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DISK/DECTAPE MONITOR FOR THE TD8E

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Medical Instrumentation Group²

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 support two tape drives, and can load and save programs from all available memory. The operation is the same as in the usual TCO1/08 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).

*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-08-ODSMA-A-D) (6) and the 1970 Introduction to Programming, Vol. I (7), except that the system device name is D0: 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 0, 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 200 code leader/trailer, is the TD8E routine (3) assembled at 7400, 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 0.
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 0 and WRITE ENABLED.
7. Start the builder at location 2000 in field 0.
8. Answer the questions, being sure to answer N to the RF08 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 7600 in field 0. In response to the monitor dot, the operator should type:

.SAVE PIP!0-5177;1000 (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!0-5177,6600-7577;200 (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!0-3377;2600 (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 7600 and save builder by:

```
.SAVE TBLD!0-7577;200 (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 0 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 0 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.

in their 1 for unit A-1
 4. The Peripheral Interchange Program (PIP), DEC-08-014A-13
 5. The Users Society distributed program DEC-08-013, P-K-T-111
 6. DEC 8K Disk Monitor System
 7. DEC-08-014A-13
 8. Introduction to Programming Vol. 1, Digital Equipment Corporation
 9. 1970. Later years books do not apply to this system.
 10. Digital Equipment Corporation
 11. DEC 08-014A-13
 12. DEC 08-014A-13
 13. DEC 08-014A-13

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

```

/TDSE 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
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
2 717	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)
2 746	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

IDLE0= 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
/BL TO
* 3722
3722 0000 BL TO, 0
3723 2371 I SZ BL TADR
3724 2372 I SZ BL TAD2
3725 1771 TAD I BL TADR
3726 6211 CDF 10
3727 3772 DCA I BL TAD2
3730 6201 CDF 00
3731 2334 I SZ BL TCNT
3732 5323 JMP BL TO+1
3733 5722 JMP I BL TO
3734 7150 BL TCNT, BOT-7577
/3735-3770 USED
* 3771
3771 6747 BL TADR, BOT
3772 6547 BL TAD2, 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 TDBE TAPE PAL10 V142 22-

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON TDBE TAP
 /START WITH OSR 12K BOOTSTRAP MUST BE USED ON TAPE JUST AFT
 /BUILDING BY TRLD BUT BEFORE ANY OTHER SYSTEM PROGRAMS ARE
 /WRITTEN ON THE TAPE. START PROGRAM WITH NEW TAPE ON UNIT
 *200

0200	0200			
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 TDBE 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 TDBF TAPE PAL10 V142 22-

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/DTDBF DECTAPE RTN.
0010 DRIVE=10 /UNITS 0 AND 1 SELECTED
0010 MFIELD=10 /AFIELD*10=MFIELD
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 LEAVF
7415 1600 TAD I DTA0 /GET FUNCTION WORD
7416 6775 SOLC /PUT FUNCTION INTO DATA REGISTER
7417 7112 CLL RTR /AC STILL HAS FUNCTION. PUT # WORDS
/BLOCK INTO LINK
/KNOCK ONE OFF WDSBLK?
/YES

7420 7630 SZL CLA
7421 7001 IAC
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 RUFF
7427 2200 ISZ DTA0 /TO BLOCK NUMBER
7430 1600 TAD I DTA0
7431 3204 DCA BLOCK
7432 2200 ISZ DTA0
7433 6213 CIF CDF MFIELD /POINT TO ERROR EXIT
7434 6777 SDRD /TO ROUTINES DATA FIELD
7435 7104 CLL RAL /GET FUNCTION INTO AC
7436 0307 AND C6203
7437 3364 DCA PGCT /GET # PAGES TO XFER
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 SOLC
7450 6776 SDRD
7451 0366 AND C100
7452 7640 SZA CLA
7453 5346 JMP FATAL=1
7404 BLOCK=DTA1

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/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON T08E TAPE PAL10 V142 22-

7454	6777		SDRD	/PUT FUNCT INTI YFUNCT IN SECOND PC
7455	3762		DCA T CXFUN	
7456	1356		TAD WCOUNT	
7457	3765		DCA T CXWCT	
7460	6777		SDRD	/GET MOTION BIT TO LINK
7461	7110		CLL RAP	
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 ALWAYS
				/SET AT RWCOM. GETCHK SETS IT.
				/NO ERROR..FINISHED XFFR?
7466	1364		TAD PGCT	
7467	1307		TAD CMP00	
7470	7450		SNA	
7471	5345		JMP EXTT	/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 RUFF	
7477	3357		DCA RUFF	
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 T CRDQUD	/WAIT AT LEAST 6 LINES TO LOOK
7506	4755		JMS T 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	/THE LINK STAYS SAME THRU THIS
7517	5335		JMP ENDZ	
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 T08E TAPE PAL10 V142 22-

7523	6777		SORD		/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 DTAD		
7546	7120		CLL CML		/AC=0 ON NORMAL RETURN
7547	1361	FATAL,	TAD UNIT		
7550	6774		SOLC		/STOP THE UNIT
7551	7230		CLA CML RAR		
7552	7402	LEAVE,	HLT		
7553	5600		JMP T DTAD		
7554	6203	C6203,	6203		
7555	7713	CRDQUO,	RDUQUO		
7556	0000	WCOUNT,	0		
7557	0000	RUFF,	0		
7560	7577	MWORDS,	-WDSRLK		
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 RUFF		/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	REVGRO,	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	REVGRO	/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	0246		AND	C300	/CHECK FOR WRITE LOCK AND SELECT EF
7622	7120		CLL	CML	/LOCK OUT AND SELECT ARE A 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	

/PROGRAM TO CONVERT STANDARD FORMAT D/D MONITOR ON T08F TAPE PAL10 V142 22-

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 T 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 WDSRLK-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	RDLPP,	JMS RDQUAD	/READ CHECKSUM
7700	0216		AND K7700	
7701	4320		JMS EQUFUN	
7702	4335		JMS GETCHK	/GET SIX BIT CHECKSUM
7703	5752		JMP T 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 T 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 T RDQUAD	

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

7720	0000	EQUFUN, 0	/COMPUTE EQUIVALENCE CHECKSUM
7721	7040	CMA	
7722	3362	DCA EQUIMP	/ACTUALLY CHECKSUMS ON DECTAPE ARE
7723	1362	TAD EQUIMP	/EQUIVALENCE OF ALL WORDS IN A RECD
7724	0356	AND CHKSUM	/SIX BITS AT A TIME, BUT SINCE EQUI
7725	7041	CIA	/IS ASSOCIATIVE, WE CAN DO IT 12
7726	7104	CLL RAL	/BITS AT A TIME AND CONDENSE LATFR.
7727	1362	TAD EQUIMP	/THIS ROUTINE USES THESE IDENTITIES
7730	1356	TAD CHKSUM	/A+B=(A.XOR.B)+2*(A.AND.B)
7731	3356	DCA CHKSUM	/A.EQU.B=.NOT.(A.XOR.B)+A.XOR.(.NOT
7732	1362	TAD EQUIMP	/A.EQU.B=(A+(.NOT.B))-2*(A.AND.(.NOT
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	EQUIMP, 0	
7763	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	

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/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
FNPNCH
00070, 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 TDARE0, 7400
7637 7404 T08E1, 7404 /**MUST FOLLOW T08E0**
7640 4636 JMST8, JMS I TDARE0
7641 0700 P700, 700
    
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/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 TDBE TAPE PAL10 V142 22-

7722	1240	DTRY,	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	TDBE0	
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,	CDP	0	/SET XFER FIELD
7740	1634		TAD I	PLINK	/SAVE LINK WORD
7741	3235		DCA	LNHOLD	
7742	1232		TAD	DTHOLD	/RFSTORE ENDANGERED WORD
7743	3634		DCA I	PLINK	
7744	6201	PCDF,	CDP	0	/BACK TO 0
7745	1235		TAD	LNHOLD	/PUT AWAY LINK WORD (OR 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 T08E TAPE PAL10 V102 22-

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/T08F 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 TRGD /SKIP CONTROL WORDS
7425 4255 JMS TRGD
7426 4255 JMS TRGD
7427 6211 CDF 10 /LOAD TO FLD 1
7430 4255 TREAD, JMS TRGD /GFT DATA WORDS
7431 3645 DCA I PTR
7432 2245 ISZ PTR
7433 0077 T77, T77 /NOP
7434 2244 ISZ TWCT /FINISHED BLOCK?
7435 5230 JMP TREAD /NO
7436 2212 ISZ TBLKNO /YFS, DO NEXT BLOCK
7437 2250 ISZ M2 /DONE BOTH BLOCKS?
7440 5200 JMP TBOOT /NO
7441 6774 SDLC /DONE STOP TARE
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	TRGD,	0	/READ A WORD
7456	6773	SDSQ		
7457	5256	JMP	.-1	
7460	6777	SDRD		
7441	5655	JMP I	TRGD	

7441 5655 JMP I TRGD
 7457 5256 JMP .-1
 7456 6773 SDSQ
 7455 0000 TRGD
 7454 7742 M36 -36
 7453 7743 M35 -35
 7452 7746 M32 -32
 7451 7752 M26 -26
 7450 7776 M2 -2
 7447 7767 K7767 7767
 7446 7600 K7600 7600
 7445 7400 PTR 7400
 7444 7600 TWCT 7600

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
```

U

APPENDIX B

This is the abstract of the report of the AX Disk Control System
developed by Dave Wainwright.

The system is a disk control system for the AX disk drive.
It is designed to be used in conjunction with the AX disk drive
and the AX disk controller.

The system is designed to be used in conjunction with the AX disk drive
and the AX disk controller.

The system is designed to be used in conjunction with the AX disk drive
and the AX disk controller.

AX DISK CONTROL SYSTEM
AX DISK DRIVE
AX DISK CONTROLLER
AX DISK CONTROL SYSTEM
AX DISK DRIVE
AX DISK CONTROLLER

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