Disk/Dectape Monitor for the TD8E

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THE MOLECULAR ANATOMY (MAN) PROGRAM

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ABSTRACT

An efficient and convenient monitor system to be
used with the low cost TD8E DECtape unit has been
developed by modifying the existing DEC 4K monitor
system and several system programs. The system will
operate in an 8K or larger PDP 8/E computer, will sup-
port two tape drives, and can load and save programs
from all available memory. The operation is the same
as in the usual TC01/08 DECtape system.

INTRODUCTION

The familiar 4K Disk Monitor* has long been used on PDP-8 computers

because of its efficient storage and convenience as a "users" monitor

as opposed to a "programmers" monitor. The capability of the 4K Disk

Monitor to call long segmented programs with one name as well as its

efficient overlaying of program segments have kept it popular despite

the advent of OS/8 with its lack of operator prompting and its long

complex command strings.

The 4K Disk Monitor system has not been available on computers using

the inexpensive TD8E DECtape. We have prepared a modification of the

monitor builder, DEC-D8-SBAF* (1), which permits the building and

operation of the Disk/DECtape monitor using the TD8E as the system

device (2).

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*These are programs of Digital Equipment Corporation and are available

from them in their original form.

Equipment Requirement.--A PDP 8/E minicomputer with 8K or larger memory with one or two DECtape drives and a TD8E controller are required. The MI8E hardware bootstrap loader is a convenience, but is not required.

METHOD

A two page (256 word) TD8E routine (DEC-8E-UZTA) (3) located at 7400 in field 1 directly operates the TD8E. The Disk/DECtape monitor head located in the 7600 page of field 0 and on block 0 of the system tape has been modified to convert the 4K Disk monitor calls into the form required by the TD8E routine. The generalized I/O routine entry at 7642 and the HLT at 7606 have been retained. In this form the monitor system is called by loading the TD8E routine into field 1, reading block 0 of the tape into 7600, field 0, and starting at 7600. An additional program, TMOD, is provided that modifies the system from this standard 4K Disk Monitor format into one which is started by the same 27-word bootstrap that is used for the OS/8 monitor system using the TD8E. In this form the TD8E routine and the monitor head are located on the tape in blocks 35-37 and block 0 contains a more extensive bootstrap to load them. The present version of the monitor system supports tape units 0 and 1 and can save or load programs into fields 0 through 7.

A modification of PIP, the Peripheral Interchange Program (DEC-D8-PDAD-DF32 version) (4) has been made so that the TD8E can be operated with the program interrupt disabled (as is required). The 8K assembler PAL8 (DECUS 8-333) (5) was modified to prevent it from overwriting the TD8E routine. Program listings are given in the appendix.

OPERATION

The operation of the modified system follows the procedure described in the 4K Disk Monitor manual (DEC-Ø8-ODSMA-A-D) (6) and the 1970 Introduction to Programming, Vol. I (7), except that the system device name is DØ: and programs must not be loaded on top of the TD8E routine in field 1. The system is started by loading a paper tape using the RIM loader in any field except field 1. The system tape must be on unit Ø, remote and write enabled. When the tape is loaded, the DECtape will start and the monitor will print a dot indicating it is ready to accept operator commands. The modified monitor tape must be started using the OS/8 12K system bootstrap (see DEC OS/8 Handbook (8), DEC-S8-OSHBA-A-D, pg 1-8 or Introduction to Programming, Vol. I, 1972, pg 9-9). This removes the need for loading the TD8E routine separately. The MI8E hardware bootstrap loader may be coded to issue this bootstrap which then may be used to start either OS/8 or Disk/DECtape monitors.

Forming the System Programs

The formation of the initial system from paper tape is simple if the computer has more than 8K of memory. The procedure for the first time is more laborious in 8K and will be discussed later.

The paper tapes required for forming the system are: Binary Loader (BIN), Builder, PIP, DT8A, PIPB, TMOD and the System Bootstrap. This last is a two-section tape, the first part is the self-starting binary loader and the second part, separated from the first by a stretch of 2ØØ code leader/trailer, is the TD8E routine (3) assembled at 74ØØ, field 1.

1. Toggle the RIM loader into field 2 or higher.

2. Load the Binary loader (BIN) into the same field as the RIM loader.

3. Use the BIN loader to load the builder, DEC-D8-SBAF-PB, into field Ø.

4. Overlay the builder with the DT8A tape using the BIN loader.

5. Load the System Bootstrap tape into field 1 using the BIN loader.
Start at the stretch of leader/trailer code in the middle of the
tape so that the program will not be started as it would if loaded
by RIM from the start of the tape.

6. Place a formatted DECtape on the tape drive, set it to REMOTE, UNIT
Ø and WRITE ENABLED.

7. Start the builder at location 2ØØ in field Ø.

8. Answer the questions, being sure to answer N to the RFØ8 and DF32
questions so that a tape system will be built. After the DF32
question has been answered the tape should start. After some tape
excursions, a dot should be typed showing that the monitor has been
built.

9. Stop the computer and load PIP (DEC-D8-PDAD-PB) (4) using the BIN
loader (not LOAD). Now overlay it with the tape PIPB using BIN.

10. Start the computer at 76ØØ in field Ø. In response to the monitor
dot, the operator should type:

.SAVE PIPT!Ø-5177;1ØØØ (CR)*
.

---

*Terms typed by the program are underlined, (CR) means typing the RETURN
key.

11. Stop the computer again, load DECUS 8-333 with BIN, overlay with

    the PL8A tape, restart the computer as in step (10) and type:

    .SAVE PAL8!Ø-5177,66ØØ-7577;2ØØ (CR).
    ·

12. Use the system to load EDIT (DEC-D8-ESAD-PB) (9) which does not

    need modification. Type:

    .LOAD (CR)

    * IN- T:(CR)

    * ST= (CR) (put tape in reader)

    ↑ start reader

    The computer will halt at the end of the code on the tape, set the

    reader to STOP, press CONTINUE, a second up arrow will be typed,

    type CTRL-P, the monitor will type a dot.

    .SAVE EDIT!Ø-3377;26ØØ (CR)
    ·

The essential parts of the system are now present. Other programs can

be loaded in the usual way or transferred by PIPT from any TD8E or non-

TD8E DECtape (just don't try to run the non-TD8E tape as a system tape

or use its PIP).

The user should now reload the builder, overlaying it as in steps

3 and 4. Restart the monitor at 76ØØ and save builder by:

    .SAVE TBLD!Ø-7577;2ØØ (CR).

This provides a reference copy of the builder on the system.

The builder is required to initialize a fresh DECtape before PIPT

can be used to transfer programs to it. Of course the TD8E copy program

may be used to copy the system tape onto any formatted tape and unwanted

programs can be deleted from the new copy.

Forming System Programs on 8K Computer

The operations to be followed are the same through step 8, however, the monitor head overwrites the RIM and BIN loaders that must be in field 0. The following procedure is to be followed after step 8:

9(a) Stop the computer. Toggle in the RIM loader and load the BIN loader with it. Load PIP and overlay it as in 9. The computer is restarted at location 7767 in field 1, this being the bootstrap location. Now save PIPT as in 10. These same steps must be repeated for PAL8.

The easiest way of providing a system for any size PDP8/E is to copy a borrowed system tape or to build a system tape using TBLD from an existing system tape.

Modification of the System to Use the OS/8 Bootstrap

If the system is to be made so that the OS/8 27 word TD8E bootstrap can be used, operation must be suspended at the end of step 8 when a monitor has been built on the tape. At this point the RIM and BIN loader should be used to load the program TMOD. This program could also be gotten into core by mounting an existing system tape on unit 0 and loading the binary of TMOD with LOAD. The starting address should be specified as 7606 the HLT in the monitor head. After TMOD is in core the freshly prepared system tape should be on UNIT 0, WRITE ENABLED, and TMOD should be started at location 200 field 0 The tape will rock and a dot will be printed showing the monitor has been recalled. This tape may no longer be bootstrapped by the system bootstrap but must use the OS/8 27 word bootstrap. It may however be restarted at location 7600 as in step 9 after PIP and PIPB have been loaded.

This modification of the system tape poses a special trouble for those building a system for the first time from paper tape on an 8K system. At step 9 where step 9(a) would be substituted the bootstrap call in field 1 is still unchanged and if started at 17767 would recall block ∅ of the tape which is now the wrong block. What is required is to change the number at 7772 in field 1 from its old value of ∅ to a new value of 37 before restarting at location 7767 as instructed in step 9(a). This difficulty will not recur since the next time the system is bootstrapped the proper values will be loaded.

REFERENCES

1. Digital Equipment Corporation (DEC) 4K Disk Monitor Builder
   DEC-D8-SBAF-PB.

2. An attempt to produce a TD8E system was made by M. Silverstein and
   A. Reidel, DECUSCOPE 12, No. 2 (1973), but will not operate as
   published and was restricted to one tape unit and to field $\emptyset$. We
   have based part of this work on his article and extended it to
   units $\emptyset$ and 1 and to all fields.

3. DEC TD8E DECtape routine DEC-8E-UZTA-PA assembled at location $74\emptyset\emptyset$
   in field 1 for units $\emptyset$, 1.

4. DEC Peripheral Interchange Program-DF32, DEC-D8-PDAD-PB.

5. DEC Users Society distributed program DECUS 8-333, 8-K PALD assembler.

6. DEC 4K Disk Monitor System
   DEC-$\emptyset$8-ODSMA-A-D.

7. Introduction to Programming, Vol. I, Digital Equipment Corporation,
   1970. Later years issues do not apply to this system.

8. Digital Equipment Corporation.
   DEC OS/8 Handbook, DEC-S8-OSHBA-A-D.

9. DEC Symbolic Disk Editor, DEC-D8-ESAD-PB.

APPENDIX A
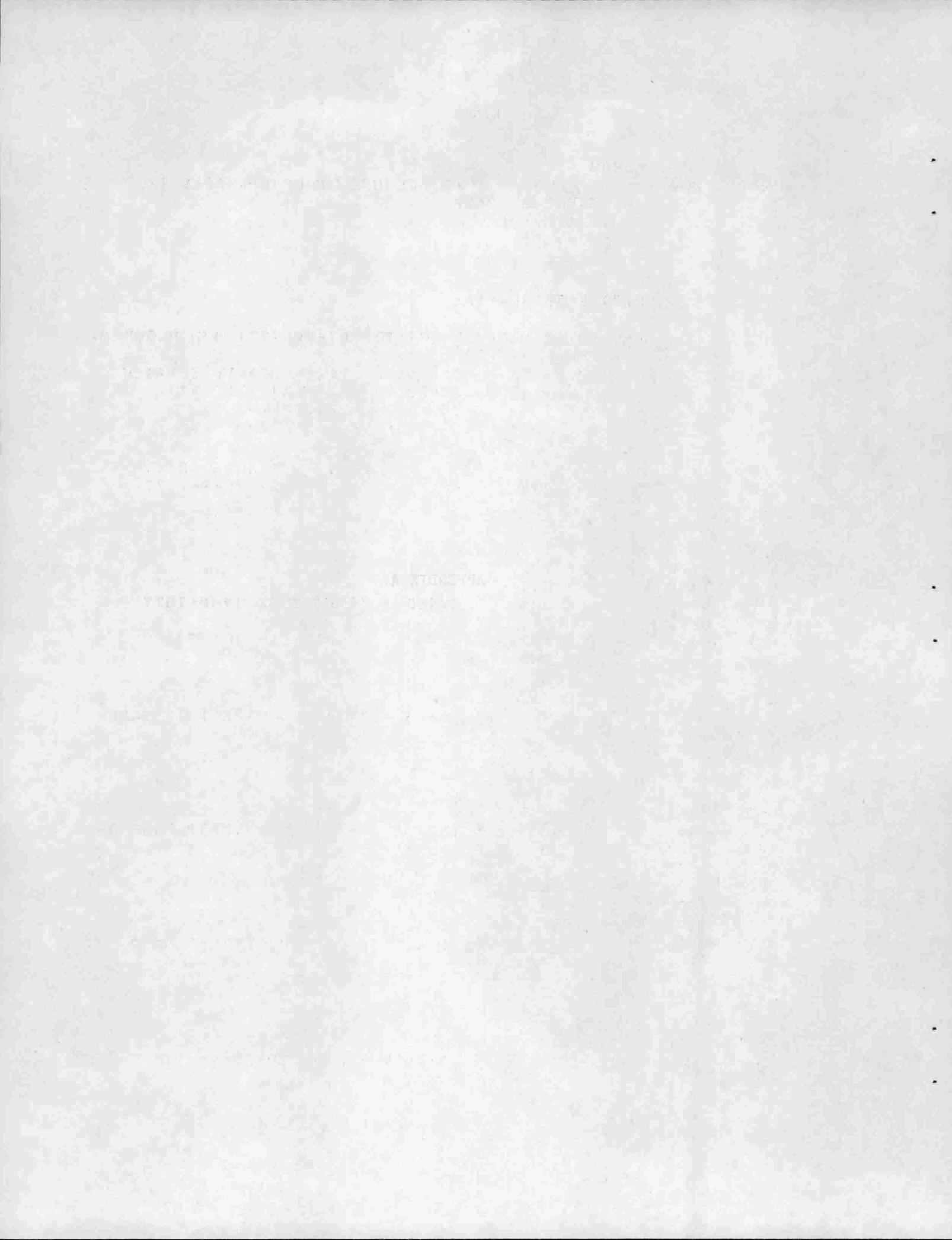
DT8A

```
                        *5242
     5242   7000              NOP           /FORCE USE OF GENERALIZED I/O
                        /ASSEMBLE AT 2600
                        /RUNS AT 7600
                        ORIGIN=2600
                        SYSIO=ORIGIN+42

                        DTCODE=ORIGIN+151

                        /RESIDENT PAGE OF MONITOR (7600-7777 AND BLOCK 0)
                        /DECTAPE VERSION
                        /FUNCTION:       SAVE CORE 7200-7577 IN SCRATCH
                        /                READS REST OF MONITOR INTO
                        /                CORE 7200-7577 JUMPS TO
                        /                MONITOR PAGE 2 (7400)
                        *ORIGIN
     2600   0070   D0070,      70                        /CONSTANT ACTS AS NOP
     2601   4242              JMS     SYSIO     /SAVE CORE 7200-7377
     2602   0005               5
     2603   0005               5
     2604   7200               7200
     2605   0000               0
     2606   7402               HLT
     2607   4242              JMS     SYSIO     /SAVE CORE 7400-7577
     2610   0005               5
     2611   0006               6                /SCRATCH BLOCK 2
     2612   7400               7400
     2613   0000               0
     2614   7402               HLT
     2615   4242              JMS     SYSIO     /READ IN PAGE 1 OF SAVE
     2616   0003               3
     2617   0001               1
     2620   7200               7200
     2621   0000   DTCORE,      0
     2622   7402               HLT
     2623   4242              JMS     SYSIO     /READ IN MONITOR PAGE 2
     2624   0003               3
     2625   0002               2
     2626   7400   DTSTRT,     7400
     2627   0000               0
     2630   7402               HLT
     2631   5626              JMP I   DTSTRT    /ENTER MONITOR PAGE 2
     2632   0000   DTHOLD,      0
     2633   0000   DTLINK,      0
     2634   0000   PLINK,       0
     2635   0000   LNHOLD,      0
     2636   7400   TD8E0,      7400
     2637   7404   TD8E1,      7404            /**MUST FOLLOW TD8E0***
     2640   4636   JMST8,      JMS I   TD8E0
     2641   0700   P700,       700
```

```
                /TD8E DECTAPE AS SYSTEM DEVICE
                *ORIGIN+42
2642  0000   DTSYS,  0                   /SYSTEM I/O
2643  7200           CLA
2644  1642           TAD I   DTSYS       /GET FCN WORD
2645  2242           ISZ     DTSYS
2646  3351           DCA     DTCODE
2647  1351           TAD     DTCODE      /FIND FIELD BITS
2650  0200           AND     D0070
2651  3332           DCA     ARG1
2652  1344           TAD     PCDF        /SET TRANSFER FIELD CDF'S
2653  1332           TAD     ARG1
2654  3304           DCA     XCDF
2655  1304           TAD     XCDF
2656  3337           DCA     XCDF1
2657  1351           TAD     DTCODE      /MOVE WRITE BIT TO BIT 0
2660  7112           CLL     RTR
2661  7012           RTR                 /CLEAR JUNK
2662  0356           AND     D4000
2663  1361           TAD     D0100       /WRITE/READ ONLY 1 BLOCK
2664  1332           TAD     ARG1        /ADD TO FIELD BITS
2665  3332           DCA     ARG1
2666  1642           TAD I   DTSYS       /GET BLOCK
2667  2242           ISZ     DTSYS
2670  3334           DCA     ARG3
2671  1642           TAD I   DTSYS       /GET CORE ADDR
2672  2242           ISZ     DTSYS       /BUMP TO LINKWORD ADDR.
2673  3333           DCA     ARG2
2674  1333           TAD     ARG2        /FORM ADDRESS OF 201TH WORD
2675  1360           TAD     D0200
2676  3234           DCA     PLINK
2677  1242           TAD     DTSYS       /SAVE LINK WORD ADDR
2700  3233           DCA     DTLINK
2701  1642           TAD I   DTSYS       /GET LINK WORD
2702  2242           ISZ     DTSYS       /BUMP TO ERROR ADDRESS
2703  3235           DCA     LNHOLD      /SAVE LINK
2704  6201   XCDF,   CDF     0           /POINT TO TRANSFER FIELD
2705  1634           TAD I   PLINK       /SAVE ENDANGERED WORD
2706  3232           DCA     DTHOLD
2707  1235           TAD     LNHOLD      /PUT LINK WORD IN XFER FIELD
2710  3634           DCA I   PLINK
```

```
2711  6201            CDF      0           /BACK TO FIELD 0
2712  1351            TAD      DTCODE      /IS THIS AN INDIRECT RETURN
2713  0357            AND      D1000
2714  7650            SNA      CLA
2715  5322            JMP      .+5         /NO
2716  1642            TAD I    DTSYS       /YES , ERROR HOLDS RETURN ADDR -1
2717  3242            DCA      DTSYS
2720  7040            CMA          .       /PREPARE TO DUMP LINK AT 7777
2721  3233            DCA      DTLINK
2722  1240  DTTRY,    TAD      JMST8       /SET UNIT 0 ENTRY
2723  3331            DCA      .+6
2724  1351            TAD      DTCODE      /GET UNIT CODE
2725  0241            AND      P700        /ANYTHING BUT 0 IS UNIT 1
2726  7640            SZA      CLA
2727  2331            ISZ      .+2         /BUMP TO UNIT 1 ADDRESS
2730  6212            CIF      10
2731  4636            JMS I    TD8E0
2732  0000  ARG1,     0                    /FUNCT
2733  0000  ARG2,     0                    /CORE
2734  0000  ARG3,     0                    /BLOCK
2735  7610            SKP CLA               /ERROR
2736  2242            ISZ      DTSYS       /OK, BUMP TO NORMAL RETURN
2737  6201  XCDF1,    CDF      0           /SET XFER FIELD
2740  1634            TAD I    PLINK       /SAVE LINK WORD
2741  3235            DCA      LNHOLD
2742  1232            TAD      DTHOLD      /RESTORE ENDANGERED WORD
2743  3634            DCA I    PLINK
2744  6201  PCDF,     CDF      0           /BACK TO 0
2745  1235            TAD      LNHOLD      /PUT AWAY LINK WORD (OR DUMP AT 7777)
2746  3633            DCA I    DTLINK
2747  5642            JMP I    DTSYS
            *ORIGIN+156
2756  4000  D4000,    4000
2757  1000  D1000,    1000
2760  0200  D0200,    200
2761  0100  D0100,    100
```

PIPB

```
                    /PATCH CHANGES INTERRUPT VERSION OF
                    /DECTAPE I/O TO NON-INTERRUPT CALL
                    /TO GENERALIZED I/O IN LAST PAGE,
                    /AND RETURNS AS IF INTERRUPT OCCURED
                    DCMA= 6601
                    DTXA= 6764
                    FIXTAB
                    /POINTERS TO LOCATIONS IN PIP
                    DTABSY= 2000
                    CDIOX= 2001
                    ERROR= 2147
                    SKPZ= 120
                    ZRET= 53
                    TAC= 3
                    LINK= 4
                    SYSIO= 121
                    A4= 133
                    IDLEO= 300
                    IDLEZ= 72
                    ITIMER= 5
                    IDLE= 302
                    IDLE1= 307
                    OUTDEV= 155
                    INDEV= 156
                    A3= 17
                    A7= 15
                    M3= 136
                    BUFPTI= 440
                    BUFSZI= 441
                    BUFSTI= 151
                    IWAIT= 153
                    OWAIT= 154
                    BUFSTO= 152
                    BUFPTO= 511
                    BUFSZO= 512
                    M200= 123
                    /INTERRUPT SERVICE ROUTINE PATCHES
                    *213
0213  6601          DCMA      /CLEAR DISK FLAG
                    *210
0210  6764          DTXA      /CLEAR DECTAPE FLAG
```

```
                    /MODIFICATIONS TO OPERATING LEVEL ROUTINE
                    *IDLE+4
   0306   5774           JMP I    IDLE5    /INPUT BUFFER EMPTY
                    *IDLE1+4
   0313   5775           JMP I    IDLE6    /OUTPUT BUFFER FULL
                    /FREE CORE MEMORY
                    *374
   0374   2203      IDLE5,   IDLE5A
   0375   2213      IDLE6,   IDLE6A
                    *2202
   2202   7402           HLT               /THERE IS NO DISK!!
   2203   1156      IDLE5A,  TAD   INDEV
   2204   7700           SMA CLA
   2205   5472           JMP I    IDLEZ    /NON-FILE
   2206   6002           IOF               /GENERATE INTERRUPT
   2207   1072           TAD      IDLEZ
   2210   3000           DCA      0         /IWAIT WILL INDICATE
   2211   3003           DCA      TAC       /IF READ DESIRED
   2212   5453           JMP I    ZRET
   2213   1155      IDLE6A,  TAD   OUTDEV
   2214   7700           SMA CLA
   2215   5626           JMP I    IDLE1Z   /NON-FILE
   2216   6002           IOF
   2217   1154           TAD      OWAIT     /FLAG TO START OUTPUT
   2220   7001           IAC
   2221   3154           DCA      OWAIT
   2222   1226           TAD      IDLE1Z
   2223   3000           DCA      0
   2224   3003           DCA      TAC
   2225   5453           JMP I    ZRET
   2226   0307      IDLE1Z,  IDLE1
```

```
                        *CDIOX
2001   0000   CDIOX,   0
2002   6002            IOF
2003   7000            NOP          /FOR DEBUGGING
2004   7200            CLA
2005   3200            DCA     DTABSY
2006   1601            TAD I   CDIOX
2007   2201            ISZ     CDIOX
2010   3235            DCA     P8EFN    /FUNCTION WORD
2011   1601            TAD I   CDIOX
2012   2201            ISZ     CDIOX
2013   3236            DCA     P8EBL    /BLOCK ADDRESS
2014   1601            TAD I   CDIOX
2015   2201            ISZ     CDIOX
2016   3237            DCA     P8ECR    /CORE ADDRESS
2017   1201            TAD     CDIOX
2020   3311            DCA     P8ELKA   /ADDRESS OF LINK
2021   1711            TAD I   P8ELKA   /LINK
2022   2201            ISZ     CDIOX
2023   3240            DCA     P8ELK    /CALLING LINK
2024   1120            TAD     SKPZ
2025   3712            DCA I   IDLEOZ
2026   3005            DCA     ITIMER
2027   3003            DCA     TAC
2030   3004            DCA     LINK
2031   7000            NOP          /FOR DEBUGGING
2032   7000            NOP
2033   7000            NOP
2034   4521            JMS I   SYSIO
2035   0000   P8EFN,   0
2036   0000   P8EBL,   0
2037   0000   P8ECR,   0
2040   0000   P8ELK,   0
2041   5355            JMP     ERROR+6
2042   7000            NOP
2043   7000            NOP
2044   7000            NOP          /FOR DEBUGGING
2045   7200            CLA
2046   1235            TAD     P8EFN    /READ?
2047   0015            AND     A7
2050   1136            TAD     M3
2051   7640            SZA     CLA
2052   5271            JMP     P8EWRT
2053   1240            TAD     P8ELK
2054   3711            DCA I   P8ELKA   /RETURN LINK
2055   7001            IAC
2056   3551            DCA I   BUFSTI   /MARK BUFFER FULL
2057   2151            ISZ     BUFSTI   /GET POINTER TO NEXT
2060   1551            TAD I   BUFSTI   /BUFFER
2061   3151            DCA     BUFSTI   /STORE POINTER (PERMANENT)
2062   1151            TAD     BUFSTI
2063   1017            TAD     A3
2064   3705            DCA I   BFPTI
2065   1123            TAD     M200     /FIXED BUFFER SIZE=128 WORDS
```

```
2066  3706              DCA I  BFSZI
2067  2153        .     ISZ    IWAIT   /SET FLAG FOR NEXT READ
2070  5601              JMP I  CDIOX
2071  7240    P8EWRT,   CLA CMA
2072  3552              DCA I  BUFSTO  /MARK BUFFER TO BE EMPTY
2073  2152              ISZ    BUFSTO
2074  1552              TAD I  BUFSTO  /GET POINTER TO NEXT
2075  3152              DCA    BUFSTO  /BUFFER HEADER
2076  1152              TAD    BUFSTO  /SETUP POINTER TO
2077  1017              TAD    A3      /BUFFER
2100  3707              DCA I  BFPTO
2101  7040              CMA
2102  1123              TAD    M200    /GET -201
2103  3710              DCA I  BFSZO
2104  5601              JMP I  CDIOX
2105  0440    BFPTI,    BUFPTI
2106  0441    BFSZI,    BUFSZI
2107  0511    BFPTO,    BUFPTO
2110  0512    BFSZO,    BUFSZO
2111  0000    P8ELKA,   0
2112  0300    IDLEOZ,   IDLEO
              /SAVE TIME IN "TIME"
              *5160   .
5160  7000              NOP
5161  7000              NOP
5162  7000              NOP
5163  7000              NOP
```

PL8A

```
/DECUS 8-333 8K PALD PATCHES
/MODIFICATIONS TO LIMIT FIELD 1
BOT=6747
TOP=7403
/BLTO
*3722
3722    0000    BLTO,       0
3723    2371                ISZ     BLTADR
3724    2372                ISZ     BLTAD2
3725    1771                TAD I   BLTADR
3726    6211                CDF     10
3727    3772                DCA I   BLTAD2
3730    6201                CDF     00
3731    2334                ISZ     BLTCNT
3732    5323                JMP     BLTO+1
3733    5722                JMP I   BLTO
3734    7150    BLTCNT,     BOT-7577
/3735-3770 USED
*3771
3771    6747                BLTADR, BOT
3772    6547                BLTAD2, BOT-200
/SDECOD
*4202
4202    1355                TAD     P7377
/4200-4354 USED
*4355
4355    7377    P7377,      7377
*437
0437    1377                TAD     MTOP
*577
0577    0575    MTOP,       -TOP+200
/SEARCH
*150
0150    7376    P7376,      7376
```

TMOD

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL1␣ V142 22-

```
                            /PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAP
                            /START WITH OS8 12K BOOTSTRAP MUST BE USED ON TAPE JUST AFT
                            /BUILDING BY TBLD BUT BEFORE ANY OTHER SYSTEM PROGRAMS ARE
                            /WRITTEN ON THE TAPE.   START PROGRAM WITH NEW TAPE ON UNIT
            0200      *200
  0200  4657           JMS I    SYSIO    /READ 1ST SAM BLK
  0201  0003           3
  0202  0200           200
  0203  1400           1400
  0204  0000           0
  0205  7402           HLT
  0206  7001           IAC               /MARK BLOCKS 35,6,7 A MONITOR
  0207  3654           DCA I    P1435    /FOR PROTECTION
  0210  7001           IAC
  0211  3655           DCA I    P1436
  0212  7001           IAC
  0213  3656           DCA I    P1437
  0214  4657           JMS I    SYSIO    /REWRITE SAM 1
  0215  0005           5
  0216  0200           200
  0217  1400           1400
  0220  0202           202               /LINK
  0221  7402           HLT
  0222  4657           JMS I    SYSIO    /NOW WRITE IN THE TD8E RTN
  0223  0005           5                 /AND MONITOR HEAD
  0224  0035           35
  0225  0400           400
  0226  0000           0
  0227  7402           HLT
  0230  4657           JMS I    SYSIO
  0231  0005           5
  0232  0036           36
  0233  0600           600
  0234  0000           0
  0235  7402           HLT
  0236  4657           JMS I    SYSIO
  0237  0005           5
  0240  0037           37
  0241  1000           1000
  0242  0000           0
  0243  7402           HLT
  0244  4657           JMS I    SYSIO    /WRITE BOOT INTO BLK 0
  0245  0005           5
  0246  0000           0
  0247  1200           1200
  0250  0000           0
  0251  7402           HLT
  0252  5653           JMP I    .+1      /RESTART MONITOR
  0253  7600           7600
  0254  1435    P1435, 1435
  0255  1436    P1436, 1436
  0256  1437    P1437, 1437
  0257  7642    SYSIO, 7642
```

```
/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8F TAPE    PAL10   V102   22-
                    /TD8F DECTAPE RTN.
            0010            DRIVE=10            /UNITS 0 AND 1 SELECTED
            0010            MFIELD=10           /AFIFLD*10=MFIFLD
            0201            WDSBLK=201          /129 WORDS PER BLOCK

      0400                  *400
                            NOPUNCH
      7400                  *7400
                            ENPUNCH
7400  0000            DTA0,  0                  /ENTRY POINT FROM UNIT 0
7401  7300            CLA CLL                   /0 TO LINK
7402  5210            JMP DTA1X
7403  1000      C1000, 1000
7404  0000            DTA1,  0                  /UNIT 2 ENTRY
7405  7320            CLA CLL CML               /1 TO LINK
7406  1204            TAD DTA1
7407  3200            DCA DTA0                  /PICK UP ARGS AT DTA0
7410  7010      DTA1X, RAR
7411  3361            DCA UNIT                  /LINK TO UNIT POSITION
7412  6214            RDF
7413  1354            TAD C6203                 /GET DATA FIELD AND SETUP RETURN
7414  3352            DCA LEAVE
7415  1600            TAD I DTA0                /GET FUNCTION WORD
7416  6775            SDLD                      /PUT FUNCTION INTO DATA REGISTER
7417  7112            CLL RTR                   /AC STILL HAS FUNCTION. PUT # WORDS
                                                /BLOCK INTO LINK
7420  7630            SZL CLA                   /KNOCK ONE OFF WDSBLK?
7421  7001            IAC                       /YES
7422  1360            TAD MWORDS
7423  3356            DCA WCOUNT                /STORE MASTER WORD COUNT
7424  2200            ISZ DTA0                  /TO BUFFER
7425  1600            TAD I DTA0
7426  3357            DCA BUFF
7427  2200            ISZ DTA0                  /TO BLOCK NUMBER
7430  1600            TAD I DTA0
7431  3204            DCA BLOCK
7432  2200            ISZ DTA0                  /POINT TO ERROR EXIT
7433  6213            CIF CDF MFIELD            /TO ROUTINES DATA FIFLD
7434  6777            SDRD                      /GET FUNCTION INTO AC
7435  7104            CLL RAL
7436  0307            AND CM200                 /GET # PAGES TO XFER
7437  3364            DCA PGCT
7440  6777            SDRD
7441  0374      C374,  AND C70                  /GET FIELD FOR XFER
7442  1354            TAD C6203                 /FORM CDF N
7443  3377            DCA XFIELD                /IF=0 AND DF=N AT XFER.
7444  7346            CLA CLL CMA RTL
7445  3367            DCA TRYCNT                /3 ERROR TRIES
7446  1361            TAD UNIT                  /TEST FOR SELECT ERROR
7447  6774            SDLC
7450  6776            SDRC
7451  0366            AND C100
7452  7640            SZA CLA
7453  5346            JMP FATAL-1
      7404            BLOCK=DTA1
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   22-

```
        7454  6777            SDRD           /PUT FUNCT INTI XFUNCT IN SECOND PG
        7455  3762            DCA I CXFUN
        7456  1356            TAD WCOUNT
        7457  3765            DCA I CXWCT
        7460  6777            SDRD           /GET MOTION BIT TO LINK
        7461  7110            CLL RAR
        7462  5301            JMP GO         /AND START THE MOTION.
        7463  6772    RWCOM,  SDST           /ANY CHECKSUM ERRORS?
        7464  7640            SZA CLA        /OR CHECKSUM ERRORS?
        7465  5341            JMP TRY3       /PLEASE NOTE THAT THE LINK IS ALWAY
                                            /SET AT RWCOM. GETCHK SETS IT.
        7466  1364            TAD PGCT       /NO ERROR..FINISHED XFER?
        7467  1307            TAD CM200
        7470  7450            SNA
        7471  5345            JMP EXIT       /ALL DONE. GET OUT
        7472  3364            DCA PGCT       /NEW PAGE COUNT
        7473  2204            ISZ BLOCK      /NEXT BLOCK TO XFER
        7474  1356            TAD WCOUNT     /FORM NEXT BUFFER ADDRESS
        7475  7041            CIA
        7476  1357            TAD BUFF
        7477  3357            DCA BUFF
        7500  7120            CLL CML        /FORCES MOTION FORWARD
        7501  7232    GO,     CLA CML RTR    /LINK BECOMES MOTION BIT
        7502  1203            TAD C1000
        7503  1361            TAD UNIT       /PUT IN 'GO' AND UNIT #
        7504  6774            SDLC           /LOOK FOR BLOCK NO.
        7505  4755            JMS I CRDQUD   /WAIT AT LEAST 6 LINES TO LOOK
        7506  4755            JMS I CRDQUD
        7507  7600    CM200,  7600           /COULD HAVE SAVED A LOC. HERE
        7510  6771    SRCH,   SDSS
        7511  5310            JMP .-1        /WAIT FOR SINGLE LINE FLAG
        7512  6776            SDRC
        7513  7106            CLL RTL        /DIRECTION TO LINK. INFO BITS
                                            /ARE SHIFTED.
        7514  0241            AND C374       /ISOLATE MARK TRACK BITS
        7515  1333            TAD M110       /IS IT END ZONE?
        7516  7450            SNA
        7517  5335            JMP ENDZ       /THE LINK STAYS SAME THRU THIS
        7520  1363            TAD M20        /CHECK FOR BLOCK MARK
        7521  7640            SZA CLA
        7522  5310            JMP SRCH
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   22-,

```
        7523  6777         SDRD           /GET THE BLOCK NUMBER
        7524  7430         SZL            /IF WD ARE IN REVERSE, LOOK FOR 3
                                          /BLOCKS BEFORE TARGET BLOCK. THIS
                                          /ALLOWS TURNAROUND AND UP TO SPEED.
        7525  1375         TAD C3         /REVERSE
        7526  7040         CMA
        7527  1204         TAD BLOCK
        7530  7040         CMA            /IS IT RIGHT BLOCK?
        7531  7450         SNA
        7532  5370         JMP FOUND      /YES..HOORAY!
        7533  7670  M110,  SZL SNA CLA    /NO, BUT ARE WE HEADED FOR IT?
                                          /ABOVE SNA IS SUPERFLUOUS.
        7534  5310         JMP SRCH       /YES
        7535  6776  ENDZ,  SDRC           /WE ARE IN THE END ZONE
        7536  7106         CLL RTL        /DIRECTION TO LINK
        7537  7630         SZL CLA        /ARE WE IN REVERSE?
        7540  5301         JMP GO         /YES..TURN US AROUND
                          /IF WE ARE IN THE END ZONE GOING FORWARD, IT IS AN ERROR
        7541  2367  TRY3,  ISZ TRYCNT
        7542  5301         JMP GO         /TRY 3 TIMES
        7543  7300         CLL CLA
        7544  5347         JMP FATAL                   /LINK OFF MEANS AC=4000 ON
        7545  2200  EXIT,  ISZ DTA0
        7546  7120         CLL CML        /AC=0 ON NORMAL RETURN
        7547  1361  FATAL, TAD UNIT
        7550  6774         SDLC           /STOP THE UNIT
        7551  7230         CLA CML RAR
        7552  7402  LEAVE, HLT
        7553  5600         JMP I DTA0
        7554  6203  C6203, 6203
        7555  7713  CRDQUD, RDQUAD
        7556  0000  WCOUNT, 0
        7557  0000  BUFF,  0
        7560  7577  MWORDS, -WDSBLK
        7561  0000  UNIT,  0
        7562  7753  CXFUN, XFUNCT
        7563  7760  M20,   -20
        7564  0000  PGCT,  0
        7565  7761  CXWCT, XWCT
        7566  0100  C100,  100
        7567  7775  TRYCNT, -3
        7570  7630  FOUND, SZL CLA        /RIGHT BLOCK. HOW ABOUT DIRECTION?
        7571  5301         JMP GO /WRONG..TURN AROUND
        7572  1361         TAD UNIT       /PUT UNIT INTO LINK
        7573  7104         CLL RAL        /AC IS NOW 0
        7574  0070  C70,   70             /*******DON'T MOVE THIS!!!!******
        7575  0003  C3,    3
        7576  1357         TAD BUFF       /GET BUFFER ADDRESS
        7577  7402  XFIELD, HLT           /INTO NEXT PAGE
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   22.

```
        7600  6212          CIF    MFIELD
        7601  3360          DCA    XBUFF        /SAVE ADDRESS
        7602  7010          RAR                 /NOW GET UNIT #
        7603  3320          DCA    XUNIT
        7604  1361          TAD    XWCT
        7605  3357          DCA    WORDS        /WORD COUNTER
        7606  6771   REVGRD, SDSS
        7607  5206          JMP    .-1          /LOOK FOR REVERSE GUARD
        7610  6776          SDRC
        7611  0241          AND    K77
        7612  1354          TAD    CM32         /IS IT REVERSE GUARD?
        7613  7640          SZA CLA
        7614  5206          JMP    REVGRD       /NO.KEEP LOOKING
        7615  1353          TAD    XFUNCT       /GET FUNCTION   READ OR WRITE
        7616  7700   K7700, SMA CLA
        7617  5254          JMP    READ         /NEG. IS WRITE
        7620  6776   WRITE,  SDRC
        7621  0266          AND    C300         /CHECK FOR WRITE LOCK AND SELECT ER
        7622  7120          CLL CML              /LOCK OUT AND SELECT ARE AC 0 ERROR
        7623  7640          SZA CLA
        7624  5751          JMP I  CFATAL       /FATAL ERROR. LINK MUST BE ON
        7625  4313          JMS    RDQUAD       /NO ONE EVER USES THIS WORD!
        7626  7600   C7600, 7600
        7627  1355          TAD    C1400
        7630  1320          TAD        XUNIT    /INITIATE WRITE MODE
        7631  6774          SOLC
        7632  7240          CLA CMA
        7633  4304          JMS    WRQUAD       /PUT 77 IN REVERSE CHECKSUM
        7634  7240          CLA CMA
        7635  3356          DCA    CHKSUM
        7636  1760   WRLP,   TAD I  XBUFF       /GLORY BE! THE ACTUAL WRITE!
        7637  4304          JMS    WRQUAD
        7640  2360          ISZ    XBUFF        /BUMP CORE POINTER
        7641  0077   K77,    77                  /ABOVE MAY SKIP
        7642  2357          ISZ    WORDS        /DONE THIS BLOCK?
        7643  5236          JMP    WRLP         /NOT YET..LOOP A WHILE
        7644  1353          TAD    XFUNCT       /IS THE OPERATION FOR WDSBLK PER BL
        7645  7112          CLL RTR              /IF NO, WRITE A 0 WORD
        7646  7630          SZL CLA

        7647  4304          JMS    WRQUAD       /WRITE A WORD OF 0
        7650  4335          JMS    GETCHK       /DO THE CHECK SUM
        7651  4304          JMS    WRQUAD       /WRITE FORWARD CHECKSUM
        7652  4304          JMS    WRQUAD       /ALLOW CHECKSUM TO BE WRITTEN
        7653  5752          JMP I  CRWCOM
```

```
7654  4313    READ,    JMS RDQUAD
7655  4313             JMS RDQUAD
7656  4313             JMS RDQUAD      /SKIP CONTROL WORDS
7657  0241             AND K77
7660  1216             TAD K7700       /TACK 7700 ONTO CHECKSUM.
7661  3356             DCA CHKSUM      /CHECKSUM ONLY LOW 6 BITS ANYWAY
7662  4313    RDLP,    JMS RDQUAD
7663  4320             JMS EQUFUN      /COMPUT CHECKSUM AS WE GO
7664  3760             DCA I XBUFF     /IT GETS CONDENSED LATER
7665  2360             ISZ XBUFF
7666  0300    C300,    300             /PROTECTION
7667  2357             ISZ WORDS       /DONE THIS OP?
7670  5262             JMP RDLP        /NO SUCH LUCK
7671  1353             TAD XFUNCT      /IF OP WAS FOR WDSBLK-1, READ AND
7672  7112             CLL RTR         /CHECKSUM THE LAST TAPE WORD
7673  7620             SNL CLA
7674  5277             JMP RDLP2
7675  4313             JMS RDQUAD      /NOT NEEDED FOR WDSBLK/BLOCK
7676  4320             JMS EQUFUN      /CHECKSUM IT
7677  4313    RDLP2,   JMS RDQUAD      /READ CHECKSUM
7700  0216             AND K7700
7701  4320             JMS EQUFUN
7702  4335             JMS GETCHK      /GET SIX BIT CHECKSUM
7703  5752             JMP I CRWCOM

7704  0000    WRQUAD,  0               /WRITE OUT A 12 BIT WORD
7705  4320             JMS EQUFUN      /ADD THIS TO CHECKSUM
7706  6773             SDSQ            /SKIP ON QUADLINE FLAG
7707  5306             JMP .-1
7710  6775             SDLD            /LOAD DATA    ONTO BUS
7711  7200             CLA             /SDLD DOESN'T CLEAR AC
7712  5704             JMP I WRQUAD

7713  0000    RDQUAD,  0               /READ A 12 BIT WORD
7714  6773             SDSQ
7715  5314             JMP .-1
7716  6777             SDRD            /READ DATA
7717  5713             JMP I RDQUAD
```

```
7720  0000      EQUFUN,  0              /COMPUTE EQUIVALENCE CHECKSUM
7721  7040               CMA            /ACTUALLY CHECKSUMS ON DECTAPE ARE
7722  3362               DCA EQUTMP      /EQUIVALENCE OF ALL WORDS IN A RECO
7723  1362               TAD EQUTMP      /SIX BITS AT A TIME, BUT SINCE EQUI
7724  0356               AND CHKSUM      /IS ASSOCIATIVE, WE CAN DO IT 12
7725  7041               CIA            /BITS AT A TIME AND CONDENSE LATER,
7726  7104               CLL RAL         /THIS ROUTINE USES THESE IDENTITIES
7727  1362               TAD EQUTMP      /A+B=(A.XOR.B)+2*(A.AND.B)
7730  1356               TAD CHKSUM      /A,EQU,B=.NOT.(A.XOR.B)=A.XOR.(.NOT
7731  3356               DCA CHKSUM      /A.EQU.B=(A+(.NOT.B))-2*(A.AND.(.NO
7732  1362               TAD EQUTMP
7733  7040               CMA
7734  5720               JMP I EQUFUN

7735  0000      GETCHK,  0              /FORM 6 BIT CHECKSUM
7736  7200               CLA
7737  1356               TAD CHKSUM
7740  7040               CMA
7741  7106               CLL RTL
7742  7006               RTL
7743  7006               RTL
7744  4320               JMS EQUFUN
7745  7320               CLA CLL CML     /FORCES LINK ON AT RWCOM
7746  1356               TAD CHKSUM
7747  0216               AND K7700
7750  5735               JMP I GETCHK

7751  7547      CFATAL,  FATAL
7752  7463      CRWCOM,  RWCOM
7753  0000      XFUNCT,  0
7754  7746      CM32,    -32
7755  1400      C1400,   1400
7756  0000      CHKSUM,  0
7757  0000      WORDS,   0
7760  0000      XBUFF,   0
7761  0000      XWCT,    0
7762  0000      EQUTMP,  0
      7720      XUNIT=EQUFUN
7763  0000               0
7764  0000               0
7765  0000               0
7766  0000               0
7767  4777               JMS I  DT0
7770  0102               0102
7771  7600               7600
7772  0037               37
7773  7402               HLT
7774  6203               CIF CDF 0
7775  5776               JMP I  .+1
7776  7600               7600
7777  7400      DT0,     7400
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   P2-

```
                    /MONITOR HEAD
                    /RUNS AT 7600
                    /RESIDENT PAGE OF MONITOR (7400-7777 AND BLOCK 0)
                    /DECTAPE VERSION
                    /FUNCTION:    SAVE CORE 7200-7577 IN SCRATCH
                    /             READS REST OF MONITOR INTO
                    /             CORE 7200-7577 JUMPS TO
                    /             MONITOR PAGE 2 (7400)
          1000      *1000
                    NOPUNCH
          7600      *7600
                    FNPUNCH
    7600  0070      D0070,  70          /CONSTANT ACTS AS NOP
    7601  4242              JMS   DTSYS /SAVE CORE 7200-7377
    7602  0005              5
    7603  0005              5
    7604  7200              7200
    7605  0000              0
    7606  7402              HLT
    7607  4242              JMS   DTSYS /SAVE CORE 7400-7577
    7610  0005              5
    7611  0006              6          /SCRATCH BLOCK 2
    7612  7400              7400
    7613  0000              0
    7614  7402              HLT
    7615  4242              JMS   DTSYS /READ IN PAGE 1 OF SAVE
    7616  0003              3
    7617  0001              1
    7620  7200              7200
    7621  0000      DTCORE, 0
    7622  7402              HLT
    7623  4242              JMS   DTSYS /READ IN MONITOR PAGE 2
    7624  0003              3
    7625  0002              2
    7626  7400      DTSTRT, 7400
    7627  0000              0
    7630  7402              HLT
    7631  5626              JMP I DTSTRT /ENTER MONITOR PAGE 2
    7632  0000      DTHOLD, 0
    7633  0000      DTLINK, 0
    7634  0000      PLINK,  0
    7635  0000      LNHOLD, 0
    7636  7400      TD8E0,  7400
    7637  7404      TD8E1,  7404  /**MUST FOLLOW TD8E0***
    7640  4636      JMST8,  JMS I TD8E0
    7641  0700      P700,   700
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10 V142   22.

```
                        /TD8E DECTAPE AS SYSTEM DEVICE
        7642  0000    DTSYS,  0               /SYSTEM I/O
        7643  7200            CLA
        7644  1642            TAD I   DTSYS    /GET FCN WORD
        7645  2242            ISZ     DTSYS
        7646  3351            DCA     DTCODE
        7647  1351            TAD     DTCODE   /FIND FIELD BITS
        7650  0200            AND     D0070
        7651  3332            DCA     ARG1
        7652  1344            TAD     PCDF     /SET TRANSFER FIELD CDF'S
        7653  1332            TAD     ARG1
        7654  3304            DCA     XCDF
        7655  1304            TAD     XCDF
        7656  3337            DCA     XCDF1
        7657  1351            TAD     DTCODE   /MOVE WRITE BIT TO BIT 0
        7660  7112            CLL     RTR
        7661  7012            RTR              /CLEAR JUNK
        7662  0350            AND     D4000
        7663  1353            TAD     D0100    /WRITE/READ ONLY 1 BLOCK
        7664  1332            TAD     ARG1     /ADD TO FIELD BITS
        7665  3332            DCA     ARG1
        7666  1642            TAD I   DTSYS    /GET BLOCK
        7667  2242            ISZ     DTSYS
        7670  3334            DCA     ARG3
        7671  1642            TAD I   DTSYS    /GET CORE ADDR
        7672  2242            ISZ     DTSYS    /BUMP TO LINKWORD ADDR.
        7673  3333            DCA     ARG2
        7674  1333            TAD     ARG2     /FORM ADDRESS OF 201TH WORD
        7675  1352            TAD     D0200
        7676  3234            DCA     PLINK
        7677  1242            TAD     DTSYS    /SAVE LINK WORD ADDR
        7700  3233            DCA     DTLINK
        7701  1642            TAD I   DTSYS    /GET LINK WORD
        7702  2242            ISZ     DTSYS    /BUMP TO ERROR ADDRESS
        7703  3235            DCA     LNHOLD   /SAVE LINK
        7704  6201    XCDF,   CDF     0        /POINT TO TRANSFER FIELD
        7705  1634            TAD I   PLINK    /SAVE ENDANGERED WORD
        7706  3232            DCA     DTHOLD
        7707  1235            TAD     LNHOLD   /PUT LINK WORD IN XFER FIELD
        7710  3634            DCA I   PLINK
        7711  6201            CDF     0        /BACK TO FIELD 0
        7712  1351            TAD     DTCODE   /IS THIS AN INDIRECT RETURN
        7713  0356            AND     D1000
        7714  7650            SNA     CLA
        7715  5322            JMP     .+5      /NO
        7716  1642            TAD I   DTSYS    /YES , ERROR HOLDS RETURN ADDR -1
        7717  3242            DCA     DTSYS
        7720  7040            CMA              /PREPARE TO DUMP LINK AT 7777
        7721  3233            DCA     DTLINK
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   22-

```
7722  1240    DTTRY,   TAD    JMSTA    /SET UNIT 0 ENTRY
7723  3331             DCA    .+6
7724  1351             TAD    DTCODE   /GET UNIT CODE
7725  0241             AND    P700     /ANYTHING BUT 0 IS UNIT 1
7726  7640             SZA CLA
7727  2331             ISZ    .+2      /BUMP TO UNIT 1 ADDRESS
7730  6212             CIF    10
7731  4636             JMS I  TD8E0
7732  0000    ARG1,    0               /FUNCT
7733  0000    ARG2,    0               /CORE
7734  0000    ARG3,    0               /BLOCK
7735  7610             SKP CLA          /ERROR
7736  2242             ISZ    DTSYS    /OK, BUMP TO NORMAL RETURN
7737  6201    XCDF1,   CDF    0        /SET XFER FIELD
7740  1634             TAD I  PLINK    /SAVE LINK WORD
7741  3235             DCA    LNHOLD
7742  1232             TAD    DTHOLD   /RESTORE ENDANGERED WORD
7743  3634             DCA I  PLINK
7744  6201    PCDF,    CDF    0        /BACK TO 0
7745  1235             TAD    LNHOLD   /PUT AWAY LINK WORD FOR DUMP AT 777
7746  3633             DCA I  DTLINK
7747  5642             JMP I  DTSYS
7750  4000    D4000,   4000
7751  0000    DTCODE,  0
7752  0200    D0200,   200
7753  0100    D0100,   100
7754  0000             0               /WC
7755  0000             0               /CA
7756  1000    D1000,   1000
```

```
/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE    PAL10   V102    22.

                        /TD8E DISK/DECTAPE BOOTSTRAP TO USE STANDARD 30 WORD 12K B'
                        /ASSEMBLED AT 7400, LOADED INTO 1220 INITIALLY, LOADS INTO
                        /7400 VIA BOOTSTRAP.
                        /READS IN FLD 1 PART FROM BLOCKS 35,36 THEN STARTS FLD1
                        /BOOTSTRAP WHICH READS MONITOR HEAD FROM BLOCK 37
        1220            *1220
                        NOPUNCH
        7400            *7400
                        ENPUNCH
        6771            SDSS=6771
        6772            SDST=6772
        6773            SDSQ=6773
        6774            SDLC=6774
        6775            SDLD=6775
        6776            SDRC=6776
        6777            SDRD=6777
7400    1246    TBOOT,  TAD     K7600   /128 WORDS/PAGE
7401    3244            DCA     TWCT    /WAIT FOR A BLOCK MARK
7402    6771            SDSS
7403    5202            JMP     .-1
7404    6776            SDRC
7405    0233            AND     T77
7406    1251            TAD     M26     /IS IT A BLOCKMARK?
7407    7640            SZA CLA
7410    5202            JMP     TBOOT+2 /NO
7411    6777            SDRD            /GET BLOCK NO
7412    1253    TBLKNO, TAD     M35     /NEED BLOCKS 35,36
7413    7640            SZA CLA
7414    5202            JMP     TBOOT+2 /NO
7415    6771    TRGRD,  SDSS
7416    5215            JMP     .-1
7417    6776            SDRC            /LOOK FOR REV. GUARD WORD
7420    0233            AND     T77
7421    1252            TAD     M32
7422    7640            SZA CLA
7423    5215            JMP     TRGRD   /NOT YET
7424    4255            JMS     TRQD    /SKIP CONTROL WORDS
7425    4255            JMS     TRQD
7426    4255            JMS     TRQD
7427    6211            CDF     10      /LOAD TO FLD 1
7430    4255    TREAD,  JMS     TRQD    /GET DATA WORDS
7431    3645            DCA I   PTR
7432    2245            ISZ     PTR
7433    0077    T77,    77              /NOP
7434    2244            ISZ     TWCT    /FINISHED BLOCK?
7435    5230            JMP     TREAD   /NO
7436    2212            ISZ     TBLKNO  /YES,DO NEXT BLOCK
7437    2250            ISZ     M2      /DONE BOTH BLOCKS?
7440    5200            JMP     TBOOT   /NO
7441    6774            SDLC            /DONE STOP TAPE
7442    6213            CIF CDF 10
7443    5647            JMP I   K7767   /GO READ MONITOR HEAD
```

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TD8E TAPE   PAL10   V142   22-

```
7444  7600   TWCT,   7600
7445  7400   PTR,    7400        /1ST LOCATION FOR TD8E RTN
7446  7600   K7600,  7600
7447  7767   K7767,  7767
7450  7776   M2,     -2
7451  7752   M26,    -26
7452  7746   M32,    -32
7453  7743   M35,    -35
7454  7742   M36,    -36         /MUST FOLLOW M35
7455  0000   TRQD,   0           /READ A WORD
7456  6773           SDSQ
7457  5256           JMP   .-1
7460  6777           SDRD
7461  5655           JMP I TRQD
                     $
```

APPENDIX B

This is the missing appendix H of the DEC 4K Disk Monitor System manual.

A system program (i.e. one that was saved by SAVE NAME!...) may be called from a running program by:

1. Placing the name of the program to be called in locations 7400 and 7401.

    Example: * 7400

    NA /EACH SIXBIT IS THE 8 BIT ASCII

    ME /CHARACTER-240

2. Executing a call to the system I/O:

```
            JMS I SYSIO
            3
            10  /FOR DISK, 13 FOR DECTAPE
            7200
            0
            HLT / ERROR
            JMP I       .+1
            7201
    SYSIO,  7642
```

APPENDIX D

This is the missing appendix D for the DEC 4K Disk Monitor System Manual.

A written program that was that was located by DAVE DAMEL... may be called from a running program by...

1. Testing the name of the program to be called in locations 7730 and 7601.

Example: * 7-60

2. MA .MACH STRNTY IS THE 5 BIT AECI.

M' .TRAILACTOR-DVA.

3. Watching's will do the system 110.

.MS I SYBIO

LD /IDR DISK, IS FOR INITIAL.
7260

BIT 7 ERROR
JMP I   I+.
7701
SYBIO, 7642

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