

M792

ROM DIODE MATRIC
MD-11-D8CA

EP-D8CA-DL

COPYRIGHT 1970

FICHE 1 OF 1

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

FOR IN-HOUSE USE ONLY

COPYRIGHT © 1970
DIGITAL EQUIPMENT
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	000006	.+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=ENT
	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 012700 001000
 001106 012767 001070 001074

 001114 016700 177740
 001120 016701 177654
 001124 012767 001100 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

PSW=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 THAN DAT1 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	ROMADD	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 177366
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 000226
001500 002562
001502 011367 000560
001506 004767 000556
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,D2BTYP     !TYPE
          JSR      7,02A        !ROM ADDRESS
          JSR      5,TYPEH      !TYPE
          M10
          MOV      (0),D2BTYP   !SEPARATOR
          JSR      7,02A        !TYPE
          JSR      5,TYPEH      !ROM DATA
          M8                   !TYPE
          MOV      X3,D2BTYP    !CR/LF
          JSR      7,02A        !TYPE
          JSR      5,TYPEH      !IMAGE ADDRESS
          M12                  !TYPE
          MOV      (3),D2BTYP   !SEPARATOR
          JSR      7,02A        !TYPE
          JSR      5,TYPEH      !IMAGE DATA
          M8                   !TYPE
          BR       T4C         !CR/LF
T4EI     SCOPE
ENDI     JSR      5,TYPEH      !GO TO T4C
          M12
          JMP      PRG0
```

!THIS PROGRAM TYPES OUT ROM DATA

```
001536 012706 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,D2BTYP		I GET ADDRESS
001576	004767	000466			JSR	7,02A		I AND TYPE IT
001602	004567	000120			JSR	5,TYPEM		I TYPE
001606	002470				MB			I CR/LF
001610	012067	000452		PRG1C:	MOV	(0)+,D2BTYP		I TYPE
001614	004767	000450			JSR	7,02A		I DATA
001620	105767	175740			TSTB	TPCSR		I WAIT FOR
001624	100375				BPL	.-4		I TELEPRINTER FLAG
001626	012767	000040	175732		MOV	01,TPDBR		I TYPE SPACE
001634	005301				DEC	X1		I ALL DATA TYPED
001636	001410				BEG	PRG1D		I GO TO FINISH
001640	005302				DEC	X2		
001642	001362				BNE	PRG1C		I RETURN TO PRG1B
001644	012702	000012			MOV	012,X2		I GET ADDRESS INDICATOR
001650	004567	000052			JSR	5,TYPEM		I TYPE
001654	002470				MB			I CR/LF
001656	000745				BR	PRG1B		I RETURN TO PRG1B
001660	000167	177204		PRG1D:	JMP	RESTART		I ALL DATA HAS BEEN TYPED
					I THIS PROGRAM CYCLES A SINGLE ADDRESS TO CHANGE			
					I THE ADDRESS TYPE NEW ADDRESS ON THE TTY.			
001664	012700	001000		PRG2I	MOV	01000,X0		I INITIALIZE STACK POINTER
001670	005067	176102			CLR	PSW		I CLEAR PROCESSOR STATUS
001674	012767	001040	176156		MOV	0GTADD,TKINTA		I LOAD KEYBOARD INTERRUPT VECTOR
001702	012767	000100	176152		MOV	0100,TKINTP		I LOAD KEYBOARD INTERRUPT PRIORITY
001710	012767	000100	175642		MOV	0100,TKCSR		I SET INTERRUPT ENABLE BIT
001716	016700	177130			MOV	ROMADD,X0		I GET ROM ADDRESS
001722	005710				TST	(0)		I READ ROM ADDRESS
001724	000776				BR	.-2		I LOOP
001726	010026			TYPEMI	MOV	X0,(6)+		I SAVE REGISTER 0
001730	012500				MOV	(5)+,X0		I PLACE MESSAGE ADDRESS IN R0
001732	112067	177054			MOV	(0)+,TERM		I GET TERMINATOR CHARACTER
001736	112067	177046		TYPEMAI	MOV	(0)+,CHAR		I GET NEXT CHARACTER
001742	126767	177042	177042		CMPEB	CHAR,TERM		I WAS NEXT CHARACTER THE TERM
001750	001005				BNE	TYPEMB		I CHARACTER
001752	014600				MOV	-(6),X0		I RESTORE R0
001754	105767	175604			TSTB	TPCSR		
001760	100375				BPL	.-4		
001762	000205				RTS	5		I AND EXIT
001764	126727	177020	000045	TYPEMBI	CMPEB	CHAR,01X		I WAS CHARACTER X
001772	001019				BNE	TYPEMC		
001774	105767	175564			TSTB	TPCSR		I TEST TELEPRINTER FLAG
002000	100375				BPL	.-4		I AND WAIT FOR DONE
002002	012767	000215	175550		MOV	0215,TPDBR		I LOAD TELEPRINTER WITH CAR. RET
002010	105767	175550			TSTB	TPCSR		I TEST TELEPRINTER FLAG
002014	100375				BPL	.-4		I AND WAIT FOR DONE
002016	012767	000212	175542		MOV	0212,TPDBR		I LOAD TELEPRINTER WITH LINE FEED
002024	000744				BR	TYPEMA		I GET NEXT CHARACTER
002026	105767	175532		TYPEHCI	TSTB	TPCSR		I TEST TELEPRINTER FLAG
002032	100375				BPL	.-4		I AND WAIT FOR DONE
002034	016767	176750	175524		MOV	CHAR,TPDBR		I LOAD TELEPRINTER BUFFER
002042	000735				BR	TYPEMA		I AND GET NEXT CHARACTER

```

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      RECD0      ;
002100 005725          TST     (5)+        ;INCREMENT RETURN ADDRESS
002102 105767 175456          TSTB    TPCSR          ;
002106 100375          BPL      ,=4          ;
002110 000205          RTS     5           ;AND EXIT
002112 042767 177770 176670 RECD0I  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      RECD0      ;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          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     0%6,RETURN ;GET ADDRESS OF NEXT TEST
002202 000002          RTI                    ;EXIT
002204 000144          ;COUNTI 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 000016          MOV     (6),D2BTYP ;TYPE PROGRAM COUNTER
002250 004767 000014          JSR     7,02A
002254 005767 175310          TST     SR          ;HALT ON ERROR?
002260 100001          BPL     ,=4          ;
002262 000000          HALT                    ;YES HALT
002264 000002          RTI                    ;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 002702 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,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
 ERRORNI .ASCII '0X PC' 0'

```

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

```

M51 .ASCII '0XTYPE MATRIX STARTING ADDRESS 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

```

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 075
002453 100

M6I .ASCII '0XPRG000'

002454 100
002455 045
002456 122
002457 117
002460 115
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 115
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 049
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