

The microfiche grid contains 72 individual frames, organized into 12 rows and 6 columns. Each frame displays a technical drawing or data table. The content of the frames includes:

- Diagrams of mechanical or electrical components.
- Tables with columns and rows of data.
- Textual descriptions or labels.
- Flowcharts or process diagrams.

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IDENTIFICATION  
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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  
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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  
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2.1 EQUIPMENT  
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- 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  
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THIS PROGRAM RUNS IN 8K MEMORY.

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

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3. SOFTWARE SWITCH REGISTER MANIPULATION  
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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  
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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)  
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- 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)  
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- 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)  
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- 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)  
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- 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)  
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- 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)  
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- 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)  
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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 8.8)  
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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  
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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  
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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  
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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 AOUT 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

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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

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5.1 NORMAL PRINTOUTS

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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,"

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

"INCORRECT ROUTINE SELECTED,"

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

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6. ERRORS  
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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  
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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  
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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  
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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  
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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 WAB: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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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

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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

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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.



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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  
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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 CSR ADDRESS
001212	177552	READER BUFFER ADDRESS
001214	177554	PUNCH CSR 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 CSR
001232	177562	TTY KEYBOARD BUFFER
001234	177564	TTY PRINTER CSR ADDRESS
001236	177566	TTY PRINTER BUFFER ADDRESS

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0. DESCRIPTION  
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0.1 PRG0 PROGRAM DESCRIPTION  
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PRG0 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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- 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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0.2 PRG1 PROGRAM DESCRIPTION  
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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 0 AND 7 MILLISECONDS OCCURS BETWEEN EACH CHARACTER.

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

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

0.3 PRG2 PROGRAM DESCRIPTION  
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PRG2 TESTS THE PC11 OUTPUT LOGIC, THE PROGRAM CONSISTS OF 17 TEST ROUTINES NUMBERED FROM 00 TO 20 (0).

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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- 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 PPS+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  
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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  
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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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0.6 PRG5 COMBINED READER-PUNCH TEST  
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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.

0.7 PRG6 PROGRAM DESCRIPTION  
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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.

0.8 PRG7 PROGRAM DESCRIPTION  
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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.

0.9 PRG10 PROGRAM DESCRIPTION  
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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  
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PRG11 PUNCHES THE SPECIAL BINARY COUNT PATTERN CONTINUOUSLY.

0.11 PRG12 PROGRAM DESCRIPTION  
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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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000000  
 000000  
 000002  
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 000006  
 000010  
 000012  
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 000016  
 000020  
 000022  
 000024  
 000026  
 000030  
 000032  
 000034  
 000036  
 000000  
 177776  
 177776  
 001200  
 000240  
 000000  
 100000  
 000000  
 000006  
 000007  
 100000  
 040000  
 020000  
 010000  
 004000  
 002000  
 001000  
 000400  
 000200

```

      .ABS
      .TITLE PC11 READER-PUNCH TESTS
      .MLIST MC,MD,TOC
      .LIST ME
;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 2 CHARACTERS FROM SR,
;PRG7 - READ 2 CHARACTERS AS PER SR,
;PRG10 - READ X CHARS, STALL Y MSECS,
;PRG11 - PUNCH SPECIAL BINARY COUNT PATTERN TAPE,
;PRG12 - READER SPEED PRINT ROUTINE,
;PRG13 - PUNCH SPEED PRINT ROUTINE,

      .=0
      .+2
      HALT
MACHER: .+2
      HALT
      .+2
      HALT
      .+2
      HALT
      .+2
      HALT
      .+2
      HALT
      .+2
      HALT
      ENTINT
      PRTY7
      DLYX
      PRTY7
;LOCATIONS 40 THROUGH 776 ARE FILLED WITH .+2 AND HALT,
      ENTX=0
      CC=177776
      PSW=177776
      SPBOT=1200
      NOP=240
      OPEN=0
      MANUAL=BIT15
      R0=00
      R6=06
      PC=07
      BIT15=100000
      BIT14=40000
      BIT13=20000
      BIT12=10000
      BIT11=4000
      BIT10=2000
      BIT9=1000
      BIT8=400
      BIT7=200
;UNASSIGNED TRAP
;SP OVERFLOW, BUS ERROR TRAP
;RESERVED INSTRUCTION TRAP
;TRACE TRAP
;TRAP TO CALL IOX
;POWER FAIL TRAP
;EMT TRAP
;PS ADDRESS
;SUBJECT TO PROGRAM MODIFICATION
;BIT DEFINITIONS
  
```

```

1101      000100
1102      000040
1103      000020
1104      000010
1105      000004
1106      000002
1107      000000
1108      005726
1109      022626
1110      000340
1111      000300
1112      000240
1113      000200
1114      000140
1115      000100
1116      000040
1117      000000
1118      104400
1119      000007
1120
1121      000046
1122      000046 002340
1123
1124
1125
1126
1127
1128
1129
1130      000174
1131      000174 000000
1132      000176 000000
1133
1134
1135      000200
1136      000200 000167 001226
1137      001204
1138      001204 000176
1139      001206 000174
1140      001210 177550
1141      001212 177552
1142      001214 177554
1143      001216 177556
1144      001220 000070
1145      001222 000200
1146      001224 000074
1147      001226 000200
1148      001230 177560
1149      001232 177562
1150      001234 177564
1151      001236 177566
1152      001240 000000
1153      001242 000000
1154      001244 000000
1155      001246 000000
1156      001250 000000
  
```

```

BIT6=100
BIT5=40
BIT4=20
BIT3=10
BIT2=4
BIT1=2
BIT0=0
POPSP=5726
POPSP2=022626
PRTY7=340
PRTY6=300
PRTY5=240
PRTY4=200
PRTY3=140
PRTY2=100
PRTY1=40
PRTY0=0
DELAYX=TRAP+0
BELL=007
  
```

```

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

```

.=46
LOGIC
  
```

```

;*****
;NOTE: PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT
;A HARDWARE SWITCH REGISTER-REFER TO DOCUMENT
;*****
  
```

```

.=174
DISPREG: OPEN
SWREG: OPEN
  
```

```

.=200
JMP START
.=,+1000
  
```

```

;GO TO START OF PROGRAM.
  
```

```

SWR: SWREG
DISPLAY: DISPREG
PRB: 177550
PRB: 177552
PPS: 177554
PPB: 177556
RDRVTR: 70
RDRLVL: PRTY4
PCHVTR: 74
PCHLVL: PRTY4
TKS: 177560
TKB: 177562
TPS: 177564
TPB: 177566
PRGNUM: OPEN
BRCTR: OPEN
DVDND: OPEN
DVQUOT: OPEN
MSEC: OPEN
  
```

```

;READER CSR
;READER BUFFER
;PUNCH CSR
;PUNCH BUFFER
;READER INTERRUPT VECTOR
;READER PRIORITY LEVEL
;PUNCH INTERRUPT VECTOR
;PUNCH PRIORITY LEVEL
;LSR CSR
;LSR BUFFER
;LSP CSR
;LSP BUFFER
;CONTAINS CURRENT PROGRAM
  
```

U  
ma

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 002514  
 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 000000  
 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  
 SCOPTR: 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  
 STPTRV  
 STPTPV  
 CHAIN  
 OPTS  
 CNTLU  
 TTIN  
 VALINP  
 CKSWRP  
  
 ERR1: 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  
 EFCTR: 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, %R6	;SET BOTTOM OF SP STACK,
1217	001436	005067	176334			CLR	PSW	
1218	001442	005767	177722			TST	FRST	
1219	001446	001404				BEQ	18	
1220	001450	104003				TYPE		
1221	001452	020773				STITLE		
1222	001454	005067	177710			CLR	FRST	
1223	001460	013746	000004	181		MOV	004, -(R6)	
1224	001464	012737	001662	000004		MOV	%XORA, 004	
1225	001472	012737	000433	177060		MOV	0433, 00177060	
1226	001500	012637	000004			MOV	(R6)+, 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, MACHER	
1239	001576	005067	177454			CLR	RTNNO	
1240	001602	012767	000003	177562	181	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	18	
1245	001630	016700	177530			MOV	TMP1, 00	
1246	001634	005067	177570			CLR	XCNT	;INIT THE XOR PROGRAM CONTROL
1247	001640	042700	177760			BIC	0177760, 00	;LIMIT (SR) TO BITS 3-0
1248	001644	020027	000013			CMP	00, 013	;COMPARE (SR) TO PROGRAM LIMIT
1249	001650	101410				BLOS	CRTA	;VALID PROGRAM NUMBER?
1250	001652	104003				TYPE		;TYPE INCORRECT PROGRAM MESSAGE.
1251	001654	015267				CM2		
1252	001656	104010				CHALT		;COMMON HALT.
1253	001660	000664				BR	START	;START OVER.
1254	001662	022626			XORA:	CMP	(R6)+, (R6)+	
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, MACHER	;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	

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1269	001736	004767	000422		GTRDYA:	JSR	07,FORMD		;ROLL FORWARD TO "NEXT" ROUTINE.
1270	001742	032777	001000	177234	GTRDYB:	BIT	0BIT9,0SWR		;SELECT ROUTINE?
1271	001750	001003				BNE	GTRDYC		;BR IF YES.
1272	001752	004767	000440			JSR	07,GOTST		;GO RUN ROUTINE.
1273	001756	000532				BR	CHNB		;NO GO, MANUAL RTN BYPASSED.
1274	001760	012767	000003	177404	GTRDYC:	MOV	03,COUNT		
1275	001766	012767	020246	012730		MOV	0SRIN,TLX		
1276	001774	104014				OPTSEL			
1277	001776	022767	000003	177366		CMP	03,COUNT		
1278	002004	001765				BEQ	GTRDYC		
1279	002006	016700	177352			MOV	TMP1,00		
1280	002012	042700	177600			BIC	0177600,00		;MASK UNDESIRED BITS
1281	002016	126700	177234		NIYET:	CMPB	RTNNO,00		;COMPARE RTNNO TO (R0)
1282	002022	001017				BNE	GTRDYD		;BRANCH IF ROUTINE NOT FOUND YET.
1283	002024	004767	000366			JSR	07,GOTST		;GO RUN ROUTINE.
1284	002030	104003				TYPE			;NO GO, MANUAL RTN BYPASSED.
1285	002032	015467				CM3			;TYPE MESSAGE.
1286	002034	104010				CHALT			
1287	002036	000724				BR	GETRDY		
1288	002040	000000			XORFLG:	0			
1289	002042	021445	041520	030461	MESS:	,ASCII	'0PC11 XOR TST0'		
1290	002050	054040	051117	052040					
1291	002056	052123	100						
1292		002062							
1293	002062	022767	177777	177170	GTRDYD:	CMP	0-1,NXTST		;NO. CHECK FOR LAST ROUTINE.
1294	002070	001403				BEQ	INCRTN		
1295	002072	004767	000266			JSR	07,FORMD		
1296	002076	000747				BR	NIYET		
1297	002100	104003			INCRTN:	TYPE			;TYPE INCORRECT RTN MESSAGE.
1298	002102	015325				CM3			
1299	002104	104010				CHALT			;COMMON HALT.
1300	002106	000700				BR	GETRDY		;START OVER.
1301	002110	012706	001200		CHAIN:	MOV	0SPBOT,R6		;RESTORE STACK.
1302	002114	104020					CKSWR		
1303	002116	005737	002040			TST	00XORFLG		;IS XOR TESTER HERE?
1304	002122	100011				BPL	30		;BR IF NOT
1305	002124	013746	000094			MOV	004,-(06)		;SAVE MEM. 4
1306	002130	012737	002354	000004		MOV	0XOR,004		
1307	002136	005737	177060			TST	00177060		;IS XOR IN ERRCR?
1308	002142	012637	000004			MOV	(06)+,004		;NO,REPLACE MEM. 4
1309	002140	032777	040000	177030	30:	BIT	0BIT14,0SWP		;SCOPE?
1310	002154	001464				BEQ	S20		;BR IF NOT
1311	002156	005067	175614		S10:	CLR	PSW		
1312	002162	000177	177076			JMP	0SCOPTR		;GO TO SCOPE ENTRY
1313	002166	032777	004000	177010	S20:	BIT	0BIT11,0SWR		;INHIBIT ITERATION?
1314	002174	001003				BNE	CHNAA		;BR IF YES.
1315	002176	005367	177060			DEC	ICTR		;NO, ICTR 0?
1316	002202	001365				BNE	S10		;BR IF NOT
1317	002204	032777	002000	176772	CHNAA:	BIT	0BIT10,0SWR		;HALT AT END OF TEST?
1318	002212	001414				BEQ	CHNB		;BR IF NOT.
1319	002214	005067	177144			CLP	TMP1		
1320	002220	116767	177032	177136		MOVB	RTNNO,TMP1		
1321	002226	004567	002622			JSR	05,ACNV4		
1322	002232	001364				TMP1			
1323	002234	020756				RTNN			
1324	002236	104003				TYPE			

1325	002240	020736				ENDRTM		
1326	002242	104010				CHALT		
1327	002244	032777	001000	176732	CHMB:	BIT	%BIT9, %SWR	;SELECT ROUTINE?
1328	002252	001216				BNE	GETRDY	;BR IF YES,
1329	002254	022767	177777	176776		CMP	%-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	%CT0, KSTART	;START PUN LOGIC TESTS IF XOR
1337	002312	000167	177372			JMP	GETRDY	
1338	002316	012767	005432	176726	28:	MOV	%AT0, KSTART	;START RDR LOGIC TESTS IF XOR
1339	002324	104003			18:	TYPE		;TYPE PROGRAM END MESSAGE.
1340	002326	015263				APGEND		
1341	002330	013700	000042			MOV	%42, R0	;GET CONTENTS OF 42.
1342	002334	001405				BEQ	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	(%6)+, (%6)+	;POP STACK
1348	002356	012637	000004			MOV	(%6)+, %04	;REPLACE MEM 4
1349	002362	000675				BR	%18	;GO TO SCOPE ENTRY
1350	002364	016705	176670		FORWD:	MOV	NXTST, %5	;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)+, SCOPTR	;GET SCOPE LOOP ENTRY POINTER.
1355	002410	010567	176640			MOV	%5, CURTST	;ADDR OF NOW CURRENT TEST TO CURTST.
1356	002414	000207				RTS	%7	;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	%BIT0, %SWR	;MANUAL RTN, BYPASS IT?
1360	002432	001401				BEQ	GOTSTA	;NO, RUN IT.
1361	002434	000207				RTS	%7	;BYPASS MANUAL ROUTINE.
1362	002436	000177	176612		GOTSTA:	JMP	%CURTST	;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	%0, TMP1	
1375	002476	001364				JSR	%5, ACNV6	
1376	002500	020717				TMPI		
1377	002502	104003				GWAS		
1378	002504	020711				TYPE		
1379	002506	000000				PCHLT		
1380	002510	104020				HALT		
						CKSWR		

```

1301 002512 000002          RTI
1302                      ;ERROR HALT ROUTINE.
1303 002514 005777 176464  EHLT:  TST  08WR          ;CHECK FOR HALT ON ERROR.
1304 002520 100002          BPL  EHLTA          ;BRANCH IF NO HALT DESIRED.
1305 002522 000000          HALT
1306 002524 104020          CKBWR
1307 002526 000002  EHLTA:  RTI          ;EXIT
1308                      ;ROUTINE TO CHECK FOR READER ERROR.
1309 002530 005777 176454  ARDR:  TST  0PRS          ;TEST ERROR BIT IN PRS
1310 002534 100401          BMI  10          ;BRANCH IF ERROR BIT SET.
1311 002536 000207          RTS  07          ;NOT SET. EXIT.
1312 002540 104004 18:    TYPES          ;TYPE STATUS MESSAGE AND
1313 002542 017404          SM1          ;INSTRUCTIONS
1314 002544 016334          IM0
1315 002546 177777          -1
1316 002550 104010          CHALT          ;HALT TO WAIT FOR USER.
1317 002552 000766          BR  ARDR          ;GO TEST AGAIN.
1318                      ;DD11-XOR PROGRAMMABLE SIMULATOR OF PCOS (PUNCH/READER)
1319                      ;CALL  -JSR  05,PCSIM
1320                      ;
1321                      ;SIMULATOR CONSTANT
1322                      ;
1323                      ;TABLE OF NEXT INSTRUCTION IF ON XOR TESTER
1324                      ;IF NOT ON AN XOR, THIS ROUTINE EXIT TO THE INSTRUCTION FOLLOWING THE CALL
1325 002554 005767 177260  PCSIM:  TST  XORFLG          ;ARE WE ON AN XOR TESTER
1326 002560 001425          BEQ  RETRN          ;IF NOT ON AN XOR TESTER RETURN
1327 002562 013746 000004  MOV  004,-(06)          ;SAVE TRAP CATCHER
1328 002566 012737 002630 000004  MOV  010,004          ;IF XOR TRAPS DURING LOAD GO TO 18
1329
1330
1331
1332
1333
1334
1335
1336 002574 052777 000001 176406  BIS  01,0PRS          ;YES, INHIBIT A M SIGNAL FROM CAUSING ERROR DUE DIFFERENT
1337 002602 104000          DELAY          ;CIRCUIT DELAYS AT THE TEST HEAD
1338
1339
1340
1341 002604 000001          1
1342 002606 012537 177060 28:    MOV  (05)+,00177060 ;LOAD SIMULATOR
1343
1344
1345
1346
1347 002612 104000          DELAY          ;WAIT FOR ERROR BIT TO SETTLE
1348 002614 000050          50
1349
1350
1351 002616 012637 000004 36:    MOV  (06)+,004          ;REPLACE TRAP CATCHER
1352 002622 000005          RESET
1353 002624 011505          MOV  (05),05          ;RETURN TO TEST SETUP
1354 002626 000205          RTS  05          ;RETURN TO TEST
1355 002630 022626 18:    CMP  (R6)+,(R6)+          ;FIX STACK
1356 002632 000771          BR  38          ;CONTINUE WITH THE SIM ROUTINE
1357 002634 062705 000004  RETRN:  ADD  04,05          ;NOT AN XOR TESTER ,RETURN TO PROGRAM AFTER PCSIM CALL
1358 002640 000205          RTS  05
1359
1360
1361
1362
1363
1364
1365
1366 002642 032777 004000 176340 ;ROUTINE TO CHECK FOR READER READY,
1367 APRDY:  BIT  04000,0PRS          ;TEST BUSY BIT.
1368          BNE  ARRDYA          ;BRANCH IF BUSY BIT SET.
1369          RTS  07          ;READER READY. EXIT.
1370 ARRDYA:  JSR  07,TSM2          ;TYPE STATUS AND INSTRUCTION MESSAGE.
1371          BR  ARRDY          ;GO CHECK AGAIN
1372
1373
1374
1375
1376 002644 004767 000036 ;ROUTINE TO FETCH A CHARACTER
1377 AREAD:  JSR  07,ARRDY          ;CHECK FOR READER READY.

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1437	002666	105277	176316	AREAD1:	INCB	0PRS	;ENABLE READER
1438	002672	005777	176312	ARDA:	TST	0PRS	;TEST ERROR BIT
1439	002676	100404			B-I	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							
1452	002732	017667	000000	000012	;ROUTINE TO SET READER INTERRUPT VECTOR AND PRIORITY		
1453	002740	062716	000002	STPTRV:	MOV	0(6), STPRA+2	;MOVE VECTOR ADDR TO STPRA+2
1454	002744	016701	176250		ADD	02, 006	;SET UP EXIT
1455	002750	012721	000000		MOV	RDRVTR, 01	
1456	002754	016721	176242	STPRA:	MOV	0OPEN, (1)+	;SET VECTOR ADDRESS
1457	002760	000002			MOV	RDRVLV, (1)+	;SET PRIORITY
1458					RTI		;EXIT
1459	002762	017667	000000	000012	;ROUTINE TO SET PUNCH INTERRUPT VECTOR AND PRIORITY.		
1460	002770	062716	000002	STPTPV:	MOV	0(6), STPPA+2	;MOVE VECTOR ADDR TO STPPA+2
1461	002774	016701	176224		ADD	02, 006	;SET UP EXIT
1462	003000	012721	000000		MOV	PCHVTR, 01	
1463	003004	016721	176216	STPPA:	MOV	0OPEN, (1)+	;SET VECTOR ADDRESS.
1464	003010	000002			MOV	PCHLVL, (1)+	;SET PRIORITY
1465					RTI		;EXIT.
1466	003012	012700	052525		;ROUTINE TO ISSUE RESET.		
1467	003016	005100		SRSETT:	MOV	052525, 00	;DATA TO R0.
1468	003020	010067	177770		COM	00	;COMPLEMENT (R0).
1469	003024	000005			MOV	00, SRSETT+2	; (R0) TO SRSETT+2.
1470	003026	000002			RESET		;ISSUE RESET, (R0) IS
1471					RTI		;DISPLAYED, EXIT.
1472	003030	016700	000042		;RANDOM NUMBER GENERATOR. ROUTINE EXITS WITH NUMBER IN REGISTER 0.		
1473	003034	006100		RNGEN:	MOV	RP1, 00	
1474	003036	006100			ROL	00	
1475	003040	066700	000034		ROL	00	
1476	003044	010067	000026		ADD	RP2, 00	
1477	003050	006100			MOV	00, RP1	
1478	003052	006100			ROL	00	
1479	003054	066700	000020		ROL	00	
1480	003060	006100			ADD	RP2, 00	
1481	003062	006100			ROL	00	
1482	003064	010067	000010		ROL	00	
1483	003070	016700	000002		MOV	00, RP2	
1484	003074	000207			MOV	RP1, 00	
1485	003076	001233			RTS	07	;EXIT, NUMBER IN R0
1486	003100	007622		RP1:	1233		
1487				RP2:	7622		
1488	003102	104011			;SUBROUTINE TO READ CHARACTER FROM READER USING INTERRUPT.		
1489	003104	003162		BREAD:	STRDRV		;SET READER VECTOR
1490	003106	012767	000340		BREADB		;TO BREADB
1491	003114	004767	177522		MOV	0PTY7, PSW	;SET PRIORITY 7.
1492	003120	052777	000101		JSR	07, ARRDY	;CHECK FOR READER READY.
					BIS	0101, 0PRS	;ENABLE PTR AND PTRI.

1493	003126	104000				DELAY			;WAIT FOR READER INTERRUPT.
1494	003130	000226				150.			
1495	003132	0C5077	176052			CLR	OPRS		;CLEAR PTRI ENABLE.
1496	003136	104033				TYPE			;TYPE NO PTR RESPONSE
1497	003140	020124				EM7			;MESSAGE
1498	003142	000757				BR	BREAD		;TRY AGAIN.
1499	003144	017767	176042	176226	BREADA:	MOV	OPRS,CRBUF		;CHAR READ TO CRBUF.
1500	003152	022626				POPSP2			
1501	003154	005067	174616			CLR	PSW		;CLEAR STATUS.
1502	003160	000207				RTS	&7		;EXIT SUBROUTINE.
1503	003162	005077	176022		BREADB:	CLR	OPRS		;CLEAR PTR INTERRUPT ENABLE.
1504	003166	005777	176016			TST	OPRS		;TEST FOR ERROR.
1505	003172	100411				BMI	BREADC		;BRANCH IF ERROR.
1506	003174	105777	176010			TSTB	OPRS		;TEST FOR DONE BIT.
1507	003200	100403				BMI	BRDBB		;BRANCH IF DONE BIT SET.
1508	003202	104007				ERROR1			;ERROR,FALSE READER INTERRUPT.
1509	003204	020140				EM10			
1510	003206	000405				BR	CRDCC		
1511	003210	012716	003144		BRDBB:	MOV	%BREADA,%6		;MODIFY INTERRUPT EXIT TO BREADA.
1512	003214	000002				RTI			;OK, EXIT INTERRUPT.
1513	003216	004767	177474		BREADC:	JSR	&7,TSM2		;TYPE NOT READY MESSAGE.
1514	003222	012716	003230		BRDCC:	MOV	%BRDD,0%6		;SET UP TO RETRY.
1515	003226	000002				RTI			;EXIT INTERRUPT.
1516	003230	022626			BRDD:	POPSP2			
1517	003232	000723				BR	BREAD		;GO TRY AGAIN.
1518						;ERROR ROUTINES			
1519	003234	004767	000060		ERR:	JSR	&7,ERRA		;FIRST ERROR TYPEOUT
1520	003240	104001				EHALT			;GO HALT IF HALT SWITCH IS SET.
1521	003242	000002				RTI			;EXIT.
1522	003244	004767	000050		ERR1:	JSR	&7,ERRA		;FIRST ERROR TYPEOUT
1523	003250	004767	000024			JSR	&7,INHPR		;INHIBIT PRINT?
1524	003254	000406				BR	ERR1A		;NO PRINT
1525	003256	011600				MOV	%6,%0		;DEVELOP ADDRESS OF ADDITIONAL
1526	003260	011067	000002			MOV	%0, %+6		;ERROR TYPEOUT.
1527	003264	104003				TYPE			;ADDITIONAL ERROR TYPEOUT.
1528	003266	000000				OPEN			
1529	003270	104001				EHALT			;GO HALT IF HALT SWITCH IS SET.
1530	003272	062716	000002		ERR1A:	ADD	%2,%6		;SET UP EXIT.
1531	003276	000002				RTI			;EXIT
1532	003300	104020			INHPR:	CKSWR			
1533	003302	032777	020000	175674		BIT	%BIT13,%SWR		;INHIBIT PRINT?
1534	003310	001002				BNE	%+6		;BR IT YES.
1535	003312	062716	000002			ADD	%2,%6		;NO.
1536	003316	000207				RTS	&7		;EXIT.
1537	003320	016600	000002		ERRA:	MOV	2(6),R0		;GET EMT PC.
1538	003324	005740				TST	-(0)		;DECREMENT BY 2.
1539	003326	010067	176030			MOV	%0,ERRT		;ADDRESS OF ERROR CALL TO ERRT
1540	003332	004767	177742			JSR	&7,INHPR		;INHIBIT PRINT?
1541	003336	000207				RTS	&7		;NO PRINT.
1542	003340	004567	001462			JSP	%5,ACNV6		;CONVERT ERROR CALL ADDRESS TO ASCII.
1543	003344	001362				ERRT			
1544	003346	017623				APC			
1545	003350	004567	001500			JSR	%5,ACNV4		;CONVERT PROGRAMS TO ASCII
1546	003354	001240				PRGNUM			
1547	003356	017602				APNUMB			
1548	003360	004567	001470			JSR	%5,ACNV4		;CONVERT TESTS TO ASCII

1549	003364	001256				RTNNO			
1550	003366	017612				ATNUMB			
1551	003370	104003				TYPE		;TYPE ERROR MESSAGE	
1552	003372	017570				E40			
1553	003374	104020				CKSWR			
1554	003376	000207				RTS	07	;EXIT.	
1555						;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.			
1556	003400	011600				TYP:	MOV	006,00	;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
1557	003402	062716	000002				ADD	02,006	;SET UP EXIT.
1558	003406	011000					MOV	000,00	;ADDRESS OF MESSAGE TO R0.
1559	003410	112067	000116			TYP:	MOV	(0)+,TYPDAT	;GET CHARACTER
1560	003414	122767	000100	000110			CMPB	0100,TYPDAT	;CHECK FOR"0"CHARACTER
1561	003422	001006					BNE	TYP	;BRANCH IF NOT"0".
1562	003424	112767	000177	000100			MOV	0177,TYPDAT	;OUTPUT RUBOUT.
1563	003432	004767	000030				JSR	07,TYP	
1564	003436	000002					RTI		;TERMINATOR CHAR. DONE. EXIT.
1565	003440	122767	000045	000064		TYP:	CMPB	045,TYPDAT	;CHECK FOR"0".
1566	003446	001416					BEG	TYP	;BRANCH IF"0"
1567	003450	122767	000043	000054			CMPB	043,TYPDAT	;NOT"0".CHECK FOR"0".
1568	003456	001417					BEG	TYP	;BRANCH IF "0"
1569	003460	004767	000002				JSR	07,TYP	;TYPE CHAR IN TYPDAT
1570	003464	000751					BR	TYP	
1571	003466	116777	000040	175542		TYP:	MOV	TYPDAT,0TPB	;OUTPUT CHARACTER TO PRINTER
1572	003474	105777	175534				TSTB	0TPB	;WAIT FOR DONE FLAG.
1573	003500	100375					BPL	-4	
1574	003502	000207					RTS	07	;EXIT
1575	003504	112767	000015	000020		TYP:	MOV	015,TYPDAT	;MOVE CARRIAGE RETURN CODE TO TYPDAT
1576	003512	004767	177750				JSR	07,TYP	;GO TYPE CHAR.
1577	003516	112767	000012	000006		TYP:	MOV	012,TYPDAT	;MOVE LF CODE TO TYPDAT.
1578	003524	004767	177736				JSR	07,TYP	;GO TYPE CHAR.
1579	003530	000727					BR	TYP	
1580	003532	000000				TYPDAT:	OPEN		
1581						;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER			
1582	003534	011600				TYP:	MOV	006,00	;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
1583	003536	062716	000002				ADD	02,006	;UPDATE TO NEXT MESSAGE ADDRESS
1584	003542	011067	000014				MOV	000,TYPB	;ADDRESS OF MESSAGE TO TYPB
1585	003546	022767	177777	000006			CMP	0-1,TYPB	;CHECK FOR TERMINATOR
1586	003554	001001					BNE	TYPB	;BRANCH IF NOT TERMINATOR.
1587	003556	000002					RTI		;TERMINATOR, EXIT
1588	003560	104003				TYP:	TYPE		;CALL ON TYP SUB TO TYPE MESSAGE
1589	003564	000000				TYPB:	OPEN		;ADDRESS OF MESSAGE GOES HERE
1590	003564	000763					BR	TYPB	;GO PROCESS NEXT MESSAGE
1591						;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS			
1592	003566	011667	000124			DLY:	MOV	006,DLCNT	;GET ADDRESS THAT CONTAINS DELAY COUNT
1593	003572	062716	000002				ADD	02,006	;SET UP EXIT
1594	003576	017767	000114	000112			MOV	00DLCNT,DLCNT	;MILLISECONDS COUNT TO DLCNT
1595	003604	005067	174166				CLR	PSW	
1596	003610	016767	175434	000076		DLY:	MOV	MSEC,DLCTR	;MOVE 1 MSEC DELAY CONSTANT TO DLCTR
1597	003616	016767	000072	000070		DLYB:	MOV	DLCTR,DLCTR	
1598	003624	016767	000064	000062			MOV	DLCTR,DLCTR	
1599	003632	016767	000056	000054			MOV	DLCTR,DLCTR	
1600	003640	016767	000050	000046			MOV	DLCTR,DLCTR	
1601	003646	016767	000042	000040			MOV	DLCTR,DLCTR	
1602	003654	016767	000034	000032			MOV	DLCTR,DLCTR	
1603	003662	016767	000026	000024			MOV	DLCTR,DLCTR	
1604	003670	016767	000020	000016			MOV	DLCTR,DLCTR	

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H3

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						TNCON=RTINIS+2
1614	003720	012700	000006	RTMCL:	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			RTMINT			
1618	003736	005067	175300		CLR	BRCTR		
1619	003742	012777	000101	175240	MOV	0101, OPRB		;ENABLE READER AND INTERRUPTS.
1620	003750	005067	174022	RTMCLA:	CLR	PSW		
1621	003754	016767	175262	175260	RTMCLB:	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	RTMCLB		;BR IF RESULT NOT 0.
1631	004042	104010			CHALT			;BRCTR OVERFLOWED.
1632								
1633	004044	005777	175140	RTMINT:	TST	OPRB		;READER ERROR?
1634	004050	100405			BMI	RTMERR		;BR IF YES.
1635	004052	005300			DEC	R0		;READ 6 CHARS?
1636	004054	001420			SEQ	RTINTA		;BR IF YES.
1637	004056	005277	175126		INC	OPRB		;NO. ENABLE READER.
1638	004062	000002			RTI			;EXIT INTERRUPT.
1639	004064	004767	176626	RTMERR:	JSR	PC, TSM2		;READER ERROR.
1640	004070	012716	003720		MOV	0RTMCL, (6)		;GO TRY AGAIN.
1641	004074	000002			RTI			
1642	004076	104004		PTMERR:	TYPES			;PUNCH ERROR.
1643	004100	017456			SMJ			
1644	004102	016620			IM16			
1645	004104	177777			-1			
1646	004106	104010			CHALT			
1647	004110	012716	004170		MOV	0PTMCL, (6)		;GO TRY AGAIN.
1648	004114	000002			RTI			
1649	004116	005077	175066	RTINTA:	CLR	OPRB		;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				BMI	PTMERR		;BR IF YES.
1673	004242	005300				DEC	R0		;PUNCHED 5 CHARS?
1674	004244	001403				BEG	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		;# IN R0, APPLY STALL MASK.
1683	004272	001404				BEG	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,#0		;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				BEG	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	05,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	07,BSYNC	;RESYNC THE READER,
1725	004450	000207				RTS	07	;EXIT.
1726								;SUBROUTINE TO SYNC THE READER TO A SPECIAL BINARY COUNT PATTERN TEST TAPE.
1727	004452	004767	000176			BSYNC:	JSR	07,INBIN
1728	004456	004767	176420				JSR	07,BREAD
1729	004462	004767	176414				JSR	07,BREAD
1730	004466	004767	176410				JSR	07,BREAD
1731	004472	016767	174702	174702			MOV	CRBUF,CHR1
1732	004500	004767	176376				JSR	07,BREAD
1733	004504	016767	174670	174672			MOV	CRBUF,CHR2
1734	004512	004767	176364				JSR	07,BREAD
1735	004516	016767	174656	174662			MOV	CRBUF,CHR3
1736	004524	004767	000012				JSR	07,SYNCA
1737	004530	000750					BR	BSYNC
1738	004532	012767	000003	174656			MOV	03,ERCTR
1739	004540	000207					RTS	07
1740	004542	012767	001000	000102		SYNCA:	MOV	0512,,SYCTRA
1741	004550	004767	000136			SYNCB:	JSR	07,GTBIN
1742	004554	010067	174630				MOV	00,CHR1A
1743	004560	004767	000126				JSR	07,GTBIN
1744	004564	010067	174622				MOV	00,CHR2A
1745	004570	004767	000116				JSR	07,GTBIN
1746	004574	010067	174614				MOV	00,CHR3A
1747	004600	026767	174576	174602			CMP	CHR1,CHR1A
1748	004606	001013					BNE	SYNCC
1749	004610	026767	174570	174574			CMP	CHR2,CHR2A
1750	004616	001007					BNE	SYNCC
1751	004620	026767	174562	174566			CMP	CHR3,CHR3A
1752	004626	001003					BNE	SYNCC
1753	004630	062716	000002				ADD	02,(6)
1754	004634	000207					RTS	07
1755	004636	005367	000010			SYNCC:	DEC	SYCTRA
1756	004642	001342					BNE	SYNCB
1757	004644	104007					ERROR1	
1758	004646	017747					EM3	
1759	004650	000207					RTS	07
1760	004652	000000				SYCTRA:	OPEN	
1761								;SUBROUTINE TO INITIALIZE BINARY COUNT PATTERNS
1762	004654	012767	177777	000014		INBIN:	MOV	0-1,RIND
1763	004662	004567	000300				JSR	05,BMOVE
1764	004666	004676					RIND	
1765	004670	004677					RIND+1	
1766	004672	000013					11,	
1767	004674	000207					RTS	07
1768	004676	000000						;EXIT
1769	004700	000000				RIND:	OPEN	
1770	004702	000000				PT0:	OPEN	
1771	004704	000000				PT1:	OPEN	
1772	004706	000000				PIND:	OPEN	
						PT0P:	OPEN	

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1773 004710 000000
1774
1775 004712 016767 177762 177762
1776 004720 005167 177756
1777 004724 005167 177746
1778 004730 001002
1779 004732 005267 177744
1780 004736 042767 177400 177736
1781 004744 016767 177732 177726
1782 004752 016700 177724
1783 004756 000207
1784 004760 016767 177722 177722
1785 004766 005167 177716
1786 004772 005167 177706
1787 004776 001002
1788 005000 005267 177704
1789 005004 042767 177400 177676
1790 005012 016767 177672 177666
1791 005020 016701 177664
1792 005024 000207
1793
1794 005026 012500
1795 005030 012567 000012
1796 005034 004767 000052
1797 005040 004567 000122
1798 005044 005102
1799 005046 000000
1800 005050 000006
1801 005052 000205
1802 005054 012500
1803 005056 012567 000012
1804 005062 004767 000024
1805 005066 004567 000074
1806 005072 005104
1807 005074 000000
1808 005076 000004
1809 005100 000205
1810 005102 000000
1811 005104 000000
1812 005106 000000
1813 005110 000000
1814 005112 012701 005110
1815 005116 012702 000006
1816 005122 011067 177762
1817 005126 016703 177756
1818 005132 042703 177770
1819 005136 062703 000060
1820 005142 110341
1821 005144 006067 177740
1822 005150 006067 177734
1823 005154 006067 177730
1824 005160 005302
1825 005162 001361
1826 005164 000207
1827
1828 005166 012501

PT1P: OPEN
;SPECIAL BINARY COUNT PATTERN SUBROUTINE, EXITS WITH BIN CHAR IN R0
GTBIN: MOV PT0,PT1 ;PREVIOUS BIN CHAR TO PT1
COM PT1
COM RIND
BNE ,+6
INC PT1
BIC 0177400,PT1 ;MASK TO 8 BITS
MOV PT1,PT0 ;SAVE BIN CHAR IN PT0
MOV PT1,00 ;BIN CHAR TO R0.
RTS 07 ;EXIT.
GTBINP: MOV PT0P,PT1P ;PREVIOUS BIN CHAR TO PT1P
COM PT1P
COM PIND
BNE ,+6
INC PT1P
BIC 0177400,PT1P ;MASK TO 8 BITS.
MOV PT1P,PT0P ;SAVE BIN CHAR IN PT0P.
MOV PT1P,01 ;BIN CHAR TO R1.
RTS 07 ;EXIT.
;OCTAL TO ASCII CONVERT ROUTINES
ACNV6: MOV (5)+,00 ;CONVERT TO 6 ASCII. GET OCTAL ADDRESS
MOV (5)+,ACNV6 ;GET ASCII ADDRESS
JSR 07,ACNV ;CONVERT TO ASCII
JSR 05,BMOVE ;MOVE 6 CHARS TO ASCII ADDRESS
ACNV8: OPEN
6
RTS 05 ;EXIT
ACNV4: MOV (5)+,00 ;CONVERT TO 4 ASCII. GET OCTAL ADDRESS
MOV (5)+,ACNV4 ;GET ASCII ADDRESS
JSR 07,ACNV ;CONVERT TO ASCII
JSR 05,BMOVE ;MOVE 4 CHARS TO ASCII ADDRESS.
ACNVC: OPEN
4
RTS 05 ;EXIT
A1ST: OPEN
OPEN
OPEN
ACNVX: OPEN
ACNVI: MOV 0A1ST+6,01 ;ADDR TO STORE ASCII TO R1
MOV 06,02 ;6 TO R2
MOV 000,ACNVX ;OCTAL WORD TO ACNVX
ACNVM: MOV ACNVX,03
BIC 0177770,03 ;ISOLATE LEAST SIGNIFICANT OCTAL 6
ADD 060,03 ;ADD 60 TO CONVERT TO ASCII
MCVB 03,-(1) ;STORE ASCII BYTE
ROR ACNVX ;MOVE NEXT OCTAL DIGIT TO LEAST
ROR ACNVX ;SIGNIFICANT POSITION
ROR ACNVX
DEC 02 ;DONE 6 TIMES?
BNE ACNVM ;NO. REPEAT.
RTS 07 ;YES. EXIT.
;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
BMOVE: MOV (5)+,01 ;GET "FROM" ADDRESS

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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	500207		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. S. PUNCH CHARACTER IN REG 0.	
1848	005236	004767	177742	HSPCH: JSR	R7, CPRDY	;GO CHECK FOR PUNCH READY.	
1849	005242	010077	173750	MOV	R0, OPPB	;LOAD PUNCH BUFFER.	
1850	005246	105777	173742	TSTB	OPPS	;WAIT FOR DONE.	
1851	005252	100375		BPL	, -4		
1852	005254	000207		RTS	R7	;DONE, EXIT.	
1853						;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.	
1854	005256	012700	015256	BDCNV: MOV	RDECVAL, R0	;SET UP ADDR TO STORE DECIMAL ASCII IN R0	
1855	005262	013501		MOV	R(5)+, R1	;BINARY VALUE TO R1.	
1856	005264	012702	005364	MOV	RADTENP, 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	B, DIGIT, (0)+	;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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1881
1882
1883
1884
1885 005376 012767 005432 173646
1886 005404 005767 174430
1887 005410 001402
1888 005412 000167 174272
1889 005416 104003
1890 005420 015540
1891 005422 004767 007614
1892 005426 000167 174256
1893
1894 005432 000000
1895 005434 005462
1896 005436 001750
1897 005440 005450
1898
1899
1900 005442 012767 005456 172334
1901 005450 005777 173534
1902 005454 104013
1903 005456 104006
1904 005460 104013
1905
1906 005462 000001
1907 005464 005512
1908 005466 001750
1909 005470 005500
1910
1911
1912 005472 012767 005506 172304
1913 005500 005777 173506
1914 005504 104013
1915 005506 104006
1916 005510 104013
1917
1918 005512 100002
1919 005514 005562
1920 005516 001750
1921 005520 005546
1922
1923
1924 005522 004567 175026
1925 005526 000033
1926 005530 005546
1927
1928 005532 104004
1929 005534 015722
1930 005536 015756
1931 005540 017025
1932 005542 177777
1933 005544 000000
1934 005546 022777 100000 173434
1935 005554 001401
1936 005556 104006

      .SBTTL  PRGP - READER LOGIC TESTS
;PPGP - READER LOGIC TESTS
;
PRGO:  MOV      @AT0,KSTART      ;ADDR OF 1ST ROUTINE TO KSTART.
      TST      XORFLG
      BEQ      18
      JMP      GETRDY
18:    TYPE
      IM0
      JSR      @7,SWTL
      JMP      GETRDY      ;GO GET STARTED.
;.....
AT0:   0      ;TEST 0
      AT1      ;NEXT TEST ADDR
      1000.    ;I COUNT
      AT0A     ;SCOPE ENTRY
;.....
;TEST ABILITY TO REFERENCE THE READER STATUS WORD
      MOV      @AT0E,MACHER      ;SET UP MACHINE ERROR TRAP.
AT0A:  TST      @PRS              ;REFERENCE READER STATUS WORD.
      SCOPE
AT0E:  ERROR      ;ERROR, TRAPPED WHEN REFERENCING READER
      SCOPE      ;STATUS WORD (PRS).
;.....
AT1:   1      ;TEST 0
      AT2      ;NEXT TEST
      1000.    ;I COUNT
      AT1A     ;SCOPE ENTRY
;.....
;TEST ABILITY TO REFERENCE THE READER BUFFER.
      MOV      @AT1E,MACHER      ;SET UP MACHINE ERROR TRAP.
AT1A:  TST      @PRB              ;REFERENCE READER BUFFER
      SCOPE
AT1E:  ERROR      ;ERROR, TRAPPED WHEN REFERENCING
      SCOPE      ;READER BUFFER, (PRB)
;.....
AT2:   2+MANUAL      ;TEST 0
      AT3      ;NEXT TEST
      1000.    ;I COUNT
      AT2A     ;SCOPE ENTRY.
;.....
;TEST THAT READER POWER OFF SETS ERROR BIT (BIT 15) IN READER STATUS WORD.
      JSR      @5,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
      ;WAIT FOR USER
AT2A:  CMP      @BIT15,@PRS      ;TEST FOR ERROR BIT ONLY.
      BEQ      .+4              ;BRANCH IF ERROR BIT ONLY SET.
      ERROR     ;ERROR,WITH READER POWER OFF ONLY THE ERROR

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1937 005560 104013          SCOPE          ;BIT SHOULD HAVE BEEN SET,
1938                                ;EXAMINE READER STATUS WORD MANUALLY,
1939                                ;*****
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                                ;TEST THAT READER OFF-LINE SETS ERROR BIT (BIT 15) IN READER STATUS WORD,
1946 005572 004567 174756          JSR 05,PCSIM
1947 005576 000033          33
1948 005600 005616          AT3A
1949 005602 104004          TYPES          ;TYPE: *TURN READER POWER ON,
1950 005604 015722          IM1          ;OFF-LINE, NO TAPE
1951 005606 016014          IM3
1952 005610 017025          IM23
1953 005612 177777          -1
1954 005614 000000          HALT
1955 005616 005777 173366          AT3A: TST 0PRS          ;WAIT FOR USER,
1956 005622 100401          BHI .+4          ;CHECK BIT 15 OF PRS
1957 005624 104006          ERROR          ;BRANCH IF BIT 15 SET.
1958 005626 104013          SCOPE          ;ERROR, ERROR BIT(BIT15) NOT SET BY
1959                                ;READER BEING OFF-LINE,
1960                                ;*****
1960 005630 100004          AT4: 4+MANUAL          ;TEST 0
1961 005632 005704          AT5          ;NEXT WORD
1962 005634 001750          1000,          ;I COUNT
1963 005636 005672          AT4A          ;SCOPE ENTRY
1964                                ;*****
1965                                ;TEST THAT READER OUT OF TAPE SETS ERROR BIT(BIT 15) IN READER STATUS WORD,
1966 005640 004567 174710          JSR 05,PCSIM
1967 005644 000033          33
1968 005646 005664          10
1969 005650 104004          TYPES          ;TYPE: SET READER AS FOLLOWS; POWER ON ON-LINE,
1970 005652 015722          IM1          ;NO TAPE,
1971 005654 016051          IM4
1972 005656 017025          IM23
1973 005660 177777          -1
1974 005662 000000          HALT
1975 005664 005277 173320          10: INC 0PRS          ;WAIT FOR USER,
1976 005670 104400          DELAYX          ;ENABLE READER
1977 005672 005777 173312          AT4A: TST 0PRS          ;WAIT A WHILE,
1978 005676 100401          BHI .+4          ;CHECK BIT 15 OF PRS
1979 005700 104006          ERROR          ;BRANCH IF BIT 15 SET,
1980 005702 104013          SCOPE          ;ERROR, ERROR BIT (BIT 15) NOT SET BY
1981                                ;READER OUT OF TAPE,
1982                                ;*****
1982 005704 100005          AT5: 5+MANUAL          ;TEST 0
1983 005706 005760          AT6          ;NEXT TEST
1984 005710 001750          1000,          ;I COUNT
1985 005712 005746          AT5A          ;SCOPE ENTRY
1986                                ;*****
1987                                ;TEST THAT ERROR BIT (BIT 15) OF READER STATUS WORD (PRS) IS NOT SET
1988                                ;WITH READER POWER ON, READER ON-LINE AND WITH TAPE LOADED IN READER
1989 005714 004567 174634          JSR 05,PCSIM
1990 005720 000433          433          ;TURN OFF RDR ERROR ON XOR TESTER
1991 005722 005740          10
1992 005724 104004          TYPES          ;TYPE, SET READER AS FOLLOWS; POWER ON, ON-LINE,

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1993 005726 015722          IM1          ;TAPE IN READER.
1994 005730 016271          IM5
1995 005732 017029          IM23
1996 005734 177777          -1
1997 005736 000000          HALT
1998 005740 005277 173244 18: INC      0PRS      ;WAIT FOR USER
1999 005744 104400          DELAYX      ;ENABLE READER.
2000 005746 005777 173236 AT5A: TST      0PRS      ;WAIT A WHILE.
2001 005752 100001          BPL         ;CHECK BIT 15 OF PRS
2002 005754 104006          ERROR      .+4      ;BR IF BIT 15 NOT SET.
2003 005756 104013          SCOPE      ;ERROR, ERROR BIT (BIT 15) SET WITH NO
                ;ERROR CONDITION PRESENT.
2004          ;*****
2005 005760 000006          AT6: 6      ;TEST 6
2006 005762 006042          AT7      ;NEXT TEST
2007 005764 001750          100.      ;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 AT6A: 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          AT6E1: ERROR      ;NO, ERROR, FAILED TO SET ID BIT (BIT 6)
2017 006016 104013          SCOPE      ;IN PRS.
2018 006020 042777 000100 173162 AT6B: BIC      0BIT6,0PRS      ;CLEAR ID BIT IN PRS.
2019 006026 032777 000100 173154          BIT      0BIT6,0PRS      ;CHECK ID BIT IN PRS
2020 006034 001401          BEQ      .+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          AT7: 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 AT7A: BIS      0BIT6,0PRS      ;SET ID BIT IN PRS
2032 006066 104002          SRESET      ;RESET
2033 006070 032777 000100 173112          BIT      0BIT6,0PRS      ;TEST ID BIT
2034 006076 001401          BEQ      .+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          AT10: 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 AT10A: JSR      07,ARRDY      ;CHECK FOR READER READY
2045 006120 005277 173064          INC      0PRS      ;ENABLE READER
2046 006124 104400          DELAYX      ;WAIT.

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2047 006126 105777 173056          TSTB  OPRB          ;TEST FOR DONE (BIT 7)
2048 006132 100401          BMI    .+4          ;BRANCH IF DONE BIT WAS SET..
2049 006134 104006          AT10E: ERROR        ;ERROR, SOMETIME AFTER READER
2050 006136 104013          SCOPE                ;ENABLE, DONE BIT WAS NOT SET.
;.....
2051
2052 006140 000011          AT11:  11           ;TEST 0
2053 006142 006174          AT12          ;NEXT TEST
2054 006144 001750          1000.             ;I COUNT
2055 006146 006162          AT11A         ;SCOPE ENTRY
;.....
2056
2057
2058 006150 004767 174466          JSR    07,ARRDY    ;CHECK FOR READER READY.
2059 006154 005277 173030          INC    OPRB        ;ENABLE READER
2060 006160 104400          DELAYX         ;WAIT.
2061 006162 105777 173022          AT11A: TSTB  OPRB    ;TEST DONE BIT (BIT 7 OF PRB)
2062 006166 100401          BMI    .+4          ;BR IF DONE BIT SET.
2063 006170 104006          ERROR          ;ERROR, DONE BIT NOT SET, OR FAILED
2064 006172 104013          SCOPE          ;TO READ IT.
;.....
2065
2066 006174 000012          AT12:  12           ;TEST 0
2067 006176 006246          AT13          ;NEXT TEST
2068 006200 000144          100.             ;I COUNT
2069 006202 006204          AT12A         ;SCOPE ENTRY.
;.....
2070
2071
2072 006204 004767 174432          AT12A: JSR    07,ARRDY ;CHECK FOR READER READY
2073 006210 005277 172774          INC    OPRB        ;ENABLE READER
2074 006214 104400          DELAYX         ;WAIT.
2075 006216 105777 172766          TSTB  OPRB        ;TEST FOR DONE BIT
2076 006222 100005          BPL    AT12E1     ;BRANCH IF DONE BIT NOT SET
2077 006224 000005          RESET          ;RESET
2078 006226 105777 172756          TSTB  OPRB        ;TEST DONE BIT
2079 006232 100403          BMI    AT12E2     ;BRANCH IF DONE BIT STILL SET.
2080 006234 104013          SCOPE
2081 006236 104006          AT12E1: ERROR      ;ERROR 1. DONE BIT NOT SET.
2082 006240 104013          SCOPE
2083 006242 104006          AT12E2: ERROR      ;ERROR 2. DONE BIT NOT RESET BY
2084 006244 104013          SCOPE            ;RESET INSTRUCTION.
;.....
2085
2086 006246 000013          AT13:  13           ;TEST0
2087 006250 006314          AT14          ;NEXT TEST
2088 006252 000144          100.             ;I COUNT
2089 006254 006256          AT13A         ;SCOPE ENTRY
;.....
2090
2091
2092 006256 104002          AT13A: SRESET     ;TEST THAT DONE BIT (BIT7 OF PRB) IS CLEARED WHEN ENABLING THE READER.
2093 006260 004767 174356          JSR    07,ARRDY    ;RESET
;CHECK FOR READER READY

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2094 006264 005277 172720      INC      0PRS      ;ENABLE READER
2095 006270 105777 172714      TSTB    0PRS      ;TEST FOR DONE BIT
2096 006274 100375                BPL     .-4        ;BRANCH IF DONE BIT NOT SET
2097 006276 005277 172706      INC      0PRS      ;ENABLE READER AGAIN
2098 006302 105777 172702      TSTB    0PRS      ;TEST DONE BIT AGAIN
2099 006306 100001                BPL     .+4        ;BRANCH IF DONE BIT IS RESET
2100 006310 104006                ERROR
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,ARRDY ;CHECK FOR READER READY,
2110 006330 005277 172654                INC      0PRS      ;ENABLE READER
2111 006334 105777 172650                TSTB    0PRS      ;TEST FOR DONE BIT
2112 006340 100375                BPL     .-4        ;BRANCH IF DONE BIT NOT SET,
2113 006342 005777 172644                TST     0PRB      ;REFERENCE READER BUFFER (PRB)
2114 006346 105777 172636                TSTB    0PRS      ;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,PCSIM   ;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      0PRS
2132 006420 105777 172564                TSTB    0PRS
2133 006424 100375                BPL     .-4
2134 006426 005277 172556                INC      0PRS      ;ENABLE READER
2135 006432 032777 004000 172550      BIT     0BIT11,0PRS ;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,

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2150 006470 005277 172514      INC      0PRS      ;ENABLE READER
2151 006474 105777 172510      TSTB    0PRS      ;WAIT FOR DONE BIT
2152 006500 100375                BPL      -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                SUBRD
2183 006622 104007                ERROR1
2184 006624 017675                EM2
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

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2206 006712 012737 000433 177060      MOV      0433,00177060
2207 006720 005777 172264      TST      0PRS
2208 006724 104000      DELAY
2209 006726 000010      10
2210 006730 005777 172254      TST      0PRS
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 012767 000000 171010  AT21A:  MOV      0PRTY0,PSW      ;SET PROCESSOR PRIORITY TO 0
2225 006766 042777 000100 172214      BIC      0BIT6,0PRS      ;DISABLE READER INTERRUPT.
2226 006774 004767 173662      JSR      07,AREAD        ;GO READ CHARACTER.
2227 007000 052777 000100 172202      BIS      0BIT6,0PRS      ;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      RDRLVL,PSW      ;SET PROCESSOR PRIORITY SAME AS READER PRIORITY.
2242 007036 005077 172146      CLR      0PRS          ;DISABLE READER INTERRUPT.
2243 007042 004767 173614      JSR      07,AREAD        ;GO READ A CHARACTER.
2244 007046 052777 000100 172134      BIS      0BIT6,0PRS      ;ENABLE READER INTERRUPT.
2245 007054 000240      NOP          ;OK IF NO INTERRUPT OCCURS.
2246 007056 005077 172126      CLR      0PRS          ;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                                     ;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

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2262 007104 016767 172112 170664 AT23A: MOV RDRLVL,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,OPRS ;DISABLE READER INTERRUPT
2265 007126 004767 173530 JSR 07,AREAD ;GO READ A CHARACTER.
2266 007132 052777 000100 172050 BIS 0BIT6,OPRS ;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 RDRLVL
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,OPRS ;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 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,OPRS ;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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H4



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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

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```

;*****
;TEST THAT READER ERROR CRIPPLES READER ENABLE
      JSR      05,PCBIN
      JJ
      AT26A:  TYPES
                IM10
                IM23
                =1
                HALT
      AT26A:  TST      0PRS
                BPL      AT26E1
                INC      0PRS
                TST      XORFLG
                BNE      AT26B
                BIT      0BIT11,0PRS
                BNE      AT26E2
      AT26E1: ERROR
                SCOPE
      AT26E2: ERROR
      AT26B:  SCOPE
;*****
      AT27:  27+MANUAL
                AT30
                100,
                AT27A
;*****
;TEST THAT ERROR BIT IS ABLE TO INTERRUPT, AND AFTER INTERRUPT
;SERVICE IT DOES NOT REINTERRUPT AGAIN,
      JSR      05,PCBIN
      JJ
      AT27A:  AT27A
                TYPES
                IM10
                IM23
                =1
                HALT
      AT27A:  STRDRV
                AT27C
                TST      0PRS
                BPL      AT27E1
                BIC      0BIT6,0PRS
                BIS      0BIT6,0PRS
                NOP
      AT27E2: ERROR
      AT27C:  SCOPE
                MOV      0AT27E3,0RDRVTR
                MOV      0AT27D,006
                RTI
      AT27D:  NOP
      AT27E3: ERROR

```

```

;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.
;TEST 0
;NEXT TEST.
;I COUNT
;SCOPE ENTRY
;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
2375 007524 104006
2376 007526 104013
2377
2378 007530 100030
2379 007532 177777
2380 007534 001750
2381 007536 007576
2382
2383
2384
2385 007540 004567 173010
2386 007544 000033
2387 007546 007562
2388 007550 104004
2389 007552 016405
2390 007554 017025
2391 007556 177777
2392 007560 000000
2393 007562 104002
2394 007564 104011
2395 007566 007624
2396 007570 005277 171414
2397 007574 104400
2398 007576 005777 171406
2399 007602 100025
2400 007604 005077 171400
2401 007610 052777 000100 171372
2402 007616 000240
2403 007620 104006
2404 007622 104013
2405 007624 012716 007632
2406 007630 000002
2407 007632 104011
2408 007634 007654
2409 007636 005777 171346
2410 007642 100005
2411 007644 005277 171340
2412 007650 000240
2413 007652 104006
2414
2415 007654 104013
2416 007656 005077 171326
2417 007662 104006
2418 007664 104013

SCOPE
AT27E1: ERROR
SCOPE
;.....
AT30: 30+MANUAL
-1
1000.
AT30A
;.....
;TEST THAT WITH ERROR BIT SET AND HAVING GENERATED AN INTERRUPT,
;ISSUING A READER ENABLE CAUSES AN IMMEDIATE INTERRUPT.
JBR 05,PCSIM
33
18
TYPES
IN10
IM23
-1
HALT
101 SRESET
STRDRV
AT30B
INC 0PRS
DELAYX
AT30A: TST 0PRS
BPL AT30E1
CLR 0PRS
DIS 0BIT6,0PRS
NOP
AT30E2: ERROR
SCOPE
AT30B: MOV 0AT30C,006
RTI
AT30C: STRDRV
AT30D
TST 0PRS
BPL AT30E1
INC 0PRS
NOP
AT30E3: ERROR
AT30D: SCOPE
AT30E1: CLR 0PRS
ERROR
SCOPE
;WAS SERVICED
;ERROR 1, ERROR BIT NOT SET, OR READER
;NOT SET UP AS SPECIFIED
;TEST 0
;LAST TEST
;I COUNT
;SCOPE ENTRY.
;SET PTR VECTOR TO AT30B.
;ENABLE READER,
;WAIT A WHILE,
;TEST FOR ERROR,
;BRANCH IF ERROR NOT SET,
;DISABLE PTRI
;ENABLE PTRI
;ERROR FAILED TO INTERRUPT.
;ERROR INTERRUPTS TO HERE, SET UP INTERRUPT
;EXIT, AND EXIT.
;SET PTR VECTOR TO AT30D.
;TEST THAT ERROR BIT IS STILL ON.
;BRANCH IF NO ERROR BIT.
;READER ENABLE, SHOULD CAUSE
;IMMEDIATE INTERRUPT.
;ERROR, READER ENABLE WITH PREVIOUS ERROR
;INTERRUPT FAILED TO INTERRUPT.
;OK, INTERRUPT OCCURED,
;DISABLE PTRI
;ERROR BIT NOT SET.

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2419          ,SBTTL PRG1 - READER TEST
2420          ;PRG1: READER TEST
2421 007666 012767 007724 171356 PRG1:  MOV      07, 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      07, 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      07, BSYNC      ;SYNC READER; SET ERROR COUNTER.
2439 007740 004767 173136          BT0A:     JSR      07, BREAD      ;GO READ CHARACTER
2440 007744 004767 174422          JSR      07, 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 MSECS).
2450 007762 012767 177770 174316          MOV      017770, STLMSK
2451 007770 004767 174456          JSR      07, BSYNC      ;SYNC READER; SET ERROR COUNTER
2452 007774 104005          BT1A:     STALL         ;RANDOM STALL (0 TO 7 MSECS)
2453 007776 004767 173100          JSR      07, BREAD      ;GO READ CHARACTER
2454 010002 004767 174364          JSR      07, 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 MSECS) BEFORE EACH GROUP.
2463 010020 012767 177740 174260          MOV      017740, STLMSK ;LIMIT STALLS TO 31 MSECS.
2464 010026 004767 174420          JSR      07, BSYNC      ;SYNC READER, SET ERROR COUNTER
2465 010032 012767 000003 174330          BT2A:     MOV      03, RNCNT ;SET CHAR COUNT TO 3.
2466 010040 104005          STALL         ;RANDOM STALL (0 TO 31 MSECS).
2467 010042 004767 173034          BT2C:     JSR      07, BREAD      ;GO READ CHARACTER.
2468 010046 004767 174320          JSR      07, 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

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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 MSEC) BETWEEN GROUPS,
2480 010072 012767 177740 174206      MOV      0177740,BTMSK ;LIMIT STALLS TO 31 MSEC.
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 104008          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 MSEC),
2499 010150 012767 177740 174130      MOV      0177740,BTMSK
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 104008          STALL          ;RANDOM STALL (0 TO 31MSEC)
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                IMBA
2513 010230 004767 005006        JSR      07,SWTL
2514 010234 000167 171450        JMP      GETRDY          ;GO GET STARTED.
2515          ;*****
2516 010240 000000                CT0:    0                ;TEST 0
2517 010242 010270                CT1                    ;NEXT TEST
2518 010244 001750                1000,                ;I COUNT
2519 010246 010256                CT0A                   ;SCOPE ENTRY
2520          ;*****
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  ;SET UP MACHINE ERROR TRAP.
2535 010306 005777 170704        CT1A:   TST      0PPB          ;REFERENCE PUNCH BUFFER.
2536 010312 104013                SCOPE
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                IM11                     ;OFF AND REMOVE TAPE FROM
2551 010344 016467                IM12                     ;PUNCH
2552 010346 017025                IM23
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          ;*****
2562 010370 100003                CT3:    3+MANUAL        ;TEST 0
2563 010372 010436                CT4                    ;NEXT TEST
2564 010374 001750                1000,                ;I COUNT

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2565 010376 010424
2566
2567
2568 010400 004567 172150
2569 010404 000433
2570 010406 010424
2571 010410 104004
2572 010412 016434
2573 010414 016513
2574 010416 017025
2575 010420 177777
2576 010422 000000
2577 010424 005777 170564
2578 010430 100401
2579 010432 104006
2580 010434 104013
2581
2582 010436 100004
2583 010440 010504
2584 010442 001750
2585 010444 010472
2586
2587
2588 010446 004567 172102
2589 010452 000033
2590 010454 010472
2591 010456 104004
2592 010460 016434
2593 010462 016536
2594 010464 017025
2595 010466 177777
2596 010470 000000
2597 010472 005777 170516
2598 010476 100001
2599 010500 104006
2600 010502 104013
2601
2602 010504 000005
2603 010506 010566
2604 010510 001750
2605 010512 010514
2606
2607
2608 010514 012767 000340 167254
2609 010522 052777 000100 170464
2610 010530 032777 000100 170456
2611 010536 001002
2612 010540 104006
2613 010542 104013
2614 010544 042777 000100 170442
2615 010552 032777 000100 170434
2616 010560 001401
2617 010562 104006
2618 010564 104013
2619
2620 010566 000006

          CT3A
;.....
;TEST THAT PUNCH OUT OF TAPE SETS ERROR BIT IN PPS
          JSP      05,PCSIM
          433
          CT3A
          TYPES
          IM11
          IM13
          IM23
          -1
          HALT
CT3A:    TST      0PPS
          BMI      ,+4
          ERROR
          SCOPE
;.....
CT4:     4+MANUAL
          CT5
          1000,
          CT4A
;.....
;TEST THAT PUNCH ERROR BIT IS NOT SET WHEN PUNCH POWER IS ON AND TAPE IS IN PUNCH.
          JSR      05,PCSIM
          33
          CT4A
          TYPES
          IM11
          IM14
          IM23
          -1
          HALT
CT4A:    TST      0PPS
          BPL      ,+4
          ERROR
          SCOPE
;.....
CT5:     5
          CT6
          1000,
          CT5A
;.....
;TEST ABILITY TO SET AND CLEAR ID BIT (BIT 6) IN PPS
CT5A:    MOV      0PRI7,PSW
          BIS      0BIT6,0PPS
          BIT      0BIT6,0PPS
          BNE      CT5B
          ERROR
          SCOPE
CT5B:    BIC      0BIT6,0PPS
          BIT      0BIT6,0PPS
          BEQ      ,+4
          ERROR
          SCOPE
;.....
CT6:     6
;TEST 0

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AS

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2621 010570 010630          CT7          ;NEXT TEST
2622 010572 000144          100.         ;I COUNT
2623 010574 010576          CT6A         ;SCOPE ENTRY
2624                                     ;*****
2625 ;TEST ABILITY TO CLEAR ID BIT IN PPS (BIT6) WITH RESET INSTRUCTION
2626 010576 012767 000340 167172 CT6A:  MOV    @PRTY7,PSW    ;SET PRIORITY 7.
2627 010604 052777 000100 170402     BIS    @BIT6,OPPS    ;SET ID BIT IN PPS.
2628 010612 104002          SRESET      ;RESET.
2629 010614 032777 000100 170372     BIT    @BIT6,OPPS    ;TEST ID BIT IN PPS.
2630 010622 001401          BEQ        .+4       ;BR IF IE BIT NOT SET.
2631 010624 104006          ERROR      ;ERROR, RESET INSTRUCTION FAILED TO
2632 010626 104013          SCOPE      ;CLEAR ID BIT (BIT 6) IN PPS.
2633                                     ;*****
2634 010630 000007          CT7:      7          ;TEST 0
2635 010632 010652          CT10     ;NEXT TEST
2636 010634 001750          1000.    ;I COUNT
2637 010636 010640          CT7A     ;SCOPE ENTRY
2638                                     ;*****
2639 ;TEST THAT READY BIT (BIT 7) IS SET FOLLOWING A RESET INSTRUCTION, AND
2640 ;THAT THE READY BIT CAN BE READ RELIABLY.
2641 010640 105777 170350          CT7A:   TSTB   @PPS    ;TEST PPS
2642 010644 100401          BMI     .+4       ;BR IF READY BIT SET.
2643 010646 104006          ERROR   ;ERROR, RESET FAILED TO SET READY BIT,
2644 010650 104013          SCOPE   ;OR FAILED TO READ READY BIT.
2645                                     ;*****
2646 010652 000010          CT10:   10         ;TEST 0
2647 010654 010742          CT11     ;NEXT TEST
2648 010656 000400          256.    ;I COUNT
2649 010660 010662          CT10A    ;SCOPE ENTRY
2650                                     ;*****
2651 ;TEST THAT READY BIT (BIT 7) OF PPS IS RESET BY LOADING PUNCH BUFFER (PPB)
2652 010662 104002          CT10A:  SRESET   ;RESET
2653 010664 004767 174314          JSR    @7,CPRDY    ;CHECK FOR PUNCH READY
2654 010670 012777 000000 170320 CT10B:  MOV    @0,PPB    ;LOAD 0 INTO PUNCH BUFFER (PPB)
2655 010676 105777 170312          TSTB   @PPS    ;TEST PPS
2656 010702 100001          BPL    .+4       ;BR IF READY BIT RESET.
2657 010704 104006          ERROR   ;ERROR, LOADING PUNCH BUFFER (PPB)
2658 010706 013746 000004          MOV    @04,-(06)
2659 010712 012737 010736 000004          MOV    @XPBE,@04
2660 010720 005737 177060          TST    @0177060
2661 010724 105237 010672          INCB   @CT10B+2
2662 010730 012637 000004          XP:    MOV    (06)+,@04
2663 010734 104013          CT10C:  SCOPE      ;FAILED TO RESET READY BIT IN PPS
2664 010736 022626          XPBE:  CMP    (06)+,(06)+
2665 010740 000773          BR     XP
2666
2667                                     ;*****
2668 010742 000011          CT11:   11         ;TEST 0
2669 010744 011004          CT12     ;NEXT TEST
2670 010746 000144          100.    ;I COUNT
2671 010750 010752          CT11A    ;SCOPE ENTRY
2672                                     ;*****
2673 ;TEST THAT READY BIT (BIT 7) IS NOT RESET BY BYTE LOADING PPB+1.
2674 010752 104002          CT11A:  SRESET   ;RESET
2675 010754 004767 174224          JSR    @7,CPRDY    ;CHECK FOR PUNCH READY.
2676 010760 016700          MOV    PPB,@0

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2677 010764 005200          INC      00
2678 010766 112710 000000    MOVB   00,006    ;LOAD PPS+1
2679 010772 105777 170216    TSTB   0PPS     ;TEST PPS
2680 010776 100401          BMI     +4       ;BRANCH IF READY BIT NOT RESET.
2681 011000 104006          CT11E: ERROR    ;ERROR, LOADING PPS+1 CLEARED READY BIT.
2682 011002 104013          SCOPE
2683                                     ;*****
2684 011004 000012          CT12:  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    CT12A: CLR     PSH    ;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          CT12E: ERROR    ;ERROR, FAILURE TO INTERRUPT WITH
2699                                     ;PUNCH READY BIT SET.
2700 011050 104013          CT12C: SCOPE    ;INTERRUPT VECTOR POINTS HERE.
2701                                     ;*****
2702 011052 000013          CT13:  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          CT13A: STPCHV   ;SET UP PUNCH INTERRUPT VECTOR
2709 011064 011120          CT13C        ;
2710 011066 005067 166704    CLR     PSH    ;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          CT13E1: ERROR   ;ERROR1, PUNCH FAILED TO INTERRUPT.
2716 011116 104013          SCOPE
2717 011120 012777 011140 170076 CT13C: 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          CT13D: NOP
2721 011136 104013          SCOPE
2722 011140 104006          CT13E2: ERROR   ;ERROR2, PUNCH REINTERRUPTED AFTER RTI WITH
2723 011142 104013          SCOPE        ;READY BIT LEFT ON.
2724                                     ;*****
2725 011144 000014          CT14:  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,

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2733 011156 011214
2734 011160 016767 170042 166610 CT14A: MOV PCHLVL,PSW ;SET PROCESSOR PRIORITY SAME AS PUNCH.
2735 011166 005077 170022 CLR 0PPS ;DISABLE PUNCH INTERRUPT.
2736 011172 004767 174006 JSR 07,CPRDY ;CHECK FOR PUNCH READY.
2737 011176 052777 000100 170010 BIS 0BIT6,0PPS ;ENABLE PUNCH INTERRUPT.
2738 011204 000240 NOP ;OK IF NO INTERRUPT OCCURS.
2739 011206 005077 170002 CLR 0PPS ;DISABLE PUNCH INTERRUPT.
2740 011212 104013
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 ;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 ;TEST THAT PUNCH INTERRUPTS WITH PROCESSOR AT PRIORITY 1 LEVEL LOWER
2752 ;THAN THE PUNCH PRIORITY.
2753 011230 104012 STPCHV ;SET UP PUNCH INTERRUPT VECTOR
2754 011232 011274 CT15B
2755 011234 016767 167766 166534 CT15A: MOV PCHLVL,PSW ;SET PROCESSOR PRIORITY ONE LEVEL LOWER
2756 011242 162767 000040 166526 SUB 040,PSW ;THAN PUNCH PRIORITY.
2757 011250 042777 000100 167736 BIC 0BIT6,0PPS ;DISABLE PUNCH INTERRUPT
2758 011256 004767 173722 JSR 07,CPRDY ;CHECK FOR PUNCH READY.
2759 011262 052777 000100 167724 BIS 0BIT6,0PPS ;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 CT15D: 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 0PRTY7,PSW ;SET PROCESSOR PRIORITY TO 7
2776 011320 004767 173660 JSR 07,CPRDY ;CHECK FOR PUNCH READY.
2777 011324 042777 000100 167662 BIC 0BIT6,0PPS ;DISABLE PUNCH INTERRUPT
2778 011332 052777 000100 167654 BIS 0BIT6,0PPS ;ENABLE PUNCH INTERRUPT
2779 011340 005067 166432 CLR PSW ;LOWER PRTY TO 0.
2780 011344 012767 000340 166424 MOV 0PRTY7,PSW ;RAISE CP PRIORITY BACK TO 7.
2781 011352 104006 CT16E: ERROP ;ERROR, PUNCH FAILED TO INTERRUPT IMMEDIATELY
2782 ;AFTER CP PRIORITY WAS LOWERED TO 0.
2783 011354 104013 CT16D: 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

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2789
2790
2791
2792 011366 004567 171162
2793 011372 000433
2794 011374 011410
2795 011376 104004
2796 011400 016567
2797 011402 017025
2798 011404 177777
2799 011406 000000
2800 011410 104002
2801 011412 104012
2802 011414 011454
2803 011416 005777 167572
2804 011422 100026
2805 011424 112777 000000 167564
2806 011432 042777 000100 167554
2807 011440 052777 000100 167546
2808 011446 000240
2809 011450 104006
2810 011452 104013
2811 011454 012777 011474 167542
2812 011462 012716 011470
2813 011466 000002
2814 011470 000240
2815 011472 104013
2816 011474 104006
2817 011476 104013
2818 011500 104006
2819 011502 104013
2820
2821 011504 100020
2822 011506 177777
2823 011510 001750
2824 011512 011536
2825
2826
2827
2828 011514 004567 171034
2829 011520 000433
2830 011522 011536
2831 011524 104004
2832 011526 016567
2833 011530 017025
2834 011532 177777
2835 011534 000000
2836 011536 104002
2837 011540 104012
2838 011542 011572
2839 011544 005777 167444
2840 011550 100025
2841 011552 005077 167436
2842 011556 052777 000100 167430
2843 011564 000240
2844 011566 104006

;*****
;TEST THAT THE PUNCH ERROR BIT IS ABLE TO INTERRUPT, AND THAT IT DOES NOT
;REINTERRUPT AFTER RTI.
JBR 05,PCSIM
433
CT17A:
TYPES
IN15
IN23
-1
HALT
CT17A: SRESET
STPCHV
CT17B
TST 0PPS
BPL CT17E3
MOVB 00,0PPB
BIC 0BIT6,0PPB
BIS 0BIT6,0PPB
NOP
CT17E1: ERROR
SCOPE
CT17B: MOV 0CT17E2,0PCHVTR
NOV 0CT17C,006
RTI
CT17C: NOP
SCOPE
CT17E2: ERROR
SCOPE
CT17E3: ERROR
SCOPE
;*****
CT20: 20+MANUAL
-1
1000,
CT20A
;*****
;TEST THAT WITH ERROR BIT SET AND HAVING GENERATED AN INTERRUPT,
;LOADING THE PUNCH BUFFER CAUSES AN IMMEDIATE INTERRUPT.
JBR 05,PCSIM
433
CT20A
TYPES
IN15
IN23
-1
HALT
CT20A: SRESET
STPCHV
CT20B
TST 0PPS
BPL CT20E1
CLR 0PPB
BIS 0BIT6,0PPB
NOP
CT20E2: ERROR

;TURN PUN ERROR ON IF ON XOR TESTLR.
;TYPE INSTRUCTION TO REMOVE TAPE FROM PUNCH
;RESET
;SET UP PUNCH INTERRUPT VECTOR.
;TEST PPS
;BRANCH IF ERROR BIT NOT SET,
;GO TO PPB TO RESET READY.
;DISABLE PUNCH INTERRUPT
;ENABLE PUNCH INTERRUPT
;ERROR1, PUNCH ERROR BIT FAILED TO
;CAUSE INTERRUPT.
;CHANGE INTERRUPT VECTOR TO CT17E2
;CHANGE INTERRUPT RETURN ADDR TO CT17C
;RETURN FROM INTERRUPT
;HERE IF NO REINTERRUPT OCCURS.
;ERROR2, PUNCH REINTERRUPTED AFTER
;RTI, (ERROR BIT LEFT ON).
;ERROR3, ERROR BIT NOT SET.
;TEST 0
;LAST TEST
;I COUNT
;SCOPE ENTRY
;MESSAGE TO REMOVE TAPE FROM PUNCH
;RESET.
;SET PTPI VECTOR TO CT20B.
;TEST FOR ERROR
;BRANCH IF ERROR BIT NOT SET.
;DISABLE PTPI
;ENABLE PTPI
;ERROR FAILED TO INTERRUPT.

```

2845	011570	104013					
2846	011572	012716	011600	CT200:	MOV	0CT20C,006	;ERROR INTERRUPT COMES HERE, SET UP
2847	011576	000002			RTI		;INTERRUPT EXIT TO CT20 AND EXIT.
2848	011600	104012		CT20C:	STPCHV		;SET PTPI VECTOR TO CT200.
2849	011602	011622			CT200		
2850	011604	005777	167404		TST	0PPS	;TEST ERROR
2851	011610	100005			BPL	CT20E1	;BRANCH IF ERROR BIT NOT SET.
2852	011612	005077	167400		CLR	0PPS	;LOAD PUNCH BUFFER.
2853	011616	000240			NOP		
2854	011620	104006		CT20E3:	ERROR		;BUFFER LOAD WITH PREVIOUS ERROR
2855							;INTERRUPT FAILED TO INTERRUPT.
2856	011622	104013		CT20D:	SCOPE		;OK, INTERRUPT OCCURRED.
2857	011624	005077	167364	CT20E1:	CLR	0PPS	;CLEAR PTPI
2858	011630	104006			ERROR		;ERROR, ERROR BIT NOT SET.
2859	011632	104013			SCOPE		

```

2860
2861
2862
2863 011634 012767 011662 167410 PRG3:  ,SMTL  PRG3 - PUNCH TEST
2864 011642 104003          TYPE          ;ADDR OF 1ST ROUTINE TO KSTART,
2865 011644 015627          INOB          ;TYPE TITLE.
2866 011646 004767 003370          JSR          07,SMTL
2867 011652 004767 172312          JSR          PC,PTNCAL          ;CALIBRATE DELAY RTN WITH PUNCH,
2868 011656 000167 170026          JMP          GETRDY          ;GO GET STARTED
2869
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 DT0A:  MOV          0512,,RCNT          ;SET CHARACTER COUNT TO 512
2877 011700 004567 000322          JSR          05,PFRT          ;GO PUNCH FRONT END AND MODE 0
2878 011704 000000          0          ;INDICATOR
2879 011706 004767 172742          JSR          07,INBIN          ;INITIALIZE SPECIAL BINARY COUNT
2880 011712 004767 172774          DT0B:  JSR          07,GTBIN          ;GET BINARY CHARACTER
2881 011716 004767 173314          JSR          07,HSPCH          ;GO PUNCH THE CHARACTER
2882 011722 005367 167450          DEC          RCNT          ;DECREMENT CHAR COUNT,
2883 011726 001371          BNE          DT0B          ;BRANCH IF COUNT NOT YET 0 YET.
2884 011730 104013          SCOPE
2885          ;*****
2886 011732 000001          DT1:  1          ;TEST 1
2887 011734 012012          DT2          ;NEXT TEST
2888 011736 000005          5          ;I COUNT
2889 011740 011750          DT1A          ;SCOPE ENTRY
2890          ;*****
2891          ;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 1 (RANDOM STALLS AFTER
2892          ;PUNCHING EACH CHARACTER, MAXIMUM STALL 47 MILLISECONDS)
2893 011742 012767 177720 172336          MOV          0177720,BTLMK          ;SET STALL MASK FOR 57(8) MAX
2894 011750 012767 001000 167420 DT1A:  MOV          0512,,RCNT          ;SET CHARACTER COUNT TO 512,
2895 011756 004567 000244          JSR          05,PFRT          ;GO PUNCH FRONT END, AND MODE 1
2896 011762 000001          1          ;INDICATOR
2897 011764 004767 172664          JSR          07,INBIN          ;INITIALIZE SPECIAL BINARY COUNT.
2898 011770 004767 172716          DT1B:  JSR          07,GTBIN          ;GET BINARY CHARACTER.
2899 011774 004767 173236          JSR          07,HSPCH          ;GO PUNCH THE CHARACTER.
2900 012000 104005          STALL          ;RANDOM STALL.
2901 012002 005367 167370          DEC          RCNT          ;DECREMENT CHAR COUNT,
2902 012006 001370          BNE          DT1B          ;BRANCH IF COUNT NOT YET 0.
2903 012010 104013          SCOPE
2904          ;*****
2905 012012 000002          DT2:  2          ;TEST 2
2906 012014 012114          DT3          ;NEXT TEST
2907 012016 000005          5          ;I COUNT
2908 012020 012036          DT2A          ;SCOPE ENTRY
2909          ;*****
2910          ;PUNCH SPECIAL BINARY COUNT PATTERN IN PUNCH MODE 2.
2911          ;(RANDOM STALL BEFORE PUNCHING RANDOM LENGTH GROUP OF CHARACTERS).
2912          ;MAXIMUM STALL 47 MILLISECONDS, MAXIMUM GROUP LENGTH -15)
2913 012022 012767 177720 172256          MOV          0177720,BTLMK          ;SET STALL MASK FOR 57(8) MAX.
2914 012030 012767 177760 172330          MOV          0177760,RCMSK          ;SET CHAR GROUP MASK FOR 17(8) MAX).
2915 012036 012767 001000 167332 DT2A:  MOV          0512,,RCNT          ;SET CHARACTER COUNT TO 512.

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2916	012044	004547	000156		JSR	05, PFRNT		;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	DT3D:	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			BEQ	DT3D		;BRANCH IF COUNT IS 0,
2925	012102	005367	172262		DEC	RNCNT		;NOT 0, DECREMENT RANDOM CHAR COUNT,
2926	012106	001366			BNE	DT2C		;BRANCH IF COUNT NOT YET 0,
2927	012110	000762			BR	DT3D		;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	;SET CHARACTER COUNT TO 512,
2939	012132	004567	000070		JSR	05, PFRNT		;GO PUNCH FRONT END AND MODE 3
2940	012136	000003			3			;INDICATOR,
2941	012140	004767	172510		JSR	07, INBIN		;INITIALIZE SPECIAL BIN COUNT
2942	012144	104000		DT3B:	DELAY			;STALL 5 SECONDS
2943	012146	011610			5000.			
2944	012150	012767	000040	172212	DT3C:	MOV	032, RNCNT	;SET GROUP COUNT TO 32,
2945	012156	004767	172530		JSR	07, GTBIN		;GET BINARY CHARACTER
2946	012162	004767	173050		JSR	07, HSPCH		;PUNCH CHARACTER
2947	012166	005367	167204		DEC	RCNT		;DECREMENT CHAR COUNT
2948	012172	001404			BEQ	DT3D		;BRANCH IF COUNT IS 0
2949	012174	005367	172170		DEC	RNCNT		;DECREMENT GROUP COUNT
2950	012200	001366			BNE	DT3C		;BRANCH IF COUNT NOT YET 0,
2951	012202	000760			BR	DT3B		;BRANCH IF COUNT 0,
2952	012204	104013		DT3D:	SCOPE			
2953								
2954	012206	000004		DT4:	4			;TEST 0,
2955	012210	177777			-1			;LAST TEST
2956	012212	000001			1			;I COUNT,
2957	012214	012216			DT4A			;SCOPE ENTRY POINT,
2958								
2959								
2960	012216	104003		DT4A:	TYPE			;TYPE END OF PASS
2961	012220	020201			P3END			
2962	012222	104010			CHALT			;COMMON HALT,
2963	012224	104013			SCOPE			
2964								
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					

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H5

2972	012254	012500		MOV	(5)+,00	;MOVE MODE CODE TO R0
2973	012256	004767	172754	JSR	07,HBPCH	;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,HBPCH	
2977	012274	005301		DEC	01	
2978	012276	001374		BNE	,-6	
2979	012300	000205		RTS	05	;EXIT.
2980						
2981						

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2982                                     ,SBTTL PRG4 - PUNCH VERIFY PROGRAM
2983                                     ;THIS PROGRAM VERIFIES TAPE PRODUCED BY PRG3,
2984                                     ;ANY ERRORS FOUND ARE REPORTED.
2985 012302 104004                                     PRG4: TYPES                                     ;TYPE TITLE AND INSTRUCTIONS
2986 012304 016700                                     IM20
2987 012306 016105                                     IM45
2988 012310 016334                                     IM6
2989 012312 017025                                     IM23
2990 012314 177777                                     -1
2991 012316 000000                                     HALT
2992 012320 004767 002716                               JSR      07,SWTL
2993 012324 004767 171370                               JSR      PC,RTMCAL
2994 012330 012767 000372 167062  ET0A:  MOV      0250,,CTRA      ;CALIBRATE DELAY RTN WITH READER,
2995 012336 012767 000012 167056  ET0B:  MOV      010,,CTRB      ;250 TO CTRA,(TOTAL CHAR COUNT),
2996 012344 004767 170532                               JSR      07,BREAD
2997 012350 005767 167024                               ET0C:  JSR      07,BREAD      ;READ CHAR
2998 012354 001007                                     TST      CRBUF
2999 012356 005367 167040                               BNE      ET0D      ;BRANCH IF NON-ZERO CHAR,
3000 012362 001412                                     DEC      CTRB      ;0 CHAR, DECREMENT CTRB
3001 012364 005367 167030                               BEQ      ET0F      ;BRANCH IF 10 CONSECUTIVE 0'S READ,
3002 012370 001365                                     DEC      CTRA      ;NO, DECREMENT CTRA,
3003 012372 000403                                     BNE      ET0C      ;BRANCH IF NOT YET 250 CHARS READ.
3004 012374 005367 167020                               BR       ET0E      ;250 CHARS READ, SYNE ERROR,
3005 012400 001356                                     ET0D:  DEC      CTRA      ;DECREMENT CTRA
3006 012402 104007                                     BNE      ET0B      ;BRANCH IF NOT 250 CHARS READ YET,
3007 012404 017747                                     ERROR1
3008 012406 000750                                     EN3
3009 012410 004767 170466                               BR       ET0A      ;SYNC ERROR, 250 CHARS READ WITHOUT
3010 012414 005767 166760                               JSR      07,BREAD      ;A SUCCESSFUL SYNC,
3011 012420 001004                                     TST      CRBUF      ;GO TRY AGAIN,
3012 012422 005367 166772                               BNE      ET0C      ;READ CHAR
3013 012426 001370                                     DEC      CTRA
3014 012430 000764                                     BNE      ET0F
3015 012432 022767 000377 166740  ET0G:  CMP      0377,CRBUF      ;BRANCH IF NON-ZERO CHAR,
3016 012440 001416                                     BEQ      ET0H      ;DECREMENT CTRA
3017 012442 012767 000377 166712  MOV      0377,ERRT      ;BRANCH IF NOT 250 CHARS READ YET.
3018 012450 004567 172400                               JSR      05,ACNV4      ;250 CHARS READ, SYNC ERROR,
3019 012454 001362                                     ERRT
3020 012456 020011                                     ESB
3021 012460 004567 172370                               JSR      05,ACNV4      ;COMPARE CHAR READ TO 377.
3022 012464 001400                                     CRBUF      ;377,OK.
3023 012466 020024                                     EWAS
3024 012470 104007                                     ERROR1      ;NOT 377,LEADER ERROR, SET UP FOR
3025 012472 017764                                     EM4
3026 012474 000715                                     BR       ET0A      ;ERROR TYPEOUT.
3027 012476 004767 170400                               JSR      07,BREAD
3028 012502 026727 166672 000003  ET0H:  CMP      CRBUF,03
3029 012510 101407                                     BLOS    ET0I      ;START OVER
3030 012512 004567 172336                               JSR      05,ACNV4      ;READ CHAR,
3031 012516 001400                                     CRBUF      ;COMPARE CHAR READ TO 3.
3032 012520 020103                                     FWAS      ;BRANCH IF SAME OR LOWER,
3033 012522 104007                                     ERROR1      ;ERROR, CONVERT DATA READ TO ASCII,
3034 012524 020031                                     EMS
3035 012526 000700                                     BR       ET0A      ;SET UP FOR TYPEOUT.
3036 012530 012767 000004 166662  ET0I:  MOV      04,CTRA      ;LEADER ERROR, SHOULD BE BETWEEN
3037 012536 005067 166620                               CLR      ERRT      ;0 AND 3.
                                     ;START OVER,
                                     ;4 TO CTRA (CHAR COUNT)
                                     ;CLEAR ERRT, EXPECTED CHAR IS 0.

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3030	012542	004767	170334		ET0J:	JSR	07,BREAD		;READ CHAR,
3039	012546	004767	000050			JSR	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			JSR	07,INBIN		;INITIALIZE SPECIAL BINARY COUNT,
3043	012564	012767	001000	166626		MOV	0512,,CTRA		;SET CHAR COUNT TO 512.
3044	012572	004767	170304		ET0K:	JSR	07,BREAD		;READ CHAR,
3045	012576	004767	172110			JSR	07,GTBIN		;GET BIN CHAR AND STORE AT
3046	012602	010067	166554			MOV	00,ERRT		;ERRT(HOLDS EXPECTED DATA),
3047	012606	004767	000010			JSR	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	ECHK		;BRANCH IF EQUAL,
3053	012632	004567	172216			JSR	05,ACNV4		;CONVERT EXPECTED DATA TO ASCII,
3054	012636	001362				ERRT			
3055	012640	017655				ASB			
3056	012642	004567	172206			JSR	05,ACNV4		;CONVERT DATA READ TO ASCII,
3057	012646	001400				CRBUF			
3058	012650	017670				AWAB			
3059	012652	104007				ERROR1			;ERROR, DATA ERROR,
3060	012654	017632				EN1			
3061	012656	000207			ECHK:	RTS	07		;EXIT



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3062                                     .SBTTL PRGS THROUGH PRG13
3063                                     ;*****
3064                                     ;PRGS - COMBINED READER PUNCH TEST, USES SPECIAL
3065                                     ;*****
3066                                     ;BINARY COUNT PATTERN.
3067 012660 104004                                     PRG5:  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      07, SMTL
3074 012700 004767 171264                               JSR      PC, PTNCAL                                     ;CALIBRATE DELAY RTN WITH PUNCH.
3075 012704 004767 171744                               JSR      07, INBIN                                     ;INITIALIZE BINARY COUNTS.
3076 012710 012767 177600 171370                         MOV      0177600, STLMSK                               ;SET MAX, STALL DELAY.
3077 012716 005067 000312                               CLR      PCHCNT                                       ;CLEAR PUNCH COUNT
3078 012722 005067 000310                               CLR      RBUSY                                        ;CLEAR READER BUSY INDICATOR
3079 012726 104011                                     STRDRV
3080 012730 013240                                     WNZERO
3081 012732 104012                                     STPCHV
3082 012734 012766                                     PBIN
3083 012736 004767 167700                               JSR      07, ARRDY                                     ;CHECK FOR READER READY
3084 012742 004767 172236                               JSR      07, CPRDY                                     ;CHECK FOR PUNCH READY
3085 012746 004767 172006                               JSR      07, GTBINP                                    ;GET BIN CHARACTER
3086 012752 010177 166240                               MOV      01, OPPB                                       ;PUNCH IT
3087 012756 052777 000100 166230                         BIS      0BIT6, OPPS                                     ;ENABLE PTPI
3088 012764 000777
3089 012766 005777 166222                               PBIN:  TST      0PPS
3090 012772 100004                                     BPL      PBNA
3091 012774 104003                                     TYPE
3092 012776 017456                                     SM3
3093 013000 104010                                     CHALT
3094 013002 000771
3095 013004 105777 166204                               PBNA:  TSTB
3096 013010 100402                                     BMI      PBND
3097 013012 104007                                     ERROR1
3098 013014 020161                                     EM11
3099 013016 005267 000212                               PBNB:  INC      PCHCNT
3100 013022 004767 171732                               JSR      07, GTBINP                                    ;INCREMENT PUNCH COUNT.
3101 013026 010177 166164                               MOV      01, OPPB                                       ;GET BINARY CHARACTER
3102 013032 105767 000200                                     TSTB
3103 013036 100414                                     BMI      PBINA                                       ;ENABLE PUNCH
3104 013040 026727 000170 000024                               CMP      PCHCNT, 20.
3105 013046 103001                                     BHS      .+4
3106 013050 000002                                     RTI
3107 013052 052767 000200 000156                               BIS      0BIT7, RBUSY
3108 013060 052777 000101 166122                               BIS      0101, OPRS
3109 013066 000002
3110 013070 026727 000140 000050                               RTI
3111                                     PBINA:  CMP      PCHCNT, 40.
                                     ;CHECK READER BUSY INDICATOR
                                     ;BRANCH IF READER BUSY
                                     ;NOT BUSY, PUNCH COUNT 20 YET?
                                     ;BRANCH IF PCHNT 20 OR MORE.
                                     ;NOT 20 YET, EXIT INTERRUPT
                                     ;SET READER BUSY
                                     ;ENABLE PTRI AND READER.
                                     ;EXIT INTERRUPT.
                                     ;PUNCH COUNT LARGER THAN 40?

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3111	013076	101402					BLOS	PBINB		;BRANCH IF NOT LARGER
3112	013100	005077	166110				CLR	OPPS		;LARGER, DISABLE PTP1
3113	013104	000002				PBINB:	RTI			;EXIT INTERRUPT,
3114	013106	005777	166076			CREAD:	TST	OPRS		;CHECK FOR ERROR,
3115	013112	100003					BPL	CRDA		;BRANCH IF NO ERROR,
3116	013114	004767	167576				JSR	07, TSM2		;ERROR, TYPE MESSAGE,
3117	013120	000772					BR	CREAD		
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					EMI0			
3122	013134	017767	166052	166236		CRDAA:	MOV	OPRB, CRBUF		;CHARACTER READ TO CRBUF
3123	013142	005367	000066				DEC	PCHCNT		
3124	013146	026727	000062	000037			CMP	PCHCNT, 031.		
3125	013154	101024					BNI	CREADC		;PUNCH COUNT GREATER THAN 317
3126	013156	032777	000100	166030			BIT	0BIT6, OPSS		;NO,
3127	013164	001003					BNE	CREADA		;PTPI ENABLED?
3128	013166	052777	000100	166020			BIS	0BIT6, OPSS		;NO, ENABLE PTP1,
3129	013174	005767	000034			CREADA:	TST	PCHCNT		
3130	013200	001006					BNE	CREADB		;PUNCH COUNT 0?
3131	013202	042767	000200	000026			BIC	0BIT7, RBUSY		;YES, CLEAR READER BUSY,
3132	013210	005077	165774				CLR	OPRS		;DISABLE PTR1,
3133	013214	000207					RTS	07		;EXIT,
3134	013216	055767	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	07		;EXIT,
3139	013234	000000				PCHCNT:	OPEN			
3140	013236	000000				RBUSY:	OPEN			
3141	013240	004767	177642			WZERO:	JSR	07, 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	0RBIN, 0ORDRVTR		;SET READER VECTOR TO READ BINARY
3146	013262	012767	000003	166126			MOV	03, EKCTR		;COUNT. SET ERROR COUNTER TO 3.
3147	013270	000402					BR	RBINA		
3148	013272	004767	177610			RBIN:	JSR	07, CREAD		;READ CHARACTER,
3149	013276	004767	171410			RBINA:	JSR	07, GTBIN		;GET BINARY CHARACTER
3150	013302	020067	166072				CMP	00, CRBUF		;COMPARE AGAINST CHAR READ,
3151	013306	001001					BNE	RBINB		;BRANCH IF NOT SAME,
3152	013310	000002					RTI			;SAME EXIT INTERRUPT,
3153	013312	010067	166044			RBINB:	MOV	00, ERR1		;MOVE EXPECTED CHAR TO ERR1
3154	013316	004567	171532				JSR	05, ACNV4		;CONVERT EXPECTED CHAR TO ASCII
3155	013322	001362					ERR1			
3156	013324	017655					ASB			
3157	013326	004567	171522				JSR	05, ACNV4		;CONVERT RECEIVED CHAR TO ASCII
3158	013332	001400					CRBUF			
3159	013334	017670					AWAB			
3160	013336	104007					ERROR1			;ERROR MESSAGE, DATA ERROR,
3161	013340	017632					EMI			
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	0BIT15, RBUSY		;DISABLE STALLS,
3166	013360	012777	013402	165632			MOV	0RBIND, 0ORDRVTR		;SET PTR VECTOR TO RBIND,

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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 156000
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
3185
3186 013454 104004
3187 013456 017003
3188 013460 016620
3189 013462 177777
3190 013464 012767 000004 165700 18:
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 28:
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 28:
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 18:
  
```

```

MOV      #3,ERCTR      ;USE ERCTR AS CHARACTER COUNTER.
MOV      #CHR1,#0      ;ADDR OF CHR1 TO 00
RTI      ;EXIT INTERRUPT
RBIND:   JSR      #7,CREAD ;READ CHARACTER
MOV      CRBUF,(0)+    ;STORE CHARACTER STARTING AT CHR1
DEC      ERCTR         ;3RD CHARACTER?
BEQ      .+4           ;YES.
RTI      ;EXIT INTERRUPT, NOT 3RD YET.
JSP      #7,SYNCA      ;GO SYNC THE READER.
BR       PBINC         ;NO SYNC, TRY AGAIN.
MOV      #RBIN,#RDRVTR ;SYNCED, SET READER VECTOR TO RBIN.
MOV      #3,ERCTR     ;SET ERROR COUNT TO 3.
BIC      #BIT15,RBUSY  ;ENABLE STALLS.
RTI      ;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
         MOV      TMP1,PUNC1
28:      MOV      #4,COUNT
         MOV      #SCH2,TLX
         OPTSEL
         CMP      #4,COUNT
         BEQ      28
         MOV      TMP1,PUNC1+1
         TYPE
         IM23
         HALT
PRG6A:   MOV      PUNC1,#0      ;PUNCH FIRST CHARACTER.
         JSR      #7,HSPCH
         MOV      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
  
```

3223	013654	012767	020654	001042		MOV	00RD2, TLX	
3224	013662	104014				OPTSEL		
3225	013664	022767	000004	165500		CMP	04, COUNT	
3226	013672	001765				BEQ	10	
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	000761				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	

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B6

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3279 014140 104003          TYPE
3280 014142 016643          IN17
3281 014144 012767 000004 165220 18:  NOV      04,COUNT
3282 014152 012767 020375 000344  NOV      08NUMCR,TLX
3283 014160 104014          OPTSEL
3284 014162 022767 000004 165202  CMP      04,COUNT
3285 014170 001768          BEG      10
3286 014172 116767 165166 165166  NOV8     TMP1,TMP2
3287 014200 012767 000004 165164 28:  NOV      04,COUNT
3288 014206 012767 020357 000510  NOV      08STALL,TLX
3289 014214 104014          OPTSEL
3290 014216 022767 000004 165146  CMP      04,COUNT
3291 014224 001768          BEG      28
3292 014226 116767 165132 165133  NOV8     TMP1,TMP2+1
3293 014234 104003          TYPE
3294 014236 017025          IN23
3295 014240 000000          HALT
3296 014242 004767 167452          JSR      PC,RTMICAL      ;CALIBRATE DELAY RTN WITH READER,
3297 014246 005067 000042          CLR      ITA:         ITY
3298 014252 005067 000042          CLR      ITX
3299 014256 116767 165105 000030  NOV8     TMP2+1,ITY      ;MOVE STALL COUNT TO ITY.
3300 014264 116767 165076 000026  NOV8     TMP2,ITX      ;MOVE CHAR COUNT TO ITX.
3301 014272 004767 166364          JSR      ITB:         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          BEG      ITA      ;BR IF YES,
3306 014312 104000          DELAY
3307 014314 000000          ITY:     OPEN
3308 014316 000753          BR      ITA      ;READ CHARS, STALL NOW,
3309 014320 000000          ITX:     OPEX      ;STALL COUNT IN MSEC.
3310          ;REPEAT
3311          ;*****
3312          ;PRG11, PUNCH SPECIAL BINARY COUNT PATTERN TEST TAPE
3313          ;*****
3313 014322 104004          PRG11:   TYPES      ;TYPE TITLE AND INSTRUCTIONS,
3314 014324 015653          IM0C
3315 014326 016620          IM16
3316 014330 017025          IM23
3317 014332 177777          -1
3318 014334 000000          HALT
3319 014336 012746 000024          NOV      020,,-(6)      ;WAIT FOR USER
3320 014342 005000          CLR      00      ;PUNCH 20 BLANK CHAR, LEADER
3321 014344 004767 170666          PRG11A: JSR      07,HSPCH
3322 014350 005316          DEC      006
3323 014352 001374          BNE      PRG11A
3324 014354 004767 170274          JSR      07,INBIN      ;INITIALIZE SPECIAL BINARY COUNT
3325 014360 004767 170326          PRG11B: JSR      07,GTBIN      ;GET BINARY CHARACTER,
3326 014364 004767 170646          JSR      07,HSPCH      ;PUNCH CHARACTER
3327 014370 000773          BR      PRG11B      ;REPEAT,
3328          ;*****
3329          ;PRG12 - READER SPEED PRINT LOOP
3330          ;*****
3331 014372 012767 000004 164772          PRG12:   NOV      04,COUNT
3332 014400 012767 020340 000316          NOV      08TIME,TLX
3333 014406 104014          OPTSEL
3334 014410 104003          TYPE
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3335 014412 020521          88KEY
3336 014414 000000          HALT
3337 014416 005067 165002   KTA: CLR      CTRC      ;CLEAR WORK REGISTERS
3338 014422 005067 164774   CLR      CTRB
3339 014426 005077 164600   CLR      0TKB
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 002767 000036 164746   KTB: ADD      030,,CTRC
3344 014456 000407          BR      KTD
3345 014460 004767 166176   KTC: JSR      07,AREAD ;READ CHARACTER.
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   KTD: MOV      CTRC,CTRA ;RELOAD CTRA.
3350 014504 105777 164520   KTE: TSTB      0TKS
3351 014510 100363          BPL      KTC
3352 014512 004567 000100   KTF: JSR      05,CPKPL ;GO TYPE OUT DEVICE SPEED.
3353 014516 017501          SM4
3354 014520 000000          HALT
3355 014522 000723          BR      PRG12
3356
3357 ;*****
3358 ;PRG13 - PUNCH SPEED PRINT LOOP
3359 ;*****
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   LTA: CLR      CTRB    ;CLEAR WORK AREAS.
3366 014544 005000   CLR      00
3367 014546 005077 164460   CLR      0TKB
3368 014552 000407   BR      LTC
3369 014554 004767 170456   LTB: JSR      07,HSPCH ;PUNCH A 0
3370 014560 005367 164634   DEC      CTRA        ;DECREMENT CTRA
3371 014564 001005          BNE      LTD        ;BRANCH IF CTRA NOT 0
3372 014566 005267 164630   INC      CTRB        ;INCREMENT CTRB.
3373 014572 012767 000074 164620   LTC: MOV      060,,CTRA ;MOVE 60 TO CTRA
3374 014600 105777 164424   LTD: TSTB      0TKS   ;TIME UP?
3375 014604 100363          BPL      LTD
3376 014606 004567 000004   LTE: JSR      05,CPKPL ;GO TYPE OUT DEVICE SPEED.
3377 014612 017523          SM5
3378 014614 000750          BR      LTA-2
3379 014616 012567 000022   CPKPL: MOV      (5)+,CPKPLA ;GO HALT AND READY UP FOR NEXT TIME,
3380 014622 004567 170430   JSR      05,BDCNV    ;MOVE ADDR OF 1ST MESSAGE TO CPKPLA.
3381 014624 001422          CTRB        ;CONVERT (CTRB) TO DECIMAL ASCII.
3382 014630 004567 170332   JSR      05,BMOVE    ;MOVE 3 DECIMAL CHARS TO PRINTOUT AREA.
3383 014634 015260          DECVAL+2
3384 014636 017544          ACPS
3385 014640 000003          J
3386 014642 104004          TYPES          ;TYPE DEVICE SPEED.
3387 014644 000000   CPKPLA: OPEN
3388 014646 017544          ACPS
3389 014650 177777          -1
3390 014652 000205   RTS      05          ;EXIT.

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3391									
3392									
3393	014654	005077	164350		TTIN:	CLR	0TK8		
3394	014660	005077	164346			CLR	0TKB		
3395	014664	005067	164504			CLR	TIB		
3396	014670	105777	164334		10:	TSTB	0TK8		
3397	014674	100375				BPL	16		
3398	014676	017767	164330	164470		MOV	0TKB,TIB		
3399	014704	105777	164324		20:	TSTB	0TP8		
3400	014710	100375				BPL	28		
3401	014712	116777	164456	164316		MOV8	TIB,0TP8		
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			10:	TTYIN			
3409	014734	104017				VALID			
3410	014736	000775				BR	10		
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	110:	CMPB	025,TIB		
3419	014770	001004				BNE	18		
3420	014772	022626			60:	POPSP2			
3421	014774	162716	000016			SUB	016,(SP)		
3422	015000	000002				RTI			
3423	015002	122767	000015	164364	10:	CMPB	015,TIB		
3424	015010	001004				BNE	48		
3425	015012	104003				TYPE			
3426	015014	020230				SCRLF			
3427	015016	022626			90:	POPSP2			
3428	015020	000002				RTI			
3429	015022	122767	000012	164344	40:	CMPB	012,TIB		
3430	015030	001410				BEQ	50		
3431	015032	122767	000060	164334	20:	CMPB	060,TIB		
3432	015040	003004				BGT	50		
3433	015042	122767	000067	164324		CMPB	067,TIB		
3434	015050	002003				BGE	70		
3435	015052	104003			50:	TYPE			
3436	015054	020232				SQUEST			
3437	015056	000745				BR	60		
3438	015060	006367	164300		70:	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	50		
3445	015116	000002				RTI			
3446									

MID  
EL6

3447							
3448	015120	105777	164104		CKSWRR:	TSTB	OTKS
3449	015124	100048				BPL	OUT
3450	015126	017767	164100	164240		MOV	OTKB, TIB
3451	015134	042767	177600	164232		BIC	0177600, TIB
3452	015142	022767	000007	164224		CMP	07, TIB
3453	015150	001033				BNE	OUT
3454	015152	104003				TYPE	
3455	015154	020223				SCTLG	
3456	015156	017767	164022	164200	CNTLU:	MOV	0SWR, TMP1
3457	015164	004567	167636			JBR	05, ACNV6
3458	015170	001364				TMP1	
3459	015172	020236				SVALUE	
3460	015174	104004				TYPES	
3461	015176	020304				0SWREQ	
3462	015200	020236				SVALUE	
3463	015202	177777				-1	
3464	015204	012767	020273	177512		MOV	0SNEW, TLX
3465	015212	012767	000007	164152		MOV	07, COUNT
3466	015220	104014				OPTSEL	
3467	015222	022767	000007	164142		CMP	07, COUNT
3468	015230	001403				BEO	OUT
3469	015232	016777	164126	163744		MOV	TMP1, 0SWR
3470	015240	000002			OUT:	RTI	
3471							
3472							
3473	015242	104004			SWTL:	TYPES	
3474	015244	015363				CM4	
3475	015246	015453				CM4B	
3476	015250	177777				-1	
3477	015252	104015				CNTL	
3478	015254	000207				RTS	07
3479							



3480												
3481	015256	020040	020040	040	DECVAL:	.SBTTL						
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	046801	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.0'					
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 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 (0NR0G) 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	IM0:	.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	'RETURN 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	045501	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			

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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 'LOAD 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 'PRESS 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 'MAKE 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 '00READER 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 '00READER 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	047120	EMS:	.ASCII	'80PUNCH SPEED : 0'
3705	017530	044103	051440	042020			
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	EMS:	.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	'8PTR NRP0'
3758	020134	051116	040120				
3759	020140	043040	046101	042523	EM10:	.ASCII	' FALSE RDR, INTRO'

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3760	020146	051040	051104	020056			
3761	020154	047111	051124	100			
3762	020161	040	040506	051514	EM11:	.ASCII	' FALSE PUN INTRO'
3763	020166	020105	052520	020116			
3764	020174	047111	051124	100			
3765	020201	045	051120	031507	P3END:	.ASCII	'@PRG3 END OF PASS@'
3766	020206	042440	042116	047440			
3767	020214	020106	040520	051523			
3768	020222	100					
3769	020223	045	043536	040045	SCTLG:	.ASCII	'@CG@'
3770	020230	040045			SCRLF:	.ASCII	'@@'
3771	020232	037445	040043		SOUEST:	.ASCII	'@?@'
3772	020236	020040	020040	020040	SVALUE:	.ASCII	' @'
3773	020244	040040					
3774	020246	051445	046105	041505	SRTN:	.ASCII	'@SELECT ROUTINE NO, @'
3775	020254	020124	047522	052125			
3776	020262	047111	020105	047516			
3777	020270	020056	100				
3778	020273	040	047040	053505	SNEW:	.ASCII	' NEW @'
3779	020300	020075	040040				
3780	020304	021445	053523	036522	S@NR@:	.ASCII	'@@NR@ @'
3781	020312	040040					
3782	020314	042445	052116	051105	S@TEST:	.ASCII	'@ENTER PROGRAM NO, @'
3783	020322	050040	047522	051107			
3784	020330	046501	047040	027117			
3785	020336	040040					
3786	020340	042445	052116	051105	S@TIME:	.ASCII	'@ENTER TIMING @'
3787	020346	052040	046511	047111			
3788	020354	020107	100				
3789	020357	045	047105	042524	S@STALL:	.ASCII	'@ENTER STALL @'
3790	020364	020122	052123	046101			
3791	020372	020114	100				
3792	020375	045	047105	042524	S@NUMCR:	.ASCII	'@ENTER CHARACTER COUNT @'
3793	020402	020122	044103	051101			
3794	020410	041501	042524	020122			
3795	020416	047503	047125	020124			
3796	020424	100					
3797	020425	045	051461	020124	S@CH1:	.ASCII	'@1ST CHAR TO PUNCH (ASCII) = @'
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	S@CH2:	.ASCII	'@2ND CHAR TO PUNCH (ASCII) = @'
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	S@KEY:	.ASCII	'@ PRESS CONTINUE WHEN READY@'
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		.ASCII	'@STRIKE ANY KEY AT END OF TIMING@'
3815	020564	040440	054516	045440			

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3816	020572	054505	040440	020124		
3817	020600	047105	020104	043117		
3818	020606	052040	046511	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 '0PC= '
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	BTITLE:	.ASCII '00MAINDEC-11-DEPCA-ES'
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

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ACNV	005112	AT2A	005546	AT6A	005776	CHALT	= 104710	CT12A	011020
ACNVB	005046	AT2B	006630	AT6B	006020	CHLT	002462	CT12C	011050
ACNVC	005074	AT20A	006650	AT6E1	006014	CHNAA	002204	CT12E	011040
ACNVM	005126	AT20B	006670	AT7	006042	CHNB	002244	CT13	011052
ACNVX	005110	AT20X	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	AT210	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	BIT0	= 000000	CKSWR	015120	CT14E	011214
ARDA	002672	AT23	007070	BIT1	= 000002	CLEAN	001716	CT15	011220
ARDB	002710	AT23A	007104	BIT10	= 002000	CM2	015267	CT15A	011234
ARDEP	002530	AT23B	007144	BIT11	= 004000	CM3	015325	CT15B	011274
AREAD	002662	AT23E	007142	BIT12	= 010000	CM4	015363	CT15E	011272
AREAD1	002666	AT24	007146	BIT13	= 020000	CM4B	015453	CT16	011276
ARRDY	002642	AT24A	007156	BIT14	= 040000	CM5	015467	CT16A	011312
ARRDYA	002654	AT24C	007214	BIT15	= 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
AT0	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	BMOVE	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	AT30A	007576	BT1A	007774	CT0E	010264	CT5	010504
AT15A	006406	AT30B	007624	BT2	010010	CT1	010270	CT5A	010514
AT15E	006442	AT30C	007632	BT2A	010032	CT1A	010306	CT5B	010544
AT16	006446	AT30D	007654	BT2C	010042	CT1E	010314	CT6	010560
AT16A	006456	AT30E1	007656	BT3	010062	CT10	010652	CT6A	010576
AT16B	006506	AT30E2	007620	BT3A	010112	CT10A	010662	CT7	010630
AT16E	006524	AT30E3	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

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A7



DISPLA	001206	ERRA	003320	IM15	016567	PBIB	013104	PJEND	020201
DISPRE	000174	ERROR =	104006	IM16	016629	PBNA	013004	RBIN	013272
DLCNT	003716	ERROR1 =	104007	IM17	016643	PBND	013016	RBINA	013276
DLCTR	003714	ERRT	001362	IM2	015756	PC	=0000007	RBIND	013312
DLY	003566	ERR1	003244	IM20	016700	PCMCNT	013234	RBINC	013352
DLYA	003610	ERR1A	003272	IM21	017003	PCNLT	020711	RBIND	013402
DLYB	003616	E4B	020011	IM22	017014	PCNLVL	001226	RBUSY	013236
DLYX	004310	ET0A	012330	IM23	017025	PCNVTR	001224	RCMSK	004366
DLYXA	004322	ET0B	012336	IM24	017046	PCBIN	002554	RCNT	001376
DLYXB	004330	ET0C	012344	IM24A	017156	PFRT	012226	RDRVL	001222
DLYX0 =	004314	ET0D	012374	IM25	017221	PIND	004704	RDRVTR	001220
DLYX1 =	004326	ET0E	012402	IM26	017252	POPSP =	005726	RETRN	002634
DT0	011662	ET0F	012410	IM3	016014	POPSP2 =	022026	RIND	004676
DT0A	011672	ET0G	012432	IM4	016051	PPB	001216	RNCNT	004370
DT0B	011712	ET0H	012476	IM4S	016109	PPB	001214	RNGEN	003030
DT1	011732	ET0I	012530	IM5	016271	PRB	001212	RP1	003076
DT1A	011750	ET0J	012542	IM6	016334	PRGID	001266	RP2	003100
DT1B	011770	ET0K	012572	IM7	016360	PRNUM	001240	RTINTA	004116
DT2	012012	ENAS	020024	INDIN	004654	PRGTAB	001270	RTINTB	004134
DT2A	012036	FORND	002364	INCRTH	002100	PRGO	003376	RTINTC	004192
DT2B	012056	FRST	001370	INGXOR	001570	PRG1	007660	RTNCAL	003720
DT2C	012064	FNAS	020103	INHPRT	003300	PRG10	014134	RTNCLA	003780
DT2D	012112	GETROY	001710	ITA	014246	PRG11	014322	RTNCLB	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	020750
DT3C	012156	GTBIN	004712	KSTART	001252	PRG13	014524	RTNNO	001266
DT3D	012204	GTBINP	004700	KTA	014416	PRG2	010216	R0	=0000000
DT4	012206	GTRDIA	001736	KTB	014450	PRG3	011634	R1	=0000001
DT4A	012216	GTRDIB	001742	KTC	014460	PRG4	012302	R2	=0000002
DVDND	001244	GTRDIC	001760	KTD	014476	PRG5	012660	R3	=0000003
DVQUOT	001246	GTRDID	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	PRB	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	017486
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	IM0	015540	NOP =	000240	PSM =	177776	SRESET =	104002
EM2	017675	IM0A	015574	NTYET	002016	PTINTA	004254	SRETT	003012
EM3	017747	IM0B	015627	NXTST	001260	PTNCAL	004170	SRN	020246
EM4	017764	IM0C	015653	OPEN =	000000	PTNERR	004076	STAL	004262
EM5	020031	IM1	015722	OPTS	014722	PTHINT	004234	STALA	004302
EM6	020110	IM10	016405	OPTSEL =	104014	PT0	004700	STALB	004304
EM7	020124	IM11	016434	ORGRD	017727	PTOP	004706	STALL =	104005
ENDRTN	020736	IM12	016467	OUT	015240	PT1	004702	START	001432
ERCTR	001416	IM13	016513	PBIN	012766	PT1P	004710	STLMSK	004306
ERR	003234	IM14	016536	PBINA	013070	PUNC1	013004	STPCHV =	104012

STPPA	003000	SYNCD	004550	TSM2	002710	TYPED	003562	SCALF	020230
STPRA	002750	SYNCC	004636	TTIN	014654	VALID =	104017	SCTLG	020223
STPTV	002762	S18	002156	TTYIN =	104016	VALIMP	014740	SNEW	020273
STPTRV	002732	S28	002166	TYP	003400	WZERO	013240	SUNCR	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	SKEY	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	SWREG	020304
SMTL	015242	TMP2	001366	TYPG	003516	XTP	006742	STIME	020340
S.CTRA	004652	TPB	001236	TYPG	003516	SCH1	020425	STITLE	020773
SYNCA	004542	TPS	001234	TYPH	003534	SCH2	020463	SVALUE	020236
.	021052			TYPSA	003560				

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)

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