

M792

ROM DIODE MATRIC
MD-11-D8CA

EP-D8CA-DL

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MAY 1978

digital

MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDC-11-D8CA
PRODUCT NAME: M792 (ROM DIODE MATRIX)
DATE CREATED: SEPT 19, 1978
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: JOHN ADAMS

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CORPORATION

1. ABSTRACT

THE M792 DIAGNOSTIC PROGRAMS ARE WRITTEN TO BE USED AS AN AID TO HARDWARE DEBUGGING AND MAINTENANCE OF THE M792 ROM DIODE MATRIX BOARD. THESE PROGRAMS MAY ALSO BE USED AS A DATA RELIABILITY TEST.

THE AVAILABLE TESTS ARE

- PRG0 - LOGIC TESTS
- PRG1 - ROM DATA DUMP
- PRG2 - SINGLE ROM ADDRESS READ DATA LOOP

2. REQUIREMENTS

2.1 EQUIPMENT

- A. PDP 11/20 SYSTEM
- B. M792

2 2 STORAGE

THIS PROGRAM USES CORE 0-4040(8)

3. LOADING PROCEDURE

THE ABSOLUTE LOADER IS USED TO LOAD THE PROGRAM

4. USE PROCEDURE

- A1 LOAD ADDRESS = 000200
- B1 SET SR = DESIRED STANDARD PDP-11 DIAGNOSTIC OPTIONS
- C1 DEPRESS START
THE PROGRAM WILL TYPE OUT INSTRUCTIONS. ALL USER RESPONSES ARE VIA THE KEYBOARD (CARRIAGE RETURN TERMINATES THE RESPONSE)
- D1 TO RESTART THE SELECTED PROGRAM LA = 000204 AND DEPRESS START

5. PROGRAM DESCRIPTIONS

5.1 PRGM - LOGIC TESTS

THE LOGIC TESTS CONSIST OF 4 ROUTINES TO TEST THE M792 LOGIC

5.1.1 ROUTINE DESCRIPTIONS

ROUTINE	TESTS
T1	ADDRESSABILITY OF M792
T2	DATA RELIABILITY
T3	THAT M792 TIMES OUT WHEN REFERENCED BY A DATIP BUS CYCLE
T4	THAT DATA READ IS CORRECT

5.1.2 ERROR PRINTOUT

IF A ROUTINE FAILS AND THE INHIBIT PRINTOUT SWITCH IS NOT ENABLED (SR13) A PRINTOUT RESULTS, THE PC AT THE TIME OF FAILURE IS TYPED.

IF AN ERROR OCCURS IN T4 THE ROM DATA AND CORRECT DATA AND THE ADDRESS OF EACH IS TYPED OUT. (THIS TYPE OUT CANNOT BE DISABLED.) THE FORMAT IS

ROM ADDRESS/ROM DATA
IMAGE ADDRESS*CORRECT DATA

5.2 PRG1 - ROM DATA DUMP

THIS PROGRAM TYPES OUT THE 32 WORDS OF ROM DATA AND HALTS.

5.3 PRG2 - SINGLE ROM ADDRESS READ DATA LOOP

THIS PROGRAM CONTINUOUSLY READS DATA FROM A TYPED IN ROM ADDRESS. TO CHANGE THE ADDRESS TYPE IN A NEW ADDRESS.

IM792 (UNCUT DIODE MATRIX) DIAGNOSTIC
 I COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
 I LOAD ADDRESS=0200
 I DEPRESS START
 I RESTART ADDRESS=0210

	000000		.=0
	000020		.REPT 20
			.+2
			HALT
			.ENDR
			.+2
0	00000	000002	HALT
0	00002	000000	.+2
0	00004	000000	HALT
0	00006	000000	.+2
0	00010	000012	HALT
0	00012	000000	.+2
0	00014	000010	HALT
0	00016	000000	.+2
0	00020	000022	HALT
0	00022	000000	.+2
0	00024	000026	HALT
0	00026	000000	.+2
0	00030	000032	HALT
0	00032	000000	.+2
0	00034	000036	HALT
0	00036	000000	.+2
0	00040	000042	HALT
0	00042	000000	.+2
0	00044	000046	HALT
0	00046	000000	.+2
0	00050	000052	HALT
0	00052	000000	.+2
0	00054	000056	HALT
0	00056	000000	.+2
0	00060	000062	HALT
0	00062	000000	.+2
0	00064	000066	HALT
0	00066	000000	.+2
0	00070	000072	HALT
0	00072	000000	.+2
0	00074	000076	HALT
0	00076	000000	.+2
			.=30
0	0030	002224	ERROR
0	0032	000340	340
0	0034	002134	SCOPEC
0	0036	000000	0
	104000		HLT=ENT
	104400		SCOPE=TRAP
	177560		TKCSR=177560
	177562		TKDBR=177562
	177564		TPCSR=177564
	177566		TPDBR=177566

177776
 177570
 000060
 000062
 000200
 0 0200 000167 0.0620
 000210
 0 0210 000167 000654
 001000
 0 1000 000040
 0 1002 004000
 0 1004 000000
 0 1006 000000
 0 1010 000000
 0 1012 000000
 0 1014 000000
 0 1016 001102
 0 1020 001530
 0 1022 001664
 0 1024 004567 000670
 0 1030 002444
 0 1032 004567 001000
 0 1036 000000
 0 1040 004567 000662
 0 1044 002404
 0 1046 042767 000100 176504
 0 1054 004567 000764
 0 1060 000000
 0 1062 004567 000640
 0 1066 002470
 0 1070 016700 177742
 0 1074 006300
 0 1076 000170 001010
 0 1102 012700 001000
 0 1106 012767 001070 001074

 0 1114 016700 177740
 0 1120 016701 177694
 0 1124 012767 001100 176052
 0 1132 011003
 0 1134 005720
 0 1136 004067 177642
 0 1142 021010
 0 1144 132020
 0 1146 000005
 0 1150 104067 177630
 0 1154 002700 000002
 0 1160 005301
 0 1162 001363
 0 1164 000403
 0 1166 022020
 0 1170 104000
 0 1172 000757
 0 1174 104400

PSM=177776
 SR=177570
 TKINTA=60
 TKINTP=62
 ,=200
 START1: JMP PRMTRS
 ,=210
 START3: JMP RESTART
 ,=1000
 WORDS: 32
 IMAGE: 4000
 DUMP: 0
 LAST: 0
 CHAR: 0
 TERM: 0
 SRT: 0
 PRGTAB: PRG0
 PRG1
 PRG2
 PRMTRS: JSR 5,TYPEH ;TYPE MESSAGE 'PRG0'
 M6
 JSR 5,RECD ;RECEIVE DATA AND PUT
 ;IT HERE
 PRGNUM: 0
 JSR 5,TYPEH
 M5
 GTADD: BIC 0100,TKCSR ;CLEAR IE BIT
 JSR 5,RECD
 ROMADD: 0
 JSR 5,TYPEH
 M8
 RESTART: MOV PRGNUM,X0 ;GET PROGRAM #
 ASL X0 ;SHIFT PROGRAM #
 JMP 0PRGTAB(0) ;GO TO PROGRAM
 PRG0: MOV 01000,X0
 MOV 0RESTART,RETURN
 ;TEST: TEST ABILITY TO REFERENCE ROM WITHOUT TIMING OUT
 T1: MOV ROMADD,X0 ;GET ROM ADDRESS
 MOV WORDS,X1 ;GET ADDRESS COUNTER
 MOV 0ERROR1,4 ;SET UP TIME OUT VECTOR
 T1A: MOV (0),X3 ;REFERENCE
 TST (0)+ ;FROM
 ADD -(0),DUMP ;
 CMP (0),(0) ;
 BITB (0)+,(0)+ ;
 RESET ;DELAY
 SUB -(0),DUMP
 ADD #2,X0 ;INCREMENT POINTER
 DEC X1 ;DECREMENT ADDRESS COUNTER
 BNE T1A ;BRANCH IF NOT FINISHED
 BR T1B ;GO TO SCOPE LOOP
 ERROR1: CMP (0)+,(0)+ ;REPOSITION STACK
 HLT ;HERE IF ERROR
 BR T1A ;LOOP ON ERROR
 T1B: SCOPE ;SCOPE

ITEST2 TEST THAT ROM DATA CAN BE READ RELIABLY.

0 1176	016700	177650	T2I	MOV	ROMADD,X0	IGET ROM ADDRESS
0 1202	016701	177572		MOV	WORDS,X1	IGET ADDRESS COUNTER
0 1206	012767	020000		MOV	#6,4	INITIALIZE TIME OUT VECTOR
0 1214	005067	177564	T2A1	CLR	DUMP	INITIALIZE DUMP
0 1220	011003			MOV	(0),X3	IGET DATA
0 1222	002767	177550		ADD	(0)*,DUMP	IADD DATA TO DUMP
0 1226	106703	177552		SUB	DUMP,X3	ISUBTRACT DATA FROM DATA
0 1232	001402			BEQ	T2B	IBRANCH IF EQUAL
0 1234	104000		ERROR2I	HLT		IDATA ERROR
0 1236	000766			BR	T2A	ILOOP ON ERROR
0 1240	000009		T2B1	RESET		IDELAY
0 1242	044067	177530		OR	-(0),DUMP	ICLEAR DUMP BITS
0 1246	001402			BEQ	T2C	IBRANCH IF EQUAL TO 0
0 1250	104000			HLT		IDATA ERROR
0 1252	000772			BR	T2B	ILOOP ON ERROR
0 1254	021010		T2C1	CMP	(0),(0)	ICOMPARE DATA
0 1256	001402			BEQ	T2D	IBRANCH IF EQUAL
0 1260	104000			HLT		IDATA ERROR
0 1262	000774			BR	T2C	ILOOP ON ERROR
0 1264	122040		T2D1	CMPB	(0)*,-(0)	ICOMPARE DATA (BYTE OPERATION)
0 1266	001402			BEQ	T2E	IBRANCH IF EQUAL
0 1270	104000			HLT		IDATA ERROR
0 1272	000774			BR	T2D	ILOOP ON ERROR
0 1274	005720		T2E1	TST	(0)*	IINCREMENT ADDRESS POINTER
0 1276	005301			DEC	X1	IDECREMENT ADDRESS COUNTER
0 1300	001349			BNE	T2A	IRETURN IF NOT DONE
0 1302	104400			SCOPE		

ITEST3 TEST THAT ROM TIMES OUT IF REFERENCED BY OTHER THAN DATA BUS CYCLE

0 1304	016700	177550	T3I	MOV	ROMADD,X0	IGET ROM ADDRESS
0 1310	016701	177464		MOV	WORDS,X1	IGET ADDRESS COUNTER
0 1314	012767	001330	T3AA1	MOV	#T3B,4	ISET UP TIME OUT VECTOR
0 1322	010010		T3A1	MOV	X0,(0)	IATTEMPT TO ALTER DATA
0 1324	104000			HLT		HERE IF DID NOT TIME OUT
0 1326	000775			BR	T3A	ILOOP ON ERROR
0 1330	012767	001340	T3B1	MOV	#T3D,4	ISET UP TIME OUT VECTOR
0 1336	022620			CMP	(6)*,(6)*	IREPOSITION STACK
0 1340	005210		T3C1	INC	(0)	IATTEMPT TO ALTER DATA
0 1342	104000			HLT		HERE IF DID NOT TIME OUT
0 1344	000775			BR	T3C	ILOOP ON ERROR
0 1346	012767	001360	T3D1	MOV	#T3F,4	ISET UP TIME OUT VECTOR
0 1354	022620			CMP	(6)*,(6)*	IREPOSITION STACK
0 1356	005077	177476	T3E1	CLR	0ROMADD	IATTEMPT TO ALTER DATA
0 1362	104000			HLT		HERE IF DID NOT TIME OUT
0 1364	000774			BR	T3E	ILOOP ON ERROR
0 1366	005720		T3F1	TST	(0)*	IINCREMENT ADDRESS POINTER
0 1370	022620			CMP	(6)*,(6)*	IREPOSITION STACK
0 1372	005301			DEC	X1	IDECREMENT ADDRESS COUNTER
0 1374	001347			BNE	T3AA	IRETURN IF NOT DONE
0 1376	104400			SCOPE		ISCOPE LOOP

!THIS TEST COMPARES ROM AND IMAGE DATA
!AND TYPES OUT DIFFERENCES

0 1400 016701 177370
0 1404 016700 177450
0 1410 016703 177360
0 1414 021010
0 1416 001004
0 1420 005301
0 1422 001437
0 1424 022023
0 1426 000772
0 1430 010067 000632
0 1434 004767 000630
0 1440 004567 020262
0 1444 002554
0 1446 011067 000614
0 1452 004767 000612
0 1456 004567 000244
0 1462 002470
0 1464 010367 020570
0 1470 004767 000574
0 1474 004567 000220
0 1500 002562
0 1502 011367 000560
0 1506 004767 000550
0 1512 004567 000210
0 1516 002470
0 1520 000737
0 1522 104400
0 1524 004567 000170
0 1530 002562
0 1532 000167 177344

T4I MOV WORDS,X1 !GET # OF WORDS
MOV ROMADD,X0 !GET ROM ADDRESS
MOV IMAGE,X3 !GET IMAGE ADDRESS
T4BI CMP (0),(3) !COMPARE DATA
BNE T4D
T4CI DEC X1 !ALL DATA BEEN COMPARED
BEQ T4E
CMP (0)+,(3)+ !INCREMENT ADDRESS POINTERS
BR T4B
T4DI MOV X0,D2BTYP !TYPE
JSR 7,02A !ROM ADDRESS
JSR 5,TYPEH !TYPE
M10 !SEPARATOR
MOV (0),D2BTYP !TYPE
JSR 7,02A !ROM DATA
JSR 5,TYPEH !TYPE
M0 !CR/LF
MOV X3,D2BTYP !TYPE
JSR 7,02A !IMAGE ADDRESS
JSR 5,TYPEH !TYPE
M12 !SEPARATOR
MOV (3),D2BTYP !TYPE
JSR 7,02A !IMAGE DATA
JSR 5,TYPEH !TYPE
M0 !CR/LF
BR T4C !GO TO T4C
T4EI SCOPE
ENDI JSR 5,TYPEH
M12
JMP PRG0

!THIS PROGRAM TYPES OUT ROM DATA

0 1536 012700 001000
0 1542 004567 000100
0 1546 002454
0 1550 016701 177224
0 1554 016700 177300
0 1560 012702 000012
0 1564 105767 175774
0 1570 100375

PRG1I MOV 01000,X6 !INITIALIZE STACK
JSR 5,TYPEH !TYPE MESSAGE
M7 !'ROM DATA'
MOV WORDS,X1 !GET # OF WORDS
PRG1AI MOV ROMADD,X0 !GET STARTING ADDRESS
MOV 012,X2 !GET ADDRESS INDICATOR
TSTB TPCSR !WAIT FOR
SPL .-4 !TELEPRINTER FLAG


```

0 2044 005015          RECDI  CLR      (5)          ;CLEAR OUT OLD DATA
0 2045 105767 175500  RECDAI  TSTB    TKCSR          ;TEST KEYBOARD FLAG
0 2052 100375          BPL      .-4           ;AND WAIT FOR CHARACTER
0 2054 116767 175502 176726  MOVB    TKDBR,CHAR    ;GET CHARACTER
0 2062 016767 176722 175476  MOV     CHAR,TPDBR   ;ECHO CHARACTER
0 2070 126727 176714 000215  CHPB    CHAR,0215    ;HAS CHARACTER CARRIAGE RETURN
0 2076 001005          BNE     RECD0        ;
0 2100 005725          TST     (5)0         ;INCREMENT RETURN ADDRESS
0 2102 105767 175456  TSTB    TPCSR        ;
0 2106 100375          BPL      .-4           ;
0 2110 000205          RTS      5           ;AND EXIT
0 2112 042767 177770 176670  RECD0I  BIC      0177770,CHAR ;STRIP AWAY ALL BUT 3 LSB
0 2120 006315          ASL     (5)          ;ROTATE
0 2122 006315          ASL     (5)          ;PREVIOUS
0 2124 006315          ASL     (5)          ;DATA
0 2126 056715 176656  BIS     CHAR,(5)     ;AND INSERT CHARACTER
0 2132 000745          BR      RECD0        ;GET NEXT CHARACTER
;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 100,TIMES
0 2134 032767 040000 179426  SCOPECI BIT      040000,SR    ;TEST SR FOR SCOPE
0 2142 001023          BNE     SCOPE0        ;YES SCOPE
0 2144 032767 004000 179416  BIT     040000,SR    ;TEST FOR ITERATION
0 2152 001007          BNE     SCOPE0        ;INHIBIT ITERATION
0 2154 026767 000020 000022  CHPB    SCOPE0,ICOUNT ;ITERATION COMPLETE
0 2162 001403          BEQ     SCOPE0        ;ITERATION COMPLETE GO TO SCOPE0
0 2164 005267 000016  INC     SCOPE0        ;INCREMENT ITERATION COUNT
0 2170 000410          BR      SCOPE0        ;GO TO SCOPE0
0 2172 005067 000010  SCOPECI CLR     SCOPE0    ;CLEAR ITERATION COUNT
0 2176 011667 000000  MOV     0X6,RETURN   ;GET ADDRESS OF NEXT TEST
0 2202 000002          RTI                    ;EXIT
A 2204 000144          ;COUNT: 100.
0 2206 000000          SCOPEFI 0
0 2210 001070          RETURNI RESTART
0 2212 005726          SCOPE0I TST(6)0     ;
0 2214 012667 175556  MOV     (6)0,PSW     ;POP PC
0 2220 000177 177764  JMP     0RETURN      ;RESTORE CONDITION CODES
0 2224 036727 175340 020000  ERRORI BIT      SR,020000 ;INHIBIT PRINTOUT?
0 2232 001401          BEQ     .04          ;BRANCH IF ERROR PRINT OUT
0 2234 000002          RTI                    ;RETURN TO TEST
0 2236 004567 177464  JSR     X5,TYPEM     ;TYPE ERROR MESSAGE
0 2242 002374          ERRORM ;PC= '
0 2244 011667 000010  MOV     (6),D2BTYP   ;TYPE PROGRAM COUNTER
0 2250 004767 000014  JSR     7,02A        ;
0 2254 005767 175310  TST     SR           ;HALT ON ERROR?
0 2260 100001          BPL      .04          ;
0 2262 000000          HALT                    ;YES HALT
0 2264 000002          RTI                    ;RETURN TO TEST

```

0.2266 000000
 0.2270 016746 175270
 0.2274 010246
 0.2276 010146
 0.2300 010046
 0.2302 016700 177760
 0.2306 012701 000000
 0.2312 005002
 0.2314 006100
 0.2316 006102
 0.2320 002702 000260
 0.2324 105767 175234
 0.2330 100375
 0.2332 010267 175230
 0.2336 005002
 0.2340 006100
 0.2342 006102
 0.2344 006100
 0.2346 006102
 0.2350 006100
 0.2352 006102
 0.2354 005301
 0.2356 001360
 0.2360 012600
 0.2362 012601
 0.2364 012602
 0.2366 012667 175172
 0.2372 000207

```

D2BTYP: 0
O2AI  MOV  TPCSR,=(6)
      MOV  X2,=(0)
      MOV  X1,=(0)
      MOV  X0,=(0)
      MOV  D2BTYP,X0
      MOV  #6,X1
      CLR  X2
      ROL  X0
      ROL  X2
O2AAI  ADD  #260,X2
      TST  TPCSR
      BPL  ,-4
      MOV  X2,TPCDBR
      CLR  X2
      ROL  X0
      ROL  X2
      ROL  X0
      ROL  X2
      ROL  X0
      ROL  X2
      DEC  X1
      BNE  O2AA
      MOV  (6)+,X0
      MOV  (6)+,X1
      MOV  (6)+,X2
      MOV  (6)+,TPCSR
      RTS  7
    
```

```

ISAVE TPCSR
ISAVE R2
ISAVE R1
ISAVE R0
IGET DATA TO BE TYPED
IGET COUNTER
ICLEAR WORKING REGISTER
IMOV FIRST BIT (MSB) INTO
IR2
IFORM ASCII CODE
ITEST TELEPRINTER
IFLAG AND WAIT UNTIL DONE
ILOAD TELEPRINTER BUFFER
ICLEAR WORKING REGISTER
IROTATE THE
INEXT
IOCTAL CHARACTER
IINTO
IREGISTER
ITWO
IDECREMENT COUNTER
IGO TO O2AA IF NOT 0
IFINISHED, RESTORE REGISTERS
I
IAND TPCSR
IAND EXIT
    
```

ASCII MESSAGES
 ERROR: ASCII '0X PC' 0'

002374 100
 002375 045
 0.2376 040
 0.2377 120
 0.2400 103
 0.2401 075
 0.2402 040
 0.2403 100
 0.2404 100
 0.2405 045
 0.2406 124
 0.2407 131
 0.2410 120
 0.2411 105
 0.2412 040
 0.2413 115
 0.2414 101
 0.2415 124
 0.2416 122
 0.2417 111
 0.2420 130
 0.2421 040
 0.2422 123
 0.2423 124

M51 .ASCII 'OXTYPE MATRIX STARTING ADDRESS 0'

R 2424 101
 R 2425 122
 R 2426 124
 R 2427 111
 R 2430 116
 R 2431 107
 R 2432 040
 R 2433 101
 R 2434 104
 R 2435 104
 R 2436 122
 R 2437 105
 R 2440 123
 R 2441 123
 R 2442 040
 R 2443 100

S 2444 100
 R 2445 045
 R 2446 120
 R 2447 122
 R 2450 107
 R 2451 043
 R 2452 075
 R 2453 100

M61 .ASCII '0XPRG000'

R 2454 100
 R 2455 045
 R 2456 122
 R 2457 117
 R 2460 115
 R 2461 040
 R 2462 104
 R 2463 101
 R 2464 124
 R 2465 101
 R 2466 045
 R 2467 100

M71 .ASCII '0XROM DATA0'

R 2470 100
 R 2471 045
 R 2472 100

M81 .ASCII '0X0'

R 2473 100
 R 2474 045
 R 2475 122
 R 2476 117
 R 2477 115
 R 2500 040
 R 2501 101
 R 2502 104
 R 2503 104
 R 2504 122
 R 2505 105
 R 2506 123

M91 .ASCII '0XROM ADDRESS/IMAGE ADDRESS ROM DATA+IMAGE DATA0'

0 2507 123
 0 2510 057
 0 2511 111
 0 2512 119
 0 2513 101
 0 2514 107
 0 2515 109
 0 2516 040
 0 2517 101
 0 2520 104
 0 2521 104
 0 2522 122
 0 2523 109
 0 2524 123
 0 2525 123
 0 2526 040
 0 2527 122
 0 2530 117
 0 2531 119
 0 2532 040
 0 2533 104
 0 2534 101
 0 2535 124
 0 2536 101
 0 2537 052
 0 2540 111
 0 2541 119
 0 2542 101
 0 2543 107
 0 2544 109
 0 2545 040
 0 2546 104
 0 2547 101
 0 2550 124
 0 2551 101
 0 2552 049
 0 2553 100

 0 2554 100
 0 2555 057
 0 2556 100

 0 2557 100
 0 2560 040
 0 2561 100

 0 2562 100
 0 2563 052
 0 2564 100

 003776
 0 3776 000000
 0 4000 177777
 0 4002 177777
 0 4004 177777

M101 .ASCII '0/0'

M111 .ASCII '0 0'

M121 .ASCII '000'

.03776
 .WORD
 177777,177777,177777,177777

0 4006 177777
 0 4010 177777
 0 4012 177777
 0 4014 177777
 0 4016 177777
 0 4020 177777
 0 4022 177777
 0 4024 177777
 0 4026 177777
 0 4030 177777
 0 4032 177777
 0 4034 177777
 0 4036 177777
 0 4040 177777
 0 4042 177777
 0 4044 177777
 0 4046 177777
 0 4050 177777
 0 4052 177777
 0 4054 177777
 0 4056 177777
 0 4060 177777
 0 4062 177777
 0 4064 177777
 0 4066 177777
 0 4070 177777
 0 4072 177777
 0 4074 177777
 0 4076 177777
 000001

177777,177777,177777,177777

177777,177777,177777,177777

177777,177777,177777,177777

177777,177777,177777,177777

177777,177777,177777,177777

177777,177777,177777,177777

177777,177777,177777,177777

.END

CHAR	001010	T2	001176
D2RTYP	002266	T2A	001214
DUMP	001004	T2B	001240
END	001524	T2C	001254
ERROR	002224	T2D	001264
ERROR1	001166	T2E	001274
ERROR2	001234	T3	001304
ERRORM	002374	T3A	001322
GTADD	001046	T3AA	001314
HLT	104000	T3B	001330
ICOUNT	002204	T3C	001340
IMAGE	001002	T3D	001346
LAST	001000	T3E	001356
M10	002554	T3F	001366
M11	002557	T4	001400
M12	002562	T4B	001414
M5	002404	T4C	001420
M6	002444	T4D	001430
M7	002454	T4E	001522
M8	002470	TERM	001012
M9	002473	TKCSR	177560
O2A	002270	TKDBR	177562
O2AA	002320	TKINTA	000060
PRG0	001102	TKINTP	000062
PRG1	001536	TPCSR	177564
PRG1A	001554	TPDBR	177566
PRG1B	001572	TYPEN	001726
PRG1C	001610	TYPENA	001736
PRG1D	001660	TYPENB	001764
PRG2	001664	TYPENC	002026
PRGNUM	001036	WORDS	001000
PRGTAB	001010		
PRMTRS	001724		
PSW	177776		
RECD	002044		
RECOA	002046		
RECOB	002112		
RESTAR	001070		
RETURN	002210		
ROMADD	001060		
SCOPE	104400		
SCOPEB	002212		
SCOPEC	002134		
SCOPEF	002200		
SCOPEG	002172		
SR	177570		
SRT	001014		
START1	000200		
START3	000210		
T1	001114		
T1A	001132		
T1B	001174		

ERRORS DETECTED: 0

RUN-TIME: 4 SECONDS

5K CORE USED

B2