

1. INTRODUCTION.

2. The information contained in this supplement provides the user with diagnostic test procedures for checking the operation of the HP 2748A Tape Reader and the HP 2758A Tape Reader-Reroller in conjunction with the HP 12597A-02 Interface Kit and the HP 2114, HP 2115, and HP 2116 Computers. These diagnostic tests enable the user to verify proper equipment operation and to isolate trouble to specific functional circuit areas.

3. TEST DESCRIPTION.

4. The diagnostic program consists of a functional test contained in the HP 20408C Tape Reader Test - Binary Tape and an operational test tape, which must be generated by the functional test tape program. When performing the diagnostic test, the HP20408C tape is loaded into the computer and the functional test is run. When the functional test is completed, the computer will halt. The teleprinter tape punch may then be used to generate a standard operational test tape from data placed in memory. The operational tape may be used for subsequent tests. A special test tape may also be prepared when continuous reading of a single character or track in the punched tape is required to diagnose a malfunction.

Note

Diagnostic tape revisions are indicated by a change in the model number suffix letter. Required changes to the diagnostic operating procedures are reflected in updating supplements attached to this manual.



5. FUNCTIONAL TEST.

6. The functional test provides a detailed analysis of the control capabilities and the interrupt logic of the tape reader interface card by performing the following tests:

- a. Test the ability of the computer PRESET switch to properly initialize the interface card.
- b. Test for proper command responses by the interface card, the I/O control card, and the I/O address card (HP 2115 and HP 2116 Computers).
- c. Dynamic test of the interface card by initiating a read operation under interrupt control. If an interrupt does not occur within 30 milliseconds for the HP 2116 Computer or 37.5 milliseconds for the HP 2114 and HP 2115 Computers, an error message is typed by the teleprinter.

7. When the functional test is completed, a completion message is typed by the teleprinter, and the program halts.

8. OPERATIONAL TEST.

9. The operational test of the tape reader is performed upon completion of the functional test on the interface card. After the operational test has been run, the computer halts to allow the insertion of either the standard or the special operational test tape. If a standard or a special test tape has not been prepared previously, it may be prepared at this time. Also, switches on the computer may be set at this time to provide various test options.

10. Table 1 provides a list of switch settings on the computer and corresponding test options that result from the settings. Switch positions 8 through 15, not shown in table 1, specify the 8-bit character to be punched in or read from the special test tape as determined by the position of switches 0 and 2 of the switch register. Paragraphs 11 through 19 describe each of the test options in table 1.



Table 1. Switch Register Selections

SWITCHES								OPTION SELECTED
7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	Read
0	0	0	0	0	0	0	1	Punch
0	0	0	0	0	0	1	0	No-Stop Read
0	0	0	0	0	1	X	X	Special Test Tape
0	0	0	0	1	X	X	X	Pause
0	0	0	1	-	-	-	-	Terminate
0	0	1	-	-	-	-	0	Resync Pause
0	1	-	-	-	1	-	0	Error Type-Out Bypass
1	-	-	-	-	-	-	0	Interrupt Control

NOTES:

- 0 = Switch in off position.
- 1 = Switch in on position.
- X = Switch is on or off as required to obtain a combination option. For example, if switch 2 and switch 0 are placed in the on position, the option becomes special test tapè, punch.
- = Position of switch is immaterial. For example, if switch 4 is on, the test will terminate regardless of the position of all other switches.

11. READ (SWITCH 0 OFF). The read option results in the reading of the standard or the special test tape. If switch 2 is off, the standard test tape is read; if switch 2 is on, the special test tape is read. For both tapes, reading can be performed with or without interrupt control (as explained in paragraph 19).

12. PUNCH (SWITCH 0 ON). The punch option results in the standard or the special test tape being generated on the teleprinter tape punch. If switch 2 is off, the standard test tape is punched; if switch 2 is on, the special test tape is punched. (No punching is done under interrupt control.)

13. NO-STOP READ (SWITCH 1). The no-stop read option allows the reading of the standard test tape in the continuous mode. Normally, start-stop tests are made while reading each data record on the tape. When switch 1 is on, these stops are omitted.

14. SPECIAL TEST TAPE (SWITCH 2). The special test tape option allows the punching or reading of the special test tape. The character to be punched in or read from the special test tape must be stored in switches 8 through 15 of the computer switch register before the punch or read operation starts. Changing the position of the switches after a punch or a read operation starts has no effect on the data pattern. The pattern can be changed only after a termination (as explained in paragraph 16).

15. PAUSE (SWITCH 3). The pause option allows the test to be interrupted momentarily by the operator at any time without affecting the test or data sequence. The switch is turned off to continue.

16. TERMINATE (SWITCH 4). The terminate option allows termination of the current operation in an orderly manner. When the termination occurs, the program halts. At this time, option changes can be made as the program will start with the option analysis at the beginning of the operational test when the computer RUN switch is pressed.

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

17. **RESYNC PAUSE (SWITCH 5).** The resync pause option inhibits continuation of the test when an error condition has been detected that results in the program resyncing to the start of a test block within a data record. When this error condition exists, a resync message will be typed by the teleprinter and a pause will occur. The switch must be placed off before the test will continue.

18. **ERROR TYPE-OUT BYPASS (SWITCH 6).** The error type-out bypass option allows the bypassing of the error type-out by the teleprinter when the special test tape is being read.

19. **INTERRUPT (SWITCH 7).** The interrupt option allows the running of the operational test under interrupt control. While the HP 2115 and HP 2116 Computers are under interrupt control and before an interrupt occurs, the B-register on the front panel of the computer will indicate 177777 and the B-register lights should flicker. If the lights stop flickering, an interrupt-hang condition exists which can be visually determined by the operator. This condition cannot be determined if an HP 2114 Computer is being used.

20. **TEST TAPE DESCRIPTION.**

21. **STANDARD TEST TAPE.**

22. The standard test tape is prepared on the teleprinter tape punch and represents the most difficult data pattern for both continuous and start-stop reading. The tape contains 3 identical 55-character data records with each record separated by 15 leader characters as illustrated in figure 1. The tape-ends shown in figure 1 are formed when the tape is torn from the teleprinter tape punch. The ends should be joined to form a continuous loop for continuous tape reader testing and an infinite number of data records. When splicing tape, butt ends of tape together with no overlap and join with a single layer of transparent cellophane tape.

23. The testing sequence in reading the standard test tape is terminated only by the operator placing switch 4 of the computer switch register in the on position. The sequence is as follows:

- a. Read three 55-character data records and store the data characters in computer memory, ignoring all leader characters.
- b. Analyze the data for correctness and sequencing.
- c. Repeat the test sequence.

24. The configuration for each data record on the standard test tape is listed in table 2. The data-to-drive signal delays indicated in table 2 check the response time of the tape reader. The delays are inserted between the receipt of data (flag signal) and the issuance of a drive signal to advance the tape to the next row of data holes. (See figure 2.)

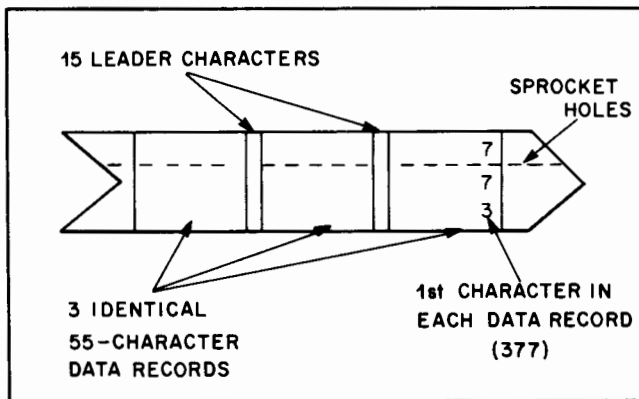


Figure 1. Standard Test Tape

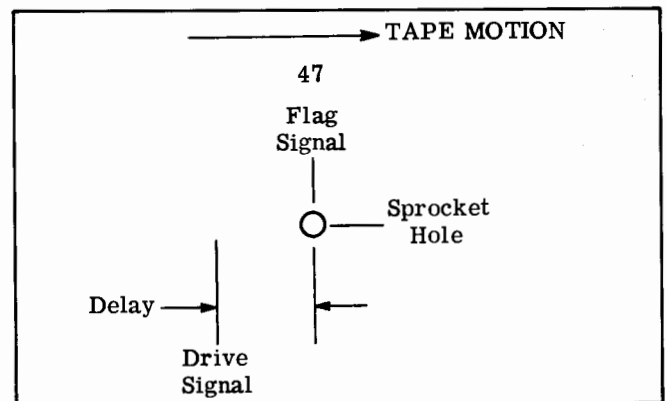


Figure 2. Data-to-Drive Signal Delays

Table 2. Data Record Configuration

TAPE CHANNEL	OCTAL NO.	CHARACTER NO.	TAPE CHANNEL	OCTAL NO.	CHARACTER NO.
8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1		
x x x x x x x x	377	1	x	102	34
x	201	2	x	201	35
x x x x	125	3	x x x x x x x x	377	36
x x x x	252	4	x x x x	252	37
x x x x x x	333	5	x x x x	125	38
x x x x x	155	5	x x x	250	39
x x x x	066	7	x x x x x x x x	377	40
x x x x	033	8		000	41
x	204	9	x x x x x x x	347	42
x x x x x	037	10	x x x	122	43
x x x	340	11	x x x x x	255	44
x x x x x x x x	377	12	x x x x	211	45
x x x x x x	127	13	x x x x	152	46
x	201	14	x x x x x	235	47
x	102	15	x x x	052	48
x x x x	145	16	x x x x x x x	367	49
x x x x	132	17	x	010	50
x x x x x x x	347	18	x x x x x x x	167	51
x x	030	19	x x	030	52
x x x x x x x x	377	20	x x x x	245	53
x x x x	132	21	x x	044	54
x x x x x	245	22	x x x x x x x	333	55
x x	030	23			
x	102	24			
x x	044	25			
x x	030	26			
x	201	27			
x x x x	245	28			
x	102	29			
x x	044	30			
x x	030	31			
x x x x	231	32			
x x	044	33			

NOTES: -s Tape reader stops, then automatically proceeds.
 -D Data-to-drive signal delay. Delays for each data record are as follows for the HP 2116 Computers (delays are 25% longer for the HP 2114 and HP 2115 Computers):

Data Record 1	0.5 ms delay	Data Record 3	1.00 ms delay
Data Record 2	0.75 ms delay	Data Record 4	1.25 ms delay

30. TYPES OF DATA ERRORS. The following steps describe the types of errors typed-out by the teleprinter as illustrated in the previous paragraph. This information is typed out only during performance of the standard test tape.

- a. BIT ERROR: This indicates that the character read is in error (one or more bits dropped, for example), but the sequence of reading is correct. Also, three consecutive BIT ERROR messages are typed out if two or more characters are skipped.
- b. REREAD CH.: This indicates that the character read is identical to the last character read, so it is assumed to be a reread of that character. This is generally caused by tape reader noise. Following this type-out, a RESYNC message will be typed, the program will automatically position the test tape to the next group of leader characters, and the testing is restarted.
- c. MISSED CH.: This indicates that the character just read is out of place so it is assumed that at least one character was skipped. This is generally caused by feedhole phototransistor sensitivity or improper setting of pinch roller tension. Following this type-out, a RESYNC message will be typed, the program will automatically position the test tape to the next group of leader characters, and the testing is restarted.
- d. RESYNC: This indicates character sequence errors or that three consecutive bit errors have been detected. The program automatically positions the test tape to the next group of leader characters, and the testing is restarted.

31. INTERRUPT ERRORS.

32. PRESET INTERRUPT. The teleprinter types "INTERRUPT ON PRESET (CONTROL)" if an interrupt occurs in the preliminary steps of the functional test on the interface card. If there were no error type-outs prior to this, it implies that the control FF on the interface card was not reset when the PRESET switch was pressed at the beginning of the test.

33. NORMAL INTERRUPT. During the functional test, the teleprinter types "NO NORMAL INTERRUPT" if an interrupt signal was not received from the interface card within 30 milliseconds (37.5 milliseconds for the HP 2114 and HP 2115 Computers) after the drive signal was sent to the tape reader. If there were no error type-outs prior to this, the circuits in the tape reader which supply the flag signal to the interface card or the interrupt logic on the interface card should be suspected of malfunctioning.

34. PRESET ERRORS.

35. SYSTEM FLAG. The teleprinter types "SYSTEM FLAG ON - PRESET" if the interrupt system enable FF (system flag) on the I/O control card did not reset when the PRESET switch was pressed.

36. READER FLAG. The teleprinter types "READER FLAG OFF - PRESET" if the flag FF (reader flag) on the interface card did not set when the PRESET switch was pressed.

37. FLAG COMMAND ERRORS.

38. CLEAR FLAG ERROR. The teleprinter types "READER CLF ERROR (CLF OR SFC)" to indicate one or both of the following error conditions:

- a. The flag FF on the interface card did not respond to a clear flag (CLF) instruction.
- b. The skip on flag clear (SFC) instruction used in testing the flag FF did not function properly on the interface card.

39. SET FLAG ERROR. The teleprinter types "READER STF ERROR (STF OR SFS)" to indicate one or both of the following error conditions:

- a. The flag FF on the interface card did not respond to a set flag (STF) instruction.
- b. The skip on flag set (STS) instruction used in testing the flag FF did not function properly on the interface card.

40. TEST COMPLETED.

41. FUNCTIONAL TEST. The teleprinter types "FUNCTIONAL TEST COMPLETE" when the functional test of the interface card is completed.

42. TERMINATE. The teleprinter types "-TERMINATE-" when switch 4 of the computer switch register is placed in the on position and the test is terminated. The test can be continued if the computer RUN switch is pressed.

43. TEST PROCEDURE.

44. The following paragraphs provide a procedure to be followed in running the diagnostic program. The procedure in paragraph 45 should be followed when using either an HP 2115 or HP 2116 Computer. The procedure in paragraph 46 should be followed when using an HP 2114 Computer. Both procedures assume that the HP 2752A Teleprinter and the HP 2748A or the HP 2758A Tape Reader are connected to the computer.

45. To run the diagnostic program when using an HP 2115 or HP 2116 Computer, proceed as follows:

- a. Set the teleprinter LINE/OFF/LOCAL switch to LOCAL. Press the teleprinter tape punch ON switch. Press the HERE IS key on the teleprinter to obtain about 6 inches of tape leader. Press the teleprinter tape punch OFF switch and then set the LINE/OFF/LOCAL switch to LINE.
- b. Place the tape reader test - binary tape in the tape reader and press the tape reader POWER switch on. Press the tape reader READ switch. Do not remove the tape until instructed to do so in step "k".
- c. If the computer contains 8K of memory, position the switches of the switch register to 17700₈. If the computer contains 4K of memory, position the switches to 7700₈. Press the LOAD ADDRESS switch to load the contents of the switch register into the P-register.
- d. Place the computer LOADER ENABLED/PROTECTED switch to ENABLED.
- e. Press the computer RUN switch. When the diagnostic program is loaded, the computer halts. (The T-register on the front panel of the computer indicates 102077 if the program was loaded properly. If not, repeat steps "c" and "d", then press the RUN switch again.)
- f. Place the LOADER ENABLED/PROTECTED switch to PROTECTED.
- g. Load 100 (starting address) in the P-register using the switch register and the LOAD ADDRESS switch.
- h. Place the lower select code of the teleprinter (noted on the inside of the front panel of the computer) in the A-register using the switches of the switch register. If a serial teleprinter is being used, also place switch 15 of the switch register up (on). Press the LOAD A switch.
- i. Place the select code of the tape reader in the B-register using the switch register. Press the LOAD B switch.
- j. Press the PRESET switch and then the RUN switch. The functional test will run and the teleprinter will type out any errors detected by the program.
- k. At completion of the functional test, the teleprinter will type-out "FUNCTIONAL TEST COMPLETE" and the computer will halt. If the functional test is to be repeated, load 101 into the P-register and press the RUN switch. If the test is not to be repeated, remove the test tape from the tape reader and proceed to step "l" to perform the operational test on the punched tape reader.
- l. Prepare the standard test tape and use it to perform the operational test as follows:
 - (1) Press the teleprinter tape punch ON switch.
 - (2) Place switch 0 of the switch register up (on).
 - (3) Press the computer RUN switch. (While the tape is being punched the teleprinter types irrelevant information.)
 - (4) The program will halt when the standard test tape has been generated. Set the teleprinter LINE/OFF/LOCAL switch to LOCAL. Press the HERE IS key to obtain about 6 inches of tape leader tape. Tear off the tape at the teleprinter, form the tape into a loop, and splice the ends of the tape together.
 - (5) Place switch 0 down (off) and press the teleprinter tape punch OFF switch.

- (6) Place the standard test tape in the punched tape reader with the sprocket holes toward the tape reader and with character 377 being the first character to enter the tape reader. Select the desired test options by positioning switches 0 through 7 (refer to table 1), and then press the RUN switch.
- (7) Any errors detected by the diagnostic program will be typed on the teleprinter.

Note

To avoid typing out a lengthy error message, press the computer HALT switch while message is being typed out. Then load address 102 into the P-register and press PRESET and RUN switches. Otherwise, setting switch 4 on will not terminate the test.

m. If the special test tape must be prepared, proceed as follows:

- (1) Press the teleprinter tape punch ON switch.
- (2) Place switches 0 and 2 of the switch register up (on).
- (3) Set up the character to be punched in the special tape in switches 8 through 15 of the switch register.
- (4) Press the computer RUN switch.
- (5) When the desired length of tape is obtained, place switch 4 in the up position to terminate the punching operation.
- (6) Place switch 0 down (off) and press the teleprinter tape punch OFF switch.
- (7) Tear off the tape at the teleprinter. With scissors, cut off the portion of the tape that does not include the special punched characters and splice the tape ends together to form a loop. Make certain that adhesive tape is at a right angle to the edge of the special tape and that the adhesive tape covers either all of a given character (including feedholes) or none of a given character at the splice junction. Otherwise, reading errors will occur. Insert the tape loop in the tape reader. Select the desired test options by positioning switches 0 through 7 (refer to table 1). Make certain that the character punched in the special test tape is also set up in the switch register. Press the computer RUN switch.
- (8) Any errors detected during the running of the special test tape will be typed on the teleprinter. Place switch 4 in the up position to terminate the reading of the special test tape.

46. To run the diagnostic program when using an HP 2114 Computer, proceed as follows:

- a. Set the teleprinter LINE/OFF/LOCAL switch to LOCAL. Press the teleprinter tape punch ON switch. Press the HERE IS key on the teleprinter to obtain about 6 inches of tape leader. Press the teleprinter tape punch OFF switch and then set the LINE/OFF/LOCAL switch to LINE.
- b. Press the tape reader POWER switch on. Press the tape reader LOAD switch.
- c. Place the tape reader test-binary tape in the tape reader.
- d. Carefully position the program tape to be loaded in the tape reader and press the READ switch. (Do not remove the tape until instructed to do so in step "k".)
- e. At the computer front panel, press the CLEAR REGISTER switch. Press and hold the PRESET and LOAD switches, then release both switches. The computer should go into the run mode (RUN indicator on) and the program tape should process through the tape reading mechanism of the tape reader. When the computer halts (RUN indicator off, HALT indicator on), check the MEMORY DATA (T-register) indicators. If the test program was correctly loaded into memory, halt instruction 102077 should be displayed.
- f. Enter 00000 into the switch register (S-register) and press the LOAD ADDRESS switch. Check the memory address (M-register) display for 00000.
- g. If a serial teleprinter is being used, set switch 15 of the switch register on. Enter teleprinter select code into the S-register and press the LOAD MEMORY switch.

- h. Enter 00001 into the S-register and press the LOAD ADDRESS switch. Check the M-register display for 00001.
- i. Enter the tape reader select code into the S-register and press the LOAD MEMORY switch.
- j. Enter 00100 (starting address) into the S-register and press the LOAD ADDRESS switch. Press the PRESET switch and then the RUN switch. The functional test will run and the teleprinter will type out any errors detected by the program.
- k. At completion of the test, the teleprinter will type-out "FUNCTIONAL TEST COMPLETE" and the computer will halt. If the test is to be repeated, enter 00101 into the S-register and press the LOAD ADDRESS switch and then the RUN switch. If the test is not to be repeated, remove the test tape from the tape reader and proceed with the next step.
- l. Prepare the standard test tape and use it to perform the operational test as follows:

Note

A lighted proximity switch in the switch register display of the HP 2114 Computer is equivalent to a toggle switch in the up (on) position on the HP 2116 and HP 2115 Computers.

- (1) Press the teleprinter tape punch ON switch.
- (2) Place switch 0 of the switch register on.
- (3) Press the computer RUN switch. (While the tape is being punched, the teleprinter types irrelevant information.)
- (4) The program will halt when the standard test tape has been generated. Tear off the tape at the teleprinter, form the tape into a loop, and splice the ends of the tape together.
- (5) Place switch 0 off and press the teleprinter tape punch OFF switch.
- (6) Place the standard test tape in the punched tape reader with the sprocket holes toward the tape reader and with character 377 being the first character to enter the tape reader. Select the desired test options by positioning switches 0 through 7 (refer to table 1), and then press the RUN switch.
- (7) Any errors detected by the diagnostic program will be typed on the teleprinter.



Note

To avoid typing out a lengthy error message, press the computer HALT switch while message is being typed out. Then load address 102 into the computer and press PRESET and RUN switches. Otherwise, setting switch 4 on will not terminate the test.

- m. If the special test tape must be prepared, proceed as follows:
 - (1) Press the teleprinter tape punch ON switch.
 - (2) Place switches 0 and 2 of the switch register on.
 - (3) Set up the character to be punched in the special tape in switches 8 through 15 of the switch register.
 - (4) Press the computer RUN switch.
 - (5) When the desired length of tape is obtained, place switch 4 in the up position to terminate the punching operation.
 - (6) Place switch 0 off and press the teleprinter tape punch OFF switch.
 - (7) Tear off the tape at the teleprinter. With scissors, cut off the portion of the tape that does not include the special punched characters and splice the tape ends together to form a loop. Make certain that the adhesive tape is at a right angle to the edge of the special tape and that the

adhesive tape covers either all of a given character (including feedholes) or none of a given character at the splice junction. Otherwise, reading errors may occur. Insert the tape loop in the tape reader. Select the desired test options by positioning switches 0 through 7 (refer to table 1). Make certain that the character punched in the special test tape is also set up in the switch register. Press the computer RUN switch.

- (8) Any errors detected during the running of the special test tape will be typed on the teleprinter. Place switch 4 in the up position to terminate the reading of the special test tape.

47. DIAGNOSTIC PROGRAM LISTING.

48. The following pages of this supplement contain a listing of the tape reader test - binary tape contents of the diagnostic program. The listing enables the user to examine the method of testing and the particular areas of testing in detail.

0001		ASFB,A,B,L,T
OUT	003147	
ABLE	000100	
ABLE1	000217	
ABLE2	000302	
ABLEM	000105	
ABLEO	000114	
ABLES	000122	
ABLX1	000225	
ABLX2	000234	
ADDM	000365	
ASC0	000477	
ASC1	000500	
ASCA	000501	
ASCC	000511	
ASRA	000363	
BAKE	000750	
B103	000675	
BJMP	000362	
BT15	000512	
BTER	000650	
C260	000525	
CHEC	000642	
CHIX	000640	
CHLU	000747	
CHP0	001366	
CHR0	001405	
CHR1	001430	
CMD1	000346	
CMD10	000357	
CMD11	000360	
CMD2	000347	
CMD3	000350	
CMD4	000351	
CMD5	000352	
CMD6	000353	
CMD7	000354	
CMD8	000355	
CMD9	000356	
CRT1	000526	
CRT2	000527	
CTIC	000463	
CTIX	000464	
CX01	000517	
CX0C	000524	
D000	000545	
D001	000537	
D003	000540	
D004	000541	
D005	000542	
D006	000543	
D008	000544	
D010	000546	
DADD	000547	
DBKK	000550	
DBKM	000675	
DCDC	000551	

DCTC	000552
DE05	000553
DE08	000554
DE11	000555
DE17	000556
DE18	000557
DE34	000560
DE64	000677
DE65	000562
DE66	000561
DEL2	000563
DEL3	000564
DEL4	000565
DEL7	000566
DELC	000567
DFBK	000570
DHBK	000571
DINTC	000572
DITC	000467
DITR	002411
DITT	000373
DITX	000470
DIXC	000573
DIXI	000574
DK03	000575
DK04	000576
DK05	000577
DK06	000600
DK07	000601
DK08	000602
DK09	000603
DLDC	000604
DLDR	000605
DSFC	000606
DTBC	000607
DTBN	002107
DTBS	000471
DTBX	000472
DTCC	000610
DTCN	002017
DTCS	000473
DTCX	000474
DWK1	000611
DWK2	000612
DWK3	000613
DWK4	000614
DWK5	000615
DWK6	000616
DWK7	000617
DWK8	000620
DWK9	000621
E000	001222
E00A	001233
E010	001245
E01A	001252
E01B	001254
E030	001267

E040	001301
EINTA	000344
EP00	001613
EP01	001622
EP02	001627
EP03	001633
EP03A	001642
EP04	001643
EP04A	001645
EP04B	001651
EP0A	001614
ER00	001444
ER01	001454
ER02	001460
ER03	001466
ER04	001477
ER05	001503
ER06	001524
ER07	001512
ER08	001541
ER09	001543
ER10	001557
ER11	001564
ER12	001571
ER13	001576
ER14	001601
ER15	001606
ERWD	000622
FEINT	000330
FINTA	000343
FM01	002177
FM01A	000623
FM02	002215
FM02A	000624
FM03	002233
FM03A	000625
FM04	002255
FM04A	000626
FM05	002277
FM05A	000627
FM06	002321
FM06A	000630
FM07	002337
FM07A	000631
FRCC1	000336
FRCC2	000317
FRCF1	000255
FRFC1	000256
FRFS1	000245
FRFS2	000270
FRSC1	000306
FRSF1	000267
FRWD	000632
HEAD	000644
IFLG	000530
INTF	000633
JMP1	001155



JMP2	001156
JMP3	001157
JMP4	001160
LASTC	000461
LASTD	000634
LDPN	001034
LK00	001665
LK01	001677
LK03	001703
LK04	001717
LK05	001732
LK06	001744
LK07	001747
LK08	001756
M000	000770
M00A	001006
M00B	001037
M00C	001023
M010	001051
M01A	001062
M01B	001075
M020	001100
M030	001107
M040	001127
M050	001140
M060	001154
M061	001161
M062	001166
M063	001173
M064	001200
M070	001204
MA00	000751
MHLT	001032
MHLT1	001020
MSCH	000662
MSK1	000736
MSK1	000735
MSM3	000475
MSMK	000476
N026	000637
OCTL	000635
P001	002377
PASS	000513
PCH0	000641
PCT1	000700
PCT2	000701
PCT3	000702
PRT1	000703
PRT2	000705
PRT3	000713
PRT4	000720
PRT5	000722
PRT6	000724
PRT7	000727
PUNB	000515
PUNF	000516
PUNN	000514

REAR	000645
REDA	000364
REPU	000746
RERD	000655
RESD	000646
RESF	000643
RESY	000667
RINT	001351
RINTA	000345
RINTF	000340
SAVB	003146
SEL1	000531
SEL2	000532
SEL3	000533
SEL4	000534
SEL5	000535
SEL6	000536
SFLAG	000361
SWA0	001432
SWA1	001433
SWCH	000636
SY00	001774
SY01	001775
T0UT	000372
T0UT0	000370
T0UT3	000371
T0UT4	000366
T0UT5	000367
T1X1	001332
T1X2	001334
T1X2A	001335
T4X1	001362
TCIC	000465
TCIX	000466
TERM0	000647
TERMM	002355
TOUT	003135
TOUT0	003137
TOUT3	003140
TOUT4	003141
TOUT5	003142
TR10	001303
TR10A	001315
TR40	001355
** NO ERRORS*	


```

0001          ASFB,A,B,L,T
0002 00100          CRG 100B
0003*
0004*
0005*          REVISED AUGUST 13,1969          REVISION C
0006*
0007*
0008*          THIS IS SOURCE TAPE 1 OF 2 FOR THE HIGH SPEED TAPE READER
0009*          TEST PROGRAM.
0010*          THIS PROGRAM WILL TEST BOTH SERIAL AND BUFFERED TTY BOARDS.
0011*          WHEN TTY OUTPUT ADDRESS IS SET IN SW., SET BIT 15 TO USE
0012*          WITH SERIAL TYPE BOARDS.
0013*
0014*
0015*          THERE ARE THREE STARTING POINTS IN THE PROGRAM TO ALLOW THE
0016*          OPERATUR START OR RESTART. THESE ARE AS FOLLOWS:
0017*
0018*          ADDRESS
0019*
0020*          100 -- START- INITIALIZE I/O ADDRESSES AND START READER
0021*                   TEST WITH FUNCTIONAL TEST THE DETAILED TE
0022*                   PRESET BEFORE START.
0023*          101 -- RESTART- FUNCTIONAL TEST IS PERFORMED THEN A HAL
0024*                   FOLLOWED BY OPTION ANALYSIS AND THE DET
0025*                   ED TEST. PRESET BEFORE STARTING AT 101.
0026*          102 -- RESTART- OPTION ANALYSIS AND DETAILED TEST. BYPA
0027*                   THE I/O ADDRESSING AND FUNCTIONAL TEST.
0028*
0029*
0030*          THE 1ST SECTION OF THIS PROGRAM ALLOWS CHANNEL ADDRESS SELECTION
0031*          FOR THE PERIPHERALS INVOLVED. THIS IS DONE AS FOLLOWS:
0032*
0033*          SET P REG = 100
0034*          SET A REG = ASF OUTPUT CHANNEL #
0035*                   SELECT TYPE OF TTY BOARD BY USE OF BIT 15.
0036*          SET B REG = READER CHANNEL #
0037*
0038*          PRESET
0039*
0040*          RUN
0041*
0042*          THIS IS THE STARTING ADDRESS FOR I/O ADDRESSING.
0043*
0044* 00100 024105  ABLE  JMP ABLE0          GO TO ADDRESSING
0045*
0046*          RESTART ADDRESS FOR FUNCTIONAL TEST (PRESET BEFORE RUN)
0047*
0048* 00101 024217          JMP ABLE1          GO TO FUNCTIONAL TEST
0049*
0050*          RESTART ADDRESS FOR DETAILED TEST
0051*
0052* 00102 024750          JMP BAKE          GO TO DETAILED TEST
0053* 00103 102000          HLT
0054* 00104 102000          HLT
0055* 00105 002020  ABLE0  SSA          CHECK FOR SERIAL/BUFFER BD.
0056* 00106 024114          JMP ABLE0
0057* 00107 070361          STA SFLAG          BUFFERED TYPE.

```

0058	00110	010365	AND ADDM	MASK ADDRESS
0059	00111	070363	STA ASRA	STORE ASR ADDRESS
0060	00112	074364	STB REDA	STORE SELECTED HSTR CHANNEL #.
0061	00113	024122	JMP ABLES	
0062	00114	010365	ABLEO AND ADDM	
0063	00115	070363	STA ASRA	
0064	00116	074364	STB REDA	
0065	00117	002400	CLA	
0066	00120	070361	STA SFLAG	
0067	00121	071633	STA EP03	
0068	00122	107700	ABLES CLC 0,C	CLEAR CONTROL AND INTERRUPT
0069	00123	060363	LDA ASRA	
0070	00124	010365	AND ADDM	
0071	00125	070363	STA ASRA	
0072	00126	107700	CLC 0,C	CLEAR CONTROL AND INTERRUPT
0073	00127	060364	LDA REDA	
0074	00130	010365	AND ADDM	MASK FOR ADDRESS ONLY (HSTR)
0075	00131	070364	STA REDA	
0076	00132	040347	ADA CMD2	ADD SFS TO CHANNEL #
0077	00133	071332	STA T1X1	
0078	00134	070245	STA FRFS1	
0079	00135	070270	STA FRFS2	
0080	00136	060364	LDA REDA	
0081	00137	040352	ADA CMD5	ADD STC ,C TO CHANNEL #
0082	00140	071315	STA TR1DA	
0083	00141	060346	LDA CMD1	
0084	00142	040364	ADA REDA	
0085	00143	070306	STA FRSC1	
0086	00144	060352	LDA CMD5	
0087	00145	040363	ADA ASRA	
0088	00146	170366	STA T0UT4,I	
0089	00147	060364	LDA REDA	
0090	00150	040353	ADA CMD6	ADD LIA TO CHANNEL #
0091	00151	071335	STA T1X2A	
0092	00152	060364	LDA REDA	SET SFC
0093	00153	040355	ADA CMD8	
0094	00154	070256	STA FRFC1	
0095	00155	060364	LDA REDA	SET CLF
0096	00156	040354	ADA CMD7	
0097	00157	070255	STA FRCF1	
0098	00160	060364	LDA REDA	SET STF
0099	00161	040356	ADA CMD9	
0100	00162	070267	STA FRSF1	
0101	00163	060364	LDA REDA	SET CLC
0102	00164	040351	ADA CMD4	
0103	00165	070336	STA FRCC1	
0104	00166	070317	STA FRCC2	
0105	00167	060346	LDA CMD1	
0106	00170	040363	ADA ASRA	ADD STC TO CHANNEL #
0107	00171	071642	STA EP03A	
0108	00172	060347	LDA CMD2	
0109	00173	040363	ADA ASRA	ADD SFS TO CHANNEL #
0110	00174	071643	STA EP04	
0111	00175	170367	STA T0UT5,I	
0112	00176	060350	LDA CMD3	
0113	00177	040363	ADA ASRA	ADD OTA ,C TO CHANNEL #
0114	00200	071645	STA EP04A	

```

0115 00201 060351 LDA CMD4
0116 00202 040363 ADA ASRA ADD CLC TO CHANNEL #
0117 00203 071651 STA EP04B
0118 00204 060357 LDA CMD10
0119 00205 040363 ADA ASRA ADD OTB TO CHANNEL #
0120 00206 170370 STA TOUT0,I
0121 00207 060360 LDA CMD11 ADD OTA TO CHANNEL #
0122 00210 040363 ADA ASRA
0123 00211 170371 STA TOUT3,I
0124 00212 060361 LDA SFLAG CHECK SERIAL FLAG
0125 00213 002003 SZA,RSS
0126 00214 024217 JMP *+3
0127 00215 060362 LDA BJMP
0128 00216 071633 STA EP03
0129* THIS SECTION OF THE PROGRAM PREFORMS A FUNCTIONAL TEST OF ALL
0130* COMMANDS RELATEI TO THE READER OPERATION. ALL DETECTED ERRORS AR
0131* TYPED OUT, THEN THE COMPLETION MESSAGE, THEN HALT.
0132*
0133 00217 002400 ABLE1 CLA
0134 00220 070516 STA PUNF
0135 00221 060540 LDA D003 SET UP COUNT TO -60
0136 00222 070611 STA DWK1
0137 00223 060532 LDA SEL2 SET STARTING ADDRESS AT 4
0138 00224 070612 STA DWK2
0139 00225 034611 ABLX1 ISZ DWK1 IS THIS THE LAST HALT?
0140 00226 024230 JMP *+2 NOT LAST HALT STORE
0141 00227 024234 JMP ABLX2 LAST INT HALT. CONTINUE
0142 00230 061032 LDA MHLT
0143 00231 170612 STA DWK2,I STORE IN INDEXED ADDRESS
0144 00232 034612 ISZ DWK2 INCREMENT STORE ADDRESS
0145 00233 024225 JMP ABLX1 GO STORE NEXT HALT
0146 00234 060344 ABLX2 LDA EINTA SET UP PRESET INTERRUPT RETURN.
0147 00235 170364 STA REDA,I STORE IN READER CHANNEL ADDRESS
0148 00236 102300 SFS 0 IS THE INTERRUPT OFF ON PRESET?
0149 00237 024245 JMP FRFS1 YES THIS (SFS AND SYSTEM FLAG) S
0150 00240 060560 LDA DE34 SET UP # OF CHS IN ERROR MESSAGE
0151 00241 070621 STA DWK9
0152 00242 060623 LDA FM01A SET UP ORIGIN OF SYSTEM FLAG ERR
0153 00243 070620 STA DWK8
0154 00244 015613 JSB EP00 TYPE MESSAGE
0155 00245 102300 FRFS1 SFS 0 IS THE READER FLAG SET ON PRESET
0156 00246 024250 JMP *+2 NO THE FLAG IS OFF
0157 00247 024255 JMP FRCF1 FLAG ON, EVERYTHING SEEMS O.K.,
0158 00250 060560 LDA DE34 SET UP TO TYPE THE READER FLAG O
0159 00251 070621 STA DWK9 PRESET MESSAGE
0160 00252 060624 LDA FM02A
0161 00253 070620 STA DWK8
0162 00254 015613 JSB EP00 TYPE THE MESSAGE
0163 00255 103100 FRCF1 CLF 0 CLEAR THE READER FLAG
0164 00256 102200 FRFC1 SFC 0 IS THE READER FLAG CLEAR?
0165 00257 024261 JMP *+2 NO, THERE IS AN ERROR IN READER
0166 00260 024267 JMP FRSF1 O.K.
0167 00261 060641 LDA PCH0 PREPARE TO TYPE READER CLF ERROR
0168 00262 070621 STA DWK9
0169 00263 060625 LDA FM03A
0170 00264 070620 STA DWK8
0171 00265 015613 JSB EP00 TYPE THE MESSAGE

```

```

0172 00266 024317      JMP FRCC2      BYPASS REMAINING TESTS
0173 00267 102100  FRSF1 STF 0      SET THE READER FLAG
0174 00270 102300  FRFS2 SFS 0      IS THE READER FLAG SET?
0175 00271 024273      JMP **2        NO, THERE IS AN ERROR IN STF
0176 00272 024300      JMP **6        O.K.
0177 00273 060641      LDA PCH0      PREPARE TO TYPE THE STF ERROR ME
0178 00274 070621      STA DWK9
0179 00275 060626      LDA FM04A
0180 00276 070620      STA DWK8
0181 00277 015613      JSB EP00      TYPE STF ERROR MESSAGE
0182 00300 102100      STF 0         TURN ON THE SYSTEM INTERRUPT
0183 00301 000000      NOP
0184 00302 060343  ABLE2 LDA FINTA      SET UP NORMAL FUNCTION INTERRUPT
0185 00303 170364      STA REDA,I
0186 00304 060572      LDA DINTC
0187 00305 070611      STA DWK1
0188 00306 102700  FRSC1 STC 0         SET THE READER TO READ
0189 00307 034611      ISZ DWK1      IS THE INTERRUPT DELAY OVER? (30
0190 00310 024307      JMP *-1       NO, CONTINUE DELAY
0191 00311 103100      CLF 0
0192 00312 060560      LDA DE34     THERE WAS NO INTERRUPT IN 30MS S
0193 00313 070621      STA DWK9
0194 00314 060630      LDA FM06A
0195 00315 070620      STA DWK8
0196 00316 015613      JSB EP00     TYPE THE MESSAGE
0197 00317 106700  FRCC2 CLC 0         CLEAR THE READER CONTROL
0198 00320 103100      CLF 0         TURN OFF SYSTEM INTERRUPT
0199 00321 060560      LDA DE34     PREPARE TO TYPE FUNCTIONAL TEST
0200 00322 070621      STA DWK9     COMPLETED MESSAGE
0201 00323 060631      LDA FM07A
0202 00324 070620      STA DWK8
0203 00325 015613      JSB EP00     TYPE COMPLETION MESSAGE
0204 00326 102000      FLT
0205 00327 024750      JMP BAKE     CONTINUE WITH NORMAL TEST
0206*
0207*  ERROR INTERRUPT RETURN FROM PRESET
0208*
0209 00330 000000  FEINT NOP
0210 00331 060641      LDA PCH0     PREPARE TO TYPE PRESET INTERRUPT
0211 00332 070621      STA DWK9     ERROR MESSAGE
0212 00333 060627      LDA FM05A
0213 00334 070620      STA DWK8
0214 00335 015613      JSB EP00
0215 00336 106700  FRCC1 CLC 0         CLEAR READER CONTROL
0216 00337 024302      JMP ABLE2
0217*
0218*  THIS IS THE NORMAL FUNCTION INTERRUPT RETURN
0219*
0220 00340 000000  RINTF NOP
0221 00341 000000      NOP
0222 00342 024317      JMP FRCC2     BYPASS REMAINING TESTS
0223 00343 014340  FINTA JSB RINTF     NORMAL INTERRUPT RETURN--FUNCTIONIO
0224 00344 014330  EINTA JSB FEINT     ERROR INTERRUPT RETURN
0225 00345 015351  RINTA JSB RINT      STANDARD TEST INTERRUPT RETURN.
0226 00346 102700  CMI1 STC 20B      ASR
0227 00347 102300  CMI2 SFS 00B      ASR AND HSTR
0228 00350 103600  CMI3 CTA 00B,C    ASR

```

```

0229 00351 106700 CMI4 CLC 00B
0230 00352 103700 CMI5 STC 0,C
0231 00353 102500 CMI6 LIA 0
0232 00354 103100 CMI7 CLF 0
0233 00355 102200 CMI8 SFC 0
0234 00356 102100 CMI9 STF 0
0235 00357 106600 CMI10 CTB 0
0236 00360 102600 CMI11 CTA 0
0237 00361 000000 SFLAG NOP
0238 00362 124372 RJMP JMP TOUT,I
0239 00363 000000 ASFA CCT 0
0240 00364 000000 REIA CCT 0
0241 00365 000077 ADIM CCT 000077
0242 00366 003141 T0LT4 DEF TOUT4
0243 00367 003142 T0LT5 DEF TOUT5
0244 00370 003137 T0LT0 DEF TOUT0
0245 00371 003140 T0LT3 DEF TOUT3
0246 00372 003135 T0LT DEF TOUT
0247 00373 000377 DITT OCT 000377
0248 00374 000201 CCT 000201
0249 00375 000125 OCT 000125
0250 00376 000252 OCT 000252
0251 00377 000333 OCT 000333
0252 00400 000155 OCT 000155
0253 00401 000066 OCT 000066
0254 00402 000033 OCT 000033
0255 00403 000204 CCT 000204
0256 00404 000037 OCT 000037
0257 00405 000340 OCT 000340
0258 00406 000377 OCT 000377
0259 00407 000127 OCT 000127
0260 00410 000201 CCT 000201
0261 00411 000102 OCT 000102
0262 00412 000145 OCT 000145
0263 00413 000132 OCT 000132
0264 00414 000347 OCT 000347
0265 00415 000030 OCT 000030
0266 00416 000377 OCT 000377
0267 00417 000132 CCT 000132
0268 00420 000245 OCT 000245
0269 00421 000030 OCT 000030
0270 00422 000102 OCT 000102
0271 00423 000044 OCT 000044
0272 00424 000030 OCT 000030
0273 00425 000201 OCT 000201
0274 00426 000245 OCT 000245
0275 00427 000102 OCT 000102
0276 00430 000044 OCT 000044
0277 00431 000030 OCT 000030
0278 00432 000231 CCT 000231
0279 00433 000044 OCT 000044
0280 00434 000102 OCT 000102
0281 00435 000201 OCT 000201
0282 00436 000377 OCT 000377
0283 00437 000252 OCT 000252
0284 00440 000125 OCT 000125
0285 00441 000250 CCT 000250
    
```

ASR

CONTAINS ASR CHANNEL ADDRESS.
CONTAINS HSTR CHANNEL ADDRESS.
MASK FOR CHANNEL ADDRESS.

TEST TAPE CH TABLE

0286	00442	000377	OCT	000377	
0287	00443	000000	OCT	000000	
0288	00444	000347	CCT	000347	
0289	00445	000122	OCT	000122	
0290	00446	000255	OCT	000255	
0291	00447	000211	OCT	000211	
0292	00450	000152	OCT	000152	
0293	00451	000235	OCT	000235	
0294	00452	000052	OCT	000052	
0295	00453	000367	OCT	000367	
0296	00454	000010	OCT	000010	
0297	00455	000167	OCT	000167	
0298	00456	000030	OCT	000030	
0299	00457	000245	CCT	000245	
0300	00460	000044	OCT	000044	
0301	00461	000333	LASTC	OCT 000333	
0302	00462	000000	OCT	000000	
0303	00463	002377	CTIC	DEF P001	CONSTANT FOR COUNT TABLE
0304	00464	000000	CTIX	OCT 0	COUNT TABLE IN INDEX
0305	00465	002411	TCIC	DEF DITR	CONSTANT FOR DI AREA
0306	00466	000000	TCIX	OCT 0	DI INDEX
0307	00467	000373	DIIC	DEF DITT	CONSTANT FOR DATA TABLE
0308	00470	000000	DITX	OCT 0	DATA TABLE INDEX
0309	00471	002107	DTES	DEF DTBN	
0310	00472	000000	DTEX	OCT 0	INDEX
0311	00473	002017	DTCS	DEF DTCN	
0312	00474	000000	DTCX	OCT 0	INDEX
0313	00475	000007	MSP3	OCT 000007	3 BIT MASK
0314	00476	000377	MSPK	OCT 000377	MS CH MASK
0315	00477	000260	ASC0	OCT 000260	ASCII 0
0316	00500	000261	ASC1	OCT 000261	ASCII 1
0317*					
0318*	THIS	IS A TABLE OF READ DELAYS	USED IN THE LAST 3 TAPE BLOCK TEST		
0319*	EACH	DELAY REQUIRES 2 WDS.			
0320*					
0321	00501	130256	ASCA	OCT 130256	0.50 MS DELAY
0322	00502	132660		OCT 132660	
0323	00503	130256		OCT 130256	0.75 MS DELAY
0324	00504	133665		OCT 133665	
0325	00505	130656		OCT 130656	1.00 MS DELAY
0326	00506	130260		OCT 130260	
0327	00507	130656		OCT 130656	1.25 MS DELAY
0328	00510	131265		OCT 131265	
0329	00511	000501	ASCC	DEF ASCA	
0330	00512	100000	BT15	OCT 100000	MASK FOR MS BIT
0331	00513	000000	PASS	OCT 0	COUNT OF TEST PASSES
0332	00514	000007	PUNN	OCT 000007	
0333	00515	000000	PUNB	OCT 0	BUFFER FOR 1 WD DATA TRANSFERS
0334	00516	000000	PUNF	OCT 0	FLAG THAT PUNCH IS TO BE RAN
0335	00517	177761	CX01	OCT 177761	OCTAL SHIFT TABLE
0336	00520	177764		OCT 177764	
0337	00521	177767		OCT 177767	
0338	00522	177772		OCT 177772	
0339	00523	177775		OCT 177775	
0340	00524	000517	CX0C	DEF CX01	
0341	00525	000260	C200	OCT 000260	ASCII CONSTANT FOR NUMERIC
0342	00526	106612	CR11	OCT 106612	CR AND LF

```

0343 00527 000215 CR12 OCT 000215 RIGHT CARRIAGE RETURN
0344 00530 000000 IFLG OCT 0 FLAG FOR TABLE INDEX
0345 00531 000002 SEL1 OCT 2
0346 00532 000004 SEL2 OCT 4
0347 00533 000010 SEL3 OCT 10
0348 00534 000020 SEL4 OCT 20
0349 00535 000040 SEL5 OCT 40
0350 00536 000100 SEL6 OCT 100
0351 00537 177777 D001 OCT 177777 0 DELAY
0352*
0353* DELAY COUNT AT 8.4 MICRO SEC/COUNT LOP
0354*
0355 00540 177704 D003 OCT 177704 0.50 MS (60 LOOPS)
0356 00541 177647 D004 OCT 177647 0.75 MS (89 LOOPS)
0357 00542 177611 D005 OCT 177611 1.00 MS (119 LOOPS)
0358 00543 177553 D006 OCT 177553 1.25 MS (149 LOOPS)
0359 00544 174776 D008 OCT 174776
0360 00545 000000 D000 OCT 0
0361 00546 174175 D010 OCT 174175
0362 00547 003000 DAID OCT 003000 ASR33 2 TRAILING ONES
0363*
0364* DEFINES STARTING ADDRESS OF DATA USING DELAYED READS
0365*
0366 00550 002165 DBKK DEF DTBN+46
0367 00551 000000 DOIC OCT 0 COUNT OF DELAY BETWEEN CHS
0368 00552 000000 DCTC OCT 0 TIME COUNT FROM READ TO DATA
0369 00553 177773 DE05 OCT 177773 -5
0370 00554 177770 DE08 OCT 177770 -8
0371 00555 177765 DE11 OCT 177765 -11
0372 00556 177761 DE17 OCT 177761 -15
0373 00557 177760 DE18 OCT 177760 -16
0374 00560 177744 DE34 OCT 177744 -28 (34 OCTAL)
0375 00561 177712 DE66 OCT 177712 -54
0376 00562 177711 DE65 OCT 177711 -55
0377 00563 177776 DEL2 OCT 177776 -2
0378 00564 177775 DEL3 OCT 177775 -3
0379 00565 177774 DEL4 OCT 177774 -4
0380 00566 177771 DEL7 OCT 177771 -7
0381 00567 000000 DELC OCT 0 DELAY COUNT BETWEEN CHS
0382 00570 120240 DFBK OCT 120240 2 BLANKS
0383 00571 120000 DHEK OCT 120000 MS CH 2 BLANK
0384 00572 012640 DINTC OCT 012640 COUNT FOR 30MS DELAY ON FUNCT IN
0385 00573 000000 DIXC OCT 0 STORAGE FOR DELAY COUNT
0386 00574 000000 DIXI OCT 0 INDEX FOR DELAY COUNT
0387 00575 000000 DK03 OCT 0 WORKING STORAGE
0388 00576 000000 DK04 OCT 0
0389 00577 000000 DK05 OCT 0
0390 00600 000000 DK06 OCT 0
0391 00601 000000 DK07 OCT 0
0392 00602 000000 DK08 OCT 0
0393 00603 000000 DK09 OCT 0
0394 00604 000515 DLIC DEF PUNB SINGLE WORD PRINT WORD LOCATION
0395 00605 000000 DLIR OCT 000000 LEADER CH
0396 00606 000010 DSFC OCT 000010 SLIP FACTOR (TIME BETWEEN READS)
0397 00607 000000 DTFC OCT 0 DATA TEST SEQUENCE #
0398 00610 000000 DTCC OCT 0 CH # IN DATA BLK
0399 00611 000000 DWK1 OCT 0 WORKING STORAGE

```

0400	00612	000000	DWK2	OCT	0		
0401	00613	000000	DWK3	OCT	0		
0402	00614	000000	DWK4	OCT	0		
0403	00615	000000	DWK5	OCT	0		
0404	00616	000000	DWK6	OCT	0		
0405	00617	000000	DWK7	OCT	0		
0406	00620	000000	DWK8	OCT	0		
0407	00621	000000	DWK9	OCT	0		
0408	00622	000000	ERRD	OCT	0		ERROR CH
0409	00623	002177	FM01A	DEF	FM01		ORG SYS FLG ON PRESET
0410	00624	002215	FM02A	DEF	FM02		ORG READER FLG ON PRESET
0411	00625	002233	FM03A	DEF	FM03		ORG CLF ERROR
0412	00526	002255	FM04A	DEF	FM04		ORG STF ERROR
0413	00627	002277	FM05A	DEF	FM05		ORG PRESET INTERRUPT
0414	00630	002321	FM06A	DEF	FM06		ORG NO NORMAL INTERRUPT
0415	00631	002337	FM07A	DEF	FM07		ORG FUNCTIONAL TEST COMPLETED
0416	00632	000000	FRWD	OCT	0		ERROR WORD TO BE ANALYZED
0417	00633	000000	INTF	CCT	0		INTERRUPT FLAG (0 = NO INTERRUPT
0418	00634	000461	LASTD	DEF	LASTC		DEFINES LAST TEST CH ADDRESS.
0419	00635	000000	OCTL	OCT	0		CONTAINS TIME COUNT WORD FOR TYP
0420	00636	000000	SWCH	OCT	0		CH BUFFER FOR SW SELECTED CH
0421	00637	177746	N026	OCT	177746		-26
0422	00640	000636	CHIX	DEF	SWCH		DEFINES ORIGIN OF SINGLE SW CH B
0423	00641	177734	PCT0	OCT	177734		-36
0424	00642	000000	CHEC	OCT	0		CHARACTER ERROR COUNT(3 CONSECUT
0425	00643	000000	RESF	OCT	0		RESYNC FLAG
0426	00644	000000	HEAD	OCT	0		CONTAINS ADDRESS OF LOOK-AHEAD C
0427	00645	000000	REAR	OCT	0		CONTAINS ADDRESS OF LAST CH READ
0428	00646	000667	RESD	DEF	RESY		STARTING ADDRESS OF RESYNC MESSA
0429	00647	002355	TERM0	DEF	TERMM		TERMINATE MESSAGE ORIGIN
0430*	BIT ERROR MESSAE						
0431	00650	141311	BTER	OCT	141311		B I
0432	00651	152240		OCT	152240		T BLK
0433	00652	142722		OCT	142722		E R
0434	00653	151317		OCT	151317		R 0
0435	00654	151240		OCT	151240		R
0436*	REREAD ERROR MESSAGE						
0437	00655	151305	REFD	OCT	151305		R E
0438	00656	151305		OCT	151305		R E
0439	00657	140704		OCT	140704		A D
0440	00660	120303		OCT	120303		C
0441	00661	144240		OCT	144240		H
0442*	MISSED CH ERROR MESSAGE						
0443	00662	146711	MSCH	OCT	146711		M I
0444	00663	151723		OCT	151723		S S
0445	00664	142704		OCT	142704		E D
0446	00665	120303		OCT	120303		C
0447	00666	144240		OCT	144240		H
0448*							
0449*	RESYNC MESSAGE						
0450*							
0451	00667	106612	RESY	CCT	106612		CR LF
0452	00670	105322		CCT	105322		LF R
0453	00671	142723		CCT	142723		E S
0454	00672	154716		CCT	154716		Y N
0455	00673	141615		CCT	141615		C CR
0456	00674	105240		CCT	105240		LF BLK




```

0457 00675 000550 DBKM DEF DBKK          DEFINES START OF DELAYED READS
0458 00676 000003 BI03 OCT 3
0459 00677 177714 DE04 OCT 177714      -52
0460 00700 000703 PC11 DEF PRT1
0461 00701 000705 PC12 DEF PRT2
0462 00702 000713 PC13 DEF PRT3
0463*
0464* THIS IS THE DATA ERROR TYPE OUT TABLE. IF THIS IS A CHARACTER
0465* LOOP TEST ONLY THE DATA THROUGH PRT4 IS TYPED.
0466*
0467 00703 106612 PRT1 OCT 106612      CR,LF
0468 00704 143640          OCT 143640      6 BLK, THE NEXT 4 WDS ARE FOR GO
0469 00705 000000 PRT2 OCT 0
0470 00706 000000          OCT 0
0471 00707 000000          OCT 0
0472 00710 000000          OCT 0
0473 00711 106612          OCT 106612
0474 00712 141240          OCT 141240      8 BLK, START OF BAD DATA
0475 00713 000000 PRT3 OCT 0
0476 00714 000000          OCT 0
0477 00715 000000          OCT 0
0478 00716 000000          OCT 0
0479 00717 120240          OCT 120240      2 BLANKS FOLLOWING BAD DATA
0480 00720 000000 PRT4 OCT 0
0481 00721 120240          OCT 120240      2 BLKS FOLLOWING BLK #
0482 00722 000000 PRT5 OCT 0
0483 00723 120240          OCT 120240      2 BLKS FOLLOWING CH #
0484 00724 000000 PRT6 OCT 0
0485 00725 000000          OCT 0
0486 00726 120240          OCT 120240      2 BLKS FOLLOWING DELAY DATA
0487 00727 000000 PRT7 OCT 0          1ST ERROR WD
0488 00730 000000          OCT 0          2ND ERROR WD
0489 00731 000000          OCT 0          3RD ERROR WD
0490 00732 000000          OCT 0          4TH ERROR WD
0491 00733 000000          OCT 0          5TH ERROR ED
0492 00734 106612          OCT 106612      CR LF
0493 00735 000736 MSK1 DEF MSK1          START ADDRESS OF MASK TABLE
0494 00736 000200 MSK1 OCT 000200          MASK TABLE FOR 1 BIT MASK ON CH
0495 00737 000100          OCT 00100
0496 00740 000040          OCT 000040
0497 00741 000020          OCT 000020
0498 00742 000010          OCT 000010
0499 00743 000004          OCT 000004
0500 00744 000002          OCT 000002
0501 00745 000001          OCT 000001
0502 00746 000000 REFU OCT 0          CONTAINS READ OR PUNCH OPTION (1
0503 00747 000000 CHLU OCT 0          CONTAINS SPECIA CH OPTION (1=CH
0504 00750 024751 BAKE JMP MA00          GO TO PROGRAM START.
0505*
0506* START OF READER MAIN LINE.
0507*
0508 00751 102501 MA00 LIA 01          LOAD SW REG.
0509 00752 010745          AND MSK1+7      MASK FOR BIT ZERO (READ/PUNCH).
0510 00753 070746          STA REPU          STORE IN OPTION TABLE.
0511 00754 102501          LIA 01
0512 00755 010532          AND SEL2      MASK FOR BIT 3 (CH LOOP).
0513 00756 070747          STA CHLU          STORE IN OPTION TABLE.

```

0514	00757	102501		LIA 01	
0515	00760	010736		AND MSK1	MASK FOR INTERRUPT OPTION
0516	00761	070633		STA INTF	SET FLAG AS INDICATED BY THE SW1
0517	00762	102501		LIA 01	LOAD SW REGISTER
0518	00763	001700		ALF	RIGHT JUSTIFY MS CH OF SW REG
0519	00764	001700		ALF	
0520	00765	010476		AND MSMK	MASK OFF LS CH OF SW REG.
0521	00766	070636		STA SWCH	STORE SELECTED CH IN CH BUFFER
0522	00767	024770		JMP M000	
0523	00770	060565	M000	LDA DEL4	SET UP 4 PASS INDEX.
0524	00771	070612		STA DWK2	
0525	00772	061155		LIA JMP1	SET UP ORIGINAL DELAY OF 3 MS ON
0526	00773	071154		STA M060	
0527	00774	060746		LDA REPU	LOAD READ/PUNCH OPTION.
0528	00775	002002		SZA	WAS THE PUNCH SELECTED? (SW 1)
0529	00776	025000		JMP **2	YES
0530	00777	025051		JMP M010	NO
0531	01000	060564		LDA DEL3	SET THE BLK COUNT
0532	01001	070615		STA DWK5	
0533	01002	015034		JSB LDPN	PUNCH LEADER CHS
0534	01003	060747		LDA CHLU	LOAD CH LOOP OPTION.
0535	01004	002002		SZA	IS THE CH LOOP SELECTED? (SW 2)
0536	01005	025366		JMP CHP0	YES, GO PUNCH A TAPE
0537	01006	060537	M00A	LDA D001	SET THE PUNCH FLAG
0538	01007	070516		STA PUNF	
0539	01010	060562		LDA DE65	LOAD CH COUNT (-55) FOR CH OUTPUT
0540	01011	070621		STA DWK9	
0541	01012	060467		LDA DITC	LOAD THE ADDRESS INDEX
0542	01013	070620		STA DWK8	
0543	01014	015613		JSB EP00	PUNCH THE DATA BLOCK
0544	01015	015034		JSB LDPN	
0545	01016	034615		ISZ DWK5	
0546	01017	025006		JMP M00A	
0547	01020	002400	MHLT1	CLA	CLEAR PUNCHING FLAG
0548	01021	070516		STA PUNF	
0549	01022	025032		JMP MHLT	NORMAL PUNCHING, DON'T TYPE TERM
0550*					
0551*	TYPE TERMINATE MESSAGE				
0552*					
0553*	THERE WILL BE 20 ZERO CHS TYPED BEFORE THE TERMINATE				
0554*	MESSAGE TO SPACE PAST THE SPECIAL CH DATA. NO TERMINATE				
0555*	IS TYPED FOR NORMAL DATA PUNCHING. ONLY A HALT.				
0556*					
0557	01023	002400	M00C	CLA	CLEAR THE PUNCH FLAG SO THE COMP
0558	01024	070516		STA PUNF	MESSAGE WILL BE TYPED
0559	01025	060641		LDA PCH0	LOAD # CHS IN MESSAGE.
0560	01026	070621		STA DWK9	
0561	01027	060647		LDA TERM0	
0562	01030	070620		STA DWK8	
0563	01031	015613		JSB EP00	
0564	01032	102000	MHLT	HLT	
0565	01033	024751		JMP MA00	GO TO PROGRAM RESTART.
0566*					
0567*	THIS ROUTINE PUNCHES 15 LEADER CHARACTERS.				
0568*					
0569	01034	000000	LDFN	NCP	
0570	01035	060556		LIA DE17	SET UP LEADER INDEX (-15)

0571	01036	070616		STA DWK6	
0572	01037	060605	M02B	LDA DLDR	LOAD 1 WD PUNCH DATA (LEADER CH)
0573	01040	070515		STA PUNB	
0574	01041	060537		LDA D001	SET UP # LEADER CH'S (1)
0575	01042	070621		STA DWK9	
0576	01043	060604		LDA DLDC	LOAD STARTING ADDRESS OF LEADER
0577	01044	070620		STA DWK8	
0578	01045	015613		JSB EP00	PUNCH LEADER CH
0579	01046	034616		ISZ DWK6	IS THIS THE 15TH LEADER CH?
0580	01047	025037		JMP M00B	NOT 15TH LEADER CH, PUNCH ANOTHE
0581	01050	125034		JMP LDPN,I	15TH CH, EXIT THE ROUTINE.
0582	01051	000000	M010	NOP	
0583	01052	002400		CLA	CLEAR PUNCH ONLY FLAG
0584	01053	070516		STA PUNF	
0585	01054	060747		LDA CHLU	LOAD CH LOOP OPTION.
0586	01055	002002		SZA	IS THE CH LOOP SELECTED? (SW 2)
0587	01056	025405		JMP CHR0	YES, GO READ A TAPE
0588	01057	015774		JSB SY00	RESYNC TO LEADER
0589	01060	060465		LDA TCIC	SET UP INPUT IX TO ORIGIN
0590	01061	070466		STA TCIX	
0591	01062	060537	M01A	LDA D001	SET UP FOR NO DELAY BETWEEN READ
0592	01063	070567		STA DELC	
0593	01064	060466		LDA TCIX	SAVE THE INPUT INDEX
0594	01065	070603		STA DK09	
0595	01066	015303		JSB TR1D	READ 1 CH
0596	01067	060515		LDA PUNB	LOAD THE INPUT CH
0597	01070	050605		CPA DLDR	IS THIS LEADER
0598	01071	025075		JMP M01B	LEADER, CONT LOOP
0599	01072	060564		LDA DEL3	SET UP 3 CH LOOP
0600	01073	070611		STA DWK1	
0601	01074	025100		JMP M020	START DATA INPUT
0602	01075	060603	M01B	LDA DK09	RESTORE THE INPUT INDEX
0603	01076	070466		STA TCIX	
0604	01077	025062		JMP M01A	READ NEXT CH FOR LEADER TEST
0605	01100	060546	M020	LDA D010	SET UP 10 MS DPLAY AFTER EACH RE
0606	01101	070567		STA DELC	
0607	01102	015303		JSB TR1D	READ 1 CH
0608	01103	034611		ISZ DWK1	IS THIS THE 3RD CH?
0609	01104	025100		JMP M020	NO
0610	01105	060566		LDA DEL7	SET UP 7 CH INDEX
0611	01106	070611		STA DWK1	
0612	01107	060537	M030	LDA D001	SET UP NO DELAY
0613	01110	070567		STA DELC	
0614	01111	015303		JSB TR1D	READ A CH
0615	01112	034611		ISZ DWK1	IS THIS THE 7TH CH
0616	01113	025107		JMP M030	NO
0617	01114	060546		LDA D010	SET UP 10 MS ELAY (STOP)
0618	01115	070567		STA DELC	
0619	01116	015303		JSB TR1D	READ 8TH CH
0620	01117	060546		LDA D010	SET UP 10 MS DELAY (STOP)
0621	01120	070567		STA DELC	
0622	01121	015303		JSB TR1D	READ A CHARACTER
0623	01122	060556		LDA DE17	SET UP TO READ 15 CH'S
0624	01123	070611		STA DWK1	
0625	01124	060537		LDA D001	SET NO DELAY
0626	01125	070567		STA DELC	
0627	01126	015355		JSB TR4D	READ FOUR CHARACTERS

0628	01127	015303	M040	JSB TR1D	READ 1 CH
0629	01130	034611		ISZ DWK1	15TH CH?
0630	01131	025127		JMP M040	NO
0631	01132	060546		LIA D010	SET UP 10MS DELAY (STOP)
0632	01133	070567		STA DELC	
0633	01134	015303		JSB TR1D	READ 1 CH
0634	01135	015303		JSB TR1D	READ NEXT CH AND STOP
0635	01136	060563		LDA DEL2	SET UP FOR 2 PASS COUNT
0636	01137	070611		STA DWK1	
0637	01140	060537	M050	LIA D001	SET UP NO DELAY
0638	01141	070567		STA DELC	
0639	01142	015355		JSB TR4D	READ FOUR CHARACTERS
0640	01143	060546		LDA D010	SET UP STOP DELAY (10 MS)
0641	01144	070567		STA DELC	
0642	01145	015303		JSB TR1D	READ A CH.
0643	01146	034611		ISZ DWK1	IS THIS THE 2ND PASS?
0644	01147	025140		JMP M050	NO
0645	01150	015303		JSB TR1D	READ A SINGLE CH AND STOP
0646	01151	015303		JSB TR1D	READ A SINGLE CH AND STOP
0647	01152	060564		LIA DEL3	SET UP FOR 3, 3CH BLKS
0648	01153	070614		STA DWK4	
0649	01154	000000	M060	NCP	
0650	01155	025161	JMF1	JMP M061	
0651	01156	025166	JMF2	JMP M062	
0652	01157	025173	JMF3	JMP M063	
0653	01160	025200	JMF4	JMP M064	
0654	01161	060540	M061	LDA D003	SET UP .5MS DELAY
0655	01162	070613		STA DWK3	
0656	01163	061156		LDA JMP2	SET UP FOR 2ND PASS
0657	01164	071154		STA M060	
0658	01165	025204		JMP M070	
0659	01166	060541	M062	LIA D004	SET UP .75 MS DELAY
0660	01167	070613		STA DWK3	
0661	01170	061157		LDA JMP3	SET UP FOR 3RD PASS
0662	01171	071154		STA M060	
0663	01172	025204		JMP M070	
0664	01173	060542	M063	LIA D005	SET UP 1. MS DELAY
0665	01174	070613		STA DWK3	
0666	01175	061160		LDA JMP4	SET UP FOR 4TH PASS
0667	01176	071154		STA M060	
0668	01177	025204		JMP M070	
0669	01200	060543	M064	LIA D006	SET UP 1.25MS DELAY
0670	01201	070613		STA DWK3	
0671	01202	061155		LDA JMP1	SET UP FOR 1ST PASS
0672	01203	071154		STA M060	
0673	01204	060613	M070	LDA DWK3	SET UP SELECTED DELAY
0674	01205	070567		STA DELC	
0675	01206	060563		LIA DEL2	SET UP FOR 2 PASSES
0676	01207	070611		STA DWK1	
0677	01210	015303		JSB TR1D	READ 1 CH
0678	01211	034611		ISZ DWK1	
0679	01212	025210		JMP *-2	READNEXT CH
0680	01213	060546		LIA D010	SET UP STOP DELAY
0681	01214	070567		STA DELC	
0682	01215	015303		JSB TR1D	READ 3RD CH
0683	01216	034614		ISZ DWK4	IS THIS THE 3RD3 CH BLK?
0684	01217	025204		JMP M070	NO, PREPARE DELAYS FOR 2ND 3CH B



```

0685 01220 034612      ISZ DWK2      IS THIS THE 4TH TAPE TEST?
0686 01221 025062      JMP M01A     NO, PREPARE FOR 2ND DATA GROUP T
0001*
0002* THIS IS SOURCE TAPE 2 OF 2 FOR THE HIGH SPEED READER
0003* TEST PROGRAM.
0004*
0005*
0006 01222 060465      E020 LDA TCIC      INITIALIZE DATA INPUT INDEX
0007 01223 070466      STA TCIX
0008 01224 002400      CLA
0009 01225 070642      STA CHEC      CLEAR CH ERROR COUNTER
0010 01226 070643      STA RESF      CLEAR RESYNC FLAG
0011 01227 060511      LDA ASCC      LOAD ASCII CONSTANT
0012 01230 070613      STA DWK3
0013 01231 060565      LDA DEL4      SET BLOCK COUNT IX
0014 01232 070612      STA DWK2
0015 01233 060467      E02A LDA DITC      INITIALIZE TEST TABLE IX
0016 01234 070470      STA DITX
0017 01235 060634      LDA LASTD     LOAD LOOK BEHIND DDSSESS GOR MAST
0018 01236 070645      STA REAR
0019 01237 060471      LDA DTBS      INITIALIZE BLK # IX
0020 01240 070472      STA DTBX
0021 01241 060473      LDA DTCS      INITIALIZE CH # IX
0022 01242 070474      STA DTCX
0023 01243 060562      LDA DE65      SET UP IX FOR CH ANALYSIS (-55)
0024 01244 070611      STA DWK1
0025 01245 160466      E010 LDA TCIX,I     LOAD READ IN CH
0026 01246 150470      CPA DITX,I    IS THIS THE CORRECT CH?
0027 01247 025252      JMP E01A      YES ITS OK, GO TOM NEXT CH
0028 01250 015665      JSB LK00      DO LOOK- AROUND AND ERROR PRINT
0029 01251 025254      JMP E01B
0030 01252 002400      E01A CLA
0031 01253 070642      STA CHEC      CLEAR ERROR COUNT
0032 01254 034611      E01B ISZ DWK1      IS TIS THE LAST CH?
0033 01255 025257      JMP *+2       NO
0034 01256 025267      JMP E030      YES
0035 01257 060470      LDA DITX      SAVE THIS CH ADDRESS FOR REFERE
0036 01260 070645      STA REAR     REREAD TEST.
0037 01261 034466      ISZ TCIX      INCREMENT DATA INPUT BUFFER INDE
0038 01262 034470      ISZ DITX      INCREMENT TEST INDEX
0039 01263 034472      ISZ DTBX      INCREMENT BLK # INDEX
0040 01264 034474      ISZ DTCX      INCREMENT CH # INDEX
0041 01265 025245      JMP E010      GO TEST NEXT CH
0042 01266 025245      JMP E010
0043 01267 034612      E030 ISZ DWK2      IS THIS THE 4TH BLOCK TEST?
0044 01270 025272      JMP *+2       CONTINUE ERROR ANALYSIS
0045 01271 025301      JMP E040      TEST COMPLETED, PERFORM SW ANAL
0046 01272 060613      LDA DWK3
0047 01273 002004      INA          INCREMENT DELAY INDEX BY 2 TO P
0048 01274 002004      INA          UP NEXT 2 WD DELAY DATA.
0049 01275 070613      STA DWK3
0050 01276 034466      ISZ TCIX      INCREMENT INPUT TEST TABLE IX
0051 01277 025233      JMP E00A
0052 01300 025233      JMP E00A
0053 01301 015432      E040 JSB SWA0      SWITCH ANALYSIS (PAUSE-TERMINATE
0054 01302 024770      JMP M000      NO TERMINATE, CONTINUE READER TE
0055 01303 000000      TRID NCP

```

```

0056 01304 102501      LIA 01          LOAD SW REGISTER
0057 01305 010531      AND SEL1       MASK FOR READ-NO-STOP
0058 01306 002002      SZA           IS THIS A STRAIGHT READ?
0059 01307 025311      JMP ++2       YES, DONT STOP ON CH
0060 01310 025313      JMP ++3       NO, STOP AS DIRECTED BY MAIN LI
0061 01311 060537      LDA D001      SET TO NOT STOP ON CH.
0062 01312 070567      STA DELC
0063 01313 060567      LIA DELC      LOAD DELAY FACTOR
0064 01314 070574      STA DIXI
0065 01315 103700      TR1DA STC 00B,C SET CONTROL TO READ HSTR
0066 01316 060633      LDA INTF
0067 01317 002002      SZA           IS THIS AN INTERRUPT READ?
0068 01320 025322      JMP ++2       YES
0069 01321 025330      JMP ++7       NO, CONTINUE PROCESSING
0070 01322 060345      LDA RINTA     SET INTERRUPT RETURN ADDRESS
0071 01323 170364      STA REDA,I
0072 01324 064537      LDB D001      SET B TO -1 TO INDICATE INTERRUPT
0073 01325 102100      STF 0
0074 01326 000000      NOP
0075 01327 025326      JMP --1       LOOP WAITING FOR INTERRUPT
0076 01330 061023      LDA M00C     PUT A HALT IN THE READER INTERRUPT
0077 01331 170364      STA REDA,I
0078 01332 102300      T1X1 SFS 00B IS A CH AVAILABLE ?
0079 01333 025332      JMP --1       DATA IS NOT AVAILABLE, LOOP ON
0080 01334 002400      T1X2 CLA
0081 01335 102500      T1X2A LIA 00B LOAD INPUT CH FROM READER
0082 01336 170466      STA TCIX,I   STORE THE CH IN THE TEST TABLE
0083 01337 070515      STA PUNB
0084 01340 034574      ISZ DIXI     IS THERE MORE DELAY?
0085 01341 025340      JMP --1
0086 01342 060747      LDA CHLU     LOAD H LOOP OPTION.
0087 01343 002002      SZA
0088 01344 125303      JMP TR1D,I   CH LOOP, DONT INCREMENT INPUT
0089 01345 060466      LEA TCIX
0090 01346 002004      INA         INCREMENT TEST CH INDEX
0091 01347 070466      STA TCIX
0092 01350 125303      JMP TR1D,I
0093*
0094* THIS IS THE INTERRUPT RETURN FROM THE NORMAL TEST INTERRUPT.
0095*
0096 01351 000000      RINT NOP
0097 01352 103100      CLF 0        TURN OFF SYSTEM INTERRUPT
0098 01353 006400      CLB         CLEAR TO INDICATE NO INTERRUPT L
0099 01354 025332      JMP T1X1     GO DO DATA PROCESSING.
0100*
0101* THIS ROUTINE READS FOUR CHARACTERS, NO STOP.
0102*
0103 01355 000000      TR4D NOP
0104 01356 060537      LDA D001     SET FOR NO READ DELAY.
0105 01357 070567      STA DELC
0106 01360 060565      LDA DEL4     SET TO READ 4 CHS.
0107 01361 070614      STA DWK4
0108 01362 015303      T4X1 JSB TR1D READ 1 CH
0109 01363 034614      ISZ DWK4     WAS THIS THE 4TH CH?
0110 01364 025362      JMP T4X1     NO, READ ANOTHER CH.
0111 01365 125355      JMP TR4D,I   YES, EXIT THE ROUTINE.
0112*

```

```

0113* PUNCH SINGLE CH FROM DESIGNATED SW REG CH.
0114*
0115 01366 060537 CHF0 LDA D001
0116 01367 070516 STA PUNF SET PUNCH FLAG
0117 01370 070621 STA DWK9 SET TO OUTPUT 1 CH
0118 01371 060636 LDA SWCH LOAD OUTPUT CH
0119 01372 070515 STA PUNB
0120 01373 060604 LDA DLDC LOAD OUTPUT DATA ORIGIN (PUNB)
0121 01374 070620 STA D*WK8
0122 01375 015613 JSB EP00 PUNCH A CH
0123 01376 102501 LIA 1 FETCH SWITCH REGISTER
0124 01377 001323 RAR,RAR MOVE SWITCH 3 TO LEAST BIT
0125 01400 001310 RAR,SLA AND CHECK FOR HANG
0126 01401 025376 JMP *-3 SWITCH 3, SO HANG
0127*
0128 01402 001310 RAR,SLA CHECK FOR SWITCH 4 TERMINATE
0129 01403 025020 JMP MHLT1 SW4 SET,TERMINATE BUT NO MESSAGE
0130 01404 025366 JMP CHF0
0131*
0132* READ SINGLE CH FOR TEST AGAINST SW REG CH
0133*
0134 01405 060640 CHF0 LDA CHIX SET SW CH ORIGIN TO SWCH (GOOD C
0135 01406 070470 STA DITX
0136 01407 060604 LDA DLDC SET DATA INPUT ORIGIN TO PUNB (R
0137 01410 070466 STA TCIX
0138 01411 060546 LDA D010 SET TO STOP ON CH
0139 01412 070567 STA DELC
0140 01413 015303 JSB TR1D READ A CH
0141 01414 060515 LDA PUNB
0142 01415 050636 CPA SWCH IS THE CH CORRECT
0143 01416 025430 JMP CHR1 YES, GO ANALYZE THE SW REGISTER
0144 01417 102501 LIA 01 NO, LOAD SW REG
0145 01420 010536 AND SEL6 MASK FOR SW 6--ERROR TYPE OUT BY
0146 01421 002002 SZA ERROR TYPE BYPASS?
0147 01422 025430 JMP CHR1 YES, GO ANALYZE SW REGISTER
0148 01423 060567 LDA DELC BLANK OUT EXTRA ERROR INFORMATI
0149 01424 070720 STA PRT4
0150 01425 070722 STA PRT5
0151 01426 070724 STA PRT6
0152 01427 015444 JSB ER00 TYPE ERRR DATA
0153 01430 015432 CHF1 JSB SWA0 ANALZE SW FOR HANG AND TERMINATE
0154 01431 025405 JMP CHR0 READ NEXT CH.
0155*
0156* THIS ROUTINE ANALYZES THE SW REGISTER FOR HANG AND TERMINATE
0157*
0158 01432 000000 SWA0 NCP
0159 01433 102501 SWA1 LIA 01 LOAD SW REG
0160 01434 010533 AND SEL3 MASK FOR HANG (SW 3)
0161 01435 002002 SZA IS THIS A HANG?
0162 01436 025433 JMP SWA1 RETEST SW REG FOR CONTINUED HANG
0163 01437 102501 LIA 01
0164 01440 010534 AND SEL4
0165 01441 002002 SZA IS THIS A TERMINATE?
0166 01442 025023 JMP M00C YES, RESTART (HALT THEN RESTART
0167 01443 125432 JMP SWA0,I NO, THEN DO NOT TERMINATE
0168 01444 000000 ER00 NCP
0169 01445 160470 LDA DITX,I LOAD THE GOOD CH

```

0170	01446	070622	STA ERWD	
0171	01447	060701	LCA PCT2	LOAD OUTPUT INDEX
0172	01450	070614	STA DWK4	
0173	01451	060563	LDA DEL2	SET 2 PASS INDEX
0174	01452	070615	STA DWK5	
0175	01453	070616	STA DWK6	
0176	01454	060735	ER01 LDA MSKI	SET UP MASK INDEX
0177	01455	070621	STA DWK9	
0178	01456	060554	LDA DE08	SET 8 BIT INDEX
0179	01457	070617	STA DWK7	
0180	01460	060622	ER02 LDA ERWD	LOAD CH TO BE PRINTED
0181	01461	110621	AND DWK9,I	MASK OFF ALL BUT DESIRED BIT
0182	01462	002002	SZA	IS THE BIT A 0
0183	01463	025466	JMP ER03	NO, THE BIT IS A 1
0184	01464	060477	LCA ASC0	LOAD AN ASCII ZER CH
0185	01465	025467	JMP **2	
0186	01466	060500	ER03 LDA ASC1	LOAD AN ASCII ONE CH
0187	01467	034616	ISZ DWK6	IS THIS THE 2ND CH OF OUTPUT WD?
0188	01470	025472	JMP **2	NO
0189	01471	025503	JMP ER05	
0190	01472	010476	AND MSMK	MASK OFF MS CH
0191	01473	001700	ALF	MOVE LS CH TO MS CH POSITION
0192	01474	001700	ALF	
0193	01475	170614	STA DWK4,I	STORE THE MS HALF OF DATA IN PRT
0194	01476	025512	JMP ER07	GO TEST FOR 8TH BIT
0195	01477	060621	ER04 LDA DWK9	
0196	01500	002004	INA	INCREMENT MASK INDEX FOR NEXT CH
0197	01501	070621	STA DWK9	
0198	01502	025460	JMP ER02	ANALYZE NEXT CH.
0199	01503	130614	ER05 ICR DWK4,I	OR THE TWO CH'S TOGETHER
0200	01504	170614	STA DWK4,I	STORE WORD IN PRINT BUFFER
0201	01505	060563	LDA DEL2	RESTORE CH IX TO -2
0202	01506	070616	STA DWK6	
0203	01507	060614	LDA DWK4	
0204	01510	002004	INA	INCREMENT PRINT TABLE INDEX
0205	01511	070614	STA DWK4	
0206	01512	034617	ER07 ISZ DWK7	IS THIS THE 8TH BIT OF THE CH?
0207	01513	025477	JMP ER04	NO
0208	01514	034615	ISZ DWK5	IS THIS THE 2ND WORD PASS
0209	01515	025517	JMP **2	NO, PREPARE FOR 2ND PASS
0210	01516	025524	JMP ER06	YES, COMPLETE ERROR PRINT OUT (C
0211	01517	160466	LDA TCIX,I	LOAD THE ERROR CH
0212	01520	070622	STA ERWD	
0213	01521	060702	LDA PCT3	LOAD ERROR LOCATION IN PRT TABLE
0214	01522	070614	STA DWK4	
0215	01523	025454	JMP ER01	
0216	01524	060700	ER06 LDA PCT1	LOAD PRINT TABLE STARTING ADDRESS
0217	01525	070620	STA DWK8	
0218*				
0219*	THIS SECTION OF TE ROUTINE PUTS THE DELAY, CH #, AND CH			
0220*	LOCATION IN THE PRINT LINE.			
0221*				
0222	01526	060747	LDA CHLU	LOAD CH LOP OPTION
0223	01527	002002	SZA	IS THIS A CH LOOP?
0224	01530	025606	JMP ER15	CH LOOP, MODIFY FOR SHORT ERROR
0225	01531	060677	LDA DE64	SET UP TO TYPE 52 CHARACTERS.
0226	01532	070621	STA DWK9	



0227	01533	060472	LDA DTBX	LOAD TEST TABLE INDEXING ADDRESS
0228	01534	003000	CMA	COMPLEMENT
0229	01535	040550	ADA DBKK	
0230	01536	002020	SSA	IS THIS A DELAYED READ?
0231	01537	025543	JMP ER09	YES, THIS IS A DELAYED READ
0232	01540	025576	JMP ER13	NO, THIS IS A NORMAL READ
0233	01541	015613	ER08 JSB EP00	TYPE ERROR DATA
0234	01542	125444	JMP ER00,I	EXIT THE ROUTINE
0235	01543	060612	ER09 LDA DWK2	LOAD DELAY NDEX
0236	01544	050565	CPA DEL4	IS THIS THE 1ST PASS (DWK3 =-4)
0237	01545	025557	JMP ER10	YES
0238	01546	050364	CPA DEL3	NO, IS THIS THE 2ND PASS (DWK3=
0239	01547	025564	JMP ER11	YES
0240	01550	050563	CPA DEL2	NO, IS THIS THE 3RD PASS (DWK3=
0241	01551	025571	JMP ER12	YES
0242	01552	060507	LDA ASCA+6	NO, ASSUME 4TH PASS, LOAD 1.25
0243	01553	070724	STA PRT6	
0244	01554	060510	LDA ASCA+7	
0245	01555	070725	STA PRT6+1	
0246	01556	025601	JMP ER14	
0247	01557	060501	ER10 LIA ASCA	LOAD 0.50 MS DELAY FOR 1ST PASS.
0248	01560	070724	STA PRT6	
0249	01561	060502	LDA ASCA+1	
0250	01562	070725	STA PRT6+1	
0251	01563	025601	JMP ER14	
0252	01564	060503	ER11 LIA ASCA+2	LOAD 0.75 MS DELAY FOR 2ND PASS
0253	01565	070724	STA PRT6	
0254	01566	060504	LDA ASCA+3	
0255	01567	070725	STA PRT6+1	
0256	01570	025601	JMP ER14	
0257	01571	060505	ER12 LIA ASCA+4	LOAD 1.00 MS DELAY FOR 3RD PASS
0258	01572	070724	STA PRT6	
0259	01573	060506	LDA ASCA+5	
0260	01574	070725	STA PRT6+1	
0261	01575	025601	JMP ER14	
0262	01576	060570	ER13 LIA DFBK	SET BLANKS IN DELAY
0263	01577	070724	STA PRT6	
0264	01600	070725	STA PRT6+1	
0265	01601	160474	ER14 LIA DTGX,I	LOAD CH # FROM TABLE
0266	01602	070720	STA PRT4	
0267	01603	160472	LDA DTBX,I	LOAD 1ST OR LAST FROM TABLE
0268	01604	070722	STA PRT5	
0269	01605	025541	JMP ER08	
0270	01606	060560	ER15 LDA DE34	LOAD # CHS FOR SHORT ERROR PRINT
0271	01607	070621	STA DWK9	ON CHARACTER LOOP OPTION. (28 C
0272	01610	060703	LDA PRT1	LOAD CR AND LF FOR SHORT PRINT.
0273	01611	070720	STA PRT4	
0274	01612	025541	JMP ER08	
0275	01613	000000	EP00 NCP	
0276	01614	060516	EP0A LIA PUNF	LOAD THE PUNCH FLAG
0277	01615	002002	SZA	IS THIS A PUNCH OUTPUT
0278	01616	025622	JMP EP01	YES
0279	01617	002400	CLA	CLEAR LS FLAG
0280	01620	070530	STA IFLG	
0281	01621	025627	JMP EP02	
0282	01622	060563	EP01 LDA DEL2	
0283	01623	070530	STA IFLG	SET FLAG INDICATING LS CH BEING

0284	01624	160620	LDA DWK8,I	LOAD THE WORD TO BE OUTPUT
0285	01625	010476	AND MSMK	MASK OFF MS CH
0286	01626	025633	JMP EP03	GO COMPLETE LS CH OUTPUT
0287	01627	160620	EP02 LIA DWK8,I	LOAD DATA WD TO PREPARE MS
0288	01630	001700	ALF	SHIFT MS TO LS CH
0289	01631	001700	ALF	
0290	01632	010476	AND MSMK	MASK OFF OLD LS CH (CURRENT MS)
0291	01633	000000	EP03 NOP	LOCATION FOR SER/BUF JMP INST.
0292	01634	001000	ALS	
0293	01635	040547	ADA DADD	ADD IN 2 TRAILING ONES
0294	01636	070617	STA DWK7	
0295	01637	060555	LDA DE11	LOAD SHIFT IX (-11)
0296	01640	070577	STA DK05	
0297	01641	060617	LDA DWK7	LOAD THE OUTPUT DATA CH
0298	01642	102700	EP03A STC 00B	SET ASR CONTROL
0299	01643	102300	EP04 SFS 00B	WAIT FOR I/O FLAG
0300	01644	025643	JMP EP04	
0301	01645	103600	EP04A OTA 00B,C	OUTPUT THE BIT
0302	01646	001300	RAR	MOVE NEXT BIT FOR OUTPUT
0303	01647	034577	ISZ DK05	IS THIS THE LAST BIT
0304	01650	025643	JMP EP04	NO, CONTINUE OUTPUT
0305	01651	106700	EP04B CLC 00B	CLEAR TTY CONTROL
0306	01652	034621	ISZ DWK9	IS THIS THE LAST CH FOR OUTPUT?
0307	01653	025655	JMP **2	
0308	01654	125613	JMP EP00,I	EXIT THE ROUTINE
0309	01655	060530	LDA IFLG	
0310	01656	002002	SZA	IS THIS THE MS CH
0311	01657	025661	JMP **2	YES
0312	01660	025622	JMP EP01	MS CH JUST OUTPUT, NOW OUTPUT LS
0313	01661	060620	LDA DWK8	
0314	01662	002004	INA	INCREMENT DATA TABLE INDEX
0315	01663	070620	STA DWK8	
0316	01664	025614	JMP EP0A	
0317*	THIS ROUTINE PROVIDES DETAILED ERROR ANALYSIS.			
0318*	LOOK-AHEAD			
0319*	LOOK-BEHIND			
0320*	SEQUENTIAL BIT ERRORS			
0321*	RESYNC			
0322*				
0323	01665	000000	LK00 NOP	
0324	01666	060470	LDA DITX	INCREMENT TEST TABLE IX FOR LOOK
0325	01667	002004	INA	
0326	01670	070644	STA HEAD	
0327	01671	060611	LDA DWK1	
0328	01672	050537	CPA D001	IS THIS THE LAST CH OF BLOCK?
0329	01673	025677	JMP LK01	YES THIS IS THE LAST DATA CH, LO
0330	01674	160644	LDA HEAD,I	NOT LAST CH, LOOK AHEAD AND BEHI
0331	01675	150466	CPA TCIX,I	IS THIS THE SAME AS THE NEXT CH?
0332	01676	025717	JMP LK04	YES, ASSUME A CH WAS SKIPPED.
0333	01677	160645	LK01 LDA REAR,I	PREPARE TO LOOK BEHIND.
0334	01700	150466	CPA TCIX,I	IS THIS THE SAME AS THE LAST CH?
0335	01701	025732	JMP LK05	YES, ASSUME A RE-READ.
0336	01702	025703	JMP LK03	ASSUME BIT ERROR ONLY.
0337*				
0338*	THIS SECTION LOADS THE "BIT ERROR" FOR ERROR TYPE			
0339*				
0340	01703	060650	LK03 LIA BTER	LOAD THE BIT ERROR MESSAGE TO PR

0341	01704	070727	STA	PRT7	
0342	01705	060651	LDA	BTER+1	
0343	01706	070730	STA	PRT7+1	
0344	01707	060652	LDA	BTER+2	
0345	01710	070731	STA	PRT7+2	
0346	01711	060653	LDA	BTER+3	
0347	01712	070732	STA	PRT7+3	
0348	01713	060654	LDA	BTER+4	
0349	01714	070733	STA	PRT7+4	
0350	01715	034642	ISZ	CHEC	INCREMENT BIT ERROR COUNT
0351	01716	025747	JMP	LK07	GO TYPE ERROR MESSAGE
0352	01717	060662	LK04 LDA	MSCH	LOAD "MISSED CH" ERROR MESSAGE
0353	01720	070727	STA	PRT7	
0354	01721	060663	LDA	MSCH+1	
0355	01722	070730	STA	PRT7+1	
0356	01723	060664	LDA	MSCH+2	
0357	01724	070731	STA	PRT7+2	
0358	01725	060665	LDA	MSCH+3	
0359	01726	070732	STA	PRT7+3	
0360	01727	060666	LDA	MSCH+4	
0361	01730	070733	STA	PRT7+4	
0362	01731	025744	JMP	LK06	
0363	01732	060655	LK05 LDA	RERD	
0364	01733	070727	STA	PRT7	
0365	01734	060656	LDA	RERD+1	
0366	01735	070730	STA	PRT7+1	
0367	01736	060657	LDA	RERD+2	
0368	01737	070731	STA	PRT7+2	
0369	01740	060660	LDA	RERD+3	
0370	01741	070732	STA	PRT7+3	
0371	01742	060661	LDA	RERD+4	
0372	01743	070733	STA	PRT7+4	
0373	01744	060537	LK06 LDA	D001	SET RESYNC FLAG
0374	01745	070643	STA	RESF	
0375	01746	025747	JMP	LK07	GO TYPE ERROR MESSAGE
0376	01747	015444	LK07 JSB	ER00	GO ANALYZE THE ERROR DATA FOR PR
0377	01750	060642	LDA	CHEC	
0378	01751	050676	CPA	BI03	IS THIS THE 3RD CONSECUTIVE CHA
0379	01752	025756	JMP	LK08	YES, 3RD CONSECUTIVE CH ERROR.
0380	01753	060643	LDA	RESF	
0381	01754	050605	CPA	DLDR	IS THE RESYNC FLAG ON (DLDR IS A
0382	01755	125665	JMP	LK00,I	RESYNC IS OFF, EXIT THE ROUTINE
0383	01756	060646	LK08 LDA	RESD	LOAD STARTING ADDRESS OF RESYNC
0384	01757	070620	STA	DWK8	
0385	01760	060565	LDA	DE11	LOAD # CH'S IN RESYNC MESSAGE.
0386	01761	070621	STA	DWK9	
0387	01762	002400	CLA		
0388	01763	070516	STA	PUNF	CLEAR PUNCH FLAG TO OUTPUT COMP
0389	01764	070643	STA	RESF	CLEAR RESYNC FLAG.
0390	01765	015613	JSB	EP00	TYPE RESYNC MESSAGE.
0391*					
0392*	THIS PORTION OF THE ROUTINE CHECKS FOR HANG ON ERROR-RESYNC				
0393*	SW 5 ON = HANG ON ERROR, CLEAR TO CONTINUE				
0394*					
0395	01766	102501	LIA	01	LOAD SW REGISTER
0396	01767	010535	AND	SEL5	MASK FOR SW 5 (BIT 6)
0397	01770	002002	SZA		IS THE SW ON ?

```

0398 01771 025766      JMP *-3          YES, LOOP
0399 01772 015432      JSB SWA0        SWITCH ANALYSIS
0400 01773 024770      JMP M000        RESTART THE PROGRAM (RESYNC)
0401*
0402*   THIS ROUTINE SYNCs TO LEADER, TEST FOR 3 LEADER CHs.
0403*
0404 01774 000000      SY00 NCP
0405 01775 060546      SY01 LDA D010   SET DELAY TO STOP ON CH
0406 01776 070567      STA DELC
0407 01777 015303      JSB TR1D        READ A CHARACTER
0408 02000 015432      JSB SWA0        SWITCH ANALYSIS (PAUSE=TERMINATE
0409 02001 060465      LDA TCIC        RESTORE INPUT ORIGIN INDEX
0410 02002 070466      STA TCIX
0411 02003 060515      LDA PUNB
0412 02004 002002      SZA             IS THIS A LEADER CH?
0413 02005 025775      JMP SY01        NO, READ ANOTHER CH
0414 02006 015303      JSB TR1D        YES
0415 02007 060515      LDA PUNB
0416 02010 002002      SZA             IS THIS THE 2ND CONSECUTIVE LEA
0417 02011 025775      JMP SY01        NO, RESTART SYNC OPERATION
0418 02012 015303      JSB TR1D        YES, READ NEXT CH
0419 02013 060515      LDA PUNB
0420 02014 002002      SZA             IS THIS THE 3RD CONSECUTIVE LEA
0421 02015 025775      JMP SY01        NO, RESTART SYNC OPERATION
0422 02016 125774      JMP SY00,I     3 CONSECUTIVE LEADER CHs. RESYN
0423*
0424*   THIS TABLE CONTAINS THE CHARACTER SEQUENCE #'S FOR
0425*   EACH TAPE BLOCK. THESE #'S RUN FROM 1 THRU 55.
0426*
0427 02017 020061      DTCN  ASC 20, 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 2
02020 020062
02021 020063
02022 020064
02023 020065
02024 020066
02025 020067
02026 020070
02027 020071
02030 030460
02031 030461
02032 030462
02033 030463
02034 030464
02035 030465
02036 030466
02037 030467
02040 030470
02041 030471
02042 031060
0428 02043 031061      ASC 20, 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 4
02044 031062
02045 031063
02046 031064
02047 031065
02050 031066
02051 031067
02052 031070

```

02053 031071
 02054 031460
 02055 031461
 02056 031462
 02057 031463
 02060 031464
 02061 031465
 02062 031466
 02063 031467
 02064 031470
 02065 031471
 02066 032060
 02067 032061
 02070 032062
 02071 032063
 02072 032064
 02073 032065
 02074 032066
 02075 032067
 02076 032070
 02077 032071
 02100 032460
 02101 032461
 02102 032462
 02103 032463
 02104 032464
 02105 032465
 02106 030060

0429

ASC 16,41424344454647484950515253545500

0430*

0431* THIS TABLE CONTAINS THE 1ST AND LAST CH DESIGNATION
 0432* FOR EACH TEST DATA BLOCK.

0433*

0434 02107 051503 DTEN ASC 20,SCSCSCSCFC020304050607LCSCFC02030405060

02110 051503
 02111 051503
 02112 051503
 02113 043103
 02114 030062
 02115 030063
 02116 030064
 02117 030065
 02120 030066
 02121 030067
 02122 046103
 02123 051503
 02124 043103
 02125 030062
 02126 030063
 02127 030064
 02130 030065
 02131 030066
 02132 030067

0435

ASC 20,080910111213141516171819LCSCFC020304LCF

02133 030070
 02134 030071
 02135 030460
 02136 030461
 02137 030462



```

02140 030463
02141 030464
02142 030465
02143 030466
02144 030467
02145 030470
02146 030471
02147 046103
02150 051503
02151 043103
02152 030062
02153 030063
02154 030064
02155 046103
02156 043103
0436 02157 030062      ASC 16,020304LCSCSCFC02LCFC02LCFC02LC00
02160 030063
02161 030064
02162 046103
02163 051503
02164 051503
02165 043103
02166 030062
02167 046103
02170 043103
02171 030062
02172 046103
02173 043103
02174 030062
02175 046103
02176 030060
0437*
0438*   SYSTEM FLAG ERFOR CN PRESET
0439*
0440 02177 106612   FM01  CCT 106612
0441 02200 051531   ASC 12,SYSTEM FLAG ON - PRESET
02201 051524
02202 042515
02203 020106
02204 046101
02205 043440
02206 047516
02207 020055
02210 020120
02211 051105
02212 051505
02213 052040
0442 02214 106612   CCT 106612
0443*
0444*   READER FLAG ERFOR CN PRESET
0445*
0446 02215 106612   FM02  CCT 106612
0447 02216 051105   ASC 12,READER FLAG OFF - PRESET
02217 040504
02220 042522
02221 020106
02222 046101

```

	02223	043440		
	02224	047506		
	02225	043040		
	02226	026440		
	02227	050122		
	02230	042523		
	02231	042524		
0448	02232	106612	CCT	106612
0449*				
0450*	READER CLF ERRCR			
0451*				
0452	02233	106612	FM03	CCT 106612
0453	02234	051105		ASC 16,READER CLF ERROR (CLF OR SFC)
	02235	040504		
	02236	042522		
	02237	020103		
	02240	046106		
	02241	020105		
	02242	051122		
	02243	047522		
	02244	020050		
	02245	041514		
	02246	043040		
	02247	047522		
	02250	020123		
	02251	043103		
	02252	024440		
	02253	020040		
0454	02254	106612	CCT	106612
0455*				
0456*	READER STF ERRCR			
0457*				
0458	02255	106612	FM04	CCT 106612
0459	02256	051105		ASC 16,READER STF ERROR (STF OR SFS)
	02257	040504		
	02260	042522		
	02261	020123		
	02262	052106		
	02263	020105		
	02264	051122		
	02265	047522		
	02266	020050		
	02267	051524		
	02270	043040		
	02271	047522		
	02272	020123		
	02273	043123		
	02274	024440		
	02275	020040		
0460	02276	106612	CCT	106612
0461*				
0462*	PRESET INTERRUPT ERROR			
0463*				
0464	02277	106612	FM05	CCT 106612
0465	02300	044516		ASC 16,INTERRUPT ON PRESET (CONTROL)
	02301	052105		
	02302	051122		

```

02303 052520
02304 052040
02305 047516
02306 020120
02307 051105
02310 051505
02311 052040
02312 024103
02313 047516
02314 052122
02315 047514
02316 024440
02317 020040
0466 02320 106612      CCT 106612
0467*
0468*   NO NORMAL INTEFRUPT
0469*
0470 02321 105612      FM06  CCT 106612
0471 02322 047117      ASC 12,NO NORMAL INTERRUPT
02323 020116
02324 047522
02325 046501
02326 046040
02327 044516
02330 052105
02331 051122
02332 052520
02333 052040
02334 020040
02335 020040
0472 02336 106612      CCT 106612
0473*
0474*   FUNCTIONAL TEST COMPLETED
0475*
0476 02337 106612      FM07  CCT 106612
0477 02340 043125      ASC 12,FUNCTIONAL TEST COMPLETE
02341 047103
02342 052111
02343 047516
02344 040514
02345 020124
02346 042523
02347 052040
02350 041517
02351 046520
02352 046105
02353 052105
0478 02354 106612      CCT 106612
0479*
0480*   TERMINATE MESSAGE
0481*       36 CHARACTERS
0482*       20 LEADING ZEROS TO PRECEDE THE TERMINATE MESSAGE
0483*       WHEN THE SPECIAL CHARACTER IS BEING PUNCHED TO SEPERATE
0484*       THE CHARACTER DATA FROM THE TERMINATE MESSAGE PUNCHED.
0485*
0486*
0487 02355 020040      TERMM ASC 10,

```



```

02356 020040
02357 020040
02360 020040
02361 020040
02362 020040
02363 020040
02364 020040
02365 020040
02366 020040
0488 02367 106612      CCT 106612
0489 02370 026524      ASC 06,-TERMINATE-
02371 042522
02372 046511
02373 047101
02374 052105
02375 026440
0490 02376 106612      CCT 106612
0491 02377 000000      P001 BSS 10
0492 02411 000000      D11R BSS 340
0493*
0494*
0495*   OUTPUT ROUTINE FOR BUFFERED OUTPUT BOARD
0496*
0497*
0498 03135 077146      TOLT STB SAVB
0499 03136 067147      LDB OUT
0500 03137 106600      TOLT0 CTB 0      OUTPUT THE INSTRUCTION
0501 03140 102600      TOLT3 CTA 0      OUTPUT A REG.
0502 03141 103700      TOLT4 STC 0,C    SET CONTROL
0503 03142 102300      TOLT5 SFS 0      WAIT
0504 03143 027142      JMP *-1
0505 03144 067146      LDB SAVB        RESTORE B REG.
0506 03145 025651      JMP EP04B      RETURN
0507 03146 000000      SAVE NOP
0508 03147 130000      OUT CCT 130000
0509                      END M000
** NO ERRORS*

```