

IDENTIFICATION

PRODUCT CODE: MAINDEC-X8-DIRFA-A-D
PRODUCT NAME: DEC/X8 MODULE "RF08DS"
RF08 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

"RF08DS" IS A DEC/X8 SOFTWARE MODULE WHICH EXERCISES
AN RF08 DISK SYSTEM WITH UP TO FOUR DISKS, THE
MAIN CHARACTERISTICS OF THIS MODULE ARE:

- 1, READ/WRITE TRANSFERS VARY RANDOMLY FROM 1 TO 1000 (8)
WORDS,
- 2, DISK ADDRESSES ARE SELECTED RANDOMLY BETWEEN
ADDRESS 000000 OF THE LOWEST NUMBERED DISK
SPECIFIED AND ADDRESS 77777 OF THE HIGHEST DISK
SPECIFIED,
- 3, TRANSFERS WILL OCCUR ACROSS DISK BOUNDARIES AND
IN THE CASE OF 4 DISK SYSTEMS WILL WRAP AROUND
TO DISK 0,
- 4, EACH PASS OF THE EXERCISER LOOP EXECUTES
WRITE/READ/DATA CHECK STARTING AT A RANDOMLY
SELECTED DISK ADDRESS,
- 5, 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: RF08 DISK CONTROL WITH UP TO 4 DISKS,
 - 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: 0600, 0610, 0620, 0640
 - 5, STANDARD WORD COUNT: 7750
 - 6, STANDARD CURRENT ADDRESS: 7751

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
	DISK ADDRESS AT WHICH TRANSFER BEGINS	0 FOR RANDOM 1 0NNN NNNN (EMA) (DMA)	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 TO ACHIEVE THE DESIRED RESULTS,

1. "RECOVR" (0366) MAY BE CHANGED FROM 1007 TO 1003 IN SYSTEMS
WHICH HAVE HARDWARE RECOVERY FROM DATA REQUEST LATE
ERRORS. THIS CHANGE ENSURES THAT THE MODULE NEVER CONSIDERS
THE DRL BIT AS AN ERROR. NO SOFTWARE RECOVERY IS MADE AND
NO ERROR REPORT OCCURS. DATA IS CHECKED AS USUAL.
2. "REPORT" (0416) MAY BE CHANGED FROM 1007 TO X00X WHERE ANY
CLEAR BITS ARE NOT REPORTED AS ERRORS. BIT ASSIGNMENT
IS THE SAME AS FOR THE RF08 STATUS REGISTER.
3. "PARITY" (0711) MAY BE CHANGED FROM 1006 TO 1007 TO INHIBIT
DATA CHECKING AFTER PARITY ERRORS.

4,4 DEVICE SETUP

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 SET TO A 1, THE BUFFER CURRENTLY ASSIGNED IS RETAINED.
 3. SR11: WHEN SET TO A 1, THE CURRENT DISK STARTING ADDRESS
IS RETAINED.

5, ERROR INFORMATION

ALL STATUS REGISTER INDICATED 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 A WORD BY WORD CHECK), THIS TYPE
OF ERROR MAY BE REPORTED AFTER A PARITY ERROR
AND INDICATES THE FOLLOWING: 1) THE PARITY ERROR
STOPPED THE TRANSFER PRIOR TO COMPLETION AND
THEREBY CAUSED A SOFTWARE SUMCHECK ERROR;
2) THE DATA TRANSFERRED WAS GOOD,

003X TRANSFER INCOMPLETE (WORD COUNT NON-ZERO BUT NO
STATUS REGISTER ERROR BIT IS SET),

0042 THIS ERROR MAY FOLLOW CODE 0032 REPORTS AND
INDICATES THAT ALTHOUGH A TRANSFER WAS INCOMPLETE
THE DATA THAT WAS TRANSFERRED WAS GOOD,

SA: FINAL CONTENTS OF THE STATUS REGISTER

SB: CURRENT BUFFER DESIGNATOR

SC: INITIAL WORD COUNT

SD: FINAL WORD COUNT

SE: INITIAL CURRENT ADDRESS

SF: FINAL CURRENT ADDRESS

SG: INITIAL EMA

SH: INITIAL DMA

SI: FINAL EMA

SJ: FINAL DMA

DA: BUFFER ADDRESS

DB: GOOD DATA WORD

DC: BAD DATA WORD

6, LISTING (ATTACHED)

/DEC/X8 EXTERNAL SYMBOL TABLE "EXTSYN"
 /FOR USE IN ASSEMBLING DEC/X8 SOFTWARE MODULES,
 /COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
 XLIST
 PAUSE

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/MAINDEC-X8-DIRFA-A-L "DEC/X8" RF0805
 /RF08 DISK SYSTEM MODULE FOR DEC/X8
 /COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
 /THIS MODULE OPERATIONAL ON PDP-8,8/1,8/L,8/E AND PDP-12.
 /PRG: LEN BEYERSDORFER (X2937)

/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
/A1	LOWEST DISK TO USE	0=3	0
/B1	HIGHEST DISK TO USE	0=3	0
/C1	TYPE OF DATA	0=RANDOM; 1 NNNN=CONSTANT	RANDOM
/D1	ADDRESSING	0=RANDOM; 1 NNNN NNNN=CONSTANT	RANDOM
/E1	LENGTH OF TRANSFER	0=RANDOM; 1 NNNN=CONSTANT	RANDOM
/F1	BUFFER ASSIGNMENT	0=RANDOM; 1 NNNN=CONSTANT	RANDOM

/SPECIAL USER MODIFICATIONS VIA RELATIVE "0" FACILITY:

/1,"RECOVER" MAY BE CHANGED FROM 1007 TO 1003 IN SYSTEMS
 /WHICH HAVE AUTOMATIC RECOVERY FROM DATA REQUEST LATE; THIS CHANGE
 /ALLOWS CHECKING DATA EVEN IF DRL IS SET AND GENERATES NO STATUS
 /ERROR REPORT FOR DRL;

/2,"REPORT" MAY BE CHANGED FROM 1007 TO X00X WHERE ANY
 /CLEAR BITS INHIBIT AN ERROR REPORT FOR THAT CONDITION;

/BIT ERROR
 /2 WLS
 /9 DRL
 /10 NXD
 /11 PER

/3,"PARITY" MAY BE CHANGED FROM 1006 TO 1007 TO INHIBIT
 /DATA CHECKING AFTER A PARITY ERROR;

/REPORT SYMBOL DEFINITIONS:

/1,REFER TO MODULE TABLE IN THIS LISTING FOR DESCRIPTION
 /OF CNTR,SAI-SJI,AND DAI-DCI

/2,"CODE" DEFINITIONS:

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/0002  DEFINED
/0004  READ
/0004  WRITE
/001X  FALSE DATA ERROR (BAD CHECKSUM BUT
/      DATA LOOKED GOOD ON WORD BY WORD CHECK.)
/      THIS TYPE OF ERROR MAY BE REPORTED AFTER
/      A PARITY ERROR AND INDICATES THE FOLLOWING:
/      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 (NO NON-ZERO,
/      BUT NO STATUS ERROR BIT WAS SET.)
/0042  THIS CODE MAY FOLLOW A CODE 0032 REPORT AND
/      INDICATES THAT ALTHOUGH A TRANSFER WAS INCOMPLETE
/      THE DATA THAT WAS TRANSFERRED WAS GOOD.

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/RF08 STANDARDS:

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/WORD COUNT:17750
/CURRENT ADDRESS:17751
/DEVICE CODES:60,61,62,64,

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/RF08 IOT DEFINITIONS:

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6601  DCMA=6601      /SYSTEM CLEAR(0->DMA,PER,DRL,PRESET LOGIC;
6603  DMAR=6603      /DCMA; AC->DMA,0->AC;READ
6605  DMAW=6605      /DCMA;AC->DMA,0->AC;WRITE
6611  DCIM=6611      /0->DIE,MAER
6615  DIML=6615      /DCIM;AC->DIE,MAER,0->AC
6616  DIMA=6616      /0->ACISR->AC
6621  DFSE=6621      /PC+>PC IF DRL,PER,WLS OR NXD
6622  DFSC=6622      /PC+1->PC IF DCF
6623  DISK=6623      /DFSE+DFSC(NEVER PC+2->PC)
6626  DMAC=6626      /0->ACIDMA->AC
6641  DCXA=6641      /0->EMA
6643  DXAL=6643      /DCXA;AC4=11->EMA,0->AC(AC0=3 IGNORED)
6645  DXAC=6645      /0->AC;EMA->AC4=11

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/MODULE TABLE
*200
0200  0000  JOB, 0      /JOB NUMBER
0201  2206  TEXT1, TEXT "RF08DS" /DEVICE NAME
0202  6070
0203  0423
0204  0000
0205  0411  TEXT "DIRFA-A" /MODULE DESIGNATOR
0206  2206
0207  0155
0210  0100
0211  0000
0212  7402
0213  5611  HQMEDF, 0      /DF=IF
0214  6202  JMP I  HOMEDF
0215  4426  INTACK, CIF 00 /ACKNOWLEDGE INTERRUPT;
0216  7777  JMS I  IHRET  /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  SEA
0227  3217  DCA  KILL
0230  4211  JMS  HOMEDF
0231  6002  IOF
0232  6202  CIF 00
0233  4461  JMS I  ERFP
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 EMA
0247  0000  ERRSH, 0    /INIT DMA
0250  0000  ERRSI, 0    /FINAL EMA
0251  0000  ERRSJ, 0    /FINAL DMA
0252  7775  -3        /DATA ERROR ENTRY TALLY;
0253  0000  ERROA, 0    /BUFFER ADDRESS
0254  0000  ERROB, 0    /GOOD DATA
0255  0000  ERROD, 0    /BAD DATA

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/END OF MODULE TABLE

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/INTERRUPT SERVICE-IMMEDIATE ONLY:
2256 0000 INT, 0 /"INT" IS INT SERV ADDR,
2257 2304 ISZ RENTRY /SKIP CHAIN DOES JMS TO HERE,
2260 5276 JMP ,+16
2261 4211 JMS HOMEDF
2262 6616 DC61A, DIMA /NO, SAVE STATUS,
2263 3240 DCA ERRSA
2264 6645 DC64A, DXAC /SAVE EMA
2265 3250 DCA ERRSI
2266 6626 DC62A, DMAC /SAVE DMA
2267 3251 DCA ERRSJ
2270 6601 DC60A, DCMA /SYSTEM CLEAR
2271 6641 DC64B, DCXA /CLEAR EMA
2272 6611 DC61B, DCIM /CLEAR INT ENABLER, MAER
2273 6601 DC60B, DCMA /SYSTEM CLEAR AGAIN,
2274 1377 TAD (DEFSRV /GET DEFERRED SERVICE ADDR,
2275 5214 JMP INTACK /ACKNOWLEDGE INTERRUPT,
2276 3304 DCA RENTRY
2277 6214 RDF
2300 1020 TAD Z KCIFDF
2301 3302 DCA ,+1
2302 7402 HLT/CIF CDF
2303 5656 JMP I INT
2304 0000 RENTRY, 0 /-1 ALLOWS INTERRUPTS,

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/ROUTINE TO SET UP RF08 TO READ OR WRITE (UNLESS "KILL"=-1)
/1, /CALL MUST BE:
/2, SET UP ERRSB, ERRSC, ERRSE, ERRSG AND ERRSH,
/3, ENSURE DF=IF
/4, PUT 0002 IN AC IF READ, 0004 IF WRITE,
/5, JMS I (GO
/6, DMR OR DMW (READ OR WRITE,
/7, RETURNS HERE IF STATUS ERROR (ALREADY REPORTED)
/8, RETURNS HERE IF NO STATUS ERROR,
3305 0000 GO, 0 /ENTER
3306 3236 DCA CODE /SAVE CODE 2 OR 4,
3307 1217 TAD KILL /COMMAND TO KILL JOB,
3310 7450 SNA
3311 5315 JMP ,+4
3312 3220 DCA KILLED /YES, SET JOB KILLED FLAG
3313 4776 JMS I (RELEASE /RELEASE ASSIGNED BUFFER
3314 5004 SERVEX /EXIT WITH AC CLEAR
3315 6201 CDF 00 /DF=0
3316 1242 TAD ERRSC /GET INITIAL WORD COUNT,
3317 3742 DCA I RF08WC /STASH IT,
3320 1244 TAD ERRSE /GET CA
3321 3743 DCA I RF08CA /STASH IT,
3322 4211 JMS HOMEDF /DF=IF
3323 1705 TAD I 00 /GET DMR OR DMW
3324 2305 ISZ GO /UPDATE TO GOOD EXIT,
3325 3340 DCA ,+13 /SAVE,

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3326 1241 TAD ERRSB /COMPUTE BREAK FIELD
3327 0105 AND Z K78 /FROM BUFFER WORD,
3330 1344 TAD K500A /ADD INT ENA FOR ERROR AND DONE,
3331 0002 IOF /INTERRUPT SYSTEM OFF,
3332 6615 DC61C, DIML /LOAD DMR AND MAER
3333 7040 CMA /SET RENTRY FLAG TO ALLOW
3334 3304 DCA RENTRY /INTERRUPT,
3335 1246 TAD ERRSG /GET INITIAL EMA
3336 6643 DC64C, DXAL /LOAD IT,
3337 1247 TAD ERRSH /GET INITIAL DMA
3340 7402 HLT/DMR OR DMW /LOAD IT AND READ OR WRITE,
3341 5004 SERVEX /EXIT WITH AC CLEAR,
3342 7750 RF08WC, 7750
3343 7751 RF08CA, 7751
3344 0500 K500A, 500

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/DEFERRED SERVICE ENTRY,
3345 6201 DEFSRV, CDF 00 /DF=0
3346 1742 TAD I RF08WC /GET FINAL WORD COUNT
3347 3243 DCA ERRSD /SAVE
3350 1743 TAD I RF08CA /SAVE FINAL CA,
3351 3245 DCA ERRSF
3352 4211 JMS HOMEDF /DF=IF
3353 1240 TAD ERRSA /GET STATUS AND CHECK RECOVERY,
3354 0366 AND RECOVER /NOTE: IF BIT NOT SPECIFIED IN
/RECOVER, IT WILL NOT BE REPORTED
/EITHER, NO REAL ERROR SHOULD
/BE OMITTED-PRESENTLY ONLY
/URL MAY BE OMITTED ON CERTAIN
/RF08 SYSTEMS, IN THESE SYSTEMS,
/THE DISK RECOVERS AUTOMATICALLY,
/IF IT IS, AC=0
/NO,
3355 7450 SNA
3356 5775 JMP I (GO2 /NO, CHECK TRANSFER DONE,
3357 7112 CLL RTR /YES, IS IT ONLY NXD?
3360 7640 SZA CLA /IF IT IS, AC=0
3361 5774 JMP I (GO1 /NO,
3362 1243 TAD I ERRSD /NO,
3363 7640 SZA CLA /NO, REAL NXD ERROR,
3364 5774 JMP I (GO1 /OK, NON CHECK TRANSFER DONE,
3365 5775 JMP I (GO2 /RECOVER MASK-MAY BE CHANGED BY USER TO 1003
3366 1007 RECOVER, 1007 /IF THE SYSTEM UNDER TEST HAS AUTOMATIC DISK
/RECOVERY FOR URL,
3367 7701 K7701A, 7701
3370 5705 GO3, JMP I GO
3371 0000 DATCON, 0
3372 1254 TAD ERRDB
3373 5771 JMP I DATCON

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/END OF PAGE
3374 *
3374 0411

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0375 0400
0376 0417
0377 0345
0400

0400 1777 G02, TAD I (ERRSD /CHECK TRANSFER DONE,
0401 7650 SNA CLA /FINAL WC=0?
0402 5207 JMP ,+5
0403 1776 TAD I (CODE /NO, MAKE CODE=003X
0404 1103 TAD Z K10
0405 3776 DCA I (CODE
0406 5214 JMP G01+3
0407 2775 ISZ I (00 /UNCONDITIONAL REPORT;
0410 5774 JMP I (003 /THERE ARE ABSOLUTELY NO
0411 1773 G01, TAD I (ERRSA /STATUS ERRORS;
0412 0216 AND REPORT /REPORT ERROR?
0413 7640 SNA CLA
0414 4772 JMS I (ERROR /YES, GENERATE STATUS ERROR REPORT
0415 5774 JMP I (003 /EXIT;
0416 1007 REPORT, 1007 /ANY OF THESE BITS MAY BE DELETED

0417 0000 RELEASE, 0 /ROUTINE TO RELEASE EXTERNAL BUFFER.
0420 1771 TAD I (ERRSB
0421 6002 IOF
0422 6202 CIF 00
0423 4457 RLBUFF
0424 5617 JMP I RELEASE
/BY THE USER TO INHIBIT REPORTING OF CERTAIN ERRORS.

/RANDOM NUMBER GENERATOR

0425 0000 RANDOM, 0
0426 2261 ISZ RAN1
0427 7000 NOP
0430 1262 TAD RAN2
0431 1265 TAD K1111A
0432 7104 CLL RAL
0433 7420 SNL
0434 7001 IAC
0435 3262 DCA RAN2
0436 1261 TAD RAN1
0437 1262 TAD RAN2
0440 5625 JMP I RANDOM
0441 0000 SAVRAN, 0 /PRESET
0442 6201 CDF 00
0443 1466 TAD I Z K0
0444 3262 DCA RAN2
0445 4770 JMS I (HOMEDF

0446 1261 TAD RAN1
0447 3263 DCA SAV1
0450 1262 TAD RAN2
0451 3264 DCA SAV2
0452 5641 JMP I SAVRAN
0453 0000 RESRAN, 0 /RESTORE
0454 1263 TAD SAV1
0455 3261 DCA RAN1
0456 1264 TAD SAV2
0457 3262 DCA RAN2
0460 5653 JMP I RESRAN
0461 0000 RAN1, 0
0462 0000 RAN2, 0
0463 0000 SAV1, 0
0464 0000 SAV2, 0
0465 1111 K1111A, 1111

0466 0000 DATCHK, 0
0467 1777 TAD I (ERRSD /CHECK DATA;
0470 4767 JMS I (SUNCHK /GET FINAL WC;
0471 7041 CIA /SUNCHK;
0472 1766 TAD I (SUMSAV /GOOD?
0473 7650 SNA CLA
0474 5666 JMP I DATCHK /YES, OUT;
0475 4253 JMS RESRAN /NO, RESTORE DATA GENERATOR.
0476 1777 TAD I (ERRSD /PRESET TO CHECK DATA;
0477 4327 JMS DATSET
0500 3305 DCA ,+5 /SAVE CDF TO BUFFER FIELD;
0501 1765 TAD I (DATGEV /MOVE DATA GENERATOR POINTER TO THIS
0502 3327 DCA DATSET /PAGE
0503 4727 JMS I DATSET /GENERATE 1 WORD;
0504 3764 DCA I (ERRDB /SAVE IN GOOD;
0505 7402 HLT/CDF /OP TO BUFFER FIELD;
0506 1417 AUA, TAD I AUTO /GET WORD IN BUFFER;
0507 4770 JMS I (HOMEDF /OP=IF
0510 3763 AUB, DCA I (ERRDC /SAVE IN BAD;
0511 1017 TAD AUTO /GET ADDR AND SAVE,
0512 3762 DCA I (ERRDA
0513 1763 TAD I (ERRDC
0514 7041 CIA
0515 1764 TAD I (ERRDB
0516 7440 SNA
0517 4772 JMS I (ERROR /NO, DATA ERROR (AC NOT 0)
0520 2761 ISZ I (BUFTAL /DONE?
0521 5303 JMP ,+16 /NO,
0522 1776 TAD I (CODE /YES, SET CODE=001X
0523 1076 TAD Z K10
0524 3776 DCA I (CODE
0525 4772 JMS I (ERROR
0526 5666 JMP I DATCHK
0527 0000 DATSET, 0
0530 7041 CIA
0531 1760 TAD I (ERRSC
0532 7450 SNA

/CLOSE ERROR ROUTINE,
/OUT,
/SET UP FOR DATA GENERATE OR CHECK;
/COMPUTE LENGTH TO FILL OR CHECK,

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0533 5666      JMP I   DATCHK
0534 3761      DCA I   (BUFTAL
0535 1757      TAD I   (ERRSE
0536 3017      AUC,    DCA   AUTO
0537 1771      TAD I   (ERRSB
0540 0105      AND Z   K70
0541 1064      TAD Z   KCDF
0542 5727      JMP I   DATSET
0543 0000      LGTCON, 0
0544 1760      TAD I   (ERRSC
0545 5743      JMP I   LGTCON

0546 0000      ADRCON, 0
0547 5756      JMP I   (OSKART
          /END OF PAGE

          *1
0556 0613
0557 0244
0560 0242
0561 0706
0562 0253
0563 0255
0564 0254
0565 0734
0566 0707
0567 0715
0570 0211
0571 0241
0572 0222
0573 0240
0574 0370
0575 0305
0576 0236
0577 0243
0600

```

*/RUNNER

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0600 3777      RUN,    DCA I   (ERRSB
0601 3776      DCA I   (CNTR
          /"RUN" IS THE RUNNING ADDRESS;
          /CLEAR BUFFER ASSIGNED WORD.

          /THIS IS THE START OF THE EXERCISER LOOP.
0602 7604      EXER,    LAS
0603 7010      RAR
0604 7630      SEL CLA
0605 5213      JMP      DSKART
0606 4731      JMS I   ADRGEV
0607 0312      AND     K377A
0610 3775      DCA I   (ERRSG
0611 4731      JMS I   ADRGEV
0612 3774      DCA I   (ERRSH
          /CHANGE DISK ADDRESS?

          /NO, BY PASS;
          /YES, ENA;

          /DMA

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0613 1775      DSKART, TAD I   (ERRSG
0614 4773      JMS I   (BTWEEN
0615 4732      LGTGEN, JMS I   LGTGEV
0616 0313      AND     K777A
0617 1272      TAD     K7000A
0620 3772      DCA I   (ERRSC
0621 1772      TAD I   (ERRSC
0622 7140      CLL CMA
0623 1774      TAD I   (ERRSH
0624 7204      CLA RAL
0625 1775      TAD I   (ERRSG
0626 4773      JMS I   (BTWEEN
0627 4733      BUFGEN, JMS I   BUFGEV
0630 1777      TAD I   (ERRSB
0631 0131      AND Z   K7600
0632 1314      TAD     M1A
0633 3771      DCA I   (ERRSE
0634 4770      DATGEN, JMS I   (SAVRAN
0635 4767      JMS I   (DATSET
0636 3237      DCA
0637 7402      HLT/CDP
0640 4734      JMS I   DATGEV
0641 3417      AUD,    DCA I   AUTO
0642 2306      ISE     BUFTAL
0643 5240      JMP     +3
0644 4766      JMS I   (HOMEDP
0645 4315      JMS     SUMCHK
0646 3307      DCA     SUMSAV
0647 1141      TAD Z   K3
0650 3310      DCA     PARTAL
0651 1073      TAD Z   K4
0652 4765      JMS I   (GO
0653 6605      DC60C,  DNAM
0654 5202      JMP     EXER
0655 4767      DSKRD,  JMS I   (DATSET
0656 3257      DCA
0657 7402      HLT/CDP
0660 3417      AVE,    DCA I   AUTO
0661 2306      ISE     BUFTAL
0662 5240      JMP     +2
0663 4766      JMS I   (HOMEDP
0664 7126      STL RIL
0665 4765      JMS I   (GO
0666 6603      DC60D,  DHAR

0667 5274      JMP     +5
0670 4764      JMS I   (DATCHK
0671 2776      ISE I   (CNTR
0672 7000      K7000A, 7000/NOP
0673 5202      JMP     EXER
0674 1763      TAD I   (ERRSA
0675 0311      AND     PARITY
0676 7650      SNA CLA
0677 4764      JMS I   (DATCHK
0678 1763      TAD I   (ERRSA

          /EMA IN LIMITS?
          /YES, TRANSFER LENGTH;
          /COMPUTE FINAL EMA;

          /IN LIMITS?
          /YES, GENERATE BUFFER,
          /COMPUTE CI START.

          /SAVE RANDOM GEN STUFF;
          /PRESET TO FILL BUFFER;

          /FILL BUFFER

          /YES, SUMCHECK;
          /SAVE IT.
          /SET FOR 3 RE-READS ON
          /PARITY ERROR;
          /4 IN AC FOR WRITE
          /WRITE IT.

          /ERROR, AGAIN
          /BK. CLEAR BUFFER;

          /2 IN AC FOR READ;
          /READ IT.

          /ERROR;
          /OK, CHECK DATA;
          /UPDATE PASS COUNTER,

          /LOOP;
          /PARITY ERROR-CHECK DATA
          /ANYWAY?

          /YES;
          /PARITY ERROR?

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```

0701 7010 RAR
0702 7630 SEL CLA
0703 2310 ISZ PARTIAL
0704 5255 JMP DSKRD
0705 5271 JMP DSKOUT
0706 0000 BUFTAL, 0
0707 0000 SUMSAV, 0
0710 0000 PARTIAL, 0
0711 1006 PARITY, 1006
0712 0377 K377A, 377
0713 0777 K777A, 777
0714 7777 M1A, -1
0715 0000 SUMCHK, 0
0716 4767 JMS I (DATSET
0717 3320 DCA ,+1
0720 7402 HLT/CDP
0721 7100 CLL
0722 1417 AUF, TAD I AUTO
0723 7430 SEL
0724 7001 IAC
0725 2306 ISZ BUFTAL
0726 5321 JMP ,+5
0727 4766 JMS I (HOMEDF
0730 5715 JMP I SUMCHK

```

/YES,3 RE=READS,

/SUMCHECK BUFFER

/END OF PAGE

```

0731 *.
/NOTE: THESE LOC'S ARE SPECIFIED BELOW THE *, SO THAT THE ADDRESSES
/INDICATED ARE MODIFIED PROPERLY BY THE DEC-X8 LOADER;
0731 0425 ADRCV, RANDOM /ADRCN
0732 0425 LGTGEV, RANDOM /LGTCON
0733 1011 BUFGV, BUFRAN /BUFGN
0734 0425 DATGEV, RANDOM /DATCON
0763 0240
0764 0466
0765 0305
0766 0211
0767 0527
0770 0441
0771 0244
0772 0242
0773 1027
0774 0247
0775 0246
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 BUFGN, 0

```

1001 1777' TAD ERRSB
1002 7041 CIA
1003 1210 TAD CONBUF
1004 7650 SNA CLA
1005 5600 JMP I BUFGN
1006 4211 JMS BUFRAN
1007 5201 JMP BUFGN+1
1010 0000 CONBUF, 0

```

/GET CURRENT BUFFER WORD;

/SPECIFIED BUFFER ASSIGNED?

/YES, EXIT;

/NO, GET NEW BUFFER,

/CHECK IT

/MUST CONTAIN LEGAL BUFFER DESIGNATOR;

/ROUTINE TO ASSIGN A BUFFER OBSERVING BR 10,

```

1011 0000 BUFRAN, 0
1012 7604 LAS
1013 7012 RTR
1014 7220 CLA CML
1015 1777' TAD ERRSB
1016 7460 SNL SEA
1017 5225 JMP ,+6
1020 7640 SEA CLA
1021 4776' JMS RELEAS
1022 6002 IOF
1023 6202 CIF 00
1024 4460 ASBUFE
1025 3777' DCA ERRSB
1026 5611 JMP I BUFRAN

```

/PUT BR 10 (NOT) IN LINK,

/BUFFER WORD IN AC;

/EXIT IF AC NON ZERO AND LINK SET;

/RELEASE BUFFER IF AC NON ZERO;

/ASSIGN A BUFFER

/SAVE BUFFER DESIGNATOR;

/EXIT;

```

1027 0000 BTWEEN, 0
1030 0245 AND K300A
1031 3211 DCA BUFRAN
1032 1211 TAD BUFRAN
1033 1243 TAD LODSK
1034 7710 SPA CLA
1035 5775 JMP I (EXER
1036 1211 TAD BUFRAN
1037 1244 TAD HIOSK
1040 7740 SMA SEA CLA
1041 5775 JMP I (EXER
1042 5627 JMP I BTWEEN
1043 0000 LODSK, 0
1044 0000 HIOSK, 0
1045 0300 K300A, 300

```

/ROUTINE TO CHECK EMA IN LIMITS.

/ENTER WITH EMA IN AC; MASH

/TO DISK SELECT;

/EMA>OR=LOW LIMIT?

/NO, BACK TO TOP OF EXER LOOP;

/EMA <OR= HIGH LIMIT?

/NO, BACK TO TOP OF EXER LOOP

/OK, EMA IN LIMITS;

/LOW DISK SELECT (BITS 4-5 NEGATED)

/SAME FOR HIGH DISK SELECT;

/INITIALIZER

/"INIT" IS INITIALIZING ADDRESS.

```

1046 1374 INIT, TAD (TEXT1
1047 3251 DCA LTRCOD
1050 4444 MESSAGE
1051 0000 LTRCOD, 0
1052 1117 INITLP, TAD Z K301
1053 3251 DCA LTRCOD
1054 4322 JMS INISR1
1055 3243 DCA LODSK
1056 4322 JMS INISR1

```

/SET CODE TO "AN"

/GET LOW DISK;

/SAVE IN BITS 4-5 NEGATED

/SAME FOR HIGH DISK;

1057	3244	DCA	HIDSK	
1060	4331	JMS	INISR2	/TYPE OF DATA;
1061	5265	JMP	,+4	/RANDOM
1062	3773	DCA I	(ERR0B	/CONSTANT=SAVE IN GOOD DATA,
1063	1372	TAD	(DATCON	/PRESET POINTERS,
1064	7410	SKP		
1065	1371	TAD	(RANDOM	
1066	3770	DCA I	(DATGEV	
1067	4331	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	(ADRCOIN	/PRESET POINTERS
1077	7410	SKP		
1100	1371	TAD	(RANDOM	
1101	3764	DCA I	(ADRGEV	
1102	4331	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	(LGTCOIN	/PRESET POINTERS,
1107	7410	SKP		
1110	1371	TAD	(RANDOM	
1111	3761	DCA I	(LGTCGEV	
1112	4331	JMS	INISR2	/BUFFER ASSIGNMENT;
1113	5317	JMP	,+4	/RANDOM
1114	3210	DCA	CONBUF	/CONSTANT=SAVE IN HOLDER,
1115	1360	TAD	(BUFCOIN	/PRESET POINTERS,
1116	7410	SKP		
1117	1357	TAD	(BUFRAN	
1120	3756	DCA I	(BUFGCV	
1121	5020	INITEX		/OUT;
1122	0000	INISR1, 0		/SERVICE 1;
1123	4342	JMS	INISR3	/DO SERVICE 3;
1124	7106	CLL RTL		/MOVE TO BITS 4-5;
1125	7006	RTL		
1126	7006	RTL		
1127	7041	CIA		/NEGATE,
1130	5722	JMP I	INISR1	/OUT;
1131	0000	INISR2, 0		/SERVICE 2
1132	4342	JMS	INISR3	/DO SERVICE 3;
1133	7650	SNA CLA		
1134	5731	JMP I	INISR2	/RANDOM OUT
1135	2331	ISZ	INISR2	/NOT 0 IS CONSTANT;
1136	4455	SPACE2		/2 SPACES,
1137	4443	FOROCT		/GET 4 OCTAL NUMBERS
1140	5252	JMP	INITLP	/ERROR;
1141	5731	JMP I	INISR2	/OUT
1142	0000	INISR3, 0		/SERVICE 3;

1143	4454	CLRF		/CARRIAGE RET-LINE FEED,
1144	1251	TAD	LTRCOD	/GET LETTER CODE,
1145	4450	TYPE		/PRINT IT
1146	4455	SPACE2		/2 SPACES
1147	4442	ONEOCT		/GET ONE OCTAL NUMBER;
1150	5252	JMP	INITLP	/ERROR;
1151	0072	AND 2	K3	/MAKE CORRS ARBITRARILY,
1152	2251	ISZ	LTRCOD	/UPDATE LETTER CODE,
1153	5742	JMP I	INISR3	/OUT;

/END OF PAGE AND END OF PROGRAM CODE

1154
1156 0733
1157 1011
1160 1000
1161 0732
1162 0543
1163 0242
1164 0731
1165 0546
1166 3247
1167 0246
1170 0734
1171 0425
1172 0371
1173 0254
1174 0201
1175 0602
1176 0417
1177 0241

```

0000
0100
0200 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0300 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0400 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0500 11111111 11111111 11111111 11111111 11111111 00000001 11111111 11111111
0600 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
0700 11111111 11111111 11111111 11111000 00000000 00000000 00011111 11111111

1000 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
1100 11111111 11111111 11111111 11111111 11111111 11110011 11111111 11111111

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

```

0001	FIELD	1	
/LOADER CALL			
1200	1046	INIT	/INITIALIZING ADDRESS
1201	0600	RUN	/RUNNING ADDRESS
1202	0256	INT	/INTERRUPT ADDRESS
1203	6623	DISK	/SKIP CHAIN
1204	0000	0	
1205	0001	1	
1206	7402	HLT	
1207	7402	HLT	
1210	7402	HLT	
1211	7772	-6	/AUTO INDEX
1212	0506	AUA	
1213	0511	AUB	
1214	0536	AUC	
1215	0641	AUD	
1216	0660	AUE	
1217	0722	AUF	
1220	7774	-4	/# OF DEVICE CODES
1221	0600	0600	
1222	7774	-4	
1223	0270	DC60A	
1224	0273	DC60B	
1225	0653	DC60C	
1226	0666	DC60D	
1227	0610	0610	
1230	7775	-3	
1231	0262	DC61A	
1232	0272	DC61B	
1233	0332	DC61C	
1234	0620	0620	
1235	7776	-2	
1236	0001	1	
1237	0266	DC62A	
1240	0640	0640	
1241	7775	-3	
1242	0264	DC64A	
1243	0271	DC64B	
1244	0336	DC64C	
1245	7777	-1	/WORD COUNT
1246	7750	7750	
1247	7777	-1	
1250	0342	RF08WC	

1251	7777	-1	/CURRENT ADDRESS
1252	7751	7751	
1253	7777	-1	
1254	0343	RF08CA	

SS

0000
0100
0200
0300
0400
0500
0600
0700

1000
1100

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

/MAINDEC-X8-DIRFA-A-L		"DEC/X8"	RF08DS PAL10	V141	15-FEB-72	19153	PAGE 2-19
ADRCN	0546	DSKRD	0655	K2000	0122	LDOSK	1043
ADRGV	0731	DXAC	6645	K212	0111	LTRCD	1051
ASBFF	4460	DXAL	6643	K215	0112	M1A	0714
ASBFF	0060	ERRDA	0253	K240	0113	M20	0135
AUA	0506	ERRDB	0254	K260	0114	M200	0131
AUB	0511	ERRDC	0255	K272	0115	M240	0127
AUC	0536	ERROR	0222	K277	0116	M260	0126
AUD	0641	ERRP	0061	K3	0072	M270	0125
AUE	0660	ERRSA	0240	K30	0103	M3	0141
AUF	0722	ERRSB	0241	K300A	1045	M30	0134
AUTO	0017	ERRSC	0242	K301	0117	M4	0140
BTWEEN	1027	ERRSD	0243	K32	0067	M40	0133
BUFFCON	1000	ERRSE	0244	K323	0120	M43	0132
BUFFGEN	0627	ERRSF	0245	K377A	0712	M5	0137
BUFFGEV	0733	ERRSG	0246	K4	0073	M7	0136
BUFFRAN	1011	ERRSH	0247	K40	0104	MESSAGE	4444
BUFFAL	0706	ERRSI	0250	K400	0121	MESSAGE	0044
CNTR	0221	ERRSJ	0251	K5	0074	MUL26P	0065
CODE	0236	EXER	0002	K500A	0344	ONEOCP	0042
CONBUF	1010	EXINI	0020	K5200	0123	ONEOCT	4442
CRLF	4454	EXSERV	0004	K540	0124	PARITY	0711
CRLFP	0054	EXTMEM	0161	K5402	0003	PARTAL	0710
DATCHK	0466	FOROCP	0043	K64	0070	PRNT1	4451
DATCON	0371	FOROCT	4443	K7	0075	PRNT1P	0051
DATGEN	0634	GO	0305	K70	0105	PRNT2	4452
DATGEV	0734	G01	0411	K7000A	0672	PRNT2P	0052
DATSET	0527	G02	0400	K7510	0125	PRNT4	4453
DC60A	0270	G03	0370	K7520	0126	PRNT4P	0053
DC60B	0273	HJDSK	1044	K7540	0127	RAN1	0461
DC60C	0653	HOMEDF	0211	K7600	0131	RAN2	0462
DC60D	0666	IMRETF	0026	K77	0106	RANDOM	0425
DC61A	0262	INISR1	1122	K7701A	0367	RECOVR	0366
DC61B	0272	INISR2	1131	K7735	0132	RELEAS	0417
DC61C	0332	INISR3	1142	K7740	0133	RENTRY	0304
DC62A	0266	INIT	1046	K7750	0134	REPORT	0416
DC64A	0264	INITEX	0020	K7760	0135	RESRAN	0453
DC64B	0271	INITLP	1052	K7771	0136	RF08CA	0343
DC64C	0336	INT	0256	K7773	0137	RF08WC	0342
DCIM	6611	INTACK	0214	K7774	0140	RLBUPF	4457
DCMA	6601	IOFMSP	0056	K7775	0141	RLBUPF	0057
DCXA	6641	JOB	0200	K777A	0713	RUN	0600
DEFSRV	0345	K0	0066	KCDF	0064	SAV1	0463
DFSC	6622	K10	0076	KCIF	0005	SAV2	0464
DFSE	6621	K100	0107	KCIFDP	0020	SAVRAN	0441
UIMA	6616	K11	0077	KILL	0217	SERVEX	0004
DIML	6615	K1111A	0465	KILLED	0220	SPACE2	4455
DISK	6623	K116	0071	K10F	0004	SPACEP	0055
DMAC	6626	K13	0100	LGTCON	0543	SUMCHK	0715
DMAR	6603	K17	0101	LGTGEN	0615	SUMSAV	0707
DMAW	6605	K177	0130	LGTGEV	0732	TEXT1	0201
OSKART	0613	K20	0102	LISN	4440	TW00CP	0041
DSKOUT	0671	K200	0110	LISNP	0040	TW00CT	4441

/MAINDEC-X8-DIRFA-A-L "DEC/X8" RF08DS PAL10 V141 15-FEB-72 19153 PAGE 2-20

TYPE 4450

TYPEP 0050

ERRORS DETECTED: 0

LINKS GENERATED: 4

RUN-TIME: 9 SECONDS

3K CORE USED