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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 EFFECTIVE PAGES

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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

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

Table 2-2. Error Messages

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,BO,EO
                               *CATALOG NO 704351 MEDIUM SPEED RAD SYSTEM TEST
                                          SYSTEM    SIG7FDP
                               *
                               *                    EQU  TABLE
                               *
          00000092             ERROR      EQU       X'92'
          000000BC             THREE      EQU       X'BC'
          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  C00002CA           DATA     LLOC            PROGRAM LOCATIONS
1 00002  C0000000 A         DATA     0               UA
1 00003                     RES      10
1 0000D  C0000066           GEN,32   REST
1 0000E  C0000012    PST1   DATA     DK1,0,0,-1
1 0000F  C0000000 A
1 00010  C0000000 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  251000C4 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  69300048           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   683000CC             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    I02              CALL ON SIO RT
1 0009B   04600000 A           CAL1,6   0
1 0009C   000000CC             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   I04              BUSY RETURN
1 000A2   000000A8             GEN,32   I05              NOT BUSY RETURN
1 000A3   000000A6             GEN,32   I04              NOT ACCEPTED RETURN
1 000A4   0000012C             GEN,32   INT              INTERRUPT ADDRESS
1 000A5   00000000 A  I02      GEN,32   0                COMMAND DOUBLE WORD
                      *
1 000A6   2210009F    I04      LI,1     IORT
1 000A7   351000CE             STW,1    PST1
1 000A8   04000000 A  I05      CAL1,0   0                RETURN TO MONITOR
```



```
                      *
1 000A9   35F000BC    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   E80000BC             B        *REP51
                      *
1 000B0   00000000 A  REP51    DATA     0
                      *                 REPORT ERROR
1 000B1   35F000BB    REPER    STW,15   REP3
1 000B2   321000C0             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   351000CE             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
```

```
1 000C7   6AF000E2     RDCOM4   BAL,15   RDSEC          READ SECTOR
1 000C8   6AF000ED              BAL,15   CHANGE         TEST FOR CHANGE OF PARAMETERS
1 000C9   321001F4              LW,1     DAIO
1 000CA   481001C6 A            AND,1    B0             TEST FOR RATE ERROR
1 000CB   683000CF              BCR,3    RDCOM2
1 000CC   221000C4 A            LI,1     4
1 000CD   351001F3              STW,1    ER
1 000CE   6AF000A9              BAL,15   REPER5
1 000CF   321001F4     RDCOM2   LW,1     DAIO           REPORT ERROR 4
1 000D0   481000FA A            AND,1    B12
1 000D1   683000DA              BCR,3    RDCOM3         TEST FOR UNUSUAL END
1 000D2   331001F2              MTW,1    TRY
1 000D3   321001F2              LW,1     TRY            TRY = TRY +1
1 000D4   3310005B              MTW,1    REREAD
1 000D5   211000C3 A            CI,1     3
1 000D6   693000C7              BCS,3    RDCOM4
1 000D7   221000C5 A            LI,1     5              TRY AGAIN
1 000D8   351001F3              STW,1    ER
1 000D9   6AF000A9              BAL,15   REPER5
1 000DA   6AF000F1     RDCOM3   BAL,15   VERBI          REPORT ERROR 5
1 000DB   221000C0 A            LI,1     0              VERIFY BUFFER
1 000DC   351001F2              STW,1    TRY
1 000DD   32100137              LW,1     DKSECT
1 000DE   31100136              CW,1     DKLAST
1 000DF   683001CF              BCR,3    CKWR           TEST FOR LAST SECTOR
1 000E0   33100137              MTW,1    DKSECT
1 000E1   680000C7              B        RDCOM4         GO TO CHECK WRITE
                       *
                       *
                       *                 READ SECTOR
1 000E2   35F001FD     RDSEC    STW,15   RETURN
1 000E3   22F000C0 A            LI,15    0
1 000E4   221FFFA6 A            LI,1     -90
1 000E5   35F201EC     RDSECX   STW,15   DKIB+90,1
1 000E6   651000E5              BIR,1    RDSECX         CLEAR INPUT BUFFER
1 000E7   22F0C1C1              LI,15    DA(LKRD)
1 000E8   35F000A5              STW,15   I02            SET UP DOUBLE WORD ADDRESS
```



```
1 000E9   046000C0 A            CAL1,6   0
1 000EA   C00000C0              DATA     PST
1 000EB   404009C4 A            TEXT     ' RD'
1 000EC   6800009F              B        IORT
                       *
1 000ED   32100002     CHANGE   LW,1     PST+2          TEST FOR CHANGE OF PARAMETERS
1 000EE   211FFFFF A            CI,1     -1
1 000EF   E83000CF A            BCR,3    *15
1 000F0   68000066              B        REST
                       *                 VERIFY IPUT BUFFER
1 000F1   35F000F8     VERBI    STW,15   VB1            SAVE RETURN
1 000F2   221FFFA6 A            LI,1     -90
1 000F3   32220192     VB2      LW,2     DKOB+90,1      COMPARE INPUT AND OUTPUT BUFFERS
1 000F4   3122C1EC              CW,2     DKIB+90,1
1 000F5   693000F9              BCS,3    VB3
1 000F6   651000F3              BIR,1    VB2
1 000F7   E80000F8              B        *VB1           RETURN
                       *
1 000F8   C00000C0 A   VB1      DATA     0
                       *
1 000F9   2230005B A   VB3      LI,3     91
1 000FA   303000C1 A            AW,3     1
1 000FB   353001F9              STW,3    ERWD+1         SET UP WORD IN ERROR
1 000FC   352001FA              STW,2    ERWD+2         SET UP WORD EXP.
1 000FD   3222C1EC              LW,2     DKIB+90,1
1 000FE   352001FB              STW,2    ERWD+3         SET UP WORD RECEVEIVED
1 000FF   32200137              LW,2     DKSECT
1 00100   352001F8              STW,2    ERWD
1 00101   222000C9 A            LI,2     9
1 00102   352000B7              STW,2    REP1
1 00103   222000C6 A            LI,2     6
1 00104   352001F3              STW,2    ER             REPORT ERROR 6
1 00105   6AF000B1              BAL,15   REPER
1 00106   E80000F8              B        *VB1
                       *
1 00107   2540017C A   GEN1     SLD,4    -4
1 00108   2540027F A            SCS,4    -1             SHIFT BYTES INTO REGISTER 5
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```
1 00109   33000004 A          MTW,0    4              * AND ADD 9 IF C1-C6
1 0010A   6910010C            BCS,1    $+2
1 0010B   305001CE            AW,5     GEN2           ADD 9
1 0010C   2540007D A          SLS,4    -3
1 0010D   E800000D A          B        *13
                     *
1 001CE   90000000 A GEN2     DATA     X'90000000'
                     *
                     *
                     *                 CHECK WRITE
1 0010F   321001EC   CKWR     LW,1     COMMAND
1 00110   2110D900 A          CI,1     X'D900'
1 00111   68300066            BCR,3    REST           RETURN TO MON IF  R  ONLY
1 00112   321001EF            LW,1     DKSECT1
1 00113   35100137            STW,1    DKSECT
1 00114   2210011C   CKWR2    LI,1     CKWR1
1 00115   351001FD            STW,1    RETURN
1 00116   221001C3            LI,1     DA(DKCKWR)     CHECK WRITE
1 00117   351000A5            STW,1    IO2
1 00118   C4600000 A          CAL1,6   0
1 00119   00000000            DATA     PST
1 0011A   404003E6 A          TEXT     '  CW'
1 0011B   6800009F            B        IORT
                     *
1 0011C   6AF000ED   CKWR1    BAL,15   CHANGE         TEST FOR CHANGE OF PARAMETERS
1 0011D   321001F4            LW,1     DAIO
1 0011E   4B1000FA A          AND,1    B12
1 0011F   68300127            BCR,3    CKWR3          TEST FOR UNUSUAL END
1 00120   32100137            LW,1     DKSECT
1 00121   351001F8            STW,1    ERWD           STORE SECTOR ADDRESS
1 00122   22100006 A          LI,1     6
1 00123   351000B7            STW,1    REP1
1 00124   22100007 A          LI,1     7              ERROR 7 ON CHECK WRITE
1 00125   351001F3            STW,1    ER
1 00126   6AF000E1            BAL,15   REPER          REPORT ERROR
1 00127   32100137   CKWR3    LW,1     DKSECT
1 00128   31100136            CW,1     DKLAST
```



```
1 00129   68300012            BCR,3    DK1            TEST FOR LAST SECTOR
1 0012A   33100137            MTW,1    DKSECT
1 0012B   68000114            B        CKWR2          CHECK WRITE NEXT SECTOR
                     *
1 0012C   35E001F4   INT      STW,14   DAIO           SAVE AIO STATUS
1 0012D   CDC001FC            TIO,12   *UA
1 0012E   35C001F5            STW,12   DTIO           SAVE TIO STATUS
1 0012F   35D001F6            STW,13   DTIO+1
1 00130   CED001FC            TDV,13   *UA
1 00131   35D001F7            STW,13   DTDV
1 00132   321001FD            LW,1     RETURN         GET PROGRAM ENTRY
1 00133   351000CF            STW,1    PST1+1
1 00134   22DFFFFF A          LI,13    -1
1 00135   E80000CF A          B        *15            RETURN
                     *
                     *
```

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                                            PAGE
 1 00136    0000000C A   DKLAST    DATA     0
 1 00137    0000000C A   DKSECT    DATA     0
 1 00138                 DKOB      RES      90
 1 00192                 DKIB      RES      90
 1 001EC    0000000C A   COMMAND   DATA     0
 1 001ED    0000000C A   SEED      DATA     0
 1 001EE    5A6B7C8D A   CONST     DATA     X'5A6B7C8D'
 1 001EF    0000000C A   DKSECT1   DATA     0
 1 001F0    0000000C A   TEMP      DATA     0
 1 001F1    0000000C A   RANDOM    DATA     0
 1 001F2    0000000C A   TRY       DATA     0
 1 001F3    0000000C A   ER        DATA     0
 1 001F4    0000000C A   DAIO      DATA     0
 1 001F5    0000000C A   DTIO      DATA     0,0
 1 001F6    0000000C A
 1 001F7    0000000C A   DTDV      DATA     0
 1 001F8                 ERWD      RES      4
 1 001FC    0000000C A   UA        DATA     0
 1 001FD    0000000C A   RETURN    DATA     0
 1 001FE                           BOUND    8
 1 001FE    C30004DE     DKWR      GEN,8,24 X'03',BA(DKSECT)+2  WRITE
 1 001FF    2C00000C2 A            GEN,8,24 X'2C',2
 1 00200    010004EC     DKWRC     GEN,8,24 X'01',BA(DKOB)
 1 00201    1C000168 A             GEN,8,24 X'1C',360
 1 00202    030004DE     DKRD      GEN,8,24 X'03',BA(DKSECT)+2  READ
 1 00203    2C00000C2 A            GEN,8,24 X'2C',2
 1 00204    02000648     DKRDC     GEN,8,24 X'02',BA(DKIB)
 1 00205    1C000168 A             GEN,8,24 X'1C',360
 1 00206    C30004DE     DKCKWR    GEN,8,24 X'03',BA(DKSECT)+2  CHECK WRITE
 1 00207    2C00000C2 A            GEN,8,24 X'2C',2
 1 00208    C50004EC     DKCKWRC   GEN,8,24 X'05',BA(DKOB)
 1 00209    1C000168 A             GEN,8,24 X'1C',360
                         *
                         *
       1 0C2CA           LLOC      EQU      $
                                   END
```