

IDENTIFICATION

PRODUCT CODE: MAINDEC-15-02AA-D(D)
PRODUCT NAME: PDP-15 AGR 33/35
TELETYPE TEST, PART 1
DATE CREATED: DECEMBER 15, 1969
MAINTAINER: DIAGNOSTIC GROUP
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PDP 15
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ABSTRACT

THE PDP-15, ASR33/35 TELETYPE TESTS PART 1, IS THE FIRST OF A 2 PART TEST PACKAGE USED TO TEST THE ASR33 OR ASR35 TELETYPE WHEN ATTACHED TO A PDP-15.

PART 1 CONTAINS SEVEN SELECTABLE PROGRAMS USED TO TEST THE INPUT AND OUTPUT LOGIC, AND THE TELETYPE READER. THE PROGRAMS ARE SELECTED AND CONTROLLED BY MEANS OF THE ACCUMULATOR SWITCHES (ACS).

THE PROGRAMS AVAILABLE ARE:

PRG0-BASIC INPUT LOGIC TESTS

PRG1-BASIC OUTPUT LOGIC TESTS

PRG2-READER TEST

PRG3-TEST TAPE GENERATOR, PUNCHES CONTENTS OF LOC 00021 AND 00022.

PRG4-TEST TAPE GENERATOR, PUNCHES BINARY COUNT PATTERN TEST TAPE.

PRG5-READER EXERCISER, BINARY COUNT PATTERN.

PRG6-READER EXERCISER, READS TAPE PUNCHED WITH ANY 2 CHARACTERS.

2. REQUIREMENTS

2.1. EQUIPMENT

- A. STANDARD PDP-15
- B. ASR33 OR ASR35 TELETYPE

2.2. STORAGE

LOCATION 00000 THROUGH 01515 ARE USED.

2.3. PRELIMINARY PROGRAMS

ALL PROGRAMS NECESSARY TO INSURE CORRECT OPERATION OF BASIC PROCESSOR SHOULD HAVE BEEN RUN SUCCESSFULLY.

3. LOADING PROCEDURE

TO LOAD THE PROGRAM PROCEED AS FOLLOWS:

- A. LOAD THE OBJECT TAPE IN THE TELETYPE READER, OR IN THE HIGH SPEED READER, IF THE SYSTEM HAS SAID READER.
- B. SET ADDRESS SWITCHES TO 17700.
- C. SET BANK SWITCH TO "ON" POSITION
- D. PRESS "RESET"
- E. PRESS "READ IN"
- F. THE PROGRAM WILL LOAD AND HALT WITH AC = 777777 IF PROGRAM LOADED CORRECTLY. IF THE PROGRAM HALTS WITH AC = 0, A CHECKSUM ERROR HAS OCCURRED. REPEAT THE LOADING PROCEDURE.

1. USE PROCEDURE

1.1 USE PROCEDURE FOR PRG0

- A. INSURE TELETYPE IS ON-LINE.
- B. LOAD BINARY COUNT PATTERN TEST TAPE IN READER. IF TAPE IS NOT SPLICED INTO A LOOP, POSITION TAPE OVER PUNCHED SECTION, NOT ON THE LEADER.
- C. TURN ON READER.
- D. SET CONSOLE REGISTER DISPLAY SWITCH TO AC.
- E. SET ADDRESS SWITCHES TO 00200.
- F. SET AC SWITCHES TO 000000 (SELECTS PRG0).
- G. PRESS I/O RESET; PRESS START
- H. PROGRAM HALTS AT LOC 00233 TO PERMIT SETTING OF AC SWITCH OPTIONS. NORMAL OPERATION IS WITH AC SWITCHES SET TO 000000.

THE AC SWITCH OPTIONS FOR THIS PROGRAM ARE:

- AC00=1 HALTS PROGRAM AT LOC 00320, AT THE END OF CURRENT ROUTINE. THE NUMBER OF THE ROUTINE COMPLETED IS DISPLAYED IN AC. TO PROCEED, PRESS CONTINUE.
- AC01=1 SELECT ROUTINE WHOSE NUMBER IS SET IN ACS12 THROUGH ACS17. ROUTINE IS SELECTED UPON THE ROUTINE'S COMPLETION.
- AC02=1 LOOP PROGRAM. ENTIRE PROGRAM IS REPEATED.
- AC012 THRU ACS17 = NUMBER OF ROUTINE TO BE SELECTED. AC01 MUST BE 1.

REFER TO APPROPRIATE SECTION UNDER SECTION 9, "PROGRAM DESCRIPTION," FOR SPECIFIC ROUTINE DESCRIPTIONS.

- I. PRESS CONTINUE.
- J. PROGRAM IS EXECUTED AND HALTS AT LOC 00275. PROGRAM END HALT, IF NO OPTIONS ARE SET, OR IF NO ERRORS OCCUR.

NOTE

ERRORS ARE INDICATED BY PROGRAM HALTS. REFER TO SECTION 5.1.1, "NORMAL HALTS," OR SECTION 6.1, "ERROR HALTS AND DESCRIPTIONS,"

4.2

USE PROCEDURE FOR PRG1

- A. INSURE TELETYPE IS ON-LINE.
- B. INSURE THAT READER IS OFF.
- C. INSURE THAT THERE IS SUFFICIENT PAPER IN TELEPRINTER.
- D. SET CONSOLE REGISTER DISPLAY SWITCH TO AC.
- E. SET ADDRESS SWITCHES TO 00200.
- F. SET AC SWITCHES TO 000001, (SELECTS PRG1)
- G. PRESS I/O RESET; PRESS START.
- H. PROGRAM HALTS AT LOC 00233, FOR SETTING OF AC SWITCH OPTIONS. NORMAL OPERATION IS WITH AC SWITCHES SET TO 000000.

THE AC SWITCH OPTIONS FOR THIS PROGRAM ARE:

ACS0=1 HALTS PROGRAM AT LOC 00320, AT END OF CURRENT ROUTINE. NUMBER OF ROUTINE JUST COMPLETED IS DISPLAYED IN AC. TO PROCEED, PRESS CONTINUE.

ACS1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN ACS12 THROUGH ACS17, ROUTINE IS SELECTED UPON COMPLETION OF CURRENT ROUTINE.

ACS2=1 LOOP PROGRAM. ENTIRE PROGRAM IS REPEATED.

ACS12 THRU ACS17 = NUMBER OF ROUTINE TO BE SELECTED, ACS1 MUST BE 1. (SEE SECTION 9 FOR DESCRIPTIONS.)

- I. PRESS CONTINUE.
- J. PROGRAM IS EXECUTED AND HALTS AT LOC 00275, PROGRAM END HALTS, IF NO OPTIONS ARE SET, OR IF NO ERRORS OCCUR. (SEE SECTIONS 5.1.1 AND 6.1 FOR HALTS.)

1.3

USE PROCEDURE FOR PRG2

- A. INSURE TELETYPE IS ON-LINE,
- B. LOAD BINARY COUNT PATTERN TEST TAPE IN READER, IF TAPE IS NOT SPLICED INTO A LOOP, POSITION TAPE OVER PUNCHED SECTION, NOT ON THE LEADER.
- C. TURN ON READER,
- D. SET CONSOLE REGISTER DISPLAY SWITCH TO AC,
- E. SET ADDRESS SWITCHES TO 00200,
- F. SET AC SWITCHES TO 000002 (SELECTS PRG2),
- G. PRESS I/O RESET; PRESS START,
- H. PROGRAM HALTS AT LOC 00233 FOR SETTING OF AC SWITCH OPTIONS. NORMAL OPERATION IS WITH AC SWITCHES SET TO 000000.

THE AC SWITCH OPTIONS FOR THIS PROGRAM ARE:

- AC00=1 HALTS PROGRAM AT LOC 00320, UPON COMPLETION OF CURRENT ROUTINE, NUMBER OF COMPLETED ROUTINE IS DISPLAYED IN AC, TO PROCEED, PRESS CONTINUE.
- AC01=1 SELECT ROUTINE WHOSE NUMBER IS SET IN ACS12 THROUGH ACS17, ROUTINE IS SELECTED UPON ROUTINE'S COMPLETION.
- AC02=1 LOOP PROGRAM, ENTIRE PROGRAM IS REPEATED.
- AC012 THRU 17 = NUMBER OF ROUTINE TO BE SELECTED, AC01 MUST BE 1. (SEE SECTION 9 FOR DESCRIPTION.)
- I. PRESS CONTINUE.
- J. PROGRAM IS EXECUTED AND HALTS AT LOC 00275, PROGRAM END HALT, IF NO OPTIONS ARE SET, OR IF NO ERRORS OCCUR, (SEE SECTION 5.1.1 OR SECTION 6.1 FOR HALTS.)

1.4

USE PROCEDURE FOR PRG3

- A. INSURE TELETYPE IS ON-LINE AND FULL DUPLEX MODE.
- B. TURN OFF TELETYPE READER,
- C. LOAD BLANK TAPE IN PUNCH, TURN ON PUNCH,
- D. DEPOSIT IN LOC 00021 AND 00022(8), THE 8 BIT CODE FOR CHARACTERS TO BE PUNCHED,
- E. SET ADDRESS SWITCHES TO 00200,
- F. SET AC SWITCHES TO 000003, (SELECTS PRG3)
- G. PRESS I/O RESET, PRESS START,
- H. PROGRAM PUNCHES TEST TAPE CONTINUOUSLY UNTIL STOPPED BY USER.

4.5 USE PROCEDURE FOR PRG4

-
- A. INSURE TELETYPE IS ON-LINE,
 - B. TURN OFF TELETYPE READER,
 - C. LOAD BLANK TAPE IN PUNCH; TURN ON PUNCH,
 - D. SET ADDRESS SWITCHES TO 00200,
 - E. SET AC SWITCHES TO 000004; (SELECTS PRG4)
 - F. PRESS I/O RESET; PRESS START,
 - G. PROGRAM PUNCHES BINARY COUNT PATTERN TEST TAPE CONTINUOUSLY UNTIL STOPPED BY USER.

4.6 USE PROCEDURE FOR PRG5

-
- A. INSURE TELETYPE IS ON-LINE,
 - B. LOAD BINARY COUNT PATTERN TEST TAPE IN READER, IF TAPE IS NOT SPLICED INTO A LOOP, POSITION TAPE OVER PUNCHED SECTION, AND NOT ON THE LEADER,
 - C. TURN ON READER,
 - D. SET CONSOLE REGISTER DISPLAY SWITCH TO AC,
 - E. SET ADDRESS SWITCHES TO 00200,
 - F. SET AC SWITCHES TO 000005; (SELECTS PRG5)
 - G. PRESS I/O RESET; PRESS START,
 - H. PROGRAM STARTS READING TAPE, SET AC SWITCHES TO 040000 TO CAUSE PROGRAM TO HALT-ON-ERROR,
 - I. PROGRAM RUNS CONTINUOUSLY, UNLESS ERRORS OCCUR, OR AC SWITCH OPTIONS CAUSE A HALT, THE AC SWITCH OPTIONS FOR THIS PROGRAM ARE:

- AC00=1 PROGRAM HALTS AT LOC 00652, AC DISPLAYS THE ACCUMULATED ERROR COUNT, IF ANY.
- AC03=1 HALT-ON-ERROR, BAD CHARACTER IS DISPLAYED IN AC.
- AC04=1 PROGRAM READS TAPE WITH RANDOM DURATION STALLS AFTER EACH CHARACTER,
- AC05=1 PROGRAM LOCKS ON CURRENT STALL BEING USED (AC4 MUST BE 1), (SEE SECTION 5.1.1 OR 6.1 FOR HALTS.)

4.7

USE PROCEDURE FOR PRG6

- A. INSURE TELETYPE IS ON-LINE;
- B. LOAD READER WITH 2 CHARACTER TEST TAPE,
- C. TURN ON READER,
- D. DEPOSIT IN LOC 00021 AND 00022 THE 8-BIT CODES FOR THE CHARACTERS PUNCHED IN THE TEST TAPE,
- E. SET CONSOLE REGISTER DISPLAY SWITCH TO AC,
- F. SET ADDRESS SWITCHES TO 00200,
- G. SET AC SWITCHES TO 000006, (SELECTS PRG6)
- H. PRESS I/O RESET; PRESS START,
- I. PROGRAM STARTS READING TAPE, SET AC SWITCHES TO 040000 TO CAUSE PROGRAM TO HALT-ON-ERROR,
- J. PROGRAM RUNS CONTINUOUSLY, UNLESS ERRORS OCCUR, OR IF CAUSED TO HALT BY AC SWITCH OPTIONS,

THE AC SWITCH OPTIONS FOR THIS PROGRAM ARE:

- AC80=1 PROGRAM HALTS AT LOC 00652, AC DISPLAYS THE ACCUMULATED ERROR COUNT, IF ANY,

- AC83=1 HALT-ON-ERROR, BAD CHARACTER IS DISPLAYED IN AC,
- AC84=1 PROGRAM READS TAPE WITH RANDOM DURATION STALLS AFTER EACH CHARACTER,
- AC85=1 PROGRAM LOCKS ON CURRENT STALL BEING USED (AC84 MUST BE 1). (SEE SECTIONS 5.1.1 OR 6.1 FOR HALTS.)

5. OPERATING PROCEDURE

5.1 PROGRAM AND/OR OPERATOR ACTION

5.1.1 NORMAL HALTS

LOC 00233 OPTION SET HALT, OCCURS DURING PRG0, PRG1,
AND PRG2 TO PERMIT SETTING OF OPTIONS. SET
OPTIONS DESIRED AND PRESS CONTINUE.

LOC 00275 PROGRAM END HALT, OCCURS AT END OF PRG0,
PRG1, OR PRG2 IF NO "LOOP PROGRAM" OPTION
IS SET. SET DESIRED OPTIONS AND PRESS CON-
TINUE. IF NO OPTIONS ARE SET, THIS HALT
REOCCURS.

LOC 00320 ROUTINE END HALT, OCCURS AT END OF CURRENT
ROUTINE DURING PRG0, PRG1, OR PRG2 EXECUTION
IF ACS0 IS ON. AC DISPLAYS ROUTINE NUMBER,
TO PROCEED, PRESS CONTINUE.

LOC 00652 HALT, OCCURS DURING PRG5 AND PRG6 IF ACS0
IS ON. THE ACCUMULATED ERROR COUNT, IF ANY,
IS DISPLAYED BY THE AC. TO PROCEED, PRESS
CONTINUE.

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

LOC 00177 INCORRECT PROGRAM NUMBER SELECTED, SET THE
CORRECT PROGRAM NUMBER IN ACS14 THROUGH ACS17
AND PRESS CONTINUE,

LOC 00256 NON-EXISTENT ROUTINE NUMBERS SELECTED, SET
THE CORRECT ROUTINE NUMBER IN ACS12 THROUGH
ACS17 AND PRESS CONTINUE,

LOC 00542 SYNC ERROR, OCCURS DURING PRG2 AND PRG5 WHEN
THE "SYNC" SUBROUTINE DOES NOT FIND AN ALL 1S
CHARACTER WITHIN 256 CHARACTERS, TO RETRY, PRESS
CONTINUE,

LOC 00643 PRG5, PRG6 READ ERROR, OCCURS IF READ ERROR IS
DETECTED AND ACS3 IS ON, BAD CHARACTER IS DIS-
PLAYED IN AC, PRESS CONTINUE,

LOC 00645 FOLLOW UP HALT TO PRG5 AND PRG6 READ ERROR,
EXPECTED CHARACTER IS DISPLAYED IN AC,

LOC 00674 ALIGN ERROR HALT, OCCURS DURING PRG6 IF THE
"ALIGN" SUBROUTINE CANNOT MATCH THE DATA READ
FROM PAPER TAPE WITH DATA STORED IN LOC 00021
AND 00022(8), CHECK THAT CORE DATA IS CORRECT
AND THAT THE TEST TAPE IS CORRECT AND IN OPER-
ATING CONDITION, PRESS CONTINUE TO RETRY,

LOC 00741 PRG0, ROUTINE 0 ERROR HALT, I/O COMMAND
700311 FAILED TO CLEAR THE AC, PRESSING
CONTINUE ENTERS SCOPE LOOP THAT SETS THE
AC TO ALL 1S, ISSUES 700311 COMMAND TO
CLEAR THE AC AND REPEATS, PROGRAM MUST
BE RESTARTED MANUALLY,

LOC 00765 PRG0, ROUTINE 1 ERROR HALT, AT LEAST 200 MS AFTER
700322 COMMAND THE READER FLAG FAILED TO SET,
OR KSF INSTRUCTION IS FAILING, PRESSING CON-
TINUE REPEATS THE TEST,

LOC 01010 PRG0, ROUTINE 2 ERROR HALT A, SAME AS PRG0,
ROUTINE 1 ERROR HALT,

LOC 01012 PRG0, ROUTINE 2 ERROR HALT B, KSF FAILURE,
WITH READER FLAG SET, KSF INSTRUCTION
FAILED TO SKIP, PRESSING CONTINUE ENTERS
SCOPE LOOP THAT SKIPS ON FLAG CONTINUOUSLY,
MANUAL RESTART,

(6.1 CONT'D)

LOC 01041 PRG0, ROUTINE 3 ERROR HALT A. SAME AS PRG0,
ROUTINE 1 ERROR HALT.

LOC 01043 PRG0, ROUTINE 3 ERROR HALT B. THE 700312
COMMAND (KRB) FAILED TO RESET THE READER
FLAG OR THE KSF COMMAND SKIPPED WITH THE
READER FLAG = 0. PRESSING CONTINUE ENTERS
SCOPE LOOP THAT CLEARS THE FLAG AND SKIPS
ON FLAG CONTINUOUSLY. MANUAL RESTART.

LOC 01063 PRG0, ROUTINE 4 ERROR HALT A. UNEXPECTED
INTERRUPT. AC CONTAINS THE IORS WORD. TURN
OFF DEVICE CAUSING THE INTERRUPT (OTHER THAN
THE TELETYPE). PRESS CONTINUE TO REPEAT TEST.

LOC 01100 PRG0, ROUTINE 4 ERROR HALT B. WITH READER
FLAG = 1, AND INTERRUPT ENABLED. NO INTERRUPT
OCCURRED. PRESSING CONTINUE ENTERS SCOPE LOOP
THAT TURNS ON INTERRUPT CONTINUOUSLY. MANUAL
RESTART.

LOC 01131 PRG0, ROUTINE 5 ERROR HALT. TIMING ERROR.
FLAG NOT 1 110MS AFTER 700322 COMMAND.
PRESSING CONTINUE ENTERS SCOPE LOOP THAT
READS TAPE CONTINUOUSLY TO AID IN TIMING
ADJUSTMENT.

LOC 01171 PRG0, ROUTINE 6 ERROR HALT A. REREAD ERROR.
A REREAD OF THE TELETYPE READER BUFFER DID
NOT MATCH WITH THE ORIGINAL READ. THE "NEW"
CHARACTER IS DISPLAYED IN AC. PRESS CONTINUE.

LOC 01173 PRG0, ROUTINE 6 ERROR HALT B. FOLLOW UP HALT
TO PRG0, ROUTINE 6 ERROR HALT A. THE "OLD"
CHARACTER IS DISPLAYED IN AC. PRESSING CON-
TINUE RESUMED TEST.

(6.1 CONT'D)

LOC 01227 PRG1, ROUTINE 0 ERROR HALT A. AT LEAST 200 MS AFTER
TIS COMMAND THE PRINTER FLAG FAILED TO SET OR
TSF COMMAND FAILED TO SKIP, PRESSING CONTINUE RETRIES
THE TEST.

LOC 01231 PRG1, ROUTINE 0 ERROR HALT B, WITH FLAG = 1,
TSF COMMAND FAILED TO SKIP, PRESSING CONTINUE
ENTERS SCOPE LOOP THAT SKIPS ON FLAG CONTINUOUSLY,
MANUAL RESTART.

LOC 01251 PRG1, ROUTINE 1 ERROR HALT, TCF COMMAND FAILED
TO CLEAR THE FLAG, OR TSF COMMAND SKIPPED WITH
FLAG = 0, PRESSING CONTINUE ENTERS SCOPE LOOP
THAT CLEARS THE FLAG AND THEN SKIPS ON FLAG
CONTINUOUSLY, MANUAL RESTART.

LOC 01276 PRG1, ROUTINE 2 ERROR HALT, TCF COMMAND FAILED
TO CLEAR THE FLAG, PRESSING CONTINUE ENTERS
SCOPE LOOP THAT ISSUES TCF COMMAND CONTINUOUSLY,
MANUAL RESTART.

LOC 01317 PRG1, ROUTINE 3 ERROR HALT A, UNEXPECTED
INTERRUPT, TURN OFF ANY DEVICE THAT MAY BE
CAUSING THE INTERRUPT. (THE TELETYPE READER
MUST BE OFF.) PRESS CONTINUE TO REPEAT TEST.

LOC 01335 PRG1, ROUTINE 3 ERROR HALT B, WITH PRINTER/
PUNCH FLAG = 1 AND INTERRUPT ENABLED, NO IN-
TERRUPT OCCURRED, PRESSING CONTINUE ENTERS
SCOPE LOOP THAT TURNS ON INTERRUPT CONTINU-
OUSLY, MANUAL RESTART.

LOC 01366 PRG1, ROUTINE 4 ERROR HALT, TIMING ERROR,
FLAG NOT 1 110MS AFTER TIS COMMAND, PRESSING
CONTINUE ENTERS SCOPE LOOP THAT RUNS PRINTER
CONTINUOUSLY TO AID IN TIMING ADJUSTMENT,
MANUAL RESTART.

(6.1 CONT'D)

LOC 01422 PRG2, ROUTINE 0 ERROR HALT A, READ ERROR,
BAD CHARACTER IN AC, PRESS CONTINUE.

LOC 01424 PRG2, ROUTINE 0 ERROR HALT B, FOLLOW UP
HALT TO PRG2, ROUTINE 0 ERROR HALT A,
EXPECTED CHARACTER IS DISPLAYED IN AC,
PRESSING CONTINUE RESUMES TESTING.

LOC 01453 PRG2, ROUTINE 1 ERROR HALT A, READ ERROR,
BAD CHARACTER IN AC, PRESS CONTINUE.

LOC 01455 PRG2, ROUTINE 1 ERROR HALT B, FOLLOW UP
HALT TO PRG2, ROUTINE 1 ERROR HALT A,

EXPECTED CHARACTER IS DISPLAYED IN AC,
PRESS CONTINUE TO RESUME TESTING.

LOC 01510 PRG2, ROUTINE 2 ERROR HALT A, READ ERROR,
BAD CHARACTER IN AC, PRESS CONTINUE.

LOC 01512 PRG2, ROUTINE 2 ERROR HALT B, FOLLOW UP
HALT TO PRG2, ROUTINE 2 ERROR HALT A,
EXPECTED CHARACTER IS DISPLAYED IN AC,
PRESS CONTINUE TO RESUME TESTING.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

ALL PROGRAMS MUST BE STARTED AT ADDRESS 00200.

7.2 OPERATING RESTRICTIONS

PRG0 AND PRG1 MUST HAVE BEEN RUN SUCCESSFULLY PRIOR TO EXECUTING ANY OTHER PROGRAM.

PROBLEMS DETECTED DURING EXECUTION OF PRG0 AND PRG1 SHOULD BE CORRECTED AS THEY OCCUR.

8. MISCELLANEOUS

8.1 EXECUTION TIME

PRG0 EXECUTION TIME: 1 MIN 15 SEC (MAX)
PRG1 EXECUTION TIME: 30 SEC (MAX)
PRG2 EXECUTION TIME: 20 MIN (MAX)
PRG3 THROUGH PRG6 ARE CONTINUOUSLY RUN PROGRAMS.

8.2 TEST TAPES

MAINDEC-00-D2G3-PT BINARY COUNT PATTERN TEST TAPE IS PROVIDED WITH THIS PROGRAM. FOR EASY USE, THE TAPE SHOULD BE SPLICED INTO A LOOP, MATCHING THE PATTERN OF THE SPLICE POINT.

9. PROGRAM DESCRIPTION

 THE PDP-15, ASR33/35 TELETYPE TESTS PART 1, CONSISTS OF 7
 PROGRAMS NUMBERED FROM 0 TO 6,

9.1 PRG0 - BASIC INPUT LOGIC TESTS

 THIS PROGRAM CONTAINS 7 ROUTINES NUMBERED FROM 0 TO 6
 (OCTAL).

RTN0 CHECKS THAT IOT 700311 IS ABLE TO CLEAR THE AC,
 DONE 1000 TIMES.

RTN1 CHECKS THAT READER FLAG IS SET 200 MS AFTER 700322
 IOT (SELECT READER); FAILURE TO SKIP INDICATES
 THAT FLAG IS NOT SET, OR KSF COMMAND FAILURE TO
 SKIP, DONE 100 TIMES,

RTN2 CHECKS THAT KSF COMMAND (IOT 700301) SKIPS WITH FLAG SET,
 DONE 1000 TIMES.

RTN3 CHECKS THAT KSF COMMAND (IOT 700301) DOES NOT SKIP
 WITH FLAG = 0, DONE 500 TIMES.

RTN4 CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT
 AND THAT READER IS CAPABLE OF INTERRUPTING.

RTN5 READER TIMING TEST.

RTN6 READS A CHARACTER FROM TAPE AND SAVES IT. IT THEN
 REREADS THE TTI STATISTICALLY 1000 TIMES TO CHECK FOR
 CONSISTENT READING FROM TTI. 256 CHARACTERS ARE
 READ IN THIS MANNER.

9.2

PRG1 - BASIC OUTPUT LOGIC TESTS

THIS PROGRAM CONTAINS 5 ROUTINES NUMBERED FROM 0 TO 4,

RTN0 CHECKS THAT PRINTER/PUNCH FLAG IS SET 200 MS AFTER
TIS COMMAND, FAILURE TO SKIP IN FLAG INDICATES THAT
FLAG IS NOT SET OR TSF FAILURE, IF TSF SKIPS,
ROUTINE THEN SKIPS ON FLAG 1000 TIMES TO CHECK
FOR RELIABLE SKIPPING,RTN1 CHECKS THAT TSF COMMAND DOES NOT SKIP WITH FLAG = 0,
DONE 1000 TIMES,RTN2 CHECKS THAT TCF COMMAND IS ABLE TO CLEAR FLAG,
DONE 100 TIMES,RTN3 CHECKS THAT NO OTHER DEVICE CAN INTERRUPT AND THAT
PRINTER/PUNCH IS ABLE TO INTERRUPT,

RTN4 TIMING TEST,

9.3

PRG2 - READER TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2,

RTN0 READS 4095 CHARACTERS OF BINARY COUNT PATTERN AT
FULL SPEED,RTN1 READS 2000 CHARACTERS OF BINARY COUNT PATTERN WITH
RANDOM STALLS BETWEEN CHARACTERS,RTN2 READS 100 RANDOM LENGTH CHARACTER BLOCKS, FIXED
STALL BETWEEN CHARACTERS IN A BLOCK, STALL IS
CHANGED FOR EACH BLOCK, AND IS DETERMINED AT RANDOM,

9.4

PRG3 - TEST TAPE GENERATOR
-----THIS PROGRAM PUNCHES TEST TAPE WITH CHARACTERS WHOSE
CODE IS SET IN LOC 00021 AND 00022,

9.5

PRG4 - TEST TAPE GENERATOR

PUNCHES BINARY COUNT PATTERN TEST TAPE,

9.6 PRG5 - READER EXERCISER, BINARY COUNT PATTERN

THIS PROGRAM READS AND CHECKS BINARY COUNT PATTERN TEST TAPE,
NORMAL TEST MODE IS WITH FULL SPEED OPERATION, ACS4 = 1
GIVES RANDOM STALLS BETWEEN CHARACTERS, ACS5 = 1 LOCKS
PROGRAM ON CURRENT STALL (ACS4 MUST BE ON),

9.7 PRG6 - READER EXERCISER, LOC 00021 AND 00022

READS TEST TAPE PUNCHED WITH ANY 2 TEST CHARACTERS, LOC
00021 AND 00022 MUST CONTAIN THE CODES FOR CHARACTERS IN
TEST TAPE. NORMAL TEST MODE IS WITH FULL SPEED OPERATION,
ACS4 = 1 GIVES RANDOM STALLS BETWEEN CHARACTERS; ACS5 = 1
LOCKS PROGRAM IN CURRENT STALL, (ACS4 MUST BE ON),

(LAST PAGE)

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/PDP-15 AND ASR33/35 TELETYPE TEST - PART1
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/
/PRG0-BASIC INPUT CONTROL LOGIC TEST. USES READER
/PRG1-BASIC OUTPUT CONTROL LOGIC TEST. USES PRINTER
/PRG2-READER TEST
/PRG3-TEST TAPE GENERATOR. PUNCHES CONTENTS OF LOC 0021 AND 0022
/PRG4-PUNCHES BINARY COUNT PATTERN TEST TAPE.
/PRG5-READER EXERCISER. BINARY COUNT PATTERN
/PRG6-READER EXERCISER. READS TAPE PUNCHED WITH ANY
/      2 CHARACTERS. LOC 0021 AND 0022 CONTAINS CODES
/      FOR CHARACTERS IN TAPE.
/
/ACS-OPTIONS
/
/ACS0-HALT AT END OF ROUTINE. RTN NUMBER IN AC FOR PRG0,PRG1,PRG2.
/      -HALT. ERROR COUNT IN AC FOR PRG5 AND PRG6.
/ACS1-SELECT ROUTINE WHOSE NUMBER IS SET IN ACS12 THROUGH ACS17.
/      (PRG0,PRG1,PRG2).
/ACS2-LOOP PROGRAM. (PRG0,PRG1,PRG2)
/ACS3-HALT ON ERROR. BAD CHARACTER IN AC (PRG5,PRG6)
/ACS4-STALL (PRG5,PRG6)
/ACS5-LOCK ON STALL (PRG5,PRG6)
      .EJECT
```

00020			.ABS
00020	000000	KSTART	.LOC 2*
00021	000000	PTEMP	0
00022	000000	PTEMP1	0
00023	000000	DELAYM	0
00024	620002		JMP* 2
00025	000000		0
00026	000077	TSTMSK	77
00027	000017	PRGMSK	17
00030	777772	PRGLIM	-6
00031	000000	PRGNUM	0
00032	000033	PSW	PRGTAB
00033	000717	PRGTAB	PRG0
00034	001201		PRG1
00035	001373		PRG2
00036	000571		PRG3
00037	000576		PRG4
00040	000602		PRG5
00041	000611		PRG6
00042	000000	TEMP	0
00043	000000	CURTST	0
00044	000000	RTNNO	0
00045	000000	NXTST	0
00046	000000	MSCTR	0
00047	000000	MILCTR	0
00050	777142	MIL1	-636
00051	000000	CTRA	0
00052	000000	CTRB	0
00053	000000	SCNT	0
00054	777401	MRBOUT	-377
00055	000000	PFLAG	0
00056	040000	SR3MSK	040000
00057	020000	SR4MSK	020000
00060	010000	SR5MSK	010000
00061	000001	K1	1
	700322	KRA=700322	
		/	
			.EJECT

00177			.LOC 177		
00177	740040		HLT		
00200	750004	START	LAS		/INCORRECT PROGRAM NUMBER
00201	500027		AND	PRGMSK	/READ SWITCHES
00202	340030		TAD	PRGLIM	/AND WITH PRG MASK
00203	740300		SMA:SZ		/ADD PROGRAM LIMIT
00204	600177		JMP	177	/VALID PROGRAM NUMBER?
00205	750004		LAS		/NO.
00206	500027		AND	PRGMSK	/YES, READ SWITCHES
00207	040031		DAC	PRGNUM	
00210	340032		TAD	PSW	/SAVE PROGRAM NUMBER
00211	040042		DAC	TEMP	/DEVELOPE PROGRAM
00212	220042		LAC*	TEMP	/ADDRESS.
00213	040221		DAC	PRGADR	
00214	100545		JMS	MOVE	/STORE ADDRESS
00215	000024		24		/INITIALIZE INTERRUPT
00216	000001		1		/AREA
00217	777776		-2		
00220	620221		JMP*	+.1	
00221	000000	PRGADR	0		
00233			.LOC 233		
00233	750040	SRSET	HLT:CLA		
00234	200020	GETRDY	LAC	KSTART	/SELECT OPTIONS
00235	040045		DAC	NXTST	/GET ADDR OF 1ST RTN
00236	100277		JMS	FORWD	/STORE AT NXTST
00237	750004		LAS		
00240	742010		RTL		/READ SWITCHES
00241	740400		SNL		
00242	620043		JMP*	CURTST	/SELECT ROUTINE?
00243	750004		LAS		/NO, START WITH CURRENT ROUTINE
00244	500026		AND	TSTMASK	/YES, READ SWITCHES
00245	740001		CMA		
00246	340061		TAD	K1	
00247	340044		TAD	RTNNO	
00250	751200		SNA:CLA		
00251	620043		JMP*	CURTST	/IS IT THIS RTN?
00252	200045		LAC	NXTST	/YES, GO DO IT.
00253	340061		TAD	K1	/NO.
00254	750200		SZA:CLA		/LAST ROUTINE?
00255	600236		JMP	GETRDY+2	/NO.
00256	750040	INCRTN	HLT:CLA		
00257	600234		JMP	GETRDY	/YES, INCORRECT ROUTINE NUMBER.
			.EJECT		

00260	100313	CHAIN	JMS	SHALT	/HALT? (SR0)
00261	750004		LAS		/READ SWITCHES
00262	742010		RTL		
00263	741400		SZL		/ROUTINE SELECT? (SR1)
00264	600234		JMP	GETRDY	/YES.
00265	200045		LAC	NXTST	
00266	340061		TAD	K1	
00267	750200		SZA:CLA		/LAST RTN?
00270	600236		JMP	GETRDY+2 /NO.	
00271	750004		LAS		/YES.
00272	742010		RTL		
00273	751100		SPA:CLA		/LOOP PROGRAM? (SR2)
00274	600234		JMP	GETRDY	
00275	750040	PRGEND	HLT:CLA		/PROG END HALT
00276	600260		JMP	CHAIN	
00277	000000	FORWD	0		
00300	220045		LAC*	NXTST	/GET NEXT RTN NO.
00301	040044		DAC	RTNNO	/STORE AT RTNNO
00302	440045		ISZ	NXTST	
00303	200045		LAC	NXTST	/SET CURRENT
00304	040042		DAC	TEMP	/RTN NUMBER
00305	440045		ISZ	NXTST	
00306	200045		LAC	NXTST	/SET CURRENT
00307	040043		DAC	CURTST	/ROUTINE ADDR
00310	220042		LAC*	TEMP	/SET NEXT
00311	040045		DAC	NXTST	/RTN ADDR
00312	620277		JMP*	FORWD	/EXIT
		/			
00313	000000	SHALT	0		
00314	750004		LAS		/READ SW
00315	740100		SMA		/HALT? (SR0)
00316	620313		JMP*	SHALT	/NO, EXIT
00317	200044		LAC	RTNNO	
00320	740040		HLT		/ROUTINE END HALT.
00321	620313		JMP*	SHALT	
00322	000000	STCTR	0		
00323	220322		LAC*	STCTR	/GET LOC ADDRESS
00324	040042		DAC	TEMP	/SAVE AT TEMP
00325	440322		ISZ	STCTR	
00326	220322		LAC*	STCTR	/GET COUNT AND
00327	060042		DAC*	TEMP	/STORE AT DESIRED LOC.
00330	440322		ISZ	STCTR	
00331	754000		CLA:CLL		
00332	620322		JMP*	STCTR	/EXIT
	100322	SETLOC=JMS	STCTR		
			.EJECT		

```

00333 000000 DLYMS 0
00334 200023 LAC DELAYM /GET MS COUNT
00335 040046 DAC MSCTR /STORE IN MSCTR
00336 200050 LAC MIL1 /GET 1 MS CONSTANT
00337 040047 DAC MILCTR /STORE AT MILCTR
00340 440047 ISZ MILCTR /DELAYED 1 MS?
00341 600340 JMP .-1 /NO
00342 440046 ISZ MSCTR /YES. DONE DELAYING?
00343 600336 JMP .-5 /NO.
00344 754000 CLA:CLL /YES.
00345 620333 JMP* DLYMS

/RANDOM NUMBER GENERATOR
RANGEN 0
LAC RANDEX
SAD (RANTBL+10)
SKP
JMP RANTAD-1
LAC (RANTBL
DAC RANDEX
LAC RANCON
SPA:CLL
STL
RAL
DAC RANCON
RANTAD LAC* RANDEX
TAD RANCON
DAC* RANDEX
LAC RANSAV
RAR
TAD* RANDEX
DAC RANSAV
ISZ RANDEX
JMP* RANGEN

/
RANCON 123456
RANDEX RANTBL+10
RANTBL 654321
361416
055363
546060
243035
762572
453237
150214
RANSAV 0
/
.EJECT

```

00406	000000	INITPT	0		/INITIALIZE COUNT PATTERN
00407	140412		DZM	PT0	/0 TO PT0
00410	750000		CLA		/0 TO AC
00411	620406		JMP*	INITPT	/EXIT.
00412	000000	PT0	0		
00413	000000	PT1	0		
00414	000377	PTMSK	377		
00415	000000	GETPTT	0		
00416	200412		LAC	PT0	/PT0 TO PT1
00417	040413		DAC	PT1	
00420	340061		TAD	K1	
00421	500414		AND	PTMSK	
00422	040412		DAC	PT0	/PT0+1 TO PT0
00423	200413		LAC	PT1	/GET PT1
00424	620415		JMP*	GETPTT	/EXIT
/					
00425	000000	PUNCH	0		/SET PFLAG
00426	440055		ISZ	PFLAG	/PUNCH/PRINT
00427	700406		TLS		
00430	200055		LAC	PFLAG	/FLAG RESET?
00431	750200		SZA!CLA		/NO
00432	741000		SKP		
00433	600436		JMP	+.3	/SAVE PRINTING?
00434	700401		TSF		/NO.
00435	600430		JMP	.-5	/YES, CLEAR FLAG
00436	700402		TCF		/0 TO PFLAG
00437	140055		DZM	PFLAG	/EXIT.
00440	620425		JMP*	PUNCH	
/					
00441	000000	STALL	0		/READ SWITCHES
00442	750004		LAS		
00443	500057		AND	SR4MSK	/STALL? (ASC4)
00444	751200		SNA!CLA		/NO. EXIT
00445	620441		JMP*	STALL	/YES. READ SWITCHES
00446	750004		LAS		
00447	500060		AND	SR5MSK	
00450	750200		SZA!CLA		/LOCK ON STALL?
00451	741000		SKP		/YES.
00452	100474		JMS	DLCNT	/GENERATE RANDOM COUNT
00453	100333		JMS	DLYMS	/STALL.
00454	620441		JMP*	STALL	/EXIT.
			.EJECT		

```

/
00455 000000 CHRCNT 0
00456 100346 JMS RANGEN /SET RANDOM NUMBER.
00457 500473 AND CRMSK /REMOVE EXCESS BITS
00460 741200 SNA /ZERO?
00461 600456 JMP CHRCNT+1 /YES.
00462 740001 CMA
00463 340061 TAD K1
00464 040053 DAC SCNT
00465 220455 LAC* CHRCNT
00466 040042 DAC TEMP
00467 200053 LAC SCNT
00470 060042 DAC* TEMP /STORE AT DESIRED ADDR
00471 440455 ISZ CHRCNT
00472 620455 JMP* CHRCNT /EXIT
00473 000077 CRMSK 77
00474 000000 DLCNT 0
00475 100346 JMS RANGEN /GET RANDOM NUMBER
00476 500505 AND DLYMSK /REMOVE EXCESS BITS
00477 741200 SNA /ZERO?
00500 600475 JMP DLCNT+1 /YES
00501 740001 CMA
00502 340061 TAD K1
00503 040023 DAC DELAYM
00504 620474 JMP* DLCNT /EXIT
00505 000277 DLYMSK 277
/
00506 000000 CHCK 0
00507 040523 DAC WCHK /AC TO WCHK
00510 220506 LAC* CHCK /GET COMPARE DATA
00511 740001 CMA
00512 340061 TAD K1
00513 340523 TAD WCHK
00514 440506 ISZ CHCK
00515 750200 SZA!CLA /SET UP FOR UNEG EXIT
00516 600521 JMP /EQUAL?
00517 440506 ISZ .+3 /NO.
00520 620506 JMP* CHCK /YES, SET UP EQUAL EXIT
00521 200523 LAC CHCK /EXIT
00522 620506 JMP* WCHK /RESTORE AC
00523 000000 WCHK 0 /EXIT
/
.EJECT

```



```

/
00524 000000 / SYNK 0
00525 100322 SETLOC /-256 TO CTSK
00526 000544 CTSK
00527 777400 -400
00530 700322 SYNKA KRA /START READER.
00531 700301 KSF /FLAG1?
00532 600531 JMP .-1 /NO
00533 700312 KRB /READ
00534 340054 TAD MRBOUT /
00535 750200 SZA:CLA /377?
00536 741000 SKP /NO.
00537 620524 JMP* SYNK /YES, EXIT
00540 440544 ISZ CTSK
00541 600530 JMP SYNKA
00542 740040 HLT /CAN'T SYNK
00543 600525 JMP SYNK+1 /REPEAT.
00544 000000 CTSK 0
00545 000000 MOVE 0 /MOVE SUBROUTINE
00546 220545 LAC* MOVE /GET AND STORE
00547 040566 DAC FADDR /"FROM" ADDR
00550 440545 ISZ MOVE
00551 220545 LAC* MOVE /GET AND STORE
00552 040567 DAC TADDR /"TO" ADDR
00553 440545 ISZ MOVE
00554 220545 LAC* MOVE /GET AND STORE
00555 040570 DAC MCTR /MOVE COUNT.
00556 440545 ISZ MOVE
00557 220566 MOVEA LAC* FADDR /GET "NEW WORD"
00560 060567 DAC* TADDR /STORE AT "TO" LOC.
00561 440566 ISZ FADDR /UPDATE ADDRESSES
00562 440567 ISZ TADDR
00563 440570 ISZ MCTR /DONE MOVING?
00564 600557 JMP MOVEA /NO.
00565 620545 JMP* MOVE /YES, EXIT.
00566 000000 FADDR 0
00567 000000 TADDR 0
00570 000000 MCTR 0
/
.EJECT

```

```

/PROGRAM 3 PUNCHES TEST TAPE WITH CHARACTERS STORED IN
/SYMBOLIC LOCATION PTEMP AND PTEMP1.
00571 200021 PRG3 LAC PTEMP /GET C(PTEMP)
00572 100425 JMS PUNCH /PUNCH
00573 200022 LAC PTEMP1 /GET C(PTEMP1)
00574 100425 JMS PUNCH /PUNCH
00575 600571 JMP PRG3 /REPEAT.
/PROGRAM 4 PUNCHES TEST TAPE WITH BINARY COUNT PATTERN
00576 100406 PRG4 JMS INITPT /INITIALIZE PATTERN
00577 100415 JMS GETPTT /GET BINARY CHARACTER
00600 100425 JMS PUNCH /PUNCH IT
00601 600577 JMP .-2 /REPEAT.
/PROGRAM 5 READS COUNT PATTERN. STALLS OPTIONAL
00602 100524 PRG5 JMS SYNK /SYNK TAPE
00603 140654 DZM ERRCTR /0 TO ERRCTR
00604 100406 JMS INITPT /INITIALIZE BINARY PATTERN
00605 700322 KRA /START READER
00606 100415 SRT0A JMS GETPTT /GET BINARY NUMBER
00607 100617 JMS READCK /READ AND CHECK CHARACTER
00610 600606 JMP SRT0A /REPEAT
/PROGRAM 6 READS DATA FROM TAPE AND MATCHES AGAINST CHARACTERS
/IN PTEMP AND PTEMP1. RANDOM DELAY BETWEEN CHARACTERS OPTIONAL
00611 140654 PRG6 DZM ERRCTR /0 TO ERRCTR
00612 100655 JMS ALIGN
00613 700322 KRA /START READER
00614 100705 SRT2A JMS GIVE /GET CHARACTER
00615 100617 JMS READCK /READ AND CHECK
00616 600614 JMP SRT2A /REPEAT
00617 000000 READCK 0
00620 040627 DAC SBSP
00621 100441 JMS STALL
00622 700301 KSF
00623 600622 JMP .-1 /READER READY?
00624 700312 KRB /NO, REPEAT.
00625 700322 KRA /READ, START READER
00626 100506 JMS CHCK
00627 000000 SBSP 0
00630 600632 JMP ERRCNT /ERROR.
00631 600646 JMP HLTST /OK.
00632 440654 ERRCNT ISZ ERRCTR /+1 TO ERRCTR
00633 600636 JMP .+3
00634 750001 CLA,CMA
00635 040654 DAC ERRCTR /7777 TO ERRCTR
00636 750004 LAS /READ SWITCHES
00637 500056 AND SR3MSK
00640 751200 SNA,CLA /HALT ON ERROR (SR3)
00641 600646 JMP HLTST /NO
00642 200523 LAC WCHK /GET BAD CHAR
00643 740040 HLT /YES
00644 200627 LAC SBSP /GET GOOD CHAR
00645 740040 HLT /GOOD CHAR IN AC
.EJECT

```

00646	750004	HLTTST	LAS		
00647	750100		SMA:CLA		/HALT?
00650	620617		JMP*	READCK	/NO, EXIT
00651	200654		LAC	ERRCTR	/GET ERROR COUNT
00652	740040		HLT		/ERROR COUNT IN AC
00653	620617		JMP*	READCK	/EXIT
00654	000000	ERRCTR	0		
		/			
00655	000000	ALIGN	0		
00656	700322		KRA		
00657	700301		KSF		/READER READY?
00660	600657		JMP	.-1	
00661	700312		KRB		/READ CHARACTER
00662	740001		CMA		
00663	340061		TAD	K1	
00664	040704		DAC	ATEMP	
00665	340021		TAD	PTEMP	
00666	751200		SNA:CLA		/IS IT CHAR IN PTEMP?
00667	600676		JMP	AL1	/YES.
00670	200704		LAC	ATEMP	/NO.
00671	340022		TAD	PTEMP1	
00672	751200		SNA:CLA		/IS IT CHAR IN PTEMP1?
00673	600701		JMP	AL2	/YES.
00674	750040		HLT:CLA		/NO, ERROR.
00675	600656		JMP	ALIGN+1	/REPEAT.
00676	740001	AL1	CMA		
00677	040703		DAC	IND	/SET IND TO -1
00700	620655		JMP*	ALIGN	
00701	140703	AL2	DZM	IND	/0 TO IND
00702	620655		JMP*	ALIGN	
00703	000000	IND	0		
00704	000000	ATEMP	0		
		/			
00705	000000	GIVE	0		
00706	440703		ISZ	IND	/IND=1?
00707	600713		JMP	+.4	/NO
00710	140703		DZM	IND	/YES
00711	200022		LAC	PTEMP1	/GET TEMP1
00712	620705		JMP*	GIVE	/EXIT
00713	750001		CLA:CMA		
00714	040703		DAC	IND	/-1 TO IND
00715	200021		LAC	PTEMP	/GET PTEMP
00716	620705		JMP*	GIVE	/EXIT.
		/			
			.EJECT		

```

/PROGRAM 0. ASR33/35 TELETYPE BASIC INPUT TESTS.
/PROGRAM CHECKS INPUT IOT'S, INTERRUPT, AND READER TIMING.
PRG0      SETLOC          /SET KSTART TO INITIAL
          KSTART         /ROUTINE ADDRESS
          P0TS0
          JMP             SRSET          /GO START PROGRAM.
/
P0TS0     0
          P0TS1
/ISSUE 700311 OP WITH AC=777777. AC SHOULD GO TO 0
          SETLOC          /-1000 TO CTRA
          CTRA
          -1750
P0TS0A    CLA!CMA          /-1 TO AC
          700311          /CLEAR AC.
          NOP
          NOP
          SZA
          JMP             P0E0          /AC=0?
          ISZ             CTRA          /NO, ERROR.
          JMP             P0TS0A        /DONE?
          JMP             P0E0          /NO, REPEAT
          JMP             CHAIN         /YES, CHAIN
P0E0      HLT              /ERROR HALT. DID NOT
          CLA!CMA          /CLEAR AC.
          700311          /-1 TO AC
          JMP             .-2          /CLEAR AC
          JMP             .-3
/ISSUE KRA, WAIT AT LEAST 200 MSEC FOR FLAG TO SET, SKIP ON FLAG.
/FAILURE TO SKIP INDICATES THAT FLAG IS NOT SET, OR KSF FAILURE
P0TS1     1
          P0TS2
          SETLOC          /-200 TO DELAYM
          DELAYM
          -310
P0TS1A    SETLOC          /-100 TO CTRA
          CTRA
          -144
P0TS1B    KRA
          JMS             DLYMS        /CLEAR AC AND FLAG
          KSF              /DELAY 200 MS.
          JMP             P0E1          /SKIP IF FLAG=1
          ISZ             CTRA          /ERROR
          JMP             P0TS1B        /DONE?
          JMP             P0E1          /NO, REPEAT.
          JMP             CHAIN         /YES, CHAIN
P0E1      HLT              /ERROR HALT. FLAG IS NOT 1,
          JMP             P0TS1A        /OR RSF FAILED.
          JMP             P0TS1A        /RESTART TEST.
/
.EJECT

```

```

00717    100322
00720    000020
00721    000723
00722    600233

00723    000000
00724    000746

00725    100322
00726    000051
00727    776030
00730    750001
00731    700311
00732    740000
00733    740000
00734    740200
00735    600741
00736    440051
00737    600730
00740    600260
00741    740040

00742    750001
00743    700311
00744    600742
00745    600742

00746    000001
00747    000767
00750    100322
00751    000023
00752    777470
00753    100322
00754    000051
00755    777634
00756    700322
00757    100333
00760    700301
00761    600765
00762    440051
00763    600756
00764    600260
00765    740040

00766    600753

```


/ISSUE KRA. WAIT AT LEAST 200 MSECS FOR FLAG TO SET. VERIFY THAT
 /FLAG IS SET. RESET FLAG (KRB) AND SKIP ON FLAG 500 TIMES
 /TO VERIFY THAT NO SKIP OCCURS WITH FLAG=0.

01016	000003			
01017	001050			
01020	100322			
01021	000023			
01022	777470			
01023	100322			
01024	000051			
01025	777014			
01026	700322	P0TS3A		
01027	100333			
01030	700301			
01031	601041			
01032	700312			
01033	700301			
01034	601036			
01035	601043			
01036	440051			
01037	601033			
01040	600260			
01041	740040	P0E3A		
01042	601026			
01043	740040	P0E3B		
01044	700312			
01045	700301			
01046	601044			
01047	601044			

P0TS3	3			
	P0TS4			
	SETLOC			
	DELAYM			/-200 TO DELAYM
	-310			
	SETLOC			
	CTRA			/-500 TO CTRA
	-764			
P0TS3A	KRA			/START READ
	JMS	DLYMS		/DELAY 200 MS.
	KSF			/READY?
	JMP	P0E3A		/NO, ERROR.
	KRB			/YES, RESET FLAG.
	KSF			/READY?
	JMP	.+2		/NO, OK
	JMP	P0E3B		/YES, ERROR
	ISz	CTRA		/DONE?
	JMP	.-4		/NO, REPEAT
	JMP	CHAIN		/YES, CHAIN
P0E3A	HLT			/ERRA. FLAG NOT SET, OR
	JMP	P0TS3A		/RSF FAILED
P0E3B	HLT			/TRY AGAIN
	KRB			/ERR B. FLAG FAILED TO RESET,
	KSF			/OR RSF SKIPPED ERRONROUSLY.
	JMP			/CLEAR FLAG
	JMP	.-2		/SKIP ON FLAG 1
	JMP	.-3		/REPEAT
				/REPEAT

/

.EJECT

```

/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE READER IS CAPABLE OF INTERRUPTING.
PØTS4      4
           PØTS5
           SETLOC                               /SET INTERRUPT RETURN
                                                /TO PØE4A.
           2
           PØE4A
PØTS4A     CAF                               /CLEAR ALL FLAGS
           ION                               /ENABLE INTERRUPT
           NOP
           IOF                               /DISABLE INTERRUPT
           JMP      .+4
PØE4A     IORS
           HLT                               /UNEXPECTED INTERRUPT
           JMP      PØTS4A                   /TRY AGAIN
           SETLOC                               /-1000 TO CTRA
           CTRA
           -1750
           SETLOC                               /SET INTERRUPT RETURN
           2                               /TO PØTS4C
           PØTS4C
           KRA                               /START READER
           KSF                               /WAIT FOR FLAG1
           JMP      .-1
PØTS4B     ION                               /ENABLE INT.
           NOP
PØE4B     HLT                               /READER FAILED TO INTERRUPT
                                                /OR INTERRUPT SYSTEM MALFUNCTION.
                                                /SET INTERRUPT RETURN
                                                /TO PØTS4C-1
           SETLOC
           2
           PØTS4C-1
/SCOPE LOOP
           ION
           NOP
           JMP      .-2
/
PØTS4C     ISZ      CTRA                       /DONE?
           JMP      PØTS4B                   /NO, REPEAT
           JMP      CHAIN                     /YES, CHAIN
/
           .EJECT

```

```

01050 000004
01051 001112
01052 100322
01053 000002
01054 001062
01055 703302
01056 700042
01057 740000
01060 700002
01061 601065
01062 700314
01063 740040
01064 601055
01065 100322
01066 000051
01067 776030
01070 100322
01071 000002
01072 001107
01073 700322
01074 700301
01075 601074
01076 700042
01077 740000
01100 740040

01101 100322
01102 000002
01103 001106

01104 700042
01105 740000
01106 601104

01107 440051
01110 601076
01111 600260

```

```

/READER TIMING TEST. CHECKS THAT READER FLAG IS=1 NO LATER THAN
/110 MILLISECONDS AFTER RSA INSTRUCTION IS ISSUED.
01112 000005 P0TS5 5
01113 001136 P0TS6
01114 100322 SETLOC /-110 TO DELAYM
01115 000023 DELAY
01116 777622 -156
01117 100322 SETLOC /-100 TO CTRA
01120 000051 CTRA
01121 777634 -144
01122 700322 P0TS5A KRA /START READER CLEAR AC AND FLAG
01123 100333 JMS DLYMS /DELAY 110 MSECS
01124 700301 KSF /READY?
01125 601131 JMP P0E5 /NO, ERROR
01126 440051 ISZ CTRA /DONE?
01127 601122 JMP P0TS5A /NO, REPEAT
01130 600260 JMP CHAIN /YES, CHAIN
01131 740040 P0E5 HLT /ERROR, FLAG NOT 1 AFTER
/110 MSECS.
/START READER CLEAR
/READY?
01132 700322 KRA /NO.
01133 700301 KSF /YES, START READER AGAIN
01134 601133 JMP .-1
01135 601132 JMP .-3
.EJECT

```


/READS 256 DIFFERENT CHARACTERS, EACH CHARACTER IS REREAD 1000 TIMES
 /TO VERIFY CONSISTENCY IN READING FROM TTI.

```

01136 000006
01137 777777
01140 100322
01141 000051
01142 777400
01143 703302
01144 700322
01145 700301
01146 601145
01147 700312
01150 041177
01151 100322
01152 000052
01153 776030
01154 700312
01155 041200
01156 740001
01157 340061
01160 341177
01161 750200
01162 601170
01163 440052
01164 601154
01165 440051
01166 601143
01167 600260
01170 201200
01171 740040

01172 201177
01173 740040
01174 601165

01175 700312
01176 601175
01177 000000
01200 000000

P0TS6 6
      777777
      SETLOC      /-256 TO CTRA
      CTRA
      -400
P0TS6A CAF      /CLEAR FLAGS
      KRA      /START READER CLEAR
      KSF      /READY?
      JMP      .-1      /WAIT
      KRB      /READ CHAR
      DAC      WTS6A      /SAVE IT
      SETLOC      /-1000 TO CTRB
      CTRB
      -1750
P0TS6B KRB
      DAC      WTS6B      /SAVE
      CMA
      TAD      K1
      TAD      WTS6A
      SZA:CLA      /RESULT 0?
      JMP      P0E6A      /NO, ERROR.
      ISZ      CTRB      /REREAD 1000 TIMES?
      JMP      P0TS6B      /NO GO READ AGAIN
P0TS6C ISZ      CTRA      /READ 256 CHARACTERS?
      JMP      P0TS6A      /NO
      JMP      CHAIN      /YES, CHAIN
P0E6A  LAC      WTS6B      /LOAD BAD CHAR
      HLT      /ERR A. BAD CHAR IN AC
      LAC      WTS6A      /PRESS CONTINUE.
      HLT      /EXPECTED CHAR IN AC
      JMP P0TS6C

/SCOPE LOOP
      KRB      /READ CHARACTER
      JMP      .-1      /REPEAT
WTS6A 0
WTS6B 0
/
      .EJECT

```

```

/PROGRAM 1. ASR33/35 TELETYPE BASIC OUTPUT TESTS. PROGRAM CHECKS
/OUTPUT IOT'S, INTERRUPT, TIMING.
PRG1  SETLOC          /SET KSTART TO INITIAL
      KSTART          /ROUTINE ADDRESS
      P1TS0
      JMP              SRSET          /START PROGRAM
/
/ROUTINE 0
/1. T1S AND WAIT AT LEAST 200 MSECS FOR FLAG TO SET. SKIP ON FLAG=1 (TSF). TSF SHOU
/SKIP OR ERROR HALT P1E0A OCCURS, INDICATING FLAG NOT SET, OR TSF FAILURE.
/2. WITH FLAG=1, SKIPS ON FLAG 1000 TIMES TO TEST FOR CONSISTENT SKIPPING.
/FAILURE TO SKIP CAUSES ERROR HALT P1E0B.
P1TS0  0
      P1TS1
      SETLOC          /-200 TO DELAYM
      DELAYM
      -310
      SETLOC          /-1000 TO CTRA
      CTRA
      -1750
P1TS0A CLA           /CLEAR AC
      T1S            /START PRINTER/PUNCH
      JMS            DLYMS  /DELAY 200 MS
      TSF            /READY?
      JMP            P1E0A  /NO, ERROR.
P1TS0B TSF            /SKIP ON FLAG 1
      JMP            P1E0B  /NO SKIP. ERROR
      ISZ            CTRA   /SKIP DONE?
      JMP            P1TS0B /NO, REPEAT
      JMP            CHAIN  /YES, CHAIN
P1E0A  HLT!CLA       /ERR A. NOT READY AFTER 200 MS.
      JMP            P1TS0A /OR TSF FAILURE
P1E0B  HLT!CLA       /ERR B. TSF FAILED TO SKIP
/SCOPE LOOP
      TSF
      JMP            .-1
      JMP            .-2
/
      .EJECT

```

01201 100322
01202 000020
01203 001205
01204 600233

01205 000000
01206 001235
01207 100322
01210 000023
01211 777470
01212 100322
01213 000051
01214 776030
01215 750000
01216 700406
01217 100333
01220 700401
01221 601227
01222 700401
01223 601231
01224 440051
01225 601222
01226 600260
01227 750040
01230 601215
01231 750040

01232 700401
01233 601232
01234 601232

P1TS0A
P1TS0B
P1E0A
P1E0B

.-1
.-2

```

/ROUTINE 1.
/ISSUE TCF TO CLEAR FLAG. SKIP ON FLAG 1000 TIMES TO VERIFY THAT NO
/SKIP OCCURS WITH FLAG=0
01235 000001 P1TS1 1
01236 001256 P1TS2
01237 100322 SETLOC /-1000 TO CTRA
01240 000051 CTRA
01241 776030 -1750
01242 700402 TCF /CLEAR FLAG
01243 700401 P1TS1A TSF
01244 741000 SKP
01245 601251 JMP P1E1
01246 440051 ISZ CTRA
01247 601243 JMP P1TS1A
01250 600260 JMP CHAIN
01251 750040 P1E1 HLT:CLA /ERR. AFTER TCF, TSF INSTRUCTION
/SCOPE LOOP /SKIPPED.
01252 700402 TCF /CLEAR FLAG
01253 700401 TSF /SKIP ON FLAG=1
01254 601253 JMP .-1
01255 601253 JMP .-2
/
.EJECT

```

```

/
/ROUTINE 2
/ISSUE TLS. WAIT FOR FLAG1. CLEAR FLAG (TCF). SKIP ON FLAG1. NO SKIP
/SHOULD OCCUR. IF SKIP, TCF INSTRUCTION (CLEAR FLAG) FAILED.
01256 000002 P1TS2 ?
01257 001301 P1TS3
01260 100322 SETLOC
01261 000051 CTRA /-100 TO CTRA
01262 777634 -144
01263 750000 P1TS2A CLA
01264 700406 TLS
01265 700401 TSF /PUNCH/PRINT
01266 601265 JMP /WAIT FOR FLAG1
01267 700402 TCF .-1
01270 700401 TSF /CLEAR FLAG
01271 741000 SKP /SKIP IF FLAG 1
01272 601276 JMP P1E2
01273 440051 ISZ CTRA /SKIPPED. ERROR
01274 601263 JMP P1TS2A /DONE?
01275 600260 JMP CHAIN /NO, REPEAT
01276 750040 P1E2 HLT:CLA /YES, CHAIN
/SCOPE LOOP /ERR. TCF FAILED TO RESET FLAG
01277 700402 TCF /CLEAR FLAG
01300 601277 JMP .-1 /REPEAT
/
.EJECT

```

```

/ROUTINE 3.
/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE PUNCH/PRINTER CAN CAUSE AN INTERRUPT.
01301 000003 P1TS3 3
01302 001347 P1TS4
01303 100322 SETLOC /SET INTERRUPT RETURN
01304 000002 2 /TO P1E2A
01305 001317 P1E3A
01306 703302 P1TS3A CAF /CLEAR ALL FLAGS.
01307 700406 TLS
01310 700401 TSF
01311 601310 JMP .-1
01312 700402 TCF /CLEAR PUNCH/PRINTER FLAG
01313 700042 ION /ENABLE INT.
01314 740000 NOP
01315 700002 IOF /DISABLE INT.
01316 601321 JMP .+3
01317 740040 P1E3A HLT /UNEXPECTED INTERRUPT
01320 601306 JMP P1TS3A /TRY AGAIN
01321 100322 SETLOC /-1000 TO CTRA
01322 000051 CTRA
01323 776030 -1750
01324 100322 SETLOC /SET INTERRUPT RETURN
01325 000002 2 /TO P1TS3C
01326 001344 P1TS3C
01327 750000 CLA
01330 700406 TLS /START PUNCH/PRINTER
01331 700401 TSF /FLAG 1?
01332 601331 JMP .-1 /WAIT.
01333 700042 P1TS3B ION
01334 740000 P1E3B NOP
01335 740040 HLT /PUNCH/PRINTER FAILED TO
/INTERRUPT OR INTERRUPT
/MALFUNCTION.
01336 100322 SETLOC
01337 000002 2
01340 001343 P1TS3C-1
01341 700042 ION /SCOPE LOOP
01342 740000 NOP
01343 601341 JMP .-2
01344 440051 P1TS3C ISZ CTRA /DONE?
01345 601333 JMP P1TS3B /NO. REPEAT
01346 600260 JMP CHAIN /YES. CHAIN
/
.EJECT

```

```

/ROUTINE 4
/TIMING TEST. CHECKS THAT FLAG IS 1 NO LATER THAN 110 MSECS.
/AFTER TLS INSTRUCTION.
P1TS4      4
01347      000004
01350      777777
01351      100322          SETLOC          /-110 TO DELAYM
01352      000023          DELAYM
01353      777622          -156
01354      100322          SETLOC          /-100 TO CTRA
01355      000051          CTRA
01356      777634          -144
01357      700406          P1TS4A  TLS          /START PUNCH/READER
01360      100333          JMS          DLYMS      /DELAY 110 MSECS.
01361      700401          TSF          /FLAG 1?
01362      601366          JMP          P1E4      /NO. ERROR
01363      440051          ISZ          CTRA          /YES. DONE?
01364      601357          JMP          P1TS4A  /NO. REPEAT
01365      600260          JMP          CHAIN    /YES. CHAIN.
01366      750040          P1E4  HLT:CLA      /ERR. FLAG NOT 1 110 MSECS
                                /AFTER TLS INSTRUCTION
                                /SCOPE LOOP, START PRINTER
                                /WAIT FOR FLAG 1
01367      700406          TLS
01370      700401          TSF
01371      601370          JMP          .-1
01372      601367          JMP          .-3          /REPEAT.
/
.EJECT

```

```

/PROGRAM 2. ASR33/35 TELETYPE READER TEST. CHECKS ABILITY OF READER
/TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS.
01373 100322 PRG2 SETLOC /SET KSTART TO INITIAL
01374 000020 KSTART /ROUTINE ADDRESS
01375 001377 P2TS0
01376 600233 JMP SRSET /START

/ROUTINE 0
/READ 4095 CHARACTERS, AT FULL SPEED, MATCHING EACH CHARACTER READ
/AGAINST BINARY COUNT PATTERN
01377 000000 P2TS0 0
01400 001426 P2TS1
01401 100524 JMS SYNK /SYNC READER
01402 100322 SETLOC /-4095 TO CTRA
01403 000051 CTRA
01404 770001 -7777
01405 100406 JMS INITPT /INITIALIZE PATTERN
01406 100415 P2TS0A JMS GETPTT /GET PATTERN CHARACTER
01407 041415 DAC SB0 /STORE AT SB0
01410 700322 KRA /READ
01411 700301 KSF /READY?
01412 601411 JMP .-1 /NO, WAIT
01413 700312 KRB /YES, READ
01414 100506 JMS CHCK /GO CHECK CHARACTER
01415 000000 SB0 0
01416 601422 JMP P2E0A /ERROR
01417 440051 P2TS0B ISZ CTRA /OK, DONE?
01420 601406 JMP P2TS0A /NO, REPEAT
01421 600260 JMP CHAIN /YES, CHAIN
01422 740040 P2E0A HLT /ERR HALT A. BAD CHAR IN AC.
/ /PRESS CONTINUE.

01423 201415 LAC SB0
01424 740040 HLT /CORRECT CHAR IN AC
01425 601417 JMP P2TS0B

/
.EJECT

```

```

/ROUTINE 1
/READS 2000 CHARACTERS. RANDEM DELAY BETWEEN CHARACTERS.
/EACH CHARACTER READ IS MATCHED AGAINST COUNT PATTERN.
P2TS1      1
           P2TS2
           JMS      SYNK      /SYNC READER.
           SETLOC   /-2000 TO CTRA
           CTRA
           -3720
           JMS      INITPT    /INITIALIZE PATTERN
P2TS1A     JMS      GETPTT    /SET PATTERN CHARACTER
           DAC
           KRA
           JMS      DLCNT     /READ
           JMS      DLYMS     /GENERATE DELAY COUNT
           KSF         /DELAY
           JMP        .-1      /WAIT FOR
           KRB         /READY.
           JMS      CHCK      /READ CHARACTER
           SB1         /GO CHECK CHARACTER
           0
           JMP        P2E1A    /ERROR
P2TS1B     ISZ      CTRA      /DONE?
           JMP        P2TS1A   /NO. REPEAT
           JMP        CHAIN    /YES. CHAIN
P2E1A     HLT
           /ERROR HALT A. BAD CHAR IN AC
           /PRESS CONTINUE
           LAC      SB1
           HLT
           JMP      P2TS1B    /CORRECT CHAR IN AC
/
.EJECT

```

```

01426 000001
01427 001457
01430 100524
01431 100322
01432 000051
01433 774060
01434 100406
01435 100415
01436 041446
01437 700322
01440 100474
01441 100333
01442 700301
01443 601442
01444 700312
01445 100506
01446 000000
01447 601453
01450 440051
01451 601435
01452 600260
01453 740040

01454 201446
01455 740040
01456 601450

```



```

/ROUTINE 2
/READ 100 GROUPS OF CHARACTERS. EACH GROUP IS OF RANDOM LENGTH.
/EACH GROUP USES A FIXED DELAY DETERMINED AT RANDOM. DELAY CHANGES BETWEEN GROUPS.
P2TS2      2
01457      000002
01460      777777
01461      100524
01462      100322
01463      000051
01464      777634
01465      100406
01466      100474
01467      100455
01470      000052
01471      100415
01472      041501
01473      700322
01474      100333
01475      700301
01476      601475
01477      700312
01500      100506
01501      000000
01502      601510
01503      440052
01504      601471
01505      440051
01506      601466
01507      600260
01510      740040

P2TS2A
P2TS2B
SB2
P2E2A

LAC      SB2
HLT
JMP      SB2+2

SYNK      /SYNC READER
          /-100 TO CTRA

INITPT    /INITIALIZE PATTERN
DLCNT     /GENERATE DELAY COUNT
CHRCNT    /GENERATE AND STORE
CTRB      /BLOCK LENGTH
GETPTT    /GET PATTERN CHARACTER

/READ
/DELAY
/READY?
.-1       /NO, WAIT
KRB       /READ CHARACTER
CHK       /GO CHECK CHARACTER

P2E2A     /ERROR.
CTRB      /GROUP DONE?
P2TS2B    /NO.
CTRA      /YES. ALL GROUPS DONE?
P2TS2A    /NO.

/ERR HALT A. BAD CHAR IN AC
/PRESS CONTINE.

/
.EJECT

```

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15TTY1

	000000	
01514	000405	*L
01515	000375	*L

.END

NO ERROR LINES