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DIAGNOSTIC PROGRAM MANUAL

SIGMA 5 AND 7
MEDIUM SPEED
RAPID ACCESS DATA (RAD)
SYSTEM TEST

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LIST OF RELATED PUBLICATIONS

Publication Title	Publication No.
Sigma 5 and 7 Systems Test Monitor, Diagnostic Program Manual	901076
Sigma 5 and 7 Relocatable Diagnostic Program Loader, Diagnostic Program Manual	900972
Symbol and Metasymbol, Reference Manual	900952
SDS Sigma Rapid Access Data (RAD) Storage System, Models 7201/7202/7203/7204, Reference Manual	900979

SECTION I
INTRODUCTION

1-1 SCOPE OF MANUAL

1-2 This document gives a description of the medium speed rapid access data (RAD) system test, describes the parameter input to the systems test monitor for this program, and explains the error printouts and profile identifications.

1-3 PROGRAM OBJECTIVES

1-4 This program provides a multiprogrammed exerciser for the medium speed RAD which can only be run under control of the systems test monitor (Catalog No. 704138). Since this program is not a diagnostic, the RAD should be thoroughly checked out before running this exerciser.

1-5 GENERAL SPECIFICATIONS

1-6 General specifications for this program are found in table 1-1.

Table 1-1. General Specifications

Computer Configuration	As specified by the Sigma 5 and 7 Systems Test Monitor Diagnostic Program Manual, No. 901076
Required Equipment	Medium speed RAD
Optional Equipment	As specified by Sigma 5 and 7 systems test monitor diagnostic program manual
Prerequisites	Sigma 5/7 systems test monitor must be resident in memory. The medium speed RAD system test is loaded via the systems test monitor as outlined in the systems test monitor program manual. The RAD and device controller must conform to their respective design specifications
Storage	The medium speed RAD system test is relocatable and requires 522_{10} memory locations
Source Language	Sigma Metasymbol (see Sigma Symbol and Metasymbol Reference Manual, No. 900952)
Program Media	80-column punched cards and 8-level punched paper tape

SECTION II
OPERATING INSTRUCTIONS

2-1 PROGRAM LOADING PROCEDURE

2-2 To load the program, place the object deck or paper tape behind the systems test monitor card deck or paper tape. Other system test device programs may precede or follow this deck. The monitor loads the program as described in the systems test monitor documentation (No. 901076).

2-3 PROGRAM OPERATING PROCEDURE

2-4 OPERATOR CONTROL

2-5 The following paragraphs, 2-6 through 2-13, describe how the operator controls the operation of this program.

2-6 Operator Input: Selection of Parameters

2-7 These inputs via the keyboard have to be made through the system test monitor.

2-8 Assigning Parameters. There is only one test available in this program. The parameters for the program are typed in the following format:

P NNNN, UA, X_1, , YYYY, ZZZZ, X_2, X_3 EOM

The input line contains a number of variables: X_1, X_2, and X_3. An explanation of what they represent are explained in table 2-1.

Table 2-1. Variables of the Input Line

Value or Meaning	Explanation
If X_1 = W	Only writing and check writing occurs
= R	Only reading occurs
= WR	Writing of one sector and reading back and verifying this sector takes place. Check writing also is performed
If X_2 = 0	X_3 is the seed for random numbers
= 1, 2, 3, or 4	The number represents the number of bytes in X_3

Table 2-1. Variables of the Input Line (Cont.)

Value or Meaning	Explanation
X_3	The random number seed if $X_2 = 0$ A pattern to be spread, up to 4 bytes, if $X_2 \neq 0$
YYYY	The beginning sector and track address for reading and writing which must be 4-hexadecimal characters long. These two bytes are sent to the RAD in the seek operation
ZZZZ	The last sector and track address to be used. (The format is the same as for YYYY)

2-9 Selecting Standard Parameters. There is no standard assignment statement for the RAD.

2-10 Changing Parameters. The parameters can be changed any time as soon as the program becomes aware that parameters have been changed, it operates under the new parameter input.

2-11 Operator Input: Selection of the Medium Speed RAD Program

2-12 The RAD program is called for in the monitor under the name that was assigned to it at load time. The input statement is:

R NNNN + . . . EOM

2-13 The program can also be added or deleted from the run list by using the name NNNN (see Systems Test Monitor Diagnostic Program Manual, No. 901076, for the method by which this is done).

2-14 Request for Error Table

2-15 The RAD program keeps track of the number of passes made through the program. Rewrites, and rereads are also recorded. To obtain this information, the operator inputs:

P NAME, UA, ER EOM

This causes a typeout of the above mentioned information.

2-16 PROGRAM PRINTOUTS

2-17 The following paragraphs describe the printouts generated by this program.

2-18 Error Statistics

2-19 The program keeps a record of the number of times the program is executed and the rewrites and rereads (on error correction) made. As described in paragraph 2-15, this information can be obtained by a parameter input. After this input, the program will respond by typing:

```
* ERROR NAME + 000000099 AAAAAAAA

BBBBBBBB CCCCCCCC
```

Word 1 (A) shows the number of passes made, word 2 (B) shows the number of rewrites attempted, and word 3 (C) shows the number of rereads attempted. The three numbers are in hexadecimal format. After this printout, all words are reset to zero. The program will not continue until a new parameter input has been made.

2-20 Error Reporting

2-21 Any error conditions detected by the program are reported via the typewriter. Before Selecting the RAD program, the file must be ready to accept read/write commands. Any sectors which are not to be used for writing should be write protected. Any "unusual end" conditions are reported with the appropriate status information. Data errors are also reported.

2-22 Table 2-2 contains the error messages which can be reported; the error number in the table follows the error page.

2-23 Profile Printout

2-24 Following is a list of the identifications provided by the RAD exerciser to the profile table:

Identification	Explanation
NAME = RD	Read a Sector
NAME = CW	Check Write a Sector
NAME = WR	Write a Sector

Table 2-2. Error Messages

Item No.	Error Message	Explanation and Recovery Procedure
1	* ERROR NAME + 0000000001	Command was not W, WR, or R. Repeat parameter input
2	* ERROR NAME + 000000002 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE	A rate error occurred during a write operation. Word 1 (A) shows the AIO response, words 2 (B) and 3 (C) shows the two words of the TIO response, and word 4 (D) shows the second word of the TDV response. Word 5 (E) shows the track and sector address used during this operation. No operator intervention is required
3	* ERROR NAME + 000000003 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE	An unusual end interrupt occurred three times in a row while attempting to write. Words 1 through 5 have the same meaning as for error 2. No operator intervention is required
4	* ERROR NAME + 000000004 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE	A rate error occurred during a read operation. Words 1 through 5 have the same meaning as for error 2. No operator intervention is required
5	* ERROR NAME + 000000005 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE	Three successive read commands produced unusual end interrupts. Words 1 through 5 have the same meaning as for error 2. No operator intervention is required
6	* ERROR NAME + 000000006 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE + FFFFFFFFF GGGGGGGG HHHHHHHH	The data read was incorrect. Words 1 through 5 have the same meaning as for error 2. Word 6 (F) gives the word in error. Word 7 (G) shows what it should have been, and word 9 (H) shows what was actually received. No operator intervention is required
7	* ERROR NAME + 000000007 AAAAAAAA BBBBBBBB CCCCCCCC DDDDDDDD EEEEEEEE	An unusual end occurred during a check write operation. Words 1 (A) through 5 (E) have the same meaning as for error 2. No operator intervention is required

SECTION III
PROGRAM DESCRIPTION

3-1 GENERAL

3-2 This medium speed RAD exerciser only runs devices on one device controller. If more than one RAD device controller is present, load the program once for each controller and assign different names each time the program is loaded.

3-3 FUNCTIONAL DESCRIPTION

3-4 The program reads, writes, and checkwrites all 90 words of a sector. The information written depends upon the parameter input. The data written is the same for all sectors. If more than one sector is to be used by the program, one RAD operation is completed on all sectors before the next operation is started. Table 3-1 shows the sequence of events for the various parameters.

Table 3-1. Sequence of Events

Parameter	Sequence of Operations
W	Writes all sectors, checkwrites all sectors
R	Reads all sectors
WR	Writes all sectors, reads all sectors, and checkwrites all sectors

SECTION IV
PROGRAM LISTING

4-1 GENERAL

4-2 The program listing which follows details the content of this program. It contains a list of memory locations, the contents of the register at each location, and an explanation of the directive called forth by each register code.

4-3 Below is a sample printout of a line from a program listing, with an explanation of what is contained in each column. There can be as many as nine columns in the medium speed system test program listing, but not every column will appear in every listing.

EXAMPLE:

```
94 1 00036 22200000 A DK2A LI,2 0 SPREAD PATTERN
a b  c      d        e f   g  h       i
```

a. Line number

b. Indication of memory protection key (applies only to Sigma 5 and 7)

c. Memory address

d. Routine instruction and data

e. Indication whether of absolute origin or not

f. Field label

g. Operation

h. Operand

i. Comments

```
A SIGMET SI,EI,LO,RO,EO
                                      *CATALOG NO 704351 MEDIUM SPEED RAD SYSTEM TEST
                                                SYSTEM     SIG7FDP
                                      *
                                      *                    EQU  TABLE
                                      *
              00000092                ERROR     EQU        X'92'
              000000B0                THREE     EQU        X'B0'
              000000E0                ONES      EQU        X'E0'
              000000E6                ZERO      EQU        X'E6'
              000000E7                B31       EQU        X'E7'
              000000E8                B30       EQU        B31+1
              000000E9                B29       EQU        B31+2
              000000EA                B28       EQU        B31+3
              000000EB                B27       EQU        B31+4
              000000EC                B26       EQU        B31+5
              000000ED                B25       EQU        B31+6
              000000EE                B24       EQU        B31+7
              000000EF                B23       EQU        B31+8
              000000F0                B22       EQU        B31+9
              000000F1                B21       EQU        B31+10
              000000F2                B20       EQU        B31+11
              000000F3                B19       EQU        B31+12
              000000F4                B18       EQU        B31+13
              000000F5                B17       EQU        B31+14
              000000F6                B16       EQU        B31+15
              000000F7                B15       EQU        B31+16
              000000F8                B14       EQU        B31+17
              000000F9                B13       EQU        B31+18
              000000FA                B12       EQU        B31+19
              000000FB                B11       EQU        B31+20
              000000FC                B10       EQU        B31+21
              000000FD                B9        EQU        B31+22
              000000FE                B8        EQU        B31+23
              000000FF                B7        EQU        B31+24
              00000100                B6        EQU        B31+25
              00000101                B5        EQU        B31+26
              00000102                B4        EQU        B31+27
```



```
              00000103                B3        EQU        B31+28
              00000104                B2        EQU        B31+29
              00000105                B1        EQU        B31+30
              00000106                B0        EQU        B31+31
              000000E7                ONE       EQU        B31
              000000E8                TWO       EQU        B31+1
              000000E9                FOUR      EQU        B31+2
```

```
                                    PAGE
                             *
                             *                SEVA DISK TEST
                             *
1 00000   C4E2D2F1 A   PST   TEXT      'DSK1'              PST TABLE
1 00001   000002CA           DATA      LLOC                PROGRAM LOCATIONS
1 00002   00000000 A         DATA      0                   UA
1 00003                      RES       10
1 0000D   00000066           GEN,32    REST
1 0000E   00000012     PST1  DATA      DK1,0,0,-1
1 0000F   00000000 A
1 00010   00000000 A
1 00011   FFFFFFFF A
                             *
                             *
                             *
1 00012   04500000 A   DK1   CAL1,5    0                   TEST DELAY
1 00013   00000066           GEN,32    DK1A
1 00014   221FFFFF A         LI,1      -1                  TEST FOR CHANGE OF UA
1 00015   31100002           CW,1      PST+2
1 00016   6830001A           BCR,3     DK1B
1 00017   32200002           LW,2      PST+2
1 00018   352001FC           STW,2     UA                  SAVE UNIT ADDRESS
1 00019   35100002           STW,1     PST+2
1 0001A   32100003     DK1B  LW,1      PST+3
1 0001B   25100070 A         SLS,1     -16
1 0001C   351001EC           STW,1     COMMAND             SAVE COMMAND
1 0001D   2110C5D9 A         CI,1      X'C5D9'             TEST FOR ER
1 0001E   6830004A           BCR,3     DKEA
1 0001F   3310005A           MTW,1     PASS
1 00020   32400004           LW,4      PST+4
1 00021   6AE0005D           BAL,14    CONV                FIND STARTING AND ENDING ADDRESS
1 00022   35400137           STW,4     DKSECT              * FOR SECTORS
1 00023   354001EF           STW,4     DKSECT1
1 00024   32400005           LW,4      PST+5
1 00025   6AE0005D           BAL,14    CONV
1 00026   35400136           STW,4     DKLAST
```



```
1 00027   32100006           LW,1      PST+6
1 00028   25100004 A         SLS,1     4
1 00029   25100064 A         SLS,1     -28                 TEST FOR PATTERN TO SPREAD
1 0002A   21100000 A         CI,1      0
1 0002B   69200036           BCS,2     DK2A                BRANCH IF NOT RANDOM,BIGGER THAN 0
1 0002C   351001F1           STW,1     RANDOM
1 0002D   32100007           LW,1      PST+7
1 0002E   222FFFA6 A         LI,2      -90
1 0002F   351001ED     DK2B  STW,1     SEED                GENERATE RANDOM PATTERN
1 00030   25100011 A         SLS,1     17
1 00031   301001ED           AW,1      SEED
1 00032   301001EE           AW,1      CONST
1 00033   35140192           STW,1     DK0B+90,2           STORE IN OUTPUT BUFFER
1 00034   6520002F           BIR,2     DK2B
1 00035   6800006C           B         DK2C
1 00036   22200000 A   DK2A  LI,2      0                   SPREAD PATTERN
1 00037   21100005 A         CI,1      5
1 00038   6910003A           BCS,1     $+2
1 00039   22100004 A         LI,1      4                   MAKE COUNT
1 0003A   351001F1           STW,1     RANDOM              SAVE NO OF BYTES
1 0003B   32400008           LW,4      PST+8
1 0003C   6AF00061           BAL,15    GEN
1 0003D   32400007           LW,4      PST+7               GENERATE 4 BYTES
1 0003E   6AF00061           BAL,15    GEN
1 0003F   355001ED           STW,5     SEED
1 00040   222FFE98 A         LI,2      -360
1 00041   22100000 A         LI,1      0
1 00042   723201ED     DK3A  LB,3      SEED,1              GENERATE PATTERN
1 00043   75340192           STB,3     DK0B+90,2
1 00044   33100001 A         MTW,1     1
1 00045   311001F1           CW,1      RANDOM
1 00046   6930004A           BCS,3     $+2
1 00047   22100000 A         LI,1      0
1 00048   65200042           BIR,2     DK3A                STORE ALLBYTES
1 00049   6800006C           B         DK2C
                             *
1 0004A   3210005A     DKEA  LW,1      PASS
```

```
  1 0004B   351001F4              STW,1    ER+1        TYPE OUT ERROR
  1 0004C   3210005C              LW,1     REWRITE
  1 0004D   351001F5              STW,1    ER+2
  1 0004E   3210005B              LW,1     REREAD
  1 0004F   351001F6              STW,1    ER+3
  1 00050   22100063 A            LI,1     99          ERROR 99
  1 00051   351001F3              STW,1    ER
  1 00052   22100004 A            LI,1     4
  1 00053   351000B7              STW,1    REP1
  1 00054   6AF000B1              BAL,15   REPER
  1 00055   22100000 A            LI,1     0            INIT. ERROR STATUS
  1 00056   3510005A              STW,1    PASS
  1 00057   3510005B              STW,1    REREAD
  1 00058   3510005C              STW,1    REWRITE
  1 00059   68000077              B        DKWX
                        *
  1 0005A   00000000 A  PASS      DATA     0
  1 0005B   00000000 A  REREAD    DATA     0
  1 0005C   00000000 A  REWRITE   DATA     0
                        *
  1 0005D   6AF00061    CONV      BAL,15   GEN
  1 0005E   22400000 A            LI,4     0           CONVERT FIRST AND LAST SECTOR
  1 0005F   25400110 A            SLD,4    16
  1 00060   E800000E A            B        *14
                        *
  1 00061   6AD001C7    GEN       BAL,13   GEN1
  1 00062   6AD001C7              BAL,13   GEN1        GENERATE ACTUAL 16 BITS IN
  1 00063   6AD001C7              BAL,13   GEN1        * REGISTER FIVE
  1 00064   6AD001C7              BAL,13   GEN1
  1 00065   E800000F A            B        *15
                        *
  1 00066   22100012    REST      LI,1     DK1
  1 00067   351000CE              STW,1    PST1
  1 00068   22000000 A            LI,0     0
  1 00069   350000CF              STW,0    PST1+1
  1 0006A   350000D0              STW,0    PST1+2
  1 0006B   C4000000 A            CAL1,0   0
```



```
                        *
      1 00066           DK1A      EQU      REST
  1 0006C   321001EC    DK2C      LW,1     COMMAND
  1 0006D   2110D900 A            CI,1     X'D900'     TEST FOR R
  1 0006E   683000CC              BCR,3    RDCOM
  1 0006F   2110E600 A            CI,1     X'E600'     TEST FOR W
  1 00070   6830007B              BCR,3    WRCOM
  1 00071   2110E6D9 A            CI,1     X'E6D9'     TEST FOR WR
  1 00072   6830007B              BCR,3    WRCOM
  1 00073   22100001 A            LI,1     1
  1 00074   351001F3              STW,1    ER
  1 00075   351000B7              STW,1    REP1        REPORT ERROR 1
  1 00076   6AF000B1              BAL,15   REPER
  1 00077   6AF000ED    DKWX      BAL,15   CHANGE
  1 00078   22100077              LI,1     DKWX
  1 00079   351000CE              STW,1    PST1        RETURN TO MONITOR
  1 0007A   C4000000 A            CAL1,0   0
                        *
  1 0007B   22100000 A  WRCOM     LI,1     0
  1 0007C   351001F2              STW,1    TRY
  1 0007D   6AF00098    WRCOM2    BAL,15   WRITE       WRITE A SECTOR
  1 0007E   6AF000ED              BAL,15   CHANGE      TEST FOR CHANGE OF DA
  1 0007F   321001F4              LW,1     DAIO
  1 00080   481001C6 A            AND,1    B0          TEST FOR RATE ERROR
  1 00081   68300086              BCR,3    WRCOM1
  1 00082   22100002 A            LI,1     2           ERROR2,RATE ERROR ON WRITE
  1 00083   352001F3              STW,2    ER
  1 00084   6AF000A9              BAL,15   REPER5
  1 00085   6800007D              B        WRCOM2
                        *
  1 00086   321001F4    WRCOM1    LW,1     DAIO        TEST FOR OTHER ERROR
  1 00087   461000FA A            AND,1    B12
  1 00088   68300091              BCR,3    WRCOM3
  1 00089   331001F2              MTW,1    TRY         YES
  1 0008A   321001F2              LW,1     TRY
  1 0008B   3310005C              MTW,1    REWRITE
  1 0008C   21100003 A            CI,1     3           TRY WRITING 3 TIMES
```

```
1 0008D  6930007D             BCS,3    WRCOM2
1 0008E  22100003 A           LI,1     3
1 0008F  351001F3             STW,1    ER           REPORT ER3 IF MORE THAN 3 TRIES
1 00090  6AF000A9             BAL,15   REPER5
1 00091  32100136   WRCOM3    LW,1     DKLAST
1 00092  31100137             CW,1     DKSECT       TEST FOR LAST SECTOR
1 00093  683000C0             BCR,3    RDCOM
1 00094  22100000 A           LI,1     0
1 00095  351001F2             STW,1    TRY          GO TO NEXT SECTOR
1 00096  33100137             MTW,1    DKSECT
1 00097  6800007D             B        WRCOM2
                    *
                    *                  WRITE A SECTOR
1 00098  35F001FF   WRITE     STW,15   RETURN
1 00099  221000FF             LI,1     DA(DKWR)
1 0009A  351000A5             STW,1    IO2          CALL ON SIO RT
1 0009B  04600000 A           CAL1,6   0
1 0009C  0000000C             DATA     PST
1 0009D  4040E6D9 A           TEXT     '  WR'
1 0009E  6800009F             B        IORT
                    *
                    *
                    *
                    *
                    *                  IO  ROUTINE
                    *
1 0009F  04100000 A IORT      CAL1,1   0            CALL SIO
1 000A0  000001FC             GEN,32   UA
1 000A1  000000A6             GEN,32   IO4          BUSY RETURN
1 000A2  000000A8             GEN,32   IO5          NOT BUSY RETURN
1 000A3  000000A6             GEN,32   IO4          NOT ACCEPTED RETURN
1 000A4  0000012C             GEN,32   INT          INTERRUPT ADDRESS
1 000A5  00000000 A IO2       GEN,32   0            COMMAND DOUBLE WORD
                    *
1 000A6  2210009F   IO4       LI,1     IORT
1 000A7  3510000E             STW,1    PST1
1 000A8  04000000 A IO5       CAL1,0   0            RETURN TO MONITOR
```



```
                    *
1 000A9  35F000B0   REPER5    STW,15   REP51
1 000AA  32100137             LW,1     DKSECT
1 000AB  351001F8             STW,1    ERWD
1 000AC  22100006 A           LI,1     6
1 000AD  351000B7             STW,1    REP1
1 000AE  6AF000B1             BAL,15   REPER
1 000AF  E80000B0             B        *REP51
                    *
1 000B0  00000000 A REP51     DATA     0
                    *                  REPORT ERROR
1 000B1  35F000BB   REPER     STW,15   REP3
1 000B2  3210000C             LW,1     PST
1 000B3  351000B9             STW,1    REP2
1 000B4  EA100092 A REP8      BAL,1    *ERROR       BRANCH TO ERROR ROUTINE
1 000B5  000000BC             GEN,32   REP6         BUSY RETURN
1 000B6  000000BF             GEN,32   REP7         BNOT BUSY RETURN
1 000B7  00000000 A REP1      DATA     0
1 000B8  82000000 A           DATA     X'82000000'
1 000B9  00000000 A REP2      DATA     0
1 000BA  000001F3             GEN,32   ER
                    *
1 000BB  00000000 A REP3      DATA     0
                    *
1 000BC  221000B4   REP6      LI,1     REP8
1 000BD  3510000E             STW,1    PST1
1 000BE  04000000 A           CAL1,0   0
                    *
1 000BF  E80000BB   REP7      B        *REP3
                    *
1 000C0  321001EC   RDCOM     LW,1     COMMAND
1 000C1  2110E600 A           CI,1     X'E600'      TEST FOR W ONLY
1 000C2  683001CF             BCR,3    CKWR
1 000C3  22100000 A RDCOM1    LI,1     0
1 000C4  351001F2             STW,1    TRY
1 000C5  321001EF             LW,1     DKSECT1      RESTORE FIRST SECTOR
1 000C6  35100137             STW,1    DKSECT
```

```
264   1 000C7   6AF000E2      RDC0M4   BAL,15   RDSEC          READ SECTOR
265   1 000C8   6AF000ED               BAL,15   CHANGE         TEST FOR CHANGE OF PARAMETERS
266   1 000C9   321001F4               LW,1     DAIO
267   1 000CA   491001C6 A             AND,1    B0             TEST FOR RATE ERROR
268   1 000CB   683000CF              BCR,3    RDC0M2
269   1 000CC   221000C4 A             LI,1     4
270   1 000CD   351001F3               STW,1    ER
271   1 000CE   6AF000A9               BAL,15   REPER5         REPORT ERROR 4
272   1 000CF   321001F4      RDC0M2   LW,1     DAIO
273   1 000D0   481000FA A             AND,1    B12            TEST FOR UNUSUAL END
274   1 000D1   683000DA              BCR,3    RDC0M3
275   1 000D2   331001F2               MTW,1    TRY            TRY = TRY +1
276   1 000D3   321001F2               LW,1     TRY
277   1 000D4   3310005B               MTW,1    REREAD
278   1 000D5   211000C3 A             CI,1     3
279   1 000D6   693000C7              BCS,3    RDC0M4         TRY AGAIN
280   1 000D7   221000C5 A             LI,1     5
281   1 000D8   351001F3               STW,1    ER
282   1 000D9   6AF000A9               BAL,15   REPER5         REPORT ERROR 5
283   1 000DA   6AF000F1      RDC0M3   BAL,15   VERBI          VERIFY BUFFER
284   1 000DB   221000C0 A             LI,1     0
285   1 000DC   351001F2               STW,1    TRY
286   1 000DD   32100137               LW,1     DKSECT
287   1 000DE   31100136               CW,1     DKLAST         TEST FOR LAST SECTOR
288   1 000DF   683001CF              BCR,3    CKWR
289   1 000E0   33100137               MTW,1    DKSECT         GO TO CHECK WRITE
290   1 000E1   680000C7              B        RDC0M4
291                             *
292                             *
293                             *              READ SECTOR
294   1 000E2   35F001FD      RDSEC    STW,15   RETURN
295   1 000E3   22F000C0 A             LI,15    0
296   1 000E4   221FFFA6 A             LI,1     -90
297   1 000E5   35F2C1EC      RDSECX   STW,15   DKIB+90,1       CLEAR INPUT BUFFER
298   1 000E6   651000E5               BIR,1    RDSECX
299   1 000E7   22F0C1C1               LI,15    DA(LKRD)       SET UP DOUBLE WORD ADDRESS
300   1 000E8   35F000A5               STW,15   102
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301   1 000E9   C4600000 A             CAL1,6   0
302   1 000EA   C0000000               DATA     PST
303   1 000EB   4040D9C4 A             TEXT     '  RD'
304   1 000EC   6800009F              B        IORT
305                             *
306   1 000ED   321000C2      CHANGE   LW,1     PST+2          TEST FOR CHANGE OF PARAMETERS
307   1 000EE   211FFFFF A             CI,1     -1
308   1 000EF   E830000F A            BCR,3    *15
309   1 000F0   68000066              B        REST
310                             *              VERIFY IPUT BUFFER
311   1 000F1   35F000F8      VERBI    STW,15   VB1            SAVE RETURN
312   1 000F2   221FFFA6 A             LI,1     -90
313   1 000F3   32220192      VB2      LW,2     DKOB+90,1      COMPARE INPUT AND OUTPUT BUFFERS
314   1 000F4   3122C1EC               CW,2     DKIB+90,1
315   1 000F5   693000F9              BCS,3    VB3
316   1 000F6   651000F3              BIR,1    VB2
317   1 000F7   E800000F              B        *VB1           RETURN
318                             *
319   1 000F8   CCCCCCCC A     VB1      DATA     0
320                             *
321   1 000F9   22300058 A     VB3      LI,3     91
322   1 000FA   30300001 A             AM,3     1
323   1 000FB   353001F9               STW,3    ERWD+1         SET UP WORD IN ERROR
324   1 000FC   3520C1FA               STW,2    ERWD+2         SET UP WORD EXP.
325   1 000FD   3222C1EC               LW,2     DKIB+90,1
326   1 000FE   352001FB               STW,2    ERWD+3         SET UP WORD RECEVEIVED
327   1 000FF   32200137               LW,2     DKSECT
328   1 00100   352001FA               STW,2    ERWD
329   1 00101   22200009 A             LI,2     9
330   1 00102   35200057               STW,2    REP1
331   1 00103   22200006 A             LI,2     6
332   1 00104   352001F3               STW,2    ER             REPORT ERROR 6
333   1 00105   6AF000E1               BAL,15   REPER
334   1 00106   E800000A               B        *VB1
335                             *
336   1 00107   2540017C A     GEN1     SLD,4    -4
337   1 00108   2540027F A             SCS,4    -1             SHIFT BYTES INTO REGISTER 5
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      338    1 00109    33000004 A            MTW,0    4                * AND ADD 9 IF C1-C6
      339    1 0010A    6910C1CC              BCS,1    $+2
      340    1 00108    305001CE              AW,5     GEN2             ADD 9
      341    1 0010C    2540007D A            SLS,4    -3
      342    1 0010D    E8000000 A            B        *13
      343                          *
      344    1 0010E    90000000 A  GEN2      DATA     X'90000000'
      345                          *
      346                          *
      347                          *                   CHECK WRITE
      348    1 0010F    321001EC    CKWR      LW,1     COMMAND
      349    1 00110    2110D900 A            CI,1     X'D900'
      350    1 00111    683000E6              BCR,3    REST             RETURN TO MON IF  R  ONLY
      351    1 00112    321001EF              LW,1     DKSECT1
      352    1 00113    35100137              STW,1    DKSECT
      353    1 00114    2210011C    CKWR2     LI,1     CKWR1
      354    1 00115    351001FD              STW,1    RETURN
      355    1 00116    221001C3              LI,1     DA(DKCKWR)       CHECK WRITE
      356    1 00117    351000A6              STW,1    102
      357    1 00118    C4630000 A            CAL1,6   0
      358    1 00119    00000000              DATA     PST
      359    1 0011A    4040C3E6 A            TEXT     '  CW'
      360    1 0011B    6A03C09F              B        10RT
      361                          *
      362    1 0011C    6AF000ED    CKWR1     BAL,15   CHANGE           TEST FOR CHANGE OF PARAMETERS
      363    1 0011D    321001F4              LW,1     DA10
      364    1 0011E    4A1000FA A            AND,1    B12
      365    1 0011F    683001Z7              BCR,3    CKWR3            TEST FOR UNUSUAL END
      366    1 00120    32100137              LW,1     DKSECT
      367    1 00121    351001F8              STW,1    ERWD             STORE SECTOR ADDRESS
      368    1 00122    221000C6 A            LI,1     6
      369    1 00123    351000B7              STW,1    REP1
      370    1 00124    221000C7 A            LI,1     7                ERROR 7 ON CHECK WRITE
      371    1 00125    351001F3              STW,1    ER
      372    1 00126    6AF000E1              BAL,15   REPER            REPORT ERROR
      373    1 00127    32100137    CKWR3     LW,1     DKSECT
      374    1 00128    31100136              CW,1     DKLAST
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      375    1 00129    683000I2              BCR,3    DK1              TEST FOR LAST SECTOR
      376    1 0012A    33100137              MTW,1    DKSECT
      377    1 0012B    68000114              B        CKWR2            CHECK WRITE NEXT SECTOR
      378                          *
      379    1 0012C    35E001F4    INT       STW,14   DA10             SAVE AIO STATUS
      380    1 0012D    CD0001FC              IIO,12   *UA
      381    1 0012E    35C001F5              STW,12   DTIO             SAVE IIO STATUS
      382    1 0012F    35D001F6              STW,13   DTIO+1
      383    1 00130    CED001FC              IDV,13   *UA
      384    1 00131    35D001F7              STW,13   DTDV
      385    1 00132    321001FD              LW,1     RETURN           GET PROGRAM ENTRY
      386    1 00133    351000CF              STW,1    PST1+1
      387    1 00134    22DFFFFF A            LI,13    -1
      388    1 00135    E80000CF A            B        *15              RETURN
      389                          *
      390                          *
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391                                                  PAGE
392    1 00136    00000000 A    DKLAST   DATA      0
393    1 00137    00000000 A    DKSECT   DATA      0
394    1 00138                  DK0B     RES       90
395    1 00192                  DKIB     RES       90
396    1 001EC    00000000 A    COMMAND  DATA      0
397    1 001ED    00000000 A    SEED     DATA      0
398    1 001EE    5A6B7C8D A    CONST    DATA      X'5A6B7C8D'
399    1 001EF    00000000 A    DKSECT1  DATA      0
400    1 001F0    00000000 A    TEMP     DATA      0
401    1 001F1    00000000 A    RANDOM   DATA      0
402    1 001F2    00000000 A    TRY      DATA      0
403    1 001F3    00000000 A    ER       DATA      0
404    1 001F4    00000000 A    DAIO     DATA      0
405    1 001F5    00000000 A    DTIO     DATA      0,0
       1 001F6    00000000 A
406    1 001F7    00000000 A    DTDV     DATA      0
407    1 001F8                  ERWD     RES       4
408    1 001FC    00000000 A    UA       DATA      0
409    1 001FD    00000000 A    RETURN   DATA      0
410    1 001FE                  BOUND    8
411    1 001FE    C30004DE      DKWR     GEN,8,24  X'03',BA(DKSECT)+2  WRITE
412    1 001FF    20000002 A               GEN,8,24  X'20',2
413    1 00200    010004E0      DKWRC    GEN,8,24  X'01',BA(DK0B)
414    1 00201    10000168 A               GEN,8,24  X'1C',360
415    1 00202    030004DE      DKRD     GEN,8,24  X'03',BA(DKSECT)+2  READ
416    1 00203    20000002 A               GEN,8,24  X'20',2
417    1 00204    02000648      DKRDC    GEN,8,24  X'02',BA(DKIB)
418    1 00205    10000168 A               GEN,8,24  X'1C',360
419    1 00206    C30004DE      DKCKWR   GEN,8,24  X'03',BA(DKSECT)+2  CHECK WRITE
420    1 00207    20000002 A               GEN,8,24  X'20',2
421    1 00208    050004E0      DKCKWRC  GEN,8,24  X'05',BA(DK0B)
422    1 00209    10000168 A               GEN,8,24  X'1C',360
423                             *
424                             *
425          1 002CA            LLOC     EQU       $
426                                      END
```