725   10691
W.MIN    003066          3381#  10523
W.MTIM   003056          3364#   9723*   9725*
W.SEC    003062          3378#  10460
W.TIME   003100          3387#   9726    9732*   9844*   9872*   9922*   9937*   9950*   9966*  10012*  10079*  10088*  10117*
                        10139*  10410*  10459*  10546*  10598*  10616*
W.WCK  = 000200          3212#  10470   10531   10557   10563
W.WTCH   045140          8895    9718#  10536   10542   10589
W.8SEC   003064          3380#   9923   10118   10526
XDPSAV   005550          3506#   6774*   6775*   6789*   6790*   6821    6822    6848
XDPSVD   003135          3429#   4538    4541*   6760*   6770*   6793*   6814    8437*
XDP1     027302          6811    6817#
XDP2     027350          6815    6818    6830#   6837    6868
XDP3     027374          6824    6839#
XDP4     027354          6826    6832#
XOVLAD   003134          3428#   6261*   6284*   6368    6813*   8431
XXDPAD   005546          3505#   6715*   6719*   6720*   6721*   6762    6768    6820
XXDPCH   003117          3415#
XXDPMG   007240          4081#   4545
$APTHD   001000          1998    2004#
$ASTAT= ****** U        11479   11494
$ATYC    055436         11450   11452#
$ATY1    055412         11448#
$ATY3    055420         10839   11449#
$ATY4    055430         11283   11451#
$AUTOB   001134          2038#
$BASE    001374          2145#   4551
$BDADR   001122          2033#
$BDDAT   001126          2035#
$BELL    001310          2096#  11270   11302
$CHARC   053200         10856*  10866*  10873   10882*  10887#
$CKSWR= ****** U        11662
$CMTAG   001100          2021#   4440    4441    4449    4455    4456    4457
```

```
$CM1   = 000040          2053#  2054#  2055#  2056#  2057#  2058#  2059#  2060#  2061#  2062#  2063#  2064#  2065#
                         2066#  2067#  2068#  2069#  2070#  2071#  2072#  2073#  2074#  2075#  2076#  2077#  2078#
                         2079#  2080#  2081#  2082#  2083#  2084#  2085#
$CM2   = 000100          2053#  2054#  2055#  2056#  2057#  2058#  2059#  2060#  2061#  2062#  2063#  2064#  2065#
                         2066#  2067#  2068#  2069#  2070#  2071#  2072#  2073#  2074#  2075#  2076#  2077#  2078#
                         2079#  2080#  2081#  2082#  2083#  2084#  2085#
$CM3   = 000040          2051#  2053
$CM4   = 000011          2085#  2086#  2087#  2088#  2089#  2090#  2091#  2092#  2093#  2094#
$CNTLG   054771         11340#
$CNTLU   054764         11339#
$CORE    056066         11531  11558#
$CPUOP   001346          2119#
$CRLF    001315          2098#   4596   4665   4807   4991   5028   5840   6483   6564   6565   7168   7173   7413
                         7473   7500   7899   7909   7914   7924   8578   8585   8599   8995   9005   9007   9015
                         9018   9028   9051   9057   9065  10855  10890  11278  11302
$CROUT   056116         11558  11565#
$DBLK    054440         11207  11241  11249#
$DB2D    053542          7963   7976   7989  11034#
$DB2O    053422          6562   7226   7411   7498  10993#
$DECVL   053722         11036  11082#
$DEVCT   001330          2110#  5216*  6388*
$DEVM    001376          2146#  4733
$DOAGN   025544          6398   6407   6413#
$DTBL    054430         11210  11245#
$ENDAD   025534          1984   6409#  11297
$ENDCT   025502          4455   6400#
$ENDMG   025553          6402   6417#
$ENULL   025550          6405   6416#
$ENV     001340          2115#  6420   10834  11280  11457  11481
$ENVM    001341          2116#  4478    4552   4734   6980  10836  10841  11459
$EOP     025430          6257   6386#
$EOPCT   025474          4455*  5066*  5210*  63??*  6401
$ERFLG   001103          2024#  11265* 11302  1137?  11392  11417  11419  11425* 11445
$ERMAX   001115          2030#  4458*  4485*  7064*  11419  11440* 11445
$ERROR   054450          4449   11264#
$ERRPC   001116          2031#  11272* 11273* 11274  11302  12077
$ERRTB   001400          2163#   8986
$ERTTL   001112          2028#  11271* 11302
$ESCAP   001306          2095#   4457* 11293  11295  11302  11439*
$ETABL   001340          2114#
$ETEND   001400          2010    2147#
$FATAL   001322          2107#  11485#
$FFLG    055656         11448*  11451* 11479  11488* 11496#
$FILLC   001156          2049#  10859  10890
$FILLS   001155          2048#  10890
$GDADR   001120          2032#
$GDDAT   001124          2034#
$GET42   025524          6406#
$GTSWR=  ****** U       11661
$HD    = 000000          1780
$HIBTS   001000          2005#
$HINUM   052716          4516*   8044  10791  10799  10804* 10809#
$HIOCT   052616          5091    5171   6599   7327  10761* 10774#
$ICNT    001104          2025#  11430* 11431  11433* 11444
$INTAG   001135          2039#
$ITEMB   001114          2029#   8981  11274* 11282  11302
```

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$KTNEX  056060          11532  11557#
$KTOUT  056050          11549  11554#
$KT11   055716           6285   6528*  6530   6823   8132   8203   8292   8301   8690   8748  11530* 11534* 11557*
$LF     001316           2099#  10890  11302
$LFLG   055655          11489* 11495#
$LONUM  052720           4517*  7549   7574   8043   10790  10797  10803* 10810#
$LPADR  001106           2026#  4459*  11365  11423* 11437* 11442  11444
$LPERR  001110           2027#  4460*  6125*  6201*  6205*  6304*  11292  11382  11423  11438* 11444
$LSTAD  056162           6532   6545   11570* 11577#
$LSTBK  056164           6536   11571* 11578#
$MADR1  001352           2132#
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$MADR3  001362           2139#
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ERRORS DETECTED: 0

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DOCUMENT PAGES: 263

FOS