

TMA-11

UTILITY DRIVER
MD-11-DZTMG-C

EP-DZTMG-C-DL-A
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PRODUCT NAME: TH,A,B-11 UTILITY DRIVER

PROGRAM DATE: AUGUST 1976

MAINTAINER: DIAGNOSTIC ENGINEERING

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UTILITY DRIVER
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1. ABSTRACT

THIS PROGRAM IS INTENDED AS A BRUTE FORCE ROUTINE TO EXECUTE AN OPERATION OR SERIES OF OPERATIONS, CONTINUOUSLY REGARDLESS OF THE RESULTS OF THE OPERATION. THIS UTILITY DRIVER WILL ALLOW AN OPERATOR TO EXECUTE ANYTHING DESIRED IN ANY ORDER. THERE ARE NO ERROR CHECKS OR PRINTOUTS MADE, AND ANY VARIATION FROM PRESET SEQUENCES AND VALUES ARE MADE BY CHANGING THE APPROPRIATE MEMORY LOCATIONS. THIS PROGRAM IS NOT ELIGABLE FOR CHAIN MODE.

2. REQUIREMENTS

2.1 HARDWARE:

- A. ANY PDP-11 PROCESSOR
- B. TM A,B-11 TAPE CONTROLLER
- C. AT LEAST ONE TUID,N,W MAG TAPE DRIVE

2.2 STORAGE:

THIS PROGRAM REQUIRES AT LEAST 1K OF CORE

3. LOADING PROCEDURE:

USE STANDARD BINARY LOADING PROCEDURE

4. STARTING PROCEDURE

THE PROGRAM IS ALWAYS STARTED AT LOCATION 200 (8)

5. CONTROL SWITCH SETTINGS (LOC. 176)

BIT 0: 1=STOP AFTER EACH OPERATION

0=PROCEED

BIT 1: 1=STOP AT THE END OF THE OPERATION SEQUENCE

0=PROCEED

E. OPERATION

THE PROGRAM OPERATION IS QUITE SIMPLE, BUT DOES REQUIRE THE OPERATOR TO HAVE KNOWLEDGE OF THE MAG TAPE SYSTEM AS OPERATED ON THE TMA-11 OR TM-11 CONTROLLER. THE OPERATOR MUST BE ABLE TO DECIDE WHICH SEQUENCE OF OPERATION IS REQUIRED, AND WHAT VALUES TO ASSIGN TO THE VARIOUS PARAMETERS REQUIRED TO EXECUTE THEM. THE OPERATION SEQUENCE IS SET UP BY LOADING A TABLE WITH THE FUNCTION CODES OF THE DESIRED OPERATIONS AND SETTING THE NUMBER OF OPERATIONS IN A COUNTER. THE PROGRAM IS SET UP TO DO A WRITE OF TWENTY (20) FRAMES OF ALL ONES DATA TO TAPE UNIT ZERO (0) WITH A DENSITY OF 800 BPI IN A NINE TRACK DRIVE. THE DATA ADDRESS IS 3000 (8). THE OPERATION SEQUENCE IS SET TO DO A SINGLE WRITE. IF LOADED AND STARTED AT 200(8) WITH NO CHANGES MADE AND LOC. 176 SET TO A ZERO (0), THIS OPERATION WILL BE EXECUTED CONTINUOUSLY. THE FOLLOWING IS THE LIST OF PARAMETERS WHICH MAY BE VARIED AND A DESCRIPTION OF EACH ALONG WITH THEIR CORE LOCATION:

| PARAMETER | LOCATION | DESCRIPTION |
|-------------------|----------|--|
| CONTROL SETTINGS | 176 | PRESET FOR CONTINUOUS OPERATION |
| TM,A,B-11 ADDRESS | 600 | ADDRESS OF TM,A,B-11 (THE FIRST REGISTER ADDRESS: MTS) |
| UNIT DESCRIPTION | 700 | SET SELECTED SLAVE NUMBER (0-7) IN BITS 8,9,10
SELECT PARITY IN BIT 11 (0=ODD 1=EVEN)
SELECT DENSITY IN BITS 13,14 |
| BYTE COUNT | 702 | SET NUMBER OF BYTES PER RECORD
IN TWO'S COMPLEMENT |
| READ ADDRESS | 704 | SET DESIRED ADDRESS FOR START OF READ BUFFER. |
| WRITE ADDRESS | 706 | SET DESIRED ADDRESS FOR START OF WRITE BUFFER. |
| SPACE COUNT | 710 | SET NUMBER OF RECORDS TO SPACE ON SPACE COMMAND
IN TWO'S COMPLEMENT. |

NOTE: WHEN SPACING MULTIPLE RECORDS INSURE THAT SUFFICIENT TIME IS ALLOWED BY SETTING THE REAL / MULTIPLIER TO THE NUMBER OF RECORDS SPACED.

| | | | |
|-----|------------------|--|--|
| 162 | READY DELAY | 712 | THIS DELAY VALUE IS USED BY THE PROGRAM TO ESTABLISH A MAXIMUM TIME TO AWAIT THE COMPLETION OF AN OPERATION BEFORE PROCEEDING TO THE NEXT |
| 163 | | | |
| 164 | | | |
| 165 | | | |
| 166 | READY MULTIPLIER | 714 | IF THE VALUE SET INTO 712 DOES NOT ALLOW ENOUGH TIME, INCREASE THE SIZE OF THE MULTIPLIER. EACH INCREMENT OF THE MULTIPLIER WILL CAUSE THE 712 DELAY TO BE EXECUTED THAT MANY MORE TIMES. |
| 167 | | | |
| 168 | | | |
| 169 | | | |
| 170 | | | |
| 171 | OPERATION DELAY | 716 | THIS DELAY IS USED TO ALLOW FOR SOME AMOUNT OF TIME BETWEEN THE EXECUTION OF EACH OPERATION. IT IS LOADED AND USED JUST AS IN THE READY DELAY(712) |
| 172 | | | |
| 173 | | | |
| 174 | | | |
| 175 | OPER MULTIPLIER | 720 | THIS IS USED JUST AS THE READY DELAY MULTIPLIER(714) |
| 176 | | | |
| 177 | OPERATION NUMBER | 722 | THIS IS THE NUMBER OF OPERATIONS TO BE PERFORMED IN A SEQUENCE AND SHOULD REFLECT THE NUMBERS OF OPERATIONS SET INTO THE OPERATION TABLE. |
| 178 | | | |
| 179 | | | |
| 180 | | | |
| 181 | OPERATION TABLE | 724-754 | THIS TABLE (CONSISTING OF 15 LOCATIONS) IS TO BE LOADED WITH THE FUNCTION CODES FOR EACH OPERATION TO BE PERFORMED IN SEQUENCE. THE NUMBER OF ENTIRES MAY BE FROM ONE (1) TO FIFTEEN (15). MAKE SURE THAT THE NUMBER OF FUNCTION CODES SET IN THE TABLE IS REFLECTED BY THE NUMBER IN LOCATION 722 (OPNUM) |
| 182 | | | |
| 183 | | | |
| 184 | | | |
| 185 | | | |
| 186 | | | |
| 187 | | | |
| 188 | 6.1 | FUNCTION CODES | |
| 189 | | 0=OFFLINE | |
| 190 | | 1=READ | |
| 191 | | 2=WRITE | |
| 192 | | 3=WRITE EOF | |
| 193 | | 4=SPACE FORWARD | |
| 194 | | 5=SPACE REVERSE | |
| 195 | | 6=WRITE WITH EXTENDED IRG | |
| 196 | | 7=REWIND | |
| 197 | | | |
| 198 | | | |
| 199 | 6.2 | DENSITY (BITS 13,14 OF UNIT DESCRIPTION) | |
| 200 | | 00=200 BPI -- 7 TRACK | |
| 201 | | 01=556 BPI -- 7 TRACK | |
| 202 | | 02=800 BPI -- 7 TRACK | |
| 203 | | 03=800 BPI -- 9 TRACK | |
| 204 | | | |
| 205 | | | |
| 206 | 6.3 | PARITY (BIT 11 OF UNIT DESCRIPTION) | |
| 207 | | 1=EVEN PARITY | |
| 208 | | 0=ODD PARITY | |
| 209 | | | |
| 210 | | | |
| 211 | 6.4 | UNIT SELECT (BITS 8,9,10 OF UNIT DESCRIPTIONS) | |
| 212 | | SET TO DESIRED UNIT NUMBER (0-7) | |
| 213 | | | |
| 214 | | | |
| 215 | | | |

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7. PROGRAM DESCRIPTION

IN ORDER TO MAINTAIN THE CONTINUOUS EXECUTION OF
THE OPERATIONS DESCRIBED THE PROGRAM IS ORGANIZED AS
FOLLOWS:

START
INITIALIZE THE TM A B-11
SET UP TAPE PARAMETERS (DENSITY, PARITY, BYTE COUNT, DATA ADDRESS)
SELECT DEVICE TO TEST (UNIT NUMBER)
EXECUTE OPERATION (SET FUNCTION FROM OP TABLE AND SET GO=1)
AWAIT END OF OPERATION (TAPE UNIT READY)
STOP IF LOC. 176 BIT 0:=1
DO OPERATION DELAY (OP DELAY)
STOP IF LAST OPERATION IN SEQUENCE AND LOC 176 BIT 1:=1
POINT TO NEXT FUNCTION CODE IN OP TABLE
JUMP BACK TO START

7.1 FLOW: START: HOUSEKEEPING
 INIT: CLEAR TM A B-11
 SET UP: SET UP REQUIRED REGISTERS
 EXECUTE: SET FUNCTION AND GO=1
 AWAIT END: LOOP ON TUR=0 AS LONG AS ALLOWED BY READY DELAY
 STOP: IF BIT 0:=1 (LOC 176)
 DELAY: PER OP DELAY
 END OF SEQUENCE? IF NOT JUMP TO START
 STOP: IF BIT 1:=1 (LOC 176)
 JUMP TO START RESTART SEQUENCE

8. LISTING

.ENDR

```

252      .TITLE  TM, A, B-11 UTILITY DRIVER
253      ;MAINDEC-11-DZTMG-C-D
254      ;AUGUST 76
255      ;R. B. BARNES
256      .ABS
257
258      ;CONTROL SWITCH SETTINGS  (LOC. 176)
259
260      ;BIT 0:=1      STOP ON EACH OPERATION
261      ;              0      CONTINUE
262
263      ;BIT 1:=1      STOP AT END OF SEQUENCE
264      ;              0      CONTINUE
265
266      ;REGISTER EQUIVALENTS
267
268      000000      R0=%0
269      000001      R1=%1
270      000002      R2=%2
271      000003      R3=%3
272      000004      R4=%4
273      000005      R5=%5
274      000006      SP=%6
275      000007      PC=%7
276
277      ;TRAP CATCHERS*****
278
279      000000      .=0
280
281
282      000176      .=176
283      000176      SWITCH: 0
284
285      ;STARTING ADDRESS
286
287      000200      .=200
288      000200      000167      000574      JMP      START
289      000600      .=600
290
291      ;TM, A, B-11 REGISTERS
292
293      000600      172520      MTS:      172520
294      000602      172522      MTC:      172522
295      000604      172524      BRC:      172524
296      000606      172526      CMA:      172526
297
298      ;PROCESSOR ADDRESSES
299
300      000610      177776      PSW:      177776      ;PROCESSOR STATUS
301      000612      177570      SWR:      177570      ;SWITCH REGISTER
302

```


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DZTMGC.SRC

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```
303
304      000700      . = 700
305                      ; SET PARAMETERS DESIRED FOR UNIT UNDER TEST*****
306
307 000700 060000      UDES: 60000      ; UNIT DESCRIPTION
308 000702 177760      BCNT: -20      ; BYTE COUNT
309 000704 003000      RADDR: 3000      ; READ ADDRESS
310 000706 002000      WADDR: 2000      ; WRITE ADDRESS
311 000710 177777      SCNT: -1      ; SPACE COUNT
312 000712 100000      RDYDLY: 100000      ; READY DELAY
313 000714 000001      RDYDX: 1      ; READ DELAY MULTIPLEXER
314 000716 010000      OPDLY: 10000      ; OPERATION DELAY
3.5 000720 000001      OPDX: 1      ; OPERATION DELAY MULTIPLEXER
316 000722 000001      OPNUM: 1      ; NUMBER OF OPERATIONS (1 TO 5)
317
```

;FILL WITH OPERATION SEQUENCE

```

350
351      001000      . = 1000
352      ; START OF PROGRAM*****
353
354 001000 012706 000500      START: MOV      #500, SP
355 001004 012777 000340 177576 MOV      #340, APSW
356 001012 016700 177704 MOV      OPNUM, R0      ; SET COUNTER
357 001016 012701 000724 MOV      #OPTBL, R1      ; SET POINTER
358 001022 012777 010000 177552 LOOP: MOV      #10000, AMTC      ; POWER CLEAR THE CONTROLLER
359 001030 016702 177644 MOV      UDES, R2      ; GET UNIT DESCRIPTION
360 001034 012103 MOV      (R1)+, R3      ; GET OP CODE
361 001036 022703 000004 CMP      #4, R3      ; IS IT A SPACE FORWARD OP?
362 001042 001403 BEQ      A      ; IF SO: BR
363 001044 022703 000005 CMP      #5, R3      ; IS IT A SPACE REVERSE OP?
364 001050 001004 BNE      B      ; IF NOT: BR
365 001052 016777 177632 177524 A: MOV      SCNT, ABRC      ; SPACE PER SPACE COUNT
366 001060 000414 BR      C      ; GO AND FORM COMMAND
367 001062 016777 177614 177514 B: MOV      BCNT, ABRC      ; SET BYTE COUNT
368 001070 016777 177612 177510 MOV      WADDR, ACMA      ; SET WRITE ADDRESS
369 001076 022703 000001 CMP      #1, R3      ; IS IT A READ OP?
370 001102 001003 BNE      C      ; IF NOT: BR
371 001104 016777 177574 177474 C: MOV      RADDR, ACMA      ; SET READ ADDRESS
372 001112 006303 ASL      R3      ; SHIFT OP CODE LEFT
373 001114 050302 BIS      R3, R2      ; BUILD COMMAND WORD
374 001116 052702 000001 BIS      #1, R2      ; SET GO BIT
375 001122 010277 177454 MOV      R2, AMTC      ; START OPERATION
376 001126 016703 177560 MOV      RDYDLY, R3      ; SET READY DELAY
377 001132 016704 177556 MOV      RDYDX, R4      ; SET DELAY MULTIPLEXER
378 001136 032777 000001 177434 D: BIT      #1, AMTS
379 001144 001004 BNE      E      ; IF TUR: BR
380 001146 005303 DEC      R3
381 001150 001372 BNE      D
382 001152 005304 DEC      R4      ; DELAY FOR TAPE READY
383 001154 001370 BNE      D
384 001156 032767 000001 177012 E: BIT      #1, SWITCH      ; SHOULD STOP ON OPERATION
385 001164 001401 BEQ      F
386 001166 000000 HALT
387 001170 016703 177522 F: MOV      OPDLY, R3      ; SET OPERATION DELAY
388 001174 016704 177520 MOV      OPDX, R4      ; SET DELAY MULTIPLEXER
389 001200 005303 G: DEC      R3
390 001202 001376 BNE      G
391 001204 005304 DEC      R4      ; DELAY BETWEEN OPERATIONS
392 001206 001374 BNE      G
393 001210 005300 DEC      R0
394 001212 001303 BNE      LOOP
395 001214 032767 000002 176754 BIT      #2, SWITCH      ; SEE IF HALT ON PASS
396 001222 001666 BEQ      START
397 001224 000000 HALT
398 001226 000167 177546 JMP      START
399

```

TM, A, B-11 UTILITY DRIVER
DZTMGC.SRC

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| | | | | |
|-----|--------|--------|-----|--------------------|
| 400 | | | | |
| 401 | 002000 | | | |
| 402 | | .=2000 | | ;WRITE BUFFER***** |
| 403 | | .REPT | 100 | |
| 404 | | -1 | | |
| 405 | | .ENDR | | |
| 406 | 003000 | | | |
| 407 | | .=3000 | | ;READ BUFFER***** |
| 408 | | .REPT | 100 | |
| 409 | | 0 | | |
| 410 | | .ENDR | | |
| 411 | 000001 | .END | | |

[illegible]

[illegible]

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

```
* ,DZTMGC.SEQ/SOL/CRF/PAGNUM/NL:TOC=DZTMGC.SRC
RUN-TIME: 1 2 .3 SECONDS
RUN-TIME RATIO: 50/4=10.0
CORE USED: 7K (13 PAGES)
```


12 KDS, 23 disk reads, 3 disk writes, 13 pages