

IDENTIFICATION

Product Code: MAINDEC-08-D3EB-D
Product Name: TC01 Extended Memory Exerciser
Date Created: January 5, 1968
Maintainer: Diagnostic Group
Author: Edward P. Steinberger

MAINDEC-08-D3EB-D

1. ABSTRACT

TC01 EXTENDED MEMORY EXERCISER is a test program for the PDP-8 Computer which tests the transfer to data between the TC01 DECTape Control and extended memory fields (more than 4K). It does this by storing a data pattern in an extended memory field, transferring the data onto DECTape and then reading the data back into the field and checking it for correct transfer.

2. REQUIREMENTS

2.1 Equipment

Standard PDP-8 Computer

TC01 DECTape Control with at least 1 Transport (TU55)

183 Memory Extension Control with at least 1 Memory Module (184)

2.2 Storage

The program occupies the first 6 pages of Bank 0 and uses 2000 to 5777 of each memory bank for data storage. All of memory not occupied by the program in Bank 0 with the exception of the last page is filled with "HLT".

2.3 Preliminary Programs

DECTape Basic Exerciser

DECTape Random Exerciser

3. LOADING PROCEDURE

3.1 Method

This test is loaded by the standard Binary Loader (SA = 7777).

4. STARTING PROCEDURE

4.1 Control Switch Settings

The following is a table of control switch settings and their action on the program.

MAINDEC-08-D3EB-D

SR	Set As	Action
0 } 1 } 2 }		Unit Select bits for DECtape transport
6 } 7 } 8 }		Number of ADDITIONAL memory fields (must be non-zero)
9	1	Halt on Error
	0	Don't Halt on Error
10	1	Don't Print Errors
	0	Print Errors
11	1	Don't Ring Bell on Error
	0	Ring Bell on Error

4.2 Starting Address

The starting address of the program is 00200.

4.3 Program and/or Operator Action

4.3.1 Load program into Memory Bank 0 per 3.1.

4.3.2 Set SR to 00200, depress "Load Address".

4.3.3 Set SR 9 to 11 per 4.1.

4.3.4 Depress "Start".

5. OPERATING PROCEDURE

5.1 Operational Switch Settings

See 4.1

5.2 Subroutine Abstracts

None

5.3 Operating Procedure

After starting the program per 4.3 the computer will halt at location 00223 if no error occurred after performing static tests on the TC01 "Field" register.

5.3.1 Set SR 0 to 2 to unit select bits of transport to be exercised.

5.3.2 Place a standard PDP-8 certified DECtape on the transport to be exercised, place transport "On Line" with "Write" enabled.

5.3.3 Set SR 6 to 8 to the number of extra memory fields (non-zero).

5.3.4 Depress "Continue".

5.3.5 To run the dynamic tests only:

5.3.5.1 Set SR to 0224, depress "Load Address".

5.3.5.2 Set unit select bit, extra field bits, error option bits in SR (see 4.1).

5.3.5.3 Assure selected transport is ready.

5.3.5.4. Depress "Start".

6. ERRORS

6.1 Error Halts and Description

The following is a table of error halts and the reason for each.

Location	Reason
0227	No extended memory indicated by SR 6 to 8
0351 (HALT 2)	"B" register not properly set
0527 (HALT 3)	Data Error
0735 (HALT 1)	DECtape Error
Outside of Program	Extended Memory Control Error (either non-existent or defective memory)

6.2 Error Recovery

6.2.1 Reset SR if necessary.

6.2.2 Depress "Continue" for any error except "Outside of program".

6.3 Error Typeouts

6.3.1 "B" Register Error.

MEMORY FIELD ERROR
RIGHT WRONG
0070 0030

The above example shows that an attempt was made to set the "B" register to 0070, however the most significant bit (0040) did not set.

6.3.2 Data Error

DATA ERROR
FIELD 0003
FIRST BLOCK 0040
LOC. DATA
2000 7402
2001 7402

The above example shows that a data error occurred in Memory Bank 3, the transfer started at block 0040, location 2000 contains 7402 (should contain 2000).

6.3.3 DECtape Error

THE FOLLOWING UNEXPECTED ERRORS OCCURRED:
MARK TRACK
END ZONE
SELECT
PARITY
TIMING

The above typeout (with at least one error indicated) will be typed out if there is a DECtape control error.

7. RESTRICTIONS

7.1 Starting Restrictions

None

7.2 Operating Restrictions

SR6 to 8 may be set to less than the number of additional memory fields but not more than that number. (SR6 to 8 must be non-zero), otherwise unpredictable results may occur (attempts to reference non-existent memory).

8. MISCELLANEOUS

8.1 Execution Time

Not applicable - 1 Pass down tape allows each memory field (other than 0) to be exercised at least 34 (Dec.) times (takes 8 minutes).

9. PROGRAM DESCRIPTION

9.1 The first portion of the test performs static tests on the memory field portion of the "B Register". The "B Register" is tested to assure that it may be set to all values (0 to 7). Any error will cause an error timeout and error halt unless these are suppressed by Switch Register settings.

9.2 The second portion of the test performs dynamic tests on the DECTape control, transfers are made to and from DECTape and extended memory.

9.2.1 The program first obtains the maximum field size from SR 6 to 8 and checks to make sure it is non-zero. The program then extracts the unit select bits from SR 0 to 2 for the DECTape drive being exercised.

9.2.2 The program then sets a location so that the first block sought is block 0 ("current block").

9.2.3 The program then sets a location so that field 1 is exercised ("current memory field").

9.2.4 The "current memory field" is then checked to assure that it is not larger than the maximum available field. If it is larger, the program goes to 9.2.3, otherwise the program goes to 9.2.5.

MAINDEC-08-D3EB-D

9.2.5 "HLT" is stored in all memory locations in field 0 not occupied by the program or the Binary or Rim Loaders. Also a location in an error timeout routine is initialized to provide error header type-out.

9.2.6 "HLT" is stored in all memory locations in the "current memory field", then data (addresses) are stored in locations 2000 through 5777 of the "current memory field".

9.2.7 The "current block" is then searched for. If a DECTape error occurs, an error timeout occurs and the search process is repeated.

9.2.8 After the "current block" has been found, the data in the "current memory field" is written on DECTape starting at that block. If an error occurs, the program goes back to 9.2.7. otherwise it goes to 9.2.9.

9.2.9 All locations in the "current memory field" are then set to "HLT".

9.2.10 The "current block" is sought again.

9.2.11 The data just written on DECTape is then read back into "current memory field" at the locations from which it came. A DECTape error at this point returns the program to 9.2.10.

9.2.12 The data in the "current memory field" is then checked to assure correctness of transfer.

9.2.13 All locations in the "current memory field" are set to "HLT".

9.2.14 The "current block" is incremented by 10 and checked to assure that it does not equal 2670. If it does, the "current block" is then set back to 0.

9.2.15 The "current memory field" is then incremented by 10 (effectively 1) and the program goes back to 9.2.4.

/PROGRAM TO EXERCISE THE IC01 AND EXTENDED MEMORY

```

0020      0020      *20
          /CONSTANTS AND VARIABLES
0020      0000      BLOCK, 0          /CURRENT BLOCK
0021      0000      CNTR, 0
0022      0000      ERROR, 0        /ERROR STATUS
0023      0000      FIELD, 0        /CURRENT FIELD
0024      0002      K0002, 2
0025      0003      K0003, 3
0026      0004      K0004, 4
0027      0007      K0007, 7
0030      0010      K0010, 10
0031      0070      K0070, 70
0032      0130      K0130, 130
0033      0150      K0150, 150
0034      0200      K0200, 200
0035      0201      K0201, 201      /MINUS 70//
0036      0207      K0207, 207      /BELL
0037      0212      K0212, 212      /LF
0040      0215      K0215, 215      /CR
0041      0240      K0240, 240      /SPACE
0042      0260      K0260, 260      /DIGIT CODE
0043      0400      K0400, 400      /FW-REV
0044      0600      K0600, 600      /GO-REV
0045      0610      K0610, 610      /GO REV SEARCH
0046      1777      K1777, 1777     /FIRST ADDRESS-1 OF DATA
0047      2670      K2670, 2670
0050      4000      K4000, 4000     /NUMBER OF DATA WORDS
0051      7000      K7000, 7000
0052      7401      K7401, 7401     /MINUS RUBOUT
0053      7754      K7754, 7754     /KC
0054      7755      K7755, 7755     /KA
0055      7774      K7774, 7774     /MINUS 4
0056      0000      MAX, 0          /HIGHEST FIELD AVAILABLE
0057      1000      PMESS1, MESS1    /DECTAPE ERROR HEADER
0060      1056      PMESS2, MESS2    /MARK TRACK
0061      1073      PMESS3, MESS3    /END ZONE
0062      1106      PMESS4, MESS4    /SELECT
0063      1117      PMESS5, MESS5    /PARITY
0064      1130      PMESS6, MESS6    /TIMING
0065      1141      PMESS7, MESS7    /"B" REGISTER ERROR HEADER
0066      1205      PMESS8, MESS8    /DATA ERROR HEADER
0067      1232      PMESS9, MESS9    /MORE DATA ERROR HEADER
0070      1251      PMESS10, MESS10   /END OF DATA ERROR HEADER
0071      0000      PTR1, 0          /MSRPT POINTER
0072      0000      PTR2, 0          /DATEERR POINTER
0073      7410      SKIP, SKP
0074      7402      STOP, HLT
0075      0000      TEMP, 0
0076      0000      UNIT, 0         /UNIT BEING OPERATED UPON
0077      0400      Z1, SET
0100      0410      Z2, STORE
    
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12/20/61 1142.45

PAGE 1-1

0101 0437
0102 0466
0103 0000
0104 0051
0105 1266

23, CHECK
24, DATERK+4
25, SEARCH
26, WAIT
27, END

/MESSAGE PRINT SUBROUTINE

```

106 0000 MSPRNI, 0
107 3071      DCA PNTR1
110 1471      TAD I PNTR1
111 4117      JMS TYPE
112 1052      TAD K/401
113 7050      SNA CLA
114 5506      JMP I MSPRNI
115 2071      ISZ PNTR1
116 5110      JMP MSPRNI+2

117 0000 TYPE, 0
120 6046      TLS
121 6041      TSP
122 5121      JMP ,71
123 5517      JMP I TYPE

124 0000 CKLF, 0
125 7200      CLA
126 1040      TAD K0210
127 4117      JMS TYPE
130 7200      CLA
131 1037      TAD K0212
132 4117      JMS TYPE
133 7200      CLA
134 5524      JMP I CKLF

```

/PRINT SUBROUTINE

```

135 0000 PRINT, 0
136 7004      LAS
137 7012      RAR
140 7030      S&L CLA
141 5535      JMP I PRINT
142 2135      ISZ PRINT
143 5535      JMP I PRINT

```

/BELL SUBROUTINE

```

144 0000 BELL, 0
145 7004      LAS
146 7010      RAR
147 7030      S&L CLA
150 5544      JMP I BELL
151 1036      TAD K0207
152 4117      JMS TYPE
153 5544      JMP I BELL

```

/TYPE OUT THE NUMBER IN THE AC

0154	0000	NUMBER, 0
0155	3075	DCA TEMP
0156	1055	TAO K774
0157	3021	DCA CNTR
0160	1075	TAO TEMP
0161	7104	RAL CLL
0162	7004	RAL
0163	7006	RIL
0164	3075	DCA TEMP
0165	1075	TAO TEMP
0166	0027	AND K0007
0167	1042	TAO K0200
0170	4117	JMS TYPE
0171	7200	CLA
0172	1075	TAO TEMP
0173	2021	ISE CNTR
0174	5162	JMP I-12
0175	7200	CLA
0176	5554	JMP I NUMBER

6761	DTXA=0701
6762	DTCA=0702
6764	DTXA=0704
6766	DTLA=0706
6771	DTST=0771
6772	DTRB=0772
6774	DTLB=0774
6201	CUF=6201

0200

*200

/STATIC - SET "B" TESTS AND READ BACK

```

1200 /300      BEGIN,  CLA CLL
1201 3023      DCA FIELDU           /CLEAR FIELDU
1202 6774      DTLB           /LOAD "B"
1203 /200      CLA
1204 6772      DIRB           /READ "B"
1205 0031      AND K0070
1206 3056      DCA MAX           /AND SAVE
1207 1056      TAD MAX
1210 /041      CIA
1211 1023      TAD FIELDU
1212 /040      SEA CLA           /SAME AS NUMBER SET?
1213 4327      JMS BERROR       /NO, ERROR
1214 1023      TAD FIELDU
1215 1030      TAD K0010         /INCREMENT FIELD SETTING
1216 0031      AND K0070
1217 3023      DCA FIELDU
1220 1023      TAD FIELDU
1221 7440      SEA           /DONE ALL FIELDS?
1222 5202      JMP BEGIN+2      /NO
1223 /402      HLT

```

/DYNAMIC TESTS

```

1224 /004      START,  LAS
1225 0031      AND K0070         /GET MAXIMUM FIELD SIZE
1226 7450      SNA           /NON-ZERO?
1227 /402      HLT           /NO
1230 3056      DCA MAX         /YES, STORE
1231 /004      LAS
1232 0031      AND K/000       /GET UNIT NUMBER
1233 3076      DCA UNIT       /AND SAVE
1234 3020      DCA BLOCK      /CLEAR BLOCK
1235 1030      TAD K0010      /SET TO OPERATE
1236 3023      DCA FIELDU     /ON FIELD 1
1237 1023      TAD FIELDU     /COMPARE CURRENT
1240 /041      CIA           /FIELD AGAINST
1241 1056      TAD MAX        /MAXIMUM FIELD
1242 /710      SPA CLA       /IS CURRENT FIELD TOO LARGE?
1243 5235      JMP I=6       /YES, RESET TO FIELD 1
1244 4353      JMS HAL1S     /STORE HAL1 IN MEMORY FIELD 0
1245 1073      TAD SKIP
1246 3502      DCA I Z4
1247 1023      TAD FIELDU     /STORE HAL1 IN
1250 4477      JMS I Z1      /MEMORY FIELD "N"
1251 1023      TAD FIELDU     /SET INTO FIELD "N"
1252 4500      JMS I Z2      /DATA (ADDRESSES) TO BE WRITTEN ON TAPE
1253 4503      JMS I Z5      /SET UP DECTAPE TO
1254 4566      JMS ERR       /ATTACK BLOCK IN FORWARD DIRECTION
1255 5253      JMP I=2       /CHECK FOR ERROR
                          /REPEAT SEARCH

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12/28/67 1142.49

PAGE 4-1

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0226 1023      TAD FIELD          /RETURN HERE WHEN BLOCK IS FOUND AND NO ERRORS
0227 6774      DILB             /LOAD MEMORY FIELD REGISTER
0228 1033      TAD K0120
0229 6764      DIXA             /CHANGE FROM SEARCH TO WRITE DATA CONT.
0230 1046      TAD K1777
0231 3454      DCA I K7755      /SET UP CA
0232 1050      TAD K4000
0233 3453      DCA I K7754      /AND WC
0234 4504      JMS I Z0         /WAIT FOR DECIPE FLAG AND NO ERRORS
0235 4366      JMS ENR
0236 5255      JMP , -12
0237 1023      TAD FIELD          /SET THE CURRENT MEMORY FIELD TO HLI
0238 4477      JMS I Z1
0239 4503      JMS I Z0         /FIND BLOCK AGAIN
0240 4366      JMS ENR
0241 5273      JMP , -2
0242 1023      TAD FIELD          /SET MEMORY FIELD REGISTER
0243 6774      DILB             /SEARCH TO READ DATA CONT
0244 1032      TAD K0120
0245 6764      DIXA
0246 1046      TAD K1777
0247 3454      DCA I K7755      /SET UP CA
0248 1050      TAD K4000
0249 3453      DCA I K7754      /AND WC
0250 4504      JMS I Z0         /WAIT FOR DECIPE FLAG AND NO ERRORS
0251 4366      JMS ENR
0252 5273      JMP , -12
0253 1023      TAD FIELD          /CHECK FOR CURRENT DATA
0254 4501      JMS I Z5
0255 1023      TAD FIELD          /SET IT TO HALT AGAIN
0256 4477      JMS I Z1
0257 1020      TAD BLOCK          /INCREMENT BLOCK
0258 1030      TAD K0010          /BY 10
0259 5020      DCA BLOCK
0260 1020      TAD BLOCK
0261 7041      CIA
0262 1047      TAD K2670
0263 7750      SPA SNA CLA      /END OF TAPE?
0264 5020      DCA BLOCK          /YES, ZERO BLOCK
0265 1023      TAD FIELD
0266 5255      JMP START+11      /RETURN TO TEST NEXT MEMORY FIELD

/ "B" REGISTER ERROR SUBROUTINE
0327 0000      BERROR, 0
0328 4144      JMS BELL
0329 4135      JMS PRINT
0330 5346      JMP HALT2-5
0331 1065      TAD PMESS7
0332 4106      JMS MSPHNI
0333 1023      TAD FIELD
0334 4154      JMS NUMBER
0335 1041      TAD K0240
0336 4117      JMS TYPE
0337 4117      JMS TYPE

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0342 7200
0343 1056
0344 4154
0345 4124
0346 7604
0347 0026
0350 7640
0351 7402
0352 5/27

CLA
TAD MAX
JMS NUMBER
JMS CHLA
LAS
AND K0004
SEA CLA
HALI2: HLT
JMP I BERRUR

```

0400      0000      *400
                                /SUBROUTINE TO STORE HALTS IN MEMORY BANK "N" (N-NONZERO), IN AC(6-8)
0400      0000      SET,      0
0401      7450      SNA
0402      5600      JMP I SET
0403      1214      TAD ,+11
0404      3206      DCA ,+2
0405      3010      DCA 10
0406      6201      CUF
0407      1074      TAD SIOP
0410      3410      DCA I 10
0411      1010      TAD 10
0412      7040      SZA CLA
0413      5207      JMP ,=4
0414      6201      CUF
0415      5600      JMP I SET
                                /SUBROUTINE TO STORE ADDRESSES IN MEMORY BANK "N" (N-NONZERO, IN AC6-8)
0416      0000      STORE,   0
0417      7450      SNA
0420      5616      JMP I STORE
0421      1235      TAD ,+14
0422      3227      DCA ,+5
0423      1046      TAD K1777
0424      3010      DCA 10
0425      1050      TAD K4000
0426      3012      DCA 12
0427      6201      CUF
0430      1010      TAD 10
0431      7001      IAC
0432      3410      DCA I 10
0433      2012      ISZ 12
0434      5230      JMP ,=4
0435      6201      CUF
0436      5616      JMP I STORE
                                /SUBROUTINE TO CHECK MEMORY BANK "N" TO ASSURE PROPER DATA STORED
0437      0000      CHECK,   0
0440      7450      SNA
0441      5637      JMP I CHECK
0442      1260      TAD ,+10
0443      3252      DCA ,+7
0444      1046      TAD K1777
0445      3010      DCA 10
0446      1050      TAD K4000
0447      3012      DCA 12
0450      1010      TAD 10
0451      7040      CMA
0452      6201      CUF
0453      1410      TAD I 10
0454      7040      SZA CLA

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/SUBROUTINE TO STORE HALTS IN MEMORY BANK 0

353	0000	HALTS:	0
354	0201		CUF
355	1105		TAD Z/
356	3011		UCA 11
357	1074		TAD STOP
360	3411		UCA I 11
361	1011		TAD 11
362	1035		TAD K0201
363	7640		SZA CLA
364	5357		JMP ,05
365	5753		JMP I HALTS

/DECTAPE ERROR REPEAT TEST SUBROUTINE

366	0000	ERR:	0
367	7200		CLA
370	6772		DIRB
371	7700		SMA CLA
372	2366		ISZ ERR
373	5766		JMP I ERR

/DATA ERROR SUBROUTINE

```

0462 0000      DATERR, 0
0463 4144      JMS BELL
0464 4155      JMS PRINT
0465 5524      JMP HALIS-3
0466 7410      SKP                      /PRINT MESSAGE HEADER?
0467 5512      JMP ,+25                /NO
0470 6201      CUF
0471 1066      TAD PMESS0            /YES, TYPE FIRST PART
0472 4106      JMS MSPRNI
0473 1025      TAD FIELD
0474 7112      CLL RTR
0475 7010      RAR
0476 4154      JMS NUMBER            /TYPE OUT FIELD
0477 1067      TAD PMESSY
0500 4106      JMS MSPRNI            /MORE HEADER
0501 1020      TAD BLOCK
0502 4154      JMS NUMBER            /FIRST BLOCK NUMBER
0503 1070      TAD PMES10
0504 4106      JMS MSPRNI            /REST OF HEADER
0505 1051      TAD K/000
0506 3266      DCA DATERR+4
0507 1252      TAD CHECK+13         /FORM "CUF"
0510 3511      DCA ,+1
0511 6201      CUF                    /CHANGE FIELD
0512 1010      TAD 10
0513 3072      DCA PNTR2
0514 1072      TAD PNTR2
0515 4154      JMS NUMBER            /TYPE OUT LOCATION
0516 1041      TAD K0290
0517 4117      JMS TYPE              /1 SPACE
0520 7200      CLA
0521 1472      TAD I PNTR2
0522 4154      JMS NUMBER            /TYPE OUT DATA
0523 4124      JMS CKLF              /CKLF
0524 7604      LAS
0525 0026      AND K0004
0526 7640      SEA CLA              /HALT?
0527 7402      HLT                    /YES
0530 5662      JMP I DATERR

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12/20/67 1142.53

PAGE /-1

J455 4262
J456 2012
J457 5250
J460 6201
J461 5637

JMS DATERR /DATA ERROR
ISE 12
JMP ,-/
CUF
JMP I CHECK

0000

*000

/SEARCH SUBROUTINE

```

0000 0000 SEARCH: 0
0001 1200 CLA
0002 3454 DCA I K//55 /BLOCK# TO LOC 0
0003 1076 TAD UNII /COMBINE UNII
0004 1045 TAD K0610 /AND SEARCH, NORM, REV
0005 6766 DTLA /LOAD A
0006 6774 DILB /CLEAR B
0007 6771 DISF /WAIT FOR
0010 5207 JMP ,=1 /SOME FLAG
0011 6772 DIRB /HEAD B
0012 7006 RIL
0013 7700 SMA CLA /END ZONE?
0014 5220 JMP ,=4 /NO
0015 1044 TAD K0600 /YES, TURN.
0016 6764 DIXA /AROUND
0017 5207 JMP SEARCH+/
0020 6772 DIRB /HEAD STATUS B
0021 7700 SMA CLA /DECTAPE ERROR?
0022 5225 JMP ,=3 /NO
0023 4251 JMS WAIT /YES, STOP TRANSPORT, ETC.
0024 5201 JMP SEARCH+1 /TRY SEARCHING AGAIN
0025 6761 DIRA /HEAD A
0026 7006 RIL /MOVE DIRECTION
0027 7006 RIL /BIT INTO LINK
0030 7200 CLA /CLEAR AC
0031 1000 TAD 0 /GET CURRENT BLOCK NUMBER
0032 7041 CIA
0033 1020 TAD BLOCK
0034 7450 SNA /CORRECT BLOCK?
0035 5245 JMP FOUND /YES, CHECK DIRECTION
0036 7041 CIA /NO, TAKE 2'S COMPLEMENT
0037 7420 SNL /LINK IS 1 IF BKWD AND NOT AT OR LOWER THAN BLOCK
0040 1024 TAD K0002 /ADD INO TO ENABLE TURN AROUND
0041 7020 SNL CLA /TURN AROUND (3 BEYOND)?
0042 1045 TAD K0400 /YES
0043 6764 DIXA /CLEAR FLAG
0044 5207 JMP SEARCH+/ /WAIT FOR NEXT FLAG
0045 7020 SNL CLA /FOUND BLOCK FORWARD?
0046 5245 JMP ,=3 /NO
0047 6764 DIXA /YES, CLEAR FLAG
0050 5000 JMP I SEARCH /EXIT
FOUND,

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/SUBROUTINE TO WAIT FOR DECTAPE FLAG AND NO ERROR
/EXIT WITH TRANSPORT STOPPED

0651	0000	WAIT,	0	
0652	6771		DISP	/WAIT FOR SOME FLAG
0653	5252		JMP ,-1	
0654	6761		DIRA	/HEAD STATUS A
0655	0034		AND K0200	
0656	1025		TAD K0003	
0657	6764		DIRA	/CLEAR GO
0660	6772		DIRB	
0661	7700		SMA CLA	
0662	5051		JMP I WAIT	
0663	4144		JMS BELL	
0664	4135		JMS PRINT	
0665	5332		JMP HALT-3	
0666	1057		TAD PMESS1	/TYPE OUT ERROR MESSAGE HEADER
0667	4106		JMS MSPKNI	
0670	6772		DIRB	
0671	7006		RIL	
0672	5022		DCA ERRUR	
0673	7420		SNL	/MARK TRACK ERROR?
0674	5277		JMP ,+3	/NO
0675	1060		TAD PMESS2	
0676	4106		JMS MSPKNI	
0677	1022		TAD ERRUR	
0700	7104		RAL CLL	
0701	5022		DCA ERRUR	
0702	7420		SNL	/END ZONE?
0703	5306		JMP ,+3	/NO
0704	1061		TAD PMESS3	
0705	4106		JMS MSPKNI	
0706	1022		TAD ERRUR	
0707	7104		RAL CLL	
0710	5022		DCA ERRUR	
0711	7420		SNL	/SELECT ERROR?
0712	5315		JMP ,+3	/NO
0713	1062		TAD PMESS4	
0714	4106		JMS MSPKNI	
0715	1022		TAD ERRUR	
0716	7104		RAL CLL	
0717	5022		DCA ERRUR	
0720	7420		SNL	/PARITY ERROR?
0721	5324		JMP ,+3	
0722	1063		TAD PMESS5	
0723	4106		JMS MSPKNI	
0724	1022		TAD ERRUR	
0725	7104		RAL CLL	
0726	7620		SNL CLA	/TIMING ERROR?
0727	5332		JMP ,+3	
0730	1064		TAD PMESS6	

0731	4106	JMS MSPRN1	
0732	7004	LAS	
0733	0026	AND K0004	
0734	7040	SEA CLA	/HALT ON ERROR?
0735	7402	HALT, HLT	
0736	5051	JMP I WAIT	

1000	0210	01000	
		/MESSAGES	
1000	0210	MESS1:	210 /CX
1001	0212		212 /LT
1002	0324		324 /I
1003	0310		310 /R
1004	0305		305 /E
1005	0240		240 /SP
1006	0306		306 /F
1007	0317		317 /U
1010	0314		314 /L
1011	0314		314 /L
1012	0317		317 /U
1013	0327		327 /W
1014	0311		311 /I
1015	0316		316 /N
1016	0307		307 /G
1017	0240		240 /SP
1020	0325		325 /U
1021	0316		316 /N
1022	0305		305 /E
1023	0330		330 /X
1024	0320		320 /P
1025	0305		305 /E
1026	0303		303 /G
1027	0324		324 /I
1030	0305		305 /E
1031	0304		304 /U
1032	0240		240 /SP
1033	0305		305 /E
1034	0322		322 /R
1035	0322		322 /R
1036	0317		317 /U
1037	0322		322 /R
1040	0323		323 /S
1041	0240		240 /SP
1042	0317		317 /U
1043	0303		303 /G
1044	0303		303 /G
1045	0325		325 /U
1046	0322		322 /R
1047	0322		322 /R
1050	0305		305 /E
1051	0304		304 /U
1052	0272		272 /:
1053	0210		210 /CX
1054	0212		212 /LT
1055	0377		377 /RU

1056	0315	MESS2,	315	/M
1057	0301		301	/A
1060	0322		322	/R
1061	0313		313	/K
1062	0240		240	/SP
1063	0324		324	/I
1064	0322		322	/R
1065	0301		301	/A
1066	0303		303	/C
1067	0313		313	/K
1070	0215		215	/CH
1071	0212		212	/LF
1072	0377		377	/RU
1073	0305	MESS3,	305	/E
1074	0316		316	/N
1075	0304		304	/U
1076	0240		240	/SP
1077	0332		332	/Z
1100	0317		317	/U
1101	0316		316	/N
1102	0305		305	/E
1103	0215		215	/CH
1104	0212		212	/LF
1105	0377		377	/RU
1106	0323	MESS4,	323	/S
1107	0305		305	/E
1110	0314		314	/L
1111	0305		305	/E
1112	0303		303	/C
1113	0324		324	/I
1114	0215		215	/CH
1115	0212		212	/LF
1116	0377		377	/RU
1117	0320	MESS5,	320	/P
1120	0301		301	/A
1121	0322		322	/R
1122	0311		311	/I
1123	0324		324	/I
1124	0331		331	/Y
1125	0215		215	/CH
1126	0212		212	/LF
1127	0377		377	/RU

1130	0324	MESS6:	324	/I
1131	0311		311	/I
1132	0315		315	/M
1133	0311		311	/I
1134	0316		316	/N
1135	0307		307	/G
1136	0215		215	/CK
1137	0212		212	/LT
1140	0377		377	/RU
1141	0215	MESS7:	215	/CK
1142	0212		212	/LT
1143	0315		315	/M
1144	0305		305	/E
1145	0315		315	/M
1146	0317		317	/U
1147	0322		322	/R
1150	0351		351	/Y
1151	0240		240	/SP
1152	0306		306	/F
1153	0311		311	/I
1154	0305		305	/E
1155	0314		314	/L
1156	0304		304	/U
1157	0240		240	/SP
1160	0305		305	/E
1161	0322		322	/R
1162	0322		322	/R
1163	0317		317	/U
1164	0322		322	/R
1165	0215		215	/CK
1166	0212		212	/LT
1167	0322		322	/R
1170	0311		311	/I
1171	0307		307	/G
1172	0310		310	/M
1173	0324		324	/I
1174	0240		240	/SP
1175	0327		327	/W
1176	0322		322	/R
1177	0317		317	/U
1200	0316		316	/N
1201	0307		307	/G
1202	0215		215	/CK
1203	0212		212	/LT
1204	0377		377	/RU

1205	0215	MESS8,	215	/CK
1206	0212		212	/LF
1207	0304		304	/U
1210	0301		301	/A
1211	0324		324	/I
1212	0301		301	/A
1213	0240		240	/SP
1214	0305		305	/E
1215	0322		322	/K
1216	0322		322	/R
1217	0317		317	/U
1220	0322		322	/K
1221	0215		215	/CK
1222	0212		212	/LF
1223	0306		306	/F
1224	0311		311	/I
1225	0305		305	/E
1226	0314		314	/L
1227	0304		304	/U
1230	0240		240	/SP
1231	0377		377	/RU
1232	0215	MESS9,	215	/CK
1233	0212		212	/LF
1234	0306		306	/F
1235	0311		311	/I
1236	0322		322	/K
1237	0323		323	/S
1240	0324		324	/I
1241	0240		240	/SP
1242	0302		302	/B
1243	0314		314	/L
1244	0317		317	/U
1245	0303		303	/G
1246	0313		313	/K
1247	0240		240	/SP
1250	0377		377	/RU

1251	0215	MESS10,	215	/OK	
1252	0212		212	/LF	
1253	0314		314	/L	
1254	0317		317	/U	
1255	0303		303	/C	
1256	0256		256	/,	
1257	0240		240	/SH	
1260	0304		304	/U	
1261	0301		301	/A	
1262	0324		324	/I	
1263	0301		301	/A	
1264	0215		215	/OK	
1265	0212		212	/LF	
1266	0377	END,	377		/KO

3

RE ARE NO ERRORS

SYMBOL TABLE

BLOCK	0020
DNTR	0021
ERROR	0022
FIELD	0023
00002	0024
00003	0025
00004	0026
00007	0027
00010	0030
00070	0031
00130	0032
00150	0033
00200	0034
00201	0035
00207	0036
00212	0037
00215	0040
00240	0041
00260	0042
00400	0043
00600	0044
00610	0045
01777	0046
02670	0047
04000	0050
07000	0051
07401	0052
07754	0053
07755	0054
07774	0055
TAX	0056
MESS1	0057
MESS2	0060
MESS3	0061
MESS4	0062
MESS5	0063
MESS6	0064
MESS7	0065
MESS8	0066
MESS9	0067
MES10	0070
INTR1	0071
INTR2	0072
SKIP	0073
STOP	0074
TEMP	0075
UNIT	0076
1	0077
2	0100
3	0101
4	0102
5	0103
6	0104

SYMBOL TABLE

Z/	0105
MSPKNT	0106
TYPE	0117
CKLF	0124
PRINT	0135
BELL	0144
NUMBER	0154
BEGIN	0200
START	0224
BERRON	0327
HALT2	0351
HALT5	0353
EMR	0366
SET	0400
STONE	0416
CHECK	0437
DATERK	0462
HALT3	0527
SEARCH	0600
FOUND	0645
HA11	0651
HAL11	0735
MESS1	1000
MESS2	1050
MESS3	1073
MESS4	1100
MESS5	1117
MESS6	1130
MESS7	1141
MESS8	1205
MESS9	1232
MESS10	1251
END	1266
CUF	6201
DIRA	6761
DTCA	6762
DIRA	6764
DIRA	6766
DIRF	6771
DIRB	6772
DIRB	6774

SYMBOL TABLE

BEGIN	0200
BELL	0144
BERROR	0327
BLOCK	0020
BUF	0201
CHECK	0437
CNTR	0021
CLF	0124
CATERN	0462
JICA	6762
JILA	6766
JILB	6774
JIRA	6761
JIRB	6772
JISF	6771
JIXA	6764
.ND	1206
.RR	0366
.RROR	0022
.ELLU	0023
.UUND	0645
HALIS	0353
HALI1	0735
HALI2	0351
HALI3	0527
00002	0024
00003	0025
00004	0026
00007	0027
00010	0030
00070	0031
00130	0032
00150	0033
00200	0034
00201	0035
00207	0036
00212	0037
00215	0040
00240	0041
00260	0042
00400	0043
00600	0044
00610	0045
01777	0046
02670	0047
04000	0050
07000	0051
07401	0052
0754	0053
0755	0054
0774	0055
MAX	0056
MESS1	1000

SYMBOL TABLE

MESS10	1251
MESS2	1056
MESS3	1073
MESS4	1100
MESS5	1117
MESS6	1130
MESS7	1141
MESS8	1205
MESS9	1232
MSPKNI	0106
NUMBER	0154
PMESS1	0057
PMESS2	0060
PMESS3	0061
PMESS4	0062
PMESS5	0063
PMESS6	0064
PMESS7	0065
PMESS8	0066
PMESS9	0067
PMESS10	0070
PNTK1	0071
PNTK2	0072
PRINT	0135
SLANCH	0600
SET	0400
SKIP	0073
SIANT	0224
SIOF	0074
SIORE	0416
TEMP	0075
TYPE	0117
UNII	0076
WALL	0651
Z1	0077
Z2	0100
Z3	0101
Z4	0102
Z5	0103
Z6	0104
Z7	0105