

# M792

ROM DIODE MATRIC  
MD-11-D8CA

EP-D8CA-DL

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MAY 1978

**digital**

MADE IN USA





IDENTIFICATION

PRODUCT CODE: MAINDEC-11-D8CA  
PRODUCT NAME: M792 (ROM DIODE MATRIX)  
DATE CREATED: SEPT 15, 1970  
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 PRG0 - 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
000000	000002	.+2
000002	000000	HALT
000004	000000	.+2
000006	000000	HALT
000010	000012	.+2
000012	000000	HALT
000014	000016	.+2
000016	000000	HALT
000020	000022	.+2
000022	000000	HALT
000024	000026	.+2
000026	000000	HALT
000030	000032	.+2
000032	000000	HALT
000034	000036	.+2
000036	000000	HALT
000040	000042	.+2
000042	000000	HALT
000044	000046	.+2
000046	000000	HALT
000050	000052	.+2
000052	000000	HALT
000054	000056	.+2
000056	000000	HALT
000060	000062	.+2
000062	000000	HALT
000064	000066	.+2
000066	000000	HALT
000070	000072	.+2
000072	000000	HALT
000074	000076	.+2
000076	000000	HALT
	000030	.+30
000030	002224	ERROR
000032	000340	340
000034	002134	SCOPEC
000036	000000	0
	104000	HLT=EMT
	104400	SCOPE=TRAP
	177560	TKCSR=177560
	177562	TKDBR=177562
	177564	TPCSR=177564
	177566	TPDBR=177566



177776  
 177570  
 000060  
 000062  
 000200  
 000167 000620  
 000210  
 000167 000654  
 001000  
 000040  
 001002 004000  
 001004 000000  
 001006 000000  
 001010 000000  
 001012 000000  
 001014 000000  
 001016 001102  
 001020 001536  
 001022 001664  
 001024 004567 000676  
 001030 002444  
 001032 004567 001000  
 001036 000000  
 001040 004567 000662  
 001044 002404  
 001046 042767 000100 176504  
 001054 004567 000764  
 001060 000000  
 001062 004567 000640  
 001066 002470  
 001070 016700 177742  
 001074 006300  
 001076 000170 001016  
 001102 012706 001000  
 001106 012767 001070 001074  
  
 001114 016700 177740  
 001120 016701 177654  
 001124 012767 001160 176652  
 001132 011003  
 001134 005720  
 001136 004067 177642  
 001142 021010  
 001144 132020  
 001146 000005  
 001150 164067 177630  
 001154 002700 000002  
 001160 005301  
 001162 001363  
 001164 000403  
 001166 022626  
 001170 104000  
 001172 000757  
 001174 104400

PSH=177776  
 SR=177570  
 TKINTA=60  
 TKINTP=62  
 ,=200  
 START1: JMP PRMTRS  
 ,=210  
 START3: JMP RESTART  
 ,=1000  
 WORDS: 32  
 IMAGE: 4000  
 DUMPI 0  
 LASTI 0  
 CHARI 0  
 TERMI 0  
 SRTI 0  
 PRGTAB: PRG0  
 PRG1  
 PRG2  
 PRMTRS: JSR 5,TYPEH ;TYPE MESSAGE 'PRG#'  
 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,X6  
 MOV 0RESTART,RETURN  
 ;TEST1 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 (6)+,(6)+ ;REPOSITION STACK  
 HLT ;HERE IF ERROR  
 BR T1A ;LOOP ON ERROR  
 T1B: SCOPE ;SCOPE

ITEST2 TEST THAT ROM DATA CAN BE READ RELIABLY.

001176	016700	177656		T2I	MOV	ROMADD,X0	IGET ROM ADDRESS
001202	016701	177572			MOV	WORDS,X1	IGET ADDRESS COUNTER
001206	012767	020800	176570		MOV	#6,4	INITIALIZE TIME OUT VECTOR
001214	005067	177564		T2AI	CLR	DUMP	INITIALIZE DUMP
001220	011003				MOV	(0),X3	IGET DATA
001222	002067	177556			ADD	(0)+,DUMP	ADD DATA TO DUMP
001226	166703	177552			SUB	DUMP,X3	SUBTRACT DATA FROM DATA
001232	001402				BEQ	T2B	BRANCH IF EQUAL
001234	104000			ERROR2I	HLT		DATA ERROR
001236	000766				BR	T2A	LOOP ON ERROR
001240	000005			T2B1	RESET		DELAY
001242	044067	177530			BIC	-(0),DUMP	CLEAR DUMP BITS
001246	001402				BEQ	T2C	BRANCH IF EQUAL TO 0
001250	104000				HLT		DATA ERROR
001252	000772				BR	T2B	LOOP ON ERROR
001254	021010			T2C1	CMP	(0),(0)	COMPARE DATA
001256	001402				BEQ	T2D	BRANCH IF EQUAL
001260	104000				HLT		DATA ERROR
001262	000774				BR	T2C	LOOP ON ERROR
001264	122040			T2D1	CMPB	(0)+,-(0)	COMPARE DATA (BYTE OPERATION)
001266	001402				BEQ	T2E	BRANCH IF EQUAL
001270	104000				HLT		DATA ERROR
001272	000774				BR	T2D	LOOP ON ERROR
001274	005720			T2E1	TST	(0)+	INCREMENT ADDRESS POINTER
001276	005301				DEC	X1	DECREMENT ADDRESS COUNTER
001300	001345				BNE	T2A	RETURN IF NOT DONE
001302	104400				SCOPE		

ITEST3 TEST THAT ROM TIMES OUT IF REFERENCED BY OTHER  
ITHAN DATI BUS CYCLE

001304	016700	177550		T3I	MOV	ROMADD,X0	IGET ROM ADDRESS
001310	016701	177464			MOV	WORDS,X1	IGET ADDRESS COUNTER
001314	012767	001330	176462	T3AA1	MOV	#T3B,4	SET UP TIME OUT VECTOR
001322	010010			T3A1	MOV	X0,(0)	ATTEMPT TO ALTER DATA
001324	104000				HLT		HERE IF DID NOT TIME OUT
001326	000775				BR	T3A	LOOP ON ERROR
001330	012767	001346	176446	T3B1	MOV	#T3D,4	SET UP TIME OUT VECTOR
001336	022626				CMP	(6)+,(6)+	REPOSITION STACK
001340	005210			T3C1	INC	(0)	ATTEMPT TO ALTER DATA
001342	104000				HLT		HERE IF DID NOT TIME OUT
001344	000775				BR	T3C	LOOP ON ERROR
001346	012767	001366	176430	T3D1	MOV	#T3F,4	SET UP TIME OUT VECTOR
001354	022626				CMP	(6)+,(6)+	REPOSITION STACK
001356	005077	177476		T3E1	CLR	0ROMADD	ATTEMPT TO ALTER DATA
001362	104000				HLT		HERE IF DID NOT TIME OUT
001364	000774				BR	T3E	LOOP ON ERROR
001366	005720			T3F1	TST	(0)+	INCREMENT ADDRESS POINTER
001370	022626				CMP	(6)+,(6)+	REPOSITION STACK
001372	005301				DEC	X1	DECREMENT ADDRESS COUNTER
001374	001347				BNE	T3AA	RETURN IF NOT DONE
001376	104400				SCOPE		SCOPE LOOP



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

001400 016701 177374  
 001404 016700 177450  
 001410 016703 177360  
 001414 021013  
 001416 001004  
 001420 005301  
 001422 001437  
 001424 022023  
 001426 000772  
 001430 010067 000632  
 001434 004767 000630  
 001440 004567 000262  
 001444 002554  
 001446 011067 000614  
 001452 004767 000612  
 001456 004567 000244  
 001462 002470  
 001464 010367 000576  
 001470 004767 000574  
 001474 004567 000220  
 001500 002562  
 001502 011367 000560  
 001506 004767 000550  
 001512 004567 000210  
 001516 002470  
 001520 000737  
 001522 104400  
 001524 004567 000170  
 001530 002562  
 001532 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,D20TYP    !TYPE
      JSR  7,02A       !ROM ADDRESS
      JSR  5,TYPEH     !TYPE
      M10
      MOV  (0),D20TYP  !SEPARATOR
      JSR  7,02A       !TYPE
      JSR  5,TYPEH     !ROM DATA
      M8              !TYPE
      MOV  X3,D20TYP   !ICR/LF
      JSR  7,02A       !TYPE
      JSR  5,TYPEH     !IMAGE ADDRESS
      M12            !TYPE
      MOV  (3),D20TYP  !SEPARATOR
      JSR  7,02A       !TYPE
      JSR  5,TYPEH     !IMAGE DATA
      M8              !TYPE
      BR   T4C        !ICR/LF
T4EI  SCOPE           !GO TO T4C
ENDI  JSR  5,TYPEH
      M12
      JHP  PRG0
    
```

!THIS PROGRAM TYPES OUT ROM DATA

001536 012700 001000  
 001542 004567 000160  
 001546 002454  
 001550 016701 177224  
 001554 016700 177300  
 001560 012702 000012  
 001564 105767 175774  
 001570 100375

```

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



001572	010067	000470		PRG1B:	MOV	X0,02BTYP		:GET ADDRESS
001576	004767	000466			JSR	7,02A		:AND TYPE IT
001602	004567	000120			JSR	5,TYPEM		:TYPE
001606	002470				MB			:CR/LF
001610	012067	000452		PRG1C:	MOV	(0),02BTYP		:TYPE
001614	004767	000450			JSR	7,02A		:DATA
001620	105767	175740			TSTB	TPCSR		:WAIT FOR
001624	100375				BPL	.-4		:TELEPRINTER FLAG
001626	012767	000040	175732		MOV	01,TPDBR		:TYPE SPACE
001634	005301				DEC	X1		:ALL DATA TYPED
001636	001410				BEG	PRG1D		:GO TO FINISH
001640	005302				DEC	X2		
001642	001362				BNE	PRG1C		:RETURN TO PRG1B
001644	012702	000012			MOV	012,X2		:GET ADDRESS INDICATOR
001650	004567	000052			JSR	5,TYPEM		:TYPE
001654	002470				MB			:CR/LF
001656	000745				BR	PRG1B		:RETURN TO PRG1B
001660	000167	177204		PRG1D:	JMP	RESTART		:ALL DATA HAS BEEN TYPED
					:THIS PROGRAM CYCLES A SINGLE ADDRESS TO CHANGE			
					:THE ADDRESS TYPE NEW ADDRESS ON THE TTY.			
001664	012700	001000		PRG2I	MOV	01000,X0		:INITIALIZE STACK POINTER
001670	005067	176102			CLR	PSW		:CLEAR PROCESSOR STATUS
001674	012767	001040	176156		MOV	0GTADD,TKINTA		:LOAD KEYBOARD INTERRUPT VECTOR
001702	012767	000100	176152		MOV	0100,TKINTP		:LOAD KEYBOARD INTERRUPT PRIORITY
001710	012767	000100	175642		MOV	0100,TKCSR		:SET INTERRUPT ENABLE BIT
001716	016700	177130			MOV	ROMADD,X0		:GET ROM ADDRESS
001722	005710				TST	(0)		:READ ROM ADDRESS
001724	000776				BR	.-2		:LOOP
001726	010026			TYPEMI	MOV	X0,(0)		:SAVE REGISTER 0
001730	012500				MOV	(5),X0		:PLACE MESSAGE ADDRESS IN R0
001732	112067	177054			MOV	(0),TERM		:GET TERMINATOR CHARACTER
001736	112067	177046		TYPEMAI	MOV	(0),CHAR		:GET NEXT CHARACTER
001742	126767	177042	177042		CMPE	CHAR,TERM		:WAS NEXT CHARACTER THE TERM
001750	001005				BNE	TYPEMB		:CHARACTER
001752	014600				MOV	-(6),X0		:RESTORE R0
001754	105767	175604			TSTB	TPCSR		
001760	100375				BPL	.-4		
001762	000205				RTS	5		:AND EXIT
001764	126727	177020	000045	TYPEMBI	CMPE	CHAR,01X		:WAS CHARACTER X
001772	001019				BNE	TYPEMC		
001774	105767	175564			TSTB	TPCSR		:TEST TELEPRINTER FLAG
002000	100375				BPL	.-4		:AND WAIT FOR DONE
002002	012767	000215	175550		MOV	0215,TPDBR		:LOAD TELEPRINTER WITH CAR. RET
002010	105767	175550			TSTB	TPCSR		:TEST TELEPRINTER FLAG
002014	100375				BPL	.-4		:AND WAIT FOR DONE
002016	012767	000212	175542		MOV	0212,TPDBR		:LOAD TELEPRINTER WITH LINE FEED
002024	000744				BR	TYPEMA		:GET NEXT CHARACTER
002026	105767	175532		TYPEHCI	TSTB	TPCSR		:TEST TELEPRINTER FLAG
002032	100375				BPL	.-4		:AND WAIT FOR DONE
002034	016767	176750	175524		MOV	CHAR,TPDBR		:LOAD TELEPRINTER BUFFER
002042	000735				BR	TYPEMA		:AND GET NEXT CHARACTER



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002044 005019          RECDI  CLR      (5)          ;CLEAR OUT OLD DATA
002046 105767 175500  RECDAI  TSTB    TKCSR          ;TEST KEYBOARD FLAG
002052 100375          BPL      ,=4          ;AND WAIT FOR CHARACTER
002054 116767 175502 176726  MOVB    TKDBR,CHAR ;GET CHARACTER
002062 016767 176722 175476  MOV     CHAR,TPDBR  ;ECHO CHARACTER
002070 126727 176714 000215  CMPB    CHAR,0215  ;HAS CHARACTER CARRIAGE RETURN
002076 001005          BNE     RECDI      ;INCREMENT RETURN ADDRESS
002100 005725          TST     (5)+
002102 105767 175456  TSTB    TPCSR
002106 100375          BPL      ,=4
002110 000205          RTS     5          ;AND EXIT
002112 042767 177770 176670  RECDBI  BIC     0177770,CHAR ;STRIP AWAY ALL BUT 3 LSB
002120 006315          ASL     (5)        ;ROTATE
002122 006315          ASL     (5)        ;PREVIOUS
002124 006315          ASL     (5)        ;DATA
002126 056715 176656  BIS     CHAR,(5)   ;AND INSERT CHARACTER
002132 000745          BR     RECDAI     ;GET NEXT CHARACTER
;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 100,TIMES
002134 032767 040000 175426  SCOPECI BIT     040000,SR ;TEST SR FOR SCOPE
002142 001023          BNE     SCOPE0    ;YES SCOPE
002144 032767 004000 175416  SCOPECI BIT     040000,SR ;TEST FOR ITERATION
002152 001007          BNE     SCOPE0    ;INHIBIT ITERATION
002154 026767 000020 000022  CMP     SCOPE0,ICOUNT ;ITERATION COMPLETE
002162 001403          BEQ     SCOPE0    ;ITERATION COMPLETE GO TO SCOPE0
002164 005267 000016  INC     SCOPE0    ;INCREMENT ITERATION COUNT
002170 000410          BR     SCOPE0    ;GO TO SCOPE0
002172 005067 000010  SCOPECI CLR     SCOPE0 ;CLEAR ITERATION COUNT
002176 011667 000000  MOV     0X6,RETURN ;GET ADDRESS OF NEXT TEST
002202 000002          RTI
002204 000144          ICOUNTI 100.
002206 000000          SCOPEFI 0
002210 001070          RETURNI  RESTART
002212 005726          SCOPEBI  TST(6)+
002214 012667 175556  MOV     (6)+,PSW  ;POP PC
002220 000177 177764  JMP     0RETURN  ;RESTORE CONDITION CODES
002224 036727 175340 020000  ERRORI  BIT     SR,020000 ;INHIBIT PRINTOUT?
002232 001401          BEQ     ,=4      ;BRANCH IF ERROR PRINT OUT
002234 000002          RTI          ;RETURN TO TEST
002236 004567 177464  JSR     X5,TYPEM  ;TYPE ERROR MESSAGE
002242 002374          ERRORM  ;PC=
002244 011667 000010  MOV     (6),D2BTYP ;TYPE PROGRAM COUNTER
002250 004767 000014  JSR     7,02A
002254 005767 175310  TST     SR
002260 100001          BPL     ,=4
002262 000000          HALT
002264 000002          RTI          ;HALT ON ERROR?
;YES HALT
;RETURN TO TEST

```



002266 000000  
 002270 016746 175270  
 002274 010246  
 002276 010146  
 002300 010046  
 002302 016700 177760  
 002306 012701 000000  
 002312 005002  
 002314 006100  
 002316 006102  
 002320 062702 000260  
 002324 105767 175234  
 002330 100375  
 002332 010267 175230  
 002336 005002  
 002340 006100  
 002342 006102  
 002344 006100  
 002346 006102  
 002350 006100  
 002352 006102  
 002354 005301  
 002356 001360  
 002360 012600  
 002362 012601  
 002364 012602  
 002366 012667 175172  
 002372 000207

D2BTYP1 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,TPDBR  
 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  
 I  
 IAND TPCSR  
 IAND EXIT

002374 100  
 002375 045  
 002376 040  
 002377 120  
 002400 103  
 002401 075  
 002402 040  
 002403 100

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

002404 100  
 002405 045  
 002406 124  
 002407 131  
 002410 120  
 002411 105  
 002412 040  
 002413 115  
 002414 101  
 002415 124  
 002416 122  
 002417 111  
 002420 130  
 002421 040  
 002422 123  
 002423 124

M51 .ASCII '0XTYPE MATRIX STARTING ADDRESS 0'



002424 101  
002425 122  
002426 124  
002427 111  
002430 116  
002431 107  
002432 040  
002433 101  
002434 104  
002435 104  
002436 122  
002437 105  
002440 123  
002441 123  
002442 040  
002443 100

002444 100  
002445 045  
002446 120  
002447 122  
002450 107  
002451 043  
002452 079  
002453 100

M6I .ASCII '0XPRG000'

002454 100  
002455 045  
002456 122  
002457 117  
002460 119  
002461 040  
002462 104  
002463 101  
002464 124  
002465 101  
002466 045  
002467 100

M7I .ASCII '0XROM DATA0'

002470 100  
002471 045  
002472 100

M8I .ASCII '0X0'

002473 100  
002474 045  
002475 122  
002476 117  
002477 119  
002500 040  
002501 101  
002502 104  
002503 104  
002504 122  
002505 105  
002506 123

M9I .ASCII '0XROM ADDRESS/IMAGE ADDRESS ROM DATA0IMAGE DATA0'



002507 123  
 002510 057  
 002511 111  
 002512 119  
 002513 101  
 002514 107  
 002515 109  
 002516 040  
 002517 101  
 002520 104  
 002521 104  
 002522 122  
 002523 109  
 002524 123  
 002525 123  
 002526 040  
 002527 122  
 002530 117  
 002531 119  
 002532 040  
 002533 104  
 002534 101  
 002535 124  
 002536 101  
 002537 052  
 002540 111  
 002541 119  
 002542 101  
 002543 107  
 002544 109  
 002545 040  
 002546 104  
 002547 101  
 002550 124  
 002551 101  
 002552 045  
 002553 100  
  
 002554 100  
 002555 057  
 002556 100  
  
 002557 100  
 002560 040  
 002561 100  
  
 002562 100  
 002563 052  
 002564 100  
  
 003776  
 003776 000000  
 004000 177777  
 004002 177777  
 004004 177777

M10: .ASCII '0/0'

M11: .ASCII '0 0'

M12: .ASCII '000'

.03776  
 .WORD  
 177777,177777,177777,177777



004006 177777  
004010 177777  
004012 177777  
004014 177777  
004016 177777  
004020 177777  
004022 177777  
004024 177777  
004026 177777  
004030 177777  
004032 177777  
004034 177777  
004036 177777  
004040 177777  
004042 177777  
004044 177777  
004046 177777  
004050 177777  
004052 177777  
004054 177777  
004056 177777  
004060 177777  
004062 177777  
004064 177777  
004066 177777  
004070 177777  
004072 177777  
004074 177777  
004076 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
D2BTYP	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	001016		
PRMTRS	001024		
PSW	177776		
RECD	002044		
RECDA	002046		
RECDB	002112		
RESTAR	001070		
RETURN	002210		
ROMADD	001060		
SCOPE	104400		
SCOPEB	002212		
SCOPEC	002134		
SCOPEF	002206		
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