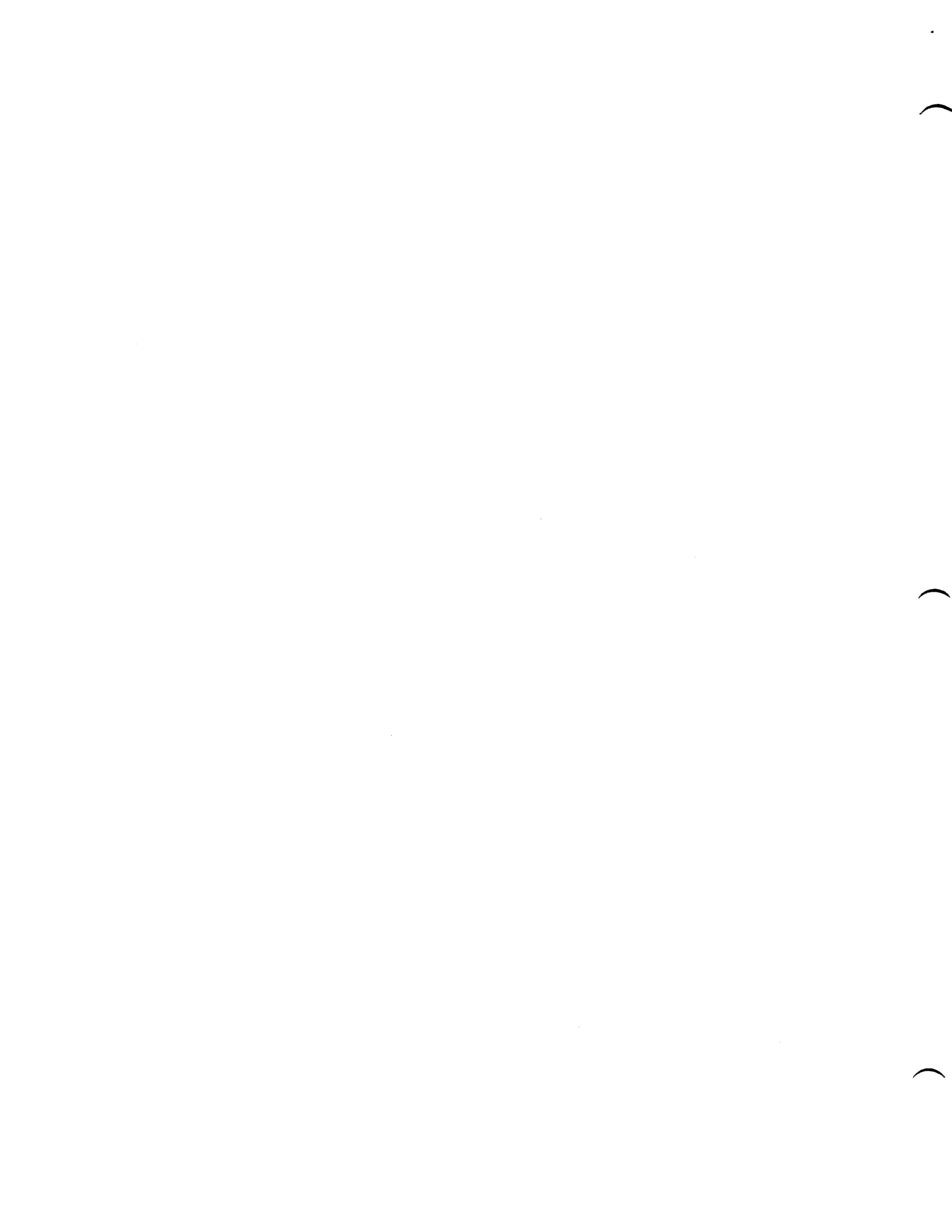


IDENTIFICATION  
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PRODUCT CODE: MAINDEC-8E-DØHC-D  
PRODUCT NAME: RANDOM JMP TEST  
DATE CREATED: JUNE 11, 1971  
MAINTAINER: DIAGNOSTIC GROUP  
AUTHOR: BRUCE HANSEN



1. ABSTRACT  
-----

THIS PROGRAM TESTS THE JMP INSTRUCTION OF THE PDP-8E. MOST OF MEMORY IS USED AS A JUMP FIELD WITH A RANDOM NUMBER GENERATOR SELECTING EACH JUMP FROM AND JUMP TO LOCATION.

2. REQUIREMENTS  
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2.1 EQUIPMENT  
-----

PDP-8E EQUIPPED WITH TELETYPE,

2.2 STORAGE  
-----

0000,0421, THE BINARY LOADER MUST BE STORED IN THE LAST MEMORY PAGE,

2.3 PRELIMINARY PROGRAMS  
-----

IT IS ASSUMED THAT MAINDEC=8E-D0A(N), AND MAINDEC=8E-D0B(N) HAVE RUN SUCCESSFULLY,

3. LOADING PROCEDURE  
-----

3.1 METHOD  
-----

USE STANDARD BINARY LOADER,

4. STARTING PROCEDURE  
-----

4.1 CONTROL SWITCH SETTINGS  
-----

SR0(0) HALT ON ERROR,

SR2 HOLD JUMP FROM ADDRESSES CONSTANT, (1)  
SELECT RANDOM JUMP FROM ADDRESSES, (0)

SR3 HOLD JUMP TO ADDRESSES CONSTANT, (1)  
SELECT RANDOM JUMP TO ADDRESSES, (0)

4.2 STARTING ADDRESS  
-----

0200

RESTART ADDRESS  
-----

0214

4.5

OPERATOR ACTION  
-----

- A. SET SR TO 0200 AND PRESS LOAD ADDRESS.
- B. SET SR TO DESIRED MODE; IF A PARTICULAR MEMORY LOCATION IS DESIRED FOR EITHER A "CONSTANT FROM" OR "CONSTANT TO", THIS MEMORY ADDRESS IS ENTERED INTO ONE OF THE LOCATIONS SHOWN BELOW:  
  
FROM 1    ADDRESS = 0120  
FROM            ADDRESS = 0117  
TO            ADDRESS = 0116  
  
NOTE! ALWAYS MAKE (FROM 1) = (FROM) #1  
  
IF SR2 OR SR3 IS SET AFTER THE PROGRAM HAS BEEN STARTED, THE LAST ADDRESS TAKEN FROM THE RANDOM NUMBER GENERATOR IS USED REPEATEDLY.

C. PRESS CLEAR THEN CONTINUE.

5. OPERATING PROCEDURE  
-----

SAME AS SECTION 4.

6. ERRORS  
-----

6.1 ERROR HALTS  
-----

ALL UNUSED MEMORY LOCATIONS ARE LOADED WITH HLT ORDERS. IF THE PROGRAM EXECUTES ONE OF THESE BACKGROUND HLTS, IT IS PROBABLE THAT THE INTERRUPT FAILED TO OCCUR FOLLOWING THE JMP INSTRUCTION.

6.2

ERROR PRINTOUTS  
-----

F WWWW TO XXXX

Z = YYYY

(FROM) F WWWWIWWW = THE ADDRESS OF THE JMP INSTRUCTION.  
(TO) T XXXX: XXXX = THE ADDRESS THAT THE JMP INSTRUCTION IS JUMPING TO;  
(LOC 0000) Z = YYYY: YYYY = THE ADDRESS STORED IN LOCATION  
0000 DURING THE INTERRUPT.

NOTE THAT YYYY SHOULD EQUAL XXXX.

EXAMPLE! THE FOLLOWING IS A TYPICAL ERROR PRINTOUT:

F 4252 TO 7020  
Z = 7000

LINE 1 OF THE PRINTOUT IS A STATEMENT OF THE PROBLEM, A JMP  
INSTRUCTION IS PLACED AT LOCATION 4252, THIS JMP INSTRUCTION IS  
TRYING TO JUMP TO LOCATION 7020, LINE 2 OF THE PRINTOUT INDICATES  
THE ERROR, THE TO ADDRESS (7020) WAS TO HAVE BEEN STORED IN  
LOCATION 0000 BUT INSTEAD A 7000 WAS STORED, THUS BIT 7 WAS  
DROPPED.

6.3

ERROR RECOVERY  
-----

THE PROGRAM CONTINUES TESTING FOLLOWING AN ERROR PRINTOUT, WHEN  
ENOUGH INFORMATION HAS BEEN GATHERED FROM THE ERROR PRINTOUTS,  
A FROM AND TO ADDRESS IS SELECTED FOR USE IN THE SCOPE MODE LOOP,  
ENTER THE CHOSEN ADDRESSES INTO PROPER LOCATIONS (SEE SECTION  
4.3.8). RESTART THE PROGRAM WITH SR2 AND SR3 SET, AFTER  
ALLOWING IT TO RUN FOR A MOMENT PUSH HALT, ENTER (3520) INTO  
LOCATION 1, AND RESTART THE PROGRAM AT LOCATION 0027 WITH SR2  
AND SR3 SET, THE SCOPE MODE LOOP IS

LOCATION	CODING
0000	
0001	JMP I FROM 1
XXXX	A, ION
XXXX	JMP I TO
0120	FROM 1, A

WHEN IT IS DESIRED TO DISCONTINUE THE SCOPE MODE LOOP, RESTORE  
THE ORIGINAL CONTENT 1116 INTO LOCATION 1, AND RESTART THE PROGRAM.

7.

RESTRICTIONS  
-----

(NONE)

8. MISCELLANEOUS  
-----

8.1 EXECUTION TIME  
-----

7200 RANDOM TEST/SECOND

9. PROGRAM DESCRIPTION  
-----

THE JMP INSTRUCTION IS CHECKED THROUGH THE USE OF THE INTERRUPT FUNCTION. A RANDOM NUMBER GENERATOR SELECTS A FROM AND A TO ADDRESS. AN ION INSTRUCTION IS THEN PLACED AT FROM+1 AND THE JMP INSTRUCTION AT FROM. THE JMP INSTRUCTION JUMPS TO THE ADDRESS SPECIFIED BY TO. AFTER EXECUTING THESE TWO ORDERS, AN INTERRUPT OCCURS STARTING THE PROGRAM COUNTER AT LOCATION 1. A CHECKING ROUTINE LOCATED HERE VERIFIES THAT THE OPERATION WAS SUCCESSFUL BEFORE STARTING THE NEXT TEST.

RANDOM ADDRESSES ARE RESTRICTED AS FOLLOWS! 0400KRANDOM ADDRESS <7600, THE AREA BETWEEN 0400 AND 7600 IS FILLED WITH HLT INSTRUCTIONS IN CASE THE INTERRUPT FAILS. A "HC" IS PRINTED AFTER EACH GROUP OF 72,000 TESTS.

/RANDOM JMP TEST  
/SR0(0)=HALT ON ERROR  
/SR2(1)=CONSTANT FROM ADDRESS  
/SR3(1)=CONSTANT TO ADDRESS

0000	0000		
0001	5001	JMP 1	/FOR SCOPE MODE INSERT
0002	0002	2	/JMP I FROM1 (5520) INTO LOC: I
0003	0003	3	
0004	0000	0	
0005	0000	0	
0006	7640	SEA CLA	
0007	5534	JMP I AER	
0010	1115	TAD HALT	
0011	3517	DCA I FROM	
0012	1115	TAD HALT	
0013	3520	DCA I FROM1	
0014	3000	DCA 0	
0015	7001	IAC	
0016	1140	TAD CT	
0017	3140	DCA CT	
0020	1140	TAD CT	
0021	7640	SEA CLA	
0022	5027	JMP LOOP	
0023	5424	JMP I I+1	
0024	0316	SUP	
0025	1142	TAD M17	
0026	3141	DCA CTI	

/CHECK FOR CONSTANT FROM

0027	7604	LAS	
0030	7004	RAL	
0031	7006	RTL	
0032	7630	SZL CLA	
0033	5057	JMP LOOP1	

/SELECT RANDOM FROM

0034	1121	GETRAN, TAD RANUM	
0035	7104	RAL CLL	
0036	7430	SZL	
0037	1122	TAD THREE	
0040	3121	DCA RANUM	
0041	7100	CLL	
0042	1121	TAD RANUM	
0043	1124	TAD LIMHI	
0044	7630	SZL CLA	
0045	5034	JMP GETRAN	
0046	1121	TAD RANUM	
0047	1123	TAD LIMLO	
0050	7620	SNL CLA	
0051	5034	JMP GETRAN	

0052 1121  
 0053 3117  
 0054 7040  
 0055 1117  
 0056 3120

TAD RANUM  
 DCA FROM  
 CMA  
 TAD FROM  
 DCA FROM1

/CHECK FOR CONSTANT TO ADDRESS

0057 7604  
 0060 7006  
 0061 7006  
 0062 7630  
 0063 5104

LOOP1, LAS  
 RTL  
 RTL  
 SEL CLA  
 JMP JPLP

/SELECT RANDOM TO ADDRESS

0064 1121  
 0065 7104  
 0066 7430  
 0067 1122  
 0070 3121  
 0071 7100  
 0072 1121  
 0073 1124  
 0074 7630  
 0075 5064  
 0076 1121  
 0077 1123  
 0100 7620  
 0101 5064  
 0102 1121  
 0103 3116

GTRAN1, TAD RANUM  
 RAL CLL  
 SEL  
 TAD THREE  
 DCA RANUM  
 CLL  
 TAD RANUM  
 TAD LIMHI  
 SEL CLA  
 JMP GTRAN1  
 TAD RANUM  
 TAD LIMLO  
 SNL CLA  
 JMP GTRAN1  
 TAD RANUM  
 DCA TO

/PLACE INSTRUCTIONS

0104 1125  
 0105 3517  
 0106 1126  
 0107 3520

JPLP, TAD JMP1  
 DCA I FROM  
 TAD ITON  
 DCA I FROM1

/RAISE FLAG

0110 6041  
 0111 6046  
 0112 6041  
 0113 5112

TSF  
 TLS  
 TSF  
 JMP 1,1

/DO IT

0114 5520  
 0115 7402

JMP I FROM1  
 HALT, HLT

/JUMP FAILED

/CONSTANTS, VARIABLES, AND SUCH



0116 0000  
 0117 0000  
 0120 0000  
 0121 2525  
 0122 0003  
 0123 7400  
 0124 0200  
 0125 5516  
 0126 6001  
 0127 0260  
 0130 0007  
 0131 0000  
 0132 0000  
 0133 0000  
 0134 0220  
 0135 0000  
 0136 7571  
 0137 0143  
 0140 0000  
 0141 0000  
 0142 7761

TO,  
 FROM,  
 RANUM,  
 THREE,  
 LIMLO,  
 LIMHI,  
 JMP1,  
 ION,  
 TW6,  
 MSK7,  
 SAVE,  
 AER,  
 WORK,  
 M207,  
 AMSG1,  
 CT,  
 CT1,  
 M17,

V141 0  
 0  
 0  
 2525  
 3  
 -400  
 -7600  
 JMP 1 TO  
 ION  
 260  
 7  
 0  
 0  
 0  
 0  
 ER  
 0  
 -207  
 MSG1  
 0  
 0  
 -17

/TTY MESSAGE

MSG1.

0143 0215  
 0144 0212  
 0145 0212  
 0146 0306  
 0147 0240  
 0150 0000  
 0151 0000  
 0152 0000  
 0153 0000  
 0154 0240  
 0155 0324  
 0156 0240  
 0157 0000  
 0160 0000  
 0161 0000  
 0162 0000  
 0163 0215  
 0164 0212

/CR  
 /LF  
 /LF  
 /F FROM ADDRESS  
 /SPACE  
 /X  
 /X  
 /X  
 /X  
 /SPACE  
 /T JMP TO  
 /SPACE  
 /X  
 /X  
 /X  
 /X  
 /CR  
 /LF

215  
 212  
 212  
 306  
 240  
 0  
 0  
 0  
 0  
 240  
 324  
 240  
 0  
 0  
 0  
 0  
 215  
 212

INS1,  
 INS2,  
 INS3,  
 INS4,  
 INS5,  
 INS6,  
 INS7,  
 INS8,  
 INS9,  
 INS10,  
 INS11,  
 INS12,

/RUBOUT  
 /Z LOCATION ZERO  
 /SPACE  
 /=  
 /SPACE  
 /X  
 /X  
 /X  
 /X  
 /CR  
 /LF

377  
 332  
 240  
 275  
 240  
 0  
 0  
 0  
 0  
 215  
 212

/SPREAD HALTS THROUGH MEMORY

0200 5770  
 0201 7041  
 0202 3116  
 0203 1115  
 0204 3516  
 0205 1116  
 0206 7001  
 0207 3116  
 0210 1116  
 0211 1124  
 0212 7640  
 0213 5203  
 0214 1367  
 0215 3141  
 0216 3140  
 0217 5027

JMP I PATCH /TAD LIMLO  
 CIA TO  
 DCA TO  
 TAD HALT  
 DCA I TO  
 TAD TO  
 IAC  
 DCA TO  
 TAD TO  
 TAD LIMHI  
 SZA CLA  
 JMP GON  
 TAD M15  
 DCA CTI  
 DCA CT  
 JMP LOOP

GON,

/ERROR ROUTINES  
 ER,  
 0220 1117  
 0221 4341  
 0222 3150  
 0223 1131  
 0224 0130  
 0225 1127  
 0226 3151  
 0227 1132  
 0230 0130  
 0231 1127  
 0232 3152  
 0233 1133  
 0234 0130  
 0235 1127  
 0236 3153  
 0237 1116  
 0240 4341  
 0241 3157  
 0242 1131  
 0243 0130  
 0244 1127  
 0245 3160  
 0246 1132  
 0247 0130  
 0250 1127  
 0251 3161  
 0252 1133  
 0253 0130  
 0254 1127  
 0255 3162  
 0256 1000  
 0257 4341  
 0 3172

TAD FROM  
 JMS SLOC  
 DCA INS1  
 TAD SAVE  
 AND MSK7  
 TAD TH6  
 DCA INS2  
 TAD SAVE+1  
 AND MSK7  
 TAD TH6  
 DCA INS3  
 TAD SAVE+2  
 AND MSK7  
 TAD TH6  
 DCA INS4  
 TAD TO  
 JMS SLOC  
 DCA INS5  
 TAD SAVE  
 AND MSK7  
 TAD TH6  
 DCA INS6  
 TAD SAVE+1  
 AND MSK7  
 TAD TH6  
 DCA INS7  
 TAD SAVE+2  
 AND MSK7  
 TAD TH6  
 DCA INS8  
 TAD 0  
 JMS SLOC  
 DCA INS9

0261 1131  
0262 0130  
0263 1127  
0264 3173  
0265 1132  
0266 0130  
0267 1127  
0270 3174  
0271 1133  
0272 0130  
0273 1127  
0274 3175

TAD SAVE  
AND MSK7  
TAD TW6  
DCA INS10  
TAD SAVE+1  
AND MSK7  
TAD TW6  
DCA INS11  
TAD SAVE+2  
AND MSK7  
TAD TW6  
DCA INS12

/PRINT ERROR MESSAGE

0275 1137  
0276 3135  
0277 1535  
0300 6046  
0301 6041  
0302 5301  
0303 7201  
0304 1135  
0305 3135  
0306 1535  
0307 1136  
0310 7640  
0311 5277  
0312 7604  
0313 7700  
0314 7402  
0315 5010

TAD AMSC1  
DCA WORK  
TAD I WORK  
TLS  
TSF  
JMP I=1  
CLA IAC  
TAD WORK  
DCA WORK  
TAD I WORK  
TAD M207  
SEA CLA  
JMP LP  
LAS  
SMA CLA  
HLT  
JMP 10

/HALT ON ERROR

0316 1141  
0317 7001  
0320 3141  
0321 1141  
0322 7640  
0323 5027

TAD CTI  
IAC  
DCA CTI  
TAD CTI  
SEA CLA  
JMP LOOP

SUP,

0324 1361  
0325 3135  
0326 1135  
0327 7001  
0330 3135  
0331 1535  
0332 6046  
0333 6041  
0334 5333  
0335 1366  
0336 7640  
0337 5326  
0340 5025

TAD AMSC2  
DCA WORK  
TAD WORK  
IAC  
DCA WORK  
TAD I WORK  
TLS  
TSF  
JMP I=1  
TAD M303  
SEA CLA  
JMP LP1  
JMP LOOP=2

LP1,

SLOC, 0

0342 3133 DCA SAVE+2  
 0343 1133 TAD SAVE+2  
 0344 7012 RTR  
 0345 7010 RAR  
 0346 3132 DCA SAVE+1  
 0347 1132 TAD SAVE+1  
 0350 7012 RTR  
 0351 7010 RAR  
 0352 3131 DCA SAVE  
 0353 1131 TAD SAVE  
 0354 7012 RTR  
 0355 7010 RAR HSK7  
 0356 0130 AND TMA  
 0357 1127 TAD TMA  
 0360 5741 JMP I SLOC

MSG2: 215 /CR  
 212 /LF  
 310 /H  
 303 /C

MS03: -303  
 M15: -15  
 PATCH: XPATCH

\*400 /RESTORE 0,1,2,3 AND 00  
 XPATCH: /AWAY

0400 DCA 0  
 0401 TAD X1  
 0402 DCA 1  
 0403 TAD X2  
 0404 DCA 2  
 0405 TAD X3  
 0406 DCA 3  
 0407 TAD X4  
 0410 DCA I X5  
 0411 CLA CLL  
 0412 DCA 4  
 0413 DCA 5  
 0414 JMP I X5

X1: 1116 /TAD TO  
 X2: CIA  
 X3: 1000 /TAD 0  
 X4: TAD LIMLO  
 X5: 200