IDENTIFICATION

PRODUCT CODE:	MAINDEC-X8-DIRKA-A-D
PRODUCT NAME:	DEC/X8 MODULE "RK8DS" RK8 DISK SYSTEM EXERCISER
DATE CREATED:	JANUARY 26, 1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	LEONARD E. BEYERSDORFER

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MAYNARD, MASS. 01754

1. MODULE DESCRIPTION

"RK8DS" IS A DEC/X8 SOFTWARE MODULE WHICH EXERCISES AN RK8 DISK SYSTEM WITH UP TO FOUR DRIVES. THE MAIN CHARACTERISTICS OF THIS MODULE ARE:

1. WRITE/READ TRANSFERS VARY RANDOMLY FROM 1 TO 1000(8) WORDS.
2. DISK ADDRESSES ARE SELECTED RANDOMLY BETWEEN ADDRESSES 0000 AND 6177 ON ALL DISKS BETWEEN THE SPECIFIED LOW AND HIGH DISK LIMITS.
3. TO ACHIEVE GREATER DATA BREAK THROUGHPUT, RANDOMLY FROM 1 TO 200(8) EXERCISER LOOP PASSES ARE MADE USING TWO ADJACENT TRACKS WITH RANDOM CHANGES TO THE SECTOR, SURFACE AND DRIVE SELECTION ENABLED.
4. THREE READS ARE DONE IN THE CASE OF A PARITY ERROR.

2. REQUIREMENTS

1. PROCESSORS: PDP-8,8/I,8/L,8/E,8/M AND PDP-12.
2. OPTIONS: RK8 DISK SYSTEM WITH UP TO FOUR RK01 DRIVES.
3. SPECIAL: NONE

3. RESTRICTIONS

NONE

4. OPERATING INFORMATION

4.1 SPECIAL CONSIDERATIONS

THIS MODULE REQUIRES EXTERNAL BUFFERS.

4.2 BUILDING

1. JOB TYPE: INTERRUPT DRIVEN
2. PRIORITY: NON-CRITICAL, BUT SHOULD BE PLACED HIGH ON THE LIST TO PROVIDE GREATER INTERACTION
3. JOB SLOTS: JF1 OR JF2 ONLY; 4 PAGES REQUIRED.

4, STANDARD DEVICE CODES: 0730, 0740, 0750,

4,3 INITIALIZING

AFTER THE INDICATED CODE LETTER IS PRINTED RESPOND BY TYPING THE PARAMETER IN THE MANNER SHOWN BELOW,

CODE	DEFINITION	RESPONSE	LIMITS	PRESET
A	LOWEST DISK	N	0-3	0
B	HIGHEST DISK	N	0-3	0
C	TYPE OF DATA	0 FOR RANDOM 1 NNNN FOR CONSTANT	ANY DATA WORD	RANDOM
D	DISK ADDRESS AT WHICH TRANSFER BEGINS	0 FOR RANDOM 1 00ØN NNNN ↑ (TRK,SUR,SEC) (DSK # IN BITS 9 AND 10)	LEGAL ADDRESS	RANDOM
E	TRANSFER LENGTH	0 FOR RANDOM 1 NNNN	0001-1000	RANDOM
F	BUFFER TO USE	0 FOR RANDOM 1 NNNN	LEGAL DESIGNATOR	RANDOM

IN ADDITION THE FOLLOWING MODULE LOCATIONS MAY BE CHANGED AS INDICATED FOR THE DESIRED RESULT,

1, "REPORT" (0362) MAY BE CHANGED FROM 5776 TO XXXX WHERE ANY CLEAR BITS INHIBIT AN ERROR REPORT FOR THAT CONDITION, BIT ASSIGNMENT IS THE SAME AS THE RK8 STATUS REGISTER,

2, "PARITY" (0730) MAY BE CHANGED FROM 1576 TO 5776 TO INHIBIT DATA CHECKING AFTER A PARITY ERROR,

4,4 DEVICE SETUP

MAKE READY AND WRITE ENABLE ALL DISKS TO BE EXERCISED,

4,5 RUNNING

1, CNTR: UPDATED AFTER A WRITE/READ/DATA CHECK OPERATION IS COMPLETED,

2, SR10: WHEN A 1, THE BUFFER CURRENTLY ASSIGNED IS RETAINED,

3, SR11: WHEN A 1, THE CURRENT DISK STARTING ADDRESS IS RETAINED,

5. ERROR INFORMATION

ALL STATUS REGISTER ERRORS ARE REPORTED AS STATUS ERRORS, DATA ERRORS IN THE DATA ERROR FORMAT.

5.1 ERROR SYMBOL DEFINITIONS

CODE: 0002 READ
0004 WRITE
0012 FALSE DATA ERROR (BAD SOFTWARE CHECKSUM BUT DATA LOOKED GOOD ON WORD BY WORD CHECK), IN THE CASE OF A PARITY ERROR, THIS CODE INDICATES 1) THE PARITY ERROR STOPPED THE TRANSFER PRIOR TO COMPLETION; AND 2) THE DATA TRANSFERRED WAS GOOD.
003X TRANSFER INCOMPLETE (WORD COUNT NON-ZERO BUT NO STATUS REG. ERROR BIT IS SET.)
0042 THIS MAY FOLLOW CODE 0032 REPORTS AND INDICATES THAT ALTHOUGH A TRANSFER WAS INCOMPLETE, THE DATA THAT WAS TRANSFERRRED WAS GOOD.

SA: FINAL STATUS REGISTER

SB: CURRENT BUFFER DESIGNATOR

SC: INITIAL WORD COUNT

SD: FINAL WORD COUNT

SE: INITIAL CURRENT ADDRESS

SF: FINAL CURRENT ADDRESS

SG: INITIAL COMMAND REGISTER

SH: INITIAL TRK, SUR, SEC

SI: FINAL COMMAND REGISTER

SJ: FINAL TRK, SUR, SEC

DA: BUFFER ADDRESS

DB: GOOD DATA WORD

DC: BAD DATA WORD

6. LISTING (ATTACHED)

```
/
/DEC/X8 EXTERNAL SYMBOL TABLE  "EXTSYM"
/FOR USE IN ASSEMBLING DEC/X8 SOFTWARE MODULES.
/COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
        XLIST
        PAUSE
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/MAINDEC-X8-DIRKA-A-L  "DEC/X8"  RK8DS

/RK8 DISK SYSTEM MODULE FOR DEC/X8

/COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

/THIS MODULE OPERATIONAL ON PDP-8,8/I,8/L,8/E AND PDP-12.

        /PRG:   LEN BEYERSDORFER (X2537)


/BUILDER INSTRUCTIONS:

        /1,PRIORITY:  NOT CRITICAL, BUT SHOULD BE ASSIGNED NEAR LEVEL 0
/TO PROVIDE MAXIMUM DATA BREAK INTERACTION.
        /2,JOB SLOT:  4 PAGES REQUIRED, SLOT JX1 OR JX2.

/INITIALIZER INSTRUCTIONS:

/CODE   DEFINED                 RESPONSE                                PRESET

/A:     LOWEST DISK TO USE      0-3                                     0
/B:     HIGHEST DISK TO USE     0-3                                     0
/C:     TYPE OF DATA            0=RANDOM; 1  NNNN=CONSTANT              RANDOM
/D:     ADDRESSING              0=RANDOM; 1  NNNN  NNNN=CONSTANT        RANDOM
/E:     LENGTH OF TRANSFER      0=RANDOM; 1  NNNN=CONSTANT              RANDOM
/F:     BUFFER ASSIGNMENT       0=RANDOM; 1  NNNN=CONSTANT              RANDOM


/SPECIAL USER MODIFICATIONS VIA RELATIVE "+0" FACILITY.

        /1,"REPORT" MAY BE CHANGED FROM 5776 TO XXXX WHERE ANY
/CLEAR BITS INHIBIT AN ERROR REPORT FOR THAT CONDITION.

        /2,"PARITY" MAY BE CHANGED FROM 1576 TO 5776 TO INHIBIT
/DATA CHECKING AFTER A PARITY ERROR.

/REPORT SYMBOL  DEFINITIONS:

        /1,REFER TO MODULE TABLE IN THIS LISTING FOR DESCRIPTION
/OF CNTR,SA:-SJ:,AND DA:-DC:

        /2,"CODE" DEFINITIONS:

                /CODE   DEFINED
                /0002   READ
                /0004   WRITE
                /001X   FALSE DATA ERROR (BAD CHECKSUM BUT
                /       DATA LOOKED GOOD ON WORD BY WORD CHECK.)
                /0012   THIS TYPE OF ERROR MAY BE REPORTED AFTER
                /       A PARITY ERROR AND INDICATES THE FOLLOWING:
                                /

/MAINDEC-X8-DIRKA-A-L  "DEC/X8"  RK8DS  PAL10  V141  15-FEB-72  19:54  PAGE 2-1
                        /       1, THE PARITY ERROR STOPPED THE TRANSFER PRIOR TO
                        /       COMPLETION AND THEREBY CAUSED A SOFTWARE
                        /       SUMCHECK ERROR; 2, THE DATA THAT WAS READ IN
                        /       WAS GOOD.
                        /003X   TRANSFER INCOMPLETE (WC NON-ZERO,
                        /       BUT NO STATUS ERROR BIT WAS SET.)
                        /0042   THIS ERROR CODE MAY FOLLOW A CODE 0032
                        /       ERROR REPORT AND INDICATES THAT ALTHOUGH A
                        /       TRANSFER WAS INCOMPLETE, THE DATA THAT WAS TRANSFERRED
                        /       WAS GOOD.

/RK8 STANDARDS:

        /DEVICE CODES:73,74,AND 75


/RK8 IOT DEFINITIONS:

6732    DLDC=6732               /AC=>CM; 0=>AC
6733    DLDR=6733               /AC=>TK,SUR,SEC; 0=>AC; READ
6735    DLDW=6735               /AC=>TK,SUR,SEC; 0=>AC; WRITE
6734    DRDA=6734               /0=>AC; TK,SUR,SEC=>AC
6736    DRDC=6736               /0=>AC; CM=>AC
6741    DRDS=6741               /0=>AC; SR=>AC
6742    DCLS=6742               /0=>SR
6745    DSKD=6745               /PC+1=>PC IF TD
6747    DSKE=6747               /PC+1=>PC IF ERR
6751    DCLA=6751               /CLEAR ALL
6752    DRWC=6752               /0=>AC; WC=>AC
6753    DLWC=6753               /AC=>WC; 0=>AC
6755    DLCA=6755               /AC=>CA; 0=>AC
6757    DRCA=6757               /0=>AC; CA=>AC


        /MODULE TABLE
        0200    *200
0200    0000    JOB,    0                       /JOB NUMBER
0201    2213    TEXT1,  TEXT    "RK8DS "        /DEVICE NAME
0202    7004
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0203  2340
0204  0000
0205  0411          TEXT    "DIRKA-A"               /MODULE DESIGNATOR
0206  2213
0207  0155
0210  0100
0211  0000    HOMEDF, 0                             /DF-IF
0212  7402          HLT/CDF
0213  5611          JMP I   HOMEDF
0214  6202    INTACK, CIF     00                    /ACKNOWLEDGE INTERRUPT,
0215  4426          JMS I   IHRETP
0216  7777          -1                            /PRIORITY
0217  7777    KILL,   -1                            /COMMAND TO KILL JOB,
0220  7777    KILLED, -1                            /MODULE SETS TO -1 WHEN JOB KILLED,
0221  0000    CNTR,   0                             /NUMBER OF EXERCISER LOOP PASSES,
0222  0000    ERROR,  0                             /ERROR CALL,
0223  3234          DCA     .+11
0224  7604          LAS
0225  0073          AND Z   K4
0226  7440          SZA
0227  3217          DCA     KILL
0230  4211          JMS     HOMEDF
0231  6002          IOF
0232  6202          CIF     00
0233  4461          JMS I   ERRP
0234  0000          0
0235  5622          JMP I   ERROR
0236  0000    CODE,   0                             /ERROR CODE,
0237  7766          -12                           /STATUS ERROR ENTRY TALLY,
0240  0000    ERRSA,  0                             /STATUS REG,
0241  0000    ERRSB,  0                             /BUFFER WORD
0242  0000    ERRSC,  0                             /INIT WC
0243  0000    ERRSD,  0                             /FINAL WC
0244  0000    ERRSE,  0                             /INIT CA
0245  0000    ERRSF,  0                             /FINAL CA
0246  0000    ERRSG,  0                             /INIT CM
0247  0000    ERRSH,  0                             /INIT TRK,SUR,SEC
0250  0000    ERRSI,  0                             /FINAL CM
0251  0000    ERRSJ,  0                             /FINAL TRK,SUR,SEC
0252  7775          -3                            /DATA ERROR ENTRY TALLY,
0253  0000    ERRDA,  0                             /BUFFER ADDRESS
0254  0000    ERRDB,  0                             /GOOD DATA
0255  0000    ERRDC,  0                             /BAD DATA

              /END OF MODULE TABLE


              /INTERRUPT SERVICE - IMMEDIATE ONLY!
                                                    /"INT" IS INT SERV ADDR
0256  0000    INT,    0                             /SKIP CHAIN DOES JMS HERE
0257  2303          ISZ     RENTRY
0260  5275          JMP     .+15
0261  4211          JMS     HOMEDF
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0262  6741    DC74A,  DRDS                          /NO, SAVE STATUS,
0263  3240          DCA     ERRSA
0264  6736    DC73A,  DRDC                          /SAVE CM,
0265  3250          DCA     ERRSI
0266  6734    DC73B,  DRDA                          /SAVE TK,SUR,SEC
0267  3251          DCA     ERRSJ
0270  6742    DC74B,  DCLS                          /CLEAR STATUS
0271  7130          STL RAR                       /CLEAR INT ENABLES
0272  6732    DC73C,  DLDC
0273  1377          TAD     (DEFSRV               /PUT DEFERRED SERVICE PNTR IN AC,
0274  5214          JMP     INTACK                /ACKNOWLEDGE INTERRUPT
0275  3303          DCA     RENTRY
0276  6214          RDF
0277  1020          TAD Z   KCIFDF
0300  3301          DCA     .+1
0301  7402          HLT
0302  5656          JMP I   INT
0303  0000    RENTRY, 0                             /=1 ALLOWS AN INTERRUPT,

              /ROUTINE TO SET UP RK8 TO READ OR WRITE (UNLESS "KILL"=-1)
                      /CALL MUST BE:
                /1,   SET UP ERRSB, ERRSC,ERRSE,ERRSG AND ERRSH,
                /2,   ENSURE DF=IF
                /3,   PUT 0002 IN AC IF READ, 0004 IF WRITE,
                /4,   JMS I (GO
                /5,   DLDR OR DLDW (READ OR WRITE,)
                /6,   RETURNS HERE IF STATUS ERROR (ALREADY REPORTED)
                /7,   RETURNS HERE IF NO STATUS ERRORS,

0304  0000    GO,     0                                     /ENTER
0305  3236          DCA     CODE                            /SAVE CODE 2 OR 4,
0306  1217          TAD     KILL                            /COMMAND TO KILL JOB?
0307  7450          SNA
0310  5314          JMP     .+4
0311  3220          DCA     KILLED                          /YES,  SET JOB KILLED FLAG
0312  4364          JMS     RELEAS                          /RELEASE ASSIGNED BUFFER
0313  5004          SERVEX                                  /EXIT WITH AC CLEAR
0314  1242          TAD     ERRSC           /GET INITIAL WC
0315  6753    DC75A,  DLWC                  /LOAD IT,
0316  1244          TAD     ERRSE           /GET INIT CA
0317  6755    DC75B,  DLCA                  /LOAD IT,
0320  1704          TAD I   GO              /GET DLDR OR DLDW
0321  2304          ISZ     GO              /UPDATE
0322  3332          DCA     .+10            /SAVE FOR EXECUTION
0323  1246          TAD     ERRSG           /GET INIT CM
0324  6002          IOF                     /INT SYS OFF
0325  6732    DC73D,  DLDC                  /LOAD IT
0326  7240          CLA CMA                 /SET FOR ONE INT
0327  3303          DCA     RENTRY
0330  6742    DC74C,  DCLS                  /CLEAR STATUS
0331  1247          TAD     ERRSH           /GET INIT TRK,SUR,SEC
0332  7402          HLT/DLDR OR DLDW        /LOAD IT AND READ OR WRITE
0333  5004          SERVEX                  /EXIT WITH AC=0
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                    /DEFERRED SERVICE ENTRY!

0334  6752  DEFSRV, DRWC                    /SAVE FINAL WC
0335  3243          DCA     ERRSD
0336  6757  DC75C,  DRCA                    /SAVE FINAL CA
0337  3245          DCA     ERRSF
0340  1240          TAD     ERRSA           /CHECK STATUS
0341  0363          AND     K5776A
0342  7640          SZA CLA
0343  5355          JMP     GO1             /ERROR
0344  1243  GO2,    TAD     ERRSD           /NO ERROR, CHECK TRANSFER DONE;
0345  7650          SNA CLA                 /FINAL WC=0?
0346  5353          JMP     .+5
0347  1236          TAD     CODE
0350  1103          TAD I Z K30             /NO, MAKE CODE =003X
0351  3236          DCA     CODE
0352  5360          JMP     GO1+3
0353  2304          ISZ     GO              /NO ERRORS
0354  5704          JMP I   GO
0355  1240  GO1,    TAD     ERRSA           /REPORT ERROR?
0356  0362          AND     REPORT
0357  7640          SZA CLA
0360  4222          JMS     ERROR           /YES
0361  5704          JMP I   GO
0362  5776  REPORT, 5776
0363  5776  K5776A, 5776

0364  0000  RELEAS, 0                               /RELEASE BUFFER;
0365  1241          TAD     ERRSB                   /BUFFER WORD IN AC;
0366  6002          IOF                             /CALL TO MONITOR ROUTINE;
0367  6202          CIF     00
0370  4457          RLBUFF
0371  5764          JMP I   RELEAS                  /OUT WITH ION;
0372  0000  DATCON, 0
0373  1254          TAD     ERRDB
0374  5772          JMP I   DATCON
                    /END OF PAGE
      0375          *.

0377  0334
      0400          *400



                    /RANDOM NUMBER GENERATOR

0400  0000  RANDOM, 0
0401  2234          ISZ     RAN1
0402  7000          NOP
0403  1235          TAD     RAN2
0404  1240          TAD     K1111A
0405  7104          CLL RAL
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0406  7420          SNL
0407  7001          IAC
0410  3235          DCA     RAN2
0411  1234          TAD     RAN1
0412  1235          TAD     RAN2
0413  5600          JMP I   RANDOM
0414  0000  SAVRAN, 0                       /PRESET
0415  6201          CDF     00
0416  1466          TAD I Z K0
0417  3235          DCA     RAN2
0420  4777          JMS I   (HOMEDF
0421  1234          TAD     RAN1
0422  3236          DCA     SAV1
0423  1235          TAD     RAN2
0424  3237          DCA     SAV2
0425  5614          JMP I   SAVRAN
0426  0000  RESRAN, 0                       /RESTORE
0427  1236          TAD     SAV1
0430  3234          DCA     RAN1
0431  1237          TAD     SAV2
0432  3235          DCA     RAN2
0433  5626          JMP I   RESRAN
0434  0000  RAN1,   0
0435  0000  RAN2,   0
0436  0000  SAV1,   0
0437  0000  SAV2,   0
0440  1111  K1111A, 1111

0441  0000  DATCHK, 0                               /CHECK DATA,
0442  1776          TAD I   (ERRSD                  /GET FINAL WC,
0443  4775          JMS I   (SUMCHK.                /SUMCHECK,
0444  7041          CIA
0445  1774          TAD I   (SUMSAV                 /GOOD?
0446  7650          SNA CLA
0447  5641          JMP I   DATCHK                  /YES, OUT,
0450  4226          JMS     RESRAN                  /NO, RESTORE DATA GENERATOR,
0451  1776          TAD I   (ERRSD                  /PRESET TO CHECK DATA,
0452  4302          JMS     DATSET
0453  3260          DCA     .+5                     /SAVE CDF TO BUFFER FIELD,
0454  1773          TAD I   (DATGEV                 /MOVE DATA GENERATOR POINTER TO THIS
0455  3302          DCA     DATSET                  /PAGE
0456  4702          JMS I   DATSET                  /GENERATE I WORD,
0457  3772          DCA I   (ERRDB                  /SAVE IN GOOD,
0460  7402          HLT/CDF                         /DF TO BUFFER FIELD,
0461  1417  AUA,    TAD I   AUTO                    /GET WORD IN BUFFER,
0462  4777          JMS I   (HOMEDF                 /DF=IF
0463  3771          DCA I   (ERRDC                  /SAVE IN BAD,
0464  1017  AUB,    TAD     AUTO                    /GET ADDR AND SAVE,
0465  3770          DCA I   (ERRDA
0466  1771          TAD I   (ERRDC                  /GOOD=BAD?
0467  7041          CIA
0470  1772          TAD I   (ERRDB
0471  7440          SZA
0472  4767          JMS I   (ERROR                  /NO, DATA ERROR (AC NOT 0)
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0473  2766            ISZ I   (BUFTAL                 /DONE?
0474  5256            JMP     .-16                    /NO,
0475  1765            TAD I   (CODE                   /YES, SET CODE=00X1X
0476  1076            TAD Z   K10
0477  3765            DCA I   (CODE
0500  4767            JMS I   (ERROR                  /CLOSE ERROR ROUTINE,
0501  5641            JMP I   DATCHK                  /OUT,
0502  0000    DATSET, 0                               /SET UP FOR DATA GENERATE OR CHECK,
0503  7041            CIA                             /COMPUTE LENGTH TO FILL OR CHECK,
0504  1764            TAD I   (ERRSC
0505  7450            SNA
0506  5641            JMP I   DATCHK
0507  3766            DCA I   (BUFTAL                 /SAVE IT,
0510  1763            TAD I   (ERRSE                  /PUT CA IN AUTO INDEX,
0511  3017    AUC,    DCA     AUTO
0512  1762            TAD I   (ERRSB                  /COMPUTE CDF TO BUFFER FIELD,
0513  7135            AND Z   K70
0514  1064            TAD Z   KCDF
0515  5702            JMP I   DATSET                  /EXIT WITH IT IN AC,
0516  0000    LGTCON, 0
0517  1764            TAD I   (ERRSC
0520  5716            JMP I   LGTCON

0521  0000    ADRCON, 0
0522  5761            JMP I   (LGTGEN

                /THIS IS THE START OF THE EXERCISER LOOP:

0523  4200    EXER,   JMS     RANDOM          /GET # OF CLOSE TRANSFERS (1-200) (2 ADJACENT TRACKS)
0524  0130            AND Z   K177
0525  7040            CMA
0526  3760            DCA I   (RKPC1          /SAVE
0527  4751            JMS I   ADRGEV          /GET TRK SUR SEC
0530  3757            DCA I   (ERRSH
0531  7120            STL                     /CHECK TRACK IN LIMITS
0532  1757            TAD I   (ERRSH
0533  1347            TAD     M6200A
0534  7620            SNL CLA
0535  5327            JMP     .-6             /OUT, TRY AGAIN,
0536  1757    DSKAGN, TAD I   (ERRSH          /SAVE ONLY BITS 0-6 TO ALLOW + OR - 1 TRACK,
0537  0133            AND Z   K7740
0540  3757            DCA I   (ERRSH
0541  4751            JMS I   ADRGEV          /NOW GET A SUR SEC AND LEAST SIG TRK BIT,
0542  0350            AND     K37A
0543  1757            TAD I   (ERRSH          /ADD IN THE MSB'S
0544  3757            DCA I   (ERRSH          /SAVE THE RESULT AS STARTER
0545  4751    DSKTRA, JMS I   ADRGEV          /GET DISK #
0546  5756            JMP I   (LGTGEN-3
0547  1600    M6200A, -6200
0550  0037    K37A,   37
      0551    *.
0551  0400    ADRGEV, RANDOM/ADRCON
0556  0603
0557  0247
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0560  0731
0561  0606
0562  0241
0563  0244
0564  0242
0565  0236
0566  0725
0567  0222
0570  0253
0571  0255
0572  0254
0573  0754
0574  0726
0575  0736
0576  0243
0577  0211
      0600    *600
0600  3777    RUN,    DCA I   (ERRSB          /CLEAR BUFFER WORD FOR "RUN"
0601  3776            DCA I   (CNTR           /ALSO COUNTER,
0602  5775            JMP I   (EXER

                /CONTINUATION OF EXERCISER LOOP - DISK NUMBER IN AC,
0603  3774            DCA I   (ERRSG          /SAVE DISK NUMBER
0604  1774            TAD I   (ERRSG          /CHECK DISK IN LIMITS
0605  4773            JMS I   (BTWEEN
0606  4752    LGTGEN, JMS I   LGTGEV          /OK, GENERATE LENGTH
0607  0333            AND     K777A           /MAKE IT 1 TO 1000
0610  1276            TAD     K7000A
0611  3772            DCA I   (ERRSC          /SAVE AS INIT WC
0612  1772            TAD I   (ERRSC          /LENGTH < OR = 400?
0613  1121            TAD Z   K400
0614  7700            SMA CLA
0615  5223            JMP     .+6             /YES, OK SECTOR
0616  7001            IAC                     /NO, NEED 2 SECTORS,
0617  1771            TAD I   (ERRSH          /ADD 1 TO OLD SECTOR
0620  0101            AND Z   K17             /AND MAKE SURE NO SECTOR 20 NEEDED
0621  7650            SNA CLA
0622  5770            JMP I   (DSKAGN         /REGENERATE STUFF
0623  4753    BUFGEN, JMS I   BUFGEV          /GENERATE BUFFER,
0624  1777            TAD I   (ERRSB          /MAKE UP CM WORD,
0625  0105            AND Z   K70
0626  3017    AUC,    DCA     AUTO
0627  1774            TAD I   (ERRSG
0630  0332            AND     K6A
0631  1017    AUH,    TAD     AUTO
0632  1276            TAD     K7000A
0633  3774            DCA I   (ERRSG          /SAVE IT,
0634  1777            TAD I   (ERRSB          /COMPUTE INIT CA
0635  0131            AND Z   K7600
0636  1334            TAD     M1A
0637  3767            DCA I   (ERRSE          /SAVE IT,
0640  4766    DATGEN, JMS I   (SAVRAN                 /SAVE RANDOM GEN STUFF,
0641  4765            JMS I   (DATSET                 /PRESET TO FILL BUFFER,
0642  3243            DCA     .+1
0643  7402            HLT/CDF
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0644  4754          JMS I   DATGEV
0645  3417  AUD,    DCA I   AUTO            /FILL BUFFER
0646  2325          ISZ     BUFTAL
0647  5244          JMP     .+3
0650  4764          JMS I   (HOMEDF
0651  4336          JMS     SUMCHK
0652  3326          DCA     SUMSAV                  /SAVE IT,
0653  1141          TAD Z   M3                      /SET FOR 3 RE-READS ON
0654  3327          DCA     PARTAL                  /PARITY ERROR,
0655  1073          TAD Z   K4                      /4 IN AC FO WRITE
0656  4763          JMS I   (GO                     /WRITE IT,
0657  6735  DC73E,  DLDW
0660  5277          JMP     K7000A+1                        /ERROR, AGAIN
0661  4765  DSKRD,  JMS I   (DATSET                 /OK, CLEAR BUFFER,
0662  3263          DCA     .+1
0663  7402          HLT/CDF
0664  3417  AUE,    DCA I   AUTO
0665  2325          ISZ     BUFTAL
0666  5264          JMP     .+2
0667  4764          JMS I   (HOMEDF
0670  7126          STL RTL                         /2 IN AC FOR READ,
0671  4763          JMS I   (GO                     /READ IT,
0672  6733  DC73F,  DLDR
0673  5313          JMP     DKRK                    /ERROR,
0674  4762          JMS I   (DATCHK                 /OK, CHECK DATA,
0675  2776  DSKOUT, ISZ I   (CNTR                  /UPDATE PASS COUNTER,
0676  7000  K7000A, 7000/NOP
0677  7604          LAS                     /CHANGE DISK ADDRESS
0700  7010          RAR
0701  7630          SZL CLA
0702  5206          JMP     LGTGEN          /NO,
0703  1761          TAD I   (ADRGEV
0704  7041          CIA
0705  1360          TAD     (RANDOM
0706  7640          SZA CLA
0707  5757          JMP I   (EXER+4         /CONSTANT ADDRESS SPECIFIED,
0710  2331          ISZ     RKPC1
0711  5770          JMP I   (DSKAGN
0712  5775          JMP I   (EXER                   /LOOP,
0713  1756  DKRK,   TAD I   (ERRSA                  /PARITY ERROR=CHECK DATA
0714  0330          AND     PARITY                  /ANYWAY?
0715  7650          SNA CLA
0716  4762          JMS I   (DATCHK                 /YES,
0717  1756          TAD I   (ERRSA                  /PARITY ERROR?
0720  0335          AND     K1576A
0721  7650          SNA CLA
0722  2327          ISZ     PARTAL                  /YES,3 RE-READS,
0723  5261          JMP     DSKRD
0724  5275          JMP     DSKOUT
0725  0000  BUFTAL, 0
0726  0000  SUMSAV, 0
0727  0000  PARTAL, 0
0730  1576  PARITY, 1576
0731  0000  RKPC1,  0
0732  0006  K6A,    6
```



```
0733  7777  K777A,  777
0734  7777  M1A,    -1
0735  1576  K1576A, 1576
0736  0000  SUMCHK, 0                               /SUMCHECK BUFFER
0737  4765          JMS I   (DATSET
0740  3341          DCA     .+1
0741  7402          HLT/CDF
0742  7100          CLL
0743  1417  AUF,    TAD I   AUTO
0744  7430          SZL
0745  7001          IAC
0746  2325          ISZ     BUFTAL
0747  5342          JMP     .+5
0750  4764          JMS I   (HOMEDF
0751  5736          JMP I   SUMCHK

              /END OF PAGE

      0752    *.
              /NOTE! THESE LOC'S ARE SPECIFIED BELOW THE *, SO THAT THE ADDRESSES
              /INDICATED ARE MODIFIED PROPERLY BY THE DEC-X8 LOADER,
0752  0400  LGTGEV, RANDOM  /LGTCON
0753  1011  BUFGEV, BUFRAN  /BUFCON
0754  0400  DATGEV, RANDOM  /DATCON
0756  0240
0757  0527
0760  0400
0761  0551
0762  0441
0763  0304
0764  0211
0765  0502
0766  0414
0767  0244
0770  0536
0771  0247
0772  0242
0773  1027
0774  0246
0775  0523
0776  0221
0777  0241
      1000    *1000


              /ROUTINE TO ASSIGN AND HOLD A SPECIFIED BUFFER WHICH MUST BE
              /LEGALLY SPECIFIED IN CONBUF (STANDARD BUFFER DESIGNATOR)

1000  0000  BUFCON, 0
1001  1777          TAD     ERRSB           /GET CURRENT BUFFER WORD,
1002  7041          CIA
1003  1210          TAD     CONBUF
1004  7650          SNA CLA                 /SPECIFIED BUFFER ASSIGNED?
1005  5600          JMP I   BUFCON          /YES, EXIT,
```

```
1006  4211          JMS     BUFRAN          /NO, GET NEW BUFFER,
1007  5201          JMP     BUFCON+1        /CHECK IT
1010  0000    CONBUF, 0                     /MUST CONTAIN LEGAL BUFFER DESIGNATOR,

                /ROUTINE TO ASSIGN A BUFFER OBSERVING SR 10,

1011  0000    BUFRAN, 0
1012  7604          LAS                     /PUT SR 10 (NOT) IN LINK,
1013  7012          RTR
1014  7220          CLA CML
1015  1777'         TAD     ERRSB           /BUFFER WORD IN AC',
1016  7460          SNL SZA
1017  5225          JMP     .+6             /EXIT IF AC NON ZERO AND LINK SET,
1020  7640          SZA CLA
1021  4776'         JMS     RELEAS          /RELEASE BUFFER IF AC NON ZERO',
1022  6002          IOF                     /ASSIGN A BUFFER
1023  6202          CIF     00
1024  4460          ASBUFF
1025  3777'         DCA     ERRSB           /SAVE BUFFER DESIGNATOR,
1026  5611          JMP I   BUFRAN          /EXIT,

1027  0000    BTWEEN, 0                             /ROUTINE TO CHECK EMA IN LIMITS,
1030  0245          AND     K6B                     /ENTER WITH EMA IN AC, MASK
1031  3211          DCA     BUFRAN                  /TO DISK SELECT,
1032  1211          TAD     BUFRAN                  /EMA>OR=LOW LIMIT?
1033  1243          TAD     LODSK
1034  7710          SPA CLA
1035  5775          JMP I   (DSKTRA                 /NO, BACK TO TOP OF EXER LOOP',
1036  1211          TAD     BUFRAN                  /EMA <OR= HIGH LIMIT?
1037  1244          TAD     HIDSK
1040  7740          SMA SZA CLA
1041  5775          JMP I   (DSKTRA                 /NO, BACK TO TOP OF EXER LOOP
1042  5627          JMP I   BTWEEN                  /OK, EMA IN LIMITS,
1043  0000    LODSK,  0                             /LOW DISK SELECT (BITS 4-5 NEGATE)
1044  0000    HIDSK,  0                             /SAME FOR HIGH DISK SELECT,
1045  0006    K6B,    6


                /INITIALIZER
                                                    /"INIT" IS INITIALIZING ADDRESS,
1046  1374    INIT,   TAD     (TEXT1
1047  3251          DCA     LTRCOD
1050  4444          MESAGE
1051  0000    LTRCOD, 0
1052  1117    INITLP, TAD Z   K301                  /SET CODE TO "A"
1053  3251          DCA     LTRCOD
1054  4322          JMS     INISR1                  /GET LOW DISK,
1055  3243          DCA     LODSK                   /SAVE IN BITS 4-5 NEGATED
1056  4322          JMS     INISR1                  /SAME FOR HIGH DISK,
1057  3244          DCA     HIDSK
1060  4327          JMS     INISR2                  /TYPE OF DATA,
1061  5265          JMP     .+4                     /RANDOM
1062  3773          DCA I   (ERRDB                  /CONSTANT=SAVE IN GOOD DATA,
1063  1372          TAD     (DATCON                 /PRESET POINTERS,
```

6


```
1064  7410          SKP
1065  1371          TAD     (RANDOM
1066  3770          DCA I   (DATGEV
1067  4327          JMS     INISR2                  /TYPE OF ADDRESSING:
1070  5300          JMP     .+10                    /RANDOM
1071  3767          DCA I   (ERRSG                  /CONSTANT=SAVE EMA PART,
1072  4455          SPACE2                          /2 SPACES
1073  4443          FOROCT                          /GET DMA PART,
1074  5252          JMP     INITLP
1075  3766          DCA I   (ERRSH                  /SAVE IT,
1076  1365          TAD     (ADRCON                 /PRESET POINTERS
1077  7410          SKP
1100  1371          TAD     (RANDOM
1101  3764          DCA I   (ADRGEV
1102  4327          JMS     INISR2                  /LENGTH OF TRANSFER:
1103  5310          JMP     .+5                     /RANDOM
1104  7041          CIA                             /CONSTANT=NEGATE AND SAVE

1105  3763          DCA I   (ERRSC                  /AS INITIAL WC',
1106  1362          TAD     (LGTCON                 /PRESET POINTERS,
1107  7410          SKP
1110  1371          TAD     (RANDOM
1111  3761          DCA I   (LGTGEV
1112  4327          JMS     INISR2                  /BUFFER ASSIGNMENT:
1113  5317          JMP     .+4                     /RANDOM
1114  3210          DCA     CONBUF                  /CONSTANT=SAVE IN HOLDER,
1115  1360          TAD     (BUFCON                 /PRESET POINTERS,
1116  7410          SKP
1117  1357          TAD     (BUFRAN
1120  3756          DCA I   (BUFGEV
1121  5020          INITEX                          /OUT',
1122  0000    INISR1, 0                             /SERVICE 1',
1123  4340          JMS     INISR3                  /DO SERVICE 3',
1124  7104          CLL RAL                         /MOVE TO BITS 4-5',
1125  7041          CIA                             /NEGATE,
1126  5722          JMP I   INISR1                  /OUT',

1127  0000    INISR2, 0                             /SERVICE 2
1130  4340          JMS     INISR3                  /DO SERVICE 3',
1131  7650          SNA CLA
1132  5727          JMP I   INISR2                  /0=RANDOM OUT
1133  2327          ISZ     INISR2                  /NOT 0 IS CONSTANT',
1134  4455          SPACE2                          /2 SPACES',
1135  4443          FOROCT                          /GET 4 OCTAL NUMBERS
1136  5252          JMP     INITLP                  /ERROR',
1137  5727          JMP I   INISR2                  /OUT

1140  0000    INISR3, 0                             /SERVICE 3',
1141  4454          CRLF                            /CARRIAGE RET-LINE FEED,
1142  1251          TAD     LTRCOD                  /GET LETTER CODE,
1143  4450          TYPE                            /PRINT IT
1144  4455          SPACE2                  /2 SPACES
1145  4442          ONEOCT                          /GET ONE OCTAL NUMBER,
1146  5252          JMP     INITLP                  /ERROR',
1147  0072          AND Z   K3                      /MAKE <OR=3 ARBITRARILY,
```

```
1150  2251            ISZ     LTRCOD                  /UPDATE LETTER CODE,
1151  5740            JMP I   INISR3                  /OUT,

                    /END OF PAGE AND END OF PROGRAM CODE

      1152          *,
1156  0753
1157  1011
1160  1030
1161  0752
1162  0516
1163  3242
1164  0551
1165  0521
1166  3247
1167  0246
1170  0754
1171  0400
1172  0372
1173  0254
1174  0201
1175  0545
1176  0364
1177  0241
```

7


```
0000
0100

0200  11111111  111111I1  11I11111  11I111I1  11111111  11111111  I1I1I1I1  11I11111
0300  11111111  111111I1  11I11111  111111I1  11111111  11111111  I1I1I1I1  11I11001

0400  11111111  111111I1  11111111  11I11111  11111111  11111111  I1I1I1I1  11I11111
0500  11111111  111111I1  11111111  111111I1  11111111  11000011  I1I1I1I1  11I11111

0600  11111111  111111I1  11111111  11111111  11111111  11111111  I1I1I1I1  11I11111
0700  11111111  111111I1  11111111  111111I1  11111111  11111011  I111I1I1  11I11111

1000  11111111  111111I1  11I11111  111111I1  11111111  11111111  I1I1I1I1  11I11111
1100  11111111  111111I1  11I11111  111111I1  11111111  11000011  I1I1I1I1  11I11111
1200
1300

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700
```

```
4000
4100

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

8


```
                0001    FIELD  1

                        /LOADER CALL

          1200  1046    INIT;RUN;INT
          1201  0600
          1202  0256

          1203  6747    DSKE;SKP;1;DSKD;0;1
          1204  7410
          1205  0001
          1206  6745
          1207  0000
          1210  0001

          1211  7770    -10;AUA;AUB;AUC;AUD;AUE;AUF;AUG;AUH
          1212  0461
          1213  0464
          1214  0511
          1215  0645
          1216  0664
          1217  0743
          1220  0626
          1221  0631

          1222  7775    -3

          1223  0730    0730;-6;DC73A;DC73B;DC73C;DC73D;DC73E;DC73F
          1224  7772
          1225  0264
          1226  0266
          1227  0272
          1230  0325
          1231  0657
          1232  0672

          1233  0740    0740;-5;DC74A;DC74B;DC74C;1;4
          1234  7773
          1235  0262
          1236  0270
          1237  0330
          1240  0001
          1241  0004

          1242  0750    0750;-4;DC75A;DC75B;DC75C;DEFSRV
          1243  7774
          1244  0315
          1245  0317
          1246  0336
          1247  0334

          1250  0000    0

          1251  0000    0
```

$$$$$$$$$$


```
0000
0100

0200
0300

0400
0500

0600
0700

1000
1100

1200  11111111  11111111  11111111  11111111  11111111  11000000  00000000  00000000
1300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700
```

```
4000
4100

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```



```
ADRCON  0521        DRDC    6736        K13     0100        KIOF    0004
ADRGEV  0551        DRDS    6741        K1376A  0735        LGTCON  0516
ASBUFF  4460        DRWC    6752        K17     0101        LGTGEN  0606
ASBUFP  0060        DSKAGN  0536        K177    0130        LGTGEV  0752
AUA     0461        DSKD    6745        K20     0102        LISN    4440
AUB     0464        DSKE    6747        K200    0110        LISNP   0040
AUC     0511        DSKOUT  0675        K2000   0122        LOOSK   1043
AUD     0645        DSKRD   0661        K212    0111        LTRCOD  1051
AUE     0664        DSKTRA  0545        K215    0112        M1A     0734
AUF     0743        ERRDA   0253        K240    0113        M20     0135
AUG     0626        ERRDB   0254        K260    0114        M200    0131
AUH     0631        ERRDC   0255        K272    0115        M240    0127
AUTO    0017        ERROR   0222        K277    0116        M260    0126
BTWEEN  1027        ERRP    0061        K3      0072        M270    0125
BUFCON  1000        ERRSA   0240        K30     0103        M3      0141
BUFGEN  0623        ERRSB   0241        K301    0117        M30     0134
BUFGEV  0753        ERRSC   0242        K32     0067        M4      0140
BUFRAN  1011        ERRSD   0243        K323    0120        M40     0133
BUFTAL  0725        ERRSE   0244        K37A    0550        M43     0132
CNTR    0221        ERRSF   0245        K4      0073        M5      0137
CODE    0236        ERRSG   0246        K40     0104        M6800A  0547
CONBUF  1010        ERRSH   0247        K400    0121        M7      0136
CRLF    4454        ERRSI   0250        K5      0074        MESAGE  4444
CRLFP   0054        ERRSJ   0251        K5200   0123        MESAGP  0044
DATCHK  0441        EXER    0523        K540    0124        MUL26P  0065
DATCON  0372        EXINIT  0020        K5402   0003        ONEOCP  0042
DATGEN  0640        EXSERV  0004        K5776A  0363        ONEOCT  4442
DATGEV  0754        EXTMEM  0161        K64     0070        PARITY  0730
DATSET  0502        FOROCP  0043        K6A     0732        PARTAL  0727
DC73A   0264        FOROCT  4443        K6B     1045        PRNT1   4451
DC73B   0266        GO      0304        K7      0075        PRNT1P  0051
DC73C   0272        GO1     0355        K70     0105        PRNT2   4452
DC73D   0325        GO2     0344        K7000A  0676        PRNT2P  0052
DC73E   0657        HIDSK   1044        K7510   0125        PRNT4   4453
DC73F   0672        HOMEDF  0211        K7520   0126        PRNT4P  0053
DC74A   0262        IHRETP  0026        K7540   0127        RAN1    0434
DC74B   0270        INISR1  1122        K7600   0131        RAN2    0435
DC74C   0330        INISR2  1127        K77     0106        RANDOM  0400
DC75A   0315        INISR3  1140        K7735   0132        RELEAS  0364
DC75B   0317        INIT    1046        K7740   0133        RENTRY  0303
DC75C   0336        INITEX  5020        K7750   0134        REPORT  0362
DCLA    6751        INITLP  1052        K7760   0135        RESRAN  0426
DCLS    6742        INT     0256        K7771   0136        RKPC1   0731
DEFSRV  0334        INTACK  0214        K7773   0137        RLBUFF  4457
DKRK    0713        IOFMSP  0056        K7774   0140        RLBUFP  0057
DLCA    6755        JOB     0200        K7775   0141        RUN     0600
DLDC    6732        K0      0066        K777A   0733        SAV1    0436
DLDR    6733        K10     0076        KCDF    0064        SAV2    0437
DLDW    6735        K100    0107        KCIF    0005        SAVRAN  0414
DLWC    6753        K11     0077        KCIFDF  0020        SERVEX  5004
DRCA    6757        K1111A  0440        KILL    0217        SPACE2  4455
DRDA    6734        K116    0071        KILLED  0220        SPACEP  0055
```

```
SUMCHK  0736
SUMSAV  0726
TEXT1   0201
TWOOCP  0041
TWOOCT  4441
TYPE    4450
TYPEP   0050

ERRORS DETECTED: 0
LINKS GENERATED: 4
RUN-TIME:  7 SECONDS
3K CORE USED
```