

PC11

READER AND PUNCH TESTS
MD-11-DZPCA-E

EP-DZPCA-E-DL
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The microfiche card contains 48 frames of data, arranged in an 8x6 grid. Each frame contains a different set of data, including punch test results and reader test data. The data is presented in a structured format, with columns and rows of text and numbers. The frames are labeled with numbers 1 through 48, indicating the sequence of the data.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZPCA-E-D

PRODUCT NAME: PC11 READER AND PUNCH TESTS

PROGRAM DATE: APRIL 1976

MAINTAINER: DIAGNOSTIC GROUP

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1. ABSTRACT

THE PC11 READER AND PUNCH TESTS CONSISTS OF A PACKAGE OF TEST PROGRAMS DESIGNED TO TEST THE READER LOGIC, READER, PUNCH LOGIC, PUNCH, AND THE READER AND PUNCH IN COMBINATION, ALL TESTS ARE INCLUDED IN ONE OBJECT TAPE,

THE AVAILABLE TESTS ARE LISTED HERE IN NUMERICAL ORDER:

PRG0-READER LOGIC TESTS
PRG1-READER TEST
PRG2-PUNCH LOGIC TESTS
PRG3-PUNCH TEST
PRG4-PUNCH VERIFY ROUTINE
PRG5-COMBINED READER-PUNCH TEST
PRG6-PUNCH TAPE WITH 2 CHARACTERS SET IN SR ROUTINE.
PRG7-READ AND CHECK TAPE PUNCHED WITH 2 CHARACTERS SET IN SR.
PRG10-READ X CHARACTERS, THEN STALL Y MSECS.
PRG11-SPECIAL BINARY COUNT PATTERN TAPE GENERATOR.
PRG12-READER SPEED PRINT ROUTINE.
PRG13-PUNCH SPEED PRINT ROUTINE.

PROGRAMS PRG0 THROUGH PRG5 ARE THE READER AND PUNCH TESTS.
PROGRAMS PRG6 THROUGH PRG13 ARE UTILITY ROUTINES THAT PRODUCE TEST TAPES AND AID IN MAKING ADJUSTMENTS.

2. REQUIREMENTS

2.1 EQUIPMENT

- A. PDP-11 SYSTEM, (8K MEMORY)
- B. CONSOLE TELETYPE
- C. PC11 READER OR PC11 READER AND PUNCH.

THE PROCESSOR AND TELETYPE MUST BE IN OPERATING CONDITION.

THE TELETYPE, HIGH SPEED READER, AND HIGH SPEED PUNCH MUST HAVE STANDARD PERIPHERAL ADDRESSES, REFER TO SECTION 7.3 IF YOUR SYSTEM DOES NOT HAVE STANDARD PERIPHERAL ADDRESSES.

2.2 STORAGE

THIS PROGRAM RUNS IN 8K MEMORY.

2.3 LOADING PRODEDURE

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

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3. SOFTWARE SWITCH REGISTER MANIPULATION -----

THIS PROGRAM DOES NOT MAKE USE OF THE HARDWARE SWITCH REGISTER (LOC 177570). IT INSTEAD USES A SOFTWARE SWITCH REGISTER (SWREG) LOCATED AT MEMORY ADDRESS 176. UPON EXECUTION OF EACH SUB-PROGRAM WHICH ALLOWS SWREG SETTINGS, THE CONTENTS OF SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND REQUESTS A NEW VALUE (IE)

SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> IF NO CHANGES ARE TO BE MADE
2. 6 DIGITS TO REPRESENT IN OCTAL THE NEW SWREG CONTENTS
 0-7 LAST DIGIT FOLLOWED BY <CR>.
3. ^U TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED
 KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY TYPING A ^G (CNTRL G) ON THE CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH WILL BE PROCESSED IN KEY AREAS OF THE PROGRAM CODE, (IE) ERROR ROUTINES, AFTER COMMON HALTS AND END OF PASS.

THE OPERATOR ALSO HAS THE ABILITY TO TYPE ^G OR ^U WHEN INPUTTING DATA SUCH AS TEST NUMBER, ROUTINE NUMBER, AND ANY ASCII DATA.

- A. ^G WILL IMMEDIATELY EXECUTE THE ROUTINE TO CHANGE SWREG AND THEN RE-ASK QUESTION IN WHICH ^G WAS ANSWERED.
- B. ^U WILL ALLOW OPERATOR TO REENTER DATA IF ERROR WAS COMMITTED.

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4. USE PROCEDURE

LOAD STARTING ADDRESS-PRESS START. THE PROGRAM IDENTIFIES ITSELF
 (1ST TIME THRU ONLY) AND REQUESTS THE PROGRAM NUMBER
 TO EXECUTE.
 THE FOLLOWING PAGES EXPLAIN IN DETAIL THE STEPS NECESSARY
 TO RUN EACH PROGRAM.

4.1 PRG0 USE PROCEDURE (DESCRIPTION IN SECTION 6.1

- A. INSURE THAT TELETYPE IS ON-LINE
- B. HAVE AVAILABLE A TAPE LOOP OF SPECIAL BINARY COUNT PATTERN.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES OUT INSTRUCTIONS TO
 SELECT ANY DESIRED SWREG OPTIONS

THIS PROGRAM'S SWREG OPTIONS ARE: (EXPLAINED IN SECTION 7.2)

BIT15=1 HALT ON ERROR.
 BIT14=1 ENTER SCOPE MODE.
 BIT13=1 INHIBIT ERROR PRINT.
 BIT11=1 INHIBIT ITERATION.
 BIT10=1 HALT AT END OF CURRENT TEST.
 BIT9=1 SELECT A SPECIFIC ROUTINE FOR EXECUTION.
 BIT8=1 BYPASS MANUAL INTERVENTION ROUTINES.

- D. IF BIT9=1 THE PROGRAM REQUESTS THE SPECIFIC ROUTINE NUMBER.
- E. REFER TO SECTION 6.2 IF ANY ERROR PRINTOUTS OCCUR.
- F. THE PROGRAM RINGS THE BELL AT THE END OF EACH PASS.

EXECUTION TIME.

PRG0 IS USER DEPENDENT DUE TO THE USE OF MANUAL INTERVENTION
 ROUTINES. HOWEVER, WITH SWREG BIT8 SET TO BYPASS MANUAL ROUTINES,
 ONE ERROR-FREE PASS WILL TAKE APPROXIMATELY 3 MINUTES.

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4.2 PRG1 USE PROCEDURE (DESCRIPTION IN SECTION 6.2)

- A. INSURE THAT TELETYPE IS ON-LINE
- B. LOAD READER WITH SPECIAL BINARY COUNT PATTERN TEST TAPE LOOP.
A TEST LOOP MUST BE USED, AS A NORMAL LENGTH TEST TAPE IS NOT LONG ENOUGH TO CONDUCT THE TEST. IF A TAPE LOOP IS NOT USED, DATA MUST BE POSITIONED OVER THE READ CELLS, NOT THE BLANK LEADER.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO SET ANY DESIRED SWREG OPTIONS.

THIS PROGRAM'S SWREG OPTIONS ARE: (EXPLAINED IN SECTION 7.2)

BIT15=1 HALT ON ERROR.
BIT14=1 ENTER SCOPE MODE.
BIT13=1 INHIBIT ERROR PRINT.
BIT11=1 INHIBIT ITERATION.
BIT10=1 HALT AT END OF CURRENT TEST.
BIT9=1 SELECT A SPECIFIC ROUTINE FOR EXECUTION.

- D. IF BIT9=1 THE PROGRAM REQUESTS A SPECIFIC ROUTINE NUMBER
- E. REFER TO SECTION 6.2 IF ANY ERROR PRINTOUTS OCCUR.
- F. THE PROGRAM RINGS THE BELL AT THE END OF EACH PASS.

EXECUTION TIME: ONE ERROR FREE PASS ABOUT 7 MINUTES.

4.3 PRG2 USE PROCEDURE (DESCRIPTION IN SECTION 6.3)

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. INSURE THAT THE PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO SET ANY DESIRED SWREG OPTIONS.

THIS PROGRAM'S SWREG OPTIONS ARE: (EXPLAINED IN SECTION 7.2)

BIT15=1 HALT ON ERROR.
BIT14=1 ENTER SCOPE MODE.
BIT13=1 INHIBIT ERROR PRINT.
BIT11=1 INHIBIT ITERATION.
BIT10=1 HALT AT END OF CURRENT TEST.
BIT9=1 SELECT A SPECIFIC ROUTINE FOR EXECUTION.
BIT8=1 BYPASS MANUAL INTERVENTION ROUTINES.

- D. IF BIT9=1 THE PROGRAM REQUESTS A SPECIFIC ROUTINE NUMBER.
- E. THE PROGRAM RINGS THE BELL AT THE END OF EACH PASS.
- F. REFER TO SECTION 6. IF ANY ERRORS OCCUR.

EXECUTION TIME

PRG2 IS USER DEPENDENT DUE TO THE USE OF MANUAL INTERVENTION ROUTINES. WITH SWREG BIT8 SET TO BYPASS MANUAL ROUTINES, ONE ERROR-FREE PASS WILL TAKE APPROXIMATELY 1.5 MINUTES.

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4.4 PRG3 USE PROCEDURE (DESCRIPTION IN SECTION 8.4)

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. INSURE THAT THE PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO SET ANY DESIRED SWREG OPTIONS.

THIS PROGRAM'S SWREG OPTIONS ARE: (EXPLAINED IN SECTION 7.2)

- BIT13=1 INHIBIT ERROR PRINT.
- BIT11=1 INHIBIT ITERATION.
- BIT10=1 HALT AT END OF CURRENT TEST.
- BIT9=1 SELECT A SPECIFIC ROUTINE FOR EXECUTION.

- D. IF BIT9=1 PROGRAM REQUESTS SPECIFIC ROUTINE NUMBER
- E. UPON COMPLETION OF A PROGRAM PASS THE PROGRAM WILL TYPE "P0003 END" AND HALT, TO REPEAT PRESS CONTINUE.

EXECUTION TIME: ONE PASS ABOUT 8 MINUTES.

4.5 PRG4 USE PROCEDURE (DESCRIPTION IN SECTION 8.5)

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD TAPE THAT WAS PUNCHED BY PRG3-PUNCH TEST IN READER. LOAD TAPE SO THAT THE FIRST RUBOUT (ALL 1'S) IS 3 INCHES RIGHT OF THE METAL PLATE OVER THE READ STATION, MAKE READER READY.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO LOAD THE READER AND SELECT SWREG OPTIONS.
- D. THE PROGRAM WILL READ THE TAPE AND REPORT ANY ERRORS. DISREGARD ANY ERRORS THAT OCCUR WHEN THE READER REACHES THE END OF THE TAPE.
- E. THE SWREG OPTIONS FOR THIS PROGRAM ARE:

- BIT15=1 HALT ON ERROR.
- BIT13=1 INHIBIT ERROR PRINT.

- F. REFER TO SECTION 6, IF ERRORS OCCUR.

PRG4 DOES NOT RESYNC THE READER AT ANY TIME, IT'S INTENT IS TO SHOW EACH AND EVERY ERROR CAUSED BY THE PUNCH.

EXECUTION TIME: DEPENDS ON LENGTH OF TAPE TO BE VERIFIED.

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4.6 PRG5 USE PROCEDURE (DESCRIPTION IN SECTION 8.6)

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. INSURE THAT THE PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. USING THE "PUNCH FEED" KEY, PUNCH 2 FEET BLANK LEADER, LOAD A 1" THICK STACK OF PREPUNCHED SPECIAL BINARY COUNT PATTERN TAPE IN READER, AND MAKE READER READY. THE BLANK LEADER PORTION OF THE TAPE MUST BE AT THE READ STATION.
- D. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO PUNCH LEADER AND LOAD READER.
- E. THE PROGRAM WILL PUNCH A NEW BINARY COUNT PATTERN WHILE READING THE PREPUNCHED TAPE IN THE READER. THE PROGRAM SHOULD RUN ERROR-FREE UNTIL THE READER TAPE IS EXHAUSTED, AT WHICH POINT A READER NOT READY MESSAGE WILL OCCUR. REPLACE THE READER TAPE WITH THE TAPE JUST PUNCHED AND RERUN THE TEST. RUN THE TEST 6 TIMES.
- F. THE SWREG OPTIONS AVAILABLE WITH THIS PROGRAM ARE:

BIT15=1 HALT ON ERROR,
BIT13=1 INHIBIT ERROR PRINT.

I. REFER TO SECTION 6. IF ERRORS OCCUR.

EXECUTION TIME: PRG5 IS CONTINUOUS RUNNING.

4.7 PRG6 USE PROCEDURE (DESCRIPTION IN SECTION 8.7)

THIS PROGRAM CONTINUOUSLY PUNCHES TAPE WITH 2 CHARACTERS SELECTED

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. INSURE THAT THE PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO ENTER THE DESIRED ASCII CODES FOR CHARACTERS TO PUNCH.
- D. PRESS CONTINUE, THE PROGRAM WILL PUNCH THE DESIRED CHARACTERS CONTINUOUSLY UNTIL STOPPED BY USER.

EXECUTION TIME: CONTINUOUS RUNNING PROGRAM.

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4.8 PRG7 USE PROCEDURE (DESCRIPTION IN SECTION 3.8)

THIS PROGRAM READS AND CHECKS A TAPE PUNCHED WITH ANY 2 CHARACTERS

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD TAPE TO BE READ IN READER, DATA MUST BE UNDER READ STATION.
- C. FOLLOW PROGRAM INSTRUCTIONS.
- D. THE PROGRAM WILL READ THE TAPE AND REPORT ANY ERRORS.
- E. THE SWREG OPTIONS AVAILABLE WITH THIS PROGRAM ARE:

BIT15=1 HALT ON ERROR,
 BIT13=1 INHIBIT ERROR PRINT.

- F. REFER TO SECTION 6, IF ERRORS OCCUR.

EXECUTION TIME: CONTINUOUS RUNNING PROGRAM.

4.9 PRG10 USE PROCEDURE

THIS PROGRAM IS INTENDED AS AN AID IN SCOPING AND ADJUSTING
 THE READER AND READER LOGIC. TO RUN:

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD ANY TAPE LOOP IN THE READER. ONE'S AND ZEROES LOOP IS
 A GOOD CHOICE.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO ENTER THE
 NUMBER OF CHARACTERS TO READ AND THE NUMBER OF MILLISECONDS
 TO STALL AFTER READING THE CHARACTERS. PLEASE NOTE:

- 1. THE RANGE FOR CHARACTERS TO READ IS 1 THRU 377 (8).
- 2. THE STALL VALUE MUST BE NON-ZERO, BETWEEN 1 AND 377(8).

- D. PRESS CONTINUE, THE PROGRAM WILL CONTINUOUSLY READ AND STALL
 UNTIL STOPPED BY USER.

EXECUTION TIME: CONTINUOUS RUNNING PROGRAM.

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4.10 PRG11 USE PROCEDURE -----

THIS PROGRAM CONTINUOUSLY PUNCHES A TAPE WITH THE SPECIAL BINARY COUNT PATTERN, TO RUN;

- A. INSURE THAT TELETYPE IS ON-LINE
- B. MAKE SURE THAT THE PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. THE PROGRAM IDENTIFIES ITSELF, AND TYPES INSTRUCTION TO MAKE THE PUNCH READY.
- D. PRESS CONTINUE, THE SPECIAL BINARY COUNT PATTERN WILL BE PUNCHED UNTIL THE PROGRAM IS STOPPED BY USER.

4.11 PRG12 USE PROCEDURE -----

THIS PROGRAM IS INTENDED AS AN AID IN DETERMINING THE SPEED OF THE READER, IT IS NOT INTENDED TO REPLACE REGULAR SCOPING PROCEDURES FOR SETTING THE READER TO ITS CORRECT SPEED.

WITH THIS PROGRAM THE READER SPEED CAN BE MEASURED IN TWO WAYS:

- 1. 30 SECOND MEASUREMENT PERIOD, PLUS OR MINUS 10 CHARACTER ACCURACY
- 2. 300 SECOND (5 MINUTE) MEASUREMENT PERIOD, PLUS OR MINUS 1 CHARACTER ACCURACY

IN EITHER CASE MEASUREMENT ACCURACY DEPENDS ON THE USER'S ATTENTION TO STARTING AND ENDING TIMES OF MEASUREMENT, AS THE TIME INTERVALS ARE DETERMINED BY THE USER USING A SWEEP SECOND HAND WATCH OR STOP WATCH.

THE SPECIFIED ACCURACY ASSUMES THAT THE USER WILL TERMINATE THE MEASURING INTERVAL WITHIN ONE SECOND OF THE MEASUREMENT PERIOD, TO RUN;

- A. INSURE THAT TELETYPE IS ON-LINE
- B. MOUNT ANY TAPE LOOP IN READER.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO LOAD READER AND MAKE READY, AND TO SELECT DESIRED MEASUREMENT PERIOD.
- D. PRESS CONTINUE WHEN READY TO START MEASUREMENT, THE READER WILL START RUNNING.
- E. AT END OF TIME PERIOD, STRIKE ANY TTY KEY
THE PROGRAM WILL TYPE ABOUT THE READER SPEED IN CHARACTERS PER SECOND AND HALT.
- F. TO REPEAT, PRESS CONTINUE WHEN READY

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4.12 PRG13 USE PROCEDURE

 THIS PROGRAM IS INTENDED AS AN AID IN DETERMINING THE PUNCH SPEED. THE SPEED OF THE PUNCH CAN BE MEASURED WITHIN ONE CHARACTER ACCURACY PROVIDED THE USER PAYS CLOSE ATTENTION TO THE STARTING AND STOPPING TIME OF THE MEASUREMENT PERIOD. THE MEASUREMENT PERIOD IS CONTROLLED BY THE USER USING A SWEEP SECOND WATCH OR STOP WATCH. THE PERIOD USED IS 60 SECONDS. TO RUN:

- A. INSURE THAT TELETYPE IS ON-LINE
- B. INSURE THAT PUNCH HAS AN ADEQUATE SUPPLY OF TAPE.
- C. THE PROGRAM IDENTIFIES ITSELF AND TYPES INSTRUCTIONS TO MAKE PUNCH READY.
- D. PRESS CONTINUE WHEN READY TO START MEASUREMENT. THE PUNCH WILL START RUNNING.
- E. AT END OF TIME PERIOD (60 SECONDS), STRIKE ANY TTY KEY THE PROGRAM WILL TYPE OUT THE PUNCH SPEED IN CHARACTER PER SECOND AND HALT.
- F. TO REPEAT, PRESS CONTINUE CONTINUE WHEN READY.

5. PROGRAM AND/OR OPERATOR ACTION

5.1 NORMAL PRINTOUTS

 NORMAL PRINTOUTS IN THIS PROGRAM SERVE TO IDENTIFY A STARTING PROGRAM, TO PROVIDE INSTRUCTIONS, TO INDICATE STATUS, OR TO SIGNAL AN OPERATOR ERROR. MOST PRINTOUTS ARE SELF-EXPLANATORY, THOSE PRINTOUTS REQUIRING ADDITIONAL EXPLANATION FOLLOW.

"INCORRECT PROGRAM SELECTED,"

THE USER HAS SELECTED FOR EXECUTION A NON-EXISTENT PROGRAM.
 PRESS CONTINUE TO RETRY.

"INCORRECT ROUTINE SELECTED,"

THE USER HAS SELECTED FOR EXECUTION A NON-EXISTENT ROUTINE.
 PRESS CONTINUE TO RETRY.

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6. ERRORS

ERRORS ARE REPORTED IN THIS PROGRAM BY ONE OF THE FOLLOWING METHODS:

- A. UNCONDITIONAL ERROR HALTS, OR
- B. ERROR PRINTOUT FOLLOWED BY AN OPTIONAL ERROR HALT.

6.1 UNCONDITIONAL ERROR HALTS

AN UNCONDITIONAL 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 000776.

- 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 PC11 AND TTY VECTORS.

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6.2 ERROR PRINTOUTS -----

ERROR PRINTOUTS IN THIS PROGRAM CAN BE ONE OF TWO TYPES:
A. NORMAL ERROR PRINTOUTS
B. EXTENDED ERROR PRINTOUTS

6.2.1 NORMAL ERROR PRINTOUTS -----

NORMAL ERROR PRINTOUTS ARE GENERATED BY THE "ERR" SUBROUTINE. THE ERR SUBROUTINE IS CALLED BY AN "ERROR" STATEMENT IN THE PROGRAM LISTING. THE NORMAL ERROR PRINTOUT TAKES THE FORM:

"ERROR P00XX T00YY PC 0ZZZZZ"

WHERE:

P00XX IS THE NUMBER OF THE PROGRAM BEING RUN,
T00YY IS THE NUMBER OF ROUTINE WHERE FAILURE OCCURRED.

PC 0ZZZZZ IS THE ADDRESS FROM WHICH THE ERROR CALLED WAS ISSUED.

WHEN THIS TYPE OF ERROR PRINTOUT OCCURS:

- A. IN THE PROGRAM LISTING, LOOK UP THE ADDRESS REFERENCED BY PC0ZZZZZ.
- B. OPPOSITE THE PC VALUE AN ERROR STATEMENT WILL BE FOUND, AND IN THE COMMENTS SECTION A DESCRIPTION OF THE FAILURE WILL BE FOUND.
- C. AT THE BEGINNING OF THE TEST ROUTINE A DESCRIPTION OF THE TEST WILL BE FOUND, AND ALSO IN THE "PROGRAM DESCRIPTION" SECTION OF THIS DOCUMENT.

6.2.2 EXTENDED ERROR PRINTOUTS -----

IN ADDITION TO THE INFORMATION TYPED BY THE NORMAL ERROR PRINTOUTS, THE EXTENDED ERROR PRINTOUTS TYPE INFORMATION THAT DESCRIBES THE TYPE OF FAILURE. MOST EXTENDED PRINTOUTS CONCERN THEMSELVES WITH DATA PROBLEMS. THE PRINTOUTS ARE GENERATED BY THE "ERR1" SUBROUTINE WHICH IS CALLED BY AN "ERROR1" STATEMENT IN THE PROGRAM LISTING. A TYPICAL PRINTOUT WOULD LOOK AS FOLLOWS:

"ERROR P0005 T0000 PC 011350 DATA ERROR 8/D:0371 WAS:0071"

THE PROGRAM, TEST AND PC INFORMATION ARE THE SAME AS FOR NORMAL ERROR PRINTOUTS. THE PC VALUE ALTHOUGH HAVING THE SAME MEANING, IS NOT AS MEANINGFUL, SINCE THE ERR1 SUBROUTINE MAY BE BEING CALLED BY A COMMON DATA ERROR SUBROUTINE WHICH IS USED BY MORE THAN ONE PROGRAM.

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(6.2.2 CONT'D)

THE IMPORTANT INFORMATION IN AN EXTENDED ERROR PRINTOUT IS THE "EXTENDED" INFORMATION TYPED. SOME OF THE EXTENDED PRINTOUTS ARE DESCRIBED BELOW:

"DATA ERROR S/B XXXX WAS: YYYY"

DATA READ WITH READER DOES NOT AGREE WITH EXPECTED DATA. S/B XXXX (SHOULD BE) IS THE EXPECTED DATA, WAS YYYY IS THE RECEIVED DATA. DEPENDING ON THE PROGRAM, THE FAILURE COULD BE CAUSED BY THE READER OR THE PUNCH. EXAMINING THE TAPE WILL SHOW IF THE TAPE IS PUNCHED CORRECTLY.

"REREAD ERROR, 1ST READ: XXXX WAS: YYYY"

THIS ERROR PRINTOUT IS GENERATED BY PRG0 TEST17. IT INDICATES THAT A REREAD OF THE READER BUFFER DID NOT AGREE WITH THE ORIGINAL DATA READ FROM THE BUFFER.

"SYNC ERROR"

THIS PRINTOUT INDICATES THAT A PROGRAM WAS UNSUCCESSFUL IN SYNCING UP WITH THE SPECIAL BINARY COUNT PATTERN TAPE IN THE READER, OR IN THE CASE OF PRG4, THAT THE PROGRAM HAS NOT READ A SUFFICIENT NUMBER OF ZEROS BEFORE SYNCING UP WITH THE LEADER CHARACTER (377). IF HALTED, PRESS CONTINUE TO TRY AGAIN.

"LEADER ERROR S/B: 377 WAS: XXXX" OR

"LEADER ERROR S/B BETWEEN 0 AND 3, WAS: XXXX"

ONE OR BOTH OF THESE PRINTOUTS IS GENERATED BY PRG4 WHEN IN READING THE LEADER THAT PRECEDES THE SPECIAL BINARY COUNT PUNCHED BY PRG3 THE DATA DOES NOT AGREE WITH THE EXPECTED DATA. CHECK THAT THE TAPE IS PUNCHED CORRECTLY. REFER TO PRG3 AND PRG4 DESCRIPTION.

"MATCH ERROR"

THIS PRINTOUT IS GENERATED BY PRG7 WHEN UNSUCCESSFUL IN MATCHING UP THE DATA READ FROM THE READER WITH THE EXPECTED DATA AS SPECIFIED. CHECK THAT THE TAPE IS THE ONE TO BE READ AND RESTART THE PROGRAM.

"FALSE READER INTERRUPT" OR,

"FALSE PUNCH INTERRUPT"

THE PROGRAM DID NOT FIND THE ERROR OR THE DONE BIT SET FOLLOWING AN INTERRUPT. POSSIBLY NOISE COULD BE CAUSING THE PROBLEM.

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7. MISCELLANEOUS

7.1 TEST TAPES

THE FOLLOWING TEST TAPES ARE RELEASED WITH THIS PROGRAM:

- A. MAINDEC-00-D2G4-PT SPECIAL BINARY COUNT PATTERN TEST TAPE.
- B. MAINDEC-00-D2G2-PT ONES AND ZEROES TEST TAPE.

THE SPECIAL BINARY COUNT PATTERN TAPE IS PUNCHED WITH A PATTERN CONSISTING OF THE NUMBERS 000 THROUGH 377. EACH NUMBER IS IMMEDIATELY FOLLOWED BY ITS ONES COMPLEMENT NUMBER. FOR EXAMPLE:

001, 376, 002, 375, 003, 374, 004, 373, ETC.

THE EASIEST WAY TO MAKE A SPECIAL BINARY COUNT PATTERN TEST LOOP IS TO OVERLAP THE TAPE AT THE POINT WHERE THE CHARACTERS 377,000,000:377, APPEAR. THAT SEQUENCE OF CHARACTERS APPEARS EVERY 512 CHARACTERS. THEREFORE A MINIMUM SIZE TEST LOOP WOULD CONSIST OF 512 CHARACTERS.

7.2 SWREG OPTIONS

THE STANDARD SWREG OPTIONS ARE DESCRIBED HERE.

BIT15 - HALT ON ERROR.

BIT14 - SCOPE. THIS OPTION CAUSES THE PROGRAM TO REMAIN IN THE CURRENT TEST ROUTINE. WHEN THE OPTION IS REMOVED THE PROGRAM PERFORMS THE TEST THE NUMBER OF TIMES SPECIFIED BY ITS ITERATION COUNT, BEFORE GOING ON TO THE NEXT ROUTINE.

BIT13 - INHIBIT ERROR PRINT. THIS OPTION IF SET WILL REMOVE ALL ERROR PRINTOUTS.

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BIT11 - INHIBIT ITERATION, SOME PROGRAMS CONSIST OF INDIVIDUAL TEST ROUTINES. FOR EACH ROUTINE THE FUNCTION BEING TESTED CAN BE TESTED A VARIABLE NUMBER OF TIMES BEFORE THE ROUTINE IS COMPLETED. THE NUMBER OF TIMES THE TEST IS TO BE PERFORMED IS CALLED THE ITERATION COUNT AND IT MAY DIFFER FROM ROUTINE TO ROUTINE. SETTING SWREG BIT11 WILL CAUSE THE PROGRAM TO PERFORM ONLY ONE ITERATION FOR EACH ROUTINE DURING WHICH THE SWITCH IS SET. TWO POSSIBLE USES OF THIS OPTION ARE:

- A. QUICK PASS. WHEN A PROGRAM RUNS FOR SEVERAL MINUTES FOR ONE PROGRAM PASS, THE USER MAY ELECT TO RUN THROUGH THE PROGRAM QUICKLY TO FIND OUT IF ANY FAILURES SHOW UP 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 WITH A MULTIPLE ITERATION COUNT HAS DETECTED A SOLID FAILURE, THE ERROR WILL BE REPORTED MANY TIMES. TO GO ON TO THE NEXT ROUTINE IF DESIRED, THE USER CAN INHIBIT ITERATION. IT WILL BE NECESSARY TO SET SR11 ROUTINE AND HALT, TO CAUSE THE PROGRAM TO STOP AT END OF FAILING ROUTINE. OTHERWISE THE PROGRAM WILL QUICKLY RUN THROUGH THE NEXT ROUTINE ALSO.

BIT10 - HALT AT END OF CURRENT ROUTINE. FOR THOSE PROGRAMS CONSISTING OF A SET OF SEPARATE TEST ROUTINES, SWREG BIT10 SET TO A 1 CAUSES THE PROGRAM TO HALT AT THE 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 BLOW UP 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.
- B-

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(7.2 CONT'D)

BIT9 - SELECT ROUTINE. THE PROGRAMS THAT CONSIST OF INDIVIDUAL TEST ROUTINES. THE USER MAY ELECT TO RUN ONLY A SPECIFIED ROUTINE. TO SELECT A ROUTINE BIT 9 (SWREG) MUST BE SET THE PROGRAM THEN REQUESTS THE ROUTINE NUMBER TO BE RUN THE SELECTED NUMBER MUST BE A VALID ROUTINE NUMBER FOR THE PROGRAM BEING RUN, OR A USER ERROR PRINTOUT WILL OCCUR. THE PROGRAM WILL RUN THE SELECTED ROUTINE UNTIL THE SELECT ROUTINE OPTION IS CLEARED, OR UNTIL THE SELECTED ROUTINE NUMBER IS CHANGED. IF THE OPTION IS CLEARED, THE PROGRAM WILL PROCEED TO EXECUTE THE REMAINING ROUTINES IN THE PROGRAM. IF THE ROUTINE NUMBER IS CHANGED, THE PROGRAM WILL EXECUTE THE NEWLY SELECTED ROUTINE.

BIT8 - BYPASS MANUAL INTERVENTION ROUTINE. SOME PROGRAMS TEST ROUTINES REQUIRE THAT THE USER PERFORM SOME MANUAL OPERATION FOR WHICH THE PROGRAM HAS TO WAIT. THE USER MAY ELECT TO BYPASS THESE ROUTINES BY SETTING BIT8 OF SWREG. A GOOD POINT AT WHICH TO USE THIS OPTION WOULD BE AFTER A COMPLETE PASS HAS BEEN COMPLETED, AND THE USER WISHES TO LOOP THE PROGRAM WITHOUT HAVING TO INTERVENE. SELECTING A MANUAL ROUTINE WITH BIT9 OPTION AND BIT8 SET WILL CAUSE THE FOLLOWING PRINTOUT:

"?MANUAL ROUTINE. BIT8 IS SET."

EITHER TURN OFF BIT8, OR SELECT ANOTHER ROUTINE. PRESS CONTINUE.

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7.3 TESTING PC11 AT NON-STANDARD ADDRESSES AND/OR VECTORS

THIS PROGRAM CAN TEST PC11'S ASSIGNED TO NON-STANDARD ADDRESSES
 AND VECTORS PROVIDED THOSE ADDRESSES AND VECTORS ARE PROVIDED
 TO THE PROGRAM AS FOLLOWS:

A. IMMEDIATELY AFTER LOADING THE PROGRAM CHANGE THE FOLLOWING
 LOCATIONS, REFER TO PROGRAM LISTING.

LOCATION	FROM STANDARD	TO NON-STANDARD
001210	177550	READER CBR ADDRESS
001212	177552	READER BUFFER ADDRESS
001214	177554	PUNCH CBR ADDRESS
001216	177556	PUNCH BUFFER ADDRESS
001220	000070	READER INTERRUPT VECTOR ADDRESS
001222	000200	READER PRIORITY LEVEL
001224	000074	PUNCH INTERRUPT VECTOR ADDRESS
001226	000200	PUNCH PRIORITY LEVEL

B. IF THE TELETYPE IS ALSO AT NON STANDARD ADDRESSES, PERFORM
 THE FOLLOWING CHANGES:

LOCATION	FROM STANDARD	TO NON-STANDARD
001230	177560	TTY KEYBOARD CBR
001232	177562	TTY KEYBOARD BUFFER
001234	177564	TTY PRINTER CBR ADDRESS
001236	177566	TTY PRINTER BUFFER ADDRESS

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8. DESCRIPTION

8.1 PRGS PROGRAM DESCRIPTION

PRGS TESTS THE PC11 INPUT LOGIC. THE PROGRAM CONSISTS OF 26
TEST ROUTINES NUMBERED FROM 00 TO 30(8).

RTN0 - TESTS THAT THE READER STATUS WORD (PRS) CAN BE
REFERENCED WITHOUT TRAPPING.

RTN1 - TESTS THAT THE READER BUFFER (PRB) CAN BE REFERENCED
WITHOUT TRAPPING.

RTN2 - MANUAL INTERVENTION ROUTINE, CHECKS THAT WITH PC11 POWER
OFF AND AFTER ISSUING A RESET THE ERROR BIT IS THE ONLY
BIT SET IN THE READER STATUS WORD (PRS).

RTN3 - MANUAL INTERVENTION ROUTINE, CHECKS THAT THE ERROR BIT
(BIT 15) BECOMES SET IN PRS WITH READER OFF-LINE.

RTN4 - MANUAL INTERVENTION ROUTINE, CHECKS THAT THE ERROR BIT
(BIT 15) BECOMES SET IN PRS WITH READER OUT-OF-TAPE.

RTN5 - MANUAL INTERVENTION ROUTINE, CHECKS THAT THE ERROR BIT
(BIT 15) IS NOT SET (CLEARED) IN PRS WITH PC11 POWER ON,
READER ON-LINE, AND TAPE LOADED IN READER.

RTN6 - TESTS ABILITY TO SET AND CLEAR THE INTERRUPT ENABLE
BIT IN PRS (BIT 6).

RTN7 - TESTS ABILITY TO CLEAR THE INTERRUPT ENABLE BIT IN
PRS (BIT 6) WITH A RESET INSTRUCTION.

RTN10 - ENABLES READER, AND AFTER APPROXIMATELY 100 MILLISECONDS
CHECKS THAT THE DONE BIT HAS BECOME SET IN PRS (BIT 7).

RTN11 - TESTS ABILITY TO READ THE DONE BIT RELIABLY (BIT 7 OF PRS).

RTN12 - TESTS THAT RESET COMMAND CLEARS DONE BIT (BIT 7 OF PRS).

RTN13 - TESTS THAT DONE BIT (BIT 7 OF PRS) IS CLEARED BY READER ENABLE.

RTN14 - TESTS THAT DONE BIT (BIT 7 OF PRS) IS CLEARED BY REFERENCING
THE READER BUFFER (PRB).

RTN15 - TEST THAT ENABLING READER (BIT 0 OF PRS) SETS THE BUSY
BIT (BIT 11 OF PRS).

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(8.1 CONT'D)

- RTN16 - TESTS ABILITY TO READ THE BUSY BIT RELIABLY (BIT 11 OF PRB).
- RTN17 - TESTS ABILITY TO READ THE READER BUFFER (PRB) RELIABLY.
- RTN20 - TESTS THAT THE READER BUFFER (PRB) IS CLEARED BY READER ENABLE.
- RTN21 - TESTS THAT READER INTERRUPTS ON DONE. IF THE INTERRUPT IS SERVICED, IT INDICATES THAT THE READER IS INTERRUPTING AT THE CORRECT VECTOR ADDRESS.
- RTN22 - TESTS THAT THE READER DOES NOT INTERRUPT WITH PROCESSOR SET TO THE SAME PRIORITY AS THE READER.
- RTN23 - TESTS THAT THE READER INTERRUPTS WITH PROCESSOR SET TO A PRIORITY ONE LEVEL LOWER THAN THE READER'S.
- RTN24 - CHECKS THAT THE READER DOES NOT REINTERRUPT AFTER AN RTI COMMAND WHEN THE DONE BIT IS LEFT SET.
- RTN25 - CHECKS THAT THE READER INTERRUPTS IMMEDIATELY UPON LOWERING CP PRIORITY TO 0.
- RTN26 - MANUAL INTERVENTION ROUTINE. CHECKS THAT ERROR BIT SET (BIT 15 OF PRB) CRIPPLES READER ENABLE.
- RTN27 - MANUAL INTERVENTION ROUTINE. CHECKS THAT THE ERROR BIT IS ABLE TO INTERRUPT, AND DOES NOT REINTERRUPT AFTER SERVICE.
- RTN30 - MANUAL INTERVENTION ROUTINE. CHECKS THAT AFTER AN ERROR INTERRUPT HAS BEEN SERVICED ISSUING A READER ENABLE CAUSES AN IMMEDIATE INTERRUPT.

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8.2 PRG1 PROGRAM DESCRIPTION -----

PRG1 IS THE PC11 READER DATA TEST. IT CONSISTS OF 3 ROUTINES
 NUMBERED FROM 00 TO 02. THE PROGRAM USES A SPECIAL BINARY COUNT
 PATTERN TEST TAPE LOOP IN ALL ROUTINES.

RTN0 - READS AND CHECKS 10000 CHARACTERS AT FULL SPEED.

RTN1 - READS AND CHECKS 500 CHARACTERS. A STALL OF BETWEEN
 6 AND 7 MILLISECDS OCCURS BETWEEN EACH CHARACTER.

RTN2 - READS AND CHECKS 1000 GROUPS OF 3 CHARACTERS EACH.
 A STALL OF BETWEEN 0 TO 31 MSECDS OCCURS BETWEEN
 EACH CHARACTER GROUP.

RTN3 - READS AND CHECKS 1000 GROUPS OF CHARACTERS. CHARACTER
 LENGTH VARIES RANDOMLY BETWEEN 1 AND 15. A STALL OF
 BETWEEN 0 TO 31 MSECDS OCCURS BETWEEN EACH CHARACTER GROUP.

RTN4 - READS AND CHECKS 1000 GROUPS OF CHARACTERS. THE NUMBER
 OF CHARACTERS IN A GROUP VARIES RANDOMLY BETWEEN 1 AND 77.
 A STALL OF BETWEEN 0 TO 31 MSECDS OCCURS BETWEEN EACH
 GROUP OF CHARACTERS.

IN ALL ROUTINES, THE PROGRAM WILL AUTOMATICALLY RESYNC ITSELF
 TO THE TEST TAPE AFTER THREE ERRORS HAVE OCCURRED.

8.3 PRG2 PROGRAM DESCRIPTION -----

PRG2 TESTS THE PC11 OUTPUT LOGIC. THE PROGRAM CONSISTS OF 17
 TEST ROUTINES NUMBERED FROM 00 TO 20 (8).

RTN0 - TESTS THAT THE PUNCH STATUS WORD (PPS) CAN BE REFERENCED
 WITHOUT TRAPPING.

RTN1 - TESTS THAT THE PUNCH BUFFER (PPB) CAN BE REFERENCED WITHOUT
 TRAPPING.

RTN2 - MANUAL INTERVENTION ROUTINE. CHECKS THAT WITH PC11 POWER
 OFF AND AFTER ISSUING A RESET, THE ERROR AND READY BITS
 ARE THE ONLY BITS SET IN THE PUNCH STATUS WORD (PPS).

RTN3 - MANUAL INTERVENTION ROUTINE. CHECKS THAT THE ERROR BIT
 (BIT 15 OF PPS) BECOMES SET WHEN THE PUNCH IS OUT OF TAPE.

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(8.3 CONT'D)

- RTN4 - MANUAL INTERVENTION ROUTINE, CHECKS THAT THE ERROR BIT DOES NOT SET WITH PC11 POWER ON, AND TAPE IN PUNCH.
- RTN5 - TESTS ABILITY TO SET AND CLEAR THE INTERRUPT ENABLE BIT (BIT 6 IN PPS).
- RTN6 - TESTS ABILITY TO CLEAR THE INTERRUPT ENABLE BIT WITH RESET INSTRUCTION.
- RTN7 - TESTS THAT THE READY BIT (BIT 7 OF PPS) IS SET BY A RESET INSTRUCTION, AND THAT THE BIT CAN BE READ RELIABLY.
- RTN10 - TESTS THAT THE READY BIT (BIT 7 OF PPS) IS CLEARED BY LOADING THE PUNCH BUFFER (PPB).
- RTN11 - TESTS THAT THE READY BIT (BIT 7 OF PPS) IS NOT CLEARED BY BYTE LOADING PPB+1.
- RTN12 - TESTS THAT THE READY BIT (BIT 7 OF PPS) IS ABLE TO INTERRUPT, IF THAT INTERRUPT IS SERVICED, IT INDICATES THAT INTERRUPT IS OCCURRING AT THE CORRECT VECTOR ADDRESS.
- RTN13 - TESTS THAT THE READY BIT DOES NOT REINTERRUPT AFTER IT HAS BEEN SERVICED AND THE READY BIT LEFT ON.
- RTN14 - TESTS THAT THE PUNCH DOES NOT INTERRUPT WITH THE PROCESSOR AT SAME PRIORITY LEVEL AS THE PUNCH.
- RTN15 - TESTS THAT THE PUNCH INTERRUPTS WITH PROCESSOR SET TO A PRIORITY ONE LEVEL LOWER THAN THE PUNCH'S.
- RTN16 - TESTS THAT THE PUNCH INTERRUPTS IMMEDIATELY UPON LOWERING OF PROCESSOR PRIORITY TO LEVEL 0.
- RTN17 - TEST THAT THE PUNCH ERROR BIT (BIT 15 OF PPS) IS ABLE TO INTERRUPT, AND THAT IT DOES NOT REINTERRUPT AFTER BEING SERVICED.
- RTN20 - MANUAL INTERVENTION ROUTINE, CHECKS THAT AFTER AN ERROR INTERRUPT HAS BEEN SERVICED, LOADING THE PUNCH BUFFER CAUSES AN IMMEDIATE INTERRUPT.

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8.4 PRG3 PROGRAM DESCRIPTION

PRG3 EXERCISES THE PUNCH, THE PROGRAM CONSISTS OF 4 ROUTINES
NUMBERED FROM 00 TO 03, THE DATA USED FOR OUTPUT IS THE SPECIAL
BINARY COUNT PATTERN, ALL ROUTINES PUNCH DATA BLOCKS IN THE
FOLLOWING FORMAT:

- A. 20 BLANK CHARACTERS
- B. SYNC CHARACTER RUBOUT.
- C. ROUTINE NUMBER (BETWEEN 0 AND 3)
- D. 4 BLANK CHARACTERS
- E. 512 CHARACTERS OF SPECIAL BINARY COUNT PATTERN.

RTN0 - PUNCHES 5 DATA BLOCKS AT FULL SPEED.

RTN1 - PUNCHES 5 DATA BLOCKS, THE SPECIAL BINARY COUNT PATTERN
DATA IS PUNCHED WITH RANDOM STALLS OF UP TO 47 MILLISECONDS
AFTER EACH CHARACTER.

RTN2 - PUNCHES 5 DATA BLOCKS, THE SPECIAL BINARY COUNT PATTERN
DATA IS PUNCHED WITH RANDOM STALLS OF UP TO 47 MILLISECONDS
BETWEEN GROUPS OF CHARACTERS OF UP TO 15 CHARACTERS.

RTN3 - PUNCHES 1 DATA BLOCK, THE SPECIAL BINARY COUNT PATTERN
DATA IS PUNCHED WITH A 5 SECOND STALL PRECEDING EACH
32 CHARACTER GROUP PUNCHED.

8.5 PRG4 PROGRAM DESCRIPTION

PRG4 VERIFIES THE PAPER TAPE PRODUCED BY PRG3, THE
PROGRAM CONSISTS OF A SINGLE ROUTINE THAT PERFORMS THE
FOLLOWING STEPS:

- A. LOOK FOR 10 CONSECUTIVE 0 CHARACTERS
- B. LOOK FOR SYNC CHARACTER (RUBOUT)
- C. LOOK FOR ROUTINE 0, BETWEEN 0 AND 3.
- D. READ 4 BLANK CHARACTERS
- E. READ 512 BINARY CHARACTERS.
- F. GO TO STEP A.

THE ROUTINE WILL REPORT EVERY ERROR, IT WILL NOT RESYNC
ON THE SPECIAL BINARY COUNT PATTERN, SINCE IT IS INTENDED
THAT EVERY ERROR CAUSED BY THE PUNCH BE REPORTED.

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8.6 PRG5 COMBINED READER-PUNCH TEST

THIS CONTINUOUS RUNNING PROGRAM EXERCISES THE PUNCH AND READER CONCURRENTLY. THE SPECIAL BINARY COUNT PATTERN IS USED IN THIS PROGRAM,

- A. THE PUNCH PUNCHES DATA AT FULL SPEED. WHEN THE CHARACTER COUNT REACHES 20, THE PUNCH ROUTINE ENABLES THE READER.
- B. WHEN THE CHARACTER COUNT REACHES 40, THE PUNCH ROUTINE WILL STOP PUNCHING. PUNCHING WILL NOT RESUME UNTIL THE CHARACTER COUNT IS DECREMENTED TO 31 BY THE READ ROUTINE.
- C. IF THE CHARACTER COUNT IS OVER 31, THE READER READS AT FULL SPEED.
- D. IF THE CHARACTER COUNT IS 31 OR LESS THE READER WILL READ WITH RANDOM STALLS BETWEEN CHARACTERS.
- E. IF THE CHARACTER COUNT BECOMES 0, THE READER STOPS READING UNTIL THE COUNT CLIMBS TO 20.
- F. THE READ ROUTINE WILL RESYNC AUTOMATICALLY AFTER 3 ERRORS.

8.7 PRG6 PROGRAM DESCRIPTION

PRG6 WILL PUNCH CONTINUOUSLY THE 2 CHARACTERS WHOSE ASCII CODES HAVE BEEN SELECTED. THE ROUTINE IS USED FOR GENERATING ALL 0'S TAPE, ALL 1'S TAPE, ONES AND ZEROES TAPE, ETC.

8.8 PRG7 PROGRAM DESCRIPTION

PRG7 READS AND CHECKS A TAPE PUNCHED WITH THE CHARACTERS WHOSE ASCII CODES HAVE BEEN SELECTED. THIS ROUTINE IS USEFUL IN SETTING UP THE READ PHOTOCELLS AND READ AMPLIFIER.

8.9 PRG10 PROGRAM DESCRIPTION

PRG10 WILL ENABLE THE READER FOR THE NUMBER OF CHARACTERS SPECIFIED, AND THEN IT WILL STALL FOR THE NUMBER OF MILLISECONDS SPECIFIED. THIS ROUTINE IS USEFUL IN SETTING UP THE READER CLOCK, ACCELERATOR, STROBE, AND FOR CHECKING THE STOP DELAY.

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0.10 PRG11 PROGRAM DESCRIPTION

PRG11 PUNCHES THE SPECIAL BINARY COUNT PATTERN CONTINUOUSLY.

0.11 PRG12 PROGRAM DESCRIPTION

PRG12 IS A ROUTINE USED TO CHECK THE SPEED OF THE READER.
READER SPEED CAN BE MEASURED IN TWO WAYS:

A. COARSE, 30 SECOND TIMING, PLUS OR MINUS 10 CHARACTER ACCURACY.
B. FINE, 300 SECOND TIMING, PLUS OR MINUS 1 CHARACTER ACCURACY.

THE USER CONTROLS THE DURATION OF THE TIMING PERIOD BY USING A
SWEEP SECOND HAND WATCH OR STOP-WATCH. AT THE END OF THE
TIMING PERIOD, STRIKE ANY TTY KEY TO OBTAIN A SPEED PRINTOUT.

0.12 PRG13 PROGRAM DESCRIPTION

PRG13 IS USED TO CHECK THE SPEED OF THE PUNCH. THE ROUTINE
USES A 60 SECOND TIMING PERIOD THAT IS CONTROLLED BY THE USER.
AT THE END OF THE TIMING PERIOD STRIKE ANY TTY KEY TO OBTAIN A
SPEED PRINTOUT.

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1045                                     .ABS
1046                                     .TITLE  PC11 READER-PUNCH TESTS
1047                                     .MLIST  MC,MD,TOC
1048                                     .LIST   ME
1049
1050 ;PRG0 - READER LOGIC TESTS
1051 ;PRG1 - READER TEST
1052 ;PRG2 - PUNCH LOGIC TESTS
1053 ;PRG3 - PUNCH TEST
1054 ;PRG4 - PUNCH VERIFY ROUTINE
1055 ;PRG5 - COMBINED READER-PUNCH TEST
1056 ;PRG6 - PUNCH 2 CHARACTERS FROM SR,
1057 ;PRG7 - READ 2 CHARACTERS AS PER SR,
1058 ;PRG10 - READ X CHARS, STALL Y MSECs.
1059 ;PRG11 - PUNCH SPECIAL BINARY COUNT PATTERN TAPE.
1060 ;PRG12 - READER SPEED PRINT ROUTINE.
1061 ;PRG13 - PUNCH SPEED PRINT ROUTINE.
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1064                                     .=0
1065 000000 000002                                     ;UNASSIGNED TRAP
1066 000002 000000                                     ;SP OVERFLOW, BUS ERROR TRAP
1067 000004 000006 MACHERR: .+2                                     ;RESERVED INSTRUCTION TRAP
1068 000006 000000                                     ;TRACE TRAP
1069 000010 000012                                     ;TRAP TO CALL IOX
1070 000012 000000                                     ;POWER FAIL TRAP
1071 000014 000016                                     ;ENT TRAP
1072 000016 000000                                     ;ENT TRAP
1073 000020 000022                                     ;ENT TRAP
1074 000022 000000                                     ;ENT TRAP
1075 000024 000026                                     ;ENT TRAP
1076 000026 000000                                     ;ENT TRAP
1077 000030 002442                                     ;ENT TRAP
1078 000032 000340 PRTY7
1079 000034 004310 DLYX
1080 000036 000340 PRTY7
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1082                                     ;LOCATIONS 40 THROUGH 776 ARE FILLED WITH .+2 AND HALT.
1083                                     ENTX=0
1084                                     CC=177776
1085                                     PSW=177776                                     ;PS ADDRESS
1086                                     SPBOT=1200
1087                                     NOP=240
1088                                     OPEN=0
1089                                     MANUAL=BIT15
1090                                     R0=40
1091                                     R6=46
1092                                     PC=47
1093                                     BIT15=100000
1094                                     BIT14=40000
1095                                     BIT13=20000
1096                                     BIT12=10000
1097                                     BIT11=4000
1098                                     BIT10=2000
1099                                     BIT9=1000
1100                                     BIT8=400
1101                                     BIT7=200
1102                                     ;SUBJECT TO PROGRAM MODIFICATION
1103                                     ;BIT DEFINITIONS

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1101	000100	BIT6=100	
1102	000040	BIT5=40	
1103	000020	BIT4=20	
1104	000010	BIT3=10	
1105	000004	BIT2=4	
1106	000002	BIT1=2	
1107	000000	BIT0=0	
1108	005726	POPSP=5726	;POP THE STACK, SAME AS TST (6)+
1109	022626	POPSP2=022626	;POP STACK TWICE, SAME AS CMP (6)+,(6)+
1110	000340	PRTY7=340	;PRIORITY LEVEL DEFINITIONS
1111	000300	PRTY6=300	
1112	000240	PRTY5=240	
1113	000200	PRTY4=200	
1114	000140	PRTY3=140	
1115	000100	PRTY2=100	
1116	000040	PRTY1=40	
1117	000000	PRTY0=0	
1118	104400	DELAYX=TRAP+0	
1119	000007	GELL=007	
1120			
1121	000046	.=46	
1122	000046	LOGIC	
1123			
1124			
1125			
1126		;***** ;NOTE: PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT ;A HARDWARE SWITCH REGISTER-REFER TO DOCUMENT ;*****	
1127			
1128			
1129			
1130	000174	.=174	
1131	000174	DISPREG:OPEN	
1132	000176	SWREG: OPEN	
1133			
1134			
1135	000200	.=200	
1136	000200	JMP START	;GO TO START OF PROGRAM.
1137	001204	.=,+1000	
1138	001204	SWR: SWREG	
1139	001206	DISPLAY:DISPREG	
1140	001210	PRS: 177550	;READER CSR
1141	001212	PRB: 177552	;READER BUFFER
1142	001214	PPS: 177554	;PUNCH CSR
1143	001216	PPB: 177556	;PUNCH BUFFER
1144	001220	RDRVTR: 70	;READER INTERRUPT VECTOR
1145	001222	RDRVLV: PRTY4	;READER PRIORITY LEVEL
1146	001224	PCHVTR: 74	;PUNCH INTERRUPT VECTOR
1147	001226	PCHLVL: PRTY4	;PUNCH PRIORITY LEVEL
1148	001230	TKS: 177560	;LSR CSR
1149	001232	TKB: 177562	;LSR BUFFER
1150	001234	TPS: 177564	;LSP CSR
1151	001236	TPB: 177566	;LSP BUFFER
1152	001240	PRGNUM: OPEN	;CONTAINS CURRENT PROGRAM
1153	001242	BRCTR: OPEN	
1154	001244	DVDND: OPEN	
1155	001246	DVQUOT: OPEN	
1156	001250	MSEC: OPEN	

U
+ m2

1157 001252 0000 0
1158 001254 0000 0
1159 001256 0000 0
1160 001260 0000 0
1161 001262 0000 0
1162 001264 0000 0
1163 001266 0000 0
1164 001270 005376
1165 001272 007666
1166 001274 010216
1167 001276 011634
1168 001300 012302
1169 001302 012660
1170 001304 013454
1171 001306 013606
1172 001310 014134
1173 001312 014322
1174 001314 014372
1175 001316 014524
1176 001320
1177 001320 003566
1178 001322 002914
1179 001324 003012
1180 001326 003400
1181 001330 003534
1182 001332 004262
1183 001334 003234
1184 001336 003244
1185 001340 002462
1186 001342 002732
1187 001344 002762
1188 001346 002110
1189 001350 014722
1190 001352 015156
1191 001354 014654
1192 001356 014740
1193 001360 015120
1194
1195
1196 001362 020000
1197 001364 000000
1198 001366 000000
1199 001370 000001
1200 001372 000000
1201 001374 000000
1202 001376 000000
1203 001400 000000
1204 001402 000000
1205 001404 000000
1206 001406 000000
1207 001410 000000
1208 001412 000000
1209 001414 000000
1210 001416 000000
1211 001420 000000
1212 001422 000000

KSTART: OPEN
CURTST: OPEN
RTNNO: OPEN
NXIST: OPEN
ICTR: OPEN
SCOPTI: OPEN
PRGID: OPEN
PPGTAB: PRG0
PRG1
PRG2
PRG3
PRG4
PRG5
PRG6
PRG7
PRG10
PRG11
PRG12
PRG13

EMTTAB:
DLY
EHLT
SRSETT
TYP
TYP5
STAL
ERR
ERR1
CHLT
STPIRV
STPIPV
CHAIN
OPTS
CNTLU
TTIN
VALINP
CKSWRP

ERRT: OPEN
TMP1: OPEN
TMP2: OPEN
FRST: 1
COUNT: OPEN
TIB: OPEN
RCNT: OPEN
CRBUF: OPEN
CHR1: OPEN
CHR2: OPEN
CHR3: OPEN
CHR1A: OPEN
CHR2A: OPEN
CHR3A: OPEN
EFCTRI: OPEN
CTRA: OPEN
CTRB: OPEN

;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
;PRG11 START ADDRESS
;PRG12 START ADDRESS
;PRG13 START ADDRESS

;POINTER FOR EMT CALL DELAY
;POINTER FOR EMT CALL EHALT
;POINTER FOR EMT CALL SRESET
;POINTER FOR EMT CALL TYPE
;POINTER FOR EMT CALL TYPES
;POINTER FOR EMT CALL STALL
;POINTER FOR EMT CALL ERROR
;POINTER FOR EMT CALL ERROR1
;POINTER FOR EMT CALL CHALT
;POINTER FOR EMT CALL STRDRV
;POINTER FOR EMT CALL STPCHV
;POINTER FOR EMT CALL SCOPE
;POINTER FOR EMT CALL OPTSEL
;POINTER FOR EMT CALL CNTL
;POINTER FOR EMT CALL TTYIN
;POINTER FOR EMT CALL VALID
;POINTER FOR EMT CALL CKSWR

;CHARACTER COUNT
;HOLDS ONE CHARACTER FROM READER.

1213	001424	000000			CTRC:	OPEN		
1214	001426	000000			CTRD:	OPEN		
1215	001430	000000			XCNT:	OPEN		
1216	001432	012706	001200		START:	MOV	%SPBOT, %6	;SET BOTTOM OF SP STACK,
1217	001436	005067	176334			CLR	PSW	
1218	001442	005767	177722			TST	FRST	
1219	001446	001404				BEQ	10	
1220	001450	104003				TYPE		
1221	001452	020773				STITLE		
1222	001454	005067	177710			CLR	FRST	
1223	001460	013746	000004		10:	MOV	004, -(R6)	
1224	001464	012737	001662	000004		MOV	%XORA, 004	
1225	001472	012737	000433	177060		MOV	0433, 00177060	
1226	001500	012637	000004			MOV	(%6)+, 004	
1227	001504	012737	177777	002040		MOV	%-1, 00XORFLG	
1228								
1229	001512	012767	000026	177530		MOV	026, MSEC	
1230	001520	104003				TYPE		
1231	001522	002042				MESS		
1232	001524	012767	160000	177456		MOV	%160000, PRS	;XOR PRS ADDRESS
1233	001532	012767	160002	177452		MOV	%160002, PRB	;XOR PRB ADDRESS
1234	001540	012767	160004	177446		MOV	%160004, PPS	;XOR PPS ADDRESS
1235	001546	012767	160006	177442		MOV	%160006, PPB	;XOR PPB ADDRESS
1236	001554	012767	000770	177436		MOV	0770, RDRVTR	;XOR READER VECTOR
1237	001562	012767	000774	177434		MOV	0774, PCHVTR	;XOR PUNCH VECTOR
1238	001570	012767	000006	176206	INGXOR:	MOV	06, MACHERR	
1239	001576	005067	177454			CLR	RTNNO	
1240	001602	012767	000003	177562	10:	MOV	03, COUNT	
1241	001610	012767	020314	013106		MOV	008TEST, TLX	
1242	001616	104014				OPTSEL		
1243	001620	022767	000003	177544		CMP	03, COUNT	
1244	001626	001765				BEQ	10	
1245	001630	016700	177530			MOV	TMP1, 00	
1246	001634	005067	177570			CLR	XCNT	
1247	001640	042700	177760			BIC	0177760, 00	;INIT THE XOR PROGRAM CONTROL
1248	001644	020027	000013			CMP	00, 013	;LIMIT (SR) TO BITS 3-0
1249	001650	101410				BLOS	CRTA	;COMPARE (SR) TO PROGRAM LIMIT
1250	001652	104003				TYPE		;VALID PROGRAM NUMBER?
1251	001654	015267				CM2		;TYPE INCORRECT PROGRAM MESSAGE.
1252	001656	104010				CHALT		
1253	001660	000664				BR	START	;COMMON HALT.
1254	001662	022626			XORA:	CMP	(R6)+, (R6)+	;START OVER.
1255	001664	012637	000004			MOV	(R6)+, 004	
1256	001670	000737				BR	INGXOR	
1257	001672	005067	177370		CRTA:	CLR	PRGID	
1258								
1259								
1260								
1261	001676	010067	177336			MOV	00, PRGNUM	;SAVE PROGRAM NUMBER AT PRGNUM
1262	001702	006300			CRTB:	ASL	00	;R0X2
1263	001704	000170	001270			JMP	0PRGTAB(0)	;GO TO SELECTED PROGRAM.
1264	001710	016767	177336	177342	GETRDY:	MOV	KSTART, NXTST	;ADDR OF 1ST ROUTINE TO NXTST
1265	001716	012767	000006	176060	CLEAN:	MOV	06, MACHERR	;SET UP BUS ERROR TRAP.
1266	001724	012706	001200			MOV	%SPBOT, R6	;SET UP STACK.
1267	001730	104002				SRESET		
1268	001732	005067	176040			CLR	PSW	

1269	001736	004767	000422		GTRDYA: JSR	07, FORMD		
1270	001742	032777	001000	177234	GTRDYB: BIT	0BIT9, 0SWR		;ROLL FORWARD TO "NEXT" ROUTINE.
1271	001750	001003						;SELECT ROUTINE?
1272	001752	004767	000440					;BR IF YES.
1273	001756	000532			JSR	07, GOTST		;GO RUN ROUTINE.
1274	001760	012767	000003	177404	BR	CHNB		;NO GO, MANUAL RTN BYPASSED.
1275	001766	012767	020246	012730	GTRDYC: MOV	03, COUNT		
1276	001774	104014			MOV	0SRIN, TLX		
1277	001776	022767	000003	177366	OPTSEL			
1278	002004	001765			CMP	03, COUNT		
1279	002006	016700	177352		BEQ	GTRDYC		
1280	002012	042700	177600		MOV	TMP1, 00		
1281	002016	126700	177234		BIC	0177600, 00		;MASK UNDESIRED BITS
1282	002022	001017			NTYET: CMPB	RTNNO, 00		;COMPARE RTNNO TO (R0)
1283	002024	004767	000366		BNE	GTRDYD		;BRANCH IF ROUTINE NOT FOUND YET.
1284	002030	104003			JSR	07, GOTST		;GO RUN ROUTINE.
1285	002032	015467			TYPE			;NO GO, MANUAL RTN BYPASSED.
1286	002034	104010			CM3			;TYPE MESSAGE.
1287	002036	000724			CHALT			
1288	002040	000000			BR	GETRDY		
1289	002042	021445	041520	030461	XORFLG: 0			
1290	002050	054040	051117	052040	MESS: ,ASCII	'0PC11 XOR TST0'		
1291	002056	052123	100					
1292		002062						
1293	002062	022767	177777	177170	GTRDYD: ,EVEN			
1294	002070	001403			CMP	0-1, NXTST		;NO. CHECK FOR LAST ROUTINE.
1295	002072	004767	000266		BEQ	INCRTN		
1296	002076	000747			JSR	07, FORMD		
1297	002100	104003			BR	NTYET		
1298	002102	015325			INCRTN: TYPE			;TYPE INCORRECT RTN MESSAGE.
1299	002104	104010			CM3			
1300	002106	000700			CHALT			;COMMON HALT.
1301	002110	012706	001200		BR	GETRDY		;START OVER.
1302	002114	104020			CHAIN: MOV	0SPBOT, R6		;RESTORE STACK.
1303	002116	005737	002040			CKSWR		
1304	002122	100011			TST	00XORFLG		;IS XOR TESTER HERE?
1305	002124	013746	000094		BPL	30		;BR IF NOT
1306	002130	012737	002354	000004	MOV	004, -(06)		;SAVE MEM. 4
1307	002136	005737	177060		MOV	0XOR, 004		
1308	002142	012637	000004		TST	00177060		;IS XOR IN ERROR?
1309	002146	032777	040000	177030	MOV	(06)+, 004		;NO, REPLACE MEM. 4
1310	002154	001464			BIT	0BIT14, 0SWP		;SCOPE?
1311	002156	005067	175614		BEQ	S28		;BR IF NOT
1312	002162	000177	177076		CLR	PSW		
1313	002166	032777	004000	177010	JMP	0SCOPT		;GO TO SCOPE ENTRY
1314	002174	001003			BIT	0BIT11, 0SWR		;INHIBIT ITERATION?
1315	002176	005367	177060		BNE	CHNAA		;BR IF YES.
1316	002202	001365			DEC	ICTR		;NO, ICTR 0?
1317	002204	032777	002600	176772	BNE	S18		;BR IF NOT
1318	002212	001414			CHNAA: BIT	0BIT10, 0SWR		;HALT AT END OF TEST?
1319	002214	005067	177144		BEQ	CHNB		;BR IF NOT.
1320	002220	116767	177032	177136	CLP	TMP1		
1321	002226	004567	002622		MOVB	RTNNO, TMP1		
1322	002232	001364			JSR	05, ACNV4		
1323	002234	020756			TMP1			
1324	002236	104003			RTNN			
					TYPE			

1325	002240	020736				ENDRTM		
1326	002242	104010				CHALT		
1327	002244	032777	001000	176732	CHMB:	BIT	0BIT9,05WR	;SELECT ROUTINE?
1328	002252	001216				BNE	GETRDY	;BR IF YES,
1329	002254	022767	177777	176776		CMP	0-1,NXTST	;NO, LAST TEST?
1330	002262	001215				BNE	CLEAN	;BR IF NOT,
1331	002264	005767	177550			TST	XORFLG	
1332	002270	100015				BPL	18	
1333	002272	005167	177132			COM	XCNT	
1334	002276	005767	177126			TST	XCNT	
1335	002302	100005				BPL	28	
1336	002304	012767	010240	176740		MOV	0CT0,KSTART	;START PUN LOGIC TESTS IF XOR
1337	002312	000167	177372			JMP	GETRDY	
1338	002316	012767	005432	176726	28:	MOV	0AT0,KSTART	;START RDR LOGIC TESTS IF XOR
1339	002324	104003			18:	TYPE		;TYPE PROGRAM END MESSAGE.
1340	002326	013263				APGEND		
1341	002330	013700	000042			MOV	0042,R0	;GET CONTENTS OF 42.
1342	002334	001405				BEG	HERE	;BR IF 0.
1343	002336	000005				PESET		
1344	002340	004710			LOGIC:	JSR	PC,(0)	;RETURN TO MONITOR.
1345	002342	000240	000240	000240		,WORD	NOP,NOP,NOP	
1346	002350	000167	177334		HERE:	JMP	GETRDY	;REPEAT.
1347	002354	022626			XOR:	CMP	(06)+,(06)+	;POP STACK
1348	002356	012637	000004			MOV	(06)+,004	;REPLACE MEM 4
1349	002362	000675				BR	018	;GO TO SCOPE ENTRY
1350	002364	016705	176670		FORWD:	MOV	NXTST,05	;ADDR OF NEXT ROUTINE TO R5.
1351	002370	012567	176662			MOV	(5)+,RTNNO	;GET NEXT ROUTINE NUMBER.
1352	002374	012567	176660			MOV	(5)+,NXTST	;GET ADDR OF NEXT "NEXT" ROUTINE.
1353	002400	012567	176656			MOV	(5)+,ICTR	;GET ITERATION COUNT.
1354	002404	012567	176654			MOV	(5)+,SCOPIR	;GET SCOPE LOOP ENTRY POINTER.
1355	002410	010567	176640			MOV	05,CURTST	;ADDR OF NOW CURRENT TEST TO CURTST.
1356	002414	000207				RTS	07	;EXIT FORWD SUBROUTINE.
1357	002416	005767	176634		GOTST:	TST	RTNNO	;CHECK FOR MANUAL RTN.
1358	002422	100005				BPL	GOTSTA	;BRANCH IF NOT MANUAL RTN.
1359	002424	032777	000400	176552		BIT	0BIT0,05WR	;MANUAL RTN, BYPASS IT?
1360	002432	001401				BEG	GOTSTA	;NO, RUN IT.
1361	002434	000207				RTS	07	;BYPASS MANUAL ROUTINE.
1362	002436	000177	176612		GOTSTA:	JMP	0CURTST	;GO RUN TEST
1363								
1364	002442	010046						
1365	002444	016600	000002		ENTINT:	MOV	R0,-(6)	;PUSH R0.
1366	002450	014000				MOV	2(6),R0	;GET ENT PC.
1367	002452	006300				MOV	-(0),R0	;GET ENT CALL.
1368	002454	016000	171320			ASL	R0	;TIMES 2.
1369	002460	000200				MOV	EMTTAB-10000(0),R0	;DEVELOP ENT RTN ADDR.
1370						RTS	R0	;GO TO ENT RTN, RESTORE R0.
1371	002462	011600			;COMMON	HALT ROUTINE.		
1372	002464	005740			CHLT:	MOV	(6),R0	
1373	002466	010067	176672			TST	-(0)	
1374	002472	004567	002330			MOV	00,TMP1	
1375	002476	001364				JSR	05,ACNV6	
1376	002500	020717				TMP1		
1377	002502	104003				GWAS		
1378	002504	020711				TYPE		
1379	002506	000000				PCHLT		
1380	002510	104020				HALT		
						CKSWR		

1381	002512	000002			RTI		
1382					;ERROR HALT ROUTINE.		
1383	002514	005777	176464		EHLT:	TST	0SWR
1384	002520	100002				BPL	EHLTA
1385	002522	000000				HALT	
1386	002524	104020				CKSWR	
1387	002526	000002			EHLTA:	RTI	
1388					;ROUTINE TO CHECK FOR READER ERROR.		
1389	002530	005777	176454		ARDER:	TST	0PRS
1390	002534	100401				BNI	10
1391	002536	000207				RTS	07
1392	002540	104004			10:	TYPES	
1393	002542	017404				BNI	
1394	002544	016334				IN0	
1395	002546	177777				-1	
1396	002550	104010				CHALT	
1397	002552	000766				BR	
1398					;DD11-XOR PROGRAMMABLE SIMULATOR OF PCOS (PUNCH/READER)		
1399						CALL	-JSR 05,PCSIM
1400							SIMULATOR CONSTANT
1401							TABLE OF NEXT INSTRUCTION IF ON XOR TESTER
1402							IF NOT ON AN XOR, THIS ROUTINE EXIT TO THE INSTRUCTION FOLLOWING THE CALL
1403	002554	005767	177260		PCSIM:	TST	XORFLC
1404	002560	001425				BEO	RETRN
1405	002562	013746	000004			MOV	004,-(06)
1406	002566	012737	002630	000004		MOV	010,004
1407							;IF XOR TRAPS DURING LOAD GO TO 10
1408							
1409							
1410							
1411	002574	052777	000001	176406		BIS	01,0PRS
1412	002602	104000				DELAY	
1413	002604	000001				1	
1414	002606	012537	177060		20:	MOV	(05)+,00177060
1415							;LOAD SIMULATOR
1416							
1417	002612	104000				DELAY	
1418	002614	000050				50	
1419							;WAIT FOR ERROR BIT TO SETTLE
1420	002616	012637	000004		30:	MOV	(06)+,004
1421	002622	000005				RESET	
1422	002624	011505				MOV	(05),05
1423	002626	000205				RTS	05
1424	002630	022626			10:	CMP	(R6)+,(R6)+
1425	002632	000771				BR	30
1426	002634	062705	000004		RETRN:	ADD	04,05
1427	002640	000205				RTS	05
1428							
1429					;ROUTINE TO CHECK FOR READER READY.		
1430	002642	032777	004000	176340	APRDY:	BIT	04000,0PRS
1431	002650	001001				BNE	ARRDYA
1432	002652	000207				RTS	07
1433	002654	004767	000036		ARRDYA:	JSR	07,TSM2
1434	002660	000770				BR	ARRDY
1435					;ROUTINE TO FETCH A CHARACTER		
1436	002662	004767	177754		AREAD:	JSR	07,ARRDY
							;CHECK FOR READER READY.

1437	002666	105277	176316	AREAD1:	INCB	0PRS	;ENABLE READER
1438	002672	005777	176312	ARDA:	TST	0PRS	;TEST ERROR BIT
1439	002676	100404			B-1	ARDB	;BRANCH IF ERROR BIT SET.
1440	002700	105777	176304		TSTB	0PRS	;CHECK DONE BIT
1441	002704	100372			BPL	ARDA	;BRANCH IF NOT DONE.
1442	002706	000207			RTS	07	;DONE, EXIT.
1443	002710	004767	000002	ARDB:	JSR	07, TSM2	;TYPE STATUS AND INSTRUCTION MESSAGE.
1444	002714	000762			BR	AREAD	;TRY AGAIN.
1445	002716	104004		TSM2:	TYPES		;TYPE READER NOT READY STATUS
1446	002720	017433			SM2		;MESSAGE AND HALT.
1447	002722	016334			IM6		
1448	002724	177777			-1		
1449	002726	104010			CHALT		
1450	002730	000207			RTS	07	;EXIT
1451				;ROUTINE TO SET	READER INTERRUPT VECTOR AND PRIORITY		
1452	002732	017667	000000	STPTRV:	MOV	0(6), STPRA+2	;MOVE VECTOR ADDR TO STPRA+2
1453	002740	062716	000002		ADD	02, 006	;SET UP EXIT
1454	002744	016701	176250		MOV	RDRVTR, 01	
1455	002750	012721	000000	STPRA:	MOV	0OPEN, (1)+	;SET VECTOR ADDRESS
1456	002754	016721	176242		MOV	RDRVLV, (1)+	;SET PRIORITY
1457	002760	000002			RTI		;EXIT
1458				;ROUTINE TO SET	PUNCH INTERRUPT VECTOR AND PRIORITY.		
1459	002762	017667	000000	STPTPV:	MOV	0(6), STPPA+2	;MOVE VECTOR ADDR TO STPPA+2
1460	002770	062716	000002		ADD	02, 006	;SET UP EXIT
1461	002774	016701	176224		MOV	PCHVTR, 01	
1462	003000	012721	000000	STPPA:	MOV	0OPEN, (1)+	;SET VECTOR ADDRESS.
1463	003004	016721	176216		MOV	PCHVLV, (1)+	;SET PRIORITY
1464	003010	000002			RTI		;EXIT.
1465				;ROUTINE TO ISSUE RESET.			
1466	003012	012700	052525	SRSETT:	MOV	052525, 00	;DATA TO R0.
1467	003016	005100			COM	00	;COMPLEMENT (R0).
1468	003020	010067	177770		MOV	00, SRSETT+2	; (R0) TO SRSETT+2.
1469	003024	000005			RESET		;ISSUE RESET. (R0) IS
1470	003026	000002			RTI		;DISPLAYED, EXIT.
1471				;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.			
1472	003030	016700	000042	RNGEN:	MOV	RP1, 00	
1473	003034	006100			ROL	00	
1474	003036	006100			ROL	00	
1475	003040	066700	000034		ADD	RP2, 00	
1476	003044	010067	000026		MOV	00, RP1	
1477	003050	006100			ROL	00	
1478	003052	006100			ROL	00	
1479	003054	066700	000020		ADD	RP2, 00	
1480	003060	006100			ROL	00	
1481	003062	006100			ROL	00	
1482	003064	010067	000010		MOV	00, RP2	
1483	003070	016700	000002		MOV	RP1, 00	
1484	003074	000207			RTS	07	;EXIT, NUMBER IN R0
1485	003076	001233		RP1:	1233		
1486	003100	007622		RP2:	7622		
1487				;SUBROUTINE TO READ CHARACTER FROM READER USING INTERRUPT.			
1488	003102	104011		BREAD:	STRDRV		;SET READER VECTOR
1489	003104	003162			BREADB		;TO BREADB
1490	003106	012767	000340		MOV	0PTY7, PSW	;SET PRIORITY 7.
1491	003114	004767	177522		JSR	07, ARRDY	;CHECK FOR READER READY.
1492	003120	052777	000101		BIS	0101, 0PRS	;ENABLE PTR AND PTR1.

1493	003126	104000			DELAY					
1494	003130	000226			150.					
1495	003132	0C5077	176052		CLR	OPRS				
1496	003136	104033			TYPE					
1497	003140	020124			EM7					
1498	003142	000757			BR	BREAD				
1499	003144	017767	176042	176226	BREADA:	MOV	OPRS,CRBUF			
1500	003152	022626			POPSP2					
1501	003154	005067	174616		CLR	PSW				
1502	003160	000207			RTS	07				
1503	003162	005077	176022		BREADB:	CLR	OPRS			
1504	003166	005777	176016		TST	OPRS				
1505	003172	100411			BNI	BREADC				
1506	003174	105777	176010		TSTB	OPRS				
1507	003200	100403			BNI	BRDBB				
1508	003202	104007			ERROR1					
1509	003204	020140			EN10					
1510	003206	000405			BR	CRDCC				
1511	003210	012716	003144		BRDBB:	MOV	BREADA,006			
1512	003214	000002			RTI					
1513	003216	004767	177474		BREADC:	JSR	07,TSM2			
1514	003222	012716	003230		BRDCC:	MOV	BRDDD,006			
1515	003226	000002			RTI					
1516	003230	022626			BRDDD:	POPSP2				
1517	003232	000723			BR	BREAD				
1518										
1519	003234	004767	000060		ERROR ROUTINES					
1520	003240	104001			ERR:	JSR	07,ERRA			
1521	003242	000002			EHALT					
1522	003244	004767	000050		ERR1:	JSR	07,ERRA			
1523	003250	004767	000024		JSR	07,INHPRT				
1524	003254	000406			BR	ERR1A				
1525	003256	011600			MOV	006,00				
1526	003260	011067	000002		MOV	000,++6				
1527	003264	104003			TYPE					
1528	003266	000000			OPEN					
1529	003270	104001			EHALT					
1530	003272	062716	000002		ERR1A:	ADD	02,006			
1531	003276	000002			RTI					
1532	003300	104020			INHPRT:	CKSWR				
1533	003302	032777	020000	175674	BIT	0BIT13,0SWR				
1534	003310	001002			BNE	++6				
1535	003312	062716	000002		ADD	02,006				
1536	003316	000207			RTS	07				
1537	003320	016600	000002		ERRA:	MOV	2(6),R0			
1538	003324	005740			TST	-(0)				
1539	003326	010067	176030		MOV	00,ERRT				
1540	003332	004767	177742		JSR	07,INHPRT				
1541	003336	000207			RTS	07				
1542	003340	004567	001462		JSP	05,ACNV6				
1543	003344	001362			ERRT					
1544	003346	017623			APC					
1545	003350	004567	001500		JSR	05,ACNV4				
1546	003354	001240			PRGNUM					
1547	003356	017602			APNUMB					
1548	003360	004567	001470		JSR	05,ACNV4				

1549	003364	001256			RTNNO	
1550	003366	017612			ATNUMB	
1551	003370	104003			TYPE	;TYPE ERROR MESSAGE
1552	003372	017570			END	
1553	003374	104020			CKSWR	
1554	003376	000207			RTS	07
1555						;EXIT.
1556	003400	011600			;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.	
1557	003402	062716	000002		TYP:	MOV 006,00
1558	003406	011000				;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
1559	003410	112067	000116			;SET UP EXIT.
1560	003414	122767	000100	000110	TYP:	MOV 000,00
1561	003422	001006			MOVB	(0)+,TYPDAT
1562	003424	112767	000177	000100	CMPB	0100,TYPDAT
1563	003432	004767	000030		BNE	TYP
1564	003436	000002			MOVB	0177,TYPDAT
1565	003440	122767	000045	000064	JSR	07,TYPD
1566	003446	001416			RTI	
1567	003450	122767	000043	000054	CMPB	045,TYPDAT
1568	003456	001417			BEG	TYP
1569	003460	004767	000002		CMPB	043,TYPDAT
1570	003464	000751			BEG	TYP
1571	003466	116777	000040	175542	JSR	07,TYPD
1572	003474	105777	175534		BR	TYP
1573	003500	100375			MOVB	TYPDAT,0TPB
1574	003502	000207			TSTB	0TPB
1575	003504	112767	000015	000020	BPL	,=4
1576	003512	004767	177750		RTS	07
1577	003516	112767	000012	000006	TYP:	MOV 015,TYPDAT
1578	003524	004767	177736		JSR	07,TYPD
1579	003530	000727			MOVB	012,TYPDAT
1580	003532	000000			JSR	07,TYPD
1581					BR	TYP
1582	003534	011600			TYPDAT: OPEN	
1583	003536	062716	000002		;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER	
1584	003542	011067	000014		TYP:	MOV 006,00
1585	003546	022767	177777	000006		;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1586	003554	001001			ADD	02,006
1587	003556	000002			MOV	000,TYPB
1588	003560	104003			CMP	0-1,TYPB
1589	003562	000000			BNE	TYPB
1590	003564	000763			RTI	
1591					TYPE	;TERMINATOR, EXIT
1592	003566	011667	000124		OPEN	;CALL ON TYP SUB TO TYPE MESSAGE
1593	003572	062716	000002		BR	;ADDRESS OF MESSAGE GOES HERE
1594	003576	017767	000114	000112	TYPB	;GO PROCESS NEXT MESSAGE
1595	003604	005067	174166		;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS	
1596	003610	016767	175434	000076	DLY:	MOV 006,DLCT
1597	003616	016767	000072	000070		;GET ADDRESS THAT CONTAINS DELAY COUNT
1598	003624	016767	000064	000062		;SET UP EXIT
1599	003632	016767	000056	000054		;MILLISECONDS COUNT TO DLCT
1600	003640	016767	000050	000046	CLR	PSW
1601	003646	016767	000042	000040	DLCT:	MOV MSEC,DLCTR
1602	003654	016767	000034	000032	DLCT:	MOV DLCTR,DLCTR
1603	003662	016767	000026	000024	DLCT:	MOV DLCTR,DLCTR
1604	003670	016767	000020	000016	DLCT:	MOV DLCTR,DLCTR

1605	003676	005367	000012		DEC	DLCTR		;DECREMENT 1 MSEC COUNTER
1606	003702	001345			BNE	DLYB		;BRANCH IF NOT YET 1 MILLISECOND
1607	003704	005367	000006		DEC	DLCNT		;DECREMENT MSEC COUNT (DLCNT)
1608	003710	001337			BNE	DLYA		;BRANCH IF DLCNT NOT 0
1609	003712	000002			RTI			;DONE DELAYING, EXIT
1610	003714	000000			DLCTR: OPEN			;1 MILLISECONDS COUNT
1611	003716	000000			DLCNT: OPEN			;CONTAINS MILLISECONDS COUNT
1612								;ROUTINE TO CALIBRATE DELAY ROUTINE USING READER.
1613		004136						
1614	003720	012700	000006		RTNCL: MOV	06, R0		;SET UP TO READ 6 CHARS.
1615	003724	012767	000021	000204	MOV	017., TNCON		;TIME TO READ 6 CHARS TO TNCON.
1616	003732	104011			STRDRV			;SET READER VECTOR.
1617	003734	004044			RTNINT			
1618	003736	005067	175300		CLR	BRCTR		
1619	003742	012777	000101	175240	MOV	0101, OPR8		;ENABLE READER AND INTERRUPTS.
1620	003750	005067	174022		RTNCLA: CLR	PSW		
1621	003754	016767	175262	175260	RTNCLB: MOV	BRCTR, BRCTR		
1622	003762	016767	175254	175252	MOV	BRCTR, BRCTR		
1623	003770	016767	175246	175244	MOV	BRCTR, BRCTR		
1624	003776	016767	175240	175236	MOV	BRCTR, BRCTR		
1625	004004	016767	175232	175230	MOV	BRCTR, BRCTR		
1626	004012	016767	175224	175222	MOV	BRCTR, BRCTR		
1627	004020	016767	175216	175214	MOV	BRCTR, BRCTR		
1628	004026	016767	175210	175206	MOV	BRCTR, BRCTR		
1629	004034	005267	175202		INC	BRCTR		
1630	004040	001345			BNE	RTNCLB		;BR IF RESULT NOT 0.
1631	004042	104010			CHALT			;BRCTR OVERFLOWED.
1632								
1633	004044	005777	175140		RTNINT: TST	OPR8		;READER ERROR?
1634	004050	100405			BMI	RTNERR		;BR IF YES.
1635	004052	005300			DEC	R0		;READ 6 CHARS?
1636	004054	001420			SEQ	RTINTA		;BR IF YES.
1637	004056	005277	175126		INC	OPR8		;NO. ENABLE READER.
1638	004062	000002			RTI			;EXIT INTERRUPT.
1639	004064	004767	176626		RTNERR: JSR	PC, TSM2		;READER ERROR.
1640	004070	012716	003720		MOV	0RTNCL, (6)		;GO TRY AGAIN.
1641	004074	000002			RTI			
1642	004076	104004			PTNERR: TYPES			;PUNCH ERROR.
1643	004100	017456			SMJ			
1644	004102	016620			IM16			
1645	004104	177777			-1			
1646	004106	104010			CHALT			
1647	004110	012716	004170		MOV	0PTNCL, (6)		;GO TRY AGAIN.
1648	004114	000002			RTI			
1649	004116	005077	175066		RTINTA: CLR	OPR8		;DISABLE READER INTERRUPTS.
1650	004122	005067	175120		CLR	DVQUOT		;CLEAR QUOTIENT.
1651	004126	016767	175110	175110	MOV	BRCTR, DVDND		
1652	004134	162767	000000	175102	RTINTB: SUB	00, DVDND		;DIVIDE DVDND BY 17 OR 100
1653	004142	103403			BLO	RTINTC		
1654	004144	005267	175076		INC	DVQUOT		;+1 TO QUOTIENT.
1655	004150	000771			BR	RTINTB		;REPEAT SUBTRACTION.
1656	004152	016767	175070	175070	RTINTC: MOV	DVQUOT, MSEC		;MSEC CONSTANT TO MSEC.
1657	004160	005067	173612		CLR	PSW		
1658	004164	022626			POPSP2			
1659	004166	000207			RTS	PC		;EXIT.
1660								;ROUTINE TO CALIBRATE DELAY ROUTINE USING PUNCH.

1661	004170	005000			PTMCAL:	CLR	R0		;GET PUNCH RUNNING.
1662	004172	004767	001040			JSR	PC,HSPCH		
1663	004176	012700	000005			MOV	#5,R0		;SET UP TO PUNCH 5 CHARS.
1664	004202	012767	000144	177726		MOV	#100.,TMCON		;TIME TO PUNCH 5 CHARS TO TMCON.
1665	004210	104012				STPCHV			;SET PUNCH INTERRUPT VECTOR.
1666	004212	004234				PTMINT			
1667	004214	005067	175022			CLR	BRCTR		
1668	004220	005077	174772			CLR	0PPB		;OUTPUT A 0.
1669	004224	052777	000100	174762		BIS	#BIT6,0PPS		;ENABLE PUNCH INTERRUPTS.
1670	004232	000646				BR	RTMCLA		
1671	004234	005777	174754		PTMINT:	TST	0PPS		;PUNCH ERROR?
1672	004240	100716				BHI	PTHERR		;BR IF YES.
1673	004242	005300				DEC	R0		;PUNCHED 5 CHARS?
1674	004244	001403				BEQ	PTINTA		;BR IF YES.
1675	004246	005077	174744			CLR	0PPB		;OUTPUT ANOTHER 0.
1676	004252	000002				RTI			;EXIT INTERRUPT.
1677	004254	005077	174734		PTINTA:	CLR	0PPS		;DISABLE INTERRUPTS.
1678	004260	000720				BR	RTINTA+4		
1679						;SUBROUTINE TO STALL A RANDOM NUMBER OF MILLIS&CONDS. MAXIMUM STALL			
1680						;DETERMINED BY CONTENTS OF LOC STLMSK.			
1681	004262	004767	176542		STAL:	JSR	#7,RNGEN		;GO GET RANDOM NUMBER.
1682	004266	046700	000014			BIC	STLMSK,#0		;0 IN R0, APPLY STALL MASK.
1683	004272	001404				BEQ	STALB		;BRANCH IF RESULT IS 0.
1684	004274	010067	000002			MOV	#0,STALA		
1685	004300	104000				DELAY			;DELAY
1686	004302	000000			STALA:	OPEN			;DELAY COUNT
1687	004304	000002			STALB:	RTI			;DONE, EXIT.
1688	004306	000000			STLMSK:	OPEN			;STALL MASK.
1689						;SUB TO DELAY X TIME.			
1690		004314				DLYX0=DLYX+4			
1691		004326				DLYX1=DLYXA+4			
1692	004310	012727	000040	000000	DLYX:	MOV	#40,00		;SET UP COUNT OF 40.
1693	004316	005067	173454			CLR	PSW		
1694	004322	012727	001750	000000	DLYXA:	MOV	#1000.,#0		;SET DELAY.
1695	004330	005367	177772		DLYXB:	DEC	DLYX1		;DECREMENT DLYX1.
1696	004334	001375				BNE	DLYXB		;BR IF NOT 0 RESULT.
1697	004336	005367	177752			DEC	DLYX0		;DECREMENT DLYX0.
1698	004342	001367				BNE	DLYXA		;BR IF NOT 0 RESULT.
1699	004344	000002				RTI			;EXIT.
1700						;SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT (1-77)			
1701	004346	004767	176456		GRCNT:	JSR	#7,RNGEN		;GET RANDOM NUMBER
1702	004352	046700	000010			BIC	RCMSK,#0		;APPLY MASK
1703	004356	001773				BEQ	GRCNT		;TRY AGAIN IF RESULT 0
1704	00'360	010067	000004			MOV	#0,RNCNT		;COUNT TO RNCNT
1705	004364	000207				RTS	#7		;EXIT.
1706	004366	000000			RCMSK:	OPEN			;RANDOM CHARACTER MASK.
1707	004370	000000			RNCNT:	OPEN			;RANDOM CHARACTER COUNT.
1708						;SUBROUTINE TO COMPARE DATA READ FROM READER AGAINST EXPECTED DATA AND REPORT ERRORS.			
1709	004372	004767	000314		BCHECK:	JSR	#7,GTBIN		;GET BIN CHARACTER(IN R0)
1710	004376	020067	174776			CMF	#0,CRBUF		;COMPARE(R0)TO DATA IN CRBUF
1711	004402	001001				BNE	,+4		;BRANCH IF NOT SAME(ERROR).
1712	004404	000207				RTS	#7		;OK.EXIT.
1713	004406	010067	174750			MOV	#0,ERRT		
1714	004412	004567	000436			JSR	#5,ACNV4		
1715	004416	001362				ERPT			
1716	004420	017655				ASB			

1717	004422	004567	000426		JSR	25,ACNV4	
1718	004426	001400			CRBUF		
1719	004430	017670			AWAS		
1720	004432	104007			ERROR1		
1721	004434	017632			EM1		
1722	004436	005367	174754		DEC	ERCTR	;DECREMENT ERROR COUNTER
1723	004442	001002			BNE	.+6	;BRANCH IF NO THIRD ERROR
1724	004444	004767	000002		JSR	27,BSYNC	;RESYNC THE READER,
1725	004450	000207			RTS	27	;EXIT.
1726					;SUBROUTINE TO SYNC THE READER TO A SPECIAL BINARY COUNT PATTERN TEST TAPE.		
1727	004452	004767	000176		BSYNC:	JSR	27,INBIN
1728	004456	004767	176420			JSR	27,BREAD
1729	004462	004767	176414			JSR	27,BREAD
1730	004466	004767	176410			JSR	27,BREAD
1731	004472	016767	174702	174702	MOV	CRBUF,CHR1	;READ CHAR,
1732	004500	004767	176376		JSR	27,BREAD	;READ CHAR,
1733	004504	016767	174670	174672	MOV	CRBUF,CHR2	;READ CHAR AND STORE AT CHR1
1734	004512	004767	176364		JSR	27,BREAD	;READ CHAR AND STORE AT CHR2
1735	004516	016767	174656	174662	MOV	CRBUF,CHR3	;READ CHAR AND STORE AT CHR3.
1736	004524	004767	000012		JSR	27,SYNCA	;GO SYNC
1737	004530	000750			BR	BSYNC	;NO SYNC, TRY AGAIN.
1738	004532	012767	000003	174656	MOV	23,ERCTR	
1739	004540	000207			RTS	27	;SUCCESS,EXIT.
1740	004542	012767	001000	000102	SYNCA:	MOV	2512,,SYCTRA
1741	004550	004767	000136		SYNCB:	JSR	27,GTBIN
1742	004554	010067	174630		MOV	20,CHR1A	;BIN CHAR TO CHR1A.
1743	004560	004767	000126		JSR	27,GTBIN	;BIN CHAR TO CHR2A.
1744	004564	010067	174622		MOV	20,CHR2A	;BIN CHAR TO CHR3A.
1745	004570	004767	000116		JSR	27,GTBIN	
1746	004574	010067	174614		MOV	20,CHR3A	
1747	004600	026767	174576	174602	CMP	CHR1,CHR1A	;CHR1 AND CHR1A SAME?
1748	004606	001013			BNE	SYNCC	;BR IF NOT.
1749	004610	026767	174570	174574	CMP	CHR2,CHR2A	;CHR2 AND CHR2A SAME?
1750	004616	001007			BNE	SYNCC	;BR IF NOT.
1751	004620	026767	174562	174566	CMP	CHR3,CHR3A	;CHR3 AND CHR3A SAME?
1752	004626	001003			BNE	SYNCC	;BR IF NOT.
1753	004630	062716	000002		ADD	2,(6)	;SET UP SYNCED EXIT.
1754	004634	000207			RTS	27	;EXIT.
1755	004636	005367	000010		SYNCC:	DEC	SYCTRA
1756	004642	001342			BNE	SYNCB	;TRIED 512 TIMES?
1757	004644	104007			ERROR1		;BR IF NOT.
1758	004646	017747			EM3		;SYNC ERROR MESSAGE.
1759	004650	000207			RTS	27	
1760	004652	000000			;NO SYNC EXIT.		
1761					SYCTRA:	OPEN	
1762	004654	012767	177777	000014	;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS		
1763	004662	004567	000300		INBIN:	MOV	2-1,RIND
1764	004666	004676				JSR	25,BMOVE
1765	004670	004677				RIND	
1766	004672	000013				RIND+1	
1767	004674	000207				11,	
1768	004676	000000			RTS	27	;EXIT
1769	004700	000000			RIND:	OPEN	
1770	004702	000000			PT0:	OPEN	
1771	004704	000000			PT1:	OPEN	
1772	004706	000000			PIND:	OPEN	
					PT0P:	OPEN	

1773	004710	000000			PT1P: OPEN		
1774					;SPECIAL BINARY COUNT PATTERN SUBROUTINE, EXITS WITH BIN CHAR IN R0		
1775	004712	016767	177762	177762	GTBIN: MOV	PT0,PT1	;PREVIOUS BIN CHAR TO PT1
1776	004720	005167	177756		COM	PT1	
1777	004724	005167	177746		COM	RIND	
1778	004730	001002			BNE	,+6	
1779	004732	005267	177744		INC	PT1	
1780	004736	042767	177400	177736	BIC	0177400,PT1	;MASK TO 8 BITS
1781	004744	016767	177732	177726	MOV	PT1,PT0	;SAVE BIN CHAR IN PT0
1782	004752	016700	177724		MOV	PT1,R0	;BIN CHAR TO R0.
1783	004756	000207			RTS	07	;EXIT.
1784	004760	016767	177722	177722	GTBINP: MOV	PT0P,PT1P	;PREVIOUS BIN CHAR TO PT1P
1785	004766	005167	177716		COM	PT1P	
1786	004772	005167	177706		COM	PIND	
1787	004776	001002			BNE	,+6	
1788	005000	005267	177704		INC	PT1P	
1789	005004	042767	177400	177676	BIC	0177400,PT1P	;MASK TO 8 BITS.
1790	005012	016767	177672	177666	MOV	PT1P,PT0P	;SAVE BIN CHAR IN PT0P.
1791	005020	016701	177664		MOV	PT1P,R1	;BIN CHAR TO R1.
1792	005024	000207			RTS	07	;EXIT.
1793					;OCTAL TO ASCII CONVERT ROUTINES		
1794	005026	012500			ACNV6: MOV	(5)+,R0	;CONVERT TO 6 ASCII. GET OCTAL ADDRESS
1795	005030	012567	000012		MOV	(5)+,ACNV6	;GET ASCII ADDRESS
1796	005034	004767	000052		JSR	07,ACNV	;CONVERT TO ASCII
1797	005040	004567	000122		JSR	05,BMOVE	;MOVE 6 CHARS TO ASCII ADDRESS
1798	005044	005102			A1ST		
1799	005046	000000			ACNV8: OPEN		
1800	005050	000006			6		
1801	005052	000205			RTS	05	;EXIT
1802	005054	012500			ACNV4: MOV	(5)+,R0	;CONVERT TO 4 ASCII. GET OCTAL ADDRESS
1803	005056	012567	000012		MOV	(5)+,ACNV4	;GET ASCII ADDRESS
1804	005062	004767	000024		JSR	07,ACNV	;CONVERT TO ASCII
1805	005066	004567	000074		JSR	05,BMOVE	;MOVE 4 CHARS TO ASCII ADDRESS.
1806	005072	005104			A1ST+2		
1807	005074	000000			ACNV8: OPEN		
1808	005076	000004			4		
1809	005100	000205			RTS	05	;EXIT
1810	005102	000000			A1ST: OPEN		
1811	005104	000000			OPEN		
1812	005106	000000			OPEN		
1813	005110	000000			ACNVX: OPEN		
1814	005112	012701	005110		ACNV: MOV	0A1ST+6,R1	;ADDR TO STORE ASCII TO R1
1815	005116	012702	000006		MOV	06,R2	;6 TO R2
1816	005122	011067	177762		MOV	000,ACNVX	;OCTAL WORD TO ACNVX
1817	005126	016703	177756		ACNVM: MOV	ACNVX,R3	
1818	005132	042703	177770		BIC	0177770,R3	;ISOLATE LEAST SIGNIFICANT OCTAL 0
1819	005136	062703	000060		ADD	060,R3	;ADD 60 TO CONVERT TO ASCII
1820	005142	110341			MCVB	03,-(1)	;STORE ASCII BYTE
1821	005144	006067	177740		ROR	ACNVX	;MOVE NEXT OCTAL DIGIT TO LEAST
1822	005150	006067	177734		ROR	ACNVX	;SIGNIFICANT POSITION
1823	005154	006067	177730		ROR	ACNVX	
1824	005160	005302			DEC	02	;DONE 6 TIMES?
1825	005162	001361			BNE	ACNVM	;NO. REPEAT.
1826	005164	000207			RTS	07	;YES. EXIT.
1827					;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.		
1828	005166	012501			BMOVE: MOV	(5)+,R1	;GET "FROM" ADDRESS

1829	005170	012502			MOV	(5)+,R2	;GET*TO*ADDRESS
1830	005172	012503			MOV	(5)+,R3	;GET COUNT
1831	005174	112122			BNOVA: MOV	(1)+,(2)+	;MOVE BYTE
1832	005176	005303			DEC	R3	;DECREMENT COUNT
1833	005200	001375			BNE	BNOVA	;BRANCH IF NOT DONE.
1834	005202	000205			RTS	R5	;DONE EXIT
1835					;SUBROUTINE TO CHECK FOR PUNCH READY.		
1836	005204	005777	174004		CPRDY: TST	OPPS	;TEST FOR ERROR BIT.
1837	005210	100404			BMI	CPRDYA	;BRANCH IF ERROR BIT SET.
1838	005212	105777	173776		TSTB	OPPS	;TEST FOR READY BIT.
1839	005216	100001			BPL	CPRDYA	;BRANCH IF READY NOT SET.
1840	005220	100207			RTS	R7	;OK, EXIT.
1841	005222	164004			CPRDYA: TYPES		;TYPE NOT READY MESSAGE.
1842	005224	017456			SM3		
1843	005226	016620			IM16		
1844	005230	177777			-1		
1845	005232	104010			CHALT		
1846	005234	000763			BR	CPRDY	
1847					;SUBROUTINE TO PUNCH ON H. 8, PUNCH CHARACTER IN REG 0.		
1848	005236	004767	177742		HSPCH: JSR	R7,CPRDY	;GO CHECK FOR PUNCH READY.
1849	005242	010077	173750		MOV	R0,OPPS	;LOAD PUNCH BUFFER.
1850	005246	105777	173742		TSTB	OPPS	;WAIT FOR DONE.
1851	005252	100375			BPL	R4	
1852	005254	000207			RTS	R7	;DONE, EXIT.
1853					;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.		
1854	005256	012700	015256		BDCNV: MOV	DECVAL,R0	;SET UP ADDR TO STORE DECIMAL ASCII IN R0
1855	005262	013501			MOV	(R5)+,R1	;BINARY VALUE TO R1.
1856	005264	012702	005364		MOV	ADTENP,R2	;ADDR OF TEN POWER STRING TO R2.
1857	005270	012767	000005	000060	MOV	R5,CNVCTR	;SET UP FOR 5 POWER CONVERSIONS.
1858	005276	012267	000060		BDCNVA: MOV	(2)+,TENPWR	;MOVE POWER OF TEN VALUE TO TENPWR.
1859	005302	004767	000010		JSR	R7,SUBTEN	;PERFORM CONVERSION
1860	005306	005367	000044		DEC	CNVCTR	;DONE 5 CONVERSIONS?
1861	005312	001371			BNE	BDCNVA	;BRANCH IF NOT YET 5.
1862	005314	000205			RTS	R5	;YES, EXIT.
1863	005316	005067	000036		SUBTEN: CLR	DIGIT	;CLEAR DIGIT
1864	005322	166701	000034		SUBTNA: SUB	TENPWR,R1	;SUBTRACT TEN POWER FROM BINARY VALUE.
1865	005326	103403			BCS	SUBTNB	;BRANCH IF UNSUCCESSFUL SUBTRACTION.
1866	005330	005267	000024		INC	DIGIT	
1867	005334	000772			BR	SUBTNA	
1868	005336	066701	000020		SUBTNB: ADD	TENPWR,R1	;RESTORE SUBTRACTED VALUE.
1869	005342	062767	000060	000010	ADD	R60,DIGIT	;CONVERT (DIGIT) TO ASCII
1870	005350	116720	000004		MOV	DIGIT,(R5)+	;MOVE ASCII CHAR TO DECVAL FIELD.
1871	005354	000207			RTS	R7	;EXIT.
1872	005356	000000			CNVCTR: OPEN		
1873	005360	000000			DIGIT: OPEN		
1874	005362	000000			TENPWR: OPEN		
1875	005364	023420			ADTENP: 10000.		
1876	005366	001750				1000.	
1877	005370	000144				100.	
1878	005372	000012				10.	
1879	005374	000001				1	
1880							

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1001
1002
1003
1004
1005 005376 012767 005432 173646
1006 005404 005767 174430
1007 005410 001402
1008 005412 000167 174272
1009 005416 104003
1010 005420 015540
1011 005422 004767 007614
1012 005426 000167 174256
1013
1014 005432 000000
1015 005434 005462
1016 005436 001750
1017 005440 005450
1018
1019 005442 012767 005456 172334
1020 005450 005777 173534
1021 005454 104013
1022 005456 104006
1023 005460 104013
1024
1025 005462 000001
1026 005464 005512
1027 005466 001750
1028 005470 005500
1029
1030
1031 005472 012767 005506 172304
1032 005500 005777 173506
1033 005504 104013
1034 005506 104006
1035 005510 104013
1036
1037 005512 100002
1038 005514 005562
1039 005516 001750
1040 005520 005546
1041
1042
1043 005522 004567 175026
1044 005526 000033
1045 005530 005546
1046
1047 005532 104004
1048 005534 015722
1049 005536 015756
1050 005540 017025
1051 005542 177777
1052 005544 000000
1053 005546 022777 100000 173434
1054 005554 001401
1055 005556 104006

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      .SBTTL  PRGP - READER LOGIC TESTS
;PPGP - READER LOGIC TESTS
;
PRG0:  MOV      0AT0,KSTART      ;ADDR OF 1ST ROUTINE TO KSTART.
      TST      XORFLG
      BEQ      18
      JMP      GETRDY
18:    TYPE
      IM0
      JSR      07,SWIL
      JMP      GETRDY      ;GO GET STARTED.
;*****
AT0:   0
      AT1
      1000.
      AT0A
      ;TEST 0
      ;NEXT TEST ADDR
      ;I COUNT
      ;SCOPE ENTRY
;*****
;TEST ABILITY TO REFERENCE THE READER STATUS WORD
      MOV      0AT0E,MACHER      ;SET UP MACHINE ERROR TRAP.
AT0A:  TST      0PRS
      SCOPE
      AT0E:    ERROR
      SCOPE
      ;ERROR, TRAPPED WHEN REFERENCING READER
      ;STATUS WORD (PRS).
;*****
AT1:   1
      AT2
      1000.
      AT1A
      ;TEST 0
      ;NEXT TEST
      ;I COUNT
      ;SCOPE ENTRY
;*****
;TEST ABILITY TO REFERENCE THE READER BUFFER.
      MOV      0AT1E,MACHER      ;SET UP MACHINE ERROR TRAP.
AT1A:  TST      0PRB
      SCOPE
      AT1E:    ERROR
      SCOPE
      ;ERROR, TRAPPED WHEN REFERENCING
      ;READER BUFFER, (PRB)
;*****
AT2:   2+MANUAL
      AT3
      1000.
      AT2A
      ;TEST 0
      ;NEXT TEST
      ;I COUNT
      ;SCOPE ENTRY.
;*****
;TEST THAT READER POWER OFF SETS ERROR BIT (BIT 15) IN READER STATUS WORD.
      JSR      05,PCSIM      ;PC11 SIMULATOR FOR XOR TESTER
      33
      AT2A
      ;ENTER IF XOR TESTER
      ;GO TO TYPES IF NOT TESTER
      ;TYPE TURN READER POWER OFF.
      TYPES
      IM1
      IM2
      IM23
      -1
      HALT
      AT2A:  CMP      0BIT15,0PRS
      BEQ      0+4
      ERROR
      ;WAIT FOR USER
      ;TEST FOR ERROR BIT ONLY.
      ;BRANCH IF ERROR BIT ONLY SET.
      ;ERROR,WITH READER POWER OFF ONLY THE ERROR

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1937	005560	104013		SCOPE	
1938					;BIT SHOULD HAVE BEEN SET.
1939					;EXAMINE READER STATUS WORD MANUALLY.
1940	005562	100003		AT3: 3+MANUAL	;TEST 0
1941	005564	005630		AT4	;NEXT TEST
1942	005566	001750		1000,	;I COUNT
1943	005570	005616		AT3A	;SCOPE ENTRY
1944					
1945					
1946	005572	004567	174756		
1947	005576	000033		JSR 05,PCSIM	
1948	005600	005616		33	
1949	005602	104004		AT3A	
1950	005604	015722		TYPES	;TYPE: *TURN READER POWER ON,
1951	005606	016014		IM1	;OFF-LINE, NO TAPE
1952	005610	017025		IM3	
1953	005612	177777		IM23	
1954	005614	000000		-1	
1955	005616	005777	173366	HALT	;WAIT FOR USER.
1956	005622	100401		AT3A: TST 0PRS	;CHECK BIT 15 OF PRS
1957	005624	104006		BMI .+4	;BRANCH IF BIT 15 SET.
1958	005626	104013		ERROR	;ERROR, ERROR BIT(BIT15) NOT SET BY
1959				SCOPE	;READER BEING OFF-LINE.
1960	005630	100004			
1961	005632	005704		AT4: 4+MANUAL	;TEST 0
1962	005634	001750		AT5	;NEXT WORD
1963	005636	005672		1000,	;I COUNT
1964				AT4A	;SCOPE ENTRY
1965					
1966	005640	004567	174710		
1967	005644	000033		JSR 05,PCSIM	
1968	005646	005664		33	
1969	005650	104004		18	
1970	005652	015722		TYPES	;TYPE: SET READER AS FOLLOWS; POWER ON ON-LINE,
1971	005654	016051		IM1	;NO TAPE.
1972	005656	017025		IM4	
1973	005660	177777		IM23	
1974	005662	000000		-1	
1975	005664	005277	173320	HALT	;WAIT FOR USER.
1976	005670	104400		18: INC 0PRS	;ENABLE READER
1977	005672	005777	173312	DELAYX	;WAIT A WHILE.
1978	005676	100401		AT4A: TST 0PRS	;CHECK BIT 15 OF PRS
1979	005700	104006		BMI .+4	;BRANCH IF BIT 15 SET.
1980	005702	104013		ERROR	;ERROR, ERROR BIT (BIT 15) NOT SET BY
1981				SCOPE	;READER OUT OF TAPE.
1982	005704	100005			
1983	005706	005760		AT5: 5+MANUAL	;TEST 0
1984	005710	001750		AT6	;NEXT TEST
1985	005712	005746		1000,	;I COUNT
1986				AT5A	;SCOPE ENTRY
1987					
1988					
1989	005714	004567	174634		
1990	005720	000433		JSR 05,PCSIM	
1991	005722	005740		433	;TURN OFF RDR ERROR ON XOR TESTER
1992	005724	104004		18	
				TYPES	;TYPE, SET READER AS FOLLOWS; POWER ON, ON-LINE,

1993	005726	015722			IM1				
1994	005730	016271			IM5				;TAPE IN READER.
1995	005732	017029			IM23				
1996	005734	177777			-1				
1997	005736	000000			HALT				;WAIT FOR USER
1998	005740	005277	173244		181 INC	0PRS			;ENABLE READER.
1999	005744	104400			DELAYX				;WAIT A WHILE.
2000	005746	005777	173236		AT5A1 TST	0PRS			;CHECK BIT 15 OF PRS
2001	005752	100001			BPL	.+4			;BR IF BIT 15 NOT SET.
2002	005754	104006			ERROR				;ERROR, ERROR BIT (BIT 15) SET WITH NO
2003	005756	104013			SCOPE				;ERROR CONDITION PRESENT.
2004					;*****				
2005	005760	000006			AT61	6			;TEST 6
2006	005762	006042			AT7				;NEXT TEST
2007	005764	001750			1000.				;I COUNT
2008	005766	005776			AT6A				;SCOPE ENTRY
2009					;*****				
2010					;TEST ABILITY TO SET AND CLEAR THE ID BIT (INTERRUPT ENABLE (BIT 6))				
2011					;IN READER STATUS WORD				
2012	005770	012767	000340	172000	MOV	0PRY7,PSW			;SET PRIORITY 7.
2013	005776	052777	000100	173204	AT6A1 BIS	0BIT6,0PRS			;SET ID BIT (BIT 6) IN READER PRS
2014	006004	032777	000100	173176	BIT	0BIT6,0PRS			;CHECK ID BIT IN PRS
2015	006012	001002			BNE	AT6B			;ID BIT SET?
2016	006014	104006			AT6E11 ERROR				;NO, ERROR, FAILED TO SET ID BIT (BIT 6)
2017	006016	104013			SCOPE				;IN PRS.
2018	006020	042777	000100	173162	AT6B1 BIC	0BIT6,0PRS			;CLEAR ID BIT IN PRS.
2019	006026	032777	000100	173154	BIT	0BIT6,0PRS			;CHECK ID BIT IN PRS
2020	006034	001401			BEG	.+4			;BR IF BIT NOT SET.
2021	006036	104006			ERROR				;ERROR, ID BIT IN PRS FAILED TO CLEAR.
2022	006040	104013			SCOPE				
2023					;*****				
2024	006042	000007			AT71	7			;TEST 7
2025	006044	006104			AT10				;NEXT TEST
2026	006046	000144			100.				;I COUNT
2027	006050	006060			AT7A				;SCOPE ENTRY
2028					;*****				
2029					;TEST ABILITY TO CLEAR ID BIT (BIT 6) WITH RESET INSTRUCTION				
2030	006052	012767	000340	171716	MOV	0PRY7,PSW			;SET PRIORITY 7
2031	006060	052777	000100	173122	AT7A1 BIS	0BIT6,0PRS			;SET ID BIT IN PRS
2032	006066	104002			BRESET				;RESET
2033	006070	032777	000100	173112	BIT	0BIT6,0PRS			;TEST ID BIT
2034	006076	001401			BEG	.+4			;BR IF IE BIT IS NOT SET.
2035	006100	104006			ERROR				;ERROR, RESET INSTRUCTION FAILED TO
2036	006102	104013			SCOPE				;CLEAR ID BIT IN READER PRS.
2037					;*****				
2038	006104	000010			AT101	10			;TEST 8
2039	006106	006140			AT11				;NEXT TEST
2040	006110	000144			100.				;I COUNT
2041	006112	006114			AT10A				;SCOPE ENTRY
2042					;*****				
2043					;TEST THAT DONE BIT SETS SOMETIME AFTER READER ENABLE.				
2044	006114	004767	174522		AT10A1 JSR	07,ARRDY			;CHECK FOR READER READY
2045	006120	005277	173064		INC	0PRS			;ENABLE READER
2046	006124	104400			DELAYX				;WAIT.

2047	006126	105777	173056			
2048	006132	100401				
2049	006134	104006				
2050	006136	104013				
2051						
2052	006140	000011				
2053	006142	006174				
2054	006144	001750				
2055	006146	006162				
2056						
2057						
2058	006150	004767	174466			
2059	006154	005277	173030			
2060	006160	104400				
2061	006162	105777	173022			
2062	006166	100401				
2063	006170	104006				
2064	006172	104013				
2065						
2066	006174	000012				
2067	006176	006246				
2068	006200	000144				
2069	006202	006204				
2070						
2071						
2072	006204	004767	174432			
2073	006210	005277	172774			
2074	006214	104400				
2075	006216	105777	172766			
2076	006222	100005				
2077	006224	000005				
2078	006226	105777	172756			
2079	006232	100403				
2080	006234	104013				
2081	006236	104006				
2082	006240	104013				
2083	006242	104006				
2084	006244	104013				
2085						
2086	006246	000013				
2087	006250	006314				
2088	006252	000144				
2089	006254	006256				
2090						
2091						
2092	006256	104002				
2093	006260	004767	174356			

	TSTB	OPRS		
	BMI	.*4		
AT10E1	ERROR			
	SCOPE			
;*****				
AT111	11			
	AT12			
	1000.			
	AT11A			
;*****				
;TEST ABILITY TO READ DONE BIT (BIT 7 OF PRS) RELIABLY				
	JSR	07, ARDY		
	INC	OPRS		
	DELAYX			
AT11A1	TSTB	OPRS		
	BMI	.*4		
	ERROR			
	SCOPE			
;*****				
AT12.	12			
	AT13			
	100.			
	AT12A			
;*****				
;TEST THAT RESET COMMAND CLEARS DONE BIT (BIT 7 OF PRS)				
AT12A1	JSR	07, ARDY		
	INC	OPRS		
	DELAYX			
	TSTB	OPRS		
	BPL	AT12E1		
	RESET			
	TSTB	OPRS		
	BMI	AT12E2		
	SCOPE			
AT12E11	ERROR			
	SCOPE			
AT12E21	ERROR			
	SCOPE			
;*****				
AT131	13			
	AT14			
	100.			
	AT13A			
;*****				
;TEST THAT DONE BIT (BIT7 OF PRS) IS CLEARED WHEN ENABLING THE READER.				
AT13A1	SRESET			
	JSR	07, ARDY		

2094	006264	005277	172720	INC	OPRS		;ENABLE READER
2095	006270	105777	172714	TSTB	OPRS		;TEST FOR DONE BIT
2096	006274	100375		BPL	, -4		;BRANCH IF DONE BIT NOT SET
2097	006276	005277	172706	INC	OPRS		;ENABLE READER AGAIN
2098	006302	105777	172702	TSTB	OPRS		;TEST DONE BIT AGAIN
2099	006306	100001		BPL	, +4		;BRANCH IF DONE BIT IS RESET
2100	006310	104006		ERROR			;READER ENABLE DID NOT CLEAR DONE BIT
2101	006312	104013		SCOPE			
2102				;*****			
2103	006314	000014		AT14:	14		;TEST 0
2104	006316	006376			AT15		;NEXT TEST
2105	006320	000144			100,		;I COUNT
2106	006322	006324			AT14A		;SCOPE ENTRY
2107				;*****			
2108				;TEST THAT DONE BIT IS CLEARED BY REFERENCING READER BUFFER (PRB)			
2109	006324	004767	174312	AT14A:	JSR	07, ARDY	;CHECK FOR READER READY,
2110	006330	005277	172654		INC	OPRS	;ENABLE READER
2111	006334	105777	172650		TSTB	OPRS	;TEST FOR DONE BIT
2112	006340	100375			BPL	, -4	;BRANCH IF DONE BIT NOT SET,
2113	006342	005777	172644		TST	OPRS	;REFERENCE READER BUFFER (PRB)
2114	006346	105777	172636		TSTB	OPRS	;TEST FOR DONE BIT
2115	006352	100001			BPL	, +4	;BR IF DONE BIT IS NOT SET,
2116	006354	104006			ERROR		;ERROR 1, DONE BIT WAS NOT CLEARED
2117	006356	004567	174172		JSR	05, PC8IM	;GO TO PC11 XOR SIMULATOR
2118	006362	000433		XCT:	433		;XOR COMM,
2119	006364	006366			AT14C		; RETURN ARGUMENT
2120	006366	062767	001000 177766	AT14C:	ADD	01000, XCT	
2121	006374	104013			SCOPE		;BY REFERENCING READER BUFFER,
2122				;*****			
2123	006376	000015		AT15:	15		;TEST 0
2124	006400	006446			AT16		;NEXT TEST
2125	006402	000144			100,		;I COUNT
2126	006404	006406			AT15A		;SCOPE ENTRY
2127				;*****			
2128				;TEST THAT ENABLING READER (BIT 0 OF PRS) SETS THE BUSY BIT (BIT 11 OF PRS)			
2129	006406	104002		AT15A:	SRESET		
2130	006410	004767	174114		JSR	07, ARDER	;CHECK THAT NO READER ERROR EXISTS,
2131	006414	005277	172570		INC	OPRS	
2132	006420	105777	172564		TSTB	OPRS	
2133	006424	100375			BPL	, -4	
2134	006426	005277	172556		INC	OPRS	;ENABLE READER
2135	006432	032777	004000 172550		BIT	0BIT11, OPRS	;TEST FOR BUSY BIT
2136	006440	001001			BNE	, +4	;BRANCH IF BUSY BIT SET
2137	006442	104006		AT15E:	ERROR		;ERROR, READER ENABLE FAILED TO SET
2138							;BUSY BIT, OR UNABLE TO READ BUSY BIT
2139	006444	104013			SCOPE		
2140				;*****			
2141	006446	000016		AT16:	16		;TEST 0
2142	006450	006530			AT17		;NEXT TEST
2143	006452	000144			100,		;I COUNT
2144	006454	006456			AT16A		;SCOPE ENTRY
2145				;*****			
2146				;TEST ABILITY TO READ BUSY BIT (BIT 11 OF PRS) RELIABLY			
2147	006456	104002		AT16A:	SRESET		
2148	006460	004767	174044		JSR	07, ARDER	;CHECK THAT NO READER ERROR EXISTS,
2149	006464	012700	000012		MOV	010,, 00	;SET UP COUNTER TO 10,

2150	006470	005277	172514		INC	0PRS		;ENABLE READER
2151	006474	105777	172510		TSTB	0PRS		;WAIT FOR DONE BIT
2152	006500	100375			BPL	0-4		
2153	006502	005277	172502		INC	0PRS		;ENABLE READER
2154	006506	032777	004000	172474	AT16B:	BIT	0BIT11,0PRS	;TEST BUSY BIT
2155	006514	001403			BEQ	AT16E		;BRANCH IF BIT NOT SET
2156	006516	005300			DEC	00		;DECREMENT COUNTER
2157	006520	001372			BNE	AT16B		;REPEAT CHECK OF BUSY BIT IF NOT 0
2158	006522	104013			SCOPE			
2159	006524	104006			AT16E:	ERROR		;ERROR, BUSY BIT NOT SET, OR FAILED
2160	006526	104013			SCOPE			;TO READ BUSY BIT
2161								;
2162	006530	000017			AT17:	17		;TEST 0
2163	006532	006630			AT20			;NEXT TEST
2164	006534	000144			100			;I COUNT
2165	006536	006540			AT17A			;SCOPE ENTRY
2166								;
2167								;TEST ABILITY TO READ READER BUFFER RELIABLY.
2168	006540	012700	000144		AT17A:	MOV	0100,00	;SET COUNT TO 100 IN R0
2169	006544	004767	174112		JSR	07,AREAD		;GET CHARACTER
2170	006550	017767	172436	172624	MOV	0PRB,CHR1		;C(PRB) TO CHR1
2171	006556	017767	172430	172620	AT17B:	MOV	0PRB,CHR2	;C(PRB) TO CHR2
2172	006564	026767	172612	172612	CMP	CHR1,CHR2		;COMPARE CHR1 AND CHR2
2173	006572	001003			BNE	AT17E		;BRANCH IF R1 AND R2 DON'T MATCH
2174	006574	005300			DEC	00		
2175	006576	001367			BNE	AT17B		
2176	006600	104013			SCOPE			
2177	006602	004567	176246		AT17E:	JSR	05,ACHV4	;CORRECT 1ST READ DATA TO ASCII
2178	006606	001402			CHR1			
2179	006610	017727			ORGRD			
2180	006612	004567	176236		JSR	05,ACHV4		
2181	006616	001404			CHR2			
2182	006620	017742			SUDRD			
2183	006622	104007			ERROR1			;ERROR, REREAD OF PRB DID NOT MATCH
2184	006624	017675			EM2			;INITIAL DATA READ FROM PRB.
2185	006626	104013			SCOPE			
2186								;
2187	006630	000020			AT20:	20		;TEST 0
2188	006632	006744			AT21			;NEXT TEST
2189	006634	000020			20			;I COUNT
2190	006636	006650			AT20A			;SCOPE ENTRY
2191								;
2192	006640	105277	172344		INCB	0PRS		
2193	006644	104000			DELAY			
2194	006646	000001			1			
2195	006650	005767	173164		AT20A:	TST	XORFLG	;THE INSTRUCTIONS WITHIN THIS TEST
2196	006654	100031			BPL	AT20X		;ARE USED WITH XOR TESTER ONLY
2197	006656	013746	000004		MOV	004,-(00)		;ERRORS WILL BE INDICATED ON XOR TESTER ONLY
2198	006662	012737	006742	000004	MOV	0XTP,004		
2199	006670	012737	000033	177060	AT20B:	MOV	033,00177060	
2200	006676	005777	172306		TST	0PRS		
2201	006702	104000			DELAY			
2202	006704	000010			10			
2203								
2204								
2205	006706	005777	172276		TST	0PRS		

2206	006712	012737	000433	177060	MOV	0433,00177060	
2207	006720	005777	172264		TST	OPRS	
2208	006724	104000			DELAY		
2209	006726	000010			10		
2210	006730	005777	172254		TST	OPRS	
2211	006734	012637	000004		MOV	(06)+,004	
2212	006740	104013			AT20X:	SCOPE	
2213	006742	000002			XTP:	RTI	
2214					;*****		
2215	006744	000021			AT21:	21	;TEST 0
2216	006746	007014				AT22	;NEXT TEST
2217	006750	000144				100,	;I COUNT
2218	006752	006760				AT21A	;SCOPE ENTRY
2219					;*****		
2220					;TEST THAT READER IS ABLE TO INTERRUPT, IF INTERRUPT IS SERVICED, IT WILL		
2221					;HAVE OCCURRED AT CORRECT VECTOR.		
2222	006754	104011			STRDRV		;SET UP READER INTERRUPT VECTOR
2223	006756	007012			AT21B		
2224	006760	012737	000000	171010	AT21A:	MOV	;SET PROCESSOR PRIORITY TO 0
2225	006766	042777	000100	172214		BIC	;DISABLE READER INTERRUPT.
2226	006774	004767	173662			JSR	;GO READ CHARACTER.
2227	007000	052777	000100	172202		BIS	;ENABLE READER INTERRUPT.
2228	007006	000240				NOP	;NO OP
2229	007010	104006			AT21E:	ERROR	;ERROR, READER FAILED TO INTERRUPT.
2230	007012	104013			AT21B:	SCOPE	
2231					;*****		
2232	007014	000022			AT22:	22	;TEST 0
2233	007016	007070				AT23	;NEXT TEST
2234	007020	000144				100,	;I COUNT
2235	007022	007030				AT22A	;SCOPE ENTRY
2236					;*****		
2237					;TEST THAT READER DOES NOT INTERRUPT WITH PROCESSOR AT SAME PRIORITY		
2238					;LEVEL AS READER.		
2239	007024	104011			STRDRV		;SET UP READER INTERRUPT VECTOR
2240	007026	007064			AT22E		
2241	007030	016767	172166	170740	AT22A:	MOV	;SET PROCESSOR PRIORITY SAME AS READER PRIORITY.
2242	007036	005077	172146			CLR	;DISABLE READER INTERRUPT.
2243	007042	004767	173614			JSR	;GO READ A CHARACTER.
2244	007046	052777	000100	172134		BIS	;ENABLE READER INTERRUPT.
2245	007054	000240				NOP	;OK IF NO INTERRUPT OCCURS.
2246	007056	005077	172126			CLR	;DISABLE READER INTERRUPT.
2247	007062	104013				SCOPE	
2248	007064	104006			AT22E:	ERROR	;ERROR, READER ERRONEOUSLY INTERRUPTED
2249					;WITH PROCESSOR AT SAME PRIORITY LEVEL AS		
2250					;THE READER, OR THE READER IS AT HIGHER		
2251	007066	104013				SCOPE	;PRIORITY LEVEL THAN SPECIFIED AT RDRLVL.
2252					;*****		
2253	007070	000023			AT23:	23	;TEST 0
2254	007072	007146				AT24	;NEXT TEST
2255	007074	000144				100,	;I COUNT
2256	007076	007104				AT23A	;SCOPE ENTRY
2257					;*****		
2258					;TEST THAT READER INTERRUPTS WITH PROCESSOR AT PRIORITY 1 LEVEL LOWER		
2259					;THAN READER'S		
2260	007100	104011			STRDRV		;SET UP READER INTERRUPT VECTOR
2261	007102	007144			AT23B		

2262	007104	016767	172112	170664	AT23A:	MOV	RDRVL,PSW	;SET PROCESSOR PRIORITY ONE LEVEL LOWER
2263	007112	162767	000040	170656		SUB	040,PSW	;THAN READER PRIORITY
2264	007120	042777	000100	172062		BIC	0BIT6,0PRS	;DISABLE READER INTERRUPT
2265	007126	004767	173530			JSR	07,AREAD	;GO READ A CHARACTER.
2266	007132	052777	000100	172050		BIS	0BIT6,0PRS	;ENABLE READER INTERRUPT
2267	007140	000240				NOP		;NOP
2268	007142	104006			AT23E:	ERROR		;READER FAILED TO INTERRUPT WITH
2269								;PROCESSOR PRIORITY ONE LEVEL LOWER THAN
2270								;READER, THEREFORE, READER PRIORITY MUST BE
2271	007144	104013			AT23B:	SCOPE		;LOWER THAN SPECIFIED AT RDRVL
2272								;*****
2273	007146	000024			AT24:	24		;TEST 0
2274	007150	007240				AT25		;NEXT TEST
2275	007152	000144				100.		;I COUNT
2276	007154	007156				AT24A		;SCOPE ENTRY
2277								;*****
2278								;TEST THAT READER DOES NOT REINTERRUPT AFTER RTI WHEN DONE BIT IS NOT CLEARED
2279	007156	104011			AT24A:	STRDRV		;SET READER INTERRUPT VECTOR
2280	007160	007214				AT24C		
2281	007162	012767	000000	170606		MOV	0PRTY0,PSW	;SET PROCESSOR TO PRIORITY 0
2282	007170	005077	172014			CLR	0PRS	;DISABLE READER INTERRUPT.
2283	007174	004767	173462			JSR	07,AREAD	;GO READ A CHARACTER.
2284	007200	052777	000100	172002		BIS	0BIT6,0PRS	;ENABLE READER INTERRUPT
2285	007206	000240				NOP		
2286	007210	104006			AT24E1:	ERROR		;ERROR 1, READER FAILED TO INTERRUPT
2287	007212	104013				SCOPE		
2288	007214	012777	007234	171776	AT24C:	MOV	0AT24E2,0RDRVTR	;CHANGE INTERRUPT VECTOR TO AT24E2
2289	007222	012716	007230			MOV	0AT24D,006	
2290	007226	000002				RTI		;RETURN FROM INTERRUPT
2291	007230	000240			AT24D:	NOP		
2292	007232	104013				SCOPE		
2293	007234	104006			AT24E2:	ERROR		;ERROR 2, READER REINTERRUPTED AFTER
2294	007236	104013				SCOPE		;RTI WITH DONE BIT LEFT ON
2295								;*****
2296	007240	000025			AT25:	25		;TEST 0
2297	007242	007316				AT26		;NEXT TEST
2298	007244	001750				1000.		;I COUNT
2299	007246	007254				AT25A		;SCOPE ENTRY.
2300								;*****
2301								;TEST THAT READER INTERRUPTS IMMEDIATELY UPON LOWERING CP PRIORITY TO 0,
2302	007250	104011				STRDRV		;SET READER INTERRUPT VECTOR TO
2303	007252	007314				AT25B		;AT27B.
2304	007254	012767	000340	170514	AT25A:	MOV	0PRTY7,PSW	;SET CP PRIORITY TO 7.
2305	007262	005077	171722			CLR	0PRS	;DISABLE PTRI.
2306	007266	004767	173370			JSR	07,AREAD	;READ A CHARACTER.
2307	007272	052777	000100	171710		BIS	0BIT6,0PRS	;ENABLE PTRI
2308	007300	005067	170472			CLR	PSW	;LOWER PRIORITY TO 0.
2309	007304	012767	000340	170464		MOV	0PRTY7,PSW	;RAISE PRIORITY BACK TO 7.
2310	007312	104006			AT25E:	ERROR		;ERROR, READER FAILED TO INTERRUPT IMMEDIATELY
2311								;AFTER LOWERING PRIORITY TO 0
2312	007314	104013			AT25B:	SCOPE		;INTERRUPTS TO HERE IF SUCCESSFUL.
2313								;*****
2314	007316	100026			AT26:	26+MANUAL		;TEST 0
2315	007320	007412				AT27		;NEXT TEST
2316	007322	000144				100.		;I COUNT
2317	007324	007350				AT26A		;SCOPE ENTRY

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2318
2319
2320 007326 004567 173222
2321 007332 000033
2322 007334 007350
2323 007336 104004
2324 007340 016405
2325 007342 017025
2326 007344 177777
2327 007346 000000
2328 007350 005777 171634
2329 007354 100012
2330 007356 005277 171626
2331 007362 005767 172452
2332 007366 001010
2333 007370 032777 004000 171612
2334 007376 001003
2335 007400 104013
2336 007402 104006
2337 007404 104013
2338 007406 104006
2339
2340 007410 104013
2341
2342 007412 100027
2343 007414 007530
2344 007416 000144
2345 007420 007444
2346
2347
2348
2349 007422 004567 173126
2350 007426 000033
2351 007430 007444
2352 007432 104004
2353 007434 016405
2354 007436 017025
2355 007440 177777
2356 007442 000000
2357 007444 104011
2358 007446 007500
2359 007450 005777 171534
2360 007454 100023
2361 007456 042777 000100 171524
2362 007464 052777 000100 171516
2363 007472 000240
2364 007474 104006
2365
2366 007476 104013
2367 007500 012777 007520 171512
2368 007506 012716 007514
2369 007512 000002
2370 007514 000240
2371 007516 104013
2372 007520 104006
2373

;*****
;TEST THAT READER ERROR CRIPPLES READER ENABLE
JSR 05,PC8IN
33
AT26A
TYPES
IM10
IM23
-1
HALT
AT26A: TST 0PRS
BPL AT26E1
INC 0PRS
TST XORFLG
BNE AT26B
BIT 0BIT11,0PRS
BNE AT26E2
SCOPE
AT26E1: ERROR
SCOPE
AT26E2: ERROR
AT26B: SCOPE
;*****
;SKIP THIS XOR TEST
;TYPE, SET READER AS FOLLOWS: POWER ON,
;OFF-LINE, TAPE IN READER
;CHECK FOR ERROR BIT,
;BRANCH IF ERROR BIT NOT SET,
;ATTEMPT READER ENABLE
;TEST READER BUSY BIT
;ERROR 1, ERROR BIT NOT SET, OR READER
;NOT SET UP AS SPECIFIED,
;READER ENABLE WITH ERROR CONDITION SET
;BUSY BIT, ERROR CONDITION SHOULD HAVE
;DISABLED READER ENABLE.
;*****
AT27: 27+MANUAL
AT30
100,
AT27A
;TEST 0
;NEXT TEST,
;I COUNT
;SCOPE ENTRY
;*****
;TEST THAT ERROR BIT IS ABLE TO INTERRUPT, AND AFTER INTERRUPT
;SERVICE IT DOES NOT REINTERRUPT AGAIN,
JSR 05,PC8IN
33
AT27A
TYPES
IM10
IM23
-1
HALT
AT27A: STRDRV
AT27C
TST 0PRS
BPL AT27E1
BIC 0BIT6,0PRS
BIS 0BIT6,0PRS
NOP
AT27E2: ERROR
SCOPE
AT27C: MOV 0AT27E3,0RDRVTR
MOV 0AT27D,006
RTI
AT27D: NOP
SCOPE
AT27E3: ERROR
;TYPE; SET READER AS FOLLOWS: POWER OFF
;OFFLINE, TAPE IN READER
;SET UP READER INTERRUPT VECTOR
;TEST ERROR BIT,
;BRANCH IF ERROR BIT NOT SET (BIT 15 OF PRS),
;DISABLE READER INTERRUPT,
;ENABLE READER INTERRUPT
;ERROR 2, ERROR CONDITION FAILED TO CAUSE
;READER INTERRUPT
;SET UP READER SERVICE TO AT27E3
;MODIFY INTERRUPT RETURN ADDRESSD
;RETURN FROM INTERRUPT
;OK IF NO INTERRUPT,
;ERROR 3, ERROR CONDITION RESULTED IN
;A REINTERRUPT AFTER INITIAL INTERRUPT

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2374	007522	104013			SCOPE				
2375	007524	104006			AT27E1: ERROR				;WAS SERVICED
2376	007526	104013			SCOPE				;ERROR 1, ERROR BIT NOT SET, OR READER
2377									;NOT SET UP AS SPECIFIED
2378	007530	100030			AT30: 30+MANUAL				;TEST 1
2379	007532	177777			-1				;LAST TEST
2380	007534	001750			1000.				;I COUNT
2381	007536	007576			AT30A				;SCOPE ENTRY.
2382									
2383									
2384									
2385	007540	004567	173010		JBR	05,PCBIN			
2386	007544	000033			J3				
2387	007546	007562			18				
2388	007550	104004			TYPES				
2389	007552	016405			IM10				
2390	007554	017025			IM23				
2391	007556	177777			-1				
2392	007560	000000			HALT				
2393	007562	104002			181 SRESET				
2394	007564	104011			STRDRV				;SET PTR VECTOR TO AT30B.
2395	007566	007624			AT30B				
2396	007570	005277	171414		INC	OPRS			;ENABLE READER.
2397	007574	104400			DELAYX				;WAIT A WHILE.
2398	007576	005777	171406		AT30A: TST	OPRS			;TEST FOR ERROR.
2399	007602	100025			BPL	AT30E1			;BRANCH IF ERROR NOT SET.
2400	007604	005077	171400		CLR	OPRS			;DISABLE PTRI
2401	007610	052777	000100	171372	BIS	0BIT6,OPRS			;ENABLE PTRI
2402	007616	000240			NOP				
2403	007620	104006			AT30E2: ERROR				;ERROR FAILED TO INTERRUPT.
2404	007622	104013			SCOPE				
2405	007624	012716	007632		AT30B: MOV	0AT30C,006			;ERROR INTERRUPTS TO HERE, SET UP INTERRUPT
2406	007630	000002			RTI				;EXIT, AND EXIT.
2407	007632	104011			AT30C: STRDRV				;SET PTR VECTOR TO AT30D.
2408	007634	007654			AT30D				
2409	007636	005777	171346		TST	OPRS			;TEST THAT ERROR BIT IS STILL ON.
2410	007642	100005			BPL	AT30E1			;BRANCH IF NO ERROR BIT.
2411	007644	005277	171340		INC	OPRS			;READER ENABLE, SHOULD CAUSE
2412	007650	000240			NOP				;IMMEDIATE INTERRUPT.
2413	007652	104006			AT30E3: ERROR				;ERROR, READER ENABLE WITH PREVIOUS ERROR
2414									;INTERRUPT FAILED TO INTERRUPT.
2415	007654	104013			AT30D: SCOPE				;OK, INTERRUPT OCCURED.
2416	007656	005077	171326		AT30E1: CLR	OPRS			;DISABLE PTRI
2417	007662	104006			ERROR				;ERROR BIT NOT SET.
2418	007664	104013			SCOPE				

Address	Hex	Hex	Hex	Hex	Assembly	Comments
2419					;SMTL PRG1 - READER TEST	
2420					;PRG1: READER TEST	
2421	007666	012767	007724	171356	PRG1: MOV BT0,KSTART	;SET ADDRESS OF FIRST ROUTINE
2422	007674	104004			TYPES	;TYPE SET UP INSTRUCTIONS
2423	007676	016360			IM7	
2424	007700	016334			IM6	
2425	007702	017025			IM23	
2426	007704	177777			-1	
2427	007706	000000			HALT	
2428	007710	004767	005326		JSR BT7,SMTL	
2429	007714	004767	174000		JSR PC,RTMCAL	;CALIBRATE DELAY RTN WITH READER.
2430	007720	000167	171764		JMP GETRDY	;GO GET STARTED.
2431					;*****	
2432	007724	000000			BT0: 0	;TEST 0
2433	007726	007752			BT1	;NEXT TEST
2434	007730	023420			10000.	;I COUNT
2435	007732	007740			BT0A	;SCOPE ENTRY
2436					;*****	
2437					;READ AND CHECK 10000 CHARACTERS OF SPECIAL BINARY COUNT PATTERN, FULL SPEED.	
2438	007734	004767	174512		JSR BT7,BSYNC	;SYNC READER; SET ERROR COUNTER.
2439	007740	004767	173136		BT0A: JSR BT7,BREAD	;GO READ CHARACTER
2440	007744	004767	174422		JSR BT7,BCHECK	;GO CHECK CHARACTER READ.
2441	007750	104013			SCOPE	
2442					;*****	
2443	007752	000001			BT1: 1	;TEST 0
2444	007754	010010			BT2	;NEXT TEST
2445	007756	000764			500.	;I COUNT
2446	007760	007774			BT1A	;SCOPE ENTRY
2447					;*****	
2448					;READ AND CHECK 500 CHARACTERS OF SPECIAL BINARY COUNT PATTERN.	
2449					;RANDOM STALL BETWEEN CHARACTERS (0 TO 7 MSEC).	
2450	007762	012767	177770	174316	MOV BT17770,STLMSK	
2451	007770	004767	174456		JSR BT7,BSYNC	;SYNC READER; SET ERROR COUNTER
2452	007774	104005			BT1A: STALL	;RANDOM STALL (0 TO 7 MSEC)
2453	007776	004767	173100		JSR BT7,BREAD	;GO READ CHARACTER
2454	010002	004767	174364		JSR BT7,BCHECK	;GO CHECK CHARACTER READ
2455	010006	104013			SCOPE	
2456					;*****	
2457	010010	000002			BT2: 2	;TEST 0
2458	010012	010062			BT3	;NEXT TEST
2459	010014	001750			1000.	;I COUNT
2460	010016	010032			BT2A	;SCOPE ENTRY
2461					;*****	
2462					;READ 1000 GROUPS OF 3 CHARACTERS EACH, RANDOM STALL (0 TO 31 MSEC) BEFORE EACH GROUP.	
2463	010020	012767	177740	174260	MOV BT177740,STLMSK	;LIMIT STALLS TO 31 MSEC.
2464	010026	004767	174420		JSR BT7,BSYNC	;SYNC READER, SET ERROR COUNTER
2465	010032	012767	000003	174330	BT2A: MOV BT3,RNCNT	;SET CHAR COUNT TO 3.
2466	010040	104005			STALL	;RANDOM STALL (0 TO 31 MSEC).
2467	010042	004767	173034		BT2C: JSR BT7,BREAD	;GO READ CHARACTER.
2468	010046	004767	174320		JSR BT7,BCHECK	;GO CHECK CHARACTER READ.
2469	010052	005367	174312		DEC RNCNT	;3 CHARS READ?
2470	010056	001371			BNE BT2C	;BR IF NOT 3 CHARS YET.
2471	010060	104013			SCOPE	
2472					;*****	
2473	010062	000003			BT3: 3	;TEST 0
2474	010064	010140			BT4	;NEXT TEST

K4 50

Address	Hex	Hex	Hex	Hex	Assembly	Comment
2475	010066	001750			1000.	;I COUNT
2476	010070	010112			BT3A	;SCOPE ENTRY,
2477						;*****
2478						;READ AND CHECK 1000 CHARACTER GROUPS OF RANDOM LENGTH (1 TO 15).
2479						;RANDOM STALL (0 TO 31 MSECs) BETWEEN GROUPS,
2480	010072	012767	177740	174206	MOV 0177740,BTLMK	;LIMIT STALLS TO 31 MSECs.
2481	010100	012767	177760	174260	MOV 0177760,RCMSK	;LIMIT MAX CHAR COUNT TO 15 CHARS.
2482	010106	004767	174340		JSR 07,BSYNC	;SYNC READER, SET ERROR COUNTER.
2483	010112	004767	174230		BT3A: JSR 07,GRCNT	;GENERATE RANDOM CHAR COUNT,
2484	010116	104005			STALL	
2485	010120	004767	172756		BT3C: JSR 07,BREAD	;GO READ CHARACTER,
2486	010124	004767	174242		JSR 07,BCHECK	;GO CHECK CHARACTER,
2487	010130	005367	174234		DEC RNCNT	;ALL CHARS READ?
2488	010134	001371			BNE BT3C	;BRANCH IF NOT,
2489	010136	104013			SCOPE	
2490						;*****
2491	010140	000004			BT4: 4	;TEST 4
2492	010142	177777			-1	;LAST TEST
2493	010144	001750			1000.	;I COUNT
2494	010146	010170			BT4A	;SCOPE ENTRY
2495						;*****
2496						;READ AND CHECK 1000 CHARACTER GROUPS OF SPECIAL BINARY COUNT PATTERN,
2497						;RANDOM LENGTH
2498						;GROUPS (BETWEEN 1 AND 77), RANDOM STALL BETWEEN GROUPS (0 TO 31 MSECs),
2499	010150	012767	177740	174130	MOV 0177740,BTLMK	
2500	010156	012767	177700	174202	MOV 0177700,RCMSK	
2501	010164	004767	174262		JSR 07,BSYNC	;SYNC READER, SET ERROR COUNTER.
2502	010170	004767	174152		BT4A: JSR 07,GRCNT	;GENERATE RANDOM CHARACTER COUNT,
2503	010174	104005			STALL	;RANDOM STALL (0 TO 31MSECs)
2504	010176	004767	172700		BT4C: JSR 07,BREAD	;GO READ CHARACTER
2505	010202	004767	174164		JSR 07,BCHECK	;GO CHECK CHARACTER READ
2506	010206	005367	174156		DEC RNCNT	;DECREMENT RANDOM CHAR COUNT
2507	010212	001371			BNE BT4C	;GO READ AGAIN IF COUNT NOT 0,
2508	010214	104013			SCOPE	


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2509          ,SBTTL PRG2 - PUNCH LOGIC TESTS
2510 010216 012767 010240 171026 PRG2: MOV      0CT0,KSTART      ;ADDR OF 1ST ROUTINE TO KSTART
2511 010224 104003          TYPE          ;TYPE TITLE.
2512 010226 015574          INDA
2513 010230 004767 005006      JSR      07,SWTL
2514 010234 000167 171450      JMP      GETROY      ;GO GET STARTED.
2515          ;*****
2516          CT0: 0          ;TEST 0
2517 010240 000000          CT1          ;NEXT TEST
2518 010242 010270          1000,        ;I COUNT
2519 010244 001750          CT0A         ;SCOPE ENTRY
2520 010246 010256          ;*****
2521          ;TEST ABILITY TO REFERENCE THE PUNCH STATUS WORD (PPS)
2522 010250 012767 010264 167526      MOV      0CT0E,MACHER
2523 010256 005777 170732      CT0A: TST      0PPS          ;REFERENCE PUNCH STATUS WORD
2524 010262 104013          SCOPE
2525 010264 104006      CT0E: ERROR          ;ERROR, TRAPPED WHEN REFERENCING PUNCH
2526 010266 104013          SCOPE          ;STATUS WORD (PPS).
2527          ;*****
2528 010270 000001          CT1: 1          ;TEST 0
2529 010272 010320          CT2          ;NEXT TEST
2530 010274 001750          1000,        ;I COUNT
2531 010276 010306          CT1A         ;SCOPE ENTRY
2532          ;*****
2533          ;TEST ABILITY TO REFERENCE THE PUNCH BUFFER (PPB)
2534 010300 012767 010314 167476      MOV      0CT1E,MACHER
2535 010306 005777 170704      CT1A: TST      0PPB          ;SET UP MACHINE ERROR TRAP,
2536 010312 104013          SCOPE          ;REFERENCE PUNCH BUFFER.
2537 010314 104006      CT1E: ERROR          ;TRAPPED WHEN REFERENCING
2538 010316 104013          SCOPE          ;PUNCH BUFFER (PPB)
2539          ;*****
2540 010320 100002          CT2: 2+MANUAL      ;TEST 0
2541 010322 010370          CT3          ;NEXT TEST
2542 010324 001750          1000,        ;I COUNT
2543 010326 010354          CT2A         ;SCOPE ENTRY
2544          ;*****
2545          ;TEST THAT PUNCH POWER OFF SETS ERROR AND READY BITS IN PPS
2546 010330 004567 172220      JSR      05,PCSIM
2547 010334 000433          433
2548 010336 010354          CT2A
2549 010340 104004          TYPES          ;TYPE INSTRUCTIONS TO TURN POWER
2550 010342 016434          IN11          ;OFF AND REMOVE TAPE FROM
2551 010344 016467          IN12          ;PUNCH
2552 010346 017025          IN23
2553 010350 177777          -1
2554 010352 000000          HALT
2555 010354 022777 100200 170632 CT2A: CMP      0100200,0PPS      ;WAIT FOR USER
2556 010362 001401          BEQ      .+4      ;TEST PPS.
2557 010364 104006          ERROR          ;BRANCH IF ERROR AND READY SET.
2558 010366 104013          SCOPE          ;ERROR, PUNCH ERROR BIT (BIT 15) NOT SET BY
2559          ;PUNCH POWER OFF, OR READY BIT NOT SET, OR
2560          ;SOME OTHER BIT IS SET, EXAMINE PUNCH
2561          ;STATUS WORD MANUALLY.
2562          ;*****
2563 010370 100003          CT3: 3+MANUAL      ;TEST 0
2564 010372 010436          CT4          ;NEXT TEST
2565 010374 001750          1000,        ;I COUNT

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2565	010376	010424		CT3A		;SCOPE ENTRY
2566						;.....
2567						;TEST THAT PUNCH OUT OF TAPE SETS ERROR BIT IN PPS
2568	010400	004567	17215P	JSP	45,PCSIM	
2569	010404	000433		433		
2570	010406	010424		CT3A		
2571	010410	104004		TYPES		;TYPE INSTRUCTIONS TO TURN PUNCH
2572	010412	016434		IM11		;POWER ON, AND REMOVE TAPE FROM PUNCH.
2573	010414	016513		IM13		
2574	010416	017025		IM23		
2575	010420	177777		-1		
2576	010422	000000		HALT		;WAIT FOR USER.
2577	010424	005777	170564	CT3A:	TST 0PPS	;TEST PPS
2578	010430	100401		BMI	,+4	;BR IF ERROR BIT SET.
2579	010432	104006		ERROR		;ERROR, PUNCH OUT OF TAPE FAILED TO SET
2580	010434	104013		SCOPE		;THE ERROR BIT IN PPS (BIT 15).
2581						;.....
2582	010436	100004		CT4:	4+MANUAL	;TEST 0
2583	010440	010504		CT5		;NEXT TEST
2584	010442	001750		1000.		;I COUNT
2585	010444	010472		CT4A		;SCOPE ENTRY
2586						;.....
2587						;TEST THAT PUNCH ERROR BIT IS NOT SET WHEN PUNCH POWER IS ON AND TAPE IS IN PUNCH.
2588	010446	004567	172102	JSP	45,PCSIM	
2589	010452	000033		33		
2590	010454	010472		CT4A		
2591	010456	104004		TYPES		;TYPE INSTRUCTIONS TO LOAD TAPE IN
2592	010460	016434		IM11		;PUNCH AND TURN POWER ON.
2593	010462	016536		IM14		
2594	010464	017025		IM23		
2595	010466	177777		-1		
2596	010470	000000		HALT		;WAIT FOR USER.
2597	010472	005777	170516	CT4A:	TST 0PPS	;TEST PPS
2598	010476	100001		HPL	,+4	;BR IF ERROR BIT NOT SET.
2599	010500	104006		ERROR		;ERROR, ERROR BIT SET WITH NO ERROR
2600	010502	104013		SCOPE		;CONDITION PRESENT.
2601						;.....
2602	010504	000005		CT5:	5	;TEST 0
2603	010506	010566		CT6		;NEXT TEST
2604	010510	001750		1000.		;I COUNT
2605	010512	010514		CT5A		;SCOPE ENTRY
2606						;.....
2607						;TEST ABILITY TO SET AND CLEAR ID BIT (BIT 6) IN PPS
2608	010514	012767	000340 167254	CT5A:	MOV 0PRTY7,PSW	;SET PRIORITY 7
2609	010522	052777	000100 170464	BIS	0BIT6,0PPS	;SET ID BIT IN PPS (BIT 6)
2610	010530	032777	000100 170456	BIT	0BIT6,0PPS	;CHECK ID BIT IN PPS
2611	010536	001002		BNE	CT5B	;BRANCH IF BIT SET
2612	010540	104006		ERROR		;FAILED TO SET ID BIT (BIT 6) IN PPS
2613	010542	104013		SCOPE		
2614	010544	042777	000100 170442	CT5B:	BIC 0BIT6,0PPS	;CLEAR ID BIT IN PPS
2615	010552	032777	000100 170434	BIT	0BIT6,0PPS	;CHECK ID BIT IN PPS
2616	010560	001401		BEQ	,+4	;BR IF BIT IS NOT SET.
2617	010562	104006		ERROR		;ERROR, ID BIT IN PPS FAILED TO CLEAR
2618	010564	104013		SCOPE		
2619						;.....
2620	010566	000006		CT6:	6	;TEST 0

BS

2677	010764	005200			INC	00	
2678	010766	112710	000000		MOVB	00,006	;LOAD PPS+1
2679	010772	105777	170216		TEST	0PPS	;TEST PPS
2680	010776	100401			BNI	,+4	;BRANCH IF READY BIT NOT RESET,
2681	011000	104006			CT11E1	ERROR	;ERROR, LOADING PPS+1 CLEARED READY BIT,
2682	011002	104013			SCOPE		
2683					;*****		
2684	011004	000012			CT121	12	;TEST 0
2685	011006	011052			CT13		;NEXT TEST
2686	011010	001750			1000,		;I COUNT
2687	011012	011020			CT12A		;SCOPE ENTRY
2688					;*****		
2689					;TEST THAT PUNCH (READY BIT) IS ABLE TO INTERRUPT, IF THE INTERRUPT IS		
2690					;SERVICED, IT WILL HAVE OCCURRED AT CORRECT VECTOR,		
2691	011014	104012			STPCHV		;SET UP PUNCH INTERRUPT VECTOR,
2692	011016	011050			CT12C		
2693	011020	005067	166752		CT12A1	CLR PSW	;SET PRTY TO 0,
2694	011024	004767	174154		JSR	07,CPRDY	;CHECK FOR PUNCH READY,
2695	011030	042777	000100	170156	BIC	0BIT6,0PPS	;DISABLE PUNCH INTERRUPT
2696	011036	052777	000100	170156	BIS	0BIT6,0PPS	;ENABLE PUNCH INTERRUPT
2697	011044	000240			NOP		
2698	011046	104006			CT12E1	ERROR	;ERROR, FAILURE TO INTERRUPT WITH
2699							;PUNCH READY BIT SET,
2700	011050	104013			CT12C1	SCOPE	;INTERRUPT VECTOR POINTS HERE,
2701					;*****		
2702	011052	000013			CT131	13	;TEST 0
2703	011054	011144			CT14		;NEXT TEST
2704	011056	001750			1000,		;I COUNT
2705	011060	011062			CT13A		;SCOPE ENTRY
2706					;*****		
2707					;TEST THAT PUNCH DOES NOT REINTERRUPT AFTER RTI WHEN READY BIT IS NOT RESET,		
2708	011062	104012			CT13A1	STPCHV	;SET UP PUNCH INTERRUPT VECTOR
2709	011064	011120			CT13C		
2710	011066	005067	166704		CLR	PSW	;SET PRTY TO 0,
2711	011072	004767	174106		JSR	07,CPRDY	;CHECK FOR PUNCH READY,
2712	011076	042777	000100	170110	BIC	0BIT6,0PPS	;DISABLE PUNCH INTERRUPT
2713	011104	052777	000100	170102	BIS	0BIT6,0PPS	;ENABLE PUNCH INTERRUPT
2714	011112	000240			NOP		
2715	011114	104006			CT13E11	ERROR	;ERROR1, PUNCH FAILED TO INTERRUPT,
2716	011116	104013			SCOPE		
2717	011120	012777	011140	170076	CT13C1	MOV 0CT13E2,0PCHVTR	;CHANGE INTERRUPT VECTOR TO CT13E2
2718	011126	012716	011134		MOV	0CT13D,006	;CHANGE INTERRUPT RETURN ADDRESS,
2719	011132	000002			RTI		;RETURN FROM INTERRUPT,
2720	011134	000240			CT13D1	NOP	
2721	011136	104013			SCOPE		
2722	011140	104006			CT13E21	ERROR	;ERROR2, PUNCH REINTERRUPTED AFTER RTI WITH
2723	011142	104013			SCOPE		;READY BIT LEFT ON,
2724					;*****		
2725	011144	000014			CT141	14	;TEST 0
2726	011146	011220			CT15		;NEXT TEST
2727	011150	001750			1000,		;I COUNT
2728	011152	011160			CT14A		;SCOPE ENTRY
2729					;*****		
2730					;TEST THAT THE PUNCH DOES NOT INTERRUPT WITH PROCESSOR AT SAME PRIORITY		
2731					;LEVEL AS THE PUNCH,		
2732	011154	104012			STPCHV		;SET UP PUNCH INTERRUPT VECTOR,

2733	011156	011214				CT14E			
2734	011160	016767	170042	166610	CT14A:	MOV	PCHLVL,PSW		;SET PROCESSOR PRIORITY SAME AS PUNCH.
2735	011166	005077	170022			CLR	OPPS		;DISABLE PUNCH INTERRUPT.
2736	011172	004767	174006			JSR	87,CPRDY		;CHECK FOR PUNCH READY.
2737	011176	052777	000100	170010		BIS	8BIT6,OPPS		;ENABLE PUNCH INTERRUPT.
2738	011204	000240				NOP			;OK IF NO INTERRUPT OCCURS.
2739	011206	005077	170002			CLR	OPPS		;DISABLE PUNCH INTERRUPT.
2740	011212	104013				SCOPE			
2741	011214	104006			CT14E:	ERROR			;ERROR, PUNCH ERRONEOUSLY INTERRUPTED
2742									;WITH PROCESSOR AT SAME PRIORITY LEVEL
2743									;AS THE PUNCH, OR THE PUNCH IS AT HIGHER
2744	011216	104013				SCOPE			;PRIORITY LEVEL THAN SPECIFIED AT PCHLVL.
2745									
2746	011220	000015			CT15:	15			;TEST 0
2747	011222	011276				CT16			;NEXT TEST
2748	011224	001750				1000.			;I COUNT
2749	011226	011234				CT15A			;SCOPE ENTRY
2750									
2751									
2752									;TEST THAT PUNCH INTERRUPTS WITH PROCESSOR AT PRIORITY 1 LEVEL LOWER
2753	011230	104012							;THAN THE PUNCH PRIORITY.
2754	011232	011274				STPCHV			;SET UP PUNCH INTERRUPT VECTOR
2755	011234	016767	167766	166534	CT15A:	MOV	PCHLVL,PSW		;SET PROCESSOR PRIORITY ONE LEVEL LOWER
2756	011242	162767	000040	166526		SUB	840,PSW		;THAN PUNCH PRIORITY.
2757	011250	042777	000100	167736		BIC	8BIT6,OPPS		;DISABLE PUNCH INTERRUPT
2758	011256	004767	173722			JSR	87,CPRDY		;CHECK FOR PUNCH READY.
2759	011262	052777	000100	167724		BIS	8BIT6,OPPS		;ENABLE PUNCH INTERRUPT.
2760	011270	000240				NOP			
2761	011272	104006			CT15E:	ERROR			;PUNCH FAILED TO INTERRUPT WITH PROCESSOR
2762									;PRIORITY ONE LEVEL LOWER THAN PUNCH.
2763									;THEREFORE, PUNCH PRIORITY MUST
2764									;BE LOWER THAN SPECIFIED AT PCHLVL.
2765	011274	104013			CT15B:	SCOPE			;HERE IF INTERRUPT OCCURS.
2766									
2767	011276	000016			CT16:	16			;TEST 0
2768	011300	011356				CT17			;NEXT TEST
2769	011302	001750				1000.			;I COUNT
2770	011304	011312				CT16A			;SCOPE ENTRY
2771									
2772									;TEST THAT PUNCH INTERRUPTS IMMEDIATELY UPON LOWERING CP PRIORITY TO 0.
2773	011306	104012				STPCHV			;SET UP PUNCH INTERRUPT VECTOR
2774	011310	011354				CT16B			
2775	011312	012767	000340	166456	CT16A:	MOV	8PRTY7,PSW		;SET PROCESSOR PRIORITY TO 7
2776	011320	004767	173660			JSR	87,CPRDY		;CHECK FOR PUNCH READY.
2777	011324	042777	000100	167662		BIC	8BIT6,OPPS		;DISABLE PUNCH INTERRUPT
2778	011332	052777	000100	167654		BIS	8BIT6,OPPS		;ENABLE PUNCH INTERRUPT
2779	011340	005067	166432			CLR	PSW		;LOWER PRTY TO 0.
2780	011344	012767	000340	166424		MOV	8PRTY7,PSW		;RAISE CP PRIORITY BACK TO 7.
2781	011352	104006			CT16E:	ERROR			;ERROR, PUNCH FAILED TO INTERRUPT IMMEDIATELY
2782									;AFTER CP PRIORITY WAS LOWERED TO 0.
2783	011354	104013			CT16B:	SCOPE			;HERE IF INTERRUPT OCCURS.
2784									
2785	011356	100017			CT17:	17+MANUAL			;TEST 0
2786	011360	011504				CT20			;NEXT TEST.
2787	011362	000144				100.			;I COUNT
2788	011364	011410				CT17A			;SCOPE ENTRY

2789							;*****			
2790							;TEST THAT THE PUNCH ERROR BIT IS ABLE TO INTERRUPT, AND THAT IT DOES NOT			
2791							;PEINTERRUPT AFTER RTI,			
2792	011366	004567	171162			JSR	%5,PCSIM			
2793	011372	000433				433				;TURN PUN ERROR ON IF ON XOR TESTER.
2794	011374	011410				CT17A				
2795	011376	104004				TYPES				;TYPE INSTRUCTION TO REMOVE TAPE FROM PUNCH
2796	011400	016567				IM15				
2797	011402	017025				IM23				
2798	011404	177777				-1				
2799	011406	000000				HALT				
2800	011410	104002				CT17A:	SRESET			;RESET
2801	011412	104012					STPCHV			;SET UP PUNCH INTERRUPT VECTOR.
2802	011414	011454					CT17B			
2803	011416	005777	167572			TST	OPPS			;TEST PPS
2804	011422	100026				BPL	CT17E3			;BRANCH IF ERROR BIT NOT SET.
2805	011424	112777	000000	167564		MOVB	%0,%PPB			;0 TO PPB TO RESET READY.
2806	011432	042777	000100	167554		DIC	%BIT6,%PPS			;DISABLE PUNCH INTERRUPT
2807	011440	052777	000100	167546		BIS	%BIT6,%PPS			;ENABLE PUNCH INTERRUPT
2808	011446	000240				NOP				
2809	011450	104006				CT17E1:	ERROR			;ERROR1,PUNCH ERROR BIT FAILED TO
2810	011452	104013					SCOPE			;CAUSE INTERRUPT.
2811	011454	012777	011474	167542		CT17B:	MOV	%CT17E2,%PCHVTR		;CHANGE INTERRUPT VECTOR TO CT17E2
2812	011462	012716	011470				MOV	%CT17C,%%6		;CHANGE INTERRUPT RETURN ADDR TO CT17C
2813	011466	000002					RTI			;RETURN FROM INTERRUPT
2814	011470	000240				CT17C:	NOP			;HERE IF NO REINTERRUPT OCCURS.
2815	011472	104013					SCOPE			
2816	011474	104006				CT17E2:	ERROR			;ERROR2, PUNCH REINTERRUPTED AFTER
2817	011476	104013					SCOPE			;RTI, (ERROR BIT LEFT ON).
2818	011500	104006				CT17E3:	ERROR			;ERROR3, ERROR BIT NOT SET.
2819	011502	104013					SCOPE			
2820										;*****
2821	011504	100020				CT20:	20+MANUAL			;TEST 0
2822	011506	177777					-1			;LAST TEST
2823	011510	001750					1000,			;I COUNT
2824	011512	011536					CT20A			;SCOPE ENTRY
2825										;*****
2826										;TEST THAT WITH ERROR BIT SET AND HAVING GENERATED AN INTERRUPT,
2827										;LOADING THE PUNCH BUFFER CAUSES AN IMMEDIATE INTERRUPT.
2828	011514	004567	171034			JSR	%5,PCSIM			
2829	011520	000433				433				
2830	011522	011536				CT20A				
2831	011524	104004				TYPES				;MESSAGE TO REMOVE TAPE FROM PUNCH
2832	011526	016567				IM15				
2833	011530	017025				IM23				
2834	011532	177777				-1				
2835	011534	000000				HALT				
2836	011536	104002				CT20A:	SRESET			;RESET.
2837	011540	104012					STPCHV			;SET PTPI VECTOR TO CT20B.
2838	011542	011572					CT20B			
2839	011544	005777	167444			TST	OPPS			;TEST FOR ERROR
2840	011550	100025				BPL	CT20E1			;BRANCH IF ERROR BIT NOT SET.
2841	011552	005077	167436			CLR	OPPS	</		

2845	011570	104013		CT200:	NOV	0CT20C,006		
2846	011572	012716	011600		RTI			
2847	011576	000002		CT20C:	STPCHV			
2848	011600	104012			CT20D			
2849	011602	011622			TST	0PPS		
2850	011604	005777	167404		BPL	CT20E1		
2851	011610	100005			CLR	0PPS		
2852	011612	005077	167400		NOP			
2853	011616	000240		CT20E3:	ERROR			
2854	011620	104006						
2855								
2856	011622	104013		CT20D:	SCOPE			
2857	011624	005077	167364	CT20E1:	CLR	0PPS		
2858	011630	104006			ERROR			
2859	011632	104013			SCOPE			

;ERROR INTERRUPT COMES HERE, SET UP
 ;INTERRUPT EXIT TO CT20 AND EXIT.
 ;SET PTPI VECTOR TO CT200.
 ;TEST ERROR
 ;BRANCH IF ERROR BIT NOT SET.
 ;LOAD PUNCH BUFFER.
 ;BUFFER LOAD WITH PREVIOUS ERROR
 ;INTERRUPT FAILED TO INTERRUPT.
 ;OK, INTERRUPT OCCURRED.
 ;CLEAR PTPI
 ;ERROR, ERROR BIT NOT SET.

2860							
2861							
2862							
2863	011634	012767	011662	167410	PRG3:	.SMTL PRG3 - PUNCH TEST	
2864	011642	104003				MOV	SDT0, KSTART ;ADDR OF 1ST ROUTINE TO KSTART.
2865	011644	015627				TYPE	;TYPE TITLE.
2866	011646	004767	003370			IMOB	
2867	011652	004767	172312			JSR	07, SMTL
2868	011656	000167	170026			JSR	PC, PTMCL ;CALIBRATE DELAY RTN WITH PUNCH.
2869						JMP	GETRDY ;GO GET STARTED
2870	011662	000000				;*****	
2871	011664	011732			DT0:	0	;TEST 0
2872	011666	000005				DT1	;NEXT TEST
2873	011670	011672				5	;I COUNT
2874						DT0A	;SCOPE ENTRY
2875						;*****	
2876	011672	012767	001000	167476		;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 0 (FULL SPEED)	
2877	011700	004567	000322		DT0A:	MOV	0512, RCNT ;SET CHARACTER COUNT TO 512
2878	011704	000000				JSR	05, PFRNT ;GO PUNCH FRONT END AND MODE 0
2879	011706	004767	172742			0	;INDICATOR
2880	011712	004767	172774		DT0B:	JSR	07, INBIN ;INITIALIZE SPECIAL BINARY COUNT
2881	011716	004767	173314			JSR	07, GTBIN ;GET BINARY CHARACTER
2882	011722	005367	167450			JSR	07, HSPCH ;GO PUNCH THE CHARACTER
2883	011726	001371				DEC	RCNT ;DECREMENT CHAR COUNT.
2884	011730	104013				BNE	DT0B ;BRANCH IF COUNT NOT YET 0 YET.
2885						SCOPE	
2886	011732	000001				;*****	
2887	011734	012012			DT1:	1	;TEST 0
2888	011736	000005				DT2	;NEXT TEST
2889	011740	011750				5	;I COUNT
2890						DT1A	;SCOPE ENTRY
2891						;*****	
2892						;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 1 (RANDOM STALLS AFTER	
2893	011742	012767	177720	172336		;PUNCHING EACH CHARACTER, MAXIMUM STALL 47 MILLISECONDS)	
2894	011750	012767	001000	167420	DT1A:	MOV	017720, STLMSK ;SET STALL MASK FOR 57(8) MAX
2895	011756	004567	000244			MOV	0512, RCNT ;SET CHARACTER COUNT TO 512.
2896	011762	000001				JSR	05, PFRNT ;GO PUNCH FRONT END, AND MODE 1
2897	011764	004767	172664			1	;INDICATOR
2898	011770	004767	172716		DT1B:	JSR	07, INBIN ;INITIALIZE SPECIAL BINARY COUNT.
2899	011774	004767	173236			JSR	07, GTBIN ;GET BINARY CHARACTER.
2900	012000	104005				JSR	07, HSPCH ;GO PUNCH THE CHARACTER.
2901	012002	005367	167370			STALL	;RANDOM STALL.
2902	012006	001370				DEC	RCNT ;DECREMENT CHAR COUNT.
2903	012010	104013				BNE	DT1B ;BRANCH IF COUNT NOT YET 0.
2904						SCOPE	
2905	012012	000002				;*****	
2906	012014	012114			DT2:	2	;TEST 0
2907	012016	000005				DT3	;NEXT TEST
2908	012020	012036				5	;I COUNT
2909						DT2A	;SCOPE ENTRY
2910						;*****	
2911						;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 2.	
2912						;(RANDOM STALL BEFORE PUNCHING RANDOM LENGTH GROUP OF CHARACTERS).	
2913	012022	012767	177720	172256		;MAXIMUM STALL 47 MILLISECONDS, MAXIMUM GROUP LENGTH -15)	
2914	012030	012767	177760	172330		MOV	017720, STLMSK ;SET STALL MASK FOR 57(8) MAX.
2915	012036	012767	001000	167332	DT2A:	MOV	017760, RCMSK ;SET CHAR GROUP MASK FOR 17(8) MAX).
						MOV	0512, RCNT ;SET CHARACTER COUNT TO 512.

2916	012044	004567	000156		JSR	05,PFRT	;GO PUNCH FRONT END AND MODE 2
2917	012050	000002			2		;INDICATOR
2918	012052	004767	172576		JSR	07,INBIN	;INITIALIZE SPECIAL BINARY COUNT.
2919	012056	004767	172264	DT3B:	JSR	07,GRCNT	;GENERATE RANDOM CHARACTER COUNT
2920	012062	104003			STALL		;RANDOM STALL.
2921	012064	004767	172622	DT2C:	JSR	07,GTBIN	;GET BINARY CHARACTER.
2922	012070	004767	173142		JSR	07,HSPCH	;PUNCH THE CHARACTER.
2923	012074	005367	167276		DEC	RCNT	;DECREMENT CHAR COUNT
2924	012100	001404			BEG	DT3D	;BRANCH IF COUNT IS 0.
2925	012102	005367	172262		DEC	RNCNT	;NOT 0, DECREMENT RANDOM CHAR COUNT.
2926	012106	001366			BNE	DT3C	;BRANCH IF COUNT NOT YET 0.
2927	012110	000762			BR	DT3B	;BRANCH IF COUNT 0.
2928	012112	104013		DT2D:	SCOPE		
2929							
2930	012114	000003		DT3:	3		;TEST 0.
2931	012116	012206			DT4		;NEXT TEST.
2932	012120	000001			1		;I COUNT.
2933	012122	012124			DT3A		;SCOPE ENTRY.
2934							
2935							
2936							
2937							
2938	012124	012767	001000	167244	DT3A:	MOV	0512,,RCNT
2939	012132	004567	000070			JSR	05,PFRT
2940	012136	000003				3	
2941	012140	004767	172510			JSR	07,INBIN
2942	012144	104000		DT3B:	DELAY		
2943	012146	011610			5000.		
2944	012150	012767	000040	172212	DT3C:	MOV	032,,RNCNT
2945	012156	004767	172530			JSR	07,GTBIN
2946	012162	004767	173050			JSR	07,HSPCH
2947	012166	005367	167204			DEC	RCNT
2948	012172	001404				BEG	DT3D
2949	012174	005367	172170			DEC	RNCNT
2950	012200	001366				BNE	DT3C
2951	012202	000760				BR	DT3B
2952	012204	104013		DT3D:	SCOPE		
2953							
2954	012206	000004		DT4:	4		
2955	012210	177777			-1		
2956	012212	000001			1		
2957	012214	012216			DT4A		
2958							
2959							
2960	012216	104003					
2961	012220	020201		DT4A:	TYPE		
2962	012222	104010			P3END		
2963	012224	104013			CHALT		
2964					SCOPE		
2965	012226	012701	000024				
2966	012232	005000					
2967	012234	004767	172776				
2968	012240	005301					
2969	012242	001374					
2970	012244	012700	000377				
2971	012250	004767	172762				

2972	012254	012500		MOV	(5)+, 00	; MOVE MODE CODE TO R0
2973	012256	004767	172754	JSR	07, HSPCH	; PUNCH MODE CODE,
2974	012262	012701	000004	MOV	04, 01	; PUNCH 4 BLANK CHARACTERS.
2975	012266	005000		CLR	00	
2976	012270	004767	172742	JSR	07, HSPCH	
2977	012274	005301		DEC	01	
2978	012276	001374		BNE	, -6	
2979	012300	000205		RTS	05	; EXIT.
2980						
2981						

				,SBTTL PRG4 - PUNCH VERIFY PROGRAM		
				;THIS PROGRAM VERIFIES TAPE PRODUCED BY PRG3.		
				;ANY ERRORS FOUND ARE REPORTED.		
				PRG4:	TYPES	;TYPE TITLE AND INSTRUCTIONS
2982					IN20	
2983					IN48	
2984					IN6	
2985	012302	104004			IN23	
2986	012304	016700			-1	
2987	012306	016105			HALT	
2988	012310	016334			JSR	07,SWTL
2989	012312	017025			JSR	PC,RTMCL
2990	012314	177777			MOV	0250,,CTRA
2991	012316	000000			MOV	010,,CTRB
2992	012320	004767	002716		JSR	07,BREAD
2993	012324	004767	171370		TST	CRBUF
2994	012330	012767	000372	167062	BNE	ET0D
2995	012336	012767	000012	167056	DEC	CTRB
2996	012344	004767	170532		DEQ	ET0F
2997	012350	005767	167024		DEC	CTRA
2998	012354	001007			BNE	ET0C
2999	012356	005367	167040		BR	ET0E
3000	012362	001412			DEC	CTRA
3001	012364	005367	167030		BNE	ET0B
3002	012370	001365			ERROR1	
3003	012372	000403			EN3	
3004	012374	005367	167020		BR	ET0A
3005	012400	001356			JSR	07,BREAD
3006	012402	104007			TST	CRBUF
3007	012404	017747			BNE	ET0G
3008	012406	000750			DEC	CTRA
3009	012410	004767	170466		BNE	ET0F
3010	012414	005767	166760		BR	ET0E
3011	012420	001004			CMP	0377,CRBUF
3012	012422	005367	166772		DEQ	ET0H
3013	012426	001370			MOV	0377,ERRT
3014	012430	000764			JSR	05,ACNV4
3015	012432	022767	000377	166740	ERRT	
3016	012440	001416			ESB	
3017	012442	012767	000377	166712	JSR	05,ACNV4
3018	012450	004567	172400		CRBUF	
3019	012454	001362			EWAS	
3020	012456	020011			ERROR1	
3021	012460	004567	172370		EN4	
3022	012464	001400			BR	ET0A
3023	012466	020024			JSR	07,BREAD
3024	012470	104007			CMP	CRBUF,03
3025	012472	017764			BLOS	ET0I
3026	012474	000715			JSR	05,ACNV4
3027	012476	004767	170400		CRBUF	
3028	012502	026727	166672	000003	FNAS	
3029	012510	101407			ERROR1	
3030	012512	004567	172336		EN5	
3031	012516	001400			BR	ET0A
3032	012520	020103			MOV	04,CTRA
3033	012522	104007			CLR	ERRT
3034	012524	020031				
3035	012526	000700				
3036	012530	012767	000004	166662	ET6I:	
3037	012536	005067	166620			

3030	012542	004767	170334		ET0J:	JBR	07,BREAD	;READ CHAR,
3039	012546	004767	000050			JBR	07,ECHK	;GO CHECK CHAR READ,
3040	012552	005367	166642			DEC	CTRA	;DECREMENT CTRA
3041	012556	001371				BNE	ET0J	;BRANCH IF NOT 4 CHARS READ YET,
3042	012560	004767	172070			JBR	07,INBIN	;INITIALIZE SPECIAL BINARY COUNT,
3043	012564	012767	001000	166626		MOV	0512,,CTRA	;SET CHAR COUNT TO 512,
3044	012572	004767	170304		ET0K:	JBR	07,BREAD	;READ CHAR,
3045	012576	004767	172110			JBR	07,GTBIN	;GET BIN CHAR AND STORE AT
3046	012602	010067	166554			MOV	00,ERRT	;ERRT(HOLDS EXPECTED DATA),
3047	012606	004767	000010			JBR	07,ECHK	;GO CHECK CHAR READ,
3048	012612	005367	166602			DEC	CTRA	;DECREMENT CHAR COUNT
3049	012616	001365				BNE	ET0K	;BRANCH IF NOT 512 CHARS READ YET,
3050	012620	000643				BR	ET0A	;DONE, START OVER,
3051	012622	026767	166552	166532	ECHK:	CMP	CRBUF,ERRT	;COMPARE CHAR READ AGAINST EXPECTED CHAR,
3052	012630	001412				BEO	ECHKA	;BRANCH IF EQUAL,
3053	012632	004567	172216			JBR	05,ACNV4	;CONVERT EXPECTED DATA TO ASCII,
3054	012636	001362				ERRT		
3055	012640	017655				ASB		
3056	012642	004567	172206			JBR	05,ACNV4	;CONVERT DATA READ TO ASCII,
3057	012646	001400				CRBUF		
3058	012650	017670				AWAS		
3059	012652	104007				ERROR1		;ERROR, DATA ERROR,
3060	012654	017632				EN1		
3061	012656	000207			ECHKA:	RTS	07	;EXIT

3062					.SBTTL PRGS THROUGH PRG13	
3063					;*****	
3064					;PRGS - COMBINED READER PUNCH TEST, USES SPECIAL	
3065					;*****	
3066					;BINARY COUNT PATTERN.	
3067	012660	104004			PRGS: TYPES	;TYPE TITLE AND INSTRUCTIONS.
3068	012662	017252			IM26	
3069	012664	016334			IM6	
3070	012666	017025			IM23	
3071	012670	177777			-1	
3072	012672	000000			HALT	
3073	012674	004767	002342		JSR	\$7,SWTL
3074	012700	004767	171264		JSR	PC,PTMCAL
3075	012704	004767	171744		JSR	\$7,INBIN
3076	012710	012767	177600	171370	MOV	\$177600,\$TLMASK
3077	012716	005067	000312		CLR	PCHCNT
3078	012722	005067	000310		CLR	RBUSY
3079	012726	104011			STRDRV	
3080	012730	013240			WZERO	
3081	012732	104012			STPCHV	
3082	012734	012766			PBIN	
3083	012736	004767	167700		JSR	\$7,ARRDY
3084	012742	004767	172236		JSR	\$7,CPRDY
3085	012746	004767	172006		JSR	\$7,GTBINP
3086	012752	010177	166240		MOV	\$1,OPPB
3087	012756	052777	000100	166230	BIS	\$BIT6,OPPS
3088	012764	000777			BR	.
3089	012766	005777	166222		TST	OPPS
3090	012772	100004			BPL	PBNA
3091	012774	104003			TYPE	
3092	012776	017456			SN3	
3093	013000	104010			CHALT	
3094	013002	000771			BR	PBIN
3095	013004	105777	166204		TSTB	OPPS
3096	013010	100402			BMI	PBND
3097	013012	104007			ERROR1	
3098	013014	020161			EM11	
3099	013016	005267	000212		INC	PCHCNT
3100	013022	004767	171732		JSR	\$7,GTBINP
3101	013026	010177	166164		MOV	\$1,OPPB
3102	013032	105767	000200		TSTB	RBUSY
3103	013036	100414			BMI	PBINA
3104	013040	026727	000170	000024	CMP	PCHCNT,\$20.
3105	013046	103001			BHIS	,\$+4
3106	013050	000002			RTI	
3107	013052	052767	000200	000156	BIS	\$BIT7,RBUSY
3108	013060	052777	000101	166122	BIS	\$101,OPPS
3109	013066	000002			RTI	
3110	013070	026727	000140	000050	PBINA: CMP	PCHCNT,\$40.

3111	013076	101402				BLOS	PBIB		
3112	013100	005077	166110			CLR	OPPS		;BRANCH IF NOT LARGER
3113	013104	000002			PBIB:	RTI			;LARGER, DISABLE PTPI
3114	013106	005777	166076		CREAD:	TST	OPRS		;EXIT INTERRUPT.
3115	013112	100003				BPL	CRDA		;CHECK FOR ERROR.
3116	013114	004767	167576			JSR	87, TSM2		;BRANCH IF NO ERROR.
3117	013120	000772				BR	CREAD		;ERROR, TYPE MESSAGE.
3118	013122	105777	166062		CRDA:	TSTB	OPRS		;TEST FOR DONE.
3119	013126	100402				BNI	CRDAA		;BRANCH IF DONE SET.
3120	013130	104007				ERROR1			;ERROR, FALSE READER INTERRUPT.
3121	013132	020140				EM10			
3122	013134	017767	166052	166236	CRDAA:	MOV	OPRS, CRBUF		;CHARACTER READ TO CRBUF
3123	013142	005367	000066			DEC	PCHCNT		
3124	013146	026727	000062	000037		CMP	PCHCNT, 431.		
3125	013154	101024				BNI	CREADC		;PUNCH COUNT GREATER THAN 317
3126	013156	032777	000100	166030		BIT	8BIT6, OPFS		;NO.
3127	013164	001003				BNE	CREADA		;PTPI ENABLED?
3128	013166	052777	000100	166020		BIS	8BIT6, OPFS		;NO, ENABLE PTPI.
3129	013174	005767	000034		CREADA:	TST	PCHCNT		
3130	013200	001006				BNE	CREADB		;PUNCH COUNT 0?
3131	013202	042767	000200	000026		BIC	8BIT7, RBUSY		;YES, CLEAR READER BUSY.
3132	013210	005077	165774			CLR	OPRS		;DISABLE PTRI.
3133	013214	000207				RTS	87		;EXIT.
3134	013216	005767	000014		CREADB:	TST	RBUSY		;TEST BUSY INDICATOR
3135	013222	100401				BNI	CREADC		;STALL?
3136	013224	104005				STALL			;YES.
3137	013226	005277	165756		CREADC:	INC	OPRS		;ENABLE READER
3138	013232	000207				RTS	87		;EXIT.
3139	013234	000000			PCHCNT:	OPEN			
3140	013236	000000			RBUSY:	OPEN			
3141	013240	004767	177642		WZERO:	JSR	87, CREAD		;READ CHARACTER
3142	013244	005767	166130			TST	CRBUF		;CHECK CHARACTER
3143	013250	001001				BNE	.+4		;BRANCH IF NON-ZERO CHAR.
3144	013252	000002				RTI			;ZERO, EXIT INTERRUPT.
3145	013254	012777	013272	165736		MOV	8RBIN, 8ORDVTR		;SET READER VECTOR TO READ BINARY
3146	013262	012767	000003	166126		MOV	83, ERCTR		;COUNT. SET ERROR COUNTER TO 3.
3147	013270	000402				BR	RBINA		
3148	013272	004767	177610		RBIN:	JSR	87, CREAD		;READ CHARACTER.
3149	013276	004767	171410		RBINA:	JSR	87, GTBIN		;GET BINARY CHARACTER
3150	013302	020067	166072			CMP	80, CRBUF		;COMPARE AGAINST CHAR READ.
3151	013306	001001				BNE	RBIB		;BRANCH IF NOT SAME.
3152	013310	000002				RTI			;SAME EXIT INTERRUPT.
3153	013312	010567	166044		RBIB:	MOV	80, ERRT		;MOVE EXPECTED CHAR TO ERRT
3154	013316	004567	171532			JSR	85, ACNV4		;CONVERT EXPECTED CHAR TO ASCII
3155	013322	001362				ERRT			
3156	013324	017655				ASB			
3157	013326	004567	171522			JSR	85, ACNV4		;CONVERT RECEIVED CHAR TO ASCII
3158	013332	001400				CRBUF			
3159	013334	017670				AWAS			
3160	013336	104007				ERROR1			;ERROR MESSAGE, DATA ERROR.
3161	013340	017632				EM1			
3162	013342	005367	166050			DEC	ERCTR		;3RD ERROR?
3163	013346	001001				BNE	RBINC		;YES.
3164	013350	000002				RTI			;NO, EXIT INTERRUPT.
3165	013352	052767	100000	177656	RBINC:	BIS	8BIT15, RBUSY		;DISABLE STALLS.
3166	013360	012777	013402	165632		MOV	8RBIB, 8ORDVTR		;SET PTR VECTOR TO RBIB.

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3167 013366 012767 000003 166022
3168 013374 012700 001402
3169 013400 000002
3170 013402 004767 177500
3171 013406 016720 165766
3172 013412 005367 166000
3173 013416 001401
3174 013420 000002
3175 013422 0047 17114
3176 013426 000751
3177 013430 012777 013272 165562
3178 013436 012767 000003 165752
3179 013444 042767 100000 177564
3180 013452 000002
3181
3182
3183
3184
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3186 013454 104004
3187 013456 017003
3188 013460 016620
3189 013462 177777
3190 013464 012767 000004 165700
3191 013472 012767 020425 001224
3192 013500 104014
3193 013502 022767 000004 165662
3194 013510 001765
3195 013512 116767 165646 000064
3196 013520 012767 000004 165644
3197 013526 012767 020463 001170
3198 013534 104014
3199 013536 022767 000004 165626
3200 013544 001765
3201 013546 116767 165612 000031
3202 013554 104003
3203 013556 017025
3204 013560 000000
3205 013562 116700 000016
3206 013566 004767 171444
3207 013572 116700 000007
3208 013576 004767 171434
3209 013602 000767
3210 013604 000000
3211
3212
3213
3214 013606 104003
3215 013610 017014
3216 013612 012767 000004 165552
3217 013620 012767 020617 001076
3218 013626 104014
3219 013630 022767 000004 165534
3220 013636 001765
3221 013640 016767 165520 165556
3222 013646 012767 000004 165516
  
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      MOV      #3, ERCTR      ;USE ERCTR AS CHARACTER COUNTER.
      MOV      #CHR1, #0      ;ADDR OF CHR1 TO 00
      RTI                          ;EXIT INTERRUPT
      ;READ CHARACTER
      ;STORE CHARACTER STARTING AT CHR1
      ;3RD CHARACTER?
      ;YES.
      ;EXIT INTERRUPT, NOT 3RD YET.
      ;GO SYNC THE READER.
      ;NO SYNC, TRY AGAIN.
      ;SYNCD, SET READER VECTOR TO RBIN.
      ;SET ERROR COUNT TO 3.
      ;ENABLE STALLS.
      ;EXIT INTERRUPT.

;*****
;PRG6 - PUNCHES CONTINUOUSLY ON PTP THE 2 CHARACTERS SELECTED
;*****
PRG6:  TYPE
      IM21
      IM16
      -1
18:   MOV      #4, COUNT
      MOV      #SCH1, TLX
      OPTSEL
      CMP      #4, COUNT
      BEQ      18
      MOVB     TMP1, PUNC1
28:   MOV      #4, COUNT
      MOV      #SCH2, TLX
      OPTSEL
      CMP      #4, COUNT
      BEQ      28
      MOVB     TMP1, PUNC1+1
      TYPE
      IM23
      HALT
PRG6A: MOVB     PUNC1, #0      ;PUNCH FIRST CHARACTER.
      JSR      #7, HSPCH
      MOVB     PUNC1+1, #0    ;PUNCH SECOND CHARACTER.
      JSR      #7, HSPCH
      BR       PRG6A          ;REPEAT.

PUNC1: WORD 0
;*****
;PRG7 - READS AND CHECKS TAPE PUNCHED WITH 2 CHARACTERS SELECTED
;*****
PRG7:  TYPE
      IM22
28:   MOV      #4, COUNT
      MOV      #RD1, TLX
      OPTSEL
      CMP      #4, COUNT
      BEQ      28
      MOV      TMP1, CTRC
18:   MOV      #4, COUNT
  
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3223	013654	012767	020654	001042		MOV	00RD2, TLX	
3224	013662	104014				OPTSEL		
3225	013664	022767	000004	165500		CMP	04, COUNT	
3226	013672	001765				BEQ	16	
3227	013674	016767	165464	165524		MOV	TMP1, CTRD	
3228	013702	104004				TYPES		
3229	013704	016334				IM6		
3230	013706	017025				IM23		
3231	013710	177777				-1		
3232	013712	000000				HALT		
3233	013714	004767	001322			JSR	07, SWTL	
3234	013720	004767	167156		HT0A:	JSR	07, BREAD	;MATCH CHARS ON TAPE AGAINST EXPECTED CHARS.
3235	013724	016767	165450	165450		MOV	CRBUF, CHR1	;READ CHAR INTO CHR1
3236	013732	004767	167144			JSR	07, BREAD	;READ CHAR
3237	013736	016767	165436	165440		MOV	CRBUF, CHR2	;INTO CHR2
3238	013744	026767	165432	165452		CMP	CHR1, CTRC	;(CHR1)=(CTRC)?
3239	013752	001040				BNE	HT0E	;NO.
3240	013754	026767	165424	165444		CMP	CHR2, CTRD	;YES, (CHR2)=(CTRD)?
3241	013762	001061				BNE	HT0G	;NO. MATCH ERROR.
3242	013764	005067	165432			CLR	CTRB	;YES, NEXT CHAR SHOULD = (CTRC) (CTRB=0)
3243	013770	012767	000003	165420	HT0B:	MOV	03, ERCTR	;3 TO ERROR COUNTER.
3244	013776	004767	167100		HT0C:	JSR	07, BREAD	;READ CHAR
3245	014002	005167	165414			COM	CTRB	;COMPLEMENT CHAR INDICATOR
3246	014006	001436				BEQ	HT0F	;BRANCH IF EXPECTED CHAR SHOULD = (CTRD)
3247	014010	026767	165364	165406		CMP	CRBUF, CTRC	;(CRBUF) = (CTRC)?
3248	014016	001767				BEQ	HT0C	;YES.
3249	014020	004567	171030			JSR	05, ACNV4	;NO. (CTRC) TO ASB IN ASCII FORM.
3250	014024	001424				CTRC		
3251	014026	017655				ASB		
3252	014030	004567	171020		HT0D:	JSR	05, ACNV4	;(CRBUF) TO AWAS IN ASCII FORM.
3253	014034	001400				CRBUF		
3254	014036	017670				AWAS		
3255	014040	104007				ERROR1		;ERROR 1 CALL. TYPE DATA ERROR MESSAGE.
3256	014042	017632				EM1		
3257	014044	005367	165346			DEC	ERCTR	;3 ERRORS?
3258	014050	001723				BEQ	HT0A	;YES, START ALL OVER.
3259	014052	000751				BR	HT0C	;NO. CONTINUE READING.
3260	014054	026767	165322	165344	HT0E:	CMP	CHR1, CTRD	;(CHR1) = (CTRD)?
3261	014062	001021				BNE	HT0G	;NO. MATCH ERROR.
3262	014064	026767	165314	165332		CMP	CHR2, CTRC	;YES, (CHR2) = (CTRC)?
3263	014072	001015				BNE	HT0G	;NO. MATCH ERROR.
3264	014074	012767	177777	165320		MOV	0-1, CTRB	;YES, NEXT CHAR SHOULD = (CTRD)
3265	014102	000732				BR	HT0B	;GO START READING.
3266	014104	026767	165270	165314	HT0F:	CMP	CRBUF, CTRD	;(CRBUF) = (CTRD)?
3267	014112	001731				BEQ	HT0C	;YES, OK. CONTINUE READING.
3268	014114	004567	170734			JSR	05, ACNV4	;NO. (CTRD) TO ASB IN ASCII FORM.
3269	014120	001426				CTRD		
3270	014122	017655				ASB		
3271	014124	000741				BR	HT0D	;GO GENERATE ERROR MESSAGE.
3272	014126	104007			HT0G:	ERROR1		;MATCH ERROR. UNABLE TO MATCH UP
3273	014130	020110				EM6		;2 CONSECUTIVE CHARACTERS FROM READER
3274	014132	000672				BR	HT0A	;TO CHARACTERS READ FROM SR.
3275								*****
3276								;PRG10 - READ X CHARACTERS, STALL Y MILLISECDS.
3277								*****
3278	014134	005067	165226		PRG10:	CLR	TMP2	

3279	014140	104003				TYPE		
3280	014142	016643				IN17		
3281	014144	012767	000004	165220	18:	MOV	04,COUNT	
3282	014152	012767	020375	000344		MOV	08HUNCR,TLX	
3283	014160	104014				OPTSEL		
3284	014162	022767	000004	165202		CMP	04,COUNT	
3285	014170	001765				SEQ	10	
3286	014172	116767	165166	165166		NOVB	TMP1,TMP2	
3287	014200	012767	000004	165164	28:	MOV	04,COUNT	
3288	014206	012767	020357	000510		MOV	08STALL,TLX	
3289	014214	104014				OPTSEL		
3290	014216	022767	000004	165146		CMP	04,COUNT	
3291	014224	001765				SEQ	28	
3292	014226	116767	165132	165133		NOVB	TMP1,TMP2+1	
3293	014234	104003				TYPE		
3294	014236	017025				IN23		
3295	014240	000000				HALT		
3296	014242	004767	167452			JSR	PC,RTMCL	;CALIBRATE DELAY RTN WITH READER,
3297	014246	005067	000042		ITA:	CLR	ITY	
3298	014252	005067	000042			CLR	ITX	
3299	014256	116767	165105	000030		NOVB	TMP2+1,ITY	;MOVE STALL COUNT TO ITY,
3300	014264	116767	165076	000026		NOVB	TMP2,ITX	;MOVE CHAR COUNT TO ITX,
3301	014272	004767	166364		ITB:	JSR	07,AREAD	;FETCH CHARACTER,
3302	014276	105367	000016			DECB	ITX	;DECREMENT CHAR COUNT,
3303	014302	001373				BNE	ITB	;BRANCH IF COUNT NOT 0,
3304	014304	005767	000004			TST	ITY	;DELAY COUNT = 0?
3305	014310	001756				SEQ	ITA	;BR IF YES,
3306	014312	104000				DELAY		;READ CHARS, STALL NOW,
3307	014314	000000			ITY:	OPEN		;STALL COUNT IN MSECs,
3308	014316	000753				BR	ITA	;REPEAT
3309	014320	000000			ITX:	OPEX		
3310								
3311								
3312								
3313	014322	104004						
3314	014324	015653						
3315	014326	016620						
3316	014330	017025						
3317	014332	177777						
3318	014334	000000						
3319	014336	012746	000024			HALT		;WAIT FOR USER
3320	014342	005000				MOV	020,,-(6)	;PUNCH 20 BLANK CHAR, LEADER
3321	014344	004767	170666		PRG11A:	CLR	00	
3322	014350	005316				JSR	07,HSPCH	
3323	014352	001374				DEC	006	
3324	014354	004767	170274			BNE	PRG11A	
3325	014360	004767	170326		PRG11B:	JSR	07,INBIN	;INITIALIZE SPECIAL BINARY COUNT
3326	014364	004767	170646			JSR	07,GTBIN	;GET BINARY CHARACTER,
3327	014370	000773				JSR	07,HSPCH	;PUNCH CHARACTER
3328						BR	PRG11B	;REPEAT,
3329								
3330								
3331	014372	012767	000004	164772				
3332	014400	012767	020340	000316		PRG12:	MOV	04,COUNT
3333	014406	104014				MOV	08TIME,TLX	
3334	014410	104003				OPTSEL		
						TYPE		

68
C6

3335	014412	020521			88KEY		
3336	014414	000000			HALT		
3337	014416	005067	165002		CLR	CTRC	;CLEAR WORK REGISTERS
3338	014422	005067	164774		CLR	CTRB	
3339	014426	005077	164600		CLR	OTKB	
3340	014432	032767	000200	164724	BIT	0BIT7,TMP1	
3341	014440	001403			BEQ	KTB	;300 SECOND TIMING IS DESIRED
3342	014442	012767	000416	164754	MOV	0270,,CTRC	;SET UP FOR DESIRED TIME BASE.
3343	014450	062767	000036	164746	KTBI:	ADD	030,,CTRC
3344	014456	000407			BR	KTD	
3345	014460	004767	166176		KTCI:	JSR	07,AREAD
3346	014464	005367	164730		DEC	CTRA	;DECREMENT CTRA
3347	014470	001005			BNE	KTE	;BRANCH IF CTRA NOT 0.
3348	014472	005267	164724		INC	CTRB	;CTRA0,+1 TO CTRB.
3349	014476	016767	164722	164714	KTDI:	MOV	CTRC,CTRA
3350	014504	105777	164520		KTEI:	TSTB	OTKS
3351	014510	100363				BPL	KTC
3352	014512	004567	000100		KTFI:	JSR	05,CPKPL
3353	014516	017501			SM4		
3354	014520	000000			HALT		
3355	014522	000723			BR	PRG12	
3356					;*****		
3357					;PRG13 - PUNCH SPEED PRINT LOOP		
3358					;*****		
3359	014524	104004			PRG13:	TYPES	;TYPE TITLE AND INSTRUCTIONS,
3360	014526	017231				IM25	
3361	014530	016620				IM16	
3362	014532	020521				88KEY	
3363	014534	177777				-1	
3364	014536	000000				HALT	;HALT, WAIT FOR USER,
3365	014540	005067	164656		LTAI:	CLR	CTRB
3366	014544	005000				CLR	00
3367	014546	005077	164460			CLR	OTKB
3368	014552	000407				BR	LTC
3369	014554	004767	170456		LTDI:	JSR	07,HSPCH
3370	014560	005367	164634			DEC	CTRA
3371	014564	001005				BNE	LTD
3372	014566	005267	164630			INC	CTRB
3373	014572	012767	000074	164620	LTCI:	MOV	060,,CTRA
3374	014600	105777	164424		LTDI:	TSTB	OTKS
3375	014604	100363				BPL	LTD
3376	014606	004567	000004		LTEI:	JSR	05,CPKPL
3377	014612	017523				SM5	
3378	014614	000750				BR	LTA-2
3379	014616	012567	000022		CPKPL:	MOV	(5)+,CPKPLA
3380	014622	004567	170430			JSR	05,BDCNV
3381	014624	001422				CTRB	
3382	014630	004567	170332			JSR	05,BMOVE
3383	014634	015260				DECVAL+2	
3384	014636	017544				ACPS	
3385	014640	000003				3	
3386	014642	104004			CPKPLA:	TYPES	;TYPE DEVICE SPEED.
3387	014644	000000				OPEN	
3388	014646	017544				ACPS	
3389	014650	177777				-1	
3390	014652	000205				RTS	05
							;EXIT.

3391							
3392							
3393	014654	005077	164350		TTIN:	CLR	OTKS
3394	014660	005077	164346			CLR	OTKB
3395	014664	005067	164804			CLR	TIB
3396	014670	105777	164334		18:	TSTB	OTKS
3397	014674	100375				BPL	18
3398	014676	017767	164330	164470		MOV	OTKB, TIB
3399	014704	105777	164324		28:	TSTB	OTPB
3400	014710	100375				BPL	28
3401	014712	116777	164456	164316		MOV	TIB, OTPB
3402	014720	000002				RTI	
3403							
3404							
3405	014722	104003			OPTS:	TYPE	
3406	014724	000000			TLX:	OPEN	
3407	014726	005067	164432			CLR	TMP1
3408	014732	104016			18:	TTYIN	
3409	014734	104017				VALID	
3410	014736	000775				BR	18
3411							
3412							
3413	014740	042767	177600	164426	VALINP:	BIC	0177600, TIB
3414	014746	122767	000007	164420		CMPB	07, TIB
3415	014754	001002				BNE	118
3416	014756	104015				CNTL	
3417	014760	000404				BR	68
3418	014762	122767	000025	164404	118:	CMPB	025, TIB
3419	014770	001004				BNE	18
3420	014772	022626			68:	POPSP2	
3421	014774	162716	000016			SUB	016, (SP)
3422	015000	000002				RTI	
3423	015002	122767	000015	164364	18:	CMPB	015, TIB
3424	015010	001004				BNE	48
3425	015012	104003				TYPE	
3426	015014	020230				SCRLF	
3427	015016	022626			98:	POPSP2	
3428	015020	000002				RTI	
3429	015022	122767	000012	164344	48:	CMPB	012, TIB
3430	015030	001410				BEQ	58
3431	015032	122767	000060	164334	28:	CMPB	060, TIB
3432	015040	003004				BGT	58
3433	015042	122767	000067	164324		CMPB	067, TIB
3434	015050	002003				BGE	78
3435	015052	104003			58:	TYPE	
3436	015054	020232				REQUEST	
3437	015056	000745				BR	68
3438	015060	006367	164300		78:	ASL	TMP1
3439	015064	006367	164274			ASL	TMP1
3440	015070	006367	164270			ASL	TMP1
3441	015074	042767	177770	164272		BIC	0177770, TIB
3442	015102	056767	164266	164254		BIS	TIB, TMP1
3443	015110	005367	164256			DEC	COUNT
3444	015114	001756				BEQ	58
3445	015116	000002				RTI	
3446							

7-17 EL6

3447						
3448	015120	105777	164104		CKSWRR:	TSTB
3449	015124	100045				DTKB
3450	015126	017767	164100	164240		OUT
3451	015134	042767	177600	164232		DTKB, TID
3452	015142	022767	000007	164224		0177600, TID
3453	015150	001033				07, TID
3454	015152	104003				OUT
3455	015154	020223				
3456	015156	017767	164022	164200	CNTLU:	8CTLG
3457	015164	004567	167636			MOV
3458	015170	001364				JSR
3459	015172	020236				TMP1
3460	015174	104004				8VALUE
3461	015176	020304				TYPES
3462	015200	020236				8SWREQ
3463	015202	177777				8VALUE
3464	015204	012767	020273	177512		-1
3465	015212	012767	000007	164152		MOV
3466	015220	104014				88NEW, TLX
3467	015222	022767	000007	164142		07, COUNT
3468	015230	001403				OPTSEL
3469	015232	016777	164126	163744		CMP
3470	015240	000002				07, COUNT
3471					OUT:	OUT
3472						TMP1, 8SWR
3473	015242	104004				RTI
3474	015244	015363			8WTL:	TYPES
3475	015246	015453				CM4
3476	015250	177777				CM4B
3477	015252	104015				-1
3478	015254	000207				CNTL
3479						RTS

3480									
3481	015256	020040	020040	040	DECVAL:	.SOTTL			
3482	015263	007			APGEND:	.ASCII	'		
3483	015264	025045	100			.BYTE	7		
3484	015267	045	044443	041516	CM2:	.ASCII	'00'		
3485	015274	051117	042522	052103		.ASCII	'00INCORRECT PROGRAM SELECTED.0'		
3486	015302	050040	047522	051107					
3487	015310	046501	051440	046105					
3488	015316	041505	042524	027104					
3489	015324	100							
3490	015325	045	044443	041516	CM3:	.ASCII	'00INCORRECT ROUTINE SELECTED.0'		
3491	015332	051117	042522	052103					
3492	015340	051040	052517	044524					
3493	015346	042516	051440	046105					
3494	015354	041505	042524	027104					
3495	015362	100							
3496	015363	045	051443	046105	CM4:	.ASCII	'00SELECT DESIRED SR OPTIONS.'		
3497	015370	041505	020124	042504					
3498	015376	044523	042522	020104					
3499	015404	051123	047440	052120					
3500	015412	047511	051516	056					
3501	015417	045	047516	046522		.ASCII	'0NORMAL OPERATION IS WITH 0 '		
3502	015424	046101	047440	042520					
3503	015432	040522	044524	047117					
3504	015440	044440	020123	044527					
3505	015446	044124	040040	040					
3506	015453	123	051127	030075	CM4B:	.ASCII	'0NR=000000 0'		
3507	015460	030060	030060	020060					
3508	015466	100							
3509	015467	045	037443	046440	CM5:	.ASCII	'00? MANUAL ROUTINE. BITS (0NRG) IS SET.0'		
3510	015474	047101	040525	020114					
3511	015502	047522	052125	047111					
3512	015510	027105	041040	052111					
3513	015516	020070	051450	051127					
3514	015524	043505	020051	051511					
3515	015532	051440	052105	040056					
3516	015540	021445	051120	030107	IM01:	.ASCII	'00PRG0, READER LOGIC TESTS.0'		
3517	015546	020056	042522	042101					
3518	015554	051105	046040	043517					
3519	015562	041511	052040	051505					
3520	015570	051524	040056						
3521	015574	021445	051120	031107	IM0A:	.ASCII	'00PRG2, PUNCH LOGIC TESTS.0'		
3522	015602	020056	052520	041516					
3523	015610	020110	047514	044507					
3524	015616	020103	042524	052123					
3525	015624	027123	100						
3526	015627	045	050043	043522	IM0B:	.ASCII	'00PRG3, PUNCH TEST.0'		
3527	015634	027063	050040	047125					
3528	015642	044103	052040	051505					
3529	015650	027124	100						
3530	015653	045	050043	043522	IM0C:	.ASCII	'00PRG11, COUNT PATTERN TAPE GENERATOR.0'		
3531	015660	030461	020056	047503					
3532	015666	047125	020124	040520					
3533	015674	052124	051105	020116					
3534	015702	040524	042520	043440					
3535	015710	047105	051105	052101					

3536	015716	051117	040056		
3537	015722	051445	052105	052440	IM1: .ASCII 'SET UP READER AS FOLLOWS: 0'
3538	015730	020120	042522	042101	
3539	015736	051105	040440	020123	
3540	015744	047506	046114	053517	
3541	015752	035123	040040		
3542	015756	047520	042527	020122	IM2: .ASCII 'POWER OFF, OFF-LINE, NO TAPE.0'
3543	015764	043117	026106	047440	
3544	015772	043106	046055	047111	
3545	016000	026105	047040	020117	
3546	016006	040524	042520	040056	
3547	016014	047520	042527	020122	IM3: .ASCII 'POWER ON, OFF-LINE, NO TAPE.0'
3548	016022	047117	020054	043117	
3549	016030	026506	044514	042516	
3550	016036	020054	047516	052040	
3551	016044	050101	027105	100	
3552	016051	120	053517	051105	IM4: .ASCII 'POWER ON, ON-LINE, NO TAPE.0'
3553	016056	047440	026116	047440	
3554	016064	026516	044514	042516	
3555	016072	020054	047516	052040	
3556	016100	050101	027105	100	
3557	016105	045	046120	041501	IM4B: .ASCII 'PLACE PRG3 OUTPUT TAPE IN READER, FIRST RUBOUT '
3558	016112	020105	051120	031507	
3559	016120	047440	052125	052520	
3560	016126	020124	040524	042520	
3561	016134	044440	020116	042522	
3562	016142	042101	051105	020056	
3563	016150	044506	051522	020124	
3564	016156	052522	047502	052125	
3565	016164	040			
3566	016168	123	047510	046125	.ASCII 'SHOULD BE ABOUT 3 INCHES'
3567	016172	020104	042502	040440	
3568	016200	047502	052125	031440	
3569	016206	044440	041516	042510	
3570	016214	123			
3571	016218	045	051106	046517	.ASCII 'FROM RIGHT EDGE OF READER PRESSURE PLATE.00'
3572	016222	051040	043511	052110	
3573	016230	042440	043504	020105	
3574	016236	043117	051040	040505	
3575	016244	042504	020122	051120	
3576	016252	051505	052523	042522	
3577	016260	050040	040514	042524	
3578	016266	022456	100		
3579	016271	120	053517	051105	IM5: .ASCII 'POWER ON, ON-LINE, TAPE IN READER.0'
3580	016276	047440	026116	047440	
3581	016304	026516	044514	042516	
3582	016312	020054	040524	042520	
3583	016320	044440	020116	042522	
3584	016326	042101	051105	040056	
3585	016334	046445	045501	020105	IM6: .ASCII 'MAKE READER READY.0'
3586	016342	042522	042101	051105	
3587	016350	051040	040505	054504	
3588	016356	040056			
3589	016360	021445	051120	030507	IM7: .ASCII 'PRG1, READER TEST.0'
3590	016366	020056	042522	042101	
3591	016374	051105	052040	051505	

3592	016402	027124	100			
3593	016405	045	052524	047122	IN10:	.ASCII 'TURN READER OFF-LINE,0'
3594	016412	051040	040505	042504		
3595	016420	020122	043117	026506		
3596	016426	044514	042516	040056		
3597	016434	051445	052105	052440	IN11:	.ASCII 'SET UP PUNCH AS FOLLOWS: 0'
3598	016442	020120	052520	041516		
3599	016450	020110	051501	043040		
3600	016450	046117	047514	051527		
3601	016464	020072	100			
3602	016467	120	053517	051105	IN12:	.ASCII 'POWER OFF, NO TAPE,0'
3603	016474	047440	043106	020054		
3604	016502	047516	052040	050101		
3605	016510	027105	100			
3606	016513	120	053517	051105	IN13:	.ASCII 'POWER ON, NO TAPE,0'
3607	016520	047440	026116	047040		
3608	016526	020117	040524	042520		
3609	016534	040056				
3610	016536	047520	042527	020122	IN14:	.ASCII 'POWER ON, TAPE IN PUNCH,0'
3611	016544	047117	020054	040524		
3612	016552	042520	044440	020116		
3613	016560	052520	041516	027110		
3614	016566	100				
3615	016567	045	042522	047515	IN15:	.ASCII 'REMOVE TAPE FROM PUNCH,0'
3616	016574	042526	052040	050101		
3617	016602	020105	051106	046517		
3618	016610	050040	047125	044103		
3619	016616	040056				
3620	016620	046445	043501	020105	IN16:	.ASCII 'MAKE PUNCH READY,0'
3621	016626	052520	041516	020110		
3622	016634	042522	042101	027131		
3623	016642	100				
3624	016643	045	050043	043522	IN17:	.ASCII 'PRG10 - READ X, STALL Y,000'
3625	016650	030061	026440	051040		
3626	016656	040505	020104	026130		
3627	016664	051440	040524	046114		
3628	016672	054440	022456	040043		
3629	016700	021445	051120	032107	IN20:	.ASCII 'PRG4, PUNCH VERIFY TEST,0'
3630	016706	020056	052520	041516		
3631	016714	020110	042526	044522		
3632	016722	054506	052040	051505		
3633	016730	027124				
3634	016732	046045	040517	020104		.ASCII 'LOAD READER WITH TAPE PRODUCED 0'
3635	016740	042522	042101	051105		
3636	016746	053440	053111	020110		
3637	016754	040524	042520	050040		
3638	016762	047522	052504	042503		
3639	016770	020104				
3640	016772	054502	050040	043522		.ASCII 'BY PRG3,0'
3641	017000	027063	100			
3642	017003	045	050043	043522	IN21:	.ASCII 'PRG6000'
3643	017010	022466	040043			
3644	017014	021445	051120	033507	IN22:	.ASCII 'PRG7000'
3645	017022	021445	100			
3646	017025	045	051120	051505	IN23:	.ASCII 'PRESS CONTINUE,0'
3647	017032	020123	047503	052116		

3648	017040	047111	042525	040056	
3649	017046	021445	051120	030507	IN24: .ASCII '00PRG12, PTR SPEED TEST.'
3650	017054	027062	050040	051124	
3651	017062	051440	042520	042105	
3652	017070	052040	051505	027124	
3653	017076	046045	040517	020104	.ASCII '0LOAD ANY TAPE LOOP IN READER '
3654	017104	047101	020131	040524	
3655	017112	042520	046040	047517	
3656	017120	020120	047111	051040	
3657	017126	040505	042504	020122	
3658	017134	047101	020104	040515	.ASCII 'AND MAKE READY,000'
3659	017142	042513	051040	040505	
3660	017150	054504	022466	040043	
3661	017156	050045	042522	051523	IN24A: .ASCII '0PRESS CONTINUE TO START TIMING,000'
3662	017164	041440	047117	044524	
3663	017172	052516	020105	047524	
3664	017200	051440	040524	052122	
3665	017206	052040	046511	047111	
3666	017214	027107	021445	100	
3667	017221	045	050043	043522	IN25: .ASCII '00PRG13, PTP SPEED TEST,0'
3668	017226	031461	020056	052120	
3669	017234	020120	050123	042505	
3670	017242	020104	042524	052123	
3671	017250	040056			
3672	017252	021445	051120	032507	IN26: .ASCII '00PRG5, COMBINED READER-PUNCH TEST.'
3673	017260	020056	047503	041115	
3674	017266	047111	042105	051040	
3675	017274	040505	042504	026522	
3676	017302	052520	041516	020110	
3677	017310	042524	052123	056	
3678	017315	045	040515	042513	.ASCII '0MAKE PUNCH READY, PUNCH BLANK LEADER, '
3679	017322	050040	047125	044103	
3680	017330	051040	040505	054504	
3681	017336	020054	052520	041516	
3682	017344	020110	046102	047101	
3683	017352	020113	042514	042101	
3684	017360	051105	020054		
3685	017364	047514	042101	044440	.ASCII 'LOAD IN READER,0'
3686	017372	020116	042522	042101	
3687	017400	051105	040056		
3688	017404	051045	040505	042504	SM1: .ASCII '0READER ERROR BIT SET,0'
3689	017412	020122	051105	047522	
3690	017420	020122	044502	020124	
3691	017426	042523	027124	100	
3692	017433	045	042522	042101	SM2: .ASCII '0READER NOT READY,0'
3693	017440	051105	047040	052117	
3694	017446	051040	040505	054504	
3695	017454	040056			
3696	017456	021445	052520	041516	SM3: .ASCII '00PUNCH NOT READY,0'
3697	017464	020110	047516	020124	
3698	017472	042522	042101	027131	
3699	017500	100			
3700	017501	045	051043	040505	SM4: .ASCII '00READER SPEED : 0'
3701	017506	042504	020122	050123	
3702	017514	042505	020104	020072	
3703	017522	100			

3704	017523	045	050043	047125	ENS:	.ASCII	'80PUNCH SPEED : 0'
3705	017520	044103	051440	042520			
3706	017536	042105	035040	040040			
3707	017544	020040	020040	041440	ACPS:	.ASCII	' CHARS PER SEC.0'
3708	017552	040510	051522	050040			
3709	017560	051105	051440	041505			
3710	017566	040056					
3711	017570	021445	051105	047522	ENS:	.ASCII	'80ERROR P '
3712	017576	020122	020120				
3713	017602	020040	020040	020040	APNUNB:	.ASCII	' T '
3714	017610	020124					
3715	017612	020040	020040	020040	ATNUNB:	.ASCII	' PC '
3716	017620	041520	040				
3717	017623	040	020040	020040	APC:	.ASCII	' 0'
3718	017630	040040					
3719	017632	020040	040504	040524	EM1:	.ASCII	' DATA ERROR S/B: '
3720	017640	042440	051122	051117			
3721	017646	020040	027523	035102			
3722	017654	040					
3723	017655	040	020040	020040	ASB:	.ASCII	' WAS: '
3724	017662	053440	051501	020072			
3725	017670	020040	020040	100	AWAS:	.ASCII	' 0'
3726	017675	040	042522	042522	EM2:	.ASCII	' REREAD ERROR, 1ST READ: '
3727	017702	042101	042440	051122			
3728	017710	051117	020056	030440			
3729	017716	052123	051040	040505			
3730	017724	035104	040				
3731	017727	040	020040	020040	ORGRD:	.ASCII	' WAS: '
3732	017734	053440	051501	020072			
3733	017742	020040	020040	100	SUBRD:	.ASCII	' 0'
3734	017747	040	054523	041516	EM3:	.ASCII	' SYNC ERROR.0'
3735	017754	042440	051122	051117			
3736	017762	040056					
3737	017764	046045	040505	042504	EM4:	.ASCII	' BLEADER ERROR, S/B: '
3738	017772	020122	051105	047522			
3739	020000	027122	020040	027523			
3740	020006	035102	040				
3741	020011	040	020040	020040	ESB:	.ASCII	' WAS: '
3742	020016	053440	051501	020072			
3743	020024	020040	020040	100	EWAS:	.ASCII	' 0'
3744	020031	045	042514	042101	EM5:	.ASCII	' BLEADER ERROR, S/B BETWEEN '
3745	020036	051105	042440	051122			
3746	020044	051117	020056	027523			
3747	020052	020102	042502	053524			
3748	020060	042505	020116				
3749	020064	020060	047101	020104		.ASCII	' 0 AND 3, WAS: '
3750	020072	027063	053440	051501			
3751	020100	035040	040				
3752	020103	040	020040	040040	FWAS:	.ASCII	' 0'
3753	020110	046440	052101	044103	EM6:	.ASCII	' MATCH ERR.0'
3754	020116	042440	051122	040056			
3755						.EVEN	
3756	020124	003407			EM7:	3407	;DOUBLE BELL.
3757	020126	021445	052120	020122		.ASCII	' 80PTR NRP0'
3758	020134	051116	040120				
3759	020140	043040	046101	042523	EM10:	.ASCII	' FALSE RDR, INTRO'

76
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3760	020146	051040	051104	020056		
3761	020154	047111	051124	100		
3762	020161	040	040506	051514	EN11:	,ASCII 'FALSE PUN INTRO'
3763	020166	020105	052520	020116		
3764	020174	047111	051124	100		
3765	020201	045	051120	031507	P3END:	,ASCII 'SPRG3 END OF PASS0'
3766	020206	042440	042116	047440		
3767	020214	020106	040520	051523		
3768	020222	100				
3769	020223	045	043536	040045	8CTLG:	,ASCII '8"CG00'
3770	020230	040045			8CRLF:	,ASCII '80'
3771	020232	037445	040043		8OUEST:	,ASCII '0700'
3772	020236	020040	020040	020040	8VALUE:	,ASCII '0'
3773	020244	040040				
3774	020246	051445	046105	041505	8RTN:	,ASCII '8SELECT ROUTINE NO, 0'
3775	020254	020124	047522	052125		
3776	020262	047111	020105	047516		
3777	020270	020056	100			
3778	020273	040	047040	053505	8NEW:	,ASCII 'NEW 0'
3779	020300	020075	040040			
3780	020304	021445	053523	036522	8SNREQ:	,ASCII '88SNR 0'
3781	020312	040040				
3782	020314	042445	052116	051105	8STEST:	,ASCII '8ENTER PROGRAM NO, 0'
3783	020322	050040	047522	051107		
3784	020330	046501	047040	027117		
3785	020336	040040				
3786	020340	042445	052116	051105	8TIME:	,ASCII '8ENTER TIMING 0'
3787	020346	052040	046511	047111		
3788	020354	020107	100			
3789	020357	045	047105	042524	8STALL:	,ASCII '8ENTER STALL 0'
3790	020364	020122	052123	046101		
3791	020372	020114	100			
3792	020375	045	047105	042524	8NUMCR:	,ASCII '8ENTER CHARACTER COUNT 0'
3793	020402	020122	044103	051101		
3794	020410	041501	042524	020123		
3795	020416	047503	047125	020124		
3796	020424	100				
3797	020425	045	051461	020124	8CH1:	,ASCII '81ST CHAR TO PUNCH (ASCII) = 0'
3798	020432	044103	051101	052040		
3799	020440	020117	052520	041516		
3800	020446	020110	040450	041523		
3801	020454	044511	020051	020075		
3802	020462	100				
3803	020463	045	047062	020104	8CH2:	,ASCII '82ND CHAR TO PUNCH (ASCII) = 0'
3804	020470	044103	051101	052040		
3805	020476	020117	052520	041516		
3806	020504	020110	040450	041523		
3807	020512	044511	020051	020075		
3808	020520	100				
3809	020521	045	050040	042522	88KEY:	,ASCII '8 PRESS CONTINUE WHEN READY88'
3810	020526	051523	041440	047117		
3811	020534	044524	052516	020105		
3812	020542	044127	047105	051040		
3813	020550	040505	054504	021445		
3814	020556	052123	044522	042513		
3815	020564	040440	054516	045440		,ASCII '8STRIKE ANY KEY AT END OF TIMING80'

77
46

3816	020572	054505	040440	020124	
3817	020600	047105	020104	043117	
3818	020606	052040	040511	047111	
3819	020614	022507	100		
3820	020617	045	051461	020124	SRD1: ,ASCII '01ST CHAR TO READ (ASCII) = 0'
3821	020624	044103	051101	052040	
3822	020632	020117	042522	042101	
3823	020640	024040	051501	044503	
3824	020646	024511	036440	040040	
3825	020654	031045	042116	041440	SRD2: ,ASCII '02ND CHAR TO READ (ASCII) = 0'
3826	020662	040510	020122	047524	
3827	020670	051040	040505	020104	
3828	020676	040400	041523	044511	
3829	020704	020051	020075	100	
3830	020711	045	050043	036503	PCHLT: ,ASCII '00PC= '
3831	020716	040			
3832	020717	040	020040	020040	GNAB: ,ASCII ' -HALT000'
3833	020724	020040	044055	046101	
3834	020732	022524	040043		
3835	020736	025045	025052	047105	ENDRTN: ,ASCII '0000END-RTN NO, '
3836	020744	026504	052122	020110	
3837	020752	047516	020056		
3838	020756	020040	020040	026440	RTNN: ,ASCII ' -HALT000'
3839	020764	040510	052114	021445	
3840	020772	100			
3841	020773	045	046443	044501	STITLE: ,ASCII '00MAINDEC-11-DZPCA-E0'
3842	021000	042116	041505	030455	
3843	021006	026461	055104	041520	
3844	021014	026501	022505		
3845	021020	041520	030461	051040	,ASCII 'PC11 READER-PUNCH TESTS000'
3846	021026	040505	042504	026522	
3847	021034	052520	041516	020110	
3848	021042	042524	052123	022523	
3849	021050	040043			
3850		000001			,END

ACNV	005112	AT2A	005546	AT6A	005776	CHALT	= 104710	CT12A	011020
ACNVB	005046	AT2B	006630	AT6B	006620	CHLT	002462	CT12C	011050
ACNVC	005074	AT2BA	006650	AT6E1	006014	CHNAA	002204	CT12E	011040
ACNVM	005126	AT2BB	006670	AT7	006042	CHNB	002244	CT13	011052
ACNVX	005110	AT2BX	006740	AT7A	006060	CHR1	001402	CT13A	011062
ACNV4	005054	AT21	006744	AWAS	017670	CHR1A	001410	CT13C	011120
ACNV6	005026	AT21A	006760	A1BT	005102	CHR2	001404	CT13D	011134
ACPS	017544	AT21B	007012	BCHECK	004372	CHR2A	001412	CT13E1	011114
ADTENP	005364	AT21E	007010	BDCNV	005256	CHR3	001406	CT13E2	011140
APC	017623	AT22	007014	BDCNVA	005276	CHR3A	001414	CT14	011144
APGEND	015263	AT22A	007030	BELL	= 000007	CKSWR	= 104020	CT14A	011160
APNUMB	017602	AT22E	007064	BITO	= 000000	CKSWRR	015120	CT14E	011214
ARDA	002672	AT23	007070	BITI	= 000002	CLEAN	001716	CT15	011220
ARDB	002710	AT23A	007104	BITI0	= 002000	CM2	015267	CT15A	011234
ARDB	002530	AT23B	007144	BITI1	= 004000	CM3	015325	CT15B	011274
AREAD	002662	AT23E	007142	BITI2	= 010000	CM4	015363	CT15E	011272
AREAD1	002666	AT24	007146	BITI3	= 020000	CM4B	015453	CT16	011276
ARRDY	002642	AT24A	007156	BITI4	= 040000	CM5	015467	CT16A	011312
APROYA	002654	AT24C	007214	BITI5	= 100000	CNTL	= 104015	CT16B	011354
ASB	017655	AT24D	007230	BIT2	= 000004	CNTLU	015156	CT16E	011352
ATNUMB	017612	AT24E1	007210	BIT3	= 000010	CNVCTR	005356	CT17	011356
ATO	005432	AT24E2	007234	BIT4	= 000020	COUNT	001372	CT17A	011410
AT0A	005450	AT25	007240	BIT5	= 000040	CPKPL	014616	CT17B	011454
AT0E	005456	AT25A	007254	BIT6	= 000100	CPKPLA	014644	CT17C	011470
AT1	005462	AT25B	007314	BIT7	= 000200	CPRDY	005204	CT17E1	011490
AT1A	005500	AT25E	007312	BIT8	= 000400	CPRDYA	005222	CT17E2	011474
AT1E	005506	AT26	007316	BIT9	= 001000	CRBUF	001400	CT17E3	011500
AT10	006104	AT26A	007350	BNOVA	005174	CRDA	013122	CT2	010320
AT10A	006114	AT26B	007410	BNOVE	005166	CRDAA	013134	CT2A	010354
AT10E	006134	AT26E1	007402	BRCTR	001242	CREAD	013106	CT20	011504
AT11	006140	AT26E2	007406	BRDBB	003210	CREADA	013174	CT20A	011536
AT11A	006162	AT27	007412	BRDCC	003222	CREADB	013216	CT20B	011572
AT12	006174	AT27A	007444	BRDDD	003230	CREADC	013226	CT20C	011600
AT12A	006204	AT27C	007500	BREAD	003102	CRIA	001672	CT20D	011622
AT12E1	006236	AT27D	007514	BREADA	003144	CRTB	001702	CT20E1	011624
AT12E2	006242	AT27E1	007524	BREADB	003162	CTRA	001420	CT20E2	011566
AT13	006246	AT27E2	007474	BREADC	003216	CTRB	001422	CT20E3	011620
AT13A	006256	AT27E3	007520	B5YNC	004452	CTRC	001424	CT3	010370
AT14	006314	AT3	005562	BT0	007724	CTRD	001426	CT3A	010424
AT14A	006324	AT3A	005616	BT0A	007740	CT0	010240	CT4	010430
AT14C	006366	AT3B	007530	BT1	007752	CT0A	010256	CT4A	010472
AT15	006376	AT3BA	007576	BT1A	007774	CT0E	010264	CT5	010504
AT15A	006406	AT3BB	007624	BT2	010010	CT1	010270	CT5A	010514
AT15E	006442	AT3BC	007632	BT2A	010032	CT1A	010306	CT5B	010544
AT16	006446	AT3BD	007654	BT2C	010042	CT1E	010314	CT6	010560
AT16A	006456	AT3BE1	007656	BT3	010062	CT10	010652	CT6A	010576
AT16B	006506	AT3BE2	007620	BT3A	010112	CT10A	010662	CT7	010630
AT16E	006524	AT3BE3	007652	BT3C	010120	CT10B	010670	CT7A	010640
AT17	006530	AT4	005630	BT4	010140	CT10C	010734	CUPTST	001254
AT17A	006540	AT4A	005672	BT4A	010170	CT11	010742	DECVAL	015256
AT17B	006556	AT5	005704	BT4C	010176	CT11A	010752	DELAY	= 104000
AT17E	006602	AT5A	005746	CC	= 177776	CT11E	011000	DELAYX	= 104400
AT2	005512	AT6	005760	CHAIN	002110	CT12	011004	DIGIT	005360

71
A7

DISPLA	001206	ERRA	003320	IN15	016567	PBIBD	013104	PJEND	020201
DISPRE	000174	ERROR =	104006	IN16	016620	PBNA	013004	RBIN	013272
DLCNT	003716	ERROR1 =	104007	IN17	016643	PBND	013016	RBINA	013276
DLCTR	003714	ERRT	001362	IN2	015756	PC	=0000007	RBIND	013312
OLY	003566	ERR1	003244	IN20	016700	PCMCNT	013234	RBINC	013352
OLYA	003610	ERR1A	003272	IN21	017003	PCNLT	020711	RBIND	013402
OLYB	003616	E4B	020011	IN22	017014	PCNLVL	001226	RBUSY	013236
OLYX	004310	ET0A	012330	IN23	017025	PCNVTR	001224	RCMSK	004366
OLYXA	004322	ET0B	012336	IN24	017046	PCBIN	002554	RCNT	001376
OLYXB	004330	ET0C	012344	IN24A	017156	PFINT	012226	RDRVL	001222
OLYX0 =	004314	ET0D	012374	IN25	017221	PIND	004704	RDRVTR	001220
OLYX1 =	004326	ET0E	012402	IN26	017252	POPSP =	005726	RETRN	002634
DT0	011662	ET0F	012410	IN3	016014	POPSP2 =	022026	RIND	004676
DT0A	011672	ET0G	012432	IN4	016051	PPB	001216	RNCNT	004370
DT0B	011712	ET0H	012476	IN4S	016105	PPB	001214	RNGEN	003030
DT1	011732	ET0I	012530	IN5	016271	PRB	001212	RP1	003076
DT1A	011750	ET0J	012542	IN6	016334	PRGID	001266	RP2	003100
DT1B	011770	ET0K	012572	IN7	016360	PRGNUM	001240	RTINTA	004116
DT2	012012	ENAS	020024	INBIN	004654	PRGTAB	001270	RTINTB	004134
DT2A	012036	FORMD	002364	INCRTH	002100	PRGO	003376	RTINTC	004152
DT2B	012056	FRST	001370	INGXOR	001570	PRG1	007660	RTNCAL	003720
DT2C	012064	FNAS	020103	INHPRT	003300	PRG10	014134	RTNCAL	003750
DT2D	012112	GETRDY	001710	ITA	014246	PRG11	014322	RTNCAL	003754
DT3	012114	GOTST	002416	ITB	014272	PRG11A	014344	RTNERR	004064
DT3A	012124	GOTSTA	002436	ITX	014320	PRG11B	014360	RTNINT	004044
DT3B	012144	GRCNT	004346	ITY	014314	PRG12	014372	RTNH	020756
DT3C	012156	GTBIN	004712	KSTART	001252	PRG13	014524	RTNHO	001256
DT3D	012204	GTBINP	004700	KTA	014416	PRG2	010216	R0	=0000000
DT4	012206	GTRDYA	001736	KTB	014450	PRG3	011634	R1	=0000001
DT4A	012216	GTRDYB	001742	KTC	014460	PRG4	012302	R2	=0000002
DVDND	001244	GTRDYC	001760	KTD	014476	PRG5	012660	R3	=0000003
DVQUOT	001246	GTRDYD	002062	KTE	014504	PRG6	013454	R4	=0000004
ECHK	012622	GWAS	020717	KTF	014512	PRG6A	013562	R5	=0000005
ECHKA	012656	HERE	002350	LOGIC	002340	PRG7	013606	R6	=0000006
EHALT =	104001	HSPCH	005236	LTA	014540	PR8	001210	SCOPE =	104013
EHLT	002514	HT0A	013720	LTD	014554	PRTY0 =	000000	SCOPTR	001264
EHLTA	002526	HT0B	013770	LTC	014572	PRTY1 =	000040	SM1	017404
ENTINT	002442	HT0C	013776	LTD	014600	PRTY2 =	000100	SM2	017433
EMTTAB	001320	HT0D	014030	LTE	014606	PRTY3 =	000140	SM3	017456
EMTX =	000021	HT0E	014054	MACHER	000004	PRTY4 =	000200	SM4	017501
EM0	017570	HT0F	014104	MANUAL =	100000	PRTY5 =	000240	SM5	017523
EM1	017632	HT0G	014126	MESS	002042	PRTY6 =	000300	SP	=0000006
EM10	020140	ICTR	001262	MSEC	001250	PRTY7 =	000340	SPBUT =	001200
EM11	020161	INO	015540	NOP =	000240	PSM =	177776	SRESET =	104002
EM2	017675	INOA	015574	NTYET	002016	PTINTA	004254	SRESET	003012
EM3	017747	INOB	015627	NXTST	001260	PTNCAL	004170	SRIN	020246
EM4	017764	INOC	015653	OPEN =	000000	PTNERR	004076	STAL	004262
EM5	020031	IN1	015722	OPTS	014722	PTNINT	004234	STALA	004302
EM6	020110	IN10	016405	OPTSEL =	104014	PT0	004700	STALB	004304
EM7	020124	IN11	016434	ORGRD	017727	PTOP	004706	STALL =	104005
ENDRTN	020736	IN12	016467	OUT	015240	PT1	004702	START	001432
ERCTR	001416	IN13	016513	PBIN	012766	PT1P	004710	STLMSK	004306
ERR	003234	IN14	016536	PBINA	013070	PUNC1	013604	STPCHV =	104012

STPPA 003000	SYNCD 004550	TSM2 002716	TYPED 003562	SCALF 020230
STPRA 002750	SYNCC 004636	TTIN 014654	VALID = 104017	SCTLG 020223
STPTPV 002762	S18 002156	TTYIN = 104016	VALIMP 014740	SNEM 020273
STPTRV 002732	S28 002166	TYP 003400	WNZERO 013240	SNUNCR 020375
STRDRV= 104011	TENPWR 005362	TYPA 003410	XCNT 001430	SQUEST 020232
SUBRD 017742	TIB 001374	TYPC 003440	XCT 006362	SRD1 020617
SUBTEN 005316	TKB 001232	TYPD 003466	XOR 002354	SRD2 020654
SUBTNA 005322	TKS 001230	TYPDAT 003532	XORA 001662	SSKEY 020521
SUBTND 005336	TLX 014724	TYPE = 104003	XORFLG 002040	STALL 020357
SWR 001204	TMCON = 004136	TYPES = 104004	XP 010730	STEST 020314
SWREG 000176	TMP1 001364	TYPF 003504	XPBE 010736	SNREG 020304
SWTL 015242	TMP2 001366	TYPG 003516	XTP 006742	STIME 020340
S.CTRA 004652	TPB 001236	TYP8 003534	SCH1 020425	STITLE 020773
SYNCA 004542	TPS 001234	TYP8A 003560	SCH2 020463	SVALUE 020236
. = 021052				

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

*,DZPCAE/SOL=DZPCAE.SRC
 RUN-TIME: 11 23 1 SECONDS
 RUN-TIME RATIO: 75/37=2.0
 CORE USED: 6K (11 PAGES)