

LC11/LA30

TERMINAL TEST
MD-11-DZLCA-C

EP-DZLCA-C-DL-A
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digital
MADE IN USA

TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6
TEST 7	TEST 8	TEST 9	TEST 10	TEST 11	TEST 12
TEST 13	TEST 14	TEST 15	TEST 16	TEST 17	TEST 18
TEST 19	TEST 20	TEST 21	TEST 22	TEST 23	TEST 24
TEST 25	TEST 26	TEST 27	TEST 28	TEST 29	TEST 30
TEST 31	TEST 32	TEST 33	TEST 34	TEST 35	TEST 36
TEST 37	TEST 38	TEST 39	TEST 40	TEST 41	TEST 42
TEST 43	TEST 44	TEST 45	TEST 46	TEST 47	TEST 48
TEST 49	TEST 50	TEST 51	TEST 52	TEST 53	TEST 54
TEST 55	TEST 56	TEST 57	TEST 58	TEST 59	TEST 60
TEST 61	TEST 62	TEST 63	TEST 64	TEST 65	TEST 66
TEST 67	TEST 68	TEST 69	TEST 70	TEST 71	TEST 72
TEST 73	TEST 74	TEST 75	TEST 76	TEST 77	TEST 78
TEST 79	TEST 80	TEST 81	TEST 82	TEST 83	TEST 84
TEST 85	TEST 86	TEST 87	TEST 88	TEST 89	TEST 90
TEST 91	TEST 92	TEST 93	TEST 94	TEST 95	TEST 96
TEST 97	TEST 98	TEST 99	TEST 100	TEST 101	TEST 102
TEST 103	TEST 104	TEST 105	TEST 106	TEST 107	TEST 108
TEST 109	TEST 110	TEST 111	TEST 112	TEST 113	TEST 114
TEST 115	TEST 116	TEST 117	TEST 118	TEST 119	TEST 120
TEST 121	TEST 122	TEST 123	TEST 124	TEST 125	TEST 126
TEST 127	TEST 128	TEST 129	TEST 130	TEST 131	TEST 132
TEST 133	TEST 134	TEST 135	TEST 136	TEST 137	TEST 138
TEST 139	TEST 140	TEST 141	TEST 142	TEST 143	TEST 144
TEST 145	TEST 146	TEST 147	TEST 148	TEST 149	TEST 150
TEST 151	TEST 152	TEST 153	TEST 154	TEST 155	TEST 156
TEST 157	TEST 158	TEST 159	TEST 160	TEST 161	TEST 162
TEST 163	TEST 164	TEST 165	TEST 166	TEST 167	TEST 168
TEST 169	TEST 170	TEST 171	TEST 172	TEST 173	TEST 174
TEST 175	TEST 176	TEST 177	TEST 178	TEST 179	TEST 180
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TEST 229	TEST 230	TEST 231	TEST 232	TEST 233	TEST 234
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TEST 247	TEST 248	TEST 249	TEST 250	TEST 251	TEST 252
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TEST 259	TEST 260	TEST 261	TEST 262	TEST 263	TEST 264
TEST 265	TEST 266	TEST 267	TEST 268	TEST 269	TEST 270
TEST 271	TEST 272	TEST 273	TEST 274	TEST 275	TEST 276
TEST 277	TEST 278	TEST 279	TEST 280	TEST 281	TEST 282
TEST 283	TEST 284	TEST 285	TEST 286	TEST 287	TEST 288
TEST 289	TEST 290	TEST 291	TEST 292	TEST 293	TEST 294
TEST 295	TEST 296	TEST 297	TEST 298	TEST 299	TEST 300

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THIS PROGRAM'S OBJECT TAPE IS PUNCHED IN ABSOLUTE FORMAT.
THE ABS LOADER IS USED TO LOAD THE PROGRAM.

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4. USE PROCEDURE

4.1 LC11 IDENTIFICATION

THIS TEST DIAGNOSTIC ASSUMES THE LA30 IS AN 80 COLUMN KSR35
AND LOCATION 000224 IS SET TO 000001.

4.2 PRGO USE PROCEDURE

- A. CHECK POWER SWITCH IS "ON"
- B. LOAD ADDRESS 000200
- C. SET SR TO 000000. PRESS START
- D. THE PROGRAM STOPS AT COMMON HALT.
- E. SET ANY DESIRED SR OPTIONS. NORMAL RUN IS WITH SR = 000000.

THIS PROGRAM'S SR OPTIONS ARE:

- SR15 HALT AT END OF ROUTINE
- SR14 ENTER SCOPE MODE AFTER ERROR
- SR11 INHIBIT ITERATION
- SR10 LOOP PROGRAM
- SR9 SELECT ROUTINE
- SR6 THROUGH SR0 = NUMBER OF ROUTINE TO BE SELECTED.

SECTION 7.2 GIVES A COMPLETE EXPLANATION OF SR OPTIONS.

- F. PRESS CONTINUE. THE PROGRAM IS EXECUTED AND STOPS AT PROGRAM END HALT WHEN COMPLETED, PROVIDED NO ERRORS OCCUR.
- G. REFER TO SECTION 6. IF ERRORS OCCUR.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.1

EXECUTION TIME:

ONE NORMAL ERROR FREE PASS TAKES APPROXIMATELY 4 MINUTES.

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1954.3 PRG1 USE PROCEDURE

- A. SET LA30 TO ON
- B. LOAD ADDRESS 000200.
- C. SET SR TO 000001. PRESS START
- D. PROGRAM STOPS AT COMMON HALT.
- E. SET ANY DESIRED SR OPTIONS. NORMAL RUN IS WITH SR = 000000.

THIS PROGRAM'S SR OPTIONS ARE:

SR15 HALT AT END OF ROUTINE
 SR10 LOOP PROGRAM
 SR9 SELECT ROUTINE
 SR6 THROUGH SR0 = NUMBER OF ROUTINE TO BE SELECTED.

SECTION 7.2 GIVES A COMPLETE EXPLANATION OF SR OPTIONS.

- F. PRESS CONTINUE. THE LA30 WILL BE EXERCISED AND THE PROGRAM WILL STOP AT PROGRAM END HALT WHEN COMPLETED.
- G. ERROR DETECTION IS BY VISUAL INSPECTION OF DISPLAY.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.2

EXECUTION TIME:

ONE NORMAL PASS TAKES APPROXIMATELY 12 MINUTES.

4.4 PRG2 USE PROCEDURE

- A. SET LA30 ON-LINE.
- B. LOAD ADDRESS 000200.
- C. SET SR TO 000002. PRESS START
- D. THE PROGRAM TYPES "KEYBOARD TEST" AND STOPS AT COMMON HALT.
- E. SET ANY DESIRED SR OPTIONS. NORMAL RUN IS WITH SR = 000000.
THIS PROGRAM'S SR OPTIONS ARE:

SR15 HALT AT END OF ROUTINE
 SR10 LOOP PROGRAM
 SR9 SELECT ROUTINE
 SR6 THROUGH SR0 = NUMBER OF ROUTINE TO BE SELECTED.

SECTION 7.2 GIVES A COMPLETE EXPLANATION OF SR OPTIONS.

- F. PRESS CONTINUE. FOLLOW TYPED INSTRUCTIONS. WHEN DONE PROGRAM STOPS AT PROGRAM END HALT.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.5

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4.5 PRG3 USE PROCEDURE

- A. SET LA30 TO ON
- B. LOAD ADDRESS 000200
- C. SET SR TO 000003. PRESS START
- D. THE PROGRAM TYPES "TYPE IN DATA"
- E. KEY IN ANY FIVE CHARACTERS TO BE TYPED.
- F. KEY IN EITHER A RUBOUT FOR FULL SPEED TYPING, OR ANY OTHER CHARACTER FOR RANDOM STALLS BETWEEN CHARACTERS.
- G. THE PROGRAM TYPES CONTINUOUSLY LINES CONTAINING THE FIVE CHARACTERS SPECIFIED, UNTIL SR15 IS SET TO A 1. AT THAT POINT THE PROGRAM GOES TO STEP E.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.9

4.6 PRG4 USE PROCEDURE

PRG4 IS USED AS AN AID IN ADJUSTING THE TRANSMITTER CLOCK, AND IN OBSERVING THE DATA BITS AS THEY ARE SHIFTED OUT OF THE TRANSMITTER BUFFER. A SCOPE IS REQUIRED.

TO ADJUST THE PUNCH CLOCK PROCEED AS FOLLOWS:

- A. LOAD ADDRESS 000200
- B. SET SR TO 00004. PRESS START.
- C. PROGRAM STOPS AT COMMON HALT.
- D. SET ANY DESIRED ASCII CODE IN LEFT HALF OF SR.
- E. SET NUMBER OF MILLISECONDS TO DELAY BETWEEN PUNCH COMMANDS IN RIGHT HALF OF SR. THE NUMBER OF MILLISECONDS SELECTED SHOULD BE LONG ENOUGH FOR THE ENTIRE PUNCH OPERATION TO COMPLETE. A SUGGESTED STARTING NUMBER IS 177.
- F. PRESS CONTINUE. THE PROGRAM RUNS CONTINUOUSLY. FIRST IT LOADS THE PUNCH BUFFER WITH THE CHARACTER IN SR LEFT, AND THEN DELAYS FOR THE NUMBER OF MILLISECONDS SPECIFIED IN SR RIGHT BEFORE RELOADING THE PUNCH BUFFER AGAIN.
- G. SET UP A SCOPE AND DISPLAY THE PUNCH CLOCK PULSES. ADJUST THE PUNCH CLOCK ACCORDING TO SPECIFICATIONS.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.10

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4.7 PRGS USE PROCEDURE

PRGS IS USED AS AN AID IN ADJUSTING THE RECEIVER CLOCK, AND IN OBSERVING THE DATA BITS AS THEY ARE SHIFTED INTO THE RECEIVER BUFFER. A SCOPE IS REQUIRED.

THE PROGRAM MAKES USE OF THE TRANSMIT MAINTENANCE BIT FEATURE IN ORDER TO CAUSE THE DATA OUTPUTTED TO THE TRANSMITTER BUFFER TO BE SHIFTED INTO HE RECEIVER BUFFER.

TO ADJUST THE RECEIVER CLOCK PROCEED AS FOLLOWS:

- A. LOAD ADDRESS 000200
- B. SET SR TO 000005. PRESS START.
- C. PROGRAM STOPS AT COMMON HALT.
- D. SET ANY DESIRED ASCII CODE IN LEFT HALF OF SR.
- E. SET NUMBER OF MILLISECONDS TO DELAY BETWEEN TRANSMIT COMMANDS IN RIGHT HALF OF SR. THE SELECTED NUMBER SHOULD BE LONG ENOUGH FOR THE ENTIRE TRANSMIT/RECEIVE OPERATION TO COMPLETE. A SUGGESTED STARTING NUMBER IS 177.
- F. PRESS CONTINUE. THE PROGRAM RUNS CONTINUOUSLY. FIRST IT LOADS THE TRANSMITTER BUFFER WITH THE CHARACTER IN SR LEFT, AND THEN DELAYS THE NUMBER OF MILLISECONDS SPECIFIED IN SR RIGHT. AS THE DATA BITS ARE SHIFTED OUT OF THE TRANSMITTER BUFFER, THE RECEIVER CLOCK STARTS, AND THE DATA BITS ARE SHIFTED INTO THE RECEIVER BUFFER. AT THE END OF THE DELAY THE PROGRAM MOVES THE RECEIVER BUFFER CONTENTS TO REG 0, AND ISSUES 5 RESET INSTRUCTIONS IN ORDER TO MAKE THE RECEIVER BUFFER CONTENTS VISIBLE IN THE RIGHT HALF OF THE DATA LIGHTS.
- G. SET UP A SCOPE AND DISPLAY THE RECEIVER CLOCK PULSES. ADJUST THE RECEIVER CLOCK ACCORDING TO SPECIFICATIONS.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.11

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4.8 PRG6 USE PROCEDURE

- A. LOAD ADDRESS 000200.
- B. SET SR TO 000006. PRESS START
- C. THE PROGRAM STOPS AT COMMON HALT.
- D. SET CODE FOR CHARACTER TO BE TESTED IN THE LEFT HALF OF THE SR.
- E. PRESS CONTINUE. THE PROGRAM RUNS CONTINUOUSLY, OUTPUTTING THE CHARACTER TO THE OUTPUT BUFFER AND CHECKING THAT THE RECEIVE BUFFER CONTAINS THE SAME CHARACTER WHEN THE RECEIVE DONE BIT BECOMES SET.
- F. REFER TO SECTION 6. ERRORS, IF ERRORS OCCUR.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.12

EXECUTION TIME:

CONTINUOUSLY RUNNING PROGRAM.

4.9 PRG7 USE PROCEDURE

- A. LOAD ADDRESS 000200.
- B. SET SR TO 000007. PRESS START
- C. THE PROGRAM RUNS CONTINUOUSLY. THE SPECIAL BINARY COUNT PATTERN IS OUTPUTTED TO THE OUTPUT BUFFER. EACH TIME THE RECEIVE DONE BIT BECOMES SET THE CHARACTER IN THE RECEIVE BUFFER IS CHECKED TO SEE THAT IT MATCHES THE PREVIOUSLY OUTPUTTED CHARACTER. THE PROGRAM STALLS RANDOMLY BETWEEN CHARACTERS. TO RUN AT FULL SPEED, SET SR8 TO A 1.
- D. REFER TO SECTION 6. ERRORS, IF ERRORS OCCUR.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.13

EXECUTION TIME:

CONTINUOUSLY RUNNING PROGRAM.

4.10 PRG10 USER PROCEDURE

- A. LOAD ADDRESS 000200.
- B. SET SR TO 000010. PRESS START
- C. PROGRAM RUNS CONTINUOUSLY. THE PAGE IS FILLED WITH ALTERNATE LINES OF A CHARACTER AND ITS COMPLEMENT AND A LINE OF THE COMPLEMENT OF THE CHARACTER FOLLOWED BY THE CHARACTER.
- D. REFER TO SECTION 6. ERRORS, IF ERRORS OCCUR.

A DESCRIPTION OF THIS PROGRAM IS GIVEN IN SECTION 8.14

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4.11 PRG11 USER PROCEDURE

- A. LOAD ADDRESS 200.
- B. SET SR TO 000011. PRESS START.
- C. PROGRAM RUNS CONTINUOUSLY. AN A IS PRINTED FOLLOWED BY AN ATTEMPT TO PRINT ALL NON-PRINTING CHARACTERS. THIS SEQUENCE IS REPEATED FOR A FULL LINE OF A'S.
- D. REFER TO SECTION 6. ERRORS, IF ERRORS OCCUR.

EXECUTION TIME:

CONTINUOUSLY RUNNING PROGRAM.

4.12 PRG12 USER PROCEDURE

- A. LOAD ADDRESS 000200.
- B. SET SR TO 000012. PRESS START.
- C. THIS PROGRAM WAS WRITTEN TO SERVE AS A WORST CASE NOISE TEST IF A WORST CASE PATTERN IS EVER ESTABLISHED. THE PROGRAM ACCEPTS UP TO 80 CHARACTERS FROM THE KEYBOARD OR UNTIL A RUBOUT IS DETECTED. AT THAT POINT THE PROGRAM CONTINUOUSLY ECHOS THE CHARACTER STRING. SWITCH 15 SELECTS NEW CHARACTER STRING.
- D. REFER TO SECTION 6. ERRORS, IF ERRORS OCCUR.

EXECUTION TIME:

PROGRAM RUNS CONTINUOUSLY.

4.13 PRG13 USER PROCEDURE

- A. LOAD ADDRESS 000200.
- B. SET SR TO 000013. PRESS START.
- C. THIS TEST VERIFIES THE "LAST CHARACTER" VISIBILITY FEATURE OF THE LA30 PRINT HEAD BY WAITING TWO SECONDS BETWEEN CHARACTERS.
- D. REFER TO SECTION 6. ERRORS, IF ERRORS ARE DETECTED.

EXECUTION TIME:

PROGRAM RUNS CONTINUOUSLY.

5. PROGRAM AND/OR OPERATOR ACTION

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4335.1 NORMAL HALTS

LOC 001502 COMMON HALT. THIS HALT OCCURS WHENEVER THE PROGRAM IS AWAITING USER INTERVENTION. THE DATA LIGHTS CONTAIN THE ADDRESS OF INSTRUCTION THAT GENERATED THE CALL TO THE COMMON HALT.

LOC 001612 END OF ROUTINE HALT. THIS HALT OCCURS AT THE END OF A TEST ROUTINE IF SR15 IS SET TO A 1. TO PROCEED, PRESS CONTINUE. PROGRAMS PRGO, PRG1, AND PRG2 USE THE ROUTINE END OPTION.

LOC 002120 PROGRAM END HALT. THIS HALT NORMALLY OCCURS AT THE END OF PROGRAMS PRGO, PRG1 AND UNLESS THE LOOP PROGRAM OPTION IS SET. (SR10)

6. ERRORS6.1 ERROR HALTS

LOC 001514 UNCONDITIONAL ERROR HALT. DATA LIGHTS CONTAIN ADDRESS OF INSTRUCTION THAT GENERATED THE ERROR CALL. REFER TO PROGRAM LISTING.

LOC 001574 CONDITIONAL ERROR HALT. THIS CALL WILL ALWAYS OCCUR, UNLESS SR14 IS SET TO A 1 (SCOPE MODE) AND THE ERROR HAS OCCURRED AT LEAST ONCE. DATA LIGHTS CONTAIN ADDRESS OF INSTRUCTION THAT GENERATED ERROR CALL. REFER TO PROGRAM LISTING.

LOC 001534 DATA ERROR HALT. OCCURS WHEN A PROGRAM OR ROUTINE CHECKING DATA FINDS THAT THE EXPECTED AND THE RECEIVED DATA DO NOT AGREE. THE LEFT HALF OF THE DATA LIGHTS CONTAIN THE EXPECTED 8 BIT DATA. THE RIGHT HALF CONTAINS THE RECEIVED 8 BIT DATA.

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4706.2 NON RECOVERABLE ERROR HALTS

A NON-RECOVERABLE ERROR HALT WILL OCCUR AT THE ADDRESSES LISTED BELOW IF THROUGH HARDWARE OR SOFTWARE FAILURE, PROGRAM CONTROL IS TRANSFERRED TO AN UNEXPECTED AREA BETWEEN 000000 AND 000176.

000002 RESERVED AREA
 000006 ERROR TRAP
 000012 RESERVED INSTRUCTION TRAP
 000016 DEBUG TRAP
 000022 IOT TRAP
 000026 POWER FAIL TRAP
 000040 THROUGH 000176 SYSTEM SOFTWARE AND INTERRUPT VECTOR AREA, EXCEPT FOR KL11 INTERRUPT VECTORS.

TO FIND OUT WHERE THE PROGRAM WAS AT THE TIME THE FAILURE OCCURRED, PERFORM THE FOLLOWING STEPS:

- A. EXAMINE THE CONTENTS OF REGISTER 6 (ADDRESS 177706).
- B. TRANSFER THE CONTENTS OF REGISTER 6 TO THE SR, LOAD ADDRESS, AND EXAMINE.
- C. THE DATA SHOWN IN THE DATA LIGHTS IS THE VALUE OF THE PC WHEN THE FAILURE OCCURRED.
- D. LOCATE IN THE PROGRAM LISTING THE DISPLAYED PC VALUE.
- E. THE INSTRUCTION THAT IMMEDIATELY PRECEDES THE ONE REFERENCED BY THE DISPLAYED PC VALUE IS THE INSTRUCTION THAT WAS BEING EXECUTED WHEN THE FAILURE OCCURRED.

A NON-RECOVERABLE ERROR HALT FAILURE IS AN ABNORMAL CONDITION INDICATING A HARDWARE FAILURE, OR MOST UNLIKELY, A PROGRAM FAILURE. THIS PROGRAM ASSUMES THAT THE PROCESSOR IS IN OPERATING CONDITION IN ORDER TO TEST THE LA30. ANY FURTHER STEPS TO DIAGNOSE A NON-RECOVERABLE ERROR ARE NOT WITHIN THE SCOPE OF THIS PROGRAM.

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5057. MISCELLANEOUS
-----7.1 SR OPTIONS

THE STANDARD SR OPTIONS ARE DESCRIBED HERE.

SR15 - HALT AT END OF ROUTINE. FOR THESE PROGRAMS CONSISTING OF A SET OF SEPARATE TEST ROUTINES, SR15 SET TO A 1 CAUSES THE PROGRAM TO HALT UPON COMPLETION OF THE ROUTINE CURRENTLY BEING EXECUTED. THREE POSSIBLE USES OF THIS OPTION ARE:

- A. TO STEP THROUGH A PROGRAM ONE ROUTINE AT A TIME.
- B. WHEN AN UNPREDICTED FAILURE HAS OCCURRED (BLOW UP, HANG UP), TO ADVANCE THROUGH THE PROGRAM ONE ROUTINE AT A TIME UNTIL THE FAILURE OCCURS. THE ROUTINE FOLLOWING THE LAST IDENTIFIED ROUTINE WOULD BE THE FAILING ROUTINE.
- C. WHEN A PROGRAM IS IN EXECUTION, TO DETERMINE HOW FAR THE PROGRAM HAS PROGRESSED.

SR14 - SCOPE. THIS OPTION IS USED ONLY BY PRGO. THE OPTION CAUSES THE PROGRAM TO BYPASS ERROR HALTS, AND TO STAY IN THE FAILING ROUTINE. THIS OPTION WILL NOT BECOME ACTIVE UNTIL AN ERROR OCCURS. SR14 MUST BE ON BEFORE THE ERROR OCCURS, OR AT LEAST IT MUST BE SET BEFORE PRESSING CONTINUE AFTER AN ERROR HALT.

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- SR13 - INHIBIT ITERATION COUNT. THIS OPTION IS USED BY PRG0, PRG1, AND PRG3. THESE PROGRAMS CONSIST OF A SET OF ROUTINES EACH OF WHICH SPECIFIES THE NUMBER OF TIMES A TEST IS TO BE PERFORMED BY MEANS OF AN ITERATION COUNT. SETTING SR13 TO A 1 CAUSES THE PROGRAM TO DISREGARD THE ITERATION COUNT AND PERFORM THE TEST ONLY ONCE FOR EACH ROUTINE. TWO POSSIBLE USES OF THIS OPTION ARE:
- A. QUICK PASS. THE USER MAY ELECT TO RUN THROUGH A PROGRAM QUICKLY TO FIND OUT IF ANY FAILURES SHOW IMMEDIATELY. A SUCCESSFUL QUICK PASS HOWEVER, DOES NOT GUARANTEE THAT THE SAME PROGRAM WILL RUN ERROR-FREE WHEN PERFORMING A NORMAL ITERATION PASS.
 - B. SKIP OVER FAILING ROUTINE. WHEN A ROUTINE HAS DETECTED A SOLID FAILURE, THE ERROR WILL BE REPORTED MANY TIMES. TO GO ON TO THE NEXT ROUTINE, THE USER CAN INHIBIT ITERATION. IT WILL BE NECESSARY TO CAUSE THE PROGRAM TO STOP AT THE END OF THE ROUTINE BY SETTING SR15 TO A 1. OTHERWISE THE PROGRAM WOULD QUICKLY RUN THROUGH THE NEXT ROUTINE(S) ALSO.
- SR10 - LOOP PROGRAM. THIS OPTION IS USED BY PROGRAMS PRG0, PRG1, AND PRG4. SETTING SR10 TO A 1 CAUSES THE PROGRAM TO REPEAT ITSELF UPON COMPLETION, INSTEAD OF STOPPING AT PROGRAM END HALT.
- SR9 - SELECT ROUTINE. THIS OPTION IS USED BY PROGRAMS PRG0, PRG1 AND PRG4. THE USER MAY ELECT TO RUN ONLY ONE SPECIFIC ROUTINE BY SETTING SR9 TO A 1, AND SR6 THROUGH SR0 TO THE NUMBER OF THE DESIRED ROUTINE. REFER TO THE INDIVIDUAL PROGRAM DESCRIPTION IN SECTION 8 TO OBTAIN THE ROUTINE NUMBER. THE ROUTINE NUMBER SELECTED MUST BE A VALID NUMBER, OR AN ERROR HALT WILL OCCUR. THE SELECT ROUTINE OPTION WILL BE HONORED BY THE PROGRAM UPON COMPLETION OF THE CURRENT ROUTINE, OR UPON STARTING THE PROGRAM.
- SR8 - DISABLE STALL MODE AND RUN FULL SPEED. USED BY PROGRAM PRG10. THIS PROGRAM OPERATES NORMALLY IN STALL MODE (TESTS OR EXERCISES ARE NOT FULL SPEED, BUT RANDOM DURATION DELAYS ARE INTRODUCED). SETTING SR8 TO A 1 CAUSE THE PROGRAM TO PERFORM THEIR TESTS AT FULL SPEED.

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7568.3 PRG2 PROGRAM DESCRIPTION

PRG2 IS USED TO TEST THE LA30 KEYBOARD. THE PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 00 TO 02.

RTN0 TESTS THAT LC11 CONTROL RESPONDS WHEN USER DEPRESSES A KEYBOARD KEY.

RTN1 ECHO TEST. THE TEST ECHOES ONTO THE TELEPRINTER THE CHARACTER RECEIVED FROM THE KEYBOARD. WHEN THE TEST SENSES A RUBOUT CHARACTER THE TEST IS ENDED. THE TEST ENABLES THE USER TO DETERMINE IF ALL PRINTABLE CODES CAN BE SUCCESSFULLY SENT TO THE LC11 CONTROL. THE FOLLOWING SECTIONS (8.3.1, 8.3.2) DESCRIBE HOW THIS ROUTINE SHOULD BE USED TO TEST THE SPECIAL CHARACTERS.

RTN2 OCTAL EQUIVALENT TEST. THE OCTAL EQUIVALENT OF ANY CHARACTER RECEIVED BY THE CONTROL IS TYPED. SENSING A RUBOUT ENDS THE TEST. THIS TEST ENABLES THE USER TO DETERMINE THAT ALL CODES INCLUDING NON-PRINTABLE CONTROL CODES ARE BEING CORRECTLY SENT TO THE LC11 CONTROL.

8.4 PRG3 PROGRAM DESCRIPTION

PRG3 IS A PRINTER EXERCISER DESIGNED AS AN AID IN MAKING LA30 ADJUSTMENTS. THE PROGRAM PERMITS THE USER TO TYPE IN FIVE TEST CHARACTERS AND ONE FINAL CHARACTER THAT SIGNIFIES WHETHER FULL SPEED OR STALL OPERATION IS DESIRED. THE PROGRAM THEN TYPES LINES CONTAINING THE FIVE SELECTED CHARACTERS. WHEN THE USER WISHES TO CHANGE THE TEST CHARACTERS SR15 IS SET TO A 1. THE PROGRAM TERMINATES TYPING THE LINE BEFORE ACCEPTING NEW DATA.

8.5 PRG4 PROGRAM DESCRIPTION

PRG11 IS USED AS AN AID IN ADJUSTING THE TRANSMITTER CLOCK WITH THE AID OF A SCOPE. THE PROGRAM PERFORMS THE FOLLOWING SEQUENCE:

- A. LOAD TRANSMITTER BUFFER WITH ASCII CODE IN SR LEFT.
- B. DELAY NUMBER OF MILLISECONDS SET IN SR RIGHT.
- C. GO TO STEP A.

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8.6 PRG5 PROGRAM DESCRIPTION

PRG5 IS USED AS AN AID IN ADJUSTING THE RECEIVER CLOCK.
A SCOPE IS REQUIRED. THE PROGRAM PERFORMS THE FOLLOWING SEQUENCE:

- A. SET PUNCH MAINTENANCE BIT.
- B. LOAD PUNCH BUFFER WITH CODE IN SR LEFT.
- C. DELAY NUMBER OF MILLISECONDS SET IN SR RIGHT.
- D. MOVE CONTENTS OF READ BUFFER TO REGISTER D.
- E. ISSUE 5 RESET INSTRUCTIONS TO "FIX" READ BUFFER CONTENTS IN RIGHT HALF OF DATA LIGHTS.
- F. GO TO STEP A.

8.7 PRG6 PROGRAM DESCRIPTION

USING THE PUNCH MAINTENANCE BIT FEATURE, PRG13 TAKES THE ASCII CODE SET IN SR LEFT AND USES IT TO CHECK THE ABILITY OF THE CONTROL TO OUTPUT AND RECEIVE DATA. THE PROGRAM PERFORMS THE FOLLOWING SEQUENCE:

- A. SET PUNCH MAINTENANCE BIT.
- B. LOAD PUNCH BUFFER WITH CODE IN SR LEFT.
- C. WHEN READER DONE BIT SETS, COMPARE CODE IN SR LEFT WITH DATA IN READER BUFFER. HALT IF NOT SAME.
- D. WAIT FOR PUNCH DONE BIT TO SET AND GO TO STEP B.

8.8 PRG7 PROGRAM DESCRIPTION

USING THE PUNCH MAINTENANCE BIT FEATURE PRG14 USES THE SPECIAL BINARY COUNT PATTERN TO CHECK ABILITY OF THE CONTROL TO OUTPUT AND RECIEVE DATA. THE PROGRAM PERFORMS THE FOLLOWING STEPS:

- A. INITIALIZE BINARY COUNT PATTERN.
- B. SET PUNCH MAINTENANCE BIT.
- C. LOAD PUNCH BUFFER WITH BINARY COUNT CHARACTER.
- D. WHEN READER DONE BIT SETS. COMPARE BINARY CHARACTER WITH DATA IN READ BUFFER. HALT IF NOT SAME.
- E. WAIT FOR PUNAH DONE BIT TO SET AND GO TO STEP C.

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8.9 PROGRAM 10 DESCRIPTION

THE PURPOSE OF THIS TEST WAS TO VERIFY THAT THE VTO6 MEMORY HAS
ROLL-UP CAPABILITIES.THE TEST FUNCTIONS AS FOLLOWS:

- A. A LINE . AND ITS COMPLEMENT . IS DISPLAYED
- B. THIS LINE IS FOLLOWED BY A LINE OF ITS EXACT COMPLEMENT

THIS PROCEDURE RUNS CONTINUOUSLY. IF SWITCH 15 IS HELD UP
MOMENTARILY THE ASCII CODE FOR THE CHARACTER IS INCREMENTED
BY ONE. BY UTILIZING SWITCH 15 IN THIS MANNER, PROGRAM 10 CAN
TEST THE ROLL-UP CAPIBILITYOF ALL CHARACTERS.

8.10 PROGRAM 11 DESCRIPTION

SEE SECTION 4.11 USER PROCEDURE

8.11 PROGRAM 12 DESCRIPTION

SEE SECTION 4.12 USER PROCEDURE

8.12 PROGRAM 13 DESCRIPTION

SEE SECTION 4.13 USER PROCEDURE

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: KL11 TESTS FOR THE LA30 TERMINAL
: COPYRIGHT 1971, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
: PRG0- COMBINED INPUT-OUTPUT LOGIC TESTS.
: PRG1- DISPLAY TEST.
: PRG2- KEYBOARD TEST.
: PRG3- PRINTER EXERCISER.
: PRG4- PUNCH CLOCK ADJUSTMENT ROUTINE.
: PRG5- READER CLOCK ADJUSTMENT ROUTINE.
: PRG6- MAINTENANCE MODE SINGLE CHARACTER DATA TEST.
: PRG7- MAINTENANCE MODE SPECIAL BINARY COUNT PATTERN DATA TEST.
: PRG10- ROLE-UP TEST
: PRG11- NON-PRINTING CHARACTER TEST
: PRG12- WORST CASE NOISE
: PRG13- LAST CHARACTER VISIBILITY TEST

: STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1)

: SR 15 - HALT AT END OF ROUTINE.
: SR 14 - SCOPE.
: SR 11 - INHIBIT ITERATION.
: SR 10 - LOOP PROGRAM.
: SR 9 - SELECT ROUTINE.
: SR 8 - DISABLE STALL MODE AND RUN FULL SPEED.
: SR 6 THROUGH SR 0 - NUMBER OF ROUTINE TO BE SELECTED.
.ABS

000000 000000
000002 000000
000004 000006
000006 000000
000010 000012
000012 000000
000014 000016
000016 000000
000020 000022
000022 000000
000024 000026
000026 000000
000030 002254
000032 000340
000034 002320
000036 000340

MACHER: . =0 ;UNASSIGNED TRAP
HALT
HALT
. +2 ;SP OVERFLOW, BUS ERROR TRAP
HALT
. +2 ;RESERVED INSTRUCTION TRAP
HALT
. +2 ;TRACE TRAP
HALT
. +2 ;TRAP TO CALL IOX
HALT
. +2 ;POWER FAIL TRAP
HALT
EMTINT ;EMT TRAP
PRTY7
TRPINT ;TRAP TRAP. SIMILAR TO EMT
PRTY7
. REPT 200
. +2
HALT
. ENDR ;TRAPPED TO PREVIOUS ADDRESS.

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0100
0101
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0115
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0123
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0125
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;EQUATE STATEMENTS
SR=177570
CC=177776
PSW=177776
NOP=240
OPEN=0
HLTSW=BIT15
SCOPSW=BIT14
NPRTSW=BIT13
NTRCSW=BIT12
NITRSW=BIT11
LPRGSW=BIT10
SRTSW=BIT9
BYPMAN=BIT8
MANUAL=BIT15
BIT15=100000
BIT14=40000
BIT13=20000
BIT12=10000
BIT11=4000
BIT10=2000
BIT9=1000
BIT8=400
BIT7=200
BIT6=100
BIT5=40
BIT4=20
BIT3=10
BIT2=4
BIT1=2
BIT0=0

R1=%1
R2=%2

POPSP=5726
POPSP2=022626
PRTY7=340
PRTY6=300
PRTY5=240
PRTY4=200
PRTY3=140
PRTY2=100
PRTY1=40
PRTY0=0
TYPE=EMT+0
TYPES=EMT+1
STALL=EMT+2
ERROR=EMT+3
DATCHK=EMT+4
CHALT=EMT+5
STRDRV=EMT+6
STPCHV=EMT+7
EHALT=EMT+10
SRESET=EMT+11
CHAIN=EMT+12
CK33=EMT+13

```

```

;HALT SWITCH DEFINITION
;SCOPE SWITCH DEFINITION
;INHIBIT PRINT SWITCH DEFINITION
;INHIBIT TRACE SWITCH DEFINITION
;INHIBIT ITERATION SWITCH DEFINITION
;LOOP PROGRAM SWITCH DEFINITION
;SELECT ROUTINE SWITCH DEFINITION
;BYPASS MANUAL INTERVENTION DEFINITION.

```

```

;POP THE STACK. SAME AS TST (6)+
;POP STACK TWICE. SAME AS CMP (6)+,(6)+
;PRIORITY LEVEL DEFINITIONS

```

935				
936		104014		CK35=EMT+14
937		104016		TYPLN3=EMT+16
938		104017		DATHLT=EMT+17
939		104020		SAVREG=EMT+20
940		104021		RSTREG=EMT+21
941		104022		CHKASR=EMT+22
942		104400		DELAY=TRAP+0
943		000007		BELL=007
944		012103		BLOCKA=DEND
945		012105		BLOCK1=BLOCKA+2
946		012225		BLOCKB=BLOCKA+82.
947		012226		BLKBB=BLOCKA+123
948		012217		BLOCK2=BLOCKA+114
949		012230		BLK2=BLOCKA+125
950		012327		BLOCKC=BLOCKA+224
951		012340		BLKCC=BLOCKA+235
952		000200		=200
953	000200	000167	001412	JMP START
954		001304		=.+1100
955	001304	000000		SPBOT: 0
956	001306	177560		TKS: 177560
957	001310	177562		TKB: 177562
958	001312	177564		TPS: 177564
959	001314	177566		TPB: 177566
960	001316	000060		TKVTR: 60
961	001320	000200		TKLVL: PRTY4
962	001322	000064		TPVTR: 64
963	001324	000200		TPLVL: PRTY4
964	001326	000001		TTYTYP: 01
965	001330	000000		PRGNUM: OPEN
966	001332	000000		KSTART: OPEN
967	001334	000000		CURTST: OPEN
968	001336	000000		RTNNO: OPEN
969	001340	000000		NXTST: OPEN
970	001342	000000		ICTR: OPEN
971	001344	000000		SCOPTR: OPEN
972	001346	000000		PRGID: OPEN
973	001350	004536		PRGTAB: PRG0
974	001352	005764		PRG1
975	001354	007246		PRG2
976	001356	007546		PRG3
977	001360	007732		PRG4
978	001362	007742		PRG5
979	001364	010032		PRG6
980	001366	010076		PRG7
981	001370	010200		PRG10
982	001372	010340		PRG11
983	001374	010500		PRG12
984	001376	010636		PRG13
985				
986				

```

;GO TO START OF PROGRAM.
;GET CODE OUT OF VECTOR AREA
;BOTTOM OF STACK
;LSR CSR
;LSR BUFFER
;LSP CSR
;LSP BUFFER
;LSR INTERRUPT VECTOR
;LSR PRIORITY LEVEL
;LSP INTERRUPT VECTOR
;LSP PRIORITY LEVEL
;LA30 = KSR35
;CONTAINS CURRENT PROGRAM#
;CURRENT PROGRAM START ADDRESS.
;CONTAINS ADDR OF CURRENT TEST.
;CONTAINS CURRENT TEST #.
;CONTAINS ADDR OF NEXT TEST.
;CONTAINS CURRENT ITERATION COUNT
;CONTAINS CURRENT SCOPE POINTER.
;CONTAINS PROGRAM INDICATORS
;PRG0 START ADDRESS
;PRG1 START ADDRESS
;PRG2 START ADDRESS
;PRG3 START ADDRESS
;PRG4 START ADDRESS
;PRG5 START ADDRESS
;PRG6 START ADDRESS
;PRG7 START ADDRESS
;PRG10 START ADDRESS
;NON PRINTING CHAR TEST
;WORST CASE NOISE
;LAST CHAR VISIBILITY

```

987				
988	001400	003054	EMTTAB: TYP	; POINTER TO TYPEOUT ROUTINE
989	001402	003176	TYP	; POINTER TO CHAINED MESSAGES ROUTINE
990	001404	003274	STAL	; POINTER TO RANDOM STALL ROUTINE
991	001406	001540	ERR	; POINTER TO ERROR ROUTINE
992	001410	001520	DTCHK	
993	001412	001474	CHLT	; COMMON HALT
994	001414	002604	STLSRV	
995	001416	002634	STLSPV	
996	001420	001506	EHLT	; POINTER TO ERROR HALT ROUTINE.
997	001422	002664	SRSETT	
998	001424	002000	CHAINN	
999	001426	002364	CHK33	
1000	001430	002400	CHK35	
1001	001432	002376	CHK330	
1002	001434	004354	TYPL3	
1003	001436	001530	DTHLT	
1004	001440	002442	SAVRG	
1005	001442	002502	RSTRG	
1006	001444	002416	CKASR	
1007	001446	003230	TRPTAB: DLY	
1008	001450	000000	RCNT: OPEN	; CHARACTER COUNT
1009	001452	000000	CRBUF: OPEN	; HOLDS ONE CHARACTER FROM READER.
1010	001454	000000	CHR1: OPEN	
1011	001456	000000	CHR2: OPEN	
1012	001460	000000	CHR3: OPEN	
1013	001462	000000	ERCTR: OPEN	
1014	001464	000000	CTRA: OPEN	
1015	001466	000000	CTRB: OPEN	
1016	001470	000000	CTRC: OPEN	
1017	001472	000000	CTRD: OPEN	

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1018
1019
1020 001474 011600
1021 001476 162700 000002
1022 001502 000000
1023 001504 000002
1024
1025 001506 011600
1026 001510 162700 000002
1027 001514 000000
1028 001516 000002
1029
1030 001520 126767 177726 177725
1031 001526 001403
1032 001530 016700 177716
1033 001534 000000
1034
1035 001536 000002
1036
1037 001540 032767 040000 176022
1038 001546 001404
1039 001550 005767 177572
1040 001554 100001
1041 001556 000002
1042 001560 052767 100000 177560
1043 001566 011600
1044 001570 162700 000002
1045 001574 000000
1046 001576 000002
1047
1048 001600 005767 175764
1049 001604 100003
1050 001606 116700 177524
1051 001612 000000
1052 001614 000207

;COMMON HALT ROUTINE
CHLT:  MOV    3%6,%0      ;DEVELOP ADDRESS OF CALLER.
        SUB    #2,%0
        HALT
        RTI
;UNCONDITIONAL ERROR HALT ROUTINE.
EHLT:  MOV    3%6,%0      ;DEVELOP ADDRESS OF CALLER.
        SUB    #2,%0
        HALT
        RTI
;DATA CHECK ROUTINE.
DTCHK:  CMPB   CRBUF,CRBUF+1 ;COMPARE EXPECTED AND RECEIVED
        BEQ   DTCHKA
DTHLT:  MOV    CRBUF,%0     ;CHARS. BRANCH IF SAME.
        HALT
        ;MOVE S/B AND WAS CHARS TO RD.
        ;DATA ERROR HALT. GOOD CHAR IN
        ;DATA LIGHTS LEFT. BAD CHAR IN DATA
        ;LIGHTS RIGHT. EXIT.
DTCHKA: RTI
;CONDITIONAL ERROR HALT.
ERR:    BIT    #SCOPSW,SR   ;CHECK SCOPE SWITCH.
        BEQ   ERR          ;BRANCH IF NO SCOPE DESIRED.
        TST   PRGID
        BPL   ERR          ;SCOPING WANTED. FIRST ERROR?
        RTI
        ;NO SCOPE IF FIRST ERROR.
        ;SCOPE EXIT.
ERRA:   BIS    #BIT15,PRGID ;SET ERROR INDICATOR.
        MOV    3%6,%0      ;DEVELOP CALLER'S ADDRESS.
        SUB    #2,%0
        HALT
        RTI
;ROUTINE END HALT SUBROUTINE.
SHALT:  TST    SR          ;CHECK HALT SWITCH.
        BPL   SHLTA       ;BRANCH IF NO HALT DESIRED.
        MOVB  RTNNO,%0    ;CURRENT TEST # TO RD.
        HALT
        RTI
SHLTA:  RTS    %7         ;ROUTINE END HALT.
        ;EXIT.

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1053										
1054	001616	012706	001304		START:	MOV	#SPBOT,%6		;SET BOTTOM OF SP STACK.	
1055	001622	005067	176150			CLR	PSW			
1056	001626	012767	000006	176150		MOV	#6,MACHER			
1057	001634	005067	177476			CLR	RTNNO			
1058	001640	016700	175724			MOV	SR,%0		;(SR) TO RO	
1059	001644	042700	177760			BIC	#177760,%0		;LIMIT (SR) TO BITS 3-0	
1060	001650	020027	000014			CMP	%0,#14		;COMPARE (SR) TO PROGRAM LIMIT	
1061	001654	101402				BLOS	CRTA		;VALID PROGRAM NUMBER?	
1062	001656	104010			INCPRG:	EHALT			;NO. INCORRECT PRG NUMBER	
1063	001660	000756				BR	START		;START OVER.	
1064	001662	005067	177460		CRTA:	CLR	PRGID			
1065	001666	010067	177436			MOV	%0,PRGNUM		;SAVE PROGRAM NUMBER AT PRGNUM	
1066	001672	006100				ROL	%0		;ROX2	
1067	001674	000170	001350			JMP	@PRGTAB(0)		;GO TO SELECTED PROGRAM.	
1068	001700	104005			SRSET:	CHALT			;SET SR OPTIONS DESIRED	
1069	001702	016767	177424	177430	GETRDY:	MOV	KSTART,NXTST		;ADDR OF 1ST ROUTINE TO NXTST	
1070	001710	000167	000314			JMP	CLEAN		;GO CLEAN UP.	
1071	001714	004767	000204		GTRDYA:	JSR	%7,FORWD		;ROLL FORWARD TO "NEXT" ROUTINE.	
1072	001720	032767	001000	175642	GTRDYB:	BIT	#SRTSW,SR		;CHECK FOR SELECT ROUTINE SWITCH	
1073	001726	001003				BNE	GTRDYC		;BRANCH IF SELECT ROUTINE SWITCH IS SET.	
1074	001730	004767	000246			JSR	%7,GOTST		;GO RUN CURRENT ROUTINE.	
1075	001734	000455				BR	CHNB		;NO GO. MANUAL RTN BYPASSED.	
1076	001736	016700	175626		GTRDYC:	MOV	SR,%0		;(SR) TO RO	
1077	001742	042700	177600			BIC	#177600,%0		;MASK UNDESIRED BITS	
1078	001746	126700	177364			CMPB	RTNNO,%0		;COMPARE RTNNO TO (RO)	
1079	001752	001004				BNE	GTRDYD		;BRANCH IF ROUTINE NOT FOUND YET.	
1080	001754	004767	000222			JSR	%7,GOTST		;GO RUN ROUTINE.	
1081	001760	104010				EHALT			;NO GO. MANUAL RTN SELECTED BYPASSED.	
1082	001762	000747				BR	GETRDY			
1083	001764	022767	177777	177346	GTRDYD:	CMP	#-1,NXTST		;NO. CHECK FOR LAST ROUTINE.	
1084	001772	001350				BNE	GTRDYA		;LAST ROUTINE?	
1085	001774	104010			INCRTN:	EHALT			;YES. INCORRECT ROUTINE SELECTED.	
1086	001776	000741				BR	GETRDY		;START OVER.	
1087	002000	005767	177342		CHAINN:	TST	PRGID		;TEST ERROR BIT IN PRGID.	
1088	002004	100013				BPL	CHNA		;BRANCH IF ERROR BIT NOT SET.	
1089	002006	032767	040000	175554		BIT	#SCOPSW,SR		;ERROR BIT SET. CHECK FOR SCOPE OPTION.	
1090	002014	001407				BEQ	CHNA		;SCOPE SWITCH SET IN SR?	
1091	002016	022767	177777	177320		CMP	#-1,SCOPTR		;YES. CHECK SCOPE ENTRY POINTER	
1092	002024	001403				BEQ	CHNA		;BRANCH IF SCOPE ENTRY IS -1.	
1093	002026	017716	177312			MOV	@SCOPTR,%6		;SET UP TO GO SCOPING	
1094	002032	000002				RTI			;GO TO SCOPE ENTRY.	
1095	002034	042767	100000	177304	CHNA:	BIC	#BIT15,PRGID		;CLEAR ERROR BIT IN PRGID.	
1096	002042	032767	004000	175520		BIT	#NITRSW,SR		;TEST INHIBIT ITERATION SWITCH	
1097	002050	001004				BNE	CHNAA		;INHIBIT ITERATION?	
1098	002052	005367	177264			DEC	ICTR		;NO	
1099	002056	001401				BEQ	CHNAA		;COUNT 0?	
1100	002060	000002				RTI			;NO. RETURN TO TEST ROUTINE	
1101	002062	022626			CHNAA:	POPSP2			;POP STACK TWICE	
1102	002064	004767	177510			JSR	%7,SHALT		;GO HALT IF HALT SWITCH IS SET	

1103											
1104	002070	032767	001000	175472	CHNB:	BIT	#SRTSW,SR				;CHECK SELECT ROUTINE SWITCH
1105	002076	001301				BNE	GETRDY				;SELECT ROUTINE SWITCH SET?
1106	002100	022767	177777	177232		CMP	#-1,NXTST				;NO.
1107	002106	001300				BNE	GTRDYA-4				;LAST TEST?
1108	002110	032767	002000	175452		BIT	#LPRGSW,SR				;YES. TEST LOOP PROGRAM SWITCH.
1109	002116	001271				BNE	GETRDY				;LOOP PROGRAM?
1110	002120	000000			PRGEND:	HALT					;NO. PROGRAM END.
1111	002122	000762				BR	CHNB				
1112	002124	016705	177210		FORWD:	MOV	NXTST,%5				;ADDR OF NEXT ROUTINE TO R5.
1113	002130	012567	177202			MOV	(5)+,RTNNO				;GET NEXT ROUTINE NUMBER.
1114	002134	012567	177200			MOV	(5)+,NXTST				;GET ADDR OF NEXT "NEXT" ROUTINE.
1115	002140	105767	177202			TSTB	PRGID				;CHECK IF PROGRAM SCOPE AND I COUNT
1116	002144	100407				BMI	FORWDB				;PARAMETERS. BRANCH IF NOT.
1117	002146	012567	177170			MOV	(5)+,ICTR				;GET ITERATION COUNT.
1118	002152	012567	177166			MOV	(5)+,SCOPTR				;GET SCOPE LOOP ENTRY POINTER.
1119	002156	010567	177152		FORWDA:	MOV	%5,CURTST				;ADDR OF NOW CURRENT TEST TO CURTST.
1120	002162	000207				RTS	%7				;EXIT FORWD SUBROUTINE.
1121	002164	012767	177777	177152	FORWDB:	MOV	#-1,SCOPTR				;FORCE "NO SCOPE"
1122	002172	012767	000001	177142		MOV	#1,ICTR				;FORCE I COUNT OF 1
1123	002200	000766				BR	FORWDA				
1124	002202	005767	177130		GOTST:	TST	RTNNO				;CHECK FOR MANUAL RTN.
1125	002206	100005				BPL	GOTSTA				;BRANCH IF NOT MANUAL RTN.
1126	002210	032767	000400	175352		BIT	#BYPMAN,SR				;MANUAL RTN. BYPASS IT?
1127	002216	001401				BEQ	GOTSTA				;NO. RUN IT.
1128	002220	000207				RTS	%7				;BYPASS MANUAL ROUTINE.
1129	002222	005726			GOTSTA:	POPSP					
1130	002224	000177	177104			JMP	@CURTST				;GO RUN TEST.
1131	002230	012767	000006	175546	CLEAN:	MOV	#6,MACHER				;RESET MACHER TRAP.
1132	002236	005067	175534			CLR	PSW				
1133	002242	012706	001304			MOV	#SPBOT,%6				;SET UP BOTTOM OF STACK.
1134	002246	104011				SRESET					
1135	002250	000167	177440			JMP	GTRDYA				
1136	002254	011646			EMTINT:	MOV	@%6,-(6)				;GET SAVED PC.
1137	002256	162716	000002			SUB	#2,@%6				;DECREMENT PC BY 2.
1138	002262	017616	000000			MOV	@(6),@%6				
1139	002266	121627	000022			CMPB	@%6,#22				;CHECK THAT CALL IS
1140	002272	101402				BLOS	EMTA				;WITHIN LIMITS.
1141	002274	000000				HALT					;CALL NOT WITHIN LIMITS.
1142	002276	000776				BR	.-2				
1143	002300	006116			EMTA:	ROL	@%6				;EMT ARG X 2.
1144	002302	042716	177001			BIC	#177001,@%6				;REMOVE 7 MSB.
1145	002306	062716	001400			ADD	#EMTTAB,@%6				;FORM EMT RTN ADDR.
1146	002312	017616	000000			MOV	@(6),@%6				
1147	002316	000136				JMP	@(6)+				;GO TO EMT ROUTINE.
1148	002320	011646			TRPINT:	MOV	@%6,-(6)				;GET SAVED PC.
1149	002322	162716	000002			SUB	#2,@%6				;DECREMENT PC BY 2.
1150	002326	017616	000000			MOV	@(6),@%6				
1151	002332	121627	000000			CMPB	@%6,#0				;CHECK THAT EMT
1152	002336	101402				BLOS	TRPA				;IS WITHIN LIMITS.
1153	002340	000000				HALT					;TRAP CALL NOT IN LIMIT.
1154	002342	000776				BR	.-2				

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1155 002344 006116 TRPA: ROL 0%6 ;TRAP ARG X 2.
1156 002346 042716 177001 BIC #177001,0%6 ;REMOVE 7 MSB.
1157 002352 062716 001446 ADD #TRPTAB,0%6 ;FORM TRAP RTN ADDR.
1158 002356 017616 000000 MOV 0(6),0%6
1159 002362 000136 JMP 0(6)+ ;GO TO TRAP ROUTINE.
1160 002364 005767 176736 CHK33: TST TTYTYP ;CHECK FOR 33.
1161 002370 001002 BNE .+6 ;BRANCH IF NOT 33.
1162 002372 062716 000002 ADD #2,0%6 ;+2 TO EXIT POINTER
1163 002376 000002 CHK330: RTI ;EXIT
1164 002400 022767 000001 176720 CHK35: CMP #1,TTYTYP ;CHECK FOR 35.
1165 002406 001002 BNE .+6 ;BRANCH IF NOT 35.
1166 002410 062716 000002 ADD #2,0%6 ;+2 TO EXIT POINTER
1167 002414 000002 RTI ;EXIT
1168 002416 032767 000010 176702 CKASR: BIT #BIT3,TTYTYP ;CHECK FOR ASR TTY.
1169 002424 001001 BNE .+4 ;BRANCH IF NOT ASR.
1170 002426 000002 RTI ;ASR. EXIT.
1171 002430 022626 POPSP2 ;POP STACK TWICE.
1172 002432 012767 000001 176702 MOV #1,ICTR ;FORCE I COUNT TO A 1.
1173 002440 104012 CHAIN ;CHAIN TO BYPASS ROUTINE.
1174 002442 012667 000030 :SAVE REGS 0 TO 4 SUBROUTINE.
1175 002446 012667 000026 SAVRG: MOV (6)+,SVRPC ;SAVE PC AND PSW.
1176 002452 010446 MOV (6)+,SVRPSW
1177 002454 010346 MOV %4,-(6) ;SAVE REGS 0 - 4
1178 002456 010246 MOV %3,-(6) ;IN STACK.
1179 002460 010146 MOV %2,-(6)
1180 002462 010046 MOV %1,-(6)
1181 002464 016746 000010 MOV SVRPSW,-(6) ;RESTORE PC AND PSW.
1182 002470 016746 000002 MOV SVRPC,-(6)
1183 002474 000002 RTI ;EXIT.
1184 002476 000000 SVRPC: OPEN
1185 002500 000000 SVRPSW: OPEN
1186 002502 012667 000030 :RESTORE REGS 0 TO 4 SUBROUTINE.
1187 002506 012667 000026 RSTRG: MOV (6)+,RSTPC ;SAVE PC AND PSW.
1188 002512 012600 MOV (6)+,RSTPSW
1189 002514 012601 MOV (6)+,%0 ;RESTORE REGS 0 - 4
1190 002516 012602 MOV (6)+,%1 ;FROM STACK.
1191 002520 012603 MOV (6)+,%2
1192 002522 012604 MOV (6)+,%3
1193 002524 016746 000010 MOV (6)+,%4
1194 002530 016746 000002 MOV RSTPSW,-(6) ;RESTORE PC AND PSW.
1195 002534 000002 MOV RSTPC,-(6)
1196 002536 000000 RTI ;EXIT
1197 002540 000000 RSTPC: OPEN
1198 002540 000000 RSTPSW: OPEN

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1201
1202
1203 002542 012767 000310 000302 :ROUTINE TO FETCH A CHARACTER
1204 002550 012777 000012 176536 AREAD: MOV #200, BRCTR ;SET UP DELAY COUNT.*****
1205 002556 105777 176524 ARDA: MOV #12, JTPB
1206 002562 100407 :CHECK DONE BIT.
1207 002564 104400 :BRANCH IF DONE.
1208 002566 000001 :DELAY 1 MILLISECOND.
1209 002570 005367 000256 :TIME UP?
1210 002574 001370 :BRANCH IF TIME NOT UP YET.
1211 002576 104010 :ERROR. NO RESPONSE FROM READER.
1212 002600 000760 :TRY AGAIN.
1213 002602 000207 :EXIT
1214
1215 002604 017667 000000 000012 :ROUTINE TO SET LSR INTERRUPT VECTOR AND PRIORITY
1216 002612 062716 000002 STLSRV: MOV @ (6), STPRA+2 ;MOVE VECTOR ADDR TO STPRA+2
1217 002616 016701 176474 :SET UP EXIT
1218 002622 012721 000000 STPRA: MOV #OPEN, (1)+ ;SET VECTOR ADDRESS
1219 002626 016721 176466 :SET PRIORITY
1220 002632 000002 :EXIT
1221
1222 002634 017667 000000 000012 :ROUTINE TO SET LSP INTERRUPT VECTOR AND PRIORITY.
1223 002642 062716 000002 STLSPV: MOV @ (6), STPPA+2 ;MOVE VECTOR ADDR TO STPPA+2
1224 002646 016701 176450 :SET UP EXIT
1225 002652 012721 000000 STPPA: MOV #OPEN, (1)+ ;SET VECTOR ADDRESS.
1226 002656 016721 176442 :SET PRIORITY
1227 002662 000002 :EXIT.
1228
1229 002664 012700 052525 :ROUTINE TO ISSUE RESET.
1230 002670 005100 SRSETT: MOV #52525, %0 ;DATA TO RO.
1231 002672 010067 177770 COM %0 ;COMPLEMENT (RO)
1232 002676 000005 MOV %0, SRSETT+2 ;(RO) TO SRSETT+2.
1233 002700 000002 RESET ;ISSUE RESET. (RO) IS
1234 :RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.
1235 002702 016700 000042 RNGEN: MOV RP1, %0
1236 002706 006100 ROL %0
1237 002710 006100 ROL %0
1238 002712 066700 000034 ADD RP2, %0
1239 002716 010067 000026 MOV %0, RP1
1240 002722 006100 ROL %0
1241 002724 006100 ROL %0
1242 002726 066700 000020 ADD RP2, %0
1243 002732 006100 ROL %0
1244 002734 006100 ROL %0
1245 002736 010067 000010 MOV %0, RP2
1246 002742 016700 000002 MOV RP1, %0
1247 002746 000207 RTS %7 ;EXIT. NUMBER IN RO
1248 002750 001233 RP1: 1233
1249 002752 007622 RP2: 7622

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1250	002754	104006			BREAD:	STRDRV			:SET READER VECTOR
1251	002756	003022				BREADB			:TO BREADB
1252	002760	052777	000101	176320		BIS	#101,DTKS		:ENABLE LSR AND LSRI.
1253	002766	012767	177777	000056		MOV	#177777,BRCTR		:DELAY APPROX. 400 MSECS.
1254	002774	005367	000052			DEC	BRCTR		
1255	003000	001375				BNE	-4		
1256	003002	005077	176300			CLR	DTKS		:CLEAR LSRI ENABLE.
1257	003006	104010				EHALT			:NO RESPONSE HALT.
1258	003010	000761				BR	BREAD		:TRY AGAIN.
1259	003012	117767	176272	176432	BREADA:	MOV	DTKB,CRBUF		:CHAR READ TO CRBUF.
1260	003020	000207				RTS	%7		:EXIT SUBROUTINE.
1261	003022	005077	176260		BREADB:	CLR	DTKS		:CLEAR LSR INTERRUPT ENABLE.
1262	003026	105777	176254			TSTB	DTKS		:TEST FOR DONE.
1263	003032	100003				BPL	BREADC		:BRANCH IF DONE NOT SET.
1264	003034	012716	003012			MOV	#BREADA,%6		:MODIFY INTERRUPT EXIT TO BREADA.
1265	003040	000002				RTI			:OK. EXIT INTERRUPT.
1266	003042	000000			BREADC:	HALT			:HALT. DONE BIT NOT SET AFTER INTERRUPT.
1267	003044	012716	002754			MOV	#BREAD,%6		:SET UP TO RETRY.
1268	003050	000002				RTI			:EXIT INTERRUPT.
1269	003052	000000			BRCTR:	OPEN			
1270						:SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.			
1271	003054	011600			TYP:	MOV	%6,%0		:GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
1272	003056	062716	000002			ADD	#2,%6		:SET UP EXIT.
1273	003062	011000				MOV	%0,%0		:ADDRESS OF MESSAGE TO RD.
1274	003064	112067	000104		TYP A:	MOV	(0)+,TYPDAT		:GET CHARACTER
1275	003070	122767	000100	000076		CMPB	#100,TYPDAT		:CHECK FOR"Q"CHARACTER
1276	003076	001001				BNE	TYP C		:BRANCH IF NOT"Q".
1277	003100	000002				RTI			:TERMINATOR CHAR. DONE. EXIT.
1278	003102	122767	000045	000064	TYP C:	CMPB	#45,TYPDAT		:CHECK FOR"%".
1279	003110	001416				BEQ	TYP F		:BRANCH IF"%".
1280	003112	122767	000043	000054		CMPB	#43,TYPDAT		:NOT"%".CHECK FOR"#".
1281	003120	001417				BEQ	TYP G		:BRANCH IF"#".
1282	003122	004767	000002			JSR	%7,TYPD		:TYPE CHAR IN TYPDAT
1283	003126	000756				BR	TYP A		
1284	003130	116777	000040	176156	TYP D:	MOV	TYPDAT,%TPB		:OUTPUT CHARACTER TO PRINTER
1285	003136	105777	176150			TSTB	DTPS		:WAIT FOR DONE FLAG.
1286	003142	100375				BPL	-4		
1287	003144	000207				RTS	%7		:EXIT
1288	003146	112767	000015	000020	TYP F:	MOV	#15,TYPDAT		:MOVE CARRIAGE RETURN CODE TO TYPDAT
1289	003154	004767	177750			JSR	%7,TYPD		:GO TYPE CHAR.
1290	003160	112767	000012	000006	TYP G:	MOV	#12,TYPDAT		:MOVE LF CODE TO TYPDAT.
1291	003166	004767	177736			JSR	%7,TYPD		:GO TYPE CHAR.
1292	003172	000734				BR	TYP A		
1293	003174	000000			TYPDAT:	OPEN			
1294						:SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER			
1295	003176	011600			TYP S:	MOV	%6,%0		:GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1296	003200	062716	000002			ADD	#2,%6		:UPDATE TO NEXT MESSAGE ADDRESS
1297	003204	011067	000014			MOV	%0,TYP SB		:ADDRESS OF MESSAGE TO TYP SB
1298	003210	022767	177777	000006		CMP	#-1,TYP SB		:CHECK FOR TERMINATOR
1299	003216	001001				BNE	TYP SA		:BRANCH IF NOT TERMINATOR.
1300	003220	000002				RTI			:TERMINATOR. EXIT
1301	003222	104000			TYP SA:	TYPE			:CALL ON TYP SUB TO TYPE MESSAGE
1302	003224	000000			TYP SB:	OPEN			:ADDRESS OF MESSAGE GOES HERE
1303	003226	000763				BR	TYP S		:GO PROCESS NEXT MESSAGE

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1304      :SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
1305      DLY:  MOV    3%6,DLCNT      ;GET DELAY COUNT ADDRESS.
1306      ADD    #2,3%6             ;SET UP EXIT ADDRESS
1307      MOV    3DLCNT,-(6)        ;DELAY COUNT TO STACK
1308      CLR    PSW                 ;SET PRIORITY 0
1309      DLYA: MOV    #226,-(6)     ;1 MSEC COUNT TO STACK
1310      DLYB: DEC    3%6           ;DECREMENT 1 MSEC COUNT
1311      BNE    DLYB              ;BRANCH IF NOT 0.
1312      FOPSP                      ;ZERO. UNCOVER MSECS. COUNT.
1313      DEC    3%6               ;DECREMENT IT
1314      BNE    DLYA              ;BR IF NOT DONE DELAYING
1315      POPSP                      ;DONE
1316      RTI                       ;EXIT.
1317      DLcnt: OPEN                ;CONTAINS MILLISECONDS COUNT ADDRESS.
1318      :SUBROUTINE TO STALL A RANDOM NUMBER OF MILLISECONDS. MAXIMUM STALL
1319      :DETERMINED BY CONTENTS OF LOC STLMSK.
1320      STAL: BIT    #BIT14,PRGID  ;TEST FOR STALLS ALLOWED.
1321      BNE    STALAA             ;ALLOWED.
1322      RTI                       ;NOT ALLOWED.
1323      STALAA: JSR   %7,RNGEN     ;GO GET RANDOM NUMBER.
1324      BIC   STLMSK,%0          ;# IN RD. APPLY STALL MASK.
1325      BEQ   STALB              ;BRANCH IF RESULT IS 0.
1326      MOV   %0,STALA
1327      DELAY
1328      STALA: OPEN                ;DELAY
1329      STALB: RTI                 ;DELAY COUNT
1330      STLMSK: OPEN              ;DONE. EXIT.
1331      :SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT
1332      GRcnt: JSR   %7,RNGEN     ;GET RANDOM NUMBER
1333      BIC   RCMSK,%0           ;APPLY MASK
1334      BEQ   GRcnt              ;TRY AGAIN IF RESULT 0
1335      MOV   %0,RNCNT           ;COUNT TO RNCNT
1336      RTS    %7                ;EXIT.
1337      RCMSK: OPEN                ;RANDOM CHARACTER MASK.
1338      RNCNT: OPEN                ;RANDOM CHARACTER COUNT.
1339      :SUBROUTINE TO COMPARE DATA READ FROM READER AGAINST EXPECTED DATA AND REPORT ERRORS.
1340      BCHECK: JSR   %7,GTBIN     ;GET BIN CHARACTER(IN RD)
1341      MOV   %0,CBUBF+1         ;S/B CHAR TO CBUBF+1
1342      CMPB  CBUBF,CBUBF+1      ;COMPARE S/B AND WAS CHARS.
1343      BNE   .+4                ;BRANCH IF NOT SAME.
1344      RTS   %7                 ;SAME. EXIT.
1345      DATHLT                      ;GO HALT AND DISPLAY DATA.
1346      DEC  ERCTR                ;3 ERRORS?
1347      BNE   .+6                ;BRANCH IF NOT 3 YET.
1348      JSR   %7,BSYNC           ;3 ERRORS. RESYNC READER.
1349      RTS    %7                ;EXIT.

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1350      :SUBROUTINE TO SYNC THE LSR TO A SPECIAL BINARY COUNT PATTERN TEST TAPE.
1351 003420 004767 000162      BSYNC: JSR    %7, INBIN      ;INITIALIZE BINARY PATTERN
1352 003424 004767 177324      JSR    %7, BREAD      ;READ CHAR AND STORE AT CHR1
1353 003430 116767 176016 176016  MOVB   CRBUF, CHR1
1354 003436 004767 177312      JSR    %7, BREAD      ;READ CHAR AND STORE AT CHR2
1355 003442 116767 176004 176006  MOVB   CRBUF, CHR2
1356 003450 004767 177300      JSR    %7, BREAD      ;READ CHAR AND STORE AT CHR3.
1357 003454 116767 175772 175776  MOVB   CRBUF, CHR3
1358 003462 004767 000012      JSR    %7, SYNCA      ;GO SYNC
1359 003466 000754      BR     BSYNC          ;NO SYNC. TRY AGAIN.
1360 003470 012767 000003 175764  MOV    #3, ERCTR
1361 003476 000207      RTS    %7
1362 003500 012767 001000 000074 SYNCA: MOV    #512, SYCTRA ;512 TO SYCTRA
1363 003506 012767 000012 000070 SYNCA: MOV    #10, SYCTRB ;10 TO SYCTRB
1364 003514 004767 000124      SYNCA: JSR    %7, GTBIN ;GET BIN CHARACTER(CHAR IN RO)
1365 003520 120067 175730      SYNCA: CMPB   %0, CHR1 ;COMPARE TO CHR1
1366 003524 001373      SYNCA: BNE    SYNCB      ;BRANCH IF NOT EQUAL
1367 003526 004767 000112      SYNCA: JSR    %7, GTBIN ;SAME. GET ANOTHER BIN CHAR.
1368 003532 120067 175720      SYNCA: CMPB   %0, CHR2 ;COMPARE TO CHR2
1369 003536 001405      SYNCA: BEQ    SYNCD      ;BRANCH IF EQUAL
1370 003540 005367 000036      SYNCA: DEC    SYCTRA    ;DECREMENT SYCTRA
1371 003544 001363      SYNCA: BNE    SYNCC      ;BRANCH IF NOT DONE 512 TIMES.
1372 003546 104010      SYNCC: EHALT ;DONE 512. SYNC ERROR.
1373 003550 000207      SYNCC: RTS    %7
1374 003552 004767 000066      SYNCD: JSR    %7, GTBIN ;GET BIN CHARACTER
1375 003556 120067 175676      SYNCD: CMPB   %0, CHR3 ;COMPARE TO CHR3
1376 003562 001404      SYNCD: BEQ    SYNCE      ;BRANCH IF SAME
1377 003564 005367 000014      SYNCD: DEC    SYCTRB    ;DECREMENT SYCTRB.
1378 003570 001351      SYNCD: BNE    SYNCC      ;BRANCH IF NOT DONE 10 TIMES
1379 003572 000765      SYNCD: BR     SYNCC
1380 003574 062716 000002      SYNCE: ADD    #2, %6    ;SYNC ERROR. BRANCH
1381 003600 000207      SYNCE: RTS    %7      ;SET UP SUCCESS EXIT
1382 003602 000000      SYNCE: RTS    %7      ;EXIT.
1383 003604 000000
1384      :SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
1385 003606 012767 177777 000014 INBIN: MOV    #-1, RIND ;SET ALL VARIABLES
1386 003614 004567 000300      INBIN: JSR    %5, BMOVE ;TO MINUS 1.
1387 003620 003630      INBIN: RIND
1388 003622 003631      INBIN: RIND+1
1389 003624 000013      INBIN: 11.
1390 003626 000207      INBIN: RTS    %7      ;EXIT
1391 003630 000000      RIND: OPEN
1392 003632 000000      PTO:  OPEN
1393 003634 000000      PT1:  OPEN
1394 003636 000000      PIND: OPEN
1395 003640 000000      PTOP: OPEN
1396 003642 000000      PTIP: OPEN

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1397
1398
1399 003644 016767 177762 177762 ;SPECIAL BINARY COUNT PATTERN SUBROUTINE. EXITS WITH BIN CHAR IN RO
1400 003652 005167 177756 GTBIN: MOV PTO,PT1 ;PREVIOUS BIN CHAR TO PT1
1401 003656 005167 177746 COM PT1
1402 003662 001002 COM RIND
1403 003664 005267 177744 BNE .+6
1404 003670 042767 177400 177736 INC PT1
1405 003676 016767 177732 177726 BIC #177400,PT1 ;MASK TO 8 BITS
1406 003704 016700 177724 MOV PT1,PTO ;SAVE BIN CHAR IN PTO
1407 003710 000207 MOV PT1,%0 ;BIN CHAR TO RO.
1408 003712 016767 177722 177722 GTBINP: MOV %7 ;EXIT.
1409 003720 005167 177716 MOV PTO,PTIP ;PREVIOUS BIN CHAR TO PTIP
1410 003724 005167 177706 COM PTIP
1411 003730 001002 COM PIND
1412 003732 005267 177704 BNE .+6
1413 003736 042767 177400 177676 177666 INC PTIP
1414 003744 016767 177672 BIC #177400,PTIP ;MASK TO 8 BITS.
1415 003752 016701 177664 MOV PTIP,PTOP ;SAVE BIN CHAR IN PTO.
1416 003756 000207 MOV PTIP,%1 ;BIN CHAR TO R1.
1417 ;OCTAL TO ASCII CONVERT ROUTINES ;EXIT.
1418 003760 012500 ACNV6: MOV (5)+,%0 ;CONVERT TO 6 ASCII. GET OCTAL ADDRESS
1419 003762 012567 000012 MOV (5)+,ACNV6 ;GET ASCII ADDRESS
1420 003766 004767 000052 JSR %7,ACNV ;CONVERT TO ASCII
1421 003772 004567 000122 JSR %5,BMOVE ;MOVE 6 CHARS TO ASCII ADDRESS
1422 003776 004034 AIST
1423 004000 000000 ACNVB: OPEN
1424 004002 000006 6
1425 004004 000205 RTS %5 ;EXIT
1426 004006 012500 ACNV4: MOV (5)+,%0 ;CONVERT TO 4 ASCII. GET OCTAL ADDRESS
1427 004010 012567 000012 MOV (5)+,ACNV4 ;GET ASCII ADDRESS
1428 004014 004767 000024 JSR %7,ACNV ;CONVERT TO ASCII
1429 004020 004567 000074 JSR %5,BMOVE ;MOVE 4 CHARS TO ASCII ADDRESS.
1430 004024 004036 AIST+2
1431 004026 000000 ACNVC: OPEN
1432 004030 000004 4
1433 004032 000205 RTS %5 ;EXIT
1434 004034 000000 AIST: OPEN
1435 004036 000000 OPEN
1436 004040 000000 OPEN
1437 004042 000000 ACNVX: OPEN
1438 004044 012701 004042 ACNV: MOV #AIST+6,%1 ;ADDR TO STORE ASCII TO R1
1439 004050 012702 000006 MOV #6,%2 ;6 TO R2
1440 004054 011067 177762 MOV 3%0,ACNVX ;OCTAL WORD TO ACNVX
1441 004060 016703 177756 ACNVM: MOV ACNVX,%3
1442 004064 042703 177770 BIC #177770,%3 ;ISOLATE LEAST SIGNIFICANT OCTAL #
1443 004070 062703 000060 ADD #60,%3 ;ADD 60 TO CONVERT TO ASCII
1444 004074 110341 MOVB %3,-(1) ;STORE ASCII BYTE
1445 004076 006067 177740 ROR ACNVX ;MOVE NEXT OCTAL DIGIT TO LEAST
1446 004102 006067 177734 ROR ACNVX ;SIGNIFICANT POSITION
1447 004106 006067 177730 ROR ACNVX
1448 004112 005302 DEC %2 ;DONE 6 TIMES?
1449 004114 001361 BNE ACNVM ;NO. REPEAT.
1450 004116 000207 RTS %7 ;YES. EXIT.

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1451
1452 ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
1453 004120 104020 BMOVE: SAVREG ;SAVE REGS.
1454 004122 012501 MOV (5)+,%1 ;GET"FROM"ADDRESS
1455 004124 012502 MOV (5)+,%2 ;GET"TO"ADDRESS
1456 004126 012503 MOV (5)+,%3 ;GET COUNT
1457 004130 112122 BMOVA: MOVB (1)+,(2)+ ;MOVE BYTE
1458 004132 005303 DEC %3 ;DECREMENT COUNT
1459 004134 001375 BNE BMOVA ;BRANCH IF NOT DONE.
1460 004136 104021 RSTREG ;RESTORE REGS.
1461 004140 000205 RTS %5 ;DONE EXIT
1462 ;SUBROUTINE TO CHECK FOR PUNCH READY.
1463 004142 105777 175144 CPRDY: TSTB %TPS ;TEST FOR READY BIT.
1464 004146 100001 BPL CPRDYA ;BRANCH IF READY NOT SET.
1465 004150 000207 RTS %7 ;OK. EXIT.
1466 004152 104010 CPRDYA: EHALT ;NOT READY. HALT.
1467 004154 000772 BR CPRDY
1468 ;SUBROUTINE TO PUNCH ON LSP CHARACTER IN REG D.
1469 004156 004767 177760 LSPCH: JSR %7,CPRDY ;GO CHECK FOR PUNCH READY.
1470 004162 010077 175126 MOV %0,%TPB ;LOAD PUNCH BUFFER.
1471 004166 105777 175120 TSTB %TPS ;WAIT FOR DONE.
1472 004172 100375 BPL -4
1473 004174 005000 CLR %0
1474 004176 000207 RTS %7 ;DONE. EXIT.
1475 ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
1476 004200 012700 011672 BDCNV: MOV #DECVAL,%0 ;SET UP ADDR TO STORE DECIMAL ASCII IN R0
1477 004204 013501 MOV @(%5)+,%1 ;BINARY VALUE TO R1.
1478 004206 012702 004306 MOV #ADTENP,%2 ;ADDR OF TEN POWER STRING TO R2.
1479 004212 012767 000005 000060 BDCNVA: MOV #5,CNVCTR ;SET UP FOR 5 POWER CONVERSIONS.
1480 004220 012267 000060 MOV (%2)+,TENPWR ;MOVE POWER OF TEN VALUE TO TENPWR.
1481 004224 004767 000010 JSR %7,SUBTEN ;PERFORM CONVERSION
1482 004230 005367 000044 DEC CNVCTR ;DONE 5 CONVERSIONS?
1483 004234 001371 BNE BDCNVA ;BRANCH IF NOT YET 5.
1484 004236 000205 RTS %5 ;YES. EXIT.
1485 004240 005067 000036 SUBTEN: CLR DIGIT ;CLEAR DIGIT
1486 004244 166701 000034 SUBTNA: SUB TENPWR,%1 ;SUBTRACT TEN POWER FROM BINARY VALUE.
1487 004250 103403 BCS SUBTNB ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
1488 004252 005267 000024 INC DIGIT
1489 004256 000772 BR SUBTNA
1490 004260 066701 000020 SUBTNB: ADD TENPWR,%1 ;RESTORE SUBTRACTED VALUE.
1491 004264 062767 000060 000010 ADD #60,DIGIT ;CONVERT (DIGIT) TO ASCII
1492 004272 116720 000004 MOVB DIGIT,(0)+ ;MOVE ASCII CHAR TO DECVAL FIELD.
1493 004276 000207 RTS %7 ;EXIT.
1494 004300 000000 CNVCTR: OPEN
1495 004302 000000 DIGIT: OPEN
1496 004304 000000 TENPWR: OPEN
1497 004306 023420 ADTENP: 10000.
1498 004310 001750 1000.
1499 004312 000144 100.
1500 004314 000012 10.
1501 004316 000001 1

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1502
1503
1504 004320 012767 000122 000024 ;SUBROUTINE TO TYPE A LINE OF CHARACTERS
1505 004326 012704 012103 TYPLN: MOV #82, TCTR ;80 TO CHAR COUNT +CR, LF
1506 004332 104002 TYPLA: MOV #BLOCKA, %4 ;SET LINE ADDRESS IN R4.
1507 004334 112400 TYPLB: STALL ;STALL IF ALLOWED.
1508 004336 004767 177614 MOVB (4)+, %0 ;GET CHARACTER
1509 004342 005367 000004 JSR %7, LSPCH ;GO OUTPUT CHARACTER.
1510 004346 001371 DEC TCTR ;DONE?
1511 004350 000207 BNE TYPLB ;BRANCH IF NOT DONE.
1512 004352 000000 RTS %7 ;DONE. EXIT
1513
1514 004354 011667 000016 ;SUBROUTINE TO TYPE LINE OF 3 CHARACTERS
1515 004360 017767 000012 000010 TYPL3: MOV @%6, TPL3A ;DEVELOP AND SET ADDRESS OF
1516 004366 062716 000002 MOV @TPL3A, TPL3A ;DATA IN TPL3A.
1517 004372 004567 000034 ADD #2, @%6 ;SET UP EXIT.
1518 004376 000000 JSR %5, FBF3 ;FILL BUFFER WITH 3 CHARACTERS
1519 004400 042767 040000 174740 TPL3A: OPEN
1520 004406 004767 177706 BIC #BIT14, PRGID ;DISABLE STALLS.
1521 004412 000002 JSR %7, TYPLN ;GO TYPE LINE OF CHARACTERS.
1522 004414 112767 000015 005461 STBF: MOVB #15, BLOCKA ;EXIT
1523 004422 112767 000012 005454 MOVB #12, BLOCKA+1 ;SUB TO SET UP BUFFER AREA.
1524 004430 000207 RTS %7 ;EXIT
1525
1526 004432 012567 000004 ;SUBROUTINE TO FILL CHARACTER BUFFER WITH 3 CHARACTERS.
1527 004436 004567 177456 FBF3: MOV (5)+, FBF3A ;MOVE 3 CHARS TO BUFFER.
1528 004442 000000 JSR %5, BMOVE
1529 004444 012105 FBF3A: OPEN
1530 004446 000003 BLOCK1
1531 004450 004567 177444 FBF3B: JSR %5, BMOVE ;FILL 80 CHARACTERS BUFFER
1532 004454 012105 BLOCK1 ;WITH 3 CHARACTERS
1533 004456 012110 BLOCK1+3
1534 004460 000116 78.
1535 004462 004567 177432 JSR %5, BMOVE
1536 004466 012105 BLOCK1
1537 004470 012217 BLOCK2
1538 004472 000120 80.
1539 004474 000205 RTS %5 ;EXIT
1540
1541 ;SUBROUTINE TO FILL BUFFER WITH ALL CHARACTERS
1542 004476 004567 177416 FBALL: JSR %5, BMOVE ;FILL 80 CHAR BUFFER WITH
1543 004502 010730 A ;ALL CHARACTERS
1544 004504 012105 BLOCK1
1545 004506 000063 63
1546 004510 004567 177404 JSR %5, BMOVE
1547 004514 010730 A
1548 004516 012204 BLOCK1+63.
1549 004520 000022 18.
1550 004522 004567 177372 JSR %5, BMOVE
1551 004526 012105 BLOCK1
1552 004530 012217 BLOCK2
1553 004532 000120 80.
1554 004534 000207 RTS %7 ;EXIT.

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1555
1556 ;PRG0 - INPUT-OUTPUT LOGIC TESTS
1557 004536 012767 004550 174566 PRG0:  MOV #ATO,KSTART ;ADDRESS OF 1ST ROUTINE TO KSTART.
1558 004544 000167 175130          JMP  SRSET ;GO GET STARTED.
1559 ;TEST ABILITY TO REFERENCE THE KEYBOARD/READER STATUS WORD (TKS)
1560 004550 000000          ATO:   0 ;TEST #.
1561 004552 004602          AT1    1000. ;NEXT TEST.
1562 004554 001750          ATOA   ;I COUNT.
1563 004556 004566          MOV #ATOE,MACHER ;SCOPE ENTRY.
1564 004560 012767 004576 173216 ATOA:  TST  @TKS ;SET UP MACHINE ERROR TRAP.
1565 004566 005777 174514          ATOB:  CHAIN ;REFERENCE CODER STATUS WORD.
1566 004572 104012          BR    ATOA ;CHAIN
1567 004574 000774          ATOE:  ERROR ;REPEAT TEST.
1568 004576 104003          BR    ATOB ;ERROR. TRAPPED WHEN REFERENCING READER.
1569 004600 000774          ;TEST ABILITY TO REFERENCE THE KEYBOARD/READER BUFFER (TKB).
1570 ;TEST ABILITY TO REFERENCE THE KEYBOARD/READER BUFFER (TKB).
1571 004602 000001          AT1:   1 ;TEST #.
1572 004604 004634          AT2    1000. ;NEXT TEST.
1573 004606 001750          AT1A   ;I COUNT.
1574 004610 004620          MOV #AT1E,MACHER ;SCOPE ENTRY.
1575 004612 012767 004630 173164 AT1A:  TST  @TKB ;SET UP MACHINE ERROR TRAP
1576 004620 005777 174464          AT1B:  CHAIN ;REFERENCE READER BUFFER.
1577 004624 104012          BR    AT1A ;CHAIN
1578 004626 000774          AT1E:  ERROR ;REPEAT TEST.
1579 004630 104003          BR    AT1B ;ERROR. TRAPPED WHEN REFERENCING
1580 004632 000774          ;TEST ABILITY TO REFERENCE PUNCH/PRINTER STATUS WORD (TPS).
1581 ;TEST ABILITY TO REFERENCE PUNCH/PRINTER STATUS WORD (TPS).
1582 004634 000002          AT2:   2 ;TEST #.
1583 004636 004666          AT3    1000. ;NEXT TEST
1584 004640 001750          AT2A   ;I COUNT.
1585 004642 004652          MOV #AT2E,MACHER ;SCOPE ENTRY.
1586 004644 012767 004662 173132 AT2A:  TST  @TPS ;SETUP MACHINE ERROR TRAP.
1587 004652 005777 174434          AT2B:  CHAIN ;REFERENCE PUNCH/PRINTER STATUS WORD.
1588 004656 104012          BR    AT2A ;CHAIN
1589 004660 000774          AT2E:  ERROR ;REPEAT TEST.
1590 004662 104003          BR    AT2B ;ERROR. TRAPPED WHEN REFERENCING
1591 004664 000774          ;TEST ABILITY TO REFERENCE PUNCH/PRINTER BUFFER (TPB).
1592 ;TEST ABILITY TO REFERENCE PUNCH/PRINTER BUFFER (TPB).
1593 004666 000003          AT3:   3 ;TEST #.
1594 004670 004720          AT4    1000. ;NEXT TEST
1595 004672 001750          AT3A   ;I COUNT.
1596 004674 004704          MOV #AT3E,MACHER ;SCOPE ENTRY.
1597 004676 012767 004714 173100 AT3A:  TST  @TPB ;SETUP MACHINE ERROR TRAP.
1598 004704 005777 174404          AT3B:  CHAIN ;REFERENCE PUNCH/PRINTER BUFFER.
1599 004710 104012          BR    AT3A ;CHAIN
1600 004712 000774          AT3E:  ERROR ;REPEAT TEST.
1601 004714 104003          BR    AT3B ;ERROR. TRAPPED WHEN REFERENCING
1602 004716 000774          ;PUNCH/PRINTER BUFFER. (TPS).

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1603
1604          ;TEST ABILITY TO SET AND CLEAR READER/KYBD ID BIT
1605 004720 000004          AT4: 4          ;TEST #
1606 004722 005004          AT5          ;NEXT TEST
1607 004724 001750          1000.          ;I COUNT
1608 004726 004736          AT4A          ;SCOPE ENTRY
1609 004730 012767 000340 173040          MOV #PRTY7,PSW          ;SET PRIORITY 7.
1610 004736 052777 000100 174342 AT4A: BIS #BIT6,@TKS          ;SET ID BIT IN TKS.
1611 004744 032777 000100 174334          BIT #BIT6,@TKS          ;CHECK ID BIT IN TKS
1612 004752 001002          BNE AT4B          ;BRANCH IF ID BIT IS SET.
1613 004754 104003          AT4E1: ERROR          ;ERROR 1 ID BIT NOT SET.
1614 004756 000410          BR AT4C          ;
1615 004760 042777 000100 174320 AT4B: BIC #BIT6,@TKS          ;CLEAR ID BIT IN TKS
1616 004766 032777 000100 174312          BIT #BIT6,@TKS          ;CHECK ID BIT IN TKS.
1617 004774 001401          BEQ AT4C          ;BRANCH IF ID BIT IS CLEARED.
1618 004776 104003          AT4E2: ERROR          ;ERROR. ID BIT FAILED TO CLEAR.
1619 005000 104012          AT4C: CHAIN          ;CHAIN
1620 005002 000755          BR AT4A          ;REPEAT TEST.
1621          ;TEST ABILITY TO CLEAR ID BIT WITH RESET INSTRUCTION.
1622 005004 000005          AT5: 5          ;TEST #
1623 005006 005050          AT24          ;NEXT TEST
1624 005010 000144          100.          ;I COUNT
1625 005012 005022          AT5A          ;SCOPE ENTRY.
1626 005014 012767 000340 172754          MOV #PRTY7,PSW          ;SET PRIORITY 7.
1627 005022 052777 000100 174256 AT5A: BIS #BIT6,@TKS          ;SET ID BIT IN TKS
1628 005030 104011          SRESET          ;RESET
1629 005032 032777 000100 174246          BIT #BIT6,@TKS          ;TEST ID BIT.
1630 005040 001401          BEQ AT5B          ;BRANCH IF ID BIT IS CLEAR.
1631 005042 104003          AT5E: ERROR          ;ERROR. RESET FAILED TO CLEAR ID BIT.
1632 005044 104012          AT5B: CHAIN          ;CHAIN
1633 005046 000765          BR AT5A          ;REPEAT TEST.

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1634
1635      ;TEST ABILITY TO SET AND CLEAR PUNCH ID BIT
1636 005050 000024      AT24: 24      ;TEST#
1637 005052 005134      ;NEXT TEST.
1638 005054 001750      ;I COUNT
1639 005056 005066      ;SCOPE ENTRY.
1640 005060 012767 000340 172710      MOV #PRTY7,PSW      ;SET PRIORITY 7.
1641 005066 052777 000100 174216      AT24A: BIS #BIT6,@TPS      ;SET PUNCH ID BIT.
1642 005074 032777 000100 174210      BIT #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1643 005102 001002      BNE AT24B      ;BRANCH IF PUNCH ID BIT IS SET.
1644 005104 104003      AT24E1: ERROR      ;ERROR1. PUNCH ID BIT DID NOT SET.
1645 005106 000410      BR AT24C
1646 005110 042777 000100 174174      AT24B: BIC #BIT6,@TPS      ;CLEAR PUNCH ID BIT.
1647 005116 032777 000100 174166      BIT #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1648 005124 001401      BEQ AT24C      ;BRANCH IF PUNCH ID BIT IS CLEAR
1649 005126 104003      AT24E2: ERROR      ;ERROR2. PUNCH ID BIT FAILED TO CLEAR.
1650 005130 104012      AT24C: CHAIN      ;CHAIN
1651 005132 000776      BR AT24C      ;REPEAT TEST
1652      ;TEST ABILITY TO CLEAR PUNCH ID BIT WITH RESET INSTRUCTION
1653 005134 000025      AT25: 25      ;TEST#
1654 005136 005200      ;NEXT TEST.
1655 005140 000144      ;I COUNT.
1656 005142 005152      ;SCOPE ENTRY.
1657 005144 012767 000340 172624      MOV #PRTY7,PSW      ;SET PRIORITY 7.
1658 005152 052777 000100 174132      AT25A: BIS #BIT6,@TPS      ;SET PUNCH ID BIT.
1659 005160 104011      SRESET      ;RESET
1660 005162 032777 000100 174122      BIT #BIT6,@TPS      ;CHECK PUNCH ID BIT.
1661 005170 001401      BEQ AT25B      ;BRANCH IF PUNCH ID BIT IS CLEAR.
1662 005172 104003      AT25E: ERROR      ;ERROR. RESET FAILED TO CLEAR PUNCH ID BIT.
1663 005174 104012      AT25B: CHAIN      ;CHAIN
1664 005176 000765      BR AT25A      ;REPEAT TEST.

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M03

1665					;TEST THAT RESET SETS THE PUNCH READY BIT, AND THAT READY CAN BE READ RELIABLY.
1666					AT30: 30 ;TEST#
1667	005200	000030			;NEXT TEST
1668	005202	005224			;I COUNT
1669	005204	001750			;SCOPE ENTRY
1670	005206	005210			;CHECK PUNCH READY.
1671	005210	105777	174076	AT30A: TSTB @TPS	;BRANCH IF PUNCH READY IS SET.
1672	005214	100401		BMI AT30B	;ERROR. RESET FAILED TO SET READY, OR FAILED TO READ IT
1673	005216	104003		AT30E: ERROR	;CHAIN
1674	005220	104012		AT30B: CHAIN	;REPEAT TEST.
1675	005222	000772		BR AT30A	;LOADING PUNCH BUFFER.
1676					;TEST THAT PUNCH READY RESETS BY
1677	005224	000031		AT31: 31 ;TEST#	
1678	005226	005264			;NEXT TEST
1679	005230	000024			;I COUNT
1680	005232	005234			;SCOPE ENTRY
1681	005234	104400		AT31A: DELAY	;WAIT 150 MSECS
1682	005236	000226		150.	
1683	005240	104011		SRESET	;RESET
1684	005242	012777	000040 174044	MOV #40,@TPB	;LOAD PUNCH BUFFER
1685	005250	105777	174036	TSTB @TPS	;CHECK PUNCH READY BIT.
1686	005254	100001		BPL AT31B	;BRANCH IF PUNCH READY IS CLEAR.
1687	005256	104003		AT31E: ERROR	;ERROR. BUFFER LOAD FAILED TO CLEAR READY.
1688	005260	104012		AT31B: CHAIN	;CHAIN
1689	005262	000764		BR AT31A	;REPEAT TEST.
1690					;TEST THAT BYTE LOAD OF PUNCH BUFFER +1 DOES NOT RESET READY.
1691	005264	000032		AT32: 32 ;TEST#	
1692	005266	005326			;NEXT TEST
1693	005270	000024			;I COUNT
1694	005272	005274			;SCOPE ENTRY
1695	005274	104400		AT32A: DELAY	;WAIT 150 MSECS
1696	005276	000226		150.	
1697	005300	104011		SRESET	;RESET
1698	005302	016700	174006	MOV TPB,%0	
1699	005306	005200		INC %0	
1700	005310	105010		CLRB @%0	;BYTE LOAD PUNCH BUFFER+1
1701	005312	105777	173774	TSTB @TPS	;CHECK PUNCH READY BIT
1702	005316	100401		BMI AT32B	;BRANCH IF PUNCH READY STILL SET.
1703	005320	104003		AT32E: ERROR	;ERROR. BYTE LOAD OF PUNCH BUFFER+1
1704	005322	104012		AT32B: CHAIN	;CLEARED READY. CHAIN
1705	005324	000763		BR AT32A	;REPEAT TEST.

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1706
1707 ;TEST THAT PUNCH BECOMES READY BY 200 MSECS AFTER BUFFER LOAD.
1708 005326 000033 AT33: 33 ;TEST #
1709 005330 005366 ;AT34 ;NEXT TEST
1710 005332 000024 20. ;I COUNT
1711 005334 005336 ;AT33A ;SCOPE ENTRY.
1712 005336 104400 AT33A: DELAY ;WAIT 150 MSECS.
1713 005340 000226 150.
1714 005342 005077 173746 CLR @TPB ;LOAD PUNCH BUFFER.
1715 005346 104400 DELAY ;WAIT 200 MSECS.
1716 005350 000310 200.
1717 005352 105777 173734 TSTB @TPS ;CHECK PUNCH READY BIT.
1718 005356 100401 BMI AT33B ;BRANCH IF PUNCH READY IS SET.
1719 005360 104003 AT33E: ERROR ;ERROR. READY NOT SET 200 MSECS AFTER BUFFER LOAD.
1720 005362 104012 AT33B: CHAIN ;CHAIN
1721 005364 000764 BR AT33A ;REPEAT TEST.
1722 ;TEST THAT PUNCH READY BIT CAN CAUSE AN INTERRUPT. IF THE INTERRUPT
1723 ;IS SERVICED, IT WILL HAVE OCCURRED AT THE CORRECT VECTOR.
1724 005366 000034 AT34: 34 ;TEST #
1725 005370 005434 AT35 ;NEXT TEST
1726 005372 001750 1000. ;I COUNT
1727 005374 005402 AT34A ;SCOPE ENTRY
1728 005376 104007 STPCHV ;SET PUNCH INTERRUPT SERVICE
1729 005400 005430 AT34C ;TO AT34C
1730 005402 005077 173704 AT34A: CLR @TPS ;DISABLE PUNCH INTERRUPTS
1731 005406 005067 172364 CLR PSW ;SET PRIORITY 0.
1732 005412 052777 000100 173672 BIS #BIT6,@TPS ;ENABLE PUNCH INTERRUPTS.
1733 005420 000240 NOP
1734 005422 104003 AT34E: ERROR ;PUNCH READY FAILED TO CAUSE
1735 005424 104012 AT34B: CHAIN ;INTERRUPT. CHAIN
1736 005426 000765 BR AT34A ;REPEAT TEST.
1737 005430 022626 AT34C: POPSP2 ;HERE IF INTERRUPT OCCURS. POP THE
1738 005432 000774 BR AT34B ;STOCK TWICE.
1739 ;TEST THAT PUNCH READY DOES NOT CAUSE AN INTERRUPT WITH PROCESSOR
1740 ;AT SAME PRIORITY LEVEL AS THE PUNCH INTERRUPT REQUEST LEVEL.
1741 005434 000035 AT35: 35 ;TEST #
1742 005436 005510 AT36 ;NEXT TEST
1743 005440 001750 1000. ;I COUNT
1744 005442 005450 AT35A ;SCOPE ENTRY
1745 005444 104007 STPCHV ;SET PUNCH INTERRUPT SERVICE
1746 005446 005502 AT35E ;TO AT35E.
1747 005450 016767 173650 172320 AT35A: MOV TPLVL,PSW ;SET PROCESSOR TO SAME PRIORITY AS PUNCH.
1748 005456 005077 173630 CLR @TPS ;DISABLE PUNCH INTERRUPTS.
1749 005462 052777 000100 173622 BIS #BIT6,@TPS ;ENABLE PUNCH INTERRUPTS.
1750 005470 000240 NOP
1751 005472 005077 173614 AT35B: CLR @TPS ;OK IF NO INTERRUPT OCCURS.
1752 005476 104012 CHAIN ;CHAIN
1753 005500 000763 BR AT35A ;REPEAT TEST.
1754 005502 022626 AT35E: POPSP2 ;ERROR. PUNCH INTERRUPTED WITH PROCESSOR
1755 005504 104003 ERROR ;SET TO SAVE PRIORITY AS THE PUNCH.
1756 005506 000771 BR AT35B

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1757
1758
1759
1760 005510 000036
1761 005512 005572
1762 005514 001750
1763 005516 005524
1764 005520 10 007
1765 005522 005560
1766 005524 005077 173562
1767 005530 016767 173570 172240
1768 005536 162767 000040 172232
1769 005544 052777 000100 173540
1770 005552 000240
1771 005554 104003
1772 005556 000401
1773 005560 022626
1774 005562 005077 173524
1775 005566 104012
1776 005570 000755
1777
1778
1779 005572 000037
1780 005574 005666
1781 005576 001750
1782 005600 005602
1783 005602 104007
1784 005604 005640
1785 005606 005077 173500
1786 005612 005067 172160
1787 005616 052777 000100 173466
1788 005624 000240
1789 005626 104003
1790 005630 005077 173456
1791 005634 104012
1792 005636 000761
1793 005640 012777 005660 173454
1794 005646 012716 005654
1795 005652 000002
1796 005654 000240
1797 005656 000764
1798 005660 022626
1799 005662 104003
1800 005664 000761

:TEST THAT THE PUNCH INTERRUPTS WITH PROCESSOR AT PRIORITY ONE LEVEL LOWER
:THAN THE PUNCH PRIORITY.
AT36: 36
      AT37
      1000.
      AT36A
      STPCHV
      AT36B
AT36A: CLR @TPS
      MOV TPLVL,PSW
      SUB #40,PSW
      BIS #BIT6,@TPS
      NOP
      ERROR
      BR AT36C
AT36B: POPSP2
AT36C: CLR @TPS
      CHAIN
      BR AT36A
:TEST THAT PUNCH READY DOES NOT
:BIT HAS NOT BEEN RESET.
AT37: 37
      AT40
      1000.
      AT37A
AT37A: STPCHV
      AT37C
      CLR @TPS
      CLR PSW
      BIS #BIT6,@TPS
      NOP
AT37E1: ERROR
AT37B: CLR @TPS
      CHAIN
      BR AT37A
AT37C: MOV #AT37E2,@TPVTR
      MOV #AT37D,@%6
      RTI
AT37D: NOP
      BR AT37B
AT37E2: POPSP2
      ERROR
      BR AT37B

:TEST #
:NEXT TEST
:I COUNT
:SCOPE ENTRY
:SET PUNCH INTERRUPT SERVICE
:TO AT36B.
:DISABLE PUNCH INTERRUPTS
:SET PROCESSOR PRIORITY ONE LEVEL
:LOWER THAN PUNCH PRIORITY
:ENABLE PUNCH INTERRUPTS
:ERROR. PUNCH FAILED TO INTERRUPT..
:HERE IF INTERRUPT OCCURS. POP
:THE STOCK TWICE. DISABLE PUNCH INTERRUPT
:CHAIN
:REPEAT TEST.
:REINTERRUPT AFTER RTI WHEN READY
:TEST #
:NEXT TEST
:I COUNT
:SCOPE ENTRY
:SET PUNCH INTERRUPT SERVICE TO
:AT37C
:DISABLE PUNCH INTERRUPTS
:SET PROCESSOR PRIORITY TO 0
:ENABLE PUNCH INTERRUPTS
:ERROR 1. PUNCH FAILED TO INTERRUPT.
:DISABLE PUNCH INTERRUPT.
:CHAIN
:REPEAT TEST.
:HERE IF INTERRUPT OCCURS. CHANGE
:PUNCH VECTOR TO AT37E2 AND EXIT
:INTERRUPT
:OK IF NO REINTERRUPT OCCURS
:ERROR 2. PUNCH REINTERRUPTED AFTER
:RTI WITH READY BIT LEFT ON
  
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1801
1802
1803
1804 005666 000040
1805 005670 177777
1806 005672 001750
1807 005674 005702
1808 005676 104007
1809 005700 005740
1810 005702 012767 000340 172066 AT40A: MOV #PRTY7,PSW
1811 005710 005077 173376 CLR @TPS
1812 005714 052777 000100 173370 BIS #BIT6,@TPS
1813 005722 005067 172050 CLR PSW
1814 005726 012767 000340 172042 MOV #PRTY7,PSW
1815 005734 104003 ERROR
1816 005736 000401 BR AT40C
1817 005740 022626 AT40B: POPSP2
1818 005742 005077 173344 AT40C: CLR @TPS
1819 005746 005737 000042 TST @#42 ;TEST FOR ACT11
1820 005752 001402 BEQ AT40D ;BRANCH IF NOT ACT11
1821 005754 004737 005764 JSR %7,@#PRG1
1822 005760 104012 AT40D: CHAIN
1823 005762 000747 BR AT40A

```

:TEST THAT THE PUNCH INTERRUPTS IMMEDIATELY UPON LOWERING
:PROCESSOR PRIORITY TO 0.

```

:TEST #
:LAST TEST
:I COUNT
:SCOPE ENTRY
:SET PUNCH INTERRUPT
:SERVICE TO AT40B
:SET PROCESSOR PRIORITY TO 7.
:DISABLE PUNCH INTERRUPTS
:ENABLE PUNCH INTERRUPTS
:LOWER PROCESSOR PRIORITY TO 0.
:RAISE PRIORITY TO 7.
:ERROR. PUNCH FAILED TO INTERRUPT
:IMMEDIATELY AFTER CP PRIORITY WAS SET TO 0.
:HERE IF INTERRUPT OCCURS
:DISABLE PUNCH INTERRUPTS
:TEST FOR ACT11
:BRANCH IF NOT ACT11
:CHAIN
:REPEAT TEST

```

```

1824
1825
1826 005764 012767 006016 173340 ;PRG1-PRINTER TESTS
1827 005772 052767 000200 173346 PRG1: MOV #CTO,KSTART ;SET ADDRESS IF 1ST ROUTINE.
1828 006000 012767 177600 175324 BIS #BIT7,PRGID ;BYPASS SCOPE AND ICNT.
1829 006006 004767 176402 JSR %7,STBF ;SET STALL LIMIT
1830 006012 000167 173662 JMP SRSET ;SET UP BUFFER AREA.
;CARRIAGE RETURN TEST. ;GO GET STARTED.
1831
1832 006016 000000 CTO: 0 ;TEST#
1833 006020 006120 CT1 ;NEXT TEST ADDRESS.
1834 006022 104000 TYPE ;TYPE TITLE.
1835 006024 011122 CRTST
1836 006026 012767 000120 173414 MOV #80,RCNT
1837 006034 016767 173410 173422 MOV RCNT,CTRA ;RCNT TO CTRA
1838 006042 005367 173416 CTOA: DEC CTRA ;DECREMENT CTRA
1839 006046 001001 BNE CTOB ;BRANCH IF NOT 0
1840 006050 104012 CHAIN ;O. CHAIN
1841 006052 016767 173406 173406 CTOB: MOV CTRA,CTRB ;SPACE COUNT TO CTRB.
1842 006060 112700 000105 CTOC: MOVB #105,%0 ;CHAR=E
1843 006064 004767 176066 JSR %7,LSPCH ;SPACE.
1844 006070 005367 173372 DEC CTRB ;DECREMENT CTRB.
1845 006074 001371 BNE CTOC ;BRANCH IF NOT DONE SPACING.
1846 006076 112700 000015 MOVB #15,%0
1847 006102 004767 176050 JSR %7,LSPCH ;CARRIAGE RETURN.
1848 006106 012700 000012 MOV #12,%0 ;LINE FEED
1849 006112 004767 176040 JSR %7,LSPCH
1850 006116 000751 BR CTOA
;RIGHT MARGIN TEST
1851
1852 006120 000001 CT1: 1 ;TEST#
1853 006122 006164 CT2 ;NEXT TEST.
1854 006124 104000 TYPE ;TYPE TITLE
1855 006126 011153 RMTST
1856 006130 012767 000024 173326 MOV #20,CTRA ;SET UP FOR 33/35
1857 006136 012767 011103 000014 MOV #RM33B,RMB
1858 006144 104000 CT1A: TYPE ;TYPE----I
1859 006146 011075 RM33A
1860 006150 005367 173310 DEC CTRA ;DONE N TIMES.
1861 006154 001373 BNE CT1A ;BRANCH IF NOT N TIMES
1862 006156 104000 TYPE ;TYPE-I-
1863 006160 000000 RMB: OPEN
1864 006162 104012 CHAIN ;CHAIN.

```

```

1865          :SPACE TEST
1866 006164 000002          CT2: 2          ;TEST#
1867 006166 006320          CT3          ;NEXT TEST
1868 006170 104000          TYPE          ;TYPE TITLE.
1869 006172 011201          SPTST
1870 006174 012767 000050 173262          MOV #40.,CTRA          ;33/35 COUNT TO CTRA.
1871 006202 104000          CT2A: TYPE          ;TYPE SPACE,\.
1872 006204 011117          SPTSTC
1873 006206 005367 173252          DEC CTRA          ;DONE TIMES SET IN CTRA?
1874 006212 001373          BNE CT2A          ;BRANCH IF NOT DONE
1875 006214 012767 000050 173242          MOV #40.,CTRA          ;SET UP CTRA COUNT FOR 33/35
1876 006222 012767 000001 173236          CT2B: MOV #1,CTRB
1877 006230 016767 173232 173232          CT2C: MOV CT2B,CTRC
1878 006236 112700 000015          MOVB #15,%D          ;CARRIAGE RETURN.
1879 006242 004767 175710          JSR #7,LSPCH
1880 006246 104400          DELAY
1881 006250 000702          450.          ;DELAY 450MS
1882
1883 006252 112700 000040          CT2D: MOVB #40,%D          ;CURSOR RIGHT
1884 006256 004767 175674          JSR #7,LSPCH          ;SET IN CTRC.
1885 006262 005367 173202          DEC CTRC          ;DONE SPACING.
1886 006266 001371          BNE CT2D          ;BRANCH IF NOT DONE SPACING.
1887 006270 112700 000057          MOVB #7,%D          ;DONE. TYPE A "/".
1888 006274 004767 175656          JSR #7,LSPCH
1889 006300 005367 173160          DEC CTRA          ;DONE 36 TIMES?
1890 006304 001001          BNE CT2E          ;BRANCH IF NOT DONE.
1891 006306 104012          CHAIN          ;DONE. CHAIN.
1892 006310 062767 000002 173150          CT2E: ADD #2,CTRB          ;MODIFY CTRB FOR NEXT TRY.
1893 006316 000744          BR CT2C          ;GO DO IT AGAIN.
1894
1895          :LINE FEED TEST
1896 006320 000003          CT3: 3          ;TEST #
1897 006322 006400          CT4          ;NEXT TEST
1898 006324 104000          TYPE          ;TYPE TITLE
1899 006326 011221          LFTST
1900 006330 052767 040000 173010          BIS #BIT14,PRGID          ;ALLOW STALLS.
1901 006336 012767 000120 173120          MOV #80.,CTRA          ;SET 33/35 LINE FEED COUNT.
1902 006344 112700 000134          CT3A: MOVB #7,%D          ;TYPE "\ "
1903 006350 004767 175602          JSR #7,LSPCH
1904 006354 112700 000012          MOVB #12,%D          ;LINE FEED.
1905 006360 004767 175572          JSR #7,LSPCH
1906 006364 005367 173074          DEC CTRA          ;DONE N TIMES?
1907 006370 001001          BNE CT3B          ;BRANCH IF NOT DONE.
1908 006372 104012          CHAIN          ;DONE. CHAIN
1909 006374 104002          CT3B: STALL          ;STALL
1909 006376 000762          BR CT3A          ;REPEAT

```


1955			:TYPE LINE OF CHARACTERS ABC	
1956	006612	000005	CT5: 5	:TEST #
1957	006614	006630	CT6	:NEXT TEST
1958	006616	104000	TYPE	:TYPE "CHARACTER TESTS"
1959	006620	011244	CHRTST	
1960	006622	104016	TYPLN3	:TYPE LINE
1961	006624	010730	A	
1962	006626	104012	CHAIN	:CHAIN
1963			:TYPE LINE OF CHARACTERS DEF	
1964	006630	000006	CT6: 6	:TEST #
1965	006632	006642	CT7	:NEXT TEST
1966	006634	104016	TYPLN3	:TYPE LINE
1967	006636	010733	D	
1968	006640	104012	CHAIN	:CHAIN
1969			:TYPE LINE OF CHARACTERS GHI	
1970	006642	000007	CT7: 7	:TEST #
1971	006644	006654	CT10	:NEXT TEST.
1972	006646	104016	TYPLN3	:TYPE LINE
1973	006650	010736	G	
1974	006652	104012	CHAIN	:CHAIN
1975			:TYPE LINE OF CHARACTERS OF JKL	
1976	006654	000010	CT10: 10	:TEST #
1977	006656	006666	CT11	:NEXT TEST.
1978	006660	104016	TYPLN3	:TYPE LINE
1979	006662	010741	J	
1980	006664	104012	CHAIN	:CHAIN
1981			:TYPE LINE OF CHARACTERS MNO	
1982	006666	000011	CT11: 11	:TEST #
1983	006670	006700	CT12	:NEXT TEST
1984	006672	104016	TYPLN3	:TYPE LINE
1985	006674	010744	M	
1986	006676	104012	CHAIN	:CHAIN
1987			:TYPE LINE OF CHARACTERS PQR	
1988			CT12: 12	:TEST #
1989	006700	000012	CT13	:NEXT TEST
1990	006702	006712	TYPLN3	:TYPE LINE
1991	006704	104016	P	
1992	006706	010747	CHAIN	:CHAIN
1993	006710	104012	:TYPE LINE OF CHARACTERS STU	
1994			CT13: 13	:TEST #
1995	006712	000013	CT14	:NEXT TEST
1996	006714	006724	TYPLN3	
1997	006716	104016	S	
1998	006720	010752	CHAIN	
1999	006722	104012		

2000					
2001			:TYPE LINE OF CHARACTERS VWX		
2002	006724	000014	CT14: 14	:TEST #	
2003	006726	006736	CT15	:NEXT TEST	
2004	006730	104016	TYPLN3	:TYPE LINE	
2005	006732	010755	V		
2006	006734	104012	CHAIN	:CHAIN	
2007			:TYPE LINE OF CHARACTERS YZ0		
2008	006736	000015	CT15: 15	:TEST #	
2009	006740	006750	CT16	:NEXT TEST	
2010	006742	104016	TYPLN3	:TYPE LINE	
2011	006744	010760	Y		
2012	006746	104012	CHAIN	:CHAIN	
2013			:TYPE LINE OF CHARACTERS 123		
2014	006750	000016	CT16: 16	:TEST #	
2015	006752	006762	CT17	:NEXT TEST	
2016	006754	104016	TYPLN3	:TYPE LINE	
2017	006756	010763	ONE		
2018	006760	104012	CHAIN	:CHAIN	
2019			:TYPE LINE OF CHARACTERS 456		
2020	006762	000017	CT17: 17	:TEST #	
2021	006764	006774	CT20	:NEXT TEST	
2022	006766	104016	TYPLN3	:TYPE LINE	
2023	006770	010766	FOUR		
2024	006772	104012	CHAIN	:CHAIN	
2025			:TYPE LINE OF CHARACTERS 789		
2026	006774	000020	CT20: 20	:TEST #	
2027	006776	007006	CT21	:NEXT TEST	
2028	007000	104016	TYPLN3	:TYPE LINE	
2029	007002	010771	SEVEN		
2030	007004	104012	CHAIN	:CHAIN	
2031			:TYPE LINE OF CHARACTERS!"#		
2032	007006	000021	CT21: 21	:TEST #	
2033	007010	007020	CT22	:NEXT TEST	
2034	007012	104016	TYPLN3	:TYPE LINE	
2035	007014	010774	C41		
2036	007016	104012	CHAIN	:CHAIN	
2037			:TYPE LINE OF CHARACTERS \$%&		
2038	007020	000022	CT22: 22	:TEST #	
2039	007022	007032	CT23	:NEXT TEST	
2040	007024	104016	TYPLN3	:TYPE LINE	
2041	007026	010777	C44		
2042	007030	104012	CHAIN	:CHAIN	
2043			:TYPE LINE OF CHARACTERS '()		
2044	007032	000023	CT23: 23	:TEST #	
2045	007034	007044	CT24	:NEXT TEST	
2046	007036	104016	TYPLN3	:TYPE LINE	
2047	007040	011002	C47		
2048	007042	104012	CHAIN	:CHAIN.	

2049					
2050			:TYPE LINE OF CHARACTERS *+,		
2051	007044	000024	CT24: 24		:TEST #
2052	007046	007056	CT25		:NEXT TEST
2053	007050	104016	TYPLN3		:TYPE LINE
2054	007052	011005	C52		
2055	007054	104012	CHAIN		:CHAIN
2056			:TYPE LINE OF CHARACTERS -./		
2057	007056	000025	CT25: 25		:TEST #
2058	007060	007070	CT26		:NEXT TEST
2059	007062	104016	TYPLN3		:TYPE LINE
2060	007064	011010	C55		
2061	007066	104012	CHAIN		:CHAIN
2062			:TYPE LINE OF CHARACTERS ::<		
2063	007070	000026	CT26: 26		:TEST #
2064	007072	007102	CT27		:NEXT TEST
2065	007074	104016	TYPLN3		:TYPE LINE
2066	007076	011013	C72		
2067	007100	104012	CHAIN		:CHAIN
2068			:TYPE LINE OF CHARACTERS =>?		
2069	007102	000027	CT27: 27		:TEST #
2070	007104	007114	CT30		:NEXT TEST
2071	007106	104016	TYPLN3		:TYPE LINE
2072	007110	011016	C75		
2073	007112	104012	CHAIN		:CHAIN.
2074			:TYPE LINE OF CHARACTERS @[\		
2075	007114	000030	CT30: 30		:TEST #
2076	007116	007126	CT31		:NEXT TEST
2077	007120	104016	TYPLN3		:TYPE LINE
2078	007122	011021	C100		
2079	007124	104012	CHAIN		:CHAIN
2080			:TYPE LINE OF CHARACTERS]↑AND LEFT ARROW		
2081	007126	000031	CT31: 31		:TEST #
2082	007130	007140	CT32		:NEXT TEST
2083	007132	104016	TYPLN3		:TYPE LINE
2084	007134	011024	C135		
2085	007136	104012	CHAIN		:CHAIN

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2086 ;TYPE 20 LINES OF ALL CHARACTERS
2087 ;FIRST 10 FULL SPEED
2089 ;SECOND 10 AT STALL SPEED
2090 007140 000032 CT32: 32 ;TEST #
2091 007142 177777 -1 ;LAST TEST
2092 007144 004767 175326 JSR %7,FBALL ;FILL BUFFER WITH ALL CHARACTERS
2093 007150 042767 040000 172170 BIC #BIT14,PRGID ;CLEAR STALL BIT
2094 007156 012767 000012 001146 MOV #10,CNT ;SET LINE COUNT = 10.
2095 007164 004767 175130 CT32A: JSR %7,TYPLN ;TYPE A LINE
2096 007170 005367 001136 DEC CNT ;
2097 007174 001373 BNE CT32A ;
2098 007176 052767 040000 172142 BIS #BIT14,PRGID ;SET STALL
2099 007204 012767 000012 001120 MOV #10,CNT ;LINE COUNT = 10
2100 007212 004767 175102 CT32B: JSR %7,TYPLN ;TYPE A LINE AT STALL SPEED
2101 007216 005367 001110 DEC CNT ;
2102 007222 001373 BNE CT32B ;
2103 007224 013700 000042 MOV #42,%0 ;BRANCH IF NOT ACT11
2104 007230 001405 BEQ CT32C ;
2105 007232 000005 RESET ;
2106 007234 004710 LOGICAL: JSR %7,%0
2107 007236 000240 NOP
2108 007240 000240 NOP
2109 007242 000240 NOP
2110 007244 104012 CT32C: CHAIN
2111 ;NOTE: FOR PRINT RATE TEST
2112 ;1) TIME FIRST 20. LINES = APPROX 30 SECONDS.
2113 ;2) CLEAR STALL BIT (BIT14 IN BIS #BIT14,PRGID).
2114 ; TIME ENTIRE TEST = APPROX 60 SECONDS.

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2115
2116
2117 007246 012767 007272 172056 :PRG2-KEYBOARD TEST
2118 007254 052767 000200 172064 PRG2:  MOV #ETO,KSTART
2119 007262 104000          BIS #BIT7,PRGID
2120 007264 011324          TYPE
2121 007266 000167 172406          KMSG1
2122          JMP SRSET
2123 007272 000000          :TEST THAT PRESSING KEY SETS DONE FLAG.
2124 007274 007376 ETO: 0 ;TEST #
2125 007276 012767 000005 172160          ET1 ;NEXT TEST.
2126 007304 104006 ETOA: MOV #5,CTRA
2127 007306 007342          STRDRV
2128 007310 104000          ETOB
2129 007312 011342          TYPE ;TYPE "PRESS A KEY WITHIN 10 SECS."
2130 007314 052777 000100 171764          KMSG2
2131 007322 005067 170450          BIS #BIT6,@TKS ;ENABLE KYBD INTERRUPT.
2132 007326 104400          CLR PSW
2133 007330 023420          DELAY ;WAIT 10 SECONDS
2134 007332 104000          TYPE "NO KEYBOARD REQUEST."
2135 007334 011544          KMSG6
2136 007336 104010          EHALT ;HALT.
2137 007340 000411          BR ETOCA
2138 007342 105777 171740          ETOB: TSTB @TKS ;TEST FOR DONE BIT ON
2139 007346 100403          BMI ETOC ;BRANCH IF DONE BIT SET.
2140 007350 104000          TYPE ;DONE BIT NOT SET. TYPE:FALSE KEY-
2141 007352 011572          KMSG7 ;BOARD OR READER INTERRUPT.
2142 007354 104010          EHALT ;HALT
2143 007356 012716 007364          ETOC: MOV #ETOCA,@%6
2144 007362 000002          RTI ;EXIT INTERRUPT.
2145 007364 104011          ETOCA: SRESET
2146 007366 005367 172072          DEC CTRA ;DONE 5 TIMES?
2147 007372 001344          BNE ETOA ;BRANCH IF NOT DONE.
2148 007374 104012          CHAIN ;CHAIN
2149          :ECHO TEST. KEYED CHARACTER IS TYPED. RUBOUT ENDS ROUTINE.
2150 007376 000001          ET1: 1 ;TEST #
2151 007400 007456          ET2 ;NEXT TEST.
2152 007402 104000          TYPE ;TYPE TITLE AND INSTRUCTIONS.
2153 007404 011402          KMSG3
2154 007406 105777 171674          ET1A: TSTB @TKS ;WAIT FOR DONE FLAG
2155 007412 100375          BPL .-4
2156 007414 117767 171670 172030          MOVB @TKB,CRBUF ;MOVE KYBD CHAR TO CRBUF.
2157 007422 116777 172024 171664          MOVB CRBUF,@TPB ;ECHO CHAR READ.
2158 007430 105777 171656          TSTB @TPS ;WAIT FOR PRINTER DONE.
2159 007434 100375          BPL .-4
2160 007436 042767 000200 172006          BIC #BIT7,CRBUF ;CLEAR BIT 7 FROM CRBUF.
2161 007444 122767 000177 172000          CMPB #177,CRBUF ;COMPARE CRBUF TO RUBOUT (177)
2162 007452 001355          BNE ET1A ;BRANCH IF NOT RUBOUT (177)
2163 007454 104012          CHAIN ;CHAIN

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```

2164
2165 ;OCTAL EQUIVALENT TEST. THE OCTAL EQUIVALENT OF ANY CHARACTER KEYED
2166 ;IS PRINTED. RUBOUT ENDS ROUTINE.
2167 007456 000002 ET2: 2 ;TEST #
2168 007460 177777 -1 ;LAST TEST
2169 007462 104001 TYPES ;TYPE TITLE AND INSTRUCTIONS.
2170 007464 011504 KMSG4
2171 007466 011415 KMSG3A
2172 007470 177777 -1
2173 007472 005067 171754 CLR CRBUF
2174 007476 105777 171604 ET2A: TSTB @TKS ;WAIT FOR DONE FLAG.
2175 007502 100375 BPL -4
2176 007504 117767 171600 171740 MOVB @TKB,CRBUF ;CHARACTER TO CRBUF
2177 007512 004567 174270 JSR %5,ACNV4 ;CONVERT CHAR IN CRBUF TO
2178 007516 001452 CRBUF ;PRINTABLE OCTAL
2179 007520 011536 OCTEQV
2180 007522 104000 TYPE ;TYPE OCTAL EQUIVALENT
2181 007524 011534 KMSG5
2182 007526 042767 000200 171716 BIC #BIT7,CRBUF ;CLEAR BIT 7 FROM CRBUF
2183 007534 022767 000177 171710 CMP #177,CRBUF ;TEST FOR RUBOUT CHARACTER.
2184 007542 001355 BNE ET2A ;BRANCH IF NOT RUBOUT (177).
2185 007544 104012 CHAIN ;CHAIN.
  
```

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2186
2187
2188
2189 007546 004767 174642
2190 007552 104000
2191 007554 011620
2192 007556 052767 040000 171562
2193 007564 012767 177600 173540
2194 007572 012703 012105
2195 007576 104000
2196 007600 011646
2197 007602 005777 171502
2198 007606 012767 000006 171650
2199 007614 004767 000060
2200 007620 005367 171640
2201 007624 001373
2202 007626 042767 000200 171616
2203 007634 122767 000177 171610
2204 007642 001003
2205 007644 042767 040000 171474
2206 007652 004567 174242
2207 007656 012105
2208 007660 012112
2209 007662 000120
2210 007664 004767 174430
2211 007670 005767 167674
2212 007674 100730
2213 007676 000772
2214 007700 105777 171402
2215 007704 100375
2216 007706 117767 171376 171536
2217 007714 116723 171532
2218 007720 116700 171526
2219 007724 004767 174226
2220 007730 000207

;PRG3-PRINTER EXERCISER. KEYBOARD CONTROLLED.
;TYPES LINES WITH ANY 5 CHARACTERS. STALLS OR FULL SPEED.
PRG3: JSR %7,STBF ;SET UP BUFFER.
TYPE ;TYPE TITLE
P7MG1
HTA: BIS #BIT14,PRGID ;SET STALL BIT IN PRGID.
MOV #177600,STLMSK ;SET STALL MASK
MOV #BLOCK1,%3
TYPE ;TYPE "TYPE IN DATA".
P7MG2
TST @TKB ;REMOVE FLAG
MOV #6,CTRA ;CHAR COUNT TO CTRA.
HTB: JSR %7,GKBCR ;GET AND STORE KYBD CHARACTER.
DEC CTRA ;GOT 6 CHARACTERS?
BNE HTB ;BRANCH IF NOT 6 CHARS YET.
BIC #BIT7,CRBUF ;CHECK 6TH CHAR FOR RUBOUT.
CMPB #177,CRBUF ;BRANCH IF NOT A RUBOUT.
BNE HTC ;RUBOUT. CLEAR STALL BIT IN PRGID.
HTC: JSR %5,BMOVE ;FILL 80 CHAR LINE.
BLOCK1
BLOCK1+5
80.
HTD: JSR %7,TYPLN ;TYPE LINE.
TST SR ;CHANGE DATA? (SR15=1).
BMI HTA ;YES. GO CHANGE DATA
BR HTD ;NO CONTINUE WITH SAME DATA.
GKBCR: TSTB @TKS ;WAIT FOR DONE FLAG.
BPL -4
MOVB @TKB,CRBUF ;CHARACTER TO CRBUF.
MOVB CRBUF,(3)+ ;CHARACTER TO LINE BUFFER.
MOVB CRBUF,%0
JSR %7,LSPCH ;ECHO CHARACTER.
RTS %7

```

```

2221
2222
2223
2224
2225
2226 007732 104005
2227 007734 004767 000036
2228 007740 000775
2229
2230
2231
2232
2233
2234
2235
2236
2237 007742 104005
2238 007744 004767 000020
2239 007750 017700 171334
2240 007754 000005
2241 007756 000005
2242 007760 000005
2243 007762 000005
2244 007764 000005
2245 007766 000766
2246
2247 007770 052777 000004 171314 C1112M: BIS #4, JTPS
2248 007776 116767 167566 000022 C1112: MOVB SR, XTY
2249 010004 005767 000016 TST XTY
2250 010010 001002 BNE C1112A
2251 010012 005267 000010 INC XTY
2252 010016 116777 167547 171270 C1112A: MOVB SR+1, JTPB
2253 010024 104400 DELAY
2254 010026 000000 XTY: OPEN
2255 010030 000207 RTS %7

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:
:PRG4-PUNCH CLOCK ADJUSTMENT ROUTINE.
:OUTPUTS CHARACTER SET IN LEFT HALF OF SR, AND
:STALLS FOR NUMBER OF MILLISECONDS SET IN RIGHT HALF OF SR.
PRG4: CHALT ;HALT TO SET SR.
ITA: JSR %7,C1112 ;GO OUTPUT CHARACTER SET IN LEFT
BR ITA ;HALF OF SR AND STALL PER SR RIGHT.

```

```

:
:PRG5-READER CLOCK ADJUSTMENT ROUTINE.
:PERFORMS SAME FUNCTION AS PRG11, AND IN ADDITION,
:USING THE PUNCH MAINTENANCE BIT, SHIFTS OUTPUT OF PUNCH
:SHIFT REGISTER ONTO THE READER BUFFER. THE CONTENTS OF THE
:READER BUFFER ARE THEN "FIXED" ON THE CONSOLE DATA LIGHTS
:BY ISSUING A RESET WITH CONTENTS OF READER BUFFER LOADED IN RO.
PRG5: CHALT ;HALT TO SET SR.
JTA: JSR %7,C1112M ;GO OUTPUT CHARACTER FROM SR LEFT AND
MOV JTKB,%0 ;STALL PER SR RIGHT. (TKB) TO RO.
RESET ;"FIX" (TKB) IN DATA LIGHTS.
RESET
RESET
RESET
RESET
BR JTA ;REPEAT.

```

```

:
:SET MAINTENANCE MODE (PUNCH).
:STALL COUNT TO XTY.
:DISREGARD 0 DELAY.
:LOAD PUNCH BUFFER.
:DELAY (APPROXIMATELY) THE NUMBER OF
:MSECS. SPECIFIED AT SR RIGHT
:EXIT

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000200

```

010032 104005
010034 052777 000004 171250
010042 105777 171244
010046 100375
010050 116777 171377 171236
010056 105777 171224
010062 100375
010064 117767 171220 171360
010072 104004
010074 000757

010076 004767 173504
010102 012767 177600 173222
010110 052767 040000 171230
010116 052777 000004 171166
010124 032767 000400 167436
010132 001001
010134 104002
010136 105777 171150
010142 100375
010144 004767 173542
010150 105067 171277
010154 110177 171134
010160 105777 171122
010164 100375
010166 117767 171116 171256
010174 104004
010176 000747

010200 012767 177736 000126
010206 016767 000122 000122
010214 012767 177660 000110
010222 005167 000110
010226 016700 000104
010232 004767 173720
  
```

```

:PRG6-MAINTENANCE MODE SINGLE CHARACTER DATA TEST.
:WITH MAINTENANCE MODE SET, OUTPUTS ONTO PUNCH BUFFER AND BACK ONTO
:READER BUFFER THE CHARACTER SET IN SR LEFT. THE CHARACTER IN THE
:READER BUFFER IS COMPARED TO THE CHARACTER IN SR LEFT. IF THE 2 CHARACTERS
:DISAGREE THE PROGRAM HALTS. THE DATA LIGHTS WILL THEN CONTAIN:
  
```

```

:LEFT HALF: THE EXPECTED CHARACTER (SR LEFT).
:RIGHT HALF: THE CHARACTER IN THE READER BUFFER.
PRG6:  CHALT          :HALT TO SET SR.
KTA:   BIS           #4,ATPS  :SET MAINTENANCE MODE.
KT8:   TSTB          ATPS     :WAIT FOR READY.
       BPL           -4
       MOVB          CRBUF+1,ATPB :OUTPUT CHARACTER.
       TSTB          ATKS     :WAIT FOR READER DONE FLAG.
       BPL           -4
       MOVB          ATKB,CRBUF :CHAR READ TO CRBUF.
       DATCHK        :GO CHECK AGAINST S/B CHAR.
BR     BR           KTA      :REPEAT.
  
```

```

:PRG7-MAINTENANCE MODE SPECIAL BINARY COUNT PATTERN DATA TEST.
:PERFORMS SAME OPERATION AS PRG13, EXCEPT THAT SPECIAL BINARY COUNT
:PATTERN IS USED.
  
```

```

PRG7:  JSR           %7,INBIN  :INITIALIZE BINARY COUNT
       MOV           #177600,STLMSK :SET STALL LIMIT
       BIS           #BIT14,PRGID :ALLOW STALLS
LTA:   BIS           #4,ATPS    :SET MAINTENANCE MODE.
       BIT           #BIT9,SR   :CHECK STALL SWITCH
       BNE          LTB        :BRANCH IF NO STALL WANTED
       STALL        :STALL
LTB:   TSTB          ATPS      :WAIT FOR READY.
       BPL           -4
       JSR           %7,GTBINP  :GET BIN CHARACTER.
       CLRB         CRBUF+1    :MOVE TO S/B CHAR.
       MOVB         %1,ATPB    :OUTPUT BIN CHARACTER.
       TSTB         ATKS      :WAIT FOR READER DONE.
       BPL           -4
       MOVB         ATKB,CRBUF  :CHAR IN READ BUFFER TO CRBUF.
       DATCHK       :GO CHECK AGAINST S/B CHAR.
BR     BR           LTA      :CONTINUE.
  
```

```

:PRG10 ROLE UP TEST
:THE FUNCTION OF THIS TEST IS TO TEST THE ROLL-UP CAPABILITY
:OF THE VT06
:TO DO THIS A LINE OF A CHARACTER AND IT'S COMPLEMENT FOLLOWED
:BY A LINE OF THE COMPLEMENT AND THE CHARACTER IS TRANSMITTED
:THIS SCHEME IS CONTINUED UNTIL SWITCH 15 IS RAISED
:THE CHARACTER SHOULD NOT BE CHANGED UNTIL THE SCREEN HAS BEEN
:COMPLETELY FILLED
  
```

```

PRG10: MOV           #-42,TCHAR  :INIT TEMP CHAR
RENIT: MOV           TCHAR,CHAR  :COMPLEMENT OF "!"
PRG10C: MOV          #-80.,CNT   :72 CHAR/LINE
PRG10D: COM          CHAR
PRG10A: MOV          CHAR,%0     :LOAD "!"
JSR    JSR          %7,LSPCH    :PUNCH "!"
  
```

010236	005167	000074		CUM	CHAR	: COMPLEMENT TO "I"
010242	016700	000070		MOV	CHAR,%D	: LOAD "I"
010246	004767	173704		JSR	%7,LSPCH	: PUNCH "I"
010252	005167	000060		COM	CHAR	: "I"
010256	062767	000002	000046	ADD	#2,CNT	: END OF LINE?
010264	001360			BNE	PRG10A	: NO
010266	012700	000015		MOV	#15,%D	: CR
010272	004767	173660		JSR	%7,LSPCH	
010276	012700	000012		MOV	#12,%D	: LF
010302	004767	173650		JSR	%7,LSPCH	
010306	005767	167256		TST	SR	: NEXT CHAR
010312	100340			BPL	PRG10C	: NO
010314	005367	000014		DEC	TCHAR	: YES CHANGE TCHAR
010320	022767	177677	000006	CMP	#177677,TCHAR	: CHAR STRING COMPLETE
010326	001724			BEO	PRG10	
010330	000726			BR	RENIT	
010332	000000					
010334	177736					
010336	000041					
				CNT:	0	
				TCHAR:	-42	
				CHAR:	41	
				;PRG11, NON-PRINTING CHAR TEST		
010340	104000			PRG11:	TYPE	: PRINT TEST TITLE
010342	011677				NPCT	
010344	012767	000120	000124	MOV	#80,CCNT	: CHAR COUNT
010352	012700	000101		PRG11A:	MOV	: PRINTABLE CHARACTER
010356	004767	173574		JSR	%7,LSPCH	: PRINT PRINTABLE CHAR
010362	012767	000000	177742	PRG11B:	MOV	: FIRST NON-PRINTABLE CHAR
010370	016700	177736		MOV	CNT,%D	
010374	004767	173556		JSR	%7,LSPCH	: PRINT NON-PRINTABLE CHAR
010400	105267	177726		INCB	CNT	
010404	022767	000012	177720	CMP	#12,CNT	: LINE FEED
010412	001366			BNE	PRG11B	: NO
010414	012700	000013		MOV	#13,%D	: PRINT NON-PRINTABLES
010420	004767	173532		JSR	%7,LSPCH	
010424	012700	000014		MOV	#14,%D	
010430	004767	173522		JSR	%7,LSPCH	
010434	012767	000016	177670	MOV	#16,CNT	
010442	016700	177664		PRG11C:	MOV	: PRINT NEST SET OF NON-PRINTABLES

```

2353 010446 004767 173504 JSR %7,LSPCH
2354 010452 005267 177654 INC CNT
2355 010456 022767 000040 177646 CMP #40,CNT
2356 010464 001366 BNE PRG11C
2357 010466 005367 000004 DEC CCNT ;DEC CHAR COUNT
2358 010472 001327 BNE PRG11A ;BRANCH IF NOT END OF TEST
2359 010474 000721 BR PRG11 ;RERUN TEST
2360 010476 000000 CCNT: 0 ;CHAR COUNT

;PRG12, WORST CASE NOISE
;THIS PROGRAM READ IN DATA FROM THE KEYBOARD UNTIL (1) A
;RUBOUT CHARACTER IS SENSED OR (2) UNTIL AN EIGHTY CHARACTER
;BUFFER IS FILLED. IT THEN ECHOS THE DATA UNTIL SWITCH 15 IS PUT UP.

2363 010500 104000 PRG12: TYPE ;TYPE PROGRAM TITLE
2364 010502 011737 WSTCN
2365 010504 104000 PRG12C: TYPE ;TYPE
2366 010506 011764 RUB80 ;RUBOUT OR 80 CHAR ENDS DATA
2367 010510 012767 000120 177760 MOV #80,CCNT ;SET CHAR COUNT = 80
2368 010516 012701 012105 MOV #DEND+2,R1
2369 010522 105777 170560 PRG12A: TSTB %TKS ;TEST FOR KEYBOARD DONE
2370 010526 100375 BPL -4
2371 010530 117711 170554 MOV %TKB,%R1 ;LOAD CHAR INTO BUFFER
2372 010534 111100 MOVB %R1,%0 ;ECHO CHAR
2373 010536 004767 173414 JSR %7,LSPCH
2374 010542 142711 000200 BICB #200,(R1) ;CLEAR UNWANTED BIT
2375 010546 122127 000177 CMPB (R1)+,%177 ;TEST FOR RUBOUT
2376 010552 001403 BEQ PRG12B ;DUMP BUFFER IF END OF DATA
2377 010554 005367 177716 DEC CCNT ;DECREASE CHAR COUNT
2378 010560 001360 BNE PRG12A ;BRANCH IF NOT 80 CHAR
2379 010562 004767 000010 PRG12B: JSR %7,DUMP ;DUMP BUFFER
2380 010566 005767 166776 TST SR ;TEST FOR END ROUTINE
2381 010572 100373 BPL PRG12B ;CONTINUE DUMP IF NOT END
2382 010574 000743 BR PRG12C ;ASK FOR NEW DATA

2387 010576 012700 000015 DUMP: MOV #15,%0 ;CARRIAGE RETURN
2388 010602 004767 173350 JSR %7,LSPCH
2389 010606 012700 000012 MOV #12,%0 ;LINE FEED
2390 010612 004767 173340 JSR %7,LSPCH
2391 010616 012702 012105 MOV #DEND+2,R2 ;R2 = BEGINNING OF BUFFER
2392 010622 112200 DMPA: MOVB (R2)+,%0 ;FETCH CHARACTER FROM BUFFER
2393 010624 004767 173326 JSR %7,LSPCH ;PRINT CHAR
2394 010630 020201 CMP R2,R1 ;TEST FOR END OF BUFFER
2395 010632 001373 BNE DMPA ;BRANCH IF NOT END
2396 010634 000207 RTS %7 ;END OF BUFFER

;PROGRAM 13, LAST CHARACTER VISIBILITY

2400 010636 104000 PRG13: TYPE ;TYPE TITLE OF TEST
2401 010640 012040 LCVIS
2402 010642 012767 000120 177626 MOV #80,CCNT ;SET CHAR COUNT = 80.
2403 010650 012700 000015 MOV #15,%0 ;CR
2404 010654 004767 173276 JSR %7,LSPCH ;LF
2405 010660 012700 000012 MOV #12,%0
2406 010664 004767 173266 JSR %7,LSPCH

```

2409	010670	012700	000102
410	010674	004767	173256
411	010700	104400	
412	010702	003720	
413			
414			
415	010704	005367	177566
416	010710	001367	
417	010712	000751	

```

PRG13A: MOV      #'B,%0
          JSR      %7,LSPQH
          DELAY   2000.
          DEC      CCNT
          SNE     PRG13A
          BR      PRG13

```

```

:LOAD TEST CHAR
:PRINT
:DELAY 2 SECONDS FOR
:PRINT HEAD TO STEP ASIDE
:DEC CHAR COUNT
:BRANCH IF NOT 80 CHAR
:CONTINUE TEST

```

F05

010714	047	137	127	A33WP6: .BYTE	047,137,127,057,127,137
010717	057	127	137		
010722	047	133	077	A35WP6: .BYTE	047,133,077,103,077,133
010725	103	077	133		
010730	101	102	103	A: .BYTE	101,102,103
010733	104	105	106	D: .BYTE	104,105,106
010736	107	110	111	G: .BYTE	107,110,111
010741	112	113	114	J: .BYTE	112,113,114
010744	115	116	117	M: .BYTE	115,116,117
010747	120	121	122	P: .BYTE	120,121,122
010752	123	124	125	S: .BYTE	123,124,125
010755	126	127	130	V: .BYTE	126,127,130
010760	131	132	060	Y: .BYTE	131,132,060
010763	061	062	063	ONE: .BYTE	061,062,063
010766	064	065	066	FOUR: .BYTE	064,065,066
010771	067	070	071	SEVEN: .BYTE	067,070,071
010774	041	042	043	C41: .BYTE	041,042,043
010777	044	045	046	C44: .BYTE	044,045,046
011002	047	050	051	C47: .BYTE	047,050,051
011005	052	053	054	C52: .BYTE	052,053,054
011010	055	056	057	C55: .BYTE	055,056,057
011013	072	073	074	C72: .BYTE	072,073,074
011016	075	076	077	C75: .BYTE	075,076,077
011021	100	133	134	C100: .BYTE	100,133,134
011024	135	136	137	C135: .BYTE	135,136,137
011027	377	000	377	C377: .BYTE	377,000,377
011032	021445	050123	041501	TBTST: .ASCII	'%#SPACE TEST%#'
011040	020105	042524	052123		
011046	021445				
011050	020040	020040	020040	TBMRK: .ASCII	' /a'
011056	020040	040057			
011062	020040	020040	020040	TBMRK1: .ASCII	' /a'
011070	027440	100			
011073	045	100		CRLF: .ASCII	'%a'
011075	055	026455	044455	RM33A: .ASCII	'-----Ia'
011102	100				
011103	055	026511	100	RM33B: .ASCII	'-I-a'
011107	055	026455	044455	RM37A: .ASCII	'-----I-Ia'
011114	044455	100			
011117	134	040040		SPTSTC: .ASCII	'\ a'
011122	021445	040503	051122	CRTST: .ASCII	'%#CARRIAGE RETURN TEST%#a'
011130	040511	042507	051040		
011136	052105	051125	020116		
011144	042524	052123	021445		
011152	100				
011153	045	051043	043511	RMTST: .ASCII	'%#RIGHT MARGIN TEST%#a'
011160	052110	046440	051101		
011166	044507	020116	042524		
011174	052123	021445	100		
011201	045	051443	040520	SPTST: .ASCII	'%#SPACE TEST%#a'
011206	042503	020040	042524		
011214	052123	021445	100		
011221	045	046043	047111	LFTST: .ASCII	'%#LINE FEED TEST%#a'
011226	020105	042506	042105		
011234	052040	051505	022524		

2473	011242	040043				
2474	011244	021445	044103	051101	CHRTST: .ASCII	'%#CHARACTER TESTS%#@'
2475	011252	041501	042524	020122		
2476	011260	042524	052123	022523		
2477	011266	040043				
2478	011270	021445	047527	051522	WCPTST: .ASCII	'%#WORST CASE PATTERN TEST%#@'
2479	011276	020124	040503	042523		
2480	011304	050040	052101	042524		
2481	011312	047122	052040	051505		
2482	011320	022524	040043			
2483	011324	021445	054513	042102	KMSG1: .ASCII	'%#KYBD TEST%#@'
2484	011332	052040	051505	022524		
2485	011340	040043				
2486	011342	050045	042522	051523	KMSG2: .ASCII	'%#PRESS A KEY WITHIN 10 SECONDS.@'
2487	011350	040440	045440	054505		
2488	011356	053440	052111	044510		
2489	011364	020116	030061	051440		
2490	011372	041505	047117	051504		
2491	011400	040056				
2492	011402	021445	041505	047510	KMSG3: .ASCII	'%#ECHO TEST'
2493	011410	052040	051505	124		
2494	011415	045	044103	051101	KMSG3A: .ASCII	'%#CHARACTER KEYED WILL BE TYPED.'
2495	011422	041501	042524	020122		
2496	011430	042513	042531	020104		
2497	011436	044527	046114	041040		
2498	011444	020105	054524	042520		
2499	011452	027104				
2500	011454	051045	041125	052517	.ASCII	'%#RUBOUT ENDS ROUTINE.%#@'
2501	011462	020124	047105	051504		
2502	011470	051040	052517	044524		
2503	011476	042516	022456	040043		
2504	011504	021445	041517	040524	KMSG4: .ASCII	'%#OCTAL EQUIVALENT TEST@'
2505	011512	020114	050505	044525		
2506	011520	040526	042514	052116		
2507	011526	052040	051505	040124		
2508	011534	020045			KMSG5: .ASCII	'%#'
2509	011536	020040	020040	040045	OCTEQV: .ASCII	'%#%#@'
2510	011544	047045	020117	042513	KMSG6: .ASCII	'%#NO KEYBOARD REQUEST.@'
2511	011552	041131	040517	042122		
2512	011560	051040	050505	042525		
2513	011566	052123	040056			
2514	011572	043045	046101	042523	KMSG7: .ASCII	'%#FALSE KYBD INTERRUPT@'
2515	011600	045440	041131	020104		
2516	011606	047111	042524	051122		
2517	011614	050125	040124			
2518	011620	021445	044504	050123	P7MG1: .ASCII	'%#DISPLAY EXERCISER%#@'
2519	011626	040514	020131	054105		
2520	011634	051105	044503	042523		
2521	011642	022522	040043			
2522	011646	021445	054524	042520	P7MG2: .ASCII	'%#TYPE IN DATA :@'
2523	011654	044440	020116	040504		
2524	011662	040524	035040	100		
2525	011667	125	040040		BKSU: .ASCII	'U @'
2526	011672	020040	020040	040	DECVAL: .ASCII	'%#'
2527	011677	045	047043	047117	NPCT: .ASCII	'%#NON-PRINTING CHARACTER TEST%#@'
2528	011704	050055	044522	052116		

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2529	011712	047111	020107	044103	
2530	011720	051101	041501	042524	
2531	011726	020122	042524	052123	
2532	011734	021445	100		
2533	011737	045	053443	051117	WSTCN: .ASCII '%#WORST CASE NOISE%#'
2534	011744	052123	041440	051501	
2535	011752	020105	047516	051511	
2536	011760	022505	040043		
2537	011764	021445	054524	042520	RUB80: .ASCII '%#TYPE DATA - RUBOUT OR 80 CHAR ENDS DATA%#'
2538	011772	042040	052101	020101	
2539	012000	020055	052522	047502	
2540	012006	052125	047440	020122	
2541	012014	030070	041440	040510	
2542	012022	020122	047105	051504	
2543	012030	042040	052101	022501	
2544	012036	040043			
2545	012040	021445	040514	052123	LCVIS: .ASCII '%#LAST CHARACTER VISIBILITY TEST%#'
2546	012046	041440	040510	040522	
2547	012054	052103	051105	053040	
2548	012062	051511	041111	046111	
2549	012070	052111	020131	042524	
2550	012076	052123	021445	100	
2551	012103	000001			DEND: .END

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 DZLCAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

A	010730	1543	1547	1961	2422#		
ACNV	004044	1420	1428	1438#			
ACNVB	004000	1419*	1423#				
ACNVC	004026	1427*	1431#				
ACNVM	004060	1441#	1449				
ACNVX	004042	1437#	1440*	1441	1445*	1446*	1447*
ACNV4	004006	1426#	2177				
ACNV6	003760	1418#					
ADTENP	004306	1478	1497#				
ARDA	002556	1205#	1210				
ARDB	002602	1206	1213#				
AREAD	002542	1203#	1212				
ATO	004550	1557	1560#				
ATOA	004566	1563	1565#	1567			
ATOB	004572	1566#	1569				
ATOE	004576	1564	1569#				
AT1	004602	1561	1571#				
AT1A	004620	1574	1576#	1578			
AT1B	004624	1577#	1580				
AT1E	004630	1575	1579#				
AT2	004634	1572	1582#				
AT2A	004652	1585	1587#	1589			
AT2B	004656	1588#	1591				
AT2E	004662	1586	1590#				
AT24	005050	1623	1636#				
AT24A	005066	1639	1641#				
AT24B	005110	1643	1646#				
AT24C	005130	1645	1648	1650#	1651		
AT24E1	005104	1644#					
AT24E2	005126	1649#					
AT25	005134	1637	1653#				
AT25A	005152	1656	1658#	1664			
AT25B	005174	1661	1663#				
AT25E	005172	1662#					
AT3	004666	1583	1593#				
AT3A	004704	1596	1598#	1600			
AT3B	004710	1599#	1602				
AT3E	004714	1597	1601#				
AT30	005200	1654	1667#				
AT30A	005210	1670	1671#	1675			
AT30B	005220	1672	1674#				
AT30E	005216	1673#					
AT31	005224	1668	1677#				
AT31A	005234	1680	1681#	1689			
AT31B	005260	1686	1688#				
AT31E	005256	1687#					
AT32	005264	1678	1691#				
AT32A	005274	1694	1695#	1705			
AT32B	005322	1702	1704#				
AT32E	005320	1703#					
AT33	005326	1692	1708#				
AT33A	005336	1711	1712#	1721			
AT33B	005362	1718	1720#				
AT33E	005360	1719#					
AT34	005366	1709	1724#				
AT34A	005402	1727	1730#	1736			

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 DZLCAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

BIT9 = 001000	892	901#																	
BKSU 011667	2525#																		
BLKBB = 012226	947#																		
BLKCC = 012340	951#																		
BLK2 = 012230	949#																		
BLOCKA= 012103	944#	945	946	947	948	949	950	951	1505	1522*	1523*								
BLOCKB= 012225	946#																		
BLOCKC= 012327	950#																		
BLOCK1= 012105	945#	1529	1532	1533	1536	1544	1548	1551	2194	2207	2208								
BLOCK2= 012217	948#	1537	1552																
BMOVA 004130	1457#	1459																	
BMCVE 004120	1386	1421	1429	1453#	1527	1531	1535	1542	1546	1550	2206								
BRCTR 003052	1203*	1209*	1253*	1254*	1269#														
BREAD 002754	1250#	1258	1267	1352	1354	1356													
BREADA 003012	1259#	1264																	
BREADB 003022	1251	1261#																	
BREADC 003042	1263	1266#																	
BSYNC 003420	1348	1351#	1359																
BYPMAN= 000400	893#	1126																	
CC = 177776	882#																		
CCNT 010476	2336*	2357*	2360#	2371*	2381*	2404*	2414*												
CHAIN = 104012	933#	1174	1566	1577	1588	1599	1619	1632	1650	1663	1674	1688	1704						
	1720	1735	1752	1775	1791	1822	1840	1864	1891	1907	1915	1926	1962						
	1968	1974	1980	1986	1993	1999	2006	2012	2018	2024	2030	2036	2042						
	2048	2055	2061	2067	2073	2079	2085	2110	2148	2163	2185								
CHAINN 002000	998	1087#																	
CHALT = 104005	928#	1068	2226	2237	2265														
CHAR 010336	2307*	2309*	2310	2312*	2313	2315*	2330#												
CHKASR= 104022	941#																		
CHK33 002364	999	1161#																	
CHK330 002376	1001	1164#																	
CHK35 002400	1000	1165#																	
CHLT 001474	993	1020#																	
CHNA 002034	1088	1090	1092	1095#															
CHNAA 002062	1097	1099	1101#																
CHNB 002070	1075	1104#	1111																
CHRTST 011244	1959	2474#																	
CHR1 001454	1010#	1353*	1365																
CHR2 001456	1011#	1355*	1368																
CHR3 001460	1012#	1357*	1375																
CKASR 002416	1006	1169#																	
CK33 = 104013	934#																		
CK35 = 104014	936#	1914																	
CLEAN 002230	1070	1131#																	
CNT 010332	2094*	2096*	2099*	2101*	2308*	2316*	2328#	2341*	2342	2344*	2345	2351*	2352						
	2354*	2355																	
CNVCTR 004300	1479*	1482*	1494#																
CPRDY 004142	1463#	1467	1469																
CPRDYA 004152	1464	1466#																	
CRBUF 001452	1009#	1030	1032	1259*	1341*	1342	1353	1355	1357	2156*	2157	2160*	2161						
	2173*	2176*	2178	2182*	2183	2202*	2203	2216*	2217	2218	2269	2272*	2289*						
	2293#																		
CRLF 011073	1938	2451#																	
CRTA 001662	1061	1064#																	
CRTST 011122	1835	2458#																	
CTRA 001464	1014#	1837*	1838*	1841	1856*	1860*	1870*	1873*	1875*	1889*	1900*	1905*	1920*						

CTRB	001466	1924*	1927*	1932*	2125*	2146*	2198*	2200*	1952*
CTRC	001470	1015#	1841*	1844*	1876*	1877	1892*	1939*	
CTRD	001472	1016#	1877*	1885*	1940*	1944*			
CTO	006016	1017#							
CTOA	006042	1826	1832#						
CTOB	006052	1838#	1850						
CTOC	006060	1839	1841#						
CT1	006120	1842#	1845						
CT1A	006144	1833	1852#						
CT10	006654	1858#	1861						
CT11	006666	1971	1976#						
CT12	006700	1977	1982#						
CT13	006712	1983	1989#						
CT14	006724	1990	1995#						
CT15	006736	1996	2002#						
CT16	006750	2003	2009#						
CT17	006762	2009	2014#						
CT2	006164	2015	2020#						
CT2A	006202	1853	1866#						
CT2B	006222	1871#	1874						
CT2C	006230	1876#							
CT2D	006252	1877#	1893						
CT2E	006310	1883#	1886						
CT20	006774	1890	1892#						
CT21	007006	1890	1892#						
CT22	007020	2021	2026#						
CT23	007032	2027	2032#						
CT24	007044	2033	2038#						
CT25	007056	2039	2044#						
CT26	007070	2045	2051#						
CT27	007102	2052	2057#						
CT3	006320	2058	2063#						
CT3A	006344	2064	2069#						
CT3B	006374	1867	1895#						
CT30	007114	1901#	1909						
CT31	007126	1906	1908#						
CT32	007140	2070	2075#						
CT32A	007164	2076	2081#						
CT32B	007212	2082	2090#						
CT32C	007244	2095#	2097						
CT4	006400	2100#	2102						
CT4A	006430	2104	2110#						
CT4B	006442	1896	1911#						
CT5	006612	1920#							
CT6	006630	1922#	1925						
CT7	006642	1912	1956#						
CURTST	001334	1957	1964#						
C100	011021	1965	1970#						
C1112	007776	967#	1119*	1130					
C1112A	010016	2078	2441#						
C1112M	007770	2227	2248#						
C135	011024	2250	2252#						
C377	011027	2238	2247#						
C41	010774	2084	2442#						
C44	010777	2443#							
		2035	2434#						
		2041	2435#						

E06

.MAIN. MACY11 27(732) 13-MAY-76 13:28 PAGE 71
 DZLCAC.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ADD	1145 1515	1158 1892	1163 2316	1167	1216	1223	1238	1242	1272	1296	1306	1380	1443	1490	1491	
BCS	1487															
BEQ	1031 1661	1038 1820	1090 1941	1092 2104	1099 2326	1127 2380	1279	1281	1325	1334	1369	1376	1617	1630	1648	
BIC	1059 2182 2378	1077 2202	1095 2205	1144	1157	1324	1333	1404	1413	1442	1519	1615	1646	2093	2160	
BICB																
BIS	1042 2130	1252 2192	1610 2247	1627 2266	1641 2281	1658 2282	1732	1749	1769	1787	1812	1827	1899	2098	2118	
BIT	1037 2293	1072	1089	1096	1104	1108	1126	1169	1320	1611	1616	1629	1642	1647	1660	
BLOS	1061	1140	1152													
BMI	1116	1206	1672	1702	1718	2139	2212									
BNE	1073 1314 1839 2184	1079 1321 1845 2201	1084 1343 1861 2204	1097 1347 1874 2250	1105 1366 1886 2284	1107 1371 1890 2317	1109 1378 1906 2346	1162 1402 1925 2356	1166 1411 1933 2358	1170 1449 1945 2382	1210 1459 1953 2396	1255 1483 2097 2415	1276 1510 2102 2147	1299 1612 2147 2162	1311 1643 2162	
BPL	1040 2287	1049 2292	1088 2323	1125 2374	1263 2385	1286	1464	1472	1686	2155	2159	2175	2215	2268	2271	
BR	1063 1467 1664 1823	1075 1489 1675 1850	1082 1567 1689 1893	1086 1569 1705 1909	1111 1578 1721 2137	1123 1580 1736 2213	1142 1589 1738 2228	1154 1591 1753 2245	1212 1600 1756 2274	1258 1602 1772 2295	1283 1614 1776 2327	1292 1620 1792 2359	1303 1633 1797 2386	1359 1645 1800 2416	1379 1651 1816	
CLR	1055 1774	1057 1785	1064 1786	1132 1790	1256 1811	1261 1813	1308 1818	1473 1921	1485 2131	1714 2173	1730	1731	1748	1751	1766	
CLRB	1700	2269														
CMP	1060	1083	1091	1106	1165	1298	2183	2325	2345	2355	2395					
CMPB	1030	1078	1139	1151	1275	1278	1280	1342	1365	1368	1375	2161	2203	2379		
COM	1230	1400	1401	1409	1410	2309	2312	2315								
DEC	1098 1873 2414	1209 1885	1254 1889	1310 1905	1313 1924	1346 1932	1370 1944	1377 1952	1448 2096	1458 2101	1482 2146	1509 2200	1838 2324	1844 2357	1860 2381	
EMT	923 939	924 940	925 941	926	927	928	929	930	931	932	933	934	936	937	938	
HALT	859 1153	860 1266	862	864	866	868	870	879	1022	1027	1033	1045	1051	1110	1141	
INC	1403	1412	1488	1699	1923	2251	2354									
INCB	2344															
JMP	953	1067	1070	1130	1135	1147	1160	1558	1830	2121						
JSR	1071 1358 1531 1916 2210 2377	1074 1364 1535 1922 2219 2383	1080 1367 1542 1943 2227 2389	1130 1102 1374 1546 1947 2238	1135 1282 1386 1550 1948 2279	1147 1289 1420 1821 1949 2288	1160 1291 1421 1829 1951 2311	1558 1323 1428 1843 2092 2314	1830 1332 1429 1847 2095 2319	2121 1340 1469 1849 2100 2321						
MOV	1020 1118 1178 1197 1245 1362 1440 1526 1794 1900	1025 1119 1179 1203 1246 1363 1441 1557 1810 1913	1032 1121 1180 1204 1253 1385 1454 1564 1814 1920	1043 1122 1181 1215 1264 1399 1455 1575 1826 1927	1054 1131 1182 1217 1267 1405 1456 1586 1828 1939	1056 1133 1183 1218 1271 1406 1470 1597 1836 1940	1058 1136 1184 1219 1273 1408 1476 1609 1837 2094	1059 1138 1184 1219 1273 1408 1476 1609 1837 2094	1065 1138 1189 1222 1295 1414 1477 1626 1841 2099	1069 1146 1190 1224 1297 1415 1478 1640 1848 2103	1076 1148 1191 1225 1305 1418 1479 1657 1856 2117	1093 1150 1192 1226 1307 1419 1480 1684 1857 2125	1112 1159 1193 1229 1309 1426 1480 1698 1870 2143	1113 1173 1194 1231 1326 1427 1480 1747 1875 2193	1114 1176 1195 1235 1335 1438 1480 1767 1876 2194	1117 1177 1196 1239 1360 1439 1515 1793 1877 2198

	2239	2280	2306	2307	2308	2310	2313	2318	2320	2336	2337	2341	2342	2347	2349
	2351	2352	2371	2372	2388	2390	2392	2404	2405	2407	2409				
MOV8	1050	1259	1274	1284	1288	1290	1341	1353	1355	1357	1444	1457	1492	1507	1522
	1523	1842	1846	1878	1883	1887	1901	1903	1942	1946	1950	2156	2157	2176	2216
	2217	2218	2248	2252	2269	2272	2290	2293	2375	2376	2393				
NOP	1733	1750	1770	1788	1796	2107	2108	2109							
RESET	1232	2105	2240	2241	2242	2243	2244								
ROL	1066	1143	1156	1236	1237	1240	1241	1243	1244						
ROR	1445	1446	1447												
RTI	1023	1028	1035	1041	1046	1094	1100	1164	1168	1171	1185	1198	1220	1227	1233
	1265	1268	1277	1300	1316	1322	1329	1521	1795	2144					
RTS	1052	1120	1128	1213	1247	1260	1287	1336	1344	1349	1361	1373	1381	1390	1407
	1416	1425	1433	1450	1461	1465	1474	1484	1493	1511	1524	1539	1554	1934	1954
	2220	2255	2397												
SUB	1021	1026	1044	1137	1149	1486	1768								
TRAP	942														
TST	1039	1048	1087	1124	1161	1565	1576	1587	1598	1819	2197	2211	2249	2322	2384
TSTB	1115	1205	1262	1285	1463	1471	1671	1685	1701	1717	2138	2154	2158	2174	2214
	2267	2270	2286	2291	2373										
.ABS	857														
.ASCII	2444	2447	2449	2451	2452	2454	2455	2457	2458	2463	2467	2470	2474	2478	2483
	2486	2492	2494	2500	2504	2508	2509	2510	2514	2518	2522	2525	2526	2527	2533
	2537	2545													
.BYTE	2418	2420	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434
	2435	2436	2437	2438	2439	2440	2441	2442	2443						
.END	2551														
.REM	1														
.REPT	875														

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

*DZLCAC DZLCAC/SOL/CRF=DZLCAC.P11
 RUN-TIME: 8 16 3 SECONDS
 RUN-TIME RATIO: 94/27=3.3
 CORE USED: 10K (19 PAGES)

